



**Ministry of Construction and
Urban Development
(MCUD)**

**National Development
Agency
(NDA)**



**Japan International
Cooperation Agency
(JICA)**

The Project for Formulation of National Comprehensive Development Plan

Final Report

December 2021

**RECS International Inc.
PADECO Co., Ltd.
Nippon Koei Co., Ltd.**

Currency equivalents (as of 20 May 2021):
MNT1.00=USD 0.00038
MNT1.00=JPY 0.04
Source: OANDA.COM (<http://www.oanda.com>)

Table of Contents

Executive summary	EX-1
Chapter 1 Introduction	1-1
1.1 Background.....	1-1
1.1.1 Project background	1-1
1.1.2 Project objectives and scope	1-2
1.1.3 Project implementation and management structure	1-2
1.2 Work Progress.....	1-4
1.2.1 Inception works.....	1-4
1.2.2 Analysis on existing conditions	1-4
1.2.3 Compilation of Progress Report.....	1-5
1.2.4 Preparation of first draft of the NCDP	1-5
1.2.5 Compilation of Interim Report 1.....	1-5
1.2.6 Revision of the NCDP.....	1-6
1.2.7 Preparation of DF/R1	1-6
1.2.8 Further revision of the NCDP, pilot projects formulation and implementation and promotion activities.....	1-7
1.2.9 Preparation of DF/R2	1-7
1.2.10 Coordination between the NCDP and the HSP and the RDP, pilot projects completion and elaboration on the NCDP	1-7
1.2.11 Extension period	1-8
1.3 Structure of F/R	1-9
Supplement to Chapter 1: Capacity Development	1-10
S1.1 Seminars.....	1-10
S1.2 Sub-working groups meetings	1-10
S1.3 Knowledge co-creation program in Japan	1-14
S1.4 GIS training.....	1-16
Chapter 2 Assessment of SDV2030 Performances and Review of Vision2050.....	2-1
2.1 Demographic Trend	2-1
2.1.1 Demographic trend in recent years	2-1
2.1.2 Demographic parameters	2-4
2.2 Macro Economic Performance	2-4
2.2.1 Historical trend.....	2-4
2.2.2 GDP by sector	2-8
2.2.3 Change in GDP structure.....	2-9
2.3 SDV2030 Performance and Vision2050 Targets.....	2-9
2.3.1 GDP and per capita GDP	2-9
2.3.2 Human development index	2-10
2.3.3 Life expectancy at birth.....	2-11
2.3.4 Poverty and income distribution	2-11
2.3.5 Global competitiveness	2-13
2.3.6 Ease of doing business	2-14
2.3.7 Environment.....	2-15
2.3.8 Share of population with social insurance.....	2-16
2.3.9 Health.....	2-16
2.3.10 Specially protected area	2-20
2.3.11 Tourism	2-20
2.3.12 Electricity supply	2-22
2.3.13 Challenges in economic development.....	2-22
2.3.14 Challenges in social development.....	2-24
2.3.15 Challenges in environmental management	2-24
2.4 Review of Vision2050 in Comparison with NCDP	2-24

2.4.1	Context of Vision2050 review with NCDP	2-24
2.4.2	Overview of Vision2050	2-25
2.4.3	Vision2050 with nine goals and 50 objectives	2-27
2.4.4	Programs and projects	2-34
Chapter 3	Development Paradigms, Vision, Objectives and Strategy	3-1
3.1	Development Paradigm Based on SDGs and SDV2030/Vision2050	3-1
3.1.1	Background	3-1
3.1.2	Procedure to establish Mongolian development paradigm	3-3
3.2	Development Models and Vision	3-22
3.2.1	Models for formulating development paradigms	3-22
3.2.2	Ideas and values for development vision	3-24
3.2.3	Development vision	3-25
3.3	Macro Development Objectives and Basic Strategy	3-28
3.3.1	Problem structure analysis	3-28
3.3.2	Macro development objectives and basic strategy	3-31
3.4	Development Objectives and Strategy for Economic Sector	3-32
3.4.1	Crop farming	3-32
3.4.2	Livestock farming	3-33
3.4.3	Mining	3-34
3.4.4	Manufacturing industry	3-35
3.4.5	Tourism	3-36
3.5	Development Objectives and Strategy for Infrastructure	3-37
3.5.1	Transport and logistic infrastructure	3-37
3.5.2	Power and heat supply	3-38
3.5.3	Digital transformation and ICT	3-38
3.5.4	Urban development	3-39
3.6	Development Objectives and Strategy for Environment	3-40
3.6.1	Environmental management	3-40
3.6.2	Social development	3-41
3.6.3	Water resources development and management	3-42
Chapter 4	Socio Economic Framework and Development Alternatives	4-1
4.1	Objectives and Methodology	4-1
4.2	Population and Labor Force Projections	4-2
4.2.1	Population projections	4-2
4.2.2	Labor force projections	4-3
4.2.3	Projections of Mongolian economy	4-4
4.3	Development Alternatives	4-8
4.3.1	Conditions for alternative definition	4-8
4.3.2	Definition of development alternatives	4-9
4.3.3	Labor force supply and demand balance	4-9
4.3.4	Evaluation of development alternatives	4-11
4.4	Recommended Development Alternative	4-12
4.4.1	Recommended development alternative	4-12
4.4.2	Elaboration of population and GDP targets for 2030	4-12
4.4.3	Population and GDP in 2040	4-15
4.4.4	Revision of the projection in view of COVID-19	4-17
Chapter 5	Spatial Structure for the National Comprehensive Development Plan (NCDP)	5-1
5.1	National Spatial Structure	5-1
5.1.1	National spatial planning system	5-1
5.1.2	Strategic approach to national spatial planning	5-1
5.1.3	Spatial plans in and links with China, Russia and Kazakhstan	5-3
5.2	Urban Hierarchy and Land Suitability for Urban Development	5-6
5.2.1	Urban hierarchy	5-6

5.2.2	Land suitability for new urban settlement.....	5-9
5.3	National Spatial Planning with Artery Network and Urban Hierarchy.....	5-10
5.3.1	Existing plans and studies related to national spatial planning.....	5-10
5.3.2	Proposed spatial structure with artery network.....	5-11
5.4	Indicative National Land Use Plan	5-20
5.4.1	Objectives and procedures of indicative national land use planning	5-20
5.4.2	Existing plans and studies related to national land use planning	5-21
5.4.3	Existing land use for national comprehensive development planning.....	5-30
5.4.4	Classification of pasture for sustainable use	5-33
5.4.5	Land suitability analysis for crop farming	5-35
5.4.6	Indicative land use plan of Mongolia.....	5-41
5.5	Spatial Analysis on Water Resources and Climatic Change	5-45
5.5.1	Water balance analysis	5-45
5.5.2	Water supply-demand gaps	5-49
5.5.3	Climate change analysis.....	5-52
5.5.4	Climate change impact assessment	5-53
5.5.5	Climate change impact on water balance.....	5-63
Supplement 1 to Chapter 5: Case studies of capital relocation		5-68
Supplement 2 to Chapter 5: Possible relocation of capital function in Mongolia.....		5-71
Chapter 6	Regional Development Vision and Strategy	6-1
6.1	New Regional Division.....	6-1
6.1.1	Rationale and conditions for regional division	6-1
6.1.2	Analysis on affinity between neighboring Aimags	6-2
6.1.3	Proposed regional division.....	6-9
6.1.4	Comparison of alternative regional divisions	6-12
6.2	Characterization of Regions.....	6-13
6.2.1	Main characteristics of each Region	6-13
6.2.2	Detailed characteristics by Region.....	6-14
6.3	Development Vision and Strategy by Region	6-20
6.3.1	Western Region	6-20
6.3.2	Khangai Region.....	6-21
6.3.3	Altai Region	6-24
6.3.4	Southern Region.....	6-25
6.3.5	Eastern Region	6-27
6.3.6	Capital Region.....	6-29
Chapter 7	Development Diagnosis by Aimag	7-1
7.1	Position and Procedure of Development Diagnosis.....	7-1
7.1.1	Position of development diagnosis in overall planning procedure.....	7-1
7.1.2	Procedure of Aimag development diagnosis.....	7-2
7.2	Development Diagnosis by Aimag in Western Region.....	7-3
7.2.1	Bayan-Ulgii.....	7-3
7.2.2	Uvs	7-8
7.2.3	Khovd.....	7-12
7.3	Development Diagnosis by Aimag in Khangai Region	7-16
7.3.1	Zavkhan.....	7-16
7.3.2	Khuvsgul	7-20
7.3.3	Arkhangai.....	7-23
7.3.4	Bulgan	7-27
7.3.5	Selenge.....	7-30
7.3.6	Darkhan-Uul.....	7-35
7.3.7	Orkhon	7-38
7.4	Development Diagnosis by Aimag in Altai Region	7-42
7.4.1	Govi-Altai	7-42

7.4.2	Bayankhongor.....	7-45
7.4.3	Uvurkhangai.....	7-48
7.5	Development Diagnosis by Aimag in Southern Region	7-53
7.5.1	Dundgovi.....	7-53
7.5.2	Govisumber.....	7-56
7.5.3	Dornogovi	7-59
7.5.4	Umnugovi.....	7-62
7.6	Development Diagnosis by Aimag in Eastern Region.....	7-65
7.6.1	Khentii.....	7-65
7.6.2	Sukhbaatar.....	7-69
7.6.3	Dornod	7-72
7.7	Development Diagnosis of Tuv Aimag in Capital Region.....	7-77
Chapter 8	Phased Development Plan with Projects and Institutional Measures	8-1
8.1	Development Scenario.....	8-1
8.1.1	Development phasing and paradigm shift.....	8-1
8.1.2	Phase 1 up to 2025	8-5
8.1.3	Phase 2 for 2026-30	8-7
8.1.4	Phase 3 for 2031-40	8-9
8.1.5	Ultimate image of Mongolia in 2040	8-10
8.2	Development Plan with Four Initiatives	8-11
8.3	Integrated Regional Development Programs	8-16
8.3.1	Regional development programs, area development schemes, urban functions and links.....	8-16
8.3.2	Western Region model green development program	8-20
8.3.3	Khangai Region advanced socio-economic complex program	8-21
8.3.4	Altai Region diversified agriculture and energy reserve program	8-21
8.3.5	Southern Region responsible mining and community development program	8-22
8.3.6	Eastern Region integrated agro-trade-tourism frontier development program	8-23
8.3.7	Capital Region advanced processing and logistic base program	8-23
8.4	Institutional Measures by Sector.....	8-24
8.4.1	Establishing principles of responsible mining	8-24
8.4.2	Policy and institutional measures for manufacturing industry.....	8-26
8.4.3	Institutional measures for other economic sectors.....	8-28
8.5	Institutional Measures for Development Administration and Finance	8-30
8.5.1	Overview.....	8-30
8.5.2	Issues in institutional and organizational aspects.....	8-31
8.5.3	Lessons from COVID-19	8-35
8.5.4	Suggested measures	8-37
8.6	Capacity Development to Promote Regional Development	8-40
8.6.1	Need for capacity development to promote regional development.....	8-40
8.6.2	Outcomes of capacity assessment of Aimag administrations.....	8-41
8.6.3	Suggestions for capacity development to support regional development	8-47
8.6.4	Recommendation for capacity development of Aimag administrations	8-49
Chapter 9	Strategic Environmental Assessment by Scenario Planning Approach and Initial Project Evaluation.....	9-1
9.1	Strategic Environmental Assessment by Scenario Planning Approach	9-1
9.1.1	Concepts and approaches of scenario planning.....	9-1
9.1.2	Scenario planning approach for the Project	9-1
9.1.3	Strategic Environmental Assessment (SEA).....	9-3
9.1.4	Participatory Planning with PWG/Sub-groups	9-6
9.1.5	NCDP Formulation with Multi-stakeholders Meetings	9-12
9.1.6	Public Acceptance Cultivation for the NCDP	9-19
9.1.7	Finalization of the NCDP.....	9-22

9.2	Initial Project Evaluation by the NCDP Evaluation System	9-23
9.2.1	Principles of Project Evaluation.....	9-23
9.2.2	Evaluation System for National Comprehensive Development.....	9-24
9.2.3	Application to the NCDP projects.....	9-26
9.3	Initial Environmental Examination of Anchor Projects	9-34
9.3.1	Scope, Objectives and Procedure of Initial Environmental Examination	9-34
9.3.2	IEE Application to the NCDP Anchor Projects.....	9-35
9.3.3	Recommendation for Next Stage	9-35
Chapter 10 Project Profiles by Development Initiative.....		10-1
10.1	Economic and Export Diversification Initiative	10-1
10.2	Broad-based Empowerment Initiative	10-41
10.3	Spatial Structure Strengthening Initiative.....	10-65
10.4	Green Development Promotion Initiative	10-81
Chapter 11 Implementation Plan.....		11-1
11.1	Implementing Arrangements for Four Initiatives.....	11-1
11.1.1	Development objectives and four initiatives.....	11-1
11.1.2	Inter-agency projects/programs.....	11-2
11.1.3	Sector projects/programs.....	11-3
11.1.4	Cooperative projects/programs	11-4
11.1.5	Municipal/Aimag projects and other projects	11-4
11.2	Implementing Arrangements for IRDPs	11-5
11.2.1	Conditions for regional development.....	11-5
11.2.2	Proposed institutional measures for regional development.....	11-9
11.3	Implementation Phasing and Investment Program.....	11-13
11.3.1	Phasing of the four initiatives	11-13
11.3.2	Indicative investment program for proposed projects and programs.....	11-14
11.4	Monitoring and Evaluation	11-18
11.4.1	Scope of monitoring and evaluation	11-18
11.4.2	Implementation monitoring and evaluation	11-19
11.4.3	Performance monitoring and evaluation	11-21
11.4.4	Monitoring and evaluation of Vision2050, HSP, RDP and NCDP.....	11-22

List of Tables

Table S1.1	Seminars for Scenario Planning and Capacity Development	1-10
Table S1.2	Sub-working Group Meetings	1-11
Table S1.3	Participants in First Knowledge Co-creation Program in Japan	1-14
Table S1.4	Themes and Contents of First Knowledge Co-creation Program in Japan	1-15
Table 2.1.1	Resident Population of Mongolia	2-1
Table 2.1.2	Changes in Population and Average Annual Population Increase, 1990-2019	2-2
Table 2.1.3	Migrant Population by Region by Five-Year Period since 2001	2-2
Table 2.1.4	Mongolians Living Outside Mongolia	2-3
Table 2.1.5	Birth and Death Rates and Natural Increase Rate of Population in Mongolia	2-4
Table 2.1.6	Changes in Age Structure of Mongolian Population	2-4
Table 2.2.1	Economic Growth Rates of Mongolia	2-5
Table 2.2.2	Mongolia's Export of Coal and Copper Concentrates	2-6
Table 2.2.3	Proportion of China in the Mongolia's Total Export Value	2-7
Table 2.2.4	Export and Manufacturing Production in Mongolia in 2017, 2018 and 2019	2-8
Table 2.2.5	GDP of Mongolia by Sector in 2010 Constant Prices	2-8
Table 2.3.1	Per Capita GDP of Mongolia	2-10
Table 2.3.2	Population and GDP Projection 1	2-10
Table 2.3.3	Population and GDP Projection 2	2-10
Table 2.3.4	Changes in Human Development Index by Region	2-11
Table 2.3.5	Life Expectancy at Birth	2-11
Table 2.3.6	Changes in Incidence of Poverty by Region and by Urban/Rural Center	2-12
Table 2.3.7	Gini Coefficients in Mongolia	2-13
Table 2.3.8	Example of Income Distribution Pattern to Attain SDV2030 Target	2-13
Table 2.3.9	Registered Entities in the Statistical Business Register Data by Region	2-14
Table 2.3.10	Doing Business Assessment for Mongolia for 2018	2-15
Table 2.3.11	IMRs of Mongolia by Region	2-17
Table 2.3.12	MMRs in Mongolia	2-18
Table 2.3.13	Government Health Expenditure and Health Service Resources	2-18
Table 2.3.14	Alcohol and Alcoholic Drinks Consumption	2-19
Table 2.3.15	Status of Environmental Indicators for SDV2030	2-20
Table 2.3.16	Inbound Tourists to Mongolia	2-21
Table 2.3.17	Number of Inbound Tourists by Country	2-21
Table 2.3.18	Changes of Shares of Mining, Agriculture, Manufacturing and Tourism Sectors in GDP	2-23
Table 2.3.19	Growth of Export by Mongolia by Country between 2010, 2017 and 2018	2-23
Table 2.4.1	List of Mega Projects Included in the Draft LTDP2050	2-34
Table 2.4.2	List of Programs and Projects with Costs Included in Both of the Draft LTDP2050 and the NCDP	2-35
Table 2.4.3	Investment Costs by Broad Sector Corresponding to Part of the Vision2050 Consistent with the NCDP	2-39
Table 3.1.1	Comparison between Existing Development Situations and the SDGs Goals/Targets	3-2
Table 3.1.2	Working Schedule for the Development Paradigm Formulation	3-3
Table 3.1.3	Relationship between Main Objectives of SDV2030/Vision2050 and SDGs	3-6
Table 3.1.4	Validity of the SDV2030 Objectives and Prospect to Be Achieved for the SDV2030 Objectives on Agriculture and Livestock Sectors	3-10
Table 3.1.5	Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Industry, Mining and Tourism Sectors	3-12
Table 3.1.6	Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Transport, Urban Development and Infrastructure Sectors	3-14
Table 3.1.7	Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030	

	Objectives on Climate Change	3-16
Table 3.1.8	Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Water Resource and Environment Sectors.....	3-17
Table 3.1.9	Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Energy Sector	3-19
Table 3.1.10	Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Social Development Sector.....	3-20
Table 3.2.1	Comparison of Two Broad Development Alternatives.....	3-23
Table 3.2.2	Important Values for Mongolians to be Reflected in Development Vision	3-24
Table 3.3.1	List of Problems Identified for Regional Development in Mongolia.....	3-29
Table 4.2.1	Population Projections by Statistical Office, UN and JICA Project Team	4-2
Table 4.2.2	Resident Population of Mongolia in 2030 by Age Group Projected by Statistical Office	4-3
Table 4.2.3	GDP of Mongolia by Sector in 2010 Price	4-5
Table 4.2.4	Trend Projection of Mongolian GDP for Year 2030 in 2019 Price.....	4-6
Table 4.2.5	Projection of Mongolian GDP until 2030 under Realistic Assumption on Agricultural Growth in 2019 Price (Case A).....	4-6
Table 4.2.6	Projection of Mongolian GDP with Zero Growth of Mining for 2030 in 2019 Price	4-7
Table 4.2.7	Projection of Mongolian GDP for 2030 with Modest Growth of Mining in 2019 Price (Case B).....	4-7
Table 4.2.8	Projection of Mongolian GDP for 2030 with Transit Trade in 2019 Price (Case C)	4-8
Table 4.2.9	Projection of Mongolian GDP for 2030 Combining High Industrialization and Transit Trade in 2019 Price (Case D)	4-8
Table 4.3.1	Comparison of Three Alternatives for Spatial Development.....	4-8
Table 4.3.2	Sector GDP Growth Rates until 2030 for Four Development Alternatives.....	4-9
Table 4.3.3	Estimation of Labor Productivity by Sector in 2019	4-10
Table 4.3.4	Estimation of Labor Productivity and Employment by Sector in 2030 for Four Cases with Assumed Rate of Increase in Labor Productivity by Sector	4-10
Table 4.3.5	Evaluation of Macro Development Alternatives by Selected Indices	4-11
Table 4.4.1	Rates of Changes in Labor Productivities in Mongolia.....	4-13
Table 4.4.2	Long-term Changes in Labor Productivities in Japan	4-13
Table 4.4.3	Projected Aimag Population in 2030	4-14
Table 4.4.4	Population of Mongolia in 2040 by Region and Aimag	4-15
Table 4.4.5	GDP Growth Rates and Labor Productivity Improvement during 2030-40	4-15
Table 4.4.6	Forecasts of GDP Growth Affected by COVID-19	4-18
Table 5.1.1	Structure and Contents of Spatial Plans at Different Tiers	5-1
Table 5.2.1	Population of 30 Cities to be Included in Urban Hierarchy	5-6
Table 5.2.2	Urban Hierarchy with Cities and Functions at Each Tier	5-8
Table 5.2.3	Correspondence between NCDP Hierarchy and Legal Designation and DCI.....	5-8
Table 5.3.1	Border Ports along the Borders with Russia and China.....	5-12
Table 5.3.2	Border Ports and Export and Import Shares by Region, 2018.....	5-12
Table 5.3.3	Estimated Population within 20km, Road Length and Travel Time of Each Route	5-15
Table 5.3.4	Evaluation Indices with Criteria and Weighting Factor to Evaluate Alternative Routes	5-16
Table 5.3.5	Results of Evaluation for Alternative Routes	5-17
Table 5.3.6	Evaluation of Alternative Routes Based on Population within 50km from Each Route	5-17
Table 5.3.7	Population within 120km from Closest to Each Route.....	5-18
Table 5.4.1	Degraded Pasture by Aimag in 2011	5-21
Table 5.4.2	Water Balance by Aimag in the West Affected Negatively by Climate Change.....	5-28
Table 5.4.3	Hazard Level of Dzud by Frequency and Risk.....	5-28
Table 5.4.4	Existing Land Area by Land Use Category (1/2)	5-31
Table 5.4.4	Existing Land Area by Land Use Category (2/2)	5-32

Table 5.4.5	Land Demand for Agriculture in 2040.....	5-35
Table 5.4.6	Analytic Hierarchy Process for Land Suitability Evaluation.....	5-36
Table 5.4.7	Suitability by Soil Type	5-36
Table 5.4.8	Suitability by Moisture Supply	5-36
Table 5.4.9	Suitability by Accumulated Temperature.....	5-36
Table 5.4.10	Suitability by Slope Gradient and Direction.....	5-36
Table 5.4.11	Land Area by Land Use Category in Indicative National Land Use Plan	5-42
Table 5.4.12	Weighting Coefficient for Sensitivity Analysis of Mining Development.....	5-44
Table 5.4.13	Detailed Land Capacity of Pasture for Livestock.....	5-45
Table 5.5.1	Aimag-wise Surface and Groundwater Potentials Estimated by JPT	5-47
Table 5.5.2	Assumptions for Projecting Water Demand in 2018, 2030 and 2040.....	5-48
Table 5.5.3	Estimated Total Water Demand by Aimag in 2040.....	5-49
Table 5.5.4	Water Supply and Demand Balance by Aimag Using JPT’s Water Potential Estimation (Dry Year)	5-50
Table 5.5.5	Soums to Face Water Shortages in 2040 under Dry Year Conditions.....	5-52
Table 5.5.6	Climate Change Scenarios.....	5-53
Table S5.2.1	Criteria for Evaluating Alternative Sites for Relocation of Capital Function.....	5-74
Table S5.2.2	Evaluation Results of Alternative Sites for Relocation of Capital Function	5-75
Table 6.1.1	Comparison of 21 Aimags by Many Indices (1/3).....	6-2
Table 6.1.1	Comparison of 21 Aimags by Many Indices (2/3).....	6-3
Table 6.1.1	Comparison of 21 Aimags by Many Indices (3/3).....	6-4
Table 6.1.2	Evaluation of Aimags for High and Low Ranking by 30 Indices (1/2)	6-6
Table 6.1.2	Evaluation of Aimags for High and Low Ranking by 30 Indices (2/2)	6-7
Table 6.1.3	Affinity of Aimag Pairs Assessed with 30 Indices	6-8
Table 6.1.4	Newly Proposed Regional Division with Constituent Aimags	6-10
Table 6.1.5	Basic Indices for Six Regions.....	6-11
Table 6.1.6	Comparison of Three Alternatives for Regional Division	6-12
Table 6.1.7	Advantages and Disadvantages of Three Alternatives for Regional Division.....	6-13
Table 6.2.1	Main Characteristics of Six Regions Defined by Proposed Regional Division.....	6-13
Table 6.2.2	Comparison of 21 Aimags Classified by New Regional Division (1/2).....	6-18
Table 6.2.3	Comparison of 21 Aimags Classified by New Regional Division (2/2).....	6-19
Table 7.1.1	Preliminary Development Diagnosis for Khovd Aimag.....	7-2
Table 7.4.1	Number of Animals in Uvurkhangai.....	7-50
Table 7.6.1	Logistics Performance Indicators (LPis) of Mongolia, Russia and China	7-75
Table 7.7.1	Number of Animals in Tuv	7-78
Table 7.7.2	Sown Area by Crop in Tuv	7-79
Table 8.1.1	Representative Comments by Mongolian Youth Groups.....	8-2
Table 8.1.2	Responses by the JPT to Issues Raised by Four Groups at Group Discussions	8-2
Table 8.2.1	Economic and Export Diversification Initiative	8-11
Table 8.2.2	Broad-based Empowerment Initiative	8-13
Table 8.2.3	Spatial Structure Strengthening Initiative.....	8-14
Table 8.2.4	Green Development Promotion Initiative.....	8-16
Table 8.3.1	Urban Functions and Inter-urban Links to Support Regional Development	8-17
Table 8.5.1	Mongolia’s Total Debt	8-35
Table 8.6.1	Local Government Budget 2021, (MNT million).....	8-43
Table 8.6.2	Functions of Departments of Local Government	8-45
Table 8.6.3	Objectives Relevant to Decentralization Reflected in Governors’ Action Plans of Bulgan and Khuvsgul	8-47
Table 8.6.4	Budget Balance by Aimag and Region in Mongolia	8-48
Table 8.6.5	Capacity Development Needs for Regional Development by Measure	8-50
Table 9.1.1	Comparison between JICA Guidelines and Mongolian Law for SEA	9-4
Table 9.1.2	Macro Development Alternatives Examined for the NCDP.....	9-7

Table 9.1.3	Evaluation of Macro Development Alternatives by Selected Indices	9-7
Table 9.1.4	Important Values for Mongolians to be Reflected in Development Vision	9-9
Table 9.1.5	Sector GDP Growth Rates until 2030 for Four Development Alternatives	9-10
Table 9.1.6	Seminars Conducted during Initial Stage of the Project.....	9-11
Table 9.1.7	Sub-working Group Meetings during Early Stage of the Project	9-11
Table 9.1.8	Seminars Conducted to Elaborate the NCDP Vision and Frameworks	9-12
Table 9.1.9	Multi-Stakeholders Meetings with Various Stakeholders.....	9-13
Table 9.1.10	Schedule of Aimag Visits for Consultation Meetings.....	9-13
Table 9.1.11	Characterization of Three Phases of Development Scenario.....	9-14
Table 9.1.12	Representative Comments by Mongolian Youth Groups.....	9-19
Table 9.1.13	Responses by the JPT to Issues Raised by Four Groups at Group Discussions	9-20
Table 9.2.1	Evaluation Criteria for Five Account Evaluation System for the NCDP.....	9-24
Table 9.2.2	Weighting of Four Accounts for Evaluation at Macro, Meso and Micro Levels.....	9-26
Table 9.2.3	Criteria for Step 2 Evaluation and Applicability to Three Types of Projects.....	9-26
Table 9.2.4	Step 1 Evaluation of Projects in Economy and Export Diversification Initiative ...	9-28
Table 9.2.5	Step 1 Evaluation of Projects in Broad-based Empowerment Initiative.....	9-30
Table 9.2.6	Step 1 Evaluation of Projects in Spatial Strengthening Initiative.....	9-31
Table 9.2.7	Step 1 Evaluation of Projects in Green Development Promotion Initiative	9-32
Table 9.2.8	Overall Evaluation of Anchor Projects at Macro, Meso and Micro Levels.....	9-33
Table 9.3.1	Evaluation Indices for Initial Environmental Examination for the NCDP Anchor Projects	9-35
Table 9.3.2	Results of Initial Environmental Examination Applied to the NCDP Anchor Projects	9-36
Table 9.3.3	Explanation of Evaluation and Recommendation for Next Stage for Each Anchor Project with Environmental Aspects Evaluated Either A or C.....	9-38
Table A	Groundwater Development Status in Ulaanbaatar (Public Wells).....	10-93
Table B	Water Demand Estimation by 2040 in Ulaanbaatar.....	10-93
Table C	Groundwater Development Potential for Ulaanbaatar.....	10-93
Table 11.1.1	List of Inter-Agency Projects and Programs with Lead Agency for Each.....	11-2
Table 11.1.2	List of Sector Projects and Programs with Implementing Agency for Each	11-3
Table 11.1.3	List of Cooperative Projects and Programs with Coordinating Agency for Each ...	11-4
Table 11.1.4	List of Municipal/Aimag Projects	11-4
Table 11.1.5	List of Other Projects to Be Implemented by Non-government Entities.....	11-5
Table 11.2.1	Total Revenues of Local and Central Governments in 2019.....	11-9
Table 11.2.2	Main Responsibility by Sector of Central Government, Prefecture and Municipality.....	11-10
Table 11.3.1	Phasing of Four Initiatives.....	11-13
Table 11.3.2	Indicative Investment Program of Proposed Programs and Projects of Economy and Exports Diversification Initiative of NCDP.....	11-15
Table 11.3.3	Indicative Investment Program of Proposed Programs and Projects of Broad-based Empowerment Initiative of NCDP	11-16
Table 11.3.4	Indicative Investment Program of Proposed Programs and Projects of Spatial Structure Strengthening Initiative of NCDP	11-17
Table 11.3.5	Indicative Investment Program of Proposed Programs and Projects of Green Development Promotion Initiative of NCDP.....	11-17
Table 11.3.6	Allocation of Investment to Four Development Initiatives by Indicative Investment Programs.....	11-18

List of Figure

Figure 1.1.1	Outline Procedure and Outcomes of the Project with HSP and RDP	1-3
Figure 1.1.2	Project Implementation and Management Structure with JCC, PWG and Five Sub-groups.....	1-4
Figure 2.1.1	Existing Division of Five Regions	2-2
Figure 2.1.2	Migration by Five-year Period from 2001 to 2015 by Region.....	2-3
Figure 2.2.1	GDP of Mongolia (MNT million in 2005 prices)	2-5
Figure 2.2.2	Copper Prices	2-7
Figure 2.2.3	Fuel Coal Prices (Australia).....	2-7
Figure 2.3.1	Environmental Performance Index Score in Mongolia in 2018.....	2-16
Figure 2.3.2	IMRs of Mongolia by Region	2-17
Figure 2.3.3	Population with Combined NCD Risk Factors by Region.....	2-19
Figure 2.3.4	Protected Areas of Mongolia.....	2-20
Figure 3.1.1	Relationships among HSP, RDV and RDP in line with SDGs and SDV2030/Vision2050	3-3
Figure 3.1.2	Original Structure of SDGs.....	3-5
Figure 3.1.3	Revised Structure of SDGs	3-6
Figure 3.1.4	Structure of SDV2030 in Economic Sector	3-8
Figure 3.2.1	Broad Alternatives for Regional Development	3-23
Figure 3.2.2	Key Concepts for National Comprehensive Development of Mongolia	3-27
Figure 3.3.1	Procedure of Problem Structure Analysis for Definition of Development Objectives and Strategy.....	3-29
Figure 3.3.2	Macro Problem Structure of Regional Development in Mongolia	3-30
Figure 3.3.3	Example of Vertical Industrial Cluster Based on Primary Products: Sea Buckthorn Industrial Cluster.....	3-32
Figure 4.1.1	Procedure for Socio-economic Framework Formulation.....	4-1
Figure 4.2.1	Population of Mongolia until 2040 Projected by Statistical Office, UN and JICA Project Team.....	4-2
Figure 4.2.2	Changes in Total Fertility Rate in Mongolia.....	4-3
Figure 4.2.3	Changes in Labor Force Coefficient (LFC) and LPR in Mongolia.....	4-4
Figure 4.2.4	GDP Growth Rates of Mongolian by Sector between 2000 and 2018.....	4-5
Figure 5.1.1	National Spatial Structure of Malaysia, Thailand, Korea and Germany	5-3
Figure 5.1.2	National Spatial Structure of Malaysia, Thailand, Korea and Germany	5-3
Figure 5.1.3	Spatial Plans in China, Russia and Kazakhstan	5-4
Figure 5.1.4	Population Distribution by Local Administrative Unit in Mongolia, Russia, China and Kazakhstan	5-5
Figure 5.1.5	Mongolian Corridors with Connection to Neighboring Countries	5-6
Figure 5.2.1	Evaluation of Target Cities by Population Size	5-7
Figure 5.2.2	Urban Hierarchy without Policy Intervention	5-8
Figure 5.2.3	Land Suitability for New Urban Settlement in National Land Management Plan	5-9
Figure 5.2.4	Seismic Risk in Mongolia	5-10
Figure 5.3.1	National Spatial Structure Specified in Parliament Resolution No. 9, 2000 and No.1, 2003	5-11
Figure 5.3.2	National Spatial Structure Proposed in Past Studies	5-11
Figure 5.3.3	National Spatial Structure with Conceived Ring Artery	5-13
Figure 5.3.4	Eight Alternative Routes from Ulaanbaatar to the West	5-15
Figure 5.3.5	Population Size by Soum in 2018 and 2040	5-15
Figure 5.3.6	Four Highest Ranked Routes to Link Ulaanbaatar and the West	5-17
Figure 5.3.7	Proposed Spatial Structure of Mongolia in 2040	5-19
Figure 5.3.8	National Spatial Structure of Mongolia to Be Established with Ring Artery in Long	

	Run	5-20
Figure 5.4.1	Thematic Maps of National Land Management Plan for Cropland and Forest	5-21
Figure 5.4.2	Pasture by Level of Degradation in 2011	5-22
Figure 5.4.3	Degraded Pasture Estimated by ALAMGaC as Part of NLMP	5-23
Figure 5.4.4	Vulnerability of Pastureland Estimated by HSP	5-23
Figure 5.4.5	Change of Normalized Difference Vegetation Index to Long Term Average	5-24
Figure 5.4.6	Average Change of NDVI in June and July from 2017 to 2019	5-24
Figure 5.4.7	Photo-Monitoring of Pasture	5-25
Figure 5.4.8	Pasture Conditions at Monitoring Points in 2019	5-25
Figure 5.4.9	Assessment of Pasture Degradation in 2018/19	5-26
Figure 5.4.10	Changes in Annual Precipitation under Each RCP Scenario	5-27
Figure 5.4.11	Changes in Precipitation by Season under RCP 8.5 Scenario	5-27
Figure 5.4.12	Maximum Changes in Annual Precipitation under All RCP Scenarios	5-28
Figure 5.4.13	Frequency of Dzud from 1980 to 2016	5-29
Figure 5.4.14	Dzud Risk for Winter 2017/2018	5-29
Figure 5.4.15	Existing Land Use of Mongolia	5-31
Figure 5.4.16	Distribution of Existing Pasture and Area that Needs Proactive Measure against Dzud	5-33
Figure 5.4.17	Potential Area for Intensive Livestock and Control Grazing	5-34
Figure 5.4.18	Potential Area for Intensive Livestock and Control Grazing in Ulaanbaatar, Selenge and Bulgan	5-34
Figure 5.4.19	Distribution of Soil Type	5-37
Figure 5.4.20	Distribution of Moisture Supply	5-37
Figure 5.4.21	Distribution of Accumulated Temperature	5-38
Figure 5.4.22	Distribution of Slope Classified by Gradient	5-38
Figure 5.4.23	Distribution of Slope Direction Classified by Degree	5-39
Figure 5.4.24	Land Suitability by Distance from Aimag Center and Artery Road	5-39
Figure 5.4.25	Land Suitability for Fodder	5-40
Figure 5.4.26	Land Suitability for Oil Seed	5-40
Figure 5.4.27	Land Suitability for Fruit	5-41
Figure 5.4.28	Indicative National Land Use Plan of Mongolia	5-43
Figure 5.4.29	Sensitivity to Mining Development and Strategically Significant Deposit	5-44
Figure 5.5.1	Classification of Water Basins in Mongolia	5-46
Figure 5.5.2	Map of Annal Surface Water Potential by Sub-Basin (Dry Year)	5-46
Figure 5.5.3	Map of Annal Groundwater Potential by Sub-Basin (Dry Year)	5-47
Figure 5.5.4	Map of Estimated Surface Water Deficit by Soum in 2040 (Dry Year)	5-50
Figure 5.5.5	Map of Estimated Groundwater Deficit by Soum in 2040 (Dry Year)	5-51
Figure 5.5.6	Flowchart for Climate Change Impact Assessment	5-53
Figure 5.5.7	Future Change of Mean Monthly Precipitation at Representative Meteorological Stations by GCMs in 2050	5-54
Figure 5.5.8	Future Change of Mean Monthly Precipitation at Representative Meteorological Stations by GCMs in 2100	5-55
Figure 5.5.9	Future Change of Mean Monthly Temperature at Representative Meteorological Stations by GCMs in 2050	5-56
Figure 5.5.10	Future Change of Mean Monthly Temperature at Representative Meteorological Stations by GCMs in 2100	5-57
Figure 5.5.11	Future Change of Annual Precipitation and Annual Mean Temperature at Representative Meteorological Stations	5-58
Figure 5.5.12	Future Change of Mean Monthly Temperature at Representative Meteorological Stations	5-58
Figure 5.5.13	Future Change of Mean Monthly Precipitation at Representative Meteorological Stations	5-59
Figure 5.5.14	Spatial Distribution of Probability Year of Dzud Disaster by Climate Change Scenarios	5-61
Figure 5.5.15	Future Mean Monthly Precipitation in Ulaanbaatar by Climate Change Scenarios	

	5-61
Figure 5.5.16	Future Mean Monthly Temperature in Ulaanbaatar, Tuul River, by Climate Change Scenarios 5-62
Figure 5.5.17	Future Flow Duration Curve at Ulaanbaatar, Tuul River, by Climate Change Scenarios 5-62
Figure 5.5.18	Future Mean Monthly Groundwater Potentials at Ulaanbaatar by Climate Change Scenarios 5-63
Figure 5.5.19	Surface Water Potential Map by Sub-basins by Climate Change Scenarios 5-64
Figure 5.5.20	Groundwater Potential Map by Sub-basins by Climate Change Scenarios 5-65
Figure 5.5.21	Surface Water Shortages in 2040 Demand by Soum (Dry Year) by Climate Change Scenarios 5-66
Figure 5.5.22	Groundwater Shortages in 2040 Demand by Soum (Dry Year) by Climate Change Scenarios 5-67
Figure S5.1.1	Population Growth in Areas around the Relocated Capital in Kazakhstan and South Korea 5-69
Figure S5.1.2	Population Ratios of Former Capitals to New Capital in Brazil, Kazakhstan, Nigeria and Pakistan 5-70
Figure S5.1.3	Location of Relocated Capital and Old Capital in Malaysia and Pakistan 5-71
Figure S5.2.1	Possible Sites for Relocation of Capital Function 5-72
Figure S5.2.2	Settlements along the Bogdkhan Railway Bypass as Candidate Sites for Relocating Capital Function 5-73
Figure S5.2.3	Sphere of Possible Sites for Relocating Capital Function 5-73
Figure S5.2.4	Alternative Site for Relocating Capital Function 5-74
Figure 6.1.1	Affinity of Neighboring Aimags 6-9
Figure 6.1.2	Grouping of Aimags Based on Affinity..... 6-10
Figure 6.1.3	Current Regional Division 6-11
Figure 6.1.4	Revised Regional Division with Constituent Aimags Proposed by NCDP..... 6-11
Figure 6.1.5	Regional Division Proposed by CDC for the HSP..... 6-12
Figure 7.1.1	Overall Procedure of NCDP Formulation for Regional Development 7-1
Figure 7.2.1	Location and Land Map of Bayan Ulgii Aimag 7-4
Figure 7.2.2	ADB-Supported Road 7-6
Figure 7.2.3	Signboard of ADB-Supported Road Construction between Khovd and Ulgii 7-6
Figure 7.2.4	Location and Land Map of Uvs Aimag 7-9
Figure 7.2.5	Location and Land Map of Khovd Aimag 7-13
Figure 7.2.6	Problem Structure of Khovd Aimag..... 7-14
Figure 7.3.1	Location and Land Map of Zavkhan Aimag 7-17
Figure 7.3.2	Location and Land Map of Khuvsgul Aimag 7-21
Figure 7.3.3	Location and Land Map of Arkhangai Aimag..... 7-24
Figure 7.3.4	Location and Land Map of Bulgan Aimag..... 7-28
Figure 7.3.5	Location and Land Map of Selenge Aimag..... 7-31
Figure 7.3.6	Location and Land Map of Darkhan-Uul Aimag 7-35
Figure 7.3.7	Location and Land Map of Orkhon Aimag 7-39
Figure 7.4.1	Location and Land Map of Govi-Altai Aimag 7-43
Figure 7.4.2	Location and Land Map of Bayankhongor Aimag..... 7-46
Figure 7.4.3	Location and Land Map of Uvurkhangai Aimag 7-49
Figure 7.4.4	Logistic Center Function of Uvurkhangai..... 7-52
Figure 7.5.1	Location and Land Map of Dundgovi Aimag 7-54
Figure 7.5.2	Location and Land Map of Govisumber Aimag 7-57
Figure 7.5.3	Location and Land Map of Dornogovi Aimag 7-60
Figure 7.5.4	Location and Land Map of Umnugovi Aimag 7-63
Figure 7.6.1	Location and Land Map of Khentii Aimag 7-66
Figure 7.6.2	Location and Land Map of Sukhbaatar Aimag 7-69
Figure 7.6.3	Location and Land Map of Dornod Aimag 7-73
Figure 7.7.1	Location and Land Map of Tuv Aimag 7-78
Figure 7.7.2	Proposed New Production and Logistic Network in Tuv 7-81

Figure 8.2.1	Maps of Spatial Structure Strengthening Initiative	8-15
Figure 8.3.1	Area Development Schemes of Integrated Regional Development Programs.....	8-17
Figure 8.3.2	Urban Functions and Inter-urban Links to Support Regional Development.....	8-20
Figure 8.5.1	Concepts of “Enterprise Mongolia”	8-33
Figure 8.5.2	Inflation Rates of CPI in Mongolia since 1991 through 2018	8-34
Figure 8.5.3	Inflation Rates of Consumer Price Index for 10 Years in Mongolia	8-35
Figure 8.5.4	Exchange Rate of Tugrik against US Dollar	8-35
Figure 8.5.5	Selection of Leaders and Ideas.....	8-38
Figure 8.5.6	Enhancing Group Dynamics	8-38
Figure 8.6.1	Organizational Structure of Local Government	8-45
Figure 9.1.1	Project Implementation and Management Structure with JCC, PWG and Five Sub-Groups	9-2
Figure 9.1.2	Procedure of Scenario Planning for the NCDP	9-3
Figure 9.1.3	Shift in Development Paradigm Mongolia Has Been Experiencing.....	9-14
Figure A	Groundwater Sources for Ulaanbaatar	10-93
Figure B	Long-term Observed Discharge Hydrograph at Tuul-Ulaanbaatar	10-94
Figure C	Flow Duration Curve at Tuul-Ulaanbaatar.....	10-94
Figure D	Simulated Groundwater Recharge at Tuul-Ulaanbaatar Basin by Tank Model ...	10-94
Figure E	Previous Plans and Studies of Tuul Water Complex.....	10-95
Figure F	Location Map of Alternative Dam Sites.....	10-96
Figure G	Future Changes in Seasonal Temperatures and Precipitation.....	10-96
Figure H	Long-term Mean Annual Discharge at Tuul-Ulaanbaatar	10-97
Figure A	Location Map of Shuren HPP	10-106
Figure 11.1.1	Structure of the NCDP with Four Initiatives and Three Development Objectives	11-1

Abbreviations

General

AFTZ	Free Trade Zone in Altanbulag	GIS	Geographic Information System
AHP	Analytic Hierarchy Process	GNI	Gross National Income
AI	Artificial Intelligence	GRDP	Gross Regional Domestic Product
AR	Assessment Report	HDI	Human Development Indicator
ASL	Above Sea Level	HIV	Human Immunodeficiency Virus
B/C	Benefit/Cost	HLPF	High Level Political Forum
B/D	Basic Design	HPP	Hydropower Plant
BOD	Biochemical Oxygen Demand	HSP	Human Settlement Plan
CBM	Coal Bed Methane	IC	Integrated Circuit
CBT	Community-Based Tourism	IAOD	Industrial Accidents and Occupational Disease
CCT	Clean Coal Technology	IC/R	Inception Report
CEC	Community Education Council	ICT	Information and Communication Technology
CFA	Chartered Financial Analyst	IMR	Infant Mortality Rate
CFRD	Concrete Faced Rockfill Dam	IoT	Internet of Things
CHP	Combined Heat Plant	IP	Intellectual Property
CIS	Commonwealth of Independence States	IQ	Intelligence Quotient
COI	Cost of Inaction	IRDP	Integrated Regional Development Program
COVID-19	Coronavirus Disease 2019	ISO	International Organization for Standardization
DBI	Doing Business Index	IT	Information Technology
D/D	Detailed Design	IT/R	Interim Report
DES	Debt-Equity Swap	IWMP	Integrated Watershed Management Program
DF/R	Draft Final Report	LDP	Liberal Democratic Party
DRM	Disaster Risk Management	LFC	Labour Force Coefficient
DTE	Deliberative Tournament Election	LFS	Labor Force Survey
EIA	Environmental Impact Assessment	LLC	Limited Liability Company
EMTDP	Education Sector Mid-Term Development Plan	LLP	limited liable partnership
EPI	Environmental Performance Index	LPI	Logistics Performance Indicator
ESIA	Environmental and Social Impact Assessment	LPR	Labour force Participation Rate
EV	Electric Vehicle	LTDP2050	Long Term Deployment Plan 2050
F/S	Feasibility Study	M/M	Minutes of Meeting
FDI	Foreign Direct Investment	M/P	Master Plan
FEZ	Free Economic Zone	M-JEED	Mongolia-Japan Engineering Development Project
FHC	Family Health Center	MCH	Maternal and Child Health
FTZ	Free Trade Zone	MCM	Million Cubic Meters
GASI	General Agency for Specialized Inspection	MDGs	Millennium Development Goals
GCI	Global Competitiveness Index	MECSS	Ministry of Education, Culture, Science and Sports
GDP	Gross Domestic Product		
GHG	Greenhouse Gas		

MINIS	Mining Infrastructure Investment Support Project		Centre
M-JEED	Mongolia-Japan Engineering Education Development Project	RDV	Regional Development Vision
MMR	Maternal Mortality Rate	REA	Regional Environmental Assessment
MMT	Modern Monetary Theory	REITO	Real Estate Investment Trust
MNT	Mongolia Tughrik	RIRS	Research Institute for Road and Street
MODIS	Moderate Resolution Imaging Spectroradiometer	SAIFI	System Average Interruption Frequency Index
MOL	Minimum Operational Level	SARA	Service Availability and Readiness
MSH	Multi-Stakeholder	SDGs	Sustainable Development Goals
MTZ	National Railway	SDV 2030	Sustainable Development Vision 2030
MUST	Mongolian University of Science and Technology	SEA	Strategic Environmental Assessment
MW	Megawatt	SEZ	Special Economic Zone
NCDP	National Comprehensive Development Plan	SME	Small and Medium-sized Enterprises
NDVI	Normalized Difference Vegetation index	TBS	Teetered Bed Separator
NGO	Non-Governmental Organization	TDNP	Tourism Development National Program
NSO	National Statistical Office	TEU	Twenty-Foot Equivalent Unit
NLMP	National Land Management Plan	TFR	Total Fertility Rate
NIMP	National Irrigation Master Plan	TMR	Total Mixed Ration
NPO	Non-Profit Organization	TOR	Terms of Reference
NUBIA	New Ulaanbaatar International Airport	TOT	Training of Trainer
ODA	Official Development Assistance	TPDP	Three Pillar Development Policy
O&M	Operation and Maintenance	UAE	United Arab Emirates
PFS	Pre-Feasibility Study	UB M/P	Ulaanbaatar 2020 Master Plan and Development Approaches for 2030
PHC	Primary Health Care	UBTZ	Ulaanbaatar Railway
PISA	Program for International Student Assessment	UCG	Underground Coal Gasification
PIU	Project Implementation Units	UK	United Kingdom
PPP	Public-Private Partnership	UFMR	Under-Five Mortality Rate
P/R	Progress Report	UHG	Ukuhaa Khudag
PWG	Project Working Group	ULTF	Unified Land Territory Foundation
QCC	Quality Control Circle	UNTF	Unified National Territory Foundation
R/D	Record of Discussion	USA	United States of America
R&D	Research and Development	USSR	Union of Soviet Socialist Republic
RCC	Roller-Compacted Concrete	VET	Vocational Education and Training
RCP	Representative Concentration Pathways	VNR	Voluntary National Review
RDC	Regional Development Council	WWTP	Wastewater Treatment Plant
RDP	Regional Development Policy	5G	Fifth Generation
RDTC	Regional Diagnostic and Treatment		

Organization

ADA	Asian Dinosaur Association	MEGD	Ministry of Green Development
ADB	Asian Development Bank	MET	Ministry of Environment and Tourism
AIDD	Asian Institute of Deliberative Democracy	MIER	Mongolian Institute for Educational Research
ALAMGaC	Agency for Land Administration and Management, Geodesy and Cartography	MLIT	Ministry of Land, Infrastructure and Transport
ASEAN	Association of South - East Asian Nations	MLSP	Ministry of Labor and Social Protection
C/P	Counterpart	MMHI	Ministry of Mining and Heavy Industry
CDC	Construction and Development Center	MNCCI	Mongolian National Chamber of Commerce and Industry
CDH	Centre for Health Development	MOE	Ministry of Environment
CGD	Center for Group Dynamics	MOF	Ministry of Finance
CITA	Communications and Information Technology Authority	MOFALI	Ministry of Food, Agriculture and Light Industry
ECB	European Central Bank	MOH	Ministry of Health
EEC	Eurasian Economic Commission	MRTD	Ministry of Road and Transportation Development
EES	Eastern Energy System	MTA	Mongolian Tourism Association
EU	European Union	NAMEM	National Agency for Meteorology and Environmental Monitoring
GMIT	German-Mongolian Institute for Resources and Technology	NCCD	National Center for Communicable Diseases
IMF	International Monetary Fund	NCMCH	National Center of Maternal and Child Health
IPCC	International Panel on Climate Change	NDA	National Development Agency
IPGMAS	Institute of Paleontology and Geology of Mongolian Academy of Sciences	NEDO	New Industrial Technology Development Organization
IRIM	Independent Research Institute of Mongolia	NEMA	National Emergency Management Agency
ISMD	Institute for the Study of Mongolian Dinosaurs	OCA	Overseas Contractors Association
ITPD	Institute of Teacher's Professional Development	RIRS	Research Institute for Road and Street
ITU	International Telecommunication Union	SWG	Sub-Working Group
JAICAF	Japan Association for International Collaboration of Agriculture and Forestry	UN	United Nations
JCC	Joint Coordination Committee	UNDP	United Nations Development Programme
JICA	Japan International Cooperation Agency	UNESCO	United Nations Educational, Scientific and Cultural Organization
JPT	JICA Project Team	UNWTO	United Nations World Tourism Organization
KOICA	Korea International Cooperation Agency	USUG	Ulaanbaatar Water Supply and Sewerage Authority
LPR	Labour Participation Rate	WB	World Bank
MAFF	Ministry of Agriculture, Forestry and Fisheries	WEF	World Economic Forum
MCC	Millennium Challenge Corporation	WG	Working Group
MCUD	Ministry of Construction and Urban Development	WHO	World Health Organization
MECSS	Ministry of Education, Culture, Science and Sports		
MEF	Mongolian Employers Federation		

Executive summary

1. Introduction

The Final Report (F/R) of the “Project for Formulation of National Comprehensive Development Plan” has compiled based on the works conducted in Mongolia and Japan up to June and the extension period from July through December 2021. The Report presents the final the National Comprehensive Development Plan in the Main Report, the three volumes of Sector Report, the Report on Pilot Projects and Supplemental Surveys, and the supplemental Report on the extension period. In preparing the F/R, extensive comments received on the DF/R2 and the DF/R3 were examined and reflected, and a series of coordination meetings were undertaken with MCUD/CDC and NDA to examine how the NCDP should be reflected in the HSP and the RDP in preparation by MCUD/CDC and NDA, respectively. During the extension period, a field work was conducted, despite the COVID-19 situation, and the fifth and the last Joint Coordination Committee meeting was convened with the Mongolian Government chaired by the Chief Cabinet Secretary and the NCDP promotion seminar was organized combining face-to-face meeting and online participation attended by over 140 participants.

The objectives of the Project as defined by the record of discussions (R/D) agreed and signed on August 22nd, 2018 by the representatives of JICA and the Mongolian Government are:

- (a) To prepare the National Comprehensive Development Plan (NCDP) encompassing the human settlement plan (HSP) and the regional development policy (RDP); and
- (b) To contribute to capacity development of the Mongolian counterparts to formulate and revise the NCDP.

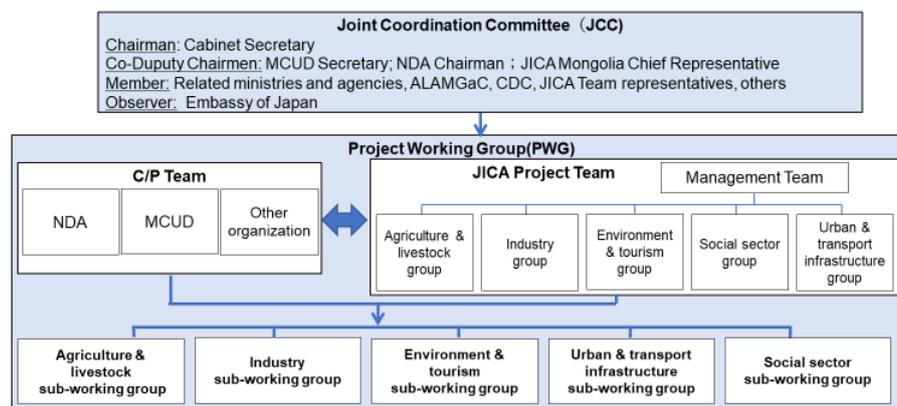
The Mongolian Government decided to prepare the RDP based on the “Law on Development Policy and Planning (2015)” and the “Law on Management and Coordination of Regional Development (2003)” and the HSP based on the “Urban Development Law (2008)”. According to the R/D, the output of the Project should support formulation of the RDP by NDA and the HSP by MCUD.

The planning period for the NCDP was up to 2030 in line with the target year for the HSP and the RDP as agreed between the Mongolian side and JICA. It has been extended to 2040 upon the request by the Mongolian side. After the Project started, the Mongolian Government decided to prepare a long-term development policy (LTDP) and the Prime Minister’s order was issued on April 30 to organize a working group to prepare the LTDP with NDA. The target year for the LTDP was set for 2050. The NCDP is now expected to aim at supporting the Vision2050.

The Project is implemented by the JICA Project Team (JPT) in close collaboration with its counterpart team of the Mongolian Government. Main counterpart organizations of the Mongolian Government are the Ministry of Construction and Urban Development (MCUD) in charge mainly of the HSP and the National Development Agency (NDA) in charge mainly of the RDP. The Project implementation is supervised by the Joint Coordination Committee (JCC), chaired by the Cabinet Secretary with co-deputy chairpersons of the MCUD Secretary, the NDA Chairman and the Chief Representative of the JICA Mongolia office. JCC members are as specified in the R/D for the Project.

Under the JCC, the Project Working Group (PWG) is organized as the Mongolian counterpart organization to work with the JPT (Figure S1). The PWG consists of MCUD and NDA as the main counterpart agencies and other related ministries and organizations spelled out in the R/D. For close collaboration and cooperation, the PWG is operated as subgroups: 1) agriculture and livestock, 2) industrial development, 3) environment and tourism, 4) social development, and 5) urban and transport infrastructure. These are informal groups to encourage free and open discussions in smaller number

of participants, respectively.



Source: JICA Project Team

Figure S1 Project Implementation and Management Structure with JCC, PWG and Five Sub-groups

2. Development Paradigm, Vision, Objectives and Strategy

2.1 Development Paradigm

(1) Review of SDV2030, SDGs and Vision2050

The performance of SDV2030/Vision2050 and SDGs has been reviewed as part of macro socio-economic analysis to find out some objectives are not properly pursued and some targets may not be attained. The targets of SDV2030/Vision2050 assessed “unclear” or “low” for attainment are either related to technology or broad human resources. These are two most critical aspects to be focused in pursuing a new development paradigm. For technology, the question is what kind of technology to develop and apply to attain the Vision2050. For human resources, education and training should be oriented toward development of new knowledge and value to support the Vision2050.

The Vision2050 has been examined in view of the NCDP with respect to development paradigm, alternatives and scenario. It should emphasize the two aspects with the targets which call for appropriate technology development and application and value and knowledge development. To guide the formulation of new development paradigm, two useful models are presented: regional development model and alternative socio-economy.

(2) Regional development model

As a general method to define broad development alternatives, a regional development model is useful. This model defines alternative directions of development by combining resources and markets as shown in Figure S2.

		Market		Alternative:
		Local	Export	
Resources	Local	A	B	A: Import substitution
	Import	C	D	B: Export promotion C: Import processing D: Export processing

Source: JICA Project Team

Figure S2 Broad Alternatives for Regional Development

Alternative A corresponds to the localization model. It implies the development based on local consumption of local products, but it may be applicable only to limited products as suggested below. Alternative C is applicable when local market is significantly large. This is not the case for Mongolia. Alternative D represents typical export processing, which does not automatically ensure promotion of indigenous industries. As Mongolia is very rich in natural and cultural resources and the local market

is small due to small and dispersed population, Alternative B appears most appropriate as a general development direction. This, however, does not contradict with the localization model for local consumption of local products. The extent this idea is applicable, however, needs to be carefully examined within the Mongolian context.

For water supply for instance, use of shallow groundwater as local resources as well as extraction of river water should be examined carefully to avoid costly development of water resources by large dams and transfer of water from remote areas. Renewable energy including biomass, mini hydro, wind and solar power should be emphasized as local energy sources. Geothermal energy may be another option in Mongolia. Further, indigenous resources related to local society, culture and heritage should be utilized to create niche markets for tourism and specialty products. These resources may be utilized for outward oriented development to vitalize the regional socio-economy supported by local governments and residents.

(3) Alternative development paradigms

As another model to guide the definition of broad development alternatives, two distinctly different development paradigms are explained: 20th century development model and alternative socio-economy. These two paradigms are compared in Table S1 from a few different points of view. The 20th century development model sees resources as income or something to realize immediate gains. This applies typically to extraction of fossil fuel and other underground resources as currently undertaken in Mongolia. This view tends to encourage abusive use of resources. The alternative socio-economy sees resources as capital, on which development will be based. Capital needs to be conserved as much as possible to support continuous development activities. Economic efficiency is the prime criterion in pursuing the 20th century development model, while the alternative socio-economy takes social and environmental considerations more seriously into account.

Table S1. Comparison of Two Broad Development Alternatives

	20th century development model	Alternative socio-economy
History	Pursued by most developed countries	Sporadic attempts started recently in developing & developed countries
Resources	Income → Abuse	Capital → Conservation
Criterion	Economic efficiency	Social & environmental considerations
Effects	Highest income possible	Largest employment opportunities
Technology	Advanced technology	Appropriate or intermediate technology

Source: JICA Project Team

The 20th century development model, as the history proves, is effective in realizing highest income levels possible. The alternative socio-economy pays more serious attention to generating the largest employment opportunities possible. This does not necessarily mean that this model sacrifices economic growth in favor of employment generation. Methods to attain high income levels are different between the two alternatives.

The 20th century development model had been supported generally by advanced manufacturing technology developed in developed countries since the industrial revolution. Such advanced technology has made it possible to pursue high economic growth by intensive resource use during the 20th century. Only recently, technological innovation has started to focus on effective use of limited resources for resource recycling and saving. For resource saving methods, a lot of lessons may be learned from collective wisdom of human beings constituting traditional skills, knowledge and wisdom.

Mongolia has traditional wisdom preventing digging out pasture and polluting river water. Also, when slaughtering animals, traditional wisdom says not to waste even a drop of blood. Some people call them “Chinggis’ admonition.” These ideas may be substantiated by applying ICT and other new technology. In fact, traditional skills, knowledge and wisdom should be strengthened by new technology to develop appropriate or intermediate technology, which should support the alternative socio-economy.

2.2 Development Vision

(1) Proposed vision

A vision should be established for national comprehensive development of Mongolia. Sharing a vision among all the stakeholders helps to muster efforts of many stakeholders in undertaking new socio-economic activities to realize the national and regional development with the common concepts. The following vision is proposed, reflecting the unique characteristics of Mongolia with rich natural and cultural resources and in line with the idea of regional development and the concepts of the alternative socio-economy examined above.

Vision for Regional Development of Mongolia

Realization of robust and resilient socio-economy, adapting to changing world and open to the global society on the one hand and realizing sustainable and inclusive development on the other, characterized by sensible management and use of resources as capital, diverse economic activities effectively linked to generate sufficient and decent employment opportunities and rich cultural heritage of mixed ethnicity that are managed by responsive and transparent governance systems with people's participation, supported by advanced appropriate technology in all the sectors and human resources with mindset to pursue new value and knowledge.

This vision may be supported by the following conditions that characterize the alternative socio-economy:

- 1) Less resource intensive economic activities,
- 2) Economic activities with smaller environmental stress,
- 3) Economic activities ensuring large employment generation and maximizing value-added,
- 4) Local mechanism to allow resources management by local people and communities, and
- 5) System of advanced appropriate technology complementing traditional techniques with advanced technology.

These conditions are mutually related to one another. Condition 1) of less resources intensive economic activities contributes to Condition 2) of smaller environmental stress by effective utilization of resources with minimal wastes. Such economic activities that satisfy these conditions engage larger number of people to utilize wastes and byproducts and thus contribute to Condition 3).

To promote these economic activities as a whole, it is desirable that a mechanism exists for managing resources by and for the benefit of local people and society as Condition 4) requires. To support such alternative socio-economy, a system of appropriate technology should be established by combining traditional techniques and advanced technology as Condition 5) requires.

The vision is substantiated by the following:

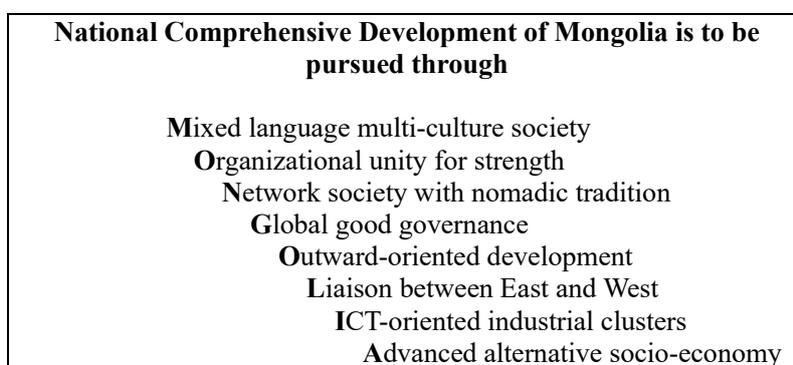
- 1) Network of transport and logistic infrastructure of high quality linking Ulaanbaatar and major regional cities to neighboring countries;
 - 2) Vertical industrial clusters based on primary products of crop farming and livestock linking livelihood activities by the poor, through indigenous industries to export industries producing a variety of products having comparative advantage in the global market;
 - 3) Environment friendly and less resource intensive socio-economic activities including responsible mining combining traditional wisdom of peoples with modern technology;
 - 4) Active communities of mixed ethnicity constituting the peaceful and prosperous society with revitalized conventional cultural activities that residents are proud of and visitors can appreciate;
- and

- 5) All of the above embraced in rich natural environment under proper management by local communities and local governments to ensure just, peaceful and prosperous society.

The conditions 2) and 3) substantiate the idea of alternative socio-economy adopted for the national comprehensive development of Mongolia. The condition 1) supports the outward oriented development also adopted above for the regional development in Mongolia. The condition 4) represents the outcome of pursuing the alternative socio-economy, and the condition 5) ensures the sustainable management and utilization of natural resources as the base for the regional development in Mongolia.

(2) Important concepts to support the vision

To make concerted efforts for the national comprehensive development involving all the stakeholders, it is useful to establish common concepts applicable to the development that can be shared by all the stakeholders. Important common concepts are presented as shown in Figure S3 to facilitate sharing by all the stakeholders in Mongolia.



Source: JICA Project Team

Figure S3 Key Concepts for National Comprehensive Development of Mongolia

Mixed language multi-cultural society characterizes Mongolia accommodating peoples of widely different ethnic, socio-cultural, religious and other backgrounds. This is taken as a positive factor as it would contribute to diversity of human resources, economic activities, social systems and infrastructure facilities and enhance resilience and robustness of regions in Mongolia.

Organizational unity for strength is most important concept in realizing development potentials for the benefits of people. This concept is the key to realize just, peaceful and prosperous society of empowered people and communities supported by responsive, participatory and transparent governance systems, reflective of Mongolia's distinct cultural identity, and rights to fiscal and political self-determination.

Network society with nomadic tradition represents a strength of Mongolia with high penetration of communication systems linking people throughout the vast territory of Mongolia including nomadic people in remote areas. This allows peoples of different backgrounds to gain access to modern services, while preserving their respective traditions.

Global good governance has two important implications. First, to support the alternative socio-economy, rich natural resources in Mongolia should be effectively utilized, supported by good governance. Second, by deepening economic relationships with countries in the Greater Central Asia, Mongolia can contribute to global economy and global governance. A lesson may be learned from the model of liberal association of nomadic countries under the Mongolian Empire. Such a mosaic regime with many member countries may represent futuristic form of global governance applicable to Europe, the Middle East and elsewhere.

Outward-oriented development is inevitable as the domestic market is small in Mongolia, but more positively it will utilize strategic geographic position of Mongolia neighboring on Russia and China and links strengthened with other countries. Service activities related to international trade represent non-

resource intensive and high value-added economic activities fit well with the concept of alternative socio-economy.

Liaison between East and West represents potential roles of Mongolia to play in international and diplomatic arenas. Promotion of mutual understanding and exchange of various cultures and societies are expected between Mongolia and other countries in the Greater Central Asia. One specific example is cooperation in excavation and restoration of Buddhism remains distributed widely in the region. Another example is social and cultural exchange through tourism development.

ICT-oriented industrial clusters based on primary products provide a viable means to realize self-reliant regional development with broad-based inclusive development, alternative socio-economy, and proper natural resources management. They would link livelihood activities by the poor through indigenous industries to export industries, generating large number of employment opportunities and attaining high value-added without increasing environmental stress in line with the concept of alternative socio-economy. ICT application to link all the players in each cluster would facilitate the cluster development and operation.

Advanced alternative socio-economy is realized by these activities illustrated here. A system of appropriate technology to support the alternative socio-economy is developed by combining traditional techniques/wisdom and advanced technology, which in fact proves to be most advanced technology.

2.3 Macro Development Objectives and Basic Strategy

(1) Problem structure analysis

Macro development objectives and basic strategy for the NCDP have been derived from a problem structure analysis, an effective method of regional development planning. By the problem structure analysis, three problem phenomena are identified: 1) Serious urban environmental problems in Ulaanbaatar, 2) High and sustained poverty incidence, and 3) Lack of capital accumulation. Macro problems related to these problem phenomena include, high unemployment and vulnerable employment, undiversified economic structure, undiversified export goods, lack of employment opportunities in rural areas, large rural-urban disparities, and over-concentration of population and economic activities in Ulaanbaatar.

Four inherent problems facing Mongolia's regional development are identified as land locked status, vast national land territory, maldistribution of limited water resources, and extremely harsh winter climate. Other than these problems, that are difficult to overcome, three fundamental problem factors are: 1) Weak capacity of local administrations, 2) Inadequate regional planning and implementation institutions, and 3) Limited financial capacity of the Central Government.

These problem factors cause many significant problems at the root of observed problem phenomena. Weak capacity of local administration causes limited access to agriculture and livestock input and support services, insufficient control of livestock diseases, and ineffective marketing of livestock products, causing in turn low productivity of agriculture and livestock and limited and low productivity processing of primary products.

Inadequate regional planning and implementation capacity causes excessive goat population beyond sustainability, over-reliance on mining for economic growth, and under-utilization of tourism resources, causing in turn degradation of grazing land and environmental problems associated with mining development. These are problems to be addressed at the regional level.

Other fundamental problems to be addressed at the national level are related to infrastructure development, technological and human development. They include lack of counter-measures for climate changes, limited human resources with high skills and technology, over-reliance on coal for domestic energy and export, incomplete road network of high quality, and limited irrigation facilities.

(2) Macro development objectives and basic strategy

Based on the three problem phenomena and the macro problems identified for regional development in Mongolia, macro development objectives may be defined as follows:

- 1) To diversify economic structure and export through increasing capital accumulation (economic objective);
- 2) To generate lucrative and stable employment opportunities in rural areas and local towns to reduce poverty and urban-rural disparities (social objective); and
- 3) To alleviate urban environmental problems by alleviating adverse effects of over-concentration of population and economic activities in Ulaanbaatar (environmental objective).

Based on the three fundamental problem factors and associated problems at the root of many observed problems, basic strategy for regional development in Mongolia may be established with the following components:

Economic strategy

- a) Effective utilization of rich natural resources for efficient primary production, and
- b) Processing of primary products to increase value-added for export markets.

Spatial strategy

- a) Utilization of locational conditions neighboring on Russia and China to establish links with global markets, and
- b) Water resources development and management as instrument of green development.

Institutional strategy

- a) Strengthening local administrations by steady decentralization of development administration system .

In addition, industrial cluster development should be pursued under the following strategy to integrate value-added production by the economic strategy and effective infrastructure development by the spatial strategy.

Industrial cluster development strategy

- a) Promotion of vertical industrial clusters based on primary products to integrate value-added production and effective infrastructure development.

A vertical industrial cluster based on primary products links livelihood activities by the rural poor such as traditional livestock farming to indigenous industries such as meat and dairy products industries, and further to export industries such as quality food products industries. By establishing export products that can sell in the global market, the entire industrial cluster becomes viable linked to them. This, therefore, could be an effective measure to alleviate poverty.

2.4 Development Objectives and Strategy by Sector

(1) Development objectives and strategy for economic sector

Through the discussions with stakeholders and literature review of policy documents by sector, the development objectives and strategy for economic sector set by the NCDP are as follow.

	Development objectives of the NCDP	NCDP strategy
Crop farming	<ol style="list-style-type: none"> 1) To realize 100% self-sufficiency of wheat, potatoes, and vegetables, 2) To introduce diversified agro-products and integrated 	<ol style="list-style-type: none"> 1) Introducing appropriate technologies which contribute to production and productivity increase, 2) Promoting diversified crop production and integrated farming with livestock,

	<p>approaches,</p> <p>3) To establish market-oriented agriculture for improvement of livelihood, and</p> <p>4) To pursue natural and social environment-friendly agriculture.</p>	<p>3) Pursuing better market environment and customer satisfaction through value addition, and</p> <p>4) Ensuring environment-friendly cultivation practices for sustainable agriculture.</p>
Livestock	<p>1) To establish Mongolia as the leading livestock country in the world with respect to organic farming and total processing without wastes,</p> <p>2) To produce high quality livestock products such as meat and dairy products for domestic and export markets,</p> <p>3) To provide robust base for processing industries of variety of livestock products to contribute to high value-added and large employment opportunities, and</p> <p>4) To preserve lively and viable nomadic tradition as inherent culture of Mongolian society and attractive base for international tourism.</p>	<p>1) Promotion of intensive or semi-intensive livestock farming combining confined rearing and grazing following the Government policy to ensure sufficient and stable supply of meat and dairy products for growing urban population and export markets;</p> <p>2) Re-vitalization of herders' communities based on nomadic livestock farming and culture as the basis for cultural and heritage tourism and the Mongolian model of alternative socio-economy for preservation of ecosystem;</p> <p>3) Designation of controlled grazing land to prevent further degradation;</p> <p>4) Increasing processing of livestock products by value chain development for higher value-added by zero-waste or total processing;</p> <p>5) Improvement of market access for livestock products as part of export diversification; and</p> <p>6) Application of advanced technology for production, processing and marketing of livestock products such as ICT.</p>
Mining	<p>1) To maintain the mining sector as the driving force for Mongolia's continuous economic growth and increase in export value;</p> <p>2) To facilitate capital accumulation through mining development to support investments in agriculture and livestock, processing industries and other economic activities as well as various infrastructure necessary for economic diversification; and</p> <p>3) To establish Mongolia as a model mining country for responsible mining in harmony with social and natural environment by utilizing mining activities for improvement of living environment and conservation of natural environment.</p>	<p>1) Policy adjustment of mining activities to ensure modest and sustainable growth</p> <ul style="list-style-type: none"> - Value-added production of coal for domestic and export markets - Promotion of mineral resources production that can be processed domestically for export market - Stable production and processing of domestic energy resources <p>2) Establishment of a comprehensive database for mineral resources to ensure sustainable mining sector</p> <ul style="list-style-type: none"> - Promotion of geological exploration activities - Introduction of advanced technology for efficient exploration, survey, analysis and extraction of mineral resources - Application of ICT for database management <p>3) Establishment of responsible mining</p> <ul style="list-style-type: none"> - Establishment of principles to be applied to mining activities including ownership, licensing and contracting - Preparation of standard contract formats to be observed by investors and developers for mining activities - Establishment of environmental monitoring system by the local initiative in line with stepwise implementation of localization of development administration
Manufacturing	<p>1) To contribute significantly to increasing value-added and employment opportunities by processing of primary products</p>	<p>1) Establishment of clear distinction of roles of the private sector and the Government,</p> <p>2) Formulation of sound, stable and transparent legal and policy framework for industrial</p>

	<p>of crop and livestock farming, and mining;</p> <p>2) To contribute to diversification of economic activities and export products; and</p> <p>3) To realize more balanced distribution of population and economic activities and reduced income disparities between Ulaanbaatar and regions by creating employment opportunities in local cities.</p>	<p>development,</p> <p>3) Facilitation of products development with technology and market development for export by private investors and</p> <p>4) Promotion of ICT industry to support a wide range of socio-economic activities to reduce consumptive use of resources in line with the alternative socio-economy paradigm.</p>
Tourism	<p>1) To develop tourism as a major industry supporting the new paradigm of alternative socio-economy not depending much on consumptive use of resources;</p> <p>2) To contribute not only to economic growth and employment generation but also to preservation and enhancement of natural environment and cultural heritage; and</p> <p>3) To enhance the image of Mongolia in the international society as the Country with environmental strength, openness and free land rich in natural beauty and culture.</p>	<p>1) Establishment and strengthening of selected tour routes that appeal to international tourists due to uniqueness of untouched nature and nomadic culture,</p> <p>2) Stronger initiatives for developing tourism products based on regional and international tourism cooperation,</p> <p>3) Open sky policy for air access including direct access points in regions and simplified visa policy,</p> <p>4) Proactive and cooperative marketing to protect and utilize common tourism resources and ensure sustainability of tourist destinations,</p> <p>5) Developing proper service stops along main tour routes to increase benefits to local economies and to provide quality tourism information and services, and</p> <p>6) Introduction of institutional mechanism to use tourism income for investing in fresh water, waste management and other critical issues that host communities are faces with.</p>

(2) Development objectives and strategy for infrastructure

Through the discussions with stakeholders and literature review of policy documents by sector, the development objectives and strategy for infrastructure set by the NCDP are as follow.

	Development objectives of the NCDP	NCDP strategy
Transport & logistics	<p>1) To strengthen the spatial structure of Mongolia;</p> <p>2) To support diversification of economy and export products; and</p> <p>3) To facilitate social services delivery in urban and rural areas.</p>	<p>1) Stage-wise development of artery roads,</p> <p>2) Prioritized improvement of sub-artery roads,</p> <p>3) Selective improvement of roads to support industrial cluster development linking primary production areas, processing bases and export markets,</p> <p>4) Railway development to support exports and transit trade,</p> <p>5) Development of air transport network to ensure mobility of people throughout the Country,</p> <p>6) Enhancement of urban functions of Ulaanbaatar and a few selected cities,</p> <p>7) Improvement of border infrastructure to facilitate export and transit trade,</p> <p>8) Improvement of access to major tourism areas,</p> <p>9) Establishment of conditions to increase passengers on railway,</p> <p>10) Removal of transport bottlenecks for export products including coal,</p> <p>11) Improvement of rural access roads to facilitate social</p>

		service delivery, and 12) Introduction of institutional mechanism to improve rural access roads.
Power & heat supply	<ol style="list-style-type: none"> 1) To ensure stable and quality supply of power and heat to support socioeconomic development of Mongolia; 2) To contribute to regional development by utilizing indigenous energy resources; and 3) To improve living environment of all the people in urban and rural areas. 	<ol style="list-style-type: none"> 1) Application of most advanced technology for development of limited coal-fired power plants to minimize adverse environmental effects, 2) Promotion of local energy development based mainly on locally available renewable energy, 3) Establishment of regional energy companies to manage and operate power and heat supply developed by the Government, 4) Demand side management to smooth out seasonal and diurnal demand fluctuations for power and heat by pricing, incentive measures to encourage off-peak power use, energy saving methods and others.
DX/ICT	<ol style="list-style-type: none"> 1) To support digital transformation of all the socioeconomic sectors as well as the public sector; 2) To improve productivities significantly in all the economic sectors; 3) To make social services provision accessible for all the people; and 4) To contribute to inclusiveness and correction of information inequality or digital divide. 	<ol style="list-style-type: none"> 1) Accelerated application of ICT to all the sectors as the means for integrated and inclusive development in line with SDGs, 2) Upgrading of ICT infrastructure for the forthcoming 5G and 6G age and beyond, 3) Development of Agro-IT parks and industrial parks as venues for cooperation among the National Government, local governments, and private companies, 4) Strengthening of ICT related curricula at primary education as part of the ongoing education sector reform, and 5) Establishment of local information platforms of open data system allowing easy access and two-way communications between local governments and local people including nomads.
Urban development	<ol style="list-style-type: none"> 1) To upgrade the urban functions of Ulaanbaatar as a global city; 2) To strengthen urban functions of regional core cities for economic diversification, and 3) To promote complementarity of urban centers for pleasant living environment including social services delivery. 	<ol style="list-style-type: none"> 1) Structural reform of Ulaanbaatar into multiple cores and city road system, 2) Development of satellite cities around Ulaanbaatar, 3) Improvement of residential environment especially in Ger district through redevelopment projects, 4) Improvement of urban planning and regulation tools, 5) Formulation of urban development master plans for local core cities, 6) Formulation of guidelines for housing planning and implementation in Ger district, 7) Formulation/updating of urban development master plans for regional core cities and local growth centers anticipating rapid population increase.

(3) Development objectives and strategy for environment

Through the discussions with stakeholders and literature review of policy documents by sector, the development objectives and strategy for environment set by the NCDP are as follow.

	Development objectives of the NCDP	NCDP strategy
Environmental development	<ol style="list-style-type: none"> 1) To maintain and enhance quality of natural environment as most important capital to be used continually for sustainable and inclusive development in line with alternative socio-economy; 	<ol style="list-style-type: none"> 1) Enhancement of quality of natural environment by: <ul style="list-style-type: none"> - Proper management of pastureland, - Protection of forest areas, watershed areas and other vulnerable areas, - Proper land use planning and implementation for mining, infrastructure and settlement, and

	<p>2) To establish ownership for indigenous resources endowed in regions and the Country by raising awareness of people and strengthening institutions for environmental management; and</p> <p>3) To realize pleasant and comfortable living environment for residents in urban and rural areas throughout the Country.</p>	<ul style="list-style-type: none"> - Promotion of responsible mining and environment-friendly economic activities such as zero-waste processing. - Establishment of ownership for indigenous resources by: - Raising awareness of people for environmental resources, and - Establishing locally based environmental monitoring system involving local people and administrations, <p>2) Realization of pleasant and comfortable living environment in urban and rural areas by:</p> <ul style="list-style-type: none"> - Proper planning for cities and rural settlements, - Provision of basic life infrastructure for water supply, sewerage, energy and waste management and disposal, and - Generation of decent employment opportunities based on use of indigenous resources.
Social development	<p>To improve social environment in urban and rural areas with provision of adequate social infrastructure and services and decent employment opportunities;</p> <p>1) To enhance capacity of individual human beings by basic social services including education and health care and training for employment in viable economic activities; and</p> <p>2) To strengthen communities with self-reliant institutional and social fabrics through development planning and implementation for community facilities with participation of local people.</p>	<p>1) Further reform of education system with respect to education performance reflecting PISA evaluation, increasing enrolment rate at pre-school, enhancement of inclusive education, alternative schooling for nomadic people, curricula at higher education oriented to new job opportunities etc.</p> <p>2) Health services oriented more to primary and preventive care, reducing disparity between urban and rural areas, and improving distribution of health personnel,</p> <p>3) More focused provision of social protection and welfare,</p> <p>4) Rectification of gender gaps in potentially high earning positions to be assumed by qualified women,</p> <p>5) Continuous training and lifelong education,</p> <p>6) Improving matching between education and job opportunities, and</p> <p>7) Step wise decentralization of development administration to re-vitalize rural areas and participatory planning and implementation of community facilities involving local people.</p>
Water resources	<p>1) To enhance resilience of Mongolian people and societies in the face of climate change and other adverse effects of human interventions;</p> <p>2) To maintain and enhance the quality of natural resources with forests and landscape;</p> <p>3) To ensure adequate supply of water in good quality, sanitation and water-related environment; and</p> <p>4) To contribute to economic growth and diversification with hydropower as renewable energy as well as other water-related infrastructure.</p>	<p>1) Facilitation of early implementation of hydropower development at advanced stage of preparation,</p> <p>2) Renovation and expansion of water supply network with increased number of water supply kiosks connected to piped system,</p> <p>3) Wastewater treatment plants renovation and construction in regional core cities and local growth centers,</p> <p>4) Renovation and development of water sources for livestock,</p> <p>5) Sewerage network renovation and development,</p> <p>6) Small wastewater treatment plans at Soum centers with sewage recycling,</p> <p>7) Improvement of sanitation and wastewater disposal in Ger district,</p>

		<p>8) Feasibility studies for major water resources development projects to establish future options to meet rapidly increasing water demand for various purposes,</p> <p>9) Awareness raising for water saving and water recycle-oriented society.</p>
Climate change	<p>1) To take comprehensive measures for climate change adaption as proposed by the Environmental Performance Review of Mongolia (EPRMNG) by United Nations in November 2018, and</p> <p>2) To strengthen monitoring and early warning system for Dzud and droughts by regular communications between local administrations and people in remote rural areas including nomads.</p>	<p>1) Improvement of pasture management including designation of controlled grazing areas,</p> <p>2) Adoption of better farming techniques such as zero-tillage farming,</p> <p>3) Proper water resources development and management to meet specific needs in different regions,</p> <p>4) Protection and expansion of forest areas to enhance water and vegetation retention capacity, and</p> <p>5) Establishment of effective communications system between local administrations supported by the Central Government for database and people in remote rural areas including nomads.</p>

3. Socio-economic Framework and Development Alternatives

3.1 Population and Labor Force Projections

(1) Population projection

There are three kinds of population projections available for 2030: official population projection by the Statistical Office of Mongolia, alternative projections by the United Nations (UN) Population Division, and a new projection by the JPT. These projections estimate the population of Mongolia in 2030 at 3,863,000 by the Statistics Office, between 3,635,000 and 3,797,000 under three variants by UN and 3,740,000 by the JPT. The official projection is adopted for the NCDP.

(2) Labor force projection

The working age population or the number of people between the age 15 and 64 is projected by the Statistics Office by applying the labor participation rate (LPR) to estimate the population of Mongolia in 2030 by age group. It is assumed the LPR assumed constant until 2030. Applying the working age population and LPR in 2030, the labor force supply in 2030 is estimated to be 1,567,400.

3.2 Development Alternatives

(1) Definitions

Macro development alternatives are defined primarily on the basis of socio-economic possibilities as shown in Table S3.

Table S2 Macro Development Alternatives

Alternative	Definition
A. Mining-led development	Continued reliance on mining for economic and export growth with minimal processing of mining products and agro-products
B. High manufacturing development	Processing industries of mining and agricultural products as driving force for development
C. Transit trade-oriented development	Transit trade across Mongolia as another driving force for development with highest growth of services sector
D. High growth hybrid development	Processing industries of mining and agricultural products and transit trade to attain highest economic growth

Source: JICA Project Team

Alternative A represents the trend development except agricultural growth set at realistic sustainable rate, which will continue relying on mining development as the prime driving force. Alternative B relies on high growth of manufacturing sector to process higher shares of mining and agricultural products than currently undertaken, while mining would grow at a modest rate. Alternative C relies more on the transit trade between China and Russia, while manufacturing would continue to grow steadily following more or less the trend. Alternative D combines Alternative B for high industrialization and Alternative C for transit trade as the driving force to attain high economic growth.

The target sector GDP growth rates of the four alternatives are summarized in Table S3. This projection does not reflect effects of the recent COVID-19.

Table S3 Sector GDP Growth Rates until 2030 for Four Development Alternatives

(Unit: %/year)

Sector	A: Mining-led development	B: High manufacturing development	C: Transit trade-oriented development	D: High growth hybrid development
Agriculture	3.5	3.5	3.5	3.5
Mining	6.3	5.0	5.0	5.0
Manufacturing & utilities	7.0	9.4	7.6	9.4
Service	7.5	7.5	8.0	8.3
GDP	6.7	6.7	6.7	7.1

Source: JICA Project Team

(2) Evaluation of development alternatives

The four alternatives are compared from the perspectives of urbanization and population distribution, social effects, environmental effects and development management as shown in Table S4.

Table S4 Evaluation of Macro Development Alternatives by Selected Indices

Alternative	A: Mining-led development	B: High manufacturing development	C: Transit trade-oriented development	D: High growth hybrid development
Economic growth, % p.a.	6.7			7.1
Labor requirement, thousand	1,562	1,559	1,556	1,555
Manufacturing GDP growth	7.0	9.4	7.6	9.4
Service GDP growth	7.5	7.5	8.0	8.3
Urbanization and population distribution	Continued population concentration in Ulaanbaatar with increased primacy Continued out-migration of people Decrease of population in rural areas and local towns	Development of local towns with manufacturing industries and associated services Ulaanbaatar primacy at similar level as present No net out-migration of people	Development of local towns along major arteries more with services Slightly increased primacy of Ulaanbaatar with more services orientation No net out-migration of people	Large in- and out-migration Development of local towns as well as Ulaanbaatar Ulaanbaatar as global city with higher order services Better balance between regions

Social effects	Increased urban-rural disparities due to limited employment generation particularly in rural areas Disruption of social and family ties due to continued out-migration	Reduced urban-rural disparities due to employment generation in local towns Better social and family ties due to processing of primary products and reactivated agriculture and livestock farming in rural areas and local towns	Continued urban-rural disparities due to concentration of urban population along limited arteries Social problems associated with urbanization of local towns and service-oriented development	Decrease in urban-rural disparities Large employment generation and better social and family ties in rural areas due to processing of primary products Possible conflicts with in-migrants
Environmental effects	Adverse environmental effects due to expansion of mining Aggravation of urban environment in Ulaanbaatar due to continued over-concentration	Generation of new urban environmental problems in local towns Reduced environmental problems associated with mining	Possible aggravation of urban environment in Ulaanbaatar Generation of urban environmental problems in local towns Reduced environmental problems associated with mining	Possible aggravation of urban environment in Ulaanbaatar Generation of urban environmental problems in local towns
Development management	Increased management needs to deal with social and environmental problems Difficult development management due to limited capital accumulation	Need to support manufacturing industries for products development with technology and market development Need to deal with environmental problems in local towns by local administration	Need to expand infrastructure capacity in Ulaanbaatar and local towns High management need for Ulaanbaatar to enhance competitiveness for services Need for infrastructure development in local towns by local administration	High management needs to make Ulaanbaatar a global city Technology and skill development to support manufacturing industries Need for infrastructure development in local towns by local administration

Source JICA Project Team

(3) Recommended development alternative

Of the four alternatives examined, the high growth hybrid scenario is recommended because it will generate the largest employment opportunities, fully utilize the potential of Mongolia and be environmentally favorable as shown in Table S5. This alternative is further examined with respect to labor supply and demand balance, labor productivity by sector and in- and out-migration implications.

1) Population and labor supply

The population of Mongolia in 2030 projected by the Statistics Office was further reviewed. Such a growth assumed under the high growth hybrid scenario would be achieved through active interactions with neighbor countries. Naturally the resident population of Mongolia will come to have more international residents including ethnic Mongolians from Inner Mongolia, Buryats in Russia, Kazakh in Kazakhstan etc. Some of the Mongolians living abroad will return to Mongolia seeking better jobs, too. It will, therefore, be reasonable to assume an addition of some population in this regard.

The Mongolians living abroad is broadly estimated to be 87,300 in 2018 according to the statistics, although there are some views that 150,000 or 200,000 Mongolians live abroad. It is assumed, for the purpose of projection, that 50 % of 87,300, which is 43,600, return to Mongolia by 2030. In addition, international residents from neighboring countries are estimated to be about 61,200.

In total 104,800 people including international residents are added to the 2030 population. The 2030 population is estimated to be 3,967,600 and labor supply 1,587,600, assuming labor force coefficient (LFC) at 62.2% and LPR at 64.3%.

2) GDP and labor productivity

The sector GDP growth rates and labor productivity were further reviewed. The required levels of labor productivity improvement to achieve the target GDP were 3.5%, 4.0%, 4.5% and 4.5% per year for agriculture, mining, manufacturing plus utilities and service respectively under the high growth hybrid scenario. The rates of increase in labor productivity for manufacturing plus utilities and services as assumed seem to be attainable in view of experiences in other countries as well as past trend in Mongolia.

(4) Population and GDP in 2040

The population and GDP for Mongolia in 2040 are estimated in the same manner based on the modified high growth hybrid alternative for 2030. The population in 2040 is estimated to be 4,637,600 and labor supply 1,849,100.

The GDP growth rate between 2030 and 2040 is assumed to be 6.7% per year. The SDV2030 sets the economic development target at 6.6% per year up to 2030, while the Vision2050 sets the long-term growth at 6% per annum. The GDP growth rates and labor productivity improvement rates are derived as shown in Table S5.

Table S5 GDP Growth Rates and Labor Productivity Improvement

<u>Sector</u>	<u>GDP Growth (%/year)</u>	<u>Labor Productivity Improvement (%/year)</u>
Agriculture	3.5	3.5
Mining	5.0	4.0
Industry and utilities	7.5	4.5
Service	7.0	4.9
GDP	6.7	4.7

Source: JICA Project Team

4. Spatial Structure for National Comprehensive Development Plan

4.1 Proposed Spatial Structure with Urban Hierarchy and Artery Network

The national spatial structure proposed by the recent studies and adopted partly the Parliament Resolutions is not ideal as it does not serve the entire territory of Mongolia properly. Main development areas are inclined to the east along the north-south economic corridor via Ulaanbaatar and to the north along the east-west green corridor. Four out of five north-south axes designated by the Parliament Resolution No. 9 of 2001 have not been effectively established. Location of the capital city has dominant effects on the distribution of economic activities and population. There have been proposals to transfer the capital to realize more balanced spatial distribution, and Kharkhorin or a new town nearby located close to the center of the national territory is one of the candidates.

(1) Urban hierarchy

The analysis on urban hierarchy is conducted to identify the regional core cities, the local growth cities and the local service centers. Cities at each tier are listed in Table S6 with functions of cities at each tier.

Table S6 Urban Hierarchy with Cities and Functions at Each Tier

Urban hierarchy	City	Functions
National capital city	Ulaanbaatar including Nalaikh and Zuunmod	Main political/administrative center; Global business center; Model mega green city with quality urban greenery & amenity; ICT base station & international transport, served by advanced urban transport system

Regional core cities	Erdenet including Bulgan, Darkhan, Choibalsan, Sainshand, Khovd, Bayankhongor	Multi-function city with high grade infrastructure providing economic and social service activities for a broad area such as a group of Aimags
Local growth cities	Baganuur, Choir, Zamyn-Uud, Murun, Dalanzadgad, Sukhbaatar, Undurkhaan, Mandalgovi	City having specialized growth function to drive the local economy
Local service cities	Remaining 12 cities	Center focusing on social services function

(2) Proposed ring artery

The national spatial structure of Mongolia, however, should be strengthened without undermining urban functions of Ulaanbaatar essential in the global world based on the concentration economy. A new ring artery is proposed to strengthen the national spatial structure, linking cities in Western, Khangai, Central and Eastern Regions effectively as shown in Figure S4. While existing roads link local cities with Ulaanbaatar separately, the ring artery link local cities mutually to induce their development. The ring artery will be established in steps by utilizing existing roads and become a high grade highway after 2030.

The proposed ring artery has the following characteristics favorable for more balanced spatial development of Mongolia:

- (a) The area inside the ring artery may be developed as the core region supported by high grade infrastructure to lead the Mongolian development in the 21st century;
- (b) Some of the important urban functions of Ulaanbaatar will be effectively transferred and shared by the cities along the ring artery;
- (c) Urban functions of Uliastai at the western end of the ring artery will be upgraded to strengthen the link of Western Region to the capital;
- (d) Urban functions of Undurkhaan at the eastern end of the ring artery will be upgraded to strengthen the link of Eastern Region to the capital;
- (e) The northern section of the ring artery will link the Aimags and cities in the border areas with Russia to realize tourism and trade development potentials; and
- (f) The southern section of the ring artery will improve the access from the Aimags bordering on China to the advanced region to the north.

This ring artery will affect urban functions of cities along and close to the artery. Urban hierarchy should be strengthened by reflecting expected urban functions of these cities as a result of the ring artery establishment. In other words, certain urban functions should be deliberately strengthened in selected cities. The urban hierarchy in the future reflecting these changes by some policy intervention is also shown in Figure S4.

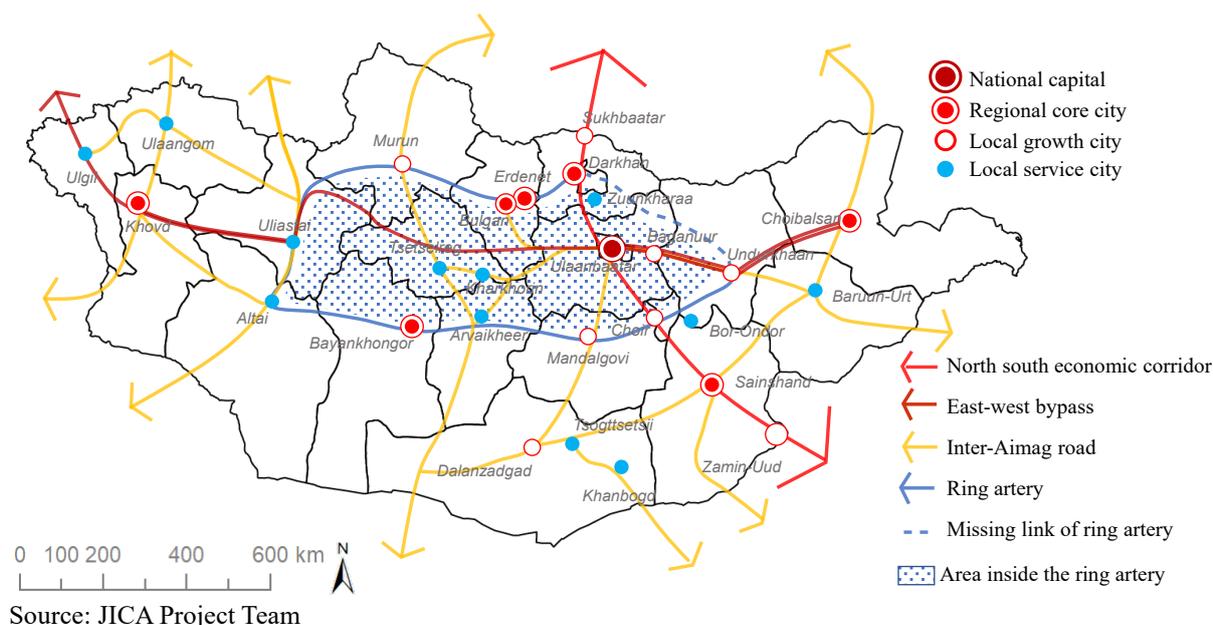


Figure S4 National Spatial Structure with Conceived Ring Artery

(3) Proposed spatial structure with inter-Aimag and international links

The national capital, regional core cities and local growth centers will be interlined effectively by the ring artery. The northern section of the ring artery will go through productive pasture, farmland, forest and tourism areas in the nature represented by the Khuvsgul lake. It will form a green corridor for tourism and trade which do not involve much consumptive use of natural resources. The southern section will connect regional core cities and local growth centers which serve Aimags in the south to facilitate domestic trade of commodities and processed products as well as provision of higher order services.

The north-south economic corridor will interlink the border city of Sukhbaatar at the Russian border and Zamyn-Uud at the Chinese border through Ulaanbaatar. From the ring artery, the north-south axes will be strengthened and extended to China, Russia and Kazakhstan.

The regional core cities, local growth cities and local service centers are connected by inter-Aimag roads as secondary arteries. Inter-Aimag arteries link Aimag centers and main cities to the neighboring countries as well.

Approximately 1.8 million population (or 54% of total population) reside in the inner area within the ring artery. The inner area is endowed with rich natural, cultural and mining resources. For instance, heritage of Kharkhorin and tourism resources in the inner area may be combined to establish a cultural corridor linking Kharkhorin and Tsetserleg. It may be linked to the tourism and trade corridor of the northern section of the ring artery. This area may become a driving force for Mongolian development in the 21st century supported by high grade infrastructure. Another telecommunication backbone may be established in the near future linking Uliastai in the west and Undurkhaan in the east through Ulaanbaatar.

4.2 Indicative Land Use Plan

(1) Criteria for land use conversion for NCDP

Following the self-sufficiency policy, existing cropland will remain as original land use in principle. Existing fodder, fruit and oil seed land will be expanded. Especially, fodder production will be enhanced around intensive or semi-intensive livestock areas. The highly suitable areas for fodder, fruit and oil seed are defined within the distance of 80km from Aimag centers and 20km from the national artery road for convenient access to market, manpower and maintenance.

Moderately and highly degraded pasture within the high-risk area of Dzud should be preserved or converted to intensive livestock land use. Moderately and highly degraded pasture as well as slightly degraded and normal pasture within the risk area of Dzud is managed as control grazing land use.

Existing forest area should be protected in line with the Vision2050. Strictly protected area should be slightly increased for the achievement of the Vision2050 targets at 30% in 2030, 33% in 2040 and 35% in 2050 of the total national land. The new strictly protected area proposed by Ministry and Environment and Tourism (MET) are reflected in the indicative land use plan.

Mining and oil land management should be undertaken along with the NCDP policy for responsible mining and oil development. The protected water recharge area suggested in the National Land Management Plan (NLMP) is conserved to prevent the encroachment from mining development and settlement. Genuine desert and very dry desert are indicated to differentiate from pasture and other types of use. Settlement areas are to be expanded along with increasing population. A range of buffer zones will be established around residential areas for future habitation.

Following these conditions, the land use categories for the indicative land use plan are set as: agriculture-cropland, normal pasture, intensive livestock, control grazing, forest, settlement, transport-road, railway and airport, and special land-protected area, border strip and free zone (the protected area includes strictly protected area, monument, nature reserve and national conservation park).

(2) Indicative land use map and estimated land area by category

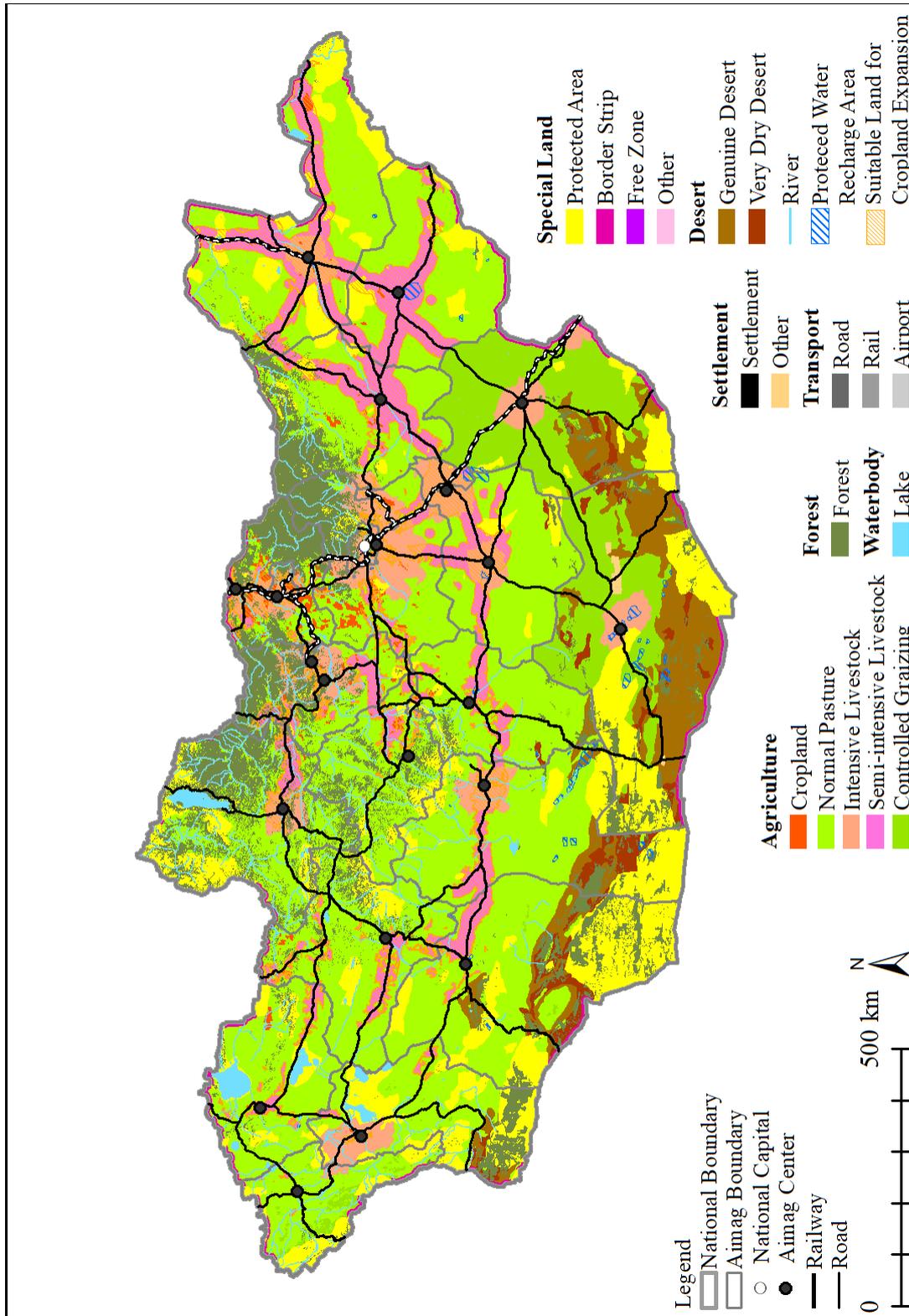
In line with the proposed criteria for the land use conversion, the indicative national land use plan is prepared as shown in Figure S5. Land area for each land use category is estimated as shown in Table S7.

Table S7 Land Area by Land Use Category in Indicative National Land Use Plan

Main	Sub	Land Area (km ²)	Share (%)
Agriculture	Cropland	12,498	0.8
	Normal Pasture	634,773	40.2
	Intensive Livestock	101,764	6.4
	Semi-intensive livestock	140,824	8.9
	Control Grazing	129,391	8.2
Forest	Forest	185,390	11.7
Water Body	Lake	13,922	0.9
Settlement	Settlement	516	0.0
	Other	1,594	0.1
Transport	Road	117	0.0
	Rail	91	0.0
	Airport	12	0.0
Special Land	Protected Area	230,103	14.6
	Border Strip	26,050	1.6
	Free Zone	20	0.0
Desert	Genuine Desert	79,377	5.0
	Very Dry Desert	22,496	1.4
Total		1,578,901	100.0

Source: JICA Project Team

Note: The estimated land area for the Protected Area does not include Forest within the Protected Area.



Source: JICA Project Team

Figure S5 Indicative National Land Use Plan of Mongolia

4.3 Spatial Analysis on Water Resources and Climate Change

(1) Water balance analysis

The JPT has estimated potentials for surface water and groundwater by using mathematical models, which have been calibrated by using observed discharge data at selected hydrological stations and observed precipitation and temperature data provided by NAMEM. The JPT has estimated water demand for various uses in line with the socioeconomic framework. Water supply-demand gaps have been calculated by Aimag and by Soum. No serious water gaps appears up to 2040 except Ulaanbaatar even for dry year. However, several Soums will face serious water shortages in 2040 for dry year as shown in Table S8.

Table S8 Soums to Face Water Shortages in 2040 under Dry Year Conditions

Aimag/UB	Soum	Water balance (Dry year) 2040			Water demand 2040			Water deficit ratio 2040 (%)		
		Surface water	Groundwater	Total	Surface water	Groundwater	Total	Surface water	Groundwater	Total
Ulaanbaatar	Bayangol	-5.03	-34.67	-39.70	5.94	35.10	41.05	-84.7	-98.8	-96.7
	Bayanzu'rx	51.54	-25.42	26.12	9.27	54.77	64.04		-46.4	
	Su'xbaatar	4.16	-19.62	-15.46	3.98	23.49	27.47		-83.5	-56.3
	Xan-Uul	14.71	-17.29	-2.57	4.47	26.43	30.90		-65.4	-8.3
	Chingeltei	-0.93	-24.13	-25.06	4.36	25.76	30.13	-21.3	-93.7	-83.2
Dornod	Khelen	-9.25	112.62	103.37	22.30	38.44	60.74	-41.5		
	Dashbalbar	-0.25	609.91	609.66	1.67	2.88	4.56	-15.0		
Khenti	Kherlen	-8.06	54.63	46.57	14.26	19.29	33.56	-56.5		
Tuv	Zuunmod	-3.06	-39.21	-42.27	3.22	39.89	43.11	-94.8	-98.3	-98.0
Selenge	Sukhbaatar	-70.53	8.15	-62.38	70.85	2.76	73.61	-99.5		-84.7
	Bayangol	-2.46	105.98	103.51	17.21	0.67	17.89	-14.3		
	Zuunburen	-1.19	253.47	252.28	8.62	0.34	8.95	-13.8		
	Saikhan	-19.46	50.52	31.06	29.09	1.13	30.22	-66.9		
	Shaamar	-8.46	141.35	132.88	12.61	0.49	13.11	-67.1		
Dornogovi	Sainshand	0.29	-22.76	-22.47	0.00	27.56	27.56		-82.6	-81.5
	Zamin-Uud	0.55	-19.90	-19.35	0.00	21.14	21.14		-94.1	-91.5
	Sainshand	0.04	-3.03	-2.99	0.00	3.67	3.67		-82.6	-81.5
Darkhan-Uul	Darkhan	-33.56	0.19	-33.37	34.31	5.20	39.51	-97.8		-84.5
	Sharingol	-2.88	8.11	5.23	3.40	0.52	3.92	-84.7		
Umnugovi	Dalanzadgad	-4.05	-8.17	-12.23	4.15	8.48	12.63	-97.6	-96.4	-96.8
Orkhon	Bayan-Undur	-3.24	1.94	-1.31	5.26	8.90	14.17	-61.6		-9.2
Uvurkhangai	Arvaikheer	-7.62	-7.21	-14.84	7.70	8.02	15.72	-99.0	-90.0	-94.4
Bulgan	Bulgan	-6.86	-4.44	-11.30	7.54	8.09	15.63	-91.0	-54.9	-72.3
Bayankhongor	Bayankhongor	-4.55	-8.46	-13.01	4.90	9.31	14.20	-93.0	-90.9	-91.6
Arkhangai	Erdenbulgan	-19.94	-0.88	-20.82	20.70	6.38	27.08	-96.3	-13.7	-76.9
Zavkhan	Uliastai	-4.06	-1.34	-5.40	4.34	2.51	6.84	-93.5	-53.4	-78.8
Bayan-Ulgii	Ulgii	-1.58	-1.61	-3.19	5.62	3.45	9.07	-28.2	-46.7	-35.2
Khovd	Jargalant	-2.89	-4.39	-7.27	4.43	5.94	10.37	-65.2	-73.9	-70.1

Source: JICA Project Team

(2) Climate change analysis

Climate change impact has been assessed by using the same mathematical model extended to identify and evaluate the effects of climate change on the water resources in Mongolia. Specifically, effects on precipitation, temperature and extreme events including flood, drought, snow depth, low temperature and Dzud have been assessed. The following summarises the results:

- 1) In Ulaanbaatar, Altai and Sainshand, the maximum monthly rainfall in summer tends to increase in the future, which may increase the risk of flooding;
- 2) The area of the probable drought year will increase in south, central and eastern area in future;
- 3) Due to the rise in temperature by climate change, the amount of snowfall will decrease throughout Mongolia around 2100, and there is a risk that the amount of snowmelt will decrease from spring to summer;
- 4) Both the minimum temperature and the 1-percentile low temperature tend to rise due to climate variability, and the frequency of occurrence during the year decreases; and
- 5) Probable Dzud year will decrease in future, but in south, central and eastern areas having Gobi area will still have risk of Dzud in future.

Climate change impacts in Ulaanbaatar have been simulated. Precipitation in winter will be increased in future in Ulaanbaatar; monthly precipitation in summer will decrease in 2099. The mean annual and mean monthly temperature will be increased significantly in future in Ulaanbaatar. Climate change impact on surface water availability of the Tuul River shows river flow would decrease from April to October due to the rise in temperature (increased evapotranspiration) due to climate change, while the amount of rainfall will not change much. The groundwater potential in the winter season from November to April will be slightly improved. In the summer season from May to October, the groundwater potentials will slightly decrease in future.

5. Regional Development Vision and Strategy

5.1 New Regional Division

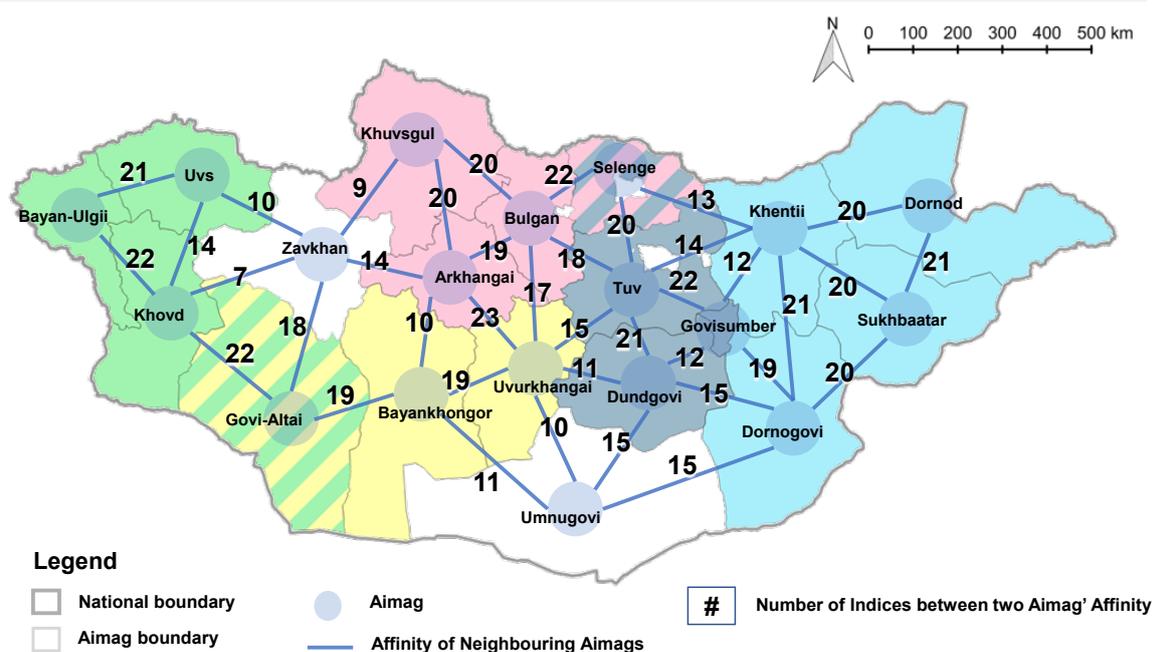
(1) Need for revision of regional division

The development administration system in Mongolia has 21 Aimag local administrations under the Central Government. These Aimag have widely varying historical and cultural backgrounds and geologic conditions, small population and limited development resources, and are not diversified economically. In order to diversify the Mongolian economy for self-reliant development, specific development should be pursued for multiple neighboring Aimags having similar characteristics, respectively.

The existing regional division divides the national territory geographically into five, and each region consists of Aimags having mutually significantly different characteristics. To implement effective development policies, common policy measures should be applied to multiple Aimags having similar characteristics such as investment incentives to promote promising development opportunities. Also, to provide various social services to the people distributed widely throughout the large national territory, common service facilities may be established by region to serve multiple Aimags. To realize balanced development among regions, revision of regional division has been pursued.

(2) Proposed regional division based on affinity

To propose revised regional division based on similarity of neighboring Aimags, characteristics of Aimags have been analyzed by using 30 indices related to socio-economy, land use and other conditions. Mutually neighboring Aimags have been compared to analyze affinity between a pair of neighboring Aimags. Results are presented in Figure S6.



Source: JICA Project Team

Figure S6 Regional Division Based on Affinity of Neighboring Aimags

5.2 Regional Development Vision and Strategy

Based on the new regional division, each region is characterized to formulate a regional vision and establish regional development strategy. They are summarized in Table S9.

Table S9 Regional Development Vision and Strategy Based on New Regional Division

Region Aimags	Regional development vision	Regional development strategy		
		Economy	Infrastructure	Urban development
Western Region Bayan-Ulgii, Uvs, Khovd	Green Development Model Region: trade and tourism related services capitalizing on access to Russia and China, rich and diversified nature and cultural resources, while preserving pastureland and alleviating effects by Dzud by strengthened Aimag administrations and active people's participation	<ul style="list-style-type: none"> - Trade promotion with Russia and China - Vitalization of Tsagaannuur FZ with agro-related activities - Nature & culture tourism network - Higher education & research for dryland agriculture, bio-diversity, cultural diversity etc. - Seaberry industrial cluster - Semi-intensive livestock farming - Vitalization of nomadic livestock with market access 	<ul style="list-style-type: none"> - Erdeneburen hydropower on Khovd River - Extension of power transmission - Ulaangom-Khovd-Ulgii Road - Road linking Dayannuurin China through Ulgii to Tashantain Russia - Khovd airport development 	<ul style="list-style-type: none"> Ulgii : Tsagaannuur FZ for processing and service activities; Center for nature and culture tourism Ulaangom: Center for trade with Russia; Distribution center for construction materials and commodities Khovd: Higher education and research center in dryland agriculture, biodiversity, sea buckthorn processing etc.; Tourism gateway to Western Region; Construction materials industry and supply base
Khangai Region Zavkhan, Khuvsgul, Arkhangai, Bulgan, Orkhon, Darkhan-Uul, Selenge	Advanced Socioeconomic Complex Region : productive crop production and livestock activities linked to processors and export markets, diversified manufacturing, and	<ul style="list-style-type: none"> - Semi-intensive livestock production combined with fodder production for integrated farming in Selenge and Bulgan - Establishment of ICT-linked livestock industrial cluster for total processing of 	<ul style="list-style-type: none"> - Improvement of roads linking Aimag capitals of Darhan, Erdenet, Bulgan, Murun and Uliastai to Ulaanbaatar - Provision of service facilities for tourists and traders along the trade and tourism 	<ul style="list-style-type: none"> Sukhbaatar: Border trade base Darkhan : Dissemination center of new farming technologies utilizing ICT Erdenet: Service base for transit trade and tourism Medipas hospital as the regional hospital Bulgan : Service base for

	tourism and trade corridors embraced in large forest areas, productive pastureland and rich natural and cultural resources supported by wide application of information and communication technology (ICT)	livestock to provide market outlets for herders and to produce high value products for urban and export markets - Livestock grazing in pastureland to produce quality meat and dairy products in Zavkhan and Arkhangai - Tourism & trade corridor linked with Russia - Diversification of tourism objects in Khuvsgul as the major foreign tourist destination - Introduction of ICT industry to support businesses as branch offices of Ulaanbaatar based companies	corridor - ICT network development for communications between herders and administrations, tele-medicine, distance education, weather adapting farming practice and tourism information provision - Further development of free trade zone (FTZ) in Altanbulag	transit trade and tourism Murun: Tourism gateway Tsetserleg: ICT center in Central Mongolia; Base for winter tourism Uliastai: Social service base for western Aimag
Altai Region Govi-Altai, Bayankhongor 、 Uvurkhangai	Diversified Agriculture and Energy Reserve Region : productive livestock production and processing belt along the road linking Altai, Bayankhongor and Arvaikheer, diversified crop production utilizing a variety of soil conditions, and renewable energy development to complement the grid electricity	- Establishment of livestock industrial cluster for processing of livestock products from the livestock belt - Diversification of crop production (fruits, oil seed, herbs, medicinal plants and fodder) and processing by SMEs - Development of cultural tourism in Kharkhorin and the Orkhon valley - Wellness tourism	- Upgrading of roads linking Altai, Bayankhongor and Arvaikheer - Establishment of a renewable energy development and research center - Zavkhan River multipurpose water resources development	Altai : Tourism base for nature, culture and health tourism; Training centers for education and health personnel; Renewable energy development and research center Bayankhongor : Central facilities for livestock industrial cluster; Center for health tourism Arvaikheer : Main logistic center; Tourism sub-center for nature and culture tourism
Southern Region Govisumber, Dundgovi, Umnugovi, Dornogovi	Responsible Mining and Community Development Model Region : proper resource management by Aimag administrations with environmental monitoring by active participation of local people, adequate community infrastructure and greenery supported by mining industry, and sustainable use of water resources	- Establishment of principles for responsible mining and strict enforcement by Aimag administrations - Promotion of processing of mining products to increase value-added and local employment opportunities - Support for locally based SMEs to be involved in processing and service activities related to mining - Semi-intensive livestock farming and processing of livestock products aiming at high end markets of Ulaanbaatar and China - Expansion of oil crop cultivation and	- Expansion of water supply for Choir to support mineral processing and intensive livestock - Improvement of road network centering on Mandalgovi to strengthen its logistic functions - Development of road network linking tourism objects distributed in large territory - Complemental development in steps of the railway and improved access roads to support the logistics in the south of Mongolia	Choir : Main logistic center in the south for export and import commodities etc.; Automobile repair and service center; Clean energy development center; ICT industrial estate Mandalgovi: Logistic center for distribution and storage of domestic commodities etc.; Service hub between Ulaanbaatar and the south Dalanzadgad : Logistic center for export to China; Base for service and commerce; ICT application center Sainshand : Logistic and tourism related service center for export and

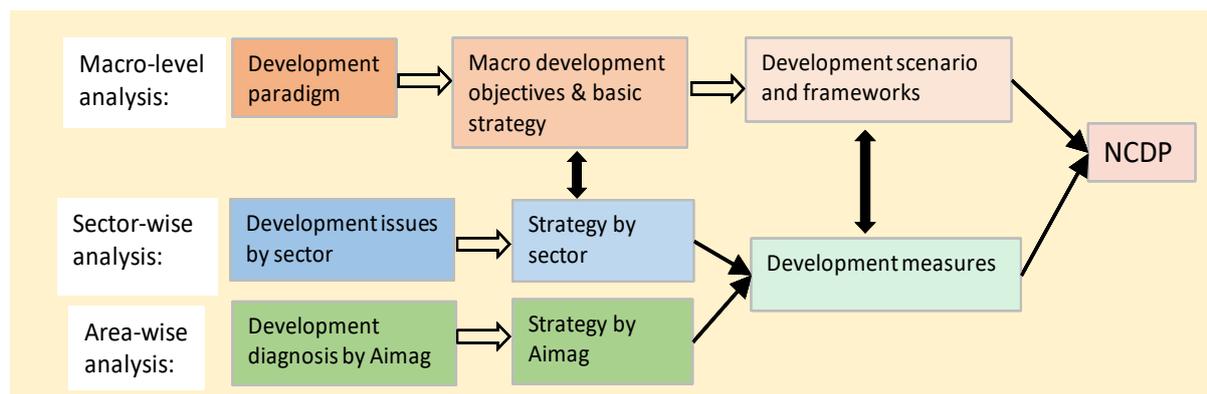
		<p>processing by locally based SMEs</p> <ul style="list-style-type: none"> - Cultivation of medicinal herbs and processing for tourists - Tourism linked with Sainshand and Zamyn-Uud 		<p>import commodities etc.; Showcase for state-of-art environmental technology & environmental education</p>
<p>Eastern Region Khenti, Dornod, Sukhbaatar</p>	<p>Robust and Resilient Frontier Region : extensive and disease-free livestock farming utilizing the vast territory to produce quality meat and dairy products, import substituting crop production for fodder, oil seed and fruits, and border trade and cross-border tourism with Russia and China</p>	<ul style="list-style-type: none"> - Further crop diversification and expansion of production for vegetables, fruits, oil seed and potatoes in Khentii - Cultivation of fruits and vegetables for import substitution with irrigation along the major rivers and application of new technologies - Semi-intensive and nomadic livestock - Responsible mining, especially for oil and gas exploration in the border areas - Expansion of light manufacturing industries to produce consumer goods and construction materials supplying Ulaanbaatar - Establishment of wellness industry - Nature and wilderness tourism utilizing national parks and forest reserves in Khentii - Heritage tourism based on historical places related especially to the life of Chinggis Khaan - Cross border trade and tourism with Russia & China 	<ul style="list-style-type: none"> - Improvement of the Erdenetsagaan - Dariganga road serving the border area and the Baruun-Urt - Bichigt road to improve access to the border area - Improvement of water quality and expansion of water supply capacity for Baruun-Urt - Upgrading of urban infrastructure in Undurkhaan and Choibalsan - Irrigation development along the Kherlen River and other major rivers in Khentii and Dornod 	<p>Undurkhaan: Tourism gateway to the east; Construction materials supply base Baruun-Urt : Base for semi-intensive livestock farming and water and supplemental feed supply base for nomadic herders Coibalsan: International logistic and business center; Tourism base in the east; Dornod University as the research and incubation base</p>
<p>Capital Region Tuv, Ulaanbaatar</p>	<p>Advanced Processing and Logistic Base Region : Ulaanbaatar as a global city with high grade urban functions to support the self-reliant socioeconomic development of Mongolia allowing import and adaption of advanced technology and refined design concepts and the final processing and logistic circle</p>	<ul style="list-style-type: none"> - Intensive livestock farming combined with increased fodder production for integrated farming - Value added final processing of products from other Aimags for export - Technology development and adaptation induced by communications and trade with Russia, China and other countries - Development of high quality tourism facilities including some artificial 	<ul style="list-style-type: none"> - Satellite cities development in Tuv - Upgrading of roads linking Bornuur, Lun, Bayan Onjuur, Bayan and Baganuur in Tuv - Strengthening of telecommunication network linking Ulaanbaatar and other Aimags - Water supply expansion for Ulaanbaatar and satellite cities by the Tuul River - Establishment of robust urban structure by improving regional 	<p>UB : Main political and administrative center as the national capital; International business center as a global city; Model mega green city with quality urban greenery and amenity; Trunk ICT base station AeroCity : Residential complex for airport employees; FTZ; Commercial center for import and domestic goods Maidar EcoCity : New political and religious center; High end residential area; Recycle</p>

	linking Bornuur, Lun, Bayan Onjuur, Bayan and Baganuur in Tuv	attractions as the main tourism gateway	multi-modal transport system linked to urban transport network of UB	oriented ecocity Zuunmod : Residential complex; Commercial center
--	---	---	--	--

6. Development Diagnosis by Aimag

(1) Position of development diagnosis in overall planning procedure

The development diagnosis by Aimag holds an important position in the national level and regional level development planning. Formulation of regional development policy (RDP) and human settlement plan (HSP) for the NCDP involves macro-level analysis, sector-wise analysis and area-wise analysis. The overall procedure of NCDP formulation is illustrated in Figure S7 in a most simplified way.



Source: JICA Project Team

Figure S7 Overall Procedure of NCDP Formulation for Regional Development

(2) Development diagnosis by Aimag

Development diagnosis was conducted for all the 21 Aimag by August 2019. Prospects for development of all the Aimag are summarized in Table S10.

Table S10 Development Prospects of 21 Aimag based on Development Diagnosis by Aimag

Aimag	Development prospects
Western Region	
Bayan-Ulgii	<ul style="list-style-type: none"> - Ulgii city development as processing, trade and tourism base linked by ADB-funded artery road - Tsagaannuur FZ as core facilities to form economic corridor linked to Russia - Semi-intensive livestock and step wise diversification of livestock processed products - Intensive farming for crop production by mechanization and irrigation - Increased production of fruits and nuts - Tourism based on multi-ethnicity - -Hydro power development with pumped storage function
Uvs	<ul style="list-style-type: none"> - Ulaangom city as a center for trade with Russia and the distribution center for construction materials and commodities in Western Region - Institutional measures to improve Borshoo border crossing - Eco-tourism utilizing pristine nature - Crop production expansion including fodder - Center for agro-based industry in Western Region including sea buckthorn processing for export - Promotion of remote working inviting enterprises in Ulaanbaatar leading to interactions with engineers or IT experts in Russia, Kazakhstan and China - ICT application for livestock and pasture management
Khovd	<ul style="list-style-type: none"> - Early realization of the Khovd river hydropower plant - Development of livestock industrial cluster combining semi-intensive livestock

	<p>farming, integrated farming with fodder production, and total processing of livestock products including high value products for export</p> <ul style="list-style-type: none"> - Irrigation development for fodder and other crops - Realization of “green development model Aimag” - Tourism development combining natural environment, fresh and saltwater lakes, mountains, valleys, caves, ancient rock paintings and fortresses - Upgrading of Khovd airport to international airport - Khovd city development as a center for trade with Russia and the industrial center in Western Region
Northwestern Region	
Zavkhan	<ul style="list-style-type: none"> - Uliastai city development linking Ulaanbaatar and Western Region for complementary provision of necessary infrastructures including those related social services and administrative functions - Export-oriented processing of agricultural products - ICT application to livestock to produce quality meat and dairy products to Russia and China - Specialization in domestic tourism as part of the Khangai tourism cluster consisting of Kharkhorin, Tsetserleg, and Bayankhongor - Development of construction materials industry
Khuvsgul	<ul style="list-style-type: none"> - Pursuit of no-mining Aimag except small scale extraction of non-metallic minerals - Diversified and integrated tourism development such as nature tourism, wellness tourism, cultural tourism and other forms of alternative tourism - Promotion of local agriculture and livestock to supply fresh fruits and vegetables, meat products, processed cheese, local beer, and honey for tourists - Livestock farming with processing to supply fresh meat and dairy products to urban markets of Erdenet, Darkhan-Uul etc. - Comprehensive resource inventory to assess forest resources and identify potential raw materials for non-wood forest products - Community infrastructure development and forest conservation by utilizing revenues from large scale tourism development
Arkhangai	<ul style="list-style-type: none"> - Livestock industrial cluster development with processing facilities - Improvement of urban infrastructure for selected towns for processing facilities - Promotion of fodder production and integrated farming to support the livestock cluster - Development of nature tourism and winter resorts with Tsetserleg as a base - Wide application of ICT for two-way communications between herders and administration, tele-medicine, distance education, weather resistant farming practice, livestock industrial cluster support and tourism information provision
Bulgan	<ul style="list-style-type: none"> - Pursuit of model Aimag for non-resource intensive and environment-friendly economy - Promotion of labor-intensive industries based on primary products supported by intermediate technology - Increase in agricultural productivity by promotion of mechanization and development or restoration of irrigation facilities - Integrated farming combining intensive livestock and high productivity crop farming, linked with processing industries in the Aimag capital and along the artery roads - - Development of tourism and trade corridor linking Ulaanbaatar through Erdenet to Murun
Orkhon	<ul style="list-style-type: none"> - Integrated farming combining intensive livestock farming and fodder production - Greenhouse and other industrial agriculture to supply high value products to urban markets - Diversification of manufacturing with tannery, food processing and other light industry - Erdenet urban development as a transit city for various service activities and the gateway for tourists from and to Ulaanbaatar, Khuvsgul and Russia - Cultural tourism and medical tourism - Model mining with plenty of greenery and pleasant living conditions supported by responsible mining with proper maintenance and rehabilitation of mining sites
Darkhan-Uul	<ul style="list-style-type: none"> - Water saving irrigation utilizing the water of the Kharaa River for high value added crops such as vegetables and fruits - Crop productivity increase by ICT application, greenhouse and hydroponics technologies - Darkhan as an experiment base to create a model of ICT oriented advanced livestock

	<p>farming for Mongolia</p> <ul style="list-style-type: none"> - Enhancement of existing industries by ICT such as cement, steel, sheep skin product and foods - Distant health and education services from Ulaanbaatar - Promotion of local autonomy with municipality status to provide decentralized regional development model for Mongolia
Selenge	<ul style="list-style-type: none"> - Expansion of crop production by introducing new farming technology including water saving irrigation, ICT application, greenhouse and hydroponics technologies - Low head hydropower generation - Intensive livestock farming including poultry and swine raising - Integrated system for crop production, storage and processing - Experience-oriented and community based tourism combining attractive nature and outdoor activities in Selenge, unique Asian culture and history of Buryat and the beauty of Baikal Lake on the Russian side - Activation of Altanbulag FTZ as a base to exchange commodities and new technologies and information - SME promotion with higher education and vocational education
Altai Region	
Govi-Altai	<ul style="list-style-type: none"> - Wilderness and long stay hermitage tourism utilizing large national parks and reserves - Altai city development as the tourism base with upgraded urban functions and facilities including health, education and training centers for education and health personnel - Establishment of a renewable energy center including hydropower plant on the Zavkhan river in the north, solar facilities in the south and possibly geothermal - Promotion of semi-intensive livestock farming combined with seasonal grazing - Greenhouse agriculture to produce high value crops for urban markets - Geothermal energy development and regional energy company establishment - Integrated Zarkhan river development to be planned with multi-purpose dam including hydropower generation, irrigation and water supply
Bayankhongor	<ul style="list-style-type: none"> - Complementary urban development of Bayankhongor with Arvaikheer and Tsetserleg by functional division - Intensive livestock in the vicinity of the Aimag capital and along the road linking Altai and Arvaikheer - Promotion of health tourism by utilizing hot springs and abundant medicinal herbs - Research center to analyse medicinal plants, select/develop more promising species and promote alternative medicines - Diversified manufacturing based on livestock, fruits and herbs to be developed by locally based SMEs - Utilization of local renewable energies as part of advanced renewable energy region in the Govi
Uvurkhangai	<ul style="list-style-type: none"> - Gateway for northern and western Aimags in exporting agriculture products mainly to China through Sainshand and the southern border point of Shiveehuren Sehee - Distribution center for goods from hinterland for export to Russia through Ulaanbaatar - Development of logistics industry taking advantage of central location - Livestock industrial cluster development with processing facilities - Nature and culture-oriented tourism in Kharkhorin and the Orkhon Valley areas
Southern Region	
Govisumber	<ul style="list-style-type: none"> - Choir logistic center and automobile service center - High value processing of various mineral resources in neighboring areas - Clean energy technology center based on large brown coal reserve - Re-activation of FTZ on former military area for ICT and other industries - Intensive livestock farming supported by improved availability of water and feed - weekend resort for visitors from Ulaanbaatar
Dundgovi	<ul style="list-style-type: none"> - Mandalgovi city development as a distribution center at transit point in four directions - Processing of raw materials from livestock farming and mining for export of processed goods to China - Production of quality meat and dairy products aiming at high-end markets of Ulaanbaatar and China - Promotion of responsible mining for limited mineral resources and processing - Promotion of culture and nature tourism - Creation of Govi brand products based on livestock, mining and tourism

Umnugovi	<ul style="list-style-type: none"> - Development of a base of border trade with China - Improved railway transportation to border area for development of the Tavan Tolgoi coal mine and the Oyu Tolgoi copper and gold mine as the economic driving force - Water resources management as part of green development policy - Development of logistic hubs to transport goods and people from neighboring Aimags to China - ICT application such as drone based monitoring and warning system, Internet direct sales of commodities to China, establishment of products traceability and agro-technology park - Nature tourism and summertime resorts for visitors from Ulaanbaatar
Dornogovi	<ul style="list-style-type: none"> - Sainshand - Zamyn-Uud corridor development with Sainshand specialized in logistic services and tourism related services - Development of triangle tourism circuit linking Sainshand as a tourism base, heritage and wilderness tourism in the southern semi-desert, and border tourism for shopping etc. in Zamyn-Uud - Utilization of medical herbs for diversification of livelihood opportunities - Responsible mining development to preserve attractive environment for tourism - Community development fund based on mining profits for social development - Showcase for state-of-art environmental technology such as water recycling by wastewater re-use etc. - Modern education system establishment including environmental education that utilizes steppe and semi-desert as fieldwork venues
Eastern Region	
Khentii	<ul style="list-style-type: none"> - Integrated farming combining intensive/semi-intensive livestock and fodder - Expansion of crop production and livestock products to supply fresh vegetables, meat and dairy products for growing urban market by water saving and advanced irrigation - Light manufacturing industries for consumer goods and construction materials - Responsible mining of various mineral resources based on economic viability - Heritage tourism, wellness industry utilizing therapeutic mineral springs and medicinal plants, rural tourism by brand development and proactive marketing - Undurkhaan urban development with multiple functions including tourism gateway, construction materials supply base, integrated farming center and green development model city
Dornod	<ul style="list-style-type: none"> - Expansion of international trade with Russia and China - Export of specialty products through the Ereentsav border point for export to Europe and Japan - Choibalsan as distribution center for goods from hinterland transported on road through the Havirga border point to Manzhouli for export - Improvement of logistic infrastructure on Mongolian side to expand international trade with Russia and China - Choibalsan city development as the international logistic and business center and tourism gateway in Eastern Region - Increased cultivation of fruits and vegetables for import substitution and export - Integrated farming with semi-intensive livestock and fodder production - Internationalization of Dornod airport
Sukhbaatar	<ul style="list-style-type: none"> - Livestock industrial cluster with intensive livestock farming, processing for value-added products for export - Traditional grazing to move livestock seasonally to areas of better water availability - Disease free livestock zone and livestock gene bank - Responsible and sensible mining with environment friendly technology, rehabilitation of mining sites and benefit sharing with local communities - Diversification of manufacturing with livestock products, consumer goods and construction materials involving locally based SMEs with government supports - Tourism development with nature, culture and heritage, border tourism etc. linked by improved road network - Bichit border facilities upgrading - Improvement of water supply for Baruun-Urt with new water source
Capital Region	
Tuv	<ul style="list-style-type: none"> - Urban development to complement Ulaanbaatar - Airport city development to create a new nucleus for urban development and a gateway

	<p>for importing advanced technology and refined design concept from abroad and exporting goods competitive in the world market</p> <ul style="list-style-type: none"> - Creation of a new production and logistic network linking five base towns around Ulaanbaatar - Eco-tourism in the Gorkhi-Terelj national park - Crop production expansion in the areas close to Selenge Aimag and along the Tuul River by greenhouses, irrigation and better farming practices for diversified crops - Domestic tourism and weekend resorts for residents in Ulaanbaatar
--	---

Source: JICA Project Team

7. Phased Development Plan with Projects and Institutional Measures

7.1 Development Scenario

(1) Development phasing and paradigm shift

1) Development phasing

The development scenario represents the process for Mongolia to realize a paradigm shift from the 20th century development model to the alternative socio-economy. Mongolia, in fact, has started to take this process as the Mongolia Sustainable Development Vision 2030 (SDV2030) was formulated in response to the UN SDGs initiative, which call for shifts in development paradigm in any countries and human beings as a whole. The NCDP is now expected to aim at supporting the Vision2050 and the development scenario for the NCDP naturally describes the process of the paradigm shift.

The development scenario presented here has to follow logical sequences in order for Mongolia to attain its objectives in line with the vision expressed in the SDV2030/Vision2050. Therefore, development paradigms to be pursued by Mongolia should guide the development phasing as outlined below.

2) Development paradigms

The Mongolian economy has attained high growth rates in recent years supported primarily by the mining sector, while traditional livestock farming faces difficulty and the economy and export products are not much diversified. The mining-led development represents a typical 20th century development paradigm characterized by resource intensive (abusive) and economic efficiency-oriented activities. It tends to involve adverse social and environmental effects, generating rather limited employment opportunities despite large investments required. This also makes the Mongolian socio-economy vulnerable to changes in international economies and natural disasters such as Dzud and drought as well as climate change.

To realize sustainable and inclusive development as pursued by the Mongolian Government in line with the SDV2030 responding to the UN SDGs initiative, Mongolia will have to shift its development paradigm away from the 20th century development model. The new development paradigm to be pursued by Mongolia is called an alternative socio-economy. Conditions for the alternative socio-economy unique to Mongolia have been investigated by the present Project and reflected in formulation of specific projects and related measures.

Development phasing should reflect the procedure for Mongolia to shift from the 20th century development model to the alternative socio-economy model. The procedure is characterized among others by the following conditions:

- 1) Management of natural and cultural resources should be improved recognizing these resources as capital to be conserved so that they can continue generating benefits for people for decades to come;
- 2) Development administration should be improved to support the resource management with stronger local administration and more active people's participation;

- 3) Economic activities and exports should be diversified to generate higher value-added and more employment opportunities and to ensure resilient and robust socio-economy; and
- 4) Capital accumulation should be realized for investment into infrastructure and new economic activities to support the diversification.

These conditions should be satisfied in steps and support one another to realize the new development paradigm of alternative socio-economy as a whole.

(2) Development scenario

The development scenario of Mongolia is summarized in Table S11 by phase up to 2040.

Table S11 Phased Development of Mongolia as Development Scenario

	Phase 1 ~2025	Phase 2 2026-30	Phase 3 2031-40
Overview	<ul style="list-style-type: none"> - Preparation for paradigm shift to alternative socio-economy - Capital accumulation - Active re-investment in new economic activities - Steady enhancement of local government capacity - Introduction of new methods to mobilize community resources to complement limited public sector resources for development - Accelerated digital transformation in all the sectors 	<ul style="list-style-type: none"> - Active transformation of socio-economic structure fitting to alternative socio-economy - Initial localization of development administration starting with environmental monitoring and management - Participatory mechanism to plan and implement community facilities to be institutionalized. 	<ul style="list-style-type: none"> - Completion of paradigm shift to Mongolian model of alternative socio-economy - Adjustment of development strategy based on reviews on attainment of SDGs and Vision2050 - Active interactions with Russia, China and other countries and in- and out-migration between Mongolia and these countries - Further devolution of various administrative functions to Aimag governments
Economy	<ul style="list-style-type: none"> - Mining to continue at high rates as driving force, shifting gradually to responsible mining - Simple coal processing to produce briquettes as well as sorting and washing for domestic market - New economic activities to process primary products of crop and livestock farming - Initial development of sea buckthorn and livestock industrial clusters - Intensive livestock farming to expand in vicinities of larger cities and along artery roads to produce quality meats and dairy products 	<ul style="list-style-type: none"> - Wide practice of responsible mining and deceleration of mining sector growth - Increasing production of iron and copper based final products - Full development of sea buckthorn and livestock industrial clusters with products diversification - Initial development of other industrial clusters - Accelerated development of free trade zones or special economic zones along the borders with Russia and China - Domestic travel agents to associate 	<ul style="list-style-type: none"> - Diversification of economy and export products to reach highest possible level with many industrial clusters - Tourism and wellness industry complex to develop by utilizing characteristic local products - Some export products to establish fame for quality in global market - Full development of free trade zones or special economic zones along borders with Russia and China with increasingly more service-oriented industries to become

	<ul style="list-style-type: none"> - Semi-intensive livestock system in combination with seasonal grazing in remote areas - Crop farming expansion for fodder and basic food for self-sufficiency - Industrial parks near Ulaanbaatar and selected agro IT parks development 	<p>directly with international travel agents to develop a variety of tour products for international tourism</p>	<p>effectively free cities</p>
Social aspects	<ul style="list-style-type: none"> - Continued rural to urban migration & urban-rural disparities due to mining-led development - Increasing needs for skill training by new economic activities in rural areas - Value & environmental education to start at pre- & primary schools - Review and reallocation of state budget for social sector as a whole - Comprehensive education sector reform to be initiated to improve higher and technical education and to initiate value development at pre-school - Health care services to shift emphasis on primary and preventive health care - Social welfare services shifting from broad coverage to more targeted coverage 	<ul style="list-style-type: none"> - Lower migration and improved urban-rural disparities - Raise awareness in the society for alternative socio-economy by value and environmental education - Pre-school and primary education to be further strengthened for value development to support the alternative socio-economy - Children as change agents for value development to change mindset of society - Realization of healthy labor force supported by primary and preventive health care - Continued improvement of social services 	<ul style="list-style-type: none"> - Family ties and community cohesion maintained by increased employment opportunities in rural areas - New social problems due to urbanization in local towns - Possibly more conflicts with increasing in-migrants - Realization of comprehensive coverage by high quality social services for all people including in-migrants and returnees - Complete eradication of poverty with livelihood activities to become economically viable linked effectively to indigenous industries
Spatial aspects	<ul style="list-style-type: none"> - Improvement of sections of future ring artery - Improvement of unpaved sections of inter-Aimag roads - Urban infrastructure development for base cities for mining, processing and tourism - Initial development of a few selected cities as logistic centers for international trade - Feasibility studies for major facilities constituting the future transport and logistic network such as new railways and border facilities 	<ul style="list-style-type: none"> - Establishment of all links of ring artery - Establishment of another telecommunication backbone linking Uliastai in the west and Undurkhaan in the east through Ulaanbaatar - Larger urban centers at higher tiers of urban hierarchy to be strengthened with designated urban functions respectively - Further improvement of access to rural areas throughout the Country 	<ul style="list-style-type: none"> - Complete establishment of artery network with the upgraded ring artery road and inter-Aimag roads - Transport and logistic network established as a multi-modal system linking production, processing and logistic centers - Railway lines as part of multi-modal system to be shared increasingly for passenger transportation - Urban hierarchy further developed with

<p>Environmental aspects</p>	<ul style="list-style-type: none"> - Rural access roads improvement to ensure adequate access to social services and facilitate collection of raw materials for new agro-processing industries - Adverse environmental problems associated with mining to continue but awareness for responsible mining to raised steadily - Satellite cities development in UB suburbs to start taking effects to alleviate - Steady enhancement of administrative capacity of local governments for environmental monitoring by participation of local people 	<ul style="list-style-type: none"> - Infrastructure development associated with mining and major tourism development to be accelerated - Responsible mining practiced increasingly widely to reduce adverse effects on environment - Development of UB satellite cities to further reduce urban environmental problems - Generation of new urban environmental problems in local towns - Environmental monitoring by local administrations to be strengthened by involvement of local people with enhanced awareness 	<p>clear functional division between major urban centers</p> <ul style="list-style-type: none"> - City networking with cities in Autonomous Region of Inner Mongolia of China and Bryatia Republic of Russia - Higher administrative and financial capacity of local governments due to regional economic development and devolution - Local alliance to alleviate new environmental problems at local towns - Further development of UB satellite cities to allow capital city to devote its resources to realizing high quality living environment with plenty of amenity and greenery.
------------------------------	---	---	---

Mongolia will be characterized by the following by the year 2040.

- 1) Resilient and robust country contributing to global economy and global governance by deepening economic relationships with countries in the Greater Central Asia;
- 2) Model country for alternative socio-economic activities, which are less resource intensive and environment friendly, characterized by many viable industrial clusters, traditional livestock farming and responsible mining, and resources utilization and management by participation of peoples;
- 3) Attractive tourism destination with a variety of tourism resources and tour itineraries for both international and domestic tourists, embracing rich cultural heritage of various peoples and unique natural features;
- 4) Center for advanced alternative technology with high grade education and research facilities including a clean energy center in Govisumber, a renewable energy center in Govi-Altai, and an alternative technology research center in Darkhan;
- 5) Regional societies open to the global society characterized by the logistic networks linked to neighboring regions and countries, city networking to share higher order urban functions, cosmopolitan atmosphere accommodating peoples of diverse socio-cultural backgrounds for lively trade and communications;
- 6) Country embodying green development with overwhelming landscape provided by mountains, rich forest resources and productive greenery of vast pastureland;
- 7) Self-reliant region based on the utilization of indigenous resources by and for the benefit of local peoples under the effective development administration by public-private partnership.

7.2 Development Plan with Programs and Projects

Many projects and programs have been formulated in different sectors and Aimags. Some of them are

mutually adjusted and modified for more effective implementation. They are packaged into four initiatives to clarify characteristics of different projects and programs and facilitate coordination between them. These initiatives are:

- I. Economic and export diversification initiative,
- II. Broad-based empowerment initiative,
- III. Spatial structure strengthening initiative, and
- IV. Green development promotion initiative.

Out of all the proposed projects, anchor projects are designated to support the shift in development paradigm from the 20th century development model to the Mongolian model of alternative socio-economy. The anchor projects will be instrumental in realizing structural changes in the socio-economy and spatial system, and some actions should be taken during Phase 1 for their early implementation.

(1) Economic and export diversification initiative

This initiative will diversify economic activities and export products in line with the idea of outward-oriented development, which fits well to Mongolia with rich natural and cultural resources and small domestic markets. In particular, vertical industrial clusters based on primary products are instrumental in pursuing this initiative. This initiative consists of the following programs and projects, including 10 anchor projects denoted by “*”

I. Economic and Export Diversification Initiative	
No.	Title
I1	Free trade zones/Special economic zones development program
I1.1	Border areas Free Trade Zones (FTZs) and Special Economic Zones (SEZs) promotion project*
I1.2	Ulaanbaatar airport-side FTZ/SEZ development project
I2	Industrial clusters support program
I2.1	Sea buckthorn industrial cluster development*
I2.2	Livestock industrial cluster development*
I3	Innovative agriculture development
I3.1	Smart agriculture promotion
I3.2	Greenhouse agriculture promotion*
I3.3	Agro IT parks development*
I4	Integrated crop-livestock farming promotion
I4.1	Fodder production expansion
I4.2	ICT monitoring and support system for livestock*
I5	Crop production expansion program
I5.1	Irrigation development
I5.2	Oil seed development
I5.3	Sea buckthorn development*
I6	Integrated cattle production promotion
I6.1	Cattle ranching system development
I6.2	Corn silage production
I6.3	Total mixed ration (TMR) feeding centers development
I6.4	Spray dry powder milk technology
I7	Market environment improvement
I7.1	Cold chain development
I7.2	Food traceability platform*
I8	Mining diversification program
I8.1	Rare earth resource exploration
I8.2	Metal mineral resources market exploration

I9	Comprehensive coal industry upgrading
	I9.1 Coal transport and export promotion*
	I9.2 Coal resource survey
	I9.3 Optimized coal business master planning
	I9.4 Coal-based industrial cluster development
I10	Comprehensive tourism development with new attractions
	I10.1 Dinosaur museum
	I10.2 “Urtuu” service stop areas*
	I10.3 Ger district handicraft street
	I10.4 Winter sports and leisure center
	I10.5 Nalaikh mining museum, culture and education center
	I10.6 Tourism sector database development
	I10.7 Tourism industrial cluster development

(2) Broad-based empowerment initiative

This initiative will prepare people to pursue the new development paradigm through raising awareness, empowering by education and training and improving health conditions. It also responds to imminent needs of people for various social services and livelihood activities. This initiative comprises the following programs and projects, including seven anchor projects denoted by “**”.

II. Broad-based Empowerment Initiative	
No.	Title
II1	New generation herders’ upbringing program
II1.1	Herder communities support facilities*
II1.2	Community-based early childhood education for herders’ children
II2	ICT-oriented support program for nomads
II2.1	Local administrations-nomads communication strengthening*
II2.2	Comprehensive nomad database development
II3	Skills training and jobs creation for youth and adults*
II4	Young women’s career development and support program network*
II5	Scholarship for business-oriented human resources development
II6	Comprehensive education sector reform program*
II7	Focused health care improvement program
II7.1	Primary health care strengthening*
II7.2	Health information center establishment
II7.3	Prevention of mother to child transmission of Human Immunodeficiency Virus (HIV), syphilis and hepatitis
II7.4	Telemedicine and electronic mobile health care for diagnostic purposes
II8	Social insurance and pension reform
II9	New business culture and mindset development
II9.1	Center of group dynamics*
II9.2	Process consulting for accomplished results
II10	Special program for ICT promotion and application
II10.1	Education sector strengthening by utilizing ICT
II10.2	Rural ICT development promotion and model ICT city development
II10.3	Integrated information network for rural people
II10.4	Offshore development promotion
II10.5	Open data promotion for organic ICT ecosystem

(3) Spatial structure strengthening initiative

This initiative will strengthen spatial structure of Mongolia by establishing a high quality network of artery and sub-artery roads linking Ulaanbaatar and major urban centers, and between Aimag capitals, and also upgrading urban functions of selected urban centers at the higher tiers of the urban hierarchy.

This initiative comprises the following projects, including five anchor projects denoted by “*”.

III. Spatial Structure Strengthening Initiative	
No.	Title
III1	Ring artery establishment*
III2	Inter-Aimag roads construction and upgrading*
III3	Aimag special purpose roads improvement development
III4	Ulaanbaatar bypath rail link (Bogd Khan link) *
III5	North-south corridor rail capacity development*
III6	Ulaanbaatar road bypath and network development
III7	Urban redevelopment utilizing freight terminal land
III8	Suburban and local cities bypath development
III9	Ulaanbaatar airport satellite city development*
III10	Local air transport network development
III11	Regional and local cities development
III12	Orkhon River water diversion to Govi

(4) Green development promotion initiative

This initiative will substantiate the government policy of green development to enhance sustainability of national land and socio-economy. Realization of recycle-oriented society is an important aspect of this initiative. Proper water resources development and management are considered instrumental in pursuing this initiative. This initiative consists of the following programs and projects, including eight anchor projects denoted by “*”.

IV. Green Development Promotion Initiative	
No.	Title
IV1	Land degradation prevention
IV2	Recycle-oriented society development
IV2.1	Food loss reduction
IV2.2	Automobile recycling park*
IV2.3	Solid wastes circulation utilizing cement plants
IV2.4	Eco-park establishment*
IV3	Ger district development promotion
IV3.1	Ger district development guidelines*
IV3.2	Ger district sanitation improvement*
IV4	Sanitary landfill site establishment
IV5	Buildings and structures preservation and restoration
IV5.1	Longer life-span facilities establishment
IV5.2	Ensuring coherence of legal documents in urban development sector and reforming its legal system
IV6	Tuul water complex project*
IV7	Water supply improvement project
IV7.1	Urban centers water supply improvement*
IV7.2	Rural water supply expansion
IV8	Wastewater treatment improvement project
IV8.1	Wastewater treatment plants construction and renovation
IV8.2	Ulaanbaatar central WWTP for industrial water of combined heat plants
IV8.3	Sewerage networks renovation and expansion
IV8.4	Small wastewater treatment plants in Soum centers*
IV8.5	Innovative wastewater treatment plant for livestock farms
IV9	Selenge River hydropower dam development*
IV10	Local energy system development

7.3 Integrated Regional Development Programs

Most projects proposed by the NCDP may be implemented by the initiative of respective sector implementing agencies. Classification by development initiative would facilitate coordination between sector agencies by clarifying development policies. Projects related to particular regions may be more effectively implemented if they are packaged by region to define integrated regional development programs (IRDPs), respectively. In particular, related projects along any corridor constitute area development programs. The IRDPs are summarized in Table S12 with component projects and respective area development programs. Area development programs are shown in Figure S9.

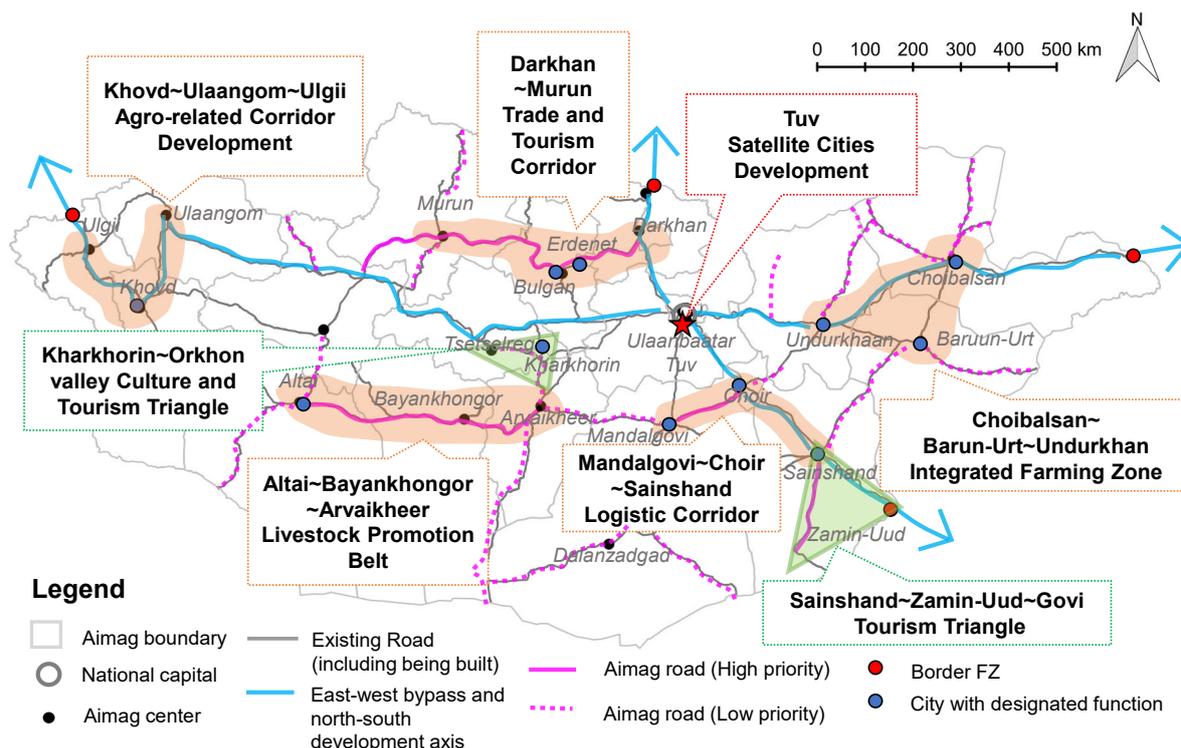


Figure S8 Area Development Programs of the IRDPs

Table S12 Integrated Regional Development Program by Region Newly Defined

Basic concepts	Component projects	Area development program
Western Region model green development program		
Development of non-resource intensive economic activities such as trade and tourism capitalizing on access to Russia & China, rich & diversified nature & cultural resources, preserving pastureland & alleviating effects by Dzud by strengthened Aimag administrations with active people's participation.	<ul style="list-style-type: none"> - Khovd~Ulgii~Ulaangom road - Khovd River hydropower development - Power network extension - Dayannuur~Tashma road (A15) - Tsaganuur FZ development - Khovd higher education & research center - Nature & culture tourism - Khovd airport internationalization 	<u>Khovd-Ulaangom-Ulgii agro-related corridor:</u> Production & processing of sea berry and livestock products for export and development of Tsaganuur FZ near Bayan-Ulgii for agro-related processing & services
Khangai Region advanced socio-economic complex program		

<p>Upgrading of crop production and livestock farming and processing applying advanced technology and trade and tourism development linked with Russia, embraced in large forest areas, productive pastureland and rich natural and cultural resources supported by wide application of ICT technology</p>	<ul style="list-style-type: none"> - Improvement of northern sections of ring artery - Tourism and border access roads - ICT network centering on Darkhan and Tsetserleg - Altanbulag FZ - ICT oriented livestock industry and smart agriculture - Irrigation development by multi-purpose projects in Selenge and Orkhon Rivers 	<p><u>Darkhan-Murun trade and tourism corridor:</u> Trade and tourism development linked with Russia supported by service facilities, urban development and ICT network along the corridor</p>
Altai Region diversified agriculture and energy reserve program		
<p>Productive livestock farming and processing belt along the road linking Altai, Bayankhongor and Arvaikheer, diversified crop production utilizing a variety of soil conditions, and renewable energy development to complement the grid electricity</p>	<ul style="list-style-type: none"> - Ring artery southern section upgrading - Tourism and border access roads - Renewable energy development and research center in Govi-Altai - Arvaikheer urban development for logistic facilities - Zavkhan River multi-purpose water resources development for irrigation and hydropower 	<p><u>Altai~Bayankhongor~Arverkheer livestock promotion belt:</u> Integrated farming promotion & livestock cluster, crop production diversification & processing, <u>Kharkhorin~Orkhon valley~Tsetserleg culture and tourism triangle:</u> Tourism road development, SME support for local processing of fruits and herbs to tourists, Kharkhorin urban development</p>
Southern Region responsible mining and community development program		
<p>Proper resource management by Aimag administrations with environmental monitoring by active participation of local people, adequate community infrastructure and greenery supported by mining industry, and sustainable use of water resources</p>	<ul style="list-style-type: none"> - Tourism roads development (Sainshand~Zamin-Uud~Khantanbulag triangle) - Mining roads development (Tavantolgoi~Gashun Sukhait; Choir~Darkhan), - ICT industrial estate in Govisumber - Community infrastructure and greenery associated with mining development 	<p><u>Mandalgovi~Choir~Sainshand logistic corridor:</u> Mandalgovi urban development for logistic facilities, clean energy and logistic center in Choir, Sainshand logistic and tourism related service center <u>Sainshand~Zamin-Uud~Govi tourism triangle:</u> Zamin-Uud border trade & tourism development, environmental technology development and education in steppe and desert</p>
Eastern Region integrated agro-trade-tourism frontier development program		
<p>Extensive and disease-free livestock farming utilizing the vast territory to produce quality meat and dairy products, import substituting crop production for fodder, oil seed and fruits, and border trade and cross-border tourism with Russia and China</p>	<ul style="list-style-type: none"> - Choibalsan~Erdentsav road with a branch to Khavirga - Baruun-Urt~Bichit road - Tourism and border access roads - Choibalsan urban development with urban facilities - Dornod University research and incubation base - Kherlen River irrigation development for import substituting production of fruits and vegetables - Erdentsagaan~Dariganga tourism road development. 	<p><u>Choibalsan~Barun-Urt~Undurkhan integrated farming zone:</u> Crop diversification & expansion of production for vegetables, fruits, oil seed and potatoes in Khenthii, cultivation of fruits & vegetables for import substitution with irrigation along Kherlen River, support facilities for nomadic livestock farming in Barun-Urt</p>
Capital Region advanced processing and logistic base development program		

<p>Ulaanbaatar as a global city with high grade urban functions to support self-reliant socioeconomic development of Mongolia allowing import & adaption of advanced technology & refined design concepts & final processing & logistic circle linking Bornuur, Lun, Bayan Onjuur, Bayan and Baganuur in Tuv</p>	<ul style="list-style-type: none"> - Bornuur, Lun, Bayan Onjuur, Bayan and Baganuur logistic link roads development - Ulaanbaatar peripheries road development - Ulaanbaatar model mega green city development - Ulaanbaatar trunk ICT base station upgrading - Integrated farming promotion combining intensive livestock farming & fodder production to supply fresh meat & dairy products to Ulaanbaatar - New airport side FTZ development 	<p><u>Tuv satellite cities development:</u> AeroCity for residential complex for airport employees, free trade zone, commercial center for import and domestic goods; Maidar EcoCity for new political and religious center, high end residential area, recycle oriented ecocity; Zuumud for residential complex, commercial center</p>
--	--	---

8. Implementation Plan

8.1 Implementing Arrangements

(1) Projects and programs in four development initiatives

The proposed projects and programs of the NCDP may be classified by implementing arrangements: 1) multi-agency projects involving multiple ministries and agencies, 2) sector projects involving only one implementing agency, 3) cooperative projects between government agencies and private entities, 4) local government projects by Ulaanbaatar City or Aimag, and 5) other projects. Implementation procedure for each type of projects is as follows.

For multi-agency projects, a lead agency is designated and inter-agency committee may be organized to finalize scope and elements of each project. Implementation schedule is determined and budgeting is made by element with agency in charge or for the project as a whole as a program.

Sector projects usually have only one implementing agency respectively, but in case of resource development projects for energy, both MMHI and MoE are joint implementing agencies. For sector projects by MOFALI, the private sector is involved in implementation. MOFALI should mobilize private entities for production, facilities construction, operation and management, investment etc. and provide supports for professional advises, fund procurement, infrastructure development etc.

Cooperative projects by public-private partnership, a coordinating government agency is designated to establish implementing arrangements with private organizations, research institutes and other entities. The coordinating agency establishes criteria and targets related to implementation, but actual implementation would be by private entities. For local government projects, local communities and private organizations will cooperate under the initiative of respective local governments. Each local government is responsible for budgeting and fund sourcing from donors. Other projects may involve NGOs in implementation.

(2) Implementing arrangements for IRDPs

Six IRDPs are formulated by combining projects included in the four development initiatives and thus multiple agencies are involved. For effective implementation, coordination between the related agencies is indispensable, but it may be difficult to designate a single most capable agency. For effective implementation of the IRDPs, two conditions should be satisfied: 1) venue to coordinate related agencies, and 2) capacity development of Aimag administrations. In view of limited administrative capacity of Aimag at present, however, the Central Government would still have to take the initiative at early stage.

To satisfy these conditions, it is proposed to establish a Regional Development Council for each region, by the initiative of NDA working closely with related Aimag Governors, respectively. For this purpose, a new department may be established in NDA in charge of regional development policy, planning and

implementation. Each RDC will be organized with governors of related Aimags, representatives of related ministries and agencies, local enterprises, NGOs and others. The new NDA department may prepare regional development budget for IRDPs, supporting Aimag administrations to prepare respective IRDPs.

While a Region is not an administrative unit at present, the proposed RDC may become the first step to establish regional administrations. According to the newly proposed regional division, each region except Capital Region has population of 200,000~500,000, which may be more appropriate in establishing new economic activities by mustering development resources jointly.

The initial functions of the RDC are: 1) review of component projects of IRDP, 2) modification and or addition of component projects as determined necessary, 3) formulation of stage-wise implementation plan and determination of implementation schedule of each component project, and 4) budgeting for each component project by respective designated implementing agency.

8.2 Indicative Investment Schedule

Priority of NCDP projects is examined in line with the phasing of the development scenario presented in Section 7.1 to prepare a stage-wise implementation plan for three phases. Investment costs of each proposed projects are roughly estimated and allocated to phases according to the stage-wise implementation plan to prepare an indicative investment schedule. For most projects, investment costs do not represent estimates but are determined based on concepts. Definitive investment schedules should be determined by the procedure outlined in Section 8.1.

Allocation of investment costs by phase is compiled by development initiative as shown in Table S13. As shown, the total investment cost of all the proposed programs and projects is US\$6,116 million over the three phases up to 2040, consisting of US\$764 million (12.4%) for economy and exports diversification, US\$427 million (6.6%) for broad-based empowerment, US\$3,197 million (52.3%) for spatial structure strengthening and US\$1,728 million (28.3%) for green development promotion.

Table S13 Allocation of Investment to Four Development Initiatives by Indicative Investment Programs

Initiative	Investment (US\$ million)			
	Total	Phase 1	Phase 2	Phase 3
Economy and exports diversification	774	414	200	160
Broad-based empowerment	432	131	190	111
Spatial structure strengthening	3,197	1,026	1,451	720
Green development promotion	2,104	682	1,062	360
Total	6,507	2,253	2,903	1,351

Source: JICA Project Team

8.3 Monitoring and Evaluation

(1) Implementation monitoring

The monitoring system for development is well established legally in Mongolia as far as implementation monitoring is concerned. Monitoring and evaluation of development in Mongolia are stipulated by the Law on Development Policy Planning, 26th November 2015, amended on 20th May 2020. According to the Law, there are two separate lines of development planning and implementation, one by the Central Government and the other by local administrations. They should be integrated first by guidelines prepared by the Central Government for preparation of local development policy and planning documents by local administrations and second by a coherent programming, budgeting, and monitoring and evaluation system linking the development planning and implementation by the Central Government and local administrations.

The integrated regional development programs (IRDPs) and the regional development councils (RDCs) proposed by the NCDP would effectively provide an institutional mechanism to link the central and

local development planning and implementation systems. Each IRDP may be formulated by member Aimags of the respective Region guided by NDA coordinating sector agencies of the Central Government through the respective RDC. Initially, budgeting and implementation for each component project may be undertaken by the respective sector agency, and monitoring and evaluation by respective Aimags in cooperation with the sector agency. In the future, regional development budget may be established separately and executed by a new department to be established in NDA in charge of regional development policy, planning and implementation supporting implementation by Aimag administrations.

(2) Performance monitoring

Performance monitoring of development has been undertaken by sector implementing agencies. Overall performance of development is compiled by the National Statistics Office (NSO) with many socio-economic and other indices as far as macro data are concerned.

The SDGs initiative by the United Nations calls for more micro data to be collected by gender, income class, Aimag/Soum, ethnicity, social groups and other attributes. Responding to this challenge, NSO has started to collect and compile more micro data. For comprehensive and inclusive data collection for SDGs, active involvement of people, private firms and local administrations is indispensable. Otherwise, administrative costs to collect and compile micro data necessary for SDGs monitoring and evaluation would become prohibitively large. A web-based and mobile monitoring and evaluation system should be established by using ICT with smartphones and the cloud system. This system should be supported by voluntary data input by people and private firms and data processing by local administrations supported by the Central Government.

This system is fundamentally different from conventional data collection by surveyors from outside as it is supported by data generation from within local communities. It will facilitate capacity development on the side of people and communities. At the same time, local administrations will enhance their capacity with more relevant and comprehensive data and ICT tools to communicate with local people and communities. In both ways, more appropriate projects and institutional measures would be formulated and implemented by the local administrations and people working together.

(3) Monitoring and evaluation of Vision2050, HSP, RDP and NCDP

It is expected that the HSP and the RDP, to be prepared reflecting the NCDP, will be monitored and evaluated in accordance with the Law on Development Policy Planning, 26th November 2015, amended on 20th May 2020 as they are formal planning documents with legal bases. The analysis on existing conditions analyzed and contained in the NCDP would provide the baseline for evaluation. The Vision2050 specifies various macro indices for evaluation and targets to be attained by 2030, 2040 and 2050.

For the GDP, per capita GDP and the ratio of mining sector in the GDP, the Vision2050 targets diverge from the targets specifies by the NCDP. Therefore, monitoring should focus on these indices among others. Population projections are largely consistent between the Vision2050 and the NCDP for 2030 and 2040. The ratio of local population in the national population is projected by the Vision2050 to be 50% even in 2050. Since the NCDP aims at vitalizing local socio-economy by regional development, the ratio of local population is a good index to measure the effects of regional development.

The Vision2050 specifies as indices related to regional development 1) the number of food processing and other light industries newly established, 2) the number of agro-related and industrial technology parks newly constructed, and 3) the number of international airports. These indices are not considered appropriate in evaluating regional development effects. Better indices are the total investment amount by newly established light industries, and employment opportunities generated by them, and the number of firms established at agro-related and industrial technology parks. The NCDP proposes to internationalize the existing airports in the east at Choibalsan and in the west at Khovd as priorities. The number of regular flights serving these airports and the number of passengers are appropriate indices to evaluate regional development effects.

Other social indices are also important for monitoring and evaluation including not only poverty rate and unemployment rate but also access to water supply, sewage treatment and solid waste management in rural areas. For these indices, micro data by gender, income class and other social attributes of residents should be collected and compiled in steps by the new method proposed by the NCDP to contribute also to the SDGs evaluation.

Chapter 1 Introduction

This introductory chapter first reproduces part of the Inception Report (IC/R) submitted in January 2019 in order to confirm the basis for the Japan International Cooperation Agency (JICA) Project as agreed between the JICA side and the Mongolian side. Then, the work progress for inception works, analysis on existing conditions, preparation of the first draft of the National Comprehensive Development Plan (NCDP) presented in the Interim Report 1 submitted in November 2019, preparation of the Draft Final Report (DF/R) 1 submitted in June 2020 containing the revised NCDP, further revision of the NCDP, pilot projects formulation and implementation and promotion activities contained in the Draft Final Report 2 (DF/R2) submitted in February 2021, and subsequent works are summarized.

Extensive comments were received on the DF/R2 from practically all the related ministries and agencies as well as individual experts. Reflecting effectively all the comments, the NCDP with sector reports was further elaborated and Draft Final Report 3 (DF/R3) was submitted on June 29, 2021 containing the final NCDP with sector reports. The Project period was extended based on the agreements between JICA and MCUD and NDA respectively in order to facilitate preparation of the Human Settlement Plan (HSP) by MCUD and the Regional Development Policy (RDP) by NDA reflecting the NCDP, while the Final Report (F/R) of the NCDP was prepared.

The structure of the F/R is explained at the end of this chapter. Seminars, working group meetings and capacity development including training tour in Japan are explained in Supplement to this chapter.

1.1 Background

1.1.1 Project background

The Mongolian economy made rapid growth during 2006-13, led mainly by mining development. The per capita gross domestic product (GDP) increased four times during this period. Population and economic activities concentrate heavily in the capital city, Ulaanbaatar and its surroundings. Of the total national population of 3.18 million in 2017, 1.46 million or 46% is found in the capital city. Also, 62% of active establishments or about 37,000 units are located in the capital city. The over-concentration of population and economic activities in Ulaanbaatar has resulted in various urban problems such as air and water pollution and traffic congestion as well as lack of adequate capacity of urban infrastructure.

The over-concentration of population and economic activities in Ulaanbaatar has caused also disparities between the urban area and the rural area. The average monthly income in the urban area was Mongolia Tughrig (MNT)1.12 million in 2017, larger by MNT0.23 million than the average in the rural area with MNT0.89 million in the same year. Poverty incidence was 18.8% in the urban area and 26.4% in the rural area in 2014, increased to 27.1% in the urban area and 34.9% in the rural area in 2016.

Despite the efforts to improve public facilities according to the standards by region and population class set by the Mongolian Government after the democratic reform of 1990, service levels and quality of social services such as education and health care have been degrading in rural areas due to limited financial capacity of local administrations and increasing maintenance costs. This, among other factors including harsh climatic conditions in recent years, contributes to migration of people to the capital city for better services as well as search for employment opportunities.

To resolve these and other problems caused by imbalanced distribution of population and economic activities and the resultant disparities, comprehensive development planning for the entire country of Mongolia is needed. The Mongolian Government, therefore, made a request to the Government of Japan to help prepare a national comprehensive development plan to promote more balanced and sustainable development in urban and rural areas, utilizing experiences in Japan for national comprehensive development planning.

Responding to this request, “Data Collection Survey on the Regional Comprehensive Development in Mongolia”

was conducted by JICA from March 2015 to October 2016 to collect information and confirm needs related to the request. Through the Data Collection Survey, existing conditions, issues and needs in Mongolia were clarified, development potentials analyzed, and scope of cooperation was examined. Following this, JICA conducted “Detailed Planning Survey for the Project for Formulation of National Comprehensive Development Plan” in May 2018, and the Record of Discussion (R/D) was signed on August 22nd, 2018 by representatives of the Mongolian Government and JICA for technical cooperation to help prepare the national comprehensive development plan and to realize capacity development of the Mongolian side for preparing and revising the Plan.

1.1.2 Project objectives and scope

(1) Project title, goal and objectives

According to the R/D of the Project, the title of the Project is “Project for Formulation of National Comprehensive Development Plan”, and the expected goal to be attained by implementing the Plan is as follows:

To reduce disparity between urban and rural areas and resolve urban issues through promoting well-balanced and sustainable development, thereby achieving the Sustainable Development Vision 2030 (SDV2030), by implementing the NCDP that includes Human Settlement Plan (HSP) and Regional Development Policy (RDP).

In order to achieve the SDV2030, the Mongolian Government decided to prepare the RDP based on the “Law on Development Policy and Planning (2015)” and the “Law on Management and Coordination of Regional Development (2003)” and the HSP based on the “Urban Development Law (2008)”. According to the R/D, the output of the Project should support formulation of the RDP by NDA and the HSP by MCUD.

Under the goals, the following outputs are to be produced:

- (a) NCDP is prepared, and
- (b) Capacity development is realized of the Mongolian counterparts (C/Ps) to formulate and revise the NCDP.

After the Project started, the Mongolian Government decided to prepare a long-term development policy (LTDP) and the Prime Minister’s order was issued on April 30 to organize a working group to prepare the LTDP with NDA. The target year for the LTDP was set for 2050. The LTDP2050 had been prepared by NDA and submitted to the Parliament, which approved the Vision2050 based on it.

The planning period for the NCDP was up to 2030 in line with the SDV2030 and the target year for the HSP and the RDP as agreed between the Mongolian side and JICA. It has been extended to 2040 upon the request by the Mongolian side. The NCDP is now expected to aim at supporting the Vision2050.

(2) Project scope

The NCDP to be formulated through the Project encompasses the HSP and the RDP. The former is prepared by Ministry of Construction and Urban Development (MCUD) and the latter by the National Development Agency (NDA), respectively based on the NCDP. Scope of the HSP and the RDP and a procedure and method to prepare them are illustrated in Figure 1.1.1 in a simplified way. Specific output of the Project related to the HSP and the RDP will follow the R/D requirements as agreed, and confirmed through discussions with MCUD and NDA, respectively reflecting relevant laws in Mongolia.

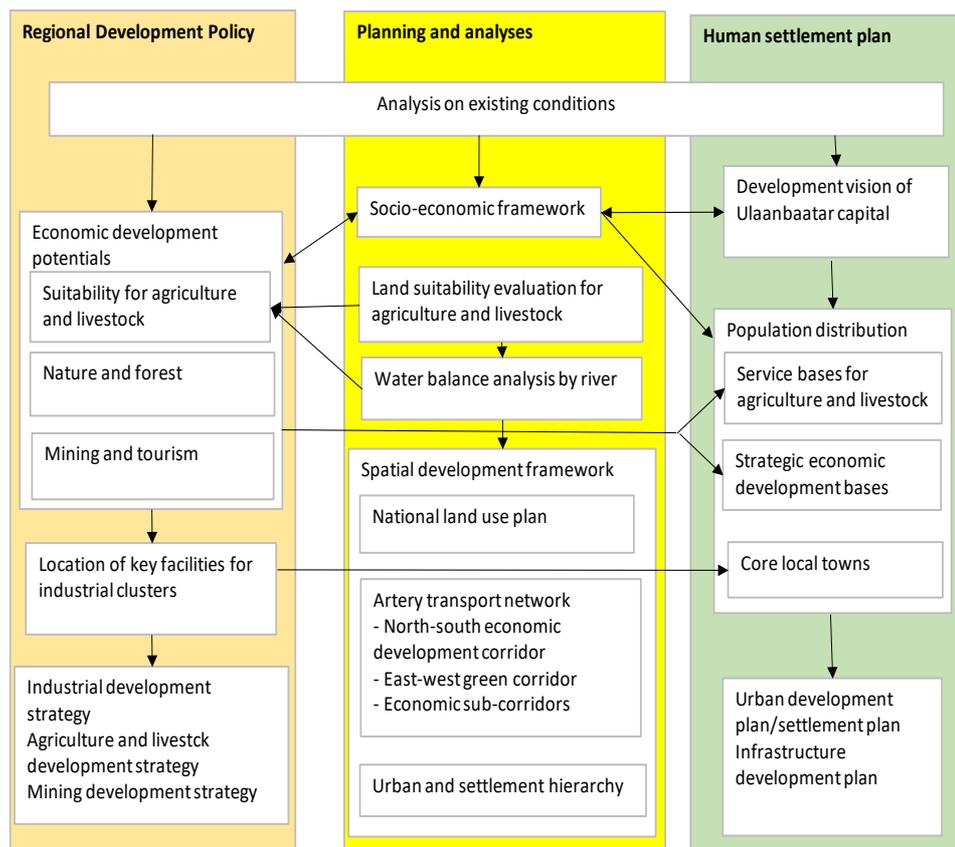
1.1.3 Project implementation and management structure

The Project is implemented by the JICA Project Team and its C/P team of the Mongolian Government. Main C/P organizations of the Mongolian Government are MCUD in charge mainly of the HSP and NDA in charge mainly of the RDP. The Project implementation is supervised by the Joint Coordination Committee (JCC), to be chaired by the Cabinet Secretary with co-deputy chairpersons of the MCUD Secretary, the NDA Chairman and the Chief Representative of the JICA Mongolia office. JCC members are as specified in the R/D for the Project.

Under the JCC, the Project Working Group (PWG) is organized as the Mongolian C/P organization to work with the JICA Project Team on a daily base. The PWG consists of MCUD and NDA as the main C/P agencies and

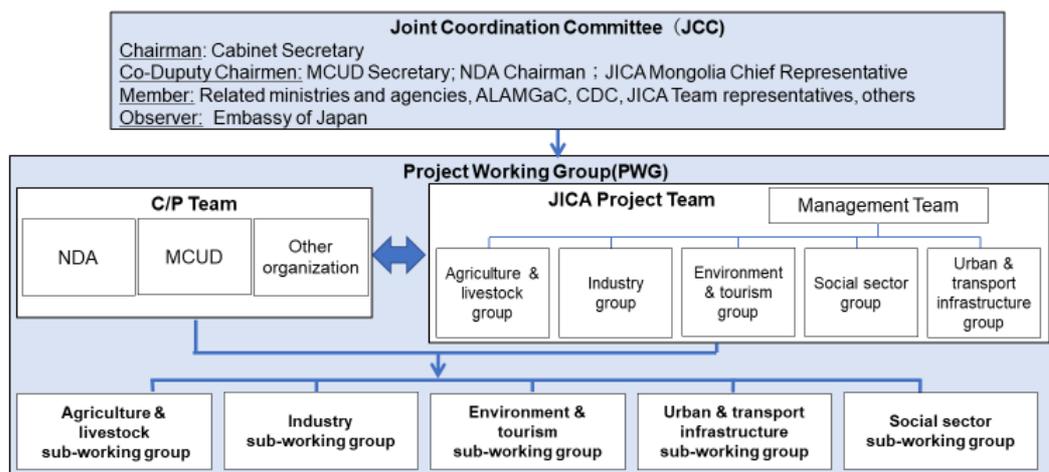
other related ministries and organizations such as Agency for Land Administration and Management, Geodesy and Cartography (ALAMGaC), Construction and Development Center (CDC), Ministry of Environment (MOE) and Tourism (MET), Ministry of Food, Agriculture and Light Industry (MOFALI), and Ulaanbaatar city, spelled out in the R/D. For close collaboration and cooperation on a daily base, the PWG is to be operated as subgroups: 1) agriculture and livestock, 2) industrial development, 3) environment and tourism, 4) social development, and 5) urban and transport infrastructure. These are informal groups to encourage free and open discussions in smaller number of participants, respectively.

The JICA Project Team (JPT) also has adopted a group structure for ease of Project operation and management in line with the PWG subgroups. The overall Project implementation and management structure is illustrated in Figure 1.1.2.



Source: JICA Project Team

Figure 1.1.1 Outline Procedure and Outcomes of the Project with HSP and RDP



Source: JICA Project Team

Note: Agriculture and livestock sub-working group (SWG): MCUD, NDA, CDC, ALAMGaC, MOFALI
 Industry SWG: MCUD, NDA, CDC, ALAMGaC, Ministry and Heavy Industry of Energy, MOFALI
 Environment and tourism SWG: MCUD, NDA, CDC, ALAMGaC, MET
 Urban and transport infrastructure SWG: MCUD, NDA, CDC, ALAMGaC, Ministry of Road and Transportation Development (MRTD)
 Social sector SWG: MCUD, NDA, CDC, ALAMGaC, Ministry of Education, Culture and Science, Ministry of Population Development and Social Protection, Ministry of Health

Figure 1.1.2 Project Implementation and Management Structure with JCC, PWG and Five Sub-groups

1.2 Work Progress

1.2.1 Inception works

The JICA Project Team started in Japan works for the Project in December 2018 after the contract with JICA was concluded. Prior to this, the JICA Project Team had the first team meeting on November 14 to confirm the scope, procedure, approach and schedule of the Project, and started to review readily available study reports and statistics. Based on the review, an initial list of development issues was prepared by sector, and additional data and information to be collected in the field were clarified.

The first field work in Mongolia started on January 9, 2019 as the first group of the JICA Project Team arrived in Ulaanbaatar. The JICA Project Team had a series of meetings with the Mongolian C/P team based on the draft IC/R prepared in Japan. The first meeting of JCC was convened on January 18 to present the draft IC/R and discuss on its contents. Based on the comments by the JCC participants, only small revision was made to finalize the IC/R, while pending issues were recorded in Minutes of Meeting (M/M) as attached in this chapter, which was signed later by representatives of MCUD, NDA, JICA and the JICA Project Team (Attachment 1).

During the inception period, a seminar was conducted by the JICA Project Team titled “Scenario Planning, Sustainable Development Goals (SDGs) and Development Paradigm” to the PWG members.

1.2.2 Analysis on existing conditions

Fieldworks of the Project continued after the JCC meeting in transportation, urban development and socioeconomic sectors. After a short break during the new year’s holiday, the fieldworks resumed towards the end of February. Based on the initial list of development issues prepared in Japan, the JICA Project Team experts in charge of different sectors had discussions with the Mongolian C/P experts and other experts of related ministries and organizations. Through the discussions, additional data and information were collected. To facilitate discussions, meetings of SWGs of the PWG were organized occasionally.

During this period, additional seminars were conducted by the JICA Project Team and also by the government

mission of the Ministry of Land, Infrastructure, Transport and Tourism of Japan.

As part of analysis on existing conditions, the JICA Project Team in cooperation with MCUD and NDA carried out the first round of Aimag consultation. As of early May, 11 Aimags had been covered. At each Aimag, the JICA Project Team explained about the Project, presented a preliminary development diagnosis, and exchange views on constraints to development that the Aimag faces and development prospects that the Aimag has.

Based on the analysis on existing conditions by sector and elaboration of development issues, development directions for Mongolia to pursue for years and decades to come were examined, and development alternatives were formulated and evaluated at a preliminary level. Socioeconomic and spatial frameworks for the NCDP were also examined at a preliminary level.

1.2.3 Compilation of Progress Report

Compiling results of all the works during the period up to early May, a progress report (P/R) was compiled in a draft form and submitted to JICA on May 10, 2019. The first meeting of the JICA Advisory Committee was convened on May 23 at the JICA Headquarters to discuss on the contents of the draft P/R. Reflecting the discussions at the Advisory Committee meeting, the P/R was finalized and submitted to the Mongolian side. The P/R was presented at the second JCC meeting convened on June 7, 2019 and discussed by JCC members. The discussions and comments during the JCC meeting were compiled into M/M and signed by the Chief Cabinet Secretary as the chair, representatives of MCUD, NDA, JICA and the JICA Project Team (JPT) (Attachment 2). Additional comments were received by June 24, 2019.

1.2.4 Preparation of first draft of the NCDP

Fieldworks of the Project continued for supplemental collection of data and information by sector, discussions with C/P experts, relevant government officers and the private sector. To facilitate discussions, meetings of SWGs of the PWG were organized occasionally. Also, additional seminars were conducted by the JPT. The Aimag consultation initiated during the previous phase was continued and all the Aimags were covered by the middle of August.

To disseminate the initial outcomes of the Project widely, many sessions were organized with politicians, scholars, opinion leaders and representatives of the private sector. These sessions represent multi-stakeholders (MSH) meetings originally planned but conducted individually for different types of stakeholders. In particular, a session with representatives of light industry associations was convened to present the P/R and receive comments.

Based on identification and examination of development issues, development objectives and strategy have been established by sector, and development programs and projects formulated. These sector works were coordinated in the light of the macro development objectives, basic strategy, spatial structure and socio-economic framework. Development alternatives were examined from various points of view, and the best alternative has been selected and elaborated. A development scenario was prepared for the best alternative, and the first draft of the NCDP has been compiled.

1.2.5 Compilation of Interim Report 1

Compiling results of all the works during the period up to October, an interim report 1 (IT/R 1) was compiled in a draft form and submitted to JICA on October 31, 2019. The second meeting of the JICA Advisory Committee was convened on November 15 at the JICA Headquarters to discuss on the contents of the draft IT/R 1. Reflecting the discussions at the Advisory Committee meeting, the IT/R1 was finalized and submitted to the Mongolian side.

1.2.6 Revision of the NCDP

The IT/R1 was explained at the third JCC meeting on November 25, 2019 and the participants made many

comments (Attachment 3). More comments were submitted in writing by member organizations of the JCC by late December 2019. Works of the Project continued after the submission of the IT/R1 and the third JCC meeting.

The fieldworks of the Project resumed in early January 2020. To present the first draft of the NCDP to a wide range of stakeholders, a multi-stakeholders' meeting was convened on January 22, 2020. The participants included researchers/scholars, representatives of media, private firms, governors and councillors of all the 21 Aimags as well as members of the PWG, totalling 162. The presentation of the first draft of the NCDP was followed by group discussions in two sessions on 1) development paradigm, vision, objectives and strategy, and 2) spatial structure and land use plan.

The JPT also had a session with representatives of political parties including the National Development Party, World Mongolia Party and Mongolia Democratic Movement Party to explain the draft NCDP and receive comments. Collaborative works with the C/P experts of the PWG continued, and in particular the spatial structure and land use plan proposed in the IT/R1 were discussed extensively and revised. Also, a note on new regional division and regional development vision and strategy was prepared and shared with the C/P organizations. The first geographic information system (GIS) training was conducted for experts of CDC during January 20 through 24. Sector works were conducted for manufacturing, tourism and water resources sectors through early March. The fieldworks, however, were suspended due to the worldwide outbreak of the Coronavirus Disease 2019 (COVID-19).

1.2.7 Preparation of DF/R1

During the fieldworks in January, the Mongolian C/P organizations made a request to advance the Project schedule and submit a DF/R1 by June 2020 before the general election in Mongolia instead of the IT/R 2 as originally planned. JICA accepted this request. As the fieldworks were suspended immediately after this decision, the JPT decided to prepare the DF/R1 in Japan communicating with relevant Mongolian organizations and individuals directly and through the national members of the JPT.

To prepare the DF/R1, sector experts of the JPT revised the project profiles contained in the IT/R1 with more in-depth analysis and additional data and information and prepared sector reports as part of the revised NCDP. The JPT made additional analysis on regional development vision and strategy and formulated area development programs for the six Regions newly defined. The JPT proposed implementing arrangements and indicative investment program. Compiling all the works outlined, the first draft of the DF/R1 was prepared and submitted first to JICA on May 15, 2020. The fourth Advisory Committee meeting was convened online on May 28, 2020.

To present the DF/R1 and discuss on it, the fourth JCC meeting was organized online linked by Zoom on June 11 (Attachment 4). Despite the fact that many on the Mongolian side were busy involved in the forthcoming general election, reasonably good attendance was obtained and active discussions took place. Reflecting comments received from JICA and the Mongolian side, the DF/R1 was finalized by the end of June.

As mentioned above, the Vision2050 was approved by the Parliament resolution No.52 on May 13th, 2020. The resolution also approved "Activities to be implemented during 2021-2030 under the framework of "Vision2050 long-term development policy of Mongolia" and "Monitoring and evaluation criteria and achievement level for the Vision2050 long-term development policy of Mongolia". The revised Constitution of Mongolia had become effective also in May 2020, which has ensured continuity of development policy and plans through central administrations. Subsequently, the national development basic policy 2021-25 was approved by the Parliament resolution No.23 on August 28th, 2020, and the government action plan 2020-24 was prepared. These policy documents have been reviewed as part of the NCDP formulation.

1.2.8 Further revision of the NCDP, pilot projects formulation and implementation and promotion activities

The NCDP contained in the DF/R1 were further revised and elaborated reflecting comments received from the Mongolian side including Cabinet Secretary, MET, MOFALI, MLSP, MMHI, MOE, MRTD, NDA and MCUD as well as comments received during the fourth JCC meeting. A MSH meeting was convened online to present

and discuss on the NCDP with Mongolian youth groups on August 17, 2020. Over 100 Mongolian youth participated not only in Mongolia (Ulaanbaatar and some Aimags) and Japan but also in 12 other countries. Well over 100 comments were received and the JPT responded to all of them, and the communications have been made open online. To follow up the meeting, group discussions took place also online on September 7 participated by selected participants of the MSH meeting.

JICA decided to undertake a few pilot projects (PPs) to prepare for early implementation of the projects proposed in the NCDP and to publicize the NCDP with PPs related particularly to anchor projects to a wide range of stakeholders to build momentum for the overall implementation of the NCDP. The JPT examined pilot projects (PPs) to be implemented as part of the NCDP Project since December 2019 in consultation with JICA. Profiles were prepared for 17 candidate PPs proposed based mainly on ideas of JPT experts. They have been discussed with the Mongolian counterparts (CPs) and JICA. Four of those 17 PPs were approved by JICA in April 2020 and one additional PP was approved in October 2020. A few additional proposals have not been selected as a full-fledged pilot projects but adopted as additional surveys.

A promotion video was prepared for the purpose of disseminating the NCDP widely to Mongolian people featuring the vision, strategy and project proposals as well as the procedure to prepare the NCDP by participatory approach. Articles related to the NCDP were published on website of a media firm.

1.2.9 Preparation of DF/R2

To prepare the DF/R2, sector experts of the JPT updated respective sector reports with the latest data including those contained in Statistical Yearbook 2019 published in the middle of 2020. In reflecting comments by JCC member organizations and other stakeholders as well as JICA, the JPT communicated online with related organizations or directly by the national members of the JPT. The JPT completed water balance analysis and analysis on climate change, and the results were incorporated in the DF/R2. Possible effects of COVID-19 were analysed based mainly on reports by international organizations and included in relevant sectors and sections of the DF/R2.

Compiling all the works outlined, the first draft of the DF/R2 was prepared and submitted first to JICA on December 15, 2020. The fourth Advisory Committee meeting was convened online on December 25, 2020. No JCC meeting was convened to discuss on the draft DF/R2, but the DF/R2 was revised reflecting over 300 comments by different sections of JICA and submitted to the Mongolian side by the end of February 2021.

1.2.10 Coordination between the NCDP and the HSP and the RDP, pilot projects completion and elaboration on the NCDP

As the NCDP was almost finalized with submission of the DF/R2, the main concern of the Project has shifted to coordination between the NCDP and the HSP and the RDP. A series of meetings have been conducted for the purpose with the MCUD/CDC for the HSP and with the NDA for the RDP. First, separate meetings were convened with NDA on February 19 and with MCUD/CDC on February 23 by the initiative of the JICA Mongolia office. In the meeting with NDA, progress of preparation of the RDP by NDA was reported and how to utilize the NCDP in preparing the RDP was discussed. In the meeting with MCUD/CDC, progress of preparation of the HSP was presented by CDC and how to utilize the NCDP in preparing the HSP was discussed.

Extensive comments were received on the DF/R2 from MOE, MMHI, CDC, MRTD, MOFALI, ALAMGaC, MOF, MLSP, MES, Cabinet Secretary, MCUD, NDA and individual experts including advisors for the HSP. The JPT reviewed them carefully and prepared a response in writing clarifying how those comments would be treated. Specifically, the JPT clarified comments related to key issues to be resolved through coordination, comments to be reflected in revising the NCDP, and a few comments that may not be reflected in the NCDP as they are beyond the scope of work for the Project.

After all the comments were received and reviewed, coordination meetings were convened with MCUD/CDC and NDA focusing on the key issues identified by the comments on the DF/R2 by the Mongolian side. At the coordination meeting on April 15, the JPT explained the following key issues raised by the Mongolian side:

- (a) Population projection,

- (b) Economic projection,
- (c) Urban hierarchy,
- (d) Ring artery,
- (e) Relocation of capital city functions,
- (f) Regional division. and
- (g) Economic clusters development.

Through extensive discussions, what needs to be further discussed was clarified while understanding on the NCDP proposals related to the key issues was deepened. In particular, discussions would continue on relocation of capital functions and revised regional division for political reasons as well. Further comments on the issues were received in writing from a few participants.

At the coordination meeting on April 23, CDC made a presentation on the HSP in preparation and discussions continued on the key issues. The JPT proposed how to resolve discrepancies that appeared to exist between the NCDP and the Vision2050 and the HSP, responding also to the comments received from the participants. Additional comments were received after the meeting from one of the participants, and the JPT responded to them in writing.

Another coordination meeting was convened on May 14 and the JPT made a presentation under the title of “NCDP to Support Vision2050”. The JPT emphasized common features of the NCDP and the Vision2050 and clarified the difference between them that should be reflected in the HSP and the RDP. Some discussions were on the same issues but forward-looking discussions also took place on regional division, regional development programs and regional development council proposed by the NCDP.

During this period, all the pilot projects and supplemental surveys were completed with final reports, respectively. Results have been compiled into a separate volume and included in the DF/R3.

Based on the works after the submission of the DF/R2, the NCDP has been further elaborated and the first draft of the DF/R3 was prepared and submitted first to JICA on May 20, 2021. The draft DF/R3 has incorporated all the comments on the DF/R2 by JICA and practically all the comments received on the DF/R2 from the Mongolian side according to the written response to them prepared by the JPT.

1.2.11 Extension period

No JCC meeting was convened to present and discuss on the DF/R2, but extensive comments were received from practically all the related ministries and agencies as well as individual experts. Reflecting effectively all the comments, the NCDP with sector reports was further elaborated and Draft Final Report 3 (DF/R3) was submitted on June 29, 2021 containing the final NCDP with sector reports. In the meantime, a series of coordination meetings were organized with MCUD/CDC and NDA to discuss on how to reflect the NCDP proposals in the HSP and the RDP in preparation by MCUD/CDC and NDA respectively.

As the preparation of the HSP and the RDP was found to be delayed from the original schedule, JICA discussed with MCUD and NDA for possible extension of the NCDP project period and they agreed on the extension as stipulated in “Confirmation on way forward related to the extension of the Project duration”. Accordingly, the Record of Discussions for the Project agreed and signed on 22 August 2018 was amended 30 June 2021.

MCUD/CDC and NDA exchanged views and ideas on how to reflect the NCDP proposals in the HSP and the RDP in a series of coordination meetings convened online due to spread of COVID-19. The pre-JCC meeting was convened online on August 27, 2021. At the meeting NDA and CDC presented progress of the RDP and the HSP preparation, and issues and need for additional information in preparing the HSP and the RDP were raised. The JPT responded to the issues raised with additional information as much as possible in the subsequent period.

A field work was planned jointly with MCUD/CDC and NDA for the fifth JCC meeting and the NCDP promotion seminar. The field work took place during October 10 through 29. The fifth JCC meeting was convened at the Government building chaired by the Chief Cabinet Secretary on 26 October 2021. JCC agreed that in order to promote the implementation of the NCDP proposals, the NCDP as well as the HSP and the RDP

should be disseminated widely to raise awareness for the NCDP proposals and cultivate understanding of the new development paradigm proposed in the NCDP. Works during the extension period are described in detail in the Supplemental Report.

1.3 Structure of F/R

Structure of the F/R is basically the same as the DF/R3 but the Supplemental Report has been prepared to explain the works undertaken during the extension period. Following Chapter 1 Introduction, Chapter 2 through Chapter 11 together present the Main Report of the final NCDP. Sector Reports consist of Sector Report on Crop Farming, Livestock Farming, Mining, Manufacturing and Tourism, Sector Report on Natural and Social Environment, and Water Resources, and Sector Report on Transport, Logistic and Other Infrastructure, Digital Transformation and ICT, and Urban Development.

The remaining part of the Main Report is structured in the following way. Chapter 2 presents an overview of Mongolia's macro socio-economy, and a comprehensive review of the Mongolian SDV2030 is also given. Chapter 3 presents results of examination of development directions and definition of macro development objectives and basic strategy for the NCDP, followed by development objectives and strategy by sector.

Chapter 4 explains socio-economic framework for the NCDP and presents alternative projections of population and economic activities. Development alternatives are presented and evaluated, and the best alternative is recommended and elaborated. Chapter 5 describes the national spatial structure covering urban hierarchy, artery network and land use. Results of water balance analysis and analysis on climate change are contained in this chapter. Chapter 6 presents proposed new division of the national territory into six Regions and regional development vision and strategy by Region. Chapter 7 presents the complete outcomes of Aimag consultation conducted during March through August covering all the 21 Aimags.

In Chapter 8, a phased development plan of the NCDP is presented in the form of the development scenario, and specific measures to realize the planned development are proposed in four development initiatives including anchor projects and institutional measures, and integrated regional development programs for the six regions newly defined are also proposed. Chapter 9 describes the procedure of scenario planning applied to the NCDP preparation and outcomes of strategic environmental assessment for the Project. The proposed evaluation system for the NCDP and results of initial environmental examination of all the anchor projects are also included. Chapter 10 contains profiles of all the proposed programs and projects by development initiative. Finally, in Chapter 11, an implementation plan for the NCDP is proposed with implementing arrangements, indicative investment program, and monitoring and evaluation methods.

Supplement to Chapter 1: Capacity Development

The capacity development program of the Project is closely linked to the scenario planning procedure. The program consists of seminars, workshops, knowledge co-creation program in Japan and on-the-job-training.

S1.1 Seminars

As part of the scenario planning for the NCDP, a series of seminars are conducted for the Mongolian C/P Team and others. Participants to the seminar conducted so far are confined to the PWG members. Other participants are expected to be invited for participation to realize more meaningful scenario planning. These seminars serve also as capacity development in a broad sense for the C/P Team to be exposed to new ways of thinking and to learn new analytical and planning methods. The seminars undertaken from the initial stage of the Project are summarized in Table S1.1.

Table S1.1 Seminars for Scenario Planning and Capacity Development

Date	Title	Resource person	Affiliation	Number of participants
January 15, 2019	Scenario Planning, SDGs and Development Paradigm	Tsuyoshi Hashimoto	JICA Project Team	35
March 5, 2019	Gross National Happiness for Mongolia: people's happiness as basis for NCDP	Haruo Yamane	JICA Project Team	24
March 11, 2019	Experiences of National Comprehensive Development Plans in Japan	Toshiyasu Noda	Seinan Gakuin University	38
	International Comparison of National Land Plans	Satoru Oba	Research Institute for Urban and Environmental Development	
	Spatial Planning Platform and Utilization of GIS on National Land Plan	Eiko Toyama	Ministry of Land, Infrastructure, Transport and Tourism	
March 18, 2019	Scenario Planning for the NCDP Formulation: Macro Development Alternatives	Tsuyoshi Hashimoto	JICA Project Team	20
June 19, 2019	Logistics trends between Asia and Europe and the role of Mongolian transport sector	Ryuichi Shibasaki D. Gerelnyam B.Gunbold Yoshiya Nakagawa	Tokyo University MRTD MCUD JICA Project Team	50
August 21, 2019	Development paradigm based on SDGs and SDV2030	Yoji Kawamura	JICA Project Team	33
	Spatial planning of international case	Masaru Tokura		
October 9, 2019	Development paradigm based on SDGs and SDV2030 (second)	Yoji Kawamura	JICA Project Team	19
	Socio-economic framework	Haruo Yamane		

Source: JICA Project Team

S1.2 Sub-working groups meetings

The PWG organized under the JCC as described in sub-section 1.1.3 has been operated in the five SWGs to

facilitate communications between the JPT and the Mongolian C/P Team. As of early October, all the five SWGs had meetings as summarized in Table S1.2. Main points of the discussions in each SWG are described below.

Table S1.2 Sub-working Group Meetings

No.	Sector	Meeting date	Themes	Number of Participants
1	Urban & transport infrastructure	March 12, 2019	General methodology for the survey on infrastructure sector, survey target cities, urban hierarchy, traffic survey and demand forecast	17
2	Environment and tourism & social (Joint SWG)	March 13, 2019	Current condition analysis and approaches to NCDP for social and tourism sectors	21
3	Industry & agriculture (Joint SWG)	April 16, 2019	Current condition analysis and approaches to NCDP for industry and agriculture sectors	18
4	Urban & transport infrastructure (Second)	April 17, 2019	Spatial analysis methods, corridor development and urban functions	25
5	Social (Second)	May 28, 2019	Preliminary highlights of findings of social development sector from the draft P/R s	10
6	Social (Third)	October 9, 2019	Voluntary National Review (VNR) Report on the SDG achievements, finding and preliminary recommendation in NCDP	19

Source: JICA Project Team

(1) Urban and transport infrastructure SWG meetings

The main roles of the SWG are as follows:

- (a) To identify the cities and areas to be surveyed based on the urban hierarchy analysis of current situations and establish a system to conduct effective surveys,
- (b) To provide a forum for clarifying relationships among sectors through analysis on the structure of SDV2030 and SDGs and relationships between them,
- (c) To develop the spatial strategy such as corridor development and to identify critical measures to strengthen the spatial structure for Mongolia through the infrastructure development, and
- (d) To achieve capacity building for infrastructure development planning through sharing planning procedure and methods.

The JPT experts in charge of infrastructure held the SWG meeting on March 12, 2019. Main topics discussed were the way of selecting survey target cities, urban hierarchy and methods of traffic survey and demand forecast. After the meeting, participants continued to discuss the details with the JPT members by small meetings and e-mail correspondence.

The second SWG meeting was convened in April 17, 2019. At the meeting, group discussions on economic corridors were undertaken based on the preliminarily proposed corridor map prepared by the JPT experts. The Mongolia side presented some ideas of corridor development reflecting the Government policy.



Source: JICA Project Team

Photo: Showing First and Second SWG Meetings in Urban and Transport Infrastructure

(2) Environment, tourism and social joint SWG meeting

The SWGs for environment and tourism and for the social sector had a joint meeting on March 13, 2019 at the NDA conference room in consideration of some common issues of the two SWGs and the availability of the JPT experts. SWGs in the coming months may be held separately. Environment was not included in the SWG at this time because of the absence of the expert in charge of environment in Mongolia.

The main objectives of the SWG were as follows:

- (a) To share the preliminary findings by the JPT in the tourism and the social sectors with the participants,
- (b) To present the approach to the NCDP formulation in the two sectors, and
- (c) To obtain feedbacks from the participants on (a) and (b).

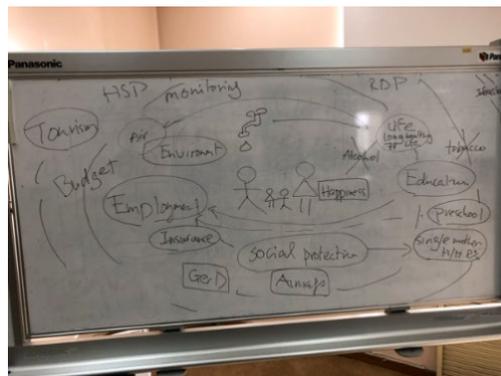
The JPT first made presentations on the outline of expected outcomes, preliminary findings and the approach to the NCDP formulation for the tourism and the social sectors. Following these presentations, comments and questions were raised by the participants and views exchanged. Main points raised are:

- (i) request to hold SWGs of different sectors on one day together for the convenience of the C/Ps on the Mongolian side,
- (ii) need to consider rural-to-urban migration patterns in consideration of push factors and pull factors,
- (iii) need for budget allocation based on needs and potentials of Aimags, Souns and municipalities,
- (iv) readiness of the Mongolian side to provide information and advice,
- (v) need to consider links between regional development policy and tourism development,
- (vi) question on the need to promote winter tourism,
- (vii) need to preserve Mongolia's traditional life style in consideration of young herders' tendency to avoid traditional animal raising,
- (viii) question on the realistic possibility of attaining one million foreign tourist arrivals by 2020 stipulated in the SDV 2030, and
- (ix) approach to the NCDP formulation in applying both quantitative and qualitative methods and its integrated nature in comprehensive planning.



Environment, tourism and social
joint SWG meeting

Source: JICA Project Team



Schematic showing all relevant factors for tourism and
social development

Photo: Showing Joint SWG Meeting on Environment, Tourism and Social Sectors

The SWGs for industry and for the agriculture and livestock sector were held jointly on April 16, 2019 at the MCUD conference room. The JPT experts in charge of agriculture, industry and institutional and legal frameworks made presentations on respective sectors, then questions and answers were made among the participants.

The main roles of the SWG were as follows:

- (a) To confirm a basic direction of industrial development planning,
- (b) To share ideas of free zones and Special Economic Zone (SEZ) development through the introduction of successful cases and trend in other countries,
- (c) To exchange views on investment promotion including laws and regulations, organizations, marketing and quality management,
- (d) To create a platform on the industrial development among related ministries,
- (e) To discuss ideas on key concepts for agriculture development such as self-sufficiency, environmental friendliness, marketing environment and industrial cluster development, and
- (f) To share ideas on new agricultural technologies such as an efficient irrigation technology and zero tillage farming.

(3) Social SWG meeting (second and third)

The main objectives of the second SWG meeting were the following:

- (a) To provide some preliminary highlights on findings of social development sector from the P/R
- (b) Update on progress of SDV 2030 implementation for the Ministry of Education, Culture, Science and Sport, Ministry of Health (MOH) and Ministry of Labor and Social Protection.
- (c) Recommendations in the NCDP for education, health care social protection

The recommendation in the meeting is summarized as follows:

- (a) The importance of social sector in the NCDP was stressed, as 25% of state budget is dedicated to this sector. A correct strategy for the NCDP needs to be identified and upcoming JCC meeting was mentioned.
- (b) After discussing the SDV 2030 subsector targets for education, health, social protection and labor for the First Phase: 2016 to 2020, some questions and comments were raised.
- (c) As preliminary recommendations for discussion, reference was made to involvement of the private sector and strong linkage to industry which is needed in all the subsectors.

- (d) Various studies and data available in the social sector including the study carried out in Central and Eastern Aimags, looking at livelihood of nomads over several years by the Institute of Geography and Genecology were mentioned. The causes of internal migration are analysed in the study, which will be important for the NCDP.
- (e) The education sector, which has a large participation of the private sector is causing the mismatch of the graduates' qualification and industry requirements due to the proliferation of substandard higher education, and supply-driven courses and diplomas offered by private universities. Job matching will not be successful unless this is rectified.
- (f) The leading role of industries was mentioned in advancing the job market, skills training and job matching of young Mongolians. At the same time, there are particular strengths and existing skills of Mongolian students that need to be recognized such as strong mathematical skills.

The third SWG meeting on social sector was held on October 9, 2019 in the frame of the PWG. The purpose of the SWG was the following:

- (a) To provide information on the recently published VNR Report on the SDG achievements,
- (b) To provide information on findings of the NCDP in the social sector,
- (c) To provide information on the preliminary recommendations in the NCDP, and
- (d) To obtain feedback and advice from the SWG members.

The JPT presented a brief summary of the VNR which gave mixed results; despite some positive result such as overall economic development, poverty and unemployment are persisting.

Some topics on which the SWG members earlier requested information were elaborated: 'reasons for internal migration' and 'how to preserve the nomadic way of life'. The JPT then presented the preliminary recommendations in the social sector, including the registration of the migrants in Ulaanbaatar so that they could have access to essential services, housing and social benefits. It is noted also that in order to increase the labor participation and efficiency, both the culture of job ethics and decent work will need to be promoted.

S1.3 Knowledge co-creation program in Japan

(1) Purpose and contents

The first knowledge co-creation program in Japan was conducted from June 26 to July 2, 2019. The purpose of this program was to share the knowledge of the National Comprehensive Development Plans in Japan with the Mongolian side and to discuss on issues involved in the NCDP formulation and implementation processes. The occasion was successfully utilized to have a common view for the cross-cutting planning concepts across different organizations involved in the NCDP.

The main themes were selected in line with the planning issues of the Project.

- (a) National development plan in Japan; and
- (b) Regional development in Japan.

The participants were carefully selected from different organizations in management level or key position to maximize the program's impact for the Project as Table S1.3 shows.

Table S1.3 Participants in First Knowledge Co-creation Program in Japan

No.	Organization	Position
1	MCUD	Deputy Minister
2	NDA	Deputy Director
3	MCUD	Director General, Urban Development and Land Affairs Policy Implementation Department
4	MCUD	Advisor, Department of Urban Development, Land Affairs Policy Implementation and Coordination
5	NDA	Head, Sector Development and Policy Regulation Department
6	NDA	Senior Officer, Sector Development Policy and Regulation Department

7	CDC	Head, Urban, Infrastructure Study and Planning Division
8	CDC	Head, Human Settlement, Regional Study and Planning Division
9	ALAMGaC	Head, Urban Development Department
10	Cabinet Secretary	Senior Officer, Strategic Management and Coordination Department
11	Cabinet Secretary	Officer, Strategic Management and Coordination Department
12	National University of Mongolia	Professor, School of Arts and Science

Source: JICA Project Team

The program contents cover a wide range of national development practices for all participants' sectors. The field work areas were selected based on the selected themes of the program. The detailed contents are summarized in Table S1.4.

Table S1.4 Themes and Contents of First Knowledge Co-creation Program in Japan

Theme	Aim to learn	Contents
Theme 1 : National Development Planning	(a) Reflection of lessons learned from experiences in Japan into the NCDP (b) Urban/town planning and land management based on the NCDP	(a) Lectures (i) Japanese NCDP's overview and method of implementation and approval process (ii) Discussion on the lessons from the Japanese case applicable to Mongolian development issues (b) Site visit (i) City planning in Tsukuba city
Theme 2 Regional Development Plan	(a) Roles of large scale infrastructure (b) Utilization of various local resources for tourism (c) Advanced technology for regional development	(a) Lectures (i) Urban development of the airport satellite town (ii) Methodology of the industrial location and investment promotion for industrial development (b) Site visits (i) Tourism development based on historical resources (ii) Development of the airport satellite town (iii) Logistic center of a major private company in Japan (iv) Small hub development

Source: JICA Project Team

(2) Outcome

The program was completed with fruitful results. All the participants have been actively involved to learn lessons from experiences in Japan and to discuss possible application to the NCDP. The lectures, discussions, site visits and Q&A sessions were evaluated mostly favorably as well balanced by the participants. According to the questionnaire, 11 participants evaluated the program at the highest level.

Notably, Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT) warmly welcomed the participants with a courtesy call on the Vice Minister of MLIT. In the session with MLIT, the participants and MLIT discussed how to collaborate further between Mongolia and Japan. The details discussed in the program and the feedback from participants will be utilized for next capacity development, especially Second Knowledge Co-Creation Program as well as the formulation of the NCDP.



Source: JICA Project Team

Photo: Showing the First Knowledge Co-Creation Program

S1.4 GIS training

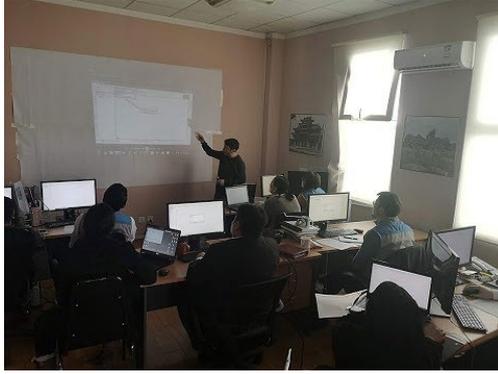
As part of the capacity building by the Project, GIS training was conducted for selected members of the Mongolian C/P, as the Mongolian side is highly interested in knowledge of GIS, and GIS-based analysis is a useful tool for regional development and spatial planning. As the analyses using GIS produce some output of the Project as important part of the NCDP, and it is expected the C/P experts will revise the output with updated data as necessary even after the Project is completed. Therefore, the GIS training was conducted for the purpose of developing the skills of C/P to produce output by using GIS. Arc GIS software was selected as the training material, and the C/P experts prepared the application software.

Two training sessions were planned, one for beginners and the other for the intermediate. A Mongolian lecturer was hired as a trainer, and the training participants were selected among young professionals of CDC. The contents of the training were finalized after discussion between JPT, the chief of participants and the GIS trainer. The training was conducted using a combination of video explanations and exercise under instruction.

The beginners' course was held in January. However, the training for the intermediate course, which was scheduled to be held in March, has been postponed until now due to the impact of COVID-19.

The details of the beginner course are summarized below. An online questionnaire was used to provide feedback on the program. The majority of the participants answered that they had achieved their goals.

Period	January 20 to 24 (13:00 ~ 16:00), 2020
Number of participants	8 (young professionals from CDC) + 1 as an observer from JPT
Contents	(i) Get started, (ii) Using attributes table (iii).About coordinate systems, (iv) Working with legend, (v) Drawing features to show quantities, (vi) Using the tools, and (vii) Map export and printing



Source: JICA Project Team

Photo: The Lecture in Progress

Attachment 1: Minutes of Meeting of First Joint Coordination Committee

MINUTES OF MEETING

ON

THE 1st JOINT COORDINATING COMMITTEE

FOR

**THE PROJECT FOR FORMULATION OF
NATIONAL COMPREHENSIVE DEVELOPMENT PLAN**

AGREED UPON BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY

AND

**MINISTRY OF CONSTRUCTION AND URBAN DEVELOPMENT
NATIONAL DEVELOPMENT AGENCY**

Ulaanbaatar, 18th January 2019

Ms. Eriko TAMURA
Senior Representative
JICA Mongolia Office

Mr. Sandag MAGNAISUREN
State Secretary
Ministry of Construction and Urban Development

The 1st
Joint

Mr. Tsuyoshi HASHIMOTO
Team Leader
JICA Project Team

Mr. Banzragch BAYARSAIKHAN
Chairperson
National Development Agency

Mr. Idesh BATKHUU
Director General
Development Financing Department, Ministry of
Finance

Coordinating Committee (hereinafter referred to as "JCC") meeting for "the Project for Formulation of National

Comprehensive Development Plan” was held on 18th January 2019 with attendance of Ministry of Construction and Urban Development (hereinafter referred to as “MCUD”), National Development Agency (hereinafter referred to as “NDA”), Mongolian related agencies, and the Japan International Cooperation Agency (hereinafter referred to as “JICA”).

At the JCC meeting, the outline and approach of the Project were explained by JICA Project Team (hereinafter referred to as “JPT”). As the conclusion of the JCC meeting, both sides agreed to intensively collaborate to implement the Project smoothly and achieve the objectives and outputs throughout the whole period of the Project.

1. Inception Report

(1) Both sides had a common understanding of the draft Inception Report of the Project reported by JPT, as shown in ANNEX (2) and (3). JPT shall modify the contents of the draft Inception Report based on the comments by JCC members and submit the finalized Inception Report to the Mongolian side. JCC members shall make additional comments by 25th January 2019 if they have.

(2) Both sides had a common understanding of the implementation structure of the Project stipulated in Record of Discussions and how to coordinate among related agencies, which was explained by JPT.

2. Major points agreed

(1) The Mongolian side shall decide on the chairperson of JCC and inform it to the JICA side.

(2) The Mongolian side shall share the available data based on the list of necessary data that will be submitted by JPT as soon as possible.

(3) The core member list of the Project Working Group will be confirmed and finalized by the end of January 2019.

(4) The core development projects will be proposed and defined in the Inception Report 1, which will be expected to submit by Oct 2019 in relation to ensuring implementation of Regional Development Policy (RDP) and Human Settlement Plan.

(5) The National Comprehensive Development Plan (NCDP) will cover the social sector including education, health and other aspects.

(6) Both sides will organize sub-working groups...; in addition to Agriculture and livestock, Industry, Environment and tourism and Infrastructure sub-working groups, a sub-group for social sector should be organized as requested by the Mongolian side.

(7) The terminologies used in the Project shall be consistent with the legal and policy documents of Mongolia.

(8) In the framework of formulation of the “National Comprehensive Development Plan”, the JPT will define the integrated methodology to be used for developing “Regional Development Policy” and “Human Settlement Plan” policy documents by scientific methods as much as possible based on the best available data, and introduce it to the Ministry of Construction and Urban Development and the National Development Agency.

(9) JPT will explore the experiences of countries, which have adopted regional development program, select 2-3 versions suitable for Mongolia in terms of methodology, and introduce them to the Ministry of Construction and Urban Development and the National Development Agency. /Eg. Russia, China, Kazakhstan, Australia, Canada, France, etc./

(10) JPT will ensure coordination of activities among the Project and formulation of RDP and HSP including existing committees and others.

(11) JPT shall submit the Progress Report in May 2019, including existing conditions and development issues by sector and for the entire country.

(12) The 2nd JCC will be held in May 2019 to discuss the contents of Progress Report.

END

- Annex: (1) Outline of the Project
(2) Summary of draft Inception Report
(3) Draft Inception Report
(4) List of Attendance
(5) Copy of the Record of Discussion of the Project

Attachment 2: Minutes of Meeting of Second Joint Coordination Committee

MINUTES OF MEETING

ON

THE 2nd JOINT COORDINATING COMMITTEE

FOR

**THE PROJECT FOR FORMULATION OF
NATIONAL COMPREHENSIVE DEVELOPMENT PLAN**

AGREED UPON BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY

AND

**MINISTRY OF CONSTRUCTION AND URBAN DEVELOPMENT
NATIONAL DEVELOPMENT AGENCY**

Ulaanbaatar, 7th June 2019

Ms. Eriko TAMURA
Chief Representative
JICA Mongolia Office

Mr. Luvsannamsrai OYUN-ERDENE,
Chief Cabinet Secretary

Mr. Sandag MAGNAISUREN
State Secretary
Ministry of Construction and Urban Development

Mr. Tsuyoshi HASHIMOTO
Team Leader
JICA Project Team

Mr. Banzragch BAYARSAIKHAN
Chairman
National Development Agency

The 2nd Joint Coordinating Committee (hereinafter referred to as “JCC”) meeting for “the Project for Formulation of National Comprehensive Development Plan” was held on 7th June 2019 with attendance of Ministry of Construction and Urban Development (hereinafter referred to as “MCUD”), National Development Agency (hereinafter referred to as “NDA”), Mongolian related agencies, and the Japan International Cooperation Agency (hereinafter referred to as “JICA”).

At the JCC meeting, the contents of the Progress Report were explained by JICA Project Team (hereinafter referred to as “JPT”) covering macro development objectives and basic strategy, development frameworks, and macro development alternatives. As the conclusion of the JCC meeting, both sides agreed to intensively collaborate to implement the Project smoothly and achieve the objectives and outputs throughout the whole period of the Project.

1. Progress Report and follow-up activities

- (1) The JPT clarified that the macro development objectives and basic strategy, development frameworks, and macro development alternatives were discussed by the PWG with sub-working groups and presented in the Progress Report to arouse discussions by a wide range of stakeholders.
- (2) Both sides have agreed that discussions on the macro development objectives and basic strategy, development frameworks, and macro development alternatives should be undertaken by involving experts and others concerned outside the PWG as well; for this purpose what is called a multi-stakeholder meeting as proposed in the Inception Report should be convened in the nearest future; schedule and subjects for subsequent MSH meetings should be determined at the first MSH meeting.
- (3) Further comments on the Progress Report by the JCC member organizations should be submitted to MCUD in writing by 24th June 2019.
- (4) Both sides have agreed that collaborative efforts between the JCC member organizations and the JPT should be intensified particularly in the next several months, which are critical in preparing the first draft of the NCDP to be contained in the Interim Report 1 due later this year. The collaborative works include spatial analyses and planning by using GIS to be undertaken by the JPT in cooperation with ALAMGaC supported by related JCC member organizations.
- (5) Compositions of RDP and HSP should be clarified by NDA and MCUD respectively and based on them the composition of the NCDP will be finalized by the end of June.
- (6) The list of the equipment to be provided by JICA for the Project will be finalized soon and the procurement will start in the nearest future.

2. Major comments

Major comments raised during the JCC meeting are presented below.

- (1) Involvement of the Ministry of Foreign Affairs in the Project is necessary, either as a member of the JCC or an important participant in the MSH meetings.
 - (2) Sustainable growth of agriculture should be pursued by commercialization as Mongolia is an agricultural country.
 - (3) Population growth is important to prevent shortages of labor force.
 - (4) Disadvantages of inherent constraints to development should be turned to advantages; for instance, the land locked status means easy land access to neighboring countries.
 - (5) Human resources related issues should be properly reflected in the NCDP by the social sector including health services.
 - (6) In evaluating development alternatives and selecting the best one, over-reliance on mining should be avoided.
 - (7) A policy of knowledge based economic development rather than natural resources-based
-

development should be pursued, considering also in which sector we could compete globally.

- (8) Preparation of draft NCDP should be in line with the schedule to prepare the Long-term National Development Policy 2045, and cohesion and coordination between them should be ensured for consolidated outcomes by November 2019.
- (9) Principles of green development should be incorporated in the NCDP.
- (10) Integrated water management plans for 21 river basins should be utilized to determine future water uses.
- (11) The National Land Management Master Plan (M/P) approved by the Government in 2018 should be utilized for the Project.
- (12) Geomorphology data, public services delivery maps and related data and maps will be provided by ALAMGaC for the Project.
- (13) Re-consideration of administrative division is a critical issue, but it is important to ensure that an administrative unit should have sufficient capacity to deliver services.
- (14) Regional pillar cities should be reconsidered including cities with national status by city ranking based on quantitative evaluation methods.
- (15) The Long-term National Development Policy 2045 is to establish development vision and priority and ensure policy continuity and consistency with short- and medium-term measures, and thus will become the base policy document for sustainable development beyond SDV2030.
- (16) Anchor projects will not be affected by the Long-term National Development Policy 2045 and they support the Policy.
- (17) The Progress Report should be taken as presenting preliminary proposals, which should be validated further.
- (18) Lack of skilled human resources should not pose constraints to development, and technological innovation for knowledge economy is to be pursued.

3. Next JCC meetings

The 3rd JCC meeting is scheduled in November 2019 to discuss the contents of Interim Report 1.

However, additional JCC meetings may be convened before that if found necessary by the JCC Chair or Secretariat.

End of Minutes

Annex: (1) Summary of the Progress Report

- (2) List of Attendance
- (3) Copy of the Record of Discussion of the Project
- (4) Copy of the minutes of meeting for the 1st JCC meeting (without annexes)

Attachment 3: Minutes of Meeting of Third Joint Coordination Committee

MINUTES OF MEETING

ON

THE 3rd JOINT COORDINATING COMMITTEE

FOR

**THE PROJECT FOR FORMULATION OF
NATIONAL COMPREHENSIVE DEVELOPMENT PLAN**

AGREED UPON BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY

AND

**MINISTRY OF CONSTRUCTION AND URBAN DEVELOPMENT
NATIONAL DEVELOPMENT AGENCY**

Ulaanbaatar, 25th November 2019

Ms. Eriko TAMURA
Chief Representative
JICA Mongolia Office

Mr. Tsuyoshi HASHIMOTO
Team Leader
JICA Project Team

Mr. Luvsannamsrai OYUN-ERDENE,
Chief Cabinet Secretary

Mr. Sandag MAGNAISUREN
State Secretary
Ministry of Construction and Urban Development

Mr. Banzragch BAYARSAIKHAN
Chairman
National Development Agency

The 3rd Joint Coordinating Committee (hereinafter referred to as “JCC”) meeting for “the Project for Formulation of National Comprehensive Development Plan” was held on 25th November 2019 with attendance of Ministry of Construction and Urban Development (hereinafter referred to as “MCUD”), National Development Agency (hereinafter referred to as “NDA”), Mongolian related agencies, and the Japan International Cooperation Agency (hereinafter referred to as “JICA”).

At the JCC meeting, the contents of the IT/R1 were explained by JICA Project Team (hereinafter referred to as “JPT”) covering development vision, macro and sector objectives and strategy, spatial structure, socio-economic framework, macro development alternatives, development scenario and development measures including anchor projects. As the conclusion of the JCC meeting, both sides agreed that the draft National Comprehensive Development Plan (NCDP) contained in the IT/R1 will be further elaborated through intensive discussions with a wide range of stakeholders and collaborative works between the JPT and the Mongolian side.

1. Confirmed and agreed

- (1) The JPT clarified that the first draft of the NCDP contained in the IT/R1 was prepared based on discussions with the PWG with sub-working groups and its contents should be further elaborated through continued collaborative works between the JPT and the PWG.
- (2) Both sides have agreed that in order to prepare a most satisfactory NCDP for the development of Mongolia for decades to come, extensive discussions should be conducted with a wide range of stakeholders based on the IT/R1; for the purpose, multi-stakeholder meetings should be convened regularly until the middle of 2020.
- (3) At the first MSH meeting after the third JCC meeting, the draft NCDP should be presented to a wide range of stakeholders for discussion to clarify important issues for elaboration of the NCDP; the schedule and subjects for the subsequent MSH meetings should be determined at the meeting.
- (4) Preparation of the NCDP should be in line with the schedule to prepare the Long-term National Development Policy 2050, and cohesion and coordination between them should be ensured for consolidated outcomes.
- (5) Further comments on the IT/R1 by the JCC member organizations should be submitted to MCUD in writing by 16th December 2019.
- (6) It was shared by JCC members that the second training tour in Japan would be undertaken during 27th November through 6th December for nine selected Mongolian trainees.
- (7) It was shared also that a set of equipment provided by JICA for the Project had been finalized with MCUD and NDA respectively and the procurement had been completed. NDA, MCUD and related organizations such as CDC and ALAMGaC will assign appropriate trainees for on-the-job training utilizing the set of equipment for capacity development for updating the NCDP by Mongolian side.

2. Comments and Q & A

Major comments raised and questions and answers exchanged during the JCC meeting are presented below. Answers by the JPT are indicated by “→”.

- (1) Contents of the draft National Comprehensive Development Plan (NCDP) contained in the Interim Report 1 are 90% in line with the Long-Term Development Policy (LTDP) 2050 in preparation by NDA; the Chief Cabinet Secretary has ordered NDA to integrate these two documents.
- (2) As part of the Long Term Deployment Plan 2050 (LTDP2050), a list of projects prepared by the all ministries and Working Group has been prepared, which will be shared by the JPT for comments and evaluation; consequently, the project list will become longer and more comprehensive.
- (3) Labor requirements for proposed projects should be clarified.
- (4) The NCDP should be further elaborated with more detailed policy alternatives.
- (5) As the population of Mongolia is projected to reach 4.6 million by 2040, what would be the population of Ulaanbaatar?

- ➔ The share of population of Ulaanbaatar would be maintained at the present level of about 45% of the national population.
- (6) Proposals are expected to reduce the primacy of Ulaanbaatar, to decrease in-migration from local areas to Ulaanbaatar, and to decentralize the population distribution.
- No proposals are seen for cities in the least developed Aimags of Zhavkhan and Govi-Altai in Western Region.
 - Eastern Region is also deprived of development except some petroleum production in Matad Soum.
 - It is important that east-west horizontal arterial corridor be strengthened.
 - ➔ The draft NCDP contains proposals to generate employment opportunities in local towns to improve the population distribution; the proposed ring artery would shift urban development to the west for more balanced distribution of population and economic activities.
- (7) Connecting Uliastai and Ulaanbaatar is important, but at present the quality of roads from Uliastai to Ulaanbaatar is only 2nd or 3rd grade; connecting Bayan-Ulgii not only to Novosibirsk but also to the Central Asia is important.
- ➔ The artery road network will be further examined based on the on-going transport and logistic survey.
- (8) It is time to take bold moves such as relocating the capital city in another place to overcome the over-centralization.
- (9) Using the NSO population projections is not ideal; migration projections need to be compatible with the proposed spatial planning and its projects.
- (10) One of the priority policy measures to be taken is to reduce debt burden with regard to macroeconomic policy, and therefore the development objective “to facilitate capital accumulation through mining development to support investments in various infrastructure necessary for economic diversification” is in line with the Government policy; also, proposed measures for economic sectors seem to be in line with the development policies of Mongolia, particularly agriculture sector policies.
- (11) Focus in health sector as proposed is more on primary and preventive care which is very important to ensure healthy human resources.
- (12) What about plans for establishing tertiary referral hospitals in urban centers at higher tiers of the urban hierarchy?
- In the event that new cities get designated as regional core cities, in what phase specialized hospitals such as Regional Diagnostic and Treatment Centers (RDTCs) are planned to be established in the new regional cities?
 - The Altai’s Central Hospital has a long way to go to meet the expectation for training centers of health personnel as proposed.
 - Medical tourism development is proposed for Orkhon Aimag having already a RDTC; what kind of planning applies to Erdenet as a regional core city?
 - ➔ Health service provision should be improved by strengthening health referral system in line with urban hierarchy.
- (13) While GDP growth and energy consumption are very much interrelated, there is no specific plans for energy sector development.
- ➔ Major energy development in Mongolia is based on coal, which will continue, and therefore the NCDP should focus more on renewable energy.
- (14) Rather smaller, micro-level plans/projects are also reflected in the draft plan.
-

- (15) Establishment of a comprehensive database for mining sector has proposed, which may be housed in the proposed National Agency/Office for Geology.
- (16) What is the main concept behind the proposed regional divisions?
 - ➔ The regional division should reflect the idea of regional development, which is “socio-economic development in a region based on utilization of indigenous resources by and for the benefit of local people in the region.”
- (17) Mongolia has no control of labor out-migration, and what should be done?
 - ➔ If regions are developed and generate large number of lucrative employment opportunities, many out-migrated Mongolian will return.
- (18) Land management plan should be based on the land suitability analyses; especially, in Bayankhongor and Govi-Altai, what is the land capacity for development of intensive farming?
 - ➔ In Bayankhongor, there exist promising areas suitable for intensive livestock farming around the Aimag capital and along the road linked to Arvaikheer.
- (19) Zero-tillage farming is unrealistic in Mongolia with limited use of chemical fertilizer and pesticides and compost, and irrigated crop farming is more realistic.
- (20) It is very important to focus on the food self-sufficiency of the people as Mongolia imports 70% of vegetables; sea-berry and fodder should come next.
- (21) “Orkhon River water diversion to Govi” project is not good for the environment.
- (22) What is financial background of proposals for infrastructure development?
- (23) Rather than livestock and crop farming emphasized in the draft plan, investments should be made in those projects having immediate gains such as ICT industry.
- (24) More expertise on market study, particularly projecting global market changes is required.
- (25) The JPT is expected to define differences between economic macro, meso and micro regions, give a description for each region and determine development priorities, coordination, functions of the regions and justification of regional divisions.
- (26) The JPT is also expected to clarify rationale for division of macro, meso and micro zones and small and large projects for each level.

3. Next JCC meetings

- (1) The 4th JCC meeting is scheduled in June 2020 after submission of the Interim Report 2 containing a revised NCDP just before the next general election in Mongolia.
- (2) However, additional JCC meetings may be convened before that if found necessary by the JCC Chair or Secretariat.

End of Minutes

Annex: (1) Summary of the Interim Report 1

(2) List of Attendance

(3) Copy of the Record of Discussion of the Project

(4) Copy of the minutes of meeting for the 2nd JCC meeting (without annexes)

Attachment 4: Minutes of Meeting of Fourth Joint Coordination Committee

MINUTES OF MEETING

ON

THE 4th JOINT COORDINATING COMMITTEE

FOR

**THE PROJECT FOR FORMULATION OF
NATIONAL COMPREHENSIVE DEVELOPMENT PLAN**

AGREED UPON BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY

AND

**MINISTRY OF CONSTRUCTION AND URBAN DEVELOPMENT
NATIONAL DEVELOPMENT AGENCY**

Ulaanbaatar, 11th June 2020

Ms. Eriko TAMURA
Chief Representative
JICA Mongolia Office

Mr. Tsuyoshi HASHIMOTO
Team Leader
JICA Project Team

Mr. Luvsannamsrai OYUN-ERDENE,
Chief Cabinet Secretary

Mr. Sandag MAGNAISUREN
State Secretary
Ministry of Construction and Urban Development

Mr. Banzragch BAYARSAIKHAN
Chairman
National Development Agency

The 4th Joint Coordinating Committee (hereinafter referred to as “JCC”) meeting for “the Project for Formulation of National Comprehensive Development Plan (NCDP)” was held on 11th June 2020 with attendance of Ministry of Construction and Urban Development (hereinafter referred to as “MCUD”), National Development Agency (hereinafter referred to as “NDA”), Mongolian related agencies, and the Japan International Cooperation Agency (hereinafter referred to as “JICA”).

At the JCC meeting, the JICA Project Team (hereinafter referred to as “JPT”) explained the contents of the Draft Final Report 1 (DF/R1) containing the revised NCDP prepared by elaborating the first draft NCDP presented in the Interim Report 1 discussed at the 3rd JCC meeting. As the conclusion of the JCC meeting, both sides agreed that the revised NCDP will be disseminated to raise awareness and understanding by a wide range of stakeholders, while further elaborated through discussions, online and otherwise, with a wide range of stakeholders and collaborative works between the JPT and the Mongolian side.

1. Confirmed and agreed

- (1) The JPT clarified that the revised NCDP contained in the DF/R1 was prepared based on field works by the JPT in January through early March in 2020, followed by distance collaboration between the JPT and the Mongolian side after the closure of Mongolia due to the COVID-19 infection.
- (2) The JPT ensured that outcomes of a multi-stakeholders’ meeting on 29th January 2020, including group discussions on 1) development paradigm and vision, and 2) spatial structure and land use, have been reflected in the DF/R1.
- (3) The Mongolian side expressed basic endorsement over the development direction and vision presented in the DF/R1 and also expectation for further refinement of the development scenario.
- (4) Both sides have agreed that in order to prepare a most satisfactory NCDP for the development of Mongolia for decades to come, extensive discussions should be conducted with a wide range of stakeholders based on the DF/R1; also the NCDP proposals should be disseminated widely to raise awareness for the NCDP proposals and cultivate understanding of the new development paradigm presented in the NCDP.
- (5) Both sides have agreed to plan and implement selected pilot projects in the post-election period for the purposes of raising awareness and cultivating understanding for the NCDP and also promoting some anchor projects for early implementation.
- (6) Preparation of the NCDP should be in line with the schedule to prepare the Long-term National Development Policy 2050 as well as HSP and RDP, and cohesion and coordination between these planning documents should be ensured for consolidated outcomes.
- (7) Further comments on the DF/R1 by the JCC member organizations should be submitted to MCUD in writing by 22nd June 2020 for reflection in the final version of the DF/R1.
- (8) The DF/R1 should be explained to the new administration of the Mongolian Government to be established following the forthcoming general election, and further elaboration of the NCDP will be undertaken through continued collaborative works between the JPT and the Mongolian counterpart team.

2. Comments and Q & A

Major comments raised and questions and answers exchanged during the JCC meeting are presented below. Answers by the JPT are indicated by “→”.

- (1) As the Law on Development Policy Planning was revised into the new Law on Development Policy Planning and Management in May, the Mongolian Government will prepare and submit to the Parliament a draft National Five-Year Development Policy by September 1; the NCDP may provide a base for this policy document if phasing is consistent.

→ The JPT will see how it can be done.

- (2) The NCDP Project started before the recent law revision and its scope includes the formulation of implementable plan in consideration of coordination between sectors and spatial development, and also planning and implementation of pilot projects.
- ➔ It is desirable that the NCDP phase 1 is made compatible with the National Five-Year Development Policy, but the investment program has been prepared based on rough estimate of investment costs by project. Proposals for pilot projects have been submitted by MCUD and additional proposals are expected from other organizations for review.
- (3) The proposed pilot project of “Aimag-nomads communication strengthening” can be implemented in cooperation with NDA, if the idea of NDA to be transmitted in writing is incorporated in it.
- (4) It is expected that the pilot project of automobile batteries recycling should be implemented with MCUD comments to be transmitted in writing.
- (5) Would the NCDP be made consistent with the Long-term Development Policy (LTDP) 2050? How would it be approved?
- ➔ The NCDP is prepared to support the preparation of the RDP and the HSP, which will be formally approved as legal documents.
- (6) How would the Regional Diagnostic Centers be planned under the new regional division? Are they reflected in the NCDP?
- ➔ The existing Regional Diagnostic Centers may continue to operate under the new regional division. Additional centers may be planned as necessary to ensure adequate service delivery under the new regional division.
- (7) The NCDP as presented seems to cover economic and spatial aspects in a comprehensive way, but the social sector may be weak. How would the prioritization of projects be undertaken especially for social sector projects?
- ➔ Consistency between social sector projects proposed by the NCDP and the National Five-Year Development Policy should be ensured.
- (8) How has the new regional division, while consistent with the LTDP2050, been determined rationally reflecting macroeconomy, geography, land, socio-economic advantages and cultural and historical conditions? The LTDP2050 has been approved without the regional division.
- ➔ The proposed regional division is based on analysis of affinity between neighboring Aimags evaluated by utilizing 30 indices. Results are unambiguous except Zavkhan and Umnugovi and the proposed regional division is thus convincing.
- (9) NDA analyzed the regional division by mobilizing a team of professionals and the same results are obtained with the NCDP proposal. Further discussions should be undertaken between MCUD, CDC, NDA and the JPT.
- (10) (Comment by JICA) As the long-term development policy, which one has the predominance: SDV2030 or LTDP2050?
- ➔ (Response by the Mongolian side) The approval of the LTDP2050 by the Parliamentary resolution no. 52 has effectively nullified the SDV2030.
- (11) Of the socio-economic plan and the spatial plan encompassing the NCDP, the former has been effectively approved as part of the LTDP2050, but the latter should be further examined especially for the regional division in relation to the HSP; distribution of medical facilities should be planned in line with population and settlement plan, for instance.
- (12) (Comment by JICA) As implementing arrangements, the proposed Regional Development Councils and the Integrated Regional Development Programs should be examined by the

Mongolian side.

➔ (Response by the Mongolian side) The Law on Regional Development Management and Coordination of 2003 has established the National Committee and the Regional Council, and therefore the NCDP proposals are compatible with this effective law.

3. Schedule for Forthcoming Period

- (1) The DF/R1 will be explained to the new administration of the Mongolian Government after it is firmly established, and the NCDP will be further elaborated reflecting comments by the Mongolian side including the counterpart team with new members.
- (2) The Draft Final Report 2 (DF/R2) will be prepared containing a further revision of the NCDP.
- (3) The 5th JCC meeting will be convened to present the DF/R2 and discuss on its contents.
- (4) The 5th JCC meeting is tentatively scheduled in February 2021, but its schedule is subject to change based on mutual agreement of JICA and the Mongolian Government.

End of Minutes

Annex: (1) Summary of the Draft Final Report 1

- (2) List of Attendance
- (3) Copy of the Record of Discussion of the Project
- (4) Copy of the minutes of meeting for the 3rd JCC meeting (without annexes)

Attachment 5: Minutes of Meeting of Fifth Joint Coordination Committee

MINUTES OF MEETING

ON

THE 5th JOINT COORDINATING COMMITTEE

FOR

THE PROJECT FOR FORMULATION OF
NATIONAL COMPREHENSIVE DEVELOPMENT PLAN

AGREED UPON BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY

AND

MINISTRY OF CONSTRUCTION AND URBAN DEVELOPMENT
NATIONAL DEVELOPMENT AGENCY

Ulaanbaatar, 26th October 2021

Ms. Eriko TAMURA
Chief Representative
JICA Mongolia Office

Mr. Tsuyoshi HASHIMOTO
Team Leader
JICA Project Team

Mr. Tsend NYAMDORJ
Chief Cabinet Secretary

Mr. S. MAGNAISUREN
State Secretary
Ministry of Construction and Urban Development

Mr. Kh. BATJARGAL
Chairman
National Development Agency

The 5th Joint Coordinating Committee (hereinafter referred to as “JCC”) meeting for “the Project for Formulation of National Comprehensive Development Plan (NCDP)” was held on 26th October 2021 chaired by the Cabinet Secretary with attendance of Ministry of Construction and Urban Development (hereinafter referred to as “MCUD”), National Development Agency (hereinafter referred to as “NDA”), Mongolian related agencies, and the Japan International Cooperation Agency (hereinafter referred to as “JICA”).

At the JCC meeting, the JICA Project Team (hereinafter referred to as “JPT”) explained the contents of the Draft Final Report 3 (DF/R3) containing the final NCDP prepared by incorporating all the comments on the Draft Final Report 2 (DF/R2) received from ministries and related agencies as well as individual experts. As the conclusion of the JCC meeting, both sides agreed that the NCDP will be disseminated to raise awareness and understanding by a wide range of stakeholders, while the NCDP proposals will be effectively utilized for preparation of the Human Settlement Plan (HSP) by MCUD/CDC and the Regional Development Policy (RDP) by NDA.

1. Confirmed and Agreed

- (1) The JPT clarified that the final NCDP contained in the DF/R3 was prepared through collaborative works between the JPT and the Mongolian side since January 2019. In particular, all the comments on the DF/R2 received from the Mongolian side have been effectively incorporated in the DF/R3.
- (2) The JPT reminded that the Project period has been extended from July through December 2021 to support the preparation of the HSP and the RDP reflecting the NCDP based on the agreement between the Mongolian Government and JICA.
- (3) The Mongolian side assured that efforts would be continued to reflect the NCDP proposals in preparing the HSP and the RDP, and expressed expectation that the JPT would continue to provide further advisory for the purpose.
- (4) Both sides have agreed that in order to promote the implementation of the NCDP proposals, the NCDP as well as the HSP and the RDP should be disseminated widely to raise awareness for the NCDP proposals and cultivate understanding of the new development paradigm proposed in the NCDP.
- (5) The JCC shared the information that the NCDP promotion seminar would be organized on 27th October and an investment promotion seminar would be organized in Tokyo subsequently.
- (6) Preparation of the HSP and the RDP has been delayed, while the NCDP Project will terminate with the extension period at the end of December. The JCC expressed expectation that even after the Project termination, the Mongolian Government and JICA would discuss on how to ensure cohesion and consistency of these policy planning documents.
- (7) While the NCDP contained in the DF/R3 is considered final, the JPT is receptive of additional comments and contributions by the Mongolian side and will make the best efforts to reflect them in the Final Report to be submitted in December.

2. Comments and Q & A

Major comments raised and questions and answers exchanged during the JCC meeting are presented below. Answers by the JPT are indicated by “→”.

- (1) (NDA): NDA and JPT worked together by visiting Aimags to clarify their existing situation and development potentials. We are planning to use results of the NCDP for the formulation of RDV and regional development target program.
- (2) (Cabinet Secretariat): MCUD have sum development projects and measures approved by the Cabinet. Is the document consistent with the NCDP? Also, are other development plans being formulated at different ministries consistent with the NCDP?

- ➔ (MCUD response): In June of 2021, the ‘Sum Development: Supply of Engineering Infrastructure’ project was approved by the Cabinet. It was prepared in line with the HSP and relevant studies by NDA. Therefore, on a policy level, the documents are consistent.
- ➔ (JPT response): For the record, I had a session with ADB HSDP Team this morning. We have agreed that HSDPs and NCDP are very much in line in terms of Aimag level plans.
- (1) (MNE): Green economy development concept included in the regional development vision and strategies, and plans regarding sustainable development of industries and consumption are in line with MNE’s policies.
- (2) (Cabinet Secretariat): It is said that goals in the Vision 2050 are ambitious. Have you analyzed 73 indicators of Vision 2050? When you say ambitious, how big were the differences? Also, have you made the analysis taking COVID-19 into account?
- ➔ (JPT response): Population projections by NCDP and Vision 2050 are practically the same. We projected economic and population projections consistently. Their consistency can be checked by assessing labor productivity by sector. If economic projections require very high increase of labor productivity by any sector, I say that is it too ambitious projection. We examined effects of COVID-19.
- (3) (Cabinet Secretariat): Are there proposals that are consistent with Mongolia’s social and economic conditions and characteristics to achieve SDGs?
- ➔ (JPT response): SDGs are the base for SDV 2030. In Chapter 2 of the NCDP report, a comprehensive review of attainment level of SDV 2030 is given in reference to Vision 2050.
- (4) (Cabinet Secretariat): What are the policy goals and objectives that can be proposed as part of 7 target programs which are stipulated in the law?
- ➔ (JPT response): We understand the 7 targeted development programs are in the making. For one of them, a regional development target program, we are trying to work with NDA as part of NCDP Project. We expect NCDP would provide reference to adjust sector-wise works. In that process, the relationships between different SDGs would be clarified, and probably also which targets would be more important in view of comprehensive development plan of Mongolia.
- (5) (Cabinet Secretariat): Are the pilot project proposals in line with 2021-2025 PIP?
- ➔ (JPT response): We decided to formulate and implement PPs to facilitate NCDP proposals. It is not comprehensive. We could implement only 5 PPs. PPs collectively do not cover the area covered by PIP. My expectation was PPs to be included in the PIP, but it is not the case so far. Most of the PPs have been followed up in one way or another.
- (6) (Cabinet Secretariat): How were the comments submitted from Cabinet Secretariat back in April is reflected in the NCDP report?
- ➔ (JPT response): We received extensive comments, particularly for DFR2 including 12 ministries and experts and advisors in writing. Only few comments were beyond the scope of NCDP. All the other comments were reflected in the DFR3. All of the Cabinet Secretariat’s comments were reflected in the DFR3.
- (7) (MEDS): Related to regional development, establishment of universities in different regions have been in talks. Just as of last week, the Cabinet discussed about relocating universities in 3 Aimags. What were the major conclusions and proposals regarding education sector for Aimags’ development trends/plans after working in aimags?
- ➔ (JPT response): You cannot relocate or establish universities from scratch. A better strategy is to use existing universities. NCDP proposes to build on existing universities.

Plans such as developing higher education institutes and research centers in Khovd, research and incubation base at the Dornod University, and education and health training centers in Altai were proposed.

(8) (MEDS): How are the capital region proposals consistent with the UB Development Master Plan until 2040 that is being formulated? Did the Project Team submit their comments for the draft?

➔ (JPT response): We know the UB Master Plan 2040, and we believe the NCDP does not obstruct its proposals.

(9) (MOE): Expansion of power systems and power supply for local areas are reflected in the NCDP. Development of green energy were emphasized in couple of areas. However, goals such as development of energy sources compatible with Mongolia's characteristics and establishment of national power transmission network which connects the sources are lacking. Such plans need to be reflected in the target program.

➔ (JPT response): NCDP proposals are not deep in power generation and power grid extension except for major HPP implemented in Khovd and power extension which would reduce dependence on imported power. We did not emphasize large scale coal fired thermal plant and extension of power grid that cover the entire territory beyond what is planned and implemented by MOE. We rather emphasized renewable energy development and use to complement the grid electricity.

(10) (MOE): Improvement of heat supply at Aimag centers were mentioned in the NCDP. It is an important plan that needs to be well thought out to ensure improved quality of public buildings and to provide public service.

➔ (JPT response): For heat supply, NCDP covered a general plan. Plans of heat supply in rural areas would be too detailed for national level development plan.

3. Final Statements by the Chairman

First of all, thank you for your works that you did to formulate the NCDP. Since implementing the NCDP project, a couple of important events took place. First one was the approval of the Law on Development Policy and Planning, and its Management, and the second one was revision of the Law on Administrative, Territorial Units and their Governance related to the revised Constitution of Mongolia. As result of these, a new legal environment is being created. There are plans to establish Ministry of Economic Development and Ministry of Digital Development and Communications. Establishment of these ministries should be reflected accordingly in the NCDP. In the future, development policy and planning will be one of the roles of the Ministry of Economic Development. It means that the work you have done will be submitted to the Cabinet through this ministry to get approval to implement the proposals in the plan.

There are three Aimags in the Western Region. Zavkhan is in the Khangai Region and Govi-Altai and Bayankhongor are grouped together in one region. The regional division needs to be reconsidered because it concerns Mongolia's demographic issues and delicate issues concerning different ethnic sub-groups. Back in 2003, the current RDV was approved and these issues were taken into account in detail, and finally we have come up with this division.

During the past 30 years, very dramatic changes took place in Mongolia. I would like to thank the Government of Japan and JICA for their continued support in this and would like to wish success in their works.

4. Schedule for Forthcoming Period

(1) The NCDP promotion seminar will be organized on 27th October, 2021 combining in person meeting in Ulaanbaatar and online participation.

(2) An ICT incubation seminar will be organized in November to promote private investments

related to NCDP proposals for ICT application.

- (3) An investment promotion seminar based on the NCDP will be organized in Tokyo linked for online participation in December.

End of Minutes

Annex: (1) Summary of the Draft Final Report 3

(2) List of Attendance

(3) Copy of the Record of Discussion of the Project as amended in June 2021

Chapter 2 Assessment of SDV2030 Performances and Review of Vision2050

The Mongolia's macro socio-economic and environmental situation is reviewed to clarify the point of departure for setting socioeconomic framework for development planning in Chapter 5. In particular, the review focuses on some of the indicators presented in the Sustainable Development Vision 2030 (SDV2030), for which data are readily available. The socioeconomic and environmental aspects considered include economic growth, per capita gross domestic product (GDP), human development index, population and migration, life expectancy at birth, poverty and income distribution, global competitiveness, ease of doing business, environment and protected areas, social insurance, health indicators such as infant mortality rate (IMR) and maternal mortality rate (MMR), tourism and electricity supply. As the SDV2030 has been superseded by the Vision2050, which in fact effectively comprises SDV2030 and extend it to 2050, the Vision2050 is reviewed in comparison with the NCDP. Further assessment of the SDV2030/Vision2050 is made in Chapter 3 to clarify the aspects to be more emphasized to realize sustainable and inclusive development in line with the Sustainable Development Goals (SDGs).

2.1 Demographic Trend

2.1.1 Demographic trend in recent years

(1) Population changes

The resident population of Mongolia, the population residing in Mongolia for six months or longer, was 3,296,900 in 2019 as shown in Table 2.1.1. The population growth rates tended to continue declining until 2010 at the rate of 0.9% per annum in the 2005-2010 period. The growth, then, went to up to 2.4% per annum in the 2010-2015 period, remained at a similar level in 2016 and declined again in 2017 and 2018. The population growth increased significantly in 2019 owing mainly to the increase in Ulaanbaatar. The average growth rate throughout the 29 years from 1990 to 2019 was 1.7% per year. In the 29 years, all the regions except Western Region saw growth of resident population despite fluctuations in some periods. The division of five region is shown in the Figure 2.1.1.

Table 2.1.1 Resident Population of Mongolia

Region/Aimag	Resident Population (1,000)									
	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
Western Region	422.3	444.7	425.7	410.6	352.4	386.9	393.6	401.1	407.2	412.0
Khangai Region	469.9	535.7	546.3	545.5	515.2	573.1	585.7	593.6	600.4	605.2
Central Region	421.3	435.8	435.9	431.4	442.0	477.2	492.1	502.8	511.4	516.6
Eastern Region	199.9	206.1	198.0	193.5	185.5	207.5	211.4	216.8	222.6	223.3
Ulaanbaatar	536.6	612.1	773.6	952.4	1,158.7	1,345.5	1,380.8	1,417.1	1,444.7	1,539.8
Mongolia	2,050.0	2,234.4	2,379.5	2,533.4	2,653.8	2,990.2	3,063.6	3,131.7	3,186.3	3,296.9
Region/Aimag	1990-1995	1995-2000	2000-2005	2005-2010	2010-2015	2015-2016	2016-2017	2017-2018	2018-2019	1990-2019
Western Region	1.0	-0.9	-0.7	-3.0	1.9	1.7	1.9	1.5	1.2	0.0
Khangai Region	2.7	0.4	0.0	-1.1	2.2	2.2	1.3	1.2	0.8	0.9
Central Region	0.7	0.0	-0.2	0.5	1.5	1.5	2.2	1.7	1.0	0.7
Eastern Region	0.6	-0.8	-0.5	-0.8	2.3	2.3	2.6	2.7	0.3	0.4
Ulaanbaatar	2.7	4.8	4.2	4.0	3.0	2.6	2.7	2.0	6.6	3.7
Mongolia	1.7	1.3	1.3	0.9	2.4	2.5	2.2	1.7	3.5	1.7

Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, National Statistical Office (NSO) of Mongolia



Source: Japan International Cooperation Agency (JICA) Project Team Existing Division of Five Regions

Figure 2.1.1 Existing Division of Five Regions

The total population in Mongolia has continued to increase since the democratic reform in 1990, and in fact the population increase has shown an accelerating trend during this period (Table 2.1.2). The average annual increase in population has accelerate disaster risk management (DRM) from 1.10% during 1990-2000, through 1.40% during 2000-10 to 2.01% during 2010-18.

Table 2.1.2 Changes in Population and Average Annual Population Increase, 1990-2019

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
Population	2,153.4	2,243.0	2,403.1	2551.1	2,761.0	3,057.8	3,119.2	3,177.9	3,238.5	3,296.9
Period	1990-2000			2000-2010			2010-2019			
Increase, % p.a.	1.10			1.40			1.99			

(2) Migration

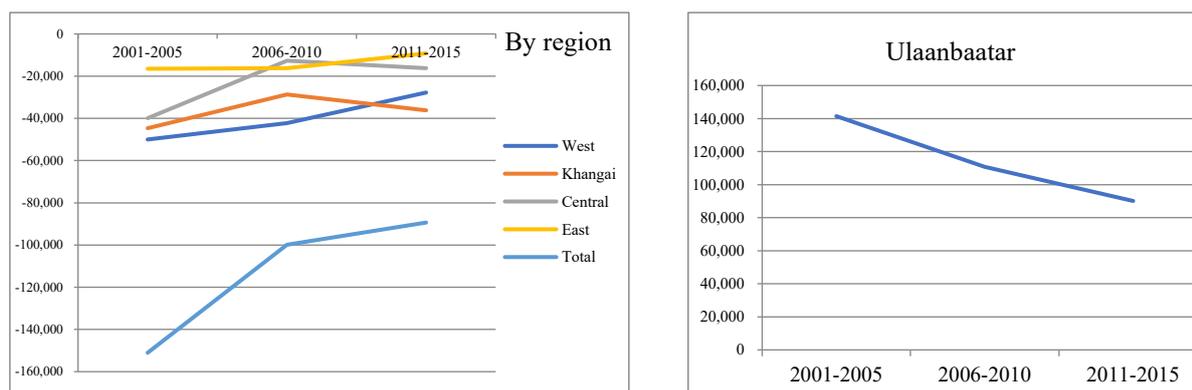
Migration by Region

The data released by the NSO online as shown in Table 2.1.3 were reviewed to capture the migration patterns by region.

Table 2.1.3 Migrant Population by Region by Five-Year Period since 2001

Region/Aimag	Unit	2001-2005	2006-2010	2011-2015
Western Region	Persons	-49,991	-42,301	-27,759
Khangai Region		-44,649	-28,669	-36,209
Central Region		-39,905	-12,669	-16,171
Eastern Region		-16,492	-16,242	-9,210
Total of regions		-151,037	-99,881	-89,349
Ulaanbaatar		141,446	110,764	90,135

Source: Mongolian Statistical Office online, NSO of Mongolia



Source: Mongolian Statistical Information Service, http://www.1212.mn/tables.aspx?TBL_ID=DT_NSO_0300_040V1

Figure 2.1.2 Migration by Five-year Period from 2001 to 2015 by Region

Although data were available for 2016, 2017 and 2018, they are not included in order to eliminate the effect of the ban on moving to the Ger areas in Ulaanbaatar imposed in January 2016. As a result of this ban, the official number of migrants to Ulaanbaatar decreased significantly in 2016, 2017 and 2018, although migration to Ulaanbaatar without residence registration continued even after the ban. Many of these migrants are said to live in a Ger house built in the premise of their relatives or families in the Ger areas. While they are not qualified to receive social welfare service such as pension, they are able to receive health service or send their children to school with temporary residence permit.

Apparently, the migrations from the regions are on the decline in a long run, except Khangai and East Regions after 2006. Migration to Ulaanbaatar continued decreasing since 2001. While these figures are official, thus not reflecting unregistered migration, and the actual number of migrants would be larger as widely agreed among experts, the migration has been declining in general as a result of improving living condition and some level of economic recovery in the provinces.

Mongolians living outside Mongolia

The Mongolian population in the world and the resident population of Mongolia are reported by NSO, and the difference represents the number of Mongolian living in Mongolia plus foreign residents in Mongolia. The number of foreign residents in Mongolia is represented by the number of foreign workers reported also by NSO, although this is an underestimate. The number of Mongolian living outside the Country is thus roughly estimated by subtracting the number of Mongolian living in the Country from the Mongolian population in the world as shown in Table 2.1.4. The results show the number of Mongolian living outside the Country is in the range of 50,000-142,000. The United Nation International Organization for Migration (IOM) estimates the number of Mongolian migrants living abroad at about 130,000 in 2016, which coincides largely with the estimates here.

Table 2.1.4 Mongolians Living Outside Mongolia

Year	Population of Mongolia (a) (1,000)	Resident Population of Mongolia (b) (1,000)	Difference (a)-(b)= (c) (1,000)	Number of Registered Foreign Workers (d) (1,000)	Mongolians Living outside Mongolia (c)+(d) (1,000)
2016	3,199.9	3,063.6	136.3	5.9	142.2
2017	3,177.9	3,131.7	46.2	4.7	50.9
2018	3,238.5	3,186.3	52.2	4.5	56.7
2019	3,296.9	3,197.0	99.9	4.6	104.5

Source: Mongolian Statistical Yearbook 2019, NSO

2.1.2 Demographic parameters

(1) Birth and death rates

During the period following the democratic reform in 1990, the birth rate declined first until 2005 and started to increase since then. The death rate has declined consistently during this period, except slight increase in 2010. As a consequence, the rate of natural increase in population decreased until 2005 and started to increase since then. The natural increase has been more or less at 2.0% per annum in recent years (Table 2.1.5).

Table 2.1.5 Birth and Death Rates and Natural Increase Rate of Population in Mongolia

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
Birth rate, per 1,000	34.4	24.4	20.4	17.8	23.1	27.1	25.9	23.9	24.5	24.4
Death rate, per 1,000	8.3	7.5	6.5	6.5	6.7	5.8	5.8	5.5	5.6	5.6
Natural rate of population increases, % p.a.	2.61	1.69	1.39	1.13	1.64	2.13	2.01	1.84	1.89	1.88

Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia

Rates of population increase in Mongolia have been consistently lower than the rates of natural population increase until recently. Only in most recent years, the population increase has become close to the natural increase of population.

(2) Age structure and labor parameters

The age structure of Mongolian population is characterized by constriction of young population in age group of 10-29 years old born during the post democratization period of 1990-2005. The birth rates during 2000-10 are lower than the rates before and after the period as seen from Table 2.1.5. The ratio of working age population between 15 and 64 years old to the total population or labor force coefficient (LFC) had increased consistently during 1990-2010, but decreased in 2018 and 2019 (Table 2.1.6). The working age population was 2,034,700 in 2019 to make the LFC 63.6%. Economically active population increased rapidly to reach 1,358,600 in 2018, of which 1,253,000 are employed and 105,600 unemployed. This makes the labor participation rate (LPR) 65.9% in 2018. The LPR had increased from 57.3% in 2000 and 63.4% in 2010. The LFC is a demographic index reflecting age structure of population, while the LPR reflects social conditions such as participation of women in workforce and working age people pursuing higher education staying away from the workforce.

Table 2.1.6 Changes in Age Structure of Mongolian Population

Age group	Unit: Population in 1,000					
	1990	2000	2010	2017	2018	2019
0-14 years old	853.4	813.1	743.3	946.5	995.2	1,026.5
15-64 years old	1,115.1	1,481.5	1,808.7	2,060.6	2,061.8	2,034.7
Over 65 years old	81.5	84.9	101.9	124.6	129.3	135.8
Total	2,050.0	2,379.5	2,653.9	3,131.7	3,186.3	3,197.0
Labor force coefficient (%)	54.4	62.2	68.2	65.8	64.7	63.6

Source: Mongolian Statistical Yearbook 2019, NSO of Mongolia

2.2 Macro Economic Performance

2.2.1 Historical trend

(1) Overview of recent performance

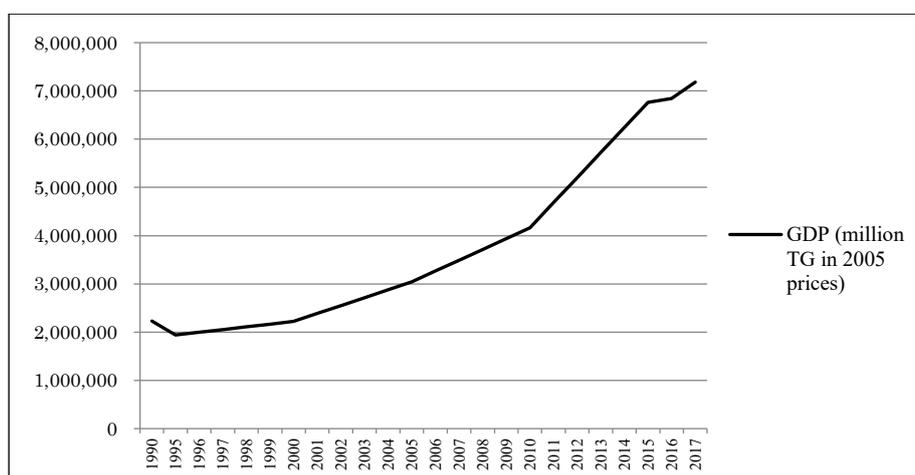
There had been large fluctuations of economic growth rates during 1995-2017, ranging between the highest at 10.2% per year in the 2005-2010 period and the lowest at minus 2.7 % per year in the 1995-2000 period (Table 2.2.1).

Table 2.2.1 Economic Growth Rates of Mongolia

GDP at 2005 prices		Average annual growth rate (%/year)	
year	(MNT million)	Period	%/year
1990	2,227,311	1990-1995	-2.7
1995	1,941,470	1995-2000	2.7
2000	2,221,690	2000-2005	6.5
2005	3,041,406	2005-2010	6.5
2010	4,162,785	2010-2015	10.2
2015	6,762,785	2015-2016	1.2
2016	6,841,925	2016-2017	5.1
2017	7,189,074	2017-2018	7.2
2018	7,705,331	2018-2019	5.1
2019	8,100,470	2010-2019	7.7
-	-	1990-2019	4.6

Source: (1) Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia, (2) Socio-economics Situation of Mongolia February 2019, NSO of Mongolia

The post Union of Soviet Socialist Republic (USSR) Mongolia can be broadly characterized by three periods in economic development: (i) contracting economy until mid-1990s (ii) shift to a market economy and expansion until mid-2010s, and (iii) slowing economic growth since 2016.



Sources: (1) Mongolian Statistical Yearbook 2013 for GDP in 2010 in 2005 prices (2) Mongolian Statistical Yearbook 2017 for all the other data.

Note: The GDP values for the intermediate years (e.g. 1996, 1997, 1998, 1999 between 1995 and 2000) were derived by interpolation by equal intervals.

Figure 2.2.1 GDP of Mongolia (MNT million in 2005 prices)

(2) Contracting economy (1990-1995)

The Mongolia's economy had been heavily dependent on the former USSR with its total trade value with the former USSR accounting for 80%, importing important materials such as machinery, petroleum, clothes and building materials. The dissolution of the former USSR in December 1991 resulted in the collapse of the marketing and raw materials procurement channels, severely damaging the Mongolian economy, although the Mongolian Government initiated a set of reform programs in the late 1980s including privatization of small shops and enterprises and large state enterprises, freeing prices, tax reforms and unification of barter and official exchange rates.

Despite these early efforts, the impacts were not generated immediately, and the Mongolian economy kept shrinking until 1992. It was in 1993 when the Mongolian economy started to recover. The GDP in 1995 expressed in 2005 prices at MNT1,941 billion was still lower than that in 1990 at MNT2,227 billion. Problems occurred during this period such as triple digit inflation, rising unemployment,

shortages of basic goods and food rationing.

(3) Recovery and expansion of the economy (1995-2015)

The subsequent 1995-2015 period saw a gradual expansion of the economy as a result of various market-economy oriented reform programs. The Mongolian economy grew steadily during this period as shown below.

- 1995-2000: 2.7% per annum
- 2000-2005: 6.5% per annum
- 2005-2010: 6.5% per annum
- 2010-2015: 10.2 % per annum
- 1995-2015: 6.4% per annum

The 2010-2015 period saw a remarkable high growth at 10.2% per year. The mining sector growth, led by the opening of the Oyu Tolgoi copper mine in 2013, was the driving force of this remarkably high growth, having recorded a growth at 13.5% per annum during this period. There were also other sectors, which grew fast in this period such as agriculture, forestry and fishing (12.6% per annum), construction (18.6%), wholesale, retail, repair of vehicles and motorcycles (10.9%) and financial and insurance activities (33.4%).

There were ups and downs of the economic activities during the 1995-2015 period caused by external and internal factors such as fluctuating prices of copper and coal in the world market, high proportion of China as the top export destination, weather and natural conditions, Asian financial crisis and Russian financial crisis.

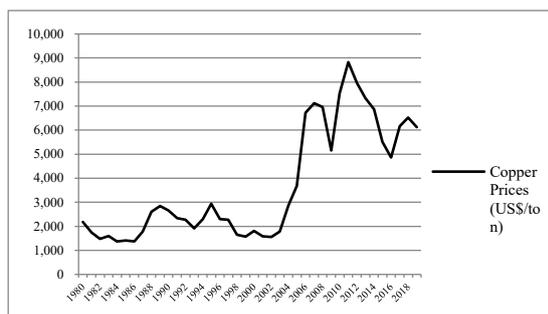
It was in the 2010-2015 period when Mongolia's export of mineral resources such as copper and coal started to increase sharply (Table 2.2.2). It was around the same time that the prices of these mineral resources began to rise in the world market as shown in Figure 2.2.2 for the copper prices and Figure 2.2.3 for the coal prices in the Australian market as a result of financial factors such as depreciation of US dollars and shift away from American financial properties due to sub-prime crisis rather than long-term fundamental economic conditions of the world.

Table 2.2.2 Mongolia's Export of Coal and Copper Concentrates

Unit: Million tons

Year	Copper export	Coal export
2005	0.6	2.2
2010	0.6	16.7
2015	1.5	14.5
2016	1.6	25.8
2017	1.4	33.4
2018	1.4	36.2
2019	1.4	36.6

Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia



Source: Sekai Keizai no Netacho, <https://ecodb.net/commodity/copper.html> for copper and https://ecodb.net/commodity/group_coal.html for coal

Figure 2.2.2 Copper Prices

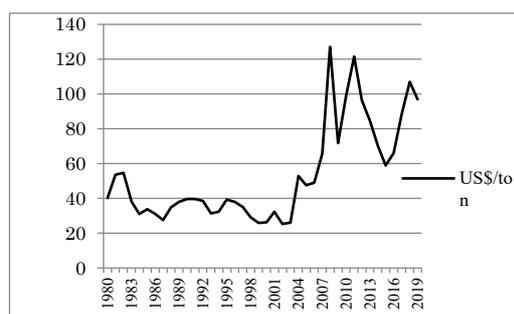


Figure 2.2.3 Fuel Coal Prices (Australia)

In a sense Mongolia was lucky in that it entered into the world mineral resources market when the prices grew much higher than before. The fluctuations of the prices at higher price levels, however, affected the export revenue and GDP of Mongolia, a factor of vulnerability for the Mongolian economy. The fact that the higher price levels of mineral resources were caused by financial factors rather than fundamental economic conditions makes it difficult to have a positive prospect of mineral resources prices in the future, thus enhancing the vulnerability of the Mongolian economy.

The reliance of the Mongolian economy on the export to China grew rapidly to reach 50% level during 2000-05, and increased further to about 85% after 2010 as shown in Table 2.2.3. This reflects largely the increase in coal export to China.

Table 2.2.3 Proportion of China in the Mongolia's Total Export Value

Year	% of China to Mongolia's total export value
1990	1.7
1995	17.1
2000	51.2
2005	48.2
2010	84.8
2015	83.7
2016	79.4
2017	85.6
2018	93.3
2019	89.1

Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia

The performance of the Chinese economy has been affecting the export by Mongolia in both positive and negative ways. As the rate of growth of the China's economy would continue declining in the future, the pace of export growth to China will also keep decreasing.

The Mongolia's economy has been affected by natural conditions as well. In 2000, about 30% of animal population or 8.98 million were lost by Dzud, and in 2010, about 45% of the total animal population of 32.3 million was lost. Occurrence of Dzud in recent years of 2009 to 2010 resulted in a decrease not only of meat and dairy products but also cashmere production.

(4) Slowing economic growth (2016-date)

The GDP in 2016 grew only at 1.2% per year largely due to declining prices of the mineral resources and a reduction in foreign direct investments (FDIs). The FDIs reduction would be related to the lack of investors' confidence due to concern about the Mongolia's regulatory framework and conflicts over mining agreements and licensing since 2014.

The GDP in 2017 showed a sign of recovering economic growth at 5.3 % per year. While the mining sector declined by 5.5%, other sectors led the growth: manufacturing grown at 19.9%, wholesale, retail

and repair of vehicles and motorcycles 6.8%, transportation and storage 14.2% and information and communication 13.3%.

The GDP increased by 7.3% in 2018 and 5.1% in 2019. These rates of growth were led by the expansion of export value and manufacturing production as shown in Table 2.2.4.

Table 2.2.4 Export and Manufacturing Production in Mongolia in 2017, 2018 and 2019

Year/Period	Export		Manufacturing Production	
	US\$ million	Growth per year(%/year)	MNT million (current prices)	Growth per year(%/year)
2017	6,200.6	-	6,780,347	-
2018	7,011.8	13.1	8,635,069	27.4
2019	7,619.6	8.7	9,873,603	14.3

Source: Mongolian Statistical Yearbook 2019, National Statistical office of Mongolia

Note: The inflation rates were 8.1% and 5.2% in 2018 and 2019, indicating high growth rates of the manufacturing sector even taking into consideration the inflation.

2.2.2 GDP by sector

The Mongolian economy started to develop rapidly supported mainly by large scale mining development by FDIs since 2000. The GDP of Mongolia grew at 6.5% per annum during 2005-10, which accelerated to 10.2% per annum during 2010-15. In particular, the GDP growth reached 13.2% in 2012, one of the highest of all the countries in the world. The GDP growth decreased thereafter affected by deceleration of the Chinese economy and decline in prices of mineral resources, on which Mongolia depends heavily. The average annual GDP growth attained 8.2% during 2005-19.

Table 2.2.5 GDP of Mongolia by Sector in 2010 Constant Prices

Unit: MNT million in 2010 constant price

Sector	2005	2010	2015	2016	2017	2018	2019
Agriculture	1,248,468	1,144,698	2,071,966	2,200,717	2,240,489	2,340,627	2,536,122
Mining	1,331,306	2,102,158	3,957,728	3,964,084	3,745,575	3,936,676	3,950,523
Manufacturing	363,168	664,815	919,391	912,053	1,093,302	1,267,064	1,404,048
Utilities	185,978	221,423	280,096	284,420	298,765	323,342	347,350
Construction	168,971	250,231	586,940	558,131	621,858	568,861	689,377
Financial services	232,943	239,607	1,011,837	1,035,154	1,128,919	1,267,883	1,313,309
Real estate activities	332,827	687,698	802,870	812,869	867,475	905,615	944,841
Other services	1,796,029	3,447,606	4,831,894	4,873,040	5,241,678	5,463,024	5,760,606
Net taxes on products	646,357	998,362	1,388,004	1,395,457	1,653,707	1,986,392	2,093,434
Total	6,306,047	9,756,598	15,850,72	16,035,92	16,891,76	18,059,484	19,039,610
	Share (%)						
	2005	2010	2015	2016	2017	2018	2019
Agriculture	19.8	11.7	13.1	13.7	13.3	13.0	13.3
Mining	21.1	21.5	25.0	24.7	22.2	21.8	20.7
Manufacturing	5.8	6.8	5.8	5.7	6.5	7.0	7.4
Utilities	2.9	2.3	1.8	1.8	1.8	1.8	1.8
Construction	2.7	2.6	3.7	3.5	3.7	3.1	3.6
Financial services	3.7	2.5	6.4	6.5	6.7	7.0	6.9
Real estate activities	5.3	7.0	5.1	5.1	5.1	5.0	5.0
Other services	28.5	35.3	30.5	30.4	31.0	30.3	30.2
Net taxes on products	10.2	10.2	8.8	8.7	9.8	11.0	11.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Average Annual Growth Rates (%/year)						
	2005-10	2010-15	2015-16	2016-17	2017-18	2018-19	2005-19
Agriculture	-1.7	12.6	6.2	1.8	4.5	5.0	5.2
Mining	9.6	13.5	0.2	-5.5	5.1	8.7	8.1
Manufacturing	12.9	6.7	-0.8	19.9	15.9	10.1	10.1
Utilities	3.6	4.8	1.5	5.0	8.2	4.3	4.6
Construction	8.2	18.6	-4.9	11.4	-8.5	9.8	10.6

Financial services	0.6	33.4	2.3	9.1	12.3	13.9	13.1
Real estate activities	15.6	3.1	1.2	6.7	4.4	8.0	7.7
Other services	13.9	7.0	0.9	7.6	4.2	8.9	8.7
Net taxes on products	9.1	6.8	0.5	18.5	20.1	9.0	8.8
Total	9.1	10.2	1.2	5.3	6.9	8.4	8.2

Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia

After the stagnation following the democratization in 1990, agriculture in Mongolia started to develop in 2000s. The agricultural GDP growth varied widely by year reflecting climatic conditions and changes in livestock population and composition. The high growth rate during 2010-15 corresponds to expansion of goat population for cashmere wool production. The subsequent low growth reflects harsh climatic conditions and saturation of carrying capacity of grazing land due to increased goat population. The average annual growth of agricultural GDP recorded 5.2% over 2005-19.

The performance of the mining sector largely determines the overall performance of the Mongolian economy after 2000. The highest growth of the mining GDP was recorded at 13.5% during 2010-15, corresponding to the highest GDP growth. The average annual growth of mining GDP is 8.7% during 2005-17. Changes in manufacturing GDP reflects performance of agriculture and mining with some time lag. The high growth during 2005-10 reflects early expansion of mining sector and increase in agricultural production in recent years has contributed also to high growth of manufacturing GDP. The average annual growth of manufacturing GDP recorded 10.1% during 2005-19.

2.2.3 Change in GDP structure

The economic structure has changed drastically in the recent decades. Agriculture had the GDP share of 32.5% in 1995, but the shares decreased steadily to reach 13.0% in 2018 and 13.3% in 2019. Mining started to increase its GDP shares rapidly after 2000 to reach 20.8% in 2019. The share of manufacturing GDP had been relatively stable since 2005 but has started to rise in 2016 reaching 7.4% in 2019.

Generally, as the agricultural GDP shares decreased since 1995, the shares of service GDP increased. After 2000, however, no significant changes in shares of service GDP are observed, except steady increases in shares of financial and insurance services and real estate activities, which together exceeded 10% after 2015. This reflects increased foreign investments in the mining sector and associated economic boom.

2.3 SDV2030 Performance and Vision2050 Targets

2.3.1 GDP and per capita GDP

The SDV2030 sets the economic development target at 6.6% per year up to 2030, while the Vision2050 sets the long-term growth at 6% per annum. The Mongolia's economy grew at an average rate of 4.4% per year since 1990 until 2017 as shown in Table 2.2.1, while that during the 2010-2017 period was 8.1% per year surpassing the SDV2030 target.

The SDV2030 sets the per capita GDP target in 2030 at US\$17,500, but the Vision2050 has reset the targets more realistically at US\$8,299 in 2030, US\$12,000 in 2040 and US\$15,000 in 2050. The SDV2030 target is equivalent to those of Czech Republic (\$18,160), Estonia (\$18,980), Greece (\$18,090) and Slovak (\$16,610) in 2017.

Table 2.3.1 presents the trends of GDP per capita in Mongolia since 1995. The GDP per capita in Mongolia had been constantly growing until 2015 with remarkable high growth rates at 16% per year and 24.4 % per year in the 2000-2005 and 2005-2010 periods respectively. It then went down in 2016 by 19%, followed by some level of recovery in 2017 to US\$3,574 and further up to US\$4,073 in 2018. The average growth rate of GDP per capita from 1995 to 2018 was 8.6 % per year. In the event that this level of growth rate is maintained until 2030, GDP per capita in 2030 will reach US\$10,961, which is equivalent to about 63% of the SDV2030 target of US\$17,500, but even this level is unlikely especially after COVID-19.

Table 2.3.1 Per Capita GDP of Mongolia

Year	Exchange rate (annual average, MNT/US\$)	GDP at current prices (MNT million)	GDP at current prices (US\$ million)	Resident population (1,000)	GDP per capita (US\$)	Annual average growth rates (%/year)
1995	473.48	651,456	1,376	2,234.4	616	-
2000	1,097.00	1,224,062	1,116	2,379.5	469	(1995-2000) -5.3
2005	1,221.00	3,041,406	2,491	2,533.4	983	(2000-05) 16.0
2010	1,257.18	9,756,588	7,761	2,653.9	2,924	(2005-10) 24.4
2015	1,995.51	23,150,286	11,601	2,990.2	3,880	(2000-15) 5.8
2016	2,489.53	23,942,866	9,617	3,063.6	3,193	(2015-16) 19.1
2017	2,427.13	27,167,035	11,193	3,131.7	3,574	(2016-17) 13.9
2018	2,472.67	32,093,615	12,979	3,186.3	4,073	(2017-18) 14.0
2019	2,664.41	36,897,640	13,858	3,296.9	4,203	(2018-19) 3.2

Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia

The SDV2030 targets on economic growth rate and per capita GDP and the future population projected by the renewed “Population Projection2015-2045” prepared by NSO of Mongolia (2017) demonstrate a problem of inconsistencies among the official figures assumed for future development. One way to look at the problem is underestimation of economic growth rate target in comparison with the target per capita GDP in 2030 and the population projected for 2030 as shown in Table 2.3.2.

Table 2.3.2 Population and GDP Projection 1

Items	Projection
(a) Population projected for 2030	3,862,808 people
(b) Per capita GDP target for 2030	US\$17,500
(c) GDP in 2030 a) times b)	US\$67,599 million
(d) Economic growth rate from \$13,858 million to \$67,599 million in 11 years	15.5 % per year between 2018 and 2030 (much higher than the SDV target of 6.6% per year)

Source: Population Projection2015-2045, NSO of Mongolia

Another way to look at the problem is a decrease of population as a result of per capita GDP growth higher than GDP growth.

Table 2.3.3 Population and GDP Projection 2

Items	Projection
(a) Per capita GDP in 2030	US\$17,500 per person
(b) GDP in 2019	US\$13,858 million
(c) SDV growth assumed	6.6% per year
(d) GDP in 2030 (from b) and e)	US\$27,991 million
(e) Population in 2030 d)/a)	1,599,528 people (49% of 2019 resident population)

Source: Population Projection2015-2045, NSO of Mongolia

It is unrealistic to assume a significant decrease of the population until 2030, because Mongolia has not entered into an era of shrinking population due to aging society yet. This inconsistency problem has been caused because the GDP per capita growth target was set at a rate higher than the GDP growth rate target. A simple way to derive the per capita GDP growth rate is to subtract the population growth rate from the GDP growth rate. If GDP per capita growth is assumed higher than GDP growth, population growth rate naturally becomes negative. The renewed targets set by the Vision2050 are more likely to be achieved.

2.3.2 Human development index

Human development index (HDI) is a composite index of life expectancy, education and per capita income indicators which are used to measure the average achievements in a country in relation to three basic dimensions of human development. HDI is evaluated the point from 0 to 1. As of 2018, the highest-ranked country marks a score of 0.953, and the lowest-ranked country receives a score of 0.354.

The average rating of OECD member countries is 0.895.

HDI in Mongolia has been declining slightly since 2010, although it had been growing steadily before 2010. The SDV2030 target for HDI is to achieve ranked at 70th in the world in 2030. As of 2014 and 2018, Mongolia was ranked at 90th and 92nd respectively. HDI in Mongolia was 0.74 in 2019, and the Vision2050 has set the targets at 0.8 in 2030, 0.85 in 2040 and 0.9 in 2050. Out of three indicators of the HDI, life expectancy and per capita income have steadily increased since 2000, while education index has declined. To attain the Vision2050 targets, education index should be consistently improved.

Table 2.3.4 Changes in Human Development Index by Region

	Year					
	2010	2015	2016	2017	2018	2019
Total	0.756	0.736	0.734	0.734	0.740	0.744
Western Region	0.697	0.667	0.664	0.659	0.664	0.667
Khangai Region	0.747	0.677	0.682	0.680	0.682	0.689
Central Region	0.735	0.695	0.693	0.690	0.693	0.704
Eastern Region	0.706	0.689	0.695	0.691	0.695	0.704
Ulaanbaatar	0.776	0.813	0.814	0.814	0.822	0.823

Source: Mongolian Statistical yearbook 2017 and 2018, National Statistics Office of Mongolia

Note: The HDI for 2016-2018 was estimated according to the revised methodology

2.3.3 Life expectancy at birth

The life expectancies in 2018 were 66.11 for male, 75.78 for female and 70.19 for total. In the last 28 years the life expectancy for female grew by 9.56 years, while that for male increased by 5.74 years. To achieve the SDV2030 target at 78 years, it will be necessary that life expectancy continues to increase by 0.65 years per annum. The Vision2050 has set more realistic targets at 71.2 years in 2030, 72.9 years in 2040 and 73.5 years in 2050. The rate of increase in life expectancy in the 2005-2010 period at 0.57 years per annum was the highest in the 28 years. There were actually some regions and many Aimags where life expectancies grew at the rates higher than 0.62 per annum such as Western Region at 0.69, Central Region at 0.67, Eastern Region at 0.81 and Ulaanbaatar at 0.69 years per year respectively.

Table 2.3.5 Life Expectancy at Birth

Year	Total	Male	Female	Difference between male and female	Annual rate of change of total life expectancy (years)
1990	63.37	60.37	66.22	-5.85	-
1995	63.78	62.01	65.43	-3.33	0.08
2000	63.18	60.40	66.10	-5.70	-0.12
2005	65.21	62.11	68.61	-6.50	0.41
2010	68.05	64.93	72.26	-7.33	0.57
2015	69.89	66.02	75.84	-9.82	0.37
2016	69.57	65.58	75.10	-9.52	-0.32
2017	69.89	65.88	75.44	-9.56	0.32
2018	70.19	66.11	75.78	-9.67	0.45
2019	70.41	66.38	75.96	-9.58	0.22
Change in 1990-2019	7.04	6.01	9.74	-3.73	0.37

Source: Mongolian Statistical Yearbook 2019, NSO of Mongolia

2.3.4 Poverty and income distribution

(1) Poverty incidence

The SDV2030 sets no poverty related target in 2030. The Vision2050 has set more realistic targets for

poverty incidence at 15% in 2030, 10% in 2040 and 5% in 2050. Poverty lines in 2018 were defined for each region by NSO of Mongolia as follows.

- Western Region: MNT178,000 per person per month
- Khangai Region: MNT182,600 per person per month
- Central region: MNT175,600 per person per month
- Eastern Region: MNT174,000 per person per month
- Ulaanbaatar: MNT198,600 per person per month

Definition of urban areas here and elsewhere follows the legal definition of cities given in Sector Report as built-up areas with population over 15,000 and secondary and tertiary industries as dominant economic activities under autonomous administration according to the Law on Legal Status of Cities.

The following are observed from the recent poverty trends shown in Table 2.3.6.

- The incidence of poverty in 2018 for Mongolia was 28.4%. To attain the SDV2030 target of zero poverty in 2030, the incidence of poverty needs to be reduced by 2.4 % every year until 2030, which is difficult to achieve in view of the recent performance described below.
- Poverty rates for Mongolia had been declining until 2014, but rose in 2016, reflecting slower economic growth (1.2% in 2016) resulted in a higher incidence of poverty. This relation shows that downturn in economic growth affects the portion of the population with lower income more seriously. The poverty incidence in 2018 showed a slight improvement, together with higher economic growth at 7.2% in 2018.
- The same trends are observed both in urban areas and rural areas. While the incidence of poverty is higher in rural areas, their differences have been declining: 15.8% in 2010 down to 3.6 % in 2018.
- The same trends are observed in all the five regions. The regions with the highest incidence of poverty was Western Region in 2010, Khangai Region in 2012 and Eastern Region in 2014, 2016 and 2018.
- The same trends are observed for Aimag centers, Soum centers and countryside. The difference between Aimag centers and Soum centers have been decreasing, 2.4% in 2010 down to 1.2 % in 2018 except in 2012 when the incidence of poverty in Soum centers was lower than that of Aimag centers.
- An alarming trend is the rise of the poverty ratio in Ulaanbaatar in 2018, while the ratios dropped in all the other regions. An increase in non-registered migrants to Ulaanbaatar since the migration ban induced in January 2016 and their difficulties in acquiring decent jobs could have been a cause for this trend.

Table 2.3.6 Changes in Incidence of Poverty by Region and by Urban/Rural Center

Unit: %

	Year				
	2010	2012	2014	2016	2018
Total	38.8	27.4	21.6	29.6	28.4
Urban	33.2	23.3	18.8	27.1	27.2
Rural	49.0	35.4	26.4	34.9	30.8
Western Region	52.7	32.3	26.0	36.0	31.8
Khangai Region	51.9	38.5	25.3	33.6	30.8
Central Region	29.9	28.2	22.2	26.8	26.1
Eastern Region	42.3	33.4	31.4	43.9	37.4
Ulaanbaatar	31.2	19.9	16.4	24.8	25.9
Aimag Centers	37.3	30.4	23.8	31.8	30.1
Sum Centers	39.7	27.5	24.7	32.3	28.9

Country	56.1	29.6	27.9	38.0	32.9
---------	------	------	------	------	------

Source: Mongolian Statistical yearbook 2017 and 2018, National Statistics Office of Mongolia

Note: Poverty line: (Western Region) MNT178,000 per person per month, (Khangai Region) MNT182,600, (Central region) MNT175,600 (Eastern Region) MNT174,000 (Ulaanbaatar) MNT 198,600

(2) Income distribution

The SDV2030 sets the Gini coefficient target for Mongolia at 0.30 in 2030. To assess the recent performances of income distribution in Mongolia, the JICA Project Team (JPT) made a simplified calculation of Gini coefficients utilizing the income distribution data presented in the statistical yearbooks of Mongolia 2017, 2018 and 2019 as shown in Table 2.3.7.

Table 2.3.7 Gini Coefficients in Mongolia

Year	Unit: %		
	Total	Urban	Rural
2010	0.433	0.421	0.390
2015	0.419	0.398	0.421
2016	0.412	0.394	0.418
2017	0.424	0.410	0.418
2018	0.423	0.408	0.416
2019	0.432	0.421	0.438

Source: Calculated by JPT utilizing the income distribution data in Mongolian Statistical Yearbook 2017, 2018 and 2019, National Statistics Office of Mongolia

Note: Income categories in 2010 constant prices for 2010, 2015, 2016, 2017, 2018 and those for 2019 in 2015 constant prices

Table 2.3.7 indicates that the Gini coefficients are in the range of 0.39 to 0.43 throughout the region and over the years without big differences.

Table 2.3.8 shows an example of income distribution with Gini coefficient at 0.30, which is the SDV2030 target, compared with the income distribution pattern in 2018. In this case, income distribution becomes more equal by reducing the proportions of the lowest two income groups (up to MNT300,000 and 300,001-500,000 per household per month) and four higher income groups (MNT900,000 and above) and increasing the proportions of middle-income levels (between MNT300,001 and MNT900,000). Livelihood development for lower income people is required in achieving such a more equal income distribution pattern as targeted by the SDV2030.

Table 2.3.8 Example of Income Distribution Pattern to Attain SDV2030 Target

Income Group (MNT per household per month in 2015 prices)	Income distribution	
	2019 with Gini coefficient at 0.43	2030 with Gini coefficient target at 0.30 (example)
-300,000	6.0	1.0
300,001-500,000	14.3	24.0
500,001-700,000	16.3	32.0
700,001-900,000	14.2	21.0
900,001-1,100,000	11.8	11.0
1,100,001-1,600,000	19.4	6.0
1,600,001-2,100,000	9.5	3.0
2,100,001-	8.5	2.0
Total	100.0	100.0

Source: 2017 values from Mongolian Statistical Yearbook 2017 and 2018 and Gini coefficient at 0.30 values calculated by JICA Project Team

2.3.5 Global competitiveness

Global competitiveness index (GCI) has been evaluated by 12 pillars such as institution, appropriate

infrastructure, stable macroeconomic framework and so forth. According to the Global Competitiveness Report 2016-17 published by the World Economic Forum (WEF), Mongolia was ranked 102nd out of 138 countries. Mongolia showed progress in the following four indicators in 2016 compared with the previous years: macroeconomic stability, financial market development, technological readiness and higher education and training. One of the factors contributing to this result was increase in cellular phone users, Internet speed and increase in the number of Internet users. Also, decrease in inflation rate to 5.9% has positively affected the macroeconomic stability indicator. On the other hand, the following four competitiveness indicators have reduced their rating: business sophistication, goods market efficiency, labor market efficiency and institutions.

As the most recent data, the report series released by WEF introduced the GCI in 2019, in which Mongolia scored 52.6 point and stood at 102nd out of 141 countries. It means that the Country showed a decline by 0.1 point or dropped by three ranks compared with the previous year.

The SDV2030 target for the GCI is to achieve ranked at 70th in the world in 2030. As of 2014 and 2019, Mongolia was ranked at 104th and 102nd respectively. As long as the trend in recent years continues, it can be said that achieving the SDV2030 target would be difficult.

2.3.6 Ease of doing business

According to the Doing Business data by the World Bank, a high ease of the doing business index (DBI) ranking means the regulatory environment is more conducive to starting and operation of a local firm. The ranking is determined by sorting the aggregate scores on 10 topics, each consisting of several indicators, giving equal weight to each topic.

According to 10 topics, Mongolia is ranked at 87th in starting a business out of 190 countries in 2018, 23rd in dealing with construction permits, 148th in getting electricity, 49th in registering property, 22nd in getting credit, and 33rd in protecting minority investors, 61st in paying taxes, 117th in trading across borders, 66th in enforcing contracts and 152nd in resolving insolvency. It indicates Mongolia's improvements in environments in starting a business, registering property and enforcing contracts, but its rank goes down in getting electricity and resolving insolvency.

As seen from Table 2.3.9, the number of registered entities in Mongolia had been increasing steadily in well balanced manner among regions.

Table 2.3.9 Registered Entities in the Statistical Business Register Data by Region

	Year					
	2010	2015	2016	2017	2018	2019
Total	73,795	126,560	141,502	155,065	170,166	187,126
Western Region	4,382	7,867	8,462	9,197	9,801	10,315
Khangai Region	5,964	10,812	11,758	12,792	13,633	14,340
Central Region	7,685	11,700	12,587	13,804	15,258	16,304
Eastern Region	2,138	3,815	4,217	4,600	5,037	5,445
Ulaanbaatar	53,626	92,366	104,478	114,672	126,437	140,722

Source: Mongolian Statistical yearbook 2017, 2018 and 2019, National Statistics Office of Mongolia

While the SDV2030 sets the DBI target for 2030 at 40th place, the Mongolia's rank deteriorated from 56th in 2014 down to 64th in 2015, 62nd in 2016 and 2017 and further down to 74th in 2018. Various problems related with mining investments on the ground could have resulted in the deterioration of this assessment result. As of 2019, Mongolia is ranked at 74th (score 67.74) out of 190 countries in 2019. It shows Mongolia's improvement by 0.27 points compared with the last year's ranking. Slovenia is ranked 40th in 2019 with 75.61. Mongolia will be able to reach the 40th place by 2030 in the event that improvement of investment environment continues at the rate of 0.716 every year with the assumption that the 2019 ranking and the scores remain unchanged until 2030. Higher levels of improvement than the recent achievement will be required to attain the SDV2030 target.

The detail of doing business assessment for Mongolia are shown in Table 2.3.10.

Table 2.3.10 Doing Business Assessment for Mongolia for 2018

Factor	Score	Rank
Starting a business	86.90	87
Dealing with construction permits	78.19	23
Getting electricity	54.88	148
Registering property	74.14	49
Getting credit	80.00	22
Protecting minority investors	68.33	33
Paying taxes	77.32	61
Trading across borders	66.89	117
Enforcing contracts	61.36	66
Resolving insolvency	29.39	152
Overall	67.74	74

Source: Doing Business 2019 Training for Reform Economy Profile Mongolia, World Bank (WB) Group

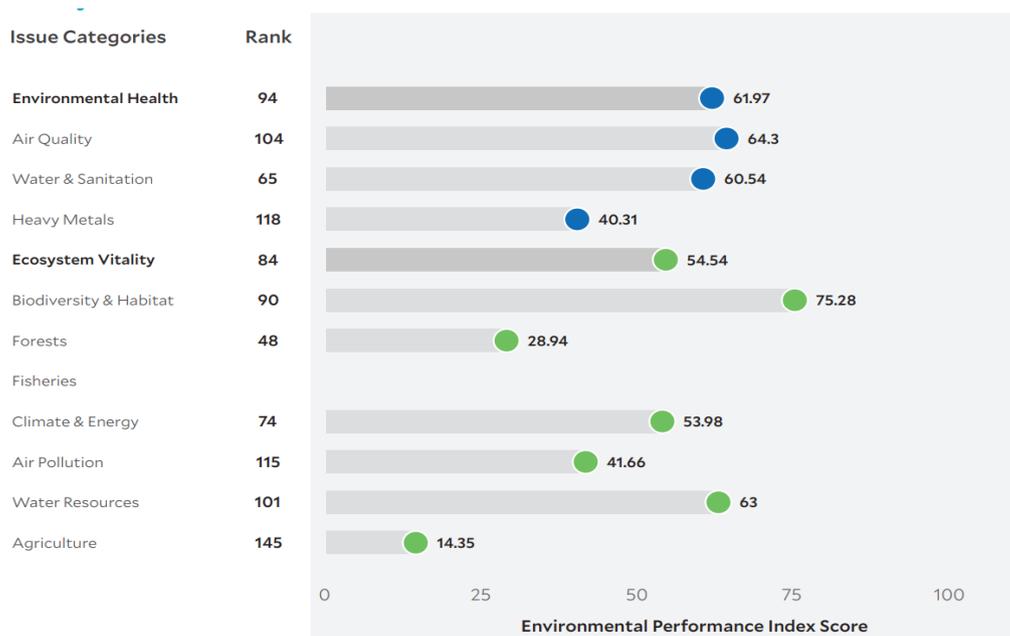
The factors significantly lower than the overall rank are “getting electricity” (148), “trading across border” (117) and “resolving insolvency” (152). The constraint in electricity is a controllable factor, which can be solved or improved by electricity infrastructure development. “Trading across border” is a more complex issue involving transportation and logistic infrastructure as well as regulatory framework and coordination with neighboring countries. “Resolving insolvency” can be tackled by improving the laws and regulations together with strengthening their enforcement effectiveness. To achieve the SDV2030 target, efforts should be continued to upgrade the qualities of these inferior factors, while maintaining the levels of the superior factors which are already above the SDV2030 targets such as “dealing with construction permits” (23) and “getting credit” (22) and “protecting minority investors” (33).

2.3.7 Environment

Environmental performance index (EPI) represents a method of quantifying and numerically marking the environmental performance of related State's policies. The EPI comprises two objectives of environmental health and ecosystem vitality, and several indicators such as environmental risk exposure, household air quality, unsafe sanitation and so forth.

The SDV2030 target for the EPI is to achieve the 90th place in the world in 2030. As of 2018, Mongolia already achieved the target ranked at 83rd. The Vision2050 has set the EPI targets at 59 in 2030, 60 in 2040 and over 61 in 2050, compared to 57.2 at present.

As seen in Figure 2.3.1, agriculture index score was so bad compared to other indices. Agriculture, while vital to the quality of life, can be harmful to the environment when poorly managed. For further improvement of environmental performance, it is recommended that agricultural practices should be improved, for example, by adopting zero-tillage farming technology widely.



Source: <https://epi.envirocenter.yale.edu/epi-country-report/MNG>, Yale University

Figure 2.3.1 Environmental Performance Index Score in Mongolia in 2018

2.3.8 Share of population with social insurance

The SDV2030 target for the share of population with social insurance coverage in the total economically active population is to achieve 99% in the whole of Mongolia in 2030. As of 2014, the percentage was only 84.4%. It seems that it would be difficult to achieve the target, although the current prospect to evaluate the possibility to achieve the target is not clear. An improvement by 14.6% in 16 years or 0.91% per year is required to attain the SDV2030 target.

JICA has been implementing the “Project on Strengthening the Capacity for Social Insurance Operation” since 2016, and planned to complete the project in 2020. The objective of the project is to strengthen Health and Social Insurance Agency's capacity for social insurance coverage, premium collection and benefits. The implementation of the project would contribute to enhanced capacity of social insurance management.

2.3.9 Health

(1) Infant mortality

The SDV2030 sets the infant mortality rate (IMR) target for 2030 at 8.0 deaths per 1,000 live births. Table 2.3.11 and Figure 2.3.2 show the trends of IMRs by region since 1990. Also, the Vision2050 set the targets at 4.5% in 2040 and 2.3% in 2050.

The following points are observed.

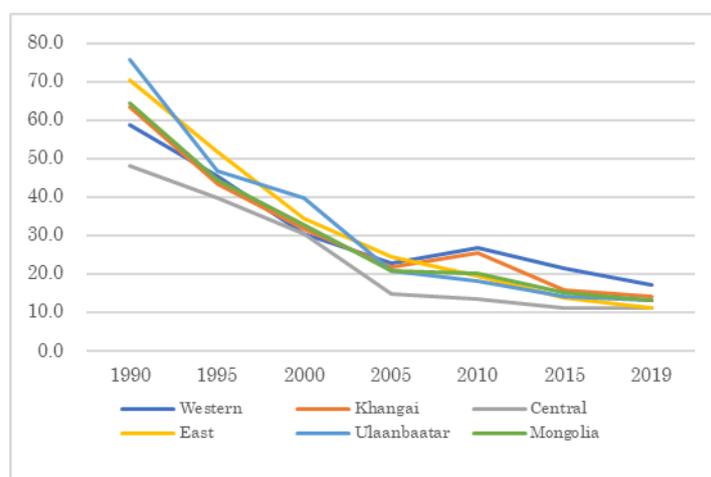
- The IMR at 13.0 per 1,000 live births in 2019 is about half the average for the middle-income countries in the world classified by the WB (gross national income: GNI) per capita between US\$996 and US\$3,895) at 28 per 1,000 live births. The SDV2030 target at 8.0 per 1,000 live births is positioned between the 2017 IMF rate for the upper middle-income countries (GNI per capita between US\$3,896 and US\$12,055) at 12 and that of the high-income countries (GNI per capita higher than US\$12,055) at 5 per 1,000 live births.

- Overall, the IMRs in all the regions had been declining sharply until 2005 and the pace of improvement slowed down since then.
- The largest improvement of IMR was observed in Ulaanbaatar and Eastern Region in number: a decline by 62.6 deaths per 1,000 live births and 59.3 deaths per 1,000 live births respectively over 29 years.
- The IMRs in 2016 deteriorated in all the regions except in Western Region and in Mongolia, but improved in the subsequent years.
- In the event that the rate of improvement between 1990 and 2019 at -5.4% per year continues until 2030, the IMR in Mongolia in 2030 will be 6.9 deaths per 1,000 live births, thus more than attaining the SDV2030 target at 7.1. In the event that the improvement rate since 2005 until 2019 at -3.2% per year continues, the IMR in 2030 will go down only to 9.0 deaths per 1,000 live births, the level slightly short of the SDV2030 target.

Table 2.3.11 IMRs of Mongolia by Region

Year	IMR (per 1,000 live births)						Maximum/ minimum	
	Western	Khangai	Central	East	Ulaanbaatar	Mongolia		
1990	58.8	63.5	48.1	70.3	75.6	64.4	1.57	
1995	45.4	43.3	39.8	51.7	46.6	44.4	1.30	
2000	30.3	31.8	30.6	34.4	39.9	32.8	1.32	
2005	22.7	21.9	14.7	24.4	20.8	20.7	1.66	
2010	26.9	25.3	13.5	19.3	18.2	20.2	1.99	
2015	21.6	15.8	11.2	13.8	14.3	15.0	1.93	
2016	21.3	20.5	15.7	15.3	15.0	16.8	1.42	
2017	16.1	14.8	11.4	16.3	12.2	13.6	1.43	
2018	15.6	14.0	11.7	8.3	13.6	13.4	1.88	
2019	17.0	14.0	11.0	11.0	13.0	13.0	1.55	
Change 1990-2019	In number	-41.8	-49.5	-37.1	-59.3	-62.6	-51.4	-
	%/year	-4.2	-5.3	-5.0	-6.2	-5.9	-5.4	-

Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia



Source: Mongolian Statistical Yearbook 2017 and 2019, NSO of Mongolia

Figure 2.3.2 IMRs of Mongolia by Region

(2) Maternal mortality

The SDV2030 sets the MMR target at 15.0 deaths per 100,000 live births in 2030. The MMRs in Mongolia were 26.6 and 23.0 in 2018 and 2019 respectively, which were much lower than the MMRs of East Asia and Pacific at 59.0 and middle income countries at 180.0 in 2015 according to the WB data (<https://data.worldbank.org/indicator/SH.STA.MMRT>). The MMR deteriorated in 2016, but improved in 2017 compared with the 2015 level, the same trend as the IMR (Table 2.3.11). The

Vision2050 set the MMR targets at 10.0 deaths in 2040 and 5.0 deaths in 2050 per 100,000 live births, respectively.

According to the WB data above, the MMR in Mongolia in 1990 was 186 deaths per 100,000 live births. The rate of improvement is, thus, estimated to be -7.0 % per year between 1990 and 2019 in Mongolia. Assuming this rate of improvement continues until 2030, the MMR in 2030 will be 10.4 deaths per 100,000 live births, which is lower than the SDV2030 target at 15.0 and the average of the high-income countries in 2015 at 13.0. Assuming the rate of improvement between 2014 and 2018 at -5.6% per year, the MMR in 2030 will be 12.2, more than attaining the SDV2030 target level at 15.0.

Table 2.3.12 MMRs in Mongolia

Unit: Deaths per 100,000 live births

Year	MMR
2014	30.6
2015	26.6
2016	49.0
2017	27.0
2018	26.6
2019	23.0
2030 Target	15.0

Source: (1) Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia, (2) Socio-economics Situation of Mongolia February 2019

(3) Health service and expenditure

The IMRs and MMRs deteriorated in 2016 as seen already: IMRs from 15.0 in 2015 to 16.8 per 1,000 live births in 2016 and IMRs from 26.0 up to 49.0 per 100,000 live births. They improved in 2017 to the levels higher than in 2015. The worsening situation of these health indicators in 2016 was a result of the stagnating Mongolian economy in 2016 with the economic growth rate as low as 1.2%. The low economic growth led to an expansion of poverty from 21.6% in 2015 to 29.6% in 2016. As a result, people's average expenditure on health decreased from MNT13,505 per capita per month in 2015 down to MNT11,383 in 2016, a decline by 15.7%. Because the level of health expenditure and resources continued expanding during this period as shown in Table 2.3.13, the decline in the expenditure on health by households should be the factor which affected the infant and IMRs. This is an indication of the instability of the economy affecting directly the quality of lives of the people.

Table 2.3.13 Government Health Expenditure and Health Service Resources

Year	Government expenditure on medicine & medical equipment (MNT million)	Portion of medicine and medical equipment (%)		Government expenditure on medicine & medical equipment in 2010 prices (MNT million)	Health service resources	
		To Government expenditure	To GDP		Number of hospital beds	Number of physicians
2005	15,947	2.1	0.5	15,947	18,285	6,788
2010	42,014	1.4	0.4	23,368	17,821	7,497
2015	86,008	1.2	0.4	30,285	21,720	9,563
2016	117,933	1.2	0.5	41,007	22,960	10,000
2017	118,944	1.3	0.4	38,860	23,897	10,576
2018	137,979	1.5	0.4	n.a	24,884	11,169
2019	151,322	1.4	0.4	78,084	25,661	11,788

Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia

The level of health service in Mongolia is high at the similar level to developed countries as far as health input is concerned. For example, the number of people per physician in Mongolia on a resident population basis was 296 people per physician in 2017, which was similar to Australia (286), Denmark (270) and France (312) and was even lower than Japan (397) and Korea (434). Considering the lower performances in health outputs such as infant and IMRs, the quality rather than quantity of the health service is the issue in Mongolia.

(4) Lifestyle on health condition

There are continued trends indicating prevalence of non-communicable diseases (NCDs) or health concerns related to life styles such as obesity, cardiovascular disease, hypertension, diabetes, alcohol and tobacco consumption, which show either no change or increased cases since 2013.¹ A slight increase by 1.3 times was observed in the percentage of citizens who received advice by health professionals against tobacco consumption with prevalence at 38.5%, while percentage of those who have been advised on various NCD risks, healthier nutrition and physical activity ranged from 57.6 to 64.4 %. The most worrisome is the 13.5% decrease in coverage of health insurance from 2013, to 78.6% in 2019, while average out-of-pocket spending for health was MNT 131,837 in 2019. It is likely that the health insurance coverage may be further affected by COVID-19 with the loss of income as well as travel restrictions causing reduction in physical activities, and possibly disruption in access to health care and medical treatments. Further improvements in efficiency of health insurance management and monitoring will be necessary.



Source: Fourth national steps survey on the prevalence of noncommunicable disease and injury risk factors-2019

Figure 2.3.3 Population with Combined NCD Risk Factors by Region

Table 2.3.14 Alcohol and Alcoholic Drinks Consumption

Mongolian population in 15-69 years (over 95%)	All	Men	Women
No alcohol in life	30.6 (28.4 - 32.7)	25.0 (22.4 - 27.7)	36.0 (33.5 - 38.4)
No alcohol in past 12 months	12.0 (11.0 - 13.1)	9.6 (8.3 - 11.0)	14.4 (12.9 - 16.0)
Alcohol consumed last month	34.8 (32.8 - 36.7)	44.9 (42.2 - 47.6)	24.8 (22.7 - 27.0)
Alcohol consumed frequently last month	4.8 (4.4-5.3)	5.7 (5.0-6.3)	3.3 (3.0-3.7)
Alcohol consumed once a month in last month: average amount by standard drink (1 standard drink = 25 ml of alcohol or 100 ml of wine)	9.3 (8.7-9.9)	11.4 (10.6-12.2)	5.7 (5.2-6.2)
Excessive alcohol consumption in last month (over 6 standard drinks at a time)	19.8 (18.4 - 21.2)	28.2 (26.1 - 30.3)	11.5 (10.1 - 12.9)

Source: Fourth national steps survey on the prevalence of noncommunicable disease and injury risk factors-2019

Taking the consumption of alcohol for example in terms of health condition and chronic diseases, the consumption of alcohol in Mongolia in 2016 (male 27.6 liters (on pure alcohol base), female 9.9 liters, average 21.9 liters) was reported to be higher than both world average, and average in Western Pacific Region. Prevalence of heavy alcohol consumption episode (more than 60 grams in at least one occasion in last 30 days) is reported for 27.9% of all male drinkers, and 5.3% of female drinkers, or average of 16.4% among drinkers.

¹ Fourth national steps survey on the prevalence of noncommunicable disease and injury risk factors-2019

2.3.10 Specially protected area

In recent years, climate change and human intervention have caused environmental degradation and natural resource depletion. Therefore, it is necessary to expand the protected area to preserve natural resources and restore ecological balance. For this reason, the Mongolian Government has approved 22 areas as national protected areas on 2nd May 2019. As a result, the territory of specially protected areas has increased by 2.1%, reaching 314 million ha, which accounts for 19.8% of the total land of Mongolia. The Vision has set targets for specially protected area as the share of total national land at 30% in 2030, 33% in 2040 and 35% in 2050.

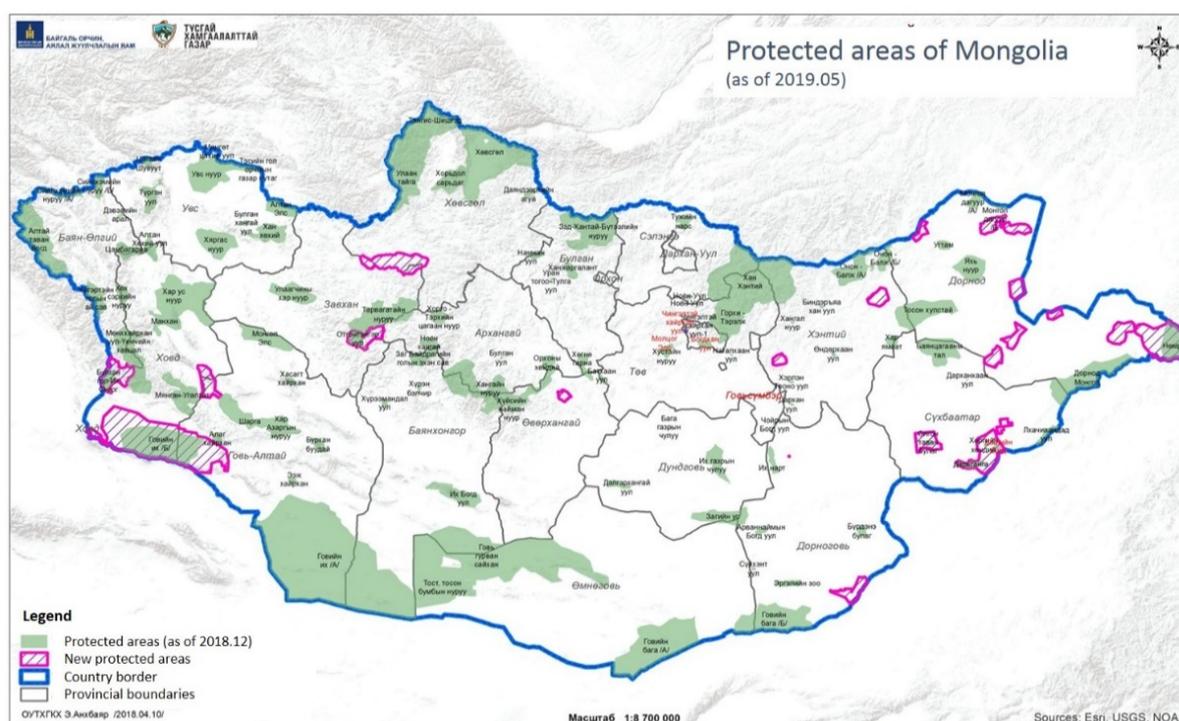
Table 2.3.15 indicates the trend in recent years and the SDV2030 target of specially protected land area. Also, the National Land Management Plan (NLMP) prepared by Agency for Land Administration and Management, Geodesy and Cartography (ALAMGaC) specifies the future protected area planned for expansion. Therefore, a prospect of achieving the target of the SDV2030/Vision2050 would be high.

Table 2.3.15 Status of Environmental Indicators for SDV2030

Indicator	Unit	2014*	2015	2016	2017	2019**	2030***
Area of specially protected land	%	3.5	13.5	13.5	13.5	19.8	30.0

Source: Statistical Yearbook 2017, NSO of Mongolia

Note: * baseline, ** http://mongolia.panda.org/en/how_you_canhel/latest_news/?uNewsID=346744, WWF (World Wide Fund for Nature) Word report, *** target



Source: WWF Mongolia

Figure 2.3.4 Protected Areas of Mongolia

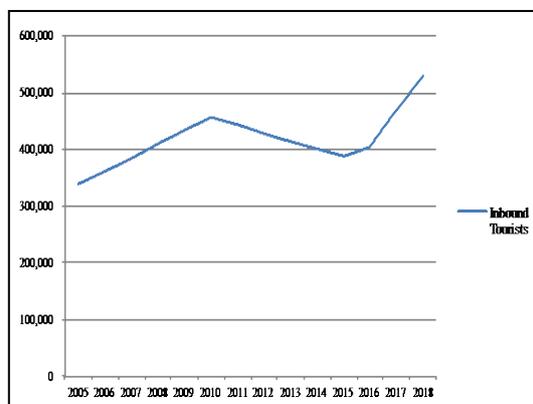
2.3.11 Tourism

The SDV2030 sets the target of foreign tourist arrivals at 2.0 million tourists in 2030. Table 2.3.16 shows the recent trend of foreign tourist arrivals in Mongolia. After a decline in 2015, the number of inbound tourists increased in 2016 and the increase accelerated in 2017-19. By the end of 2019, Mongolia received 577,300 tourists, an increase by 9.1% from 2018. The Vision2050 has set targets

of foreign tourist arrivals at 2.0 million tourists in 2030, 4 million in 2040 and 6 million in 2050. The prospects have been undermined by the recent COVID-19 proliferation.

Table 2.3.16 Inbound Tourists to Mongolia

Year	Number of inbound tourists	Growth rate (%/year)
2005	338,768	-
2010	456,090	6.1
2015	368,204	-3.3
2016	404,163	4.7
2017	469,309	16.1
2018	529,370	12.8
2019	577,300	9.1



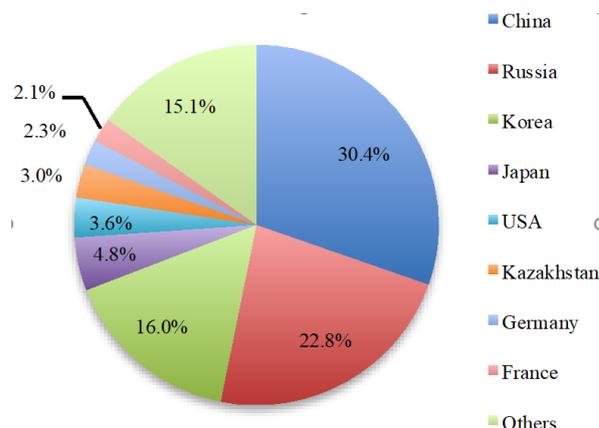
Source: Mongolian Statistical Yearbook 2017, 2018 and 2019, NSO of Mongolia

Note: The values for intermediate years between 2005, 2010 and 2015 were interpolated by equal intervals.

The major source countries of these inbound tourists are China, Russia, Korea, Japan, USA, Kazakhstan, Germany and France as shown in Table 2.3.17.

Table 2.3.17 Number of Inbound Tourists by Country

Country	Inbound tourists			Proportion (%)	
	2005	2019	2005-19 change (%/year)	2005	2019
China	170,345	168,298	0.0	50.3	29.2
Russia	57,926	141,927	6.6	17.1	24.6
Korea	30,787	101,279	8.9	9.1	17.5
Japan	12,952	24,419	4.6	3.8	4.2
USA	10,153	18,838	4.5	3.0	3.3
Kazakhstan	3,928	16,264	10.7	1.2	2.8
Germany	8,168	12,405	3.0	2.4	2.1
France	5,822	10,572	4.3	1.7	1.8
Others	38,687	83,298	5.6	11.4	14.4
Total	338,768	577,300	3.9	100.0	100.0



Source: Mongolian Statistical Yearbook 2017 and 2018, NSO of Mongolia

While the number of inbound tourists from China has been decreasing, those from other countries have been increasing, especially those from Russia, Korea, Japan, USA, Kazakhstan and France. The gap between the SDV2030 target at 2.0 million inbound tourists in 2030 and the 2019 level at 577,300 is 1,423,000 tourists. To achieve the SDV2030 target, inbound tourists should increase by 129,000 per annum or an average increase rate at 12.0 % per year.

There are a number of requirements to be fulfilled if this SDV2030 target is to be attained such as follows:

- Increase in the accommodation capacity,
- Increase in international flights and entry points,
- Tourism sector human resources development, both in quantity and quality,
- Upgrading of related service quality,
- Development of tourism related infrastructure,

- Increasing number and variety of the products and services to reduce seasonal variation of the sector, and
- Designation of tourism special zones.

The increase in the accommodation capacity and reduction in seasonal fluctuations of international tourists should be planned together. The following is a simple calculation of the upper limit of the accommodation capacity under the present condition.

- Present number of hotel rooms in Mongolia is 6,726 (United Nations World Tourism Organization (UNWTO), eLibrary)
- Room occupancy rate (world standard) is 70% (255 days/year)
- Number of persons per room is 1.5 persons
- Upper limit of hotel guests is 2,572,000/year

This calculation shows that the target number of 2.0 million tourists annually can be accommodated in the event that tourists arrive in Mongolia evenly throughout a year. In reality, however, international arrivals to Mongolia are concentrated in summer months. Taking into consideration the seasonal fluctuations of tourist arrivals, the actual number of guests that can be accommodated under the present condition would be about 859,000, assuming four months from June to September as the time hotels receive foreign tourists. The required number of hotel rooms to receive 2,000,000 foreign tourists with the same seasonal fluctuations as now is estimated to be 15,900, as calculated below, a 2.4 times increase.

Number of guest rooms required = 2,000,000 guests/4 months operation (120 days)/1.5 persons per room/70% occupancy = 15,873 rooms

In the event that seasonal fluctuations are reduced and the period of hotels receiving foreign tourists increases to six months, for example, the accommodation capacity should be increased to 10,600 as calculated below. The accommodation capacity should be increased by 57% in this case.

Number of guest rooms required = 2,000,000 guests/6 months receiving foreign tourists (180 days)/1.5 persons per room/70% occupancy = 10,582 rooms

2.3.12 Electricity supply

The SDV2030 sets the target for share of households using reliable electricity in 2030 at 100%. As of 2016, Mongolia already achieved 99.2 % for this index. It is assumed that rural households in remote area comprise remaining 0.8% point.

System Average Interruption Frequency Index (SAIFI) is commonly used as a reliability indicator by electric power utilities. SAIFI is the average number of interruptions that a customer would experience in a year. In the last decade, SAIFI in Mongolia has been improved dramatically compared with 10 years ago. Especially, in central areas SAIFI generally continues to be between 2.0 to 3.0 in recent years. Therefore, a perspective of achieving the target of the SDV2030 would be high.

2.3.13 Challenges in economic development

Summarizing the analysis in this section, the challenges facing Mongolia in pursuing further economic growth include the following:

- Minimization of fluctuations of economic performances by shifting the economic structure from a mining and China dependent one to a diversified and multi-partners type economy,
- Organizational structuring and integration of livestock value-chains, and development of export-oriented processing industries in the livestock sector,
- Structural reform of crop farming to ensure food security, increase production of crop products and reduce dependence of the country on imports to improve trade balance,

- Creation of an investment environment favorable for foreign investors to attract FDIs to promote diversification of the economy,
- Enhancement of public investment effectiveness and efficiency by capacity development at individual, organizational and institutional levels,
- Provision of guidance on economic development based on a future vision with reality and consistency,
- Promotion of the tourism sector as a means to promote diversification of the economy,
- Improvement of investment climate and regaining of investors' confidence, and
- Rational investment decision and capital expenditure.

While revenue from the mining sector will remain an important financial source for economic growth for the coming years, it will be important to develop other sectors such as agriculture and livestock, manufacturing and tourism in order to achieve a more resilient economy capable to cope with changes in the global market conditions. The shares of these sectors in GDP should be increased.

Table 2.3.18 Changes of Shares of Mining, Agriculture, Manufacturing and Tourism Sectors in GDP

Sector	Share in GDP (%)		
	2000	2010	2019
Mining	19.5	21.5	20.7
Agriculture	27.8	11.7	13.3
Manufacturing	5.1	6.8	7.4
Tourism	0.7	0.5	0.5

Source: Source: Mongolian Statistical Yearbook 2019, NSO of Mongolia

Note: "Accommodation and food services" is used as a proxy to tourism

The Mongolian economy heavily depends on coal export to China, whose share reached 93% in the total export value of Mongolia in 2018. Diversification of export destinations would contribute to stabilization of the Mongolian economy with lower impacts by the performance of the Chinese economy. In consideration of the recent trends, the countries listed in Table 2.3.19, whose growth rates between either 2010-17 or 2010-18 surpassed the overall growth of Mongolian exports, are promising in further promoting exports in addition to China (93.3% of the total export value in 2018), Russia (1.2%) and South Korea (0.3%) with which Mongolia has strong economic ties.

Table 2.3.19 Growth of Export by Mongolia by Country between 2010, 2017 and 2018

Country	Export value (US\$ million)				Growth rate 2010-18 (%/year)	Growth rate 2010-19 (%/year)
	2010	2017	2018	2019		
Australia	0.3	3.5	1.3	39.6	20.1	72.0
UAE	0.5	2.9	0.5	1.1	0.0	9.1
Belgium	0.5	1.3	0.3	0.5	-6.2	0.0
Indonesia	0.0	3.3	0.2	0.0	-	-
UK	67.4	660.5	172.9	291.1	12.5	17.7
Netherlands	0.2	0.9	1.3	0.8	26.4	16.6
Singapore	2.5	26.1	30.0	154.5	36.4	58.1
Turkey	0.2	2.8	4.5	2.4	47.6	31.8
Sweden	0.1	0.6	0.1	0.8	0.0	26.0
India	0.7	1.8	1.0	1.2	4.6	6.2
Japan	2.7	14.8	26.5	15.5	33.0	21.4
China	2,466.4	5,307.4	6,542.8	6,789.7	13.0	11.9
Russia	82.7	67.7	85.9	68.1	0.5	-2.1
South Korea	30.5	11.6	21.2	27.8	-4.4	-1.0

Total	2,908.5	6,200.6	7,011.8	7,619.6	11.6	11.3
-------	---------	---------	---------	---------	------	------

Source: Mongolian Statistical Yearbook 2017 and 2018, NSO of Mongolia

Managing limited public financial resources in an effective and efficient manner is an important prerequisite for properly guiding economic development with limited government budget. “Mongolia Economic Update: Fiscal Space for Growth, the Role of Public Investment Spending Efficiency” by the WB in July 2018 points out that Mongolia is ranked at 124th place on efficiency on public spending in the Global Competitiveness Assessment. Mongolia’s scores in 2016 IMF Public Investment Management Assessment are much lower than for other emerging market competitors. To realize effective and efficient public financial resources management, the Mongolian Government should pursue (i) giving adequate consideration to the qualities of proposed projects and measures from technical and planning perspectives rather than political consideration, (ii) unified management of development budget avoiding fragmented decision making and (iii) developing skills for planning projects and their appraisal.

2.3.14 Challenges in social development

Based on the analysis in this section, the challenge Mongolia is facing in improving social services for people to realize high level social development are summarized as follows:

- Minimizing emigration from Aimags and Soums by creating job opportunities in rural areas and local towns,
- Prolonging the life expectancy at births focusing on prevention and dealing with chronic diseases caused by unhealthy lifestyles,
- Tackling the poverty to reduce the population below the poverty lines by supporting local entrepreneurs and providing more job opportunities to the poor population and achieve more equitable income distribution, and
- Enhancing health situations of the people such as IMR and IMR by improving the quality of health services.

2.3.15 Challenges in environmental management

Similarly, the challenge Mongolia is facing in conserving natural environment and traditional lifestyle for people to live in pleasant and comfortable living environment and promote sustainable management of environment are summarized as follows:

- Ensuring the national target attainment for expansion of specially protected area to control environmental deterioration and manage resources in relation to extractive industrial activities,
- Proper management of pastureland to prevent further degradation due to over-grazing,
- Improvement of water management to ensure sufficient and safe water supply for human settlements, improve wastewater treatment in particular for cities and industries and reduce groundwater pollution,
- Control of soil contamination and drainage from livestock land,
- Reducing the area of desertification and extending the forest area at the same time, and
- Improving agriculture practices to make it more sophisticated to mitigate adverse environmental effects through wide application of advanced technology and zero-tillage farming technology.

2.4 Review of Vision2050 in Comparison with NCDP

2.4.1 Context of Vision2050 review with NCDP

The NCDP Project has been implemented since January 2019 based on the R/D agreed between the

representatives of JICA and the Mongolian Government on August 22nd, 2018. The NCDP was expected to support the Mongolian sustainable development vision (SDV) 2030, which was prepared in response to the UN SDGs initiative. On April 30th, 2019, the Prime Minister's Decree No.52 was issued to direct the establishment of a Working Group to prepare a Long-term Development Policy (LTDP) of Mongolia together with a Medium-term Development Plan for its implementation. A draft LTDP2050 was submitted to the Parliament, and based on it, the Vision2050 was approved by the Parliament Resolution No.52 on May 13th, 2020, which has effectively nullified the SDV2030.

According to the R/D, the NCDP should be utilized to prepare the Human Settlement Plan (HSP) in preparation by MCUD and the Regional Development Policy (RDP) in preparation by NDA as formal documents with legal base, respectively. Final drafts of the HSP and the RDP were expected to be prepared by the end of 2020 for approval by the Parliament during 2021, but the HSP draft may be delayed to late 2021. NDA is preparing the Regional Development Concept for approval by the Parliament in early 2021 to be followed by preparation of the Regional Development Program elaborating the RDP. While the NCDP itself does not have a legal base, it is expected to be prepared consistently with the legal documents of the Vision2050 as well as the HSP and the RDP.

In this section, the draft LTDP2050 made available by NDA is examined in view of the NCDP to check consistency between the two documents. An early draft of the LTDP2050 was made available in December 2019 with a list of projects and programs, which have been modified to prepare the final draft. In the meantime, the Public Investment Program (PIP) 2021-25 was prepared by September 2020 for the initial implementation of the Vision2050. The examination in this section is based on these drafts. The HSP and the RDP are further elaborated to submit in draft forms to the fall Parliament in 2021. The Vision2050 as examined here is a translated version in Japanese, and its English interpretation is by the JPT.

2.4.2 Overview of Vision2050

(1) National development model of Mongolia: Core values to support long-term development

According to the Vision2050, the core value to support the long-term development of Mongolia consists of: "Spirit" cultivated through human-nature interactions represented by nomadic culture, "Efficiency" realized by economic interactions supported by transport and communication infrastructure, and "Inherency" embraced by people sharing historical progress including memories of Pax Mongolia.

Although it is not explicitly stated, the long-term development policy of Mongolia should shift from socialistic welfare policy to human-centered development to result in middle class constituting 80% of the population. While the Vision2050 explicitly emphasizes the creation of strong middle class as its objective, it is rather an outcome of development to be realized by the shift of emphasis irrespective of the definition of middle class. The NCDP recommends more clearly a shift of development paradigm from socialistic one before 1990, through largely capitalistic one in recent years, to the new development paradigm called the alternative socio-economy as an alternative to the 20th century development model characterized by intensive resource use and economic efficiency orientation.

The Vision2050 anchors the long-term development of Mongolia on 1) green development, 2) economic development, and 3) social development based on rich natural resources and locational advantages in line with the globalization concepts. Regional development allows effective use of natural resources under proper resource management by local administrations and people to realize economic development with more equitable distribution of its wealth. The locational advantages neighboring on Russia and China are utilized for less resource intensive economic activities such as tourism and trade. In both ways, green development is realized. The Vision as interpreted this way, is perfectly consistent with the NCDP vision.

(2) Mongolia's socioeconomy

The Vision2050 identifies main bottlenecks to the long-term development of Mongolia properly. They include corruption, weak governance, lack of policy in political parties, irresponsibility of the judiciary and law enforcement systems, unstable government, unsuitable electoral system, insufficient energy

sector dependent on imports, and undiversified economy dependent mainly on mining and traditional livestock farming. The most striking phenomenon observed at present is over-concentration of population, economic activities and wealth in Ulaanbaatar. Significant disparities exist between the Capital City and local areas not simply in income levels but more importantly in availability of development resources including high quality human resources and financial resources. Regional development with administrative localization proposed by the NCDP is, in fact, a method to re-distribute development resources.

Some data presented in the Vision2050 characterize existing socio-economic conditions: 28.4% of the population is poor, 100,000 people are unemployed, and 221,000 working people do not pay taxes. Symbolizing the welfare policy, one in every four people are getting welfare support from the Government that makes up 4% of GDP, while the total amount of money spent on science and innovation makes 0.25% of GDP (world average is 1.7%).

Debt situations show that 70% of the population gets a salary of up to MNT900,000, while living on MNT306,000. The total household debt is equivalent to 40% of GDP, and the total government debt corresponds to 220% of GDP.

A total of 175,000 households live in apartments, while 343,000 households reside in the Ger district that lacks proper infrastructure. The situation poses a serious challenge when the population of Mongolia is projected to be 5.4 million in 2050 according to the Vision2050.

The Vision2050 defines middle class as “population with an income equivalent to 67-200% of the income median, with a consistent employment, living in apartments, ability to receive full health check at least once a year, ability to travel to a foreign country of their choice at least once a year, with savings for their children’s future or for overcoming any financial difficulties and burdens faced by households, and with an active social engagement”. This definition mixes what the Government should contribute to solve such as employment, housing and social services and what the people should choose to accomplish on their own. Despite the human-centered development policy, limited emphasis on human development by the Vision2050 with education, training and other supports raises serious concern.

(3) Overview of Vision2050

The Vision2050 of Mongolia has nine goals as listed below with 50 objectives and will be carried out in three periods: 2020-2030, 2031-2040, and 2041-2050.

- (a) Shared national values: Becoming a nation with deep sense of shared national values
- (b) Human development: Raising Mongolia's human development index (HDI) to 0.9 and making Mongolia one of the world’s top-10 countries in terms of happiness index
- (c) Quality of life and the middle class: Bringing 80% of the total population to middle class by 2050
- (d) Economy: Increasing GDP by 6.1 times, GDP per capita by 3.6 times, reaching US\$15,000 by 2050, exceeding the threshold of the world's developed countries
- (e) Good governance: Establishing a sustainable governance, ensuring full human rights with a fair system and eradicating corruption
- (f) Green growth: Promoting green growth and ensuring environmental sustainability
- (g) Peaceful and secure society: Creating a favorable external and internal environment to protect the core national interests
- (h) Regional development: Developing regions within the Country that are integrated into the regional economy with competitiveness and a stable settlement system
- (i) Ulaanbaatar and satellite cities: Developing Ulaanbaatar into a livable, environmentally friendly and human-centered city

These goals are mutually complementary, and there exists hierarchical structure of goals in that attainment of one goal is a prerequisite to attaining another goal. “Quality of life and the middle class” goal may be conditional on attainment of “Economy” goal, which may be one of conditions to attain “Peaceful and secure society” goal as well. “Regional development” is a method to realize “Economy” and “Green growth” goals as mentioned above, for which “Human development” and “Good governance” are essential conditions. “Ulaanbaatar and satellite cities” goal may complement “Regional development” goal. “Shared national values” will help people to muster their efforts to attain these goals.

The NCDP pursues regional development based on rich domestic resources utilization oriented to external markets in the global economy to realize diversified economy and green growth naturally. Important means to realize this is broad-based human development from pre-school education to higher education and life-long education. Value development to support the new development paradigm of alternative socio-economy should start already at pre-school level so that children would become change agents to alter mindset of society. Another important means is step wise localization of development administration as important part of good governance. The Vision2050 may be further elaborated to emphasize these specific means to realize the vision.

2.4.3 Vision2050 with nine goals and 50 objectives

(1) Value shared by Mongolian people

The Vision2050 aims to establish the value system shared by people aware of their identity with strong immunity through cultivating unified sense of language, history, culture and belief. Toward this goal, it sets the following five objectives.

Objective 1.1: To establish the value system of Mongolia with high reputation in the world and deep cooperation among Mongolian within and outside the Country

Objective 1.2: To realize the excellent country maintaining nomadic culture based on creative Mongolian of unique ideas, culture and mindset

Objective 1.3: To anchor firmly as part of the value system the Mongolian language and literacy fully mastered by all the Mongolians

Objective 1.4: To strengthen solidarity and patriotism of people proud of their traditional position of the Country, cultural and historical heritage, literature and arts

Objective 1.5: To raise social enlightenment level through research on national heritage, studies of nomadic culture, Mongolian history, language, habits, religion and philosophy as priority subjects, expanding opportunities for people to appreciate them.

Objective 1.1 is the foundation and ultimate goal of the long-term development of Mongolia. Objectives 1.2 through 1.4 pursue different aspects of the value system encompassing nomadic culture, language and literacy, tradition and history. Objective 1.5 aims at enlightening the people by research and studies on these aspects and making the people appreciate them. The Vision ensures that Mongolian families will be supported by the Government for carrying their cultural traditions, Chinggis Khaan’s sacred places of worship will be revived, and everyone will be expected to pay high regards for their dignity and pride. This is consistent with the NCDP vision that incorporates ideas of pride, pleasure and purpose derived from stakeholders.

Worshipping nature and human-nature interactions are important part of the value system shared by traditional religions of most Mongolians: Tibetan Buddhism and Animism/Shamanism. Tibetan Buddhism sees the true nature of reality as all phenomena empty of inherent existence or essence. Animism consists of crediting all elements in the nature with a soul that man must respect, and Shamanism derives from this belief and involves actions to come into contact with these souls and interact with them.

The traditional wisdom in Mongolia including what is called “Chinggis’ admonition” is consistent with these beliefs of traditional religions. When slaughtering animals, traditional wisdom says not to waste

even a drop of blood. Traditional wisdom preventing digging out pasture and polluting river water is also consistent with the value system. The alternative socio-economy recommended by the NCDP is in fact an embodiment of this value system.

(2) Human development

The Vision2050 aims to develop socially active Mongolians by ensuring high quality social security, environment conducive to happy family lives, and high quality education as the foundation of national development in order to attain HDI at 0.9 and 10th rank by happiness index. For this goal, seven objectives are established to cover education, health care, population management, research and development, social services, employment and inheritance as follows.

Objective 2.1: To ensure equal access to high quality education for all and promote life-long education for individual development, family lives and national development

Objective 2.2: To establish efficient medical care system allowing access to high quality medical services in order to foster healthy life habits and active lifestyle of people

Objective 2.3: To encourage stable population growth and bring up active and creative individuals and families

Objective 2.4: To develop national science and innovation system that can compete at the international level

Objective 2.5: To establish healthy and comfortable living environment to satisfy life needs and ensure food security

Objective 2.6: To secure economic self-reliance by labor and establish knowledge economy in order to ensure adequate employment and income

Objective 2.7: To protect gene bank of Mongolians and strengthen capacity to protect from risk in order to promote human development of Mongolians

Objective 2.1 to ensure high quality education and life-long education is most fundamental for human development. The Vision2050 recommendations include open and accessible education system for both general and life-long education, increase in salaries and training for teachers, bilingual education, distance and online learning, and counselling for both teachers and students.

No mention is made in the Vision2050 of acclimatizing the Program for International Student Assessment (PISA) for evaluation of the educational system. The NCDP for education sector is based on the presumption that Mongolia has agreed to participate in 2021 PISA assessment and financial and technical support have been secured for the ongoing education sector reform. This involves two conditions: 1) all schools will conduct two shifts, which requires additional teaching staff input and rehabilitation and re-furbishing of some schools; and 2) general and high schools will cater to the nomadic population and lifestyle.

The Vision2050 states that a national research university will be established for Objective 2.4, but the roles and responsibilities of existing universities are not clarified. It seems increasing the number of schools and kindergartens, schools operating in one shift for ensuring inclusive services with quality will not be possible until 2050 according to the Vision2050. Education and training for skills necessary in the digital age will start only after 20 years. Related to Objective 2.4, investment in science, technology and innovation will account only for 2% of GDP.

For Objective 2.2 related to the healthcare sector, the Vision2050 recommends the following. Financial independence of the healthcare sector will be supported. Citizens will be accustomed to have preventative health checkups once every two years, which appears to contradict the definition of middle class. Online and distance checkups will be introduced. Special consumption tax will be applied to alcohol, sweets and medicine, forming a healthcare fund. It is stated that psychological services will be directed towards families, but there were no targets on dealing with violence issues.

Objective 2.6 aims to realize self-reliant knowledge economy by ensuring employment opportunities for decent income. Monetary policy will focus on creating more jobs, developing industries or sectors

with high employment capacity, encouraging and promoting business entities that generate high earning employment opportunities. Matching human resources development with labor demand by businesses is important part of this goal, but it can be realized only by generating human resources of high quality rather than national program for supplying labor as implied by the Vision2050. The Vision2050 aims at employment rate of 80% by 2050 from the current level of 56.3%.

Objective 2.3 specifies target population for these services to be provided with adequate quality, aiming at realizing active and creative individuals and families. Objective 2.5 sets external conditions of living environment including food security as a prerequisite to human development.

(3) Life quality and middle class

The Vision2050 aims to realize middle class making up 80% of population having high satisfaction for their lives by promoting employment, increasing income levels continually, cultivating active and creative families, realizing physical environment with housing satisfying life needs, and supporting business management of small and medium enterprises for income sufficient to satisfy family and individual life needs. Creating middle class constituting 80 % of population seems to be the central goal of the Vision2050, but in fact it is an outcome of efforts to eliminate income inequality. This goal is pursued with the following six objectives.

Objective 3.1: To develop social protection system to ensure lives

Objective 3.2: To establish such a housing supply system that would meet the demand at prices affordable with purchasing capacity of families and individuals

Objective 3.3: To strengthen competitiveness of small and medium enterprises by promoting employment and developing business skills and methods

Objective 3.4: To provide financial services for middle class to avoid business risk

Objective 3.5: To prepare environment conducive to physical exercise and sports to support citizens and families of active lifestyle

Objective 3.6: To satisfy conditions for fair, equitable and safe national economy and sustainable development by exercising comprehensive smart and human-centered land management system

These objectives are supposed to support collectively individuals and businesses to develop middle class by social protection, affordable housing, support to SMEs, financial services, physical exercises and land management, respectively. Apparently mixed roles of the Government are expected for different aspects. More direct supports are expected for social protection as the prerequisite condition to be satisfied by all (Objective 3.1) and probably for rational and efficient land management system (Objective 3.6). The Government should provide facilitative measure for affordable housing supply (Objective 3.2) and supporting SMEs (Objective 3.3). Only limited roles of the Government are expected for financial services (Objective 3.4) and physical exercises (Objective 3.5).

Establishment and operation of many funds have mixed results. At present, there exist a total of 29 special funds including the SME fund. The social insurance fund is constantly running at a loss (more or less MNT700 billion a year). According to the Vision2050, the fund's investment policy will be determined from 2030, and the transition to the savings system will begin in 2040. Through setting up a savings fund for housing, an apartment can be purchased with the payment of 30% of one's salary. While this idea seems valid, its coverage of 50% households living in housing connected to infrastructure by 2050 contradicts the target middle class population share of 80%.

While the Vision2050 states SME support by establishing nationwide supply chains and complex facilities for marketing and providing a "one-stop service" for export promotion, nothing is mentioned on reforming the SME fund system. The NCDP recommends to support SMEs by training of their employees, institutionalizing technical extension and financial supports coordinating private banks and government fund as well as incorporating SMEs into value chains of industrial clusters.

(4) Economy

The Vision2050 has assessed economic outlook for the next 30 years by using the three alternative scenarios: Base (status quo), Green economy, and Development of mega projects. “Base” is continuation of present economic structure; “Green economy” pursues sustainable development by controlling livestock population within carrying capacity of pasture; “Development of mega projects” is supported by large scale mining and related infrastructure development. These definitions do not seem comprehensive in covering all possible alternatives but rather all the alternatives seem to take mining as the driving force of economic development. The NCDP has examined manufacturing, particularly value-adding processing of primary products, tourism, trade and related services as alternatives to drive the national economy.

The Vision2050 states some positive prospects such as reducing budget deficit and keeping the government debt at 40% of GDP, development of a national brand and creation of 110,000 new jobs by 2030, and measures against money laundering. However, specific actions for achieving these are not mentioned. It states inflation rate will be 2% in 2050, poverty rate will be 5%, and GDP per capita will be US\$15,000.

The Vision2050 identifies manufacturing, mining, energy, transport, tourism and intellectual innovation as the main sectors. Currently 30% of all employees work in the agriculture sector, but the income is low due to low productivity. Therefore, policy support will be directed towards domestic processing industry in order to increase the export of agro-processed products such as meat products, wool, cashmere, leather and organic foods.

The following six objectives are defined to attain the goal covering macro economy, main economic sectors, financial sector, regional economy and trade, and SME supports, and a new fund is proposed to be established.

Objective 4.1: To develop stable macro economy and bring up middle class as the main actors in the society

Objective 4.2: To develop priority economic sectors and realize export-oriented economy

Objective 4.3: To strengthen financial sector for sustainable economic development

Objective 4.4: To integrate regional economy and trade and simplify trading system

Objective 4.5: To develop internationally competitive small and medium enterprises to create employment opportunities

Objective 4.6: To establish a Sovereign Wealth Fund to support economic diversification, innovation, new technologies, human development and green development

The main point emphasized by the Vision2050 is that large investments will be made in the energy sector, thus putting an end to external dependence. At present, 20% of electricity and almost 100% of fuel are dependent on Russia. Establishment of oil refinery which produces 1.5 million ton of oil per year will satisfy domestic demand fully. Establishment of power plants with capacity of 450MW in Tavan Tolgoi and 5,280MW in Shivee Ovoo will expand the power supply. Another major investment will be made in transport infrastructure. In particular, the existing 1,933 km railway network will be upgraded and a new 6,600 km will be built with MNT16 trillion.

The Vision2050 states that a Sovereign Wealth Fund will be established with the revenue from mining, which will be spent on building major infrastructure. Apparently, it refers to the above-mentioned power plants and railways. Increasing currency circulation by sovereign fund is a sound idea instead of burrowing in foreign currencies to make investments. This is consistent with the NCDP proposal to issue “equity currency”. It is more important, however, to manage the fund with respect to sources and uses of fund so that it will not result in increased debts in foreign currencies for the Country and the people. For the contribution of the private sector to infrastructure development, the NCDP proposes establishment of a community development fund by contribution of major mining and tourism development for community infrastructure such as access roads and social facilities.

(5) Good governance

The Vision2050 aims to establish smart and sustainable governance for human development to furnish best organizational structure for national functions, introduce e-governance for administrative services, expand cooperation between the nation, private firms and civil society, secure human rights fully and realize just and corruption free country. To realize this goal, the following six objectives are defined.

Objective 5.1: To ensure sustainable governance by optimizing distribution, monitoring and balance of power

Objective 5.2: To elaborate administrative functions and authorities by specifying administrative structure rationally

Objective 5.3: To establish effective and efficient e-governance to support human development

Objective 5.4: To enrich public services characterized by professional, capable, transparent, efficient and smart services to citizens

Objective 5.5: To develop institutions for participation of stakeholders in development policy making, planning and implementation by strengthening partnerships between civil society, private sector and the Government

Objective 5.6: To reduce corruption and unlawful activities by officials by strengthening national justice system

For Objective 5.1, the Vision2050 recommends small and efficient structure of civil services, but specific proposals seem to be contradictory such as “establishment of a Ministry of Development Policy Planning, including the standing committee in the Parliament, and units established at each Aimag, Capital City and Soum. This appears to be against the worldwide trend of localization of development administration as proposed by the NCDP. For Objective 5.2 and Objective 5.5, a transparent, accountable, monitored and participatory system of governance should be created with stronger roles of local administrations with increased participation of local people. Objective 5.3 for e-governance will facilitate this through coordination between the Central and local governments. The Vision2050 states that the civil society-private sector-government partnership will be improved and some government activities will be transferred to NGOs, which is commendable.

(6) Green development

This is the central goal of the Vision2050 as described in 2. (1) and pursued with the following four objectives.

Objective 6.1 To maintain ecological balance by evaluating and protecting nature’s value and endowments

Objective 6.2: To restore natural resources, protect them from reduction and ensure their stock so that their benefits will be inherited to next generations

Objective 6.3: To ensure sufficient availability and supply of water by providing storage to prevent reduction of water resources

Objective 6.4: To develop efficient and accessible green economy with low emission of carbon dioxide and contribute to international efforts to reduce climate change.

Within the framework of this goal, the Vision2050 states that “35% of total land, 75% of rivers and 60% of forests will be taken under special state protection, and a national park for protecting endangered species of animals and plants and a central laboratory for environmental analysis will be established to protect biodiversity. The size of forests will be increased to 9%, number of river-basin protection areas tripled from 150 to 450 and improving the efficiency of conservation management.

According to the NCDP indicative land use plan, the forest area accounts for 11.7%, semi-intensive livestock area (8.9%) is defined, and controlled grazing area (8.2%) is introduced. The NCDP considers proper water resources development and management instrumental in realizing green economy. In this sense, the Vision2050 is consistent with the NCDP in recommending to increase the

use of gray water and reuse of industrial water to 80%, and to start the “Blue horse” project to regulate the flow of major rivers, which will cost MNT11.4 trillion.

The Vision2050 recommends to introduce and implement the 3R-Remove, Reduce, Recycle-program, and to establish a system to control hazardous wastes. The NCDP recommends to pursue a recycle-oriented society with a few specific projects. The Vision2050 recommends also to develop a methodology for estimating the greenhouse gas emission of industries and create a green climate fund by bringing in taxes on emissions. Also, the tax will be reduced for companies that have introduced environmentally friendly technologies. The Vision2050 includes the ADB funded project with US\$145 million for renewable energy, and improvement of Ger areas approved in 2019. Renewable energy and Ger areas improvement are priority projects of the NCDP as well.

(7) Peaceful and safe society

The Vision2050 aims to strengthen national defense, ensure human rights, freedom, social order and life environment of people, and reduction of disaster risk to secure safe human society. To attain this goal, the following five objectives are defined.

Objective 7.1: To strengthen national defense system of enhanced capacity

Objective 7.2: To secure national borders and ensure security and stability of border areas by enhancing frontier defense capacity

Objective 7.3: To reduce risk by unconventional threats, strengthen risk countermeasures and capacity in order to ensure security of human beings and society

Objective 7.4: To accelerate development of legal environment, improve labor conditions and enhance competitiveness by cultivating highly capable professionals

Objective 7.5: To enhance competitiveness of economy by establishing comprehensiveness, confidentiality and security of information environment of the nation, people and private sector and ensuring access

A steady increase in the defense budget was proposed which is set at 2% of GDP yearly. It is the same as the budget for science and innovation of the goal 2.

It is proposed to build a complex of buildings for intellectual property office, training centers and development centers, develop international standard services, and improve the monitoring system. This is commendable as countries are expected to protect intellectual property just like any other property in order to realize self-reliant development. This goal should be closely linked to the other goals.

In addition to strengthening the national defense force and ensuring security of borders, it is important to develop new technologies that will help to overcome inherent constraints that Mongolia has such as vast territory and extremely cold climate or undertake scientific experiments to take advantages of these conditions. Drones and cold-resistant batteries are just two examples. Such technologies, once developed, may become export products. In this sense, increasing budget for science and technology is important.

(8) Regional development

This is another central goal of the Vision2050 as described in 2. (1). The Vision2050 presents the following objectives for six regions newly defined, largely consistent with the NCDP proposals.

Objective 8.1 To protect vast grassland of Eastern Mongolia, participate in economic alliance of Northeast Asia and realize balanced development of agriculture and livestock, manufacturing and tourism applying green technology

Objective 8.2 To maintain ecological balance of Gobi, participate actively in economic cooperation with the neighboring country and the Northeast Asia and develop responsible mining and manufacturing and service industries based on high technology

Objective 8.3 To maintain ecological balance of Gobi mountains and grassland, participate actively in regional cooperation and develop livestock and tourism

Objective 8.4 To maintain ecosystem balance of the Altai mountains of Mongolia and become a tourist destination region with livestock management connecting the east and west with international transport and logistics.

Objective 8.5 To realize proper combination of tourism, intensive agriculture and processing industries that maintains the ecosystems of Khangai-Khuvsgul, protect the freshwater resources for humanity and actively participate in cooperation with neighboring countries and broader international cooperation.

Objective 8.6: To properly re-distribute population and economic activities reducing concentration in Ulaanbaatar and its vicinity and realize better settlement structure and alliance between the city center, satellite cities and settlements for knowledge-based international economic cooperation

These objectives are generally in line with the NCDP strategy by region. The NCDP has formulated an integrated regional development program (IRDP) under the strategy for each region and proposed the establishment of a Regional Development Council (RDC) for each region for coordinated implementation of the IRDP, respectively. Each IRDP as proposed by the NCDP consists of support measures for promising industries and service activities based on local characteristics integrated with key infrastructure and urban facilities constituting various industrial clusters. Such a regional development approach is effective not only in supporting economic development but also providing various social services more effectively. The IRDPs should be further elaborated for effective implementation through the coordination process with the RDC.

(9) Ulaanbaatar and satellite cities

The Vision2050 aims to develop Ulaanbaatar into pleasant, environment-friendly and human-centered smart city. This is consistent with the NCDP. This goal is pursued with the following five objectives.

Objective 9.1 To develop Ulaanbaatar into a city providing opportunities for development of healthy, creative and high productivity activities by all the citizens

Objective 9.2. To create safe and healthy environment for the citizens and realize the city providing a favorable living environment preserving the ecological balance and utilizing green technologies with minimum pollution emissions.

Objective 9.3 To make Ulaanbaatar an internationally competitive metropolis with a rationally planned settlement system and rapidly developing satellite towns.

Objective 9.4. To ensure the city with good governance, stable legal environment and compliance with the standards for environment.

Objective 9.5 To develop satellite towns to make them international transport and logistic hubs in the Northeast Asia with tourism and cultural services capitalizing on the national characteristics

The Vision2050 shares the same basic idea with the NCDP to develop Ulaanbaatar into a capital region encompassing satellite cities in its southern neighborhood. The NCDP characterizes the future Ulaanbaatar as the main political and administrative center as the national capital, international business center as a global city, model mega green city with quality urban greenery and amenity, the trunk ICT base station, and advanced urban transport system possibly with subway network. The NCDP characterizes also satellite cities with functional division. Moreover, the NCDP proposes a regional administration as the Capital Region consisting of the Capital City of Ulaanbaatar and Tuv Aimag.

The Vision2050 is not clear about the administration of the future Ulaanbaatar with satellite cities. Also, the Vision2050 is more physically oriented to propose some fancy infrastructure facilities. To make them serve interests of the citizens, region-based urban administration should be emphasized. It is commendable that the Vision2050 proposes to develop and implement a policy to preserve and restore the City's immovable historical and cultural heritage.

2.4.4 Programs and projects

(1) Difference in scope between the Vision2050 and the NCDP

Although both the Vision2050 and the NCDP plan for the long-term development of Mongolia, the planning scopes are different between them. The Vision2050 is more comprehensive to cover all the sectors and aspects not only for public investments but also for major private sector investments having potentially significant effects on the national socio-economy such as large-scale mining development. The scope of the NCDP is defined by the R/D agreed by representatives of the Mongolian Government and JICA for technical cooperation. The target year for the NCDP was set in 2030 by the R/D but has been extended to 2040 upon a request by the Mongolian Government.

More specifically, the NCDP represents public sector planning and does not cover private investments. Even in the public sector, some sub-sectors and aspects are not fully covered. For urban development, only urban utilities including water supply and sewerage, heat supply and solid waste management are covered but not urban facilities such as urban roads and pedestrian facilities. In energy sector, the NCDP proposes renewable energy projects but not major thermal power generation nor nationwide transmission networks.

(2) Difference in development paradigm and alternatives

The Vision2050 and the NCDP share basically the same vision as clarified in 3. (1), but development paradigms pursued by the Vision2050 and the NCDP diverge from each other. As clarified in 1. (2), the NCDP pursues the new development paradigm called the alternative socio-economy. The Vision2050 seems to pursue basically the 20th century development model, which is characterized by intensive use of resources, mainly mineral resources, and economic efficiency orientation by investing in many large-scale infrastructure projects to support economic development.

The difference manifests in definitions of development alternatives. The Vision2050 defines rather narrow range of alternatives for economic development: Base (status quo), Green economy, and Development of mega projects. It appears that mining will continue to be the driving force for economic development supported by development of mega infrastructure. In this sense, the three alternatives defined by the Vision2050 come to one under the 20th century development paradigm. The NCDP examines as alternative driving forces manufacturing, particularly processing of primary products, tourism, trade and related services in combination with mining. It is shown that the same levels of economic growth may be attained by combining these sectors with mining sector that will have a diminishing share in the GDP.

(3) Mega projects in Vision2050

The draft LTDP2050 submitted to the Parliament contained many projects under the goal of regional development, but the Vision2050 was approved without projects. The projects originally proposed are examined here. There exist many mega projects. A list of all projects with a budget of more than MNT1 trillion is shown in Table 2.4.1. They consist of major power plants, railways, road, large-scale mining development and others.

Table 2.4.1 List of Mega Projects Included in the Draft LTDP2050

Project	Cost (MNT trillion)	Specification
Power development		
Shivee Ovoo power plant	17.5	5,280 MW
Tavan Tolgoi power plant	2.7	450 MW
Baganuur power plant	2.6	700 MW
Egiin Gol hydropower plant	2.3	315 MW
Booroljuut power plant	1.1	300 MW
TETS3 annex	1	250 MW

TETS2 annex	1	300 MW
Railway and road projects		
Bogdkhan railroad (Tuv)	5.7	
Erdenet – Ovoo railroad	5.7	
Tavan Tolgoi – Zuunbayan railway	3	415 km
Zuunbayan – Khangai railway	2.9	
Tavan Tolgoi – Gashuun Sukhait railway	1	
Tavan Tolgoi – Gashuun Sukhait road	1	
Mining development		
Tavan Tolgoi coal deposit (Umnugobi, Tsogttsetsii)	8.3	
Ovoot coal deposit (Khuvsugul, Tsetserleg)	7.2	
Natural gas production facility from coal (Baganuur)	6.8	
Copper concentrate processing facility (Umnugobi, Khanbogd)	5.7	
Metallurgical complex (Darkhan)	4	
Dulaan Uul, Zuuvcch Ovoo uranium deposits (Dornod, Ulaanbadrakh)	3	
Oil refinery (Dornogobi, Altanshiree)	3	
Tsagaan Suvraga copper molybdenum deposits (Dornogobi, Mandakh)	1.7	
Other projects		
Baganuurt University campus	11.7	
Blue horse (water basin)	11.4	
State housing corporation (Ulaanbaatar)	1.5	
Science IT park (Tuv, Sergelen)	1	

All the power projects in Table 2.4.1 cost MNT28.2 trillion to increase the power generating capacity by 7,595 MW. It may be difficult to sell all the energy generated by coal-fired thermal plants when the world is generally switching to renewable energy. Some of the plants are destined to become “stranded assets” sooner or later. All the railway projects cost in total MNT16 trillion to build 6,600 km of new railways. All the mining development and related processing as listed in Table 2.4.1 costs in total MNT39.7 trillion. Of the total investment cost of MNT145 trillion planned by the LTDP2050, these mega projects take up MNT83.9 trillion. Including the road and other projects listed in Table 2.4.1, the total cost of all the mega projects becomes MNT110.5 trillion. The balance of MNT34.6 trillion is allocated to all the remaining projects in different sectors.

(4) Correspondence between projects of draft LTDP2050 and NCDP

To examine correspondence of programs and projects between the draft LTDP2050 and the NCDP, the programs and projects proposed originally by the draft LTDP2050 are examined to see whether they have corresponding programs and projects in the NCDP. All the programs and projects in the draft LTDP2050 and the project list of the PIP2021-25 are taken for examination. Those mega projects and private sector development projects in the draft LTDP2050 are excluded from the examination as they are outside the scope of the NCDP as agreed by the R/D. Results are summarized in Table 2.4.2.

Table 2.4.2 List of Programs and Projects with Costs Included in Both of the Draft LTDP2050 and the NCDP

Project	Cost (MNT billion)	Reflection in NCDP
Mongolian national value program	177	Consistent with the NCDP vision
Agriculture and agro-processing		
Rural agriculture and livestock development	142	Project No. I4.1, Project No. I4.2, Project No. I5.1, Project No. I5.2, Project No. I5.3, Project No.

		I6.1
Livestock marketing strengthening	86	Incorporated in livestock cluster development; Project No. I2
Vegetable production and irrigation support	114	Project No. I5.1
Milking plant construction	98	Incorporated in livestock cluster development; Project No. I6.4
Livestock processing complex with technological innovation	221	Incorporated in livestock cluster development; Project No. I3.3
Export support	56	Incorporated in cluster development; Project No. I2
Climate resilient livestock	85	Project No. I4.1, Project No. I4.2, Project No. I6.1
SMEs business upbringing	142	Project No. II3, Project No. II4, Project No. II5
Greenhouse agriculture	101	Project No. I3.2
Meat production with disease protection	169	Incorporated in livestock cluster development especially in Easter Region
Export finance	212	Incorporated in cluster development; Project No. I2
Credit guarantee, economic diversification and employment generation	170	Incorporated in cluster development; Project No. I2
Potatoes, vegetables and fruits preservation and sales complex in UB	69	Project No. I2
Dairy processing cluster for import substitution and export promotion	117	Project No. I2
sub-total	1,782	
Industry and logistics		
Emeelt light industrial estate	479	Accelerated development recommended by NCDP
Border inland ports infrastructure development	141	Project No. I1.1
Special economic zones development	85	Project No. I1.1
Logistic center development at Altanbulag, Sainshand, Khushgiin khundii and Tsagaannuurfor inland ports	200	Logistic centers designated by IRDPs
sub-total	905	
Tourism		
Urtuu service stop areas development	84	Project No. I10.2
Sustainable tourism support	108	Reflected in tourism sector recommendation; Project No. I10.6
sub-total	192	
Social sector		
Primary and secondary education improvement	208	Included in Project No. II6
Self-reliance support for grown up youth	100	Project No. II3
Elderly care and service establishment	72	Reflected in social sector recommendation

Health access improvement for socially handicapped	227	Reflected in health sector recommendation
Schools and kindergartens construction	997	Implied as part of PISA adoption as proposed
Education sector reform	77	Project No. II6
Competitive higher education	71	Reflected in education sector recommendation
Industrial technical high schools	200	Reflected in education sector recommendation
Seil-reliance support service strengthening for socially handicapped	300	Reflected in social sector recommendation
Life-long education for elderly	50	Reflected in social sector recommendation
Employment promotion for handicapped	200	Reflected in social sector recommendation
sub-total	2,502	
Infrastructure		
Tavantolgoi~Gashunskhait road (250km)	1,086	Included in Southern Region responsible mining and community development; Project No. III3 (Phase 2)
Tavantologoi~Baruunnaren road to Tsagaandel road	733	Included in Southern Region responsible mining and community development
Tavantolgoi~ Manlai~ Khangii road	1,422	Project No. III2 (Second priority)
UB~ Darkhan~ Altanbulag and UB~ Arvaikheer roads	336	Project No. III1
Khovd~ Ulgii~ Ulaanbaishint road	355	Included in Western Region model green development
Kharkhorin soum-Shankhiin temple~ Bat-Ulzii Soum~Ulaan tsutgalan falls~Tuvkhun temple road (91 km)	86	Project No. III3
Baruun-Urt~Bichigt road (272km) for heavy vehicles	220	Project No. III3 (on going)
Jargaltkhaan-Umnudelger soum~Rashaan khad~Uglugchiin kherem-Binder Soum~Bayan-Adarga soum~Dadal soum road (290 km)	276	Project No. III3 (Phase 2~Phase 3)
Choibalsan~Ulikhan border inland port road (223.48km)	221	Project No. III3 (Phase 1)
Choibalsan~Khavirgiin border inland port road(124.5 km)	119	Project No. III3 (Phase 1)
Choibalsan~Ereentsav border inland port road(242 km)	232	Project No. III3 (Phase 2)
Undurkhaan~Norovlin road (200 km)	190	Project No. III2 (Second priority)
Darkhan-Uul Aimag~Selenge road~Shaamar-Zuunburen-Tsagaannuur-Tushig-Zelteriin border inlandport road (120.85km)	215	Project No. III2 (Second priority)
UB~Darkhan-Uul Aimag road (204.6 km) improvement	455	Project No. III1
Dalanzadgad~Bayandalai~Gurvantes road (220 km)	209	Project No. III3 (Phase 3)
Tavantolgoi~Baruunnaran road~“Mt. Tsagaandel”border inlandport road (270 km)	710	Project No. III3 (Phase 3)

Bulgan Aimag-Khishig Undur Soum~ Gurvanbulag soum road (133.7 km)	126	Project No. III3 (Phase 3)
Dashinchilen-Orkhon bridge road ~Ulziit soum~Murun~Tarialan road (120 km)	107	Project No. III2 (Second priority)
Ulgii-Ulaankhus Soum~ Mt. Altaitavanbogd road (118km)	112	Project No. III3 (Phase 3)
Uliastai~Altai road (194km)	150	Project No. III1
Khovd~Ulaangom road (163km)	155	Project No. III2 (Phase 2)
Baganuur industrial estate infrastructure	161	Accelerated development recommended by NCDP
Internationalization of six local airports	580	Project No. III10 (Priority to Khovd and Choibalsan)
sub-total	8,256	
Environment		
UB central sewage treatment	743	Project No. IV8.1
UB sustainable long-term water supply expansion	1,311	Project No. IV6
Tuul and Selbe Rivers discharges and environment improvement	178	Project No. IV6
Renewable energy use expansion	172	Included in Altai Region diversified agriculture and energy reserve
Erdeneburen Soum hydropower development	854	Included in Western Region model green development
Land degradation and desertification prevention, forestation,	189	Project No. IV1
Energy recycling with solid waste treatment	472	Project No. IV2.3
Ger district "infrastructure center"	460	Project No. IV3
Ger district re-development and housing	298	Project No. IV3.1, Project No. IV3.2
Ger district re-development	212	Project No. IV3.1, Project No. IV3.2
sub-total	4,889	
Total	18,703	

Source: JICA Project Team

The total cost of all the programs and projects listed in Table 2.4.2 is MNT18.7 trillion or US\$6.58 billion at US\$1=MNT2,840. The total cost corresponds largely to the total cost of the NCDP estimated at US\$6.12 billion for the period of 2021-40 (Chapter 11). The balance of MNT15.9 trillion is for programs and projects in other sectors not covered by the NCDP. They include public facilities such as libraries, specialized hospitals, laboratories, museums and theaters, housing, security, power transmission lines and urban facilities.

(5) Consistency between Vision2050 and NCDP

The Vision2050 and the NCDP are consistent with respect to the development vision based on Mongolian values and the basic concept to pursue human-centered development as described. Also, both the Vision2050 and the NCDP anchor the long-term development of Mongolia effectively on regional development and green development as interpreted in 1. (2). While the NCDP defines clearly a shift in development paradigm from socialistic or capitalistic one to the new one called alternative socio-economy, the Vision 2050 seems to continue pursuing largely the 20th century development model with mining as the driving force for the three alternatives evaluated.

The Vision2050 seems to continue mining led development supported by mega infrastructure to extend

the railway network and expand power supply mainly by coal-fired thermal plants, which may be called alternatively mega projects-driven development. This will expand the export and reduce dependence on imported energy at the costs of degrading environmental quality. Also, it is not clear to what extent the economy and export products may diversify.

The NCDP proposes to promote manufacturing and related service activities integrated with related infrastructure in the form of industrial clusters development, integrating livelihood activities through indigenous industries to export industries. This will diversify both economy and export products to make the Mongolian socio-economy resilient to changes. Under the Vision2050, the Mongolian socio-economy may continue to be vulnerable to external factors such as international financial crises and pandemics. Full utilization of resources without wastes as proposed by the NCDP would contribute to green development.

In the energy sector, the NCDP does not recommend large scale power plants and extension of national grids to cover remote rural areas. Rather, it proposes to utilize local sources of energy, mainly renewable energy resources, as much as possible to establish local power supply networks. Such local energy supply may be undertaken by regional energy companies to be established for some regions.

The new regional division proposed by NDA for the draft LTDP2050 is fully supported by the analysis on affinity of mutually neighboring Aimags in the NCDP utilizing 30 indices representing natural, social, economic, land use, financial and other conditions. Basic strategy for development of the six regions appears to be largely consistent between the draft NCDP2050 and the NCDP, although naming of some regions and expressions of some strategies should better be consolidated.

The Vision2050 and the NCDP share the view that circulation of domestic currency should be much increased to support the rapid economic growth without relying on burrowing in foreign currencies. The Vision2050 proposes the establishment of a Sovereign Wealth Fund, while the NCDP recommends a community development fund to improve various community infrastructure. While the establishment of the Sovereign Wealth Fund may be justified, sources and uses of the fund should be carefully examined so that it would not result in increases in debts by the Government and the people of Mongolia.

Another distinct difference is in development administration. The Vision2050 still depends heavily on the initiative of the Central Government, but the NCDP recommends increasingly localization of development administration. In particular for regional development, the NCDP proposes to establish a Regional Development Council (RDC) for each region to plan, coordinate and implement projects meeting regional demand based on indigenous resources (Chapter 8). This is different from the existing Regional Development Council established by the Law on Regional Development Management and Coordination of Mongolia as the national entity.

The RDCs may be established first as *ad hoc* entities supported by NDA working closely with respective Aimag governors to discuss on the proposed IRDPs by representatives of Aimags and cities, central ministries and other local entities to expedite their implementation by proper budget allocation. This would help to strengthen the capacity of Aimag administrations for coordination with ministries as the first substantive step toward administrative localization.

If mega infrastructure projects to extend the railway network and expand power supply mainly by coal-fired thermal plants and large-scale mining development projects contained in the Vision2050 are excluded, the remaining part of the Vision2050 seems to be largely consistent with the NCDP as examined in (4). Investment costs by broad sector for part of the Vision2050 consistent with the NCDP are summarized in Table 2.4.3.

Table 2.4.3 Investment Costs by Broad Sector Corresponding to Part of the Vision2050 Consistent with the NCDP

Sector	Total cost (MNT billion)	Share (%)
Mongolian national value program	177	0.9
Agriculture and agro-processing	1,782	9.5

Industry and logistics	905	4.8
Tourism	192	1.0
Social sector	2,502	13.4
Infrastructure	8,256	44.1
Environment	4,889	26.1
Total	18,703	100.0

Source: JICA Project Team

Investment allocation as shown in Table 2.4.3 seems well balanced consisting of 15.4% for economic sector including agriculture and agro-processing, industry and logistics, and tourism, 13.2% for social sector, 44.1% for infrastructure and 26.1% for environment. If the allocation to the economic sector is directed to development of various industrial clusters based on primary products supported by infrastructure to facilitate links between related economic activities constituting industrial clusters, high economic growth and diversification of economy and export products would be realized. While mining continues to be a driving force of economic development in the foreseeable future, much increased processing of mineral products, which in fact is manufacturing, would be undertaken resulting in decreasing shares of the mining sector. The adequate investment allocation to the social and the environmental sectors would ensure improved quality of living environment as prerequisite of human-centered development.

Chapter 3 Development Paradigms, Vision, Objectives and Strategy

This chapter examines first development paradigms that Mongolia should pursue in the coming decades in the light of the Sustainable Development Goals (SDGs) and SDV2030/Vision2050. Most important aspects to be focused in pursuing the Vision2050 are identified as technology and human resources. Then, based on the seminars conducted by the Japan International Cooperation Agency (JICA) Project Team (JPT), methods to define broad alternatives are explained and some ideas derived from the seminars are summarized. A development vision is presented incorporating more important ideas identified. Second, the chapter presents definitions of macro development objectives and basic strategy for the national comprehensive development plan (NCDP) derived from a problem structure analysis, an effective method of regional development planning. Then, development objectives and strategy for economic sector, infrastructure and environment are defined in line with the macro development objectives and basic strategy.

3.1 Development Paradigm Based on SDGs and SDV2030/Vision2050

3.1.1 Background

(1) SDGs and SDV2030

The Mongolia Sustainable Development Vision 2030 (SDV2030), formulated by the Mongolian Government with the support of United Nations Development Programme (UNDP) in response to SDGs initiative by the United Nations (UN), had been pursued by the successive administrations and was considered to represent the common development vision supported by all the stakeholders irrespective of their political positions. As such, the SDV2030 pursues sustainable development of Mongolia. The Vision2050 approved by the Parliament Resolution No.52 on May 13th, 2020 has formally nullified the SDV2030. In effect, however, the Vision2050 has encompassed the SDV2030 and extended it beyond 2030.

The UN SDGs initiative succeeded the previous Millennium Development Goals (MDGs) initiative in response to global development issues such as global warming and pandemics threatening not simply the sustainability of any development but more fundamentally the survival of human beings. This is why the SDGs have been adopted by all the members of the UN including both developing and developed countries. Therefore, the SDGs pursue shifts in the development paradigm away from the 20th century development model, which has caused the global development issues due to resource intensive and economic efficiency-oriented development.

The SDGs, however, do not dictate what development paradigm should be pursued to realize the sustainable development. As the Vision2050 extends the SDV2030 formulated in response to the SDGs, it should naturally pursue a new development paradigm, which has not been clearly defined yet. It is expected that an original development paradigm should be defined for Mongolia to realize the SDV2030/Vision2050 targets for sustainable development based on the unique resources that Mongolia has.

(2) Existing status of development of Mongolia and SDGs

Mongolia has experienced high economic growth rates in recent years, with an average of 10% over 2010-2015, and many people have benefited from the economic growth. The high economic performance has been driven mainly by mining, which is by definition resource intensive. The continued dependence on mining for high economic growth means continued extraction of resources, which is against the idea of sustainability pursued by the SDGs and the SDV2030/Vision2050. This tendency is seen in many aspects of Mongolian socio-economy as summarized in Table 3.1.1. Also,

the Vision2050 clearly shows the sustainable development in Mongolia, which includes high economic growth achieving the standard of developed countries and competitive regional development.

Table 3.1.1 shows discrepancy that may exist between the existing development situations in Mongolia and what the SDGs pursue with their goals and targets. If the current development trend is continued, the realization of the SDGs and the SDV2030/Vision2050 may not be ensured. In other words, Table 3.1.1 simply shows that the development paradigm currently pursued in Mongolia should also be shifted in one way or another.

Table 3.1.1 Comparison between Existing Development Situations and the SDGs Goals/Targets

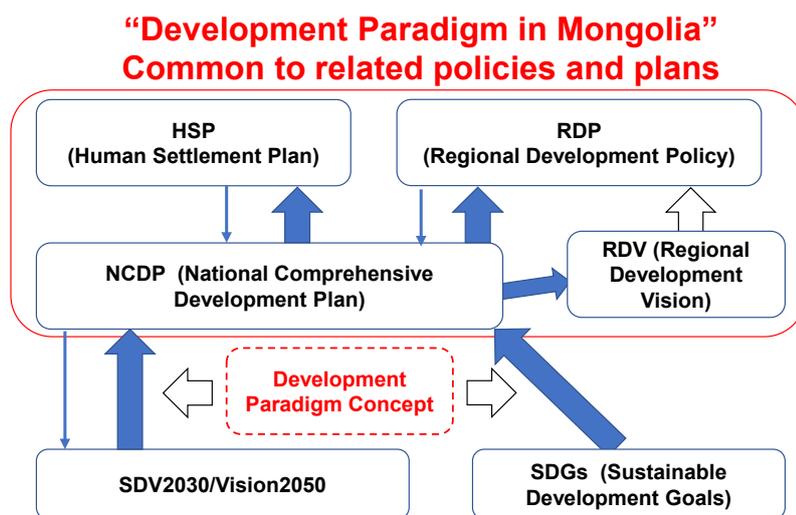
Sector	Aspects	Existing development situation in Mongolia	SDGs goals/targets
Economy	Industrial diversification and employment	Mineral resources and livestock dependence and worsening unemployment rate in recent years	Achieve higher levels of economic productivity and maximize work opportunities through a focus on high-value added and labor-intensive sectors
	Industrial form and income	Deterioration of poverty rate in recent years, low agricultural productivity and limitation of livestock expansion	End poverty in all its forms everywhere and promote decent work
	Income distribution	Gini coefficient in recent years has been around 0.3 to 0.5 (intermediate in the world).	Achieve full and productive employment and decent work for all women and men, inclusive of for young people and persons with disabilities
Social	Social development	Increasing literacy rate and educational opportunities	Ensure inclusive and equitable quality education and promote gender equality for all
	Human development index	Human development index (HDI) is 0.74, ranking 92nd out of 189 countries.	Ensure healthy lives and promote well-being for all at all ages
Environment	Conservation of resources and the environment	Excessive consumption of mineral resources for economic growth and soil degradation due to overgrazing in some areas	Ensure sustainable consumption and production patterns and prevent/restore land degradation and biodiversity loss
	Living environment	Air pollution, chronic traffic congestion, soil contamination and degradation of environmental quality in urban areas	Make cities and human settlements inclusive, safe, resilient and sustainable

Source: JICA Project Team

(3) Need to define new development paradigm

The NCDP is formulated to realize the SDV2030/Vision2050 in a most effective way by promoting complementary aspects of various activities and sectors. For this purpose, a consistent and coherent development paradigm should be established to ensure cross-section collaboration among stakeholders involved in various fields.

The SDGs define development goals already adopted by the UN, but what development paradigm to be established with combination of a variety of development goals varies for different countries or regions. It is necessary to formulate such a development paradigm unique to Mongolia as the common reference for all the related policies and plans including Human Settlement Plan (HSP), Regional Development Vision (RDV) and Regional Development Policy (RDP) in line with the SDV2030/Vision2050. The relationship among HSP, RDV and RDP in line with the SDGs and the SDV2030 is illustrated in Figure 3.1.1.



Source: JICA Project Team

Figure 3.1.1 Relationships among HSP, RDV and RDP in line with SDGs and SDV2030/Vision2050

The JPT held a seminar on “Development Paradigm based on SDGs and SDV2030” with the Mongolian side in January 2019 to clarify a procedure to formulate a development paradigm through collaborative efforts by a wide range of stakeholders as scenario planning, general relationships between the SDGs and the SDV2030, and multi-stakeholders (MSHs) meetings as venues for scenario planning. In addition, in March 2019, another seminar on “Three Ps (purpose, pride and pressure) of happiness” was also conducted to guide the formulation of a development paradigm. These seminars serve as bases to discuss further on a new development paradigm.

In establishing the Mongolian development paradigm, it is desirable to combine 1) the logical method derived from the SDGs and SDV2030/Vision2050 and 2) the participatory approach in collaboration with the Mongolian side in open discussions such as workshops or seminars.

3.1.2 Procedure to establish Mongolian development paradigm

The development paradigm will be established through collaborative works between the Mongolian side and the JPT, but the JPT side should carry out the basic analysis in advance to provide a basis for the discussion. The tasks, schedule and responsibilities have been proposed in Table 3.1.2.

Table 3.1.2 Working Schedule for the Development Paradigm Formulation

Tasks	Schedule	Responsibilities
Clarification of macro issues related to SDGs	End of July, 2019	JPT
Macro structure analysis of SDGs and SDV2030	Late August, 2019	Mongolian and JPT collaborative workshop
Analysis of major development issues for each sector related to SDV2030	Early September, 2019	JPT
Analysis on existing situation and expected achievement of SDGs and SDV2030 by sector	Early September, 2019	JPT
Suggestion of base ideas related to a new development paradigm	Early October, 2019	Mongolian and JPT collaborative workshop
Establishment of development paradigm	Middle to end of December, 2019	Mongolian and JPT collaborative workshop
Elaboration on development paradigm	January through May 2020	MSHs meetings
Further elaboration of development paradigm, scenario and NCDP in view of Vision2050	June 2020 through January 2021	JPT in cooperation with Mongolian C/Ps through online communications

Source: JICA Project Team

(1) Clarification of macro issues related to SDGs

The Voluntary National Review Report 2019 (VNR 2019) prepared by the Mongolian Government for High Level Political Forum (HLPF) of the UN should be utilized for the macro issues analysis. Also, the JPT analysed macro issues during an early stage of the NCDP Project.

1) Mongolian VNR 2019

Mongolian VNR 2019 shows the challenges and efforts to promote the SDGs as follows.

- Mongolia is the country that adopted the SDGs in early stage for national development, but the current level of achievement is not high.
- The work is ongoing to adapt comprehensive development goals prioritizing short- and medium-term development policies and align governmental budget in line with domestic conditions of Mongolia.
- An economy that relies heavily on mining and natural resources and depends on agriculture and livestock lacks resilience against external factors such as commodity price fluctuations and is vulnerable to natural disasters.
- A limited job opportunities, inequality and disparity of social service provision by region has undermine living conditions of some people.
- Air pollution, especially in Ulaanbaatar, has been even worse than before, and frequent natural disasters affect directly not only livelihood, but also environmental quality, causing degradation of economic activities.

In order to address to these issues, it is important to establish development policies that incorporate sustainability and inclusiveness. Mongolia can utilize the SDGs as a guide to strengthening consensus building between governments and various stakeholders. The “All Mongolia” approach involving governments at different levels and all the segments of the society is important to ensure the comprehensiveness with sustainable goals and the inclusiveness with mutual cooperation as well.

2) JPT analysis on macro issues for the NCDP Project

The following macro issues have been identified by the JPT, which are closely related to the promotion of the SDGs. More details are discussed in Section 6.3.

- High unemployment and vulnerable employment,
- Lack of employment opportunities in rural area and also in Ulaanbaatar,
- Undiversified economic structure and export goods,
- Over-concentration of population and economic activities in Ulaanbaatar,
- Large urban-rural disparity,
- High and sustained poverty incidence, and
- Lack of capital accumulation.

(2) Macro structural analysis of SDGs and SDV2030/Vision2050

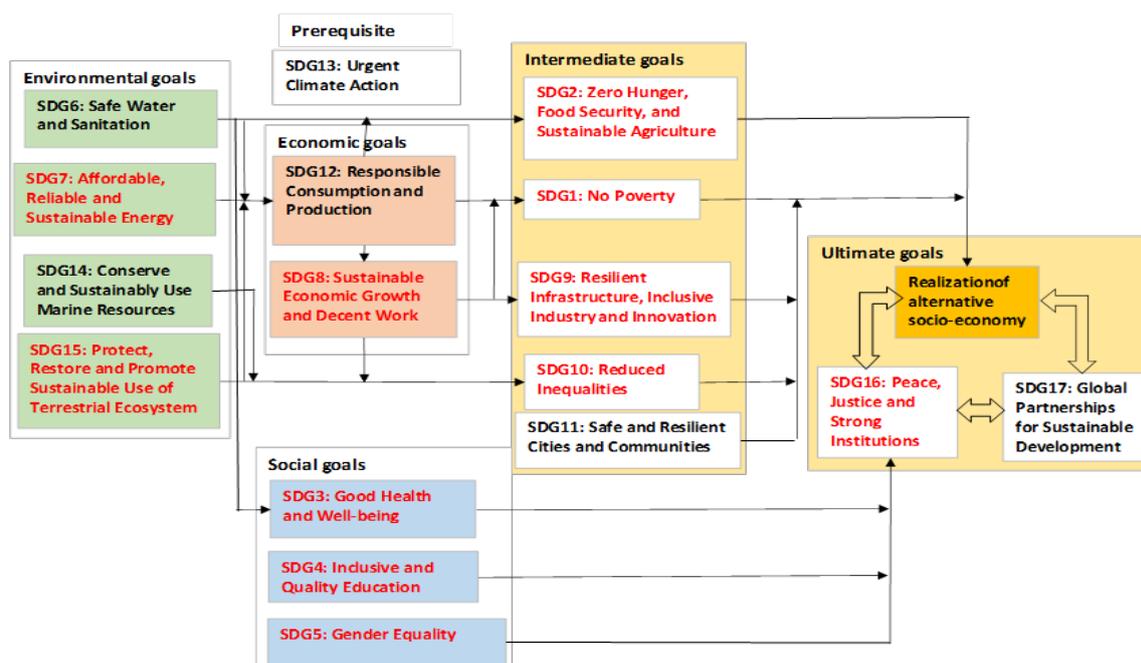
A macro structural analysis is conducted to see if the SDV2030/Vision2050 is properly set to achieve the ultimate goal of the SDGs: “Realization of Sustainable Socio-Economy”. The following works are involved:

- To abstract factors that are not covered by the SDV2030/Vision2050 among the SDGs goals,
- To identify factors not included in the SDV2030/Vision2050 to achieve the ultimate goal of the SDGs, and
- To share the recognition of issues in each sector in a structured form as a hierarchy of issues through the structural analysis of the SDV2030/Vision2050.

1) Initial structural analysis of SDGs

An initial structural analysis of SDGs was conducted as shown in Figure 3.1.2. According to the structure, it is realized that the ultimate goal of the SDGs is “Realization of sustainable socio-economy” expressed as an alternative socio-economy as against the 20th century development paradigm. In order to achieve this, “16. Peace, Justice and Strong Institutions” and “17. Global Partnerships for Sustainable Development” should be linked mutually.

Economic, social and environmental goals have been positioned as intermediate goals: “1. No Poverty”, “Reduced Inequality” and other related goals. The fundamental philosophy of the SDGs, “Leaving no one behind” will be achieved through the intermediate goals, and eventually it leads to “Realization of sustainable socio-economy”.



Source: JICA Project Team

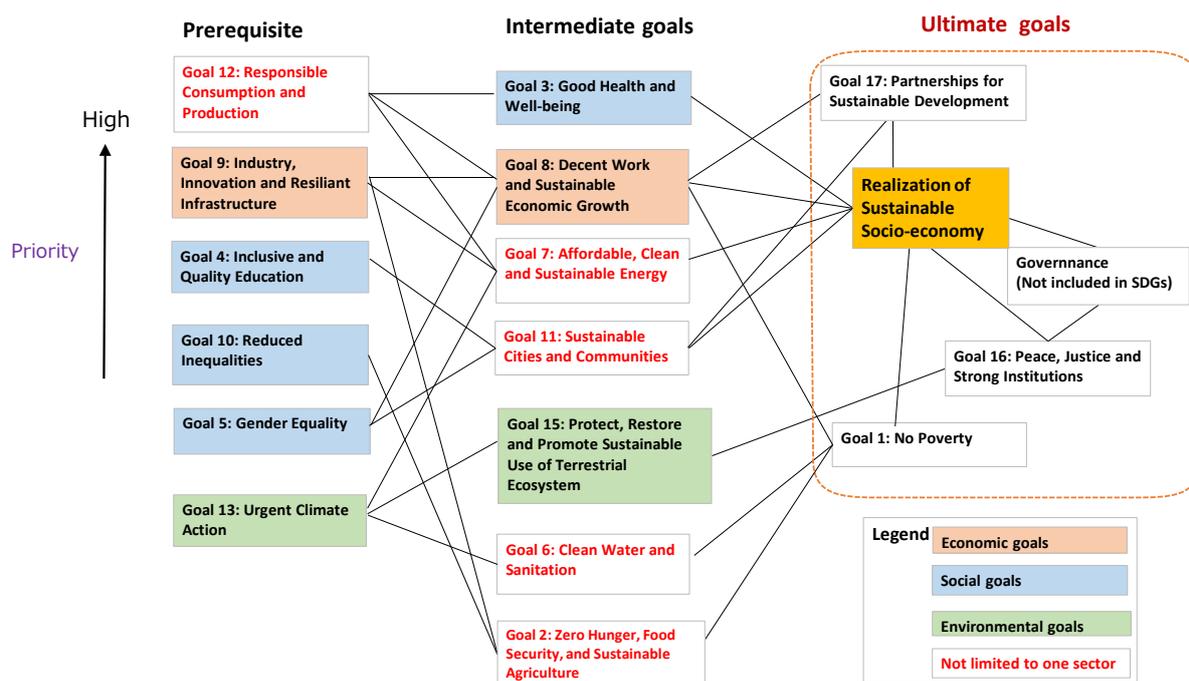
Note: SDGs denoted in red are explicitly reflected in SDV2030

Figure 3.1.2 Original Structure of SDGs

2) Revised structural analysis based on the first workshop

In the draft SDGs structure created by the JPT, the economy, society, environment, preconditions, intermediary goals and ultimate goals are shown in a form of cause-effect relationships. Through the first workshop held on 21st August 2019 collaborating with Project Working Group (PWG) members, it has been confirmed that some goals relate to both economy and environment, and priority order of goals depends on relationships between the three categories of prerequisite, intermediate goals and ultimate goals.

Reflecting these results, the JPT has proposed a revised structure shown in Figure 3.1.3. As the SDV2030/Vision2050 is defined by category as economy, society, environment and governance, this structure allows easy comparison between the SDV2030/Vision2050 and the SDGs. Also, the structure shows the priority of each of SDGs goals in formulating a development paradigm.



Source: JICA Project Team

Figure 3.1.3 Revised Structure of SDGs

(3) Analysis of major development issues by sector in line with SDV2030/Vision2050

1) Description of SDV2030/Vision2050 structure in economic sector

Main objectives of the SDV2030/Vision2050 related to each sector are analysed to clarify their hierarchical structure as part of the structural analysis on the SDV2030/Vision2050 undertaken by the JPT. Since the Vision2050 comprises the SDV2030 formulated in response to the SDGs initiative, it naturally has the same philosophy as the SDGs. Also, the SDV2030/Vision2050 positions “Governance” as an important pillar as well as economy, social (human development) and environment (green development). The structural analysis of the economic objectives of SDV2030/Vision2050 was conducted and results are shown in Table 3.1.3 and Figure 3.1.4.

This structure visualizes the main issues of each sector to achieve “Sustaining long-term average economic growth”, which is the ultimate objective of SDV2030/Vision2050 in economic sector. This is the basis for the detailed analysis by sector, implemented as reported in the following sections.

Table 3.1.3 Relationship between Main Objectives of SDV2030/Vision2050 and SDGs

(1) SDV2030

Sector	Main objectives of SDV2030	Relationship with SDGs structure	Consistency with SDGs
Agriculture and livestock	Meet the domestic demand for grains, potato and vegetable	This is related to the achievement of Goal②, Goal③ and Goal⑫ and directly linked to “Sustainable Socio-economics”. Goal⑫ contributes to the achievement of Goal⑧.	Match well
	Develop livestock sector that is competitive in international market	This is related to Goal③ and Goal⑧, and these can contribute to Goal① and “Sustainable Socio-economy”. Goal⑨ will be important as a prerequisite.	Match well
Industry	Increase the share of production and processing sector in total export	This can contribute to “Sustainable socio-economy”, and common points with the SDGs can be seen in Goal⑧.	Match well

	Develop agriculture, and food processing industry clusters in cities and urban settlements	Although it looks close to Goal⑪, the content is a bit different. This can contribute to the achievement of goal ①	Match
Mining	Encourage transparent and accountable extractive industry, and improve the competitiveness	This is relevant to Goal⑦, Goal⑨, Goal⑧ and Goal⑮. Furthermore, it contributes to the achievement of goal ⑯. It will also indirectly affect Goal⑰.	Match
Tourism	Become the international destination for nomadic culture and tourism	This can contribute greatly to Goal⑧ and Goal⑰. It is also related to Goal⑮ from the viewpoint of environmental conservation.	Match well
Energy	Ensure stable, reliable and full supply of energy domestically and export energy	This is mostly relevant to Goal⑦. It is also related to Goal⑧ and Goal⑨	Match

Source: JICA Project Team

(2) Vision2050

Objective No.	Objective of Vision2050	Relationship with SDGs structure	Consistency with SDGs
4.1	To develop stable macro economy and bring up middle class as the main actors in the society	This objective represents overall aim of the Vision2050 to be pursued related particularly to Goals 1, 2, 8 and 12	Consistent at macro and conceptual level
4.2	To develop priority economic sectors and realize export-oriented economy	This objective is pursued to realize attainment of Goals 2 and 8	To be made consistent through economic diversification
4.3	To strengthen financial sector for sustainable economic development	This objective provides investment environment to contribute to Goals 8 and 12 by supporting economic development	Consistent with necessary condition for SDGs
4.4	To integrate regional economy and trade and simplify trading system	This objective implies pursuing Goals 9 and 11 and realization of Goal 12	To be made consistent through regional development
4.5	To develop internationally competitive small and medium enterprises to create employment opportunities	This objective contributes to Goals 1, 8 and 12	To be made consistent by pursuing with Objective 4.4
4.6	To establish a Sovereign Wealth Fund to support economic diversification, innovation, new technologies, human development and green development	This objective ensures financial conditions to realize all the Goals, particularly through attainment of Goals 16 and 17	Consistent as one of sufficient conditions to realize SDGs

Source: JICA Project Team

2) Analysis of SDV2030/Vision2050 structure in economic sector

The SDV2030 in economic sector appropriately reflects the philosophy of the SDGs. In agriculture, livestock and tourism sectors, three aspects of economy, social and environment are described in a well-balanced manner. In addition, the economic objectives pursue economic sustainability reflecting regional characteristics, traditions and culture of Mongolia. On the other hand, in mining and energy sectors, the SDV2030 has limited descriptions of specific objectives.

The Vision2050 pursues more dynamic and comprehensive transformation of economic structure under the macroeconomic stability and favorable investment environment with reliable financial system. Mining is expected to develop further as the driving force, but more primary products will be processed into value-added products for export. Crop farming and livestock will serve to provide raw materials for diversified products for export as well as import substitution of some essential food products. The Vision2050 emphasizes creative industry utilizing ICT and other advanced technology, international tourism utilizing unique Mongolian resources, and enhanced trade with Russia and China as part of stable international relationships. Innovation and brand development are emphasized in all the sectors.

Agriculture and livestock

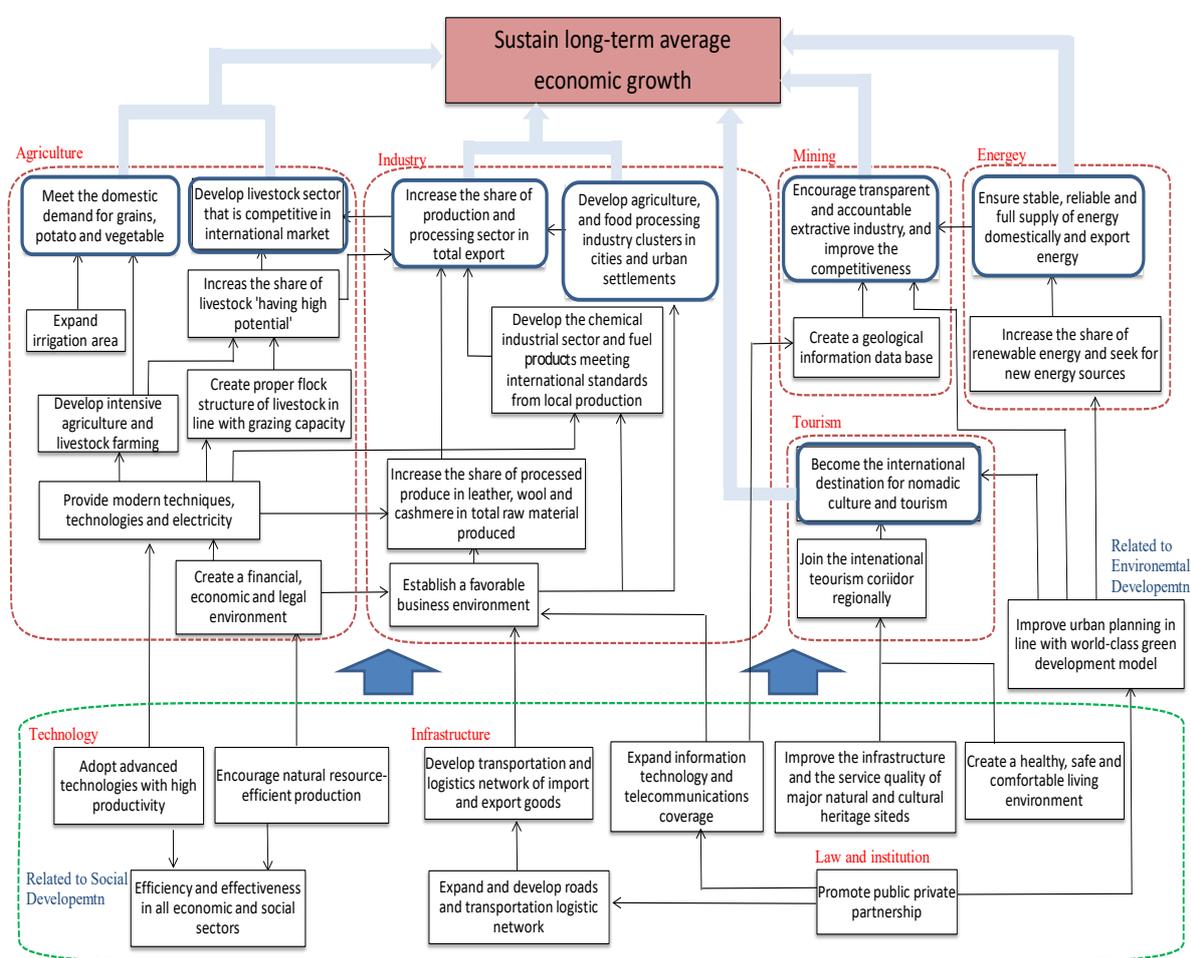
Through the SDV2030 structural analysis, it has been clarified that the main challenges in agriculture

sector are to achieve full self-sufficiency of grains, potato and vegetable and to expand livestock products with high productivity. The pursuit of self-sufficiency needs to be environment-friendly in the sense that it increases security and resilience against adverse environmental phenomena and to realize this the conservation of farmland is required. Improving productivity and increasing processing of livestock products are means to increase job opportunities and income for herders at the same time, which will contribute to suppressing excessive resource consumption.

The SDGs place emphasis on high value-added and labor-intensive activities, and promotion of local industry is in line with the direction of the SDGs that seek to maximize employment opportunities. The key objectives include the development of new technologies and improvements in economic and financial environment.

Pasture management is an important objective of SDV2030. In view of the vastness of pastureland, the specific approach would be to establish a resource management system by involving local residents and local communities.

The promotion of exports by processing livestock and agricultural products as another major objective in industrial sector will naturally help to improve agricultural and livestock activities. These inter-related activities together will constitute what is called the sixth industry to produce export products.



Source: JICA Project Team

Figure 3.1.4 Structure of SDV2030 in Economic Sector

Industry, mining and tourism

The main objectives of industrial sector according to the SDV2030 are promotion of chemical industry and fossil fuel related products and establishment of industrial clusters related to agriculture and food

processing in urban areas as well as processing of wood, leather and cashmere. Also, export of high-value-added processed products is important. These are succeeded by the Vision2050.

Mining sector is expected to be a transparent and responsible industry in SDV2030/Vision2050. It is supported by information and communication technology (ICT) and other kinds of advanced technology as well as stable energy supply. Less consumptive use of resources and higher value-added production should be pursued for sustainable production in mining sector as well.

As for tourism, the SDV2030/Vision2050 aims at making Mongolia international destination for culture tourism based on nomadic traditions and establishing international tourism corridors to support it.

Energy

It is obvious that energy self-sufficiency is a major challenge to achieve a sustainable economy. The SDV2030/Vision2050 pursues increase in the share of renewable energy and development of new energy sources to achieve full self-sufficiency in energy supply.

Technology, infrastructure, laws and institution

The SDV2030/Vision2050 describes the goals for technology, infrastructure, laws and institution that can support the development in different sectors as described above. For infrastructure development, the SDV2030/Vision2050 emphasizes importance to expand the transport and logistic networks and information/communication networks. In terms of institutional structure, the promotion of public-private partnership (PPP) is considered important to support infrastructure and urban development as well as advanced technology to support high productivity manufacturing industries.

(4) Analysis on existing status and expected achievement of SDGs and SDV2030/Vision2050 by sector

Since the Vision2050 comprises SDV2030, attainment of targets set by SDV2030 gives indication of prospects of attaining the Vision2050 targets. Therefore, a table comparing goals and targets of the SDV2030 and the SDGs has been prepared by the JPT for each sector. Quantitative evaluation should better be undertaken as much as possible, but qualitative evaluation is needed in some respects. As a validity evaluation, the SDV2030 objectives should be analyzed whether or not they are aligned with the SDGs. The analysis does not aim review and revision of the SDV2030/Vision2050. Rather, it is intended to examine how the Vision2050 can be used to build up a new development paradigm of Mongolia.

Also, the table will clarify effective approaches to the main objectives of each sector. This may lead to identification of some conditions to be added to complement the Vision2050.

1) Agriculture and livestock

Table 3.1.4 represents the validity of the SDV2030 objectives and the prospect of achievement of the SDV2030 objectives in agriculture and livestock sectors.

Agriculture and livestock sectors are strongly connected to the goals and targets related to poverty and hunger in the SDGs. The SDV2030 objectives are set properly and generally consistent with SDGs goals and targets. For example, promoting zero-tillage farming technology is very effective to protect soil conditions and mitigate a damage by drought. Not only physical technology such as zero-tillage farming, but also soft technology such as ICT application to agriculture or livestock have been included in SDV2030 objectives. Also, the use of such advanced technology will make the national territory resilient for climate change, drought and Dzud. Pursuing efficient economic activities and environmental conservation at the same time complies with the basic concept of sustainability.

Promotion of value-chains or industrial clusters in a broad context of economic globalization is pursued in the SDV2030 in the form of global value-chains. This may not necessarily lead to generation of high value added and large employment opportunities as more value added and employment opportunities may be generated outside Mongolia. To avoid such leakages, it is important to internalize the value-chain as much as possible by industrial cluster development linking livelihood activities by

rural people, through indigenous industries to export industries.

In some aspects, prospect of achieving SDV2030 objectives would be unclear due to lack of information. Recycle-oriented society is not included in the SDV2030 objectives, while “12.3 Reducing foods losses” will be attained most effectively by such a society.

Table 3.1.4 Validity of the SDV2030 Objectives and Prospect to Be Achieved for the SDV2030 Objectives on Agriculture and Livestock Sectors

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Poverty	1.4	Access to appropriate new technology	2.1.1	4	75% of herders and farmers (electricity and technologies)	High	Unclear	Unclear
	1.4	Access to financial service	2.1.1	4	75% of herders and farmers (concessional loans and other financial instruments)	High	Unclear	Unclear
Hunger	2.1	Ensure access by the poor to nutritious and sufficient food	2.1.1	3	Intensify farming for domestic demand of vegetables	High	60% self-sufficient for vegetables in 2020 according to MOFALI	High
	2.3	Access to financial service	2.1.1	4	75% of herders and farmers (concessional loans and other financial instruments)	High	Unclear	Middle
	2.3	Enhance value addition in livestock products	2.1.1	2	Increase the share of animals and livestock having high output potential in the total animal and livestock population to 8%	High	Increasing number of farmers undertaking intensive or semi-intensive livestock farming in recent years	High
	2.3	Enhance value addition in vegetables	2.1.3	1	Build the industrial cluster and increase export	High	Agro Information Technology (IT) Park Plan	Middle
	2.3	Enhance value addition in vegetables	2.1.3	1	Build the industrial cluster and increase export	High	Meat products, leather and other livestock products are traded without processing or with only primary processing.	Middle
	2.4	Resilient agriculture	2.1.3	2	Ensure full supply of grains, potatoes and vegetables	High	Grains 100%, Potatoes 100%, Vegetables 60% (MOFALI)	High
	2.4	Land and soil conservation	2.1.1	3	Zero-tillage farming technology to 90%	High	Soil conservation practices applied in 8 Aimags and total area covering 123,000 ha (24% of sown area) in 2019 (MOFALI).	Middle
	2.4	Land and soil conservation	2.1.1	3	No less than 60% of territory as disease free	High	Unclear	Unclear
	2.4	Implement resilient agricultural practices	-	-	N/A	-	-	-

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Water resource	6.4	Enhance water-use efficiency	2.1.1	3	Increase the area of irrigated arable land to 120,000 ha	High	Irrigated land is approximately 57,000 ha in 2019 (MOFALI).	High
Decent work	8.2	Increase value added in labor sectors	2.1.3	1	Build the industrial cluster and increase export	High	Agro IT Park Plan	High
	8.2	Increase value added in labor sectors	2.1.3	1	Build the industrial cluster and increase export	High	Meat products, leather and other livestock products are traded without processing or with only primary processing.	Middle
Sustainable industry	9.3	Access to markets	2.1.1	4	75% of herders and farmers	Middle	Unclear	Middle
	9.3	Access to value chain	2.1.3	1	Build the industrial cluster and increase export	High	Agro IT Park Plan	High
	9.3	Access to value chain	2.1.3	1	Build the industrial cluster and increase export	High	Meat products, leather and other livestock products are traded without processing or with only primary processing.	Middle
	9.4	Clean and environmentally sound technologies	2.1.1	3	Zero-tillage farming technology to 90%	Middle	Unclear	Unclear
Consumption and production	12.3	Reduce foods losses	-	-	N/A	-	-	-
Climate change	13.1	Strengthen resilience to climate-related hazards	2.1.1	1	Preserve the gene pool and resilience of pastoral livestock breeding adapted to climate change.	High	Unclear	Unclear
Protection of ecosystems	15.3	Land and soil conservation	2.1.1	3	Zero-tillage farming technology to 90%	High	Soil conservation practices applied in 8 Aimags covering total area approximately 123,000 ha (24% of sown area) in 2019 (MOFALI).	Middle

Source: JICA Project Team

2) Industry, mining and tourism

In Chapter 5 of this report, a socio-economic framework is set based on realistic assumptions in line also with the SDV2030/Vision2050 targets. Actually, the average of real gross domestic product (GDP) growth rate at 6.2% between 2017 and 2019 was below the SDV2030 target (6.6%: average in 2016-30). In order to achieve the target, productivity improvement is required, especially in industry and mining sectors. One of the objectives of the SDV2030 represents this improvement by increasing the share of processing sector in total export value.

The SDV2030 describes that for sustainable industry of the SDGs, not only leather, wool and cashmere, but also meat and dairy products are vitally important to increase and diversify export. To make mining less resource-intensive, transparent and accountable extractive industry should be promoted. The

SDV2030/Vision2050 emphasizes responsible mining, but specific measures to realize it are not clearly described.

The SDGs target 9.3 (access to markets and value chains) also represents the sustainable industry, and it is properly reflected as the objective of the SDV2030/Vision2050. However, its achievement may not be easy as value added processing of livestock and mining products has not been much developed such as meat and dairy products and coal.

In tourism sector, development direction as an international destination taking advantage of nomadic culture, eco-tourism and tourism corridor is consistent with SDGs target 11.4. Both of them place high value to conservation of tradition, culture and natural heritage. In terms of the SDGs targets 8.9 and 12.b for devising and implementing policies and tools for monitoring development impacts for sustainable tourism, Mongolia recognizes the significance of the sector for further diversifying the economy. However, more focus needs to be put on the implementation part.

Table 3.1.5 Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Industry, Mining and Tourism Sectors

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Employment	8.1	Sustainable economic growth	2.1		Real GDP growth rate 6.6% (average in 2016-30)	High	Real GDP growth rate 5.3% (2017), 7.1% (2018) and 5.1% (2019)	Middle
	8.2	Achieve high levels of economic productivity through high-value addition	2.1.3	1	15% share of processing sector in total export	High	14.7% (2019) share of processing sector in total export (Statistical Yearbook 2019)	High
Decent work	8.9	Devise and implement policies to promote sustainable tourism	2.1.2	1	Increase the number of foreign tourists to 2 million per year	High	More than 500,000 tourists in 2018; tourism sector recognized as one of the three major sectors for development, but legal aspects still in need of further refinement.	Middle
Sustainable industry	9.2	Promote sustainable industrialization	2.1.3	1	15% share of processing sector in total export	High	14.7% (2019) share of processing sector in total export	High
	9.2	Promote sustainable industrialization	2.1.3	1	Share of produce in leather, wool and cashmere up to 80% in total raw material produced	High	Value of manufacturing of wearing apparel and leather increasing in recent year.	Middle
	9.2	Promote sustainable industrialization	2.1.4	2	Improve the competitiveness of the mining sector	High	Coal bed methane (CBM) and underground coal gasification (UCG) being considered in Mongolia.	Middle
	9.3	Access to markets and value chain	2.1.3	2	At least 70 % of the meat and 80 % of the milk supply (as raw material)	High	Primary processing of meat and milk conducted.	Middle

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
					processed in food manufacturers domestically.		Secondary processing condition not clear.	
	9.4	Clean and environmentally sound technologies	2.1.3	3	Meet up to 100% of the national demand for main fuels from domestic production meeting the Euro-5 standards	Middle	0% at present	Low
	9.4	Clean and environmentally sound technologies	2.1.4	2	Encourage transparent and accountable extractive industry	High	The master plan for the Baganuur coal mine being prepared to establish low carbon-resource recycling coal town by promoting coal gasification.	Middle
	9.5	Enhance scientific research in industrial sectors	2.2.3	5	Increase expenditures for scientific research and technology to 3% in GDP	High	Unclear	Low
Human settlement	11.4	Strengthen effort to protect and safeguard the world's cultural and natural heritage	2.1.2	1	Mongolia to become the international destination for nomadic culture and tourism and promote eco-tourism, tourism corridor.	High	Cultural heritage risk assessment project conducted by the Center for Cultural Heritage in 2017	Middle
Responsible consumption and production	12.b	Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products	2.1.2	1	Mongolia to become the international destination for nomadic culture and tourism: Develop eco-tourism regions, products and services compliant with environmental and health requirements, and increase revenue from tourism.	High	Tourism sector is highly prioritized in policy documents, but implementation not adequate enough.	Middle
Global partnership	17.3	Mobilize additional financial	-	-	N/A	-	-	-

Source: JICA Project Team

3) Transport, urban development and infrastructure

Transport and urban development are strongly linked to the goals and targets of sustainable industry and human settlement of the SDGs. Transport development currently undertaken covers not only roads and railways but also airports. As effects of the transport development is visible and long-lasting, it is

easy to understand its relationships with the SDGs targets.

Urban development is directly related to conditions of human settlement. However, sustainable urban development is not even taken as the target of the SDV2030/Vision2050. On the other hand, the SDGs emphasizes sustainability of human settlement. Currently, revision of the Ulaanbaatar master plan has been progressing since 2020 and legal framework for Aimag master planning is under preparation. The Vision2050 objectives for urban development should be substantiated by incorporating these ongoing efforts. Also, the future administration of Ulaanbaatar with satellite cities as the Capital Region should be clarified.

Environmental infrastructure development is not explicitly included in the SDV2030/Vision2050 targets, albeit irreversible soil contamination and ecosystem deterioration are observed in specific areas. Vision2050 has established targets for proper environmental management, sewage treatment and waste management systems, but specific measures should be defined early for larger urban centers.

The SDV2030/Vision2050 correctly sees technology sector based on high penetration of the Internet and mobile phones without information disparity as the key to develop rural areas.

Table 3.1.6 Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Transport, Urban Development and Infrastructure Sectors

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Sustainable industry	9.1	Developing resilient infrastructure	2.1.5	3	Development infrastructure (road, railroad, cross-border facilities)	High	Railroad of Ukhaa Khudag to Gashuun Sukhait revised, and Ukhaa Khudag-Zuunbayan 430km started construction	High
	9.2	Promote sustainable industrialization	2.1.5	3	Build transportation and logistics centers for industrialization	Middle	Logistics centers at Zamin-Uud and Altanbulag	High
	9.3	Increase the access of small-scale industrial enterprises	2.1.5	4	Reduce transport cost	Middle	1) New airport (NUBIA) opening has been postponed after April 2021, 2) new container terminal in Zamin-Uud has been fully opened in 2019 to replace the back-to-back railyard operation in the old railway terminal. (Oct 2020) 3) Container/rail freight terminals in UB has not been modernized, and congestions of the UBTZ mainline with single track operation continuously generate delays in delivery on rail.	Middle
	9.4	Upgrade infrastructure to make sustainable with clean technologies	2.1.5	3	Build and use railroads	High	Railroad of Ukhaa Khudag to Gashuun Sukhait revised	High
	9.4	Upgrade infrastructure to make	-	-	N/A	-	Sewage and solid waste management not adequate in urban and	-

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
		sustainable with clean technologies					rural area.	
	9.a	Facilitate infrastructure development through financial support	2.1.5	4	Promote international trade and border facilities	High	Upgrade of the border checkpoint and passenger facility in Zamin-Uud is ongoing, and will be opened by 4Q 2021. (Oct 2020) (https://www.montsame.mn/mn/read/240695)	Middle
Resilient infrastructure	9.c	Increase access to ICT and the Internet	2.1.5	7	High speed Internet connection to 95%, and digitize public services to 85%	High	Almost 100% access by mobile phone users 311Soums with access to the Internet.	-
Human settlement	11.3	Enhance urbanization for participatory human settlement planning	-	-	N/A	-	Ulaanbaatar Master Plan to be revised in 2020. Legal framework of Aimag master plan under preparation.	-
	11.5	Reduce the number of people affected by disasters	-	-	N/A	-	Importance of resilience recognized	-
	11.7	Provide accessible green and public spaces	2.1.5	6	N/A	-	Ulaanbaatar with 20 m ² green public space per person in 2020, according to General Land Management Plan	High
	11.a	Formulate development plan in national and regional level	2.1.5	5	Formulate HSP	High	Ongoing	High
	11.b	Implement resiliency to disaster risk	-	-	N/A	-	-	-

Source: JICA Project Team

4) Climate change

The SDGs clearly emphasizes the resilience to natural disasters and climate-related hazards. Reflecting this concern, the strategy for disaster risk reduction system and risk management capacity should be developed in the framework of the Vision2050.

The Vision2050 objectives intend to take advantage of new technology toward climate change management. For example, early detection systems of natural hazards should be effective by using high penetration rate of the Internet and mobile phones in Mongolia.

Table 3.1.7 Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Climate Change

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Poverty	1.5	Build resilience to the poor and those in vulnerable situation	2.3.2	1	Establish early detection systems of natural hazard	High	137/152 (The number of climate/water level observatory)	High
	1.5	Build resilience to natural disasters	2.3.2	1	Develop the strategy of disaster risk reduction	High	National Action Program on Climate Change 2021	High
	1.5	Strengthen resilience to climate change	2.3.2	1	Implement pilot projects to cope with climate change	High	2 pilot projects for strengthening climate resilience	Unclear
	1.5	Build resilience to climate change	2.3.2	1	Strengthen disaster risk management capacity	High	National Emergency Management Agency (NEMA) established.	Middle
Hunger	2.4	Strengthen capacity for adaptation to climate change	2.3.2	1	Establish early detection systems of natural hazard	High	137/152 (The number of climate/water level observatory)	High
	2.4	Build resilience to natural disasters	2.3.2	1	Develop the strategy of disaster risk reduction	High	National Action Program on Climate Change 2021	High
	2.4	Strengthen resilience to climate-change	2.3.2	1	Implement pilot projects to cope with climate change	High	Unclear	High
	2.4	Build resilience to climate change	2.3.2	1	Strengthen disaster risk management capacity	High	NEMA established.	Middle
Human settlement	11.5	Reduction of the number of deaths by disaster	2.3.2	1	Loss reduction related to natural disasters	High	Dzud and blizzard still happened on a large scale.	Middle
	11.b	Implement disaster risk management	2.3.2	1	Loss reduction related to natural disasters	High	Dzud risk map prepared and utilized by NEMA	Middle
Climate Change	13.1	Strengthen resilience to climate-related hazards	2.3.2	1	Loss reduction related to climate-related hazards	High	3,400,000 / 2,400,000(Numbe r of livestock, 1999/2003)	Middle
	13.1	Strengthen resilience to climate-related hazards	2.3.2	1	Loss reduction related to climate-related hazards	High	Dzud risk map prepared and utilized by NEMA	Middle
	13.2	Integrate measure of climate change in policies	2.3.2	1	Implement pilot projects to cope with climate change	High	National Adaptation planning	High
	13.2	Integrate	2.3.2	1	National levels	High	Unclear	High

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
		measure of climate change in policies			activities for reduction of natural disasters			
	13.3	Improvement education and institutional capacities	2.3.2	1	Framework of lifelong education	High	Unclear High	

Source: JICA Project Team

5) Water resources and environment

Water resources are related widely to several sectors such as health, agriculture and livestock, industry and environment. Therefore, the SDGs have diverse targets dealing with water supply, water-borne diseases, soil pollution and so forth. The Vision2050 responds well to the SDG requirements. Mongolia is a landlocked country so that conservation of terrestrial environment and water resources within the territory is vitally important to ensure sustainability.

Environmental objectives of the Vision2050 set targets for environmental monitoring consistent with the SDGs targets very well. However, measures to achieve the targets are not clear and neither the prospects to achieve them. It is continued challenge to stop the progress of desertification and deterioration of ecosystem in the territory.

Table 3.1.8 Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Water Resource and Environment Sectors

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Health	3.3	End water-borne diseases	2.3.1	2	Ensure that 90% of the population is supplied with safe drinking water	High	50% in 2010 (Safe drink water supply to the population program 2015) High	
	3.3	End water-borne diseases	2.3.1	2	Ensure that 60% of the population uses improved sanitation and hygiene facilities.	High	31% in 2010 Middle	
	3.9	Reduce illness from water, air and soil pollution	2.3.1	2	Ensure that 90% of the population is supplied with safe drinking water	High	50% in 2010 Unintentional contamination mortality rate = 1.7% in 2016 (MVNR) High	
	3.9	Reduce illness from water, air and soil pollution	2.3.1	2	Ensure that 60% of the population uses improved sanitation and hygiene facilities.	High	31% in 2010 Middle	
Water resource	6.1	Accessibility to safe water	2.3.1	2	Ensure that 90% of the population is supplied with safe drinking water	High	30% of population has access to the water supply system. 25% receives water from the water transportation service. Over 35% get High	

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
							water from water supply points. Less than 10% use water from springs, rivers and snow water (2018).	
	6.2	Accessibility to adequate sanitation	2.3.1	2	Ensure that 60% of the population uses improved sanitation and hygiene facilities.	High	51% in 2012	High
	6.3	Reducing water pollution	2.3.1	2	Ensure that 60% of the population uses improved sanitation and hygiene facilities.	High	51% in 2012	High
	6.3	Improving water quality and increase in the proportion of water bodies with good ambient water quality	2.3.1	1	Conserve 60% of water resources in special protected area	High	21% of protected areas in whole area in 2020	Middle
	6.3	Sustainable fresh water supply	2.3.1	1	Conserve 60% of water resources	High	Unclear	Middle
	6.3	Sustainable fresh-water supply	2.3.1	1	Build national level large water tanks to collect water	High	10 small plants and two hydropower plants	Middle
	6.5	Integrated water resources management at all levels	2.3.1	1	Conserve 60% of water resources in special protected area	High	Unclear	Middle
	6.6	Protection of water ecosystem	2.3.1	1	Conserve 60% of water resources in special protected area	High	Unclear	Unclear
	6.a	Expand official development assistance (ODA) in sanitation-related activities	2.1	-	Cooperate with international financial organizations	Low	Unclear	Middle
	6.b	Support communities in water sanitation management	-	-	-	-	-	-
Sustainable industry	9.4	Resource use efficiency	2.3.2	2	Reduce greenhouse emissions by 14% from the current levels	High	Greenhouse gas (GHG) emissions increased by 3.7 (7%) from 1990-2012	Middle
	9.4	Clean technology	2.3.2	2	Encourage introduction of MNS International Organization for Standardization (ISO) 14001	High	Unclear	Middle

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Consumption and production	12.4	Reduction of emissions of chemicals and wastes	2.3.3	2	Amount of recycled waste to 40%	High	Unclear	Middle
Protect of ecosystems	15.1	Conservation of inland freshwater ecosystems	2.3.1	1	Conserve 60% of water resources	High	Unclear	Middle
	15.1	Conservation in terrestrial freshwater ecosystems	2.3.3	1	Ensure sustainability of the ecosystem services	High	Unclear	Middle
	15.3	Combat desertification	2.3.3	1	Continue mitigating desertification	High	77% of country's territory affected by desertification	Middle
	15.3	Restore land and soil affected by desertification	2.3.3	1	Specially protected areas to 30%	Low	13.78% of specially protected areas (2012)	Middle

Source: JICA Project Team

6) Energy

As for energy sector, the SDV230/Vision2050 objectives are set properly based on the SDGs. It is obvious that energy self-sufficiency is a major challenge to achieve sustainable economy. In the SDV2030, increase in the share of renewable energy and development of new energy sources are encouraged to realize full achievement self-sufficiency, but energy self-sufficiency is not explicitly pursued by Vision2050. However, the achievement of the SDV objective of “Provision of 30% of domestic energy by renewable energy sources” is not easy to achieve due to fluctuation of supply capacity of renewable energy depending on solar and wind. Possibly, use of geothermal energy may be another option.

Geothermal energy resources in Mongolia have been explored mainly in Bayankhongor and Arkhangai, and the potentials totaling 230 MW have been identified at 40 locations. Geothermal energy resources in other countries are: 39,000 MW in the U.S., 27,000 MW in Indonesia, 23,000 MW in Japan, and 6,000 MW in the Philippines and Mexico. Installed power generating capacities are 3,570 MW in the U.S., 2,130 MW in Indonesia, and 2,130 MW in the Philippines. The installed capacity in Japan is only 601 MW ranked 10th in the world.

Table 3.1.9 Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Energy Sector

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Energy	7.1	Accessibility to modern energy services	2.1.5	1	Supply 100% of national energy	High	80.46% (2015, Source; Ministry of Energy)	High
	7.2	Increase the share of renewable energy	2.1.5	2	Provide 30% of domestic renewable energy	High	Around 20% in 2019	Middle
	7.3	Improvement in energy efficiency	-	-	-	-	Thermal efficiency in power supply 61.14%	-
	7.a	Promote investment in clean energy	-	-	-	-	-	-

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
	7.b	Enhance the technology of energy and infrastructure	2.1.5	2	Preparation for a nuclear power plant	-	0% (2019)	-

Source: JICA Project Team

7) Social development

The SDV2030 target of zero poverty is an ambitious challenge. The Vision2050 sets more realistic targets at 15% in 2030, 10% in 2040 and 5% in 2050. In order to realize the targets, all related sectors should support it to ensure employment opportunities and provision of adequate education and health services in a comprehensive manner. Poverty is symbolic of the ultimate goal of “Leaving no one behind”.

As shown in the SDGs target, the social development is mainly supported by the government measures and budget allocation in education, health and labor sectors. The SDV2030/Vision2050 responds well toward achievement of a variety of social development targets of the SDGs. In some aspects, the targets are qualitative, but existing efforts to tackle these issues are remarkable. Especially, social insurance system has been improved steadily and JICA technical cooperation project, “Project on Social Insurance Operation” since 2016 may help further improvement.

As of 2017, unemployment rate was 8.8% on average in Mongolia as a whole. The prospect to achieve the Vision2050 targets at 7% by 2030, 5% by 2040 and 3 % by 2050 are relatively high. However, it is equally important that decent works are ensured for all employees in line with the SDGs.

Table 3.1.10 Validity of the SDV2030 Objectives and Prospect to be Achieved for the SDV2030 Objectives on Social Development Sector

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
Poverty	1.2.	Proportion of population living below the national poverty line in total	2.1.2	1	Reduce poverty to 0%	High	28.4% in 2018	Middle
	-	-	2.1.2	1	Increase middle class to 80% by 2030	Middle	Unclear	Middle
Social protection and employment	1.3, 8.b.	Total government spending in social protection and employment programs as a proportion of the national budgets and GDP	2.1.2	3	Social security management	High	88.9% children, 97.5% elderly, 44.7% unemployed covered by social protection	High
Health	-	-	2.1.2	1	Disease prevention Increase life expectancy	High	Life expectancy 70.41 years in 2019	Middle
	3.1	Maternal mortality ratio, Under-five mortality rate	2.2.2	2	Reduce maternal mortality to ... Under 5 mortality to ...	High	23.0 per 100,000 in 2019, 16.0 per 1,000 in 2019	Unclear

SDGs			Mongolia Sustainable Development Vision 2030				Existing conditions	Prospect to achieve target
Goal	Number	Target	Number	Object	Target	Validity		
	3.4	Mortality rate attributed to cardiovascular disease, cancer	2.2.2	3	Reduce death from cardiovascular disease to 14 per 10,000; cancer to 8 per 10,000	High	Death from cardiovascular is 17.3 per 10,000 in 2019; cancer 14.4 per 10,000 in 2019	Unclear
	3.3	Tuberculosis incidence per 1,000 population, Hepatitis B incidence per 100,000 population	2.2.2	4	Reduce hepatitis to 2 per 10,000; TB to 13 per 10,000	High	Tuberculosis incidence is 11.2 per 1,000 population in 2019, hepatitis B incidence 0.7 per 10,000 population	High
Education	4.2	Participation in organized pre-school	2.2.3	1	Reduce preschool child/teacher ratio to 20/1; 90% enrolment	High	81.5% coverage in 2019/2020	High
	4.a,4.c	Quality of education	2.2.3	2	Program for International Student Assessment (PISA) performance	High	PISA evaluation to be prepared, some schools with 3 shifts	Unclear
	4.3	Adult participation in education and training	2.2.3	3	Improve vocational and skills training	High	Teaching capacity of vocational schools limited, less than 60,000 intakes	Unclear
	4.3,4.6	Adult participation in education and training, literacy and numeracy	2.2.3	4	Advance tertiary and lifelong education	High	Re-training of drop-outs (herder children) and those returning to education need strengthening	Unclear
	-	-	2.2.2.	5	Ensure coordination and coherence of science and industry for knowledge-based society	Middle	Linkage between science and industry not clear	Unclear
Gender	5.2	Violence against women	2.2	-	Ensure gender equality	High	17.3% (2017)	No target
	5.5	Women in Parliament and local government	2.2	-	Ensure gender equality	High	17.1% (2016)	No target
	5.5	Women in managerial position	2.2	-	Ensure gender equality	High	43% (2019)	No target
Employment	8.5	Full and productive employment and decent work	2.1.2	2	Increase labor participation to 70%, Unemployment to 3%	High	Labor force participation rate (LPR) 60.5% in 2019, Unemployment rate 10% in 2019	High

Source: JICA Project Team

3.2 Development Models and Vision

3.2.1 Models for formulating development paradigms

(1) SDGs and SDV2030/Vision2050 to guide paradigm formulation

As the Vision2050 extends the SDV2030 prepared in response to the SDGs, they provide guidelines to prepare the NCDP. In fact, the NCDP is prepared to attain the SDV2030/Vision2050. The analysis on the SDGs and the SDV2030/Vision2050 objectives and targets in Section 3.1, however, has clarified the attainment of the overall goals of sustainable and inclusive development may not be ensured as some objectives and targets are not necessarily pursued properly. The targets of SDV2030 assessed “Unclear” or “Low” for attainment are listed below:

- (a) Access to appropriate new technology for poverty alleviation,
- (b) Land and soil conservation with advanced technology for crop farming and animal disease control,
- (c) Resilience to cope with climate change,
- (d) Domestic production of main fuels of high quality for 100% self-sufficiency,
- (e) Responsible mining with environmentally sound technology,
- (f) Scientific research and technology development to support industrial development,
- (g) Conservation of water resources in specially protected areas,
- (h) Reduction of maternal and under-five mortality rates,
- (i) Reduction of deaths from cardiovascular diseases and cancer,
- (j) Reduction of cases of hepatitis,
- (k) Improvement of formal education quality according to PISA,
- (l) Improvement of vocational and skill training,
- (m) Improvement of tertiary and life-long education, and
- (n) Linkage strengthening through coordination between science and industry for knowledge-based society.

Many of these targets are related to technology. Others are related broadly to human resources. These are two most critical aspects to be focused in pursuing a new development paradigm. For technology, the question is what kind of technology to develop and apply to attain the Vision2050. For human resources, education and training should be oriented toward development of new knowledge and value to support the Vision2050.

The Vision2050 should be further substantiated by emphasizing these two aspects with the targets which call for appropriate technology development and application and value and knowledge development. The sector-wise analysis in the previous section should be integrated into a consistent and coherent development paradigm unique for Mongolia to be supported by appropriate technology and human resources with new value and knowledge. To guide the integration, useful models are presented in this sub-section.

(2) Regional development model

As a first step to formulate the NCDP, development directions for Mongolia to pursue in the coming decades are examined. To facilitate this step, general methods to define development directions were presented by the JPT at the seminar on January 15, 2019. As a general method to define broad development alternatives, a regional development model was presented. This method defines alternative directions of development by combining resources and markets as shown in Figure 3.2.1.

		Market		Alternative:	A: Import substitution B: Export promotion C: Import processing D: Export processing
		Local	Export		
Resources	Local	A	B		
	Import	C	D		

Source: JICA Project Team

Figure 3.2.1 Broad Alternatives for Regional Development

Alternative A corresponds to the localization model. It implies the development based on local consumption of local products, but it may be applicable only to limited products as suggested below. Alternative C is applicable when local market is significantly large. This is not the case for Mongolia. Alternative D represents typical export processing, which does not automatically ensure promotion of indigenous industries. For self-reliant regional development, Alternative B is most valid. A key for success under this alternative is to create specialty products having export competitiveness.

As Mongolia is very rich in natural and cultural resources and the local market is small due to small and dispersed population, Alternative B appears most appropriate as a general development direction. This, however, does not contradict with the localization model for local consumption of local products. The extent this idea is applicable, however, needs to be carefully examined within the Mongolian context.

For water supply for instance, use of shallow groundwater as local resources as well as extraction of river water should be examined carefully to avoid costly development of water resources by large dams and transfer of water from remote areas. Renewable energy including biomass, mini hydro, wind and solar power should be emphasized as local energy sources. Geothermal energy may be another option in Mongolia. Further, indigenous resources related to local society, culture and heritage should be utilized to create niche markets for tourism and specialty products. These resources may be utilized for outward oriented development to vitalize the regional socio-economy supported by local governments and residents.

(2) Alternative development paradigms

As another method to guide the definition of broad development alternatives, two distinctly different development paradigms were explained: 20th century development model and alternative socio-economy. These two paradigms are compared in Table 3.2.1 from a few different points of view. Historically, the 20th century development model had been pursued by most developed countries since the industrial revolution and throughout the 20th century. The alternative socio-economy had been discussed recently, and some sporadic attempts have started to be made in recent years in both developed and developing countries.

The 20th century development model sees resources as income or something to realize immediate gains. This applies typically to extraction of fossil fuel and other underground resources as currently undertaken in Mongolia. This view tends to encourage abusive use of resources. The alternative socio-economy sees resources as capital, on which development will be based. Capital needs to be conserved as much as possible to support continuous development activities. Economic efficiency is the prime criterion in pursuing the 20th century development model, while the alternative socio-economy takes social and environmental considerations more seriously into account.

Table 3.2.1 Comparison of Two Broad Development Alternatives

	20th century development model	Alternative socio-economy
History	Pursued by most developed countries	Sporadic attempts started recently in developing and developed countries
Resources	Income → Abuse	Capital → Conservation
Criterion	Economic efficiency	Social & environmental considerations
Effects	Highest income possible	Largest employment opportunities
Technology	Advanced technology	Appropriate or intermediate technology

Source: JICA Project Team

The 20th century development model, as the history proves, is effective in realizing highest income

levels possible. The alternative socio-economy pays more serious attention to generating the largest employment opportunities possible. This does not necessarily mean that this model sacrifices economic growth in favor of employment generation. Methods to attain high income levels are different between the two alternatives.

The 20th century development model had been supported generally by advanced technology developed in developed countries since the industrial revolution. Advanced technology has made it possible to pursue high economic growth by intensive resource use during the 20th century. Only recently, technological innovation has started to focus on effective use of limited resources for resource recycling and saving. For resource saving methods, a lot of lessons may be learned from collective wisdom of human beings constituting traditional skills, knowledge and wisdom. Mongolia has traditional wisdom preventing digging out pasture and polluting river water. Also, when slaughtering animals, traditional wisdom says not to waste even a drop of blood. Some people call them Chinggis' admonition." These ideas may be substantiated by applying advanced technology. In fact, traditional skills, knowledge and wisdom should be strengthened by advanced technology to develop appropriate or intermediate technology, which should support the alternative socio-economy.

3.2.2 Ideas and values for development vision

(1) Happiness concepts derived from seminar

As part of efforts to define development directions, another seminar was conducted on March 5, 2019 by the JPT on happiness concepts for development. The seminar served also as brainstorming for ideas and values to be reflected in the development vision. Participants were guided by the seminar to discuss and present their ideas on important values for Mongolians represented by 3P's: Pleasure, Purpose and Pride. The results of group discussions are summarized in Table 3.2.2.

Table 3.2.2 Important Values for Mongolians to be Reflected in Development Vision

Group 1				
Participants	Pleasure	Purpose	Pride	Other
Women	<ul style="list-style-type: none"> - Family - Vast and free steppe - Family - Spending time with people I am close to - Money and shopping - Friends - Leisure 	<ul style="list-style-type: none"> - To live in a country that is a tourism gateway to the world based on its nomadic culture - Travelling - Healthy life - Live a healthy life - To be healthy - Live a healthy life and have a successful career - To be able to manage my work duties 	<ul style="list-style-type: none"> - Mongolian men who respect and love their mothers, wives and daughters - Work - Work achievements - Family - Education - Work, colleagues, friends and family 	<ul style="list-style-type: none"> - Development of artificial intelligence (AI) by making use of high intelligence quotient (IQ)*children in the country - Learning new things
Men	<ul style="list-style-type: none"> - Stability - Family - Friends - Favorable living condition (housing, safety etc.) 	<ul style="list-style-type: none"> - Governance - Education - Dreams - To be a competent/skilled person 	<ul style="list-style-type: none"> - History - History - Culture - My knowledge and skills 	<ul style="list-style-type: none"> - Reducing income inequality
Group 2				
Participants	Pleasure	Purpose	Pride	Other

Women	<ul style="list-style-type: none"> - Seeing smile on others' face after helping them - Embracing my mother's hair - Leisure - Hobby - Ecological balance - Being myself - To be healthy - Family (my three children and husband) - To be healthy, to be free, my family being healthy (parents, children and grandchildren) - To live in safe and healthy environment - To have a job - To be able to do what I enjoy 	<ul style="list-style-type: none"> - Becoming a chartered financial analyst (CFA) - To achieve my dreams - To contribute to the development of my country - Education - To achieve my dreams - Financial opportunities - Knowledge - To do sports - Travel around the world - Doing what I love (drawing and doing ceramics) 	<ul style="list-style-type: none"> - My parents - History and culture of my country - My nation and my family - My profession - Keeping my promises - To be a citizen of a happy country, Mongolia - My profession - Being reliable 	<ul style="list-style-type: none"> - Travelling - Safe and healthy environment - Disaster and risk-free environment
Men	<ul style="list-style-type: none"> - Early retirement - Family - Family and health 	<ul style="list-style-type: none"> - Children's education - Education - Development of my country 	<ul style="list-style-type: none"> - Participation in NCDP - History - A Mongolian man 	

Source: JICA Project Team

Note: IQ stands for Intelligence Quotient

(2) Happiness index

Mongolia's happiness index is not calculated officially, but National Statistical Office (NSO) has issued the reports "Mongolia's Happiness Index Compared with Other Countries" and "Mongolia's Happiness Index" for statistical data users as of 2016. According to these reports, of 140 countries evaluated, Mongolia is ranked 136th with 14.3 points, while the world average is 26.4. The highest ranked countries are Costa Rica with 44.7, and Mexico and Columbia with 40.7.

Of the factors to evaluate happiness, Mongolia is ranked 95th for life expectancy at birth with 68.6 years (2012) and 90th for well-being felt by people with 4.9 lower than the world average of 5.4. For the latter factor, Switzerland is ranked first at 7.8, and Japan and South Korea at 6.0 and China at 5.1.

Mongolia is ranked high for ecological resources availability per person. Due mainly to pastureland and forest-steppe, resource endowments in Mongolia far exceed demand for them. Demand for resources exceeds availability in Japan, South Korea and China, and in the world as a whole. Per capita ecological resources availability is 15.6 ha, much higher than the world average of 1.7 ha.

Clearly, this evaluation of happiness has limits as it utilizes only a few factors affecting happiness. In particular, the well-being factor is only subjective and does not reflect socio-cultural and traditional value, which is evaluated high by the PWG members as shown in Table 3.2.2 as factor of happiness. Nevertheless, lessons can be learned on how to improve the conditions in Mongolia related to happiness. Mongolia needs to increase the life expectancy of the population, balance the income inequality, and properly utilize and restore ecological resources.

3.2.3 Development vision

(1) Proposed vision

A vision should be established for national comprehensive development of Mongolia based on balanced regional development. The vision should be shared by all the stakeholders including local residents,

ethnic groups, supporters of the regional development such as donors and non-governmental organizations (NGOs), and officers and experts of the local governments as well as the Mongolian Government. Sharing a vision helps to muster efforts of many stakeholders in undertaking new socio-economic activities to realize the national and regional development with the common concepts. The following vision is proposed, reflecting the unique characteristics of Mongolia with rich natural and cultural resources and in line with the idea of regional development and the concepts of the alternative socio-economy examined in sub-section 3.2.1. This represents the vision to be shared widely by the Mongolian people, while the Vision2050 is rather a vision of the Mongolian Government wishing to increase the share of middle income people.

Vision for Regional Development of Mongolia

Realization of robust and resilient socio-economy, adapting to changing world and open to the global society on the one hand and realizing sustainable and inclusive development on the other, characterized by sensible management and use of resources as capital, diverse economic activities effectively linked to generate sufficient and decent employment opportunities and rich cultural heritage of mixed ethnicity that are managed by responsive and transparent governance systems with people's participation, supported by advanced appropriate technology in all the sectors and human resources with mindset to pursue new value and knowledge.

This vision may be supported by the following conditions that characterize the alternative socio-economy:

- (a) Less resource intensive economic activities,
- (b) Economic activities with smaller environmental stress,
- (c) Economic activities ensuring large employment generation and maximizing value-added,
- (d) Local mechanism to allow resources management by local people and communities, and
- (e) System of advanced appropriate technology complementing traditional techniques with advanced technology.

These conditions are mutually related to one another. Condition 1) of less resources intensive economic activities contributes to Condition 2) of smaller environmental stress by effective utilization of resources with minimal wastes. Such economic activities that satisfy these conditions engage larger number of people to utilize wastes and byproducts and thus contribute to Condition 3).

To promote these economic activities as a whole, it is desirable that a mechanism exists for managing resources by and for the benefit of local people and society as Condition 4) requires. To support such alternative socio-economy, a system of appropriate technology should be established by combining traditional techniques and advanced technology as Condition 5) requires.

The vision is substantiated by the following:

- (a) Network of transport and logistic infrastructure of high quality linking Ulaanbaatar and major regional cities to neighboring countries;
- (b) Vertical industrial clusters based on primary products of crop production and livestock farming linking livelihood activities by the poor, through indigenous industries to export industries producing a variety of products having comparative advantage in the global market;
- (c) Environment friendly and less resource intensive socio-economic activities including responsible mining combining traditional wisdom of peoples with modern technology;

- (d) Active communities of mixed ethnicity constituting the peaceful and prosperous society with revitalized conventional cultural activities that residents are proud of and visitors can appreciate; and
- (e) All of the above embraced in rich natural environment under proper management by local communities and local governments to ensure just, peaceful and prosperous society.

The conditions 2) and 3) substantiate the idea of alternative socio-economy adopted for the national comprehensive development of Mongolia. The condition 1) supports the outward oriented development also adopted above for the regional development in Mongolia. The condition 4) represents the outcome of pursuing the alternative socio-economy, and the condition 5) ensures the sustainable management and utilization of natural resources as the base for the regional development in Mongolia.

More specific conditions by Aimag were analyzed as development diagnosis by Aimag prepared through discussions with various stakeholders at the Aimag consultations. The development diagnosis by Aimag is presented in Chapter 7.

(2) Important concepts to support the vision

To make concerted efforts for the national comprehensive development involving all the stakeholders, it is useful to establish common concepts applicable to the development that can be shared by all the stakeholders. Important common concepts are presented as shown in Figure 3.2.2 to facilitate sharing by all the stakeholders in Mongolia. These concepts have been derived from the discussions between the PWG and the JPT as described above but expressed in the way to reflect the characteristics of Mongolia clarified by the analysis on existing conditions by sector. Each concept is explained.

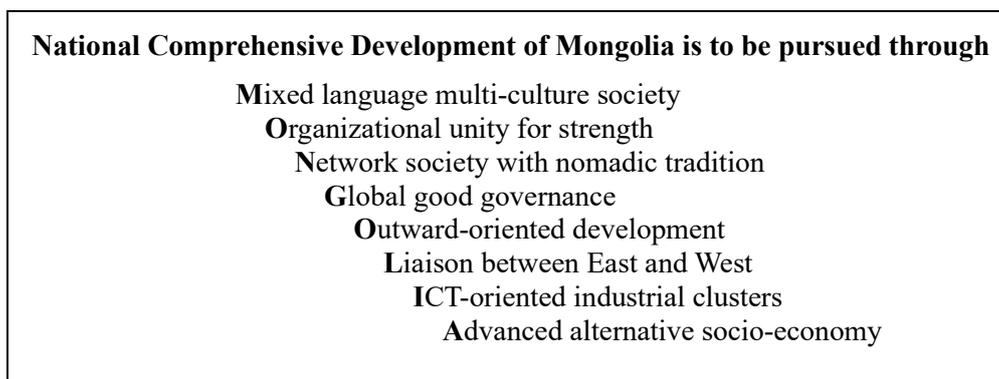


Figure 3.2.2 Key Concepts for National Comprehensive Development of Mongolia

Mixed language multi-cultural society characterizes Mongolia accommodating peoples of widely different ethnic, socio-cultural, religious and other backgrounds. This is taken as a positive factor as it would contribute to diversity of human resources, economic activities, social systems and infrastructure facilities and enhance resilience and robustness of regions in Mongolia.

Organizational unity for strength is most important concept in realizing development potentials for the benefits of people. This concept is the key to realize just, peaceful and prosperous society of empowered people and communities supported by responsive, participatory and transparent governance systems, reflective of Mongolia's distinct cultural identity, and rights to fiscal and political self-determination.

Network society with nomadic tradition represents a strength of Mongolia with high penetration of communication systems linking people throughout the vast territory of Mongolia including nomadic people in remote areas. This allows peoples of different backgrounds to gain access to modern services, while preserving their respective traditions.

Global good governance has two important implications. First, to support the alternative socio-

economy, rich natural resources in Mongolia should be effectively utilized, supported by good governance. Second, by deepening economic relationships with countries in the Greater Central Asia, Mongolia can contribute to global economy and global governance. A lesson may be learned from the model of liberal association of nomadic countries under the Mongolian Empire. Such a mosaic regime with many member countries may represent futuristic form of global governance applicable to Europe, the Middle East and elsewhere.

Outward-oriented development is inevitable as the domestic market is small in Mongolia, but more positively it will utilize strategic geographic position of Mongolia neighboring on Russia and China and links strengthened with other countries. Service activities related to international trade represent non-resource intensive and high value-added economic activities fit well with the concept of alternative socio-economy.

Liaison between East and West represents potential roles of Mongolia to play in international and diplomatic arenas. Promotion of mutual understanding and exchange of various cultures and societies is expected between Mongolia and other countries in the Greater Central Asia. One specific example is cooperation in excavation and restoration of Buddhism remains distributed widely in the region. Another example is social and cultural exchange through tourism development.

ICT-oriented industrial clusters based on primary products provide a viable means to realize self-reliant regional development with broad-based inclusive development, alternative socio-economy, and proper natural resources management. They would link livelihood activities by the poor through indigenous industries to export industries, generating large number of employment opportunities and attaining high value-added without increasing environmental stress in line with the concept of alternative socio-economy. ICT application to link all the players in each cluster would facilitate the cluster development and operation.

Advanced alternative socio-economy is realized by these activities illustrated here. A system of appropriate technology to support the alternative socio-economy is developed by combining traditional techniques/wisdom and advanced technology, which in fact proves to be most advanced technology.

3.3 Macro Development Objectives and Basic Strategy

3.3.1 Problem structure analysis

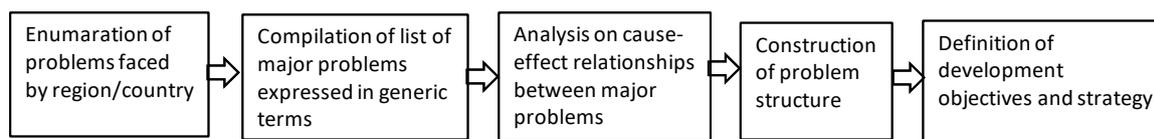
(1) Methodology and procedure

The existing conditions of Mongolia have been analyzed at the macro level as reported in Chapter 2 and by sector as reported in the Sector Reports consisting of three volumes. While Mongolia has high development potentials, the Country faces various problems, which combined would work as constraints to the national and regional development. Many of these problems are interrelated to cause undesirable phenomena as observed at present. A problem structure analysis is a method to clarify these interrelationships in a macroscopic way. The analysis, usually undertaken during the initial stage of the development planning, allows to maintain a broad perspective without getting into details to identify more essential factors and major problems to be alleviated through planned development efforts.

The problem structure analysis is applied usually through a series of workshops with many stakeholders to define development objectives and basic strategy for a country or region of concern. First, problems facing the country or region are enumerated. Some specific problems may be combined to define a major problem so that the analysis would not lapse into too much detail. Most problems are expressed in generic terms to imply related sector problems.

With all the major problems identified, a problem structure is constructed for the country or region. The problem structure is constructed in such a way that problem phenomena observed on surface are aligned on the right and problem factors at the root of many interacting problems on the left. The problem structure clarifies more important problem factors and phenomena expressed in generic terms to imply many detailed or sector specific problems. It also shows causal relationships between the identified problems, focusing only on main interrelationships. Based on the problem structure thus constructed,

development objectives are defined in reference to the problem phenomena, and strategy is established in reference to the problem factors. The procedure is illustrated in Figure 3.3.1.



Source: JICA Project Team

Figure 3.3.1 Procedure of Problem Structure Analysis for Definition of Development Objectives and Strategy

To establish macro development objectives and basic strategy for Mongolia, a problem structure analysis is effective. The analysis is a kind of situation analysis conducted during an early stage of multi-sector planning usually by a participatory approach. At this time, the problem structure analysis has been conducted mainly by the JPT based on the review of past study reports, field observations and limited hearings from some stakeholders.

(2) Problem structure of regional development in Mongolia

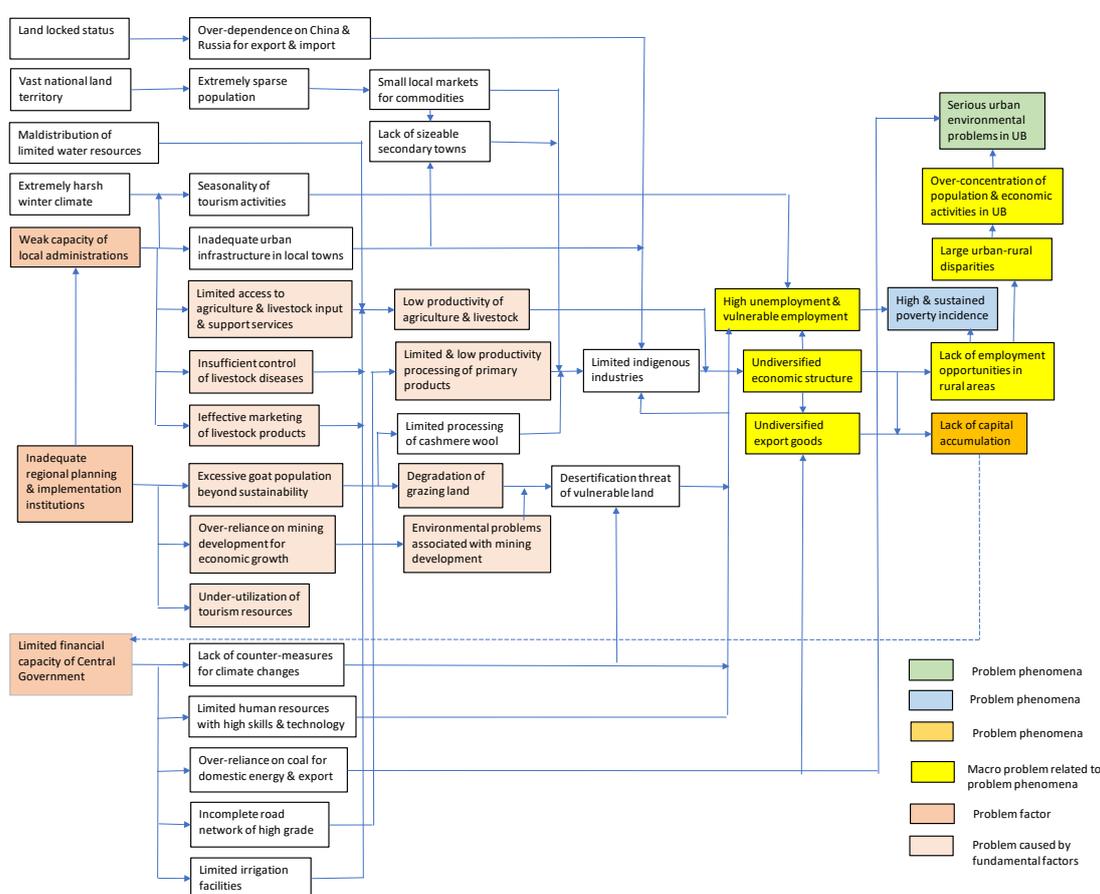
Based on existing data and study reports, problems facing regional development in Mongolia are first enumerated. Neglecting relatively small problems and combining similar problems, comparatively more significant problems are identified and expressed in generic terms. Thus 40 macro problems are identified as listed in Table 3.3.1 by sector. Based on them a problem structure has been constructed as shown in Figure 3.3.2.

Table 3.3.1 List of Problems Identified for Regional Development in Mongolia

Inherent problems	
1)	Vast national land territory
2)	Extremely harsh winter climate
3)	Maldistribution of limited water resources
4)	Land locked status
Economic problems	
5)	Over-reliance on mining development for economic growth
6)	Low productivity of agriculture and livestock
7)	Limited access to agriculture and livestock input and support services
8)	Limited and low productivity processing of primary products
9)	Excessive goat population beyond sustainability
10)	Insufficient control of livestock diseases
11)	Ineffective marketing for livestock products
12)	Limited processing of cashmere wool
13)	Limited indigenous industries
14)	Lack of capital accumulation
15)	Undiversified export goods
16)	Undiversified economic structure
17)	Small local markets for commodities
18)	Under-utilization of rich tourism resources
19)	Seasonality of tourism activities
Environmental problems	
20)	Environmental problems associated with mining development
21)	Over-concentration of population and economic activities in Ulaanbaatar
22)	Degradation of grazing areas
23)	Serious urban environmental problems in Ulaanbaatar
24)	Desertification threat of vulnerable land
Institutional problems	
25)	Limited financial capacity of Central Government
26)	Weak capacity of local administrations
27)	Lack of counter-measures for climatic changes

28)	Inadequate regional planning and implementation institutions
29)	Over-dependence on China and Russia for export and import
Social problems	
30)	Extremely sparse population
31)	Large urban-rural disparities
32)	Lack of sizeable secondary towns
33)	High unemployment and vulnerable employment
34)	High and sustained poverty incidence
35)	Lack of employment opportunities in rural areas
36)	Limited human resources with high skills and technology
Infrastructure problems	
37)	Over-reliance on coal as domestic energy source and for export
38)	Incomplete road network of high quality
39)	Limited irrigation facilities
40)	Inadequate urban infrastructure in local towns

Source: JICA Project Team



Source: JICA Project Team

Figure 3.3.2 Macro Problem Structure of Regional Development in Mongolia

From Figure 3.3.2, three problem phenomena are identified: 1) Serious urban environmental problems in Ulaanbaatar, 2) High and sustained poverty incidence, and 3) Lack of capital accumulation. Macro problems related to these problem phenomena include, high unemployment and vulnerable employment, undiversified economic structure, undiversified export goods, lack of employment opportunities in rural areas, large rural-urban disparities, and over-concentration of population and economic activities in Ulaanbaatar.

Four inherent problems facing Mongolia's regional development are shown also in Figure 6.3.2: land locked status, vast national land territory, maldistribution of limited water resources, and extremely

harsh winter climate. Other than these problems, that are difficult to overcome, three fundamental problem factors are: 1) Weak capacity of local administrations, 2) Inadequate regional planning and implementation institutions, and 3) Limited financial capacity of the Central Government.

These problem factors cause many significant problems at the root of observed problem phenomena. Weak capacity of local administration causes limited access to agriculture and livestock input and support services, insufficient control of livestock diseases, and ineffective marketing of livestock products, causing in turn low productivity of agriculture and livestock and limited and low productivity processing of primary products.

Inadequate regional planning and implementation capacity causes excessive goat and other livestock population beyond sustainability, over-reliance on mining for economic growth, and under-utilization of tourism resources, causing in turn degradation of grazing land and environmental problems associated with mining development. These are problems to be addressed at the regional level.

Other fundamental problems to be addressed at the national level are related to infrastructure development, technological and human development. They include lack of counter-measures for climate changes, limited human resources with high skills and technology, over-reliance on coal for domestic energy and export, incomplete road network of high quality, and limited irrigation facilities.

3.3.2 Macro development objectives and basic strategy

(1) Macro development objectives

As explained above, macro development objectives are defined in reference to the problem phenomena, and basic strategy is established in reference to the problem factors. Based on the three problem phenomena and the macro problems identified for regional development in Mongolia, macro development objectives may be defined as follows:

- (a) To diversify economic structure and export products through increasing capital accumulation (economic objective);
- (b) To generate lucrative and stable employment opportunities in rural areas and local towns to reduce poverty and urban-rural disparities (social objective); and
- (c) To resolve urban environmental problems by alleviating adverse effects of over-concentration of population and economic activities in Ulaanbaatar (environmental objective).

(2) Basic strategy

Based on the three fundamental problem factors and associated problems at the root of many observed problems, basic strategy for regional development in Mongolia may be established with the following components:

Economic strategy

- (a) Effective and sensible utilization of rich natural resources for efficient primary production, and
- (b) Processing of primary products to increase value-added for export markets.

Spatial strategy

- (a) Utilization of locational conditions neighboring on Russia and China to establish links with global markets, and
- (b) Water resources development and management as instrument of green development.

Institutional strategy

- (a) Strengthening local administrations by steady decentralization of development administration system.

In addition, industrial cluster development should be pursued under the following strategy to integrate value-added production by the economic strategy and effective infrastructure development by the spatial strategy.

Industrial cluster development strategy

- (a) Promotion of vertical industrial clusters based on primary products to integrate value-added production and effective infrastructure development.

A vertical industrial cluster based on primary products links livelihood activities by the rural poor such as traditional livestock farming to indigenous industries such as meat and dairy products industries, and further to export industries such as quality food products industries. By establishing export products that can sell in the global market, the entire industrial cluster becomes viable linked to them. This, therefore, could be an effective measure to alleviate poverty as well.

Application of the industrial cluster development strategy in Mongolia is illustrated by sea buckthorn industrial cluster in Figure 3.3.3. Other possible industrial clusters are listed in sub-section 3.4.8 (Table 3.4.19).



Source: JICT Project Team

Figure 3.3.3 Example of Vertical Industrial Cluster Based on Primary Products: Sea Buckthorn Industrial Cluster

3.4 Development Objectives and Strategy for Economic Sector

3.4.1 Crop farming

(1) Development objectives

Through the discussions with stakeholders and literature review of policy documents, the most important issues for crop farming in Mongolia are summarized as follows:

- (a) Ensuring self-sufficiency of basic food,

- (b) Providing diversified agro-products as part of economic diversification,
- (c) Market-oriented agriculture for import substitution and export promotion, and
- (d) Environment-friendly agriculture as part of green development.

To address to these issues, the following development objectives are proposed:

- (a) Realization of 100% self-sufficiency of wheat, potatoes, and selected vegetables,
- (b) Introduction of diversified agro-products and integrated approaches,
- (c) Establishment of market-oriented agriculture for improvement of livelihood, and
- (d) Consideration of natural and social environment-friendly agriculture.

(2) Development strategy

In the light of the above objectives, the basic strategy for agricultural development in Mongolia is proposed with the following components:

- (a) Introducing appropriate technologies which contribute to production and productivity increase,
- (b) Promoting diversified crop production and integrated farming with livestock,
- (c) Contribution to food safety and environmental sustainability,
- (d) Pursuing better market environment and customer satisfaction through value addition, and
- (e) Ensuring environment-friendly cultivation practices for sustainable agriculture.

3.4.2 Livestock farming

(1) Development objectives

The livestock sector of Mongolia is not just one of economic sectors but a totality of socio-cultural and economic activities complex constituting the backbone of the Mongolian tradition having millennia long history. Through the discussions with stakeholders and literature review of policy documents, most important issues for livestock development in Mongolia have been identified as follows:

- (a) Environmental preservation against aggravation of grazing land degradation,
- (b) Coping with serious damages by Dzud,
- (c) Safety and security related to communicable diseases, sanitation, quality control,
- (d) Providing proper raw materials for processing industry, and
- (e) Serving international tourism for nomadic culture.

To address to these issues, the objectives of the livestock farming in Mongolia to be pursued may be summarized as follows:

- (a) To establish Mongolia as the leading livestock country in the world with respect to organic farming and total processing without wastes,
- (b) To produce high quality livestock products such as meat and dairy products for domestic and export markets,
- (c) To provide robust base for processing industries of variety of livestock products to contribute to high value-added and large employment opportunities, and
- (d) To preserve lively and viable nomadic tradition as inherent culture of Mongolian society and attractive base for international tourism.

(2) Development strategy

In line with the policy direction described in Sector Report, development strategy for livestock farming to attain the development objectives proposed above is established with the following components:

- (a) Promotion of intensive or semi-intensive livestock farming following the Government policy to ensure sufficient and stable supply of meat and dairy products for growing urban population and export markets;
- (b) Re-vitalization of herders' communities based on nomadic livestock farming and culture as the basis for cultural and heritage tourism and the Mongolian model of alternative socio-economy for preservation of ecosystem;
- (c) Designation of controlled grazing land to prevent further degradation;
- (d) Increasing processing of livestock products by value chain development for higher value-added by zero-waste or total processing;
- (e) Improvement of market access for livestock products as part of export diversification; and
- (f) Application of advanced technology for production, processing and marketing of livestock products such as ICT.

3.4.3 Mining

(1) Development objectives in mining sector

Mongolia is rich in mineral resources, producing coal, copper, gold, uranium and rare metals, and recently oil as well. The mining sector has served as the driving force for high economic growth in recent years, but at the same time adverse environmental and social effects of mining are increasing concerns. As Mongolia is a land locked country geopolitically between China and Russia, there are many issues involved in the case of exporting mineral resources to third countries. In addition, the Mongolian Government has been pushing on high added value processing use of mineral resources for exports. Especially for coal, industrial development by power plants and coal chemistry such as coal gasification and liquefaction are expected.

Through the discussions with stakeholders and literature review of policy documents on these issues, the objectives of the mining development in Mongolia to be pursued may be summarized as follows:

- (a) To maintain the mining sector as the driving force for Mongolia's continuous economic growth and increase in export value;
- (b) To facilitate capital accumulation through mining development to support investments in agriculture and livestock, processing industries and other economic activities as well as various infrastructure necessary for economic diversification; and
- (c) To establish Mongolia as a model mining country for responsible mining in harmony with social and natural environment by utilizing mining activities for improvement of living environment and conservation of natural environment.

(3) Development strategy in mining sector

In line with the policy direction described in Sector Report, development strategy for mining sector to attain the development objectives proposed above is established with the following components:

- (a) Policy adjustment of mining activities to ensure modest and sustainable growth
 - ✓ Value-added production of coal for domestic and export markets

- ✓ Promotion of mineral resources production that can be processed domestically for export market
- ✓ Stable production and processing of domestic energy resources
- (b) Establishment of a comprehensive database for mineral resources to ensure sustainable mining sector
 - ✓ Promotion of geological and mineral resources survey and exploration activities
 - ✓ Introduction of advanced technology for efficient exploration, survey, analysis and extraction of mineral resources
 - ✓ Application of ICT for database management
- (c) Establishment of responsible mining
 - ✓ Establishment of principles to be applied to mining activities including ownership, licensing and contracting
 - ✓ Preparation of standard contract formats to be observed by investors and developers for mining activities
 - ✓ Establishment of environmental monitoring system by the local initiative in line with stepwise implementation of localization of development administration

3.4.4 Manufacturing industry

(1) Development objectives in industry sector

Through the discussions with stakeholders and literature review of policy documents, important issues in industry sector that should be addressed in the NCDP formulation have been identified as follows:

- (a) Promoting promising industrial clusters based on agriculture and livestock with high value-added and research for product development, and market development for exports,
- (b) Development of free trade zones and border areas,
- (c) Value-added processing of existing mining products and linkage among economic sector,
- (d) Import substitution and technology development in manufacturing sector,
- (e) Skill training linked to employment generation and job matching, and
- (f) Setting up information and incubator centers in collaboration with relevant professional association.

To address to these issues, the objectives of the industrial development in Mongolia to be pursued may be summarized as follows:

- (a) To contribute significantly to increasing value-added and employment opportunities by processing of primary products of crop and livestock farming, and mining;
- (b) To contribute to diversification of economic activities and export products;
- (c) To realize more balanced distribution of population and economic activities and reduced income disparities between Ulaanbaatar and regions by creating employment opportunities in local cities; and
- (d) Promotion of ICT industry to support a wide range of socio-economic activities to reduce consumptive use of resources in line with the alternative socio-economy paradigm.

(2) Development strategy in industry sector

In line with the policy direction described in Sector Report, development strategy for industry sector to attain the development objectives proposed above is established with the following components:

- (a) Establishment of clear distinction of roles of the private sector and the Government,
- (b) Formulation of sound, stable and transparent legal and policy framework for industrial development, and
- (c) Facilitation of products development with technology and market development for export by private investors.

3.4.5 Tourism

(1) Development objectives in tourism sector

Competitiveness and sustainability are two sides of the same coin as the quality of tourist destinations is determined by their natural environment and cultural aspects, and their integration into the local community. Mongolia has the potential to attract more tourists as an emerging destination by promoting the uniqueness of its untouched nature and the nomadic culture as well as a country redefining its cultural and social heritage through its democracy. To realize the potential, a) tour itineraries development, b) international openness, c) cooperation among stakeholders, d) improves infrastructure and services, and e) institutional mechanism for environmental sustainability are to be pursued.

To address these issues, the objectives of the tourism development in Mongolia to be pursued may be summarized as follows:

- (a) To develop tourism as a major industry supporting the new paradigm of alternative socio-economy not depending much on consumptive use of resources;
- (b) To contribute not only to economic growth and employment generation but also to preservation and enhancement of natural environment, cultural heritage and traditional/historical structures;
- (c) To enhance the image of Mongolia in the international society as the Country with environmental strength, openness and free land rich in natural beauty and culture; and
- (d) To utilize international tourism as the means to expand opportunities to communicate with other countries for knowledge and value development for new era, and research and development on advanced appropriate technology for alternative socioeconomy by utilizing the New Ulaanbaatar International Airport (NUBIA) for MICE (Meeting, incentive tour, convention and exhibition) tourism.

(2) Development strategy in tourism sector

In line with the policy direction described in Sector Report, development strategy for industry sector to attain the development objectives proposed above is established with the following components:

- (a) Establishment and strengthening of selected tour routes that appeal to international tourists due to the uniqueness of its untouched nature and the nomadic culture,
- (b) Stronger initiatives for developing tourism products based on regional and international tourism cooperation,
- (c) Open sky policy for air access including direct access points in regions and simplified visa policy,

- (d) Proactive and cooperative marketing to protect and utilize common tourism resources and ensure sustainability of tourist destinations,
- (e) Improvement of transport infrastructure such as airports and roads and tourism facilities such as hotels and restaurants,
- (f) Developing proper service stops along the main tour routes to increase benefits to local economies and to provide quality tourism information and services, and
- (g) Introduction of institutional mechanism to use tourism income for investing in fresh water, waste management and other critical issues that host communities are faces with.

3.5 Development Objectives and Strategy for Infrastructure

3.5.1 Transport and logistic infrastructure

(1) Development objectives of transport and logistic infrastructure

As the global logistics develop in the 21st century, position of Mongolia in connecting adjacent countries has been consistently increasing. Based on the analysis on existing conditions and important issues in the transport and logistic sector, and reflecting the prospects of transit trade and logistic infrastructure, the most important issues in the sector are identified as follows:

- (a) Transport development for services through strengthening spatial structure, area development with transport network, urban development and social services delivery;
- (b) Logistic infrastructure development for export and transit trade; and
- (c) Regional road development to support economic diversification.

To address these issues, objectives of the sector as part of the NCDP are defined as follows:

- (a) To strengthen the spatial structure of Mongolia;
- (b) To support diversification of economy and export products; and
- (c) To facilitate social services delivery in urban and rural areas.

(2) Development strategy for transport and logistic infrastructure

To support the attainment of the development objectives, strategy for transport and logistic infrastructure is established with the following components:

- (a) Stage-wise development of artery roads,
- (b) Prioritized improvement of sub-artery roads,
- (c) Selective improvement of roads to support industrial cluster development linking primary production areas, processing bases and export markets,
- (d) Railway development to support exports and transit trade,
- (e) Development of air transport network to ensure mobility of people throughout the Country,
- (f) Enhancement of urban functions of Ulaanbaatar and a few selected cities,
- (g) Improvement of border infrastructure to facilitate export and transit trade,
- (h) Improvement of access to major tourism areas,
- (i) Establishment of conditions to increase passengers on railway,
- (j) Removal of transport bottlenecks for export products including coal,

- (k) Improvement of rural access roads to facilitate social service delivery, and
- (l) Introduction of institutional mechanism to improve rural access roads.

3.5.2 Power and heat supply

(1) Development objectives of power and heat supply

The capacity of power supply in Mongolia provided by domestic plants/facilities is not sufficient at present, and the power is imported from the neighboring Siberian region of Russia and the Inner Mongolia autonomous region of China. Most Mongolia's energy demand is covered by coal fired power plants with remaining small amount by hydro, wind, solar and diesel stations, causing environmental deterioration. Heat supply systems that serve most urban buildings are insufficient, unreliable and deteriorating due to the lack of funds for investments and maintenance. Most important issues in the sector are a) new coal-fired thermal plants for power and heat supply, b) use of renewable energy as local energy, c) coherent policy and institutions for Ulaanbaatar, local cities and rural areas, d) demand side management to smooth out demand fluctuation.

To address these issues, objectives of the sector as part of the NCDP are defined as follows:

- (a) To ensure stable and quality supply of power and heat to support socioeconomic development of Mongolia;
- (b) To contribute to regional development by utilizing indigenous energy resources; and
- (c) To improve living environment of all the people in urban and rural areas.

(2) Development strategy for power and heat supply

To support the attainment of the development objectives, strategy for power and heat supply is established with the following components:

- (a) Application of most advanced technology for development of limited coal-fired power plants to minimize adverse environmental effects,
- (b) Promotion of local energy development based mainly on locally available renewable energy,
- (c) Establishment of regional energy companies to manage and operate power and heat supply developed by the Government,
- (d) Demand side management to smooth out seasonal and diurnal demand fluctuations for power and heat by pricing, incentive measures to encourage off-peak power use, energy saving methods and others.

3.5.3 Digital transformation and ICT

(1) Development objectives for digital transformation and ICT

Mongolia is a land-locked country with most sparse population distributed in the large territory. Mongolia has a unique characteristic that there are a large number of nomadic people in the countryside and settlers in the Ger districts around the major cities. These characteristics make development of ICT infrastructure as hardware and digital transformation (DX) as software more important and challenging. ICT infrastructure is expected to serve all the sectors of Mongolia including social services delivery, productivity improvement in economic sectors, and development administration with enhanced communications between the people and governments, and DX will enhance efficiency of infrastructure use.

To serve these functions, objectives of the sector as part of the NCDP are defined as follows:

- (a) To support digital transformation of all the socioeconomic sectors as well as the public sector;
- (b) To improve productivities significantly in all the economic sectors;
- (c) To make social services provision accessible for all the people; and
- (d) To contribute to inclusiveness and correction of information inequality or digital divide.

(2) Strategy for digital transformation and ICT

To support the attainment of the development objectives, strategy for digital transformation and ICT is established with the following components:

- (a) Accelerated application of ICT to all the sectors as the means for integrated and inclusive development in line with SDGs,
- (b) Upgrading of ICT infrastructure for the forthcoming 5G and 6G age and beyond,
- (c) Development of Agro-IT parks and industrial parks as venues for cooperation among the National Government, local governments, and private companies,
- (d) Strengthening of ICT related curricula at primary education as part of the ongoing education sector reform, and
- (e) Establishment of local information platforms of open data system allowing easy access and two-way communications between local governments and local people including nomads.

3.5.4 Urban development

(1) Development objectives of urban development

Urban development in Mongolia is characterized by a) dominant primacy of Ulaanbaatar with over-concentration of population and economic activities, b) limited secondary cities with very small population and economic activities, c) presence of the Ger district in Ulaanbaatar and larger cities settled mainly by immigrants from rural areas and local towns, and d) border areas without much urban facilities. Preparation and updating of urban development plans to cope with rapid population growth in some cities present another issue in the urban sector. To serve increasingly high demand for various urban functions in the changing society, functional division between urban centers of different size and locations should be clarified by establishing urban hierarchy.

To address these issues, objectives of the sector as part of the NCDP are defined as follows:

- (a) To upgrade the urban functions of Ulaanbaatar as a global city;
- (b) To strengthen urban functions of regional core cities for economic diversification, and
- (c) To promote complementarity of urban centers for pleasant living environment including social services delivery.

(2) Development strategy for urban development

To support the attainment of the development objectives, strategy for urban development is established with the following components:

- (a) Structural reform of Ulaanbaatar into multiple cores and city road and improvement of public transportation such as BRT, LRT and subway,
- (b) Development of satellite cities around Ulaanbaatar,
- (c) Study on possible relocation of some capital city functions to be shared with satellite cities around Ulaanbaatar and selected secondary cities,

- (d) Improvement of residential environment especially in the Ger district through redevelopment projects,
- (e) Improvement of urban planning and regulation tools,
- (f) Formulation of urban development master plans for local core cities,
- (g) Formulation of guidelines for housing planning and implementation in the Ger district, and
- (h) Formulation/updating of urban development master plans for regional core cities and local growth centers anticipating rapid population increase.

3.6 Development Objectives and Strategy for Environment

3.6.1 Environmental management

(1) Development objectives of environmental management

Five major environmental problems are enumerated by the problem structure analysis at macro level reported in Sector Report:

- (a) Environmental problems associated with mining development,
- (b) Over-concentration of population and economic activities in Ulaanbaatar,
- (c) Degradation of grazing areas,
- (d) Serious urban environmental problems in Ulaanbaatar including serious air pollution and traffic congestion, and
- (e) Desertification threat of vulnerable land.

The problem structure analysis also identified inherent problems that Mongolia faces: vast national land territory, extremely harsh winter climate, maldistribution of limited water resources, and land locked status. Climate change is another environmental challenge that Mongolia faces. Sector analysis of environment discusses also additional issues such as soil contamination, solid waste management, protected areas, biodiversity and forest management.

Given these existing conditions and issues, the objectives of environmental management for national comprehensive development of Mongolia are defined as follows:

- (a) To maintain and enhance quality of natural environment as most important capital to be used continually for sustainable and inclusive development in line with alternative socio-economy;
- (b) To establish ownership for indigenous resources endowed in regions and the Country by raising awareness of people and strengthening institutions for environmental management; and
- (c) To realize pleasant and comfortable living environment for residents in urban and rural areas throughout the Country.

(2) Development strategy for environmental management

To realize the objectives of environmental management, the strategy for environmental management is established with the following components:

- (a) Enhancement of quality of natural environment by:
 - ✓ Proper management of pastureland,
 - ✓ Protection of forest areas, watershed areas and other vulnerable areas,

- ✓ Proper land use planning and implementation for mining, infrastructure and settlement, and
 - ✓ Promotion of responsible mining and environment-friendly economic activities such as zero-waste processing.
- (b) Establishment of ownership for indigenous resources by:
- ✓ Raising awareness of people for environmental resources, and
 - ✓ Establishing locally based environmental monitoring system involving local people and administrations,
- (c) Realization of pleasant and comfortable living environment in urban and rural areas by:
- ✓ Proper planning for cities and rural settlements,
 - ✓ Provision of basic life infrastructure for water supply, sewerage, energy and waste management and disposal, and
 - ✓ Generation of decent employment opportunities based on use of indigenous resources.

(3) Objectives and strategy for climate change adaptation

As mentioned above, climate change is another serious environmental challenge that Mongolia faces. Most visible effects are higher temperature and increase in winter snow as reported in Section 5.5. Higher temperature may have some positive effects in the cold country of Mongolia. While winter snow increases, no significant changes in annual precipitation are observed. This implies that precipitation during summer has decreased, resulting in higher risk for droughts. More serious is increased risk for Dzud. With smaller precipitation during summer, pastureland is exposed to higher stress reducing carrying capacity for animals. This makes animals more vulnerable to cold weather during winter.

Given these situations, the following objectives are defined for adaptation to climate change:

- (a) To take comprehensive measures for climate change adaption as proposed by the Environmental Performance Review of Mongolia (EPRMNG) by UN in November 2018, and
- (b) To strengthen monitoring and early warning system for Dzud and droughts by regular communications between local administrations and people in remote rural areas including nomads.

Specific goals, targets and needs proposed by EPRMNG are summarized in Sector Report. Strategy for climate change adaptation should emphasize the following aspects:

- Improvement of pasture management including designation of controlled grazing areas,
- Adoption of better farming techniques such as zero-tillage farming,
- Proper water resources development and management to meet specific needs in different regions,
- Protection and expansion of forest areas to enhance water and vegetation retention capacity, and
- Establishment of effective communications system between local administrations supported by the Central Government for database and people in remote rural areas including nomads.

3.6.2 Social development

(1) Development objectives of social development

As social environment in a broadest sense is understood as an entire sphere of human-nature interactions, social development or development of social environment encompasses all the factors affecting human-nature interactions. These factors include social services affecting ability of human beings to communicate each other, institutional and social fabrics to facilitate human development, and physical infrastructure to support community development through human interactions. With these concepts,

the objectives of social development in the NCDP are defined as follows:

- (a) To improve social environment in urban and rural areas with provision of adequate social infrastructure and services and decent employment opportunities;
- (b) To enhance capacity of individual human beings by basic social services including education and health care and training for employment in viable economic activities; and
- (c) To strengthen communities with self-reliant institutional and social fabrics through development planning and implementation for community facilities such as clinics, kindergartens, and common service facilities for livestock with participation of local people.

(2) Development strategy for social development

To realize the objectives of social development, the strategy for social development is established with the following components:

- (a) Further reform of education system with respect to education performance reflecting PISA evaluation, increasing enrolment rate at pre-school, enhancement of Inclusive Education, alternative schooling for nomadic people, curricula at higher education oriented to new job opportunities etc.,
- (b) Expansion of health services oriented more to primary and preventive care, reducing disparity between urban and rural areas, and improving distribution of health personnel,
- (c) More focused provision of social protection and welfare,
- (d) Rectification of gender gaps in potentially high earning positions to be assumed by qualified women,
- (e) Continuous training and lifelong education,
- (f) Improving matching between education and job opportunities,
- (g) Step wise decentralization of development administration to re-vitalize rural areas and participatory planning and implementation of community facilities involving local people, and
- (h) Ensuring robust recovery from socio-economic shocks under COVID19 pandemic response providing in particular protection of the vulnerable.¹

3.6.3 Water resources development and management

(1) Development objectives for water resources development and management

Mongolia has rather limited water resource endowments as it is situated mostly in arid and semi-arid region with the mean annual precipitation in 200-400mm. Most precipitation in winter takes the form of snowfalls, and snowcaps remain in high mountains throughout a year. The land is covered with frozen soil during winter and the northern part is covered by permafrost. These conditions make water availability and use difficult. Concentration of population and economic activities, and therefore water demand in the capital city makes water availability even more difficult.

To cope with these situations, objectives of the sector as part of the NCDP are defined as follows:

¹ Households with disabled persons, youth, single-mother households, with recent migration, herder, elderly (UNDP, Rapid Socio-Economic Impact Assessment of COVID19 Response Measures on Vulnerable Groups and Value Chains in Mongolia, May 2020)

- (a) To enhance resilience of Mongolian people and societies in the face of climate change and other adverse effects of human interventions;
- (b) To maintain and enhance the quality of natural resources with forests and landscape;
- (c) To ensure adequate supply of water in good quality, sanitation and water-related environment; and
- (d) To contribute to economic growth and diversification with hydropower as renewable energy as well as other water-related infrastructure.

(2) Development strategy for water resources development and management

For the NCDP, water resources development and management are taken as instrument to pursue green development as important component of the basic strategy. Under the basic strategy, strategy for water resources development and management is established with the following components to support the attainment of the development objectives:

- (a) Facilitation of early implementation of hydropower development at advanced stage of preparation,
- (b) Renovation and expansion of water supply network with increased number of connected water supply kiosks,
- (c) Wastewater treatment plants renovation and construction in regional core cities and local growth centers,
- (d) Renovation and development of water sources for livestock,
- (e) Sewerage network renovation and development,
- (f) Small wastewater treatment plans at Soum centers with sewage recycling,
- (g) Improvement of sanitation and wastewater disposal in Ger district,
- (h) Feasibility studies for major water resources development projects to establish future options to meet rapidly increasing water demand for various purposes, and
- (i) Awareness raising for water saving and water recycle-oriented society.

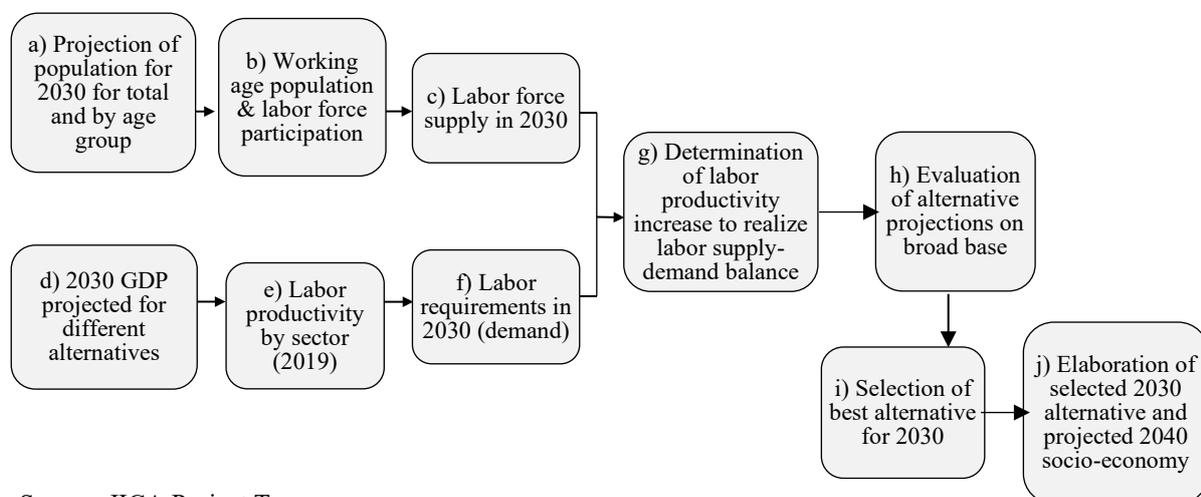
Chapter 4 Socio Economic Framework and Development Alternatives

This chapter presents socio-economic framework and development alternatives for national comprehensive development of Mongolia elaborated on the basis of the discussions with the Project Working Group (PWG) members. Early results were presented at the seminar on October 9, 2019 to the PWG members. Comments received at the seminar have been reflected in further analysis by the Japan International Cooperation Agency (JICA) Project Team (JPT) and the revised version was presented in the Interim Report (IT/R) 1. Also, the socio-economic framework was presented to a wider range of stakeholders thereafter. The socio-economic projections reported in this chapter are based on the existing conditions as of 2019 as the base year. Effects of the coronavirus disease 2019 (COVID-19) are taken into account in the revised projections reflecting forecasts by international organizations.

4.1 Objectives and Methodology

A socio-economic framework has been prepared for the year 2030 and 2040, comprising the population, employment and gross domestic products (GDP). The socio-economic framework provides future targets of development for Mongolia, presents policy directions in population and economic planning and serves as a basis for planning infrastructures.

The socio-economic framework has been prepared following the procedure shown in Figure 4.1.1, which ensures consistency between projected population, labor force and GDP. Steps to be taken for the projection procedure are as listed below.



Source: JICA Project Team

Figure 4.1.1 Procedure for Socio-economic Framework Formulation

- (a) Projection of population in 2030 for the total population and by age group,
- (b) Estimate of working age population and labor force participation,
- (c) Estimate of labor force as the supply to labor market,
- (d) Projection of 2030 GDPs under assumed growth rates for different scenarios,
- (e) Clarification of labor productivities by sector in 2019,
- (f) Estimate of labor requirements to achieve the GDP growth rates assumed in each alternative with the 2019 labor productivity levels,

- (g) Determination of labor productivity increase to realize labor supply-demand balance,
- (h) Evaluation of alternative projections on broad base,
- (i) Selection of best alternative for 2030,
- (j) Elaboration of the population estimate and GDP projection for 2030 for the selected alternative and preparation of 2040 socio-economic indices.

4.2 Population and Labor Force Projections

4.2.1 Population projections

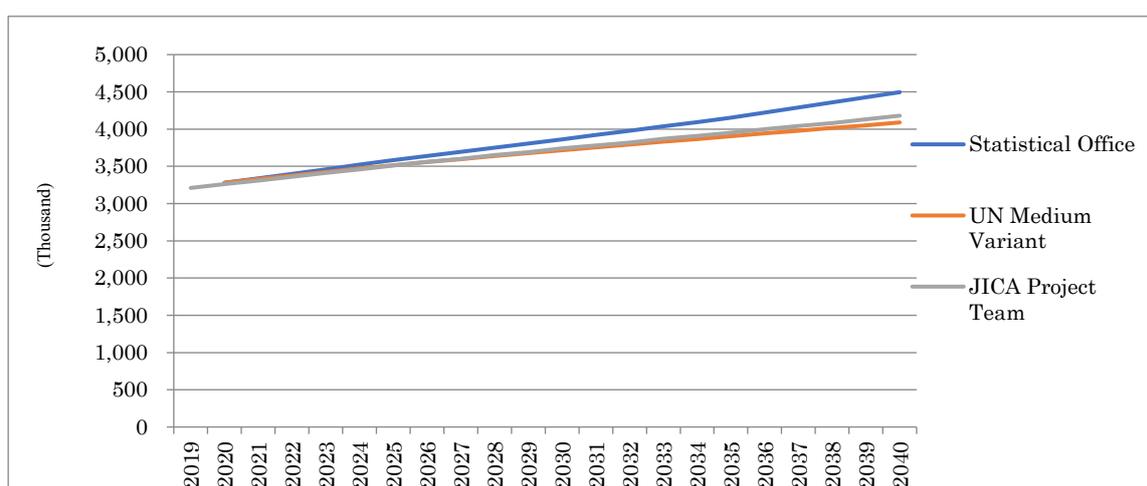
There are three kinds of population projections available for 2030. The Statistical Office of Mongolia has prepared the official population projection. The United Nations (UN) Population Division made alternative projections. The JICA Project Team (JPT) has prepared a new projection by utilizing a software called “Spectrum”. These projections estimate the population of Mongolia in 2030 at 3,863,000 by the Statistics Office, between 3,635,000 and 3,797,000 under three variants by UN and 3,740,000 by the JPT as shown in Table 4.2.1 and Figure 4.2.1.

Table 4.2.1 Population Projections by Statistical Office, UN and JICA Project Team

Year	Population (Thousand)					Total Fertility Rate				
	Statistical Office	UN			JPT	Statistical Office	UN			JPT
		High Variant	Medium Variant	Low Variant			High Variant	Medium Variant	Low Variant	
2018 (actual)	3,186					2.90				
2030	3,863	3,797	3,716	3,635	3,740	3.30	2.99	2.59	2.19	2.90
2040	4,495	4,309	4,089	3,870	4,180	3.40	2.86	2.36	1.86	2.90

Source: (i) Renewed 2015-2045 Population Projection, NSO of Mongolia; (ii) "World Population Prospects 2019", Population Division, Department of Economic and Social Affairs, UN, <https://population.un.org/wpp/> (iii) JPT projection made by using a program called “Spectrum”

Note: The values for Statistical Office projection and 2018 actual are resident population values. Those by UN and JPT are those of Mongolians total.



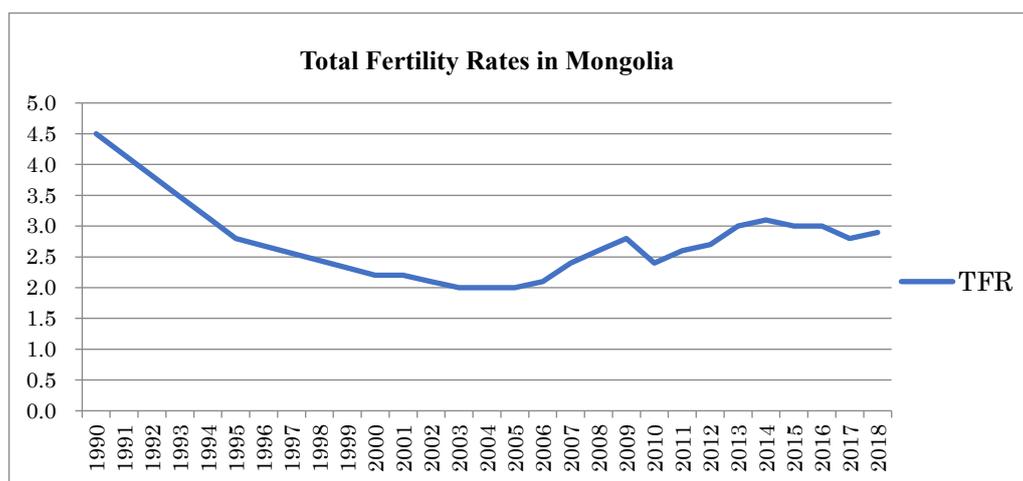
Source: (i) Renewed 2015-2045 Population Projection, Statistical Office (ii) "World Population Prospects 2019", Population Division, Department of Economic and Social Affairs, UN, <https://population.un.org/wpp/> (iii) JST projection made by using a program called Spectrum

Figure 4.2.1 Population of Mongolia until 2040 Projected by Statistical Office, UN and JICA Project Team

Total fertility rate (TFR), defined as the average total number of children born from a woman during

lifetime, is an important demographic index and its assumed value affects the future population. Figure 4.2.2 shows that TFR in Mongolia had been declining until around 2005, then continued gradually increasing until 2014 and has been remained around 3.0 since then until 2018. The Statistics Office projection assumes TFR to increase in the future, whereas the UN projections assume a continuous decline at different rates depending on the variants. The JPT's projection assumed that TFR at 2.9 in 2018 will remain constant in the future.

The Statistics Office projection is applied to socio-economic framework in consideration of its official status as the basis of various planning by different government offices. The projected population is larger and considered more desirable for Mongolia to support higher economic growth. The population projection should thus be taken rather as a policy target than a purely technical projection.



Source: Mongolian Statistical Yearbook 2016 and 2018, NSO

Figure 4.2.2 Changes in Total Fertility Rate in Mongolia

4.2.2 Labor force projections

The working age population in the Statistics Office projection estimates the population of Mongolia in 2030 by age group as shown in Table 4.2.2. It projects the working age population of Mongolia in 2030, which is the number of people between the age 15 and 64, at 2,404,000 for the total of male and female, meaning the labor force coefficient (LFC) of 62.2%.

Table 4.2.2 Resident Population of Mongolia in 2030 by Age Group Projected by Statistical Office

Unit: Thousand

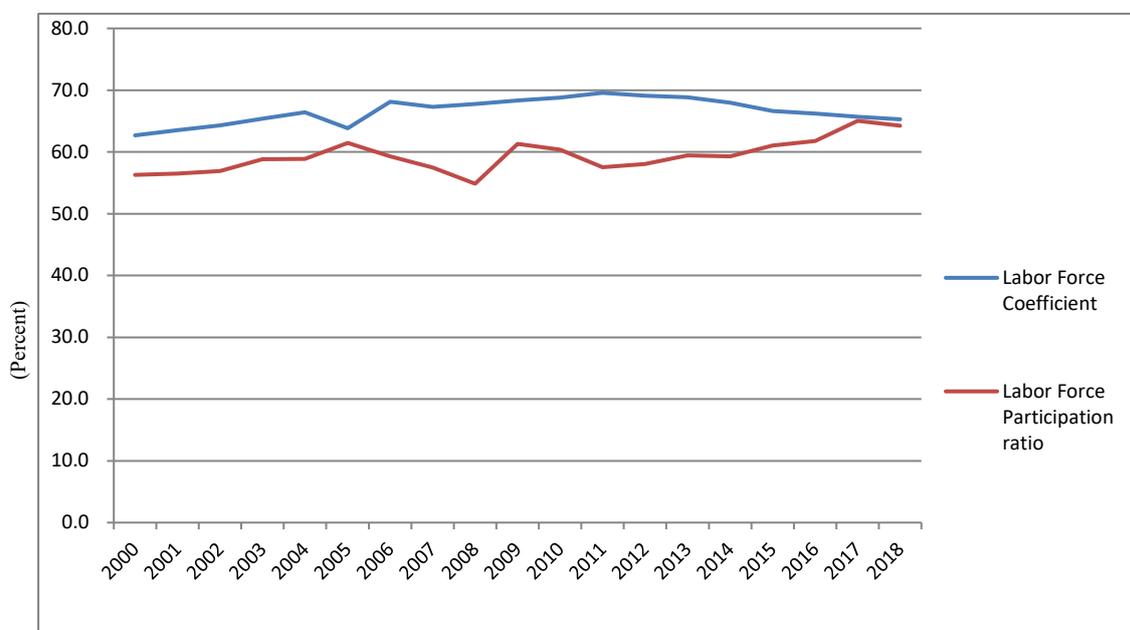
Year	Population by Age Group		
	Total	Male	Female
0-4	398,462	200,131	198,331
5-9	400,861	200,765	200,097
10-14	405,539	202,367	203,171
15-19	357,070	181,554	175,516
20-24	268,893	135,423	133,470
25-29	200,224	100,912	99,312
30-34	222,478	112,048	110,431
35-39	255,386	128,180	127,206
40-44	292,703	145,976	146,727
45-49	246,081	121,503	124,578
50-54	217,325	105,590	111,735

55-59	189,564	89,732	99,832
60-64	154,322	70,403	83,919
65-69	121,798	53,414	68,384
70+	132,102	51,538	80,564
Total	3,862,808	1,899,536	1,963,273
<i>15-65 (working age population)</i>	<i>2,404,046</i>	<i>1,191,321</i>	<i>1,212,726</i>

Source: Renewed 2015-2045 Population Projection, NSO

Labor participation rate (LPR), which is the proportion of the economically active population to the working age population, was 64.3% in 2018 in Mongolia as a whole (Figure 4.2.3). This rate is assumed to remain constant until 2030 in consideration of a balance between the both factors that would raise the rate and decrease the rate. The LPR would rise in the event that a larger proportion of women wishes to work and comes into labor market, whereas the rate would decrease in the event of more young people going to high schools, universities and other higher educational institutes. Both of these factors are likely to happen, but it would be difficult to project to what extent. It is assumed, therefore, that the effects of these two contradicting factors cancel out each other and the LPR assumed constant until 2030.

Applying the working age population and LPR in 2030, the labor supply in 2030 is estimated to be 1,567,400.



Source: Mongolian Statistical Yearbook 2016, 2017 and 2018, NSO

Figure 4.2.3 Changes in Labor Force Coefficient (LFC) and LPR in Mongolia

4.2.3 Projections of Mongolian economy

(1) Recent Mongolian economy and trend projection

Table 4.2.3 summarizes the recent trends of the Mongolian economy by sector. The performance of Mongolian economy in recent years depends much on the mining sector. The economy has slowed down in most recent years as mining has become relatively stagnant. To see the possible outcomes of development following this trend, it is assumed that the mining GDP maintains the same level up to 2030 as the share in 2018. This implies that the growth rate of the mining GDP is the same as the overall growth rate of GDP. The growth rates of agriculture, manufacturing plus utilities and service are assumed to be 4.7%, 7.0% and 7.5% per year respectively, following the trend during the 2000-2018 period shown in Table 4.2.3 (Figure 4.2.4 and Figure 4.2.5).

Table 4.2.3 GDP of Mongolia by Sector in 2010 Price

Unit: MTN million

Year	Agriculture	Mining	Manufacturing & utilities	Service	GDP
2000	1,064,152	1,235,460	478,713	2,200,963	4,979,289
2005	1,037,814	1,831,581	658,392	3,122,175	6,649,962
2010	1,144,698	2,102,158	886,238	4,625,133	8,758,226
2015	2,071,966	3,957,728	1,199,486	7,233,543	14,462,723
2018	2,340,628	3,936,676	1,590,406	8,205,381	16,073,092
2019	2,536,122	3,950,523	1,718,198	8,741,333	16,946,176
Share (%)					
2000	21.4	24.8	9.6	44.2	100.0
2005	15.6	27.5	9.9	47.0	100.0
2010	13.1	24.0	10.1	52.8	100.0
2015	14.3	27.4	8.3	50.0	100.0
2018	14.6	24.5	9.9	51.1	100.0
2019	14.9	23.3	10.1	51.6	100.0
Average annual growth rates by period (%/year)					
2000-2005	-0.5	8.2	6.6	7.2	6.0
2005-2010	2.0	2.8	6.1	8.2	5.7
2010-2015	12.6	13.5	6.2	9.4	10.6
2015-2019	5.2	-0.0	9.4	4.8	4.0
Maximum	12.6	13.5	9.9	9.4	10.6
Minimum	-0.5	-0.2	6.1	4.3	3.6
2010-2019	9.2	7.3	7.6	7.3	7.6
2000-2019	4.7	6.3	7.0	7.5	6.7

Source: Calculated by JICA Project Team using data in Mongolian Statistical Yearbook 2016, 2017 and 2018, NSO of Mongolia



Source: Calculated by JICA Project Team using data in Mongolian Statistical Yearbook 2016, 2017 and 2018, NSO of Mongolia

Figure 4.2.4 GDP Growth Rates of Mongolian by Sector between 2000 and 2018

Based on these assumptions, the GDP is projected as shown in Table 4.2.4. The projection largely duplicates the trend realized in the 2000-19 period with respect to the GDP growth by sector. The GDP values hereafter are expressed in 2019 prices consistently for the future projection purpose.

Table 4.2.4 Trend Projection of Mongolian GDP for Year 2030 in 2019 Price

Unit: MNT million

Year	2019	2030	Growth rate 2019-2030 (%/year)
Agriculture	4,062,667	6,733,250	4.7
Mining	8,799,222	17,230,988	6.3
Manufacturing & utilities	4,176,313	8,790,520	7.0
Service	15,931,144	35,297,185	7.5
GDP	32,846,794	68,051,943	6.8

Source: JICA Project Team

The trend projection shown in Table 4.2.4 incorporates no structural changes in the Mongolian economy in the following sense:

- (a) Mining products are mostly exported without processing, and their processing is at the same level as done at present; and
- (b) Processing of agro-products is limited to the present level with respect to shares.

The future of Mongolian economy represented by the trend projection may not be desirable for the following reasons:

- (a) High GDP growth is realized due mainly to mining;
- (b) The increase in mining output by 2.0 times the present level may result in serious environmental problems;
- (c) Only limited employment opportunities will be generated in rural areas and local towns due to limited processing of agro-products and mining products; and
- (d) Limited value-added despite high economic growth constrains capital accumulation in the Country.

The trend development may appear attractive, but agriculture cannot develop at 4.7 % per annum on a sustainable basis. More realistically, the growth of agricultural GDP is assumed to be 3.5% per annum on a sustainable basis. The growth of manufacturing GDP may maintain the same level at 7.0% per annum. Under these conditions, the Mongolian economy is projected as shown in Table 4.2.5. The overall growth of GDP attains 6.7% per annum, equivalent to the target 6.7% annual growth set by Sustainable Development Vision 2030 (SDV 2030). Therefore, this level of economic growth at 6.7% is used as a reference in searching a range of possibilities for socio-economic performance.

Table 4.2.5 Projection of Mongolian GDP until 2030 under Realistic Assumption on Agricultural Growth in 2019 Price (Case A)

Unit: MNT million

Year	2019	2030	Growth rate 2019-2030 (%/year)
Agriculture	4,062,667	5,931,371	3.5
Mining	8,799,222	17,230,988	6.3
Manufacturing & utilities	4,091,963	8,790,520	7.0
Service	15,931,144	35,297,185	7.5
GDP	32,884,996	67,250,064	6.7

Source: JICA Project Team

(2) Range of possibilities for economic performance

If higher proportion of mining products are processed in the Country, the same level of GDP can be

attained with lower growth of the mining sector. In an extreme case, the same level of GDP may be realized without increasing the mining GDP. This extreme possibility is examined by the projection shown in Table 4.2.6. The growth rate of agricultural GDP is assumed at the same level as the trend projection.

Table 4.2.6 Projection of Mongolian GDP with Zero Growth of Mining for 2030 in 2019 Price

Unit: MNT million

Year	2019	2030	Growth rate 2019-2030 (%/year)
Agriculture	4,062,667	5,931,371	3.5
Mining	8,799,222	8,799,222	0.0
Manufacturing & utilities	4,091,963	17,222,286	14.0
Service	15,931,144	35,297,185	7.5
GDP	32,884,996	67,250,064	6.7

Source: JICA Project Team

As shown in Table 4.2.6, the manufacturing sector would have to grow at the very high rate of 14.0% per annum to support the same economic growth as the reference case. This may be possible but probably not realistic. Therefore, the GDP is projected under a modest growth of mining at 5% per annum. The results are shown in Table 4.2.7.

Table 4.2.7 Projection of Mongolian GDP for 2030 with Modest Growth of Mining in 2019 Price (Case B)

Unit: MNT million

Year	2019	2030	Growth rate 2019-2030 (%/year)
Agriculture	4,062,667	5,931,371	3.5
Mining	8,799,222	15,049,656	5.0
Manufacturing & utilities	4,091,963	10,971,852	9.4
Service	15,931,144	35,297,185	7.5
GDP	32,884,996	67,250,064	6.7

Source: JICA Project Team

The projections presented above depend on the growth of mining or manufacturing sector as the prime drive of economic growth. These production sectors induce service sector growth to attain the overall economic growth. There exist cases that non-production services provide additional drive of economic growth. As pointed at the seminar in March 2019, the transit trade is another promising economic sector in Mongolia. Goods imported from the neighboring country of China are transported through Mongolia and exported to another neighboring country of Russia, and vice versa. Some imported goods may be processed in Mongolia into value-added products to be exported by export processing model. Even if goods are not processed, some value-added is generated within Mongolia in the service sectors of transport and storage, and some financial and insurance and administrative and support service activities.

No reliable data are available to allow estimation of such transit service activities, but by these activities the services sector GDP should attain the highest growth. For the purpose of indicative projection, the annual average growth of the services sector is assumed to be 8.0%, higher than the projections above. The projection results are shown in Table 4.2.8.

Table 4.2.8 Projection of Mongolian GDP for 2030 with Transit Trade in 2019 Price (Case C)

Unit: MNT million

Year	2019	2030	Growth rate 2019-2030 (%/year)
Agriculture	4,062,667	5,931,371	3.5
Mining	8,799,222	15,049,656	5.0
Manufacturing & utilities	4,091,963	9,123,360	7.6
Service	15,931,144	37,145,677	8.0
GDP	32,884,996	67,250,064	6.7

Source: JICA Project Team

As seen from Table 4.2.8, with the contribution of transit trade, the same level of economic growth can be attained with rather modest growth of manufacturing sector. In fact, the manufacturing GDP growth in this case is only marginally higher than the trend growth level, implying modest processing of mining and agricultural products. If the products of primary production are processed at higher rates than realized in recent years, the manufacturing GDP would grow at a higher rate and so would the GDP as a whole. This possibility is shown in Table 4.2.9.

Table 4.2.9 Projection of Mongolian GDP for 2030 Combining High Industrialization and Transit Trade in 2019 Price (Case D)

Unit: MNT million

Year	2019	2030	Growth rate 2019-2030 (%/year)
Agriculture	4,062,667	5,931,371	3.5
Mining	8,799,222	15,049,656	5.0
Manufacturing & utilities	4,091,963	10,971,852	9.4
Service	15,931,144	38,296,579	8.3
GDP	32,884,996	70,249,458	7.1

Source: JICA Project Team

4.3 Development Alternatives

4.3.1 Conditions for alternative definition

The range of possibilities for socio-economic development was examined in Section 4.2. Of these possibilities, the zero-growth of mining may not be realistic. The other four possibilities provide the basis for defining the development alternatives for Mongolian socio-economy.

For spatial development, the primacy of Ulaanbaatar is an important condition in defining macro development alternatives. Therefore, a range of possibilities for the Ulaanbaatar primacy is examined first. The primacy of Ulaanbaatar measured as the population share may increase, stay at the same level or decrease. Specifically, the primacy level is assumed to become 60%, 46% or 40% by 2040. These three alternatives are compared in Table 4.3.1.

Table 4.3.1 Comparison of Three Alternatives for Spatial Development

Alternative	I	II	III
Primacy of Ulaanbaatar	Will increase	Will stay the same	Will decrease
Primacy level of Ulaanbaatar, %	60	46	40
UB population in 2040, million	3.0	2.3	2.0
UB population increase, 1,000	1,537	837	537
UB population rate of increase, % p.a.	3.17	1.99	1.37
Population increase in other areas, 1,000	296.3	996.3	1,296.3
Population increase rate in other areas, % p.a.	0.70	2.01	2.48

Source: JICA Project Team

Under Alternative I, population in other areas will increase only at 0.70% per annum. This population increase will naturally take place in local towns, and population in other rural areas is likely to decrease. Increase in population of Ulaanbaatar at 3.17% per annum is slightly lower than the recent trend. Alternative II maintains the balance between Ulaanbaatar and other areas, preventing further dominance of the capital city. Realization of Alternative III would require deliberate efforts as the population increase at 1.37% per annum in Ulaanbaatar is much lower than the recent trend. Population in other areas is expected to increase rapidly to improve the balance between Ulaanbaatar and other regions. It is interesting to note that the rate of population increases in other areas at 2.48% per annum is close to the trend increase in population of cities other than Ulaanbaatar and cities around it, which was 2.49% per annum during 2010-17.

These alternatives were presented at the seminar in March 2019 and discussed among the PWG members. Most participants supported maintaining the current primacy level for Ulaanbaatar. The Revised Official Population Projection 2015-2045 by NSO adopts decreasing population growth from 2.1% in 2015 to 1.57% by 2045, and the primacy of Ulaanbaatar will increase steadily to 57.3% by 2045. If the population growth is higher as assumed above, the increasing primacy of Ulaanbaatar is less desirable. On the other hand, suppressing the Ulaanbaatar primacy seems unrealistic as the population growth at 1.37% per annum in Ulaanbaatar is much lower than the recent trend as shown by Alternative III. Probably, plausible levels of the Ulaanbaatar primacy would be around the current level of 45% more or less.

4.3.2 Definition of development alternatives

Based on the four projections analyzed in Section 4.2, development alternatives are defined: Case A) mining-led development, Case B) high manufacturing growth, Case C) transit trade-oriented development, and Case D) high growth hybrid development. Socio-economic indices are derived for these alternatives based on the analysis on labor demand and supply balance in the next sub-section.

4.3.3 Labor force supply and demand balance

The target sector GDP growth rates of the four alternatives examined in sub-section 4.2.3 are summarized in Table 4.3.2.

Table 4.3.2 Sector GDP Growth Rates until 2030 for Four Development Alternatives

Unit: %/year

Sector	Mining-led development	High manufacturing growth	Transit trade oriented development	High growth hybrid development
Agriculture	3.5	3.5	3.5	3.5
Mining	6.3	5.0	5.0	5.0
Manufacturing & utilities	7.0	9.4	7.6	9.4
Service	7.5	7.5	8.0	8.3
GDP	6.7	6.7	6.7	7.1

Source: JICA Project Team

Labor requirement for each case is estimated and compared with the labor supply estimated in sub-section 4.2.2. First the labor productivity by sector, defined as the value added in a sector generated by unit labor input, were estimated for 2019 as shown in Table 4.3.3. Second, rate of increase in labor productivity is assumed by sector in line with the concepts of alternative cases and the labor productivity by sector in 2030 is calculated. Finally, the labor requirement by sector in 2030 is calculated by dividing the projected sector GDP by the sector-wise labor productivity. Results are summarized in Table 4.3.4.

Table 4.3.3 Estimation of Labor Productivity by Sector in 2019

Sector	GDP (MNT1,000)	Employment (1,000)	Labor productivity (MNT/Employment)
Agriculture	4,062,667	290,160	14,001.5
Mining	8,799,222	57,923	151,912.4
Manufacturing & utilities	4,091,963	109,726	37,292.6
Services	15,931,144	688,352	23,143.9
Total	32,884,996	1,146,161	226,350.3

Source: JICA Project Team

Table 4.3.4 Estimation of Labor Productivity and Employment by Sector in 2030 for Four Cases with Assumed Rate of Increase in Labor Productivity by Sector

Case	Sector	Rate of productivity increase (% p.a.)	Labor productivity (MNT/Employment)	GDP (MNT1,000)	Share (%)	Employment (1,000)	Share (%)
A	Agriculture	3.5	20,442	5,931,371	8.8	290.2	18.6
	Mining	4.0	233,862	17,230,988	25.6	73.7	4.7
	Manuf.+utilities	4.0	57,410	8,790,520	13.1	153.1	9.8
	Services	3.5	33,789	35,297,185	52.5	1044.6	66.9
	Total		43,065	67,250,064	100.0	1,561.6	100.0
B	Agriculture	3.5	20,442	5,931,371	8.8	290.2	18.6
	Mining	4.0	233,862	15,049,656	22.4	64.4	4.1
	Manuf.+utilities	4.5	60,520	10,971,852	16.3	181.3	11.6
	Services	3.7	34,515	35,297,185	52.5	1022.7	65.6
	Total		43,151	67,250,064	100.0	1,558.5	100.0
C	Agriculture	3.5	20,442	5,931,371	8.8	290.2	18.6
	Mining	4.0	233,862	15,049,656	22.4	64.4	4.1
	Manufact.+utility	4.0	57,410	9,123,360	13.6	158.9	10.2
	Services	4.0	35,629	37,145,677	55.2	1042.6	67.0
	Total		43,220	67,250,064	100.0	1556.0	100.0
D	Agriculture	3.5	20,442	5,931,371	8.4	290.2	18.7
	Mining	4.0	233,862	15,049,656	21.4	64.4	4.1
	Manufact.+utility	4.5	60,520	10,971,852	15.6	181.3	11.7
	Services	4.5	37,559	38,296,579	54.5	1,019.6	65.6
	Total		45,164	70,249,458	100.0	1,555.4	100.0

Source: JICA Project Team

In Table 4.3.4, the rate of labor productivity increase by sector is assumed for each case as follows. For agriculture, the rate is assumed at 3.5% per annum for all the four cases, the same as the agricultural GDP growth rate, meaning the number of workers in agriculture will maintain the present level. For mining, the rate is assumed the same for the four cases at 4.0%. For manufacturing plus utilities, the rate is assumed at 4.0% for Case A and Case C but higher at 4.5% for Case B of high manufacturing

growth and Case D of high growth hybrid development. For services, the rate is assumed increase from 3.5% for Case A, through 3.7% for Case B and 4.0% for Case C, to 4.5% for Case D. For all the cases, the total labor requirement is in the range of 99.2~99.6% of the total labor supply estimated in subsection 4.2.2 at 1,567,400 in 2030.

4.3.4 Evaluation of development alternatives

The four alternatives are compared from the perspectives of urbanization and population distribution, social effects, environmental effects and development management as shown in Table 4.3.5.

Table 4.3.5 Evaluation of Macro Development Alternatives by Selected Indices

Alternative	A: Mining-led development	B: High manufacturing development	C: Transit trade-oriented development	D: High growth hybrid development
Population in 2030, thousand	3,740			
Economic growth, % p.a.			6.7	7.1
Per capita GDP in 2030, MNT thousand			17,933	18,848
Labor requirement, thousand	1,562	1,559	1,556	1,555
Manufacturing GDP growth	7.0	9.4	7.6	9.4
Service GDP growth	7.5	7.5	8.0	8.3
Urbanization and population distribution	Continued population concentration in Ulaanbaatar with increased primacy Continued out-migration of people Decrease of population in rural areas and local towns	Development of local towns with manufacturing industries and associated services Ulaanbaatar primacy at similar level as present No net out-migration of people	Development of local towns along major arteries more with services Slightly increased primacy of Ulaanbaatar with more services orientation No net out-migration of people	Large in- and out-migration Development of local towns as well as Ulaanbaatar Ulaanbaatar as global city with higher order services Better balance between regions
Social effects	Increased urban-rural disparities due to limited employment generation particularly in rural areas -Disruption of social and family ties due to continued out-migration	Reduced urban-rural disparities due to employment generation in local towns Better social and family ties due to processing of primary products and reactivated agriculture and livestock farming in rural areas and local towns	Continued urban-rural disparities due to concentration of urban population along limited arteries Social problems associated with urbanization of local towns and service-oriented development	Decrease in urban-rural disparities Large employment generation and better social and family ties in rural areas due to processing of primary products - Possible conflicts with in-migrants

Environmental effects	Adverse environmental effects due to expansion of mining Aggravation of urban environment in Ulaanbaatar due to continued over-concentration	Generation of new urban environmental problems in local towns Reduced environmental problems associated with mining	Possible aggravation of urban environment in Ulaanbaatar Generation of urban environmental problems in local towns Reduced environmental problems associated with mining	Possible aggravation of urban environment in Ulaanbaatar Generation of urban environmental problems in local towns
Development management	Increased management needs to deal with social and environmental problems Difficult development management due to limited capital accumulation	Need to support manufacturing industries for products development with technology and market development Need to deal with environmental problems in local towns by local administration	Need to expand infrastructure capacity in Ulaanbaatar and local towns High management need for Ulaanbaatar to enhance competitiveness for services Need for infrastructure development in local towns by local administration	High management needs to make Ulaanbaatar a global city Technology and skill development to support manufacturing industries Need for infrastructure development in local towns by local administration

Source: JICA Project Team

4.4 Recommended Development Alternative

4.4.1 Recommended development alternative

The four alternatives examined in Section 4.3 will have the similar level of population and employment but implications of technological development vary between them. For Case B of high manufacturing development and as Case D of high growth hybrid development, significant technology development will be required to realize the highest labor productivity. Needs for technology development in services will be required progressively for Case B, Case C and Case D. Higher growth in manufacturing with technological development tends to increase growth in services as well. Consequently, the high growth hybrid development attains the highest growth and the largest per capita GDP and is therefore considered most desirable. This alternative will realize most diversified economy in manufacturing and services together and is environmentally favorable as well as shown in Table 4.3.5.

4.4.2 Elaboration of population and GDP targets for 2030

(1) Population and labor supply

The population of Mongolia in 2030 projected by the Statistics Office was further reviewed. Such a growth assumed under the high growth hybrid scenario would be achieved through active interactions with neighbor countries. Naturally the resident population of Mongolia will come to have more international residents including ethnic Mongolians from Inner Mongolia, Buryats in Russia, Kazakh in Kazakhstan etc. Some of the Mongolians living abroad will return to Mongolia seeking better jobs, too. It will, therefore, be reasonable to assume an addition of some population in this regard.

In this connection, the existing law to limit the population of foreign residents may be modified. At present, the foreign residents are limited to less than 3% of the total population in Mongolia and those from any foreign country should not exceed 1% of the total population. As of October 2019, the 3% limit corresponds to the population of 97,154, while the total number of foreign residents in Mongolia was 25,419.

The Mongolians living abroad was estimated in sub-section 2.1.1 in 50,000-142,000 in recent years. A rough estimate of 87,300 in 2018 based on NSO statistics is taken here. It is assumed, for the purpose of projection, that about 50 % of 87,300 or 44,000, return to Mongolia by 2030. In addition, international residents from neighboring countries are estimated by using data on inbound passengers to Mongolia and foreign workers in Mongolia. The total inbound passengers may increase from 598,000 in 2018 to 2.0 million in 2030 by 3.34 times to achieve the SDV2030 target. The number of foreign workers in Mongolia is about 5,000 in recent years as shown in Table 2.1.4. This may correspond to total foreign residents of 15,000. The number of foreign residents may increase at a higher rate than the rate of increase in inbound passengers and about 4.0 times increase is assumed. Then, the number of foreign residents in Mongolia may be about 60,000 in 2030.

In total 104,000 people including international residents are added to the 2030 population. The 2030 population and labor supply will be, thus, estimated as follows.

2030 Population:	3,966,800
Working age population:	2,467,000 (assuming the same LFC at 62.2%)
Labor force supply:	1,586,000 (assuming the same LPR at 64.3%)

(2) GDP and labor productivity

The sector GDP growth rates and labor productivity were further reviewed. The required levels of labor productivity improvement to achieve the target GDP were 3.5%, 4.0%, 4.5% and 4.5% per year for agriculture, mining, manufacturing plus utilities and services respectively under the high growth hybrid development. The rates of increase in labor productivity for manufacturing plus utilities and services as assumed seem to be attainable in view of experiences in other countries as well as past trend in Mongolia. Table 4.4.1 presents the past trends of labor productivities in Mongolia. Table 4.4.2 presents the long-term trends of labor productivities in Japan.

Table 4.4.1 Rates of Changes in Labor Productivities in Mongolia

Unit: %/year

Sector	2000-05	2005-10	2010-15	2015-19	2000-19
Agriculture	-0.1	2.0	12.3	13.4	6.4
Mining	-7.1	2.8	12.3	-7.8	0.1
Manufacturing and utilities	6.1	6.1	-5.5	0.7	1.8
Service	1.6	7.5	10.1	-2.3	4.5
Total	3.3	5.6	9.3	1.4	5.0

Source: Calculated by JICA Project Team based on the data in Mongolian Statistical Yearbook 2017 and 2019

Table 4.4.2 Long-term Changes in Labor Productivities in Japan

Year	Agriculture, fishery	Mining	Manufacturing	Construction	Electricity, gas, heating, water supply, transportation, telecommunication	Wholesale, retail, restaurant, finance, insurance, real estate	Service	Public service
1955-60	5.8	20.3	7.1	7.6	8.1	5.4	3.5	1.6
1960-65	4.1	14.5	9.4	4.0	7.6	8.1	0.2	2.9
1965-70	2.3	11.3	10.9	7.9	8.1	8.7	10.8	3.3
1970-75	8.5	6.5	4.9	0.6	3.5	4.7	0.5	0.2
1975-80	0.6	10.7	5.5	-1.4	1.1	5.0	1.2	3.6
1980-85	4.9	4.0	4.0	-0.1	4.8	2.1	2.7	2.3
1985-90	3.3	1.4	4.1	5.7	2.9	4.6	-0.3	1.7
1990-95	1.7	-	1.5	-1.8	-0.4	1.2	1.1	-1.2
1955-95	3.9	9.7*	5.9	2.8	4.4	5.0	2.4	1.8

Note: * The growth rate for the mining sector at 9.7%/year is for the 1955-1990 period.

Source: Calculated by the JICA Project Team using the statistics presented in "Statistics Japan", Statistics Bureau, Ministry of Internal Affairs and Communications

(3) 2030 population by Aimag

The population of Mongolia in 2030 is distributed to Aimags based on the following assumptions:

- (a) The proportion of the population in Ulaanbaatar at 45.3 % in 2018 will remain constant until 2030 as a result of continued efforts to promote regional development; and
- (b) The population of other Aimags are estimated applying the distribution ratios of the Aimags excluding Ulaanbaatar derived from the NSO projection.

As a result, the population of Ulaanbaatar will be 1,799,000 and those of Aimags be 2,168,700 in 2030 as shown in Table 4.4.3.

Table 4.4.3 Projected Aimag Population in 2030

Region/Aimag	Statistical Office Projection for 2030					Adjusted Population Projection for 2030		
	Population (thousand)			Composition (%)		2030 Composition (%)	2030 Population	2018-30 Growth Rate (%/year)
	2018	2030 (projected)	2018- 30 Growth Rate (%/year)	2018	2030 (projected)			
Mongolia	3,186.3	3,862.8	1.6	100.0	100.0	100.0	3,967.6	1.8
<i>Western Region</i>	<i>407.2</i>	<i>440.6</i>	<i>0.7</i>	<i>12.8</i>	<i>11.4</i>	<i>13.3</i>	<i>526.1</i>	<i>2.2</i>
Bayan-Ulgii	103.8	120.2	1.2	3.3	3.1	3.6	143.6	2.7
Gove-Altai	58.3	58.5	0.0	1.8	1.5	1.8	69.8	1.5
Zavkhan	73.1	72.4	-0.1	2.3	1.9	2.2	86.1	1.4
Uvs	83.6	84.8	0.1	2.6	2.2	2.6	101.6	1.6
Khovd	88.4	104.7	1.4	2.8	2.7	3.2	125.0	2.9
<i>Khangai Region</i>	<i>600.4</i>	<i>641.3</i>	<i>0.6</i>	<i>18.8</i>	<i>16.6</i>	<i>19.3</i>	<i>765.4</i>	<i>2.0</i>
Arkhangai	96.0	100.9	0.4	3.0	2.6	3.0	120.2	1.9
Bayankhongor	88.4	98.6	0.9	2.8	2.6	3.0	117.4	2.4
Bulgan	61.8	61.8	0.0	1.9	1.6	1.9	73.8	1.5
Orkhon	103.2	106.1	0.2	3.2	2.8	3.2	127.0	1.7
Uvurkhangai	116.6	125.9	0.6	3.7	3.3	3.8	150.4	2.1
Khusvgul	134.4	148.0	0.8	4.2	3.8	4.5	176.6	2.3
<i>Central Region</i>	<i>511.4</i>	<i>506.3</i>	<i>-0.1</i>	<i>16.0</i>	<i>13.1</i>	<i>15.2</i>	<i>604.6</i>	<i>1.4</i>
Govisumber	17.5	22.0	1.9	0.5	0.6	0.7	26.2	3.4
Darkhan-Uul	104.2	105.4	0.1	3.3	2.7	3.2	125.8	1.6
Dornogovi	69.6	68.3	-0.2	2.2	1.8	2.1	81.7	1.3
Dundgovi	46.8	48.5	0.3	1.5	1.3	1.5	58.3	1.8
Umnugovi	69.1	69.3	0.0	2.2	1.8	2.1	82.5	1.5
Selenge	109.2	104.8	-0.3	3.4	2.7	3.2	125.0	1.1
Tuv	95.0	88.0	-0.6	3.0	2.3	2.7	105.1	0.8
<i>Eastern Region</i>	<i>222.6</i>	<i>227.9</i>	<i>0.2</i>	<i>7.0</i>	<i>5.9</i>	<i>6.9</i>	<i>271.7</i>	<i>1.7</i>
Dornod	82.3	81.0	-0.1	2.6	2.1	2.4	96.8	1.4
Sukhbaatar	62.6	67.7	0.7	2.0	1.8	2.0	80.5	2.1
Khentii	77.7	79.2	0.2	2.4	2.1	2.4	94.4	1.6
<i>Ulaanbaatar</i>	<i>1,444.7</i>	<i>2,046.7</i>	<i>2.9</i>	<i>45.3</i>	<i>53.0</i>	<i>45.3</i>	<i>1,798.9</i>	<i>1.8</i>

Source: (1) Mongolian Statistical Yearbook 2018 (2) Renewed 2015-2045 Population Projection, NSO

4.4.3 Population and GDP in 2040

The population and GDP for Mongolia in 2040 are estimated in the same manner based on the modified high growth hybrid alternative for 2030.

(1) Population and labor force

The population and labor force supply in 2040 are estimated as follows. The population in 2040 projected by NSO is 4,495,000. It is assumed about 50,000 Mongolian living abroad will be returning to Mongolia by 2040. International residents may increase 1.5 times to 90,000 from the number in 2030 or 60,000, the same ratio as the increase in inbound passengers from 2.0 million in 2030 to 3.0 million in 2040. Thus, the total population, working age population and labor supply in 2040 are estimated as follows.

- Population in 2040: 4,635,000
- Working age population: 2,883,000 (62.2%)
- Labor supply: 1,854,000 (64.3%)

The population thus projected for 2040 is allocated to Ulaanbaatar and Aimags with the same assumptions with those for 2030: Ulaanbaatar's share to remain at 45.3 % and the ratios among Aimags estimated by the NSO projection to be applied. The result is shown in Table 4.4.4.

Table 4.4.4 Population of Mongolia in 2040 by Region and Aimag

Aimag	2040 Population (thousand)	Aimag	2040 Population (thousand)
Mongolia	4,637.6	<i>Central Region</i>	686.8
<i>Western Region</i>	636.3	Govisumber	35.2
Bayan-Ulgii	182.7	Darkhan-Uul	142.4
Gove-Altai	77.9	Dornogovi	95.5
Zavkhan	97.4	Dundgovi	65.9
Uvs	118.3	Umnugovi	98.3
Khovd	160.0	Selenge	135.9
<i>Khangai Region</i>	893.6	Tuv	113.6
Arkhangai	139.6	<i>Eastern Region</i>	318.2
Bayankhongor	141.4	Dornod	110.4
Bulgan	81.6	Sukhbaatar	97.4
Orkhon	144.7	Khentii	110.4
Uvurkhangai	176.7	<i>Ulaanbaatar</i>	2,102.7
Khuvs gul	209.6		

Source: Estimated by the JICA Project Team

(2) GDP and labor productivities

Assuming the GDP growth rate between 2030 and 2040 at 6.7% per year, the same level as the SDV 2030 target, the growth rates and labor productivity improvement rates are derived as shown in Table 4.4.5.

Table 4.4.5 GDP Growth Rates and Labor Productivity Improvement during 2030-40

Sector	GDP Growth (%/year)	Labor Productivity Improvement (%/year)
Agriculture	3.0	3.0
Mining	5.0	5/0
Industry and utilities	7.5	6.0
Service	7.0	4.9
GDP	6.7	4.7

Source: JICA Project Team

(3) Policy implications

The following policy implications are drawn from the analysis above.

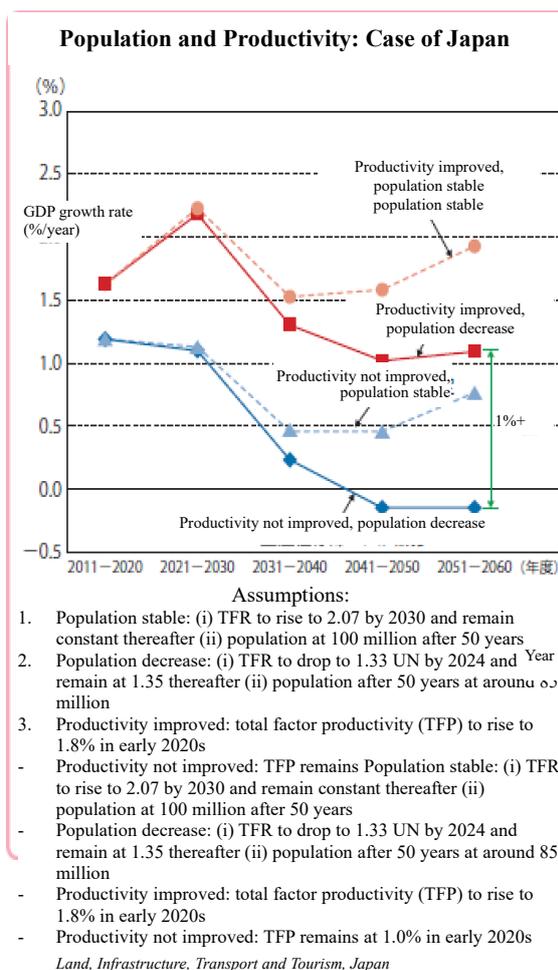
- There is a need to increase labor supply to support high economic growth. Without sufficient labor supply, such a high growth rate as the one presented above, or the target set by SDV 2030 will not be achieved. As the basis for increasing labor supply, the resident population of Mongolia should be increased with policy tools aligned to support natural growth by Mongolians and encourage international migration to Mongolia. It goes without saying that not only the quantity, but also the quality of the labor force should be upgraded through better education and skill training.
- Labor productivity, which is the value added produced by unit labor input, should be enhanced in a number of aspects such as promotion of investment, enhancement of investment efficiency and technological improvements through introducing advanced technologies and upgrading the skill levels of engineers and workers from the top level to lower level.
- The effort to enhance labor productivity should be maintained over a long term taking advantage of various technologies of the “fourth industrial revolution” such as robotics, AI, blockchain, nanotechnology, quantum computer, biotechnology, IoT, 3D printer and automatic driving.
- In determining the development policies and targets for the future, consistency should be maintained among important indicators such as population and GDP.

Box: Population and Economic Growth - Case of Japan

Japan and Mongolia share the same problem of inadequate population to support economic growth. The population of Japan has been decreasing after the peak in 2008, while the working age population has been declining since 1995. The population and working age population are projected to go down to 88 million and 45 million respectively by 2065.

According to the report by the Committee for Economic and Fiscal Advisory Specialization “The Future to Choose” in Japan, there will be a difference of GDP growth rate at 1 % point per year or more, depending on the level of productivities improvement under the population decrease scenario.

As the figure shows, GDP growth rate will begin to rise in the 2040s even in the case of population decrease as a result of productivity increase. The best scenario to be pursued would be an increase of the working age population accompanied with productivity improvement as shown in the orange line in the graph. Mongolia shares the same challenge.



Source: White Paper on Land, Infrastructure, Transport and Tourism in Japan, 2017

4.4.4 Revision of the projection in view of COVID-19

In this chapter, four alternatives were defined for long-term development of Mongolia and evaluated with respect to urbanization and population distribution, social effects, environmental effects and development management as well as the GDP projected based on the latest data for 2019. For population, the official projection by NSO was taken based on the 2018 population data. Projections of the GDP and the population should better be modified reflecting effects of recent COVID-19 pandemics, but unfortunately, they cannot be evaluated quantitatively at this stage.

Mongolia was considered one of most successful countries in containing effects of the pandemics during early stage of pandemics owing to early actions by the Mongolian Government to close schools and borders and sparsely populated land. However, the first case of domestic infection was found in November and since then the pandemics has spread fast to affect both the macro economy of Mongolia and people’s lives. The effects predicted by World Bank, IMF, UN, ADB and other international organizations during early 2020 are largely consistent.

Against the relatively sound economic growth of about 6% per annum during 2017-19, marginally negative growth of the GDP is predicted in the range of minus 1.0~2.0% for 2020. According to the World Bank, the fiscal gains of the past three years are being rapidly eroded by unprecedented revenue losses, driven mainly by a large contraction in the trade flows and spending increase including health care costs and capital expenditure as well as fiscal relief measures. These organizations also share a

relatively optimistic view on the economic recovery in the immediate future, predicting the GDP growth at 4.7~8.0% for 2021.

Recovery of the Mongolian economy will depend naturally on the economic performance of other countries, especially China and Russia. Forecasts of GDP Growth affected by COVID-19 are presented in Table 4.4.6 for selected countries and regions, for which consistent data are available.

Table 4.4.6 Forecasts of GDP Growth Affected by COVID-19

Country/Region	2020	2021
Mongolia	-5.2	4.3
China	2.0	7.9
Russia	-4.0	2.6
Developing Asia	-0.4	6.8
Major advanced countries	-5.1	4.4

Sources: World Bank Global Economic Prospects, January 2021 (Mongolia, China and Russia); ADB Development Outlook Supplement, December 2020 (others)

These forecasts have been revised downward as most countries have experienced the second and the third waves of pandemics proliferation, although no consistent forecasts are available at this stage. Mongolia has an advantage in that the economic performance of neighboring countries including China seems rather favorable, except Russia. The indigenous resources-based development to diversify the economy and export products and destinations as pursued by the NCDP will enhance the favorable position of Mongolia.

Even in the worst case, the Mongolian economy would contract in 2020 only comparable to advanced countries, and the recovery in 2021 would be at a rate higher than in most developing countries. Overall effects during 2020-21 would be zero growth at the worst. This means the economic growth in Mongolia will be delayed by just two years from the projections presented in this chapter. Thus, the GDP will increase to MNT 61,193,432 million in 2030, increased at 5.8% per annum during 2019-30.

Chapter 5 Spatial Structure for the National Comprehensive Development Plan (NCDP)

This chapter presents first spatial structure of Mongolia to be realized by planned development based on the review of existing policies and studies and also case studies of other countries. The national spatial structure encompasses urban hierarchy, artery network and land use. As supplements to this chapter, case studies of capital relocation in other selected countries and conditions for possible relocation of capital function in Mongolia are presented as references.

The second part of this chapter presents spatial analysis on water resources and climate change: two factors that affect future spatial structure of Mongolia. Water demand and supply balance is examined by mathematical models to find out Soums that may face water shortages. Effects of climate change are also analyzed on temperature, precipitation and other climatic conditions including extreme events such as Dzud and consequent water balance.

5.1 National Spatial Structure

5.1.1 National spatial planning system

The national spatial planning system in Mongolia comprises national (macro), regional/Aimag (meso) and Soum (micro) levels. To reflect national policies for spatial development and land use, principles should be established to allow each Aimag to prepare such a spatial structure and land use plan which are consistent with the national policies. Such principles should better be visualized in the form of national spatial structure and indicative land use plan. The spatial plan of the NCDP comprises such spatial structure and land use plan at national and regional levels. Table 5.1.1 shows the structure of spatial plans at national, regional/Aimag and Soum levels with basic characteristics and main contents at the respective levels.

Table 5.1.1 Structure and Contents of Spatial Plans at Different Tiers

Level	Characteristics	Contents
National (Macro)	Indicative	Spatial structure, artery transport system, urban hierarchy with functional division, indicative land use plan, location of major industrial and public facilities
Regional (Meso)	Indicative	Same as above
Aimag (Meso)	Definitive	Components of artery transport network and urban/industrial facilities in the national plan, definitive land use plan
Soum (Micro)	Definitive	Detailed land use plan, location of public/social facilities and common service facilities coordinated by respective Aimag

Source: JICA Project Team

5.1.2 Strategic approach to national spatial planning

The macro development objectives for the NCDP are defined in Section 3.3 as follows:

- (a) To diversify economic structure and export products through increasing capital accumulation;
- (b) To generate lucrative and stable employment opportunities in rural areas and local towns to reduce poverty and urban-rural disparities; and
- (c) To resolve urban environmental problems by alleviating adverse effects of over-concentration of population and economic activities in Ulaanbaatar.

To attain the macro development objectives, basic strategy for spatial plan is established also in Section 3.3 as follows.

- (a) Utilization of locational conditions neighboring on Russia and China to establish links with global markets, and
- (b) Water resources development and management as instrument of green development.

More specifically, principles for national spatial planning are established to meet the macro development objectives under the basic strategy as follows.

- (a) To strengthen urban functions of Ulaanbaatar as the gateway city in the global economy to enhance competitiveness of the national economy. The gateway city should be a major city having considerable accumulation of economic activities, rich culture, pleasant environment and population. The gateway city is designated typically at the population larger than 1.5 million in other counties as explained in Box 5.1. Ulaanbaatar is a sole city to be qualified as the gateway city. The national capital and its vicinities should enhance urban functions with quality infrastructure in such a way as to avoid causing social and environmental problems.
- (b) To create an urban hierarchy consisting of regional core cities, local growth cities and local service cities under the national capital to encourage economic activities and facilitate social services provision in local towns and rural areas.
- (c) To establish an economic corridor to link the national capital, regional core cities and local growth cities with Russia and China to enhance the transit economy.
- (d) To establish inter-Aimag corridors to link cities and centers designated at the higher tiers of the urban hierarchy to improve the development potentials and social services in rural areas and local towns.

Box 5.1 Example of National Spatial Structure in Other Countries

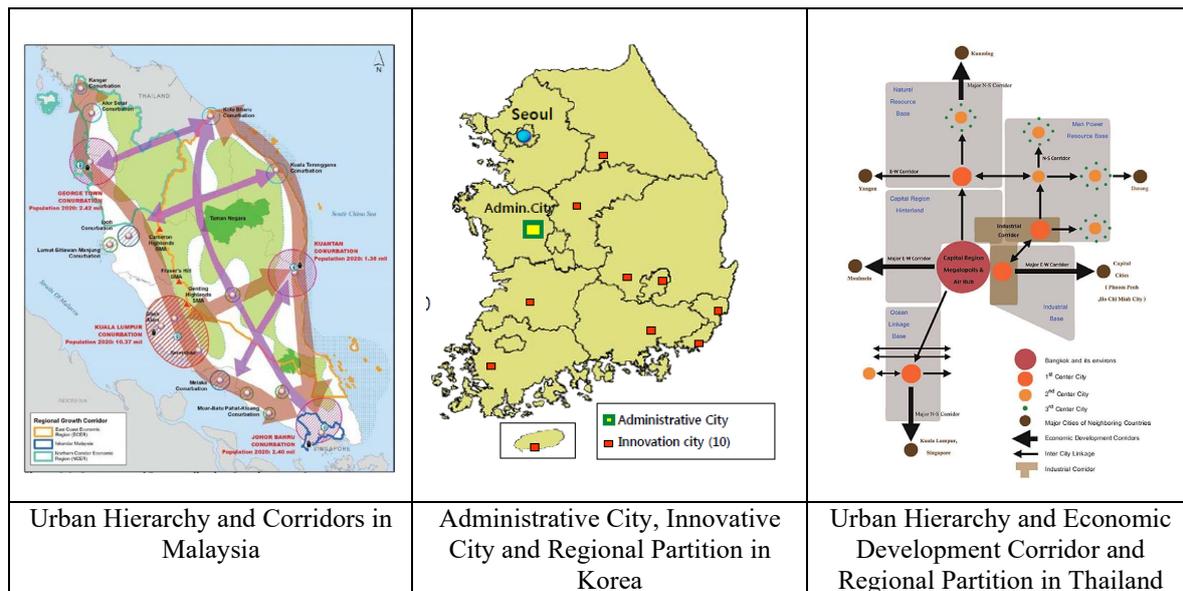
In Malaysia, the national capital and large cities more than 1.5 million are designated for the gateway city to win competitiveness in South East Asia and the global economy in the National Physical Plan 2. In Thailand, Bangkok is selected for the national gateway city to Association of Southeast Asian Nations (ASEAN) and South China in the Thailand National Spatial Development Plan 2057. Seoul and coastal large cities are the gateway cities to Pacific Ocean in The Revised 4th Comprehensive National Territorial Plan in Korea. In Germany, the metropolitan regions are considered major regions in European Union (EU) countries in Concepts and Strategies for Spatial Development in Germany. The plans and concept in those countries show the large cities with population more than 1.5 million are given the important role to drive the national economy.

			
<p>Kuala Lumpur and 3 Major Cities in Malaysia</p>	<p>Bangkok to ASEAN and South China in Thailand</p>	<p>Seoul and Coastal Large Cities to Pacific Ocean in Korea</p>	<p>Metropolitan Regions to EU Countries in Germany</p>

Source: National Physical Plan 2 of Malaysia, Thailand National Spatial Development Plan 2057, The Revised 4th Comprehensive National Territorial Plan, Concepts and Strategies for Spatial Development in Germany

Figure 5.1.1 National Spatial Structure of Malaysia, Thailand, Korea and Germany

Growth conurbation is designated at national, regional, sub-regional, state, and district levels in Malaysia. Those growth conurbations form the urban hierarchy and are interlinked via main and sub-development corridors. The sub-development corridor aims to improve the social service and economic activities in the economically lagging regions. In Thailand, three-layered cities are selected for regional center. Those cities are linked to national capital by economic development corridor and intercity linkage. In Korea, an administrative city and 10 innovative cities are designated to encourage the regional development.



Source: National Physical Plan 2 of Malaysia, The Revised 4th Comprehensive National Territorial Plan, Thailand National Spatial Development Plan 2057

Figure 5.1.2 National Spatial Structure of Malaysia, Thailand, Korea and Germany

5.1.3 Spatial plans in and links with China, Russia and Kazakhstan

Mongolia is a landlocked country surrounded by China and Russia. To reflect its geographic position in spatial planning for Mongolia, development situations in countries around Mongolia are reviewed.

(1) Spatial plans

China

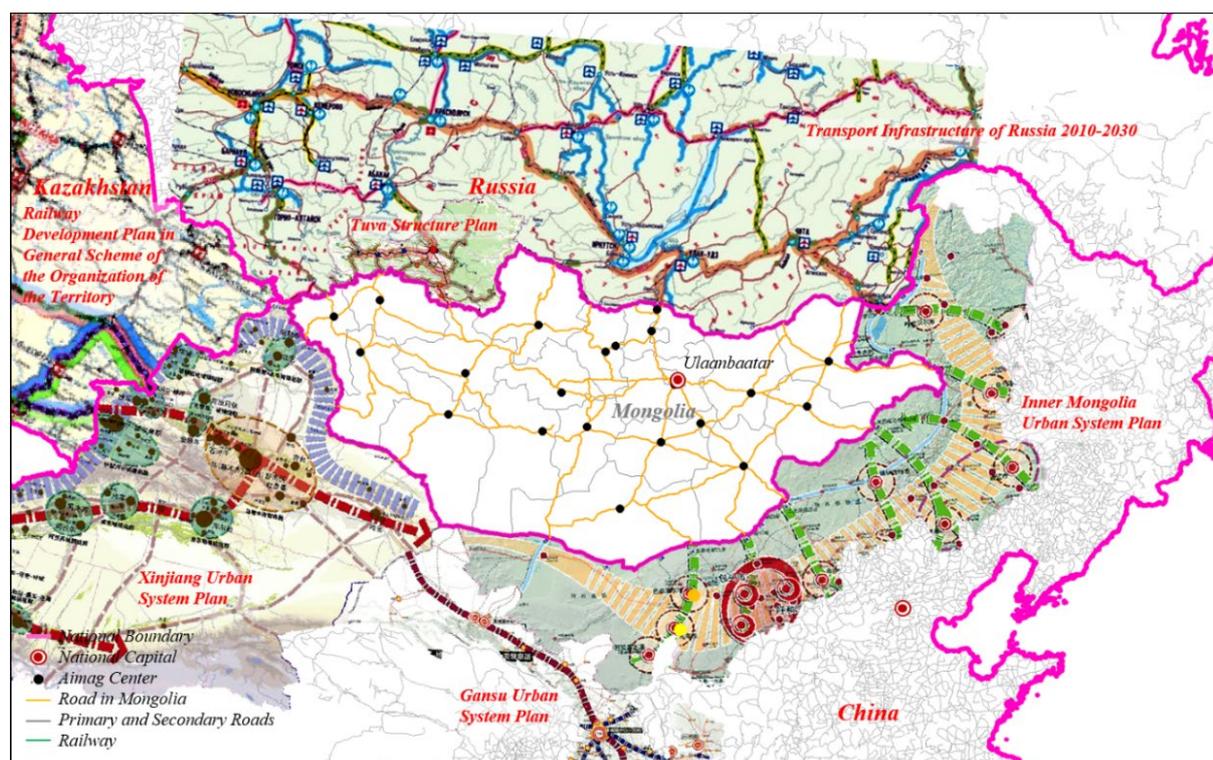
In China, the Inner Mongolia Autonomous Region, the Gansu Province and Xinjiang Uygur Autonomous Region are located adjacent to the Mongolian national borders (Figure 5.1.3). The spatial plan has been prepared for each administrative area. The international access to Mongolia is specified aiming at the material supply and tourism development for the northeast region and the material supply to the central and western regions in Inner Mongolia Autonomous Region Urban System Plan (2015-30). International access to Mongolia is specified at the point of convenient access to mineral resources such as coal and petroleum in Mongolia. In line with the proposed international access, the railway line is already put in place next to the border. In the Gansu Provincial Plan Urban System Plan (2013-30) and the Xinjiang Uygur Autonomous Region Urban System Plan (2012-30), no specific policy for development related to Mongolia is presented.

Russia

In Russia, the transport corridor via Mongolia to China is specified in the Transport Infrastructure of Russia 2010-30. The regional interlinkage with the northwestern area of Mongolia is specified in the Structure Plan of Tuva Republic.

Kazakhstan

Kazakhstan does not have a border with Mongolia. However, the government of Kazakhstan formulated the General Scheme of the Organization of the Territory for Kazakhstan. Figure 5.1.3 shows part of the general scheme as reference

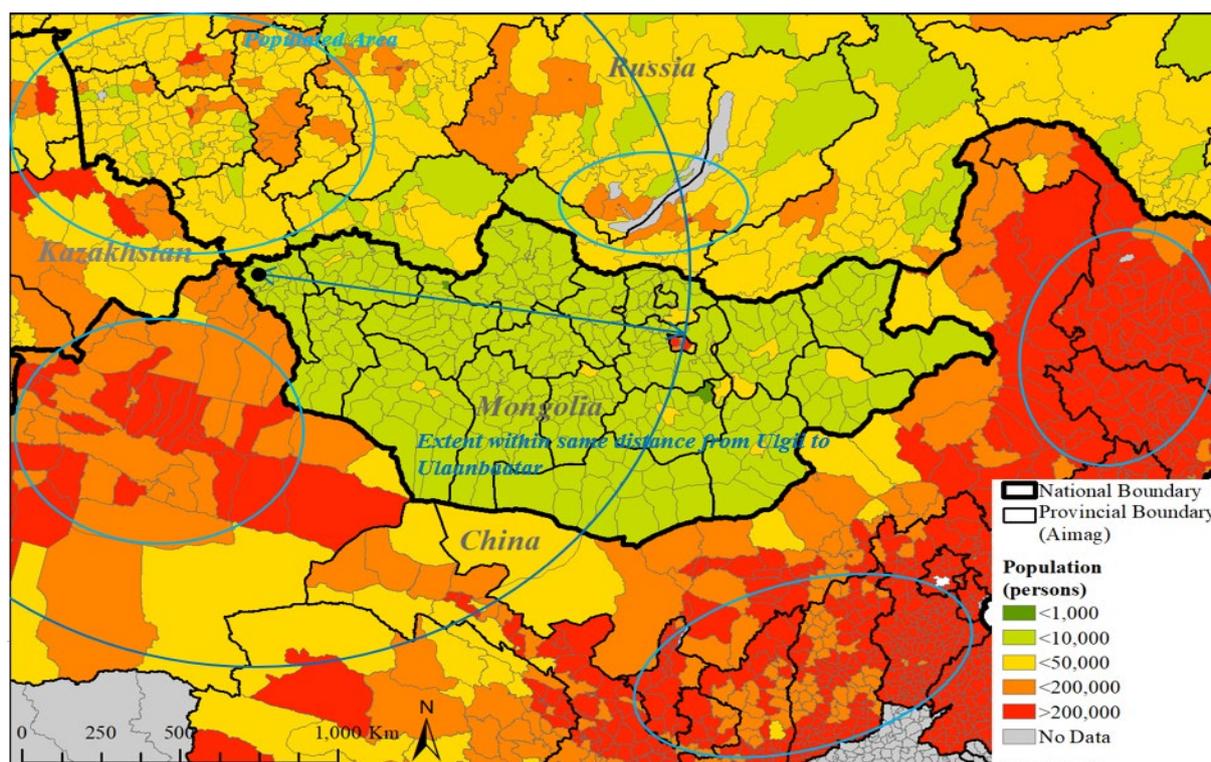


Source: Inner Mongolia Autonomous Region Urban System Plan (2015-2030), Gansu Provincial Plan Urban System Plan (2013-2030), Xinjiang Uygur Autonomous Region Urban System Plan (2012-2030), Transport Infrastructure of Russia 2010-2030, Tuva Republic Spatial Plan, and General Scheme of the Organization of the Territory for Kazakhstan

Figure 5.1.3 Spatial Plans in China, Russia and Kazakhstan

(2) Population distribution

Figure 5.1.4 shows the population distribution by the low-order administrative unit in Mongolia, China, Russia and Kazakhstan. The low-order administrative unit is Soum and district in Mongolia and cities and districts in China, Russia and Kazakhstan. The administrative units with more than 50,000 population in Mongolia are districts in Ulaanbaatar and two Soums only. In contrast, there are the large number of administrative units having more than 50,000 population in the neighboring countries. It is worthwhile for Mongolia to strengthen the links to those populated areas in the neighboring countries for pursuing economic opportunities. For instance, the Russian cities have more than 0.5 million population in Novosibirsk (1.6 million), Tomsk (0.5), Kemerovo (0.5) and Krayanorsk (1.1) within the same distance from Ulgii to Ulaanbaatar.



Source: JICA Project Team based on the data at www.citypopulation.de

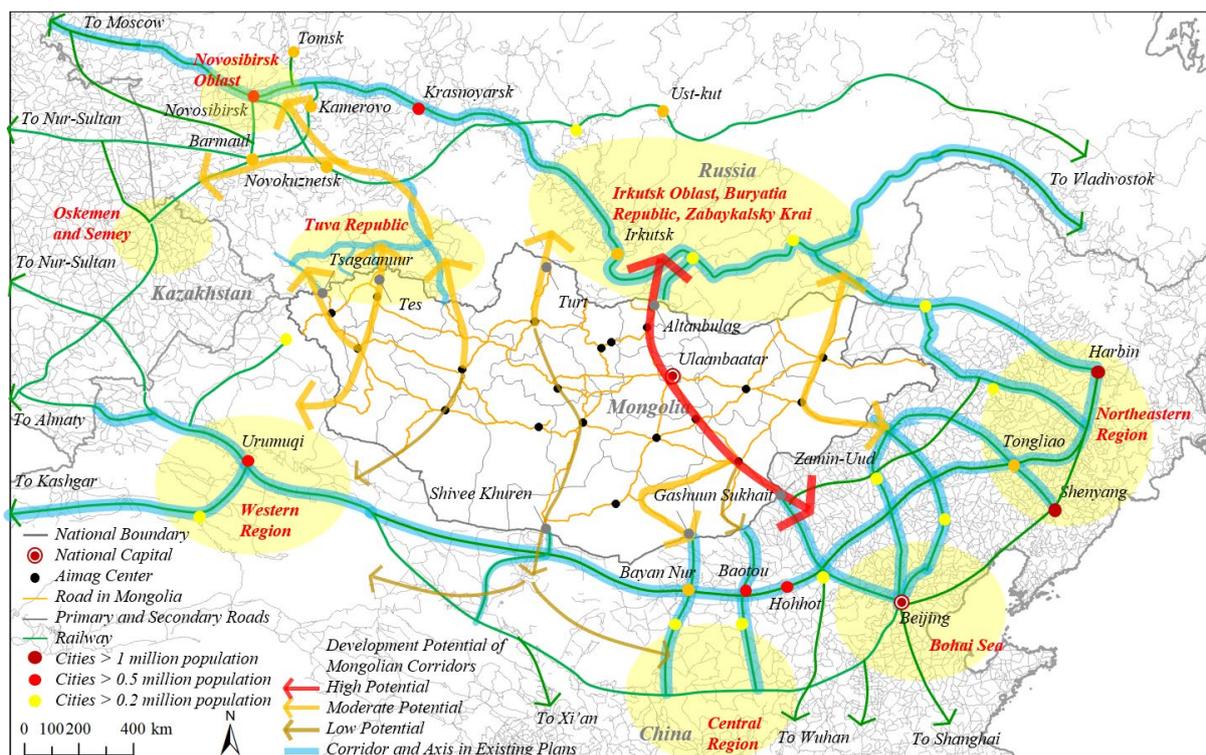
Figure 5.1.4 Population Distribution by Local Administrative Unit in Mongolia, Russia, China and Kazakhstan

(3) International access and links

The development potentials of international access connected with Russia and China are reviewed. The international access along the Sukhbaatar~Zamin-Uud route is significant to convey the commodities between Russia and China. The materials and processed products of Mongolia are other main commodities. The international access in the northwest has been developed at Tsaganuur and Khandagyty. At present, the access at Gashuun Sukhait in the southeast is main route to be used for coal supply. Once the railway construction is completed, this function will be strengthened. Accesses at Erdenet-Sagaan (east), Ereentsav (northeast), Turt (north) and Tes (northwest) presents challenges in strengthening the links with Russia and China.

The development potential of Khangai (southeast) is improved, when the transport capacity of Zamyn-Uud and Gashuun Sukhait is increased. Such situations may not be realized in the short term. The international access in the southwest will be enhanced when the social conditions become stable in the Northwestern region of China.

Figure 5.1.5 shows the Mongolian international corridors to neighboring countries reflecting the level of development potential.



Source: JICA Project Team based on Inner Mongolia Autonomous Region Urban System Plan (2015-2030), Gansu Provincial Plan Urban System Plan (2013-2030), Xinjiang Uygur Autonomous Region Urban System Plan (2012-2030), Transport Infrastructure of Russia 2010-2030, Tuva Republic Spatial Plan, and General Scheme of the Organization of the Territory

Figure 5.1.5 Mongolian Corridors with Connection to Neighboring Countries

5.2 Urban Hierarchy and Land Suitability for Urban Development

5.2.1 Urban hierarchy

The analysis on urban hierarchy is conducted to identify the regional core cities, the local growth cities and the local service cities. A regional core city is a multi-function city providing economic and social service activities for a broad area such as a group of Aimags. A local growth city is a city having specialized growth function to drive the local economy. A local service city focuses on social services function. Under those cities and centers, the Soum centers undertake a role of rural service function.

The cities to form the urban hierarchy are selected as those satisfying one of the following conditions: i) population size larger than 10,000 persons and ii) annual population growth rate higher than 4% and population size larger than 6,300 persons. In addition, Kharkhorin is included although its population growth rate is lower. Table 5.2.1 shows the target cities.

Table 5.2.1 Population of 30 Cities to be Included in Urban Hierarchy

City	Population in 2018	City	Population in 2018
Ulaanbaatar + Nalaikh + Zuunmod	1,428,037	Tsetserleg	22,138
Erdenet + Bulgan	111,251	Undurkhaan	21,857
Darkhan	86,749	Zuunkharaa	20,191
Choibalsan	46,710	Altai	18,931
Murun	40,510	Zamyn-Uud	18,930
Ulgii	36,024	Baruun-Urt	18,252
Arvaikheer	31,917	Uliastai	16,696
Bayankhongor	31,308	Choir	12,773
Ulaangom	31,279	Mandalgovi	12,443
Khovd	30,068	Bor-Undur 1)	8,981

Baganuur	29,512
Dalanzadgad	25,998
Sainshand	25,023
Sukhbaatar	23,151

Kharkhorin	8,958
Khanbogd 1)	7,200
Tsogttsetsii 1)	6,800

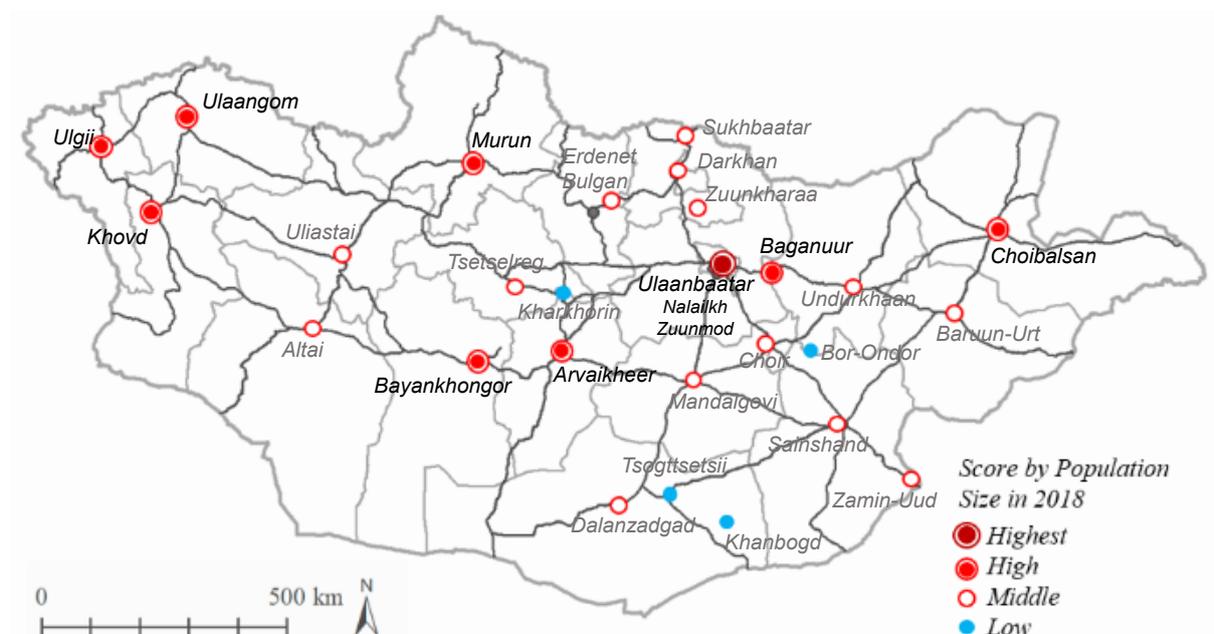
Source: National Statistics Office

Note:1) Annual growth rate higher than 4% and population size larger than 6,300

2) Conurbation of multiple cities within 100km: Ulaanbaatar (1,373,150) + Nalaikh (37,608) + Zuunmod (17,279) and Erdenet (98,652) +Bulgan (12,599)

The development potentials are evaluated for each city. Evaluation criteria are set to cover six indicators including the population, access to national capital and foreign countries, size of economy and infrastructure as listed below:

- Population size,
- Administrative status: National capital, Aimag center, other,
- Access to Ulaanbaatar,
- Gross regional domestic products (GRDP),
- Access to international trading port, and
- Infrastructure (artery road, airport, railway).



Source: JICA Project Team based on Population in 2018, National Statistics Office

Figure 5.2.1 Evaluation of Target Cities by Population Size

Evaluation of target cities by population is shown in Figure 5.2.1. Evaluation results by six evaluation criteria are scored and integrated. The cities are classified into four levels of national capital, regional core city, local growth city and local service city as shown in Figure 5.2.2. Cities at each tier are listed in Table 5.2.2 with functions of cities at each tier.

Cities designated as regional core cities and local growth cities have legal status. Correspondence between the NCDP urban hierarchy and legal designation is shown in Table 5.2.3. Also shown in Table 5.2.3 are development capacity index number evaluated by CDC based on 15 indices representing population and labor force, economy and infrastructure. The NCDP urban hierarchy and the legal designation have some discrepancies. If Bayankhongor and Sainshand are designated as state level cities, all the regional core cities are state level cities. If Undurkhan, Uliastai, Choir and Kharkhorin are removed from regional pillar cities designation, all the regional pillar cities are regional core cities. In this way, the NCDP hierarchy becomes totally consistent with the legal designation except naming. By the development capacity index, regional core cities have index value larger than 3.6 except

Bayankhongor (3.0) and Khovd (3.1), local growth cities 3.1~3.7 except Mandalgovi 2.9, and local service cities 2.7~3.3. The NCDP hierarchy designate Bayankhongor and Khovd strategically as regional core cities as they are the regional centers of Altai Region and Western Region, respectively by the new regional division proposed by the NCDP (Chapter 6).

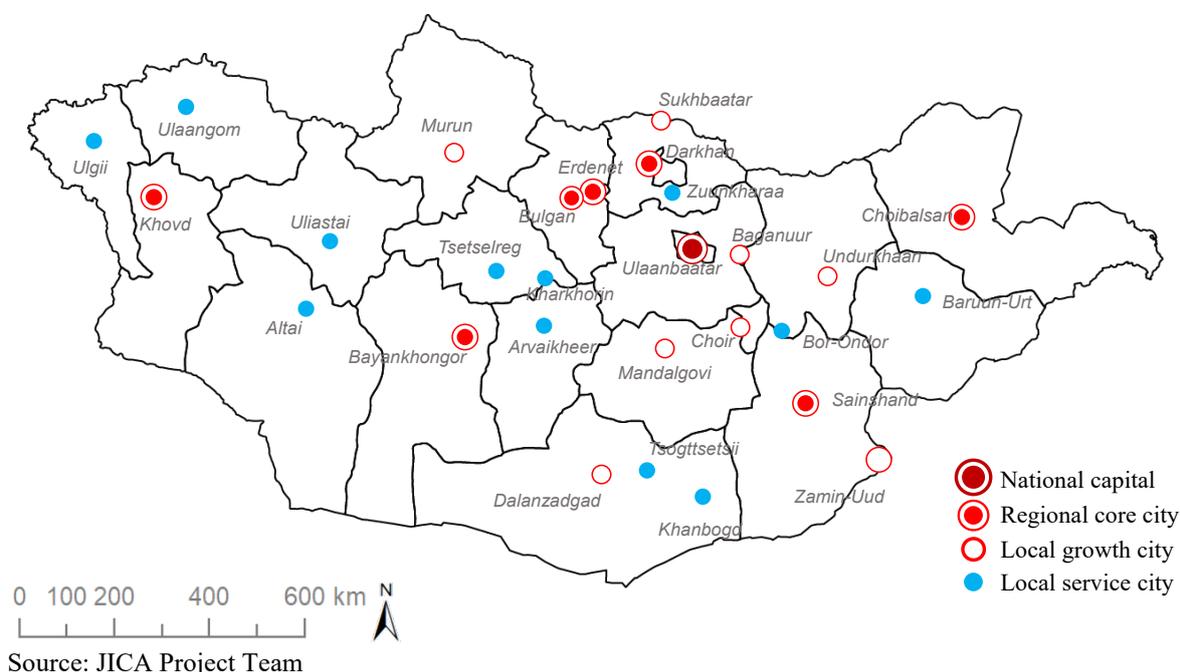


Figure 5.2.2 Urban Hierarchy without Policy Intervention

Table 5.2.2 Urban Hierarchy with Cities and Functions at Each Tier

Urban hierarchy	City	Functions
National capital city	Ulaanbaatar including Nalaikh and Zuunmod	Main political/administrative center; Global business center; Model mega green city with quality urban greenery & amenity; ICT base station & international transport, served by advanced urban transport system
Regional core cities	Erdenet including Bulgan, Darkhan, Choibalsan, Sainshand, Khovd, Bayankhongor	Multi-function city with high grade infrastructure providing economic and social service activities for a broad area such as a group of Aimags
Local growth cities	Baganuur, Choir, Zamyn-Uud, Murun, Dalanzadgad, Sukhbaatar, Undurkhaan, Mandalgovi	City having specialized growth function to drive the local economy
Local service cities	Remaining 12 cities	Center focusing on social services function

Source: JICA Project Team

Table 5.2.3 Correspondence between NCDP Hierarchy and Legal Designation and DCI

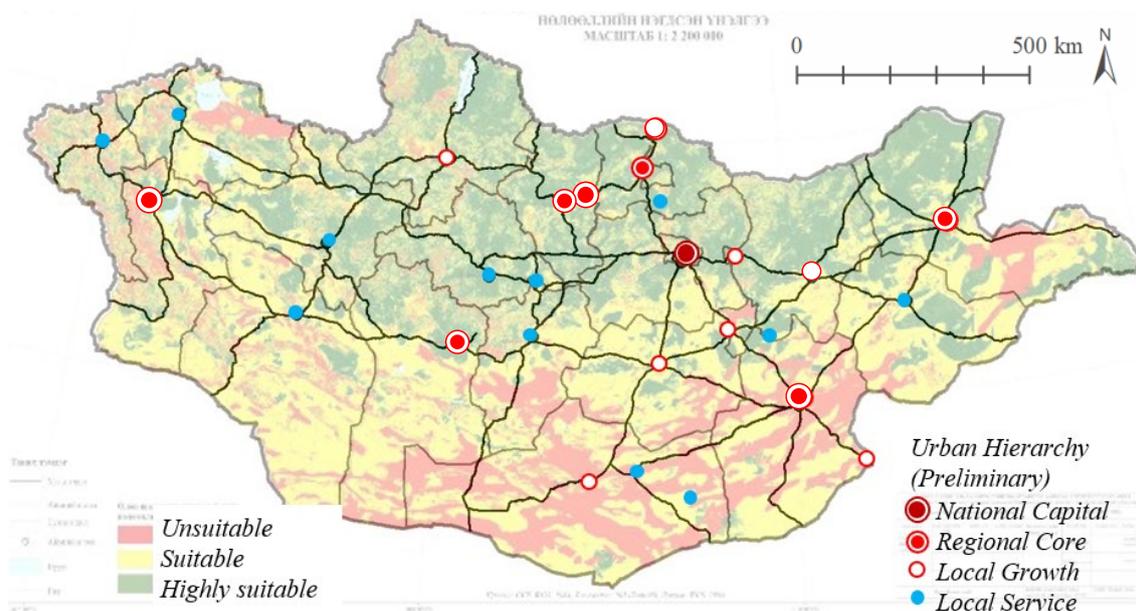
City	NCDP hierarchy	Legal status	Development capacity index
Ulaanbaatar+Nalaikh	Capital city	Capital/State level city	UB4.6, Nalaikh3.8
Erdenet+Bulgan	Regional core city	State level/Regional pillar	Erdenet4.3, Bulgan2.8
Darkhan	Regional core city	State level/Regional pillar	4.4
Choibalsan	Regional core city	State level city	4.0
Bayankhongor	Regional core city	Local level city	3.0
Khovd	Regional core city	State level/Regional pillar	3.1

Sainshand	Regional core city	Local level city	3.6
Undurkhaan	Local growth city	Regional pillar	3.3
Zuunmod	Part of national capital	Regional pillar	3.3
Uliastai	Local level city	Regional pillar	2.8
Choir	Local growth city	Regional pillar	3.2
Kharkhorin	Local service city	Regional pillar	2.7
Murun	Local growth city	Local level city	3.1
Baganuur	Local growth city		3.5
Dalanzadgad	Local growth city	Regional center	3.4
Sukhbaatar	Local growth city	Local level city	3.5
Zamyn-Uud	Local growth city	State level city	3.7
Mandalgovi	Local growth city	Local level city	2.9

Source: JICA Project Team

5.2.2 Land suitability for new urban settlement

Agency for Land Administration and Management, Geodesy and Cartography (ALAMGaC) evaluated the level of land suitability for new urban settlement in the National Land Management Plan (NLMP). The land suitability for urban settlement is classified to three levels: highly suitable, suitable and unsuitable. The cities included in the urban hierarchy analysis are geographically distributed to the lands evaluated as highly suitable and suitable although some cities are exceptionally located in unsuitable lands as shown in Figure 5.2.3. Those exceptional cities are located close to the mineral deposits. The location of the cities is generally reasonable complying with the land suitability.



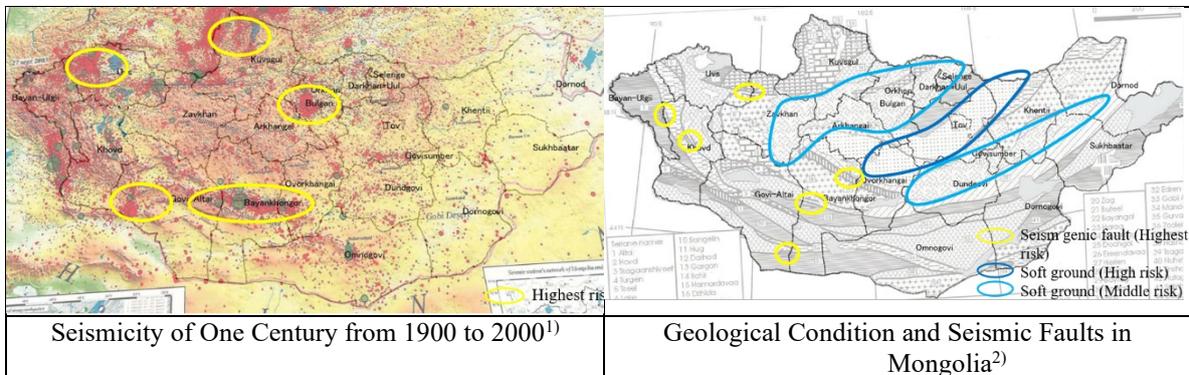
Source: National Land Management Plan, ALAMGaC

Figure 5.2.3 Land Suitability for New Urban Settlement in National Land Management Plan

The Research Center of Astronomy and Geophysics prepared a thematic map of seismicity for one century from 1900 to 2000. The seismicity map indicates the high concentration of seismicity in the southwest and the northwest of Mongolia.

Another thematic map incorporates geological, geochemical and geochronological data from more than 60 years of Mongolian, Russian and joint international studies (Figure 5.2.4). This geological map indicates the seismic faults in the southwest and the northwest. The seismic faults are potential threat to cause earthquakes. The soft grounds are hazardous as they tend to be influenced by the seismicity.

Those are distributed to the north and the northeast. As the soft grounds broadly extend to the area including the national capital and populated areas, restriction of new settlement in the soft ground area is not practicable. The application of technical regulations to facilities and institutional measures for disaster management should be applied to existing situations. Another approach is to restrict nationally important functions and hazardous facilities which heavily deteriorate the national economy and administration in areas close to highly concentrated seismicity and seismic faults.



Source: Research Center of Astronomy and Geophysics, 2) Journal of Asian Earth Sciences, November 2002

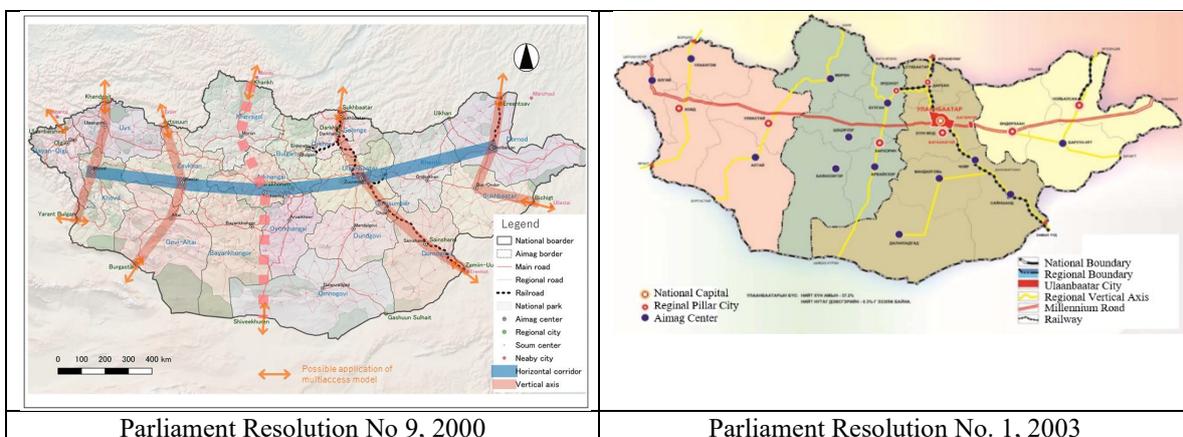
Figure 5.2.4 Seismic Risk in Mongolia

5.3 National Spatial Planning with Artery Network and Urban Hierarchy

5.3.1 Existing plans and studies related to national spatial planning

During the preparation of the NCDP, the national development policy was confirmed with the Government of Mongolia to review the national spatial structure. Two concepts are emphasized in the review, i.e., to create the east-west corridor and focus on international access for transit economy via five north-south corridors as shown in Figure 5.3.1.

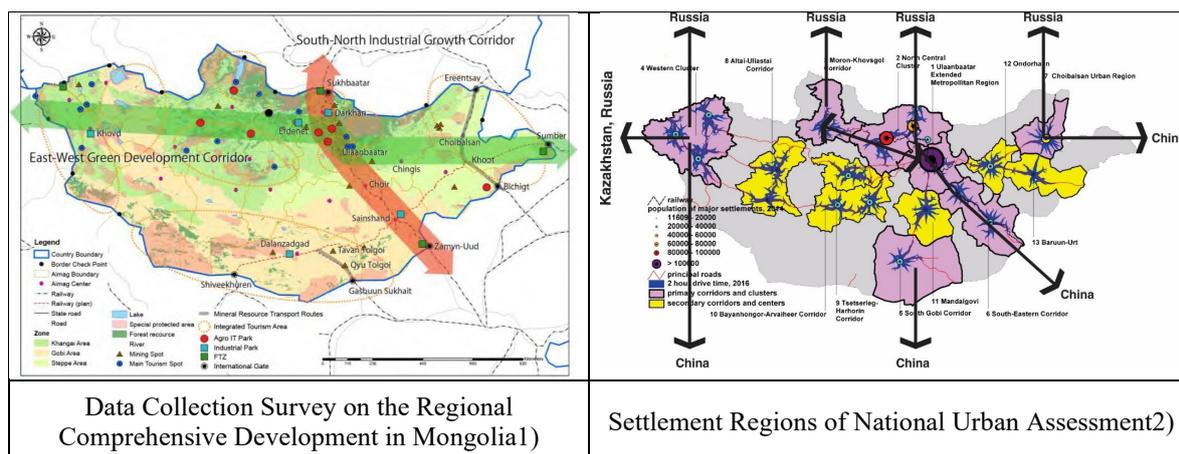
The Mongolia's National Parliament approved four Parliament Resolutions related to national spatial plans. They specify the east-west axis of Millennium Road and five north-south axes (Parliament Resolution No.9, 2000 and Parliament Resolution No. 9, 2001), the regional development concept (Parliament Resolution No. 57, 2001) and the regional pillar center cities (Parliament Resolution No. 1, 2003). The Parliament Resolution No. 57 specifies five regions of Western, Khangai, Central, Eastern and Ulaanbaatar. The Parliament Resolution No. 1 designates eight regional cities as Khovd, Uliastai, Kharkhorin, Undurkhaan, Choibalsan, Erdenet, Darkhan and Zuunmod. Figure 5.3.1 shows the spatial structure specified in Parliament Resolution No.9, 2000 and Parliament Resolution No. 1, 2003.



Source: Parliament Resolution No. 1, 2003 and Parliament Resolution No. 9, 2000

Figure 5.3.1 National Spatial Structure Specified in Parliament Resolution No. 9, 2000 and No. 1, 2003

After the Parliament Resolution No. 1 was approved, JICA and Asian Development Bank (ADB) conducted two studies that include analyses on the national spatial structure. The Data Collection Survey on the Regional Comprehensive Development in Mongolia by JICA proposes the east-west green corridor in the northern area and the north-south economic corridor via Ulaanbaatar in the east of central area. The Settlement Regions of National Urban Assessment by ADB estimated the Soum development indices. The ADB's study prioritizes international and domestic routes while it excludes the international routes in the southwest area. These proposals are shown in Figure 5.3.2.



Source: 1) JICA, 2) ADB

Figure 5.3.2 National Spatial Structure Proposed in Past Studies

The approved and proposed spatial structure implies the concept that should be reflected in the NCDP as below:

- (a) Creation of the east-west corridor to interlink regional core cities of Khovd, Uliastai, Kharkhorin, Undurkhaan and Choibalsan;
- (a) Creation of the northern east-west corridor to encourage the regional development utilizing rich environment and productive agriculture; and
- (b) Enhancement of international access in the north and the south, taking the level of development potential into account.

5.3.2 Proposed spatial structure with artery network

The national spatial structure proposed by the recent studies and adopted partly by the Parliament Resolutions is not ideal as it does not serve the entire territory of Mongolia properly. Main development areas are inclined to the east along the north-south economic corridor via Ulaanbaatar and to the north along the east-west green corridor. Four out of five north-south axes designated by the Parliament Resolution No. 9 of 2001 have not been effectively established. Location of the capital city has dominant effects on the distribution of economic activities and population. There have been proposals to transfer the capital to realize more balanced spatial distribution, and Kharkhorin or a new town nearby located close to the center of the national territory is one of the candidates.

(1) Examination of current spatial structure with five north-south axes

The national spatial structure currently effective as approved by the Parliament Resolution No. 1, 2003 consists of five north-south axes to cover the entire territory of Mongolia as well as nine regional pillar

cities designated in four regions except the Capital region of Ulaanbaatar (Figure 5.3.1). At present only one of the north-south axes passing through Ulaanbaatar is well established as the north-south economic corridor, while the four others do not have any substance in linking the national territory vertically.

At the ends of the five north-south axes, there are border ports having widely varies traffic between the neighboring countries and areas in Mongolia. These border ports are summarized in Table 5.3.1. As seen from Table 5.3.1, most border ports belong to Soums having very sparse population. Exceptions are Altanbulag with population density 450/km² and Zamyn-Uud with 39/km². Distribution of border ports shows relatively high concentration of border ports in the Western region, at both ends of the north-south economic corridor, and along the norther border with Russia near the border between Khentii and Dornod.

Table 5.3.1 Border Ports along the Borders with Russia and China

Aimag	Border port	Soum	Population density (2018) (/km)
Bayan-Ulgii	Ulaanbayshint	Nogoonnuur	1.5
	Dayannuur	Sagsai	1.6
Khovd	Yarantal Takashikyen	Bulgan	1.2
Uvs	Borshoo	Davst	0.3
	Tes Shar Shur	Tes	1.7
Murun	Khankh Mondy	Khankh	0.5
Selenge	Sikhbaatar	Tushig	0.8
	Altanbulag	Altanbulag	450
Khentii	Ulikhan	Bayan-Uul	0.9
Dornod	Erdentsav	Chuluunkhoroot	0.3
	Khavirga	Choibalsan	0.3
Sukhbaatar	Bichit	Erdenetsagaan	0.4
Dornogovi	Zamyn-Uud	Zamyn-Uud	39
Umnugovi	Gashun Sukhait	Khanbagd	0.5
	Shiveerkhuren Sekhee	Gulvantes	0.2
Govi-Altai	Burgastai	Bugat	0.3

Source: Study on border ports by CDC

Most border ports are used mainly for local trade between Aimags along the borders and their immediate neighboring countries. Border ports and shares of trade value are summarized in Table 5.3.2. As shown, the trade is dominated by the Central region and Ulaanbaatar having a combined share of 90% of export value and 96% of import value. The Eastern region has 7.3% export share and 2.1% import share, and the Western region has 2.5% export share and 1.3% import share. The export and import shares of the Khangai region is negligible.

Table 5.3.2 Border Ports and Export and Import Shares by Region, 2018

Region	Border ports	Export share (%)	Import share (%)
Central	Altanbulag, Zamyn-Uud, Shiveerkhren, Gashuunskhait, UB	44.8	81.9
Capital	Ulaanbaatar	8.1	51.2
Eastern	Erdentsav, Khavirga, Bayan Khoshuu, Bichit	7.3	2.1

Western	Tsagaanuur, Dayannuur, Burgastai, Artssuuri, Borshoo, Bulgan	2.5	1.3
Khangai	Khankh	0.0	0.0

Source: Study on border ports by CDC

From the viewpoint of border trade, the north-south economic corridor passing through Ulaanbaatar is the only viable link. The north-south axis passing through the Western region may have higher potential due to the relatively active local trade between the Aimags and both of Russia and China. For the north-south axis in the Eastern region, alternative links may be conceived between two border ports in the north and Bichit in the south. The north-south axes linking Zavkhan and Govi-Altai and through the Khangai region have the least potentials. In view of development areas in Russia and China shown in Figure 5.1.5, the north-south axis in the Eastern region may be slightly more promising than the three other axes except the north-south economic corridor.

(2) Concepts of ring artery

The national spatial structure of Mongolia, however, should be strengthened without undermining urban functions of Ulaanbaatar essential in the global world based on the concentration economy. A new ring artery is conceived to strengthen the national spatial structure, linking cities in Western, Khangai, Central and Eastern Regions effectively as shown in Figure 5.3.3.

As shown in Figure 5.3.3, Khovd and Bayankhongor are upgraded from local growth centers to regional core cities in the future urban hierarchy in view of improving regional balance of the national development. Larger cities linked by the ring artery are: Uliastai in Western Region, Murun, Bayankhongor and Arvaikheer in Khangai Region, Choir, Darkhan and Erdenet in Central Region, and Undurkhaan in Eastern Region.

The ring artery can be established by utilizing existing road sections with some modifications or upgrading. While existing artery roads link major local cities with Ulaanbaatar separately, the ring artery will link major local cities mutually inducing the growth of these local cities. Consequently, the northern and the southern sections of the ring artery would become parts of main east-west artery roads as analyzed in the next paragraph (2).

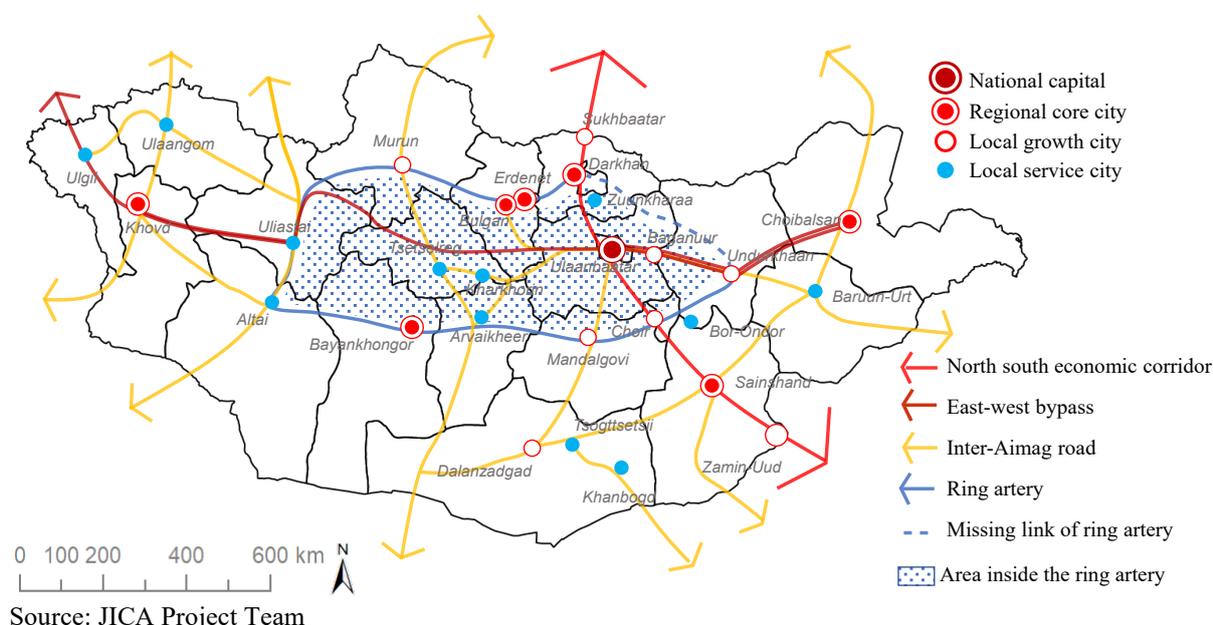


Figure 5.3.3 National Spatial Structure with Conceived Ring Artery

The conceived ring artery has the following characteristics favorable for more balanced spatial development of Mongolia:

- (a) The area inside the ring artery may be developed as the core region supported by high grade infrastructure to lead the Mongolian development in the 21st century;
- (b) Some of the important urban functions of Ulaanbaatar will be effectively transferred and shared by the cities along the ring corridor;
- (c) Urban functions of Uliastai at the western end of the ring artery will be upgraded to strengthen the link of Western Region to the capital;
- (d) Urban functions of Undurkhaan at the eastern end of the ring artery will be upgraded to strengthen the link of Eastern Region to the capital;
- (e) The northern section of the ring artery will link the Aimags and cities in the border areas with Russia to realize tourism and trade development potentials; and
- (f) The southern section of the ring artery will improve the access from the Aimags bordering on China to the advanced region to the north.

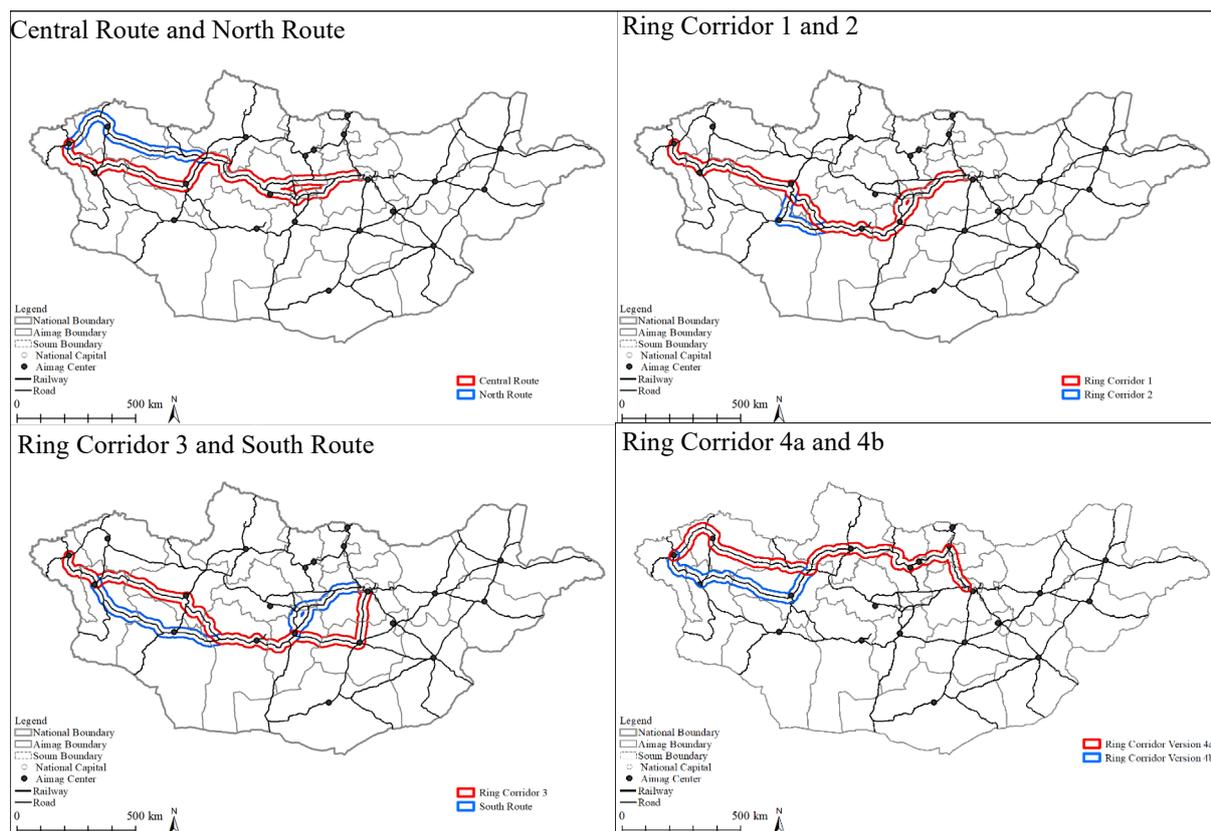
This ring artery will affect urban functions of cities along and close to the artery. Urban hierarchy should be strengthened by reflecting expected urban functions of these cities as a result of the ring artery establishment. In other words, certain urban functions should be deliberately strengthened in selected cities.

(3) Analysis on alternative east-west routes

While the conceived ring artery has many potential advantages as listed above, it is unrealistic to establish it in the near future as high-grade highways due to large investment costs involved. Different sections of the ring artery should be improved in steps as part of overall road network improvement. In particular, some sections of the ring artery constitute parts of alternative east-west routes. Therefore, these alternative routes are examined to determine priority for improving road sections related to the ring artery.

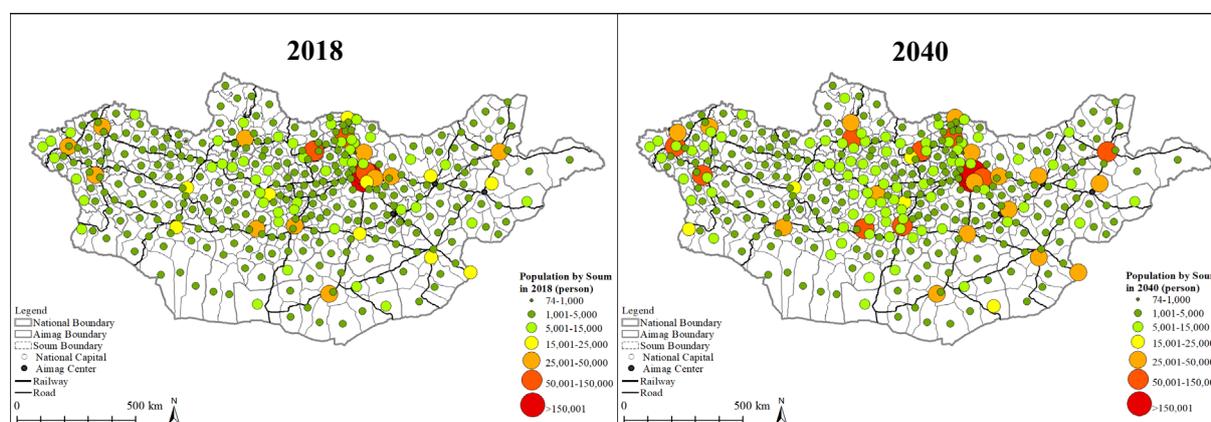
Eight alternative routes are defined to link the western part of the Country from Ulaanbaatar as shown in Figure 5.3.4. Each route serves many Soums along the alignment, and the population served by each route indicates significance of the route. An index is defined by dividing the total population in Soums along the route by the route length, which may be called line density. Population size by Soum in 2018 and the projected population by Soum in 2040 are shown in Figure 5.3.5. Data on the number of Soum centers, road length and line density are summarized in Table 5.3.3.

Evaluation indices with criteria and weighting factor for overall evaluation are presented in Table 5.3.4. Results of evaluation are summarized in Table 5.3.5 and the four highest ranked routes are shown in Figure 5.3.6. If the population within 50km from each route is taken instead of Soum population, slightly different results are obtained as summarized in Table 5.3.5. In particular, rank of the central route is reduced. If the population is attributed to a route closest to the route within 120km, Ring corridor 4a and Ring corridor 4b have the largest attributed population as shown in Table 5.3.6.



Source: JICA Project Team

Figure 5.3.4 Eight Alternative Routes from Ulaanbaatar to the West



Source: JICA Project Team

Figure 5.3.5 Population Size by Soum in 2018 and 2040

Table 5.3.3 Estimated Population within 20km, Road Length and Travel Time of Each Route

Route	Soum center	Population (Density base)		Population (All population in Soum center)		Road length (km)	Population per km (person/km)		Population per km (person/km)		Travel time (hr.)
		2018	2040	2018	2040		2018	2040	2018	2040	
Central Route	37	186,906	337,200	235,291	387,996	1,657	113	204	142	234	21
North Route	34	155,037	259,697	175,441	269,582	1,562	99	166	112	173	20

Ring Corridor 1	36	212,641	399,784	252,690	434,154	1,795	118	223	141	242	22
Ring Corridor 2	37	219,450	411,516	271,510	465,601	1,899	116	217	143	245	24
Ring Corridor 3	31	214,280	412,562	252,371	445,622	1,910	112	216	132	233	24
Ring Corridor 4a	34	362,110 (267,234)	575,664 (438,699)	384,058 (289,182)	564,239 (427,274)	1,764	205	326	218	320	22
Ring Corridor 4b	37	394,032 (299,156)	653,245 (516,280)	443,908 (349,032)	682,652 (545,687)	1,811	218	361	245	377	23
South Route	34	207,986	395,670	253,527	440,972	1,710	122	231	148	258	21

Source: JICA Project Team

Table 5.3.4 Evaluation Indices with Criteria and Weighting Factor to Evaluate Alternative Routes

1) Evaluation criteria

Criteria	Population Density Base			All Population in Soum Center (Reference Only)		
	High	Moderate	Low	High	Moderate	Low
Number of Soum (location)	37~	~36	~33	37~	~35	~34
Population within 20km in 2018 (person)	250,001~	~200,001	~200,000	300,001~	~250,001	~250,000
Population within 20km in 2040 (person)	450,001~	~400,001	~400,000	500,001~	~450,001	~450,000
Population per km in 2018 (person)	151~	~116	~115	201~	~136	~135
Population per km in 2040 (person)	251~	~225	~225	301~	~251	~250
Travel time (hour)	~21	~24	~28	~21	~24	~28

2) Estimates weighting factor for criteria

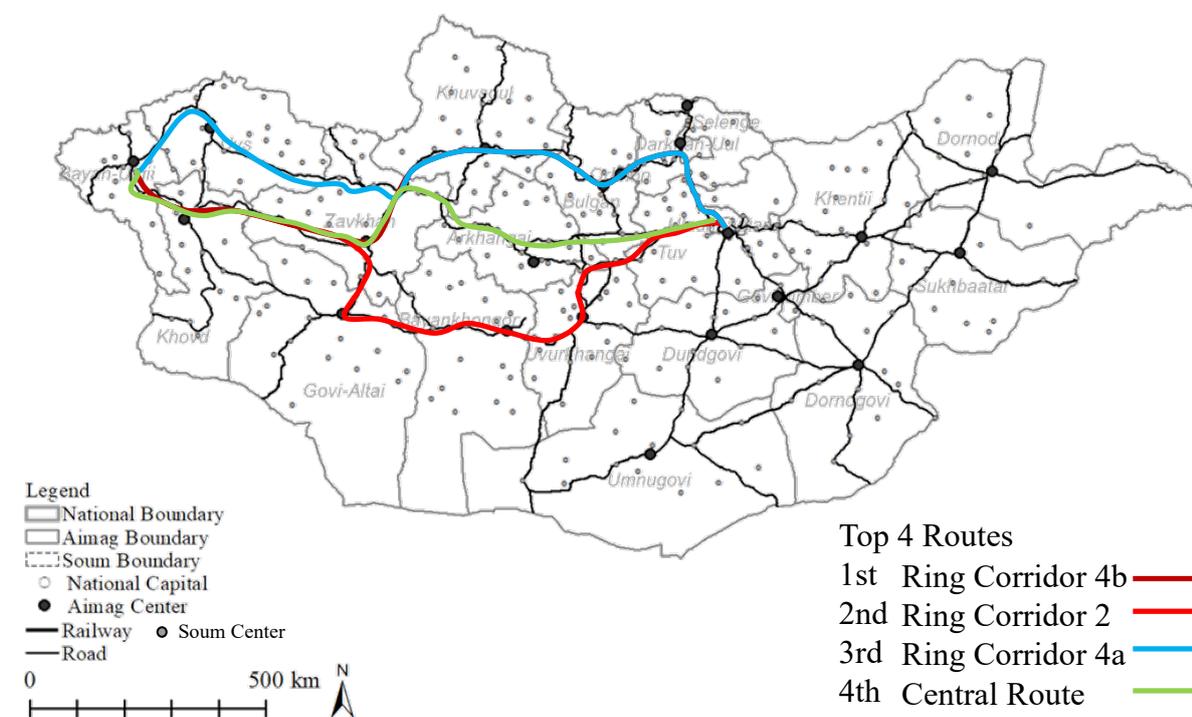
Criteria	Number of Soum	Population within 20km in 2018	Population within 20km in 2040	Population per km in 2018	Population per km in 2040	Travel time	Geometric Average	Weighting Factor
Number of Soum	1	3	6	5	7	3	3.516	0.423
Population within 20km in 2018	1/3	1	4	3	5	1	1.648	0.198
Population within 20km in 2040	1/6	1/4	1	1/3	3	1/4	0.467	0.056
Population per km in 2018	1/5	1/4	3	1	4	1/4	0.729	0.088
Population per km in 2040	1/7	1/4	1/3	1/4	1	1/4	0.301	0.036
Travel time	1/3	1	4	3	5	1	1.648	0.198

Source: JICA Project Team

Table 5.3.5 Results of Evaluation for Alternative Routes

Alternative Route	Population Density Base		All Population in Soum Center (For Reference)	
	Evaluation Score	Rank	Evaluation Score	Rank
Central Route	2.243	4	2.331	4
North Route	1.820	7	1.820	7
Ring Corridor 1	1.944	6	2.000	6
Ring Corridor 2	2.423	2	2.423	2
Ring Corridor 3	1.489	8	1.453	8
Ring Corridor 4a	2.379	3	2.379	3
Ring Corridor 4b	2.802	1	2.802	1
South Route	2.142	5	2.198	5

Source: JICA Project Team



Source: JICA Project Team

Figure 5.3.6 Four Highest Ranked Routes to Link Ulaanbaatar and the West

Table 5.3.6 Evaluation of Alternative Routes Based on Population within 50km from Each Route

Route	Population density base				All population in Soum center			
	Pop. in 2018	Pop. in 2040	Evaluation score	Rank	Pop. in 2018	Pop. in 2040	Evaluation score	Rank
Central Route	310,784	517,473	1.876	7	335,027	521,694	1.944	5

North Route	297,857	472,635	1.908	6	319,914	466,357	1.908	7
Ring Corridor 1	325,425	563,674	1.912	4	358,606	575,983	1.912	6
Ring Corridor 2	345,915	598,599	1.912	4	377,885	607,964	2.000	4
Ring Corridor 3	302,355	542,319	1.255	8	316,834	530,118	1.255	8
Ring Corridor 4a	520,542 (375,274)	799,738 (600,737)	2.802	1	576,578 (431,310)	813,697 (614,696)	2.802	1
Ring Corridor 4b	533,985 (388,717)	845,265 (646,264)	2.802	1	591,691 (446,423)	869,034 (670,033)	2.802	1
South Route	331,766	575,183	2.198	3	369,336	592,431	2.198	3

Source: JICA Project Team

Table 5.3.7 Population within 120km from Closest to Each Route

Route	2018	2040
Central Route	213,653	311,418
North Route	232,195	370,786
Ring Corridor 1a	244,051	377,953
Ring Corridor 1b	234,096	361,886
Ring Corridor 2a	255,263	395,041
Ring Corridor 2b	245,308	378,974
Ring Corridor 3	242,097	379,020
Ring Corridor 4a	611,298 (466,030)	929,113 (730,112)
Ring Corridor 4b	568,034 (422,766)	828,251 (629,250)
South Route a	309,827	509,334
South Route b	299,872	493,267

Source: JICA Project Team

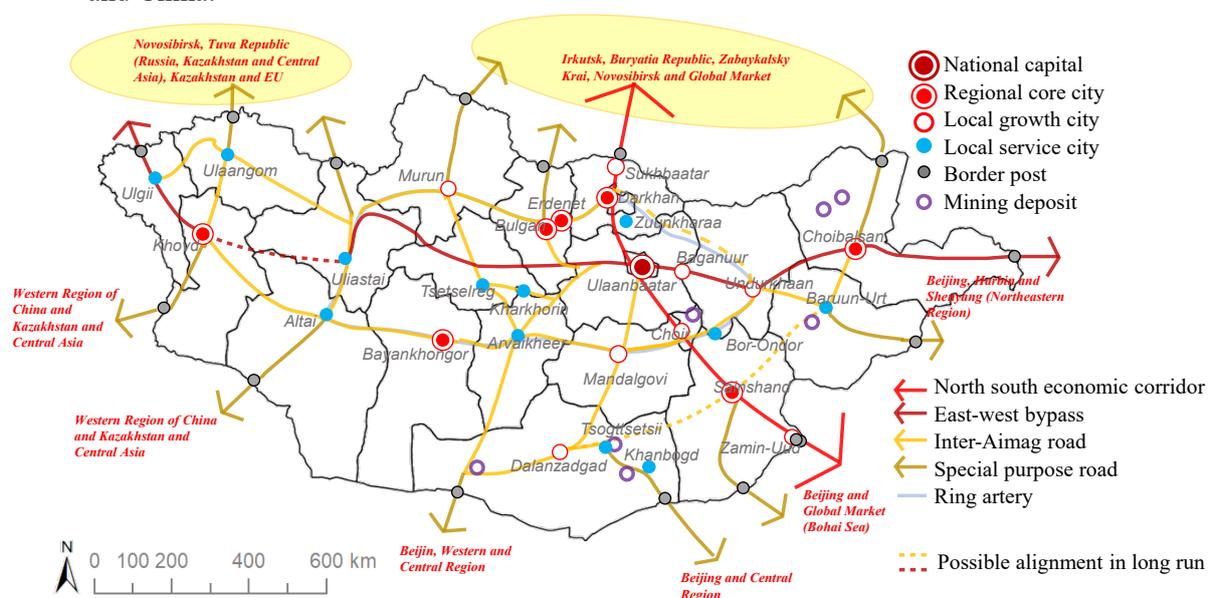
From the results, the following are concluded:

- (a) Ring corridor 4a is most significant as the east-west route linking the western part of the Country from Ulaanbaatar, which in fact is the main route at present,
- (b) Ring corridor 4b will become significant if the link between Uliastai and Khovd is improved,
- (c) Ring corridor 2 is second most important if the link between Uliastai and Khovd is improved, but less important than Ring corridor 4b in terms of population served along the route, and
- (d) Central route is less important than the three routes in terms of population served along the route but provide an important link between Uliastai and Khovd.

(4) Proposed spatial structure

Based on the results of analysis on alternative east-west routes, the national spatial structure in 2040 is proposed as shown in Figure 5.3.7. The following are reflected in the national spatial structure:

- The north-south economic corridor will continue to interlink the border city of Sukhbaatar at the Russian border and Zamyn-Uud at the Chinese border through Ulaanbaatar;
- A future ring corridor will emerge, although some sections will be still weak in 2040;
- A strong east-west development axis will be established, which may serve as a bypass once the ring artery is established; and
- Inter-Aimag roads extend from the future ring artery and improve international access to Russia and China.



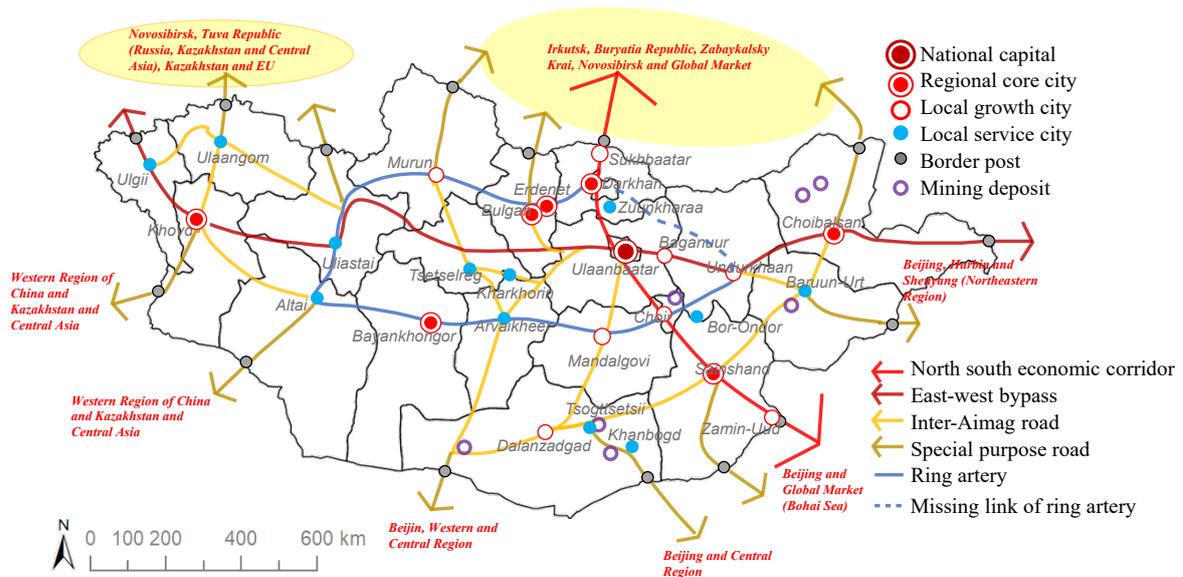
Source: JICA Project Team

Figure 5.3.7 Proposed Spatial Structure of Mongolia in 2040

Eventually, the national spatial structure will be further strengthened with the ring artery fully established as shown in Figure 5.3.8. The urban hierarchy in the future reflecting policy intervention is also shown in the figure. The national capital, regional core cities and local growth centers will be interlined effectively by the ring artery. The northern section of the ring artery will go through productive pasture, farmland, forest and tourism areas in the nature represented by the Khuvsgul lake. It will form a green corridor for tourism and trade which do not involve much consumptive use of natural resources. The southern section will connect regional core cities and local growth centers which serve Aimags in the south to facilitate domestic trade of commodities and processed products as well as provision of higher order services.

From the ring artery, the north-south axes will be strengthened and extended to China, Russia and Kazakhstan. The regional core cities, local growth cities and local service cities are connected by inter-Aimag roads as secondary arteries. Inter-Aimag arteries link Aimag centers and main cities to the neighboring countries as well.

At present, approximately 1.8 million population (or 54% of total population) reside in the inner area within the ring artery. The inner area is endowed with rich natural, cultural and mining resources. For instance, heritage of Kharkhorin and tourism resources in the inner area may be combined to establish a cultural corridor linking Kharkhorin and Tsetserleg. It may be linked to the tourism and trade corridor of the northern section of the ring artery. This area may become a driving force for Mongolian development in the 21st century supported by high grade infrastructure. Another telecommunication backbone may be established in the near future linking Uliastai in the west and Undurkhaan in the east through Ulaanbaatar.



Source: JICA Project Team

Figure 5.3.8 National Spatial Structure of Mongolia to Be Established with Ring Artery in Long Run

5.4 Indicative National Land Use Plan

5.4.1 Objectives and procedures of indicative national land use planning

Objectives of indicative national land use planning are to promote an appropriate national land use so that the effectiveness of the NCDP can be enhanced.

In line with the objectives, the principles for indicative land use planning are set as follows:

- To preserve pasture, rivers, lakes, permafrost and forests as natural resources in order to ensure sustainable livestock activities and water supply for drinking and agriculture,
- To secure cropland and pastureland to achieve a food self-sufficiency at 100 %,
- To preserve the natural environment and heritage that can support tourism and related industries, and
- To preserve the water resources reflecting a water balance analysis.

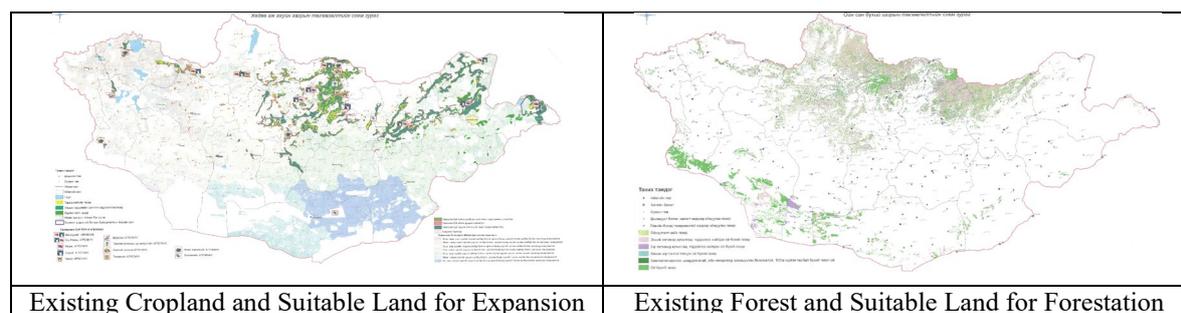
Procedure of the indicative land use planning is set as below.

- Preparation of existing land use plan to present the existing natural resources, cropland and pastureland according to level of growth conditions,
- Evaluation of land suitability for crop production for target products selected in the agriculture sector policy,
- Evaluation of pastureland for management for sustainable use,
- Evaluation of land suitability for urban development in Ulaanbaatar and Aimag centers to delineate the potential habitation areas,
- Establishment of land use conversion rules, and
- Preparation of land use plan in accordance with the established rules.

5.4.2 Existing plans and studies related to national land use planning

(1) National Land Management Plan

ALAMGaC has prepared the NLMP for the national territory for a four-year period. The NLMP was approved by the Government of Mongolia in December 2018. The NLMP contains the analyses on land management for agriculture, forest, grazing, mining, settlement and transport. These analyses attempted to classify the national territory by level of land suitability in order to expand cropland and urban settlement. They also identified the water bodies and potential areas for groundwater reserves to be protected from mining development, because the licensed mining expropriation area has encroached on water bodies and the protected areas.



Source: National Land Management Plan, ALAMGaC

Figure 5.4.1 Thematic Maps of National Land Management Plan for Cropland and Forest

(2) Pasture degradation

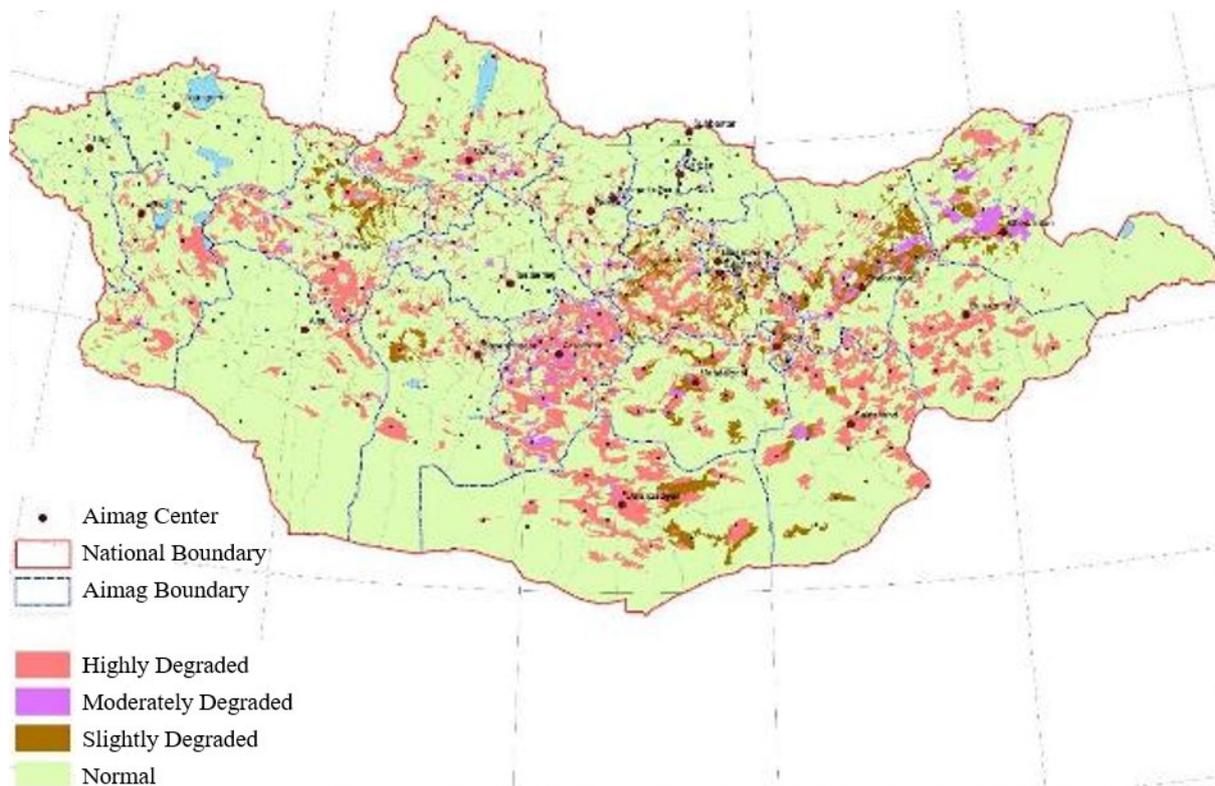
ALAMGaC, in preparing the NLMP, analyzed pasture degradation and classified pastureland by the level of vegetation conditions into normal, slightly degraded, moderately degraded and highly degraded. The total land area of pasture decreased from 126,964,000 ha in 2002 to 110,490,000 ha in 2016. In 2011, 23% of the total pasture was degraded as shown in Table 5.4.1. The highly degraded pasture is estimated to be 3% of the total pasture. Figure 5.4.2 shows the distribution of pasture by the level of degradation. The degraded pasture extends in the areas around the Aimag centers and along the artery roads.

Table 5.4.1 Degraded Pasture by Aimag in 2011

Aimag	Total Pasture (1,000ha)	Degraded Pasture (1,000ha)	Degraded Grade Level (%)			
			Overall	Highly	Moderately	Low
Mongolia	111,181.3	24,055.9	23.1	3.1	10.9	9.1
Western	28,828.9	4,685.2	19.1	2.8	8.9	7.4
Bayan-Ulgii	3,582.0	365.4	10.3	0.8	4.1	8.6
Gobi-Altai	8,810.8	771.0	20.1	0.8	12.1	7.2
Zavkhan	6,917.4	1,348.9	19.5	4.2	6.7	5.3
Uvs	4,341.7	916.1	21.1	4.2	8.9	7.9
Khovd	5,177.0	1,283.9	24.8	4.0	12.9	8
Khangai	25,222.5	6,993.0	24.4	2.8	14.6	7.0
Arkhangai	3,739.0	867.4	23.2	4.3	11.8	5
Bayankhongor	8,867.2	2,518.3	28.4	4.2	18.3	7.4
Bulgan	2,490.0	749.5	30.1	0.0	24.5	5.6
Orkhon	39.6	3.6	9.2	0.0	4.2	5.9
Uvurkhangai	5,707.0	1,820.5	31.9	4.8	19.7	7.1
Khuvsgul	4,379.7	1,033.6	23.6	3.9	9.2	10.5
Central	35,447.3	8,484.2	31.5	4.2	14.2	13.0
Govisumber	472.6	239.6	50.4	6.7	40.7	4.5
Darkhan-Uul	179.3	33.9	18.9	0.0	0.0	3

Dornogovi	9,264.0	1,769.4	19.1	1.1	11.1	8.7
Dundgovi	7,164.0	1,425.6	19.9	0.0	5.8	6.9
Umnugovi	11,458.0	2,463.5	21.5	3.9	8.7	18.9
Selenge	1,632.5	320.0	19.6	0.7	10.2	8.9
Tuv	5,276.9	2,232.1	42.3	11.2	26.6	14.1
Eastern	21,451.6	3,754.4	17.7	2.5	5.7	9.3
Dornod	8,738.8	1,433.2	16.4	4.6	6.5	5.3
Sukhbaatar	7,639.0	1,367.4	17.9	2.9	6.8	8.2
Khentii	5,073.8	953.9	18.8	0.2	4.0	14.6
Ulaanbaatar	231.0	139.1	60.2	10.1	10.5	39.6

Source: National Land Management Plan, ALAMGaC

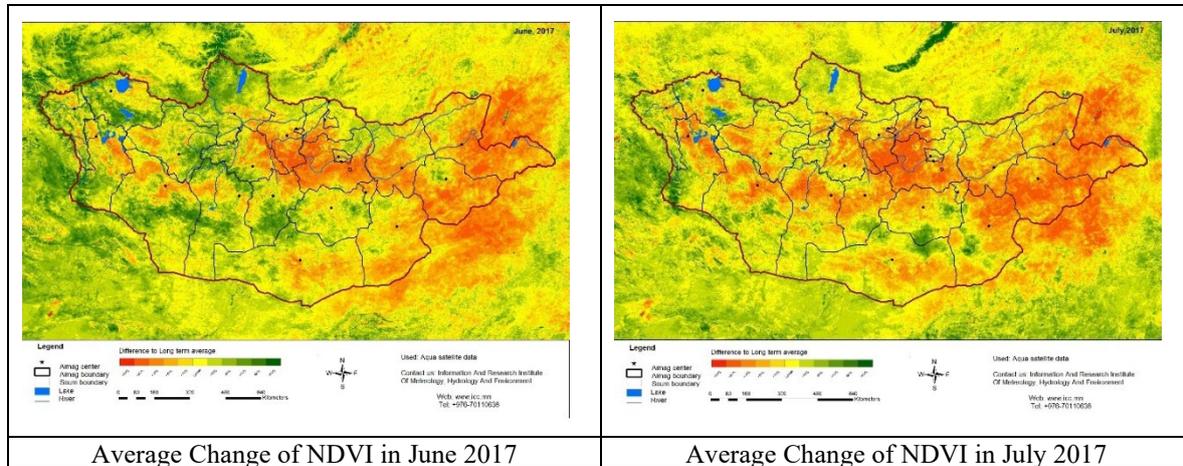


Source: National Land Management Plan, ALAMGaC

Figure 5.4.2 Pasture by Level of Degradation in 2011

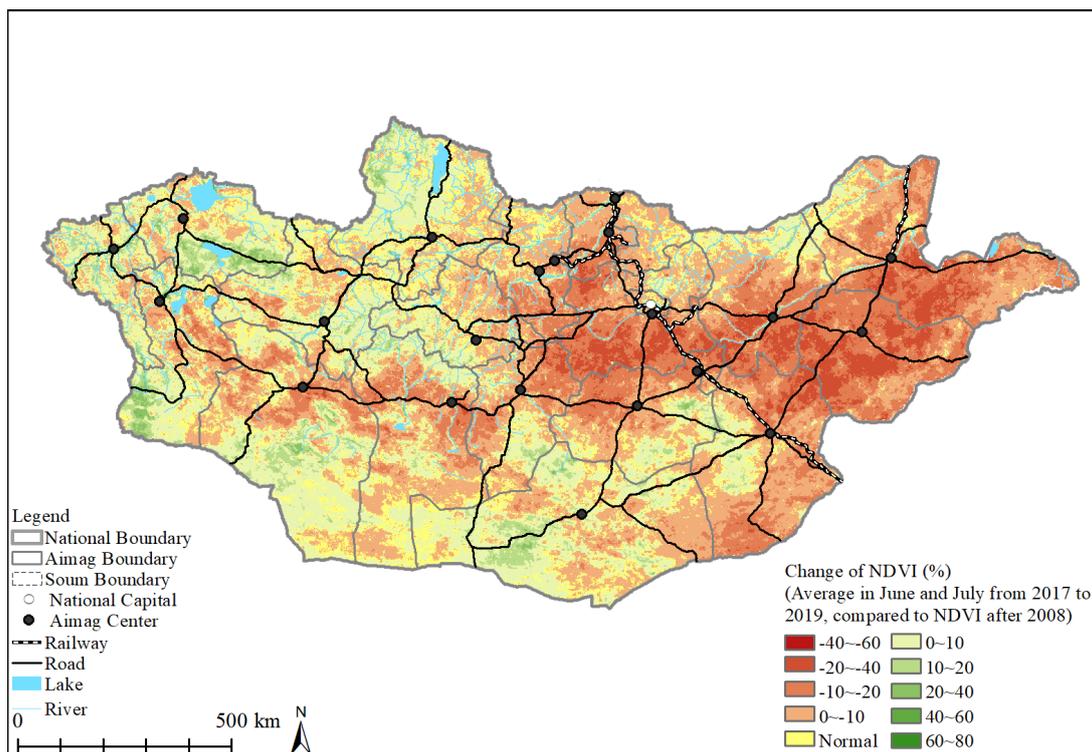
Changes in degraded pasture by Aimag between 2017 and 2018 are estimated by ALAMGaC as part of the NLMP as illustrated in Figure 5.4.3. Pasture was degraded in Khovd, Gove-Altai, Zavkhan, Bayankhongor, Dundgovi, Umnugovi, Khuvsgul, Bulgan, Tuv, Khentii 2017 and 2018. Vulnerability of pastureland was also analyzed as part of the HSP preparation, and results are shown in Figure 5.4.4. As seen from the figure, the pasture is vulnerable also in Arkhangai, Uvurkhangai, Dornogovi and Sukhbaatar.

estimated NDVI starting from 2017, the estimated NDVI in June and July shows the changes of NDVI (Figure 5.4.5), while the changes in estimated NDVI in August are not so clear as the NDVI is enhanced after rainfall. Hence, the estimated NDVI in June and July from 2017 to 2019 are used to estimate the average change of NDVI that represents the level of vegetation conditions of the pasture. Figure 5.4.6 shows the average change of NDVI in June and July from 2017 to 2019.



Source: National Remote Sensing Center

Figure 5.4.5 Change of Normalized Difference Vegetation Index to Long Term Average

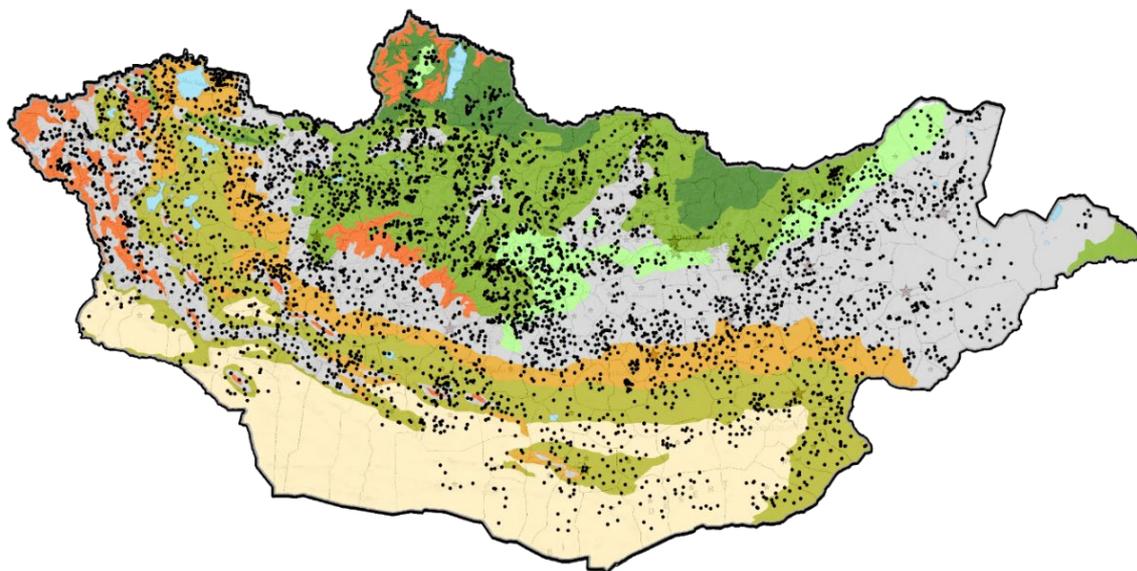


Source: JICA Project Team based on the estimated change of NDVI by National Remote Sensing Center

Figure 5.4.6 Average Change of NDVI in June and July from 2017 to 2019

In response to the degradation of pasture, ALAMGaC installed a photo-monitoring system to monitor the growth situation of pasture. The number of monitoring points was increased from 2,620 in 2015 to 4,617 in 2018. Figure 5.4.7 shows distribution of the photo-monitoring points. Pasture conditions at monitoring points in 2019 are illustrated in Figure 5.4.8. As seen from the figure, pasture is degraded along artery roads and in Tuv, Dundgovi, Dornogovi, Sukhbaatar, Uvurkhangai and Arkhangai.

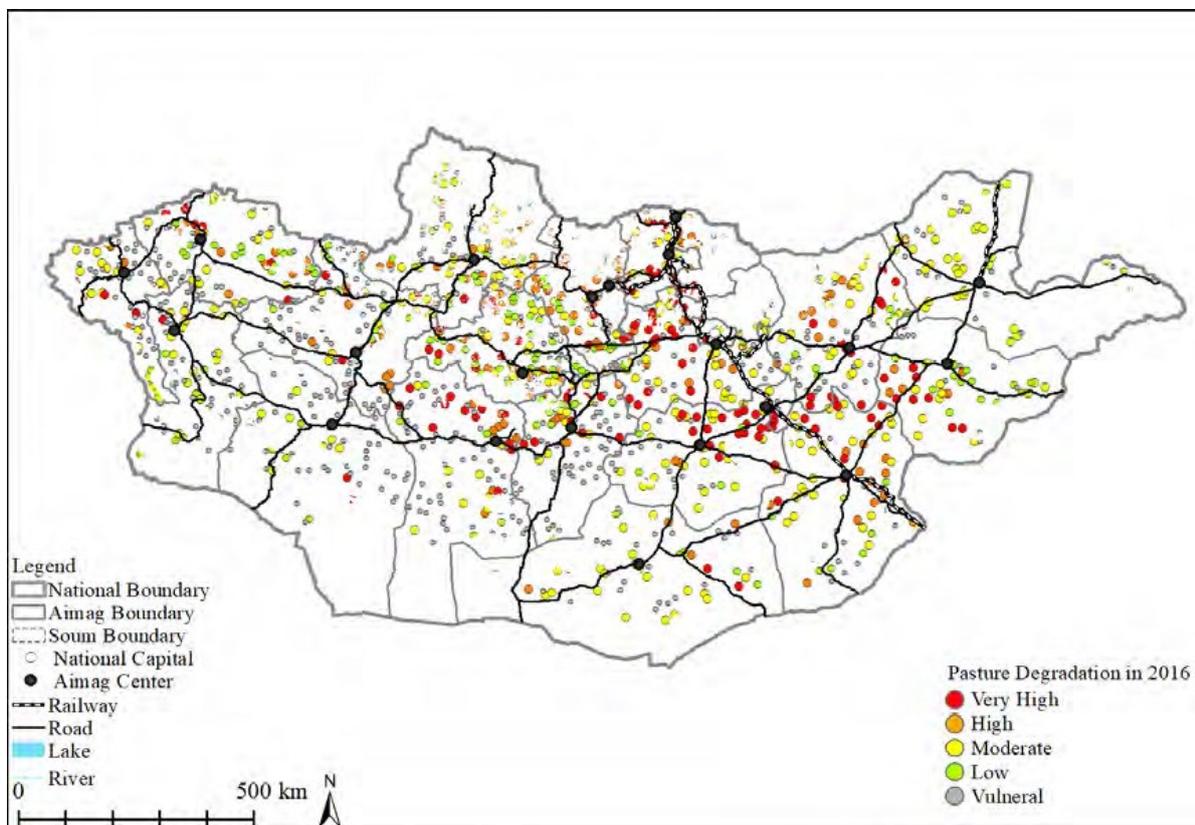
The National Agency for Meteorology and Environmental Monitoring (NAMEM) has assessed pasture degradation in 2018/19 as shown in Figure 5.4.9. It is seen from the figure pasture is in high risk of degradation along artery roads from Ulaanbaatar to Khovd and in Tuv, Arkhangai, Uvurkhangai, Dundgovi, Dornogovi, Umnugovi and Sukhbaatar.



●: Photo-monitoring points

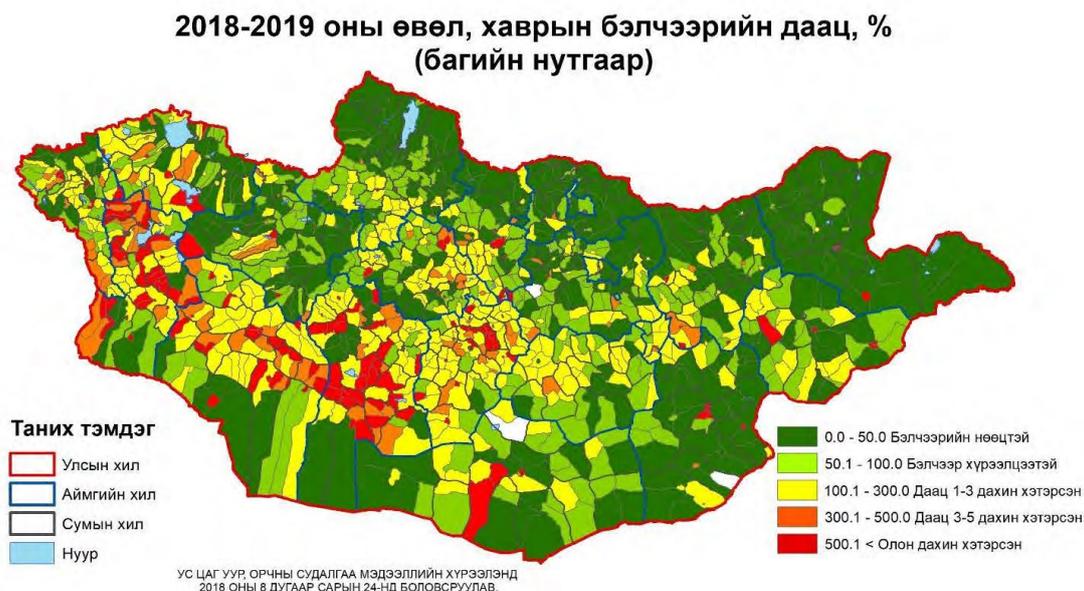
Source: JICA Project Team based on ALAMGaC

Figure 5.4.7 Photo-Monitoring of Pasture



Source: JICA Project Team based on ALAMGaC

Figure 5.4.8 Pasture Conditions at Monitoring Points in 2019



Source: ALAMGaC

Figure 5.4.9 Assessment of Pasture Degradation in 2018/19

Geographical distribution of pasture in degraded and vulnerable conditions is different by sources. Generally, the degraded pasture is distributed in areas as below:

- (a) Areas along artery roads from Ulaanbaatar to Khovd, and
- (b) Areas in Tuv, Uvurkhangai, Arkhangai, Dundgovi, Dornogovi and Sukhbaatar.

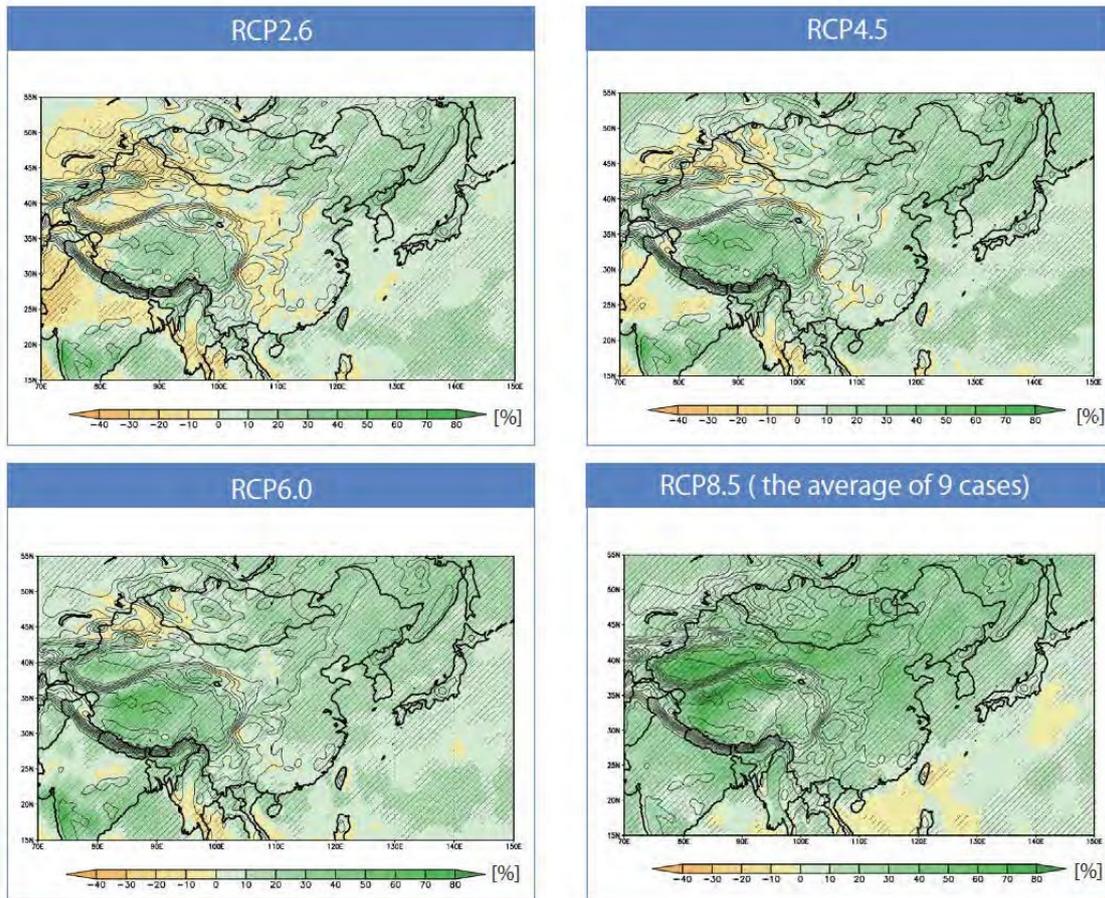
(3) Climate change

International Panel on Climate Change (IPCC) published the Synthesis Report of the Fifth Assessment Report (AR5) in 2014. The Ministry of Environment created a climate change projection dataset by downscaling the projection dataset used in the AR5. The climate change projection dataset is made in four different scenarios of possible changes.

- (a) Representative Concentration Pathways (RCP) 2.6: Global annual greenhouse gas (GHG) emissions peak between 2010–2020 and declining thereafter,
- (b) RCP 4.5: Peak around 2040, then decline,
- (c) RCP 6.0: Peak around 2080, then decline, and
- (d) RCP 8.5: Emissions continue to rise throughout the 21st century.

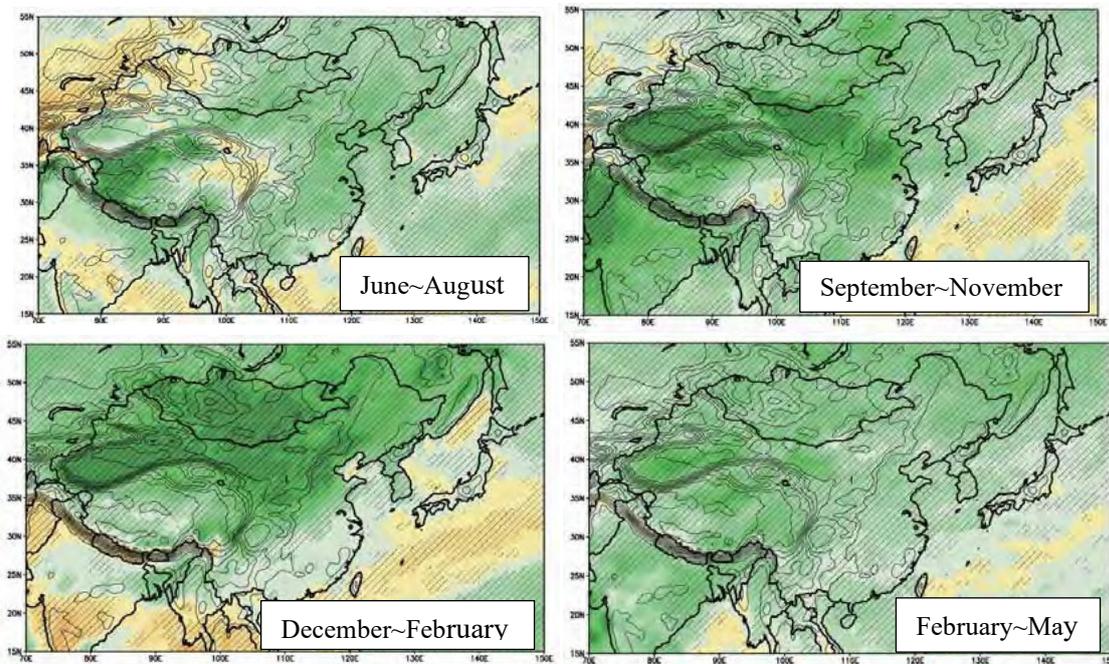
Changes in annual precipitation under each RCP scenario are shown in Figure 5.4.10. As seen from the figure, annual precipitation will be reduced by 0~10% in the west of the Country and -10~-20% in particular areas under RCP2.6, RCP4.5 and RCP6.0. Under RCP 8.5, the annual precipitation will increase in the whole Country, but the precipitation will decline in months from June to August as shown in Figure 5.4.11. As these months are a crucial period for vegetation growth, this deduction will be constraints to the growth of pasture grass.

Maximum changes in annual mean precipitation under all the scenarios are shown in Figure 5.4.12. The annual mean precipitation will decline by up to 20% in the west of the Country. Water balance by Aimag in the west of the Country is examined by reflecting the climate change as summarized in Table 5.4.2. As shown, all the Aimags will have water surplus even under the reduced precipitation due to climate change.



Source: IPCC

Figure 5.4.10 Changes in Annual Precipitation under Each RCP Scenario



Source: IPCC

Figure 5.4.11 Changes in Precipitation by Season under RCP 8.5 Scenario

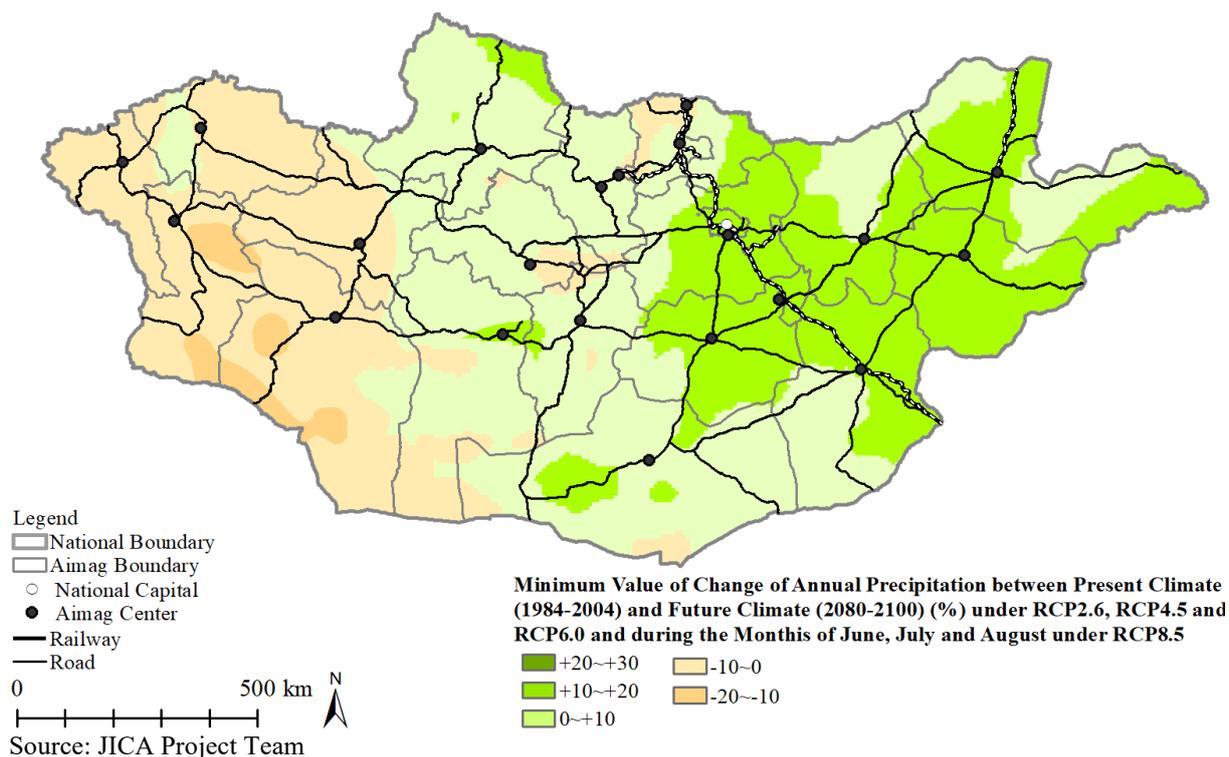


Figure 5.4.12 Maximum Changes in Annual Precipitation under All RCP Scenarios

Table 5.4.2 Water Balance by Aimag in the West Affected Negatively by Climate Change

Aimag	Effects by climate change (%)	Water availability after climate change (m ³ million/year)	Water balance in 2040 (m ³ million/year)
Bayan-Ulgii	-10	3,096	3,070
Govi-Altai	-10	142	115
Zavkhan	-10	3,870	3,840
Uvs	-10	1,287	1,238
Khovd	-10	1,215	1,184

Source: JICA Project Team

(4) Dzud risk

The Information and Research Institute of Meteorology, Hydrology and Environment estimated the frequency of Dzud for 36 years from 1980 to 2016 (Figure 5.4.13). The institute worked out the level of risk against the Dzud (Figure 5.4.14). Highly hazardous areas against Dzud are defined to cover the areas with very high and high risks and moderate risk with frequency higher than 21% (Table 5.4.3).

Table 5.4.3 Hazard Level of Dzud by Frequency and Risk

		Frequency of Dzud from 1980 to 2016 (%)				
		41~75	21~40	10~20	1~9	0
Level of Risk	Very High	++	++	++	++	-
	High	++	++	++	++	-
	Moderate	++	++	+	+	-
	Low	+	+	+	+	-
	Lowest	+	+	+	+	-

Source: JICA Project Team

Note: xx: High hazardous area requiring the proactive measure against Dzud

x: Hazardous area against Dzud

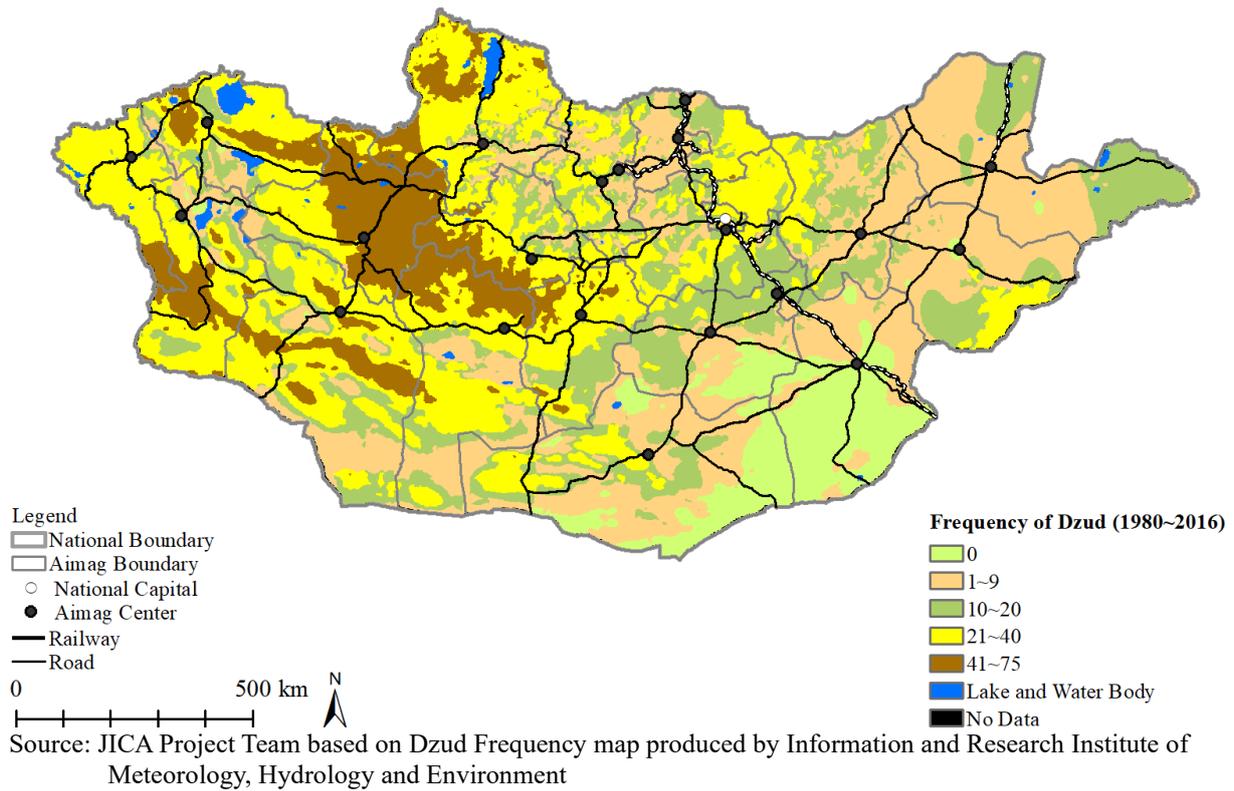


Figure 5.4.13 Frequency of Dzud from 1980 to 2016

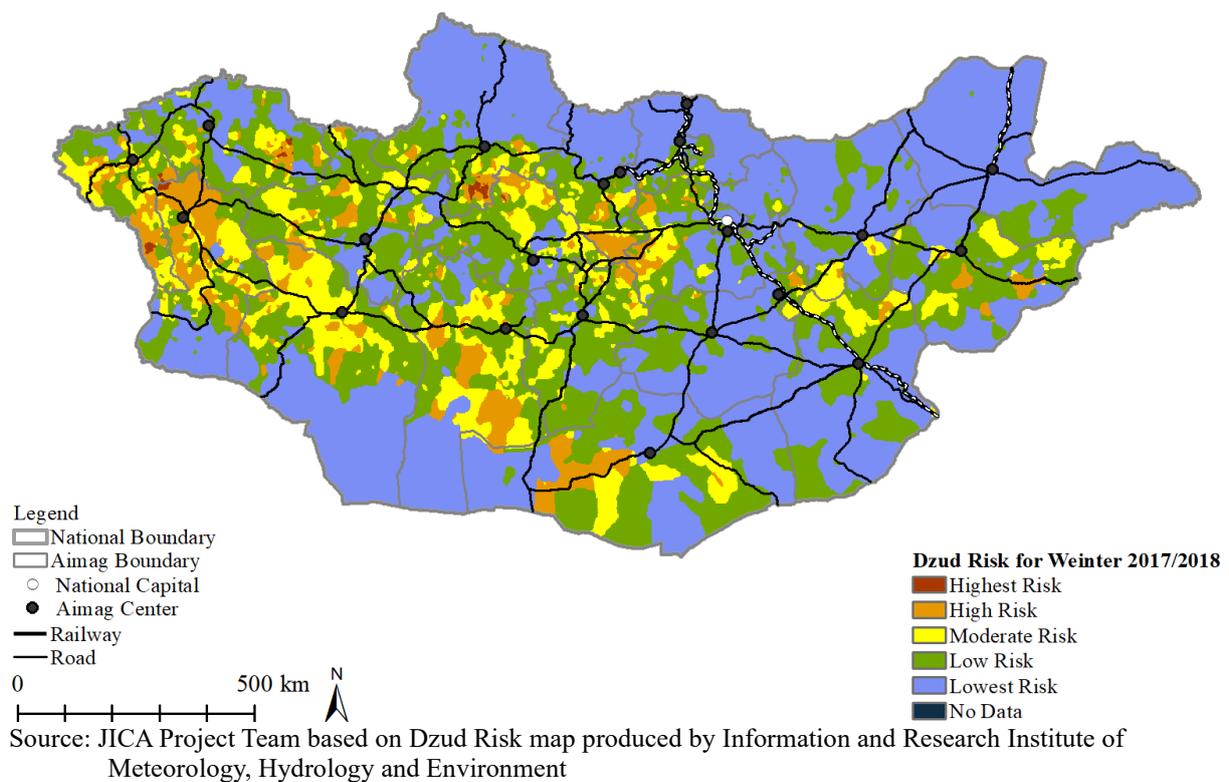


Figure 5.4.14 Dzud Risk for Winter 2017/2018

These are many different kinds of Dzud phenomena such as white, black, storm, cold, iron and combined Dzud. Iron Dzud is characterized by layers of ice to make grass inaccessible for animals. This causes degradation of pasture grass due to hoofing by animals. As the locations of Dzud hazard areas and types of Dzud change every year, a resilient disaster response system including early warnings may be more effective than relying on a static approach such as land use control to reduce Dzud damages.

(5) Seismicity

Based on the research by the Research Center of Astronomy and Geophysics on seismic events over a century 1900-2000, areas of high seismic risk are identified as shown in Figure 5.2.4. As shown, high seismic risk areas are found in areas around Bayankhongor, Bulgan and Ulaangom, along the southern borders of Khovd and Govi-Altai, and mountain area of Khuvsgul. Seismic risk was analyzed also by geological point of view as illustrated also in Figure 5.2.4. Areas identified as high seismic risk by two methods coincide only partly, but they concentrate in the western part of the Country.

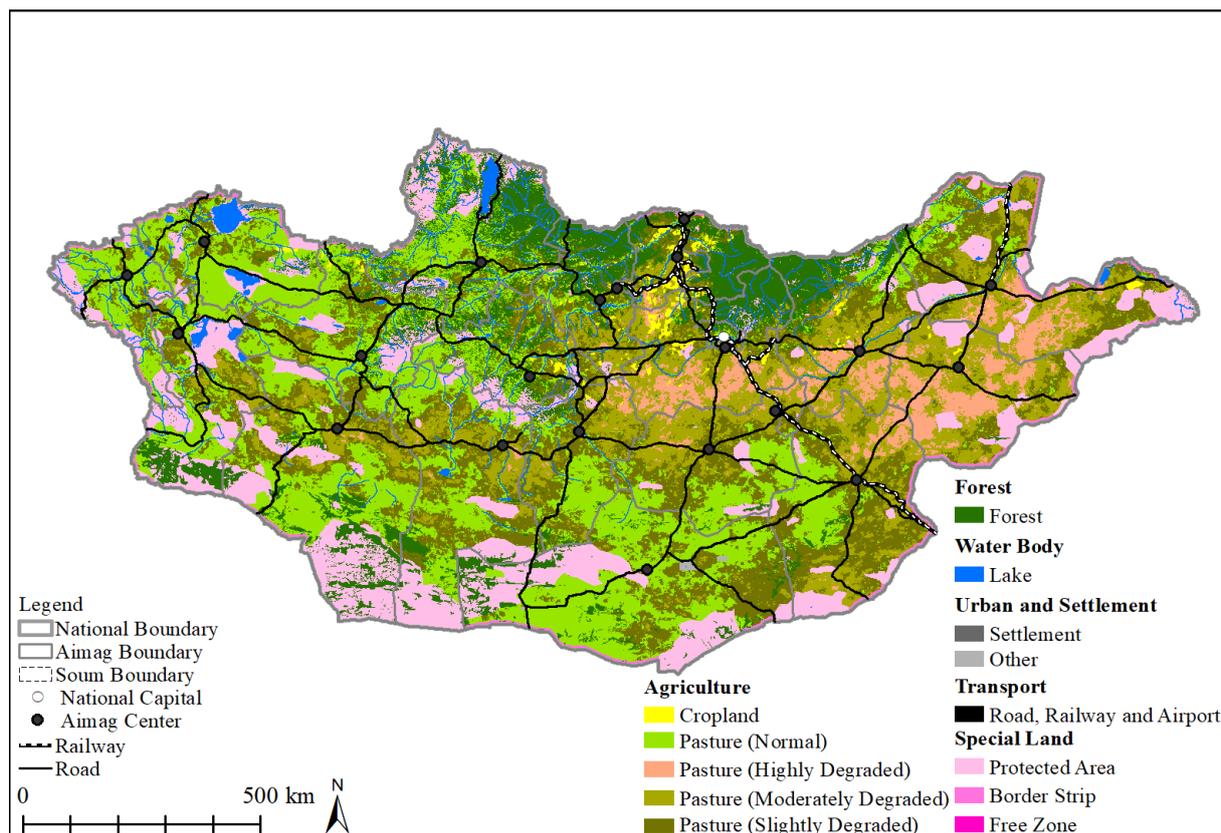
5.4.3 Existing land use for national comprehensive development planning

An existing land use map is the basis for preparation of a national land use plan. The land use categories of the existing land use map comprise forest area, cropland, and lake and rivers to be protected from the land use conversion to another type of land use. In addition, the land use categories include a special land of a protected area, a free zone, a border strip and others in line with the land use categories specified in the Unified Land Territorial Formation (ULTF). In addition to those categories, the land use category of artificial surface land is set for settlement and transport facilities.

The existing land use map is prepared to indicate the level of vegetation conditions of pasture. Figure 5.4.15 shows the existing land use map and Table 5.4.4 shows the estimated land area in each Aimag for each land use category. Pasture is classified into four levels according to the estimated average change of NDVI. Pasture where average changes increased and which is stable is graded as normal. Where the average change is decreased by 0% to -10%, pasture is classified as slightly degraded. Pasture with average changes which decreased at the level of -10% to -20% is classified as moderately degraded. Pasture where NDVI is decreased by higher than -20% is classified highly degraded.

Among the land use categories of the existing land use map, forest and protected areas follow the boundaries defined by the Ministry of Environment and Tourism (MET). Protected areas include the strictly protected area, monument, nature reserve and national conservation park. Cropland follows the areas specified in the NLMP. Boundaries of free zone and border strip follows the areas specified in the Unified National Territory Foundation (UNTF).

Pasture occupies 70% of the total land. Among the pasture, 62% is degraded, while the remaining pasture of 38% is in normal conditions. The degraded pasture is located along the artery roads and close to Aimag centers. The degradation is progressed widely in Eastern and around Capital Regions. A concentration of degraded pasture is also found along the artery road from Arvaikheer to Khovd.



Source: JICA Project Team based on MET, NLMP and UNTF

Figure 5.4.15 Existing Land Use of Mongolia

Table 5.4.4 Existing Land Area by Land Use Category (1/2)

Aimag	Agriculture							Forest	Water Body	Settlement
	Sub-total	Pasture					Crop land			
		Sub-total	Normal	Highly Degraded	Moderately Degraded	Slightly Degraded				
Arkhangai	39,899	39,278	19,686	73	2,799	16,721	621	10,123	125	6
Bayankhongor	85,305	85,302	32,997	724	16,972	34,609	3	5,789	504	11
Bayan-Ulgii	30,744	30,744	24,363	0	510	5,872	0	860	495	19
Bulgan	28,411	27,519	6,042	375	9,643	11,458	893	19,333	41	10
Govi-Altai	85,281	85,281	45,512	409	12,719	26,642	0	16,980	95	7
Govisumber	5,557	5,557	239	1,111	2,641	1,565	0	0	2	5
Darkhan-Uul	2,434	2,026	173	25	848	980	408	822	1	27
Dornogovi	96,621	96,621	18,572	6,157	29,020	42,873	0	1,988	106	9
Dornod	92,112	91,282	12,893	13,468	33,445	31,476	830	2,472	1,068	16
Dundgovi	70,652	70,652	22,310	1,851	19,740	26,750	0	591	52	8
Zavkhan	65,469	64,911	41,945	0	1,916	21,051	558	7,856	531	7
Orkhon	632	591	29	0	234	329	41	179	0	35
Uvurkhangai	57,266	57,001	17,371	1,655	14,794	23,181	265	3,058	24	11
Umnugovi	113,462	113,462	72,819	3	1,960	38,680	0	12,611	41	12
Sukhbaatar	71,327	71,062	698	22,560	39,258	8,546	265	160	66	9
Selenge	20,677	17,113	2,214	714	5,479	8,706	3,565	19,408	5	11
Tuv	58,356	54,846	1,570	14,959	28,376	9,942	3,509	14,529	23	7
Uvs	51,111	50,605	39,011	0	223	11,371	506	2,372	5,432	13
Khovd	42,818	42,728	23,460	66	4,724	14,478	89	8,060	2,151	11
Khovsgul	41,530	41,370	31,177	0	120	10,074	159	39,138	3,135	15
Khentii	59,254	58,489	6,961	9,803	26,777	14,948	765	17,889	26	9
Ulaanbaatar	3,123	3,102	857	25	578	1,641	21	1,174	0	230
Total	1,122,041	1,109,543	420,899	73,979	252,773	361,893	12,498	185,391	13,922	489

Source: JICA Project Team

Table 5.4.4 Existing Land Area by Land Use Category (2/2)

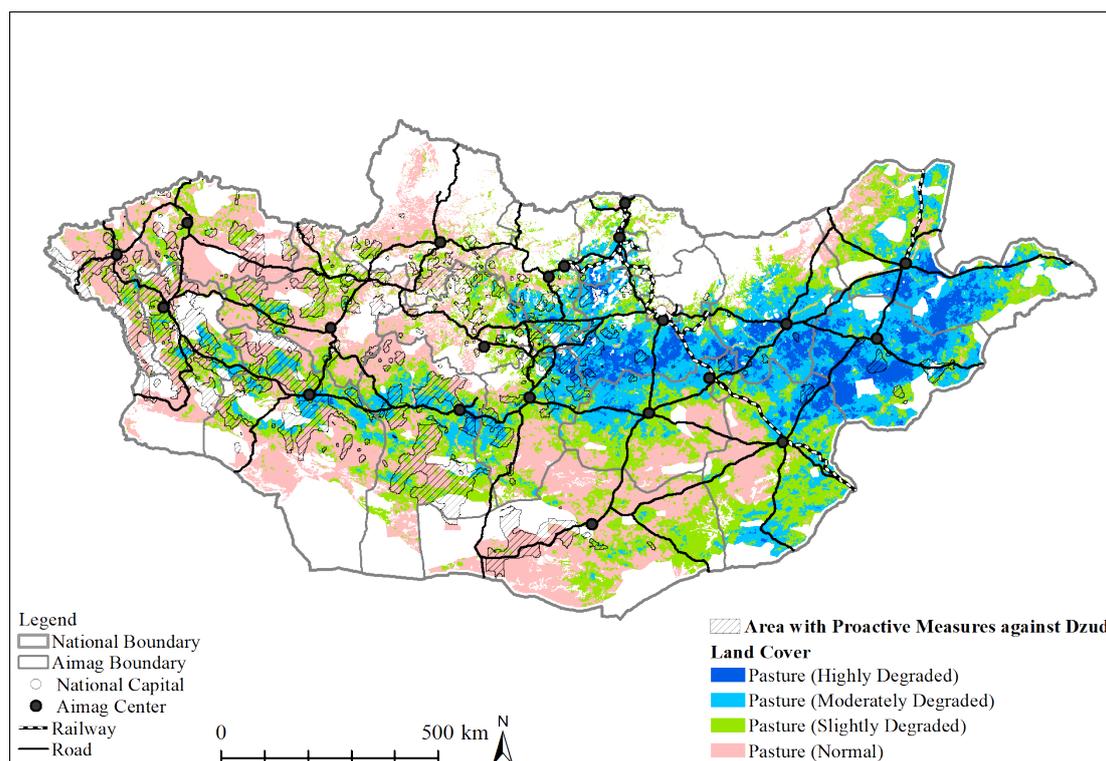
Aimag	Settlement (Other)	Transport				Special Land			Total	
		Sub-total	Road	Rail	Airport	Sub-total	Protected Area	Border Strip		Free Zone
Arkhangai	0	1	1	0	0	0	0	0	5,136	55,285
Bayankhongor	0	1	1	0	1	0	0	1	23,892	115,492
Bayan-Ulgii	0	5	5	0	0	0	0	0	14,131	46,235
Bulgan	0	3	3	0	1	1	0	0	993	48,783
Govi-Altai	0	5	5	0	0	0	0	0	39,461	141,822
Govisumber	0	2	2	0	11	6	5	0	39	5,609
Darkhan-Uul	0	20	20	0	8	1	6	0	0	3,284
Dornogovi	0	8	8	0	75	32	42	0	12,535	111,332
Dornod	0	5	5	0	26	9	14	3	32,432	128,114
Dundgovi	0	7	7	0	6	5	0	1	3,934	75,240
Zavkhan	0	3	3	0	3	1	0	2	8,722	82,585
Orkhon	0	29	29	0	3	1	1	0	0	843
Uvurkhangai	0	8	8	0	2	1	0	1	2,596	62,953
Umnugovi	927	940	12	927	9	8	0	1	38,801	165,864
Sukhbaatar	0	3	3	0	23	21	0	2	13,268	84,847
Selenge	0	3	3	0	12	4	8	0	1,651	41,756
Tuv	0	5	5	0	16	7	9	0	1,602	74,530
Uvs	0	9	9	0	0	0	0	0	10,987	69,911
Khovd	0	7	7	0	1	1	0	0	23,461	76,497
Khuvsgul	0	3	3	0	2	1	0	1	17,187	100,995
Khentii	0	2	2	0	16	15	0	1	4,961	82,147
Ulaanbaatar	0	72	72	0	9	3	6	0	398	4,776
Total	927	1,141	213	927	221	117	91	12	256,186	1,578,902

Source: JICA Project Team

5.4.4 Classification of pasture for sustainable use

(1) Identification of pasture that requires special measures

For indicative land use planning, pasture is classified by the level of degradation and risk to be affected by Dzud. Moderately and highly degraded pasture within the highly hazardous area by Dzud requires the proactive measures to prevent from severe damages. Pasture within the distance of 100 km from Ulaanbaatar and 50km from regional core city and local growth city has threats from the overgrazing. Those areas require the proactive measures and are classified as intensive livestock area in the land use plan. Figure 5.4.16 shows distribution of existing pasture and areas that needs proactive measures against Dzud.



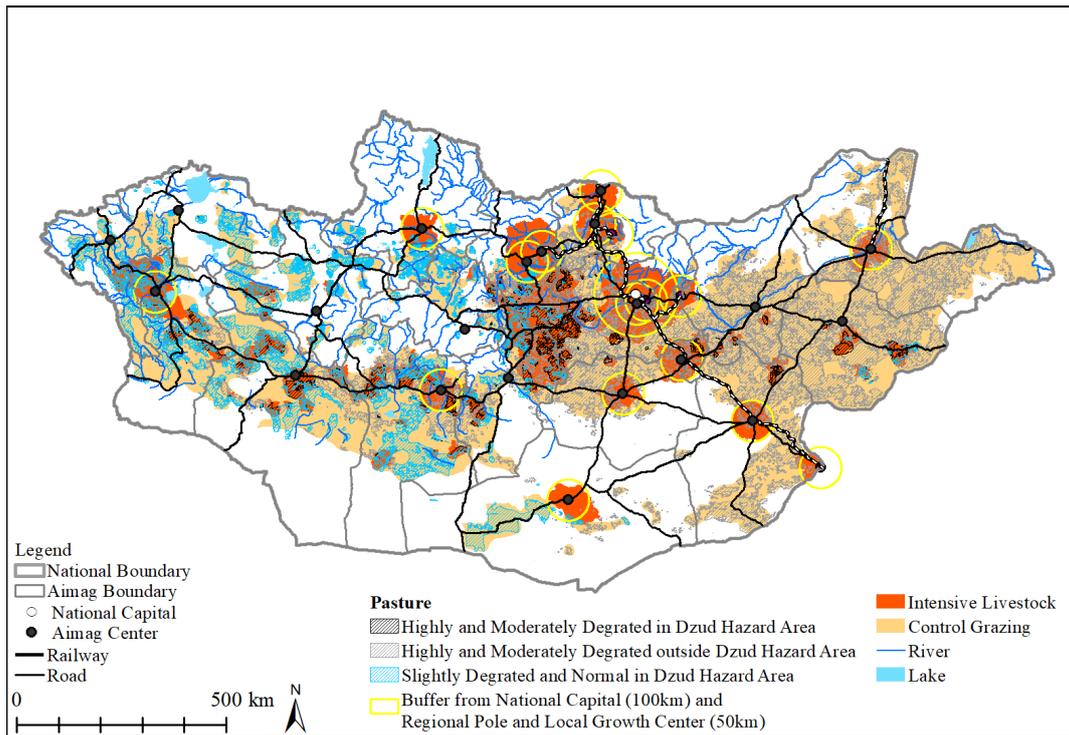
Source: JICA Project Team

Figure 5.4.16 Distribution of Existing Pasture and Area that Needs Proactive Measure against Dzud

The other moderately and highly degraded pasture is classified as land that requires proper land use control. The normal and slightly degraded pasture within the highly hazardous area against Dzud also requires the land use control from the overgrazing. Such pasture is classified as control grazing area in the land use plan.

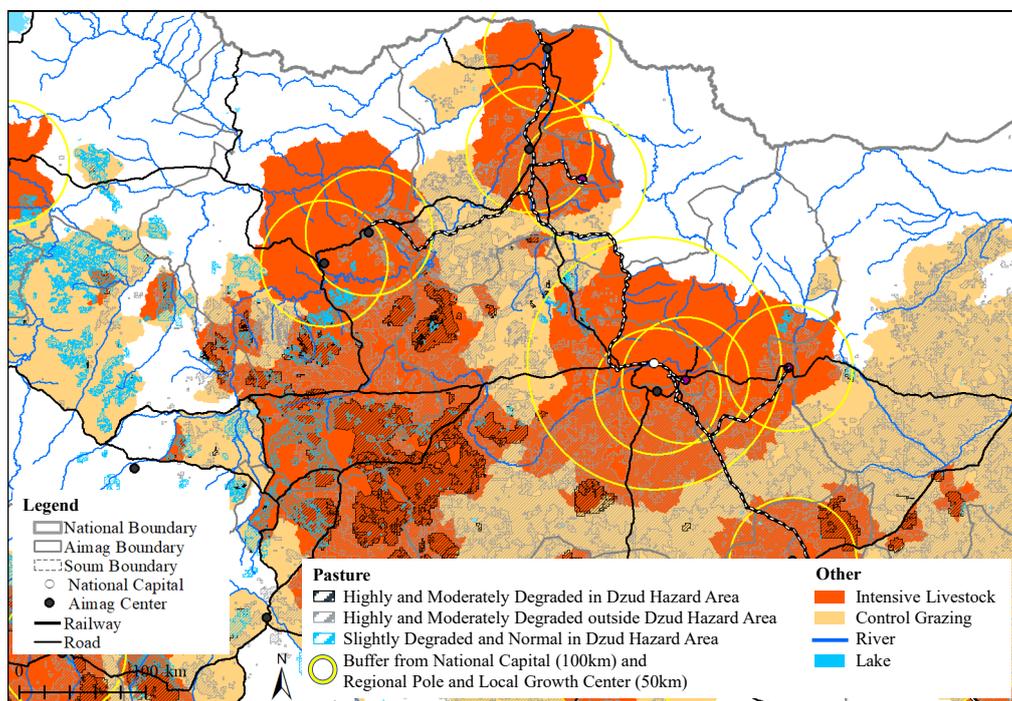
(2) Delineation of intensive livestock and control grazing areas

The boundaries of intensive livestock and control grazing areas are delineated along rivers and roads to allow the recognition of their location. Where rivers and roads are not located, the ridge line of hills and mountains are used for the boundaries. Figure 5.4.17 and Figure 5.4.18 show the delineated areas for intensive livestock and control grazing for the Country and areas around Ulaanbaatar. The delineated areas are only indicative and subject to revision according to the actual situation.



Source: JICA Project Team

Figure 5.4.17 Potential Area for Intensive Livestock and Control Grazing



Source: JICA Project Team

Figure 5.4.18 Potential Area for Intensive Livestock and Control Grazing in Ulaanbaatar, Selenge and Bulgan

5.4.5 Land suitability analysis for crop farming

(1) Land demand for cropland

The demand for crop land is estimated to meet the self-sufficiency rates for different crops in 2040. The additional land area for the cropland is estimated at 680 km² (Table 5.4.5). The existing sown area is estimated at 5,079km² which is less than half of the estimated cropland of 12,498km². The existing cropland is sufficient to meet the land demand for cropland when existing fallow land is utilized.

Table 5.4.5 Land Demand for Agriculture in 2040

Agriculture Product	Production (ton)			Area (ha)			Increase of Land Demand from 2018 (ha)
	2018	2030	2040	2018	2030	2040	
Cereal	453,849	476,852	550,214	366,809	366,809	366,809	0
Potatoes	168,883	202,838	229,883	12,925	15,025	15,025	2,100
Vegetables	100,732	287,338	329,420	8,866	22,987	23,530	14,664
Fodder crops	123,840	138,927	152,820	46,309	46,309	46,309	0
Industrial crops	34,581	59,194	82,034	69,161	98,657	112,702	43,541
Fruits	1,692			3,873	6,983	11,638	7,765
Total				507,943	556,770	576,013	68,070

Source: JICA Project Team

(2) Target agriculture products for land suitability analysis

Among the main agricultural products in the agriculture sector, the self-sufficiency rates of cereal and potatoes already reached 100%. Possibility for exporting cereal and potatoes are not high as they are not competitive in international market due to high production costs and resultant high prices. Hence, possibility to develop the new cropland for cereal and potatoes is low.

Vegetable production requires new cropland to improve the self-sufficiency rate. Vegetables require care to ensure their growth. The expansion of cropland may be located within the existing cropland. Hence, possibility to develop the new cropland for vegetables is low.

The self-sufficiency rates of fodder and oil seed are low and should be increased for import substitution. Fodder and oil seed have a high affinity for livestock farming with respect to feed supply. Fodder and oil seed production may require conversion of the pasture to cropland for expansion.

Fruit is an option to promote export and processing. Fruit production may need to convert the pasture to the cropland.

Taking these conditions into account, fodder, oil seeds and fruits are selected as the agriculture products to analyze the land suitability, because three agricultural products may need conversion of the pasture to cropland. Characteristics of fodder is represented by alfalfa in the land suitability analysis, while sunflower represents oil and sea buckthorn represents the fruit.

(3) Evaluation criteria for land suitability

Criteria to evaluate the land suitability for cropland comprise growth conditions and social conditions. The growth conditions include soil, slope gradient and slope direction, moisture supply and accumulated temperature. The social conditions are defined by distance from Aimag centers and artery roads to represent the accessibility to the market and workforce.

The level of suitability is set from unsuitable (N) to highly suitable (S1) for each criterion. The comprehensive evaluation of land suitability is conducted by multiplying the level of estimated suitability of criteria with weighting factor. The weighting factor is derived from a pairwise comparison matrix of the analytic hierarchy process (AHP) as shown in Table 5.4.6.

Table 5.4.6 Analytic Hierarchy Process for Land Suitability Evaluation

	Soil	Slope	Aspect	Moisture	Accumulated Temperature	Weighting Factor
Soil	1	5	7	3	1/3	0.268
Slope	1/5	1	3	1/3	1/7	0.065
Aspect	1/7	1/3	1	1/7	1/7	0.033
Moisture	1/3	3	7	1	1/5	0.141
Temperature	3	7	7	5	1	0.493

Source: JICA Project Team

Table 5.4.7 through Table 5.4.10 show the level of suitability according to the criteria. Figure 5.4.19 through Figure 5.4.23 show spatial distribution of the level of estimated suitability according to the criteria.

Table 5.4.7 Suitability by Soil Type

Crops	S1	S2	S3	N
Fodder	CH	FL, KS, UM	CL, GY, LP	CR
Oil seed	CH	FL, KS, UM	CL	CR, GY, LP
Fruits	CH	FL, KS, UM	GY, LP	CL, CR

Note: S1: Highly suitable, S2: Moderately suitable, S3: Marginally suitable, N: Not suitable

CH: Chernozems, CL: Calcisol, CR: Cryosol, FL: Fluvisols, GY: Gypsisols, KS: Kastanozems, LP: Leptosols, UM: Umbrisol

Source: JICA Project Team and National Land Management Plan

Table 5.4.8 Suitability by Moisture Supply

Unit: mm/growth duration

Crops	Range of Moisture Supply				Level of Suitability Shown in Figure 5.4.12			
	S1	S2	S3	N	S1	S2	S3	N
Fodder	340-440	220-340	105-220	< 105	>= 3	4	5	<= 6
Oil seed	470-570	340-470	220-340	< 220	>= 2	3	4	<= 5
Fruits	> 340	220-340	105-220	< 105	>= 3	4	5	<= 6

Source: NLMP and JICA Project Team

Table 5.4.9 Suitability by Accumulated Temperature

Unit: Sum of daily average temperature above 10 degrees

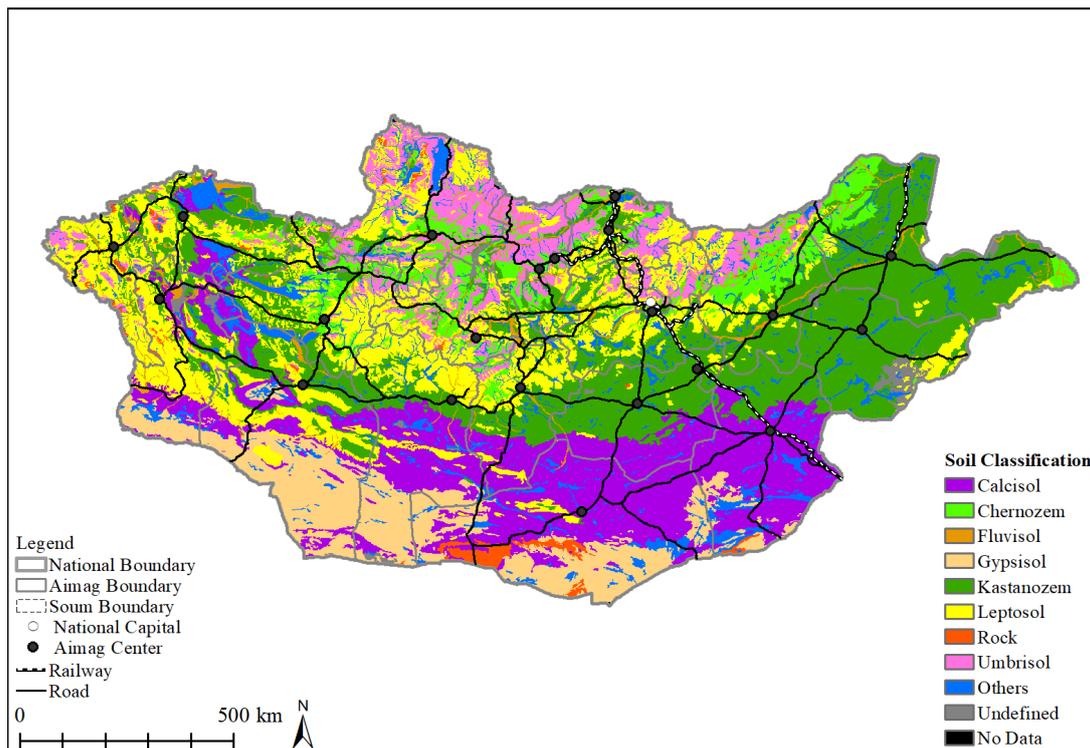
Crops	Range of Accumulated Temperature				Level of Suitability shown in Figure 5.4.13			
	S1	S2	S3	N	S1	S2	S3	N
Fodder	> 1400	1000-1400	400-1000	< 400	>=4	3	2	1
Oil seed	> 2600	2000-2600	1400-2000	< 1400	>=6	5	4	< 3
Fruits	> 2000	1400-2000	1000-1400	< 1000	>=5	4	3	< 2

Source: NLMP and JICA Project Team

Table 5.4.10 Suitability by Slope Gradient and Direction

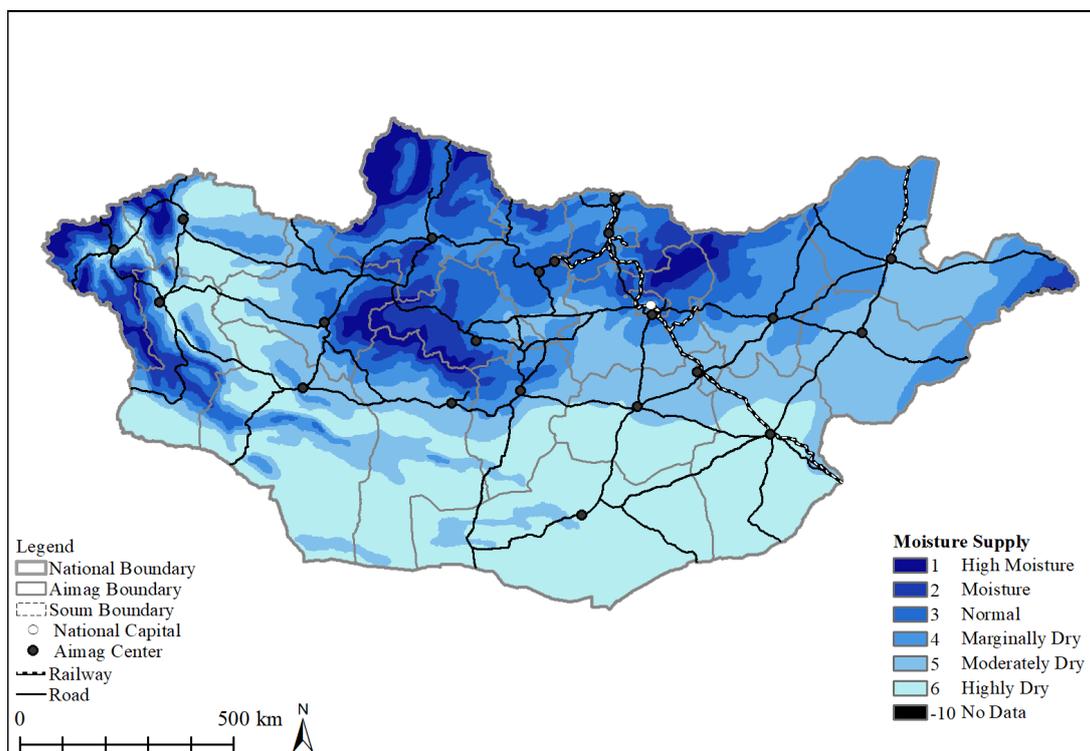
Criteria	Unit	S1	S2	S3	N
Slope	degree	0~3	3~8	8~15	>15
Aspect	degree	135~225	45~135, 225~215	0~45, 315~360	

Source: NLMP and JICA Project Team



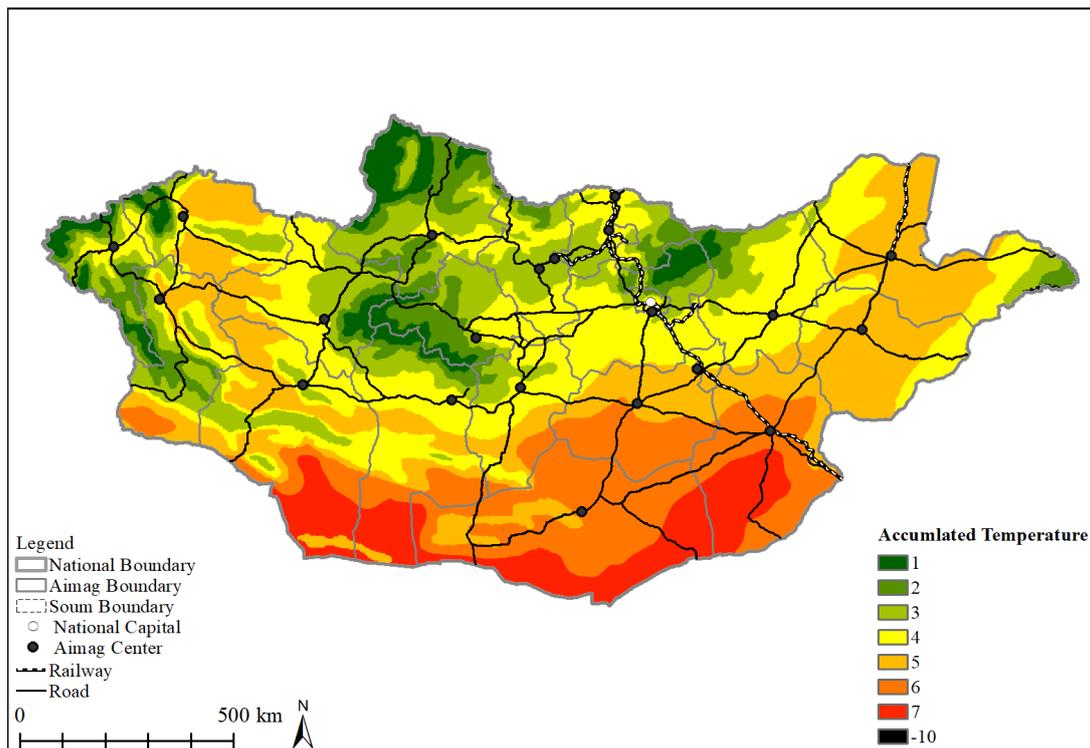
Source: JICA Project Team based on data of Institute of Geography and Geoecology

Figure 5.4.19 Distribution of Soil Type



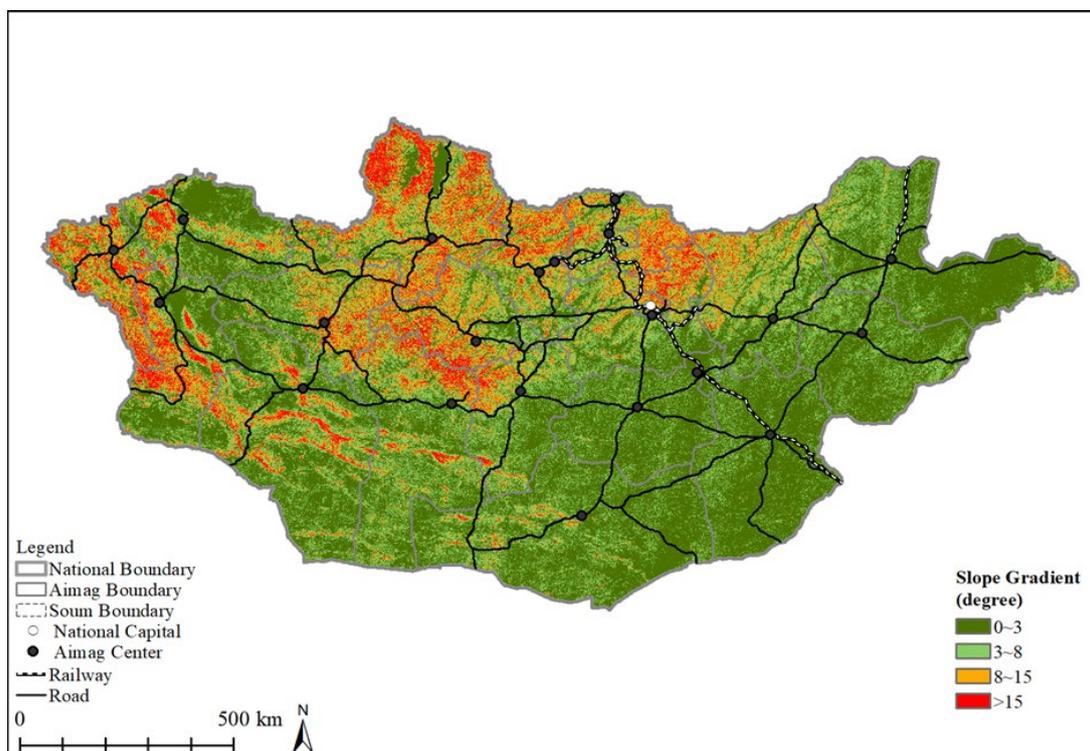
Source: JICA Project Team based on National Land Management Plan

Figure 5.4.20 Distribution of Moisture Supply



Source: JICA Project Team based on National Land Management Plan

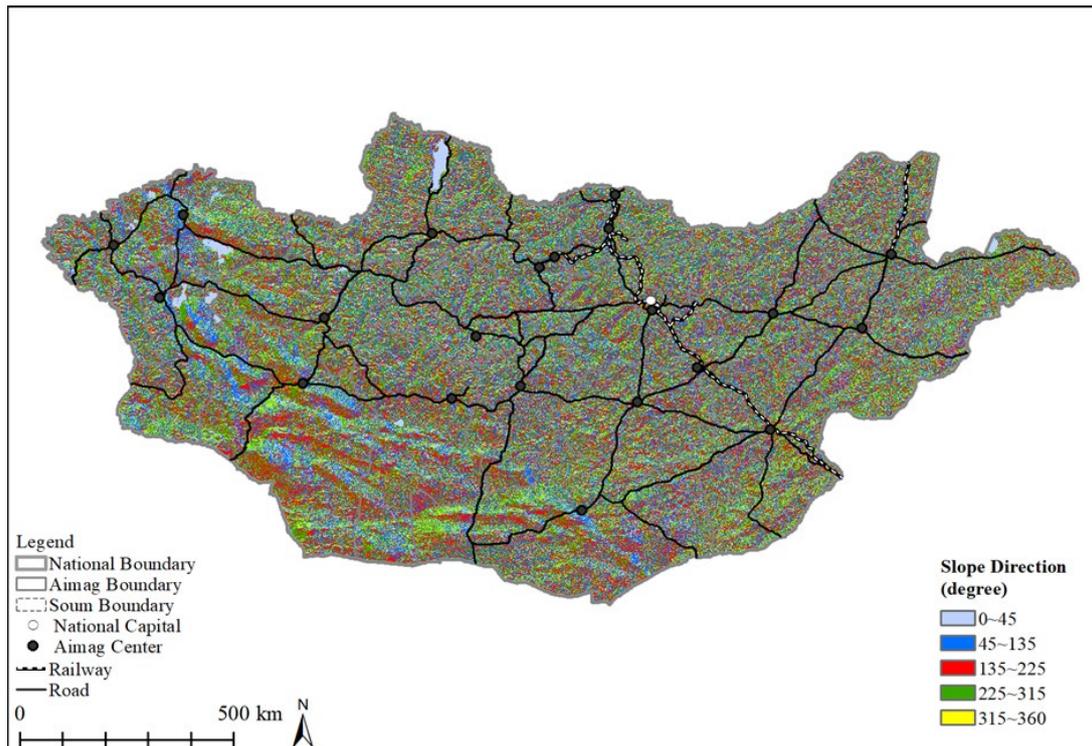
Figure 5.4.21 Distribution of Accumulated Temperature



Source: JICA Project Team using digital elevation model of ASTER DEM

Note: Resolution at approximately 115m

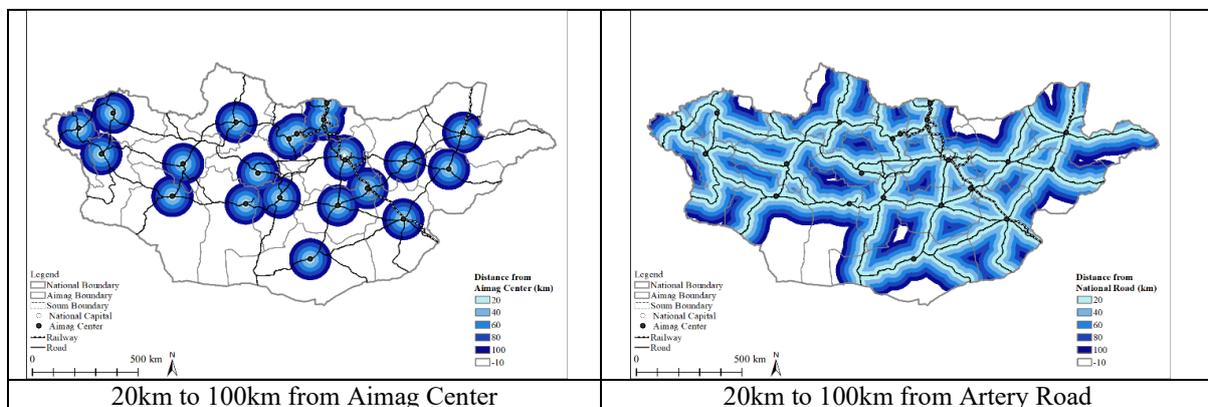
Figure 5.4.22 Distribution of Slope Classified by Gradient



Source: JICA Project Team using digital elevation model of ASTER DEM
 Note: Resolution at approximately 115m

Figure 5.4.23 Distribution of Slope Direction Classified by Degree

For the social conditions, Figure 5.4.24 shows the area within the distance of 20km to 100km from Aimag centers and artery roads, respectively.

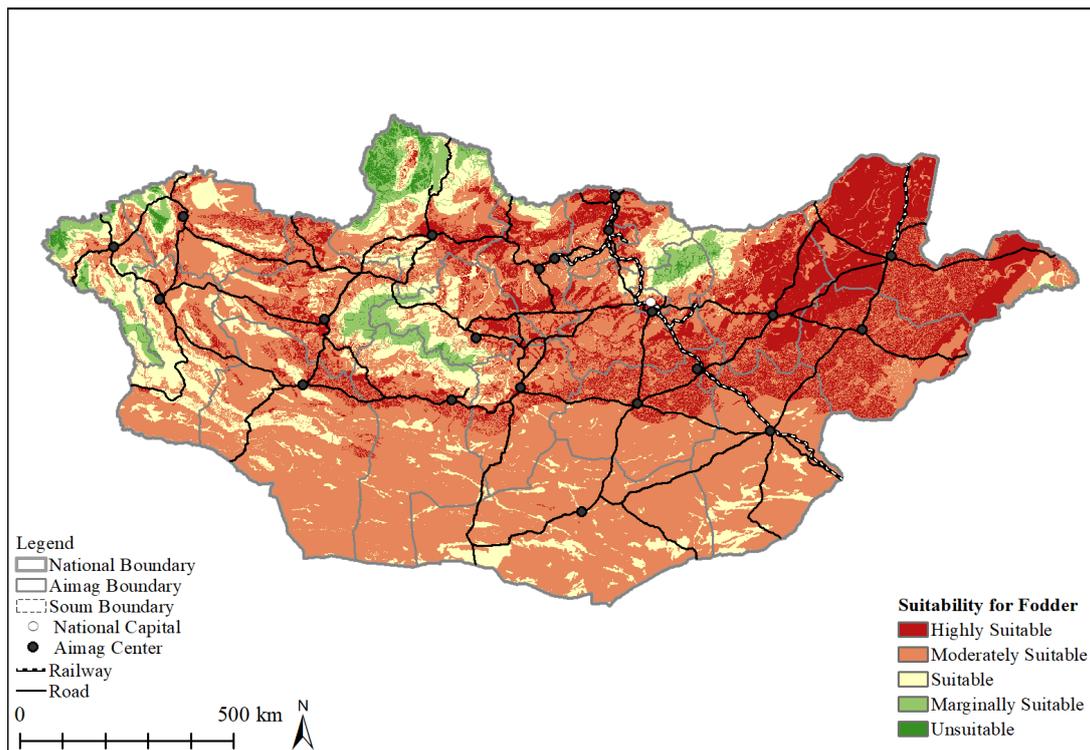


Source: JICA Project Team

Figure 5.4.24 Land Suitability by Distance from Aimag Center and Artery Road

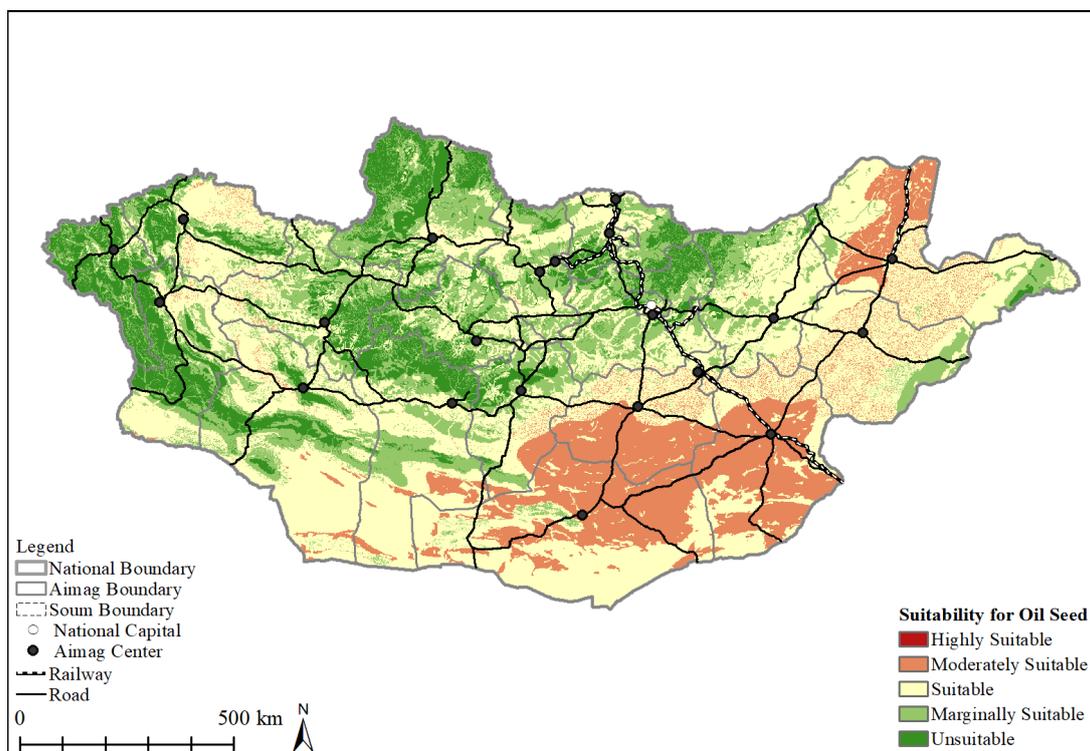
(4) Estimated level of land suitability for specific products

Spatial distribution by level of land suitability for fodder, oil seed and fruit is shown in Figure 5.4.25 through Figure 5.4.27. The land suitability in the figures reflect the growth conditions only. The social conditions are considered in the process for finalization of the indicative land use plan.



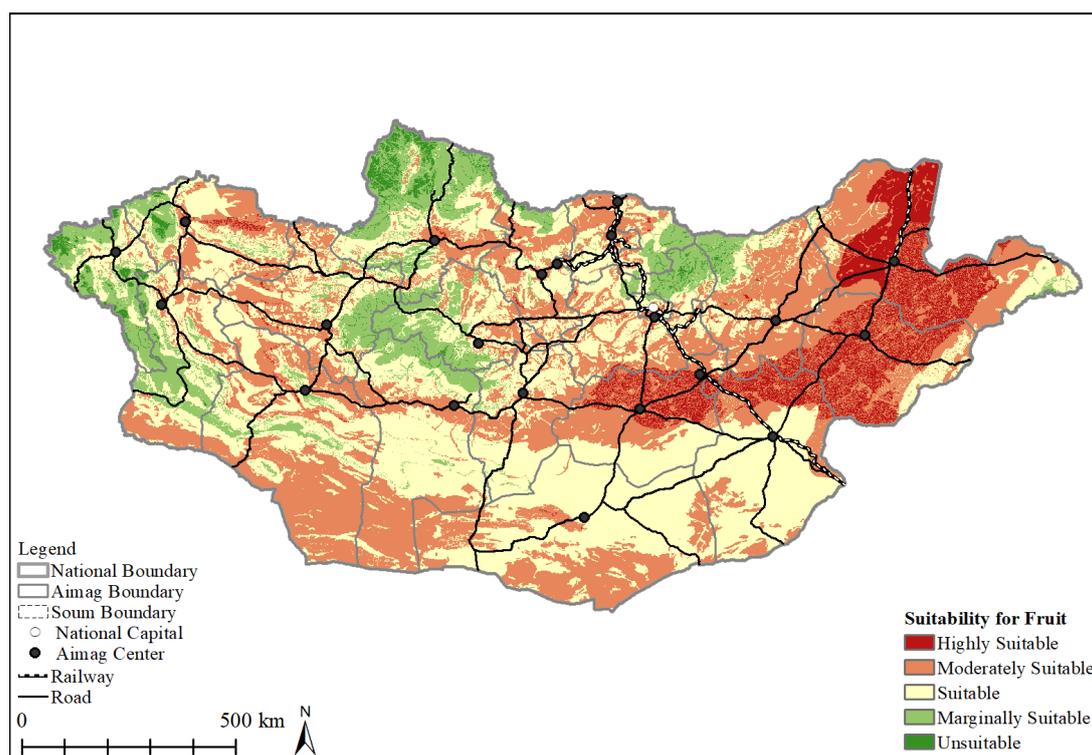
Source: JICA Project Team

Figure 5.4.25 Land Suitability for Fodder



Source: JICA Project Team

Figure 5.4.26 Land Suitability for Oil Seed



Source: JICA Project Team

Figure 5.4.27 Land Suitability for Fruit

5.4.6 Indicative land use plan of Mongolia

(1) Criteria for land use conversion for NCDP

Areas for intensive livestock are defined within 100km from Ulaanbaatar and 50km from Regional Core Cities and Local Growth Centers. Areas for semi-intensive livestock are defined within 50km from Aimag centers and 20km from the national artery road, where conditions for high suitability for fodder are satisfied: i.e. 1) good pasture conditions in existing land use map and 2) water balance in surplus in 2040. In these areas, integrated farming combining livestock and crop production may be undertaken.

All extremely and highly degraded pastures and moderately and slightly degraded pastures in Aimags where water shortages are foreseen in 2040 are designated as controlled grazing areas. These Aimags include Dornogovi and Umnugovi. Other pastures are defined as normal pasture.

Following the self-sufficiency policy, existing cropland will remain as original land use in principle. Existing fodder, fruit and oil seed land will be expanded. Especially, fodder production will be enhanced around intensive or semi-intensive livestock areas. The highly suitable areas for fodder, fruit and oil seed are defined within the distance of 80km from Aimag centers and 20km from the national artery road for convenient access to market, manpower and maintenance. The highly suitable areas are indicated in the indicative land use plan as reference.

Existing forest area should be protected in line with Sustainable Development Vision (SDV2030). Conservation area should be slightly increased for the achievement of the SDV2030 targets. The new strictly protected area proposed by MET are reflected in the indicative land use plan.

Moderately and highly degraded pasture within the high-risk area of Dzud should be preserved or converted to intensive livestock land use. Moderately and highly degraded pasture as well as slightly degraded and normal pasture within the risk area of Dzud is managed as control grazing land use.

Existing forest area should be protected in line with SDV2030. Conservation area should be slightly increased for the achievement of the SDV2030 targets. The new strictly protected area proposed by MET are reflected in the indicative land use plan.

Mining and oil land management should be undertaken along with the NCDP policy for responsible mining and oil development. The protected water recharge area suggested in the NLMP is conserved to prevent the encroachment from mining development and settlement.

Genuine desert and very dry desert are indicated to differentiate from pasture and other types of use.

Settlement areas are to be expanded along with increasing population. A range of buffer zones will be established around residential areas for future habitation.

Following these conditions, the land use categories for the indicative land use plan are set as below.

- Agriculture: cropland, normal pasture, intensive livestock, control grazing
- Forest
- Settlement: settlement and others
- Transport: road, railway and airport
- Special Land: protected area, border strip and free zone (the protected area includes strictly protected area, monument, nature reserve and national conservation park)

The land use plan shows the protected water recharge area and the land suitable for cropland expansion as reference.

The sensitivity analysis has been carried out to prevent the negative impact from the mining development. Although the result is not shown in the land use plan, they are presented in Box 7.2 for reference.

(2) Indicative land use map and estimated land area by category

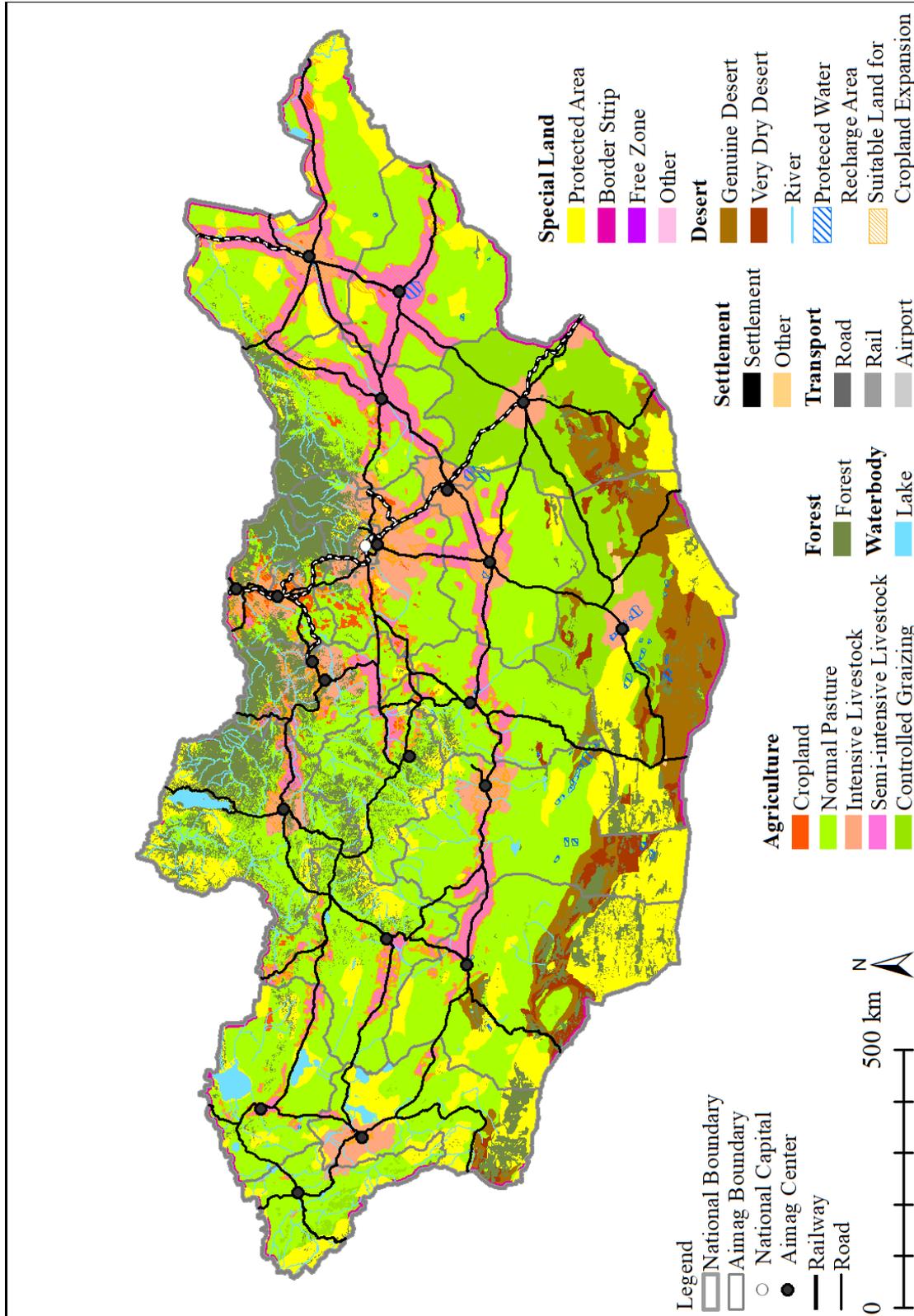
In line with the proposed criteria for the land use conversion, the indicative national land use plan is prepared as shown in Figure 5.4.28. Land area for each land use category is estimated as shown in Table 5.4.11.

Table 5.4.11 Land Area by Land Use Category in Indicative National Land Use Plan

Main	Sub	Land Area (km ²)	Share (%)
Agriculture	Cropland	12,498	0.8
	Normal Pasture	634,773	40.2
	Intensive Livestock	101,764	6.4
	Semi-intensive livestock	140,824	8.9
	Control Grazing	129,391	8.2
Forest	Forest	185,390	11.7
Water Body	Lake	13,922	0.9
Settlement	Settlement	516	0.0
	Other	1,594	0.1
Transport	Road	117	0.0
	Rail	91	0.0
	Airport	12	0.0
Special Land	Protected Area	230,103	14.6
	Border Strip	26,050	1.6
	Free Zone	20	0.0
Desert	Genuine Desert	79,377	5.0
	Very Dry Desert	22,496	1.4
Total		1,578,901	100.0

Source: JICA Project Team

Note: Protected Area comprises Strictly Protected Area, Monument, Nature Reserve and National Conservation Park. The estimated land area for the Protected Area does not include Forest within the Protected Area.



Source: JICA Project Team
Figure 5.4.28 Indicative National Land Use Plan of Mongolia

Box 5.2 Sensitivity Analysis for Mining Development

The level of sensitivity is defined for each land use category including agriculture, forest, water bodies, settlement, transport and special land. The weighting coefficient is estimated for each type of land use using a direct evaluation method as shown in Table 5.4.12.

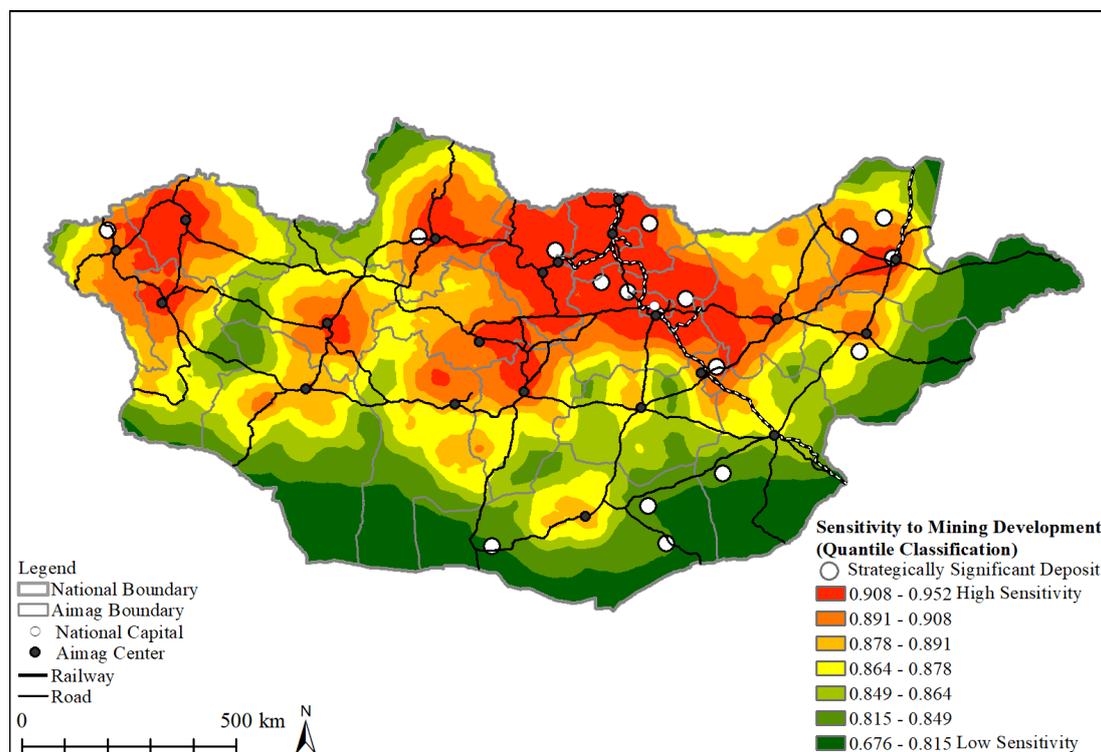
The level of sensitivity is estimated depending on the distance for each land use category. Multiplying the estimated sensitivity with weighting coefficient, the comprehensive sensitivity is worked out and classified into seven levels. Figure 5.4.29 shows distribution of estimated sensitivity and strategically significant mining deposits. Sensitivity in dark green area is relatively low compared to other area.

Table 5.4.12 Weighting Coefficient for Sensitivity Analysis of Mining Development

Main	Sub	Weight	Weighting Coefficient	Main	Sub	Weight	Weighting Coefficient
Agriculture	Cropland	4	0.0870	Special Land	Protected Area	5	0.1087
	Pasture	3	0.0652		Border Strip	1	0.0217
Forest	Forest	5	0.1087		Free Zone	2	0.0435
Water Body	Lake	5	0.1087		Other	1	0.0217
Settlement	Settlement	5	0.1087	River		5	0.1087
	Other	2	0.0435	Water Recharge to be Protected (LMP)		5	0.1087
Transport	Road, Rail, Airport	3	0.0652	Total		46	1.0000

Source: JICA Project Team

Note: 5: Highly sensitive, 4: Moderately sensitive, 3: Marginally sensitive, 2: Sensitive, 1: Low sensitivity



Source: JICA Project Team

Figure 5.4.29 Sensitivity to Mining Development and Strategically Significant Deposit

(3) Detailed land capacity for livestock use by Aimag

To facilitate pasture capacity determination, detailed land capacity for livestock use by Aimag is compiled from the GIS data of the indicative land use map as shown in Table 5.4.13.

Table 5.4.13 Detailed Land Capacity of Pasture for Livestock

Unit: sq.km

Aimag	Normal Pasture	Intensive Livestock	Semi-intensive Livestock	Controlled Grazing	Total
Arkhangai	34,711	0	4,562	0	39,273
Bayankhongor	59,622	8,085	6,233	15	73,955
Bayan-Ulgii	25,340	977	308	4,105	30,730
Bulgan	12,885	8,244	6,346	37	27,512
Govi-Altai	62,057	0	6,793	336	69,186
Govisumber	391	4,778	384	0	5,553
Darkhan-Uul	36	1,983	0	0	2,019
Dornogovi	0	9,006	0	71,891	80,897
Dornod	58,148	6,516	26,606	0	91,270
Dundgovi	50,035	9,928	10,322	0	70,286
Zavkhan	55,927	0	8,981	0	64,908
Orkhon	0	584	0	0	584
Uvurkhangai	47,044	2	8,441	85	55,573
Umnugovi	0	6,512	0	52,469	58,981
Sukhbaatar	46,671	0	24,385	0	71,056
Selenge	9,244	6,461	1,404	0	17,109
Tuv	28,155	20,564	6,104	22	54,844
Uvs	45,447	0	5,054	100	50,601
Khovd	29,184	8,785	1,313	329	39,610
Khuvsgul	32,917	4,903	3,537	1	41,359
Khentii	36,921	1,509	20,052	0	58,481
Ulaanbaatar	0	2,926	0	0	2,926
Total	634,733	101,764	140,824	129,391	1,006,713

Source: JICA Project Team

5.5 Spatial Analysis on Water Resources and Climatic Change

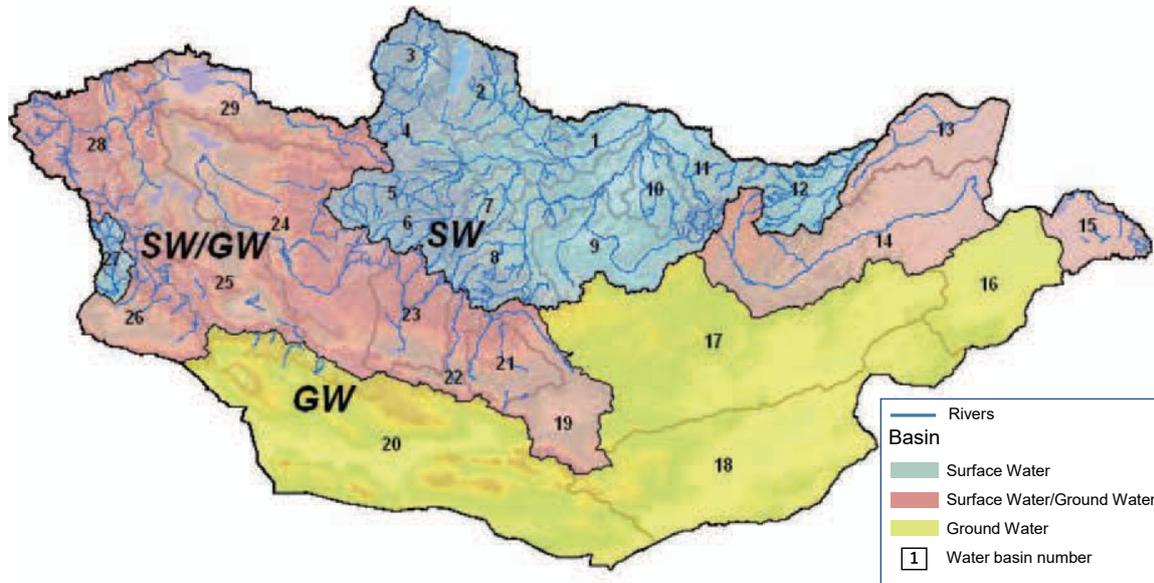
5.5.1 Water balance analysis

(1) Water resources as critical factor of regional development

Mongolia is relatively blessed with water resource endowments for both surface water and groundwater but their distribution is rather skewed spatially and seasonally due to geographic and climatic conditions. Concentration of population in Ulaanbaatar and dispersed population distribution in other regions make water availability difficult in both ways. In planning for regional development for more balanced development of the national territory and socioeconomy, water resources constitute one of most critical factors. A water balance analysis has been conducted by the JPT to generate data and information useful in making decisions for regional development.

(2) Water potentials estimate

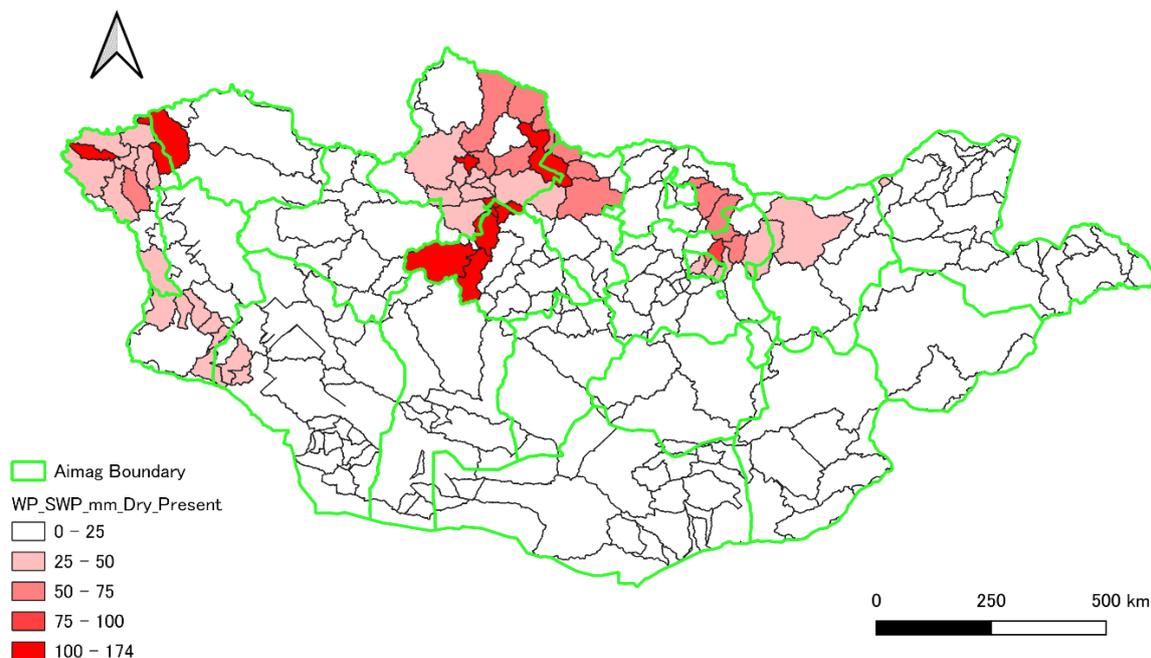
Mongolia is broadly divided into three basins: Arctic Ocean, Pacific Ocean and Central Asian internal drainage basins, which are further sub-divided into 29 basins as shown in Figure 5.5.1.



Source: Ministry of Environment and Green Development (former), (2013), “Integrated Water Management Plan, Mongolia”

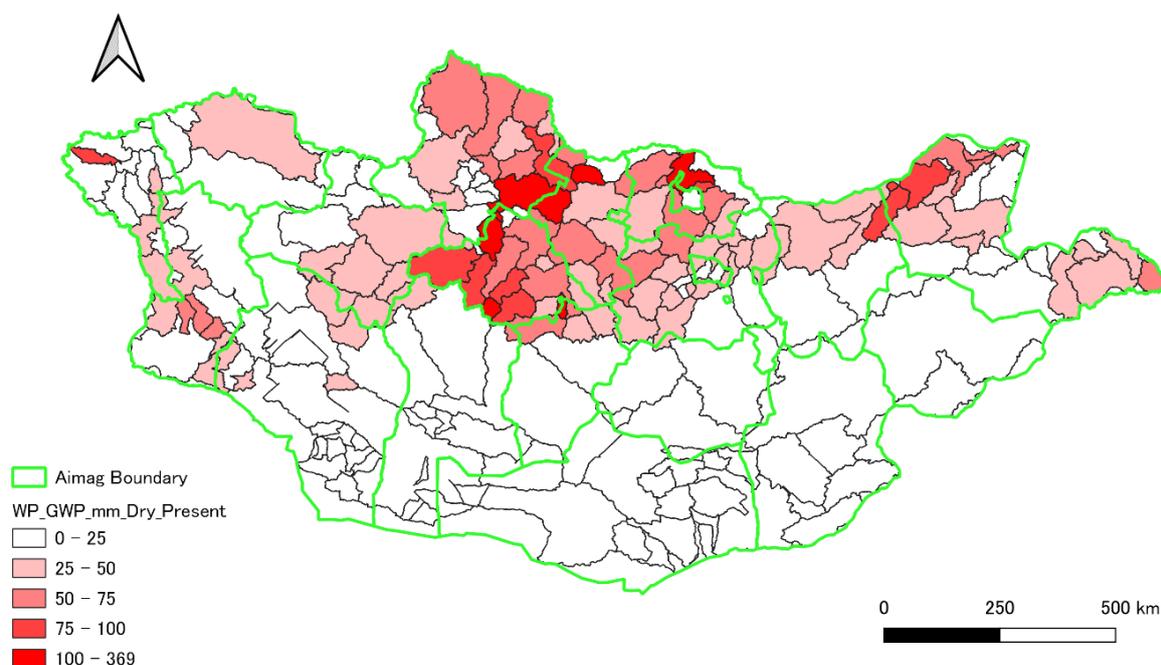
Figure 5.5.1 Classification of Water Basins in Mongolia

The JPT has estimated potentials for surface water and groundwater by using mathematical models, which have been calibrated by using observed discharge data at selected hydrological stations and observed precipitation and temperature data provided by NAMEM. Water potentials have been estimated by river basin and sub-basin representing average conditions (average of 30 years 1989-2018) and dry year conditions (driest year during 1989-2018) separately. Results for dry year are shown by Soum in Figure 5.5.2 for surface water and Figure 5.5.3 for groundwater. As shown, the north-central area and the western most areas are relatively rich in surface water endowments. Most parts of the northern half of the Country have relatively rich groundwater resources. The Aimag-wise water potentials estimated by the JPT are shown in Table 5.5.1 for average and dry year conditions.



Source: JICA Project Team

Figure 5.5.2 Map of Annal Surface Water Potential by Sub-Basin (Dry Year)



Source: JICA Project Team

Figure 5.5.3 Map of Annal Groundwater Potential by Sub-Basin (Dry Year)

Table 5.5.1 Aimag-wise Surface and Groundwater Potentials Estimated by JPT

Unit: million m³/year

Aimag/City	Water Potential (Average)			Water Potential (Dry Year)		
	SW	GW	Total	SW	GW	Total
Mongolia	44,209	80,487	124,697	22,081	42,740	64,820
<i>Western Region</i>	<i>15,338</i>	<i>17,828</i>	<i>33,166</i>	<i>7,768</i>	<i>8,987</i>	<i>16,755</i>
Bayan-Ulgii	3,423	1,930	5,353	1,716	1,045	2,761
Gove-Altai	3,618	4,940	8,558	1,692	2,398	4,090
Zavkhan	2,198	3,838	6,036	1,124	2,078	3,202
Uvs	2,988	3,824	6,812	1,643	1,741	3,385
Khovd	3,110	3,297	6,407	1,593	1,724	3,317
<i>Khangai Region</i>	<i>17,498</i>	<i>29,615</i>	<i>47,114</i>	<i>9,735</i>	<i>16,709</i>	<i>26,445</i>
Arkhangai	4,714	7,046	11,760	2,951	4,071	7,022
Bayankhongor	1,728	3,366	5,094	793	1,612	2,405
Bulgan	2,977	6,151	9,127	1,817	3,515	5,332
Orkhon	13	61	74	6	33	40
Uvurkhangai	783	2,652	3,435	319	1,326	1,645
Khuvsgul	7,284	10,339	17,623	3,850	6,152	10,002
<i>Central Region</i>	<i>8,135</i>	<i>17,077</i>	<i>25,212</i>	<i>3,194</i>	<i>8,407</i>	<i>11,601</i>
Govisumber	59	105	164	23	51	73
Darkhan-Uul	32	534	566	18	344	362
Dornogovi	896	2,259	3,155	57	855	912
Dundgovi	830	2,069	2,899	249	955	1,204
Umnugovi	1,523	3,660	5,183	342	1,312	1,654
Selenge	2,775	4,150	6,925	1,595	2,746	4,341
Tuv	2,019	4,301	6,319	909	2,144	3,054
<i>Eastern Region</i>	<i>2,827</i>	<i>15,720</i>	<i>18,547</i>	<i>1,202</i>	<i>8,485</i>	<i>9,687</i>
Dornod	540	9,063	9,602	190	4,999	5,189
Sukhbaatar	533	2,482	3,015	79	1,199	1,278
Khentii	1,754	4,176	5,930	933	2,287	3,220
<i>Ulaanbaatar</i>	<i>412</i>	<i>246</i>	<i>659</i>	<i>182</i>	<i>151</i>	<i>332</i>

Source: JICA Project Team

(3) Water demand estimate

The JPT has estimated water demand for various uses in line with the socioeconomic framework presented in Chapter 4. The assumptions used for the water demand estimation for 2018, 2030 and 2040 are summarized in Table 5.5.2. Water demand has been estimated by Aimag and broken down to Soum level demand based on projected population for 2030 and 2040.

Table 5.5.2 Assumptions for Projecting Water Demand in 2018, 2030 and 2040

Year	2018	2030	2040
Drinking water use			
Population growth	Statistical data of 2018	Aimag:0.8%~3.4%/year ^{*1} Average: 1.8%/year ^{*1}	Aimag:0.8%~3.0%/year ^{*1} Average: 1.6%/year ^{*1}
% urban population*	67.40%	75.10% ^{*2}	81.00% ^{*2}
Water consumption norm	For apartment dwellers: 200 l/day/person in Ulaanbaatar, and 80 l/day/person in other urban area; For users of kiosks and protected sources: 20 l/day/person	For apartment dwellers: 160 l/day/person in Ulaanbaatar ^{*3} , and 150 l/day/person ^{*4} in other urban area; For users of kiosks and protected sources: 30 l/day/person ^{*3}	Same as 2030
Municipal water use			
Utilities growth rate	-	1.40% ^{*3}	1.40% ^{*3}
Services growth rate	-	1.40% ^{*3}	1.40% ^{*3}
Industrial water use			
Manufacturing growth rate	-	4.80% ^{*5}	6.00% ^{*5}
Heavy industries growth rate	-	4.80% ^{*5}	6.00% ^{*5}
Construction growth rate	-	4.80% ^{*5}	6.00% ^{*5}
Energy growth rate	-	6.90% ^{*3}	6.90% ^{*3}
Existing mines & new mines	-	10.5% growth According MMRE estimates ^{*3}	Same as 2030
Livestock water use			
Livestock numbers	Statistical data of 2018	According trend of statistical data from 2000-2018 ^{*6}	According trend of statistical data from 2000-2018 ^{*6}
Consumption norm	8.80 l/head/day	8.80 l/head/day ^{*7}	8.80 l/head/day ^{*7}
Irrigation water use			
Irrigated area *	Statistical data of 2018	Projection according MOFALI	Projection according MOFALI
Crop water requirement	by CropWat ¹	Unchanged	Unchanged
Tourism water use			
Water demand growth	-	1.40% ^{*8}	9.38% ^{*9}
Green areas water use			
Water use growth	-	1.40% ^{*8}	9.38% ^{*9}

Source: JICA Project Team (2019)

¹ CropWat is computer program for the calculation of crop water requirements and irrigation requirements based on soil, climate and crop data developed by FAO

Note *: Urban population refers to people living in urban areas as defined by national statistical offices.

*1: Based on socio-economic frame growth forecast by JICA Project Team.

*2: Urban population refers to people living in urban areas as defined by national statistical offices. The number of urban populations was forecasted from trends in the Urban population from 2005 to 2018, National Statics Office of Mongolia, (2018), "Mongolian Statistical Yearbook".

*3: Based on Ministry of Environment, Green Development and Tourism (MEGDT), (2013), Integrated Water Management Plan of Mongolia.

*4: Assumed based on Note) *3.

*5: Based on "Production of major industrial commodities by Aimag" by NSO, Water Consumption Table by Ulaanbaatar City 2015 (Land organized construction and integrated water policy regulation), Integrated Water Management National Assessment Report Volume II Ulaanbaatar 2012, and Ulaanbaatar Hydro-economic Analysis on Cost-Effective Solutions to Close Ulaanbaatar's Future Water Gap, August 2016.

*6: Forecast from trends from 2000 to 2018, National Statics Office of Mongolia, (2018), "Mongolian Statistical Yearbook".

*7: Average of water consumption norm of "Use of the Water Basin Management Plan", MEGDT, (2015).

*8: Assumed as "utility growth rate" based on Ministry of Environment, Green Development and Tourism (MEGDT), (2013), Integrated Water Management Plan of Mongolia.

*9: Average of utility, service, tourism and green area water use growth rate" based on Ministry of Environment, Green Development and Tourism (MEGDT), (2013), Integrated Water Management Plan of Mongolia.

Estimated water demand by Aimag in 2040 is summarized in Table 5.5.3.

Table 5.5.3 Estimated Total Water Demand by Aimag in 2040

Aimag	Water Demand in 2040 (million m ³ /year)							
	Drinking and domestic water for population	Utility service & tourism & green area	Industry	Other industry, energy, construction, road and transport	Mining (mine and processing)	Livestock (pastoral and farming)	Irrigated area	Grand total
Mongolia	201.80	56.18	28.68	130.70	211.08	388.70	845.52	1,862.7
<i>Western Region</i>	18.20	4.32	1.00	4.01	1.23	87.60	47.70	164.1
Bayan-Ulgii	5.90	1.83	0.14	1.20	0.85	11.30	5.31	26.5
Gove-Altai	2.00	0.32	0.22	0.24	0.00	21.20	3.43	27.4
Zavkhan	2.20	1.01	0.24	1.91	0.24	20.10	4.21	29.9
Uvs	4.00	1.07	0.26	0.65	0.14	16.60	26.66	49.4
Khovd	4.10	0.09	0.14	0.00	0.00	18.50	8.09	30.9
<i>Khangai Region</i>	27.70	7.16	2.01	12.48	61.20	148.20	115.61	374.4
Arkhangai	3.30	2.97	0.01	10.08	55.90	32.80	12.11	117.2
Bayankhongor	4.50	1.07	0.01	0.87	4.92	27.20	1.53	40.1
Bulgan	1.60	0.57	0.04	0.42	0.10	20.30	54.12	77.2
Orkhon	8.20	0.00	1.15	0.00	0.00	0.30	5.08	14.7
Uvurkhangai	4.80	0.32	0.53	0.00	0.00	34.40	17.93	58.0
Khuvsgul	5.30	2.24	0.27	1.10	0.27	33.20	24.85	67.2
<i>Central Region</i>	23.60	5.21	9.78	24.64	91.08	89.90	550.74	794.9
Govisumber	1.00	0.00	0.00	0.00	0.00	2.90	0.15	4.1
Darkhan-Uul	6.60	0.00	1.18	0.00	0.00	1.70	38.38	47.9
Dornogovi	4.30	0.66	5.07	0.00	62.94	11.40	0.62	85.0
Dundgovi	1.40	1.67	0.01	3.56	6.66	21.10	0.35	34.8
Umnugovi	3.30	1.36	0.00	3.85	9.19	14.60	1.59	33.9
Selenge	5.00	0.00	3.41	0.00	3.35	9.30	325.60	346.7
Tuv	2.00	1.52	0.10	17.23	8.95	28.90	184.05	242.7
<i>Eastern Region</i>	9.50	2.18	0.11	13.31	46.31	60.70	128.64	260.8
Dornod	4.20	0.19	0.08	1.32	27.08	12.60	62.75	108.2
Sukhbaatar	3.00	0.00	0.02	0.00	0.00	20.30	16.41	39.7
Khentii	2.30	1.99	0.01	12.00	19.23	27.80	49.48	112.8
<i>Ulaanbaatar</i>	122.80	37.31	15.79	76.25	11.27	2.30	2.83	268.5

Source: JICA Project Team

5.5.2 Water supply-demand gaps

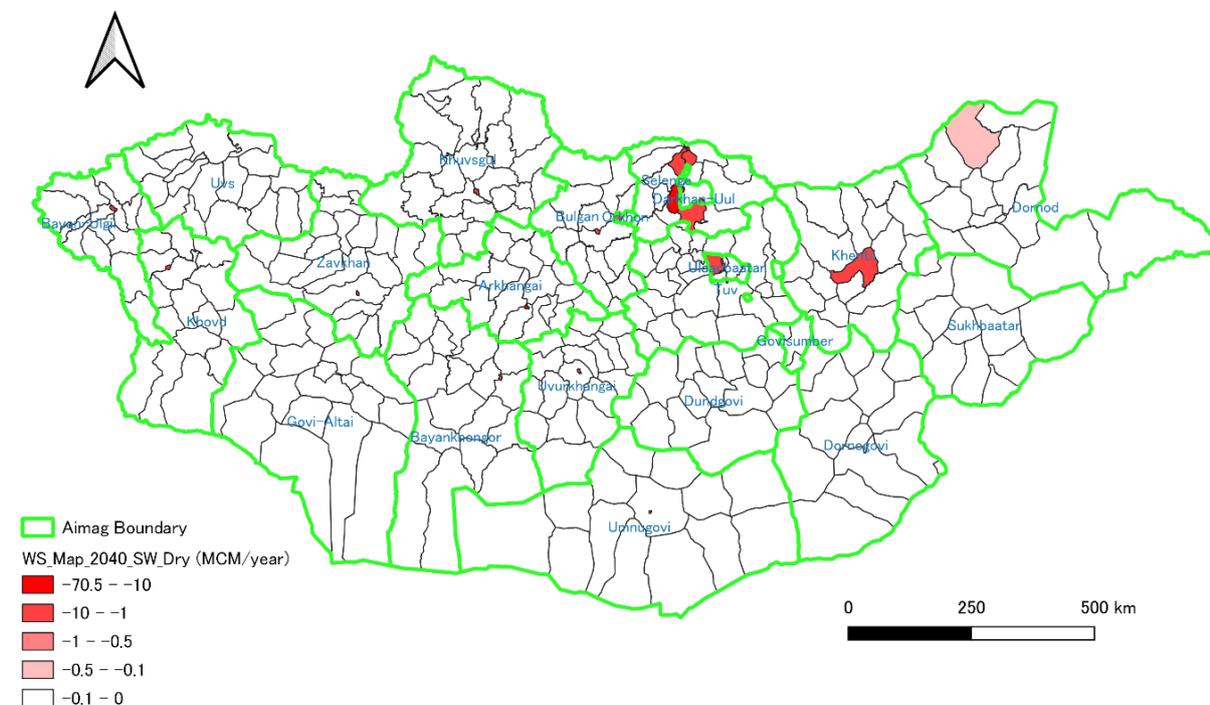
Aimag-wise water supply-demand gaps and water balance in 2018, 2030 and 2040 by using water

potentials and demand estimated by the JPT for dry year are summarized in Table 5.5.4. This Aimag-wise water balance analysis does not show serious water gaps up to 2040 except Ulaanbaatar even for dry year. However, from the viewpoint of the Soum-wise water balance, several Soums will face serious water shortages in 2040 for dry year as shown in Figure 5.5.4 for surface water and Figure 5.5.5 for groundwater.

Table 5.5.4 Water Supply and Demand Balance by Aimag Using JPT's Water Potential Estimation (Dry Year)

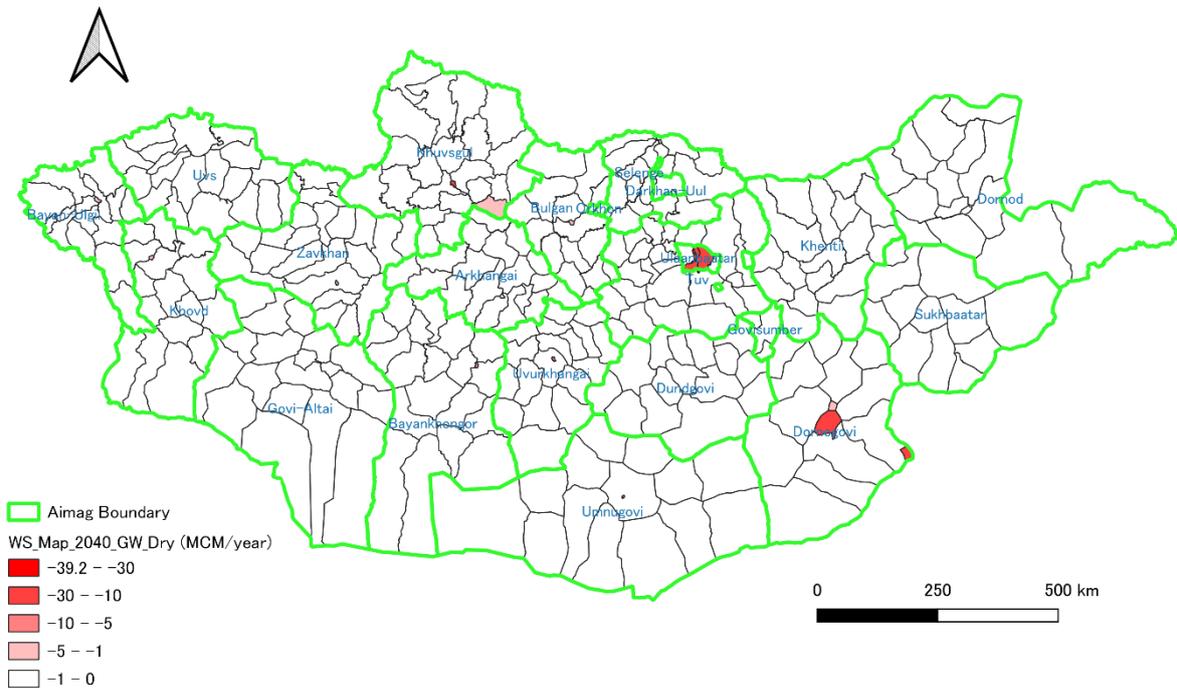
Aimag Name	Water Availability (Dry Year)			Water Demand in 2018			Gap in 2018			Water Demand in 2030			Gap in 2030			Water Demand in 2040			Gap in 2040		
	SW	GW	Total	SW	GW	Total	SW	GW	Total	SW	GW	Total	SW	GW	Total	SW	GW	Total	SW	GW	Total
	a	b	c=a+b	d	e	f=d+e	g=c-d	h=c-e	i=c-f	j	k	l=j+k	m=c-j	n=c-k	o=c-l	p	q	r=p+q	s=c-p	t=c-q	u=c-r
Mongolia	22,080.6	42,739.7	64,820.3	352.7	505.0	857.7	21,727.9	42,234.6	63,962.6	596.7	779.9	1,376.6	21,483.9	41,959.8	63,443.7	811.4	1,051.4	1,862.8	21,269.2	41,688.3	62,957.5
Western Region	7,767.8	8,997.0	16,764.8	42.4	35.2	80.5	7,725.4	8,945.8	16,674.3	66.6	59.5	126.1	7,701.2	8,907.5	16,608.7	83.5	71.6	164.2	7,679.3	8,911.4	16,590.6
Bayan-Ulgii	1,716.0	1,045.2	2,761.2	7.7	4.5	12.3	1,708.2	1,040.7	2,748.9	12.5	7.5	19.9	1,703.5	1,037.7	2,741.3	16.5	10.1	26.5	1,699.5	1,035.1	2,734.7
Govi-Altai	1,691.7	2,398.2	4,089.9	1.8	12.1	13.9	1,689.9	2,386.1	4,076.0	3.0	18.6	21.6	1,688.7	2,379.7	4,068.3	4.1	23.3	27.4	1,687.6	2,374.9	4,062.5
Zavkhan	1,124.0	2,077.8	3,201.8	9.7	5.7	15.3	1,114.3	2,072.1	3,186.4	14.6	8.7	23.3	1,109.4	2,069.1	3,178.5	18.9	11.0	29.9	1,105.0	2,066.8	3,171.9
Uvs	1,643.5	1,741.4	3,384.8	18.0	6.9	24.8	1,625.5	1,734.5	3,360.0	26.8	10.6	37.3	1,616.7	1,730.8	3,347.5	35.8	13.5	49.4	1,607.6	1,727.8	3,335.4
Khovd	1,592.7	1,734.4	3,317.1	5.2	9.0	14.2	1,587.5	1,715.4	3,302.9	9.8	14.2	24.0	1,582.9	1,710.2	3,293.1	13.2	17.7	30.9	1,579.5	1,706.7	3,286.2
Khovsgol Region	9,733.3	16,709.2	26,444.7	80.6	33.2	163.8	9,654.8	16,624.0	26,278.8	140.9	138.5	279.4	9,594.6	16,370.7	26,165.2	191.3	132.6	374.4	9,548.7	16,326.6	26,070.3
Arkhangai	2,950.8	4,071.1	7,021.9	32.6	12.9	45.4	2,918.2	4,058.3	6,976.5	64.0	20.5	84.5	2,886.8	4,050.6	6,937.4	89.6	27.6	117.2	2,861.2	4,043.5	6,904.7
Bayankhongor	793.0	1,611.7	2,404.7	6.1	11.4	17.6	786.8	1,600.2	2,387.1	10.5	19.8	30.2	782.5	1,591.9	2,374.4	13.8	26.3	40.1	779.2	1,585.4	2,364.6
Bulgan	1,817.1	3,514.7	5,331.7	17.7	19.2	36.9	1,799.3	3,495.5	5,294.8	27.8	30.1	58.0	1,789.2	3,484.5	5,273.8	37.2	39.9	77.2	1,779.8	3,474.7	5,254.6
Orkhon	6.2	33.3	39.6	2.6	3.4	6.0	3.6	30.0	33.6	4.1	7.7	11.8	2.1	25.7	27.8	5.5	9.3	14.7	0.7	24.1	24.8
Uvurkhangai	318.7	1,326.4	1,645.1	12.9	14.1	27.0	305.9	1,312.3	1,618.1	21.3	22.7	44.0	297.5	1,308.7	1,601.1	28.4	29.6	58.0	290.3	1,296.8	1,587.1
Khuvsgul	3,849.7	6,152.1	10,001.8	8.7	24.3	33.0	3,841.0	6,127.7	9,968.7	13.3	37.7	51.0	3,836.4	6,114.3	9,950.8	17.3	49.9	67.2	3,832.4	6,102.1	9,934.5
Central Region	3,194.1	8,497.3	11,691.4	176.4	163.0	341.4	3,017.7	8,242.3	11,260.0	296.2	286.3	582.3	2,897.9	8,121.0	11,018.9	494.5	390.4	794.9	2,789.5	8,016.9	10,806.4
Govi-sumber	22.7	50.5	73.3	0.0	1.9	1.9	22.7	48.7	71.4	0.0	3.1	3.1	22.7	47.4	70.1	0.0	4.1	4.1	22.7	46.5	69.2
Davidan-Uul	18.2	344.3	362.5	16.3	2.6	18.9	1.9	341.7	343.6	30.5	5.4	35.9	-12.2	338.8	326.6	41.6	6.3	47.9	-23.3	338.0	314.6
Darkhan-Uul	57.3	855.0	912.3	0.0	28.8	28.8	57.3	826.3	883.6	0.0	60.0	60.0	57.3	795.0	852.3	0.0	85.0	85.0	57.3	770.0	827.3
Dundgovi	248.8	955.4	1,204.2	0.0	16.8	16.8	248.8	938.6	1,187.4	0.0	26.2	26.2	248.8	929.2	1,178.0	0.0	34.8	34.8	248.8	920.7	1,169.4
Umnugovi	342.2	1,312.0	1,654.1	4.7	9.8	14.5	337.5	1,302.2	1,639.7	8.3	16.8	25.1	333.9	1,295.2	1,629.1	11.1	22.7	33.9	331.0	1,289.2	1,620.2
Selenge	1,595.4	2,745.9	4,341.3	147.2	4.9	152.1	1,448.2	2,741.0	4,189.2	243.7	9.9	253.6	1,351.7	2,736.0	4,087.8	333.7	13.0	346.7	1,261.7	2,732.9	3,994.7
Tuv	909.5	2,144.2	3,053.7	8.2	100.3	108.5	901.3	2,043.9	2,945.2	13.8	164.9	178.7	895.7	1,979.3	2,875.0	18.2	224.6	242.7	891.3	1,919.6	2,810.9
Eastern Region	1,201.6	8,493.4	9,695.0	39.4	72.3	111.6	1,162.2	8,418.1	9,571.3	64.2	126.2	190.4	1,137.4	8,359.2	9,496.6	87.7	173.1	260.8	1,118.9	8,312.3	9,431.2
Dornod	189.9	4,999.2	5,189.1	17.4	25.9	43.3	172.5	4,973.3	5,145.8	28.8	48.9	77.7	161.1	4,950.3	5,111.4	39.7	68.5	108.2	150.1	4,930.7	5,080.9
Sukhbaatar	78.7	1,199.2	1,277.9	0.0	19.9	19.9	78.7	1,179.2	1,258.0	0.0	30.2	30.2	78.7	1,169.0	1,247.7	0.0	39.7	39.7	78.7	1,159.4	1,238.1
Khentii	933.0	2,287.0	3,220.0	22.0	26.4	48.4	911.0	2,260.6	3,171.6	35.5	47.0	82.5	897.6	2,239.9	3,137.5	47.9	64.9	112.8	885.1	2,222.1	3,107.2
Ulaanbaatar	181.7	150.3	332.3	14.0	144.3	158.3	167.3	6.4	174.2	26.8	169.4	196.2	152.9	-18.6	194.3	33.9	229.7	268.3	142.8	-78.9	63.9

Source: JICA Project Team



Source: JICA Project Team

Figure 5.5.4 Map of Estimated Surface Water Deficit by Soum in 2040 (Dry Year)



Source: JICA Project Team

Figure 5.5.5 Map of Estimated Groundwater Deficit by Soum in 2040 (Dry Year)

Soums to face water shortages by 2040 are summarized in Table 5.5.5, where deficit ratios in comparison with water demand are also shown. Five districts of Ulaanbaatar City will face serious water shortages unless water resources development is undertaken in stages. A total of 20 Soums in 15 Aimags will face shortages of surface water, which are quite serious in some Soums with deficit ratios over 60%. A total of 13 Soums in 10 Aimags will face shortages of groundwater. These Soums may be considered for merger or annexation with neighboring Soums to develop new water sources together.

Table 5.5.5 Soums to Face Water Shortages in 2040 under Dry Year Conditions

Aimags/UB	Soum	Water balance (Dry year) 2040			Water demand 2040			Water deficit ratio 2040 (%)		
		Surface water	Groundwater	Total	Surface water	Groundwater	Total	Surface water	Groundwater	Total
Ulaanbaatar	Bayangol	-5.03	-34.67	-39.70	5.94	35.10	41.05	-84.7	-98.8	-96.7
	Bayanzu'rx	51.54	-25.42	26.12	9.27	54.77	64.04		-46.4	
	Su'xbaatar	4.16	-19.62	-15.46	3.98	23.49	27.47		-83.5	-56.3
	Xan-Uul	14.71	-17.29	-2.57	4.47	26.43	30.90		-65.4	-8.3
	Chingeltei	-0.93	-24.13	-25.06	4.36	25.76	30.13	-21.3	-93.7	-83.2
Dornod	Khelen	-9.25	112.62	103.37	22.30	38.44	60.74	-41.5		
	Dashbalbar	-0.25	609.91	609.66	1.67	2.88	4.56	-15.0		
Khenti	Kherlen	-8.06	54.63	46.57	14.26	19.29	33.56	-56.5		
Tuv	Zuunmod	-3.06	-39.21	-42.27	3.22	39.89	43.11	-94.8	-98.3	-98.0
Selenge	Sukhbaatar	-70.53	8.15	-62.38	70.85	2.76	73.61	-99.5		-84.7
	Bayangol	-2.46	105.98	103.51	17.21	0.67	17.89	-14.3		
	Zuunburen	-1.19	253.47	252.28	8.62	0.34	8.95	-13.8		
	Saikhan	-19.46	50.52	31.06	29.09	1.13	30.22	-66.9		
	Shaamar	-8.46	141.35	132.88	12.61	0.49	13.11	-67.1		
Dornogovi	Sainshand	0.29	-22.76	-22.47	0.00	27.56	27.56		-82.6	-81.5
	Zamin-Uud	0.55	-19.90	-19.35	0.00	21.14	21.14		-94.1	-91.5
	Sainshand	0.04	-3.03	-2.99	0.00	3.67	3.67		-82.6	-81.5
Darkhan-Uul	Darkhan	-33.56	0.19	-33.37	34.31	5.20	39.51	-97.8		-84.5
	Sharingol	-2.88	8.11	5.23	3.40	0.52	3.92	-84.7		
Umnugovi	Dalanzadgad	-4.05	-8.17	-12.23	4.15	8.48	12.63	-97.6	-96.4	-96.8
Orkhon	Bayan-Undur	-3.24	1.94	-1.31	5.26	8.90	14.17	-61.6		-9.2
Uvurkhangai	Arvaikheer	-7.62	-7.21	-14.84	7.70	8.02	15.72	-99.0	-90.0	-94.4
Bulgan	Bulgan	-6.86	-4.44	-11.30	7.54	8.09	15.63	-91.0	-54.9	-72.3
Bayankhongor	Bayankhongor	-4.55	-8.46	-13.01	4.90	9.31	14.20	-93.0	-90.9	-91.6
Arkhangai	Erdenbulgan	-19.94	-0.88	-20.82	20.70	6.38	27.08	-96.3	-13.7	-76.9
Zavkhan	Uliastai	-4.06	-1.34	-5.40	4.34	2.51	6.84	-93.5	-53.4	-78.8
Bayan-Ulgii	Ulgii	-1.58	-1.61	-3.19	5.62	3.45	9.07	-28.2	-46.7	-35.2
Khovd	Jargalant	-2.89	-4.39	-7.27	4.43	5.94	10.37	-65.2	-73.9	-70.1

Source: JICA Project Team

5.5.3 Climate change analysis

(1) Overview of possible climate change effects in Mongolia

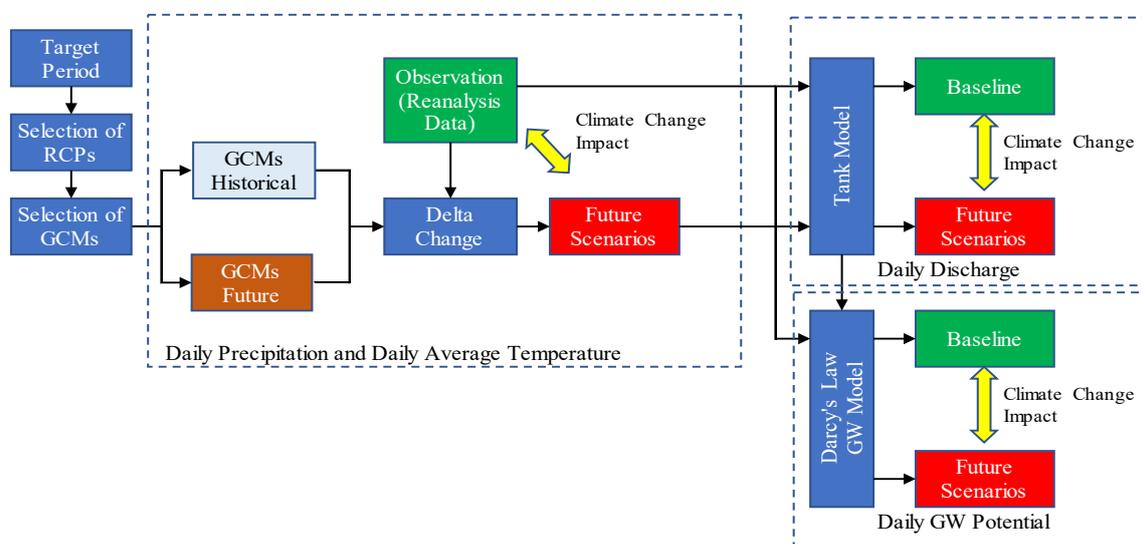
In the upstream areas of the Mongolia, snow mountains and glaciers are located and the melted water derived from them contributes to annual runoff, in particular from spring to summer runoff. The seasonal patterns indicate that some of precipitation in winter accumulates as snow in the mountainous areas, and as temperature increases in spring to summer, snow-melt water contributes to runoff during spring with less rainfall. Considering these hydrological characteristics, possible impact to the project in the mountainous areas due to climate change might be as follows:

- - Intense rainfall events may increase flood damages along the rivers.
- - Changes of precipitation pattern may change flow regime in the basins.
- - Temperature rises may increase evapotranspiration and increase the risk of drought.
- - Temperature rises may reduce snow accumulation in winter and shift snow-melt season earlier.
- - Temperature rises may also affect increase of glacier lakes and consequently an increase of glacier-related hazards such as glacial lake outburst floods (GLOFs).

(2) Future climate scenarios for climate change impact assessment

The goal of climate change impact assessment is to identify and evaluate the effects of climate change on the water resources in Mongolia. Figure 5.5.6 shows the flowchart of the impact assessment. For the assessment, climate change projections derived from general circulation models (GCMs) in the

Coupled Model Intercomparison Project Phase 5 (CMIP5) were used to develop future climate scenarios of temperature and precipitation. Runoffs were simulated by a runoff model as used for the water balance analysis by feeding the developed temperature and precipitation. Then, climate change impacts were evaluated by comparing baseline and future scenarios for the target periods.



Source: JICA Project Team

Figure 5.5.6 Flowchart for Climate Change Impact Assessment

5.5.4 Climate change impact assessment

In this study, the base case (present condition) and the four scenarios of climate change as summarized in Table 5.5.6 have been assessed.

Table 5.5.6 Climate Change Scenarios

Base Case	Present Condition (1979-2016; 38-years)
Case-1	Average of Selected GCMs 2050-RCP4.5 (2038-2062; 25-years)
Case-2	Average of Selected GCMs 2050-RCP8.5 (2038-2062; 25-years)
Case-3	Average of Selected GCMs 2100-RCP4.5 (2076-2100; 25-years)
Case-4	Average of Selected GCMs 2100-RCP4.5 (2076-2100; 25-years)

(1) Climate change impact on mean monthly precipitation

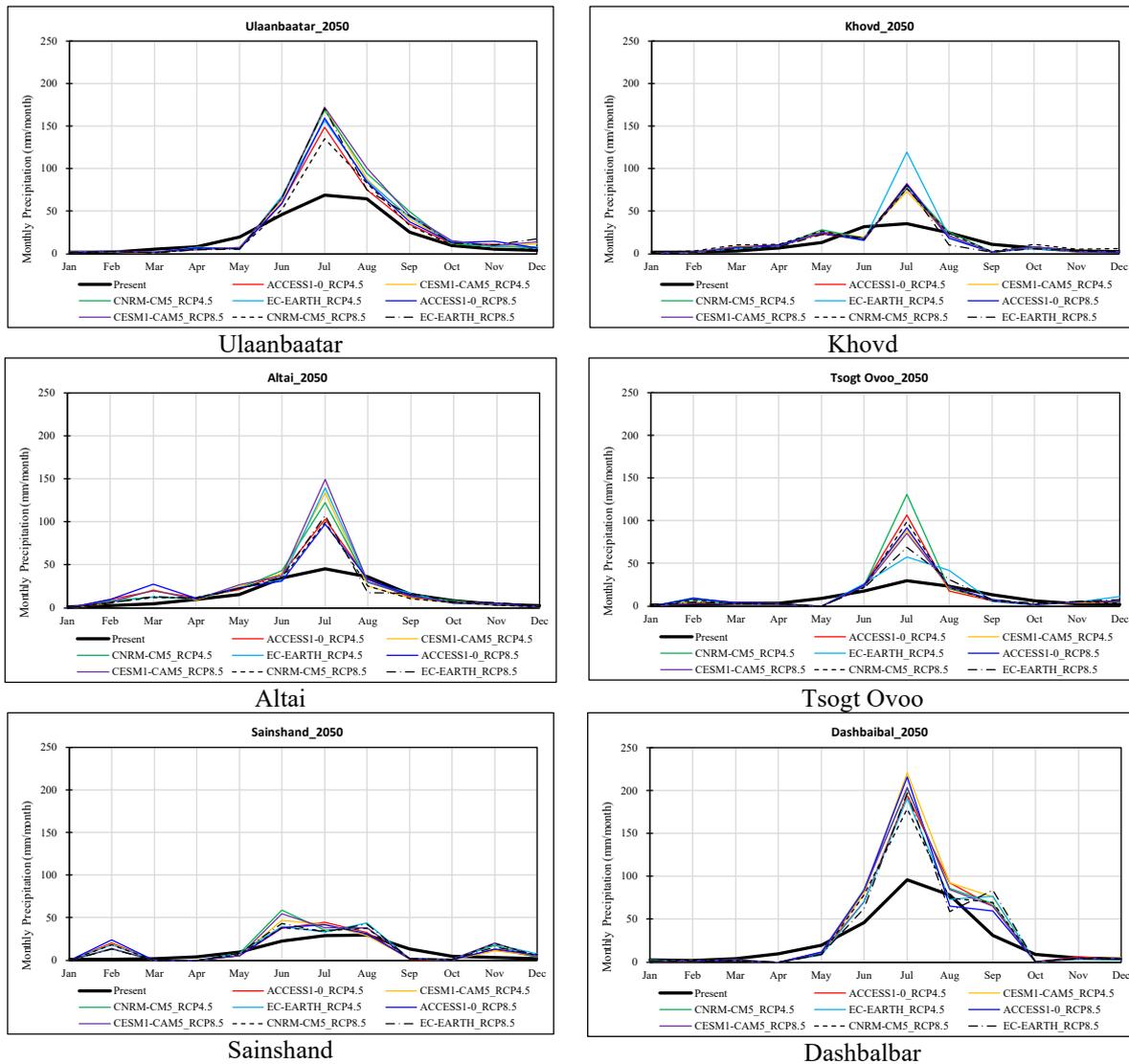
Figure 5.5.7 and Figure 5.5.8 show the climate change impact on mean monthly precipitation at representative meteorological stations by each GCM. In Ulaanbaatar, the mean monthly precipitation in the summer of 2050 tends to increase significantly compared to the present condition, but in 2100 the summer precipitation tends to decrease compared to the present. In 2050, precipitation from October to December also tends to increase, but on the contrary, it tends to decrease to 2100.

In Khovd, many GCMs tend to have higher precipitation in May and July 2050, while other months tend to have lower precipitation than present condition. On the other hand, in 2100, precipitation tends to increase from June to August, but decrease from the current situation in other months. In Altai, precipitation in March and July of 2050 tends to increase, but precipitation in July and August tends to increase significantly in 2100.

In Tsogt Ovoo, precipitation in July 2050 tends to increase significantly, while precipitation tends to decrease in other months. On the other hand, in 2100, precipitation increases slightly in February, but tends to be less than the current precipitation in other months. In Sainshand, average monthly precipitation is only about 30 mm/month, which occurs in a small area even at present, but in 2050,

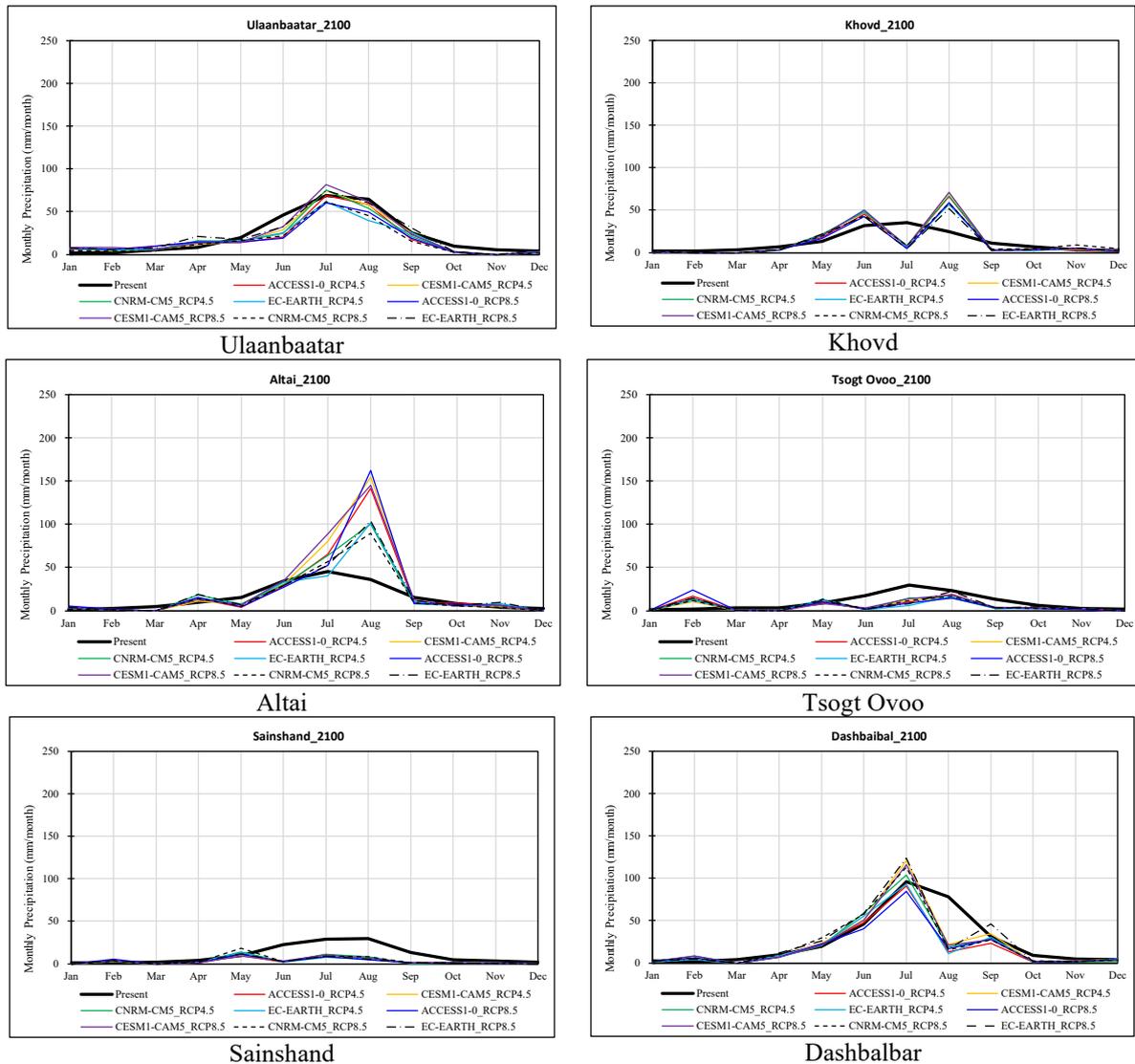
precipitation tends to increase slightly in February, summer, and November. However, in 2100, it tends to be much lower than the current rainfall in most months, and there are concerns about desertification and drought.

In Dashbalbar, precipitation in the summer of 2050 will increase sharply and floods are of concern, while precipitation from winter to spring tends to decrease from the current level. In 2100, there is not much tendency for precipitation to increase in summer, and precipitation decreases from August to winter.



Source: JICA Project Team

Figure 5.5.7 Future Change of Mean Monthly Precipitation at Representative Meteorological Stations by GCMs in 2050

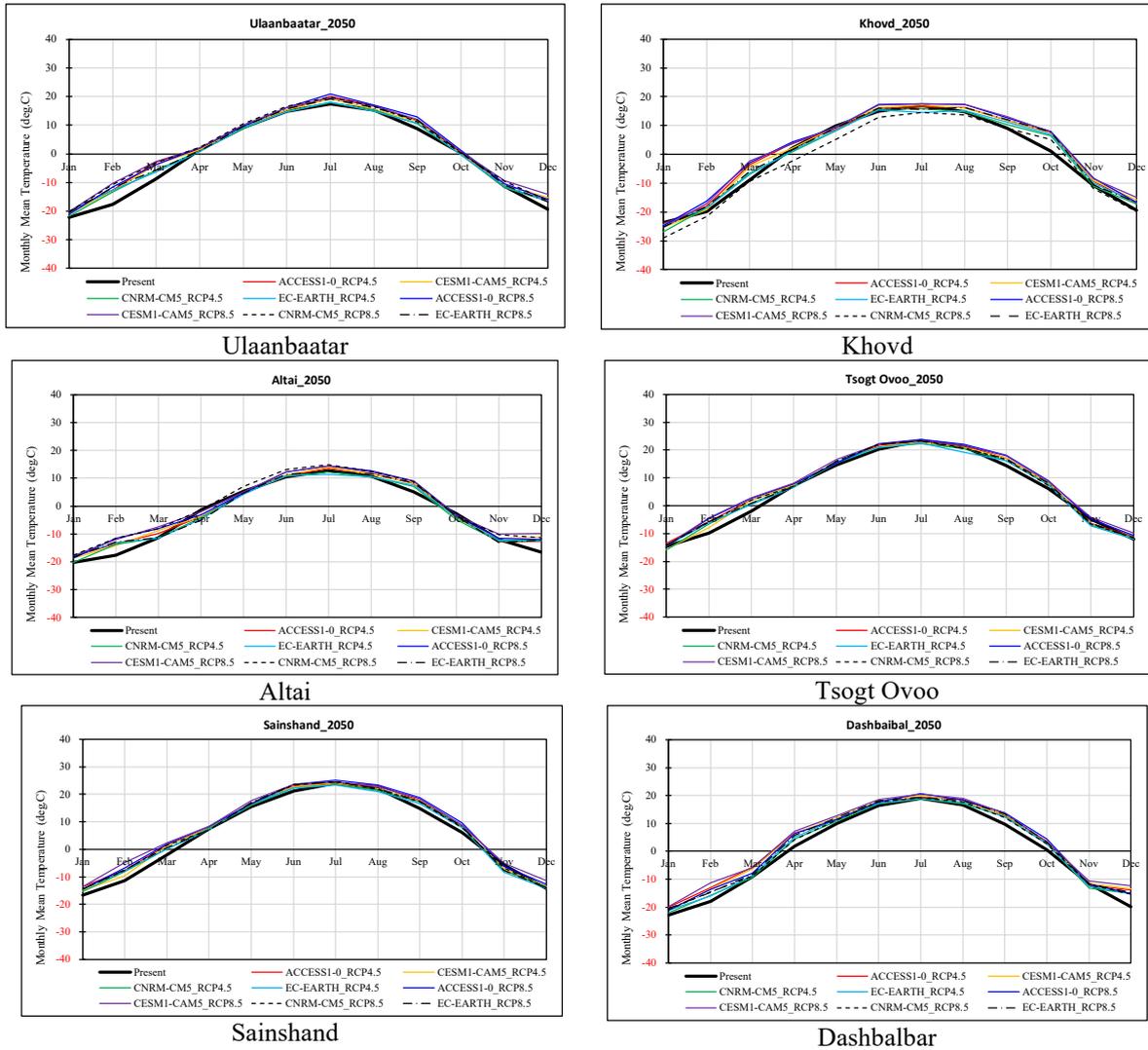


Source: JICA Project Team

Figure 5.5.8 Future Change of Mean Monthly Precipitation at Representative Meteorological Stations by GCMs in 2100

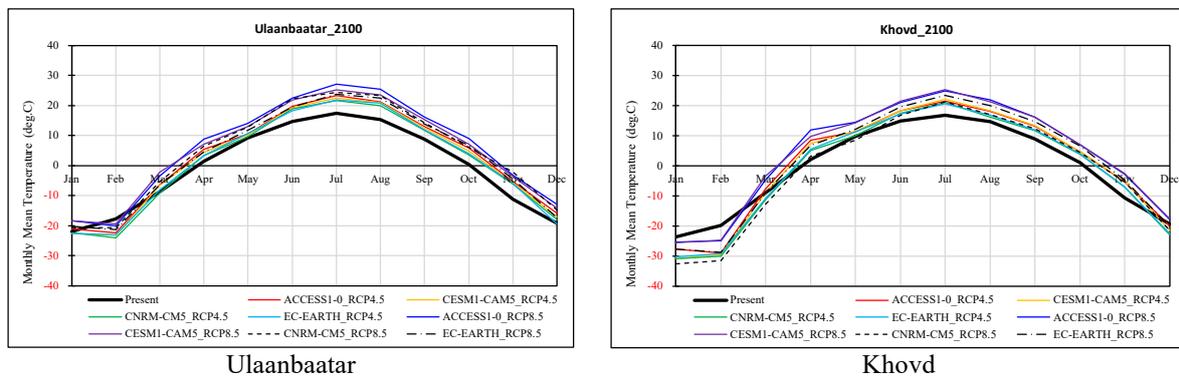
(2) Climate change impact on mean monthly temperature

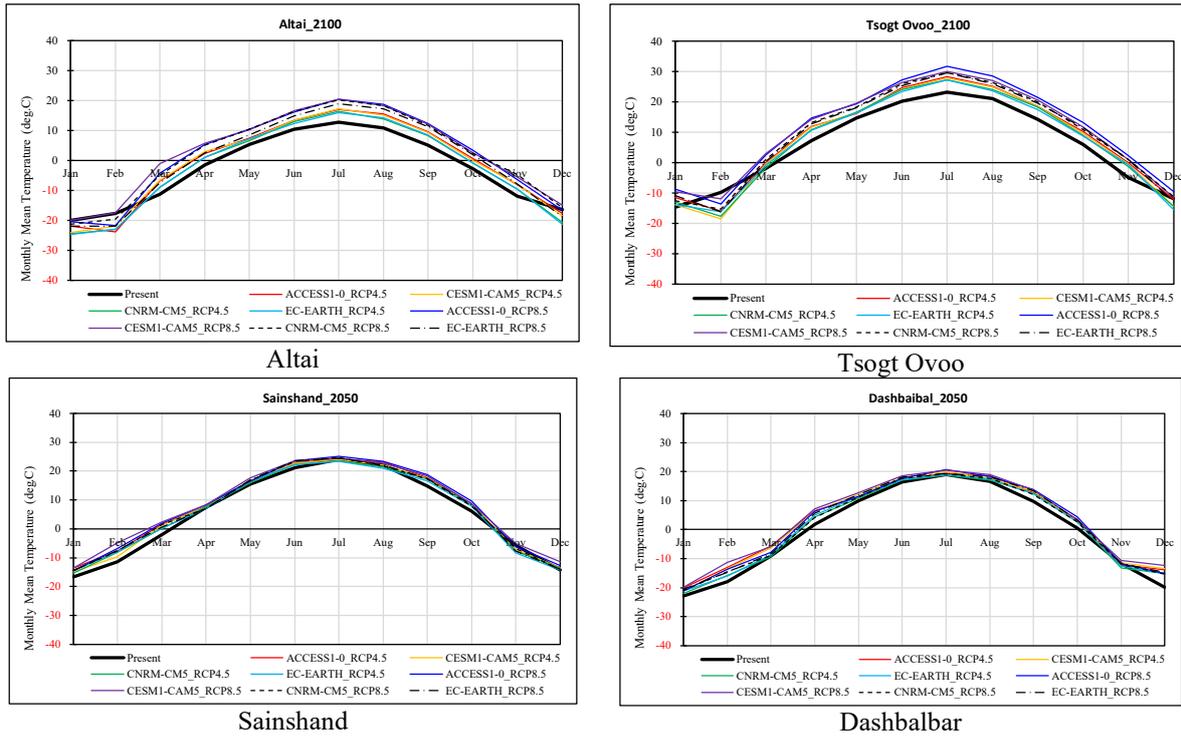
Figure 5.5.9 and Figure 5.5.10 show the climate change impact on mean monthly temperature at representative meteorological stations by each GCMs. In 2050, the average monthly temperature will tend to rise in all regions and all months in all GCMs. However, in 2100, the average monthly temperature from January to February tends to be lower than present condition in some areas (Ulaanbaatar, Khovd and Altai).



Source: JICA Project Team

Figure 5.5.9 Future Change of Mean Monthly Temperature at Representative Meteorological Stations by GCMs in 2050



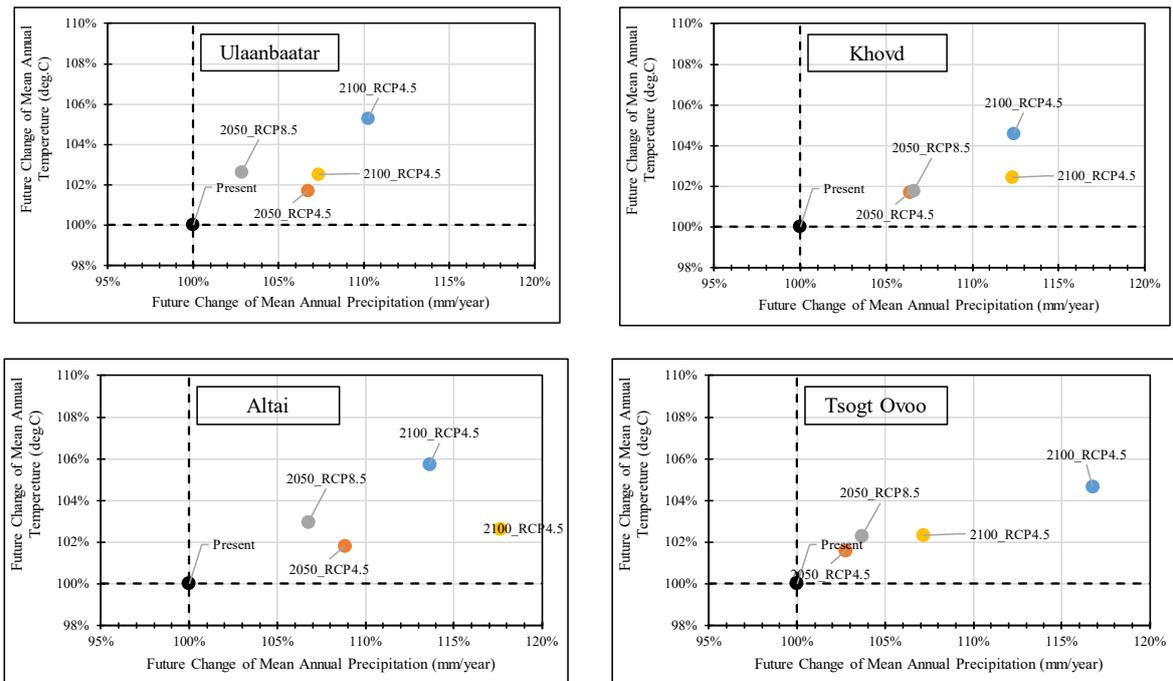


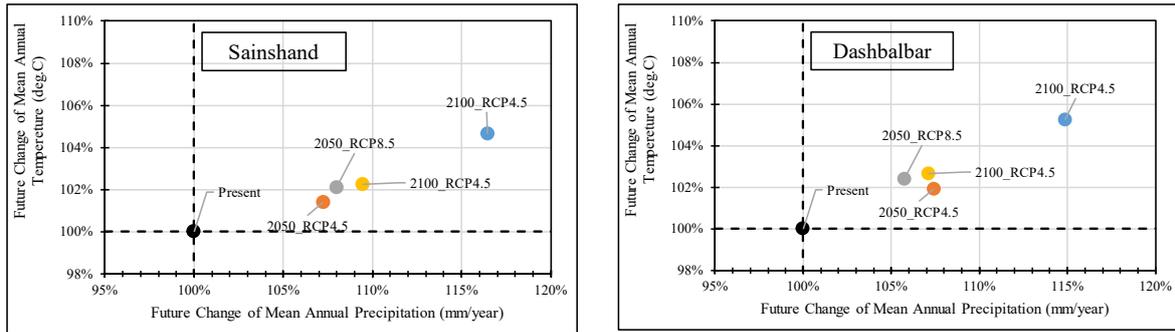
Source: JICA Project Team

Figure 5.5.10 Future Change of Mean Monthly Temperature at Representative Meteorological Stations by GCMs in 2100

(3) Comparative climate change on mean monthly precipitation and mean monthly temperature

Figures 5.5.11 through 5.5.13 show comparative change of annual precipitation and annual mean temperature *vis-à-vis* the present condition at the representative meteorological stations. Mean annual temperature of all climate scenarios are projected to rise compared with the present condition, whereas projected trend of mean annual precipitation vary among the scenarios.

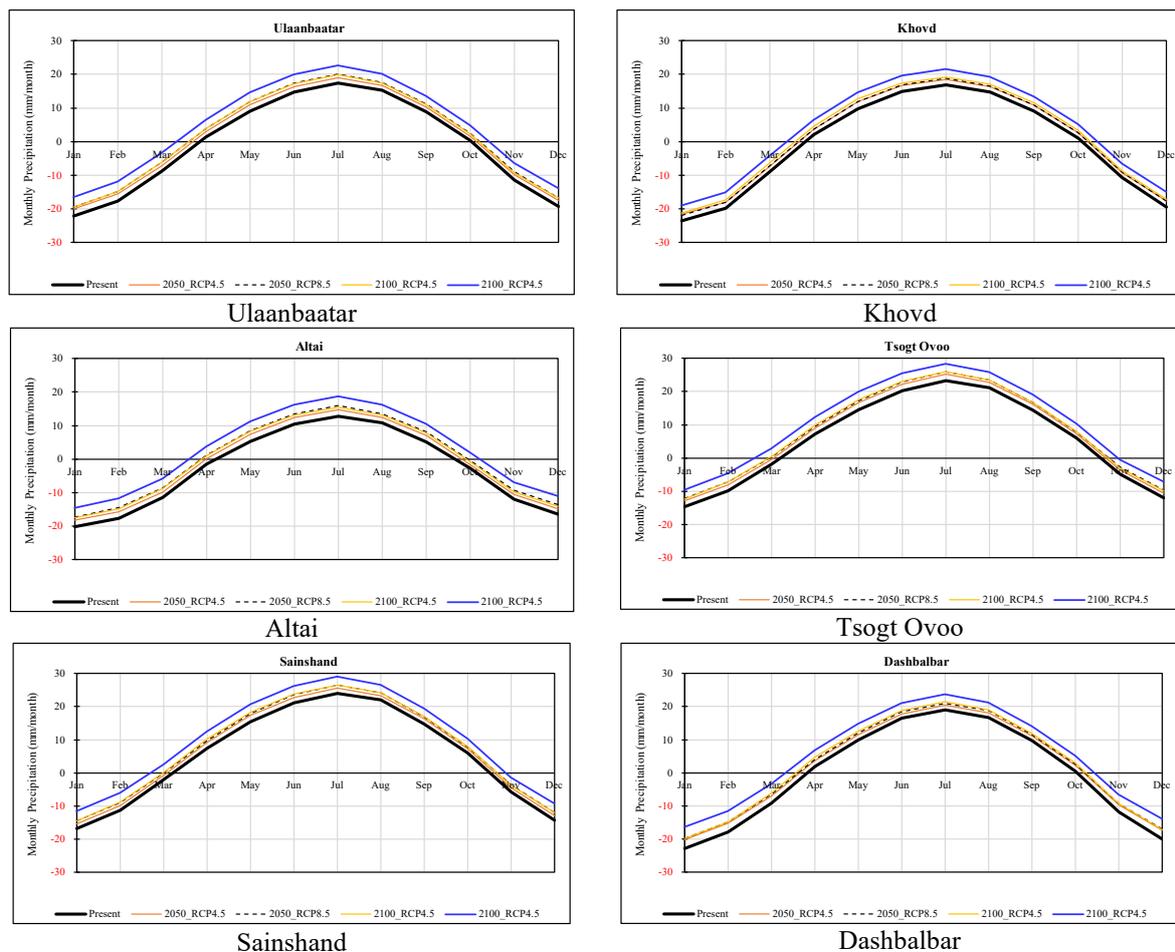




Source: JICA Project Team

Figure 5.5.11 Future Change of Annual Precipitation and Annual Mean Temperature at Representative Meteorological Stations

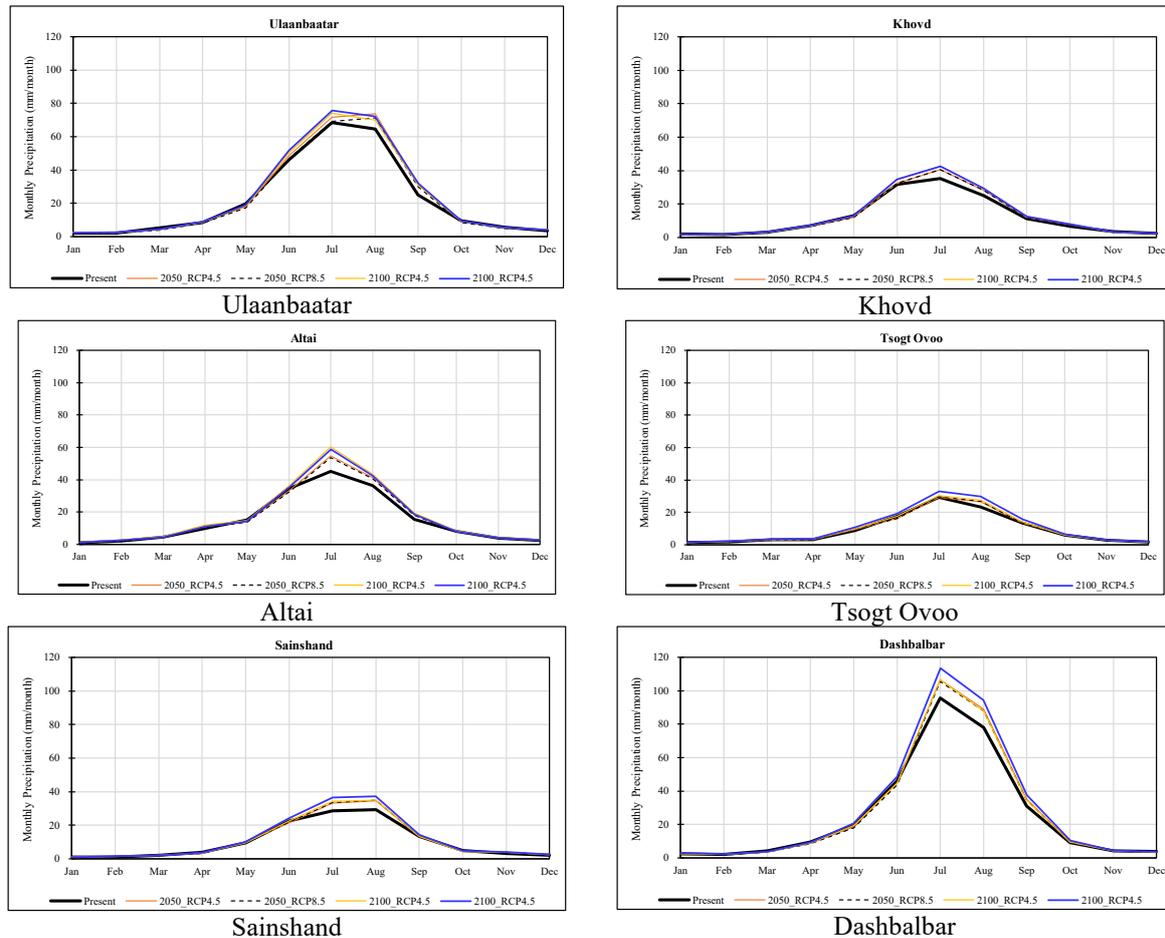
Among the four cases of RCP4.5 and RCP8.5 in 2050 and 2100, Case-1 (107%), Case-2 (106%), Case-3 (107%) and Case-4 (115%) project larger annual precipitation than present condition (100%) in Ulaanbaatar. While, for temperature increase, among the four cases, Case-1 (102%), Case-2 (102%), Case-3 (103%) and Case-4 (105%) project larger mean annual temperature than present condition (100%) in Ulaanbaatar. At all the representative meteorological stations, precipitation and temperature in future will increase.



Source: JICA Project Team

Figure 5.5.12 Future Change of Mean Monthly Temperature at Representative Meteorological Stations

It is predicted that the mean monthly temperature will be higher than the current level in all months at all stations. In the RCP8.5 case of 2100, there is a point where the temperature rises by 5 to 6 ° C compared with present condition.



Source: JICA Project Team

Figure 5.5.13 Future Change of Mean Monthly Precipitation at Representative Meteorological Stations

At all the representative meteorological stations, mean monthly precipitation in future will be increased especially in summer. It is predicted that there will be little change in winter.

(4) Climate change impact on spatial distribution of precipitation and temperature

Spatial distribution of mean annual precipitation and mean annual temperature has also been simulated. It is found the mean annual precipitation is high in northern Mongolia, while low in the Gobi region in the south. This trend will not change much in the future. On the other hand, the current mean annual temperature is high in southern Mongolia, but it will become higher in the northern region due to future climate change. Mean annual precipitation tends to increase nationwide in the future, especially in northern Mongolia. On the other hand, the mean annual temperature tends to increase nationwide.

(5) Climate change impact on extreme events

Flood

The average annual heavy rain days is calculated by using daily rainfall over 10 mm/day that occur in a year. The average number of days of heavy rainfall tends to increase in 2100 from the northern part to the central part of Mongolia. It is found in Ulaanbaatar, Altai and Sainshand, the maximum monthly rainfall in summer tends to increase in the future, which may increase the risk of flooding.

Drought

Using mean annual temperature described above, the potential evapotranspiration at each grid was estimated by Hamon's formula. At present, the potential evapotranspiration is high in the south and southeast, but 2100 shows high evapotranspiration in other areas besides the south area. The probable drought year was estimated by using the standardized variance against the average of summer (from May to October) accumulated rainfall is less than -0.5 and the standardized variance of summer (from May to October) mean monthly temperature is more than +0.5. The area of the probable drought year will increase in south, central and eastern area in future.

Snow depth

Due to the rise in temperature by climate change, it is predicted that the amount of snowfall will decrease throughout Mongolia around 2100, and there is a risk that the amount of snowmelt will decrease from spring to summer. The amount of snowfall was calculated by integrating the amount of precipitation with an average daily temperature of 2 ° C or lower.

Low temperature

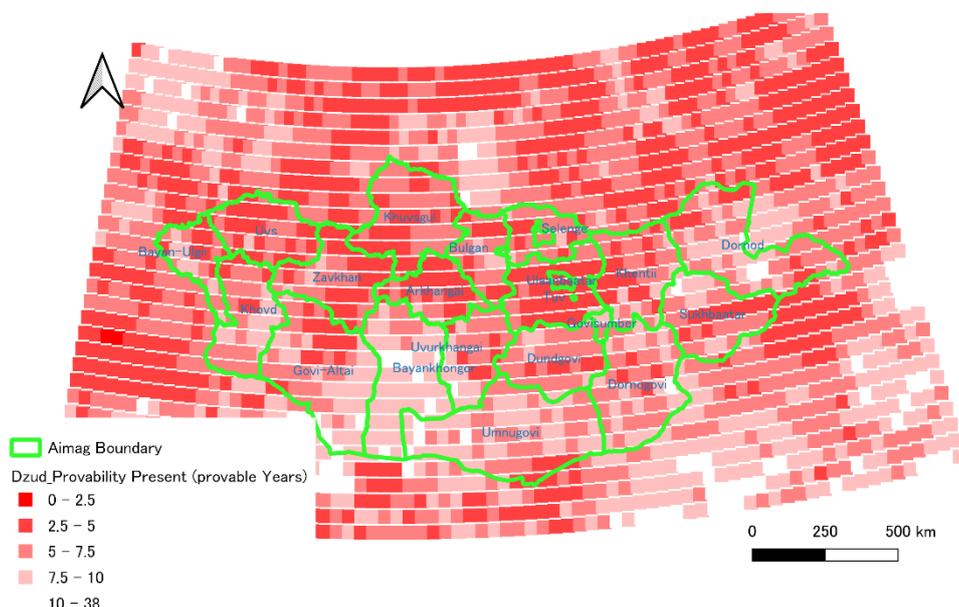
Due to the rising temperature by climate change, the annual minimum temperature tends to rise in whole area. Therefore, the effects of low temperature damage may be mitigated a little. It is found both the minimum temperature and the 1-percentile (low temperature) tend to rise due to climate variability, and the frequency of occurrence during the year is also decreasing.

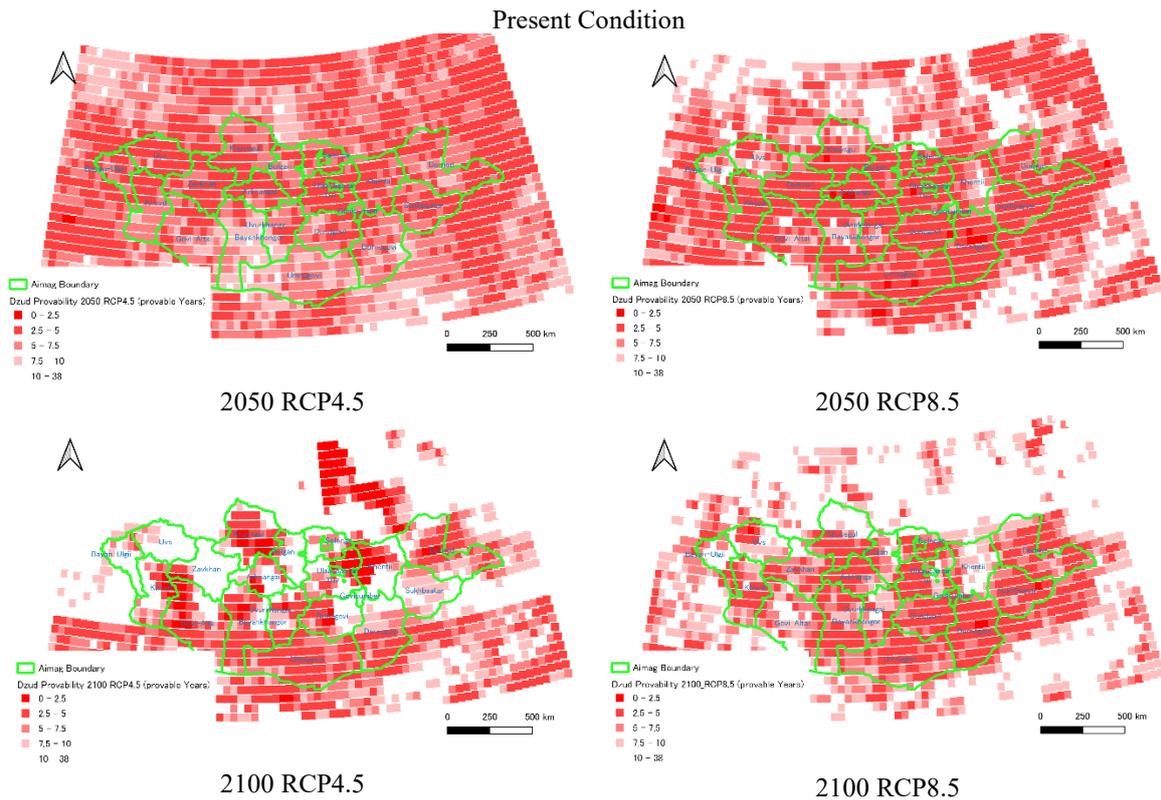
Dzud

In this study, the Dzud occurrence was evaluated by using the standardized variances as follows:

- The standardized variances against the average of previous summer season (from May to October) accumulated rainfall is less than -0.5 and the standardized variate of summer (from May to October) mean monthly temperature is more than +0.5.
- The standardized variances against the average of winter temperature are less than -2.0.
- The standardized variances against the average of accumulated winter snow depth are more than 2.0.
- The standardized variances against the average of spring precipitation are less than -2.0.

Figure 5.5.14 shows the Dzud probability year maps of present condition and by the climate change. The probable Dzud year will decrease in future, but in south, central and eastern areas having Gobi area will still have risk of Dzud in future.



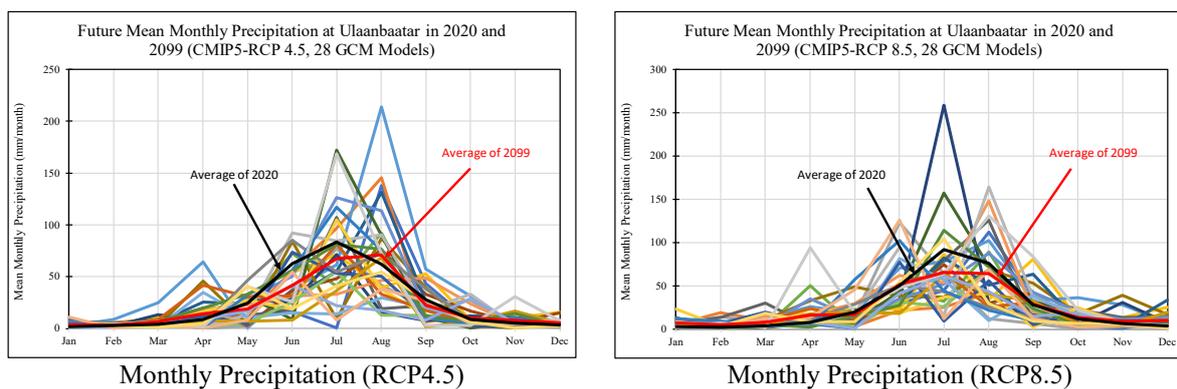


Source: JICA Project Team

Figure 5.5.14 Spatial Distribution of Probability Year of Dzug Disaster by Climate Change Scenarios

(6) Climate change impact in Ulaanbaatar

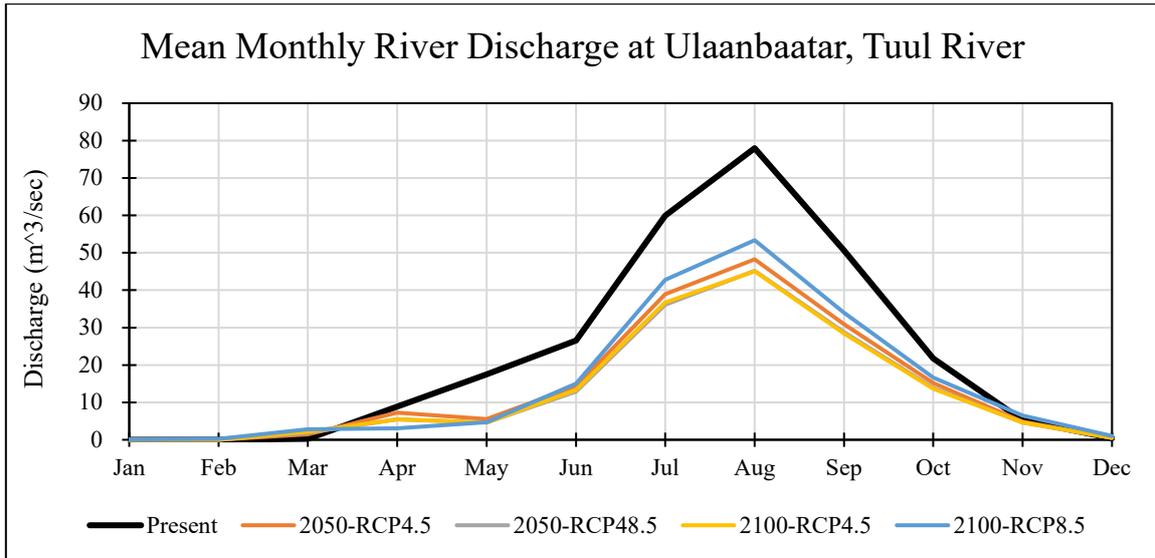
Climate change impacts in Ulaanbaatar have been simulated. It is found the precipitation in winter will be increased in future in Ulaanbaatar; however, precipitation in summer will be likely not to change much. The comparison of monthly precipitation in future (2099) and present (2020) at Ulaanbaatar is shown in Figure 5.5.15. As shown, monthly precipitation in summer will decrease in 2099. It is found also the mean annual and mean monthly temperature will be increased significantly in future in Ulaanbaatar.



Source: Prepared by JICA Project Team based on Nippon Koei ClimVault bata (<https://nk-climvault.com/>)

Figure 5.5.15 Future Mean Monthly Precipitation in Ulaanbaatar by Climate Change Scenarios

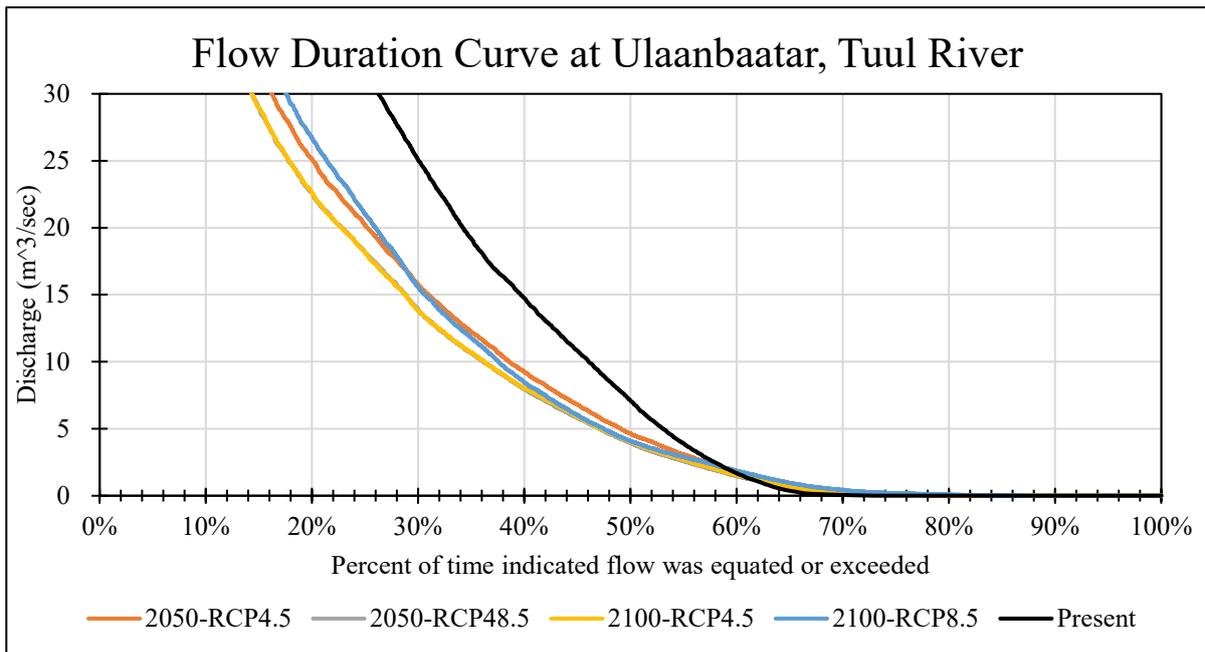
Climate change impact on surface water availability of the Tuul River has been simulated. It is found that river flow would decrease from April to October due to the rise in temperature (increased evapotranspiration) due to climate change, while the amount of rainfall will not change much.



Source: JICA Project Team

Figure 5.5.16 Future Mean Monthly Temperature in Ulaanbaatar, Tuul River, by Climate Change Scenarios

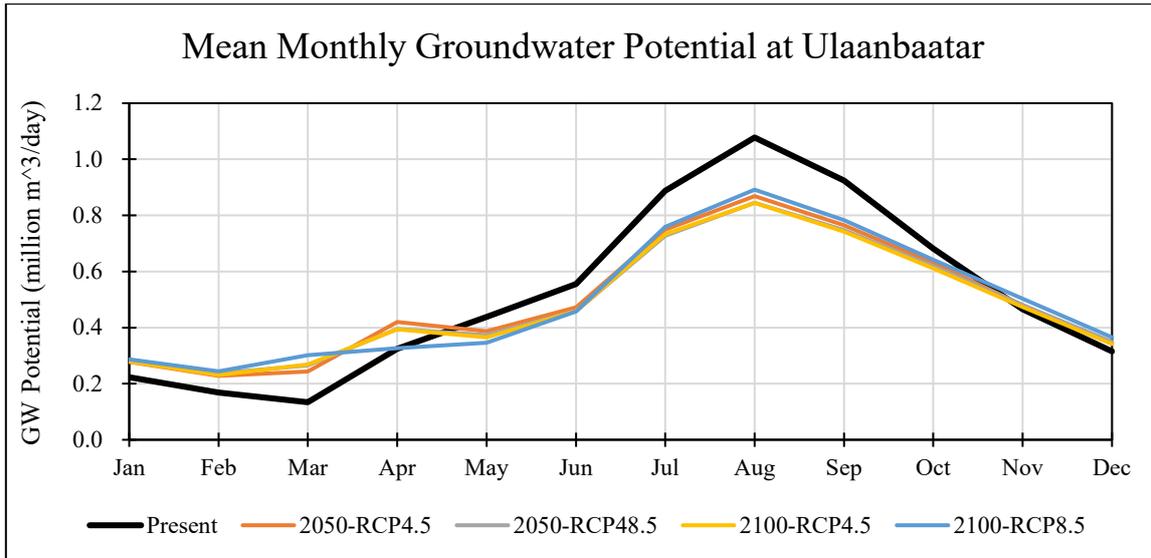
The Tuul River flow will be smaller during summer about 60% of year in future as compared with present condition. The river flow in dry (winter) season will not be changed significantly.



Source: JICA Project Team

Figure 5.5.17 Future Flow Duration Curve at Ulaanbaatar, Tuul River, by Climate Change Scenarios

The groundwater potential in the winter season from November to April will be slightly improved. In the summer season from May to October, the groundwater potentials will be slightly decreased in future.



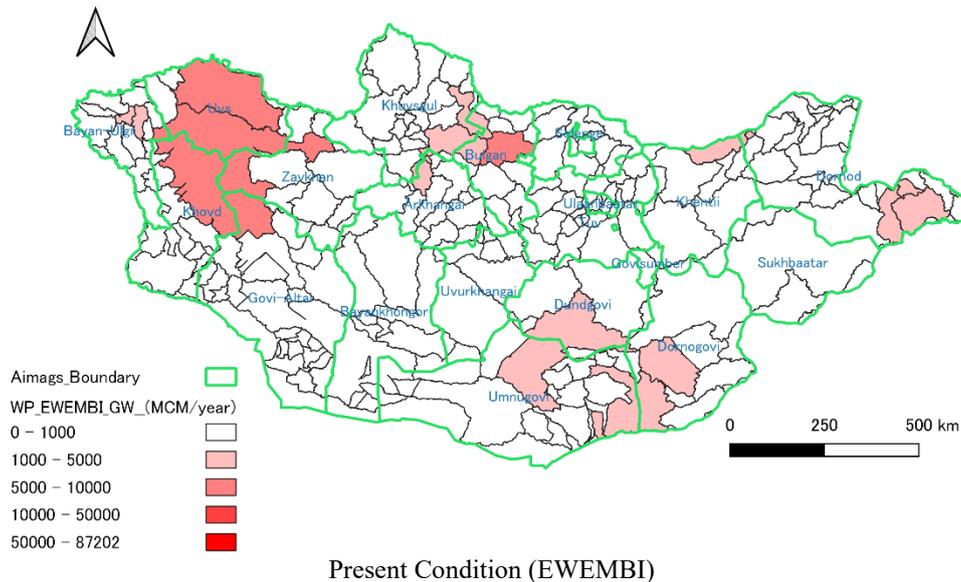
Source: JICA Project Team

Figure 5.5.18 Future Mean Monthly Groundwater Potentials at Ulaanbaatar by Climate Change Scenarios

5.5.5 Climate change impact on water balance

(1) Water potentials

Using the estimated present and future climate conditions i.e., daily precipitation and daily temperature, surface water potentials by sub-basin and groundwater potentials are simulated. Figure 5.5.19 and Figure 5.5.20 show the surface water and groundwater potential by sub-basin. High surface water potential areas lie in north-western part, central part and south-east part, while high groundwater potential areas lie in north-western part, central part and eastern part.



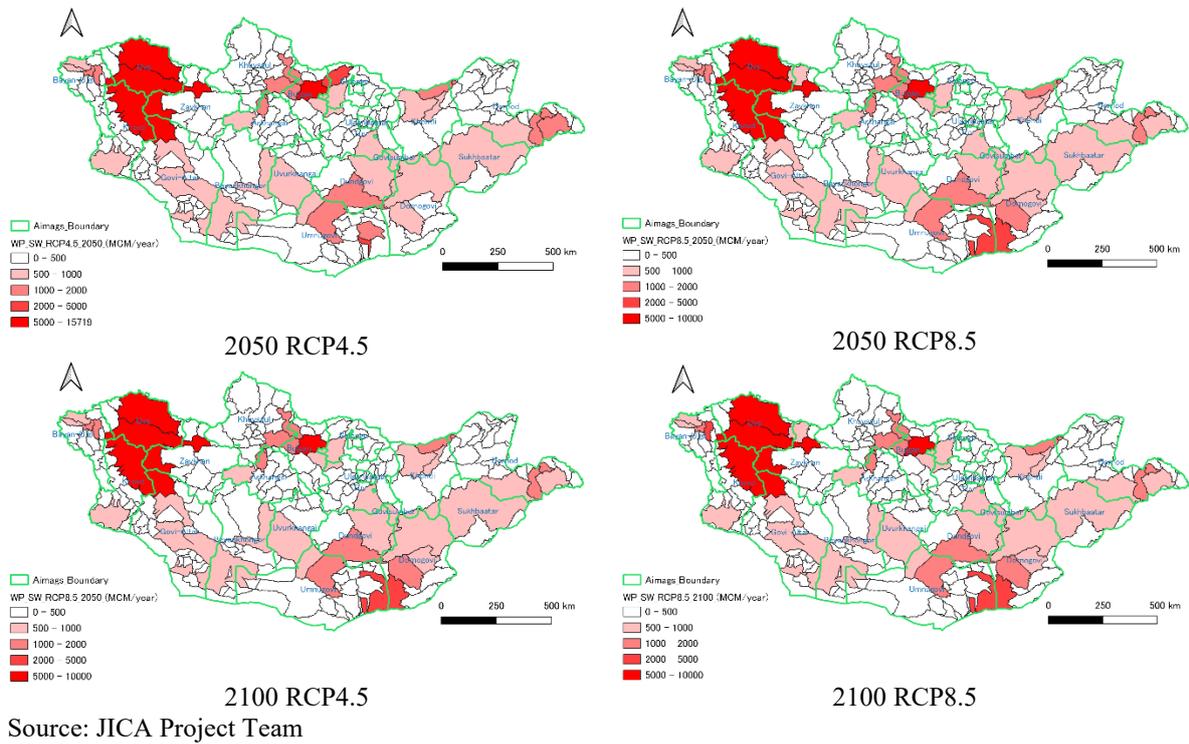
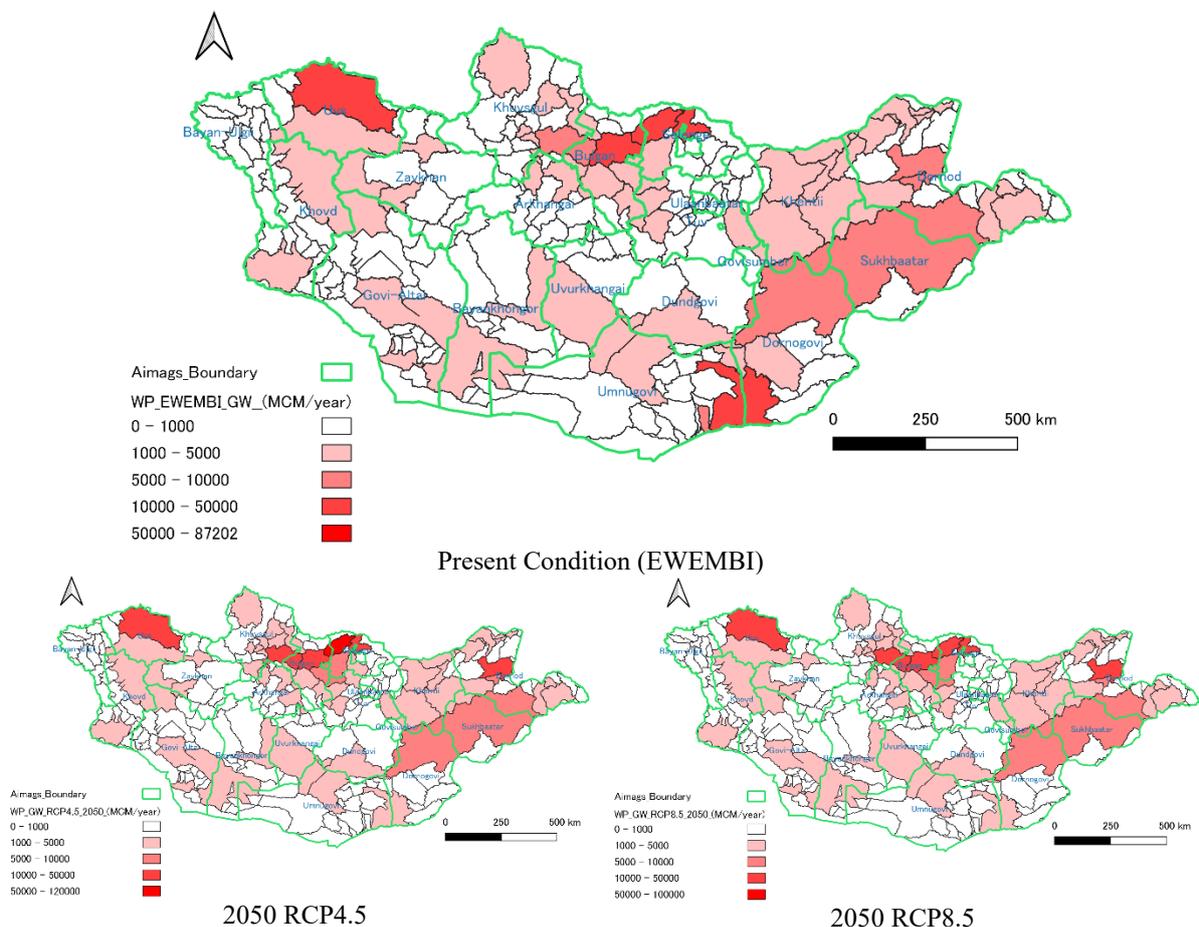


Figure 5.5.19 Surface Water Potential Map by Sub-basins by Climate Change Scenarios



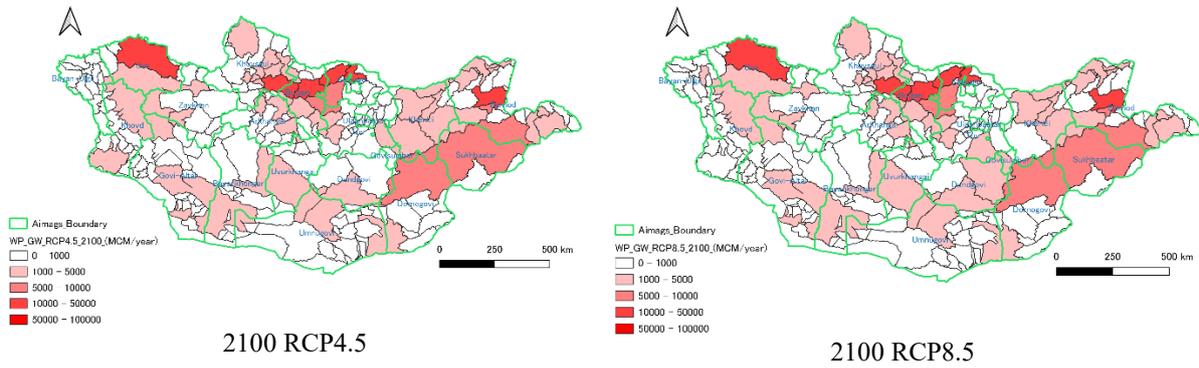
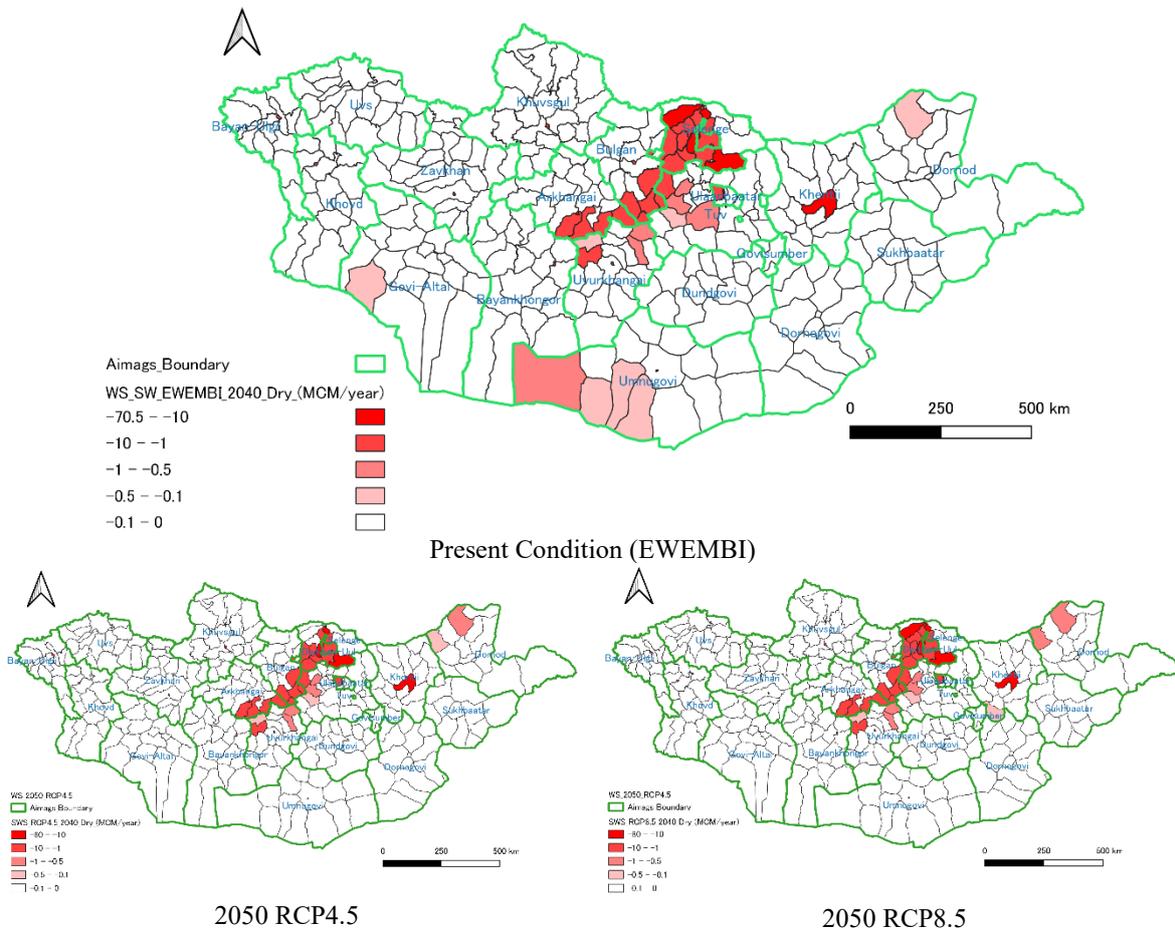


Figure 5.5.20 Groundwater Potential Map by Sub-basins by Climate Change Scenarios

(2) Water balance analysis by Soum

Using estimated water demand in 2030 and 2040 as mentioned above, water potentials at present condition and future water potentials with climate change are used for calculation of water balance analysis. Figure 5.5.21 and Figure 5.5.22 show water shortages of surface water and groundwater respectively under dry year conditions that will occur in Soums.



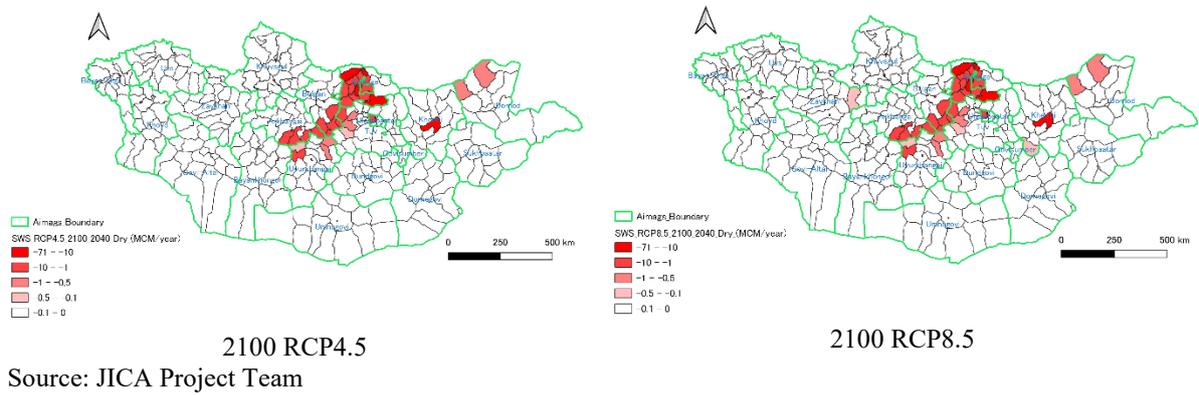
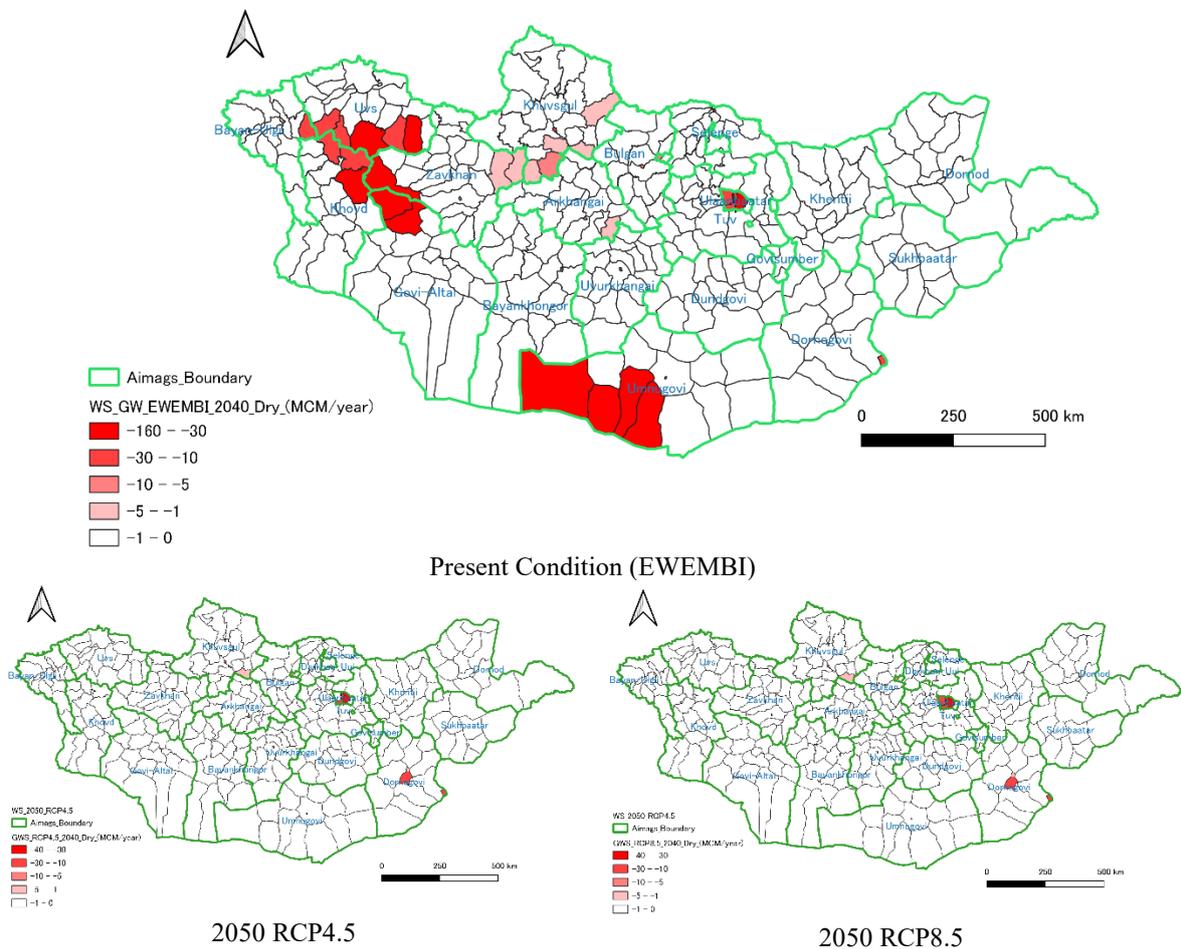
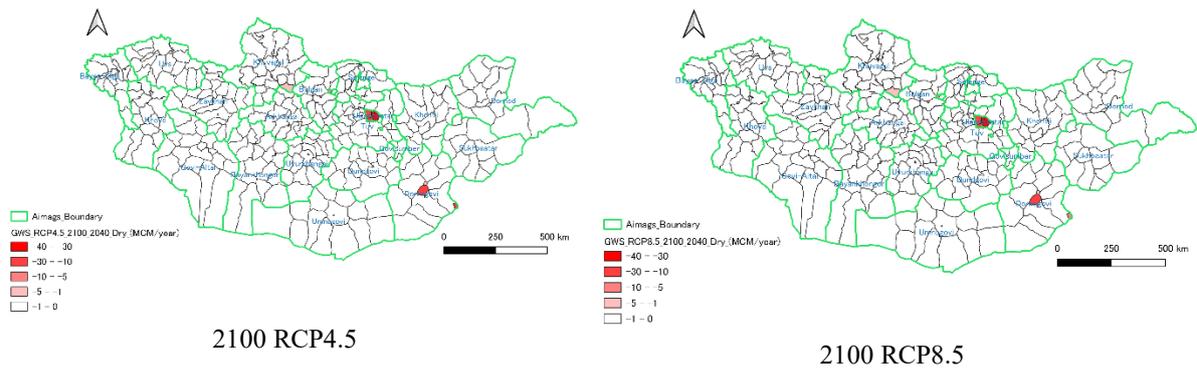


Figure 5.5.21 Surface Water Shortages in 2040 Demand by Soum (Dry Year) by Climate Change Scenarios

The surface water shortages in 2040 water demand at dry year will occur in some Soums in Ulaanbaatar, Selenge, Darkhan-Uul, Khentii, Bulgan, Uvurkhangai, Dornod and Arkhangai Aimags as shown in Figure 5.5.21.





Source: JICA Project Team

Figure 5.5.22 Groundwater Shortages in 2040 Demand by Soum (Dry Year) by Climate Change Scenarios

The groundwater shortages in 2040 water demand at dry year will be occurred in some Soums in Ulaanbaatar, Dornogovi, Khuvsgul, Arkhangai, Uvurkhangai and Umnugovi Aimags as shown in Figure 5.5.22. In general, the volume of groundwater shortages will not so large, but Ulaanbaatar and Dornogovi will face increased groundwater shortages.

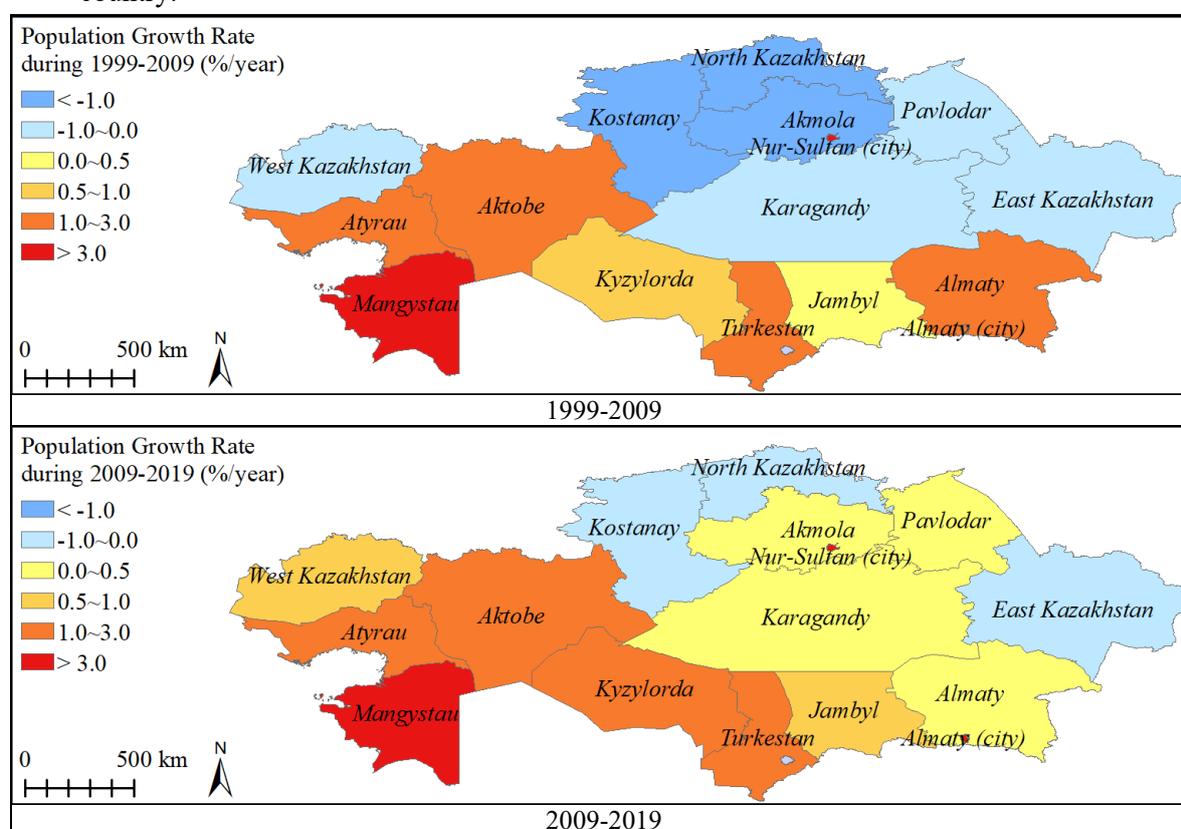
Supplement 1 to Chapter 5: Case studies of capital relocation

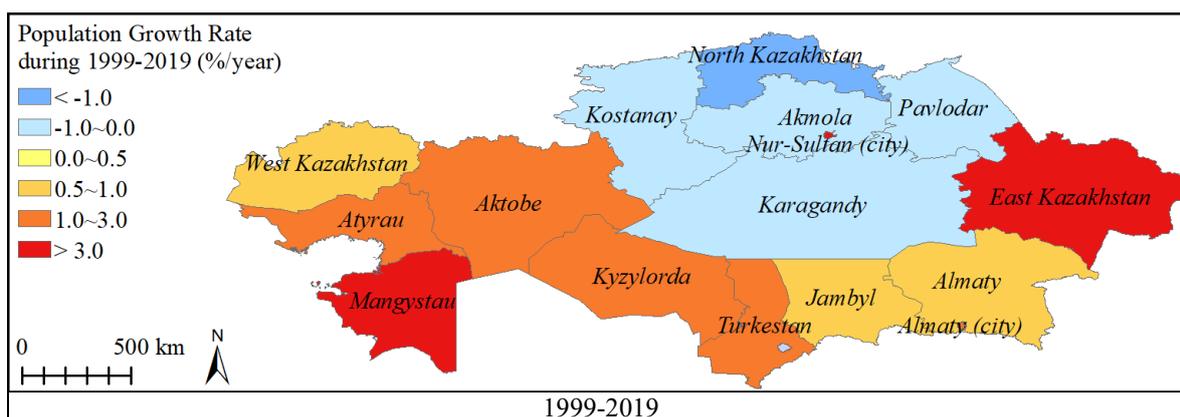
The Ministry of Land, Infrastructure and Transport (MLIT) of Japan carried out a study in 2017 to review the experiences of capital relocation undertaken in foreign countries covering the following countries. Countries that completed the capital relocation are: **South Korea**, Germany, **Malaysia**, **Myanmar**, **Kazakhstan**, Ireland, England, **Australia**, **Brazil**, **Pakistan**, **Nigeria**, Sri Lanka, and Chile. Countries contemplating capital relocation are Egypt, China, Russia, Indonesia, Iran, and Argentina. The JICA Project Team (JPT) conducted the further survey of the countries indicated in bold letters above.

(1) Has the capital relocation attained the regional balance of the country?

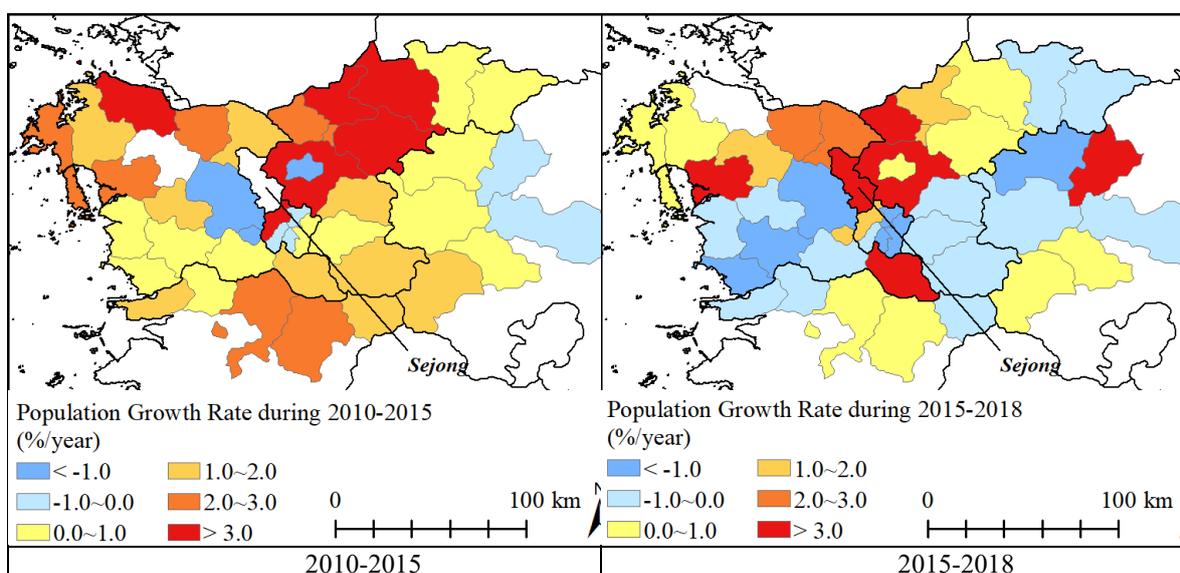
Answer to this question is “No”. The new capital development influenced the areas of the development site and surrounding areas as follows:

- The influences caused negative impacts by reducing the population in the surrounding areas in Kazakhstan and South Korea, if the surrounding areas have not been developed enough and matured prior to the capital relocation (Figure S5.1.1);
- Kazakhstan, Myanmar, Nigeria and Pakistan had other objectives for capital relocation such as national security to prevent from social disturbance and attack from the coasts and national borders; the regional balance was not considered as the objectives; and
- South Korea and Brazil aimed at regional balance by creating a new capital at the center of the country.





Source: National Population Census in 1999 and 2009, the Agency on Statistics
www.citypopulation.de for estimated population in 2019

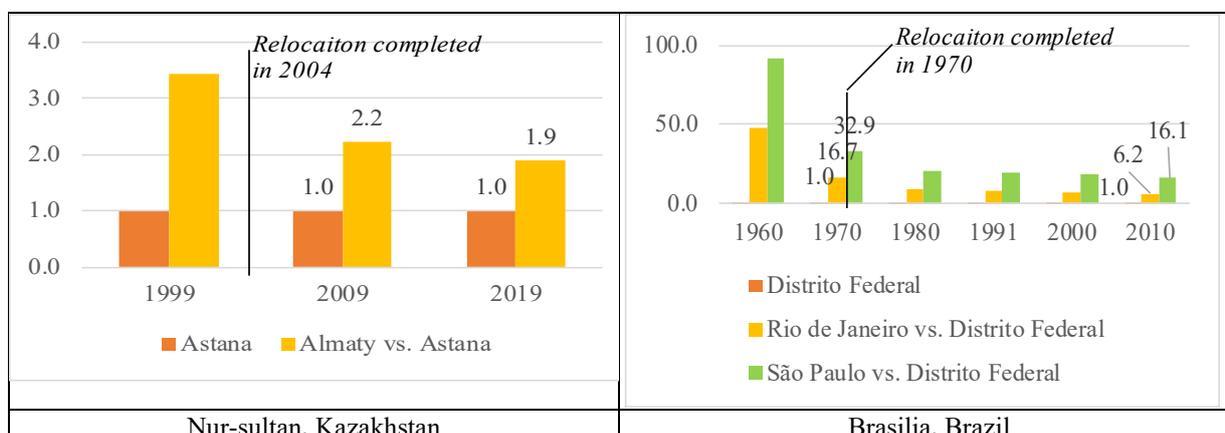


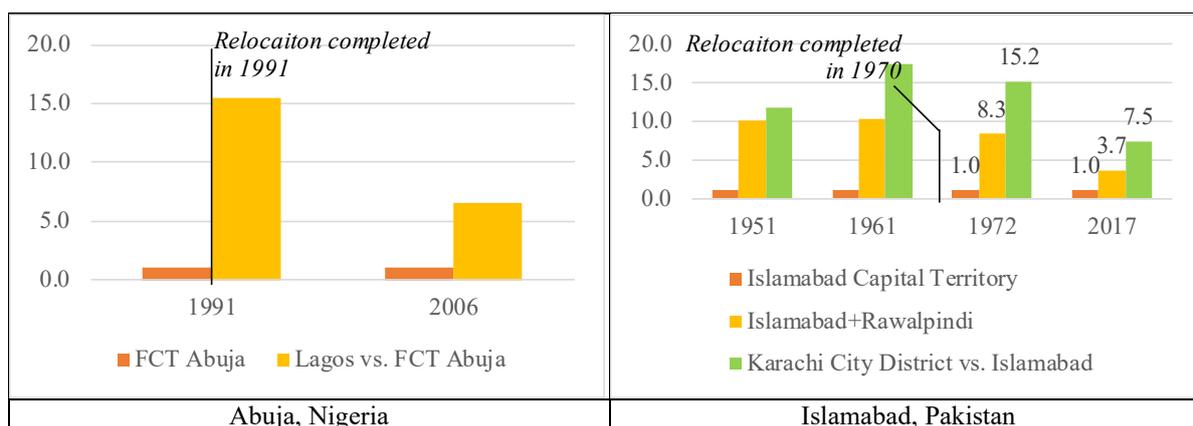
Source: Population Census 2015 and 2018, Korean Statistical Information Service

Figure S5.1.1 Population Growth in Areas around the Relocated Capital in Kazakhstan and South Korea

(2) Has the capital relocation succeeded to reduce the overconcentration?

Answer to this question is “Yes, to some extent”. As the population size and economic magnitude of the relocated capital is small as compared to the old capital city and its agglomeration, the effect of capital relocation is limited in terms of de-concentration (Figure S5.1.2).





Source: Population census and estimate made by statistics office in Brazil, Kazakhstan, Nigeria and Pakistan

Figure S5.1.2 Population Ratios of Former Capitals to New Capital in Brazil, Kazakhstan, Nigeria and Pakistan

(3) Conclusions

From the case studies, the following are concluded.

- Effects of capital relocation on regional balance are not distinct.
- Over-concentration in the former capital is reduced to some extent.
- Economic impact is only marginal.
- To take advantages of capital relocation, while preventing the negative impacts, several conditions should be satisfied such as the following (Figure S5.1.3):
 - ✓ To locate the new capital in proximity of the former capital assuring the convenient access between two cities (case of Putrajaya); and
 - ✓ To locate the new capital in the second or third-largest cities to reduce the negative impacts in the surrounding areas of the new capital area (cases of Islamabad and Rawalpindi).



Source: google



Source: google

Figure S5.1.3 Location of Relocated Capital and Old Capital in Malaysia and Pakistan

The following are learned as prerequisites for capital relocation.

- (a) Strong and stable government for implementation
- (b) The capital relocation was decided under the regimes of military or strong governments often under dictatorial presidency in cases of Brazil, Kazakhstan, Myanmar, Nigeria and Pakistan.
- (c) Strong and robust financial resources for implementation

Financial sources necessary for capital relocation were secured from the oil and mineral resources development in Kazakhstan. Although Nigeria had the high external debt, the national economy could support the relocation with oil-related financial sources. Brazil had high gross domestic production (GDP) growth rates estimated at 7%/year during 1950-1961, 4.0%/year during 1962-1967, and 11.1%/year during 1968-1973, respectively. Pakistan had been in high economic boom with annual average GDP growth rates at 7.2% for 10 years from 1960 to 1970.

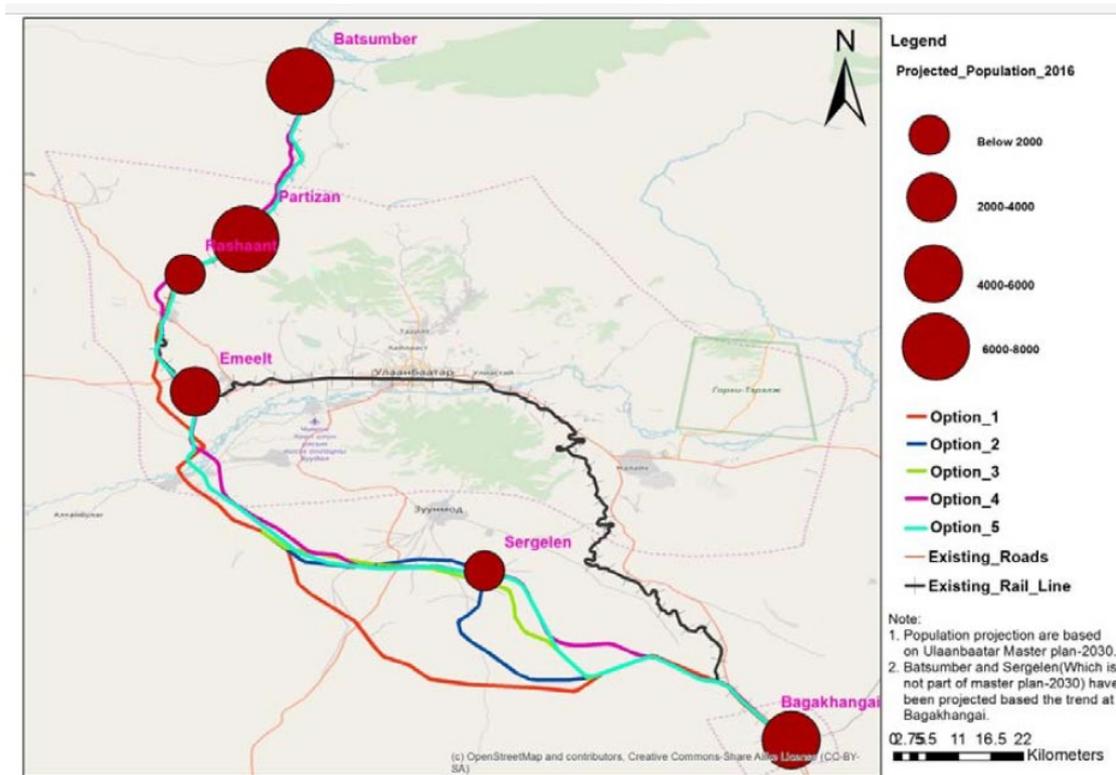
Supplement 2 to Chapter 5: Possible relocation of capital function in Mongolia

While relocation of the capital city is not recommended, possibility of relocating capital function in Mongolia is examined. Learning from the lessons above, candidate sites are found in the areas near the new airport and planned satellite development (Figure S5.2.1). Another candidate site may be found along the route of Bogdkhan railway bypass (Figure S5.2.2).



Source: MCUD

Figure S5.2.1 Possible Sites for Relocation of Capital Function

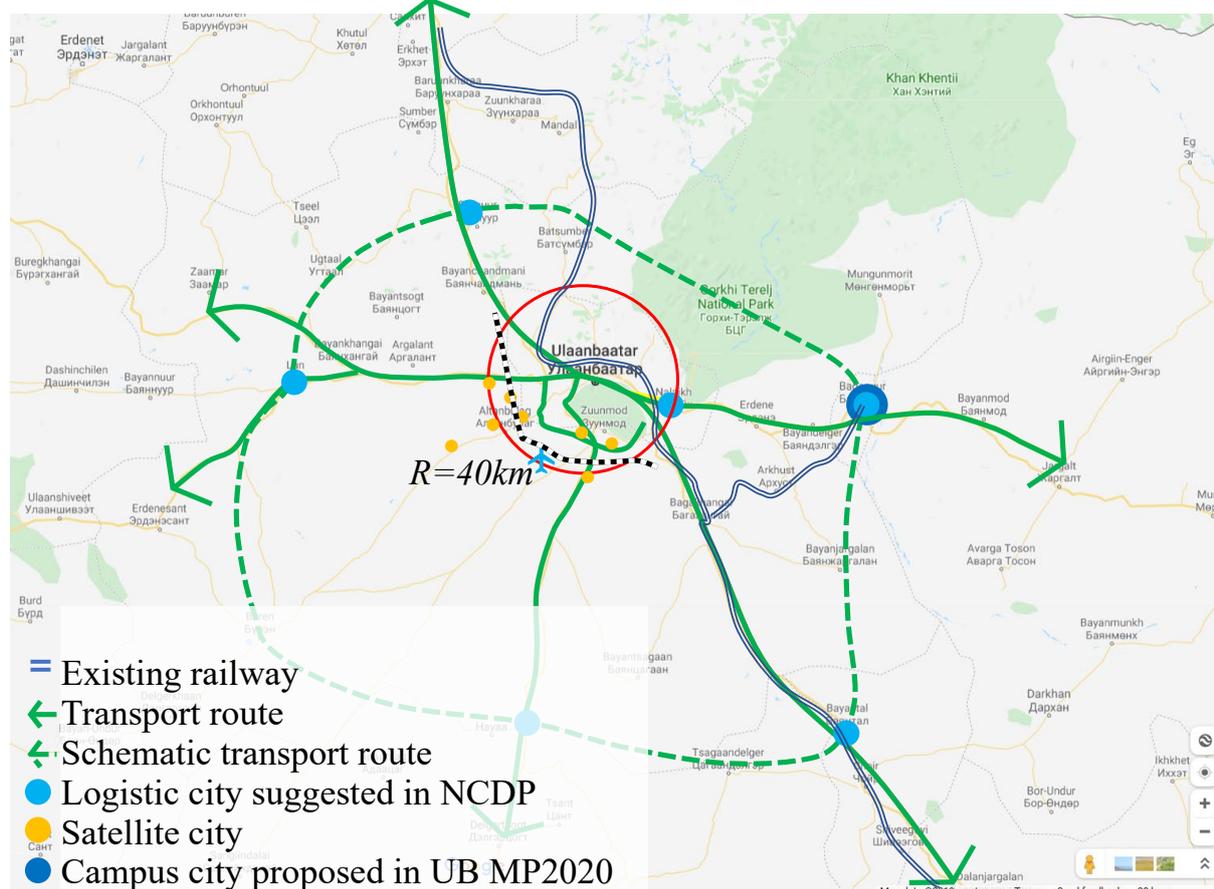


Source: Bogdkhan Railway Bypass Investment Program, ADB

Figure S5.2.2 Settlements along the Bogdkhan Railway Bypass as Candidate Sites for Relocating Capital Function

The following conditions should be considered for relocating capital function from Ulaanbaatar (Figure S5.2.3):

- The north-south axis must be fully utilized for transit economy linking China and Russia to sustain the Mongolian economy;
- A railway between Nalaikh and Ulaanbaatar is fully used to transport coal up to its capacity, but the railway alignment is not suitable for speeding up;
- As the efficient transport is essential to ensure complementary capital function shared by Ulaanbaatar and new cities, an area on the east of north-south axis separated by the railway is not suitable; and
- A 30-40km distance is a limit to find a suitable location to secure short travel time between Ulaanbaatar and the new cities.



Source: JICA Project Team

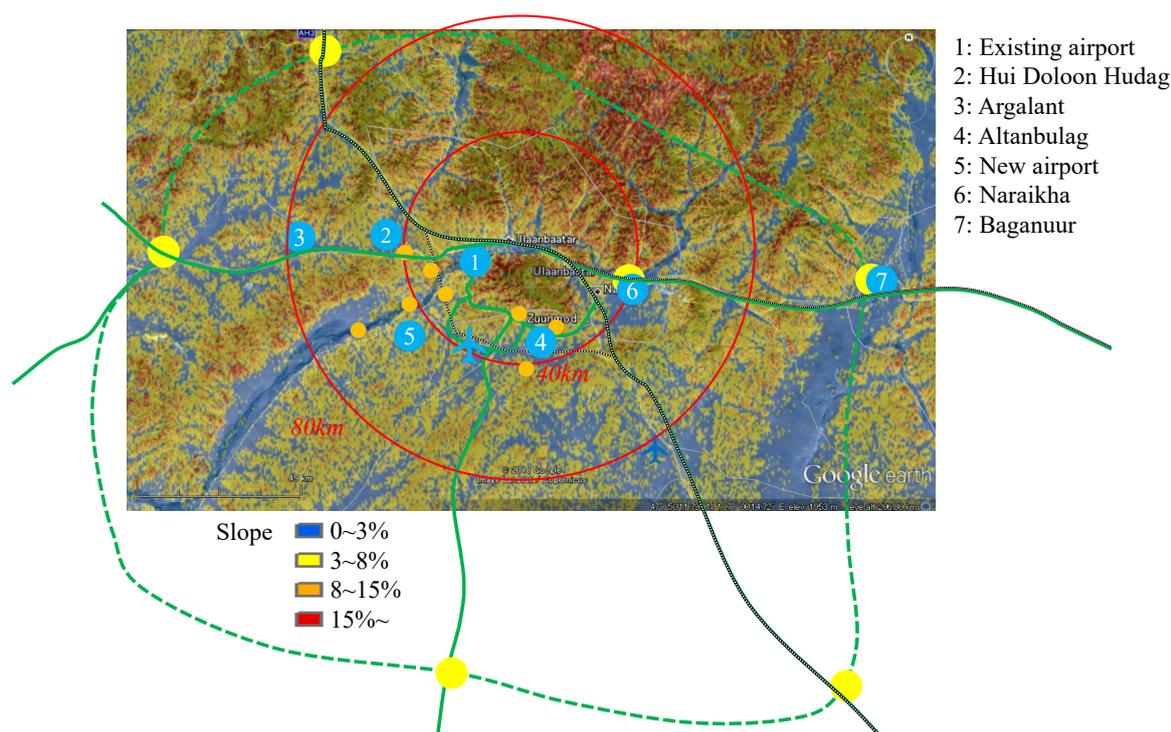
Figure S5.2.3 Sphere of Possible Sites for Relocating Capital Function

As a reference, the distance between the old capital city and new cities and new central business districts in other countries are as follows:

- Putrajaya to Kuala Lumpur: 33km,

- Yokohama MM21 and Makuhari to Tokyo: 30km,
- Sejong to Soul:120km,
- Le Defense to center of Paris: 10km, and
- New government city to Cairo: 49km (not implemented yet).

Alternative sites for relocating capital function are shown in Figure S5.2.4 and evaluated by some criteria. Criteria with weighting factor estimated by pairwise comparison of the criteria are summarized in Table S5.2.1. Results of the evaluation are presented in Table S5.2.2. As shown, the existing airport located in the west and Naraikha have the highest score, followed by Altanbulag and Hui Doloon Hudag. Availability of water resources is another important condition to evaluate alternative sites for relocating capital function, which has not been reflected in the present analysis due to lack of comparable quantitative data.



Source: JICA Project Team

Figure S5.2.4 Alternative Site for Relocating Capital Function

Table S5.2.1 Criteria for Evaluating Alternative Sites for Relocation of Capital Function

	Land Availability	Topography	Transport ¹⁾	Proximity to Existing Agglomeration ²⁾	Aerial route ³⁾	Geometric Average	Weighting Factor
	a	b	c	d	e	$f=(a*b*c*d*e)^{1/5}$	$g=f/\sum f_i$
Land Availability	1	3	1	1/3	5	0.89	0.199
Topography	1/3	1	1	1/5	3	0.72	0.105
Transport ¹⁾	1	3	1	1/3	5	1.38	0.199
Proximity to Existing Agglomeration ²⁾	3	5	3	1	7	2.14	0.456
Aerial route ³⁾	1/5	1/3	1/5	1/7	1	1.18	0.041

Note: 1) Availability of mass transport, 2) proximity to existing agglomeration within 40km, 3) Overlapped with

aerial route to existing and new airport
Source: JICA Project Team

Table S5.2.2 Evaluation Results of Alternative Sites for Relocation of Capital Function

Case in Figure S5.2.4	Weighting Factor	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Land Availability	0.199	2	1	2	2	2	2	2
Topography	0.105	2	2	2	1	1	2	2
Transport	0.199	2	2	0	2	0	2	2
Proximity to Existing Agglomeration	0.456	2	2	0	2	0	2	0
Aerial route	0.041	0	0	0	-1	-1	0	0
Score		1.918	1.718	0.607	1.772	0.462	1.918	1.006
Ranking		1	4	6	3	7	1	5

Source: JICA Project Team

Chapter 6 Regional Development Vision and Strategy

This chapter presents first new regional division proposed as part of the national comprehensive development plan (NCDP) to make development measures more effective for regional development and balanced national development. Affinity of mutually neighboring Aimags is analyzed by using many socio-economic and other indices, and those Aimags having high affinity are grouped into a region. For each region thus defined, development vision is presented and strategy is established with some general measures covering economic activities, infrastructure, urban functions and institutional measures.

6.1 New Regional Division

6.1.1 Rationale and conditions for regional division

(1) Rationale for regional division in Mongolia

Mongolia is divided administratively into 21 Aimags under the Central Government. Due to the large territory and the long history, 21 Aimags have widely varying natural, economic, socio-cultural and other characteristics. Applicability of development policies by the Mongolian Government tends to have widely different effects for different areas in the Country. Therefore, different development policies would have to be introduced in different areas for effectiveness.

Each Aimag has small population and mostly small and undiversified economy. With limited resources including human resources as well as natural and cultural resources, it is difficult for most Aimags to pursue self-reliant development by diversifying their economies. A group of neighboring Aimags may be a better unit to plan for specific development activities. This is an increasingly important consideration as any country or region will have to produce products and services that can compete and survive in the globalizing economy.

Mongolia has defined five regions between the Nation and the Aimags. A region is not an administrative unit. Except Capital Region of Ulaanbaatar, each of the remaining four regions consists of three to seven Aimags. One of ideas of regional division is to introduce a common development policy for any region applicable to all the constituent Aimags. For instance, region specific incentives may be introduced to promote investments in specific industries having comparative advantage in any region. Also, more effective and high quality social services may be provided by larger facilities serving multiple Aimags in any region rather than smaller facilities provided in each Aimag.

At present, the national territory of Mongolia is divided into five regions: Capital, Western, Khangai, Central and Eastern Regions. This division approved by the Parliament Resolution No. 1, 2002 is currently reviewed. Revision of the regional division has been contemplated to see if it supports the more balanced development between the regions for more robust and resilient national socio-economic and spatial structure.

According to the draft Long-term Development Policy 2050 (LTDP2050) submitted to the Parliament in May 2020, six economic regions were newly proposed, which coincide with the regional re-division proposed in this chapter. Regional development vision (RDV) for each region in line with the proposed regional division, however, was not approved by the Parliament.

(2) Conditions for regional division

In the revision of regional division, certain basic conditions should be satisfied. First, existing Aimag territories are taken as a unit to form any region. In other words, sub-division of any Aimag is not considered. Second, any region to be defined should consist of contiguous Aimag territories. That is, there should be no enclave Aimag.

Under these basic conditions, a new division of regions is pursued for the purpose of making

development policies by the Mongolian Government more effective. The current regional division represents basically a north-south division to define four out of five regions except Capital Region. The four regions contain northern and southern areas stretching between borders with Russia in the north and China in the south, which have widely different natural conditions. This is particularly true for Khangai and Central Regions.

A new regional division should be examined by various criteria and indices representing natural, economic, socio-cultural and other conditions. In principle, those Aimag having many common characteristics should be grouped into a region so that common development policies may be applied to the region for effectiveness.

6.1.2 Analysis on affinity between neighboring Aimags

(1) Evaluation of Aimags by many indices

Differences between Aimags are measured by various criteria and indices. Basic data by Aimag have been taken from official statistics and summarized in Table 6.1.1. From these data, a total of 30 indices are defined as listed below.

Economy	-GRDP share of industry & services -Per capita GRDP -Unemployment rate	-Labor productivity -Capital expenditure per capita -Aimag revenue per capita
Environmental constraints	-Forest land share -Sown area -Controlled grazing land	-High dzud risk area -High & moderately dry land -Sensitivity to mining
Land potentials	-Intensive livestock land -Highly suitable for fodder -Moderately suitable for oil crops	-Highly/moderately suitable for fruits -Livestock population per herder household -Livestock population per 100ha pasture
Social service levels	-Enrolment in kindergarten -Pupils/teacher ratio at primary education -Infant mortality rate -No. of people per physician	-Infectious disease per 1,000 population -Poverty incidence -Vocational students per 1,000 population -Vocational teachers per 1,000population

For each index, top six and bottom six Aimags are identified as shown in Table 6.1.2. In Table 6.1.2, six Aimags having highest evaluation by any index is highlighted in green and six Aimags having lowest evaluation in red. This way, all the 21 Aimags are classified into three groups by any index: high, medium and low.

Table 6.1.1 Comparison of 21 Aimags by Many Indices (1/3)

Region/Aimag	Land area (km ²)	Population 2017	Population 2015	Population 2010	Population density (/km ²)	Population growth rate 2010-15 (% p.a.)	Population growth rate 2015-17 (% p.a.)	Population growth rate 2010-17 (% p.a.)	Urbanization rate (%)	Agriculture gross regional domestic product (GRDP)	Industry GRDP	Services GRDP	GRDP share of industry & services (%)	Per capita GRDP (MNT 103)
<i>Western Region</i>	415,300	400,800	390,600	357,100	0.97	1.81	1.30	1.66	32.8	41.4	19.7	38.8	58.5	3,827
Bayan-Ulgii	45,700	102,600	100,200	88,200	2.25	2.58	1.19	2.18	36.1	37.2	17.0	45.8	62.8	3,109
Gove-Altai	141,400	57,500	56,200	53,500	0.41	0.99	1.15	1.04	32.5	46.5	23.0	30.5	53.5	4,677
Zavkhan	82,500	71,600	69,900	65,400	0.87	1.34	1.21	1.30	22.6	44.9	15.5	39.7	55.2	4,357
Uvs	69,600	82,700	80,800	73,200	1.19	2.00	1.17	1.76	36.4	36.7	24.7	38.6	63.3	3,789
Khovd	76,100	86,400	83,500	76,800	1.14	1.69	1.72	1.70	34.1	42.6	19.0	38.4	57.4	3,703
<i>Khangai Region</i>	384,300	593,700	577,300	521,700	1.54	2.05	1.41	1.86	39.5	26.1	54.6	19.3	73.9	6,450
Arkhangai	55,300	95,100	92,100	84,600	1.72	1.71	1.62	1.69	22.8	59.1	17.9	23.0	40.9	4,328

Bayankhongor	116,000	86,600	83,900	76,200	0.75	1.94	1.60	1.84	35.5	46.6	24.0	29.4	53.4	4,355
Bulgan	48,700	61,300	60,000	53,700	1.26	2.24	1.08	1.91	19.8	50.9	23.5	25.7	49.2	4,529
Orkhon	800	104,000	100,700	90,900	130.00	2.07	1.63	1.94	96.2	0.6	89.3	10.1	99.4	17,917
Uvurkhangai	62,900	115,100	112,400	101,400	1.83	2.08	1.19	1.83	25.4	50.7	20.6	28.7	49.3	3,769
Khuvsgul	100,600	131,600	128,200	114,900	1.31	2.21	1.32	1.96	32.2	41.4	28.6	30.0	58.6	3,780
Central Region	473,600	504,300	485,500	450,700	1.06	1.50	1.92	1.62	45.5	26.5	41.0	32.5	73.5	5,336
Govisumber	5,500	17,400	16,500	13,300	3.16	4.41	2.69	3.91	40.9	20.4	38.2	41.3	79.5	5,015
Darkhan-Uul	3,300	104,100	100,900	94,900	31.55	1.23	1.57	1.33	82.3	7.8	49.3	43.0	92.3	4,296
Dornogovi	109,500	68,100	65,300	58,900	0.62	2.08	2.12	2.10	63.1	27.2	22.1	50.7	72.8	4,393
Dundgovi	74,700	45,800	44,400	38,700	0.61	2.79	1.56	2.44	26.6	58.5	13.4	28.1	41.5	5,442
Umnugovi	165,400	65,300	61,700	61,600	0.39	0.03	2.88	0.84	38.2	19.7	53.3	27.0	80.3	8,237
Selenge	41,200	109,600	106,300	97,900	2.66	1.66	1.54	1.63	37.2	19.1	53.2	27.7	80.9	5,290
Tuv	74,000	94,000	90,400	85,400	1.27	1.14	1.97	1.38	17.9	43.6	31.8	24.6	56.4	5,185
Eastern Region	286,200	216,200	208,100	186,900	0.76	2.17	1.93	2.10	41.9	28.9	53.2	17.9	71.1	7,207
Dornod	123,600	79,400	76,500	69,600	0.64	1.91	1.88	1.90	56.4	13.7	72.0	14.3	86.3	10,229
Sukhbaatar	82,300	61,100	59,000	51,400	0.74	2.80	1.76	2.50	30.2	33.8	49.4	16.9	66.3	6,744
Khentii	80,300	75,700	72,600	65,900	0.94	1.96	2.11	2.00	36.1	59.7	12.5	27.8	40.3	4,419
Ulaanbaatar	4,700	1,463,000	1,396,300	1,244,400	311.28	2.33	2.36	2.34	100.0	0.4	36.4	63.2	99.6	12,387
Mongolia	1,564,103	3,178,003	3,057,802	2,760,800	2.03	2.06	1.95	2.03	67.2	10.6	39.4	50.0	89.4	8,675

Table 6.1.1 Comparison of 21 Aimags by Many Indices (2/3)

Region/Aimag	Forest (%)	Sown area (ha)	Controlled grazing (%)	Intensive livestock (%)	High Dzud risk area (km ²)	High & moderately dry (%)	Sensitivity to mining (%)	Highly suitable for fodder (km ²)	Moderately suitable for oil seed (km ²)	High & moderately suitable for fruit (km ²)	Livestock population per herder household	Livestock population per 100ha pasture land
Western Region	23,121	18,437										
Bayan-Ulgii	226	1,222	37	7	4,806	15	80	789	0	1,675	240	99
Gove-Altai	12,213	1,320	30	10	20,479	88	18	7,077	3,657	77,815	529	57
Zavkhan	4,906	1,863	26	5	52,047	40	47	14,262	818	30,736	394	82
Uvs	1,102	11,775	25	0	13,492	68	72	7,636	1,954	27,105	350	109
Khovd	4,674	2,257	27	18	14,632	58	40	2,865	715	20,433	438	102
Khangai Region	74,904	92,675										
Arkhangai	10,826	11,509	23	9	13,477	6	89	8,667	28	12,464	349	279
Bayankhongor	3,307	754	38	16	22,802	75	25	7,939	7,303	41,501	388	77
Bulgan	19,050	48,559	6	39	6	9	100	16,387	192	21,751	396	241
Orkhon	159	2,603	0	70	0	0	100	369	0	509	139	734
Uvurkhangai	1,508	10,536	32	26	5,981	61	52	9,456	6,940	23,082	357	163
Khuvsgul	40,054	18,714	8	5	19,908	0	58	10,409	112	15,371	318	200

<i>Central Region</i>	31,599	340,772										
Govisumber	0	39	5	85	0	100	100	3,010	411	4,615	616	133
Darkhan-Uul	720	22,528	0	61	1	0	100	1,750	22	2,016	227	351
Dornogovi	1,585	122	43	10	0	100	7	10,884	69,430	38,451	480	35
Dundgovi	687	92	29	14	0	100	13	16,414	43,648	50,532	513	69
Umnugovi	7,537	185	5	4	62	100	4	77	77,912	61,809	456	33
Selenge	15,339	208,968	18	17	106	0	100	12,605	55	14,896	323	180
Tuv	5,731	108,839	29	44	11	39	89	19,609	364	29,556	394	158
<i>Eastern Region</i>	13,048	71,608										
Dornod	1,746	34,246	50	5	0	33	35	90,116	36,698	111,756	409	48
Sukhbaatar	1	9,219	76	8	0	74	24	43,763	10,485	75,470	463	85
Khentii	11,301	28,143	52	5	0	19	83	44,168	1,048	54,048	562	145
<i>Ulaanbaatar</i>	741	825	0	65	18	0	100	1,184	16	1,422		
Mongolia	143,413	524,318										

Table 6.1.1 Comparison of 21 Aimags by Many Indices (3/3)

Region/Aimag	Share of herders in total employment (%)	Unemployment rate (2017) (%)	Labor productivity (2017) (MNT103)	Enrollment in kindergarten (%)	Pupil-to-teacher ratio at primary education	Infant mortality rate (IMR) 2017 (/1,000birth)	No. of people per physician 2017	Infectious diseases per 10,000 people	Poverty incidence 2017 (%)	Vocational students per 1,000 population	Vocational teachers per 1,000 population	Capital expenditure per capita (MNT106)	Aimag revenue per capita (MNT103)
<i>Western Region</i>		10.7				16.1	409		10.7	10.1	0.88	221	744
Bayan-Ulgii	37	12.4	6,777	68	20	13.3	495	33	12.4	7.1	0.56	87	706
Gove-Altai	50	8.6	10,366	90	22	16.4	305	137	8.6	6.6	0.75	172	732
Zavkhan	51	4.4	9,490	101	27	16.6	395	63	4.4	14.6	1.48	725	842
Uvs	52	13.0	9,427	87	25	18.7	485	86	13.0	10.9	0.86	122	758
Khovd	44	13.5	9,436	82	28	16.7	374	59	13.5	11.4	0.86	86	701
<i>Khangai Region</i>		9.8				14.8	449		9.8	9.7	0.57	238	737
Arkhangai	63	5.4	9,596	82	27	16.8	548	52	5.4	11.5	0.64	115	698
Bayankhongor	54	5.6	9,285	91	29	15.5	461	129	5.6	12.2	0.67	311	763
Bulgan	53	10.7	10,211	78	26	10.8	505	77	10.7	8.2	0.52	337	874
Orkhon	4	23.5	56,589	88	34	5.0	313	66	23.5	10.9	0.77	335	843
Uvurkhangai	51	7.6	7,900	83	28	16.1	445	96	7.6	12.7	0.59	260	641
Khuvsgul	56	8.5	8,869	80	29	22.0	526	116	8.5	3.7	0.30	141	687
<i>Central Region</i>		8.3				11.4	369		8.3	13.6	0.89	1,634	941
Govisumber	16	7.8	12,289	92	31	7.2	301	134	7.8	34.6	2.41	219	1,419
Darkhan-Uul	6	14.2	11,995	85	32	10.6	368	92	14.2	19.2	1.28	381	563

Dornogovi	23	6.1	9,541	79	31	12.8	304	101	6.1	8.8	0.50	1,396	826
Dundgovi	54	4.4	11,173	81	24	9.1	326	106	4.4	11.8	0.80	172	847
Umnugovi	38	16.4	21,358	83	30	16.1	342	109	16.4	9.6	0.67	8,577	2,252
Selenge	19	6.6	13,230	82	28	11.0	438	71	6.6	7.1	0.56	769	703
Tuv	40	3.2	10,082	84	27	10.0	430	85	3.2	18.2	1.08	309	754
<i>Eastern Region</i>		10.4				16.3	415		10.4	10.8	0.65	178	741
Dornod	31	10.1	28,734	87	30	13.4	430	367	10.1	17.3	0.86	146	693
Sukhbaatar	57	10.9	15,838	90	30	17.3	397	208	10.9	4.9	0.36	130	784
Khentii	45	10.3	11,702	89	27	19.4	416	91	10.3	8.8	0.66	249	756
<i>Ulaanbaatar</i>		7.5				12.7	218		7.5	11.9	0.67	1,098	749
Mongolia		8.8				13.6	293		8.8	152.9	0.71	1,103	776

Note: Aimags are classified in this table according to the present regional division.

Source: Japan International Cooperation Agency (JICA) Project Team

Table 6.1.2 Evaluation of Aimags for High and Low Ranking by 30 Indices (1/2)

Region/Aimags	Land area (km ²)	Population 2017	Population density (/km ²)	Population growth rate 2010-17 (% p.a.)	Urbanization rate (%)	GRDP share of industry & services (%)	Per capita MNT103 GRDP	Forest (%)	Sown area (ha)	Controlled grazing (%)	Intensive livestock (%)	High dzud risk area (km ²)	High & moderately dry (%)	Sensitivity to mining (%)	Highly suitable for fodder (km ²)	Moderately suitable for oil seed (km ²)	High & moderately suitable for fruit (km ²)
<i>Western Region</i>	415,300	400,800	0.97	1.66	32.8	58.5	3,827	23,121	18,437								
Bayan-Ulgii	45,700	102,600	2.25	2.18	36.1	62.8	3,109	226	1,222	37	7	4,806	15	80	789	0	1,675
Govi-Altai	141,400	57,500	0.41	1.04	32.5	53.5	4,677	12,213	1,320	30	10	20,479	88	18	7,077	3,657	77,815
Zavkhan	82,500	71,600	0.87	1.30	22.6	55.2	4,357	4,906	1,863	26	5	52,047	40	47	14,262	818	30,736
Uvs	69,600	82,700	1.19	1.76	36.4	63.3	3,789	1,102	11,775	25	0	13,492	68	72	7,636	1,954	27,105
Khovd	76,100	86,400	1.14	1.70	34.1	57.4	3,703	4,674	2,257	27	18	14,632	58	40	2,865	715	20,433
<i>Khangai Region</i>	384,300	593,700	1.54	1.86	39.5	73.9	6,450	74,904	92,675								
Arkhangai	55,300	95,100	1.72	1.69	22.8	40.9	4,328	10,826	11,509	23	9	13,477	6	89	8,667	28	12,464
Bayankhongor	116,000	86,600	0.75	1.84	35.5	53.4	4,355	3,307	754	38	16	22,802	75	25	7,939	7,303	41,501
Bulgan	48,700	61,300	1.26	1.91	19.8	49.2	4,529	19,050	48,559	6	39	6	9	100	16,387	192	21,751
Orkhon	800	104,000	130.00	1.94	96.2	99.4	17,917	159	2,603	0	70	0	0	100	369	0	509
Uvurkhangai	62,900	115,100	1.83	1.83	25.4	49.3	3,769	1,508	10,536	32	26	5,981	61	52	9,456	6,940	23,082
Khuvsgul	100,600	131,600	1.31	1.96	32.2	58.6	3,780	40,054	18,714	8	5	19,908	0	58	10,409	112	15,371
<i>Central Region</i>	473,600	504,300	1.06	1.62	45.5	73.5	5,336	31,599	340,772								
Govi-sumber	5,500	17,400	3.16	3.91	40.9	79.5	5,015	0	39	5	85	0	100	100	3,010	411	4,615
Darkhan-Uul	3,300	104,100	31.55	1.33	82.3	92.3	4,296	720	22,528	0	61	1	0	100	1,750	22	2,016
Dornogovi	109,500	68,100	0.62	2.10	63.1	72.8	4,393	1,585	122	43	10	0	100	7	10,884	69,430	38,451
Dundgovi	74,700	45,800	0.61	2.44	26.6	41.5	5,442	687	92	29	14	0	100	13	16,414	43,648	50,532
Umnugovi	165,400	65,300	0.39	0.84	38.2	80.3	8,237	7,537	185	5	4	62	100	4	77	77,912	61,809
Selenge	41,200	109,600	2.66	1.63	37.2	80.9	5,290	15,339	208,968	18	17	106	0	100	12,605	55	14,896
Tuv	74,000	94,000	1.27	1.38	17.9	56.4	5,185	5,731	108,839	29	44	11	39	89	19,609	364	29,556
<i>Eastern Region</i>	286,200	216,200	0.76	2.10	41.9	71.1	7,207	13,048	71,608								
Dornod	123,600	79,400	0.64	1.90	56.4	86.3	10,229	1,746	34,246	50	5	0	33	35	90,116	36,698	111,756
Sukhbaatar	82,300	61,100	0.74	2.50	30.2	66.3	6,744	1	9,219	76	8	0	74	24	43,763	10,485	75,470
Khenti	80,300	75,700	0.94	2.00	36.1	40.3	4,419	11,301	28,143	52	5	0	19	83	44,168	1,048	54,048
<i>Ulaanbaatar</i>	4,700	1,463,000	311.28	2.34	100.0	99.6	12,387	741	825	0	65	18	0	100	1,184	16	1,422
Mongolia	1,564,100	3,178,000	2.03	2.03	67.2	89.4	8,675	143,413	524,318		12		57	43	329,395	261,808	717,098

Table 6.1.2 Evaluation of Aimags for High and Low Ranking by 30 Indices (2/2)

Region/Aimags	Livestock population per herder household	Livestock population per 100ha pasture land	Share of herders in total employment (%)	Unemployment rate (2017) (%)	Labor productivity (2017) (MNT103)	Enrollment in kindergarten (%)	Pupil-to-teacher ratio at primary education	IMR 2017 (/1,000birth)	No. of people per physician 2017	Infectious diseases per 10,000 people	Poverty incidence 2017 (%)	Vocational students per 1,000 population	Vocational teachers per 1,000 population	Capital expenditure per capita (MNT106)	Aimags revenue per capita (MNT103)
Western Region				10.7				16.1	409		10.7	10.1	0.88	221	744
Bayan-Ulgii	240	99	37	12.4	6,777	68	20	13.3	495	33	12.4	7.1	0.56	87	706
Govi-Altai	529	57	50	8.6	10,366	90	22	16.4	305	137	8.6	6.6	0.75	172	732
Zavkhan	394	82	51	4.4	9,490	101	27	16.6	395	63	4.4	14.6	1.48	725	842
Uvs	350	109	52	13.0	9,427	87	25	18.7	485	86	13.0	10.9	0.86	122	758
Khovd	438	102	44	13.5	9,436	82	28	16.7	374	59	13.5	11.4	0.86	86	701
Khangaigai Region				9.8				14.8	449		9.8	9.7	0.57	238	737
Arkhangai	349	279	63	5.4	9,596	82	27	16.8	548	52	5.4	11.5	0.64	115	698
Bayankhongor	388	77	54	5.6	9,285	91	29	15.5	461	129	5.6	12.2	0.67	311	763
Bulgan	396	241	53	10.7	10,211	78	26	10.8	505	77	10.7	8.2	0.52	337	874
Orkhon	139	734	4	23.5	56,589	88	34	5.0	313	66	23.5	10.9	0.77	335	843
Uvurkhangai	357	163	51	7.6	7,900	83	28	16.1	445	96	7.6	12.7	0.59	260	641
Khuvsgul	318	200	56	8.5	8,869	80	29	22.0	526	116	8.5	3.7	0.30	141	687
Central Region				8.3				11.4	369		8.3	13.6	0.89	1,634	941
Govi-sumber	616	133	16	7.8	12,289	92	31	7.2	301	134	7.8	34.6	2.41	219	1,419
Darkhan-Uul	227	351	6	14.2	11,995	85	32	10.6	368	92	14.2	19.2	1.28	381	563
Dornogovi	480	35	23	6.1	9,541	79	31	12.8	304	101	6.1	8.8	0.50	1,396	826
Dundgovi	513	69	54	4.4	11,173	81	24	9.1	326	106	4.4	11.8	0.80	172	847
Umnugovi	456	33	38	16.4	21,358	83	30	16.1	342	109	16.4	9.6	0.67	8,577	2,252
Selenge	323	180	19	6.6	13,230	82	28	11.0	438	71	6.6	7.1	0.56	769	703
Tuv	394	158	40	3.2	10,082	84	27	10.0	430	85	3.2	18.2	1.08	309	754
Eastern Region				10.4				16.3	415		10.4	10.8	0.65	178	741
Dornod	409	48	31	10.1	28,734	87	30	13.4	430	367	10.1	17.3	0.86	146	693
Sukhbaatar	463	85	57	10.9	15,838	90	30	17.3	397	208	10.9	4.9	0.36	130	784
Khenti	562	145	45	10.3	11,702	89	27	19.4	416	91	10.3	8.8	0.66	249	756
Ulaanbaatar				7.5				12.7	218		7.5	11.9	0.67	1,098	749
Mongolia				8.8				13.6	293		8.8	152.9	0.71	1,103	776

Note: Six highest ranked Aimags; : Six lowest ranked Aimags

Source: JICA Project Team

(2) Pair-wise comparison of Aimags

Based on the data in Table 6.1.2, each pair of mutually neighboring Aimags is compared by using the 30 indices to see “affinity” of the two neighboring Aimags. For any index, if both Aimags have high evaluation (green) or one Aimag has high and the other medium, score of “1” is given to the pair. The same applies to low evaluation. If both Aimags have medium evaluation, score of “0” is given. If one Aimag has low evaluation (red) and the other high (green), score of “-1” is given to the pair. The affinity of the pair of Aimags is assessed by adding the scores by all the 30 indices. Results are summarized as a matrix in Table 6.1.3, which may be called an “Aimag affinity matrix.”

As seen from Table 6.1.3, 41 pairs of neighboring Aimags are identified. The total affinity scores range from 9 to 23. Two Aimags of Orkhon and Darkhan-Uul are not included in the evaluation as they are practically involved in the Aimags of their immediate neighbors respectively.

6.1.3 Proposed regional division

(1) Affinity of neighboring Aimags

Affinity of neighboring Aimags is presented in Figure 6.1.1. The number on each line shows the number of indices by which the Aimags linked by the line have affinity. From Figure 6.1.1, groups of Aimags linked by high affinity are identified. Aimags of Bayan-Ulgii, Uvs, Khovd and Govi-Altai have high affinity with scores of any pair larger than 21. Aimags of Govi-Altai, Bayankhongor and Uvurkhangai have high affinity with scores 19 for both pairs linking the three Aimags. Aimags of Khuvsgul, Arkhangai, Bulgan and Selenge are linked by pairs having scores larger than 19. Aimags of Selenge, Tuv, Govisumber and Dundgovi are linked by pairs having scores larger than 20. Aimags of Khentii, Dornod, Sukhbaatar and Dornogovi have high affinity with scores of any pairs larger than 20.

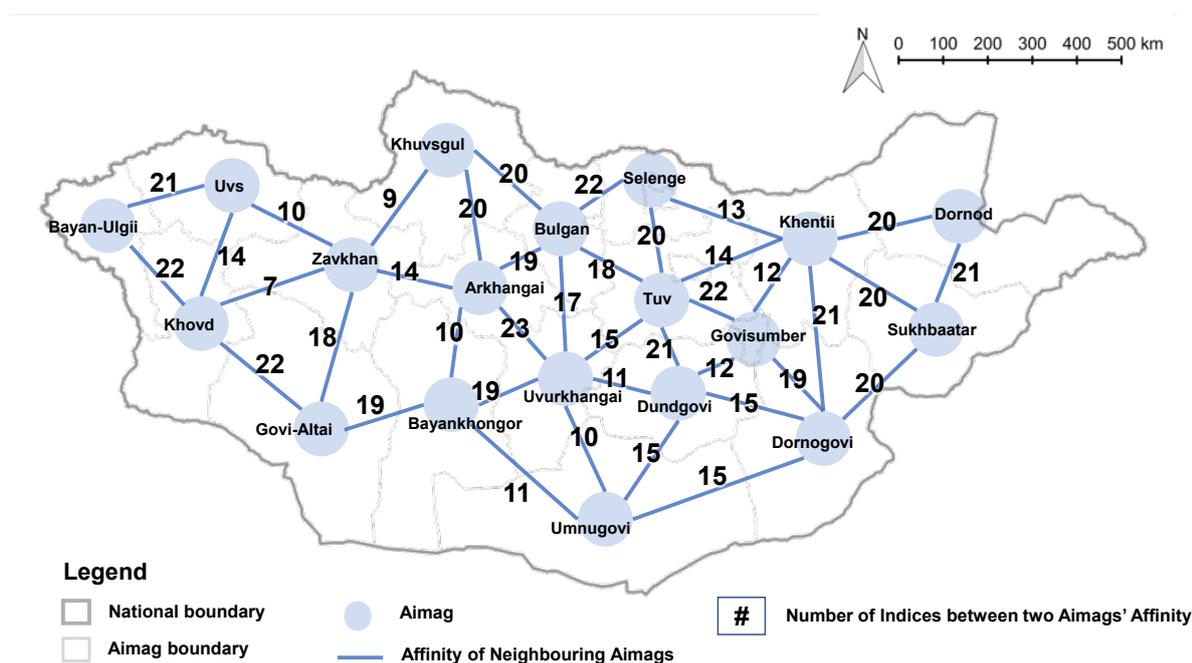
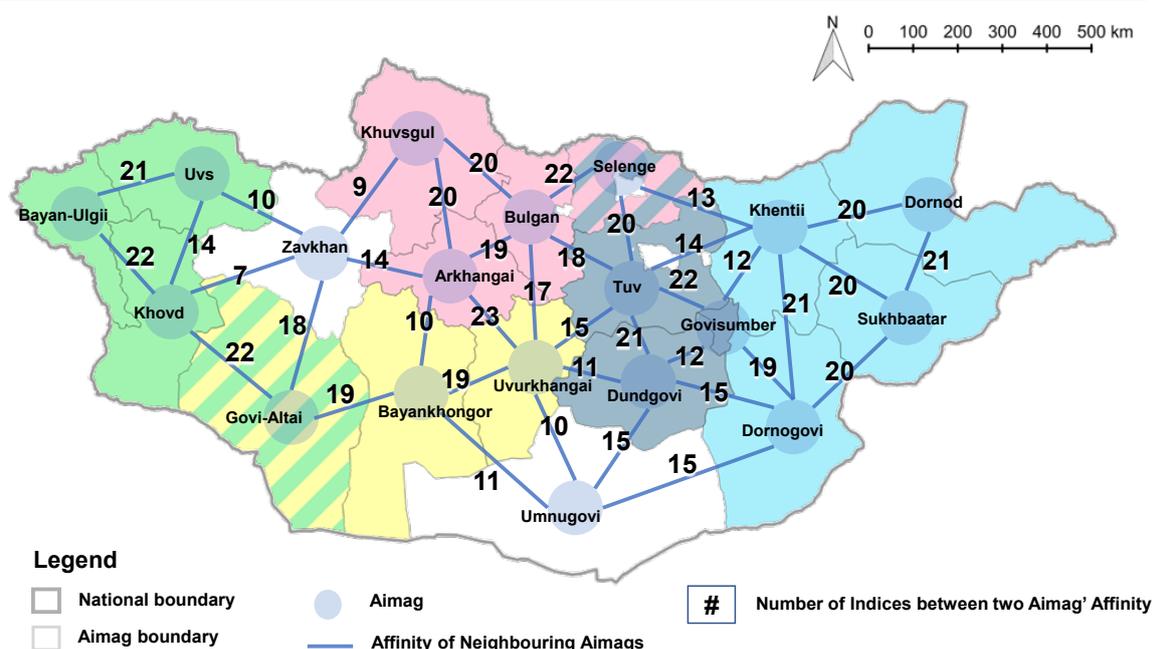


Figure 6.1.1 Affinity of Neighboring Aimags

Govi-Altai belongs to two groups. Govi-Altai shares with Bayankhongor the geographic position bordering on China in the south and steppe and semi-desert in the north of Altai mountains. Therefore, Govi-Altai may be grouped with Bayankhongor. Consequently, three regions may be defined: Western Region with Bayan-Ulgii, Uvs and Khovd, Altai Region with Govi-Altai, Bayankhongor and Uvurkhangai, and Khangai Region with Khuvsgul, Arkhangai, Bulgan and Selenge.

Two Aimags of Zavkhan and Umnugovi do not belong to any Aimag groups identified above as shown in Figure 6.1.2. There are two alternative groups for Zavkhan to join: group of Khuvsgul, Arkhangai, Bulgan and Selenge, and group of Bayan-Ulgii, Uvs and Khovd. Zavkhan has two neighboring Aimags respectively with the former and also with the latter. Combined scores of affinity are 23 with the former and 17 with the latter. Therefore, Zavkhan may belong to the former. Thus, Khangai Region is re-defined with Zavkhan, Khuvsgul, Arkhangai, Bulgan and Selenge.

The three Aimags surrounding Tuv have affinity scores larger than 20. Selenge, however, has stronger affinity to Bulgan. Govisumber is more strongly linked to Dundgovi and Dornogovi with combined affinity score of 31. Dundgovi is more strongly linked to Umnugovi and Govisumber with combined affinity score of 27. Therefore, these four Aimags may constitute a region: Southern Region. This leaves only Tuv to join with the capital city of Ulaanbaatar to constitute Capital Region. As Dornogovi belongs to Southern Region, Easter Region is defined with Khentii, Dornod and Sukhbaatar.



Source: JICA Project Team

Figure 6.1.2 Grouping of Aimags Based on Affinity

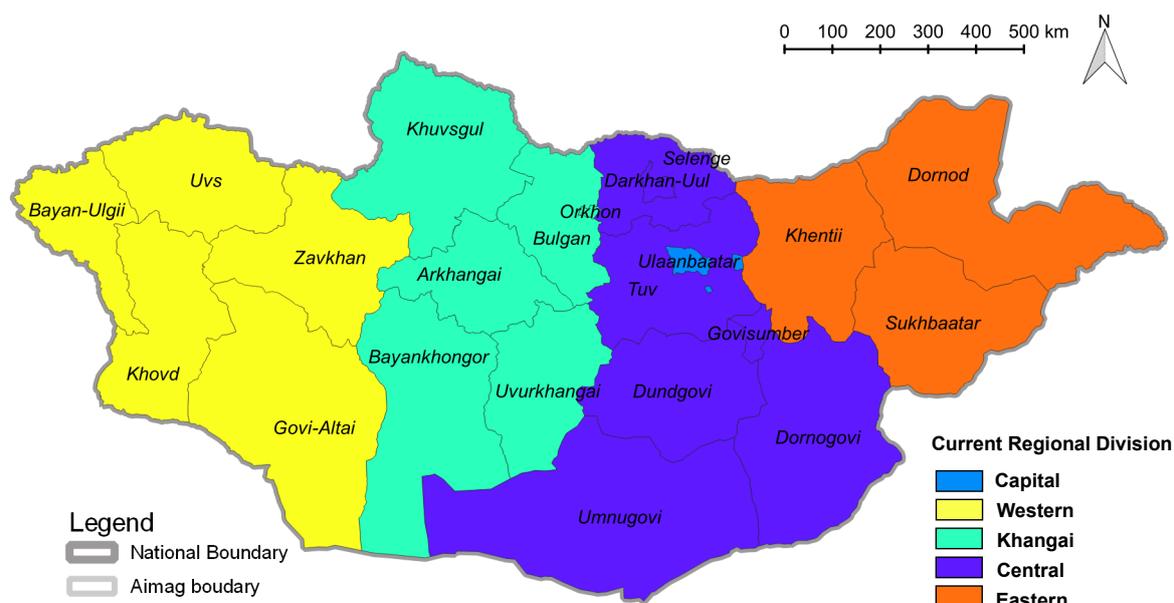
(2) Proposed regional division

Based on the grouping analysis of Aimags described above, six regions are defined with member Aimags respectively as summarized in Figure 6.1.4 and Table 6.1.4 including Orkhon and Darkhan-Uul belonging to Khangai Region. Basic indices for all the Regions are summarized in Table 6.1.5.

Table 6.1.4 Newly Proposed Regional Division with Constituent Aimags

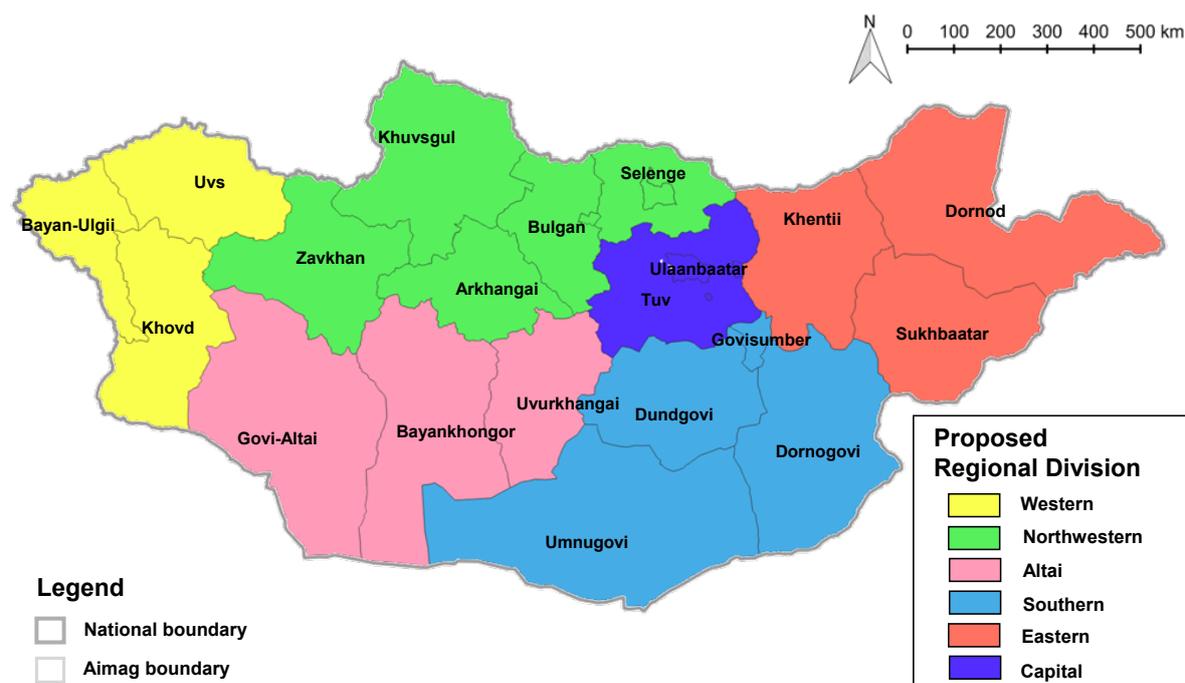
Region	Aimags
Western	Bayan-Ulgii, Uvs and Khovd
Khangai	Zavkhan, Khuvsgul, Arkhangai, Bulgan, Orkhon, Darkhan-Uul and Selenge
Altai	Govi-Altai, Bayankhongor and Uvurkhangai
Southern	Govisumber, Dundgovi, Umnugovi and Dornogovi
Eastern	Khentii, Dornod and Sukhbaatar
Capital	Tuv, Ulaanbaatar

Source: JICA Project Team



Source: JICA Project Team based on statistical yearbook

Figure 6.1.3 Current Regional Division



Source: JICA Project Team

Figure 6.1.4 Revised Regional Division with Constituent Aimags Proposed by NCDP

Table 6.1.5 Basic Indices for Six Regions

Region	No. of Aimags	Land area (km ²)	Population in 2017	Population density 2017/(/km ²)	Population growth rate 2010-17 (%p.a.)
Western	3	191,400	271,700	1.42	1.90
Khangai	7	208,700	496,100	2.38	1.76
Altai	3	320,300	259,200	0.81	1.65
Southern	4	355,100	196,600	0.55	1.89
Eastern	3	286,200	216,200	0.76	2.10

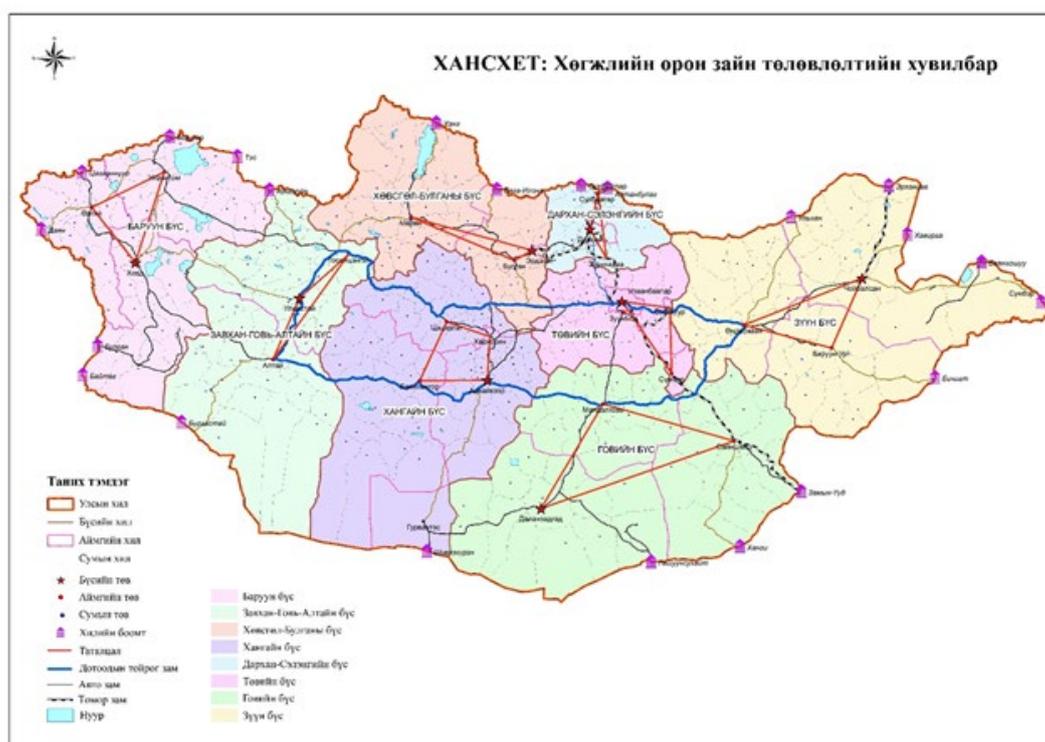
Capital	1+UB	78,700	1,557,000	19.78	2.28
---------	------	--------	-----------	-------	------

Source: JICA Project Team

6.1.4 Comparison of alternative regional divisions

(1) Regional division proposed by CDC

In addition to the current regional division and the new division proposed by the NCDP, another regional division has been proposed by CDC for the HSP as shown in Figure 6.1.5. This division has eight regions.



Source: draft HSP

Figure 6.1.5 Regional Division Proposed by CDC for the HSP

(2) Comparison of three alternatives for regional division

The three alternatives for regional division are compared in Table 6.1.6 with respect to basic characteristics. These alternatives were discussed at coordination meetings on April 15 and April 23 by MCUD/CDC, NDA and the JPT. Advantages and disadvantages of the alternatives are summarized in Table 6.1.7. Through the discussions, it has been clarified that a new regional division will have to be discussed at public consultation involving all stakeholders before adaption, which will take long time. Therefore, further discussions have been suspended.

Table 6.1.6 Comparison of Three Alternatives for Regional Division

Regional division	No. of regions	No. of Aimags in region	Land area except Capital Region (km ²)	Population in 2018 except Capital Region	Population growth rate 2010-18 (%p.a.)
Current	5	3~7	286,200~474,400	222,600~614,600	1.59~2.21
CDC	8	2~5	44,500~349,600	131,400~301,000	1.26~2.21
NCDP	6	3~7	191,400~355,100	203,000~681,900	1.54~2.21

Source: draft HSP

Table 6.1.7 Advantages and Disadvantages of Three Alternatives for Regional Division

	Current	CDC	NCDP
Advantages	Considered scientific as prepared through many years study Widely familiar since 2001 Diversified geography and socio-economy	Little difference between Aimags in population, area and GDP Enlarged territory and larger population of Capital Region to accommodate various urban service functions	All the Aimags in any region with high affinity to allow effective policy for regional development Enlarged territory and larger population of Capital Region to accommodate various urban service functions
Disadvantages	Region-specific policies ineffective due to widely varying natural and socio-economic conditions	Too many regions with some regions too small to pursue self-reliant development Strong resistance against changes in regional division	Wide variance in population and number of Aimags Strong resistance against changes in regional division

Source: JICA Project Team

The rationale for the regional division proposed by the NCDP is that region specific development policies will be more effective if Aimags having similar characteristics constitute a region. In accordance with the Law on Regional Development Management and Coordination, a regional development program shall be approved by the Government. Such a program shall be formulated under a strategy commonly applicable to the entire territory of the region. Therefore, in what follows, development strategy and development programs are developed under the regional division proposed by the NCDP.

6.2 Characterization of Regions

6.2.1 Main characteristics of each Region

The six Regions defined above have widely different characteristics. Main characteristics of each Region are described in Table 6.2.1 reflecting the evaluation in Table 6.1.2.

Table 6.2.1 Main Characteristics of Six Regions Defined by Proposed Regional Division

Region	Aimags	Natural environment	Economic characteristics	Social services
Capital	Ulaanbaatar, Tuv	Generally highland with protected area in mountains in northeast	Service and industrial activities in the capital city and high productivity livestock and crop production in its vicinity	High education and health care services Urban poor and unemployment in the capital city but low unemployment in its vicinity
Western	Bayan-Ulgii, Uvs, Khovd	Containing high mountain zone Steppe~desert- steppe distributing widely Sharing Khovd river basins	Low per capita gross domestic products (GDP) High unemployment rate Low labor productivity	Small pupils-to-teacher ratios except Khovd High IMR except Bayan-Ulgii Low availability of physicians Low rate of infectious diseases

Khangai	Zavkhan, Khuvsgul, Arkhangai, Bulgan, Selenge, Darkhan-Uul, Orkhon	Forest steppe and high mountain areas dominant Sharing Selenge and Orkhon river basins	Large number of livestock per 100ha pasture except Zavkhan Small number of livestock per herder household except Bulgan Dichotomy between economically advanced Aimags of Orkhon, Selenge and Darkhan-Uul and agriculture dominant Aimags of Zavkhan, Khuvsgul, Arkhangai and Bulgan	High IMR in Khuvsgul and Arkhangai and low rate in other Aimags Low enrollment rate in kindergarten in Bulgan, Khuvsgul, Selenge and Arkhangai Small number of infectious diseases per 10,000 except Khuvsgul
Altai	Govi-Altai, Bayankhongor, Uvurkhangai,	Desert~dry steppe dominant Sharing Khangai and Gobi-Altai mountains	Small number of livestock per 100ha pasture except Uvurkhangai Relatively large share of herders in total employment	Relatively large number of infectious diseases per 10,000 except Uvurkhangai
Southern	Dundgovi, Govisumber, Dornogovi, Umnugovi	Semi-desert~dry steppe dominant; Good access to UB and north-south artery Largely flat without perennial river	Small number of livestock per 100ha pasture except Govisumber Large number of livestock per herder household Relatively low unemployment rate	Low enrollment rate in kindergarten in Dundgovi and Dornogovi and high rate in Govisumber Relatively low IMR Small number of people per physician
Eastern	Dornod, Sukhbaatar, Khentii	Stepp~dry steppe dominant Sharing Herlen river basin	Relatively large number of livestock per herder household Relatively small share of economically active population Relatively high labor productivity	Relatively high enrollment rate in kindergarten Large number of infectious diseases per 10,000 except Khentii

Source: JICA Project Team

6.2.2 Detailed characteristics by Region

More detailed characteristics of six Regions newly defined may be seen from Table 6.2.2, which re-arranges the Aimag data in Table 6.1.1 by Region. The following are observed by Region.

(1) Western Region

Three Aimags in Western Region have the following common characteristics:

- (a) Low per capita GRDP,
- (b) Low labor productivity,
- (c) High unemployment rate,
- (d) Relatively small forest and sown areas,
- (e) High Dzud risk,
- (f) Small pupils-to-teacher ratio,
- (g) Relatively high IMR,

- (h) Relatively large number of people per physician,
- (i) Small number of infectious diseases per 10,000 population, and
- (j) Small capital expenditure per capita.

The Aimags in Western Region are ranked at medium for the share of herders in total employment, livestock population per herder 100ha pastureland, share of herders in total employment, GRDP share of industry and services and population density. They have relatively low sensitivity to mining.

(2) Khangai Region

Common characteristics of Aimags in Khangai Region other than Zavkhan include the following:

- (a) Relatively high population density except Zavkhan,
- (b) Relatively large sown area except Zavkhan,
- (c) Not suitable for oil seed or fruit production,
- (d) Relatively large forest area except naturally Darkhan-Uul and Orkhon having small land areas,
- (e) Low ratio of area for controlled grazing,
- (f) Small livestock population per herder household,
- (g) Large livestock population per 100ha pastureland except Zavkhan, and
- (h) Highly sensitive to mining.

Zavkhan is rather exceptional in Khangai Region. This reflects its position between Western Region and Khangai Region as shown by the affinity analysis above. As compared to the Aimags in Western Region, Zavkhan is an exception as expected from the low affinity with the neighboring Aimags in the following aspects:

- (a) Low unemployment rate,
- (b) High enrolment at kindergarten,
- (c) Low poverty incidence,
- (d) Large number of vocational students per 1,000 population,
- (e) Large capital expenditure per capita, and
- (f) Large Aimag revenue per capita.

These characteristics indicate Zavkhan is a relatively advanced Aimag in the western part of the Country. This may justify strengthening Zavkhan, in particular its capital Uliastai, for the provision of higher order services serving all the Aimags in Western Region

For social services, the Aimags in Khangai Region show mixed performance. Of the seven Aimags in Khangai Region, Bulgan is rather exceptional with respect to low urbanization rate, relatively small GRDP share of industry and services, high suitability for fodder production, low availability of vocational students and teachers, large capital expenditure per capita and large Aimag revenue per capita.

(3) Altai Region

Common characteristics of Aimags in Altai Region include the following:

- (a) Relatively small GRDP share of industry and services,
- (b) Relatively small sown area,
- (c) Relatively high suitability for intensive livestock,
- (d) Relatively high Dzud risk and dry climate except Uvurkhangai,
- (e) Not highly sensitive to mining, and

- (f) Relatively low labor productivity.

For social services, the Aimags in Altai Region show mixed performance. The number of infectious diseases per 10,000 population is large in Bayankhongor and Govi-Altai, and poverty incidence is high in Govi-Altai. Uvurkhangai is rather exceptional with respect to relatively high population density, relatively high risk for mining, relatively low enrolment in kindergarten, large number of vocational students per 1,000 population, and small Aimag revenue per capita.

(4) Southern Region

Common characteristics of Aimags in Southern Region include the following:

- (a) Low population density except Govisumber,
- (b) High population growth during 2010-17 except Umnugovi,
- (c) Relatively large per capita GRDP,
- (d) High labor productivity,
- (e) Small forest and sown areas,
- (f) Relatively Dzud risk free except Umnugovi but dry climate,
- (g) Moderately suitable for oilseed and fruit production except Govisumber,
- (h) Large livestock population per herder household,
- (i) Small livestock population per 100ha pastureland,
- (j) Small number of people per physician, and
- (k) Relatively large capital expenditure and Aimag revenue per capita.

Govisumber is rather exceptional with respect to high population density, high sensitivity for mining, low suitability for fruit production, high enrolment in kindergarten, large number of infectious diseases per 10,000 population and large numbers of vocational students and teachers per 1,000 population.

(5) Eastern Region

Common characteristics of Aimags in Southern Region include the following:

- (a) Low population density,
- (b) Relatively high population growth rate (2010-17),
- (c) Relatively large per capita GRDP,
- (d) Relatively large sown area,
- (e) High ratios of controlled grazing and low ratios of intensive livestock areas,
- (f) Suitable for fodder, oil seed and fruit production,
- (g) Relatively large livestock population per herder household,
- (h) Relatively high enrolment rate in kindergarten,
- (i) Relatively large pupil-to-teacher ratio at primary education,
- (j) Relatively high IMR, and
- (k) Relatively large infectious diseases per 10,000 population.

(6) Capital Region

Many characteristics of Tuv reflect its coterminous location with the capital city of Ulaanbaatar. Population growth rate during 2010-17 is among the lowest, and urbanization rate is only 17.9%. The ratio of land suitable for intensive livestock is 44%, smaller than 65% in the capital city. Tuv is also

highly sensitive to mining, although less sensitive than Ulaanbaatar. Tuv, however, has the following more favorable characteristics than Ulaanbaatar:

- (a) Large sown area,
- (b) Low unemployment rate,
- (c) High suitability for fodder production,
- (d) Low IMR,
- (e) Low poverty incidence, and
- (f) Large numbers of vocational students and teachers per 1,000 population.

These characteristics may be effectively utilized to improve the living environment of Capital Region by alleviating problems faced by Ulaanbaatar due to over-concentration of population and economic activities. Other favorable characteristics include large land area over 15 times larger than Ulaanbaatar, forest area over 7 times larger than Ulaanbaatar, and area suitable for fruit as well as fodder production.

Table 6.2.2 Comparison of 21 Aimag Classified by New Regional Division (1/2)

Region/Aimag	Land area (km ²)	Population 2017	Population 2015	Population 2010	Population density (/km ²)	Population growth rate 2010-15 (% p.a.)	Population growth rate 2015-17 (% p.a.)	Population growth rate 2010-17 (% p.a.)	Urbanization rate (%)	Agriculture GRDP	Industry GRDP	Services GRDP	GRDP share of industry & services (%)	Per capita GRDP (MNT103)	Forest (%)	Sown area (ha)	Controlled grazing (%)	Intensive livestock (%)	High Dzend risk area (km ²)	High & moderately dry (%)
<i>Western Region</i>	191,400	271,700	264,500	238,200	1.42	2.12	1.35	1.90	32.8	41.4	19.7	38.8	58.5	3,827	6,002	15,254				
Bayan-Ulgii	45,700	102,600	100,200	88,200	2.25	2.58	1.19	2.18	36.1	37.2	17.0	45.8	62.8	3,109	226	1,222	38	7	4,806	15
Uvs	69,600	82,700	80,800	73,200	1.19	2.00	1.17	1.76	36.4	36.7	24.7	38.6	63.3	3,789	1,102	11,775	25	18	3,491	68
Khovd	76,100	86,400	83,500	76,800	1.14	1.69	1.72	1.70	34.1	42.6	19.0	38.4	57.4	3,703	4,674	2,257	27	5	4,631	58
<i>Khangai Region</i>	208,700	496,100	481,900	439,000	2.38	1.88	1.46	1.76	39.5	26.1	54.6	19.3	73.9	6,450	70,809	103,914				
Arkhangai	55,300	95,100	92,100	84,600	1.72	1.71	1.62	1.69	22.8	59.1	17.9	23.0	40.9	4,328	10,826	11,509	23	9	3,471	6
Bulgan	48,700	61,300	60,000	53,700	1.26	2.24	1.08	1.91	19.8	50.9	23.5	25.7	49.2	4,529	19,050	48,559	6	39	6	9
Darkhan-Uul	3,300	104,100	100,900	94,900	31.55	1.23	1.57	1.33	82.3	7.8	49.3	43.0	92.3	4,296	720	22,528	0	39	1	0
Orkhon	800	104,000	100,700	90,900	130.00	2.07	1.63	1.94	96.2	0.6	89.3	10.1	99.4	17,917	159	2,603	0	5	0	0
Khuvsgul	100,600	131,600	128,200	114,900	1.31	2.21	1.32	1.96	32.2	41.4	28.6	30.0	58.6	3,780	40,054	18,714	8	5	9,901	0
Selenge	41,200	109,600	106,300	97,900	2.66	1.66	1.54	1.63	37.2	19.1	53.2	27.7	80.9	5,290	15,339	208,968	18	17	106	0
Zavkhan	82,500	71,600	69,900	65,400	0.87	1.34	1.21	1.30	22.6	44.9	15.5	39.7	55.2	4,357	4,906	1,863	26	5	2,041	40
<i>Altai Region</i>																				
Bayankhongor	116,000	86,600	83,900	76,200	0.75	1.94	1.60	1.84	35.5	46.6	24.0	29.4	53.4	4,355	3,307	754	38	16	2,801	75
Govi-Altai	141,400	57,500	56,200	53,500	0.41	0.99	1.15	1.04	32.5	46.5	23.0	30.5	53.5	4,677	12,213	1,320	30	10	0,471	88
Uvurkhangai	62,900	115,100	112,400	101,400	1.83	2.08	1.19	1.83	25.4	50.7	20.6	28.7	49.3	3,769	1,508	10,536	32	26	5,981	61
<i>Southern Region</i>	355,100	196,600	187,900	172,500	0.55	1.72	2.29	1.89	45.5	26.5	41.0	32.5	73.5	5,336	9,809	438				
Govisumber	5,500	17,400	16,500	13,300	3.16	4.41	2.69	3.91	40.9	20.4	38.2	41.3	79.5	5,015	0	39	5	10	0	100
Dornogovi	109,500	68,100	65,300	58,900	0.62	2.08	2.12	2.10	63.1	27.2	22.1	50.7	72.8	4,393	1,585	122	43	10	0	100
Dundgovi	74,700	45,800	44,400	38,700	0.61	2.79	1.56	2.44	26.6	58.5	13.4	28.1	41.5	5,442	687	92	29	14	0	100
Umnugovi	165,400	65,300	61,700	61,600	0.39	0.03	2.88	0.84	38.2	19.7	53.3	27.0	80.3	8,237	7,537	185	5	4	62	100
<i>Eastern Region</i>	286,200	216,200	208,100	186,900	0.76	2.17	1.93	2.10	41.9	28.9	53.2	17.9	71.1	7,207	13,048	71,608				
Dornod	123,600	79,400	76,500	69,600	0.64	1.91	1.88	1.90	56.4	13.7	72.0	14.3	86.3	10,229	1,746	34,246	50	5	0	33
Sukhbaatar	82,300	61,100	59,000	51,400	0.74	2.80	1.76	2.50	30.2	33.8	49.4	16.9	66.3	6,744	1	9,219	76	8	0	74
Khentii	80,300	75,700	72,600	65,900	0.94	1.96	2.11	2.00	36.1	59.7	12.5	27.8	40.3	4,419	11,301	28,143	52	5	0	19
<i>Capital Region</i>																				
Ulaanbaatar	4,700	1,463,000	1,396,300	1,244,400	311.28	2.33	2.36	2.34	100	0.4	36.4	63.2	99.6	12,387	741	825	0	65	18	0
Tuv	74,000	94,000	90,400	85,400	1.27	1.14	1.97	1.38	17.9	43.6	31.8	24.6	56.4	5,185	5,731	108,839	29	44	11	39
Mongolia	1,046,100	2,643,600	2,538,700	2,281,000	2.53	2.16	2.05	2.13	67.2	10.6	39.4	50.0	89.4	8,675	100,409	192,039				57

Table 6.2.3 Comparison of 21 Aimags Classified by New Regional Division (2/2)

Region/Aimags	Sensitivity to mining (%)	Highly suitable for fodder (km2)	Moderately suitable for oil seed (km2)	High & moderately suitable for fruit (km2)	Livestock population per herder household	Livestock population per 100ha pasture land	Share of herders in total employment (%)	Unemployment rate (2017) (%)	Labor productivity (2017) (MNT103)	Enrollment in kindergarten (%)	Pupil-to-teacher ratio at primary education (/1,000birth)	IMR 2017	No. of people per physician 2017	Infectious diseases per 10,000 people (%)	Poverty incidence 2017 (%)	Vocational students per 1,000 population	Vocational teachers per 1,000 population	Capital expenditure per capita (MNT106)	Aimags revenue per capita (MNT103)
Western Region								10.7				16.1	409		10.7	10.1	0.88	221	744
Bayan-Ulgii	80	789	0	1,675	240	99	37	12.4	6,777	68	20	13.3	495	33	12.4	7.1	0.56	87	706
Uvs	72	7,636	1,954	27,105	350	109	52	13.0	9,427	87	25	18.7	485	86	13.0	10.9	0.86	122	758
Khovd	40	2,865	715	20,433	438	102	44	13.5	9,436	82	28	16.7	374	59	13.5	11.4	0.86	86	701
Khangai Region								9.8				14.8	449		9.8	9.7	0.57	238	737
Arkhangai	89	8,667	28	12,464	349	279	63	5.4	9,596	82	27	16.8	548	52	5.4	11.5	0.64	115	698
Bulgan	100	16,387	192	21,751	396	241	53	10.7	10,211	78	26	10.8	505	77	10.7	8.2	0.52	337	874
Darkhan-Uul	100	1,750	22	2,016	227	351	6	14.2	11,995	85	32	10.6	368	92	14.2	19.2	1.28	381	563
Orkhon	100	369	0	509	139	734	4	23.5	56,589	88	34	5.0	313	66	23.5	10.9	0.77	335	843
Khuvsgul	58	10,409	112	15,371	318	200	56	8.5	8,869	80	29	22.0	526	116	8.5	3.7	0.30	141	687
Selenge	100	12,605	55	14,896	323	180	19	6.6	13,230	82	28	11.0	438	71	6.6	7.1	0.56	769	703
Zavkhan	47	14,262	818	30,736	394	82	51	4.4	9,490	101	27	16.6	395	63	4.4	14.6	1.48	725	842
Altai Region																			
Bayankhongor	25	7,939	7,303	41,501	388	77	54	5.6	9,285	91	29	15.5	461	129	5.6	12.2	0.67	311	763
Govi-Altai	18	7,077	3,657	77,815	529	57	50	8.6	10,366	90	22	16.4	305	137	8.6	6.6	0.75	172	732
Uvurkhangai	52	9,456	6,940	23,082	357	163	51	7.6	7,900	83	28	16.1	445	96	7.6	12.7	0.59	260	641
Southern Region								8.3				11.4	369		8.3	13.6	0.89	1,634	941
Govisumber	100	3,010	411	4,615	616	133	16	7.8	12,289	92	31	7.2	301	134	7.8	34.6	2.41	219	1,419
Dornogovi	7	10,884	69,430	38,451	480	35	23	6.1	9,541	79	31	12.8	304	101	6.1	8.8	0.50	1,396	826
Dundgovi	13	16,414	43,648	50,532	513	69	54	4.4	11,173	81	24	9.1	326	106	4.4	11.8	0.80	172	847
Umnugovi	4	77	77,912	61,809	456	33	38	16.4	21,358	83	30	16.1	342	109	16.4	9.6	0.67	8,577	2,252
Eastern Region								10.4				16.3	415		10.4	10.8	0.65	178	741
Dornod	35	90,116	36,698	111,756	409	48	31	10.1	28,734	87	30	13.4	430	367	10.1	17.3	0.86	146	693
Sukhbaatar	24	43,763	10,485	75,470	463	85	57	10.9	15,838	90	30	17.3	397	208	10.9	4.9	0.36	130	784
Khentii	83	44,168	1,048	54,048	562	145	45	10.3	11,702	89	27	19.4	416	91	10.3	8.8	0.66	249	756
Capital Region																			
Ulaanbaatar	100	1,184	16	1,422				7.5				12.7	218		7.5	11.9	0.67	1,098	749
Tuv	89	19,609	364	29,556	394	158	40	3.2	10,082	84	27	10.0	430	85	3.2	18.2	1.08	309	754
Mongolia	43	329,395	261,808	717,098				8.8				13.6	293		8.8	152.9	0.71	1,103	776

Source: JICA Project Team

6.3 Development Vision and Strategy by Region

Based on the proposed regional division and the analysis on characteristics by Region presented above, development vision and strategy are formulated by Region as part of the NCDP.

6.3.1 Western Region

(1) Regional development vision (RDV)

Western Region is developed as the **Green Development Model Region** characterized by trade and tourism related services capitalizing on access to Russia and China, rich and diversified nature and cultural resources, while preserving pastureland and alleviating effects by Dzud by strengthened Aimag administrations and active people's participation.

(1) Development strategy and measures

Economic aspects

Western Region is less developed with low per capita GRDP, low labor productivity and high unemployment rate. Forest and sown areas are relatively small and Dzud risk is high. Given these conditions, Western Region should be specialized in trade and tourism related services, semi-intensive livestock farming, sea buckthorn industrial cluster development, construction materials industry and distribution of construction materials and commodities. Only limited mining activities should be allowed for strictly responsible mining under monitoring by the local administrations and residents. Its specialization in trade and tourism related services should be strengthened by:

- (a) Promotion of trade with Russia and China by upgrading border facilities at Borshoo, Ulaan Bayshint and Dayannuur,
- (b) Activation of the Tsagaannuur FZ near Ulgii mainly for agro-related industries,
- (c) Establishment of integrated tourism network for nature and culture tourism,
- (d) Specialization in higher education and research in dryland agriculture, biodiversity to improve livestock, sea buckthorn processing, multi-ethnicity and culture, and tourism services.

Crop production and livestock in Western Region are promoted by:

- (a) Semi-intensive livestock farming mainly in Uvs together with increased fodder production for integrated farming,
- (b) Nomadic livestock activities and lifestyle preserved with enhanced productivity and profitability with market outlets provided in Uvs, serving also for culture tourism,
- (c) Sea buckthorn expansion as the first step of industrial cluster development in Uvs and Khovd along the artery linking Ulaangom and Khovd cities, and
- (d) Establishment of a processing base for sea buckthorn also along the artery.

The integrated tourism network is established by:

- (a) Linking nature tourism in Bayan-Ulgii and Khovd with the Altai mountains and in the Uvsnuur basin with the lake in Uvs, and culture tourism based on multi-ethnicity in Bayan-Ulgii and Khovd, and
- (b) Khovd city serving as a tourism gateway for Western Region with direct air access from other regions and countries.

Infrastructure

To support these development prospects in economic aspects, infrastructure should be much improved:

- (a) The Erdeneburen hydropower plant on the Khovd River completed with the installed capacity of 90 megawatt (MW) to meet power demand in Western Region fully without relying on power import from Russia and China,
- (b) Power grid extension to Bayan-Ulgii and Uvs,
- (c) Road links between Ulaangom, Khovd and Ulgii to be improved to facilitate the establishment of integrated tourism network, procurement of fodder for semi-intensive livestock farming, marketing of livestock products and distribution of construction materials and commodities, and
- (d) Improvement of the road link from China at Dayannuur on A15 through Ulgii to Tashanta in Russia, and
- (e) Internationalization of Khovd city airport.

Urban functions

Urban functions to be strengthened for the three Aimag capitals are summarized below. Of the three Aimag capitals, Khovd is identified as the regional core city by the urban hierarchical analysis.

Aimag capital	Major functions
Ulgii, Bayan-Ulgii	Tsagaannuur FZ for processing and service activities Center for nature and culture tourism
Ulaangom, Uvs	Center for trade with Russia Distribution center for construction materials and commodities
Khovd, Khovd	Higher education and research center in dryland agriculture, biodiversity, sea buckthorn processing etc. Tourism gateway to Western Region Construction materials industry and supply base

Institutional measures

The following institutional measures should be taken to support the new economic activities:

- (a) Establishment of principles for responsible mining and strict enforcement by Aimag administrations,
- (b) Management of pastureland to prevent further degradation,
- (c) Simplified administrative procedure and tax and tariff incentives for border trade with Russia and China,
- (d) Preparation of a comprehensive water resources and management plan encompassing the Buyant, Bulgan, Khovd and Senkher rivers,
- (e) Facilitation of formulation/strengthening of producers' association, technology adaptation for product development and marketing of products for sea buckthorn industrial cluster development, and
- (f) Support for locally based small and medium-sized enterprises (SMEs) for trade and tourism related services, construction materials industry and other new economic activities.

6.3.2 Khangai Region

(1) RDV

Khangai Region is developed as the **Advanced Socioeconomic Complex Region** encompassing productive crop production and livestock activities linked to processors and export markets, diversified

manufacturing, and tourism and trade corridors embraced in large forest areas, productive pastureland and rich natural and cultural resources supported by wide application of information and communication technology (ICT) and other advanced technology.

(2) Development strategy and measures

Economic aspects

Khangai Region consists of three different kinds of Aimags: agricultural Aimags of Selenge, Bulgan, Arkhangai and Zavkhan, urban services and industry oriented Aimags of Darkhan-Uul and Orkhon, and tourism Aimag of Khuvsgul. Of the agricultural Aimags, Selenge and Bulgan are specialized more in crop cultivation, while Arkhangai and Zavkhan are more specialized in livestock. Further development of crop production and livestock farming is promoted by:

- (a) Semi-intensive livestock production combined with fodder production for integrated farming in Selenge and Bulgan,
- (b) Livestock grazing in pastureland to produce quality meat and dairy products in Zavkhan and Arkhangai,
- (c) Establishment of ICT-linked livestock industrial cluster for total processing of livestock to provide market outlets for herders and to produce high value products for urban and export markets,
- (d) Increase in agricultural productivity by smart agriculture promotion with mechanization and development or restoration of irrigation facilities in Bulgan,
- (e) Upgrading of crop production, storage and processing system, and
- (f) Water saving irrigation utilizing the water of the Selenge River and the Orkhon River for high value-added crops such as vegetables and fruits for processing in Erdenet.

The tourism and trade corridor development is promoted by:

- (a) Diversification of tourism objects in Khuvsgul as the major foreign tourist destination with nature tourism, wellness tourism, cultural tourism and other forms of alternative tourism,
- (b) Integration of tourism objects in other Aimags and also in the Buryat Republic and Lake Baikal on the Russian side,
- (c) Improvement of urban facilities and amenity in Darkhan, Erdenet and Murun and also social and business services utilizing ICT linked to Ulaanbaatar,
- (d) Establishment of artificial tourism facilities such as rest areas, shops and restaurants along the corridor, and
- (e) Preservation of rich forest resources, while allowing use of non-wood forest resources to ensure proper forest management for sustainability.

Mining and manufacturing industries are promoted as follows:

- (a) Establishment of principles for responsible mining and strict enforcement by Aimag administrations with monitoring involving local residents,
- (b) Strengthening unique characteristics of Aimags such as Khuvsgul as non-mining Aimag, and Bulgan as non-resource intensive and environment friendly Aimag,

- (c) Promotion of labor-intensive industries for construction materials and commodities aiming at urban market, and
- (d) Introduction of ICT industry to support businesses as branch offices of Ulaanbaatar based companies.

Infrastructure

To support the development prospects in economic aspects, infrastructure should be developed as follows:

- (a) Improvement of roads linking Aimag capitals of Darkhan, Erdenet, Bulgan, Murun and Uliastai to Ulaanbaatar,
- (b) Provision of service facilities for tourists and traders along the trade and tourism corridor,
- (c) ICT network development serving socioeconomic activities along the corridor and between cities and their hinterland for communications between herders and administrations, tele-medicine, distance education, weather adapting farming practice and tourism information provision etc.,
- (d) Further development of free trade zone (FTZ) in Altanbulag at the border point with Russia, and
- (e) Irrigation development to increase crop productivity including multipurpose dam with hydropower development.

Urban functions

Urban functions to be strengthened for the seven Aimag capitals are summarized below. Of all the Aimag capitals, Erdenet including Bulgan is identified as the regional core city by the urban hierarchical analysis.

Aimag capital	Major functions
Sukhbaatar, Selenge	Border trade base
Darkhan, Darkhan-Uul	Innovation and dissemination center of new farming technologies utilizing ICT, Artificial Intelligence (AI) and Fifth Generation (5G)
Erdenet, Orkhon	Service base for transit trade and tourism Medipas hospital as the regional hospital
Bulgan, Bulgan	Service base for transit trade and tourism
Murun, Khuvsgul	Tourism gateway
Tsetserleg, Arkhangai	ICT center in Central Mongolia Base for winter tourism
Uliastai, Zvakhan	Social service base for western Aimags

Institutional measures

The following institutional measures should be taken to support the new economic activities:

- (a) Establishment of principles for responsible mining and strict enforcement by Aimag administrations,
- (b) Management and use of forest resources based on comprehensive resource inventory to assess forest resources and identify potential raw materials for non-wood forest products,
- (c) Promotion of locally based SMEs for crop production and processing,
- (d) Promotion of local autonomy and stepwise devolution of administrative functions to pursue decentralized regional development model starting from Darkhan-Uul, and
- (e) Establishment of drought forecast and alarm system to provide the farmers with accurate and reliable information on possible climate.

6.3.3 Altai Region

(1) RDV

Altai Region is developed as the **Diversified Agriculture and Energy Reserve Region** encompassing the productive livestock production and processing belt along the road linking Altai, Bayankhongor and Arvaikheer, diversified crop production utilizing a variety of soil conditions, and renewable energy development to complement the grid electricity.

(2) Development strategy and measures

Economic aspects

Altai Region are dominantly agricultural with crop cultivation and livestock accounting for close to 50% of GRDP. At present, the Region has relatively small sown area and low productivity. Further development of crop production and livestock farming is promoted by:

- (a) Semi-intensive livestock production combined with fodder production for integrated farming along the road linking Altai, Bayankhongor and Arvaikheer,
- (b) Establishment of livestock industrial cluster for processing of livestock products from the livestock belt and also nomadic livestock farming in controlled grazing areas,
- (c) Diversification of crop production including fruits, oil seed, herbs and medicinal plants as well as fodder,
- (d) Processing of fruits and herbs by locally based SMEs for jam, juice, ingredients for medicine and tea, and
- (e) Water saving irrigation and improved access for water to support livestock by utilizing the Zavkhan River.

Utilizing the central location of Arvaikheer, trade and logistics can be further developed in the Region. The Region is located between the Altai and the Hangai mountain ranges and rich in nature tourism opportunities, which may be combined with cultural heritage to develop various forms of alternative tourism. Further development of trade and tourism is promoted by:

- (a) Development of cultural tourism in Kharkhorin and the Orkhon valley, which may be linked also to Tsetserleg to form a tourism triangle,
- (b) Promotion of health tourism by utilizing hot springs, e.g. Shargaljiuut, and abundant medicinal plants,
- (c) Support for locally based SMEs to process fruits and herbs for supply to tourists, and
- (d) Improvement of trade outlet to China through Shiveekhuren Sekhee in Umnugovi.

Limited mining activities may be allowed in Gobi-Altai as it is classified mostly as low sensitivity area for mining except the area around the Altai city. In particular, non-metallic mineral resources may be developed for construction materials such as cement and bricks.

Infrastructure

To support the development prospects in economic aspects, infrastructure should be developed as follows:

- (a) Upgrading of roads linking Altai, Bayankhongor and Arvaikheer as an important part of the ring artery,
- (b) Establishment of a renewable energy development and research center covering the major hydropower development on the Zavkhan River, wind and solar energy in the south, and geothermal energy exploration in the depression areas between the Altai and the Khangai mountains,

- (c) Strengthening logistic functions of Arvaikheer located in the center of Mongolia, and
- (d) Feasibility study of the Zavkhan River multipurpose dam with irrigation and hydropower development coordinating related implementing agencies to examine future options.

Urban functions

Urban functions to be strengthened for the three Aimag capitals are summarized below. Of the three Aimag capitals, Bayankhongor is identified as the regional core city by the urban hierarchical analysis.

Aimag capital	Major functions
Altai, Govi-Altai	Tourism base for nature, culture and health tourism Training centers for education and health personnel Renewable energy development and research center
Bayankhongor,	Central facilities for livestock industrial cluster Center for health tourism and medical science
Arvaikheer, Uvurkhangai	Main logistic center Tourism sub-center for nature and culture tourism

Institutional measures

The following institutional measures should be taken to support the new economic activities:

- (a) Enforcement of controlled grazing by Aimag administrations supported by herders,
- (b) Support for locally based SMEs for crop production and processing,
- (c) Preparation of a strategic plan for the Orkhon Valley area tourism development,
- (d) Preparation of an integrated Zavkhan river development plan with multi-purpose dam including hydropower generation, irrigation and water supply, and
- (e) Preparation of plan for the renewable energy development and research center with implementing arrangements including examination of regional energy company development.

6.3.4 Southern Region

(1) RDV

Southern Region is developed as the **Responsible Mining and Community Development Model Region** characterized by proper resource management by Aimag administrations with environmental monitoring by active participation of local people, adequate community infrastructure and greenery supported by mining industry, and sustainable use of water resources.

(2) Development strategy and measures

Economic aspects

Southern Region has relatively large per capita GRDP and high labor productivity due mainly to mining. Per capita capital expenditure and per capita Aimag revenues are also relatively large. Further mining development in the Region is pursued by:

- (a) Establishment of principles for responsible mining and strict enforcement by Aimag administrations with monitoring involving local people,
- (b) Promotion of processing of mining products to increase value-added and local employment opportunities,
- (c) Support for locally based SMEs to be involved in processing and service activities related to mining,

- (d) Exploration of new reserves of mineral resources to ensure sustainable mining-based development, and
- (e) Technology development and adaptation to process mineral resources for value added products and market development for new products.

Southern Region is dominated by extensive livestock activities characterized by large number of livestock per herder family and small livestock population per 100ha pastureland. The Region has small sown area but is relatively suitable for oil crops. Given these conditions, crop production and livestock farming in the Region is further promoted by:

- (a) Intensive or semi-intensive livestock farming at selected locations by ensuring supply of water and feed from outside,
- (b) Processing of livestock products aiming at high end markets of Ulaanbaatar and China,
- (c) Expansion of oil crop cultivation and processing by locally based SMEs, and
- (d) Cultivation of medicinal herbs as livelihood activities of local people and processing thereof as souvenirs for tourists.

Southern Region may capitalize on harsh climate to develop unique opportunities for tourism and also environmental education. These possibilities are pursued by:

- (a) Establishment of a triangle tourism circuit linking Sainshand as a tourism base with museums and other man-made attractions, archaeological heritage and wilderness tourism in the southern semi-desert, and border tourism for shopping etc. in Zamyn-Uud,
- (b) Creation of alternative tourism combining harsh natural conditions with cultural heritage with music, traditional stories, arts and crafts, traditional landscape and cultural heritage,
- (c) Summertime or weekend resorts for visitors from Ulaanbaatar with beautiful sceneries and clear air in Govisumber and Umnugovi, and
- (d) Showcasing state-of-art environmental technology for reuse and recycling and environmental education utilizing steppe and semi-desert as fieldwork venues.

Infrastructure

To support the development prospects in economic aspects, infrastructure should be developed as follows:

- (a) Establishment of ICT industrial estate in the former Russian military base in Govisumber for advanced processing and service establishments capitalizing on the telecommunications backbone,
- (b) Establishment of a clean energy development center for clean coal technology and other advanced energy technology development,
- (c) Expansion of water supply for Choir to support mineral processing and intensive livestock,
- (d) Improvement of road network centering on Mandalgovi to strengthen its logistic and service hub functions,
- (e) Development of road network linking tourism objects distributed in large territory and provision of tourism infrastructure such as hotels, restaurants, parks, toilets and museum at selected locations, and
- (f) Complemental development in steps of the railway and improved access roads to support the logistics in the south of Mongolia.

Urban functions

Urban functions to be strengthened for the three Aimag capitals are summarized below. Of the four Aimag capitals, Sainshand is identified as the regional core city by the urban hierarchical analysis.

Aimag capital	Major functions
Choir, Govisumber	Main logistic center in the south for export and import commodities etc. Automobile repair and service center Clean energy development center ICT industrial estate
Mandalgovi, Dundgovi	Logistic center for distribution and storage of domestic commodities etc. Service hub between Ulaanbaatar and the south
Dalanzadgad, Umnugovi	Logistic center for export to China Base for service and commerce ICT application center
Sainshand, Dornogovi	Logistic and tourism related service center for export and import commodities etc. Showcase for state-of-art environmental technology and environmental education

Institutional measures

The following institutional measures should be taken to support the new economic activities:

- (a) Designation of FTZ in the former Russian military base in Govisumber,
- (b) Preparation for the clean energy center with implementing arrangements,
- (c) Preparation of guidelines for use of water and feed supply provided for intensive or semi-intensive livestock by nomadic herders,
- (d) Streamlining of procedure for border trade at Shiveekhuren Sekhee, Gashun Sukhait and Zamyn-Uud,
- (e) Cooperative arrangements between Aimags for developing and managing tourism triangle and circuit, and
- (f) Development of common brand for products in the Govi area.

6.3.5 Eastern Region

(1) RDV

Eastern Region is developed as the **Integrated Agro-trade-tourism Frontier Region** characterized by extensive and disease-free livestock farming utilizing the vast territory to produce quality meat and dairy products, import substituting crop production for fodder, oil seed and fruits, and border trade and cross-border tourism with Russia and China.

(2) Development strategy and measures

Economic aspects

Eastern Region is economically supported mainly by mining in Dornod and Sukhbaatar and livestock farming in Khentii. Per capita GRDP is high in the mining Aimags and low in livestock Aimag. The Region has large sown area and suitability is high for fodder, oil seed and fruits. It is not suitable for intensive livestock farming as degradation of pastureland has been proceeding. Given these conditions, crop production and livestock farming in the Region is further promoted by:

- (a) Further crop diversification and expansion of production for vegetables, fruits, oil seed and potatoes in Khentii utilizing favorable soil conditions and water availability,
- (b) Cultivation of fruits and vegetables for import substitution with water saving irrigation along the major rivers and application of new technologies such as ICT and trench-type greenhouse,

- (c) Semi-intensive livestock farming and processing into fresh meats and dairy products for urban and export markets, and
- (d) Support for nomadic livestock farming by ensuring seasonal move according to water availability and supplemental feed availability and bringing up new generation herders.

Mining and manufacturing should be pursued as follows:

- (a) Establishment of principles for responsible mining, especially for oil and gas exploration in the border areas, based on economic viability assessment reflecting costs of responsible mining including rehabilitation of mining sites and strict enforcement by Aimag administrations with monitoring involving local people,
- (b) Expansion of light manufacturing industries to produce consumer goods and construction materials supplying Ulaanbaatar by locally based SMEs,
- (c) Establishment of wellness industry utilizing therapeutic mineral springs, medicinal lake and medicinal plants/herbs in Khentii and Dornod, and
- (d) Development of metallic and non-metallic minerals in small scale by locally based SMEs.

Eastern Region has variety of tourism resources and high prospects for border trade. These possibilities are developed as follows:

- (a) Development of nature and wilderness tourism utilizing national parks and forest reserves in Khentii,
- (b) Promotion of heritage tourism based on historical places related especially to the life of Chinggis Khaan in Khentii and based on nomadic and traditional culture and lifestyle in Sukhbaatar,
- (c) Promotion of tourism development in the Ganga Nuur National Reserve (28,000ha) near Dariganga in Sukhbaatar having a variety of resources,
- (d) Promotion of border tourism based on Bichigt in combination with shopping opportunity on the border with a FTZ, and
- (e) Expansion of border trade from Choibalsan through the Khavirga border point to Manzhouli in China for export and the Ereentsav border point to Russia.

Infrastructure

To support the development prospects in economic aspects, infrastructure should be developed as follows:

- (a) Improvement of the Erdenetsagaan - Dariganga road serving the border area and the Baruun-Urt - Bichigt road to improve access to the border area,
- (b) Improvement of water quality and expansion of water supply capacity with new sources for piped water for Baruun-Urt,
- (c) Upgrading of urban infrastructure in Undurkhaan including water supply and sewerage,
- (d) Upgrading of urban infrastructure in Choibalsan including water and sewerage, power, telecommunication and urban roads,
- (e) Strengthening of industrial technology research and development at the Dornod university,
- (f) Internationalization of the Dornod airport, and
- (g) Irrigation development along the Kherlen River and other major rivers in Khentii and Dornod.

Urban functions

Urban functions to be strengthened for the three Aimag capitals are summarized below. Of the three Aimag capitals, Choibalsan is identified as the regional core city by the urban hierarchical analysis.

Aimag capital	Major functions
Undurkhaan, Khentii	Tourism gateway to the east Construction materials supply base
Baruun-Urt, Sukhbaatar	Base for semi-intensive livestock farming and water and supplemental feed supply base for nomadic herders
Choibalsan, Dornod	International logistic and business center Tourism base in the east Dornod University as the research and incubation base

Institutional measures

The following institutional measures should be taken to support the new economic activities:

- (a) Exploration for new mining development by establishing economic viability while ensuring responsible mining,
- (b) Brand development and proactive marketing for integrated Eastern Region tourism,
- (c) Preparation of standard form of contracts with the foreign investors for mining development and monitoring for the performance of mining activities by Aimag administrations and local people,
- (d) Policy support for locally based SMEs to undertake processing of primary products and related services, and
- (e) Comprehensive program for business development including entrepreneurship, incubation service, business support service, financial support schemes and international business promotion.

6.3.6 Capital Region

(1) RDV

Capital Region is developed as the **Advanced Processing and Logistic Base Region** with Ulaanbaatar as a global city with high grade urban functions to support the self-reliant socioeconomic development of Mongolia allowing import and adaption of advanced technology and refined design concepts and the final processing and logistic circle linking Bornuur, Lun, Bayan Onjuur, Bayan and Baganuur in Tuv.

(2) Development strategy and measures

Economic aspects

Capital Region is developed by effectively utilizing complementary characteristics of Ulaanbaatar and Tuv Aimag. Ulaanbaatar will benefit from Tuv by de-concentrating its political, administrative and some economic functions, and Tuv will benefit from Ulaanbaatar offering lucrative marketing opportunities for crop and livestock farming products and commodities supplied from other Aimags. Tuv has large sown area and suitable for intensive livestock and fodder production. Tuv shows more favorable performance by some social indices including low poverty incidence, low IMR and large numbers of vocational students and teachers per 1,000 population. By utilizing these characteristics, further economic development of Capital Region is promoted by:

- (a) Intensive livestock farming combined with increased fodder production for integrated farming to supply fresh meat and dairy products to Ulaanbaatar,
- (b) Research and development for high productivity livestock farming with livestock gene bank,

- (c) Relocation of some public and social service facilities to satellite cities in Tuv to ensure high quality services for residents of Capital Region as a whole,
- (d) Value added final processing of products from other Aimags for export including branding and labelling,
- (e) Technology development and adaptation induced by communications and trade with Russia, China and other countries and their emission with training to share with other Aimags by ICT, and
- (f) Development of high quality tourism facilities including some artificial attractions as the main tourism gateway and base for Mongolia.

Infrastructure

To support the development prospects in economic aspects, infrastructure should be developed as follows:

- (a) Satellite cities development in Tuv,
- (b) Upgrading of roads linking Bornuur, Lun, Bayan Onjuur, Bayan and Baganuur in Tuv,
- (c) Strengthening of telecommunication network linking Ulaanbaatar to Tuv and other Aimags,
- (d) Water supply expansion for Ulaanbaatar and satellite cities by combining the Tuul River and groundwater as sources, and
- (e) Establishment of robust urban structure by improving regional multi-modal transport system effectively linked to improved urban transport network of Ulaanbaatar, which will include effective link between the NUBIA and the railway system and new urban transit system in Ulaanbaatar.

Urban functions

Urban functions to be strengthened or introduces in Ulaanbaatar and three planned satellite cities are summarized as follows. There is no regional core city in this region as Ulaanbaatar is the national capital. One of the new cities in Tuv may be designated as the regional core city in the future.

City	Major functions
Ulaanbaatar	Main political and administrative center as the national capital International business center as a global city Model mega green city with quality urban greenery and amenity Trunk ICT base station and international transport hub linked with neighboring countries and served by advanced urban transport system possibly with subway network
New Zuunmod (formerly AeroCity)	Residential complex for airport employees FTZ Commercial center for import and domestic goods
Maidar EcoCity	New political and religious center High end residential area Recycle oriented ecocity
Zuunmod	Residential complex Commercial center

Institutional measures

The following institutional measures should be taken to support the new economic activities:

- (a) Provision of legal base and administrative procedure for de-concentration of political and administrative functions,
- (b) Designation of airport side FTZ,

- (c) Clarification of water right situations associated with water resources development and supply to the satellite cities and vicinities,
- (d) Institutional strengthening for technology development and adaptation, and
- (e) Cooperative arrangements for establishing the logistic circle linking five towns.

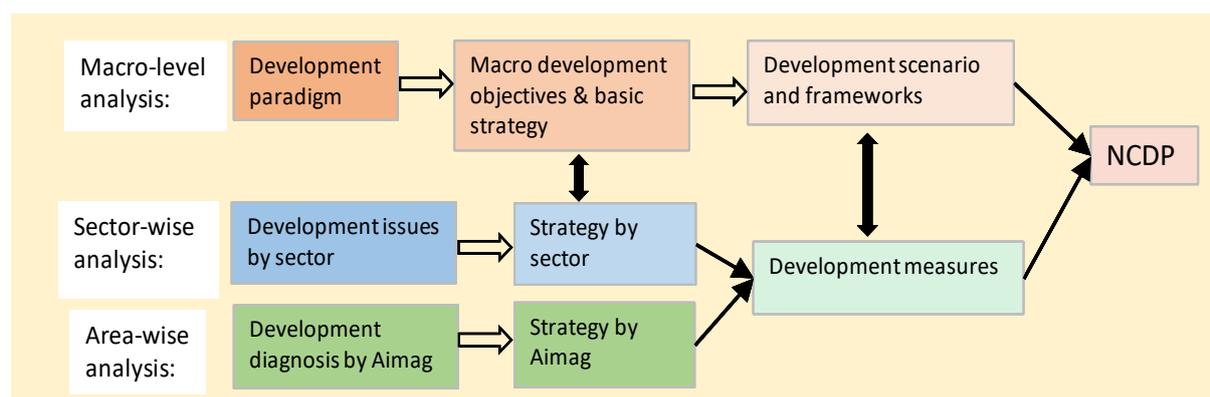
Chapter 7 Development Diagnosis by Aimag

Development diagnosis by Aimag was undertaken jointly by the Japan International Cooperation Agency (JICA) Project Team (JPT) and the Mongolian counterpart (C/P) team of Ministry of Construction and Urban Development (MCUD) and National Development Authority (NDA), starting in March 2019. All the 21 Aimags were covered by August 2019. This chapter explains the purpose and procedure of the development diagnosis by Aimag and presents results by Region as newly defined in Chapter 6. Some statements, however, refer to the present regional division.

7.1 Position and Procedure of Development Diagnosis

7.1.1 Position of development diagnosis in overall planning procedure

The development diagnosis by Aimag holds an important position in the national level and regional level development planning by the JICA project. Formulation of Regional Development Policy (RDP) and Human Settlement Plan (HSP) for the national comprehensive development plan (NCDP) involves macro-level analysis, sector-wise analysis and area-wise analysis. The overall procedure of NCDP formulation is illustrated in Figure 7.1.1 in a most simplified way.



Source: JICA Project Team

Figure 7.1.1 Overall Procedure of NCDP Formulation for Regional Development

At the macro level, macro economy, macro spatial structure with infrastructure, and resource endowments are analyzed to examine broad development directions of Mongolia. Based on these analyses, macro development alternatives are formulated and evaluated by various criteria, and the best alternative is selected for elaboration. Macro development objectives and basic strategy to realize the best alternative are established for Mongolia as a whole, and a development scenario is elaborated.

Sector-wise analysis is conducted under the macro development objectives and basic strategy to establish strategy by sector. As the first step to establish strategy by sector, important development issues are identified by sector first based on existing study reports and other readily available data. These issues will be further clarified through discussions with the Mongolian side and review of other materials during the initial part of the fieldwork, and strategy by sector will be established.

Area-wise analysis is conducted also under the macro development objectives and basic strategy to establish strategy by area. Proper area division depends on administrative structure and other positional and locational conditions of regions. In Mongolia, Aimag seems to be an appropriate unit for the area-wise analysis. Therefore, development diagnosis is conducted by Aimag to examine existing conditions, analyze development constraints and indicate specific prospects for development.

Although JPT deals primarily with the macro (sector) and regional levels, Aimag level analyses and

planning are necessary to derive vision and broad measures for regional development. This is particularly essential since re-definition of regional division has been seriously discussed in Mongolia. Without Aimag level data, analyses and planning, it would be difficult to derive meaningful outcomes at the regional level once regional division is revised.

7.1.2 Procedure of Aimag development diagnosis

In parallel with analysis of existing conditions by sector, existing conditions by Aimag are examined based on statistics, existing study reports and limited discussions with experts. The results are compiled into a preliminary development diagnosis by Aimag as shown in Table 7.1.1 for Khovd Aimag. It examines existing conditions, analyze development constraints and indicate prospects for development at a preliminary level. It contains working hypotheses related to development constraints and prospects

Second, the JPT visits each Aimag for consultation with Aimag and Soum administrations, representatives of residents and private businesses and other local stakeholders in order to verify the preliminary development diagnosis and obtain additional data and information as well as understanding needs and aspirations of local stakeholders. At each Aimag, the preliminary development diagnosis is presented, and some questions raised through the preliminary diagnosis are asked to the participants for clarification. This is followed by group discussions to discuss particularly the problems the Aimag faces that work as constraints to development and development prospects the Aimag has as seen by the participants. Results of the group discussions are presented by group leaders selected in each group. This way, more participants are expected to speak out in a smaller group, and they present more responsible ideas by themselves.

Third, reflecting the outcomes of the first Aimag consultation, specific development programs, projects and related measures will be formulated as part of the NCDP level to realize more promising potentials in Aimag. As a step for project formulation, development diagnosis for selected Aimag is presented in the sub-subsequent sections for eight Aimag. At a later stage of the JICA project, social and environmental effects of proposed projects and related measures will be evaluated at the Aimag level also by a participatory approach. These meetings at the Aimag level should be participated by representatives of all the Soum administrations in the respective Aimag as well as other key stakeholders and serve as public consultation at the local level as required by Strategic Environmental Assessment (SEA) following the legal requirements in Mongolia.

Table 7.1.1 Preliminary Development Diagnosis for Khovd Aimag

Basic data		
Land area: 76,100km ²	Population : 86,400(2017)	Population density : 1.14/km ²
Population growth: 0.60%p.a. (1990-2000); 0.00%p.a. (2000-17)		Urbanization ratio : 34.1%(2017)
GDP structure : Agriculture 43%, Industry (including construction) 19%, Services 38%(2017)		
Land use : Forest 4,674km ² (6.1%) ; Cultivated area 2,257ha (grains 230ha, vegetables 860 ha, potatoes 693ha, fodder 472ha ; 2017)		
Existing conditions		
<u>Natural conditions</u> Mongol Altai Nuur range in middle; semi-desert and steppe in depression dotted with salt lakes and smaller mountains in north and Govi Desert in south Natural resources of ferrous and nonferrous metals, construction materials and fuel, anthracite, iron ore, copper, lead, marble, granite and ochre Large protected areas for rare animals such as argali sheep, ibex, snow leopards, antelope gazelles, jerboas and takhi (wild horses), lakes for many bird species Many rivers without sea outlet disappearing beneath the sands or running into large saltwater marshes Most appealing Aimag with mixture of desert rock, salt lake, snowy peaks and Kazakh culture		<u>Social aspects</u> Multi-cultural population with more than 17 nationalities and ethnicities Labor force coefficient: 62.3% Labor participation rate: 71.0% (10th) Economically active population: 46.5% (15th) High unemployment rate: 13.5% (18th) Ratio of government employees: 15.6% (6th) Mediocre levels of enrollment ratios at primary (11th), basic (8th) and secondary(10th) education Average levels of pupils to teacher ratios at kindergarten (11th), primary (10th) and secondary (6th) education Above average availability of physicians (8th) and

	nurses (9th) Small infectious diseases per 10,000: 59 (3rd)
<u>Economy</u> Low per capita gross regional domestic product (GRDP): MNT3,789,000 (20th) Relatively low labor productivity: MNT9,436,000 (16th) Livestock population per herder household: 438 (8th), per 100ha pasture land: 102 (12th); 44.1% engaged in livestock farming(12th) Main crops: grains, potatoes, vegetables, fodder; famous for watermelon Industrial production value: MNT125.9billion (8th), GRDP share: 38.9% (14th) Large number of establishments at 1,934 (4th), 1,728 private (4th) and 46 large (8th) Food processing and some light manufacturing of building materials Small percentage of loan holders: 28.8% (19th)	<u>Infrastructure</u> Sizable hydroelectric dam project underway Khovd city connected to the Russian power grid Poor quality of roads (19th) Number of vehicles per 100 working age population: 16 (7th) Telephone lines per 1,000: 6 (19th) Water supply points per 1,000 families: 5 (9th) Price of heat energy: 440m2/MNT (9th) Low electricity price: 106kWh/MNT (1st) Ratio of livestock families having electric engine: 89.1% (4th) Highest gasoline price: MNT1,687/liter (21st)
<u>Constraints to development</u>	
Small population of Aimag capital: 29,800 Stagnant Aimag population Large area occupied by national reserves Small number of establishments without much diversity Weak economic structure with low productivity agriculture, small shares of industry and services	Low labor productivity, high unemployment and outmigration rates Ineffective government services, insufficient social services and basic infrastructure Low mortgage ability, lack of capital accumulation
<u>Development prospects</u>	
Khovd city as a center for trade with Russia and the industrial center in Western Region Extensive grazing in combination with specialty crops production Expansion of construction materials industry utilizing rich natural resources with products diversification Center of higher education and research in Western Region specialized in dry land agriculture, biodiversity, multi-ethnicity and cultural diversity by inviting international scholars	Major tourism development based on natural environment, fresh and salt water lakes, mountains, valleys, caves, ancient rock paintings and fortresses Domestic and international tourism and sports hunting as sizable industry Diversification of tourism attractions by featuring traditional dwelling and settlement pattern, dress and other cultural distinctions, literary, artistic, and musical traditions of multi-ethnic people

Sources : Mongolia: Provincial Competitiveness Report 2018, Statistical Yearbook 2017 and other miscellaneous sources

7.2 Development Diagnosis by Aimag in Western Region

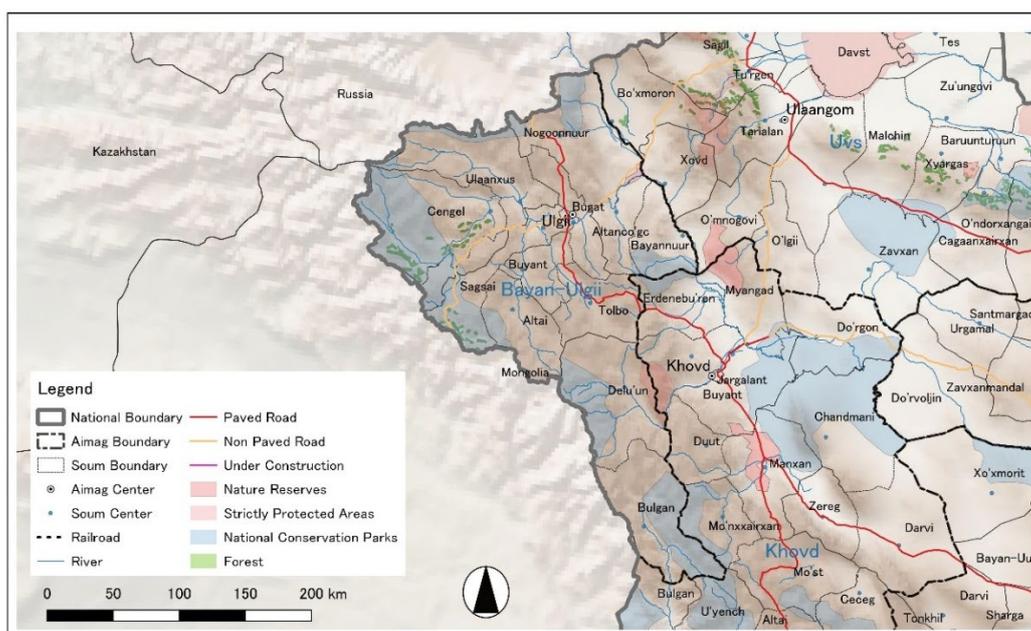
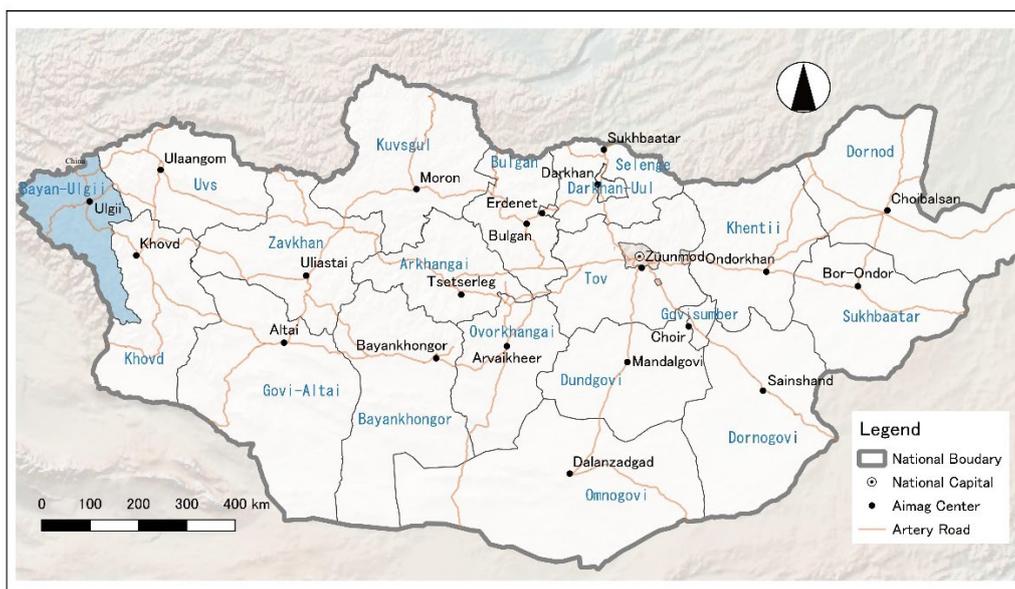
7.2.1 Bayan-Ulgii

(1) Existing conditions

Location and natural conditions

Bayan-Ulgii is a relatively small Aimag with a land area of 48,700 km², located in the westernmost part of the Country with its capital Ulgii located 1,260 km from Ulaanbaatar. The Aimag borders on both Russia and China. Its climate is moderate, but its annual precipitation is extremely low and the average temperature ranges in -4 to 0 degree Celsius. Most Aimag land is occupied by the Altai mountain ranges at elevations higher than 1,500 m above sea level (ASL). Only the northeastern part bordering on Uvs Aimag extends on wide valleys of the Khovd River and its tributaries. Forest areas account only for 10% of the Aimag's land area. The Tavan Bogd of the Altai mountains in the Aimag is the highest mountain in Mongolia, and is the origin of the Khovd River that flows to Khar-Uus Lake in Khovd Aimag.

The Altai Tavan Bogd National Park covers 6,362 km² and is located south of the Tavan Bogd. The park includes Khurgan Lake well known for its beautiful glacier and many species of alpine animals. In rural areas of the Aimag, many nomadic people live maintaining their traditional livelihood practices such as hunting with eagles and producing unique dairy products.



Source: JICA Project Team

Figure 7.2.1 Location and Land Map of Bayan Ulgii Aimag

Socio-economy

The most distinctive social feature of Bayan-Ulgii is its ethnic composition: Kazakhs account for more than 90% of its population and the rest consisting of several other ethnic groups such as Uriankhai, Dorbert, Khalkha, and Tuvans. The Aimag has two official languages, Kazakh and Mongolian, but Kazakh is overwhelmingly dominant unlike the rest of Mongolia.

The population of Bayan-Ulgii has increased recently (2010–15) at 2.76% per annum despite a stagnation from 1989 to 2010 at lower growth rates. According to the questionnaire survey conducted

by the JPT, this change in population growth is said to be due to 1) in-migration or return from Kazakhstan and 2) enhancement of social security such as child allowance.

Although livestock farming is a major economic activity in Bayan-Ulgii, its livestock population was 2,226,100 in 2017, the smallest in Western Region. Among the livestock, sheep and goats are the most popular in the Aimag. Extensive livestock farming is widely practiced in the Aimag as seen from its small livestock population per herder household at 240 ranked 19th of all the Aimags. The total sown area in the Aimag was 1,222 ha, about 10% of Bayan-Ulgii Aimag land having the largest sown area in Western Region. These contribute to low labor productivity and low average wage, both the lowest of all the Aimags (ranked 21st).

Along with livestock, tourism is recognized as a major income source in the Aimag. Bayan-Ulgii is famous for its natural tourist attractions. Especially, many tourists visit the Altai Tavan Bogd Natural Complex Area in the summer located in Tsengel Soum on the western side of the Aimag. The Altai mountains including the Tavan Bogd are also a major tourist spot in Mongolia. About 5,000 tourists visit Tsengel Soum a year to see the glacier, alpine plants, and coniferous forests.

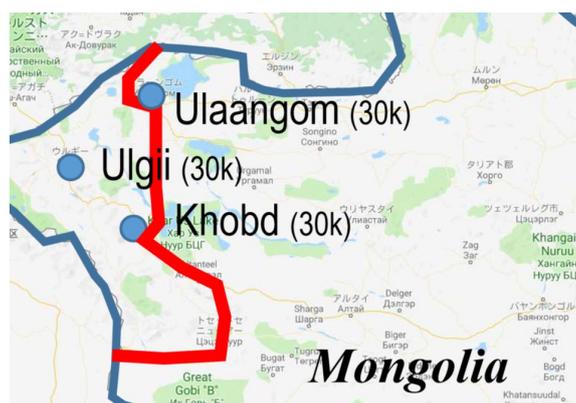
Bayan-Ulgii had 1,512 establishments (ranked 7th all the Aimags) in 2017, mostly private (1,323; ranked 6th) with a relatively moderate number of large (with more than 50 employees) businesses (45, ranked 9th). Also, economic diversity is said to be high in the Aimag (ranked 5th). This implies that while livestock farming is a major economic activity, the Aimag's economy is not dependent exclusively on it. From these, it may be inferred that private businesses for trade and tourism related services are not much influenced by the performance of the mining sector, one of the main industries in Mongolia. However, the share of the industrial sector in the Aimag's economy is small.

The share of economically active population in Bayan-Ulgii is large at 52.5% (ranked 2nd). The unemployment rate, however, is also high at 12.4%. This is related to the small scale of the Aimag's economic activities, especially industry and service sector and corporate activities, as a whole as indicated by the lowest per-capita GRDP, labor productivity, and average wage of all the Aimags. These are the factors that impede the development of the Aimag's agriculture including livestock farming and tourism, thereby hampering the expansion of economic activities.

Spatial development and infrastructure

The urbanization rate in Bayan-Ulgii has been almost constant at around 36% since 2010. This is consistent with the urbanization rates of the other Aimags in Western Region but much lower than the national average at 67.2% in 2017. The lowest GRDP per capita and other indicators as mentioned above are related to the Aimag's low urbanization. On the other hand, it may also be construed that the low urbanization has contributed to the preservation of Kazakh's traditional culture and the stability of their lifestyle as nomads.

Bayan-Ulgii has relatively good road infrastructure with an Asia Development Bank (ADB) -supported road (Figure 7.2.2) to be completed by 2020. The road connects Ulgii to the national border with Russia and the free zone (FZ) in Tsagaannuur in the northern most Aimag. At the same time, ADB is implementing a road construction project between Khovd and Ulgii (Figure 7.2.3), originally scheduled to be completed by September 2019. However, road access to each Soum and tourist sites such as the Altai Tavan Bogd National Park is difficult as it takes a long time to reach them. Also, according to the Provincial Competitiveness Report 2018, the condition of roads in the Aimag is the poorest (ranked 21st) of all the Aimags.



Source: JICA Project Team

Figure 7.2.2 ADB-Supported Road



Source: JICA Project Team

Figure 7.2.3 Signboard of ADB-Supported Road Construction between Khovd and Ulgii

Bayan-Ulgii relies on the grid of Russia for power supply, and the price of electricity from the grid is high. Securing stable and independent energy sources is vital for the people and the development of Western Region. The Aimag has a high potential of hydroelectric dams as it has many high mountains. The construction of a new hydroelectric power plant was planned in the western area of the Aimag a long time ago, but not even a survey or plant design, let alone construction, has commenced.

There are only two water supply points per 1,000 families in the Aimag (ranked 19th). The facilities to provide water is inadequate. However, in the long run, this is not a vital issue for the Aimag because it has plenty of surface water from some large rivers and many small streams, which can be developed for water supply.

(2) Constraints to development

1) Socio-economy

Weak economic structure due to the small share of the industrial sector and the low agricultural production volume is a constraint to the development of Bayan-Ulgii Aimag. The small share of the industrial sector means insufficient capacity to process primary products such as raw meat, leather, and dairy products. Also, the Aimag has not taken advantage of its accessibility to not only the Khovd city, the economic core in Western Region of Mongolia, but also the neighboring countries including Russia and China.

Low self-sufficiency in crops due to the small sown area and production is also a constraint to the Aimag's development. Despite the vast land area, the dominant mountainous topography presents an

inherent constraint. Small scale cultivation of vegetables will contribute to food security together with staple crops (grains and potatoes) and improvement of the local people's health condition.

The weak industrial sector and limited agricultural development of low productivity constrain employment generation. Mining in the Aimag is limited to tungsten extraction at Tsengel. Reportedly, even university graduates do not have much job opportunities. This lack of employment opportunities is likely to reduce the attractiveness of the Aimag. Also, living environment in the Aimag is not up to par in quality as in other Aimag of Western Region, so are medical services.

School enrolment rates and student-to-teacher ratios are reasonable at all the educational levels. However, in remote Soums, there are not enough classrooms. In those Soums, many children move out of their homes and live near their schools away from their parents to receive education.

2) Environment

At the Aimag consultation on June 14, 2019 in Ulgii, poor solid waste management and air pollution in the Aimag center were discussed. Participants at the consultation pointed out pollution of well water by human wastes. Piped water supply in the capital city was improved in 2000, but the quality of water is rather low. In addition, preservation of the Aimag's rich natural environment is important to support the local people's livelihood through tourism development.

3) Infrastructure and others

Dependence on the Russian grid for power supply represents a weakness of Bayan-Ulgii and Western Region as well. Another weakness is that Western Region is located farthest from Ulaanbaatar in Mongolia. Due to the remoteness, some building materials and equipment are more expensive in this region than in other regions. This means that the local people must pay more to build their houses. As a result, it is harder for the people to improve their living conditions in this region than in other regions.

(3) Development prospects

The development of Bayan-Ulgii Aimag should be considered as integral part of the development of Western Region, not depending on the economy and industry of Ulaanbaatar. The ADB-supported road should be utilized as a circular economic corridor linking Russia, China, and Kazakhstan. Ulgii, the capital city, located on this road and linked by the artery road to Khovd should be strengthened to enhance livestock products processing, crop production, tourism promotion, and commodity trade along the corridor.

The road link from China at g on A15 through Ulgii to Tashanta in Russia is considered particularly important for the development of Bayan-Ulgii. The FZ in Tsagaannuur on A306 should be commenced to operate fully in the near future as the core facilities of the surrounding regions for diverse processing and service activities to establish a corridor along these roads. Investments in the FZ by foreign direct investment (FDI) as well as domestic investment should be supported by the Government with microfinancing for locally based small and medium enterprises (SMEs).

Semi-intensive or extensive livestock farming will continue to be major economic activities in Bayan-Ulgii, but more intensive livestock farming should be promoted in selected areas of Aimag. To provide stable markets for livestock farming, livestock products processing should be expanded for meat and dairy products in the near future for local, regional and export markets. Livestock processed products should be diversified in steps for high value products increasingly for export markets including quality halal meat products for the Moslem population.

Semi-intensive livestock farming is combined with seasonal grazing in pastureland. To prevent further degradation of pastureland, rules and regulations for pasture management should be established and monitoring by local administrations and people should be effectively undertaken.

For the crop farming sector, self-sufficiency in basic crops should be realized in the medium to long term. Increase in crop production would be achieved by enhancing intensive farming with improved

on-farm management and agricultural mechanization. Irrigation may be extended in areas along the Khovd river and its tributaries. Production of fruits and nuts should be increased for domestic consumption first and subsequently for export.

There is a high potential in the Aimag for promoting tourism based on the diversity of multi-ethnic groups, traditions, cultures and customs. This is possible as multi-ethnicity is perceived positively by most people according to the Aimag consultation. Promotion of tourism events based on local tradition and culture should be undertaken as exemplified by the eagle festival organized in the Aimag. The Government will be responsible for developing the infrastructure including landfills for solid waste disposal, and access roads to tourist spots as well as enforcing environmental laws. On the other hand, private tourism companies and local communities should make concerted efforts to train local guides and organize events to attract tourists, and also to raise people's awareness on environmental issues.

To secure power supply, construction of a hydroelectric power plant is considered an important option in the long term. The Mongolian Government has set the target share of renewable energy in the total energy use. However, intensive investment in wind or solar power would not contribute to stable supply. To meet peak power demand for diversifying economic activities, a hydroelectric power plant with a pumped storage function is considered to be most effective in stabilizing and adjusting power supply to the demand. As Mongolia has been dependent on coal for energy, the shift to hydropower is consistent with the policy of green infrastructure in the NCDP.

In conclusion, the Aimag should establish itself as an environment friendly Aimag in Western Region of Mongolia. In addition, the Aimag would be instrumental in enhancing its economic relationships with Russia, China and Kazakhstan and contribute to the development of Greater Central Asia in the long run.

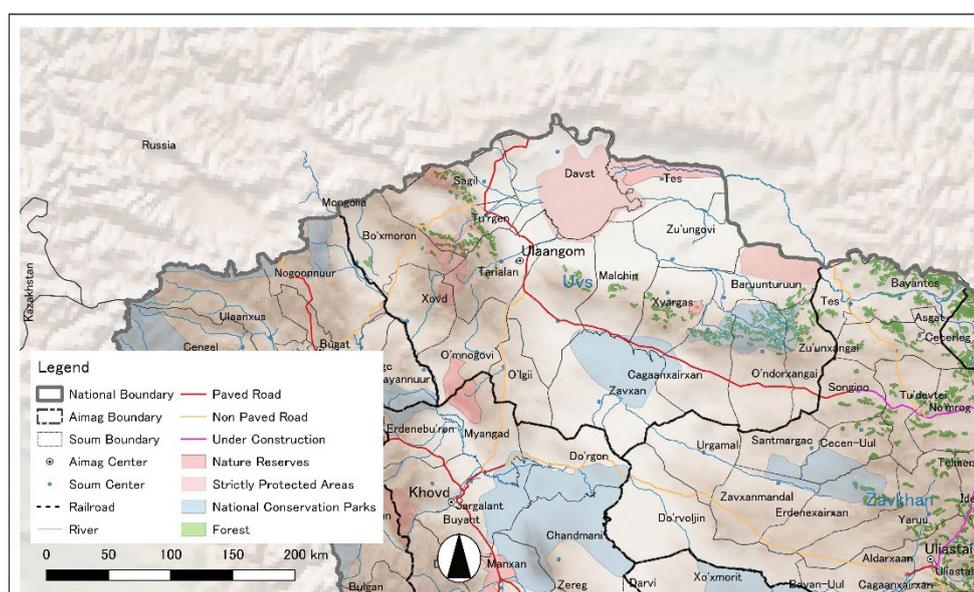
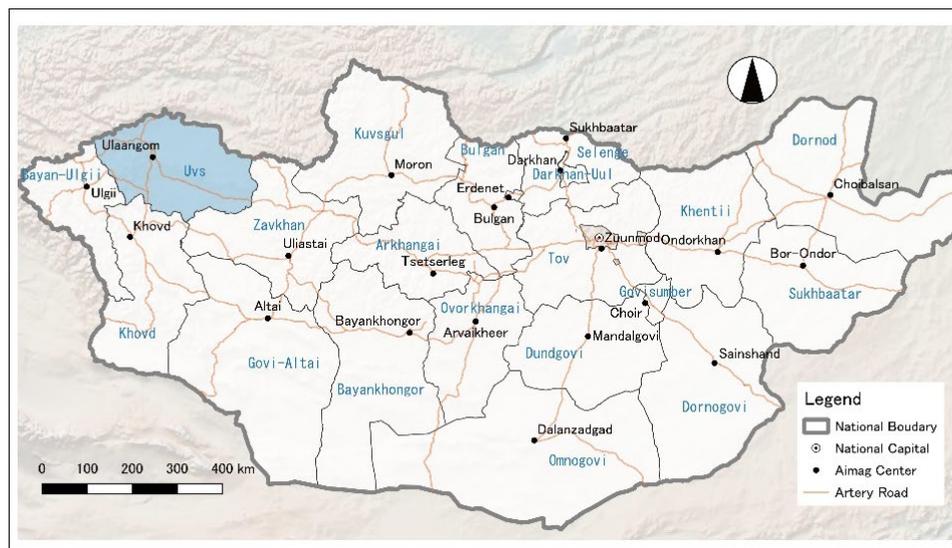
7.2.2 Uvs

(1) Existing conditions

Location and natural condition

Uvs is a middle scale Aimag with land area of 69,600km², located in northwestern Mongolia with its capital Ulaangom located 1,120km from the national capital. The Aimag shares long borders with Russia in the north. Temperature of the Aimag is extremely low except for western side of the Aimag. Also, annual precipitation is relatively low at around 135 mm as a whole. It is situated in dry steppe and desert area with sporadic forest of 1,560km². The average elevation in the Aimag is around 1,000 m ASL.

The Uvsnuur basin consisting of 12 protected areas was listed as a natural World Heritage Site in 2003 by United Nations (UN) Educational, Scientific and Cultural Organization (UNESCO). The basin straddles Russia and Mongolia. The Uvs lake, largest lake in Mongolia with a length of 84 km and a width of 79 km, is located at the center of Uvsnuur basin. The Tes River with total length of 732km flows through Uvs Aimag for 135km into the Uvs lake.



Source: JICA Project Team

Figure 7.2.4 Location and Land Map of Uvs Aimag

Socio-economy

Population of Uvs was 82,604 in 2017 to make population density 1.2/km². The population has been growing in recent years at 2.03% per annum in 2010-2015 after the decrease from 2000-2010 at -1.69% and the stagnation from 1989-2010 at 0.64%. According to the questionnaire survey conducted by the JPT to the participants of the Aimag consultation, this population growth in recent years is due to increase of birth rate by government policy to support social welfare, local economy growth and reduced out-migration.

The economy of Uvs shown in the GRDP structure (agriculture 37%, industry 25%, services 39%) is relatively balanced compared to other Aimags. Uvs had 3,129,900 heads of livestock in 2017 close to average number of other Aimags in Western Region and livestock population per herder household was 350 in 2017 (ranked 15th). Crop production is very popular in the Aimag with 11,775 ha cultivated area as of 2017. This cultivated area is prominent compared to other Aimags in Western Region. Main crops are grains and fodder cultivated in 9,235ha and 1,890ha respectively. Other crops are potatoes and vegetables in 274 ha and 274 ha respectively.

The per capita GRDP was MNT3,818,000 in 2017 ranked 19th, and labor productivity is low at MNT9,427,000 per employee ranked 17th. This situation is in common with other Aimags in Western Region. This may be due mainly to small manufacturing value in the Aimag at MNT14.3 billion ranked 15th, corresponding to only 4.3% of the GRDP ranked 13th. The manufacturing industries have low value-added ratios to make the GRDP share of industry lower.

Uvs has large number of establishments with 1,519 in 2017 ranked 6th, and 1,323 private establishments (6th) and 449 large establishments (5th) exist in the Aimag. Uvs has a moderate level of banking and financial services ranked 9th, and the small number of bank branches with 40 (16th).

The social condition of Uvs is characterized by population consisting of several ethnic minorities. According to the questionnaire survey, the people living in the Aimag tend to want to preserve their tradition and lifestyle actively. Therefore, there are many minority people preserving the nomadic lifestyle or other traditional cultures adopted to the natural conditions.

Uvs has high labor participation rate (LPR), 76.4% in 2017 ranked 4th. On the other hand, unemployment rate is high, 13% (17th). These figures indicate that employment opportunities in non-livestock activities are very limited.

Uvs has moderate enrolment ratios at primary, basic and secondary schools, and pupils to teacher ratios are high at primary and secondary education. Infectious diseases per 10,000 population is 86 in 2017 ranked 9th.

Spatial development and infrastructure

The urbanization rate in Uvs is relatively high at 36.4% in 2017. This rate is higher than the average of 32.8% in Western Region as of 2017, but significantly lower than 67.2 % in 2017 of the ratio in the whole of Mongolia.

Uvs has a good quality of paved road (ranked 2nd) to Ulaanbaatar indicated in transportation index in *Provincial Competitiveness Report 2018*. However, according to the report, the quality of roads and highways in the Aimag is not good, ranked 16th. Also, the road conditions to neighboring on Khovd, Bayan-Ulgii and Zavkhan Aimags are not good at present. Ulaangom, capital city of Uvs, is connected to the Russian border by highway. However, the border function is not well provided.

As well as Bayan-Ulgii, the price of electricity is high in the Aimag as in the rest of the Aimags in Western Region. This is because much of the electricity in the region is provided by the Russian power grid. Unlike Bayan-Ulgii and Khovd, there is less potential to develop new dams due to limited mountain area.

Piped water distribution in Ulaangom serves fresh water to the residents. However, other Soums and Ger area have not been connected to the piped system in most areas. Reportedly, there is a plan for developing facilities to provide fresh water in several Soums. At present, most Soums are using groundwater with high concentration of minerals.

(2) Constraints to development

1) Socio-economy

Small population of the Aimag capital, 30,090 in 2017, works as a constraint to development of the entire Aimag. This kind of constraint is common in Western Region.

The low human development index (HDI), ranked 19th, is one of the serious constraints to socio-economic development for Uvs. From the viewpoint of some indicators on education and health showing moderate levels, the low HDI in the Aimag may be due mainly to low average wage and high unemployment rate.

As represented by the Uvs lake, Uvs is endowed with rich and unique natural tourism resources. Therefore, large areas in Uvs are occupied by national reserves such as National Conservation Park and World Heritage Site. In other words, use of land with natural resources is constrained by conservation needs, affecting kinds of farming and industrial activities as well as tourism industry.

Uvs has a high risk of potential damages by Dzud according to temperature condition as experienced in recent years causing insufficient food and herding opportunities. For the rural area of the Aimag that depends heavily on livestock, it is serious constraint to the socio-economy.

2) Environment

Uvs is one of the areas in Mongolia that have experienced the coldest winter. However, because of climate change, the area of permafrost that contribute to forest conservation and environmental stability has been deteriorated in recent years.

In some Soums, water pollution has been experienced due to outdated water treatment facilities and lack of proper management. In addition to existence of Ger district around Ulaangom, one of the reasons for environmental deterioration may be mining activities utilizing rich mineral resources in the Aimag.

3) Infrastructure and others

Low security of power supply has been a vital issue common to Aimags in Western Region. The dependence for most of the energy on imported power from Russia lead directly to weak energy security of this region. Critical constraint to the Aimag's development is the difficulty in reaching fresh water, especially in Ger and remote areas away from the cities.

The other issue is large distance from Ulaanbaatar. Due to the remoteness, some building materials and equipment are more expensive rather than in other regions. In addition, the accessibility among Soum centers including Aimag centers is not adequate.

(3) Development prospects

The capital city of Ulaangom is located on the ADB-supported road that connects to Russia and China and artery roads linked to Khovd and Ulgii. Taking full advantage of this strategic location, Ulaangom should be upgraded as a center for trade with Russia and the distribution center for construction materials and commodities in Western Region. It is supported by such activities as processing livestock products, development of crop cultivation, tourism promotion and commodity trade in and around the capital city.

A border area with Russia in the north of Uvs has not been developed well; however, according to the questionnaire survey to participants of the Aimag consultation, the people of Uvs has utilized the crossing function at the border town of Borshoo. At present, meat and leather products produced in Uvs have been exported to Russia. The people want to expand the border function further, and also expect some incentives to be provided for the Borshoo border crossing in terms of tariffs, taxes and fees.

Development of a tourism cluster in Western Region linking Uvs, Bayan-Ulgii and Khovd will also be facilitated by the ADB-supported road. Nature tourism in the Uvsnuur basin with the lake is promising in the Aimag utilizing its unique and unspoiled nature in combination with traditional culture. To avoid adverse environmental impact, eco-tourism should be promoted.

Opportunities for intensive livestock are rather limited in Uvs in terms of land suitability, but management of the pastureland and processing of primary products are important for the Aimag development as a whole. Uvs has large amount of fodder production, and land suitable for crop expansion is found around Ulaangom and the road between Ulaangom and Zavkhan Aimag. Therefore, through integration of livestock and crop production, semi-intensive livestock farming should be established in order to meet market demands of international quality and to improve supply of basic food to the residents in the Aimag.

Albeit the largest area of crop cultivation in Western Region, Uvs has a deficit in agricultural produce except for fodder and some fruits. In the short term, self-sufficiency rates should be enhanced through horizontal expansion by utilizing vast farmland to produce diversified crops. In the medium- to long-term future, Uvs should be developed as a center of agro-based industry cluster in Western Region. Several processing factories on agricultural produces, starting with sea buckthorn would be expected to establish in the Aimag for domestic and export markets in Russia and Kazakhstan. Higher value products may be exported to other advanced countries as well.

Self-sufficiency in power supply should be achieved in view of regional security and stable supply for diversified economic activities. Dependence on new coal fired power plants is not desirable. In Western Region, construction of several hydropower plants has been planned since several years ago. These plans should be promoted for sustainable power supply reflecting environmental and social considerations. Integration of power supply network with other regions should also be considered to enhance security further.

Uvs has a large number of small establishments in commerce and service sectors, and the share of tertiary industry is large. These conditions make Uvs favorable for inviting branch offices of firms based in Ulaanbaatar or other major cities. With the Internet connection, remote working may become common in the Aimag. It could lead to interactions with engineers or information technology (IT) experts in Russia, Kazakhstan and China.

Damages by Dzud must be alleviated, for instance, by semi-intensive livestock promotion with proper management of pasture, fodder production and proper farming. The high penetration rate of mobile phones and Internet services in the area are advantages for information and communication technology (ICT) application. In Western Region where natural conditions are severe, ICT use becomes more effective to manage the livestock activities in response to climatic conditions.

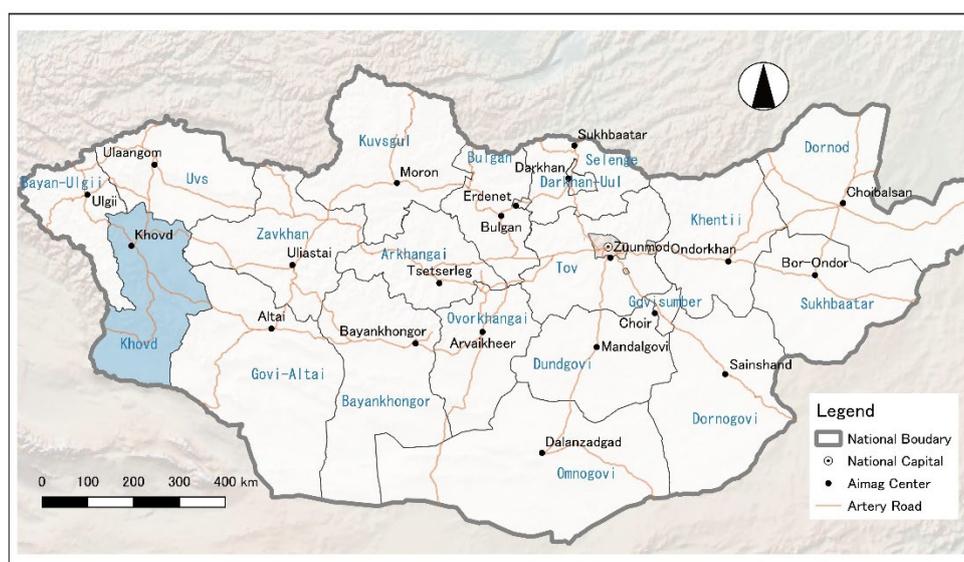
7.2.3 Khovd

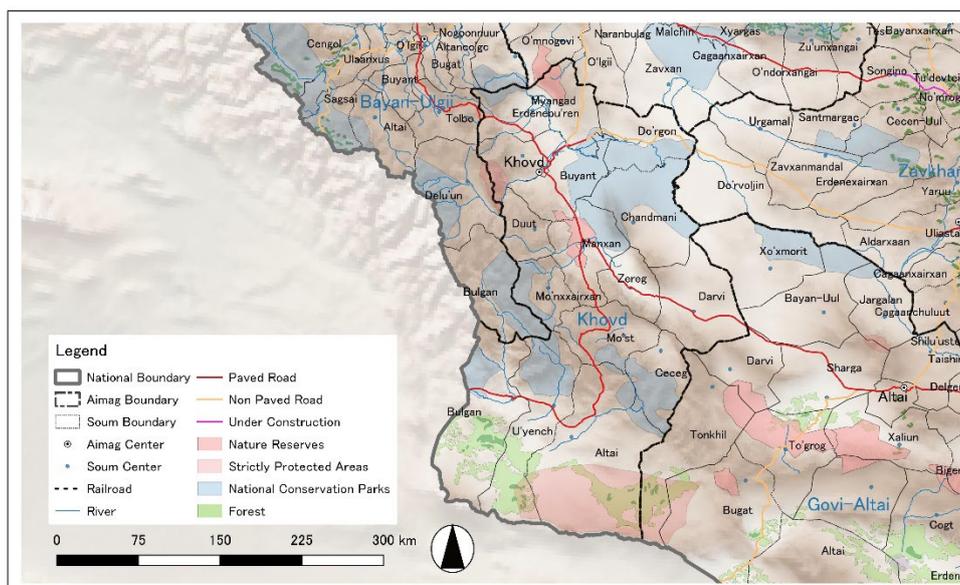
(1) Existing conditions

Location and natural conditions

Khovd Aimag is located in the far west of Mongolia, constituting the border Aimags with the Xinjiang Uygur Autonomous Region of China together with Bayan-Ulgii, with the land area of 76,100km². Its capital Khovd is located at 1,270km by road distance from Ulaanbaatar. It is linked to the neighboring Aimags by A305 to Ulgii of Bayan-Ulgii, by A1701 to Ulaangom of Uvs and by A304 to Altai of Govi-Altai. The link with Uliastai of Zavkhan is weak at present through unpaved roads.

Khovd is divided by the Altai mountains broadly into three areas. The northern area is a depression between the Altai and the Khangai mountains with salt lakes surrounded by semi-desert and steppe, and the southern area is Govi Desert with small rivers draining into China. Many rivers without sea outlet disappear beneath the sands or run into large saltwater marshes. Khovd has large protected areas for rare animals such as argali sheep, ibex, snow leopards, antelope gazelles, jerboas and takhi (wild horses), lakes for many bird species.





Source: JICA Project Team

Figure 7.2.5 Location and Land Map of Khovd Aimag

Socio-economy

Population of Khovd was 86,400 in 2017 to make population density 1.14/km². Population in Khovd Aimag increased slightly after the democratic reform but stagnated in recent years from 2000-2017 due mainly to out-migration to larger cities including Ulaanbaatar. In addition to limited employment opportunities, harsh winter conditions of Dzud during 2000-01 and 2009-10 contributed to the out-migration.

Khovd has multi-cultural population with more than 17 nationalities and ethnicities. Khovd has been settled by people from the neighboring countries of Russia and China and all over the Country for centuries especially during 1700s. Khovd city itself has a long history of 334 years. These peoples co-exist peacefully preserving their traditions and culture, which together constitute the heritage of Western Mongolia.

Khovd is a typical livestock area with respect to livestock population per herder household ranked 8th of all the Aimags and per 100ha pasture land ranked 12th with 44.1% of households engaging in livestock activities ranked also 12th. Crop cultivation is represented by grains, potatoes, vegetables and fodder, and the Aimag is famous for watermelon production.

Khovd has relatively large number of establishments at 1,984 ranked 4th, including 1,728 private (4th) and 46 large (8th) establishments. They are dominated by various service activities. Industrial production value was MNT125.9billion in 2017 (8th), and the industrial GRDP accounts for 38.9% of the total (14th). Food processing and some light manufacturing of building materials dominate the manufacturing industry. The per capita GRDP in Khovd is among the lowest at MNT3,789,000 (20th), and labor productivity is relatively low at MNT9,436,000 (16th).

Labor force coefficient in Khovd is relatively small at 62.3% partly reflecting employment seeking out-migration. Labor participation rate is relatively high at 71.0% due to dominant rural economy with livestock farming. Combined effects of these conditions are small ratio of economically active population at 46.5% (15th) and high unemployment rate at 13.5% (18th).

Khovd is evaluated more or less at average levels by education indices such as enrollment ratios and pupils to teacher ratios. Availability of health personnel in Khovd is relatively high with respect to physicians (8th) and nurses (9th). It is noteworthy that Khovd has small number of infectious diseases per 10,000 population at 59 ranked 3rd of all the Aimags.

Spatial development and infrastructure

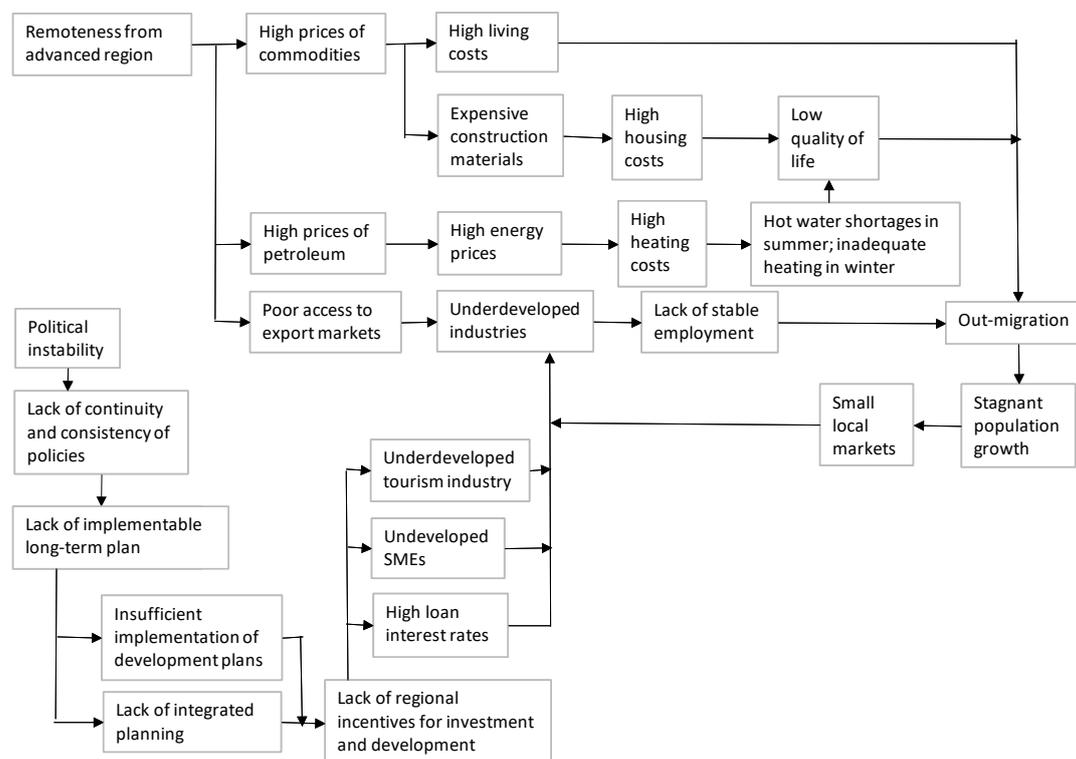
The urbanization rate in Khovd is relatively high at 34.1% in 2017 considering the dominantly rural economy. Although the capital city of Khovd is remote from Ulaanbaatar, it has good access to Russia by the Ulgi and the Ulaangom cities. Access to China is constrained by the Altai mountain range.

Quality of roads in Khovd is evaluated low ranked 19th of all the Aimags, while the number of vehicles per 100 working age population at 16 is ranked 7th due to vast territory. Electricity supply in Khovd still depends partly on import from Russia and China with the Khovd city connected to the Russian power grid. Still the electricity price in Khovd is the lowest of all the Aimags. A sizeable hydroelectric dam project is under way, which will solve the power shortage completely and allow export of excess power to China.

Ratio of livestock families having electric engine is at 89.1% ranked 4th, but Khovd suffers from the highest gasoline price at MNT1,687/liter.

(2) Constraints to development

As part of the Aimag consultation, group discussions were undertaken to identify constraints to development that Khovd faces. Based on the results, a problem structure is constructed as shown in Figure 7.2.6.



Source: JICA Project Team

Figure 7.2.6 Problem Structure of Khovd Aimag

It is seen from the problem structure that many problems are caused by remoteness from the advanced region. High prices of commodities cause high living costs and expensive construction materials resulting in high housing costs. High prices of petroleum cause high energy prices resulting in high heating costs. This in turn causes hot water shortages in summer and inadequate heating in winter. High energy prices and the poor access to export markets are accountable for underdeveloped industries, resulting in lack of stable employment, which is a main factor for out-migration resulting in stagnant population growth. Small and stagnant population mean small local markets.

Many other problems are derived from policy issues. Political instability causes lack of continuity and consistency of policies and lack of implementable long-term plan. This situation contributes to insufficient implementation of development plans and lack of integrated planning. It contributes lack of regional incentives for investment and development.

These two fundamental conditions are responsible for underdeveloped industries. Specifically, they cause undeveloped SMEs, high loan interest rates and underdeveloped tourism industry. This situation in turn results in lack of stable employment leading again to out-migration, stagnant population growth and small local markets.

Several participants in the group discussions raised concerns on water supply: deteriorated piped water supply for Khovd and poor quality of water supplied, low performance of a new wastewater treatment plant (WWTP), lack of awareness for water saving due to low prices of piped water without water meters, and inadequate water supply in rural areas with insufficient number of water kiosks.

(3) Development prospects

Based on the group discussions, development prospects that Khovd has were clarified consisting of immediate possibilities and medium to long term development. Immediate possibilities include the Khovd river hydropower plant, construction of a new cement plant and expansion of existing thermal power plant.

The implementation of the Khovd river hydropower dam and generating plant with 90 megawatts (MW) will completely satisfy the power demand in Khovd for foreseeable future and allow export of excess energy to China. Construction of a new cement plant will contribute to reduction of prices of construction materials and thus housing costs. Expansion of existing thermal power plant will improve the supply hot water in summer and resolve inadequate heating in winter.

In the medium to long term, livestock farming as the main economic activity in Khovd should be upgraded by livestock industrial cluster development, combining semi-intensive livestock farming, integrated farming with fodder production, and total processing of livestock products including high value products for export. Semi-intensive livestock farming combines grazing in natural pasture and feeding with increased fodder production. Processing of livestock products should be diversified in steps starting from dairy products for local market and meat products in urban markets.

To increase production of fodder and other crops, irrigation facilities may be developed in the medium to long term by utilizing rich river water. In view of the current water situations in urban and rural areas described above, a comprehensive water resources and management plan should be prepared first encompassing the Buyant, Bulgan, Khovd and Senkher Rivers.

Participants in the group discussions expressed strong concerns for making Khovd “Green development model Aimag”. Responsible mining will be essential part of this vision. Khovd is classified as low sensitivity area for mining and does not include any strategically significant deposits. Therefore, conditions for responsible mining should be strictly observed when mining development is undertaken.

Tourism development constitutes another important component of green development. Major tourism development is possible combining natural environment, fresh and saltwater lakes, mountains, valleys, caves, ancient rock paintings and fortresses. Domestic and international tourism and sports hunting may be developed into sizable industry. Diversification of tourism attractions may be undertaken by featuring traditional dwelling and settlement pattern, dress and other cultural distinctions, literary, artistic, and musical traditions of multi-ethnic people.

The Khovd city is conceived as a center for trade with Russia and the industrial center in Western Region. Urban functions of the Khovd city should be strengthened as the center of higher education and research in Western Region specialized in dry land agriculture, biodiversity, multi-ethnicity and cultural diversity by inviting international scholars. The city serves as the gateway for tourism in Western Region. Construction materials industry should be further developed in the city by utilizing rich natural resources with products diversification. To support these functions, the Khovd city airport should be upgraded to an international airport.

7.3 Development Diagnosis by Aimag in Khangai Region

7.3.1 Zavkhan

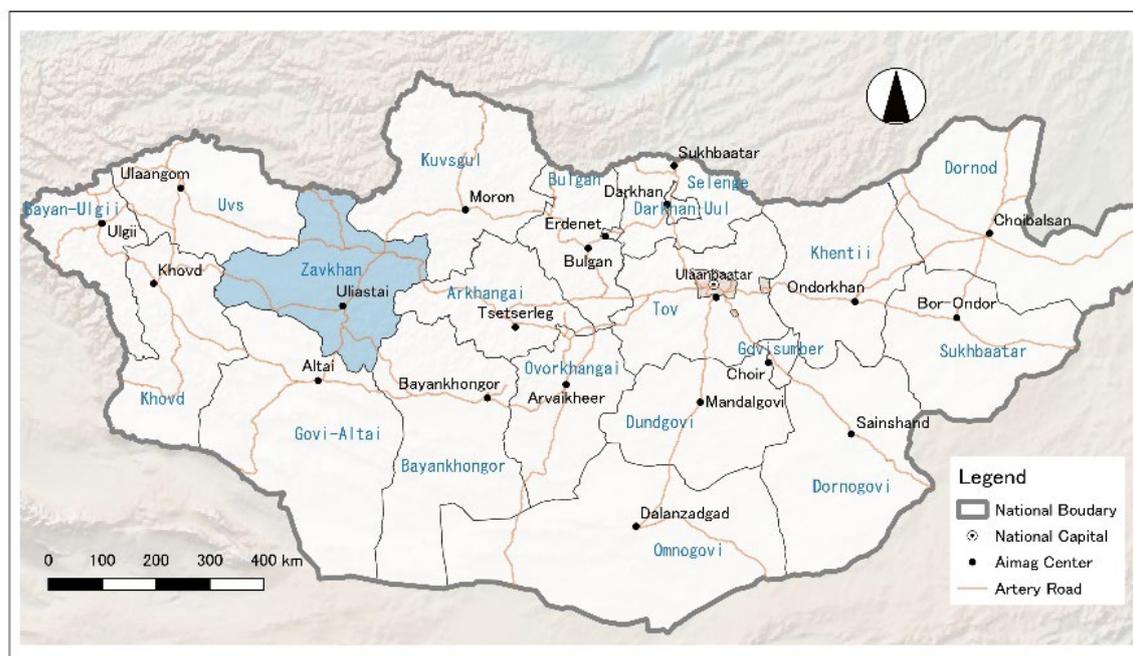
(1) Existing conditions

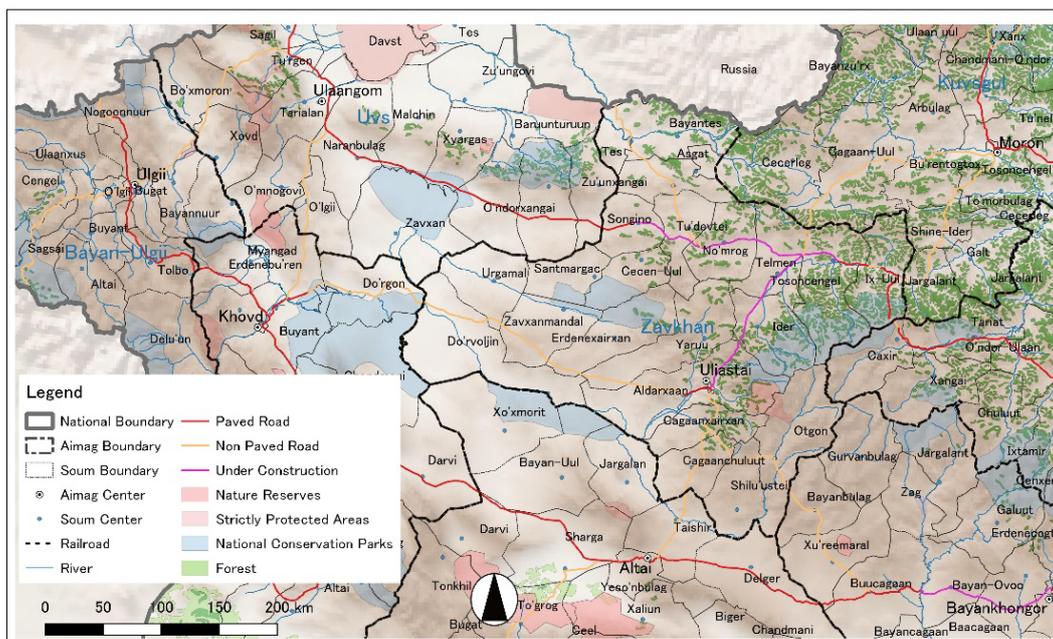
Location and natural conditions

Zavkhan Aimag is located far west of Ulaanbaatar with a land area of 82,456 km² (7th largest of all the Aimags). This Aimag is in the easternmost part of Western Region, as defined by Mongolian national policy, sharing a relatively short border with Russia to the north. Its capital, Uliastai is located about 760 km from Ulaanbaatar. Zavkhan is one of the coldest Aimags in Mongolia: it sometimes snows even in summer. The Aimag's climate is broadly divided into dry steppe in the western and central areas and steppe in the eastern area, and its land is generally covered by short grasses. The average annual precipitation is around 400 mm in the high mountain areas on the eastern side, 80–100 mm in the western area, and 200–260 mm in the rest of the Aimag. The high-altitude range is in the eastern area consisting of part of the Khangai mountains. In the western and central areas, the altitude ranges from 1,000 to 1,500 m ASL.

Although the Aimag has many major rivers in the eastern and southern areas, water resources development is insufficient. The people depend on groundwater, lakes, and springs for potable and domestic water.

The Aimag's ecological zones and deep forests in the eastern area are home to diverse wildlife. A variety of forest, mountain, and migratory birds are found in the Aimag, including rare snowcocks and bobwhites as well as swans, vultures, falcons, and hawks.





Source: JICA Project Team

Figure 7.3.1 Location and Land Map of Zavkhan Aimag

Socio-economy

The population of Zavkhan is 72,104 with its density of 0.87/km² in 2017. The Aimag's population has slightly increased recently (2010–15) at 1.35% per annum, below the national average (2.2%). The growth stagnated from 1989 to 2000, and the population decreased from 2000 to 2010 by 2.48%. According to the questionnaire survey, the changes in the Aimag's population are due to 1) out-migration from the Aimag due to lack of jobs, and underdeveloped industry between 2000 and 2010 and 2) increase in childbirths, improved infrastructure, and increase in household income from 2010 to 2015.

The economy of Zavkhan is characterized by the relatively large share of the service sector accounting for 40% of the GRDP and the small share of the industrial sector (including construction) for 16% in 2017. Tourism activities contribute to the large share of the service sector. The people in the Aimag have taken advantage of the rich natural environment for tourism.

Extensive livestock farming is widely practiced in Zavkhan as seen from its small livestock population, 82 per 100 ha pastureland (ranked 15th). The livestock population per herder household was 394 in 2017 (ranked 11th). According to some participants in the group discussion organized by the JPT on June 18, 2019, livestock has gradually increased in number in recent years and the farmers are trying to keep the trend going.

The value of industrial products in Zavkhan was relatively large at MNT 131.1 billion in 2017 (ranked 7th), corresponding to 41.7% of the GRDP (ranked 8th) in 2017. Of the five Aimag in Western Region, Zavkhan has the highest industrial capacity. This may be due to its proximity to Ulaanbaatar compared to the other western Aimag. Nevertheless, the Aimag's per capita GRDP in 2017 was low at MNT 4,421,000 (ranked 14th) and labor productivity was also low at MNT 9,490,000 (ranked 15th). This reflects the relatively low influence of industrial activities on the Aimag's economy.

There were 1,284 establishments in Zavkhan in 2017 (ranked 11th), of which 1,062 were private (ranked 11th). Of the private establishments, only 27 were large (ranked 17th). SMEs promotion in the Aimag has stagnated due to its small market capacity and lack of entrepreneurs. Easily available inexpensive products imported from China also contribute to the stagnation.

The total sown area is 1,863 ha in the Aimag, about 17% of Zavkhan Aimag having the largest sown area in Western Region. The cultivated areas for major crops such as grains, potatoes, vegetables, and

fodder are balanced in terms of land area. However, self-sufficiency in produce is not high in Zavkhan because shortages can be made up with crops harvested in Zavkhan.

Unemployment rate in the Aimag is low at 4.4% (ranked 2nd). Labor force coefficient and economically active population are 74.5% (8th) and 48.7% (9th), respectively. However, according to some participants in the group discussion, there are many unemployed people in the Aimag, who do not report their employment status to the Aimag government. Therefore, the situation of employment and job opportunities in the Aimag needs to be examined carefully and accurately. In 2017, the average wage in the Aimag was MNT 635,000/month (ranked 15th), and economic activities were not much diversified (ranked 19th).

Spatial development and infrastructure

The urbanization rate in Zavkhan is low at 22.4% in 2017. The population of Uliastai, the Aimag capital, was 16,265 in 2017.

Uliastai and Altai (the capital of Govi-Altai) are located in the middle between Russia to the north and China to the south. As pointed out by participants in the group discussion, the north-south axis is expected to play an important role in spatial development of the Aimag in the future. According to the *Provincial Competitiveness Report 2018*, the Aimag's roads are relatively good in quality (ranked 9th), but the development of arteries such as north-south and east-west corridors is insufficient as the Aimag is connected only to Altai to the south at present. The east-west road to Khovd and Ulaanbaatar is far from being convenient, and some of its sections have yet to be paved.

The Aimag has only one water supply point per 1,000 families (ranked 19th). According to the questionnaire survey by the JPT, while the Aimag has surface water potential as there are some rivers and lakes, its water supply capacity is inadequate not only for the residents but also for the livestock. Also, the water quality is not good in the whole Aimag, and especially the Govi region has serious water supply problems.

The price of electricity is high in the Aimag as in the rest of the Aimags in Western Region. This is because much of the electricity in the region is provided by the Russian power grid.

(2) Constraints to development

1) Socio-economy

The capital city of Uliastai does not have enough population to drive the Aimag's economy. The small population has been a barrier to the development of the Aimag's industrial sector. Given the population size, it is difficult to establish an industrial cluster even for processing primary products for local market, much less, producing commodities marketable outside the Aimag. Also, due to the population size, there are a limited number of markets in the Aimag. A case in point is seaberry (sea buckthorn), a well-known, typical local fruit of the Aimag. Albeit its marketing potential, it is difficult to develop value-added products using the fruit as there is no market outlet nor processing factory.

Low agricultural productivity is also a constraint. Deterioration of agricultural machinery is one of the reasons for the low productivity. Agricultural cooperatives established during the planned economy era are not functioning at present, and fund for repairing or replacing old machinery cannot be established. Also, it has become difficult to implement intensive agriculture with the cooperation of farmers.

Livestock farming faces a similar situation. Meat products are sold at lower prices (about US\$3/kg) than the international average (about US\$5/kg) due to the defunct agricultural cooperatives and the lack of market information and cooperation as well as lack of reliability of the products.

In part of the western and southern area in the Aimag, deterioration in pastureland has been in progress. Not only overgrazing, but also a climate change causing the change of permafrost may be factors for the deterioration.

The industrial sector has yet to be developed in the Aimag due to its underdeveloped infrastructure, lack

of policy to support related activities, and so forth. The lack of large establishments and weak local SMEs also constrain the Aimag's development.

The most critical constraint to the development of Zavkhan is stagnated population growth. If the population remains below the level to make provision of social services feasible, the deterioration of the service industry in the Aimag may proceed and it will become difficult to ensure the commodities and services necessary for life.

2) Environment

In the group discussion, some participants indicated that the effects of global warming are the causes of environmental deterioration such as Dzug and snow damages. These problems pose an inherent constraint to the Aimag development. Desertification in the southwestern area is a matter of concern as well.

3) Infrastructure and others

Still another constraint to the Aimag's development is the difficulty in reaching the capital city from remote areas due to the surrounding mountains. To deal with this constraint, however, an exorbitant budget would be required for road improvement. The condition of the road to Russia is poor, albeit its importance to link with the country as recognized by the residents. That aside, the conditions of most roads within the Aimag are not good. Most Soums do not have good access roads to the Aimag center.

Poor living environment drives people away regardless of urban or rural areas: unless they feel comfortable living there, they will not stay there. For example, despite being one of the coldest Aimag, the diffusion of central heating is still quite low in rural areas of Zavkhan.

Some participants in the group discussion pointed out other constraints related to the Aimag's development: 1) unstable Aimag administration policy and lack of national policy on regional development, 2) lack of proper land management for efficient usage for livestock farming, and 3) high prices of commodities due to distance from the national capital

(3) Development prospects

Although Zavkhan Aimag at present is in Western Region, linkage with Murun in Khuvsgul Aimag of Khangai Region should be strengthened in the short-term future. This linkage is expected to contribute to the development of a tourism cluster with Khuvsgul Aimag, and at the same time, improve accessibility to Ulaanbaatar from Uliastai, for which a prerequisite is to improve the road condition between Uliastai and Murun.

In the medium to long-term future, connectivity with Altai in Govi-Altai Aimag to the south and Khovd in Khovd Aimag to the west will become important for Zavkhan. By improving connectivity with Altai, the relationship with China and Russia will be strengthened, contributing to the establishment of a part of vertical axis. Zavkhan, located on the national east-west corridor, should enhance its linkage with the economic zone in Western Region covering three secondary cities, Khovd, Ulgii, and Ulaangom, taking full advantage of its location as a transition point to and from Ulaanbaatar. The capital city of Uliastai should strengthen its urban functions to provide more effective links between Ulaanbaatar and Western Region as a whole for complementary provision of necessary infrastructures including those related social services and administrative functions.

Many participants in the group discussion responded in the questionnaire survey that pursuing the mining industry development would be unnecessary in the Aimag. In accordance with this, rather than depending on mining, Zavkhan should develop export-oriented products through processing primary agricultural products. Also, a cement factory and a construction material factory should also be built.

Application of ICT to livestock farming is important in Mongolia as a whole. In the central area of Zavkhan, integrated circuit (IC) tags have been introduced in livestock management except for horses. By this, each animal's history (e.g., lineage, birthplace, health record, etc.) can easily be traced, reducing the chance of improper sales of its meat. This will facilitate determination of appropriate market prices

of livestock products for retailers, wholesalers, and farmers. Generally, livestock meat produced in Mongolia is said to be high in quality because livestock animals feed on a variety of pasture. Because of proximity, Zavkhan has a potential to expand the export of livestock meat to the Russian and Chinese markets in the future.

In recent years, the number of tourists in Zavkhan has increased gradually. There are many tourist attractions such as beautiful dunes and lakes in the Aimag. The eastern area of Zavkhan should be included in the development of the Khangai tourism cluster consisting of Kharkhorin, Tsetserleg, and Bayankhongor. Unlike other western Aimag such as Bayan-Ulgii and Uvs, it might be pragmatic that Zavkhan would focus on the target of domestic tourists rather than foreigners. In the process, it would be necessary to expand existing tourist facilities (e.g., campsites) in the Aimag and to cooperate with the other cities in the cluster.

Mongolia has a great advantage in developing ICT applications because of its high nationwide penetration of mobile phones and Internet services. For livestock and agriculture, a drought forecast and alarm system to provide the farmers with accurate and reliable information on possible droughts will be effective in mitigating drought damages in the Aimag. The same applies to Dzud as well. Also, ICT should be fully utilized to improve the quality and reliability of agricultural products with a certification system.

7.3.2 Khuvsgul

(1) Existing conditions

Location and natural conditions

Khuvsgul Aimag is located in the northwest of Ulaanbaatar with the land area of 100,629 km², 6th largest of all the Aimag. The Aimag's land is divided into three regions: high mountain, low mountain and forest steppe. Its capital Murun is 779 km away from Ulaanbaatar by road distance.

Within Mongolia, the Aimag is well known for its rich natural environment as represented by Lake Khuvsgul and large forest areas. The Aimag has the largest forest area of Mongolia accounting for 35.4% of total land area of Aimag. Of the forest area, 90% comprises larch forests and remaining 10% consisting of pine and other species. Khuvsgul Aimag has around 400 rivers and streams, including the Ider, Tes and Bugdgeen Rivers. There are around 300 large and small lakes.

As for fauna, there are 35 different species of 31 different types, 13 different families and 5 different orders of mammals inhabit in Khuvsgul Aimag. Many animals include furbearers like fox, wolf, moose, bear, steppe fox, musk deer, boar, deer, antelope, sable and marmot. Many bird species are found in Khuvsgul including vulture, lammergeyer, snowcock, hawk and endangered species of birds like stork, whooper swan, wild goose, duck, osprey, oceanic white-tailed eagle, Asian godwit, great black headed gull.

The number of establishments in Khuvsgul is relatively large with 1,648 in 2017, ranked 5th, and 1,398 private establishments, ranked 5th. It is noteworthy that the number of large private enterprises is at 78, ranked 1st, due mainly to activities of tourism, agriculture and livestock, and food processing according to the group discussion in Khuvsgul. Wool cleansing and meat processing also exist.

LPR of Khuvsgul is relatively low at 68.8% in 2017 ranked 14th. This is due to seasonality of tourism sector and lack of job opportunities including SMEs. Unemployment rate is moderate level at 8.5% in 2017 ranked 10th.

Khuvsgul has relatively high enrolment rates at primary, basic and secondary schools, and pupils to teacher ratio is high at secondary education. Health indicators show poor situations in Khuvsgul. For instance, average estimate of life expectancy in 2017 was 66, ranked 21th.

Spatial development and infrastructure

The urbanization rate in Khuvsgul is relatively low at 32.2% in 2017. The Aimag capital of Murun had population 39,407 in 2017 increased at the annual average rate of 1.38% during 2010-17.

Murun is located along the east-west road linking Ulaanbaatar and Ulaangom in Uvs Aimag. Khuvsgul has relatively good road network throughout the Aimag, but access to rural areas has not been improved except the access to tourism areas around Lake Khuvsgul. The road infrastructure between Ulaanbaatar and Murun has been partly degraded. Murun has the airport with regular flights to Ulaanbaatar. The Aimag has the only port in Mongolia, that is Hatgal port in Khuvsgul Lake. The port works for transportation of goods and pleasure boats for tourism.

Basic infrastructure such as energy, access to clean water and waste management is identified as the moderate level. Life basic infrastructure such as consumer goods supply and large service center are relatively good, ranked 2nd and 3rd, respectively.

(2) Constraints to development

As part of the Aimag consultation, group discussions were undertaken in four groups. Most serious constraints on development identified by three out of the four groups are: 1) low human index indicators, 2) weak health infrastructure, 3) lack of tourism policy and plan, and 4) overgrazing.

The lowest human development index is one of the serious constraints to development for Khuvsgul. Particularly, health infrastructure such as basic health infrastructure is insufficient, and number of people per physician and nurse indicate inadequate health services availability. The weak health infrastructure may adversely affect not only peoples' health but economic activities in Khuvsgul. Health indicators such as life expectancy ranked 21st, infant mortality rate (IMR) at ranked 21st and infectious diseases at ranked 16th are extremely low in 21 Aimag.

As represented by Khuvsgul Lake, Khuvsgul Aimag is endowed with natural tourism resources. However, there is no integrated tourism policy and plan to preserve the nature for sustainable tourism. As a result, the recent increase in number of tourists has caused deterioration of natural environment. Moreover, local people could receive only limited economic benefits from tourism, since current tourism is organized and conducted mainly by tourism agencies in Ulaanbaatar. Despite abundant tourism resources, the tourism sector in Khuvsgul provides the limited benefits to local people.

Livestock farming is one of the main economic activities in Khuvsgul. The number of domestic animals has increased already beyond the sustainable level, given the limited pastureland. Many participants of group discussions expressed strong concern on the degrading pastureland due to overgrazing and lack of livestock policy. Also, participants of group discussions pointed out inadequate forest management and use of forest resources limited to handicrafts without use of waste materials. Poor quality of water supply in some Soums and inadequate solid waste management in tourism areas were also raised at the group discussions.

(3) Development prospects

Khuvsgul has a variety of mineral resources including metallic minerals such as gold, copper and molybdenum and non-metallic minerals such as phosphate, coal and graphite. As many participants at

the Aimag consultation expressed, however, Khuvsgul will pursue “No-mining Aimag”. This is sensible as most mineral resources are endowed in forest areas. Mining activities may be limited to extraction of non-metallic minerals in small scale.

As priority sectors, Khuvsgul should focus on tourism, agriculture and livestock and forest-oriented activities. These sectors should be promoted in a sustainable manner under the integrated green development policy and plans. The Aimag should pursue the eco-friendly model based on the natural resources.

Based on the comparative advantages such as rich nature, tradition and access by air transportation, various type of tourism has the potential in Khuvsgul. The Aimag could provide diversified and integrated tourism such as nature tourism, wellness tourism, cultural tourism and other forms of alternative tourism to make differences as the major tourism destination in Mongolia. Community-based sustainable tourism should provide the common basis in pursuing various forms of tourism so that local people will benefit without leakages of tourism benefits to Ulaanbaatar and other regions. Furthermore, local agriculture and livestock could supply fresh fruits and vegetables, meat products, processed cheese, local beer, and honey for tourists.

In the vast forest, international tourists could enjoy nature experiences and some adventures as well. Bird watching would be particularly attractive for European tourists. A wide range of options should be offered for accommodations including international class hotel in the base town of Murun, cottages for long stay tourists, and Gel houses.

The livestock sector should manage the number of domestic animals at the sustainable levels and focus on processing of livestock products for value addition. By taking advantage of large number of animals, Khuvsgul will produce both meat and dairy products, and fresh meat and dairy products will be supplied for the urban markets in Erdenet, Darkhan-Uul and elsewhere as well as for tourists.

Conservation and effective use of the rich forest resources are of utmost importance for the Aimag development. A comprehensive resource inventory may be undertaken to assess forest resources and identify potential raw materials for non-wood forest products, and a master plan may be prepared for optimal use of forest resources in medium to long terms including the optimal levels of tourism development. Certain large-scale tourism development may be allowed in line with the master plan on the condition that part of revenues from it should be utilized for community infrastructure development as well as forest conservation.

7.3.3 Arkhangai

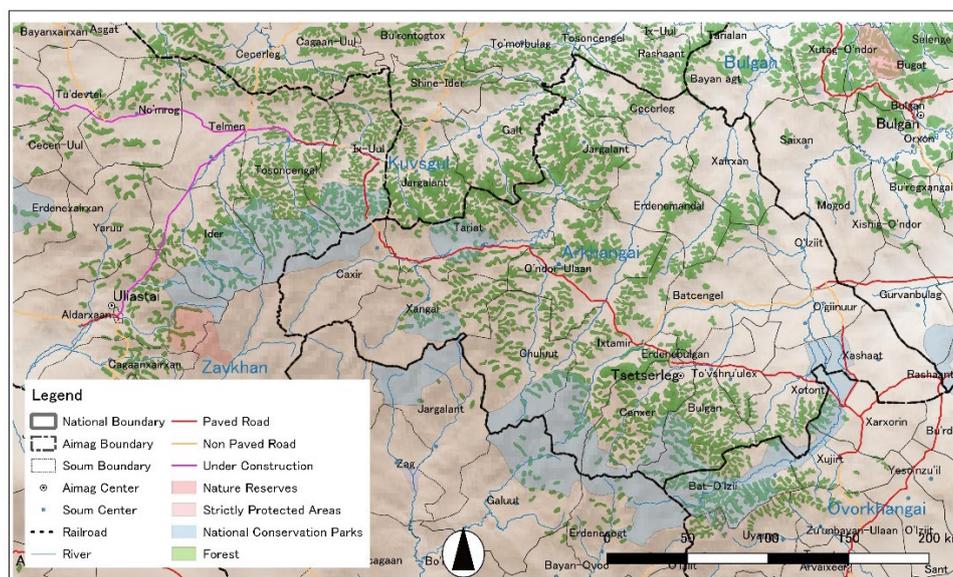
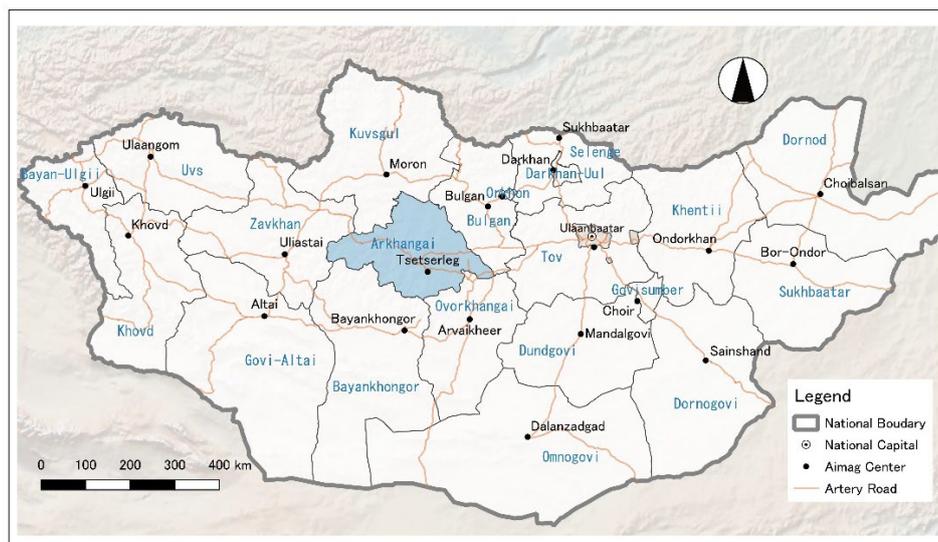
(1) Existing conditions

Location and natural conditions

Arkhangai Aimag stretches over the northern slope of the Khangai mountains. The north-south distance is about 260km and the east-west distance is about 350km. Most of the Aimag land is mountainous. The mountainous areas with the altitude from 2,500m to more than 3,000m stretches east-west in the southern part of the Aimag and the land gently slopes down northeast to the altitudes of 1,300 to 1,400m along the border with Bulgan Aimag. The provincial capital Tsetserleg is situated at about 1,700m in altitude. The Kharlagtai peak with the altitude of 3,529m is the highest point in the Aimag.

The Tamir River flows near Tsetserleg toward east and merges the Orkhon River flowing from the south at the altitude of 1,290m, which is the lowest point in the Aimag. The Chuluut River and Khanui River in the north run northward and merge the main Selenge River. Most of the Aimag area belongs to the forest-steppe area. There is a popular tourism spot in the northwest called Terkhiin Tsagaan Nuur Lake.

The rainy days in 2018 were 132 days, which was third place after Erdenet and Bulgan in Khangai Region, while the annual precipitation at 296 mm was the second after Erdenet.



Source: JICA Project Team

Figure 7.3.3 Location and Land Map of Arkhangai Aimag

Socio-economy

GRDP of Arkhangai was MNT431 billion in 2018, which was 12th in Mongolia, maintaining the same rank as in 2010. Per capita GRDP at 1,428,000 in 2010 at 18th grew to MNT4,487,000 per person in 2018, slightly having upgraded the rank to 17th place. While the economic structure in 2010 was 59% agriculture, 13% industry and 28% service, that in 2018 was 54% agriculture, 22% industry and 24% service with the agriculture playing the dominant role. The rank of agriculture value added rose from 5th in 2010 to second in 2018.

Livestock is the main activity of agriculture. The number of animals at 5,482,000 in 2018 was 2nd, having risen from 3rd in 2010. The number of animals increased by 105% from 2010 to 2018, which was slightly higher than the national average at 103%. The numbers of animals per person were 32 (5th) in 2010 and 57 (5th) in 2018.

Livestock is the main activity of agriculture. The number of animals at 5,482,000 in 2018 was 2nd, having risen from 3rd in 2010. The number of animals increased by 105% from 2010 to 2018, which was slightly higher than the national average at 103%. The numbers of animals per person were 32

(5th) in 2010 and 57 (5th) in 2018.

Monthly wage at MNT621,000 in 2018 was 62% of the national average and third lowest among all the Aimags.

The population of Arkhangai has been decreased at 1.5 % per year from 2000 to 2010, but the trend reversed since then with the average annual growth rate at 1.7 % per year until 2018.

Unemployment rate in 2018 was 5.2%, which was fourth from the lowest after Tuv (2.6%), Zavkhan (4.3%) and Dundgovi (5.0%). The poverty rate in 2018 was 38% at 15th place. These facts indicate relatively low unemployment, but lower level of income.

While the number of crimes increased from 458 in 2010 to 519 in 2018, those per 1,000 population remained at 5.4 incidents.

Spatial development and infrastructure

Tsetserleg, the Aimag capital of Arkhangai, is situated 488 km west of Ulaanbaatar and connected with Ulaanbaatar by National Highway A0301, A0601 and A0602, all asphalt road. Tsetserleg is the relaying point for Western Region to Ulaanbaatar. National Highway A0603 (asphalt) starting at Tsetserleg runs toward west, changes to A1102 (under asphalt paving work) and reaches Uliastai with a distance of 533 km from Tsetserleg. A31 (soil and improved soil) and A305 (asphalt) run toward further west reaching Orgiy in Bayan Olgii Aimag, with a distance of 1,044 km from Tsetserleg.

Electricity in Arkhangai Aimag is supplied by the Central Power System with the total installed capacity of 1,100 MW. There is no power plant and central heating system in Arkhangai.

The number of telephone lines decreased from 589 in 2010 at 21th to 409 in 2018 also at 21th. The number of water stations increased from 22 in 2010 to 34 in 2018. As a result, the number of people covered by one water station decreased from 3,823 in 2010 (17th) to 2,823 in 2017.

(2) Constraints to development

There are a number of constraints for development in Arkhangai such as loss of traditional culture, low level of industrial and service development, unfavorable business environment, human resources and infrastructure.

Arkhangai was ranked 19th in terms of the level of traditional culture and nomadic lifestyle not being lost. This illustrates that Arkhangai people tend to view traditional nomadic life negatively, although livestock is the most important economic activity in Arkhangai. It would be important to turn the people's negative perception to a positive one through making the livestock activities more attractive job, especially for young people. Success of any effort to promote livestock-related activities hinges upon people's positive way of thinking and attitude.

Arkhangai was assessed as having the least balanced or diversified economic structure in 2018. Heavy dependence on the primary sector, mainly livestock, in Arkhangai is accompanied by low level of industrialization and business development, indicating weak base for the development of the secondary and tertiary sectors. A number of weaknesses that could hamper industrial and business development include: ease in doing business (18th), licensing requirements for business well understood and easily accessible (21st), fairness and transparency of local tender process (21st), fairness of competition in business (21st), and accessibility to opportunities to engage in private business (17th). In financing, difficulty in accessing finance (17th) and high bank loan interest rates (21st) are the serious constraints.

There seems to be a lack of strong initiative by local government to lead development in cooperation with local community as shown by transparency of decisions and policies of local government (21st), budget expenditure being influenced and determined at a local level (21st) and policies and decisions adopted by local government contributing to province development (15th).

People's behavior and mind-set were cited as a constraint for development by participants in the Aimag consultation. People become lazy as a result of government social welfare policy of spoon feeding the people. Alcoholism is also observed. From the human resource perspective, there is a lack of qualified engineers (19th), low entrepreneur skill (18th) and low foreign language skill (19th). It was

pointed out in the Aimag consultation that the types of vocational training provided at vocational schools emphasizes the theoretical aspect, therefore are not able to equip graduates with the practical skills to meet the needs by companies.

On the government side, inconsistency of policies affected by four-year political cycle hampers steady development of the Aimag. Infrastructures such as clean water (19th), heating system (16th) and heating price (21st) are also the constraints.

(3) Development prospects

High economic dependence of Arkhangai Aimag on livestock activities is an advantage for economic growth. The challenge would be to shift its economy from the current simplistic production practices producing limited value added to a more process-oriented production practices generating higher value added. A livestock industrial cluster could be promoted for this purpose with core facilities in the Aimag capital Tsetserleg and the Khotont Soum located along the Tsetserleg-Kharkhorin road. There already exists a wool scouring plant in Khotont, where wool from western and central Aimags are processed. Sub-centers may be established in four Soum centers of Erdenmandal, Battsengel, Ogiyunuur and Hashaat to the north of the main road once the access roads are improved.

These four Soum centers are preliminarily proposed in consideration of their locational advantages such as relatively flat topography on the northern side of A0602/03, downstream locations for lower risk of polluting further downstream, easy access to river water and present road transportation hub function serving the surrounding areas. Raw materials provided by the hinterland such as meat, milk, wool, cashmere and animal skins are processed at these industrial cluster centers, transported to Ulaanbaatar and other locations within Mongolia and foreign countries and sold to markets for domestic consumption and export.

A simple calculation indicates an order of production size at around 150 animals processed in a day at one industrial cluster center as shown below.

- Number of animals: 5,482,000 in 2018 in Arkhangai
- 5% processed annually assumed
- 274,000 animals processed per year
- 750 animals to be processed in a day as a total of Arkhangai
- 150 animals to be processed at one location in a day

The issues subject to further detailed analysis are an economically rational size of production, appropriate number of livestock industrial cluster centers and vertical division of roles in the production process in relation to distance to market. Infrastructure should be upgraded for these locations including access road, power and heating supply, water supply, sewerage and solid waste management. Proper environmental management would be a prerequisite for establishing livestock industrial clusters. As the advanced livestock Aimag, Arkhangai could start a new taxation system on animal ownership as a means to control the number of animals and prevent overgrazing.

It is proposed that fodder production and integrated farming be introduced in the hinterlands of these industrial clusters to supply raw materials. Arkhangai has already experiences in fodder and cereal production. Fodder crops production in 2018 was 5,817 tons, which was third in Mongolia after Tuv and Selenge. Its land productivity of fodder at 2.7 tons/ha was, however, 12th and 25% of Ulaanbaatar where the land productivity was highest in Mongolia at 10.6 tons/ha in 2018. Arkhangai was 5th in the sown area of cereals in 2018, while it was 10th in its harvest, indicating low land productivity of cereal production in Arkhangai (0.96 tons/ha at 11th place compared to 3.13 tons/ha in Orkhon, which was the highest in Mongolia in 2018). There should be a big room for improving the land productivities in Arkhangai in consideration of fertile chernozem soil covering most of the Aimag area and the availability of river water.

Tourism could be promoted in Arkhangai capitalizing on precious natural assets such as Terkhin Tsagaan Nuur (White Lake) located about 170 km northwest of Tsetserleg as experience and community type tourism linking it to nomadic tradition of Mongolia. Crop production taking advantage of water and

fertile soil and prevailing livestock tradition for integrated farming could be promoted targeting the tourism industry as the market for fresh vegetables and fruits.

ICT could be introduced in various ways such as mutual information transactions between herders and administration, tele-medicine, distance education, weather resistant farming practice and semi-intensive and intensive livestock activities and tourism information provision. An idea would be to “bring a city to people” instead of “bring people to a city”. New generation herders could grow from this initiative.

Box	
<u>Skin and hide production: preliminary estimate of contribution to GRDP and requirements for land and water</u>	
<u>An example of raw skin and hide production’s contribution to GRDP</u>	
a) Amount of raw leather:	42 kg per head of cattle
b) Price:	US\$ 1.5 per kg
c) Number of cattle:	124 thousand cattle =20% of 621.2 thousand in 2018 in Arkhangai
d) Total sales:	US\$ 13.0 million or Tg 32,599 million <i>a)*b)*c)</i>
e) GRDP:	Tg 430,740 million in 2018
f) Contribution:	7.6% <i>d)/e)</i>
<u>Land and water requirement</u>	
a) Area required per head:	100 m ² per head of cattle
b) Number of cattle:	124 thousand per year or 340 heads per day to be processed
c) Total area required:	34,000 m ² or 3.4 hectares as the land area required
d) Unit water requirement:	26.9 m ³ per day per 1,000 m ² (data in Japan)
e) Total water requirement:	914 m ³ per day
Implications:	
<i>(i) Contribution of skin and hide production would be much greater if other animals are considered.</i>	
<i>(ii) Contribution would be much greater if products are processed more.</i>	

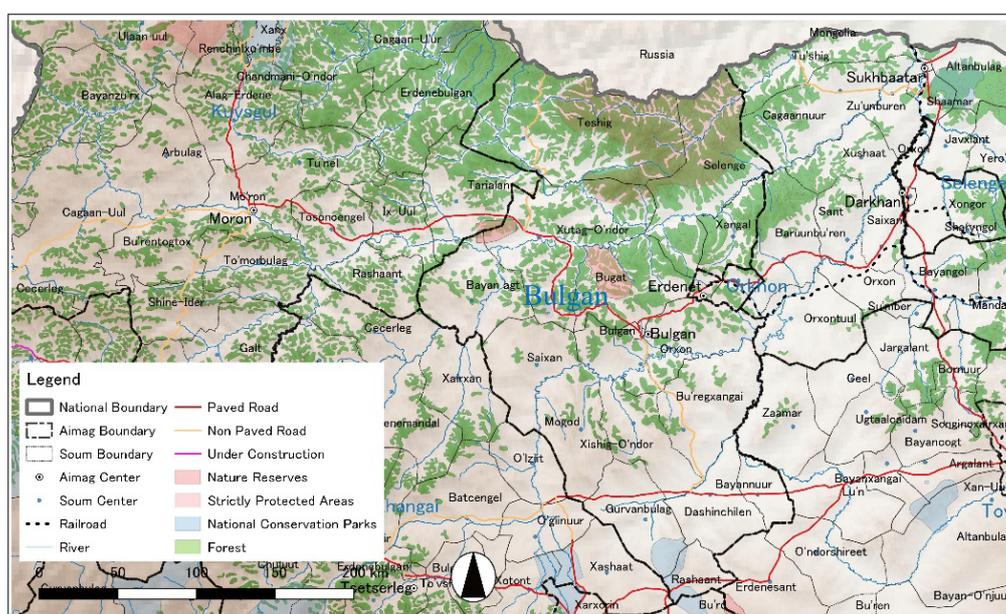
7.3.4 Bulgan

(1) Existing conditions

Location and natural conditions

Bulgan is relatively small Aimag with land area of 48,700km², located in the northeast of Khangai Region with its capital Bulgan located 280km from the national capital. It is situated largely in mountainous area mostly belonging to the Khangai mountains. In the north area of the Aimag, large forest area exists. The average temperature in the Aimag is between -0.9 to -1.6 degree Celsius. The annual precipitation is in the range of 300-350mm. The main rivers are the Orkhon and the Selenge Gol, both of which enter the Aimag from Uvurkhangai Aimag. Therefore, the center to south area of the Aimag is favorable for cultivation.

The forest area covers 19,050km² (39.1%) and most of the area is located middle to north side of the Aimag. In general, most of the forest area in Mongolia is designated as protected forest. In Bulgan, commercial forest is only 7% of whole forest area.



Source: JICA Project Team

Figure 7.3.4 Location and Land Map of Bulgan Aimag

Socio-economy

Population of Bulgan was 61,300 in 2017 to make population density 1.26/km². The population in Bulgan has been growing in recent years at 2.37% per annum in 2010-2015, despite the decrease at -1.20% per annum during 2000-2010. The recent growing trend of the population is due to 1) decrease of out-migration from the Aimag to large cities such as Erdenet and Ulaanbaatar, 2) in-migration from western Aimags such as Uvs, and 3) development of infrastructure, living environment and recovery of employment opportunity in the Aimag.

The economy of Bulgan is dominantly agriculture with the share of agricultural GRDP 50.9% in 2017. Bulgan had 974,000 heads of livestock in 2017 ranked 8th. Livestock population per herder household was 396 in 2017 ranked 10th. Compared to moderate livestock activities, cultivated area is the third largest in Mongolia with 48,559 ha. Crop production is popular in Bulgan taking advantage of good soil and climate condition as farmland. Main crops are grains cultivated in 42,993ha (the largest area

in Khangai Region). Other crops are fodder cultivated in 288ha, potatoes and vegetables.

The per capita GRDP was MNT4,607,000 in 2017 ranked 10th and labor productivity was MNT10,211,000 in 2017 ranked 11th. Both of them are moderate among the 21 Aimags. According to the questionnaire survey conducted by the JPT, stagnation of the productivity is due to dominant extensive livestock and insufficient number of factories to process livestock production.

Bulgan has limited number of establishments with 1,186 in 2017 ranked 13th, and 1,008 private establishments (13th) and 30 large establishments (14th) exist in the Aimag. These figures indicate the underdevelopment of industrial sector. The weakness of industrial sector is a factor causing high unemployment rate at 10.7% (14th).

In social aspects, enrolment rates of primary, secondary and tertiary education in Bulgan are the lowest in all the Aimags. However, pupils to teacher ratios at primary (ranked 5th) and secondary (ranked 5th) education are favorable. These statistics seem simply to indicate the lack of primary, secondary and tertiary schools. According to the questionnaire survey, many children in the Aimag are educated in Erdenet or Ulaanbaatar due to low quality of Bulgan education.

On the other hand, quality of health services in Bulgan is relatively high as a whole. Infectious diseases per 10,000 is 77 ranked 7th and IMR is low at 11 per 1,000 ranked 7th. The service and quality of health centers and hospitals are good due to preventive measures, early diagnosis, medical training, etc. in the Aimag.

Spatial development and infrastructure

The urbanization rate in Bulgan is very low at 19.8% in 2017 reflecting dominant rural economy. Also, the low urbanization indicates a large number of nomadic people and people being engaged in agriculture. Therefore, telephone lines are moderate at 10 per 1,000 ranked 11th and access to information is the lowest of all the Aimags.

Bulgan has a good quality road infrastructure connecting to Erdenet, Darkhan and the national capital as well as Murun in Khuvsgul Aimag (quality of roads ranked at top). Also, there are no problems for transportation between Ulaanbaatar city and the Aimag

Bulgan is in the mediocre position in water stations and access to clean water. In the Aimag, garbage and waste issues have been managed appropriately (ranked 4th) compared to other Aimags.

(2) Constraints to development

1) Socio-economy

The very small population of Aimag center presents a kind of constraint to development of Bulgan. This constraint leads to small number of establishments without much diversity. In rural area, primary industries such as agriculture and livestock are well developed. However, due to small capacity for industrial sector in the Aimag center, there is a difficulty to produce a value-added processed product.

The small GRDP share of service industry is also a constraint. Bulgan may be at the transition stage from dominantly rural economy to urban-oriented activities represented by processing primary products and commercial activities. High capacity of primary industry has not been able to lead up to the development of industrial and service sector so far. This may be due to not only limited mining activities, but also inadequate education environment and small number of engineers. These conditions may cause many kinds of constraints for social and economic aspects, leading to out-migration of the population in the future.

2) Environment

Environmental deterioration risk is relatively low in Bulgan compared to other Aimags. However, the north area and part of the south area have high risk of Dzud that is in common in the north area in Mongolia.

3) Infrastructure and others

Condition of technological infrastructure such as access to information is the lowest in the whole of Mongolia. This means that the local residents in the Aimag do not have easy access to local general information. Bulgan is ranked the second lowest regarding media, which indicates the local media is not perceived as fair, timely and accessible. These are largely due to dominant population in rural area.

(3) Development prospects

Bulgan is basically an agricultural Aimag having agricultural GRDP over 50% and low urbanization rate. Despite the relatively undeveloped secondary and tertiary industries, the Aimag has moderate GRDP per capita compared to other Aimags in Mongolia. This implies that productivity of primary sector is relatively high due to large-scale crop farming and efficient livestock farming.

Rather than depending on mining and heavy industries, Bulgan may become a model Aimag for non-resource intensive and environment-friendly economy, which characterize the alternative socio-economy pursued by the NCDP. To resolve the present high unemployment rates, labor intensive industries should be expanded based on primary products. To increase and diversify value added products, intermediate and alternative technologies must be introduced for products development in line with the idea of alternative socio-economy.

In the short term, it is important for Bulgan to increase agricultural productivity by promotion of agricultural mechanization and development or restoration of irrigation facilities, and further improve food self-sufficiency. In the medium to long term, it would be desirable for the Aimag to start exporting processed surplus crops to the neighboring Aimags and Russia.

Integrated farming should be promoted by combining more intensive livestock and high productivity crop farming, linked with processing industries in the Aimag capital and along the artery roads. Both primary and processed products will find markets in the capital city and other larger nearby cities such as Erdenet.

Bulgan is located along the artery linking Ulaanbaatar and Murun and beyond through Erdenet. A major tourism and trade corridor are conceived along the road, possibly linked also to the Bryard Republic of Russia. Bulgan is in the best position as a transit city providing tourism and trade related services. Along the corridor, facilities such as “Michi no Eki” (rest area found along roads and highways in Japan) or processing factories would be provided as a base for promotion of tourism, trade and manufacturing.

Bulgan has a large forest area which may work as a constraint to development. However, utilizing commercial forest, high-quality wood product such as insulation material or furniture may be produced as part of industrial diversification.

To suppress out-migration to the capital area or other large cities, social development is important as well. The quality of the health sector has been good in Bulgan, but education in general has been inadequate. Therefore, enrollment rates in Bulgan should be improved at all the educational levels. Further, it is necessary to carefully listen to the residents, as community issues are directly connected with the local livelihood activities. In particular, it may be difficult for the voices of nomads to reach the Aimag’s administration. Therefore, it is also important to strengthen community facilitation by such means as residents’ associations supported by ICT.

7.3.5 Selenge

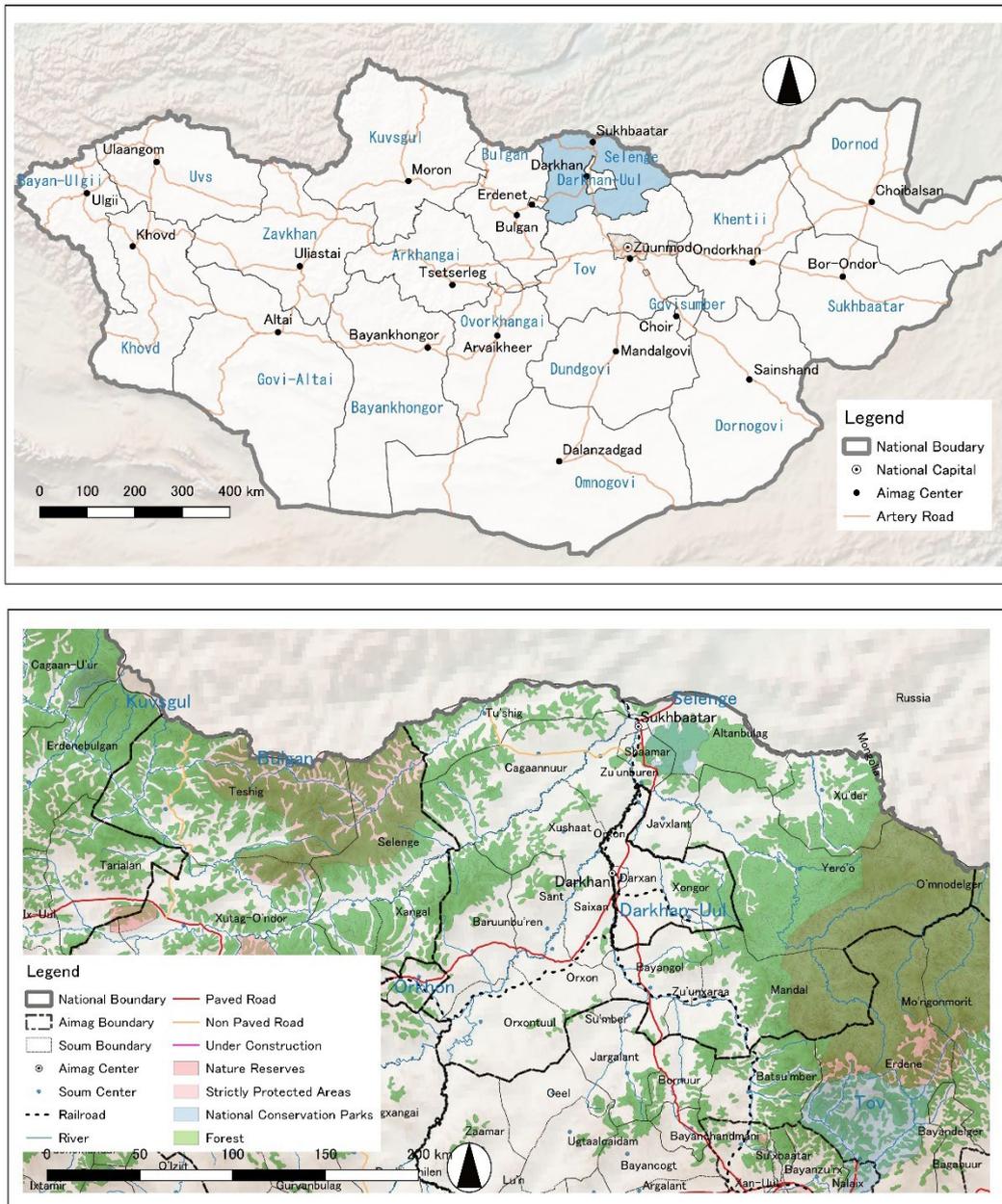
(1) Existing conditions

Location and natural conditions

Selenge Aimag with an area of 44,500 m² is situated in the central northern area of Mongolia bordering on Russia. It extends over a valley zone between the Khangai mountains in the west and the Khentii mountains in the east with the altitudes of 600 to 1,200 m in the lower areas, lower than the national average of 1,580 m ASL. The surrounding mountains are higher close to 1,600 m ASL.

The Selenge River, the largest river in Mongolia, runs in the middle of the Aimag in the southwest to northeast direction ultimately flowing into Lake Baikal in Russia, whose southernmost point is about 180 km away northwest from the provincial capital Sukhbaatar. It has a catchment area of 447,000 km² and average discharge volumes of 23 m³/sec in February and 601 m³/sec in August. The Orkhon River runs south north and merges the Selenge River in the west of Sukhbaatar. It is 1,124 km long, the longest in Mongolia, and has a catchment area of 1,124 km² and an average discharge at 66 m³/sec.

Most of the Aimag area belong to forest-steppe climatic zone except some steppe zones in the central southern part. The Aimag is largely covered by fertile chernozem soil suitable for crop production. Annual precipitation at 357 mm in Sukhbaatar in 2017, the third highest in Mongolia, while the number of rainy days at 125 days was 5th.



Source: JICA Project Team

Figure 7.3.5 Location and Land Map of Selenge Aimag

Socio-economy

The population in Selenge has been consistently increasing at the average rate of 0.75% per year since 1990 until 2017 except the 2000-2005 period when it decreased at 1.0% per year. The rate of population increase tended to rise since 2005: 1.3%/year (2005-10), 1.7%/year (2010-15), 1.9%/year (2016) and 2.0%/year (2017). Since the rates of population increase by natural factor (births minus deaths) did not change much at a range of 1.2% to 1.7% per year, migration must have affected the population trend more. While outmigration had been outnumbering in-migration resulting in net outmigration until 2009, this trend reversed somewhere in around 2010 and since then Selenge has become a net in-migration Aimag. It was pointed out in the group discussions with Aimag and Soum representatives held on April 24, 2019 that there have been herders migrating from Western Region such as Uvs and Zavkhan recently. They migrate to Selenge because of the proximity to market and good pasture lands. Most of them are poorly educated and unskilled.

Poverty rate at 36% was 12th in Mongolia. Some group discussion participants pointed out that the lives of Selenge people are generally good owing to crop farming, and it should be poorly educated and unskilled migrants from the west, who are contributing to raising the poverty rate and unemployment rate in recent years.

Crop production is the main economic activity in Selenge. The total sown area at 157,000 ha in 2017 accounted for 40% of that in Mongolia. The proportions were high for grain (40%), vegetables (31%) and fodder crops (33%). The Selenge's position is even stronger in terms of harvest with grain and vegetables accounting for 64% and 38% respectively of the total harvest in Mongolia. Naturally yields are higher in Selenge: 0.96 tons/ha for grain (Mongolia 0.61 tons/ha), 12.1 tons/ha for vegetables (9.8 tons/ha) and 72 tons/ha for potatoes (8.0 tons/ha). These higher crop productivities of Selenge within Mongolia are, however, still low by international standard. The average yield of wheat in the world was 3.5 tons/ha 2017, while that in Japan in 2018 was 4.0 tons/ha, ranging between the highest in Hokkaido at 4.6 tons/ha and the lowest in Osaka at 1.2 tons/ha. The yields of vegetables in Japan ranged from 35 to 54 tons/ha for cucumbers, eggplants, tomatoes and green peppers in 2018. There is a big room for Selenge to increase its crop production through productivity improvement.

The industry sector accounted for 53% of the Selenge's GRDP in 2017, followed by service at 28% and agriculture at 19%. This fact illustrates that value added generated by crop production in Selenge is still low. Processing of crops and livestock products would be the main activities of the industrial sector.

While per capita GRDP at MNT5,290,000 in 2017 was 7th in Mongolia, the gap with that of Orkhon, the highest per capita GRDP Aimag, expanded from 2.1 times in 2010 to 3.3 times in 2017.

Spatial development and infrastructure

The urbanization rate in Selenge was 37.2% in 2017 at 8th place. Other than Ulaanbaatar where all the people live in urban areas, there were 16 Aimag where the urbanization rates declined from 2010 to 2017. Selenge also experienced a decline in the urbanization rate from 49% in 2010 down to 37% in 2017, which was the largest decrease among the 16 Aimag. This is presumably due to the return of part of the population to rural areas to engage in farming activities. The sown area in Selenge increased by 42% during this time. There should have been no impact of livestock activities on the urbanization rate, because the number of herders decreased by 7% during the same time.

Selenge is served by relatively good road infrastructure. The national road passing in the middle of the Aimag in the north-south direction, classified as A0401, A0402 and A0403 from the south, reaches Ulan Ude and Lake Baikal in Russia. It was agreed in 2016 by the three governments of Mongolia, China and Russia that this route be connected to Asian Highway No. 3. A lower level road network is developed in the south-western part of the Aimag with the altitudes between 700m and 1,000m, where farming activities are active around the Orkhon River and the Kharaa River, connecting such towns as Buren, Sant, Orkhon and Orkhonuul. The National Railway (MTZ) linking Russia and China through Ulaanbaatar also passes through the Aimag.

Selenge is in the mediocre position in water stations and telephone lines with the average population

covered by a water station at 1,470 (11th) and the number of telephone lines per 1,000 population at 10 (12th). Selenge ranked 10th in terms of the expenditure on construction and capital repair per capita at MNT1,177,000 per person for the total of 2015, 2016 and 2017.

(2) Constraints to development

The rich natural environment in Selenge Aimag with rivers, mountains and forests is exposed to threat of degradation for a number of causes. The increase in the number of animals brought in by herders from the west has resulted in increased incidences of overgrazing and degradation of the soil and destruction of farmlands and planted trees. Recent climate change has caused desertification, especially in Altanbulag, Mandal, Javhlanat, Orkhon, Orkhontuul and Saikhan, more incidences of forest fire and extreme weather, hotter summer and colder winter, as pointed out in the group discussions. Damages on the environment are caused by human activities as well such as illegal gold mining reducing river flow and killing fish and illegal logging of forest trees.

The opportunities for technical skill development are decreasing in Selenge Aimag. The number of vocational training school students decreased by 67% from 2,352 in 2010 down to 773 in 2017. The training opportunities for the teachers also declined from 121 to 61 during the same period. There are problems on the supply side such as closure of one vocational school, unsuitable locations of vocational schools, abolishment of allowance at MNT70,000 per month, educational program not matching the needs of the society, old teaching method and poor performance of teachers due to low salaries and unfavorable working environment. The allowance system will be resumed in 2020 as heard at the group discussions. Some young people prefer to go to vocational schools in Darkhan.

In terms of general education, Selenge is ranked rather low with enrollment rates at primary education ranked 19th, secondary education 19th and tertiary education 16th.

There are divided views concerning health services in Selenge. The statistics show both the IMR and Under-Five Mortality Rate (UFMR) declined in Selenge from 2010 to 2017: IMR from 6.8 to 11.0 per 1,000 thousand live births and UFMR from 10.6 to 15.1, while those in Mongolia improved in the same period. Some group discussion participants explained that the declines of these indicators were caused by increasing population and their behaviors. The immigrants from the west, who are largely poorly educated, may be pushing up IMR and UFMR. The need for improving health services in Selenge still lies in such aspects as health education, awareness raising, equipment and the number of health workers, while there are some positive views to assess health policies and services as improving and equipment being renovated well.

The constraints hindering further expansion of crop production include lack of irrigation facilities, limited application of green houses, lack of supportive policy and regulations, limited introduction of cutting-edge technologies, inadequate and old equipment, and inadequate sales channels.

A number of constraints that hinder business development as pointed out during the group discussions are low rates of labor participation and economically active population, which might result in a shortage of labor, out-migration of skilled labor, tax evasion weakening the financial base of the Aimag administration, unfair competition, lack of finance skills, inadequate banking and financial services, and high bank interest rates.

(3) Development prospects

A tendency in development planning in Mongolia is to distribute all kinds of elements to all Aimags and Soums in response to their requests without proper prioritization. Everybody wants to have everything. This tendency should be improved to a planning practice with distribution of key elements according to appropriate priorities. With this idea in mind, merging of Selenge Aimag and Darkhan-Uul Aimag is worth consideration as the basis for planning and development of Selenge Aimag. The two Aimags are geographically contiguous and share the two major rivers of Selenge and Orkhon, and therefore have similar natural and geographic conditions.

While Darkhan has been one of the major industrial agglomerations in Mongolia, Selenge Aimag is the leading crop producing Aimag. Development in the coming decades should be planned and promoted

by taking advantage of the mutually complementing strengths of these two Aimags. Crop production is the strength of Selenge and its further development could be promoted hand in hand with the strengthening functions of Darkhan as the dissemination center of new farming technologies utilizing ICT, Artificial Intelligence (AI) and Fifth Generation (5G).

Crop production will continue to be the leading economic activity in Selenge. As seen already, the productivities of crop production in Selenge are high within Mongolia, but lower than those in other countries in the world. There is a big room for increasing crop production by productivity improvement. Water saving irrigation utilizing the water of the Selenge River and the Orkhon River for high value-added crops such as vegetables and fruits would be promising. An integrated system for crop production, storage and processing should be developed in steps as the production increases with high productivity.

Since the water of these two rivers ultimately flow into Lake Baikal, the largest freshwater lake in the world and a UNESCO world heritage site, the amount of irrigation water intake and water quality of agricultural drainage should be carefully managed. Utilization of grey water generated in urban areas is also worth serious consideration. Advanced ICT can be introduced together with greenhouse and hydroponics technologies.

Usage of the water of these two rivers for irrigated wheat production is not recommended from the environmental conservation point of view. An increase in the productivity of wheat production should be pursued by improved farming practices such as fertilization rather than irrigation.

Utilization of the river water for hydropower generation applying such technologies as low head power generation should be carefully examined in consideration of possible environmental impacts.

The livestock sector should be promoted with an emphasis on intensive livestock especially in Selenge in order to minimize conflicts of land uses with crop production. Poultry farms and pig farms are new types of livestock activities to meet diversifying demands for meat products in Ulaanbaatar and other urban areas.

Tourism is a prospective sector and it should be planned from a region-wide perspective. Experience-oriented and community-based tourism (CBT) in Selenge could be promoted in combination with tours to visit the Buryat Republic and Lake Baikal on the Russian side. Most package tours in Japan to visit Lake Baikal is arranged as the tour to Far East Russia as the nearest Europe from Japan, directly entering Russia. An exception is a tour starting from Ulaanbaatar by train in the evening and arriving at Irkutsk in the morning, but without stopping within Mongolia. Tourists will be able to enjoy the beautiful nature of Selenge experiencing Ger stay, horse riding, fishing, bird watching etc. as well as unique Asian culture and history of Buryat and the beauty of Baikal Lake on the Russian side at the same time. Positive initiatives from the Mongolian side, especially by Selenge Aimag, would be needed in developing road and onsite infrastructure, promoting tourism investments and proactive marketing to realize this concept. As a means to reduce seasonal fluctuations of tourist visits, developing winter leisure base at hot spring site in Yeroo Soum could be promoted.

The free trade zone in Altanbulag (AFTZ) at the border point with Russia could be activated as a base to exchange not only commodities but also new technologies and information. There should be many possibilities considering the common natural conditions and ethnic background of Mongolia and the Buryat Republic. New farm products and their production technologies developed in Selenge could be presented, while some technologies to preserve soil applied on the Russian side, for example, could be transferred to the Mongolian side. As part of tourism promotion, AFTZ can be a point to present histories and cultures on the Mongolian and Russian sides together, which will be an eye-opening experience for foreign tourists.

SMEs promotion will play an important role especially in Selenge, because chances for development beyond mere crop cultivation and engaging processing will depend on integrated efforts by small scale individual farmers in the form of cooperatives and SMEs. It would be a sensible strategy to create an environment in which small scale investors start small taking advantage of crop production, gradually grow larger and become leading business under supportive policies and regulations. Higher education and vocational education programs should be improved and upgraded in consideration of crop

production and SMEs promotion.

7.3.6 Darkhan-Uul

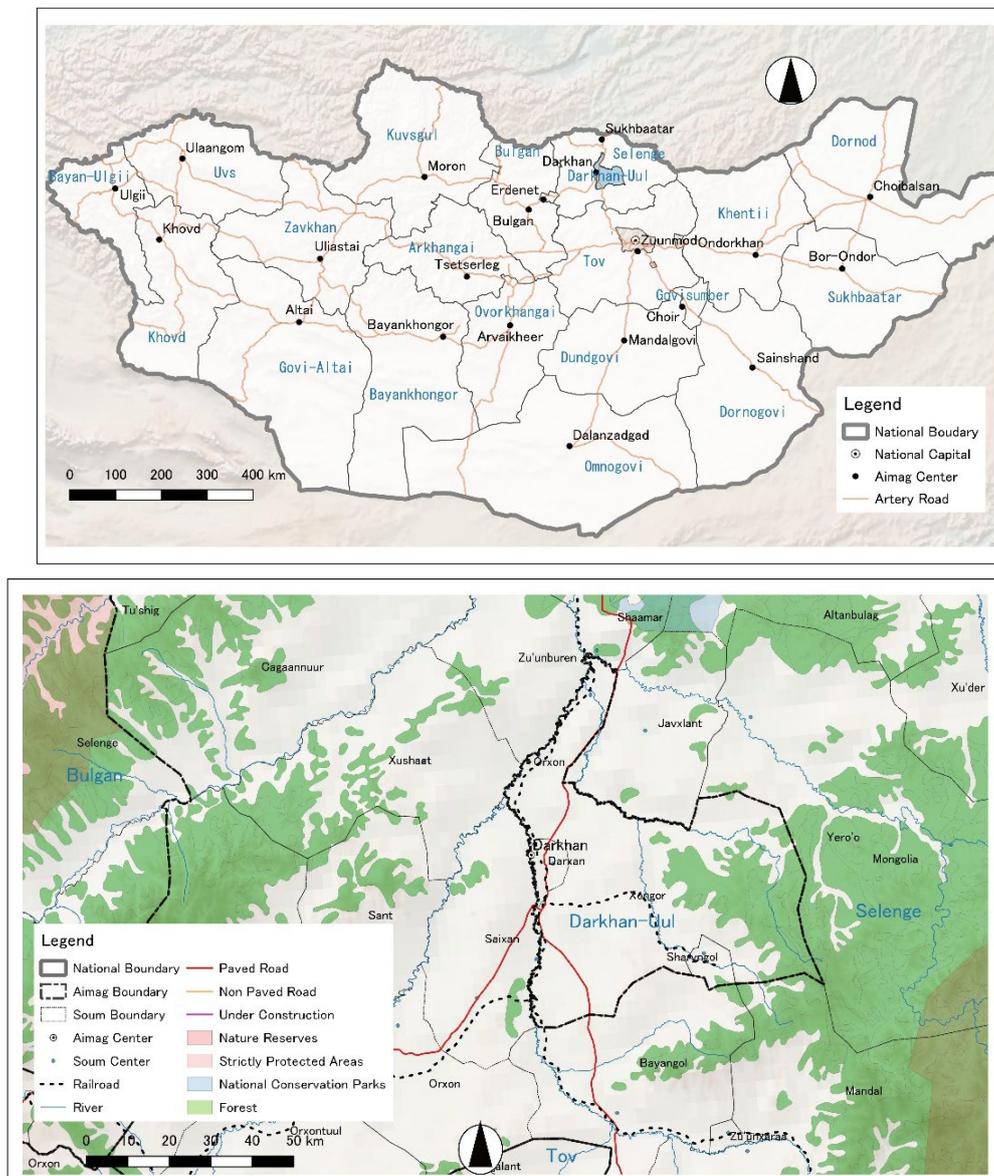
(1) Existing conditions

Location and natural conditions

Darkhan-Uul Aimag has an area of 3,280 km², the second smallest in Mongolia after Orkhon with 844 km². The Aimag was separated from Selenge Aimag in 1994. It is totally surrounded by Selenge Aimag.

While the eastern part of the Aimag is largely mountainous with altitudes ranging from 800 to 1,300 m, the western part is flatter with altitudes of 600 to 1,000 m, extending mostly along the Kharaa River and partly in the northern section along the Orkhon River. The Kharaa River runs from south to north along the western border of the Aimag with an average discharge of 8.3 m³/sec and the maximum discharge of 99.3 m³/sec. Its catchment area is 15,000 km².

The Aimag belongs to steppe climate zone and is covered largely by fertile chernozem soil.



Source: JICA Project Team

Figure 7.3.6 Location and Land Map of Darkhan-Uul Aimag

Socio-economy

The resident population of Darhan-Uul has been consistently growing at an average rate of 0.9% per year from 1990 to 2017 except the 1995-2000 period when the population decreased at 0.7% per year on average and the 2005-10 period when the population remained almost unchanged. The population growth tended to accelerate since 2010: 1.5%/year in 2010-15, 2.1%/year in 2016 and 2.1%/year in 2017. It seems the population growth has been affected more by natural factor as seen by the rates of natural population increase risen from a range of 0.9 to 1.2% per year in the 1995-2005 period to a range of 1.5% to 2.1% in the 2010-17 period.

The migration is characterized by a net decrease in the 2005-14 period followed by no net migration in 2015-16 and net in-migration of 300 in 2016-17. It was pointed out by a number of participants in the group discussions held on April 25, 2019, though, that migration from rural areas to Darkhan is continuing both by push factors such as overgrazing, desertification, mining industry and poor living conditions in rural areas and by pull factors such as job opportunities, better health and education services and family status represented by wives moving to Darkhan, while husbands working in the mining sector in Govi. Rural people who are not able to afford migrating to Ulaanbaatar tend to move to Darkhan.

The economic structure of Darkhan-Uul is 49% industry, 43% service and 8% agriculture of the GRDP. Darkhan, the capital city of Darkhan-Uul Aimag, had been the second largest manufacturing base in Mongolia traditionally producing cement and other construction materials, iron and steel, sheep skin and leather products and food processing products, of which some were exported. Most of them have been degraded by privatization during the socio-political confusion after the democratization in 1990. This resulted in loss of not only employment opportunities but also educated and skilled human resources. The industrial production in Darkhan-Uul fell down to the 6th in Mongolia in 2017.

Like Selenge Aimag, Darkhan-Uul is active in crop production with relatively favorable climate and availability of water. Its sown area occupies 6.8% of the total Aimag area, far higher than the ratios in most other Aimags ranging in almost 0% to 0.4% except Selenge at 5.1% and Orkhon at 3.3%. Its GRDP contribution, however, is low due to low value added generated by crop production just like in Selenge.

Livestock is not active as seen by the number of animals per person at 3 heads ranked 20th of all the Aimags, larger only than Ulaanbaatar and Orkhon.

Spatial development and infrastructure

Urbanization in Darkhan-Uul proceeded from 1995 to 2005 with the urbanization rates rising from 78.5% in 1995 to 79.3% in 2005 and further up to 82.4% in 2010. The urbanization rates have remained almost constant since then until 2017 at 82.3%.

Darkhan-Uul is playing a pivotal role in the northern part of Central Region. The national highway A0401 runs from Ulaanbaatar to Darkhan and it becomes A0402 and continues going up all the way to Sukhbaatar of Selenge Aimag in the north. There is a national road from Darkhan to Erdenet (A 1102) to the west and further to Bulgan (A1002), connecting these major northern cities. The MTZ linking Russia and China through Ulaanbaatar also passes through the Aimag.

Darkhan-Uul gained relatively high priority in terms of the total expenditure on construction and capital repair at MNT175 billion in the 2015-17 period, which was third after Ulaanbaatar and Umnugobi. These expenditures were devoted to such uses as roof repair, landscape improvement, playground, lighting, roads, kindergartens and schools, heating pipes and hospitals, according to some group discussion participants.

The number of telephone lines per 1,000 population was 35 ranked top among all the Aimags in 2017. The number of persons covered by one water station was 1,820 in 2017 at 15th place.

(2) Constraints to development

The Kharra River running along the western border of the Aimag is an important natural asset for the

Aimag. It is, however, exposed to the threat of pollution and degrading environment by tannery, gold mining including that at smaller tributary rivers, direct discharge of domestic grey water, especially from old Darkhan City, and littering by tourists in summer and industries.

Constraints in the social sector are found in human resources, materials and management. In case of the health sector, problems in human resources on the service provider side include both quantity factors such as limited number of doctors, nurses and midwives and quality factors such as low technical level, lack of ethics and communication skills. Behaviors of the people also constrain their health level such as taking unhealthy foods with low nutrition and causing obesity. Outdated equipment and lack of diagnostics laboratory are the constraints in the material aspect. In the management aspect, constraints include unstable and impractical policies caused by political influence, bureaucratic doctors and corruption.

Upgrading of technical skills holds a key to economic development. The situation in Darkhan-Uul, however, is not favorable in this sense. The number of vocational school students declined by 20% from 2,449 in 2010 down to 1,957 in 2017 as a result of the abolition of the incentive at MNT70,000 per month and a general trend of young people to prefer universities to vocational schools. Vocational education in Darkhan-Uul is not meeting the demands by the society and graduates are not able to get satisfactory jobs due to mismatch of the curricula, outdated equipment and limited technical levels of teachers.

Increasing crimes such as drug abuse, prostitution, robbery, cattle theft, alcoholism and domestic violence are caused largely by limited job opportunities, and poverty is a social problem undermining the development of the Aimag.

Darkhan used to be the second industrial city in Mongolia after Orkhon. It succeeded only partly in modifying its industrial structure from a socialistic one to a market-oriented one, and consequently its industrial production fell down to the 6th in Mongolia in 2017. There are a number of constraints hindering industrial development of the Aimag related to human resources, financial capability and public policy. Despite the relatively high labor force coefficient (LFC), the ratio of economically active population is small due to low LPR, causing shortages of human resources. The lack of competent senior managers and skilled labor is a constraint on the quality side. Many companies have not been able to cope with changing economic circumstances such as rising prices of raw materials and lowering prices of products. Access to bank loans is limited and interest rates are high. Political instability has resulted in a lack of state policy to support industrial development in a consistent and sustainable manner.

Despite the relatively favorable natural conditions for crop production in the Aimag, it has not been developed fully due to lack of promotion and sustainable policy and competition with imported farm products.

(3) Development prospects

Crop production of the Aimag should be promoted as a cooperative initiative with Selenge Aimag, because the lands of the two Aimags are geographically contiguous and they share the two rivers of the Orkhon River and the Kharaa River as water sources. Water saving irrigation utilizing the water of the Kharaa River for high value-added crops such as vegetables and fruits would be promising to supply the growing urban markets. Since the Kharra River water ultimately flows into Lake Baikal, the largest freshwater lake in the world and a UNESCO world heritage site, through the Orkhon River and the Selenge River in the downstream, the amount of irrigation water intake and quality of agricultural drainage should be carefully managed. Utilization of grey water generated in urban areas is also worth serious consideration. Advanced ICT technologies can be introduced together with green house and hydroponics technologies.

Usage of the Kharaa River water for irrigated wheat production is not recommended from the environmental conservation perspective. An increase in the productivity of wheat production should be pursued by improved farming practices such as fertilization rather than irrigation.

Application of ICT to livestock is an important subject for Mongolia both for traditional grazing and

new intensive and settled type livestock farming. Darkhan can be an experiment base to create a model of ICT oriented advanced livestock farming for Mongolia. ICT application to livestock farming could bring about a new lifestyle for Mongolian herders which would allow them to enjoy both rural life in the nature and convenience of urban life.

The factories and facilities remaining from degradation and neglect after the democratization are important assets to be utilized for further industrialization of Darkhan. The land rights for the factories and facilities are currently held by banks. These current conditions should be assessed and accounted for as the first step to utilize them for productive purposes. Some of them may be renovated to constitute industrial clusters possibly with the re-designation of the Darkhan industrial park. A long-term industrial development plan should be prepared with proper land management arrangements. Accordingly, infrastructure renovation and promotion policy should be planned and implemented to prepare such environment that would be conducive to private sector investments.

Taking advantage of the industrial accumulation in Darkhan and high educational background of Mongolians, an emphasis for industrial development in Darkhan could be placed on ICT application. “Internet of Things” or IoT is the world trend and it will not be long before this trend prevails in Mongolia. This trend should be fully taken advantage of for the development of Aimag in such a country like Mongolia with a vast territory and dispersed population. Kinds of industries existing in Darkhan such as cement, steel, sheep skin product and foods could be targets for ICT application. Darkhan can assume the role of experimenting, applying and expanding IoT application at the ground level, while Ulaanbaatar can take the leading role in introducing IoT technologies from advanced countries to Mongolia as an international gateway.

ICT application would be effective in improving the coverage and the quality of social services in the health and education sectors as well, especially in Mongolia. Darkhan could play an intermediary role connecting Ulaanbaatar and Soums of Darkhan-Uul Aimag by ICT. Residents in Soums in Darkhan-Uul and even in Selenge Aimag, for example, will be able to receive diagnosis provided at the Aimag center hospital without actually travelling there. Herders’ children will be able to access to Internet classes without staying at dormitories away from their parents. While Ulaanbaatar takes initial actions to introduce ICT from advanced countries, Darkhan can actually apply them on the ground.

Application of ICT, AI and 5G technologies should be a focus in redesign of education system as well. While university education should focus more on the principles and basics, vocational and skill training programs should focus more on application. Making this distinction would be important in redesigning curricula of both universities and vocational schools.

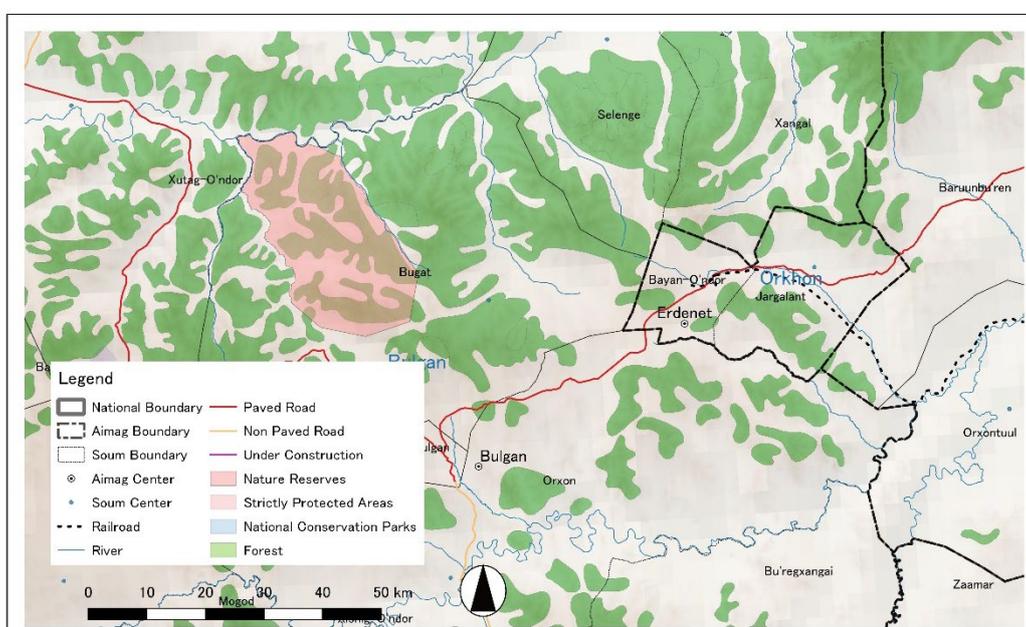
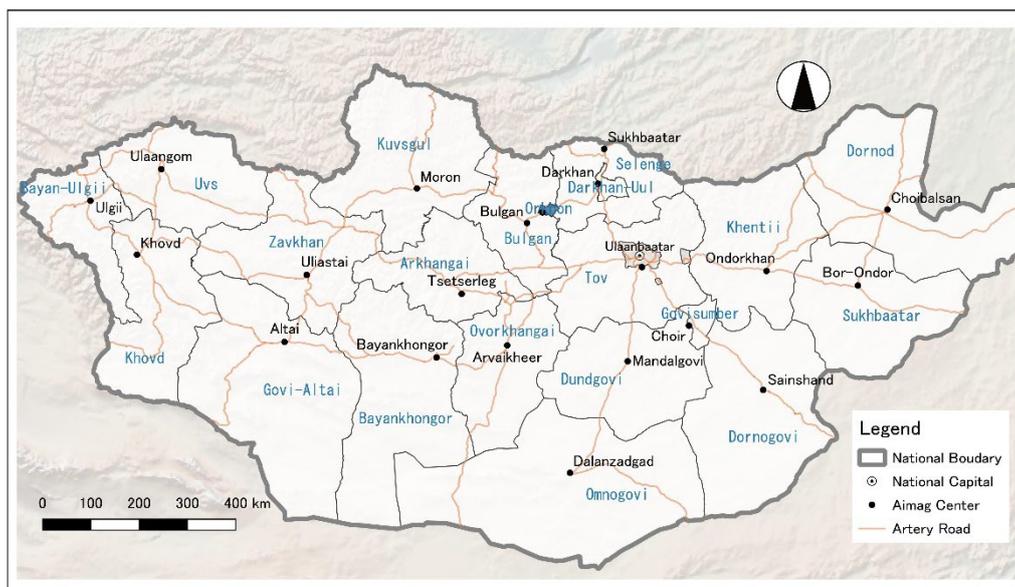
Promotion of local autonomy, generally pursued by the Mongolian Government on policy documents, should be substantiated first for Darkhan-Uul. The municipality status would give a higher level authority in decision making and revenue generation, and the needs of local communities will be more closely reflected in development planning, thus making the development plan more implementable supported by residents with reduced political influence from Ulaanbaatar. This initiative would motivate the youth to take initiatives in innovative business development. A decentralized regional development model could be created in Darkhan-Uul.

7.3.7 Orkhon

(1) Existing conditions

Location and natural conditions

Orkhon Aimag is located in central Mongolia with the smallest land area of 840 km² and highest population density of 21 Aimag. Erdenet is the capital city of the Aimag and 371 km far away from Ulaanbaatar. Orkhon Aimag is situated in the forest-steppe sub-region of Khangai Mountain region, comprising the midlands of the Buren mountain range and the Orkhon and the Selenge River basins. The soil includes the steppe, desert-steppe, and mountain umber powder like soil with carbonate.



Source: JICA Project Team

Figure 7.3.7 Location and Land Map of Orkhon Aimag

Socio-economy

Orkhon Aimag had the 104,000 population in 2017 to make population density 130/km². Population growth rates had constantly increased from 2.44% per annum during 1990-2000 to 2.21% per annum during 2000-15 owing to the increase of immigrants from other areas mainly to the Erdenet city.

The Orkhon economy is supported mainly by the industry sector including mining, manufacturing and construction with the dominant share of the GRDP at 89% in 2017. The Aimag is endowed with mineral resources such as copper and molybdenum. In the Erdenet city, Mongolia-Russia joint venture Erdenet Mining Corporation with the copper and molybdenum concentration plant is the major mining company, that has led the economy in Orkhon. The Erdenet city has other factories such as carpet manufacturing, food and beverage, and metal processing factories.

Agriculture and livestock sector's activities are limited with only a 1% share of the GRDP in Orkhon Aimag. Livestock population per herder family was 139, the lowest of all the Aimags. In addition,

the number of animals itself is just 47,000, the smallest of all the Aimags. Only 4.3% people of total employment are engaged in the livestock farming in 2017. Crop cultivation area is also limited with cultivated area 2,603 ha in 2017.

Overall economic situation in Orkhon is well developed among all the Aimags. The GRDP and the GRDP per capita are ranked 1st due mainly to the active mining industry as mentioned above. In addition to the high GRDP, several economic indicators such as labor productivity and high average wage are ranked 1st as well. Especially, the number of establishments are large with 2,308 and the number of private enterprises is large at 2,181, both ranked also 1st. However, there are other economic indicators showing economic disparities such as high unemployment rate (23.5% in 2017) and income inequality. Although the mining industry leads the economy in Orkhon and creates around 6,000 job opportunities, job opportunities in other sectors are limited.

Enrolment rates in primary and secondary education are quite high exceeding 100%, both ranked 1st. This reflects significant inflow of immigrants according to the result of group discussion in Orkhon. Pupils to teacher ratios are very high in Orkhon at primary education. The number of schools is relatively small at the secondary education with 24 schools ranked 15th in 2017. The participants of group discussion pointed out shortages of kindergartens and primary schools.

IMR per 1,000 live births in Orkhon is 5, the lowest among all the Aimags. Numbers of people per physician and nurse are relatively large ranked 4th and 2nd respectively.

Participants at the Aimag consultation pointed out that staff shortages for health services by the local administrations, resulting in part from large number of immigrants. However, relatively good access to health services might be one of the factors to attract immigrants from other Aimags.

Development of cultural infrastructure is left behind. Number of cultural centers is small at just 5 in Aimag, ranked at 19th. Likewise, number of public libraries is relatively small at 5 in Aimag, ranked at 19th.

Spatial development and infrastructure

The urbanization rate in Orkhon is extremely high at 96.2% in 2017 reflecting the development of the Erdenet city in the small land area of the Aimag. The city has relatively good access to the capital city, Ulaanbaatar, by paved road. The Aimag capital of Erdenet is located on the way between Darkhan and Murun. The branch line of trans-Mongolian railway reaches the Erdenet city mostly for the export of mining resources and products to Russia. In addition, an international train from Russia runs into Erdenet weekly.

Quality of various infrastructure is relatively at high levels due to the development of basic infrastructure in the Erdenet city. However, there are several problems in rural areas, especially for water supply and water quality.

Telephone lines per 1,000 was 17 in 2017 ranked 4th, price of heat energy ranked at 15th with 553m²/MNT, and relatively low gasoline price at MNT1,498/liter ranked at 3rd. The number of water supply points per 1,000 families were 6 in 2017 ranked 4th. The ratio of livestock families having electric engine was 91.5% ranked 1st.

(2) Constraints to development

The high GRDP, per capita GRDP and labor productivity are due mainly to the mining sector, which benefit mostly mining workers and their families. Except for the mining sector, there are limited job opportunities in Orkhon Aimag. As a result, economic disparities are expanding represented by high unemployment rate and income inequality. The largest number of recorded criminal cases in Orkhon of all the Aimags may be related to the considerable economic disparities.

All the four groups in the group discussions pointed out that expansion of the unplanned Ger area has caused several urban problems such as air pollution, white dust, soil contamination and fires.

High dependency on the mining sector and related activities is identified as the constraint to balanced development. Due to the limited land area, it is difficult to develop the agriculture and livestock sector

in the traditional way.

As for the social development sector, many participants expressed concerns on the lack of kindergartens and schools, especially in the Ger area. In addition, lack of sufficient number of teachers is also considered as the constraint.

In addition, high interest rates of commercial banks constrain the development of SMEs. Probably, the Aimag government cannot provide sufficient support services to the rapidly growing population, including support services for SMEs.

(3) Development prospects

The northern part of Central Region including Orkhon Aimag is identified as the agriculture and livestock potential area by Unified Land Territory Foundation (ULTF) due to large pastureland, hay land, crop land and fallow land for fodder supply, and favorable water availability. Due to the inherent land constraint, however, Orkhon may be specialized only in intensive livestock farming possibly in combination with fodder production for integrated farming. Greenhouse agriculture is also promising by taking advantage of abundant labor force, existing infrastructure and favorable access to urban markets of Ulaanbaatar, Erdenet and Darkhan.

Orkhon Aimag with the Erdenet city could be one of the bases of industry and manufacturing in Mongolia due to some advantages such as population concentration, skilled workers, infrastructure, rich mineral resources and good access to urban and export markets. Even though there are still abundant reserves of minerals, diversification of industry is necessary to generate much larger employment opportunities in order to rectify the existing economic disparities. Based on the refining technology for copper and molybdenum, metal industry may be promoted. In addition, tannery, food processing, chemical and other light industry may also be promoted.

The Erdenet city has developed relatively recently with orderly city structure, which attracts young population. Participants of the group discussions pointed out that urban market developed associated with the rapid urbanization would provide good business environment for self-employed workers. Erdenet has open atmosphere due to its location between the national capital and Russia, which may make it a transit city for a wide range of service activities. With the function of transit city, Orkhon Aimag will drive the economic development of Mongolia by accumulating people, goods, money and knowledge.

By taking advantage of the transit city, tourism development could be another potential for Orkhon Aimag. Its position linking the major tourism area of Khuvsgul with Ulaanbaatar and also Russia through Darkhan would qualify the Aimag and the city as the gateway for tourists from and to Ulaanbaatar, Khuvsgul and Russia.

In medium to long term future, Orkhon could provide the unique cultural tourism by combining the Russian culture and the mining culture by developing mining areas as tourism resources with greenery. Furthermore, Orkhon Aimag has the Medipas hospital, that works as the regional hospital with relatively good equipment, contributing to favorable medical conditions such as low maternal and IMRs. Promotion of medical tourism in Orkhon Aimag by further development of health and basic infrastructure could be another option.

The Erdenet carpet industry may be developed further to produce quality products for export. Supply of raw materials would be improved by intensive livestock farming in and around the Aimag, but quality control of raw wool is a prerequisite. Products and brand development hold a key for developing the export market.

To realize these prospects, water supply needs to be expanded with improved water quality both in the city and rural areas. This is an important consideration when the Erdenet city formulate a city master plan as well as improvement of living conditions in the Ger district. The Erdenet city should be planned as a model mining city in Mongolia with plenty of greenery and pleasant living conditions supported by sensible and responsible mining activities with proper maintenance and rehabilitation of the mining sites to serve as a showcase to the world to attract more tourists as well.

7.4 Development Diagnosis by Aimag in Altai Region

7.4.1 Govi-Altai

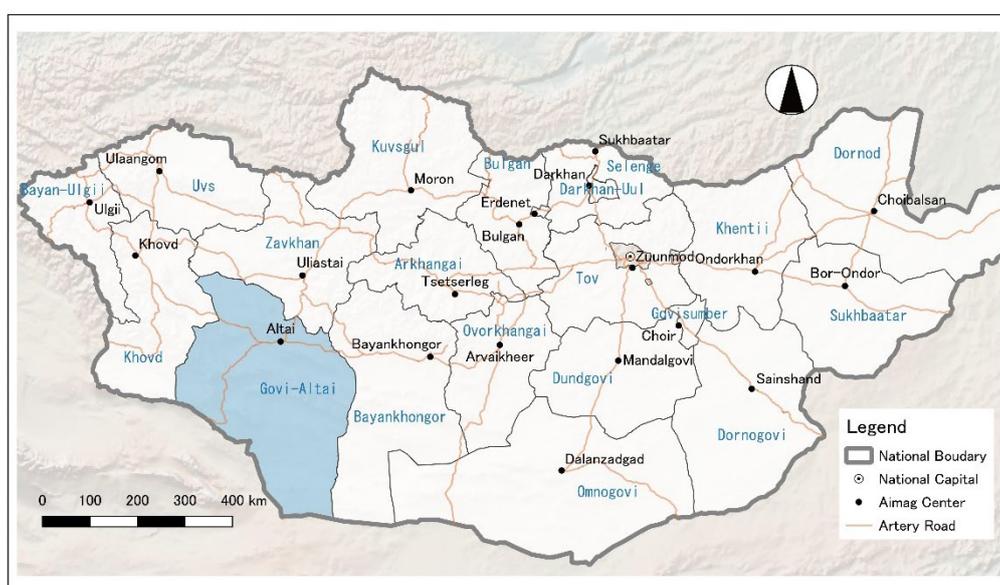
(1) Existing conditions

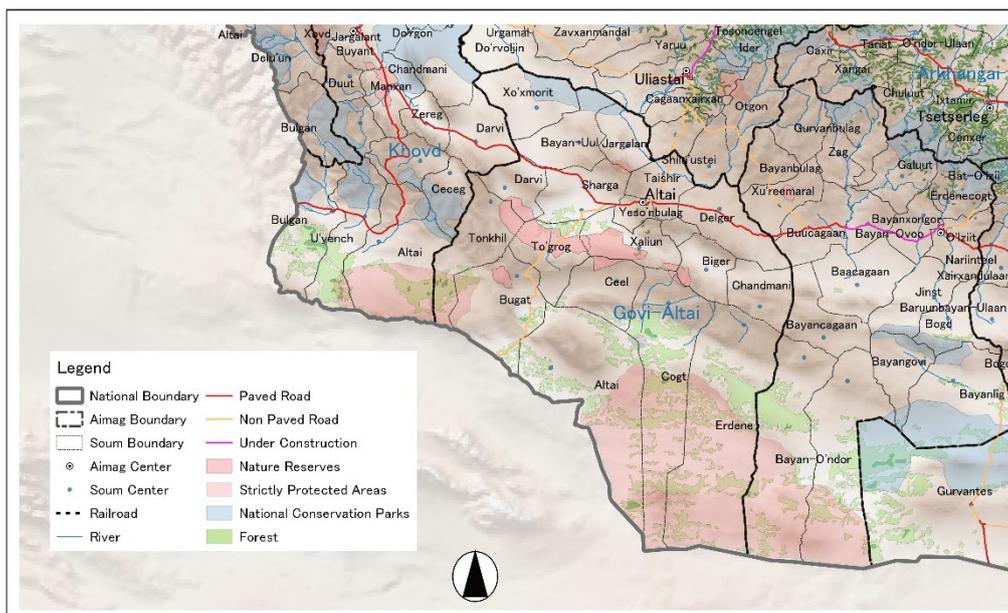
Location and natural conditions

Govi-Altai Aimag is located in the southwest of Mongolia bordering on the Autonomous Region of Inner Mongolia in China, with the land area of 141,400km², second largest next to Umnugobi. Its capital Altai is situated 1,027km from Ulaanbaatar by road distance. It is linked with the neighboring Aimags to Khovd by A304, Uliastai of Zavkhan by A1103 and Bayankhongor by A303. It is linked by A 1104 to Burgastai Laoyemya border port.

Altai mountain ranges occupy the middle of Aimag from West to East with several high peaks around 4,000m, which divide the Aimag into three parts. Semi desert and steppe distribute between mountains, and the southern part of Aimag is Govi Desert. About 20 salt lakes are distributed in the depression area between the mountain ranges. Climate varies for the three areas: dry alpine climate in the north, semi-arid cold climate on downhills and steppes (1,600-2,000m), and warm and dry desert-steppe climate in the south.

Zavkhan river flows along the northern border to drain eventually into Khyargas lake in Uvs Aimag. Govi-Altai has large national parks and reserves including Great Govi Strictly Protected Area (44,000km²), fourth largest biosphere reserve in the world. Many rare species of animals are found including Govi bears, wild camels, ibex and even snow leopards.





Source: JICA Project Team

Figure 7.4.1 Location and Land Map of Govi-Altai Aimag

Socio-economy

Population of Govi-Altai was 57,500 in 2017 to make population density 0.41/km², among the lowest of all the Aimags. Population decreased significantly after the democratic reform from 64,700 in 1990 to 53,500 in 2010. It started to increase slowly to reach 57,500 in 2017. Some people once moved out to cities due to limited employment opportunities and Dzud have come back in response to government welfare policy, improved infrastructure and business opportunities.

Govi-Altai is considered least suitable areas for raising livestock. This is reflected in small livestock population per 100ha pasture at 57 ranked 18th among 21 Aimags, and large livestock population per herder household at 529 ranked 3rd. Herders share 49.9% of total employment.

Economic structure of Govi-Altai is dominated by agriculture with 47% of GRDP, while industry including construction account for 23% and services 31% in 2017. Govi-Altai has small manufacturing value with MNT7.5billion ranked 17th, and its GRDP share is only 2.81% ranked 15th. Food, leather and construction materials represent manufacturing in the Aimag. It has small number of establishments at 838 ranked 18th, including 641 private (18th) and 32 large (13th) establishments.

Despite the dominantly rural economy, per capita GRDP and average wage are relatively high in Govi-Altai. According to the participants in the group discussions, this is due mainly to increased cashmere production and prices and partly to mining development such as iron ore production in Tseel Soum.

Labor force coefficient in Govi-Altai is relatively low at 63.9% reflecting employment seeking outmigration, while labor participation rate is relatively high at 75.3% ranked 7th reflecting the dominantly rural economy. Ratio of government employees to total employment is high at 16.7% ranked 3rd to cover the vast territory for social services Govi-Altai is ranked 11th by average wage and unemployment rate.

Reflecting the government welfare policy, pupils to teacher ratios are small at primary (2nd) and secondary (2nd) education. Availability of health personnel is also high in the Aimag with number of people per physician at 305 (3rd) and per nurse at 225 (1st). However, infectious diseases per 10,000 were 137 among the largest at 19th rank. Some participants in the group discussions attributed this to poor water quality containing high concentration of minerals.

Spatial development and infrastructure

The urbanization rate in Govi-Altai is relatively high at 32.5% in 2017 considering the dominantly rural economy. While the capital city of Altai has good road links with Khovd, Uliastai and Bayankhongor in the neighboring Aimags, the access to the south and border area is constrained by the Altai mountain range and the Govi Desert.

Quality of roads in Govi-Altai is evaluated low ranked 17th. Govi-Altai is ranked low also with respect to price of heat energy (16th) and gasoline price (18th) due to distance from Ulaanbaatar. Nevertheless, Govi-Altai ranked 7th for share of herder households with electric engine at 86.5%. Govi-Altai is ranked low for poor management of solid wastes (20th) and poor availability of communication technology (20th).

A hydropower plant installed with 11MW has been operational since 2009 at Taisir on the Zavkhan river flowing along the northern border of Aimag, and piped water supply from the Taisir dam is being implemented supported by Austria. Groundwater is widely available in the northern part of Govi-Altai but aquifers are deep at 150~200m.

(2) Constraints to development

Small population and remoteness from the advanced region constrain marketing of livestock and other products. Prices of livestock products are generally low. Remoteness makes prices of commodity and energy high undermining industries and living environment as well. Cultivated area is minimal, and crop production is constrained by harsh climate and unfavorable soil conditions. Livestock farming suffers also from these unfavorable conditions and over-grazing and desertification tend to aggravate the situation.

Although the Taisir hydropower plant has been operational, some participants in the group discussions pointed out inadequate power supply as a constraint to development. They expect a thermal power plant to supply hot water as well.

Despite the government welfare policy, infrastructure in Govi-Altai is still generally in poor conditions with underdeveloped road network, poor water supply and lack of power source among others. These conditions make Govi-Altai unfavorable for industrial location. Even SMEs are not much developed. Consequently, Govi-Altai suffers from poverty and unemployment.

Some participants in the group discussions pointed out poor health conditions, lack of qualified manpower and lack of RDP as additional constraints. To overcome these problems, adequate policy and political stability are necessary pre-requisites as pointed out also by the participants.

(3) Development prospects

The large territory and diversified topographic and climatic conditions present both opportunities and prospects for Govi-Altai. They may be utilized in two major ways. One is for tourism development. Large national parks and reserves offer opportunities for wilderness tourism. Mountains of 4,000m class on the Altai mountain range in the Aimag is more accessible than high mountains in the west. Long stay hermitage tourism combining access to urban services in Altai and beautiful landscape may attract tourists from advanced countries if ICT links are established between tourism base and sites and the rest of the world.

The capital city of Altai should be strengthened as the tourism base with upgraded urban functions and facilities. The city should be instrumental in improving provision of education and health services to the people throughout the Aimag. Training centers for education and health personnel may be established to change drastically the position of the Aimag with respect to social services under the government welfare policy.

The other possibility to utilize the large territory and diversified topographic and climatic conditions may be to establish a renewable energy center. Govi-Altai already has a major hydropower plant on the Zavkhan river in the north and solar facilities in the south of Altai. Wind power has potential in the Govi area as well. Another possibility is geothermal power generation by tapping geothermal

reserves in the depression areas between mountains. A relatively small geothermal power plant may be adequate as a local energy source to satisfy local demand. It should serve also to supply hot water naturally. A regional energy company may be established for effective operation and management of geothermal power plant once established based on geothermal energy reserves confirmed through exploration by the Government.

Concerted efforts should be made to turn the low productivity livestock farming and lack of sizeable crop cultivation. The main direction is to promote semi-intensive livestock farming, which combines more intensive livestock farming with fodder production in areas close to cities and local markets and seasonal grazing in pastureland. Livestock herds should be carefully managed to maintain goat population within carrying capacity of grazing land to prevent over-grazing.

Crop cultivation may be diversified by utilizing a wide variety of soil and climatic conditions existing in Govi-Altai, but crops produced in remote rural areas will face difficulty in marketing except some herbs that may be marketed in tourism areas. Greenhouse agriculture is more promising to produce high value crops for urban markets. Semi-underground greenhouses may be adopted for crop production during winter. Use of geothermal energy for heating the greenhouses seems promising, and possibilities to establish complex facilities to support crop and livestock farming during winter should be investigated.

Several participants in the group discussions expressed concerns for restoration of neglected irrigation fields to produce grains, potatoes, vegetables and fruits. Water sources for irrigation should be carefully examined together with crop selection first for local markets. Integrated Zavkhan river development with multi-purpose dam including hydropower generation, irrigation and water supply should be planned as a priority.

Govi-Altai is classified mostly as low sensitivity area for mining except the area around the Altai city. It does not include any strategically significant deposits, but limited mining activities should be allowed. In addition to coal, gold and iron already exploited, non-mineral resources may be developed for construction materials such as cement and bricks.

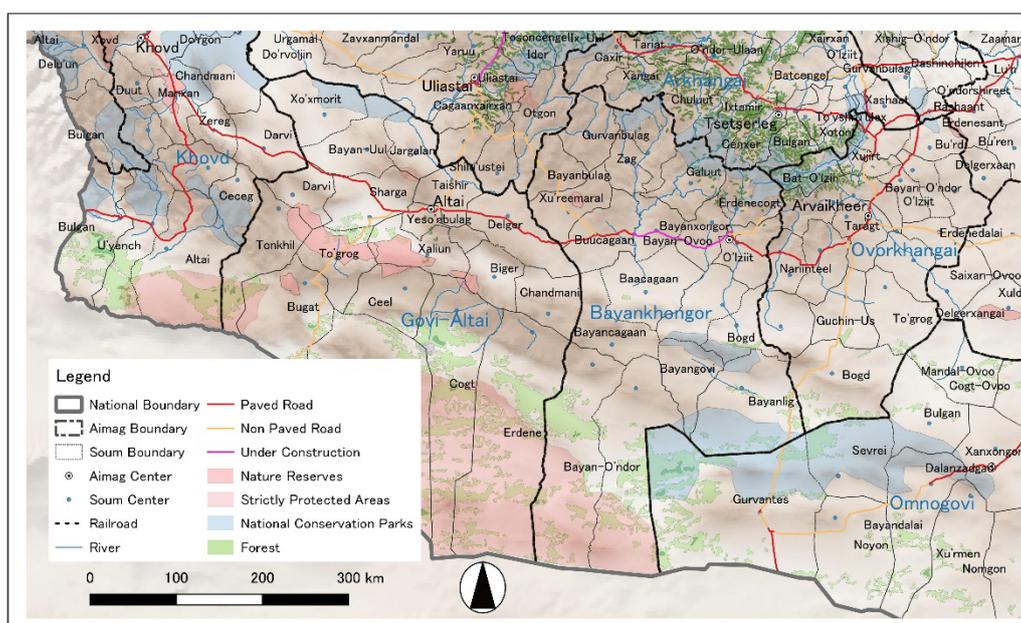
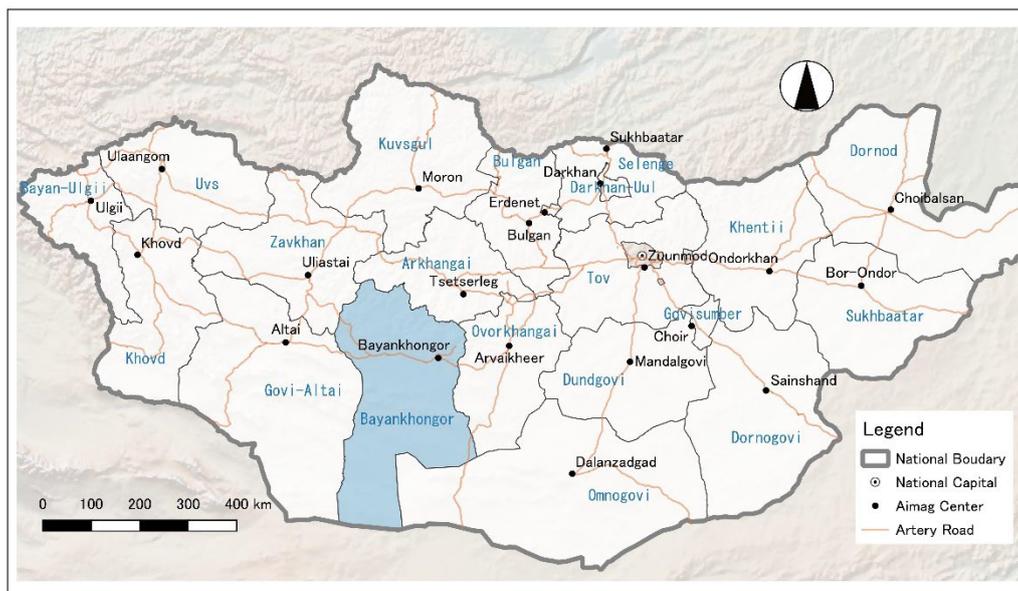
7.4.2 Bayankhongor

(1) Existing conditions

Location and natural conditions

Bayankhongor Aimag is located in the central west of Ulaanbaatar with the land area of 116,000km², the 4th largest of all Aimags. The Aimag is long north to south, bordered with Arkhangai, Zavkhan, Govi-Altai and Umnugovi Aimags. Its capital Bayankhongor is 630km away from the national capital by road distance. Bayankhongor is comprised of several zones: high mountain area, Govi area, forest-steppe in the north, steppe in the middle and semi-desert in the south. As for mineral resources, Bayankhongor Aimag is rich with coal, gold and other construction material resources.

Forest areas occupy 3,307 km² accounting for only 2.9% of the Aimag land. It is rich in variety of wildlife, fauna and flora. Various wildlife such as wild sheep, wild goat, lynx, deer, badger, wild boar and roe deer are found in the Aimag. One third of all species of plants grown in Mongolia are found in Bayankhongor Aimag. The north side of the area is covered with forest-steppe plants, and the middle and south parts are covered with steppe-Govi plants.



Source: JICA Project Team

Figure 7.4.2 Location and Land Map of Bayankhongor Aimag

Socio-economy

Population of Bayankhongor was 87,243 in 2017 to make population density 0.75/km². Population growth was 0.79% per annum during the post democratization period of 1990-2000 and decreased to 0.14% per annum during 2000-17.

The economy of Bayankhongor is dominated by agricultural with the share of GRDP 47% in 2017. The number of livestock in Bayankhongor was 1,074,000 heads in 2017, the 6th largest of all the Aimag. Livestock population per herder household was 388 in 2017, ranked 13th. As the economic activity, relatively many households are engaged in the livestock sector as seen by the data of 54.4% ranked 4th of all Aimag. Crop production is less popular in Bayankhongor with just 754 ha cultivated area in 2017. Bayankhongor produces small amount of wheat, potatoes and vegetables.

Overall economic situation of Bayankhongor is positioned at middle level. The GRDP was MNT 380

million in 2017, ranked 11th and the per capita GRDP was MNT 4,431,000 in 2017 ranked 13th.

Bayankhongor has limited number of establishments with 1,083 in 2017 ranked 16th, and 889 private establishments (15th) and 28 large establishments (15th) exist in the Aimag. Bayankhongor has relatively favorable economic environment such as ease of doing business ranked 8th and accessing credit ranked 2nd and opportunity to engage in private business ranked 4th.

The rate of economically active population was relatively high at 50.5% in 2017 ranked 5th but LPR was low at 65.1% in 2017 ranked 16th. Unemployment rate in Bayankhongor was just 5.6% in 2017 and employment rate was high at 94.5% in 2017.

As for education aspects, enrolment rate at kindergarten was high ranked 3rd. However, enrolment rates at primary and secondary education were low ranked 14th and 15th respectively.

Health sector infrastructure does not meet the needs of society sufficiently as the Aimag is ranked 18th in this aspect. Infectious diseases per 10,000 population is 129 in 2017 ranked 17th.

Spatial development and infrastructure

The urbanization rate in Bayankhongor is relatively low at 35.5% in 2017. The Aimag capital of Bayankhongor is considered as the transit city on the alternative route between the east and the west of Mongolia. The southern land is classified as the protected area bordering on China.

Quality of roads is assessed as middle level ranked 12th and the number of vehicles per 100 working age population is just 10 in 2017 ranked 17th.

Other infrastructure seems to be at average levels of all the Aimags. Telephone lines per 1,000 population is 11 (7th), water supply points per 1,000 families are 4 (11th), price of heat energy is 495m²/MNT (11th), ratio of livestock families having electric engine is 84.5% (9th), and gasoline price is MNT1,578/liter (15th). It is worth mentioning that Bayankhongor is equipped with large service centers ranked 2nd.

(2) Constraints to development

The mountainous land presents an inherent constraint to development of Bayankhongor. High mountain range in the north obstructs access to the advanced Central Region. In addition to the limited access to outside Aimag, internal connections within the Aimag are not well developed due to the vast land area. Aimag boundaries may not be optimal as a coherent Aimag since Bayankhongor has a long territory extending north to south, and contains diverse geographical and climatic conditions.

Desertification and pasture degradation by overgrazing and climate change are recognized as the serious constraints by the participants of group discussion. The total number of livestock increased drastically from 1,963,000 heads in 2010 to 4,588,000 heads in 2017 resulting in pasture degradation.

The Aimag economy is at an average level but undiversified with minimal agricultural production and dominance of traditional livestock farming. Excessive dependence on the primary sector, mainly livestock, in Bayankhongor is a factor causing undeveloped industrialization and business development. As a result of dependence on livestock sector, overgrazing causes the degradation of pastureland and desertification. This causes a weak economic base for the development of the secondary and tertiary sectors. Low mortgage ability, low income and lack of capital accumulation are derived from the weak economic structure without much economic diversity.

There are social and economic disparities between the Aimag capital and rural Soums as seen by several indicators such as income equality (21st) and access to health facilities.

Shortages of government staffs, recognized by participants in the Aimag consultation as the constraint, cause several problems such as low public service (15th), provincial administrative regulations for favorable business environment (13th) and low quality of primary education (13th), and health sector infrastructure (18th).

People in Bayankhongor, especially in Ger area, are using raw coal as the source of energy due to the lack of reliable power plant and central heating system. This heating method causes air pollution.

(3) Development prospects

Utilizing geographical proximity, complementary urban development of Bayankhongor with Arvaikheer and Tseserleg by functional division would be effective in providing various social services for the people in the tree Aimag together. The ring road linking the tree Aimag capitals should be strengthened. Bayankhongor could serve as the transition city to connect the alternative route between the east and the west. The bordering area with China is designated as the protected area, that encompasses precious wildlife and plants. This area, therefore, should not be developed as the border city for export and import for pursuing economic purpose. Rather trade outlets should be secured through the neighboring Aimag of Umnugovi.

As the economy of Bayankhongor depends largely on traditional livestock on vast land, more intensive livestock and livestock-based processing activities should be promoted for economic growth. Potential areas suitable for more intensive livestock farming are found in the vicinity of the Aimag capital and along the road linking Altai and Arvaikheer. Fodder production should be promoted in suitable places to support more intensive livestock activities. Promotion of livestock-based processing activities would give the value addition to the products such as leather products, dairy and meat products for domestic markets in western and eastern cities.

Tourism sector has another significant potential for Bayankhongor to pursue. Bayankhongor is characterized by untouched natural beauty and many historical sites in any Soums. There are old ancient human remains in Bayanlag Soum's white rock crystal cave, Ulziit Soum's Uran Khairkan, Zag and Baidrag. In addition, Bayankhongor will become a potential place for health tourism by utilizing hot springs and abundant medicinal herbs. In order to realize the tourism potential fully, basic tourism infrastructure such as roads and accommodations should be improved, and human resources trained.

Bayankhongor has the potentials of medicinal plants due to the abundant plants' habitats. Currently, the amount of production is limited since the production of medicinal plants is mainly based on the naturally grown plants. Cultivation of herbs and fodder plants by local communities are recommended to achieve the stable production of plants of good product quality. A research center may be established within the existing university to analyse medicinal plants, select/develop more promising species and promote alternative medicines.

Manufacturing industries in Bayankhongor may be diversified with livestock related industries such as leather products, dairy and meat products, and fruit plants and herbs should be developed by locally based SMEs as raw materials for jam, juice, ingredients for medicine and tea. The Government should support the SMEs by vocational training and products development through research.

To realize the potentials mentioned above, basic socio-economic infrastructure such as roads, electricity, education and health in Bayankhongor should be much improved. For the stable electricity supply, utilization of renewable energy is recommended. Considering the vast land in Bayankhongor, utilization of local renewable energies is the reasonable option to complement the supply of grid electricity. The Govi region has potentials for wind, solar and geothermal power. Bayankhongor with Govi-Altai, Umnugovi and Dundgovi may become the model of advanced renewable energy Aimags.

7.4.3 Uvurkhangai

(1) Existing conditions

Location and natural conditions

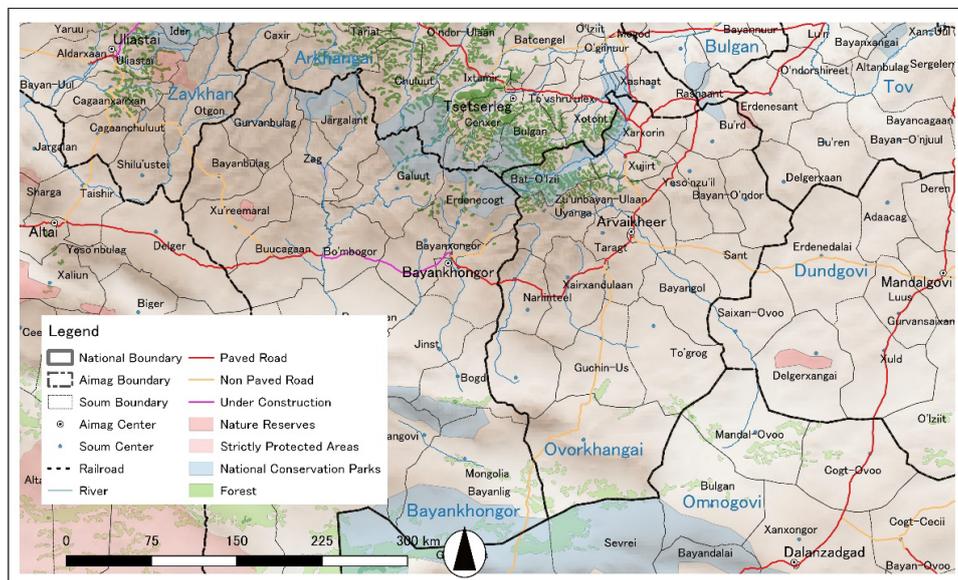
Uvurkhangai Aimag is 360 km long south-north and 240 km wide east-west. More than half of the northern area constitutes part of the northern slope of the Khangai Mountains with altitudes ranging from 1,500 to 2,200 m. The land gently slopes down eastward in a fan shape from the southwest town of Baruunbayan-Ulaan. The eastern end of the Altai mountains running from the west crosses Uvurkhangai in the south. The southernmost area bordering on Umnugovi is about 1,100 m in altitude.

The northern part of the Aimag is steppe, while the southern part is Govi in terms of climatic zone.

Rainy days and annual precipitation were 89 days and 310 mm in 2018, which were second lowest after Bayankhongor in Khangai Region. Annual average temperature at 2.5 degree Celsius in 2018 was second highest in Khangai Region after Bulgan.

The Orkhon River runs in the northeastern direction in the north of the Aimag along the border with Arkhangai. It is 1,124 km long and has an average discharge at 66 m³/sec and a catchment area of 132,835 km². It changes its direction toward north at around Harholin and merges with the Selenge River in Bulgan Aimag.

The Orkhon Valley is recognized as one of the UNESCO world heritages as representing the evolution of traditional nomadic culture.



Source: JICA Project Team

Figure 7.4.3 Location and Land Map of Uvurkhangai Aimag

Socio-economy

The population in Uvurkhangai has been growing at a rate of 1.9% per year since 2010, having reversed the population decrease at -1.2% per year in the preceding 10 years. This change in population trend

was caused mainly by changing patterns of natural population growth and migration. The rate of natural population growth declined from 18.1 births per 1,000 population in 2010 down to 17.5 births in 2010, then remained almost constant until 2018. Migration pattern is characterized by continued outmigration throughout 2000-18, but an increase in inflow of population into Uvurkhangai since 2010. The Aimag consultation participants pointed out that there is an increase in migration from Western Region to Uvurkhangai.

The Uvurkhangai's GRDP in 2018 at MNT489,370 million was 7th in Mongolia. Per capita GRDP at MNT4,197,000 in 2018 was, however, much lower at 20th, same as in 2010, reflecting high dependence on the primary sector, which produces lower value added compared with other sectors. The economic structure in 2010 was 39% agriculture, industry 17% and service 45%, while that in 2018 was 44% agriculture, industry 25% and service 31%. The agriculture and industrial sectors increased the shares. The ranks in GRDP were 5th for agriculture and 11th for industry in 2018. The average monthly wage at MNT653,000 in 2018 was 18th and 65% of the national average.

The number of animals was 5,461,000 in 2018, which was third in Mongolia, up from 6th in 2010. The number of animals in Uvurkhangai increased by 172% between 2010 and 2018, while the increase in Mongolia was 103% in the same period. The increase was especially high for horse, cattle and sheep as shown in Table 7.4.1.

Table 7.4.1 Number of Animals in Uvurkhangai

Animal	2010	2018	Increase (%)
Horse	113.8	323.6	184
Cattle	76.2	272.3	257
Camel	14.7	31.5	114
Sheep	896.6	2,588.1	189
Goat	909.2	2,245.8	147
Total	2,010.6	5,461.3	172

Source: Mongolian Statistical Yearbook 2017 and 2018

Spatial development and infrastructure

The provincial capital, Arvaikheer, is situated at the center of Mongolia at a road network hub location. It is connected with Ulaanbaatar to the east by A0301 (paved) and all the way to Olgiy to the west by A0301, A0302 A0303, A0304 and A0305, all paved roads except some sections under pavement work, through Bayankhongor, Altay and Khovd. It is connected with Shiveehuen Sehee, a border point in Umnugovi Aimag in the south, by A29 (normal earth road) and with Mandalgovi, the provincial capital of Dundgovi Aimag in the east, by A3401 (normal earth road).

Electricity is supplied by the Central Energy System with an installed capacity of 1,100MW and there is no thermal power plant in Uvurkhangai. The number of telephone lines was 629 in 2018 at the 12th place, but in terms of prevalence the rank was 20th with 0.54 telephones per 100 people.

The number of water supply stations increased from 67 at 3rd in 2010 to 97 in 2018 at 4th. The average number of people served by a water station decreased from 1,500 in 2010 (5th) down to 832 (8th).

(2) Constraints to development

Humans is the driving force of development. Without positive initiative and commitment by the people themselves, no development will occur even with rich natural resources. Uvurkhangai Aimag is not in a favorable situation in this sense. Many participants in the Aimag consultation pointed out that the social welfare policy of the government to provide food tickets discourages people to work and make them lazy, and even make them prefer to be unemployed. In addition to this spoon-feeding policy, the dependency or hand-out mentality of the people, with which people wait for services and opportunities to be provided by the government, most likely a negative inheritance from the socialist time, discourages people to take actions from their end. Unless this kind of receptive or passive mind-set is improved, it would be difficult for development to happen.

Increasing crime cases such as animal theft and home theft would be an outcome of this kind of inactive social situation. Alcoholism is also observed. Improvements in the skill training and education sectors are required in such aspects as improvement of the quality of and opportunities for skill training, provision of job placement service, provision of focused trainings to meet market demands, upgrading teachers' quality for basic education, and increasing schools especially secondary schools and kindergartens. These improvements, of course, should be undertaken coupled with the various initiatives to change the people's mind-set.

The recent change of the education system to start primary education at the age of six years instead of eight is causing a social problem in the form of separation of families. Mothers have to move to Soum centers or Aimag centers to take care of their children, who are not mature enough to go to school from dormitory on their own, separating from their husbands engaged in nomadic activities in their home places. Unless this problematic situation is resolved, it will discourage nomadic people to continue animal husbandry, which will accelerate outmigration and result in a lack of manpower for livestock activities.

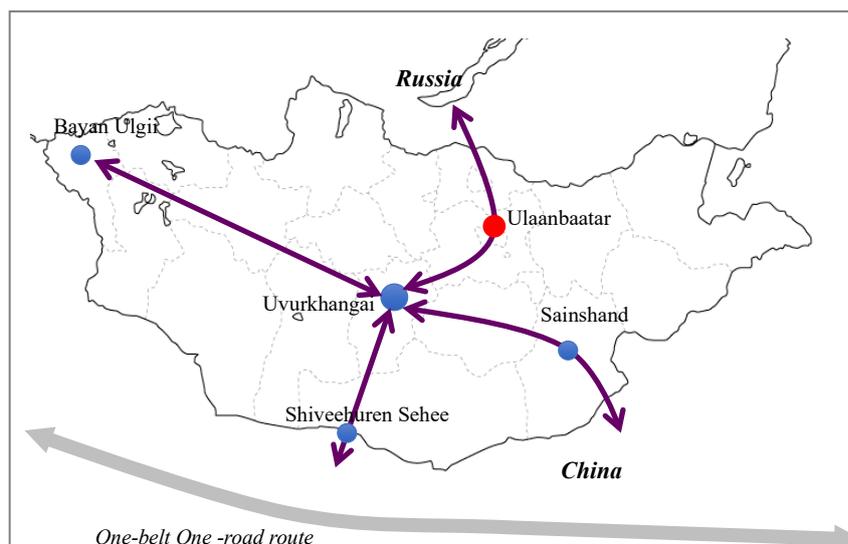
Overgrazing as a result of an increase in the number of animals is posing a risk of soil degradation and lowering land productivity, although it contributed to improvement of herders' livelihood in a short-term. Some measures like imposing tax on animal ownership should be introduced to control the number of animals. This initiative could start from targeting herders with more animals, for example, those with more than 500 animals. A substantial portion of meats and dairy products produced by herders are self-consumed and not circulated in the market at present. Promotion of livestock activities would require, as a first step, raising of awareness and training of herders to make them understand the concept of business and equip them with minimum knowledge on how to respond to market requirements.

Although there is a high potential for tourism development in Uvurkhangai and a strategic plan for the Orkhon Valley Area has been prepared, no specific action has been undertaken yet. A lack of management capability especially in terms of giving priorities to actions and starting initiative in a systematic way is the cause of this inaction. There are also a number of challenges for promotion of tourism such as no fixed itineraries, inadequate human resources with sufficient skill and inadequate infrastructure such as road, electricity and sewerage.

While there are many positive factors in business promotion in Uvurkhangai, there are negative factors as well such as weak distribution network (18th), high interest rate (17th), limited banking and financial services (16th), weak communication technologies such as Internet, telephone and postal services (19th) and limited application of digital devices by companies (19th).

(3) Development prospects

In consideration of the Uvurkhangai's location and a number of positive factors favorable for business development, logistic industry promotion is proposed. As shown in Figure 7.4.4, Uvurkhangai is geographically located in the center of Mongolia with mountainous northern and western Aimags in its back. It could serve as a gateway for northern and western Aimags in exporting agriculture products mainly to China through Sainshand and the southern border point of Shiveehuren Sehee, which is located in the immediate north of one of the One-Belt One Road routes and also in importing goods from abroad. Products from the hinterland could be collected and exported to Russia through Ulaanbaatar as well and vice versa.

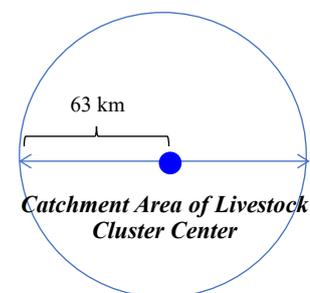


Source: JICA Project Team

Figure 7.4.4 Logistic Center Function of Uvurkhangai

While Uvurkhangai is an agriculture dominant Aimag, it is endowed with a number of favorable conditions for business development such as bureaucracy not hindering business (3rd), low bribe and corruption (4th), easy access to licenses (2nd), competent senior managers (5th), good financial skills (2nd), large investment in the last year by companies (1st), and proper construction and maintenance of infrastructure in provincial center (3rd). Low percentage of government workers (21st) may be contributing to these positive aspects of private business. Local initiative is also observed in such ways as efficient expenditure by local government (2nd), policies and decisions by local government contributing to province development (3rd) and decency of public services (4th). Development of logistics industry could thus be planned and promoted taking advantage of its geographical location, strengthening and expanding the advantages in place and overcoming various weaknesses.

Livestock promotion is also promising in Uvurkhangai. As in other Aimags, enhancement of value added by increasing the level of processing is an important challenge for Uvurkhangai. This direction could be pursued by establishing livestock industrial cluster with core facilities at several locations. The idea is that animal raw materials provided from the hinterlands are processed at these centers for producing meat, dairy products such as milk, cheese and butter and skin and leather. Central facilities may be located in the Aimag capital of Arvaikheer, and sub-centers may be located in Baruunbayan-Ulaan in the south, Bayangol in the east and Bayan-Ondor in the northeast. These locations are preliminarily proposed in consideration of their present road transportation hub function and their locations along the logistic routes shown in Figure 7.4.4.



A preliminary estimate indicates that a catchment area of one livestock industrial cluster center would be 12,000 to 13,000 km², assuming 150 animals processed in a day as estimated for Arkhangai, a circle with 63 km radius. The following shows the calculation process.

- (a) Number of animals to be processed in a day: 150
- (b) % of processed animals to total animals: 5%
- (c) Total number of animals: 1,095,000 heads
- (d) Animal density in Uvurkhangai: 5,461,000 animals in 2018/62,900 km²=87 heads/km²

(e) Catchment area: c)/d) about 12,500 km²

Since the animal density was estimated using the total Aimag area, actual density would be higher because grazing area would be smaller than the Aimag area. This means the actual catchment area of a livestock cluster center would be smaller than 12,000 to 13,000 km². Applying this preliminary estimate, the number of livestock cluster centers required to cover the entire Uvurkhangaigai Aimag would be about five (62,900km² divided by 12,500 km²/center = 5.03).

The estimate above is preliminary, thus subject to further examination. What is important is to prepare a practical livestock promotion plan based on the existing condition of the target area in such a way as to realize the long-term targets. Once a more detailed analysis is made and priority determined, it could be presented to private investors for their consideration on investment. A pilot project could be implemented as a joint venture by the Aimag government and private investors.

Kharkhorin and the Orkhon Valley areas are proposed for nature and culture-oriented tourism promotion and integrated farming. The strategic plan for the Orkhon Valley area should be developed into an action plan and an initial step taken.

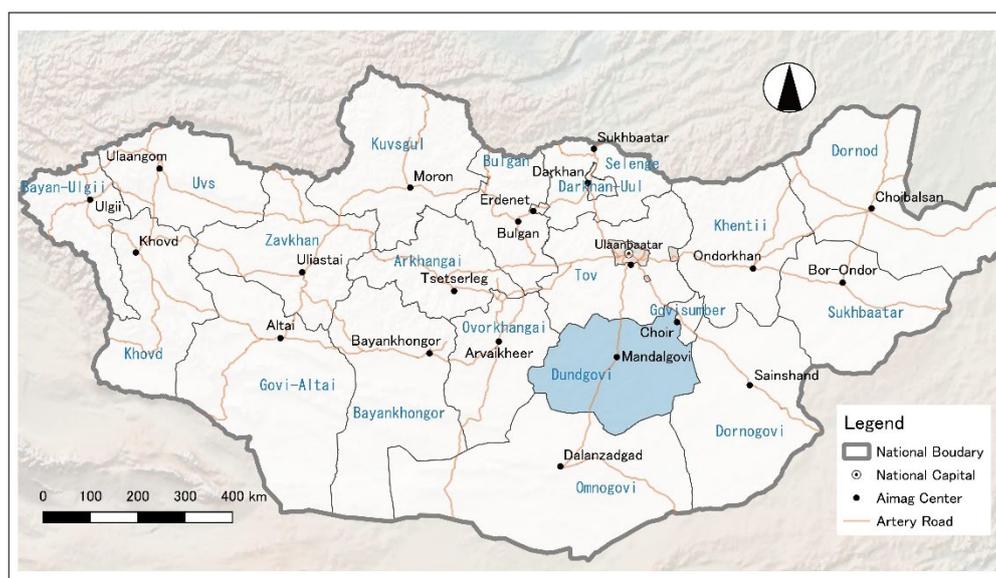
7.5 Development Diagnosis by Aimag in Southern Region

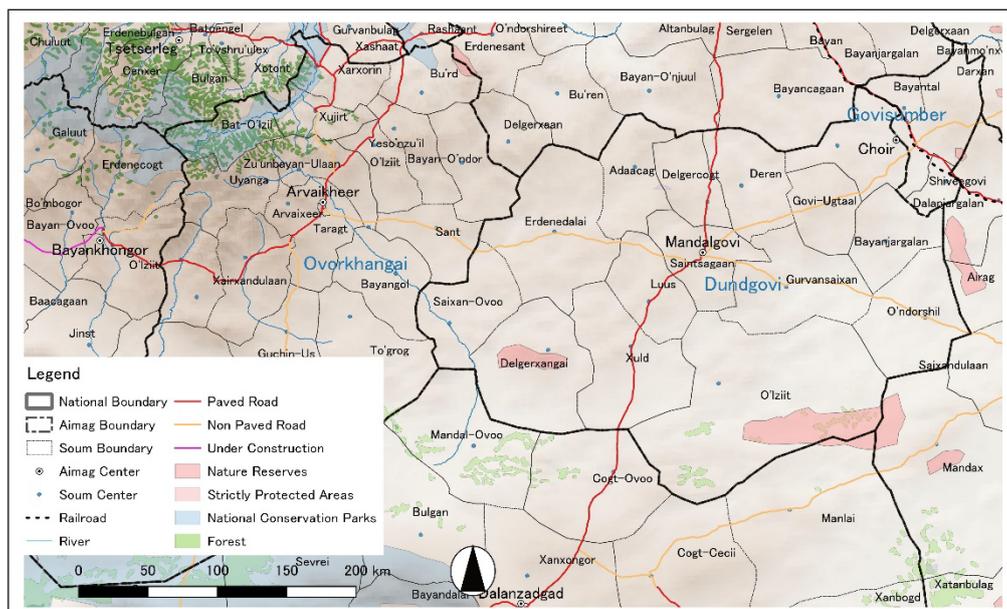
7.5.1 Dundgovi

(1) Existing conditions

Location and natural conditions

Dundgovi is located in the central eastern area of Mongolia with the land area of 74,690 km² ranked 11th, bordering on Tuv, Umnugovi, Uvurkhangaigai, and Dornogovi Aimags. Its capital Mandalgovi is located 160 km from Ulaanbaatar by road distance. The northern part of Dundgovi Aimag belongs to dry zone and the southern part belongs to desert zone. Forest areas occupy 27,100 ha. There are no lakes and very few springs and wells. Many diverse plants and animals are observed in Aimag because of the diversified geographical and environmental features.





Source: JICA Project Team

Figure 7.5.1 Location and Land Map of Dundgovi Aimag

Socio-economy

The population in Dundgovi has been growing in recent years by 2.89% per annum in 2010-15 after depopulating period from 2000 to 2010 by -2.24%. According to the Aimag group discussion, this decrease of population from 2000 to 2010 is due mainly to out migration and severe damage of livestock sector by Dzud and drought. The recent increase of population is due to the improvement of infrastructure such as roads and communications as well as improved economic situation in Aimag.

The economy of Dundgovi is supported by the primary sector, mainly livestock, with the share of the GRDP 59%. The total number of animals per person was 77 in 2017 ranked 1st and the livestock population in Dundgovi considerably increased from 1,112,000 in 2010 to 3,593,000 in 2017 ranked 9th of all the Aimags. Indeed, the Aimag was damaged by Dzud and drought in 2010 and lost significant number of livestock. The increase of number livestock is due partly to the recovery from Dzud in 2010. There is a decreasing trend on sown area: 125 ha in 2010 to 92 ha in 2017.

The ratio of economically active population is relatively high at 52.4% in 2017. The unemployment rate was drastically improved from 10.1% in 2010 to 4.4% in 2017. This may reflect increase in employment opportunities in livestock and related processing industries and public sector according to the group discussion.

The per capita GRDP in Dundgovi was MNT5,579,000 in 2017, ranked 20th of all the Aimag, improved from 2010. The number of establishments is limited at 639 ranked 20th. There are just 20 large private companies, ranked 20th. This may reflect undeveloped industry sector in Dundgovi as seen by the share of industry just 13% and sales of industrial products is lowest in all of 21 Aimags.

Primary and secondary education in Dundgovi appears favorable with respect to pupil teacher ratios and enrolment ratios. Quality of tertiary education, however, is assessed low. Health sector of Dundgovi shows mixed performance. Availability of physicians is relatively favorable and IMR is low. Infectious diseases per 10,000 are 106 ranked 14th.

Spatial development and infrastructure

The urbanization rate in Dundgovi was low at 26.6% in 2017. The Aimag capital of Mandalgovi had population 14,294 in 2017, which is consistently increasing although the rates of increase are low at 0.91% per annum in 2010-15.

The capital city Mandalgovi is connected to Ulaanbaatar by A201 and Dalanzadgad by A202 and Sainshand by local roads. The road infrastructure between Mandalgovi and Dalanzadgad and Sainshand is not adequate yet, comprising mixture of asphalt and gravel surfaces despite strategic importance of the roads. In fact, quality of road system in Dundgovi is assessed low ranked 18th.

There is no railway and airport in the Aimag. Dundgovi has middle level of infrastructure such as telephones, energy and water supply, while basic infrastructure such as access to clean water and waste management is less developed.

(2) Constraints to development

The small population size represents an inherent constraint to development of Dundgovi. The land of Dundgovi Aimag is not very suitable for agriculture due to natural conditions. Overgrazing and climate change have caused degradation of pastureland and desertification. Degradation of pastureland and desertification are proceeding to become constraints to livestock activities. Dundgovi was affected most by previous Dzud in 2009 and 2010 and lost many domestic animals due to insufficient measures to prepare for the events.

As for tourism sector, most tourists tend to just pass the Aimag without staying overnight owing to the Aimag location between Ulaanbaatar and Umnugovi although there are attractive tourism resources in the Aimag.

In order to promote industry and service sector other than livestock sector, low availability of qualified graduates and skilled labor is recognized as a constraint. Low quality of tertiary education ranked 17th does not meet the needs of Aimag. Participants of the group discussion pointed out that lack of institution of tertiary education in Dundgovi is a constrain for economic development.

Access to clean water is a severe constraint as seen by 21st rank while there are 10 water supplies points per 1,000 families ranked 1st. As many participants of the group discussion expressed concerns on inappropriate waste management, that is ranked 21st.

Participants of the group discussion pointed out that lazy mind of people in Dundgovi due to the government social welfare policy was the constraint for development.

(3) Development prospects

Dundgovi is located in the center of Mongolia and close to two big markets: Ulaanbaatar and China. By taking advantage of favorable geographical location, Dundgovi could serve as the sub-center of the central area. The capital city of Mandalgovi is located along the main artery between Ulaanbaatar and Dalanzadgad, bordering on China. In addition, Mandalgovi is connected with other strategically important cities such as Choir, Sainshand and Arvaikheer although roads are not paved but gravel and normal earth roads. As the transit point of four directions, there may be hidden demand of loading and unloading, and interim storage of cargos.

The road networks should be strengthened in order to activate the logistic potentials and make Dundgovi the transit base. Once paved roads to Choir, Ayrag and Sainshand are established, the Aimag can also be connected to the north-south railway more easily. In association with development of logistic hub, it may be better that Mandalgovi will have the function with service hub city. In addition to the transit function, raw materials from livestock farming and mining could be processed in Dundgovi and exported to China via border cities such as Zamyn-Uud, Gashuun Suhalt and Shiveehuren.

Dundgovi Aimag should pursue the sustainable and resilient livestock industry. As a precondition of further livestock development, preparation against harsh weather conditions such as Dzud and drought should be carefully undertaken such as planned production and storage of hay and fodder. Primary livestock products should be improved for high-end markets of Ulaanbaatar and China. As the Aimag is situated in a transitional area favorable for both meat and dairy production, fresh meat and dairy products can find immediate urban markets in and around Ulaanbaatar.

For the diversification of economic activities, mining and its processing industry should be promoted to some extent. Many participants in the Aimag consultation emphasized necessity of developing mining

sector as the responsible mining for Aimag development. Although Dundgovi does not have strategically significant deposit of mineral resources, there are still development potentials of mineral resources such as coal, iron ore and silver. These mineral resources have not been much developed yet so far. In Dundgovi, not only exploitation of mineral resources but also simple processing should be undertaken for the value addition. After the primary processing, further value addition should be conducted in processing bases in Umnugovi for export of the final products to China.

The key strategy of tourism sector is to create the tourism route centering on culture and nature tourism, that will provide one-night stay at least in Dundgovi and give benefits to local people. In addition to the culture and nature tourism, Dundgovi has unique tradition represented by local songs. Tourism sector will play a key role in regional promotion by combining several sectors such as agriculture, music, story, natural resources, arts and crafts, traditional landscape and cultural heritage. In other words, tourism sector should be clustered by combining local resources and promoted as the Dundgovi model. Needless to say, tourism infrastructure such as hotels, restaurants, parks, toilets and museum should be improved to attract tourists.

With favorable natural conditions, Dundgovi has a good potential to utilize a renewable energy, especially solar photovoltaic generation, with neighboring Aimags such as Umnugovi and Dornogovi. A gradual shift from fossil fuels to renewable energy in the Govi area including Dundgovi should be pursued.

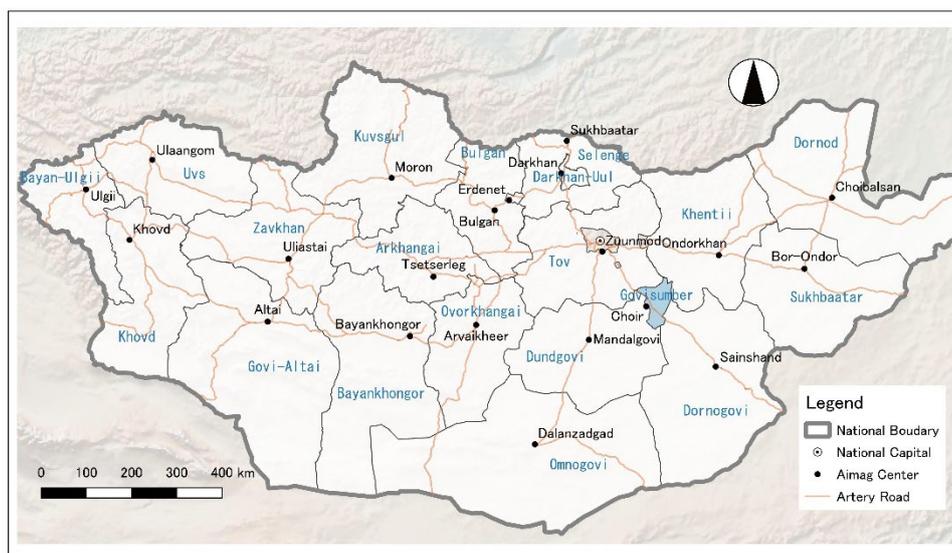
Participants in the Aimag consultation proposed to create Govi brand products. This idea should be elaborated. Dundgovi should pursue to produce the high quality and sophisticated products based on livestock, mining and tourism to establish the Govi brand.

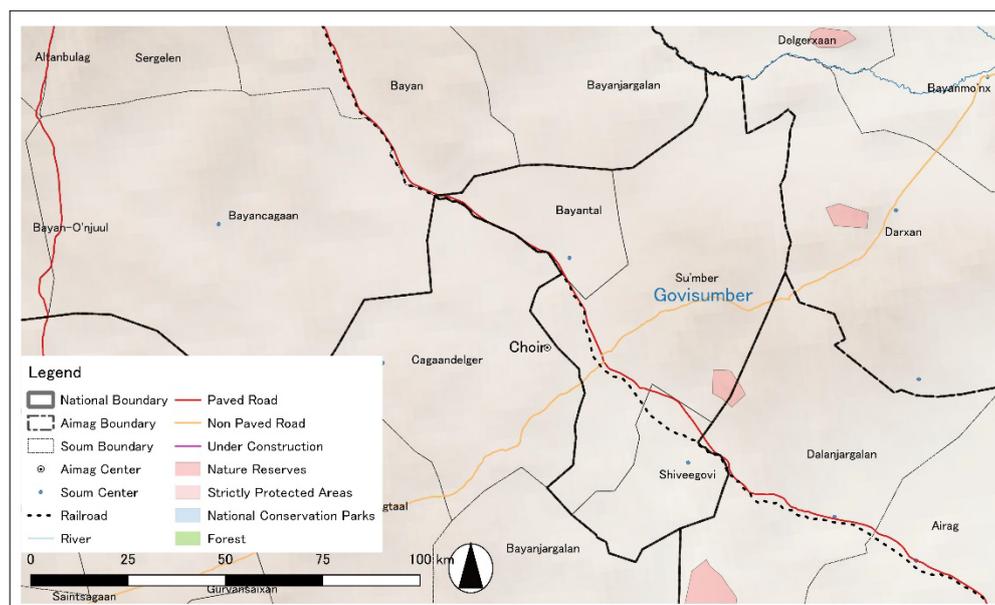
7.5.2 Govisumber

(1) Existing conditions

Location and natural conditions

Govisumber is the third smallest Aimag with land area of 5,541.8km², located in the southeast of Ulaanbaatar with its capital Choir located 226km from the national capital. It is situated largely in a steppe zone and some 80% of land suitable for extensive livestock grazing. No forest area exists in the Aimag. Govisumber has typical continental climate with large annual temperature variance between -37 and 37 degree Celsius. The annual precipitation is in the range of 200-250mm. The altitude ranges in 1,000-1,200m ASL. As the Aimag land is used for extensive grazing without forest, wildlife is limited represented by gazelle.





Source: JICA Project Team

Figure 7.5.2 Location and Land Map of Govisumber Aimag

Socio-economy

The population in Govisumber has been growing in recent years and in fact the growth accelerated from 0.57% per annum in 1995-2005 to 2.73% per annum in 2005-17. According to the Aimag administration, this population growth is due to 1) establishment of wool processing, 2) in-migration of herders due to favorable water availability, and 3) privatization of land ownership.

The livestock population in Govisumber is 97,000 in 2017, the second smallest of all the Aimags, but the livestock population per herder household is largest at 616. Cultivate area occupies only 38.7ha in Govisumber and no significant crops exist. Agriculture decreased its GRDP share from 24% in 2016 to 20% in 2017, while the share of services GRDP increased from 38% to 41% during the same period.

The ratio of economically active population is low at 44.9% in 2017, although it was improved from 37.1% in 2016. The employment rate was also improved from 82.3% in 2016 to 92.2% in 2017. This reflects increase in employment opportunities in livestock and related processing industries. This is reflected also in the significant increase in LPR from 52.4% in 2016 to 69.0% in 2017.

The per capita GRDP in Govisumber was MNT5,080,000 in 2017, ranked 8th of all the Aimags, increased by 3.8% from 2016. The largest per capita loans outstanding in the private sector and the largest budget to expenditure ratio of the Aimag government indicate active economic activities, while the per capita deposit is relatively low. This may reflect revitalized but somewhat volatile Aimag economy in recent years. Govisumber has high average wage MNT874,000 per month, the second highest of 21 Aimags, and the unemployment rate improved significantly from 18.1% in 2016 to 7.8% in 2017.

Spatial development and infrastructure

The urbanization rate in Govisumber has been consistently decreasing from 74.5% in 2010 to 40.9% in 2017. This is presumably due to in-migration of herders as described above. The Aimag capital of Choir had population 10,434 in 2017, consistently increasing although the rates of increase are low: 0.78% per annum in 2000-10 and 1.04% per annum in 2010-17.

Govisumber is served by relatively good road infrastructure with the national road A101 passing through the Aimag. The MTZ linking Russia and China through Ulaanbaatar also passes through the Aimag. Govisumber is also favored by other economic infrastructure such as telephones, energy and water supply, although the infrastructure capacity is becoming tight as population increases in recent years.

Access to social and commercial facilities is also relatively favorable in Govisumber. The Aimag has the smallest population per commercial facilities. For management of solid wastes, the Aimag is ranked low.

(2) Constraints to development

The small land area presents an inherent constraint to development of Govisumber. The Aimag economy is small and undiversified with minimal crop production and dominance of relatively large-scale livestock farming. Both urban and rural infrastructure and social services are becoming inadequate to serve the rapidly increasing population. While piped water supply from the Kherlen River is considered an advantage, concerns for water shortages were raised at the Aimag consultation.

Govisumber may be at the transition stage from dominantly rural economy to urban-oriented activities represented by new wool processing and services. While the unemployment rate has been improved and the average wage is high, poverty incidence is high, 52.4% in 2016. Income variance is large between workers at large industries and the urban poor, and also between large scale herders and the rural poor. Disparities exist in social services provision between rural and urban areas.

In pursuing urban-oriented development, insufficient qualified graduate becomes a constraint. While enrollment rates in primary, basic and secondary education are high, Govisumber is weak in tertiary education ranked in the middle among all the Aimags. Need for expansion of tertiary education was noted at the Aimag consultation.

(3) Development prospects

The capital city of Choir is located along the main artery linking Ulaanbaatar and Zamyn-Uud on the border with China. It is served by the main railway line between Russia and China as well. The trunk telecommunication backbone has been established along the artery, which is expected to expand communications capacity between Russia and China. With these conditions, Choir has a good potential to become a major logistic center in the south with loading/unloading facilities for road and rail transport. Possibility of Choir to become an automobile service/repair center was also raised at the Aimag consultation.

Govisumber has various mineral resources such as brown coal, oil, tin, clay for bricks and fluorspar in and around the Aimag. These mineral resources have not been much utilized yet, except fluorite mines near Bor-Uundur in the neighboring Khentii Aimag. After primary processing at respective mining sites, further processing for higher value products may be undertaken in Choir or other cities in Govisumber and shipped out from the logistic center.

Large reserve of brown coal in and around Govisumber deserves special attention. An easy way to utilize it is to establish a large-scale coal-fired power plant to produce cheap electricity as planned by China. Instead of dirty coal, clean energy may be exported to China, but this will give environmental stress on the Mongolian side. A preferable option may be to establish a clean coal technology (CCT) center to develop advanced technology for processing low quality coal into high value energy products. To establish the advanced coal technology to supply processed coal products, development of domestic market is vitally important. To encourage use of processed coal products by low income city residents, a subsidy scheme may be introduced. Such a use of public resources may be justified as CCT serves for protection of environment.

Presence of the former military base with a paved runway left by Russian presents a major potential for medium to long term development of Govisumber. To utilize it effectively, free trade zone (FTZ) designation may be re-activated for establishment of processing plants of mineral resources, expansion of cashmere wool processing, high value processing of livestock products including hides and skins, dairy, placentas and others, automobile service/repair shops and other manufacturing and service establishments. Most of these establishments can be developed on the basis of locally-based SMEs, for which the Government should provide support as part of social and RDP.

Another major possibility is to establish an ICT industrial estate in the FTZ by utilizing advantages of the telecommunication backbone, availability of water, energy and transport infrastructure. A

necessary prerequisite is to generate a corps of highly qualified manpower through international cooperative programs.

The urban-oriented development suggested above should not undermine historical and cultural heritage of Govisumber, which is rural based. As a base for rural economy, livestock activities should be intensified. The establishment of processing industries based on livestock products as described above will re-activate the sector. To support the intensive livestock activities, availability of water and feed should continue to be improved to encourage further in-migration of herders. Tourism may provide minor but important economic activities for rural and urban areas. Govisumber may serve as a weekend resort for visitors from Ulaanbaatar, utilizing cool climate in Bayantal during summer, Khalzan springs near Choir and some man-made attractions. Local products such as food and handicraft related to history and culture may find markets among visitors.

7.5.3 Dornogovi

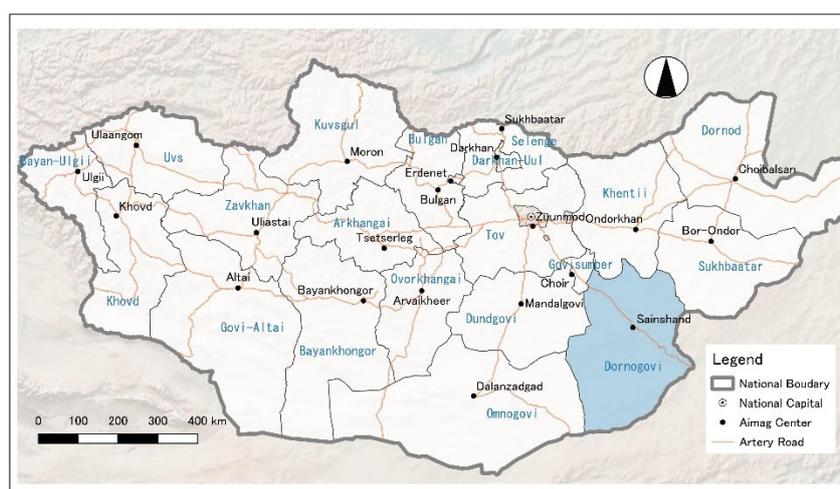
(1) Existing conditions

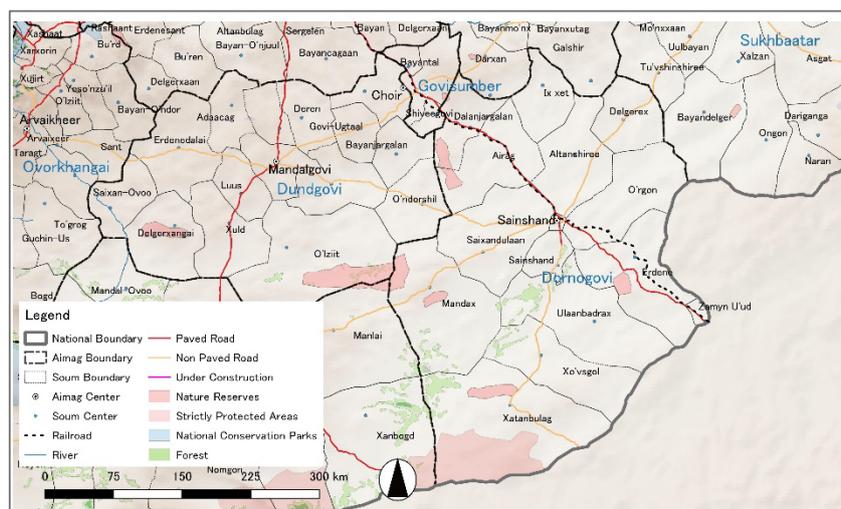
Location and natural conditions

Dornogovi Aimag is located in the southeast of Ulaanbaatar with the land area of 109,472 km², 5th largest of all the Aimags. The Aimag is bordering on the China's Autonomous Region of Inner Mongolia in the south side. The Aimag's climate is broadly divided into semi-desert and steppe, and the land is covered generally by hard and sandy soil. As it is located in the Govi desert, frequent sand storms make the Aimag hottest and most windswept areas in Mongolia. Snow storms during winter amplify the hard weather conditions. Its capital Sainshand is around 450 km away from Ulaanbaatar by road distance. It is located along the national artery A 0102/0103 and also the MTZ running along it in the north-south direction.

Forest area accounts only for 1.5% of total land area of Aimag, and cultivate area is only 122 ha. Although the Aimag has no major river, water resource depends on sizeable resources of subterranean water and many small lakes, small rivers and springs.

As for wildlife, there are many steppe species of animals such as wild horse, wild sheep, ibex, black tailed antelope, white antelope, lynx and so forth.





Source: JICA Project Team

Figure 7.5.3 Location and Land Map of Dornogovi Aimag

Socio-economy

Population of Dornogovi was 68,192 in 2017 to make population density 0.62/km². Population growth accelerated from -1.12% per annum during 2000-2010 and to 1.93% per annum during 2000-17.

The economy of Dornogovi is characterized by large share of the service sector accounting for 51% of the GRDP in 2017. Tourism activities contribute to the large share of the service sector. Extensive livestock farming is popular in Dornogovi as seen from small livestock population per 100 ha pastureland at 35, ranked 20th of all the Aimags. Livestock population per herder household, however, was 480 in 2017, ranked 5th. Of all the families, 23.0% were engaged in livestock farming in 2017 ranked 17th.

The value of industrial products in Dornogovi was large at MNT272.8 billion in 2017, ranked 4th, which corresponds to 91.05% of the GRDP, ranked 3rd in 2017. This reflects positive effects of mining activities. Nevertheless, the per capita GRDP in 2016 was middle at MNT 4,451,000 ranked 12th and labor productivity was relatively low at MNT 9,541,000 ranked 14th, reflecting low productivity of dominant services activities.

The number of establishments in Dornogovi is relatively small with 1,069 in 2017, ranked 17th, and 886 private establishments, ranked 16th. The number of large private enterprises is at 34, ranked 12th. There are several large and some 50 small and medium-sized factories such as mining, food processing, cement and construction. However, the economic structure is weak with dichotomy between large establishments with high wages and small ones.

In social aspects, LFC is relatively low at 63.3%, lower than the national average at 65.7 in 2017. As part of the Aimag consultation, group discussions were undertaken in four groups. According to participants at the group discussions, this is due to increased births after 2000 rather than large out-migration. The average monthly wage, however, is high at MNT 839,000, ranked 4th, which shows another aspect of economic dichotomy. Quality of primary, secondary and tertiary education in Dornogovi seems high at least in urban areas, but pupils to teacher ratios at primary (ranked 18th) and secondary (ranked 19th) education are large. Still, 3-shifts exist in the Aimag. Infectious diseases per 10,000 is 101 ranked 13th and the number of people per physician is small with 304 ranked 2nd.

Spatial development and infrastructure

The urbanization rate in Dornogovi is relatively high at 63.1% in 2017. The Aimag capital of Sainshand had population 24,772 in 2017.

Sainshand is located between Choir in Govisumber and Zamyn-Uud bordering on China. Dornogovi

has relatively good quality roadways passing through the north to the south of the Aimag. However, the width (gauge) of the road is not sufficient to serve as a main logistic artery. The railroad maintains good service quality contributing mainly to large among of cargoes and passenger's transport.

Penetration rates of various infrastructure are relatively high measured by some indices such as telephone lines per 1,000 population ranked 2nd, water supply points per 1,000 families at 4th, and the number of vehicles per working age population at 3rd. However, level of communication technology (ranked 21st) and access to information (ranked 18th) are low. All Soums except Khatanbulag away from the artery road and the railway are connected by optic fiber cables.

(2) Constraints to development

Severe climate of semi desert poses an inherent constraint for the Aimag development. Desertification along the southern border is a matter of concern. Although Sainshand is strategically located along the main artery road and the MTZ, its population is still too small to drive the Aimag economy.

Availability of water is a constraint to development of Soums to different degrees. Sainshand obtains piped water from 27km distance. Other Soums rely on local groundwater extracted from 100-150m depth. Water hardness is considered a problem in some Soums. Zamyn-Uud suffers from water shortages and faces also water right problem as some participants at the group discussions clarified.

The weak economic structure with dichotomy between large establishments with high wages and small ones is a fundamental constraint to sound development of the Aimag socio-economy. Despite the large share of the service sector in the GRDP, large establishments including mining do not induce much service activities. Also, low income and purchasing power constrain the development of local industries. Consequently, the financial base of the Aimag administration is weak with limited capital accumulation, which in turn makes it difficult to provide social services and develop infrastructure particularly in rural areas. Some participants at the group discussions pointed out that mining concessions would not contribute to local incomes.

Participants of the group discussions pointed out as constraints related to development administration as: 1) unstable Aimag policy, 2) too much license and other requirements causing complexity, 3) lack of proper land management without planning, and 4) high tax rates and lack of regulatory framework preventing foreign investments. Also pointed out are limited pasture capacity constraining livestock development, and insufficient tourism facilities of good quality including sanitation.

(3) Development prospects

Considering the strategic location and still small population of Sainshand, inter-city links should be strengthened along the main north-south artery. The Sainshand - Zamyn-Uud corridor development should be deliberately pursued, where Sainshand may be specialized in service activities including logistic services and tourism related services. A triangle tourism circuit may be formed linking Sainshand as a tourism base with museums and other man-made attractions, archaeological heritage and wilderness tourism in the southern semi-desert, and border tourism for shopping etc. in Zamyn-Uud. The Zamyn-Uud FTZ should be further developed to become eventually a free border town.

Utilization of medicinal herbs such as liquorice, *cuscuta australis*, and others for multiple purposes may be promoted to diversify livelihood opportunities for rural people. Production of herbs, watermelon and other crops as raised by participants at the group discussions may deserve considerations. Some products may find immediate market for tourists. If they are bought by foreign tourists, it would be an export industry.

Rich mineral resources may be further developed by sensible and responsible mining so that attractive environment for tourism would be preserved. Possibilities include further development of fluorspar, and new development of oil in Zuunbayan, gold, iron, uranium in Altanshiree, and bituminous coal. The mining development should be taken as opportunities to improve rural infrastructure and to improve financial situations of the local administration so that social services will be improved. To facilitate this, a community development fund may be created based on part of profits from the mining development for use to improve various community infrastructure and facilities.

Sensible and responsible mining activities should associate with processing of mining products to increase value added and enlarge opportunities for community development with larger number of employment generation and larger contribution to the community development fund. FDI should be promoted by improving related administrative support and regulation. An example of FDI for mining and processing is given in Box below.

Considering high tourism potentials and vulnerable environment, Dornogovi should become a showcase for state-of-art environmental technology. For example, wastewater reuse technology should be introduced as well as proper water supply management. Social services should continue to be improved in anticipation of increasing population and visitors. Modern education system should be introduced including environmental education that utilizes steppe and semi-desert as fieldwork venues. Health development may be broadened by supply of herbal medicine produced locally. The current shortages of qualified engineers and nurses should be resolved as a matter of course.

Box

The Megatech Manufacturing Mongolia limited liability company (LLC) established by Japanese company, MEGATECH Corporation has been investigating the possibility of operation on silica smelting plant in Mongolia since 10 years ago. It was planned to start operation in Sainshand in June 2019. Production capacity is 200 to 400 tons of silica smelting capacity per month. The company has secured a stable supply of raw materials from the quarry located about 90 km from Sainshand. The reserves of quartzite are said to be large enough for about 400 years. The company plans to export the silica products to Japan, Korea and China in the future.



Photo: Silica Smelting Factory in Sainshand

7.5.4 Umnugovi

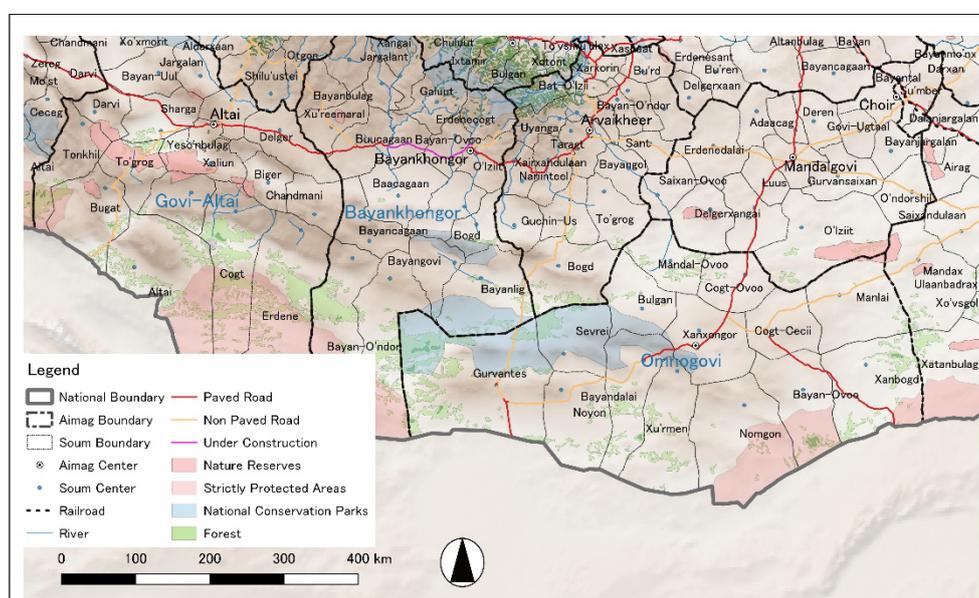
(1) Existing conditions

Location and natural conditions

Umnugovi Aimag is located in the south in Mongolia with the vast land area of 165,000 km², largest of all Aimag. It is bordered on Dundgovi, Dornogovi, Bayankhongor and Uvurkhangai Aimag. The area of Umnugovi belongs to a part of the Gobi Desert. The topography of Umnugovi is characterized by the eastern most continuation of the Altai mountain range, 3,000 m class mountains like Gobi Gurvan Saikhan, Sevrei, Noyon Bogd, Nomgon, Tost, Nemegt, Altan Uul, Gilbent. Its capital Dalanzadgad is around 550 km away from Ulaanbaatar by road distance. It is located along the sub-artery in the north-south direction.

Forest area occupies 753,700 ha and cultivate area is only 185 ha. Although there are no big lakes and rivers in Umnugovi, it has some oasis, small lakes and ponds. Umnugovi has the underground water with estimated reserve of 260.5 million m³.

As for wildlife, many animals including endangered species like Argali the wild sheep, ibex, leopard, black tailed antelope, Mazaalai the Gobi bear, marbled polecat, wildcat, lynx, rock marten and gopher, antelope are observed in Umnugovi. There are medicinal herbs and about 250 species of small leafed, nutritious, short plants and vegetation that are resistant to hot and dry weather of the desert, grow in Umnugovi.



Source: JICA Project Team

Figure 7.5.4 Location and Land Map of Umnugovi Aimag

Socio-economy

Umnugovi has the 65,600 population in 2017 with population density 0.39/km². Population growth changed from 2.80% per annum during 2000-2010 and to 0.11% per annum during 2010-15.

Overall economic situation is relatively better than other Aimags as seen by GRDP MNT 540 million ranked 4th and GRDP per capita ranked 3rd of all the Aimag. Furthermore, average wages and salary is MNT 858,000 ranked 3rd. The ratio of economically active population is relatively low at 47.1% in 2017, ranked 13th. The employment rate was second lowest at 83.5% in 2017, ranked 20th. Economic development in Aimag is confined largely in mining, limited industry and construction.

The economy of Umnugovi has been dominated by industry and construction sector accounting for 53% of GRDP in 2017. This strong industry and construction sector are based on mining sector, which is represented by the Tavan Tolgoi coal mine and the Oyu Tolgoi copper and gold mine. These two mines have contributed to economic growth in Mongolia significantly.

Mining sector induces other sectors development such as processing, construction and other service industry. The value of industrial products in Umnugovi was overwhelmingly large at MNT2055.7 billion in 2017 ranked 2nd. This is due to the positive effects deriving from mining activities. The number of establishments in Umnugovi was moderate with 1,429 in 2017 ranked 9th, and 1,218 private establishments ranked 9th. The number of large private enterprises, however, was relatively large at 51 ranked 4th. The economic structure is supported mainly by large companies, that are engaged in mining, industry and construction sector.

Due to the natural conditions, economic activities of primary sector, especially agriculture, are limited with share of 20% of total GRDP. As for livestock sector, the number of livestock per herder household was 456, ranked 7th in 2017 even though number of livestock itself was 662,000, ranked 15th in 2017.

In social aspects, quality of primary and secondary education in Umnugovi seems low as seen by pupils to teacher ratios at primary (ranked 15th) and secondary education (ranked 11th). Additionally, quality of tertiary education was ranked 19th. Health sector infrastructure is not favourable ranked 17th in 2017. The number of people per physician is 342 ranked 6th and infectious diseases per 10,000 was 109 ranked 15th.

Spatial development and infrastructure

The urbanization rate in Umnugovi is relatively low at 33.7% in 2017 reflecting vast land. While population increased during 2000-10, it is mainly due to in-migration for development of the Oyu Tolgoi mine from neighboring Aimags. Thus, in-migrants to urban areas are limited due to limited employment opportunities in the Aimag center. The Aimag capital of Dalanzadgad is recognized as the base city for mining and tourism, connecting to China via Gashuun Suhalt and Shiveehuren and tourism destination from Ulaanbaatar.

The number of telephone lines decreased from 1,614 in 2010 at 8th to 950 in 2018 at 8th. The number of water stations increased from 37 in 2010 to 71 in 2018. As a result, the number of people covered by one water station decreased from 1,651 in 2010 (16th) to 924 in 2017(20th).

Quality of various infrastructure is at high levels as seen by construction and maintenance (1st), transportation (1st) and communication technology (1st), except low quality of roads (20nd) and food security (21st).

(2) Constraints to development

While the mining sector has initiated economic development in Umnugovi Aimag, the sector has the negative aspects such as limited economic beneficiaries and environmental problems.

The high GRDP, per capita GRDP and wages are owing mainly to the mining sector, which benefit mostly mining workers and their families. Except for the mining sector, there are limited job opportunities in Umnugovi Aimag. In consequence, economic disparities are expanding as represented by high unemployment rate and income inequality.

Participants of the group discussions pointed out negative effects from mining sector on groundwater, dust, pasture, desertification, soil and animals. In addition, mining companies pay less attention to restoration of used land and overuse of groundwater. Knowledge and understanding of green economy of provincial businesses in Umnugovi is the lowest ranked 21th.

While overall business environment such as banking and financial services, employee training and ease of doing business is recognized as favorable, other conditions such as public private partnership (21th), foreign projects (21th) and unfair competition (20th) would work as the constraints. As for human resources, there is a lack of skilled labor force (21th), and migration of skilled workers (20th). Scarce water resources in the Aimag may be a serious constraint for most industries.

(3) Development prospects

Umnugovi shares a long border with China having main outlets at Gashuun Sukhait in the east and Shiveekhuren in the west. Taking advantage of this position, Umnugovi should be developed as the base of border trade with China. Each outlet should be equipped not only with trade related functions

but also with additional functions to strengthen its position.

For development of the Tavan Tolgoi coal mine and the Oyu Tolgoi copper and gold mine as the economic driving force of Umnugovi Aimag, improved railway transportation to border area is extremely important. The railway transportation will be used for non-mining cargos and passengers including tourists as well in the future. At the same time, access roads to border should be strengthened.

The railway and improved access roads will complement each other to support the logistics in the south of Mongolia. Goods and people are transported from neighboring Aimags to China through the logistic hubs. To develop the logistic hubs, both soft and hard infrastructure need to be strengthened to establish sub-corridor development in this area. Soft infrastructure would include establishment of delivery system and simplification of export and import procedures at the border. Hard infrastructure would include development of warehouses and transport depots on the border. In addition to the logistic hub function, the areas around Dalanzadgad, Gashuun Suhalt and Shiveehuren could serve as the base of service and commerce.

The mining sector represented by the Tavan Tolgoi coal mine and the Oyu Tolgoi copper and gold mine is the most promising sector but should be developed with adequate social and environment considerations. To realize the optimal potential from mining sector, the practice of responsible mining development should be undertaken to showcase model regional development by mining development. Many participants at the Aimag consultation expressed strong concerns on negative environmental effects by mining sector. The green policy with effective regulation should be formulated and implemented. Community development fund may be established with portions of profits from mining activities for use to improve community infrastructure in and around the mining sites. Water resources management is important part of green policy associated with mining. Planned piped transfer of water to resolve depletion of groundwater due to mining is an option to be examined carefully.

Based on the steady ICT development in Umnugovi as seen by application of digital devices ranked 1st, ICT application in some sectors will be established as the new industries to create job opportunities. As for primary sector, there are some potentials to increase efficiency such as drone-based monitoring and warning system, Internet direct sales of commodities to China, establishment of products traceability and agro-technology park. A new system to strengthen communications between Aimag and local residents including nomads by ICT may be pilot tested for Umnogovi.

Tourism in Umnugovi has the great potentials as represented by nature tourism for Yolyn Am canyon, Bayanzag, Flaming Cliffs and others. Umnugovi could serve as a summertime resort for visitors from Ulaanbaatar with beautiful sceneries and clear air.

Establishment and promotion of the Govi brand products of high quality such as meat, camel milk products, wool, cashmere, cynomorium and nettle in cooperation with neighboring Aimags should be promoted for differentiation of products by other Aimags.

As with other Aimags in the Govi region, there are huge potentials of renewable energy as represented by solar and wind power. The institution for renewable energy may be established in Umnugovi for experiments of renewable energy in the Govi region.

7.6 Development Diagnosis by Aimag in Eastern Region

7.6.1 Khentii

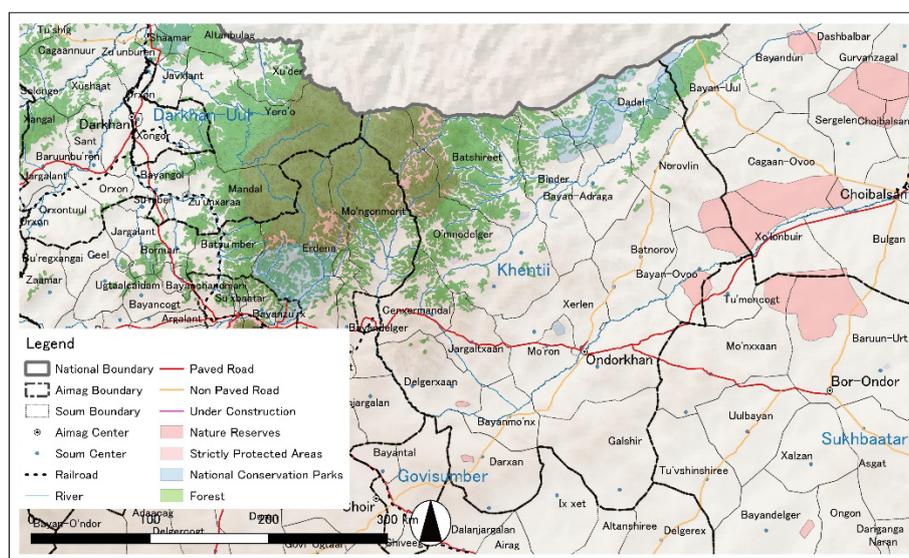
(1) Existing conditions

Location and natural conditions

Khentii Aimag is located in the east of Ulaanbaatar with the land area of 80,300km², 9th largest of all the Aimags. Its capital Undurkhaan is 335km away from the national capital by road distance. Its land occupies transition area between the Eurasian coniferous forest taiga in the northwest and the Central Asian arid steppe in the southeast. In the northern part of the Aimag, the Khan Khantii Protected Area exists with 1.2 million ha and the highest peak of Asralt Khaikhan 2,800m ASL. The

Aimag land is drained by three large rivers: Tuul River flowing into Russia to drain in Lake Baikal, Onon and Kerulen Rivers joining Amur River to drain eventually into the Pacific Ocean.

Forest areas occupy 11,301km² accounting for 14.1% of the Aimag land. As the Aimag land encompasses the two major ecological zones, it is rich in variety of fauna and flora. Wildlife found in Khentii include endangered musk deer and moose, brown bear, wolf, lynx, badger, wolverine, weasel, sable, roe-deer, elk etc. Many species of birds are also found.



Source: JICA Project Team

Figure 7.6.1 Location and Land Map of Khentii Aimag

Socio-economy

Population of Khentii was 75,700 in 2017 to make population density 0.94/km². Population growth accelerated from -0.57% per annum during the post democratization period of 1990-2000 to 1.47% per annum during 2000-17. Population has been increasing consistently since 2010.

The economy of Khentii is dominantly agricultural with the share of agricultural GRDP 59.7% in 2017. Khentii had 1,216,000 heads of livestock in 2017, the 5th largest of all the Aimags. Livestock population per herder household was 562 in 2017, the second largest. Of all the families, 45.2% were engaged in livestock farming in 2017. Crop production is also popular in Khentii with 28,143ha cultivated area as of 2017. Main crops are grains cultivated in 19,170ha. Other crops are fodder

cultivated in 170ha, potatoes and vegetables.

The per capita GRDP was MNT4,498,000 in 2017 ranked 11th, but labor productivity is relatively high at MNT11,702,000 per employee ranked 8th. This is mainly due to relatively large-scale operation of livestock farming under favorable conditions, while the industrial GRDP has only 12.5% share as of 2017. In fact, manufacturing value was very small at MNT5.7 billion ranked 19th, corresponding to only 1.70% of the GRDP ranked 20th.

Khentii has limited number of establishments with 1,087 in 2017 ranked 14th, and 892 private establishments (14th) and 25 large establishments (18th) exist in the Aimag. Khentii, however, has relatively efficient banking and financial services ranked 7th, and the largest number of bank branches with 75. This reflects the long history of the Aimag capital and proximity to the national capital.

Khentii has low LPR, 56.4% in 2017 ranked 20th. This is generally either due to low participation of women in the labor force, or high orientation for higher education or both. In the dominantly agricultural economy, labor participation of women tends to be rather high. Therefore, the main reason for low LPR may be high orientation for higher education. This is supported by the fact that as tertiary education was improved from 2016 to 2017, LPR was reduced. The ratio of economically active population to the total population is also low in Khentii because of the low LPR and probably low LFC as a result of employment seeking out-migration to Ulaanbaatar.

As another evidence of limited employment opportunities, unemployment rate is rather high at 10.3% in 2017 ranked 13th. Poverty incidence is 43.8% as of 2016, 4th highest of the Aimags.

Khentii has relatively high enrolment rates at primary, basic and secondary schools, and pupils to teacher ratio is high at secondary education. Infectious diseases per 10,000 population is 91 in 2017 ranked 10th.

Spatial development and infrastructure

The urbanization rate in Khentii is relatively high at 36.1% in 2017. This appears to be contradictory to the agriculture dominated economy. This is due to three cities existing in Khentii. These cities have mines nearby: Chandgaya coal mine field 53 km east of Undurkhaan, and fluorite mines near Bor-Ondor and Berkh. Most Soums lost population during 2001-10. Only Kherlen by Undurkhaan, Dadal in the northeast near the border with Russia and Tsenkhermandal close to Ulaanbaatar had positive population growth during 2001-10.

The Aimag capital of Undurkhaan is considered a gateway to Eastern Region leading from Ulaanbaatar by A0501 linked to Choibalsan of Dornod Aimag by the national road A0502 and to Baruun-Urt of Sukhbaatar by A2001. Another national road A19 start from Undurkhaan leading to the northeast to link to Bayan-Uul, where it joins A21 linking Choibalsan to Ulikhan Deed Ulikhan on the border with Russia.

Khentii is served by good road system ranked second of the Aimags, but interestingly the number of vehicles per 100 working age population is 8 in 2017 ranked 20th. Other infrastructure seems to be at average levels of all the Aimags. Telephone lines per 1,000 population is 10 (10th), water supply points per 1,000 families are 4 (11th), price of heat energy is 620m²/MNT (18th), ratio of livestock families having electric engine is 82.0% (11th), and gasoline price is MNT1,555/liter (9th).

(2) Constraints to development

Small population of the Aimag capital, 20,935 in 2017, works as a constraint to development of the entire Aimag. The Khentii economy has weak structure with small number of establishments without much diversification and small GRDP share of industry sector only at 12.5% in 2017. Khentii suffers from high unemployment rate, high poverty incidence and out-migration. Despite the recent improvement, tertiary education is still weak, and Khentii is ranked 19th in 2018 in the availability of skilled labor force.

The weak economic structure in Khentii causes low mortgage ability and lack of capital accumulation, which constrain the self-reliant development. The relatively high labor productivity is due mainly to

mining activities, which do not benefit the majority of rural people. The industry sector is particularly undeveloped, and the number of large establishments is limited.

Government employees account for 16.1% of the total employment in Khentii, the 5th largest share of the Aimags, and revenue and expenditure are largely balanced in Khentii. Still, social services in the Aimag seem to be insufficient.

As part of the Aimag consultation, group discussions were undertaken in four groups. Most serious constraints to development identified by three out of four groups are: 1) unemployment and poverty, 2) low industrial development, 3) inadequate infrastructure, 4) undeveloped tourism, and 5) environmental problems such as degradation of pasture, desertification, decreasing water availability, air and soil pollution, and water hygiene.

(3) Development prospects

Khentii has favorable soil conditions and water availability for livestock farming and crop cultivation. Semi-intensive livestock farming may be combined with cultivation of fodder crops for integrated farming. By utilizing a wide range of agro-ecological conditions of the two major ecological zones, cultivation of other crops may also be expanded such as vegetables and potatoes. Water saving and advanced irrigation should be introduced by using the two major rivers as sources of water in medium to long term future. A feasibility study should be undertaken in the short term. Primary livestock products should be processed into value-added products for urban and export markets. As the Aimag is situated in a transitional area favorable for both meat and dairy production, fresh meat and dairy products can find immediate urban markets in and around Ulaanbaatar.

Light manufacturing industries to produce consumer goods and construction materials may be developed capitalizing on rich forest resources and proximity to the national capital. Cement, concrete blocks, bricks and various wood products may be produced by locally based SMEs, if proper support measures are taken by the Government. For wood products, it is important to utilize limited forest resources without wastes to produce such high quality products as oriented strand board (OSB) and particle board.

In addition to coal and fluorite already produced, other mineral resources may be developed such as smoky quartz, asbestos, tungsten, iron, gold, silver and copper. As a prerequisite, economic viability of mining development should be established reflecting costs of responsible mining and rehabilitation of mining sites.

Tourism of various forms has major potentials in the medium to long terms. The Khan Khentii State Reserve may be developed for nature tourism integrated with the Teraj National Park to the west. Wilderness tourism in and around the Onon-Balj National Park and Dalal village is another promising prospect.

Heritage tourism based on historical places related especially to the life of Chinggis Khaan and cultural/religious tourism based on ruins of 13th and 14th century towns and other historical objects and places deserve serious examination for tourism potentials and costs of rehabilitation. Related to tourism development, establishment of wellness industry utilizing therapeutic mineral springs, medicinal lake of Gurvan Nuur Rashaan and medicinal plants/herbs may be examined as important option in the medium to long terms.

Tourism development expands and diversify opportunities for development of local industries serving tourists with handicrafts for souvenirs, specialty local food, fresh vegetables and fruits as well as tourism related services. Local culture and habits are also promoted as additional attractions for tourists such as horse and camel riding and festivities. Rural tourism can attract curiosity seeking tourists by offering accommodation at rural houses, experiences of milking livestock and farming/harvesting. Brand development and proactive marketing hold keys for successful tourism development with local characteristics.

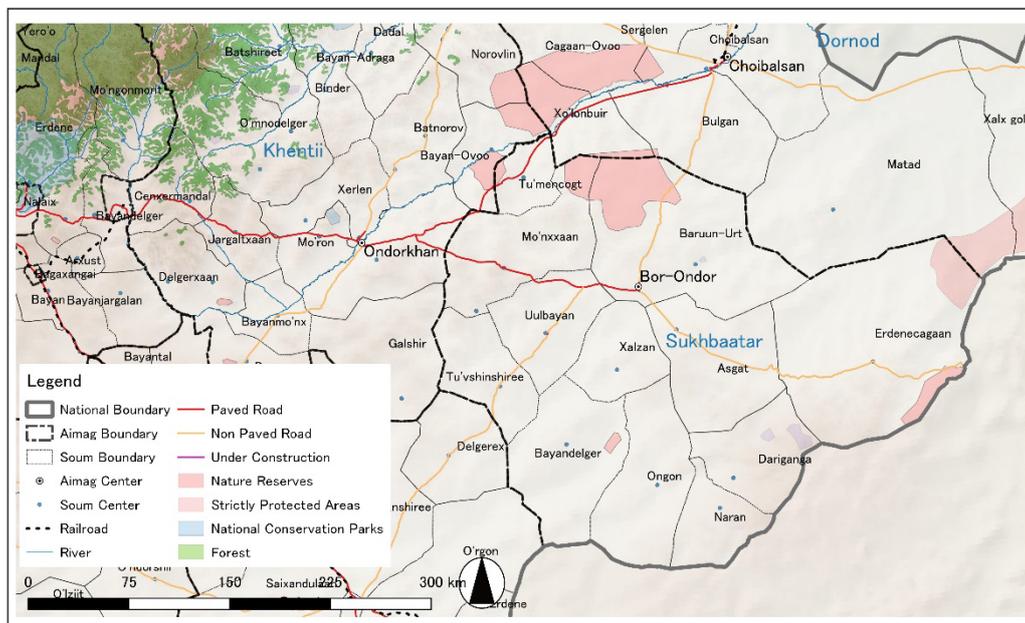
Undurkhaan urban development is essential for the development of Khentii Aimag. Undurkhaan as the gateway to Easter Region should be developed with multiple functions including tourism gateway, construction materials supply base, integrated farming center and green development model city.

7.6.2 Sukhbaatar

(1) Existing conditions

Location and natural conditions

Sukhbaatar Aimag is located in the southeast of Ulaanbaatar with the land area of 82,287km², the eighth largest of the 21 Aimag. Its capital Baruun-Urt is located 549km by road distance from Ulaanbaatar at the crossroad between the national road A2001 linked with Ulaanbaatar through Undurkhaan in Khentii Aimag leading by A2002 to the Bichigt on the border with China and the national road A22 linked to Choibalsan in Dornod Aimag.



Source: JICA Project Team

Figure 7.6.2 Location and Land Map of Sukhbaatar Aimag

Sukhbaatar is situated in hilly, predominantly steppe land with average altitude of 1,000-1,200m ASL. Dead volcanos stretch along the southeastern border with China. Sand desert or semi-desert occupies the southern part of dunes. Forest areas occupy only 100ha. Sukhbaatar is rich in steppe flora and

fauna, and wildlife such as white antelopes, foxes, badgers, gophers, wolves, marmots, porcupines and wild cats are commonly observed. The Ganga Nuur lake in the Dariana area near the border with China is visited by migrant swans during August to October.

Socio-economy

Population of Sukhbaatar was 61,323 in 2017 to make population density 0.75/km² among the lowest of all the Aimags. Population growth decelerated from 0.56% per annum during 1990-2000 to -1.00% per annum during 2000-17 due to stagnant economy, poor quality drinking water and low birth rate. The population increased again after 2008 due to improved living and working conditions with infrastructure development, according to participants of the Aimag consultation including the Aimag Statistical Office.

Both intensive livestock activities and grazing are popular economic activities, and number of herders and livestock population are increasing in recent years. LPR is relatively high reflecting largely rural economy. Livestock population per herder family was 463, 6th largest of all the Aimags, but livestock population per 100ha grazing land was 85 ranked 14th. Of all the families, 56.6% are engaged in livestock farming as of 2017. Crop cultivation is limited with cultivated area 9,219ha in 2017, of which grains account for 7,481ha.

Despite the dominantly rural economy, the share of industry including construction in the GRDP was 49% in 2017. The total manufacturing value of MNT238.51 in 2017 was 6th largest of the Aimags, and the sales of industrial products to the GRDP was 6th largest. These manufacturing industries have low value-added ratios to make the GRDP share of industry lower. There exist limited number of establishments and private establishments and large establishments are particularly limited. Dominant industries are food processing, cashmere and construction materials industries.

Mining activities in Sukhbaatar is represented by Tumortei zinc mine and Tal Bulag coal mine. The Tumortei Owoo zinc and lead deposit located near Baruun-Urt is owned 100% by the Chinese invested Tsairt Mineral LLC, and the Tumortei mine is considered one of strategic mines in Mongolia. The Tal Bulag coal mine is located northwest of the Aimag capital. Sukhbaatar has relatively high per capita GRDP at MNT6,836,000 and labor productivity at MNT15,835,000 in 2017, both ranked 4th due to the mining activities.

Pupils to teacher ratios are high in Sukhbaatar at primary and secondary education, and enrollment ratio at secondary schools is high. According to the Aimag consultation participants, however, overall education sector performance is not low in the Aimag. The number of schools is small particularly at the secondary education with 16 schools ranked 20th in 2017. Infectious diseases per 1,000 was high at 208 in 2017 ranked at 20th. Participants at the Aimag consultation pointed out the health problems associated with poor quality drinking water, and it is reported that liver and digestive diseases are widespread. They also pointed out staff shortages for education and health services and lack of proper care and policy by the local administrations.

Spatial development and infrastructure

The urbanization rate in Sukhbaatar is relatively low at 29.0% in 2016 reflecting dominantly rural economy. While population started to increase in recent years, it is mainly due to in-migration of herders from neighboring Aimags. In-migrants to urban areas are limited due to limited employment opportunities in manufacturing and related services.

The Aimag capital of Baruun-Urt is located at the crossroad between the northwest-southeast road and the northeast road linked to Choibalsan as mentioned above. Baruun-Urt has access to Bichigt on the border with China through the national road A2002. Only links to the southwest are rather weak at present.

Quality of various infrastructure is still at rather low levels despite the recent infrastructure development to improve the living and working conditions in Sukhbaatar, except roads relatively in good quality. Telephone lines per 1,000 was 8 in 2017 ranked 15th, price of heat energy ranked at 16th with 616m²/MNT, and high gasoline price at MNT1,627/liter ranked 17th. The number of water supply points per 1,000 families were 6 in 2017 ranked 4th. The ratio of livestock families having electric

engine was 88.5% ranked 6th.

(2) Constraints to development

Most severe climate presents an inherent constraint to development of Sukhbaatar. Desertification in the southern area poses a threat. Small population of the Aimag capital, 18,190 in 2017, works as a constraint to development of the entire Aimag. High sulphur content of piped water for Baruun-Urt and apparent lack of alternative water sources constrains the urban development of the capital city. The Aimag economy has weak structure with small number of establishments without much diversification and small share of services sector. Low income and purchasing power constrain the development of manufacturing industries.

While the Aimag economy is largely rural, rural infrastructure is generally poor, and social services are insufficient in remote rural areas. Many participants at the Aimag consultation attribute this situation to lack of adequate policy for social services rather than shortages of staff at local administrations.

The weak economic structure in Sukhbaatar causes low mortgage ability and lack of capital accumulation, which constrain the self-reliant development. The relatively high per capita GRDP and labor productivity are due mainly to mining activities, which do not benefit the majority of rural people. A participant at the Aimag consultation pointed out that the Chinese invested zinc mine contributes to the local development fund but use of the fund questionable. Many participants expressed strong concerns on adverse social and environmental effects associated with mining development, and proposed application of environment friendly technology, need for skill training of local people, and rehabilitation of mining areas.

(3) Development prospects

As the economy of Sukhbaatar is still largely rural-based, more intensive livestock activities seem a main direction to pursue for economic growth. At the same time, processing of livestock products should be promoted to produce value-added products for export and to provide market outlets for livestock activities. They include dairy, meat and leather products, which may be developed into a livestock industrial cluster. In the medium to long terms, processing of placenta of horses and sheep for medicines and cosmetics, bones and other animal wastes for pet food, and halal food may also be included in the cluster.

Promotion of intensive livestock activities should not mean neglect of traditional herding, which is considered effective under local conditions. As the Aimag faces water shortages generally, water availability should be taken as a condition to determine best balance between more intensive livestock activities and traditional herding. It is logical to move livestock seasonally to areas of better water availability rather than transporting costly water for more intensive livestock in the vicinity of cities. Balance between feed production to support more intensive livestock and grazing should also be determined accordingly.

As a prerequisite to further development of both intensive and traditional livestock farming, disease free livestock zone should be established in the short-term future. In the medium- to long-term future, livestock improvement should be undertaken and as the first step a gene bank should be established for both traditional and high productivity species.

Considering high concerns of Aimag people on social and environmental effects of mining, responsible and sensible mining activities should be promoted. As a participant at the Aimag consultation proposed, a standard form of contracts need to be concluded with the foreign investors for mining development and monitoring for the performance of mining activities following the contracts need to be improved to enhance the investor's responsibility.

Possible risks that may affect livestock farming due to mining should be kept to a minimum. Environment friendly technology should be applied to mining and rehabilitation of mining sites should be made compulsory. Most importantly, technology transfer and skill training for Mongolian C/P organizations and experts should be undertaken, and a mechanism should be introduced to allow part of profits from mining development to contribute to capital accumulation for local administrations.

Establishment of a community development fund to be used for community infrastructure would be such a mechanism.

Manufacturing industries in Sukhbaatar may be diversified with livestock related industries such as leather products, dairy and meat products, light industries for consumer goods, building materials industries can be developed based on locally based SMEs. Tourism related industries can also be undertaken by SMEs including handicrafts and food industries. Consistent government policy to support locally based SMEs selectively is expected.

Tourism holds another important direction for Sukhbaatar to pursue. Tourism development in the Ganga Nuur National Reserve (28,000ha) near Dariganga may be particularly promising as a variety of resources exist. They include six lakes, sacred mountain of Shiliin Bogd Uul (1,778m high), Taliin Agui cave and cultural heritage. Tourism based on culture and heritage was recommended by several participants at the Aimag consultation such as nomadic and traditional culture and lifestyle. Heritage tourism based on three ethnic groups with traditional costumes and silversmith may deserve investigation. Border tourism based on Bichigt was suggested at the Aimag consultation showcasing the steppe land and life of Mongolians in combination with shopping opportunity on the border possibly with a FTZ at Bichigt. In this connection, border facilities at Bichit should be upgraded in steps including logistic center and related facilities.

Some road sections may be improved as a prerequisite to tourism development in the medium to long terms. Priority for improvement of roads should be determined in consideration of effects on other economic activities. In this sense, the Erdenetsagaan - Dariganga road serving the border area and the Baruun-Urt - Bichigt road to improve access to the border area may deserve serious consideration. Possibility of improving the Ulaanbaatar – Undurkhaan -Tuvshinshiree – Bayandelger – Ongon – Naran – Dariganga - Erdenetsagaan route was suggested at the Aimag consultation.

To realize the potentials mentioned above, water supply in Sukhbaatar should be much improved. The piped water for Baruun-Urt should be treated by quality purifying equipment, and alternative sources of water should be investigating including the northern area of Asgat Soum suggested at the Aimag consultation.

7.6.3 Dornod

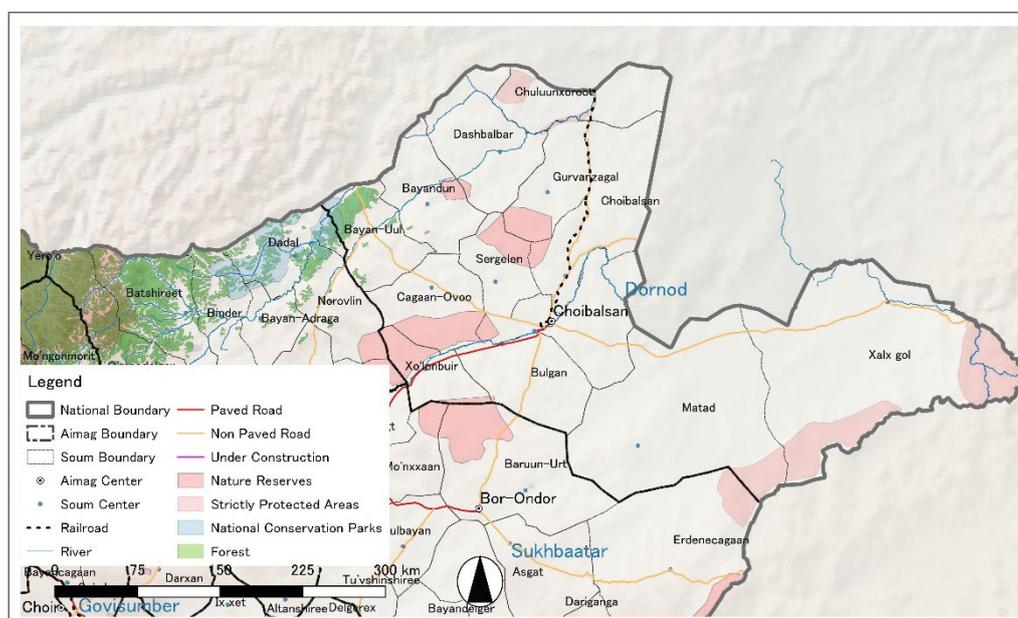
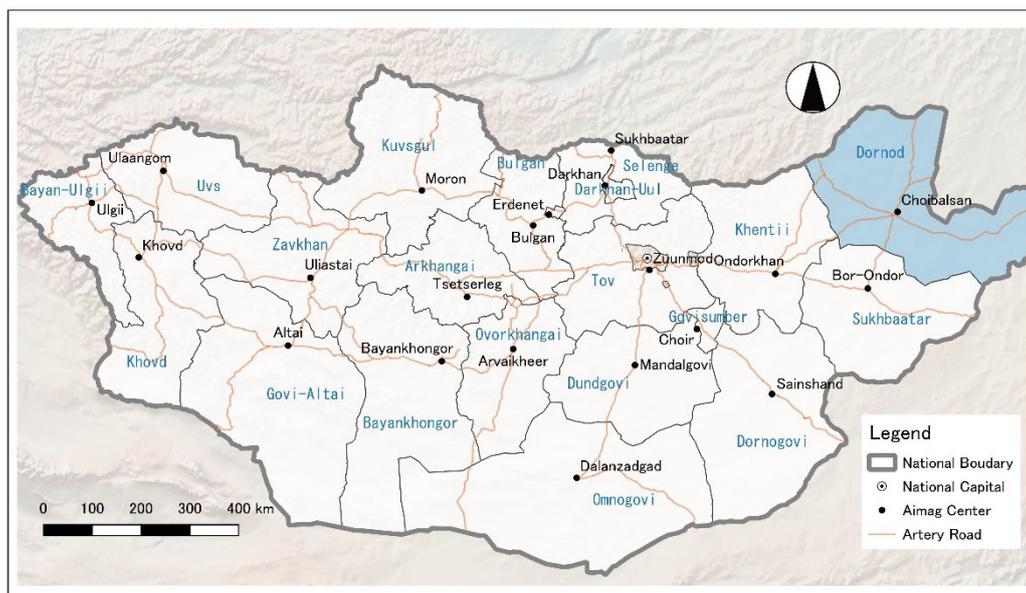
(1) Existing conditions

Location and natural conditions

Dornod is situated in the easternmost end of Mongolia bordering with Russia in the north and with China in the east and the south. It is the third largest Aimag in Mongolia with a land area of 123,600 km². It is inhabited by a population of 79,500 with a population density of 0.67 people per km². The Aimag area is covered largely by an alluvial plain along the Kherlen River and the Ulz River, both running from west to east. The Aimag's land is gently sloping downward from the altitudes of 800 to 1,100 m along the border with Khenti Aimag and Sukhbaatar Aimag in the west to around 600 m in the eastern areas bordering on Russia and China. The land is mostly flat characterized by steppe climatic zone. Annual precipitation is from 250 mm to 300 mm.

Buir Lake is the largest freshwater lake in Mongolia. There are salt lakes and numerous springs. There are three strictly protected areas: Dornod Mongol (5,704km²), Nomrog (3,112km²), and Mongol Daguur (1,030km²) and three national parks: Yashi Lake National Park, Ugtam Mountain National Park and Toson Khulstai National Park.

Flora in Dornod accounts for 10% of flora registered in Mongolia including more than 40 kinds of herbs and 10 kinds of useful plants. Dornod is rich in fauna as well with deer, elks, raccoons, boars, otters and white antelopes in the basins of Onon and Ulz rivers and Khyangan mountain range as well as marmots in steppe. Bears, boars, and muskrats inhabit in the Onon River basin.



Source: JICA Project Team

Figure 7.6.3 Location and Land Map of Dornod Aimag

Socio-economy

The population in Dornod has been growing at a rate of 2.3% per year since 2010, having reversed the population decrease at -0.7% per year in the preceding 10 years. The information collected at the Aimag consultation indicates that the decrease of the population until 2010 was largely attributed to population outflow to Ulaanbaatar for seeking job opportunities and better living condition, while the increase of the population since 2010 was caused by better economic condition resulting from expanded trades with China and Russia and private business as well as improved living condition with better infrastructures. Urban population in Dornod accounts for 57% of the total Aimag population, which is higher than the average 40% of all the Aimags excluding Ulaanbaatar, indicating active urban activities in Choibalsan.

Economically active population in Dornod accounts for 40.1% of the Aimag population, which is the

lowest in Mongolia. Dependence on the mining sector and low motivation to work could explain this phenomenon.

GRDP per capita in Dornod was MNT10,983,000 in 2018 at the 3rd place in Mongolia following Orkhon (MNT17,779,000) and Ulaanbaatar (MNT14,793,000), substantially having upgraded the rank from 20th in 2005. Oil extraction in Dornod contributed to this upgrading of per capita income. The economic structure of Dornod is, thus, characterized by heavy dependence on the secondary sector including oil industry at 70% in 2018, far higher than the Mongolian average at 34%.

The sown area in Dornod at 29,862 ha in 2018 was 4th in Mongolia after Selenge, Tuv and Bulgan. Wheat and fodder sown areas are especially high at 4th and 3rd place respectively. In terms of the number of animals, Dornod is at the 15th place. Animal-wise, the numbers of horses and cattle are rather high at 6th and 8th place, whereas those of camels, sheep and goats are lower at 11th, 13th and 17th place. The number of animas increased rapidly in the 2010-18 period at 10.0% per year, slightly faster than the national average at 9.3% per year.

Spatial development and infrastructure

Choibalsan has been serving as the major center of Eastern Region since the socialistic era. It still functions as the transportation hub for the entire Dornod Aimag and Eastern Region. Choibalsan, situated at a distance of 640 km from Ulaanbaatar to the east, is connected with Ulaanbaatar by national highways A0501 and A0502, most of which are paved and maintained in a fair condition. There are five border points in Dornod, three at the border with Russia and two with China. The road from Choibalsan to Chuluunhoroot (A0503) is a normal soil road, whereas that to Ulihan Deed Uihan (A21) is a gravel road. The road to Ymalhyn Gol Shine Durulguy, another border point with Russia, is of lower grade. Of the two border points with China, Havirga Ar Hashaat, the most active border point among the five according to the Aimag consultation participants, is connected with Choibalsan by a normal soil road (A23). The other border point with China, Bayanhoshuu, is connected with Choibalsan also by a normal soil road.

Choibalsan is the end of the spur line of the Siberian railway branching off the main line at Borj in Russia. Its route runs south-north with a distance to the border at about 220 km. It used to transport agro-products, mainly fodder and wheat, to Russia and other Union of Soviet Socialist Republics (USSR). It still transports cargo, but in a lower amount.

Electricity for Eastern Region is generated by a thermal plant in Choibalsan and supplied by the Eastern Energy System (EES) with a capacity at 33MW. Access to utility services in Dornod is not favorable as seen by the number of water points per 1,000 families ranked 18th and that of telephone lines per 1,000 population at 18th.

(2) Constraints to development

Distance with Ulaanbaatar is felt as a constraint in transportation. This is reflected in high commodity prices. Gas price is at the 6th place from the highest and a rise in consumer price index in 2017 was 7th from the highest.

The economic structure is unbalanced with heavy dependence on the oil industry and underdevelopment of various manufacturing and service industries although there is a certain level of accumulation from the socialistic time such as flour mill, rug and carpet factory, meat processing plant and brick making factory. This contributes to the weak capacity to generating funds by local tax on local industries. The budget to GRDP ratio is as low as 20th place. In the private sector, deposit by people is low (21st) and non-performing loan is high at 2nd, indicating limited financial literacy of people, although banking and financial services are ranked 3rd.

Human resources represent a fundamental weakness. There is a lack of senior managers (14th), skilled labor force (17th) and qualified engineers (15th). Low priority given to employee training (15th) exacerbates the constraint. Participants in Aimag consultation pointed out as constraints emigration of experienced workers out of Dornod, failure in providing the types of skill training demanded by market and low work ethics of workers.

Dornod has the highest morbidity rate in infectious diseases. A negative side of its geographical location bordering on Russia and China is the higher chances of infectious diseases such as sexually transmitted diseases caused by foot traffic across the border. Other factors such as insufficient medical support, low practice of annual medical check-ups among people and a lack of public awareness contribute to high incidence of infectious diseases.

Tradition and environment are at stake. People in Dornod may be losing a sense of traditional culture and nomadic life (2nd from the bottom), that might lead to loss of identity in the people’s mind. While the mining sector contributes to the economy, it is damaging the natural environment and habitat, for example, new roads eroding soil and vegetation and big trucks transporting oil destroying surrounding environment and grazing areas.

(3) Development prospects

International trade

Expansion of international trade with Russia and China is a promising possibility taking advantage of Dornod’s geographical position and the railway link with Russia from the socialist time. There is an existing flow of commodities between China and Russia through Trans-Siberian railway. Manzhouli of Inner Mongolia, situated about 270 km northeast of Choibalsan, is the largest inland transportation hub in China. Cargos in containers were transported from China to Europe through Manzhouli in 1,036 trains for an amount of 83,000 twenty-foot equivalent unit (TEU) in 2016.

The railway spur line starting in Choibalsan joins the Trans-Siberian main line at Borj in Russia located at about 110km northwest of Manzhouli. Unique products from Dornod could be shipped through Ereentsav border point and added to this existing commodities flow at Boorj for export to Europe and Japan. In addition, all the goods from Dornod could be collected at Choibalsan and transported on road through the Havirga border point to Manzhouli for export. The other three border points should be used for promoting more ground level trades targeting local markets of Russia and China.

In promoting the expansion of international trade with Russia and China, logistic infrastructure on the Mongolian side should be improved first. Table 7.6.1 presents the logistics performance indicators of Mongolia, Russia and China, an assessment made by the World Bank (WB) for the countries all over the world.

Table 7.6.1 Logistics Performance Indicators (LPis) of Mongolia, Russia and China

Factor	Mongolia	Russia	China
Rank of the country	141	94	27
Overall score	2.25	2.61	3.49
Customs Efficiency of the clearance process (i.e. speed, simplicity and predictability of formalities) by border control agencies, including Customs	1.81	2.15	3.16
Infrastructure: Quality of trade and transport related infrastructure (e.g. ports, railroads, roads, IT)	1.94	2.38	3.54
International shipments: Ease of arranging competitively priced shipments	2.46	2.72	3.31
Logistics competence: Competence and quality of logistics services (e.g. transport operators, customs brokers)	2.24	2.51	3.49
Tracking & tracing: Ability to track and trace consignments	2.42	2.60	3.55
Timeliness: Timeliness of shipments in reaching destination within the scheduled or expected delivery time	2.55	3.23	3.91

Source: LPI Global Rankings 2018, WB, <https://lpi.worldbank.org/international/global/2018>

Note: 155 countries were assessed.

Mongolia’s position is as low as 141th place among the surveyed 155 countries, while those of Russia and China are higher at 94th place and 27th place respectively. Smooth flow of commodities across the borders with the two neighbor countries could, therefore, be hampered by the constraints on the Mongolian side rather than on the other sides. Ranks by the first two factors, “customs efficiency” and “infrastructure”, are especially low and these are the factors to be tackled by the government. The

other four factors, “ease in international shipment”, “logistics competence”, “tracking and tracing” and “timeliness”, all fall under the private sector’s responsibility and are rated higher. The effort by the Government is thus especially required to accelerate international trade with Russia and China.

Choibalsan urban development

Upgrading of Choibalsan urban functions is required as the international logistic and business center as well as the tourism gateway in Eastern Region. Fortunately, there are a number of advantages for business promotion in Choibalsan such as follows.

- Doing business ease: 1st
- Efficient support by banking and financial services for business: 3rd
- Low bribe: 3rd
- Transparency of decision and policies by local government: 4th
- Bureaucracy not hampering business: 3rd
- Easy access to opportunities to engage in private business: 2nd
- No energy problem: 4th
- No heating problem: 1st
- Access to information: 1st
- Fairness, timeliness and accessibility of local media: 1st

Both soft and hard infrastructure need to be strengthened to support Choibalsan’s urban development. Soft infrastructure would include entrepreneurship awareness and training with market economy principles, incubation service, business support service based on market survey and business needs assessment, financial support schemes and international business promotion such as dispatch and receipt of international missions, conventions and fairs etc. Hard infrastructure would include urban infrastructure such as water and sewerage, power, telecommunication and urban roads with sufficient capacities to meet future demands as well as a business complex with modern ICT facilities and agro-industrial parks. Strengthening of Dornod University as the research and incubation base would support private business initiatives. To promote international tourism and business development, the Dornod airport should be upgraded into an international airport.

Promising industries and products

The following activities and products are promising in Dornod.

- Cultivation of fruits and vegetables for import substitution with irrigation along the major rivers and application of new technologies such as ICT and trench-type greenhouse that would make cultivation in an extreme climatic condition possible;
- Promotion of exporting various berries to Japan and other developed countries by Mongolian businesses;
- Integrated farming combining semi-intensive livestock and crop farming supported by advanced technology including ICT application for monitoring and control of farming environment with meteorological and soil sensors linked also to processing industries in livestock industrial complex facilities constituting the livestock industrial cluster;
- Pharmaceutical industry capitalizing on various herbs available in Dornod (40 kinds of herbs and 10 useful plants), targeting respiratory and inflammatory diseases; and
- Tourism promotion capitalizing on various touristic assets: joint Mongolia-Russia-China Daguur Preservation Area, bird-watching in the northeast wetland, heritage tourism based on historical places related especially to the life of Chinggis Khaan, historical and nostalgic tourism in the far eastern areas combined with beautiful Buir Lake fishing and Khalkhin River.

7.7 Development Diagnosis of Tuv Aimag in Capital Region

(1) Existing conditions

Location and natural conditions

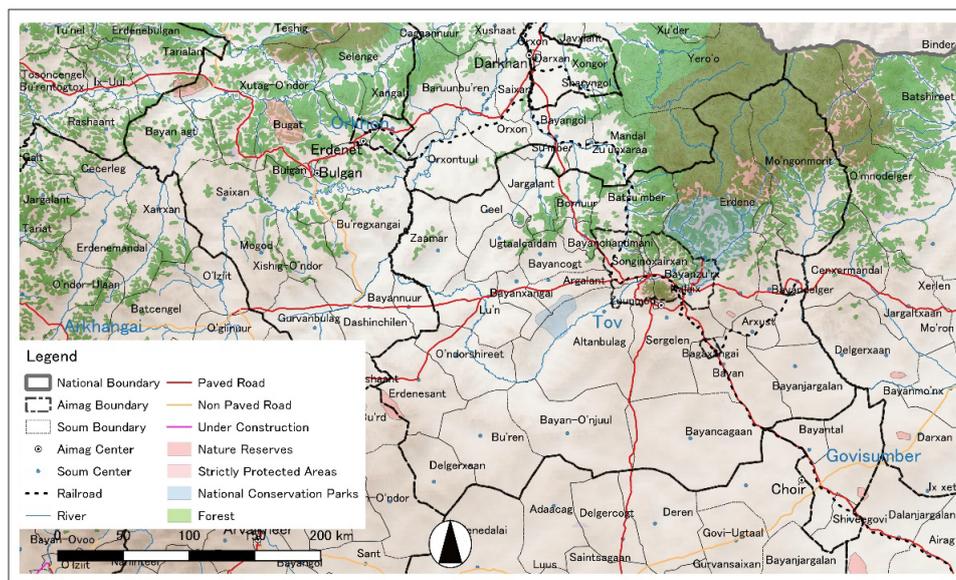
Tuv Aimag is about 250 km long north-south and 330 km wide east-west and it encompasses the whole Ulaanbaatar area in the middle. The northeastern part of Tuv Aimag is mountainous forming part of the Khenti mountains with the altitude of around 1,800 m. The land slopes down southward and westward along the Tuul River. The southwestern border area of the Aimag is part of the Khangai mountains with the altitudes of 1,500 to 1,600 m ASL.

The Tuul River, an important water source for Ulaanbaatar, originates in the Khenty mountains, flows down westward and change its direction toward north and meets the Orkhon River after it enters Selenge Aimag. It is 704 km long with a catchment area of 49,840 km² and has a mean annual runoff at 26.6 m³ /sec. It is home to an endangered species of sturgeon.

There are three natural protection areas: Gorkhi-Terelj National Park, Khustain Nuruu National Park and Gun-Galuut Nature Reserve. Most of the Aimag area is steppe except the northeastern corner where mountain taiga and forest steppe are observed.

Fertile chernozem soil covers most of the Aimag land except the north eastern corner. The areas bordering on Selenge Aimag and those along the Tuul River are covered with fertile land suitable for crop production. The number of rainy days and precipitation were 126 days, most in the Central Region, and 262 mm, third in the Central Region after Sukhbaatar (346 mm) and Darkhan (320 mm).





Source: JICA Project Team

Figure 7.7.1 Location and Land Map of Tuv Aimag

Socio-economy

The population in Tuv has been growing at a rate of 1.5% per year since 2010, having reversed the population decrease at -1.4% per year in the preceding 10 years. This change in population trend was caused mainly by the migration pattern. The number of net migration (outmigration minus in-migration) was 23,400 in the nine years between 2000 and 2009, then it went down to 5,300 in the next nine years from 2010 to 2018. During all these times, the number of births per 1,000 population continued growing: 20.0 in 2000, 23.6 in 2010 and 24.6 in 2018. A unique characteristic of Tuv is that it sends out its population mostly to Ulaanbaatar and some herders to Khentii or Sukhbaatar where there are still good pasturelands available, but it also receives population from other Aimags largely those in Western Region. The net migration at 5,300 between 2010 and 2018 was a result of out-migration at 25,600 and in-migration at 20,300.

The Tuv's GRDP in 2018 at MNT594,207 million was 6th in Mongolia, while per capita GRDP at MNT6,255,000 in 2018 was 7th. The economic structure of Tuv Aimag has drastically changed since 2010. While the 2010's structure was agriculture 64%, industry 13% and service 23%, that in 2018 was agriculture 48%, industry 30% and service 22%, showing a big increase of the industrial sector by 17% points. The expansion of the industrial sector might be explained by the information provided by the Aimag consultation participants indicating new products such as mushroom, steel balls, boots, bricks, smokeless fuel, wool by "Mongol Noos", cashmere, wheat and sheep wool fertilizer. The agriculture production in Tuv was highest in Mongolia in 2018, while that of industry was 9th.

The number of animals was 4,582,000 in 2018, which was fifth in Mongolia, down from second in 2010. The number of animals in Tuv increased by 69 % between 2010 and 2018, which was slower than the increase in Mongolia at 103% in the same period, presumably due to limitation in grazing areas and availability of other opportunities than animal husbandry in Tuv. The increase of animals was especially high for horse and sheep as shown in Table 7.7.1.

Table 7.7.1 Number of Animals in Tuv

Animal	2010	2018	Unit: thousand heads	
				Increase (%)
Horse	199.8	341.4		71
Cattle	172.0	282.3		64
Camel	2.2	3.5		59

Sheep	1,358.7	2,449.3	80
Goat	977.9	1,506.0	54
Total	2,710.7	4,582.4	69

Source: Mongolian Statistical Yearbook 2017 and 2018

Crop production is also active in Tuv. Table 7.7.2 indicates that Tuv is one of the leading crops producing Aimags in Mongolia. The values in parentheses indicate the ranks in Mongolia.

Table 7.7.2 Sown Area by Crop in Tuv

Unit: hectare; rank in parentheses

Crop	2010	2018	Increase (%)
Cereals	50,284 (2)	78,014 (2)	55
Potatoes	3,983 (1)	5,723 (1)	44
Vegetables	1,119 (2)	1,185 (3)	6
Fodder	4,175 (1)	10,925 (2)	162
Total	64,813 (2)	109,002 (2)	68

Source: Mongolian Statistical Yearbook 2017 and 2018

The increase in sown area was especially high for fodder. The rank, however, went down from the first to second, because the increase in Selenge where the fodder sown area increased from 1,264 ha in 2010 to 15,292 ha in 2018, an increase of 12 times, far surpassed Tuv. The land productivities in Mongolia is generally low compared with other countries. The productivities of cereals and potatoes were 1.2 tons/ha and 14 tons/ha respectively in Tuv, while those in the world are 3.5 tons/ha and 18 tons/ha. Promotion of crop production should be accompanied with productivity improvement.

The average monthly wage at MNT671,000 in 2018 in Tuv was 13th and 67% of the national average.

Spatial development and infrastructure

The provincial capital Zuunmod with a population of about 16,000 is situated in the immediate south of Ulaanbaatar area. The distance is about 45 km from the Sukhbaatar square following Zuunmod road circumventing the Bogd Khan Uul Strictly Protected Area (mountainous area in the south of Ulaanbaatar) on the western side. All the major trunk roads radiating from Ulaanbaatar to Aimags pass through Tuv Aimag: A0401 to north, AH32 and A0901 to west, A0501 to east and A0101 and A0201 to south. They are all paved roads except A0901. The transportation sector in Tuv is in a favorable condition as observed by the assessment on the quality of roads (5th), transportation with Ulaanbaatar (5th) and gasoline price (2nd lowest).

Electricity is supplied by the Central Energy System with the installed capacity of 1,100 MW. The level of energy problem solved is assessed as 12th, while energy price is high at MNT116/kWh at 15th place. Heating has a less problem as seen by the rank at 5th.

The number of water stations in Tuv was 1,421 in 2018 at 1st in Mongolia, but the number of people per water station was also 1st at 1,421 people per water station, indicating lower service coverage for Ger people. Similarly, Tuv was second in the proportion of households with portable water supply, meaning those carrying water in jerry cans from water stations to their homes, to the total population at 80% in 2018, following Bulgan at 98%. The proportion for Mongolia was 57%. Overall access to clean water in Tuv was assessed 8th in Mongolia.

There were 34 garbage collecting trucks in Tuv in 2018, which was 6th, while the number of population per truck was 2,794 at 9th. The level of appropriate management of garbage and waste was assessed at a similar level at 8th.

There were 743 land telephone lines in Tuv in 2018, which was 10th in Mongolia. The rank was also 10th for the number of land telephone lines per 100 people at 0.78. The overall communication environment including Internet, telephone and postal service was assessed better at 6th place. The perception of local media being fair, timely and accessible was ranked 5th.

The number of bathhouses was 32 in 2018 at 8th place, while the number of people served by one bathhouse at 2,969 was 9th.

(2) Constraints to development

The Tuv's geographical location close to Ulaanbaatar has both positive and negative aspects. The urbanization ratio of Tuv Aimag was 19.1 % in 2018, which was lowest in Mongolia. The proportion of service sector in GRDP at 22% was 19th in Mongolia including Ulaanbaatar. These data indicate a low level of urban and business activities in Tuv. It seems Ulaanbaatar sucks up all business and commercial activities from Tuv except some basic services resulting in less population residing in Zuunmod.

Many children go to schools in Ulaanbaatar and this may be indirectly lowering the quality of education in Tuv because of the availability of alternative option for education in Ulaanbaatar. Enrollment rates are low for primary education (21st) and secondary education (20th).

There is a gap between a favorable environment created by local administration and the reality of business development in Tuv. There are a number of positive factors for business such as efficient provincial budget (2nd), policies and decisions of local government contributing to province development (4th), transparency of decision and policies of local government (5th), no bribe (1st), decency of public services (5th), easy access to licenses (3rd), fair and transparent tender process (2nd), low unfair competition (1st), administrative regulations creating favorable business environment (4th), support by local government to participate in foreign projects (2nd) and rule of law (3rd).

These favorable factors for business, however, would be still inadequate to overcome the weaknesses in market economy principles and to make business development actually happen. Stronger push would be needed. The negative factors for business development include opportunity to engage in private business (21st), ease of doing business (20th), availability of public-private partnership (PPP) projects (20th), image of province on business development (20th), possibility of export (19th), access to credit (19th), bank loan interest rate (18th), adaptability of companies to market (17th), accounting and auditing rules and procedures (17th), entrepreneurship and agility of business owners and managers (19th), energy price (highest) and innovative capacity of companies (19th).

Many Aimag consultation participants expressed their idea that nomadic life is the key culture of Mongolia and emphasized the importance of maintaining the tradition and nomadic life and handing them over to next generations as the backbone of their lives. Tradition is the base of patriotism according to some participants. In reality, however, tradition is threatened to be lost in Tuv as shown by the assessment on the traditional culture and nomadic life at 16th. An example cited by some Aimag consultation participants as a loss of tradition is the increased use of motorcycles for herding animals in place of horses and camels. This increasing practice is not only a loss of tradition, but also an increased damage to environment and economy by accelerated overgrazing. It was proposed that nomadic tradition should be maintained through applying economically sustainable animal grazing method as well as awareness raising at schools and providing opportunities to university and high school students to experience nomadic life during summer vacation.

(3) Development prospects

Two factors should be considered in planning development for Tuv Aimag. One is how to strengthen its function to bear part of the Ulaanbaatar's capital city function and the other is how to strengthen economic bases to promote balanced regional development.

Tuv Aimag could contribute to restraining excessive agglomeration of political, administrative and economic functions in Ulaanbaatar taking advantage of its proximity to Ulaanbaatar. There are two important locations in this sense. One is the new Ulaanbaatar international airport and adjacent Airport City and the other is Zuunmod.

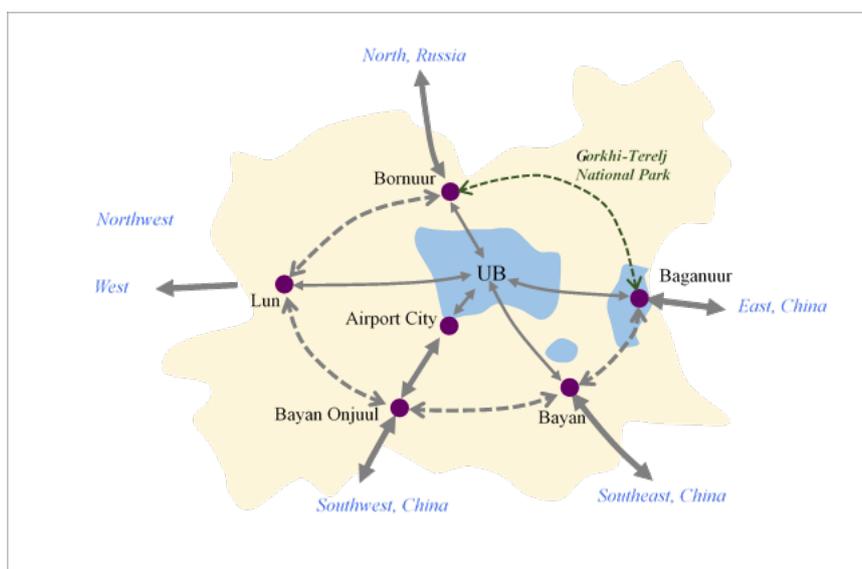
The Airport City project is under preparation with a feasibility study undertaken. It could be a new nucleus for urban development outside Ulaanbaatar mainly with economic function. Taking advantage of the new airport, it could be a gateway for importing advanced technology and refined design concept from abroad and exporting goods competitive in the world market in close cooperation with agro-industrial complexes all over Mongolia. It could be the location for producing goods under the final processing stage of vertical clusters based on primary products within Mongolia. PPP will play an

important role at the initial stage. Once possibilities become clear and initial momentum is created, the private sector will be playing a larger role.

Zuunmod could contribute to easing overloading of Ulaanbaatar by receiving political and administrative functions of Ulaanbaatar. Both for the Airport City and Zuunmod, the availability of water resources should be carefully examined.

A balanced regional development could be achieved by creating a new production and logistic network in Tuv as shown in Figure 7.7.2. The basic concept is to intercept the exiting flow of commodities before they reach Ulaanbaatar by creating a set of production and logistic bases in such a form as to surround Ulaanbaatar. Raw materials supplied from their immediate hinterlands could be processed at these production and logistic bases and transported to markets in Ulaanbaatar, foreign countries and other regions. Semi-processed products from other Aimags could go through final processing here, hence these production bases belong to the final stage of vertical cluster.

In the logistic aspect, goods from other Aimags could be collected and sorted at these bases and shipped out to Ulaanbaatar and other Aimags. This is made possible by linking the five production and logistic bases shown in Figure 7.7.2. Although commodities will continue flowing in and out of Ulaanbaatar, the amount will be smaller due to handling at these production and logistic bases, thus relieving the load on Ulaanbaatar. Because the northeastern part of Tuv Aimag is the protected area as Gorkhi-Terelj National Park, the linkage in this section is for eco-tourism purpose.



Source: JICA Project Team

Figure 7.7.2 Proposed New Production and Logistic Network in Tuv

Development of these production and logistic bases should be promoted by upgrading infrastructure and creating a business and production environment attractive enough for private investors. Sustainable economic development in hinterlands should accompany this initiative. For the areas where crop production is promising such as the areas close to Selenge Aimag and along the Tuul River, various methods to increase the varieties and amount of crops and productivities should be encouraged such as greenhouses including severe weather resistant trench type greenhouses, irrigation and better farming practices. Bornuur and Lun will, therefore, be the bases for processing farm crops. More emphasis will be placed on livestock related processing in Bayan Onjuul, Bayan and Baganuur such as meat, dairy products, leather and skins, cashmere and wool.

Tourism in Tuv has a high potential due to its locational advantage being close to Ulaanbaatar and most tourists passing through Tuv. Nature tourism in the Terelj National Park, agro-ecotourism utilizing rich agricultural land and rural areas, and historical and cultural tourism are promising. New opportunities are developing for MICE tourism associated with the new international airport. Tour circuits should be prepared for different types of tourists and promoted together with the efforts in developing

infrastructure and upgrading the quality of services.

Chapter 8 Phased Development Plan with Projects and Institutional Measures

This chapter integrates the outcomes of macro, sector wise and Aimag wise analyses reported in the previous chapters into a coherent and integrated development plan. The National Comprehensive Development Plan (NCDP) is formulated based on the sector wise analysis reported in Sector Report (separate volume), the development diagnosis by Aimag presented in Chapter 7 within the frameworks of the macro analysis in Chapter 2, the spatial analysis in Chapter 4 and the socio-economic analysis in Chapter 5. First, a phased development plan is presented in the form of a development scenario. Second, projects formulated in different sectors and Aimags are proposed and anchor projects are designated. These projects are instrumental in attaining the development objectives defined in Chapter 3 under the strategy presented also in Chapter 3. Third, integrated regional development programs are proposed combining several projects for the six regions newly defined. Fourth, institutional measures to complement project implementation are proposed by sector. Fifth, institutional measures for development administration and finance in Mongolia are proposed to support the project implementation.

8.1 Development Scenario

8.1.1 Development phasing and paradigm shift

(1) Development paradigms

A series of activities to be undertaken and events to take place over the planning period up to 2040 is described in this section as the development scenario for Mongolia. To examine the development scenario, two distinct development alternatives have been used: 1) 20th century development model, and 2) alternative socio-economy model. Mongolia at present is in a transitional stage away from the 20th century development characterized by intensive (abusive) resource use and economic efficiency orientation.

The Mongolian economy has attained high growth rates in recent years supported primarily by the mining sector, while traditional livestock farming faces difficulty and the economy and export products are not much diversified. The mining-led development represents a typical 20th century development paradigm characterized by resource intensive (abusive) and economic efficiency-oriented activities. It tends to involve adverse social and environmental effects, generating rather limited employment opportunities despite large investments required. This also makes the Mongolian socio-economy vulnerable to changes in international economies and natural disasters such as Dzud and drought as well as climate change.

Mongolia has started already to pursue an alternative development paradigm under the SDV2030 prepared in response to the United Nations (UN) Sustainable Development Goals (SDGs) initiative, which calls for a shift in development paradigm. A question, however, is how to realize the alternative development. The NCDP provides answers by clarifying specific approach and methods. Specifically, the NCDP establishes a development vision and objectives of the alternative development and presents strategy and measures to realize it.

The two development alternatives have been explained by the JICA Project Team (JPT) and discussed with the Mongolian counterpart (C/P) experts on various occasions. The development vision, objectives and strategy have been established and measures formulated through collaborative works between the JPT and the Mongolian C/P experts. A major multi-stakeholders (MSH) meeting was organized on January 21st, 2020 to present them to a wide range of stakeholders including scholars, private sector representatives and media as well as representatives of Aimags.

Participants in group discussions at the MSH meeting expressed their preference for alternative development paradigms and reasons for selection. Majority accepted the alternative socio-economy

model, but about a half of the participant showed preference for a hybrid model combining the 20th century development and the alternative socio-economy models.

The participants expressed their ideas on possible outcomes of development when the current trend continues such as political instability and policy inconsistency, over-concentration of population and economic activities in Ulaanbaatar, large income disparities between urban and rural areas and regions, environmental degradation, undiversified economy and export as well as continued high economic growth driven by mining.

They also expressed what would cause structural changes in socio-economy and spatial development to realize the development vision. They include basic education and awareness raising, higher education and vocational training, promotion of eco-products and recycling, response to climate change, pro-active marketing by trade agreements with other countries, conversion from coal to renewable energy, strengthening links between cities by transport infrastructure, administrative reform including strengthening of local administration, knowledge industry and application of Artificial Intelligence (AI), Internet of Things (IoT) and advanced technology, expansion of forest and protection area, and protection of pastureland and designation of controlled grazing land.

Another MSH meeting was convened online to present and discuss on the NCDP with Mongolian youth groups on August 17, 2020. Over 100 Mongolian youth participated not only in Mongolia (Ulaanbaatar and some Aimags) and Japan but also in 12 other countries. Well over 100 comments were received and the JPT responded to all of them, and the communications have been made open online. Representative comments are summarized in Table 8.1.1. To follow up the meeting, group discussions took place also online on September 7 participated by selected participants of the MSH meeting. The group discussions are summarized in Table 8.1.2 in the form of the responses by the JPT to issues raised by four groups. Most comments received at both sessions are related mainly on specific issues, but many participants expressed appreciation that the NCDP is a comprehensive long-term development plan prepared reflecting local needs based on extensive surveys and consultation.

Table 8.1.1 Representative Comments by Mongolian Youth Groups

Classification	Comments
Comments already reflected in the NCDP	1) Application of advanced technology, 2) Use of indices related to culture, climate and tradition to analyze regional division, and 3) Livestock disease free zone
Comments requiring further considerations	1) Establishment of wood products quality laboratory, 2) Use of grey water, 3) Health information centers to be used also for health education, and 4) Youth development centers.
Comments difficult to reflect in the NCDP	1) Projects for cultural sector, 2) Tavan Tolgoi ~ Zuunbayan railway, 3) Address system to improve postal services, and 4) Export of power as part of Asian power grid.
General comments	Relationships between the LTDP2050, HSP, RDP and the NCDP to be clarified

Source: JICA Project Team

Table 8.1.2 Responses by the JPT to Issues Raised by Four Groups at Group Discussions

Group	Issues	Responses by the JPT
A	Livestock and crop farming	1) NCDP proposes industrial cluster development strategy to integrate livestock and crop farming, primary processing and value-added processing linked eventually to export market. 2) Support measures include farmers organizing and strengthening, skill training, R&D for product development and export market development with product quality. 3) Road infrastructure should be improved to link primary production areas, processing centers and export bases.
	Semi-intensive	1) Semi-intensive livestock farming should be combined with increased fodder

	livestock farming	production for integrated farming, which should be developed in steps into a livestock industrial cluster. 2) The cluster may start with processing for meat and dairy products and will develop into total processing of livestock products including high value products for export.
	Disease free zone	The NCDP proposes disease free zone development particularly in the Eastern Region to promote export of meat and dairy products to Asian and other countries.
	Productivity and production increase for crops	1) The NCDP proposes to increase productivity and production of essential food crops such as grains, vegetables and some fruits and industrial crops for processing represented by sea buckthorn and oil seed. 2) For the purposes, the NCDP proposes irrigation development utilizing major rivers, greenhouse agriculture and ICT application including smart agriculture and Agro-IT parks. 3) An agricultural laboratory proposed by Group A may be located in an Agro-IT park.
	Crop production and marketing	1) To support production and marketing, the NCDP proposes food traceability platform, cold chain and ICT monitoring and support services among others. 2) The NCDP would not support the use of vast land for crop production with foreign countries suggested by Group A.
B	Urban infrastructure	The NCDP does not deal with urban infrastructure such as pedestrian ways and bicycle roads, urban parks and urban transport or housing proposed by Group B except urban water supply, sewerage and solid waste management.
	Solid waste management	1) For solid waste management, the NCDP proposes promotion of waste recycling with the automobile recycling park and the eco-park establishment. 2) In addition to waste separation at sources, the NCDP recommends food loss reduction.
	Ger district	1) The NCDP proposes the sanitation improvement project and development guidelines preparation. 2) Expansion of greenery as proposed by Group B will be accommodated in these projects.
	Regional division	1) The NCDP recommends the revised regional division proposed by the draft LTDP2050 based on the analysis on affinity of mutually neighboring Aimags by using 30 indices representing natural, social, economic, land use, financial and other conditions. 2) The new division will allow more effective measures for socio-economic development of each region having largely similar characteristics.
	Local administration	1) The NCDP recommends localization of development administration as suggested by Group B to establish self-reliant and autonomous Aimag governments in steps for transparent and responsible budget management.
	Education sector	1) The NCDP endorses the ongoing comprehensive education sector reform and proposes measures for higher and technical education and lifelong/continuous education as well as general education. 2) In particular, the NCDP strongly recommends general education with value development as a base for pursuing a new development paradigm, which should start at pre-school education. 3) Specific recommendations by Group B on education sector such as improving teachers training, ensuring equal access to education by utilizing distant education with ICT, and curriculum improvement will be reflected in the revised NCDP.
C	Tourism development	1) The NCDP is generally in line with suggestions by Group C on tourism development. 2) The “Urtuu” service stop areas development as proposed is proposed by the NCDP and already pilot implemented as part of the NCDP Project. 3) Community involvement is considered an essential condition for both domestic and international tourism for cultural heritage tourism and rural/farm experience- oriented tourism. 4) Visitors from Ulaanbaatar may enjoy home gardening as domestic tourism during weekends. 5) Local communities can supply local products to tourists and provide tourism services.

		<p>6) As Mongolia is joining the international tourism market newly, collaboration by all the stakeholders to create unique and original sets of destinations complementing one another is essential rather than competing tourism areas and products for marketing.</p> <p>7) The NCDP proposes a platform to share and exchange tourism information that will link not only tourists and service providers but also between various service providers for collaborative marketing.</p>
	Private sector for infrastructure	<p>1) Road construction by the private sector as suggested by Group C may be rather difficult in Mongolia as there exist few major roads having heavy traffic to ensure profitability as toll roads.</p> <p>2) For the contribution of the private sector to road development, the NCDP proposes establishment of community development fund by contribution of major mining and tourism development for community infrastructure such as access roads and social facilities.</p>
D	Education sector	<p>1) The NCDP for education sector is based on the presumption that Mongolia has agreed to participate in 2021 PISA assessment and financial and technical support have been secured for education sector reform.</p> <p>2) This involves two conditions ① all schools will conduct 2 shifts, which requires additional teaching staff input and rehabilitation and re-furbishing of some schools; and ② general and high schools will cater to the nomadic population and lifestyle.</p> <p>3) Most measures suggested by Group D for education will be pursued under these conditions such as teachers' training, TOT, foreign language education, and upgrading of school facilities.</p> <p>4) The NCDP proposes supports for vocational schools and technology colleges as well.</p> <p>5) Only way to reduce the education quality between private and public schools is to improve the quality of public schools with respect to facilities, curricula and teachers' quality.</p>
	Industrial development	Support measures in the NCDP for industrial sector include formulation of legal and policy framework, human resources development including assistance to SMEs for training of their employees, promotion of FDI and domestic investment including FTZ/SEZ development, improving access to finance, and support of business start-up, incubation and innovation.
	Import and export	<p>1) Development of transport infrastructure for import, export and domestic distribution is naturally part of the NCDP proposal.</p> <p>2) Producing pet food seems a viable idea but increasing vegetable production for export is a remote possibility.</p>
	Livestock farming	Same as responses to Group A

Source: JICA Project Team

(2) Development phasing

The development scenario represents the process for Mongolia to realize a paradigm shift from the 20th century development model to the alternative socio-economy. In other words, Mongolia would pursue a hybrid model combining the 20th century model initially gradually shifting to the alternative socio-economy model to realize the SDV2030. The NCDP is prepared to realize the SDV2030 and the development scenario for the NCDP naturally describes the process of the paradigm shift. To present the development scenario, the planning period is divided broadly into three phases: Phase 1 up to 2025, Phase 2 for 2026-30 and Phase 3 for 2031-40. Activities and events in each phase are described in the next sub-sections.

Development phasing should reflect the procedure for Mongolia to shift from the 20th century development model to the alternative socio-economy model. The procedure is characterized among others by the following conditions:

- (a) Management of natural and cultural resources should be improved recognizing these resources as capital to be conserved so that they can continue generating benefits for people for decades to come;
- (b) Development administration should be improved to support the resource management with stronger local administration and more active people's participation;
- (c) Economic activities and exports should be diversified to generate higher value-added and more employment opportunities and to ensure resilient and robust socio-economy; and
- (d) Capital accumulation should be realized for investment into infrastructure and new economic activities to support the diversification.

These conditions should be satisfied in steps and support one another to realize the new development paradigm of alternative socio-economy as a whole.

8.1.2 Phase 1 up to 2025

(1) Overview

This is a preparatory phase for the paradigm shift to the alternative socio-economy. Most economic activities will be undertaken as continuation of the 20th century development model. In particular, mining will be continued at relatively high level as the driving force for economic growth and the means for capital accumulation but shifted gradually to responsible mining. Principles of responsible mining should be established firmly during this phase as proposed in sub-section 8.4.1, which will contribute to capital accumulation.

With increasing capital made available from responsible mining, active investments will be made into new economic activities to process primary products of crop and livestock farming as well as mineral resources. Processed products will be diversified in steps to produce higher value-added products. Processing plants will be established in selected strategic locations in relation to production areas of primary products. Storage facilities for raw and semi-processed materials of crop and livestock farming may also be provided to expand the value-added production in the future.

Selective investments will be made also into key transport infrastructure to link production areas and urban centers as processing bases, and further to urban and export markets. Urban functions at these urban centers will be upgraded with priority. As part of responsible mining, community infrastructure in and around the base towns for mining will be improved with the contribution of profits from mining. Community development fund may be established for the purpose.

Local government capacity should be enhanced steadily during this phase. As part of it, participatory mechanism to plan and implement community facilities such as clinics, kindergartens, and common service facilities for livestock should be further strengthened to activate local communities, extending the initial efforts made by the Project for Aimag consultation. Also, methods to mobilize community resources should be newly introduced to complement the limited public sector resources for development such as use of remittances from migrant workers. This phase will see accelerated digital transformation in all the sectors.

COVID-19 and emergency measures taken by the Mongolian Government affect the development during this phase in all sectors, particularly education, health and social welfare as well as support for herders. Overall effects will be positive once the present difficulties are overcome since this crisis has been taken as presenting opportunities to adopt more innovative systems especially in the social sector.

(2) Economy

Mining will continue to be undertaken to maintain relatively high economic growth but increasing portions of mining products will be processed to generate higher value-added and more employment

opportunities. Simple coal processing to produce briquettes as well as sorting and washing should be undertaken to improve the quality of coal for domestic market. At the same time, introduction of new technology to produce clean coal should be initiated. Iron and copper processing will increase and some higher value processed products will be exported as final products to diversified markets.

More intensive livestock farming will be expanded in the vicinities of larger cities and along the artery roads linking larger cities to produce quality meats and dairy products mainly for urban market. In local areas away from major cities and artery roads, extensive grazing will continue but areas for controlled grazing will be designated to protect pastureland from further degradation by over-grazing. In such areas, semi-intensive livestock system will be established in combination with seasonal grazing.

To support intensive and semi-intensive livestock farming, fodder production will be increased in the respective areas. Crop farming area should be expanded aiming at attaining self-sufficiency of basic grains, potatoes and vegetables. As part of efforts to increase crop production, greenhouse production will be increased. Various innovative greenhouses including trench type greenhouses should be experimented for high value crops.

In addition to processing of mining products, agro-processing industries will be expanded and diversified. These industries should form industrial clusters in steps linking primary production to indigenous processing industries, of which some may develop into export industries. On-going initiative by the private sector should be supported by the Government with respect to products development by technological innovation and market development to diversify export products and markets. A sea berry industrial cluster may pioneer the export-oriented industrial cluster in Mongolia. A livestock industrial cluster may follow.

Of several industrial parks planned, those near Ulaanbaatar will start developing rapidly. The industrial parks planned in Darkhan and Sainshand will start to be implemented. Selected agro-IT parks (AIPs) may also be developed after the concept of the AIP development is carefully reviewed from the viewpoint of industrial cluster formation including applicable technology and marketing opportunities. Free trade zones (FTZs) or special economic zones (SEZs) currently planned in border areas and the new zone near the new Ulaanbaatar international airport should be developed in steps by establishing implementing arrangements for public-private partnership (PPP).

(3) Social aspects

Out-migration and rural to urban migration will continue and the urban-rural disparities will remain as the mining-led development continues and investments concentrate in the Ulaanbaatar and its vicinities. As new economic activities generate employment opportunities in limited local areas and towns, needs for skill development and technical and vocational training will increase in these areas. As income levels start to increase, demand for basic and higher education and health services will also increase slowly.

Anticipating these changes, a review and reallocation of state budget for social sector as a whole should be undertaken. As part of it, a comprehensive education sector reform should be initiated in two main directions. One is to improve higher and technical education to meet challenges of emerging economic opportunities. The other is to initiate value development necessary for the paradigm shift at early stage of education starting from pre-school education. Health care services should shift emphasis on primary and preventive health care. Social welfare services should be reviewed for more cost-effective allocation of state budget shifting from broad coverage to more targeted coverage for welfare payments, pensions and social insurance.

As a landlocked country located directly on a regional transport corridor, the slowdown of trade and economic activities due to the COVID-19 pandemics has had a major impact on livelihood of Mongolian families. The impact, however, has been mitigated by the resilience of Mongolian society supported by traditional socialistic services by the Government. The post-pandemic period will provide an opportunity to 'build back better', if the socialistic tradition is combined with the new paradigm pursued by the NCDP based on indigenous resources and outward orientation as well as the reform in social services as proposed above.

(4) Spatial development

Improvement of limited key artery roads will be initiated, including unpaved sections of roads linking Aimag capitals. Additional roads linking production areas and processing bases and further to export outlets will be selectively upgraded. Urban infrastructure should be improved for selected local cities as well as Ulaanbaatar. They include base cities for mining, processing and tourism, and a few selected cities may be developed as logistic centers for international trade.

Feasibility studies for major facilities constituting the future transport and logistic network will be initiated including new railway construction and upgrading of border facilities. Dialogues with Russia and China may be promoted for reactivating some border facilities, which may contribute to establishment of vertical (north-south) development axes in Western, Northwestern, Altai and Eastern Regions.

Rural access roads should also be selectively improved to ensure adequate access to social services and facilitate collection of raw materials for new agro-processing industries and marketing of new agro-products. Some of the improvement of rural access roads may be conducted as part of mining development utilizing the community development fund as proposed above.

(5) Environmental aspects

Adverse environmental problems associated with the mining-led development may continue, but awareness of people will be steadily enhanced for responsible mining supported by environmental education as well as publicity activities. The urban environmental problems will continue in Ulaanbaatar, but satellite cities development in the Ulaanbaatar suburbs may start to take effects to alleviate the problems. As local government capacity is enhanced steadily throughout this phase, involvement of local people in environmental monitoring will increase and start to be institutionalized. This will help to reduce land degradation by crop farming and livestock supported by designation of controlled grazing land.

8.1.3 Phase 2 for 2026-30

(1) Overview

This phase is for active transformation of socio-economic structure to make it fit to the alternative socio-economy model. The new economic activities initiated during Phase 1 will fully develop and additional economic activities will be introduced. Most of these activities will develop in the form of vertical industrial clusters based on primary products.

Mining will continue to grow but at modest rates as responsible mining is widely practiced. The growth will decelerate in steps, and by the end of this phase zero growth should be realized. Contribution of mining, however, will continue to be significant as increasing amount of mining products will be processed domestically to generate higher value added and comparatively more employment opportunities.

Localization of development administration will continue throughout this phase, transferring some administrative functions from the Central to local governments. Environmental monitoring and management will be the first to be devolved. Participatory mechanism to plan and implement community facilities will be institutionalized.

(2) Economy

The industrial clusters established during Phase 1 will be fully developed in this phase including the sea berry and livestock industrial clusters. The sea berry industrial cluster will produce not only sea berry juice but cosmetics and pharmaceuticals based on essential oils extracted from the juice. Some of these high value products may find lucrative market in advanced countries in the West.

The livestock industrial cluster will produce not only apparel products based on wool, cashmere and leather and high quality meat and dairy products, but also medicine, cosmetics and health products from placenta of sheep and horses, halal food and pet food. Eventually all the raw materials including bones

and blood will be fully utilized without wastes for total or zero-waste processing. Other industrial clusters will start developing supported by the Government for products development with technological innovation and market development.

Mining will contribute increasingly more to employment generation as well as value added by providing raw materials for processing by indigenous industries. Increasing production of iron and copper based final products will facilitate Mongolia to take the initiative in marketing of these products in internationally markets. New mining products may start commercial production such as uranium and rare earth materials by introducing foreign capital and technology.

More industrial parks will be developed including those away from Ulaanbaatar. Development of FTZs or SEZs should be accelerated along the borders with Russia and China concomitantly with improvement of facilities and institutions for border trade.

Domestic travel agents will associate directly with international travel agents to develop a variety of tour products for international tourism. A few cities should be strengthened as tourism gateways or bases including Murun, Khovd and Tsetserleg for different types of tour itineraries including those for winter tourism.

(3) Social aspects

Out-migration and rural to urban migration and the urban-rural disparities will start to be reduced as more employment opportunities are generated in local areas by new economic activities. Environmental education at the pre-school and primary levels starting in Phase 1 will raise awareness for alternative socio-economy in the society as a whole. It should be further strengthened for value development to support the alternative socio-economy by encouraging children to become change agents. The idea of putting the welfare and safety of citizens at the forefront of development should be substantiated and accepted widely in the society. The emphasis on primary and preventive health care should take effects to realize healthy labor force. Of social welfare services, employment related support measures should be transferred to the private sector.

(4) Spatial development

To establish the ring artery in the central part of Mongolia proposed in Section 4.3, unpaved or poor quality sections will be improved possibly with re-alignment of some sections. The northern section of the ring artery will provide effective links for tourism areas along the border with Russia, and the southern section will facilitate the access from border areas with China to the advanced central areas. Undurkhaan at the eastern end of the ring artery will be strengthened as the gateway to Eastern Region, and Uliastai at the western end as the gateway to Western Region. All in all, the ring artery will strengthen the spatial integration of the national territory.

The area inside the ring artery may become a driving force for Mongolian development in the 21st century supported by high grade infrastructure. Another telecommunication backbone may be established at the beginning of this phase linking Uliastai in the west and Undurkhaan in the east through Ulaanbaatar.

Larger urban centers at higher tiers of the urban hierarchy will be strengthened in accordance with designated urban functions respectively. Regional core cities should develop with multiple functions, and a few of them may be provided with new administrative status. Cities along the ring artery road should be given priority for improving urban infrastructure, including Undurkhaan in the east and Uliastai in the west.

With the improvement of the ring artery road together with inter-Aimag roads improved during Phase 1, access to rural areas throughout the Country will be further improved. Infrastructure development associated with mining and major tourism development will be accelerated by wider application of the community development fund.

(5) Environmental aspects

As responsible mining is practiced increasingly widely, adverse environmental effects associated with

will be reduced. The urban environmental problems will be further reduced as the satellite cities develop in the Ulaanbaatar suburbs. New urban environmental problems may be generated in local towns as population and economic activities increase in these towns. Environmental monitoring by local administrations will be strengthened by involvement of local people with enhanced awareness.

8.1.4 Phase 3 for 2031-40

(1) Overview

This phase will see the completion of paradigm shift to the Mongolian model of the alternative socio-economy. Reviews on the attainment of the SDV2030 and the SDGs will guide the formulation of specific measures necessary for the completion of paradigm shift by clarifying needs for modifications of development strategy and priority. Active trade and interactions with Russia, China and other countries and mobility of peoples between Mongolia and these countries characterize this phase. Many Mongolia living in other countries will come back to participate in the nation's development during this phase.

Ulaanbaatar will not only continue to be the main political and administrative center in Mongolia but also support the active trade and interactions with other countries as a global city with international business center functions. It will be a model mega green city with quality urban greenery and amenity, served by trunk ICT base station and advanced urban transport system possibly with subway network.

Devolution of various administrative functions to the Aimag governments will continue in steps during this phase. As part of localization of development administration, mechanism and practices of participatory planning and implementation will be established throughout the Country and fully operational as integral part of improved development administration.

(2) Economy

Diversification of economy and export products will reach the highest possible level with many industrial clusters based on primary products. Some industrial clusters link livelihood activities by the poor through indigenous industries to export industries to make the livelihood activities viable. As a result, incidence of poverty will be largely eradicated by the end of this phase. As a condition for successful development of any industrial clusters, all the players constituting the clusters are linked by information and communication technology (ICT) for coordinated production, marketing and support activities.

Some clusters may complement one another to form industrial complexes. A tourism and wellness industry complex may develop by utilizing characteristic products such as condiments, health products, cosmetic and medical products for tourism development. Service-oriented clusters linking logistic centers and tourism may also develop. Additional industrial clusters will be established based on mineral resources to produce final goods for export. Some export products will establish fame for quality in the global market.

FTZs or SEZs along the borders with Russia and China will further develop utilizing locally available resources including tourism resources. They will accommodate increasingly more service-oriented industries to become effectively free cities, where peoples of different backgrounds will trade and communicate freely.

(3) Social aspects

While increased employment opportunities in local areas will help to maintain family ties and community cohesion, some social problems may arise with urbanization of local towns. As more migrants come to undertake new economic activities, more conflicts may arise between original residents and in-migrants over use and management of local resources including water.

As the economic development increases capital accumulation and government budget, comprehensive coverage by high quality social services should be realized for all people including in-migrants and returnees. Incident of poverty will be largely eradicated as livelihood activities become economically

viable linked effectively to indigenous industries, of which some will establish fame in the international market as export industries.

(4) Spatial development

The network of artery roads will be fully established with the upgraded ring artery road, and access to rural communities will be further improved accordingly. The transport and logistic network will be established as a multi-modal system linking production, processing and logistic centers. The railway lines as part of the multi-modal system will be shared increasingly for passenger transportation.

Urban hierarchy will be further developed with clear functional division between major urban centers. Regional core cities will be equipped with some higher order functions. Murun and Khovd may be specialized in international tourism and trade related services. Erdenet, Darkhan and Choybalsan may be centers of advanced education and research to support alternative socio-economy. Choir may be a clean energy center, and Altai a renewable energy center. Other higher order functions may include specialized health care, wellness industries and alternative technology development.

The urban hierarchy will be extended to neighboring countries to form a city network, in which higher order urban functions are shared for mutually complementary development. Cities in the Autonomous Region of Inner Mongolia of China and the Buryatia Republic of Russia may be involved in the city network. Joint development and management of border areas will be continued as model development cooperation.

(5) Environmental aspects

As the local governments have higher administrative and financial capacity due to regional economic development and devolution, environmental monitoring capacity will much increase at the local level. This helps to alleviate the new environmental problems at local towns such as solid waste management, water supply and drainage. The satellite cities in the Ulaanbaatar suburbs will develop further to allow the capital city to devote its resources to realizing high quality living environment with plenty of amenity and greenery.

8.1.5 Ultimate image of Mongolia in 2040

Mongolia will be characterized by the following by the year 2040.

- (a) Resilient and robust country contributing to global economy and global governance by deepening economic relationships with countries in the Greater Central Asia;
- (b) Model country for alternative socio-economic activities, which are less resource intensive and environment friendly, characterized by many viable industrial clusters, traditional livestock farming and responsible mining, and resources utilization and management by participation of peoples;
- (c) Attractive tourism destination with a variety of tourism resources and tour itineraries for both international and domestic tourists, embracing rich cultural heritage of various peoples and unique natural features;
- (d) Center for advanced alternative technology with high grade education and research facilities including a clean energy center in Govisumber, a renewable energy center in Govi-Altai, and an alternative technology research center in Darkhan;

- (e) Regional societies open to the global society characterized by the logistic networks linked to neighboring regions and countries, city networking to share higher order urban functions, cosmopolitan atmosphere accommodating peoples of diverse socio-cultural backgrounds for lively trade and communications;
- (f) Country embodying green development with overwhelming landscape provided by mountains, rich forest resources and productive greenery of vast pastureland; and
- (g) Self-reliant region based on the utilization of indigenous resources by and for the benefit of local peoples under the effective development administration by PPP.

8.2 Development Plan with Four Initiatives

Many projects and programs have been formulated in different sectors and Aimags. Some of them are mutually adjusted and modified for more effective implementation. They are packaged into four initiatives to clarify characteristics of different projects and programs and facilitate coordination between them. These initiatives are:

- I. Economic and export diversification initiative,
- II. Broad-based empowerment initiative,
- III. Spatial structure strengthening initiative, and
- IV. Green development promotion initiative.

Out of all the proposed projects, anchor projects are designated to support the shift in development paradigm from the 20th century development model to the Mongolian model of alternative socio-economy. The anchor projects will be instrumental in realizing structural changes in the socio-economy and spatial system, and some actions should be taken during Phase 1 for their early implementation. Profiles of all the proposed projects and programs are presented in Chapter 9.

(1) Economic and export diversification initiative

This initiative will diversify economic activities and export products in line with the idea of outward-oriented development, which fits well to Mongolia with rich natural and cultural resources and small domestic markets. In particular, vertical industrial clusters based on primary products are instrumental in pursuing this initiative. This initiative consists of the programs and projects listed in Table 8.2.1, including 10 anchor projects denoted by “*”

Table 8.2.1 Economic and Export Diversification Initiative

I. Economic and Export Diversification Initiative	
No.	Title
I1	Free trade zones/Special economic zones development program
I1.1	Border areas Free Trade Zones (FTZs) and Special Economic Zones (SEZs) promotion project*
I1.2	Ulaanbaatar airport-side FTZ/SEZ development project
I2	Industrial clusters support program
I2.1	Sea buckthorn industrial cluster development*
I2.2	Livestock industrial cluster development*
I3	Innovative agriculture development
I3.1	Smart agriculture promotion
I3.2	Greenhouse agriculture promotion*
I3.3	Agro IT parks development*

I4	Integrated crop-livestock farming promotion
I4.1	Fodder production expansion
I4.2	ICT monitoring and support system for livestock*
I5	Crop production expansion program
I5.1	Irrigation development
I5.2	Oil seed development
I5.3	Sea buckthorn development*
I6	Integrated cattle production promotion
I6.1	Cattle ranching system development
I6.2	Corn silage production
I6.3	Total mixed ration (TMR) feeding centers development
I6.4	Spray dry powder milk technology
I7	Market environment improvement
I7.1	Cold chain development
I7.2	Food traceability platform*
I8	Mining diversification program
I8.1	Rare earth resource exploration
I8.2	Metal mineral resources market exploration
I9	Comprehensive coal industry upgrading
I9.1	Coal transport and export promotion*
I9.2	Coal resource survey
I9.3	Optimized coal business master planning
I9.4	Coal-based industrial cluster development
I10	Comprehensive tourism development with new attractions
I10.1	Dinosaur museum
I10.2	“Urtuu” service stop areas*
I10.3	Ger district handicraft street
I10.4	Winter sports and leisure center
I10.5	Nalaikh mining museum, culture and education center
I10.6	Tourism sector database development
I10.7	Tourism industrial cluster development

Source: JICA Project Team

Program No. 11 with two projects will establish/strengthen special zones designated in border areas and near the new Ulaanbaatar international airport to drive trade-oriented manufacturing and services and contribute to economic and export diversification. Program No. 12 with two projects will support the development of promising agro-industrial clusters complementally with Programs Nos. I4 and I5. Program No. 13 with three projects will pursue new types of agricultural activities supported by ICT. Program No. 16 with four projects will promote cattle-based livestock farming and processing by applying advanced technology.

Program No. 17 with two projects will facilitate marketing of agro-products by introducing advanced technology. Program No. 18 with two projects will contribute to diversification of mining with rare earth and metal mineral resources. Program No. 19 with four projects will contribute to upgrading coal industry and enhancing competitiveness of coal export. Program No.10 with seven projects will promote tourism development by creating various artificial tourism attractions to diversify tourism activities and increase tourists visits to Mongolia.

(2) Broad-based empowerment initiative

This initiative will prepare people to pursue the new development paradigm through raising awareness, empowering by education and training and improving health conditions, and expanding employment opportunities, all supported by ICT application. It also responds to imminent needs of people for various social services and livelihood activities. This initiative comprises the programs and projects listed in Table 8.2.2, including seven anchor projects denoted by “*”, and the special program for ICT

promotion and application consisting of five projects.

Table 8.2.2 Broad-based Empowerment Initiative

II. Broad-based Empowerment Initiative	
No.	Title
II1	New generation herders' upbringing program
II1.1	Herder communities support facilities*
II1.2	Community-based early childhood education for herders' children
II2	ICT-oriented support program for nomads
II2.1	Local administrations-nomads communication strengthening*
II2.2	Comprehensive nomad database development
II3	Skills training and jobs creation for youth and adults*
II4	Young women's career development and support program network*
II5	Scholarship for business-oriented human resources development
II6	Comprehensive education sector reform program*
II7	Focused health care improvement program
II7.1	Primary health care strengthening*
II7.2	Health information center establishment
II7.3	Prevention of mother to child transmission of Human Immunodeficiency Virus (HIV), syphilis and hepatitis
II7.4	Telemedicine and electronic mobile health care for diagnostic purposes
II8	Social insurance and pension reform
II9	New business culture and mindset development
II9.1	Center of group dynamics*
II9.2	Process consulting for accomplished results
II10	Special program for ICT promotion and application
II10.1	Education sector strengthening by utilizing ICT
II10.2	Rural ICT development promotion and model ICT city development
II10.3	Integrated information network for rural people
II10.4	Offshore development promotion
II10.5	Open data promotion for organic ICT ecosystem

Source: JICA Project Team

Program No. II1 with two projects will help sustain traditional herding as the base of livelihood and tourism by training and educating the youth for traditional and modern livestock farming and providing various facilities. Program No. II2 with two projects will support nomadic people with ICT for better communications with local administrations and database. Program No. II3 will provide skill training for the youth and create jobs matching acquired skills. Programs Nos. II4 and II5 will provide focused support for career development for women and business-oriented human resources development, respectively.

Program No. II6 will aim at comprehensive reform of the education sector covering pre-school and general education with value development as a base for pursuing a new development paradigm, higher and technical education with improved curricula emphasizing advanced technology and science meeting needs of emerging businesses, and life-long education for all. Program No. II7 with four projects will improve health care with focus on preventive and primary health care. Program No.8 will contribute to improving social insurance system by proposing selection criteria of the beneficiaries, updated benefit packages and fund management. Program No. II9 with two projects will facilitate establishment of new business culture and mindset of business people for the new development paradigm.

Program II10 with five projects will facilitate social service delivery by the governments and support business development by the private sector to generate employment opportunities in emerging economic areas.

(3) Spatial structure strengthening initiative

This initiative will strengthen spatial structure of Mongolia by establishing a high quality network of

artery and sub-artery roads linking Ulaanbaatar and major urban centers, and between Aimag capitals, and also upgrading urban functions of selected urban centers at the higher tiers of the urban hierarchy. This initiative comprises the projects listed in Table 8.2.3, including five anchor projects denoted by “*”.

Table 8.2.3 Spatial Structure Strengthening Initiative

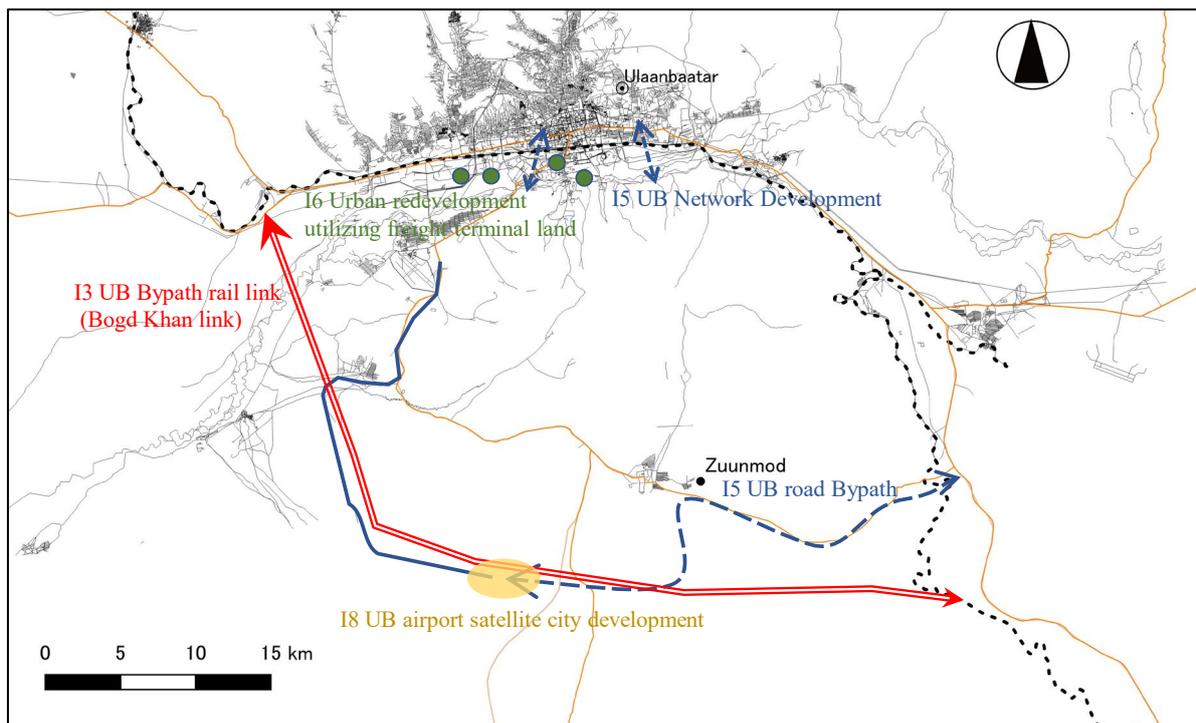
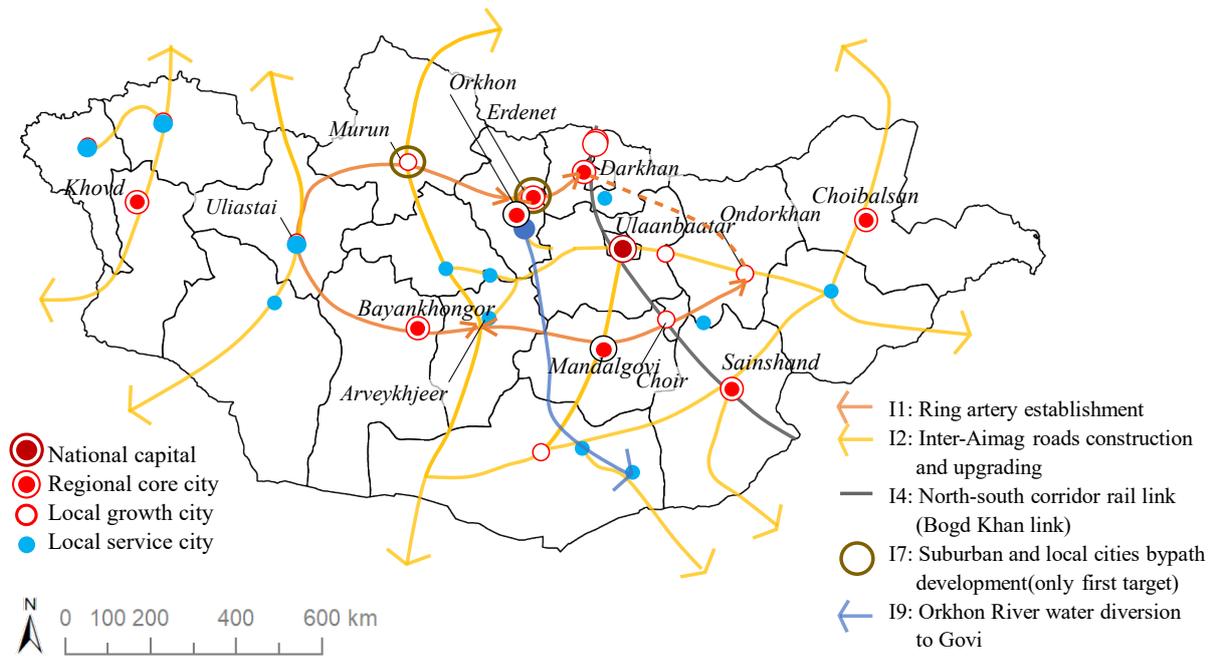
III. Spatial Structure Strengthening Initiative	
No.	Title
III1	Ring artery establishment*
III2	Inter-Aimag roads construction and upgrading*
III3	Aimag special purpose roads improvement development
III4	Ulaanbaatar bypath rail link (Bogd Khan link) *
III5	North-south corridor rail capacity development*
III6	Ulaanbaatar road bypath and network development
III7	Urban redevelopment utilizing freight terminal land
III8	Suburban and local cities bypath development
III9	Ulaanbaatar airport satellite city development*
III10	Local air transport network development
III11	Regional and local cities development
III12	Orkhon River water diversion to Govi

Source: JICA Project Team

Project No. III1 and Project No. III2 will strengthen links between major urban centers and Aimag capitals, and also improve accesses to border areas and beyond by facilitating the establishment of the north-south axes. Project No. III3 will improve roads in respective Aimags for specific purposes such as tourism, mining and border trade. Project No. III8 will improve transport efficiency for inter-city traffic, while allowing more pleasant and safe development of urban living environment in major cities.

Three railway projects, Project Nos. III4, III5 and III6, will increase the capacity of the north-south artery for domestic and international trade including transit trade. Project No. III7 will redevelop the existing freight terminal land in Ulaanbaatar to accommodate high grade urban spaces and functions. Project No. I9 will enhance the urban functions of the capital region by providing high grade urban space and facilities and alleviating over-concentration in Ulaanbaatar.

Project No. III10 and Project No. III11 will support the self-reliant regional development by improving air access to larger cities in local areas and upgrading urban functions of larger cities, respectively. Project No. III12 will facilitate human settlement in the Govi area by transferring much needed water from the Orkhon River. This will help to improve distribution of population and economic activities for more balanced spatial development.



Source: JICA Project Team

Figure 8.2.1 Maps of Spatial Structure Strengthening Initiative

(4) Green development promotion initiative

This initiative will substantiate the government policy of green development to enhance sustainability of national land and socio-economy. Realization of recycle-oriented society is an important aspect of this initiative. Proper water resources development and management are considered instrumental in pursuing this initiative. This initiative consists of the programs and projects listed in Table 8.2.4, including eight anchor projects denoted by “*”.

Table 8.2.4 Green Development Promotion Initiative

IV. Green Development Promotion Initiative	
No.	Title
IV1	Land degradation prevention
IV2	Recycle-oriented society development
IV2.1	Food loss reduction
IV2.2	Automobile recycling park*
IV2.3	Solid wastes circulation utilizing cement plants
IV2.4	Eco-park establishment*
IV3	Ger district development promotion
IV3.1	Ger district development guidelines*
IV3.2	Ger district sanitation improvement*
IV4	Sanitary landfill site establishment
IV5	Buildings and structures preservation and restoration
IV5.1	Longer life-span facilities establishment
IV5.2	Ensuring coherence of legal documents in urban development sector and reforming its legal system
IV6	Tuul water complex project*
IV7	Water supply improvement project
IV7.1	Urban centers water supply improvement*
IV7.2	Rural water supply expansion
IV8	Wastewater treatment improvement project
IV8.1	Wastewater treatment plants construction and renovation
IV8.2	Ulaanbaatar central WWTP for industrial water of combined heat plants
IV8.3	Sewerage networks renovation and expansion
IV8.4	Small wastewater treatment plants in Soum centers*
IV8.5	Innovative wastewater treatment plant for livestock farms
IV9	Selenge River hydropower dam development*
IV10	Local energy system development

Source: JICA Project Team

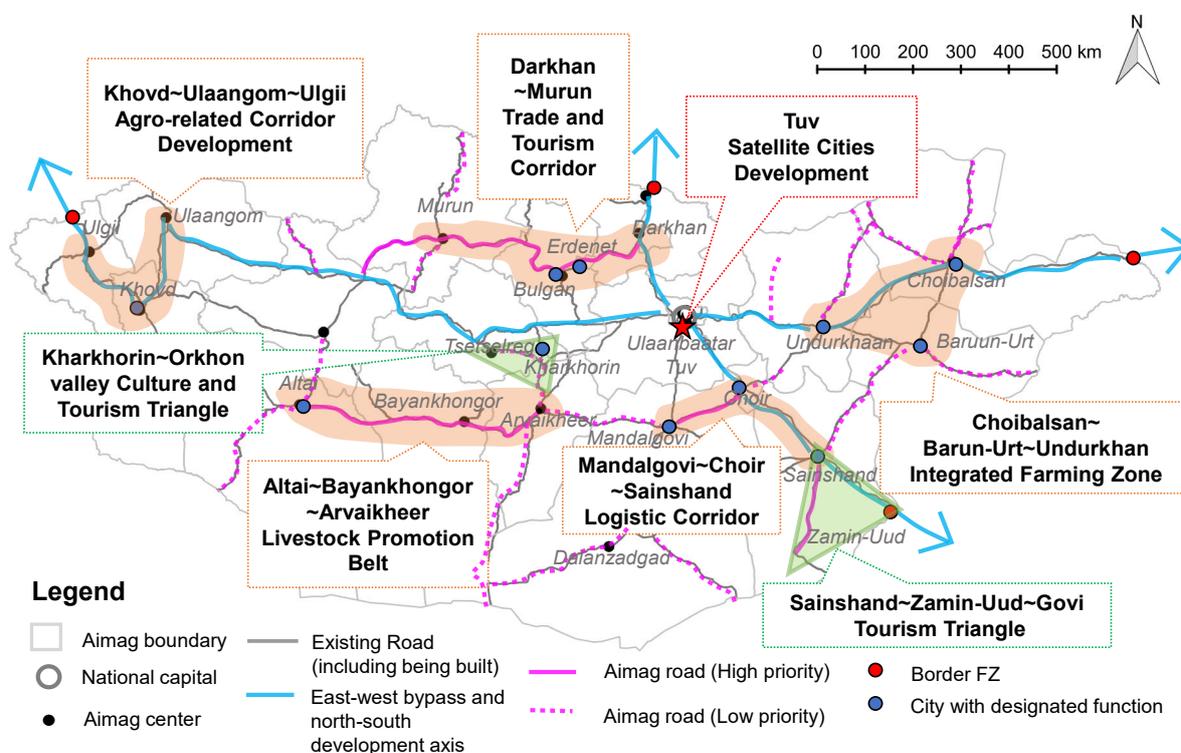
Program No. IV1 will reduce and prevent land degradation by crop farming by promoting soil conservation measures and better cultivation techniques. Program No. IV2 with four projects will promote recycle-oriented society by reducing food losses, establishing automobile recycling park, and encouraging solid waste re-use. Program No. IV3 with two projects will improve living environment of Ger district by both physical and institutional measures. Programs Nos. IV4 and IV5 will introduce environment-friendly facilities by applying state-of-art technology. Project No. IV6 will identify and establish new sources of water supply for Ulaanbaatar including dam construction. Program No. IV7 with two projects will improve water supply for urban and rural areas, respectively. Program No. IV8 with five projects will improve sewage treatment facilities in urban and rural areas, including facilities for combined heat plant (CHP) and livestock farms. Project No. IV9 will develop water resources in the Selenge River basin for hydropower generation and water supply. Project No. IV10 will promote the development and use of renewable energy resources including solar, wind, hydropower and geothermal.

8.3 Integrated Regional Development Programs

8.3.1 Regional development programs, area development schemes, urban functions and links

Most proposed projects, except those to be implemented by the private sector initiative, are expected to be implemented by respective sector ministries and agencies. The four initiatives are defined to establish consistent policies of the Mongolian Government for coherent implementation of related projects and facilitate coordination between various implementing organizations. Some projects, however, are related to specific geographic locations and thus should be implemented as a set of related projects in respective localities for effectiveness.

These related projects in specific locations are packaged into integrated regional development programs (IRDPs), respectively. An IRDP is defined for each of the six Regions newly defined in Chapter 6. Each IRDP consists of component projects defined in Section 8.2 and area development scheme(s) covering specific area(s) in each Region (Figure 8.3.1). Implementing arrangements for IRDPs are proposed in sub-section 10.1.2.



Source: JICA Project Team

Figure 8.3.1 Area Development Schemes of Integrated Regional Development Programs

Urban functions and inter-urban links to support the regional development are summarized in Table 8.3.1 and illustrated in Figure 8.3.2.

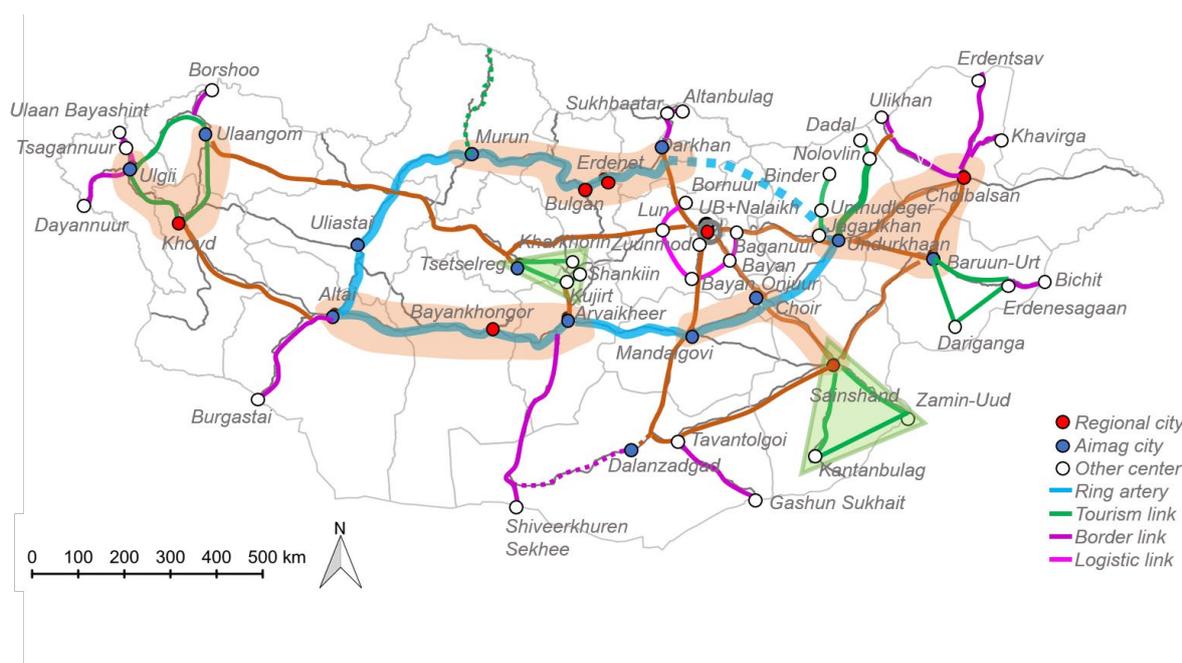
Table 8.3.1 Urban Functions and Inter-urban Links to Support Regional Development

Designation	City	Functions	Urban linkages
Western Region			
Regional center	Khovd	Higher education & research center in dryland agriculture, biodiversity, sea buckthorn processing etc.; Tourism gateway to Western Region; Construction materials industry and supply base	Khovd~Ulaangom~Ulgii agro-related corridor
Aimag centers	Ulgii	Center for nature & culture tourism	Khovd~Ulaangom~Ulgii agro-related corridor
	Ulaangom	Center for trade with Russia; Distribution center for construction materials and commodities	Khovd~Ulaangom~Ulgii agro-related corridor
Other centers	Tsaganuur	FTZ for processing and service activities	Border access
	Borshoo	Border trade	Border access

	Ulaan Bayshint	Border trade	Border access
	Dayannuur	Border trade	Border access
Khangaig Region			
Regional city	Erdenet-Bulgan	Erdenet: Service base for transit trade and tourism; Medipas hospital as the regional hospital Bulgan: Service base for transit trade and tourism	Darkhan-Murun trade and tourism corridor
Aimag city	Darkhan	Innovation and dissemination center of new farming technologies utilizing ICT, AI and 5G	Darkhan-Murun trade and tourism corridor
	Murun	Tourism gateway	Darkhan-Murun trade and tourism corridor
	Uliastai	Social service base for western Aimags	Ring artery
	Tsetserleg	ICT center in Central Mongolia; Base for winter tourism	Kharkhorin~Orkhon valley culture and tourism triangle
Other centers	Sukhbaatar	Border trade base	Border access
	Altanbulag	FTZ	Border access
Altai Region			
Regional city	Bayankhongor	Central facilities for livestock industrial cluster; Center for health tourism and medical science	Altai~Bayankhongor~Arvaikheer livestock promotion belt
Aimag city	Altai	Tourism base for nature, culture and health tourism; Training centers for education and health personnel; Renewable energy development and research center	Altai~Bayankhongor~Arvaikheer livestock promotion belt
	Arvaikheer	Main logistic center; Tourism sub-center for nature and culture tourism	Altai~Bayankhongor~Arvaikheer livestock promotion belt
Other centers	Kujirt	Tourism service	Tourism access
	Shankiin	Tourism service	Tourism access
	Burgastai	Border trade	Border access
	Kharkhorin	Tourism service	Kharkhorin~Orkhon valley culture and tourism triangle
Southern Region			
Regional city	Sainshand	Logistic and tourism related service center for export & import commodities etc.; Showcase for state-of-art environmental technology and environmental education	Mandalgovi~Choir~Sainshand logistic corridor; Sainshand~Zamin-Uud~Govi tourism triangle
Aimag city	Mandalgovi	Logistic center for distribution and storage of domestic commodities etc.; Service hub between Ulaanbaatar and the south	Mandalgovi~Choir~Sainshand logistic corridor
	Choir	Main logistic center in the south for export and import commodities etc.; Automobile repair and service center; Clean energy development center; ICT industrial estate	Mandalgovi~Choir~Sainshand logistic corridor
	Dalanzadgad	Logistic center for export to China; Base for service and commerce; ICT application center	UB~Mandalgovi~Dalanzadgad artery; Coibalsan~Baruun-Urt~Sainshand~Dalanzadgad artery
Other centers	Tavantolgoi	Mining base	Access to mining
	Zamin-Uud	Border trade	Sainshand~Zamin-Uud~Govi tourism triangle
	Kantanbulag	Tourism service	Sainshand~Zamin-Uud~Govi

			tourism triangle
	Gashun Sukhait	Border trade	Border access
	Shiveerkhuren Sekhee	Border trade	Border access
Eastern Region			
Regional city	Choibalsan	International logistic and business center; Tourism base in the east; Dornod University as the research and incubation base	Choibalsan~Barun-Urt~Undurkhan integrated farming zone
Aimag city	Baruun-Urt	Base for semi-intensive livestock farming and water and supplemental feed supply base for nomadic herders	Choibalsan~Barun-Urt~Undurkhan integrated farming zone
	Undurkhan	Tourism gateway to the east; Construction materials supply base	Choibalsan~Barun-Urt~Undurkhan integrated farming zone
Other centers	Erdenesagaan	Tourism service	Tourim access
	Bichit	Border trade	Border access
	Dariganga	Tourism service	Tourim access
	Jagartkhan	Tourism service	Tourim access
	Umnudelger, Binder	Tourism service	Tourim access
	Nolovlin, Dadal	Tourism service	Tourim access
	Erdentsav	Border trade	Border access
	Khavirga	Border trade	Border access
	Ulikhan	Border trade	Border access
Capital Region			
Regional city	UB+Nalaikh	Main political & administrative center as the national capital; International business center as a global city; Model mega green city with quality urban greenery & amenity; Trunk ICT base station & international transport hub linked with neighboring countries served by advanced urban transport system	North-South economic corridor Radial arteries
Aimag city	Zuunmod	Residential complex; Commercial center	Tuv satellite cities development
Other centers	New Zuunmod	Residential complex for airport employees; FTZ; Commercial center for import and domestic goods	Tuv satellite cities development
	Maidar EcoCity	New political and religious center; High end residential area; Recycle oriented ecocity	Tuv satellite cities development
	Bornuur	Logistic service	Logistic link
	Lun	Logistic service	Logistic link
	Bayan Onjuur	Logistic service	Logistic link
	Bayan	Logistic service	Logistic link
	Baganuur	Logistic service	Logistic link

Source: JICA Project Team



Source: JICA Project Team

Figure 8.3.2 Urban Functions and Inter-urban Links to Support Regional Development

8.3.2 Western Region model green development program

This program consists of the following component projects:

- (a) Khovd~Ulgii~Ulaangom road development (ongoing supported by Asian Development Bank (ADB)),
- (b) Khovd River hydropower development (ongoing),
- (c) Power grid extension from Khovd to Bayan-Ulgii and Uvs (ongoing),
- (d) Road improvement from Dayannuur to Tashma (A15) [III3],
- (e) Tsagannuur FZ development [I1.1],
- (f) Khovd higher education and research center [III11],
- (g) Integrated tourism development for nature and culture tourism [III3], and
- (h) Khovd city airport internationalization [III12].

Also, the following area development project is instrumental in developing the regional socio-economy.

Khovd-Ulaangom-Ulgii agro-related corridor development

- (a) Semi-intensive livestock farming mainly in Khovd and Uvs together with increased fodder production for integrated farming to be developed in steps into the livestock industrial cluster [I2.2],
- (b) Support facilities for nomadic livestock activities and lifestyle to enhance productivity and profitability with market outlets provided in Uvs, serving also for culture tourism [III.1],
- (c) Sea berry expansion and sea berry industrial cluster development [I2.1], and

- (d) Urban development with Ulgii as a center for nature and culture tourism, Ulaangom as a center for trade with Russia and distribution center for construction materials and commodities, and Khovd as a higher education and research center, tourism gateway and construction materials industry and supply base [III11].

8.3.3 Khangai Region advanced socio-economic complex program

This program consists of the following component projects:

- (a) Ring artery northern section development (improvement and upgrading) [III1],
- (b) Tourism and border access roads (Khatgal~Khankh, Bat Olzii~Tsenkher~Tsetserleg, Khutag Ondor~Teshig~Baga Ilenkh) [III3],
- (c) ICT network development centering on Darkhan and Tsetserleg,
- (d) Altanbulag FZ development with Sukhbaatar urban development [I1.1],
- (e) ICT-linked livestock industrial cluster development [I4.2],
- (f) Integrated farming combining semi-intensive livestock and fodder production in Selenge and Bulgan [I4],
- (g) Livestock grazing in pastureland to produce quality meat and dairy products in Zavkhan and Arkhangai [I2.2],
- (h) Smart agriculture promotion in Bulgan [I3.1],
- (i) Irrigation development with the Selenge and the Orkhon Rivers [I5.1], and
- (j) Preservation of rich forest resources, while allowing use of non-wood forest resources for sustainable forest management [institutional measures]

Also, the following is instrumental in developing the regional socio-economy.

Darkhan-Murun trade and tourism corridor

- (a) Erdenet-Bulgan twin city development for social facilities,
- (b) Improvement of urban facilities, amenity, social and business services in Darkhan, Erdenet and Murun utilizing ICT linked to Ulaanbaatar [III11],
- (c) Tourism diversification in Khuvsgul [I10],
- (d) Tourism facilities development along the corridor [I10], and
- (e) Urban development with Sukhbaatar as border trade base, Darkhan as dissemination center of advanced farming technologies, Erdenet and Bulgan as service bases for transit trade and tourism, Tsetserleg and ICT center and base for winter tourism, and Uliastai as social service base for western Aimags [III11].

8.3.4 Altai Region diversified agriculture and energy reserve program

This program consists of the following component projects:

- (a) Ring artery southern section upgrading [III1],

- (b) Tourism and border access roads (Arvaikheer~Khujirt, Kharkhorin~Shankhiin~ Tuvkhun, Altai~Burgastai) [III3],
- (c) Renewable energy development and research center in Govi-Altai [III11],
- (d) Arvaikheer urban development for logistic facilities [III11],
- (e) Urban development with Altai as a tourism base and training center for education and health personnel, Bayankhongor as health tourism center and Arvaikheer as a tourism sub-center [III11], and
- (f) Zavkhan River multi-purpose water resources development for irrigation and hydropower [I5.1].

Also, the following are instrumental in developing the regional socio-economy.

Altai~Bayankhongor~Arvaikheer livestock promotion belt

- (a) Integrated farming promotion combining semi-intensive livestock farming and fodder production to be developed in steps into the livestock industrial cluster with central facilities in Bayankhongor [I4],
- (b) Crop production diversification for fruits, oil seed, herbs and medicinal plants as well as fodder [I5], and
- (c) Local processing of fruits and herbs [institutional measures].

Kharkhorin~Orkhon valley culture and tourism triangle

- (a) Tourism roads improvement [I3],
- (b) Small and medium-sized enterprises (SME) support for local processing of fruits and herbs to tourists [institutional measures], and
- (c) Kharkhorin urban development for tourism facilities [III11].

8.3.5 Southern Region responsible mining and community development program

This program consists of the following component projects:

- (a) Tourism roads development (Sainshand~Zamin-Uud~Khantanbulag triangle) [I3],
- (b) Mining roads development (Tavantolgoi~Gashun Sukhait; Choir~Darkhan) [I3],
- (c) Water supply expansion in Choir [IV7.1],
- (d) ICT industrial estate in Govisumber [III11], and
- (e) Community infrastructure and greenery associated with mining development [institutional measures].

Also, the following are instrumental in developing the regional socio-economy.

Mandalgovi~Choir~Sainshand logistic corridor

- (a) Mandalgovi urban development for logistic facilities [III11],
- (b) Clean energy and logistic center in Choir [III11], and

- (c) Sainshand logistic and tourism related service center [III11].

Sainshand~Zamin-Uud~Govi tourism triangle

- (a) Zamin-Uud border trade and tourism development [III11],
- (b) Sainshand urban development as a tourism base with museum and other man-made attractions [III11],
- (c) Alternative tourism development with archaeological and cultural heritage and wilderness in Govi [I10], and
- (d) Environmental technology development and education in steppe and desert.

8.3.6 Eastern Region integrated agro-trade-tourism frontier development program

This program consists of the following component projects:

- (a) Baruun-Urt~Bichigt road [III3],
- (b) Border access roads (Choibalsan~Erdentsav road with a branch to Khavirga, Choibalsan~Ulikhan) [III3],
- (c) Tourism access roads (Erdentsagaan~Dariganga, Jargaltkhaan~Umnudelger~Binder, Nolovlin~Dadal) [III3],
- (d) Choibalsan urban development as international logistic and business center and tourism base [III11],
- (e) Dornod University research and incubation base [II6],
- (f) Undurkhan urban development as tourism gateway and construction materials supply base [III11], and
- (g) Kherlen River irrigation development for import substituting production of fruits and vegetables [I5.1].

Also, the following is instrumental in developing the regional socio-economy.

Choibalsan~Barun-Urt~Undurkhan integrated farming zone

- (a) Crop diversification and expansion of production for vegetables, fruits, oil seed and potatoes in Khenthii [I5],
- (b) Cultivation of fruits and vegetables for import substitution with irrigation along the Kherlen River [I5],
- (c) Semi-intensive livestock farming and processing for urban and export market [I6], and
- (d) Support facilities for nomadic livestock farming in Barun-Urt [III11].

8.3.7 Capital Region advanced processing and logistic base program

This program consists of the following component projects:

- (a) Bornuur, Lun, Bayan Onjuur, Bayan and Baganuur logistic link roads development [III3],
- (b) Ulaanbaatar peripheries road development [III3],

- (c) Water supply expansion for Ulaanbaatar and satellite cities [IV7.1],
- (d) Ulaanbaatar model mega green city development,
- (e) Ulaanbaatar trunk ICT base station upgrading to strengthen links with Tuv and other Aimags [III4, III6],
- (f) Integrated farming promotion combining intensive livestock farming and fodder production to supply fresh meat and dairy products to Ulaanbaatar [I4],
- (g) High grade tourism facilities development including some artificial attractions [I10], and
- (h) New airport side FTZ development [I1.2].

The following is undertaken as a special program.

Tuv satellite cities development

Satellite cities are developed in Tuv to de-concentrate some political, administrative and economic functions of Ulaanbaatar as follows.

City	Major functions
New Zuunmud (formerly AeroCity)	- Residential complex for airport employees - FTZ - Commercial center for import and domestic goods
Maidar EcoCity	- New political and religious center - High end residential area - Recycle oriented ecocity
Zuunmud	- Residential complex - Commercial center

Source: JICA Project Team

8.4 Institutional Measures by Sector

8.4.1 Establishing principles of responsible mining

(1) Idea of regional development

The NCDP pursues regional development of different regions in Mongolia to realize more balanced development between Regions and Aimags and between urban and rural areas. The idea of regional development is socio-economic development based on the use of indigenous resources endowed in a region by and for the benefit of local people in the region. Thus, it builds in the concept of equity and therefore is consistent with the idea of alternative socio-economy advocated by the Project.

The idea of regional development embraces a few important pre-conditions. Most important is the ownership for resources. For local people to utilize the indigenous resources for their own purposes and benefits, the ownership for resources has to belong to the people. It may indeed be ideal if the local people can realize their own development with all the indigenous resources alone including human resources, cultural and social resources as well as natural resources. This represents typically the idea of “local consumption of local products and services.”

Difficulty in the real world arises from the fact that this model of regional development cannot be realized in a purest form as some resources will have to be introduced from outside, typically capital and technology necessary for the development. Human resources may also be introduced from outside to complement and augment the capacity of local people. Then, the region will have to pay for those external resources in one way or another.

The idea of regional development with its complications provides a basis to establish principles for responsible mining. First, mineral resources endowed in a region or a country belong to the region or the country as a matter of principle. How to use them should be determined by the people living in the

region or the country including decisions to introduce external resources such as capital for investment, technology and human resources necessary for the mining development.

Usually, investors from outside provide capital, technology and human resources necessary for developing certain mineral deposits. They bear costs for exploration and exploitation of the deposits by using their capital and human resources with relevant technology. It is important, however, to confirm that such initial input by investors from outside or anywhere else will not transfer the ownership for resources. Even if the exploitable deposits are quantified by the investors, this will not establish their ownership even for the deposits assessed for their value.

(2) Pre-requisites for costs and benefits sharing

How to share costs and benefits from the exploitation of the deposits between the owner and the investors is another issue. The owner would like to ensure they can obtain proper profits from the exploitation. For the purpose, the owner would have to be involved in the decision-making process of investors company. For a modern shareholding company, this is realized by representation in the board of directors of the company as well as large enough shares.

- (a) Pre-requisite conditions for responsible mining may be summarized at this point as follows:
- (b) Decisions on mining activities are made by those to be affected by such activities;
- (c) Benefits from mining activities are shared by them based on agreements between them; and
- (d) Costs involved in mining activities are borne by them.

These, however, are not sufficient conditions. First, the ownership and the representation in the company need to be defined more precisely. The ownership belongs to the region or the country, or more precisely the people in the region or the country collectively, not a single or few residents. An institutional mechanism is necessary to reflect this or to avoid the ownership represented by arbitrary and influential individuals. The representation should accompany holding shares of the mining company large enough to exercise influence for the benefits of the collective owner.

(3) Shareholding arrangements and capital preservation

At least, two conditions have to be satisfied to approach responsible mining: the shares of the people are large enough to exercise influence on the company's decisions and a representative member of the board of directors is properly selected to represent the interests of people in the region or the country. Another important condition is that such shareholding arrangements and representation are stable over time.

In general, shares of any respectable mining company can be traded freely at any stock exchange markets throughout the world. Any shareholders can buy and sell to increase or decrease their shares. Therefore, even if the people have large enough shares of the mining company initially, someone can purchase them to increase the share when the people decide to sell theirs. It may result in undermining the interests of the region or the country.

A subtle point is that having shares means sharing production and profit according to the shares, not the investment costs including costs of mineral exploration which are sunk costs. It means in other words, sharing the future not the past. The sunk costs are reflected in the future only through share prices.

It is necessary to restrict trade of the mining shares owned by the people at least for some time until the mining company establish responsible mining practices. In fact, shares of the mining company constitute indeed the capital of the company shared between the owner and the investors. Preserving the capital is more than symbolic of preserving mining resources, which should be considered as capital in accordance with the idea of alternative socio-economy.

As long as the people continue to own their shares of the mining company, they can ensure preservation of the mining deposit that they own as the capital. The mining deposit should be seen as the capital to be preserved so that they can continue generating benefits for the people in the region or the country. On the contrary, if the mining deposit is seen as a source of income, the deposit tends to be depleted

easily as more extraction means more income.

The people having shares of the mining company should share costs involved in mining activities as well. This means they have to make sure the mining site will be properly restored after extraction of deposits. They are, in fact, in the best position to monitor environmental effects associated with mining activities since they live there. This is facilitated by devolution of environmental monitoring function to local governments as part of stage wise devolution of development administration in Mongolia.

(4) Stability agreements

The arrangements for responsible mining can be established and maintained only if both the owner and the investors can count on them as fair arrangements at present and in the future. This is ensured by stability agreements in two ways. For the mining company, future changes in legal conditions should not apply to the arrangements already made between the owner and the investors.

For the people and the regional or national economy, the following conditions should apply:

- (a) The mining company should purchase services and products available in the region or the country as much as possible;
- (b) The mining company should employ people in the region or the country as a first priority,
- (c) Construction of infrastructure required for mining development should follow official planning by the central or relevant local government; and
- (d) Use of the infrastructure should be open to the general public without creating a monopoly right or any other undesirable exclusion.

There are several cases in the past where stability agreements failed to ensure fair arrangements for the Mongolian side. To avoid such failures, transparency of negotiation and accountability of the relevant local administrations as well as the National Government would be most essential.

8.4.2 Policy and institutional measures for manufacturing industry

Based on the analysis on existing conditions, issues and policies in industry reported in Chapter 4 of Sector Report on Crop Farming, Livestock Farming, Mining, Manufacturing and Tourism, policy and institutional measures for industrial development are recommended as follows.

(1) Formulation of legal and policy framework

- Provision of the detailed regulations for the FTZ development is needed.
- Ministries and agencies related to industrial development may be consolidated for effective measures from the viewpoint of the long-term perspective.
- PPP or equivalent scheme should be introduced especially for FTZ/SEZ development.
- The existing Action Program and vision should be steadily implemented.
- National standard for quality should be fully developed.
- Strategic mobilization of international cooperation will be promoted.

(2) Human resource development

- Provision of assistance to SMEs for training of their employees is needed.
- Skill certification and awards scheme should be introduced.

(3) Strengthening and diversifying private firms

- Introduction of productivity tools for SMEs should be considered by Ministry of Food, Agriculture and Light Industry (MOFALI) and private associations.

- Introduction of institutionalized technical extension for SMEs will be considered.
- Quality standards and certification, testing services should be strengthened.
- Subsidies and incentives for upgrading management, technology, marketing and ICT should be introduced.
- Potentials for value-added processing of existing mining related industries should be promoted.
- The National Heavy Industry Development Program should be implemented.
- For import substitution, development of food industries should be undertaken with introduction of the advanced technology; also, plastic products, rubber, furniture, beverages and soap seem to be promising commodities.

(4) Promotion of foreign direct investment (FDI) and domestic investment including FTZ/SEZ development

- Results of the study conducted by NDA for evaluation of the optimum locations for several sub-sectors such as leather, wool, cashmere, dairy industry, meat industry and so on may be helpful for investment promotion and incentive system by sub-sector and by region (Aimag and Soum).
- Effective investor information package and website should be developed.
- Investment promotion seminars, missions and office abroad should be strengthened.
- Development of high-quality infrastructure should be continued steadily to support industrial activities with the long-term perspective.
- Infrastructure development of the industrial zones, consistent policy measures, and involvement of private sector for the management seem to be indispensable.
- Development of rental factories or standard factories in the new industrial parks or zones will be needed especially from the viewpoints of relocation from the city center.

(5) Value-chain development and strengthening of business linkage including industrial clusters

- Support for domestic and export market development should be continued and strengthened.
- Enterprises database for the networking of industries should be developed.
- Incentives and subsidies for FDI-local firm linkage and technology transfer should be considered.
- Official promotion/ intermediation of subcontracting should be promoted by MOFALI and NDA in cooperation with Mongolian National Chamber of Commerce and Industry (MNCCI).
- Establishment and strengthening of industry/business associations and local firm networks should be promoted.
- It is important to introduce industrial cluster development from the perspective of the new development paradigm. Also, unique and identifiable “brand” for agricultural products in the cluster should be developed.

(6) Improved access to finance

- Coordination among governmental fund/bank and private commercial banks is needed to provide a loan to SMEs in response to their demand.
- Implementation of subsidized commercial bank loans or two-step loans for targeted firms should be taken into account.
- Loans and enterprises diagnostic and business advisory system should be linked.

(7) Support of business start-up, incubation and innovation

- Support of setting up incubation centers including the functions of research and development (R&D) should be promoted in collaboration with relevant business and professional associations.

- Strengthening and building capacity to effectively utilize scientific and technical information including Intellectual Property (IP) tool is needed.
- The innovation cluster stimulates the development of new technologies with educational and research institutions. An innovation cluster or a Science City will be developed.

(8) Promotion of IT industry through application of DX and ICT

Given the widely distributing population in the vast territory, application of DX and ICT is of critical importance in Mongolia for manufacturing and related sectors. The public sector and the private sector should cooperate in an organized systematic manner on the basis of mutually supporting concept as follows.

- Construction of an organic business ecosystem combining ICT infrastructure and software development as well as institutional measures;
- Utilization of the private sector initiative such as offshore development by utilizing high technological skills, relatively low wages and multi-language capability of Mongolian youth;
- Establishment of open data system satisfying open-source requirements supported by the Government to allow easy access by people and mutual communications between people and local administrations;
- Cooperative experimentation of 5G communication system at strategic locations for various application fields; and
- Establishment of model city/Aimag for advanced technology application with infrastructure, business startups and training.

8.4.3 Institutional measures for other economic sectors

(1) Crop farming

For crop farming to contribute to the attainment of the SDV2030 and further the realization of the new development paradigm of alternative socio-economy, technology development and adaptation are most important. Farming activities by private individual and cooperative farmers should be supported by the strong initiative of the Government to take appropriate institutional measures related to technology.

Technology development and adaptation for crop farming should aim at increasing productivity in view of currently low productivity of most crops and need to protect pastureland from further degradation. Specifically, irrigation development needs the government initiative for site selection, planning for water resources development and management and design of facilities. Greenhouse agriculture should be supported by subsidy schemes to encourage introduction of innovative facilities that would fit to local climatic and other conditions.

Other areas and aspects to be supported by the Government include farming technology such as zero-tillage farming, soil improvement measures and selection and development of crop varieties and quality seed. Specific technology and crops to be introduced and adapted are proposed in Sector Report on Crop Farming.

Another important aspect that would need the government initiative is marketing particularly to promote exports. Production of safe and traceable agro-products is increasingly demanded by the export market. ICT application is indispensable to establish traceable production and marketing system, which should be established first as a pilot project by the government initiative.

The Government may take incentive measures to encourage production of strategic crops that can be processed for higher value added and export products. While an industrial cluster based on a strategic crop may develop by voluntary activities of individual farmers and investors, the Government may facilitate the cluster formation by linking prospective members of the cluster including farmers, processing industries, marketing agents, research institutes and other support service providers. Also, technology for product development and marketing support for export products may be the roles of the

Government for some industrial clusters.

In order to promote ICT application, collaboration between stakeholders is indispensable. In Japan, cabinet office has launched "Cross-ministerial Strategic Innovation Promotion Program" in 2014 to address the critical social challenges. The program aims at science technology innovation through promotion of R&D with an exit strategy. The features of the programs are the following: 1) the priority programs are selected by interdisciplinary science technology and innovation committee, 2) programs are implemented by cross ministerial and interdisciplinary approach, 3) comprehensive approaches from fundamental research to social application, 4) establishment of regulation, deregulation, and establishment of special zone, and 5) establishment of intellectual property system for further development. Out of 10 priority programs selected in the first phase, cultivation support system for agriculture sector was established in collaboration between stakeholders such as research institute, university, and private sectors. The system provides information such as meteorological parameters, growth simulation model, early warning, and cultivation techniques. Private sector will be able to link their own cultivation system to the system established by the program to upgrade their system and disseminate the latest information to producers. Apart from the program mentioned above, Ministry of Agriculture, Forestry and Fisheries (MAFF) in Japan has prepared ICT-related technology catalogue to promote ICT application. As of September 2019, 226 technologies are listed together with outline of technology, name of company, and contact address. Moreover, MAFF is planning to launch new project to accelerate dissemination of ICT-related technologies. It is aimed at achieving all the producers are engaged in agriculture by use of agricultural information by 2026. The technologies to be tested will be selected by public invitation and implementation cost will be disbursed for selected technologies to confirm the effectiveness and further social application.

(2) Livestock farming

Disease control is a prerequisite to promoting export of livestock products. Of prevalent livestock diseases in Mongolia, foot-and-mouth disease calls for priority attention by the Government due to 1) its high communicable power, 2) economic losses, and 3) difficulty to cope with by individual herders. Establishment of disease-free zones may be initiated by the Government in consultation with livestock farmers.

Image control to overcome negative rumors about livestock diseases in Mongolia is another important role of the Government. Information dissemination is another important part of the measures against foot-and-mouth disease.

Proper management of pastureland is not only vitally important to sustain the livestock sector as the economic and cultural backbone of Mongolia but also essential to ensure protection and enhancement of natural environment. Sound and healthy livestock farming depends on government measures to cope with Dzud, drought and other natural disasters, climate change and pasture degradation. The ICT-oriented communication system linking livestock farmers including traditional nomads and local administrations should be established.

(3) Tourism

Tourism is expected to become a major industry supporting the new paradigm of alternative socio-economy not depending much on consumptive use of resources. To realize the potential, concerted efforts by the Government and the private sector are desirable. Proactive marketing by private tour operators is expected, but support by the Government should be effective such as national campaign to enhance tourism images of Mongolia. Important measures to promote international tourism include open sky policy for air access including direct access points in regions and simplified visa policy to be taken by the Government

Another important area for the Government initiative is to promote inter-regional and international alliances for tourism development. Regional tourism seems very promising in Mongolia, and direct air access to tourism gateway in a Region and alliance of neighbouring Aimags to establish common tourism routes may be encouraged by government policies. The Government may also facilitate development of international tourism routes with Russia and China as part of broad trade negotiations.

Possibilities include linking tourism objects in Aimags along the border with Russia with the Bryard Republic and further with Lake Baikal, and developing a tripartite tourism route around Manzhouli in China close also to Russia.

To increase financial resources for investment into tourism related infrastructure and facilities, a new funding mechanism may be introduced by the Government. A community development fund may be established by allocating small portions of profits from mining development and major tourism development, which may be used for various community facilities and preservation of forests and other natural resources as necessary condition for sustainable tourism development.

(4) Stock exchange markets

The Mongolian Stock Exchange (MSE) was established in 1990 by the decree of the Mongolian Government to privatize state-owned assets as part of the Country's transition to market economy from a planned economy. Although the MSE used to be the world's smallest stock exchange by market capitalization in 2006, it had become the world's best performing stock market by 2010. As of February 2019, it has 218 listed companies with a combined market capitalization of MNT 2.5 trillion. It is reported the total market capitalization reaches MNT3 trillion by February 2021. Further development of the MSE is an essential condition for continued growth of the Mongolian economy.

In the global society, performance of stock exchange in any country depends on multi-national companies listed in stock exchange of other countries. For instance, Ireland increased its stock exchange capitalization during 1990's by successfully listing "campus companies" within its research institutes at the stock exchange in the United States. This was made possible by the research capacity particularly in software development and medicine combined with human resources and government supports. Active performance of the stock exchange in Japan is supported mainly by overseas investors who purchase stocks of Japanese firms. The point here is those Japanese firms are listed at stock exchange in other countries. Investors can enjoy arbitrage by selling stocks of a Japanese firm in the U.S. and buying stocks of the same firm listed at stock exchange in Japan, and *vice versa*.

Therefore, for the development of the MSE, it is desirable that more multi-national corporations establish their business in Mongolia. To facilitate those firms to establish in Mongolia, an environment conducive to operation of multi-national corporations should be established. Also, establishment of branch offices of international banks is another condition.

Mining corporations have been the major investors in Mongolia in recent years, but further investments in the mining sector face increasing problems to satisfy social and environmental requirements. As proposed in sub-section 8.4.1, shareholding arrangements with local people would be pre-requisites for responsible mining. More opportunities may be found in crop and livestock farming and processing, which have not been subjects for investments by multi-national corporations so far. An idea has been raised to establish a huge ranch of several hundreds of thousand hectare as an FEZ with investments by a major meat processing firm and trading house to establish a joint venture company with Mongolian partners and to export products certified by international food quality standards from an inland port. The joint venture company should be listed at stock exchange in the U.S. and Japan as well as the MSE.

Campus companies and multi-national livestock processing firms are just examples. Other possibilities should also be pursued. The point here is to develop the MSE by strategically inviting foreign investors to undertake processing of primary products, not only mineral resources but also crops and livestock products, by joint venture companies to be listed at the MSE. Involvement of research institutes as well as human resources available in Mongolia in such undertakings should be supported by facilitation measures by the Government to create a business environment conducive to multi-national corporations.

8.5 Institutional Measures for Development Administration and Finance

8.5.1 Overview

The proposed NCDP projects and programs are implemented within the existing development

administration and finance in principle. To make the implementation more effective, some suggestions are made in this section. Development administration and finance have been changed substantively after the 1990 transition from the socialistic system to a more democratic one, but some legacies of the socialistic regime still affect their operation. As any system is operated by human beings, the effects are related largely to mindset of officials and staff of related organizations, which constitute organizational culture and social attitude. Also, rapid transformation of the administrative and finance system has created new problems related to macroeconomy of Mongolia.

Some of the problems are related to management issues within respective organizations such as inadequate corporate culture, and some others to external conditions such as excessive influence of politics represented by high staff turnover resulting from administrative changes following elections. Although Mongolia has strengths both in the private and the public sectors for development and administration, there seems to be rooms for substantial improvement in institutional development to overcome the legacies under the socialistic regime until 1990 and to adapt to changing values.

A structural problem of macroeconomy has been created in Mongolia due to large foreign investments for mining development, which led the economy at high growth rates, and limited export products and destinations, resulting in large foreign debts. The recent and ongoing Coronavirus disease 2019 (COVID-19) presents opportunities to re-examine administrative functions and finance of the central and local governments. Methods to overcome the structural problems and realize sustainable post-COVID-19 growth are suggested.

8.5.2 Issues in institutional and organizational aspects

(1) Positive social settings

Mongolia seems to have the best social setups among all the Soviet-influenced countries in terms of female participation in the labor force and communications across ministries and departments, and among companies. Due to nomadic lifestyle outside of Ulaanbaatar where sons are supposed to inherit nomadic life together with their livestock, the parents tend to send their daughters to higher education mainly in Ulaanbaatar. Accordingly, the proportion of female students at the university level is 60 to 70%¹, which encourages the private and the public sectors to hire more educated female as office staff and workers.

Moreover, thanks to the general education system under the socialistic regime, literacy level attained practically 100% in Mongolia by 1990. Mongolia has developed comparatively well-educated human resources well disciplined often with multi-language communication capability. This is certainly a major advantage in the increasingly globalizing society.

Mongolia achieved the world highest gross domestic product (GDP) growth of more than 16% in 2011 driven by mining industry based on rich natural resources represented by coals, copper, etc. The Country also has positive trade balance since 2014.

(2) Political instability and high staff turnover

In spite of the strong points in the economy represented by natural resources to earn foreign currencies, and livestock farming ensuring supply of meat and dairy products for the people, Mongolia's politics is not considered as well supporting the implementation of many government-led projects. The main reason is political instabilities and high staff turnover (too much and too often staff changes) all across the ministries and organizations including project units mainly due to elections.

Since 1990, the central administrations changed almost each time the general election was undertaken, resulting in political instability. This caused unstable positions subsequent to every election as many of the officers from the top to the bottom in the respective organizations and in the public sector are politically appointed or arranged by elected politicians. Officials individually have good motivation

1 At the Consultation Workshop CDS Mongolia by ADB on April 9th 2019, the keynote speaker Professor Dr. Otgontugs Banzragch explained that 64% are female students at universities according to the recent statistics.

in good social setups with balanced female participation in the public sector as described above, but their performance has tended to be undermined by the political instability. As a result, there are not enough group dynamics to take advantage of accumulated wisdom all across the board related to policy implementation.

This frequent staff turnover results in lack of experienced knowledgeable managers and staff in most ministries and departments, leading to low productivity and inadequate group dynamics, which hampers realizing consensus buildings across relevant departments or ministries to implement projects as needed.

It is advisable that annual staff turnover should be less than 30%, and preferably less than 15% as far as they are qualified in any organizations. The reduction of this magnitude from the current high level to 20% or less annually with some training to enhance positive mindsets or group dynamics will induce a drastic change in the organization culture from an organization of individuals not concerned about other jobs to an organization of mutual understanding and supports, which brings higher productivity and mutual benefits to all concerned within the organization.

The revised Law on National Public Officials was enacted on January 1, 2019. According to the law, the selection and appointment of civil servants shall not be influenced, pressurized and coerced in any forms by any third parties, governors, political appointees, managerial and executive officials of political parties and coalitions and other individuals.

(3) Mindset of individuals and society

The political instability and high staff turnover discussed above have affected mindset of individuals and the society in both the public and the private sectors. Staff of any organizations tend to seek individual gains in the short term rather than collective value of the organizations that they belong to. This makes Mongolia difficult to attract interests by foreign visitors and businessmen, resulting in loss of opportunities for development. The worst symptom observed in Mongolia is inadequate motivations and lack of loyalties of the officials and professionals to their jobs/responsibilities in the ministries, authorities, institutes and companies all across the board, because they can only see short-term future.

As the economy develops beyond the level to meet just basic human needs such as food, shelter and clothing, the government officials need to focus on quality rather than quantity (“A transition from quantity to quality” in Provincial Competitiveness Report 2018²(page 10). This means after the economy goes beyond the period of inadequate quantities, the people will start seeking quality of services, and more importantly quality of life in general.

Figure 8.5.1 shows changes needed in the mindsets and communication flows from the current mostly top-down to combined flows of bottom-up and top-down directions. It cannot be overemphasized that “Quantity follows quality”, and for all the individual customers “Quality is imperative in any business”.

2 The report was made by ECONOMIC POLICY AND COMPETITIVENESS RESEARCH CENTER in 2018 (web site: eee.ecrc.mn info@ecrc.mn)

**Mongolia can participate in the Olympics of Economies,
 if you stop the Soviet style ...**



Source: JICA Project Team

Figure 8.5.1 Concepts of "Enterprise Mongolia"³

(4) Inadequate customer orientation

The Law of Mongolia on Civil Service enacted on December 7th, 2017, which entered into effect from January 1st, 2019, has no customer concept, and therefore no mission can be shared by the civil servants. The purpose of the law is as follows (Article 1. Purpose of the Law).

The Purpose of the law is to establish the legal basis for ensuring professional, sustainable, transparent and responsible civil services, and to regulate relations concerning the central civil service authority and defining the legal status of civil servants and their social security entitlements.

Whereas, the Civil Service Law of Japan defines the purpose as follows (Article 1).

This law establishes basic standards (including welfare and appropriate measures to protect interests of civil servants) to be applied to national civil servants, and determines that the civil servants should be selected and managed in democratic manners so that they can achieve the maximum performance in jobs, thereby ensuring democratic and efficient services in their jobs for the people.

The Mongolian law, Article 1. simply establishes the legal status and social securities of the civil servants without consideration to their customers (the people), whereas the Japanese law, Article 1. determines how the civil servants should be hired to ensure their maximum performance for the people, meaning that the Japanese civil servants are supposed to work in more mission-oriented manners, understanding who their customers are.⁴

³ A keynote speech at International Conference of Innovation and Entrepreneurship Development May 2016 at the Mongolian University of Science and Technology. The title "Enterprise Mongolia" means all the people in Mongolia should consider themselves as workers in a single big "Enterprise Mongolia", and ideas should be discussed in "Small Meetings".

⁴ The Law of Mongolia on Civil Service determines "mission of civil services" in its Article 5. Mission of civil services shall aim to enforce the Constitution of Mongolia and other laws, while upholding

In case the civil servants have no clear customers they serve, consensus building is not possible without reference to whom they are working for, and most likely each of the civil servants is allowed to work for their individual benefits because of their status being legally defined at the beginning.

(5) Inflation under control

Mongolia’s Constitution has Chapter Two: Human Rights and Freedom in which the citizens of Mongolia shall be guaranteed to exercise various rights such as the right to life, a healthy and safe environment, material and financial assistance in old age, disability, childbirth and childcare, etc. Moreover, as far as its inflation is controlled at less than 10%⁵, the Government can ensure adequate budget to provide good education for employment, welfare for children, handicapped and aged people. They can even construct more houses/apartments for the people under the poverty line.

In Mongolia from 1991 through 1995 in particular, after the collapse of the Soviet supply management system in 1990, the people started suffering from shortages of fuels, foods and other industrial goods which, otherwise, should have been supplied from Commonwealth of Independence States (CIS) countries. Because of the shortages, high inflation over 50% persisted early 1990s (Figure 8.5.2).

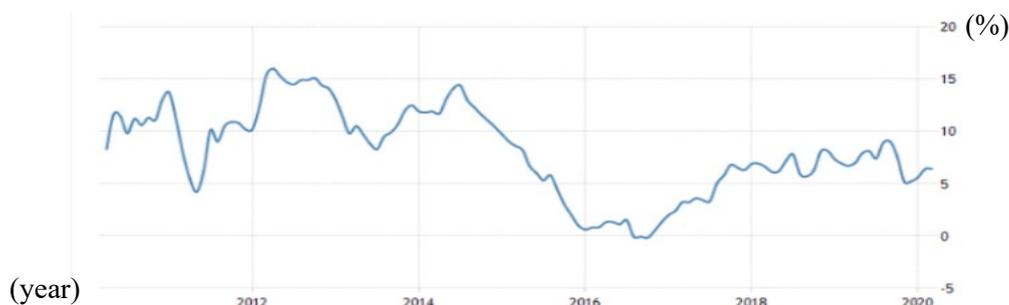


Source: JICA Project Team

Figure 8.5.2 Inflation Rates of CPI in Mongolia since 1991 through 2018

Inflation rates of Mongolia have been well controlled under 10% in recent several years with positive trade balance, a bigger assistance program than this may be feasible (Figure 8.5.3). Generally speaking, inflation around 4% is considered as optimum for most businessmen to make

decisions to expand and invest more for the future business development. In this sense, inflation in Mongolia should better be further controlled.



Source: Trading Economics.

fundamental national interests, and serving the public and the state with utmost loyalty.

5 The inflation in Mongolia can be further lowered by reducing dependence on foreign currencies, and issuing more Mongolian Tugriks. This is discussed further in the following sections.

Figure 8.5.3 Inflation Rates of Consumer Price Index for 10 Years in Mongolia

(6) National debts

As shown in Table 8.5.1, the foreign debt is as big as 270% of Mongolia’s GDP, whereas the debt in domestic currency is as small as 0.26% of the foreign debt. This means that Mongolia depends on borrowings of foreign currencies and the domestic market of government securities has not developed yet. This situation is understandable because the economy of Mongolia heavily depends on the exports of natural resources such as coals, copper, gold, rare metals, etc. The reason why government securities are not issued enough is that high interest rates, which should be 10% or more pose a big burden for the Treasury (MOF)

Table 8.5.1 Mongolia’s Total Debt

Unit: US\$ million

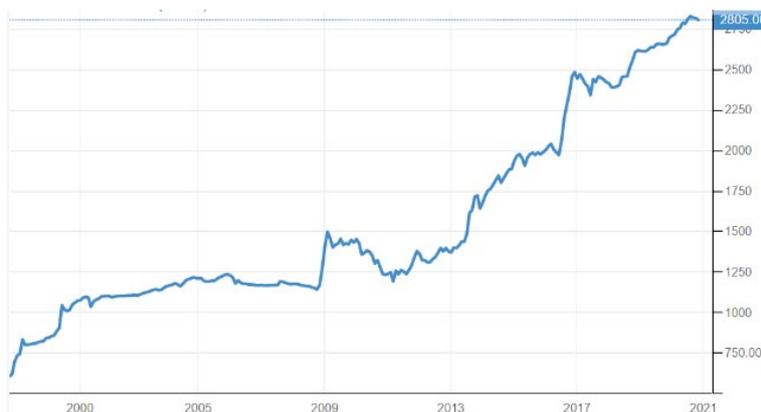
Debt	Amount
Debt in foreign currency	30,599.63
Short term	2,926.19
Long term	27,674.44
Det in domestic currency	78.25
Short term	37.45
Long term	40.71
Uncertain	-
Gross debt	30,677.88

Source: Bank of Mongolia

Note: Statistics are prepared in accordance with IMS’s SDSS standard.

Debt amount as of 2019/12/31

The Mongolia’s currency has been constantly depreciating due to its constant selling pressure of Tugrik to buy foreign currencies for imports (Figure 8.5.4), i.e. daily commodities and some industrial materials including even cashmere after dehairing process in China, although plenty of raw materials is produced from goats in Mongolia. Not only businessmen but people in general in Mongolia often appreciate foreign currencies rather than their own currency loans at high interest rates around 15% or higher.



Source: Currencies in Trading Economics (<https://tradingeconomics.com/mongolia/currency>)

Figure 8.5.4 Exchange Rate of Tugrik against US Dollar

8.5.3 Lessons from COVID-19

(1) Context of financial measures

Due to the COVID-19 spreading over the world since late 2019, the governments of many countries including Mongolia and economically advanced countries are taking new measures to cope with it. Most governments are providing financial assistance in a large scale to businesses and individuals, after

the governments declared state of emergency and stopped many business operations in respective countries. Considering the needs of public funding by the governments for various reasons, the domestic and foreign debts are of major concerns to cope with emergencies in a short term, and also to implement long-term programs for the sound economic development thereafter.

The Bank of Mongolia decreased its monetary policy interest rate to 9% by 1% each in March and again in April from the previous 11% as an emergency response measure. In contrast to the Chinese government which started taking economic measures as early as January, the Mongolian Government approved MNT5.1 trillion (US\$1.9 billion) stimulus package only in April. A question is whether there are businesses currently willing to get loans from commercial banks under the Bank of Mongolia (DeFacto Review April 24th).

(2) Early response by some advanced countries

The US Federal Reserve: the central bank of US announced that it could pump up US\$2.3 trillion into the economy to help companies and state/local governments suffering financial damages by the pandemic in their planned total of US\$6 trillion equivalent to 30% of GDP as the economic-relief package in March 2020. The Treasury Department funds authorized by the Congress would buy municipal and corporate bonds by using a special-purpose vehicle (SPV), capitalized with \$10 billion from the Treasury. The Federal government wavs to also implement a lending program under a small business administration loan program (New York Times, April 9th)

The UK government was to provide more than £330 billion of loans and guarantees to help firms continue operating, declaring the UK government is committed to do everything to support businesses and manage their cashflows during this difficult time. For small and medium sized businesses, the coronavirus business interruption loan scheme wavs introduced to help any viable business to access government-backed finance of up to £5 million with interests covered by the government for the first year (Express & Stars, March 17th).

The British government supported 80% of salaries by workers immediately. The German government provided US\$ 0.8 trillion salary supports for those severely affected by the crisis.

The Japanese government introduced a financial support program for companies with about US\$46 billion in times of emergency out of the total support of US\$1 trillion. Of the total, however, only US\$ 0.17 trillion was for direct cash supports. This program was in addition to US\$1.9 billion support announced in March due to the quickly declining economic situation for small- and medium-scale companies with loans without interests (NHK World Japan April 4th).

(3) Essential workers: important but low paid

A lesson learned from the COVID-19 crisis is the presence of essential workers and relatively low compensations for them. They include not only medical and social workers but also those involved in logistic industries supplying essential food and goods and utility services for lifeline infrastructure. Those engaged in production of food by crop farming and livestock rearing are also considered essential workers. These are the workers providing goods and services essential for survival of human beings.

If long term development of a country beyond and after the pandemics is considered, those engaging in human resources development may be included in essential workers in the sense that socio-economic development cannot be sustained without adequate human resources. Teaching staff at primary and secondary education certainly belongs to this category, and so do researchers engaging in basic research on various subjects. These people are generally compensated at relatively low rates in competitive societies as their works do not produce immediate tangible products and services in the market.

(4) Direct cash support: effective short-term measure

Despite controversies, the direct cash support provided by the Japanese government was considered effective in rescuing people in financial difficulties under COVID-19, while it does not have much meaning for the wealthy people. Those in difficulties would use it immediately, making money flow in the society for broad economic benefits as well. A key point to be learned is that it is important to

increase money flow in the society to stimulate the economy.

(5) Local vs. central governments

Many European countries introduced “lock down” of the capital cities and other larger urban centers to suppress the spread of COVID-19. Such a drastic measures may be taken only under the strong authority of central governments with legal base. This appears to be contradictory to local autonomy of European cities. Also, it is true that more effective measures can be taken by capable local governments. Apparently, most effective measures to control the spread of COVID-19 have been taken by the Chinese government with the strong central authority.

Such a strong central authority to suppress the autonomy of local/city governments as manifested by the Chinese government is clearly against the direction of localization pursued by many developed and developing countries. Actually, an alliance of local governments/cities can introduce “lock down” by mutual agreement as long as there exists legal base established by respective central governments. Division of responsibilities between central and local governments to cope with the crises needs to be re-examined.

8.5.4 Suggested measures

(1) Structural problem of Mongolian economy

The high economic growth realized in recent years is due to export of coal and other limited mineral resources exploited by foreign investments, making Mongolia indebted in foreign currencies equivalent to 270% of the GDP. Many private firms prefer to borrow, as far as possible, in foreign currencies as interest rates are comparatively lower than borrowing in Tugrik. High interest rates on Tugrik tend to constrain money flow, which in turn increases interest rates in this vicious circle.

Decrease in circulation of domestic currency encourages foreign currencies introduction by large enterprises to make up for the deficiencies. This results in depreciation of Tugriks and inflation of import prices. Large enterprises are capable of increasing foreign currency introduction, but small ones are not. Therefore, discrepancies between the rich and the poor tend to become wider. This is an inherent problem that Mongolia faces, which in fact is shared partly by other capitalistic countries as well. The problem tends to be more significant in Mongolia as circulation of domestic currency is constrained. The Mongolian Government issued bonds traded by the Bank of Mongolia in 2012 and at the stock exchange in 2014. Only a few commercial banks bought government bonds with high interest rates which put pressure on MOF. Therefore, its trading had been suspended since October 2017 and issue of new bonds re-started only in 2020.

Based on the analysis on existing conditions related to development administration and finance and lessons learned from COVID-19 described above, suggestions are made as measures to improve them. They consist of measures related to organizational culture and mindset of individuals and society, re-examination of division of responsibilities between the central and local governments, and financial measures.

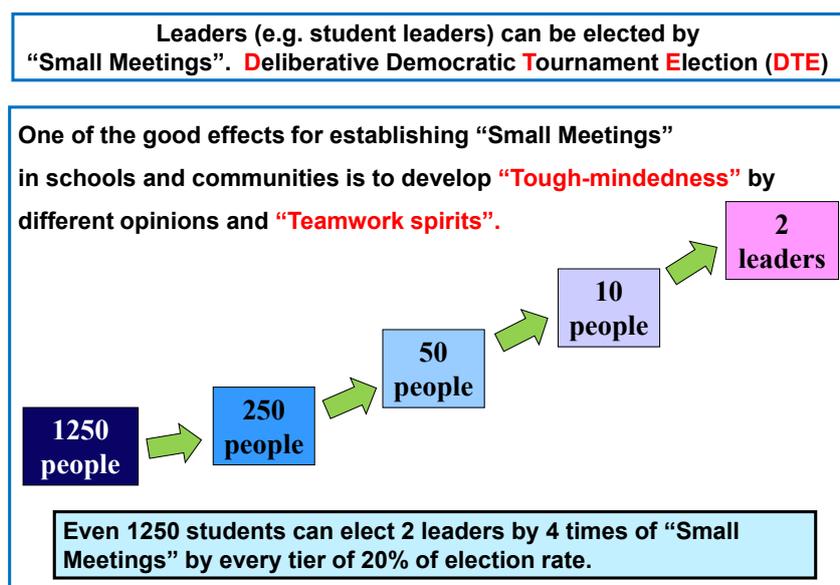
(2) Organizational culture and mindset of individuals and society

The political instability has been substantively overcome by the establishment of the new administration and enactment of the revised Constitution of Mongolia made effective in May 2020, which has ensured continuity of development policy and plans through consecutive central administrations. Still, high staff turnover in government organizations seems to continue together with mindset of officials without “customer orientation”.

There are needs to produce and provide training programs for political leaders and civil servants in Mongolia. Effective programs should have the following objectives:

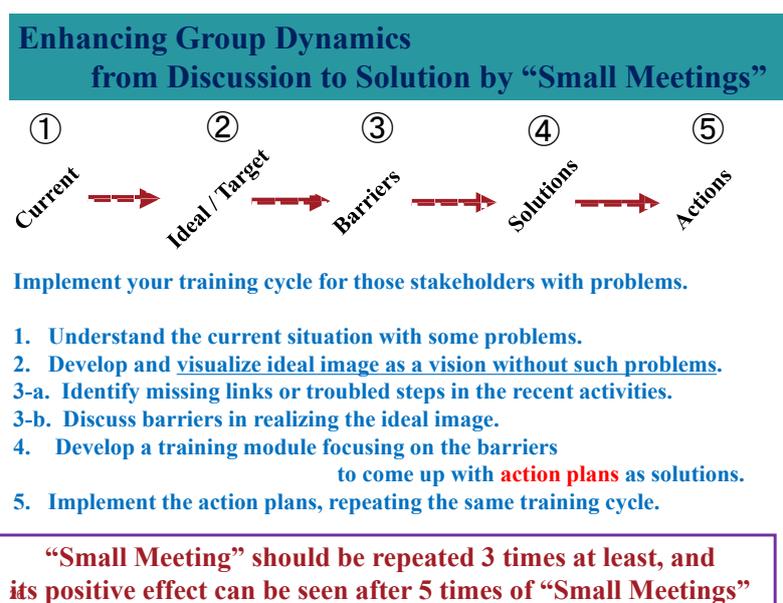
- (a) To enhance tough-mindedness through group discussions for consensus-building, and
- (b) To enhance action-oriented challenges to provide solutions to problems for the people.

It is proposed that the relevant departments of the Government could take initiatives to adopt a dynamic approach and try to provide solutions to various problems for the people in Mongolia. In participating in the training of dynamic approach, each participant in his/her mind should put oneself in the top position of “enterprise Mongolia” and come up with action plans as a solution through group discussions. Any issue can be taken up for this exercise. For instance, “towards more efficient job procedures in the department”, or a regional or nationwide program like “towards fairer business environment in Mongolia”, “development in a specific region” and “air pollution abatement measures”, etc. It should be noted that customers include current residents, youths, children and future generations to be born in the future in Mongolia. The procedure of dynamic approach and its practice through small meetings are illustrated in Figure 8.5.5 and Figure 8.5.6 respectively.



Source: JICA Project Team

Figure 8.5.5 Selection of Leaders and Ideas



Source: JICA Project Team

Figure 8.5.6 Enhancing Group Dynamics

(3) Division of responsibilities between central and local governments

The COVID-19 provided opportunities for many developed and some developing countries to reconsider division of responsibilities between central and local governments to cope with crisis situations. The authority of central government with a legal base is essential in taking drastic measures such as city lockdowns, but measures to control activities of individuals and enterprises can be more effectively taken by local governments. This is particularly true when prompt actions need to be taken in response to rapidly evolving conditions in localities.

The Mongolian Government was effective in taking prompt actions to close down all the borders and enforce lockdown of the capital city. Together with early closure of all the schools and stringent quarantine for in-coming people, the Government was successful in suppressing the spread of the pandemics up until November 2020. It is also true that many herders suffer from reduced demand from Europe for cashmere products and limited access by Chinese traders for cashmere raw materials and other commodities, despite emergency support measures taken by the Government.

To sustain the livelihood of people in rural areas including herders and to recover the economy during with- and post-COVID-19 period, local governments should have much enhanced roles under the guidance of the Mongolian Government. Implementation of the regional development programs as proposed by the NCDP will provide a testing ground for enhancing the roles of Aimag administrations and communications between the Mongolian Government and Aimag administrations. Specific measures for this are proposed in Chapter 10, Section 10.2

(4) Financial measures

A key to overcome the structural problems of macroeconomy that Mongolia faces is to enhance the circulation of domestic currency. A straightforward way is to increase the supply of Tugrik, but possible inflation is of concern. It should be reminded here, however, that Mongolia is a country which has not experienced serious famine in the history thanks to large territory with rich natural resources. As long as those engaged in crop farming and livestock rearing continue to produce basic foodstuff under proper management of water and land resources, this situation would persist. They are indeed essential workers.

Fortunately, Mongolia has been fairly successful in controlling inflation in recent years. If more money is supplied in the hands of the people, they buy more under the controlled inflation. Inflation can be controlled, because there is potential in the supply capacities. That is, some competition exists on the supply side, so it is not possible for suppliers to raise prices deliberately too high.

Compensation for essential workers is another issue. As mentioned, essential workers are generally compensated at relatively low rates in competitive societies as their works do not produce immediate tangible products and services in the market. The Government cannot allocate as much budget as required for people to receive adequate social services to cover salaries of teachers at primary and secondary education and medical personnel. Also, budget allocation for professors engaging in basic research on various subjects may not be sufficient to ensure technology development necessary for emerging business opportunities in the new era.

To finance the implementation of proposed projects without further increasing national debts in foreign currencies, new financial measures should be introduced in addition to regular budget allocation. Issuing government bonds is one way. The Mongolian Government issued bonds during early 2010s, but it was not considered successful because of high interest rates which applied pressure on the Ministry of Finance. Short-term bonds may be preferable. A short-term government bond with the maturity of 3 months at the interest rate of 3~4% per the period, for instance, may be considered. After redemption, it will increase the supply of Tugrik. The Government should plan for procurement of additional domestic currency budget by issuing short-term bonds.

Another method to increase finance for project implementation is to establish special purpose funds. The Mongolian Government has established dozens of funds including social insurance fund, savings fund for housing and SMEs fund. Some of them have been abused by political interests and some others run at a loss. The Vision2050 proposes to establish a sovereign wealth fund possibly based on

mining royalty fees, dividends of government shares, revenues from stock trading, revenues from oil and natural gas production sharing agreements and net income from investment of the fund. Use of the fund seems to be directed to mega transport infrastructure projects to support the large-scale mining development under the direction of the Government.

The NCDP proposes to establish a community development fund, which should be directed to community needs and managed by respective Aimags under guidance by the Government. As mineral resources are not created by human beings but endowed naturally, it is reasonable that each citizen in any Aimag endowed with mineral resources is entitled a share from revenues deriving from natural resources.

As another way to increase domestic currency circulation, an option of “Equity currency” may deserve a serious consideration. While any currencies in the world are called “Debt currencies” because creating loans/debt is the only method to create currencies, equity currency may be issued without debts. It should be noted that government bonds (treasury bills) and the currency have the same meaning in finance/accountancy. They are debt for issuing banks (MOF, Bank of Mongolia), but assets for those keeping them.

Equity currency may be used to increase compensations for essential workers. The Government cannot allocate as much budget as required for medical and social workers since increased allocation would reduce allocation to other economically more directly rewarding sectors and activities. That is, the allocation to medical and social workers has opportunity costs. Equity currency, on the other hand, involves no opportunity cost as it bears no interest.

It is worth serious consideration to introduce equity currency to increase compensations for medical and social workers and also for those in difficulties during the crisis period. It would work just as the direct cash compensation for the poor as learned during COVID-19. Further application of equity currency should be subject strictly to: 1) establishment of mechanism to ensure financial discipline, 2) careful assessment of subjects for application, and 3) monitoring to prevent inflation. As a prerequisite, existing laws should be reviewed and amended as necessary including: 1) Law on Central Bank (May 13, 2001), 2) Law of Mongolia on Fiscal Stability (June 24, 2010), 3) Budget Law Approved by Government (February 1, 2012), and 4) Banking Law (January 28, 2010).

8.6 Capacity Development to Promote Regional Development

8.6.1 Need for capacity development to promote regional development

(1) Need for regional development

The Central Government has manifested a reasonable performance since the 1990 “revolution” in guiding the development of Mongolia. It has successfully realized a sort of paradigm shift from the socialistic development to a largely capitalistic development with some liberal policy inherited from the socialistic regime. As the results, high economic growth was realized driven mainly by mining development. This success, however, has been accompanied by increased disparities in income levels and between urban and rural areas. The Mongolian Government has started to place increasing emphasis on regional development to realize more balanced socio-economic and spatial development of Mongolia.

Localization of development administration is a common trend in most countries, including both developed and developing countries. To realize the regional development, capacity of local administrations should be much strengthened. This is because by definition, regional development means socio-economic development of a region by utilizing indigenous resources in the region by the local people for the benefits of the local people supported by local administrations. In Mongolia, deliberate efforts should be made to strengthen Aimag administrations in view of small population and local economy distributed in a large territory.

(2) Need for capacity development

The NCDP has proposed a revised regional division and formulated an integrated regional development program (IRDP) for each region consisting of Aimags having respectively similar characteristics. This would allow more effective policy measures for regional development to be formulated by region, and each region to realize self-reliant development by mustering their resources including human resources. Regional development in Mongolia should be realized by partnership between the Central Government and Aimag administrations. It is documented that past efforts for regional development failed due to limited capacity of local administrations. For effective partnership between the Central Government and local administrations, capacity of local administrations should be developed.

As part of the NCDP, a supplemental survey has been conducted to understand the current capacity of local administrations. The JPT has undertaken capacity assessment at individual and organizational levels of Aimag administrations as well as law/institution. Bulgan Aimag and Khuvsgul Aimag were selected for the survey based on the preliminary analysis on annual fiscal balance (budget deficit/surplus), distance from Ulaanbaatar and total population. Details of the survey including survey design, framework for capacity assessment and outcomes are contained in the Report on Pilot Projects and Supplemental Surveys. Main outcomes and recommendations are presented below.

8.6.2 Outcomes of capacity assessment of Aimag administrations

(1) Capacity at individual level

The capacity of the civil servants working for Bulgan and Khuvsgul Aimags was assessed at two levels: (i) Cognitive ability/technical capacity, and (ii) Non-cognitive ability/core capacity.

1) Cognitive ability/technical capacity

The technical capacity of the participants is good according to their self-assessment. It should be noted, however, the self-assessment of ability to access information is biased as the majority of the respondents make access mostly to comparatively less reliable information through Facebook groups and Internet searches. Their capacities to retrieve and use information effectively may not be enough from their usage and knowledge in the fields of database and data visualization. Moreover, the participants named that “inaccessibility to accurate information”, “poor Internet speed”, and “language barrier” as the main challenges to access information.

It is also concluded that the participants have acquired basic computer skills such as word processing, spreadsheet, and presentation, while their ability to use new technologies, including video conference and database, is not enough.

2) Non-cognitive ability/core capacity

The participants rate their self-awareness as good. Comparing internal and external self-awareness, however, 38.5% were in the “Seekers” category, or their internal and external self-awareness is simultaneously lower than the mean assessment of the participants. The assessment results show that the participants are very motivated from the inside. They are proud of working in the civil service and desire to perform well at the workplace. Therefore, it can be concluded that they have deep-rooted beliefs about their current jobs. Although intrinsic motivation is high among participants, there is less external motivation stimulated by external factors.

The social skills of participants are not good enough overall. Although their communication skill and awareness of providing citizen participation in civil services are reasonable, their networking skill and understanding of human-centered principles need to be improved. Especially, their knowledge of recognizing and respecting under-represented groups is relatively low.

(2) Capacity at organization level

Capacity assessment at organization level includes assessment of human resources, budget, service quality, and structure of local governmental organizations.

1) Human resources

As of 2019, 198,463 civil servants worked in 4,374 public organizations in Mongolia, which was 6.0% of the current population⁶ and 15.6% of total workforce. This percentage is similar to the developed countries as a whole. The number of public sector employees in the total workforce is 13.3% for USA, 20.2% for Canada, and 15.1% for Malaysia⁷. As of 2019, a total of 97,374 civil servants worked in the local governments throughout the Country, which was 5.5% of local populations-18 persons per civil servant on average; 67.5% of civil servants in local governments are women.

For the organizations covered by the survey, 273 civil servants are working in 10 public organizations in Bulgan Aimag, and 339 civil servants in 10 public organizations of Khuvsgul Aimag. Bulgan and Khuvsgul Aimags Governor's Offices have 78 and 76 civil servants, respectively. During the interview survey, almost all organizations mentioned that the number of staff is insufficient, or they operate fewer employees than the staffing limits of the organization. A half of the organizations (11) answer that their staff's knowledge and skills are adequate to provide civil service properly, while the other half mention it is not acceptable. The most needed knowledge and skills in local public organizations are ranked: 1) advanced professional development, 2) information and technology, 3) communication and attitude, 4) foreign languages and 5) policy and planning.

Employee turnover is significantly low for local government organizations. The employees of local governments had hardly changed as a result of the new local government reform in 2020. The employees of local government had hardly changed as a result of new local government reform in 2020. Main challenges faced in the organizations are: low salary and high workload as high challenges, and lack of continuous and advanced professional training and development and shortages of human resources as medium challenges.

2) Budget

The local government budget consists of base revenue and expenditure. There are three types of revenue, current revenue, capital revenue, and grants and transfers. The current revenue consists of tax and non-tax revenue, capital revenue comprises immovable assets, and grants and transfers include the central government transfer to the local government, transfer for specific activities, and transfer from the Local Development Fund (LDF). The local government distributes a certain per cent of some tax revenue to the Central Government as stated in Article 23.6 of the Budget law. For example, the local government allocates 40% of the land fee and 60% of corporate income tax to the Central Government budget.

The local government organizations are financed from the local government budget, while the organizations belonging to the ministries and agencies are funded from the state government budget. The majority of organizations except for Aimag Governor's Office and Land Affair, Construction and Urban Development Department have no obligation to earn income. The expenditure allocations within an organization vary depending on its activities. It is common for organizations to have a large share of salaries and fuel expenses in the total cost.

Table 8.6.1 presents the Local Government Budget-2021 for 21 Aimags. It includes base income and expenditure, balance, and financial support of local governments. The base income of the local budget exceeds the base expenditure in the five Aimags of the mining regions. These Aimags will distribute excess revenues to the central government budget, and they do not get any financial support from the central government in 2021. Other 16 Aimags need to get financial support from the Central Government to finance their budget deficit. On average, these Aimags will receive 43% of their base expenditure from the Central Government.

6 Civil Service Council (2020), 'Statistical Report for Civil Servants'

7 https://en.wikipedia.org/wiki/List_of_countries_by_public_sector_size

Table 8.6.1 Local Government Budget 2021, (MNT million)

Aimags	Base Expenditure			Main Balance			Financial Support from Central Govt
	Base Income	Financed from the budget	Financed from the LDF	Balance	Remain in the Local Budget	Distribute to Central Govt	
	(1)	(2)	(3)	(4)=(2)-(1)	(5)	(6)	
Arkhangai	9,390.5	20,454.2	540.0	-11,063.7	0.0	0.0	11,063.7
Bayan-Ulgii	11,156.4	16,952.2	358.6	-5,795.8	0.0	0.0	5,795.8
Bayankhongor	11,127.7	27,472.9	635.4	-16,345.3	0.0	0.0	16,345.3
Bulgan	23,266.0	24,843.7	534.3	-1,577.7	0.0	0.0	1,577.7
Govi-Altai	8,361.7	21,354.0	479.4	-12,992.3	0.0	0.0	12,992.3
Dornogovi	29,438.2	21,665.8	184.5	7,772.4	5,440.7	2,331.7	0.0
Dornod	21,886.0	17,177.6	500.0	4,708.4	3,295.9	1,412.5	0.0
Dundgovi	6,735.3	17,204.4	244.5	-10,469.1	0.0	0.0	10,469.1
Zavkhan	9,335.6	26,003.9	308.4	-16,668.3	0.0	0.0	16,668.3
Uvurkhangai	13,609.5	29,170.2	489.4	-15,560.6	0.0	0.0	15,560.6
Umnugovi	154,694.0	44,576.1	376.8	110,117.9	31,203.3	78,914.6	0.0
Sukhbaatar	10,013.3	18,226.7	494.8	-8,213.3	0.0	0.0	8,213.3
Selenge	22,827.5	26,937.4	482.5	-4,109.9	0.0	0.0	4,109.9
Tuv	23,007.0	30,790.5	538.7	-7,783.5	0.0	0.0	7,783.5
Uvs	10,801.0	24,200.2	443.0	-13,399.2	0.0	0.0	13,399.2
Khovd	12,488.5	21,002.8	523.9	-8,514.3	0.0	0.0	8,514.3
Khuvsgul	14,036.0	31,696.5	962.4	-17,660.5	0.0	0.0	17,660.5
Khentii	13,468.3	25,136.9	577.4	-11,668.6	0.0	0.0	11,668.6
Darkhan-Uul	25,402.4	16,226.7	1,025.1	9,175.7	6,423.0	2,752.7	0.0
Ulaanbaatar	974,006.4	325,513.8	205.9	648,492.6	227,859.7	420,632.9	0.0
Orkhon	58,323.8	18,107.2	301.1	40,216.6	12,675.1	27,541.5	0.0
Govisumber	5,809.6	6,890.2	61.2	-1,080.7	0.0	0.0	1,080.7
Total	1,469,184.7	811,604.0	10,267.3	657,580.7	286,897.6	533,586.0	162,902.9

Source: JICA Project Team based on General Government Budget 2021

Citizens participate in the decision-making process of local budget by voting on the planning of investment priorities funded by the Local Development Fund (LDF) and monitoring the disbursements of the LDF. The LDF is a citizen participatory tool for financing investment in a particular Aimag, the Capital City, Soum and districts. It enables the local citizens to vote for their proposals by participating in the decision-making process of investment projects/programs funded by the national government LDF. The fund allocations are made to all 21 Aimags, districts and Ulaanbaatar by annually. The fund investments are commonly made in the area of local infrastructure, restoration and renovation of public properties, reservation of pastureland/water source and local business⁸.

3) Service quality

According to the Governor's Action Plans for 2020-2024, both Bulgan and Khuvsgul focus on the implementation of E-Governance, and strengthening the professional, ethical and non-bureaucratic public service to improve civil service quality.

On the demand side, in 2019, the Cabinet Secretariat of Government of Mongolia (CSGM) conducted the Citizen Satisfaction Survey on Public Policies and Service throughout the country. According to the survey result, citizens of Bulgan and Khuvsgul Aimags evaluated the service quality of local government organizations as good. The main challenges faced in delivering civil service are: 1) Difficulties concerning E-governance in terms of knowledge and technology, 2) Small size of the workplace, 3) Unavailability and incomparability of equipment, and 4) Poor institutional coordination and cooperation.

⁸ <http://tusuv-oronnutag.mof.gov.mn/?p=117>

4) Citizens' participation in the planning activities or decision making

The official activity ensuring citizens' participation is to get feedback on the draft action plan of Aimag governor. It is conducted through the website of Governor's Office, phone call and in person. Generally, the majority of organizations involved (16) in the survey organize the citizens meeting 1-2 times in a year under the framework of their main directions. In addition, the Governor's Office has collected citizens' feedback on the policy and programs through the website.

5) Needs of under-represented groups

The Labor and Welfare Service Department and Social Policy Development Department of the Aimag Governor's Office are responsible for issues of under-represented groups such as people with disability, people living under the minimum subsistence level, and single-headed households. These organizations of two Aimags regularly study the needs of under-represents groups and provide information to relevant organizations. Some organizations involved in the survey cooperate with these departments under their main directions such as the Education and Culture Department, the Health Department, and the Family, Child and Youth Development Department.

6) Participatory system and information transparency

Citizens' petitions, complaints, and suggestions are received in writing and electronically. A half of organizations receive citizens' complaints through more than two tools such as website and handwriting. Only one organization in each Aimag did not receive citizens' complaints since the main activities are not directed to the citizens. In addition to these permanent tools, they collect citizens satisfaction and feedbacks through surveys and doors open day. All organizations provide feedback to the citizens' complaints through official letters and phone calls.

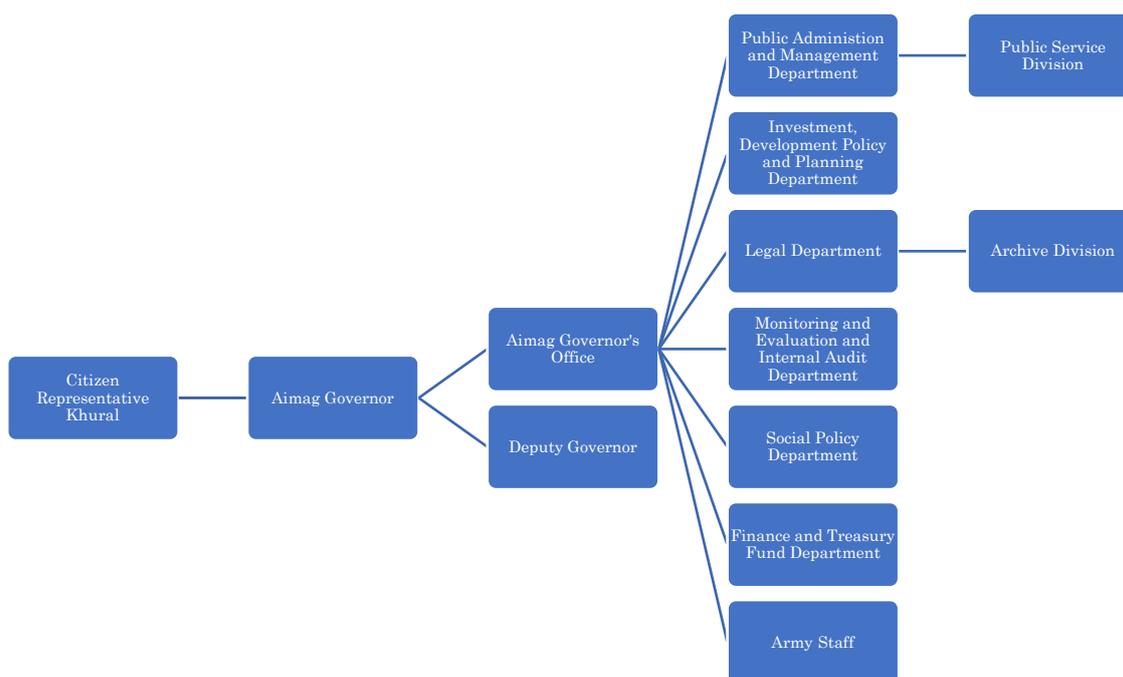
The Law of Criteria on Transparency (2009) and the Law on Information Transparency and Right to Information (2011) were adopted to ensure and increase the transparency, openness, accountability and ethics of government organizations, and strengthen mutual trust between the government and citizens. In this regard, all state and local government agencies have to disclose information in a timely and accessibly manner. Independent Research Institute of Mongolia (IRIM) has been assessing the transparency of government websites since 2010 to identify information availability and accessibility of the governmental organizations.

According to the digital transparency index, the average digital transparency score of the local government organizations of 21 Aimags (0.576) is higher than the national average (0.537). In 2020, the local government of Darkhan-Uul was the highest ranked among 86 state and local government organizations in Mongolia. The digital transparency of seven Aimags was at 'satisfactory' level, while six Aimags were classified in the 'unsatisfactory' level. Bulgan and Khuvsgul are at the moderate level. The critical weaknesses of the websites of local government organizations are (i) no foreign language option, (ii) not possible to download any helpful information or open data, and (iii) no direct communication system.

7) Structure of local government

According to the Law on Administrative and Territorial Units of Mongolia and their Governance, the governing system of the administrative and territorial units in local area consists of (i) Citizen Representatives' Khural of Aimag and Soum, (ii) public meetings of Bagh, (iii) the presidiums of (i) and (ii), and (iv) Governors of Aimag, Soums, and Baghs. Members of Aimag and Soum Citizens' Representatives' Khural shall be elected for a term of four years, and any representative shall be a permanent resident of the respective administrative and territorial units.

Figure 8.6.1 illustrates the organizational structure of local government. Table 8.6.2 shows functions of each department.



Source: JICA Project Team

Figure 8.6.1 Organizational Structure of Local Government

Table 8.6.2 Functions of Departments of Local Government

#	Departments	Functions
1	Public Administration and Management Department	<ul style="list-style-type: none"> - Provide policy advice and support to improve local governance through the implementation of public administration leadership at the Aimag level - Plan and organize the internal work of the office and the policy of the local administration personnel to organize their training, retraining and selection for the civil service - Receive and resolve citizens' petitions and complaints, and evaluate the implementation of legislation, government decisions and the National Program - Responsible for the Aimag's foreign relations
2	Investment, Development Policy and Planning Department	<ul style="list-style-type: none"> - Identify long-term and medium-term economic development perspectives, develop and plan long-term and medium-term policies in accordance with the National Development Policy, Government Action Program, and Aimag Governor's Action Plan - Increase investment efficiency, develop real industries, and increase the capacity of entrepreneurs.
3	Social Policy Development	<ul style="list-style-type: none"> - Plan and develop Aimag social development strategy and policy - Implement functions such as developing policies, programs, projects, providing advice and support, organizing and coordinating implementation in the fields of education, culture, science, health, sports, labor, social welfare, protection and population development
4	Finance and Treasury Fund Department	<ul style="list-style-type: none"> - Carry out budget planning, reporting and spending activities - Develop and organize the implementation of economic development policy to increase Aimag budget revenues and ensure the stability of budget revenues. - Plan, allocate and approve current expenditures for local and special-purpose transfers - Implement the approved budget and organize the economic analysis of budget and financial activities.

5	Legal Department	<ul style="list-style-type: none"> - Implement and promote laws and government decisions, and provide professional and methodological guidance to soums and local organizations; - Develop, implement and promote the decision of the Aimag Governor following the legislation; - Provide legal advice and other support in the implementation of the Government and Aimag Governor's policies;
6	Monitoring-Evaluation and Internal Audit Department	<ul style="list-style-type: none"> - Monitor and evaluate the implementation of Mongolian laws and policies, the activities of departments, agencies and affiliated organizations - Provide information and policy recommendations to support the improvement of public services

Source: The websites of Aimag Governor's Office of Bulgan, Khuvsgul, and Darkhan-Uul

8) Organizational governance and planning capacity

Specialists of the Aimag Governor's Office can often formulate their development plan or urban master plan by themselves in both Aimags. Otherwise, depending on their budget sufficiency, they tend to hire external/professional team for the formulation. There are examples where some policy documents have been prepared by a professional body when the budget approved. For instance, in Khuvsgul, the tourism master plan was developed by the Mongolian Tourism Association. Also, the Mercy Corps, an international NGO, developed the Development Plans for seven Soums. As for Bulgan, the Aimag Comprehensive Development Plan for 2010-2020 was created by an external consulting team of scientist.

9) Accessibility to training

The internal and external training is conducted in local governmental organizations. The organizations conduct internal training based on their own resources, whereas external training is mainly organized by the central government organizations and international donor organizations. Although the availability and accessibility of basic training like introducing new law and regulation, Mongolia script, working in the ERP system, etc., the retraining and specialization training for local civil servants are limited for the civil servants of regional governmental organizations.

(3) Institutional capacity

1) Policies and measures formulated by local government initiatives

Local governments develop the following policy documents and measures, but the contents of these documents differ from Aimag to Aimag: Five-year guidelines for Aimag development, Governor's four-year action plan, Aimag annual development plan, Sector master plan and program⁹, Local plans of national program¹⁰, Internal regulations and rules, and Governor's decrees. These plans and programs, however, are not totally integrated and not structured with respect to multiple sectors.

2) Transparency/accountability/corruption in the public sector

The websites of Aimag Governor's Office have a menu for transparency. However, the availability and disclosure of information are at different levels. Compared to Bulgan, the openness in Khuvsgul Governor's Office is significantly high. At the policy level, anti-corruption objectives are reflected in the Governor's action plan of Bulgan and Khuvsgul.

At the organizational level, most organizations of two Aimags have developed their anti-corruption plans under the National Anti-Corruption Program. In this regard, the following activities are organized:

- Anti-corruption training for all civil servants,

⁹ Khuvsgul Aimag formulated the Tourism master plan, Tourism management plan, and Long-life education program.

¹⁰ The local government organizations developed the local implementation plans for the government programs. Recently, they developed the local plan for the National Youth Development Program.

- Monitoring by the Legal Department of the Governor’s Office of the decrees of affiliated organizations and formulation of a list of illegal acts, and
- Preparation of a brief report by each organization on anti-corruption activities.

3) Legal governance and legal system for decentralization

No document directly deals with decentralization for both Aimags, but aspects connected with decentralization are reflected in the Governor’s action plans of the respective Aimags as shown in Table 8.6.3.

Table 8.6.3 Objectives Relevant to Decentralization Reflected in Governors’ Action Plans of Bulgan and Khuvsgul

Objectives	Bulgan	Khuvsgul
Effectively implement E-governance at the local level, and create conditions for efficient, responsible and accessible delivery of public services, and save citizens' time and money.	X	X
Conduct a comprehensive analysis of functions in public administration organizations, streamline functions, and begin work to eliminate duplication functions.	X	X
A new Public Service Center will be established under the Aimag Governor's Office	X	
Effectively organize the activities of Public Service Center and increase the access to services		X
Support local self-governing bodies, improve decision-making activities and organizational structure, and improve quality and efficiency.		X
Improve soum and bagh activities, and create opportunities for independent development		X

Source: Governor’s Action Plan for 2021-2024 of Bulgan and Khuvsgul Aimag

4) Securing appropriate governance

The Law on Development Policy, Planning, and Administration ensures the sustainability and continuity of development policy and planning. Therefore, the suitable governance measures under the development policy and planning are ensured within the local government. Although the management team is replaced every four years, it is possible to keep the main principle of governance. The reason is that experienced civil servants in local government organizations formulate the Governor's Action Plans in connection with long-term development policies.

8.6.3 Suggestions for capacity development to support regional development

(1) Vitalization of socio-economy in the regions

1) Formulating population policy and development plan

According to the capacity assessment survey on organizational planning capacity, local government organizations have capacity to formulate their development plans or urban master plans including population policy by themselves in both of the targeted Aimags. However, in reality, a large part of policy or plan formulation has been supported by NDA or other public organizations. Lack of comprehensive policy making capacity in most Aimags might be due to the staff balance inclined to many staff members specialized in narrow expertise. It might be necessary to improve the staff composition by increasing generalists who can manage and organize multiple sectors.

2) Promotion of industry development and implementing projects

In view of small size of population and economy in each Aimag, an effective development program such as the IRDPs proposed by the NCDP should be formulated and implemented for a region consisting of a few Aimags by mustering their resources including human resources. Also, the Central Government

responsible for the development of the entire territory of Mongolia needs to redistribute national assets and resources to different regions in a well-balanced manner. Moreover, participation of multiple Aimags in formulating and implementing programs and projects would facilitate coordination and horizontal integration of development budget, contributing to reduction of disparities between Aimags and regions.

3) Provision of social services

Mongolian socio-economy should realize a shift in development paradigm from strongly centralized model to more decentralized model as advocated by the NCDP. In line with this concept, local government officials are required to work proactively, identifying local issues, formulating countermeasures, and implementing and evaluating them, instead of just providing social services. According to the survey, however, most participants were not able to show clear recognition of inclusive social service provision, which may be cultivated through communications with local residents in formulating development plans and projects. Social welfare services, for instance, would be made more effective by employment related support measures to be formulated by development planning involving also the private sector.

(2) Relationship between the Central Government and local governments

Among all Aimags, in 2021 only five Aimags have a budget surplus to be distributed to the Central Government, while other 16 Aimags rely on redistribution from the Central Government. The redistribution of enormous accumulation of wealth in Ulaanbaatar has been done by the Central Government initiative. In terms of human resources, most local governments do not rely on the Central Government. Also, there are many permanent civil servants in local governments not influenced by the government reform. Therefore, this would allow consistent development by region.

The survey has confirmed the local government initiatives to make an effort for citizens' participation in their development such as organizing LDF, etc. One of the important tasks of local governments is to ensure the welfare of the citizens by properly handling collaborative services affecting lives of the citizens in the region. In this aspect, the division of roles between the Central Government and local governments would be essential.

The basic idea is that a local government closest to the inhabitants should have authority and discretion and is responsible for local governance and administrative services. The role of the local government is important in working closely with local communities, residents' associations and neighborhood associations. However, in order to properly carry out these tasks, human resource development, system design, human resource allocation, decentralized organizations, etc. in local governments are indispensable, and it is also necessary to transfer some specific financial resources from the Central Government to local governments.

(3) Reducing disparities between regions

1) Budget balance by Aimag and region

As shown in Table 8.6.4, budget balance between Aimags is inconsistent and widely varied by Aimag, but budget balance is realized by region according to the new regional division proposed by the NCDP. While solving the disparities between Aimags and each Aimag becoming independent from the Central Government in terms of fiscal, administration and social capital are difficult, the goal of achieving self-reliant development may be attained more easily by region. Reallocation of national assets and resources may be more effectively realized between regions.

Table 8.6.4 Budget Balance by Aimag and Region in Mongolia

Aimag	Revenue	Expenditure	Profit/Loss	Population
Western Region				
Bayan-Ulgii	77,785.90	77,913.60	-127.7	94,994

Uvs	80,456.20	79,797.10	659.1	69,187
Khovd	70,832.50	68,989.70	1,842.80	77,957
sub-total	229,074.60	226,700.40	2,374.20	242,138
Khangai Region				
Arkhangai	68702.8	67550.4	1152.4	94,994
Bulgan	59,919.60	60,254.30	-334.7	88,672
Darkhan-Uul	77,727.30	72,723.60	5,003.70	62,089
Orkhon	95,978.70	96,039.90	-61.2	135,095
Khuvsgul	85,736.20	83,624.50	2,111.70	89,712
Selenge	44,843.00	44,241.20	601.8	107,634
Zavkhan	66,287.30	66,526.20	-238.9	116,732
sub-total	499,194.90	490,960.10	8,234.80	694,928
Altai Region				
Bayankhongor	76,612.40	69,878.80	6,733.60	108,530
Govi-Altai	59,639.60	61,701.20	-2,061.60	47,104
Uvurkhangai	108,864.10	99,513.60	9,350.50	83,223
sub-total	245,116.10	231,093.60	14,022.50	238,857
Southern Region				
Govisumber	82,848.00	79,916.10	2,931.90	57,748
Dornogovi	16,527.20	16,530.90	-3.7	82,054
Dundgovi	66,696.20	65,818.70	877.5	71,014
Umnugovi	68,690.30	69,022.30	-332	94,250
sub-total	234,761.70	231,288.00	3,473.70	305,066
Eastern Region				
Dornod	63,934.00	63,962.50	-28.5	107,018
Sukhbaatar	53,995.60	53,175.10	820.5	110,110
Khentii	65,947.80	64,532.10	1,415.70	17,928
sub-total	183,877.40	181,669.70	2,207.70	235,056
Capital Region				
Ulaanbaatar	1,381,386.40	1,353,132.60	28,253.80	1,539,810
Tuv	169,433.20	194,247.40	-24,814.20	63,182
sub-total	1,550,819.60	1,547,380.00	3,439.60	1,602,992
Total	2,942,844.30	2,909,091.80	33,752.50	3,319,037

Source: JICA Project Team based on NSO, 2019

2) Population distribution

As shown in Chapter 5, NSO has projected the population growth rate during 2018-2030 by Aimag. The projection implies highly varied population growth rates by Aimag. For instance, Tuv has the lowest annual average population growth of -0.2% and Govisumber is the highest at 1.9%. The population distribution will aggravate in the future. The population growth would be strongly influenced by the situation of job opportunities and economy growth in any Aimag, and local governments should be made responsible in vitalizing socio-economy to generate sustainable job opportunities in order to achieve the well-balanced population distribution.

8.6.4 Recommendation for capacity development of Aimag administrations

The shift from the socialistic development paradigm to the capitalistic one has been successfully undertaken by the Central Government initiative to realize high economic growth. Mongolia has started another paradigm shift to realize sustainable development in line with the UN SDGs initiative. It is high time for Mongolia to pursue regional development for more balanced socio-economic and

spatial development. This will help to realize robust and resilient Mongolia to compete successfully in the global society.

Most essential in pursuing regional development is to strengthen local governments. Specifically, Aimag administrations should be strengthened with respect to fiscal and human resources, and this may be realized most effectively by introducing a regional governance system in steps under the strong Central Government initiative. The integrated regional development programs (IRDPs) formulated by region according to the new regional division and the regional development councils (RDCs) to be established by region and institutionalized in steps will be instrumental for regional development in Mongolia.

Specific needs for capacity development of Aimag administrations have been identified as shown in Table 8.6.5 by individual, organizational and institutional level.

Table 8.6.5 Capacity Development Needs for Regional Development by Measure

	Item	Measure to be implemented by local government	Needs of CD in local government		
			Individual	Organization	Law/Institution
1	Region-wise approach including IRDP promotion for regional development with RDC	Stepwise promotion of IRDP (1): Review and modify the components	✓		
		Stepwise promotion of IRDP (2): Implementation with establishment of RDC	✓	✓	✓
		Horizontal cooperation between regions within newly defined regional division	✓	✓	
		Self-reliant region utilizing indigenous resources and resilient economy linking with global economy	✓	✓	✓
2	Strengthening regional authority in stages	Evolution of laws and institutions related to regional development			✓
		Reducing the gap (fiscal budget, human resource and industry) between regions	✓	✓	✓
		Stepwise reform of the taxation system		✓	✓
		Transparent and responsible budget/investment management for specific region	✓	✓	✓
		Conducting effective measures to control the spread of COVID-19 or other similar crises		✓	✓
		Utilizing indigenous energy resource such as renewable energy	✓	✓	
3	Promotion of DX/ICT for horizontal cooperation between Aimags	ICT network development among several Aimags or within the region	✓	✓	
		Establishment of LIP (Local Information Platform)	✓	✓	
		Establishment of ICT industrial estate in the center of the region	✓	✓	✓
		Establishment of data sharing system and API (Application Programming Interface)	✓	✓	
4	Community-based development with participatory approach	Community infrastructure and green development planning work	✓		✓
		Community infrastructure and green development implementation	✓	✓	
		Environmental monitoring by local government/residents	✓	✓	
		Establishment of frame for local people to utilize the indigenous resources for	✓	✓	
5	Promotion of decentralization	Development of related laws to promote decentralization		✓	✓
		Construction of localized infrastructure initiated by local government	✓	✓	✓

		Operation and maintenance of localized infrastructure initiated by local government	✓	✓	
		Local initiative frame/institution such as PPP promotion initiated by local government	✓	✓	✓
		Utilizing indigenous energy resource such as renewable energy or so	✓	✓	

Source: JICA Project Team

Chapter 9 Strategic Environmental Assessment by Scenario Planning Approach and Initial Project Evaluation

This chapter presents comprehensive results of strategic environmental assessment (SEA) applied to the National Comprehensive Development Plan (NCDP) of Mongolia. In applying SEA in the Mongolian institutional context, an approach of scenario planning was used to reflect ideas and opinions of various stakeholders. In Section 9.1, procedure of scenario planning as applied to the SEA for the NCDP and concept of SEA as well as institutional context related to SEA in Mongolia are explained, followed by description of processes and activities actually undertaken by the Project. Section 9.2 presents the methodology for initial project evaluation developed particularly for the NCDP and evaluation results for the anchor projects of the NCDP. In Section 9.3, initial environmental examination conducted for the NCDP anchor projects is presented. As this chapter is meant to be comprehensive in presenting implementing arrangements, procedure, methodology and outcomes of the SEA, some contents presented in earlier chapters and Sector Report are repeated.

9.1 Strategic Environmental Assessment by Scenario Planning Approach

9.1.1 Concepts and approaches of scenario planning

Scenario planning in general refers to strategic planning for long-term future, and as such is applied to any fields. It is considered to originate from strategic planning by military intelligence with adaptation and generalization of its methods. Scenario planning has been applied typically to corporate planning to plan for activities involving significant uncertainties such as cases of mineral or petroleum exploration. When uncertainties are involved in outcomes of activities and decisions of a firm, country or region in the long-term future, scenario planning is applied as a procedure to build consensus among stakeholders for their common future. This often involves changing mindset of the stakeholders on how to see external factors affecting their future and what actions to take to cope with them.

Scenario planning may be broadly classified into the adaptive scenario planning and the transformative scenario planning. The former is represented typically by strategic planning by military intelligence. Scenario planning applied to long-term development planning is usually a case of transformative scenario planning (Adam Kahen, “Transformative Scenario Planning,” 2012). Particularly in the context of long-term development planning for a region in a developing country or a development country itself, structural changes would be necessary in socio-economy or spatial structure to overcome many and varied development problems. This would call for changes in development models or shift in development paradigms, for which consensus of stakeholders would be required with respect to options and alternatives to be pursued under various external conditions foreseen.

Scenario planning is applied to formulation of the NCDP, which pursues a paradigm shift. Application of scenario planning is found difficult in the formally socialistic country, where planning decisions used to be made almost exclusively by the Central Government without substantively involving all the stakeholders, in particular, the people of Mongolia. Therefore, scenario planning has been applied in a somewhat modified way as described in the following.

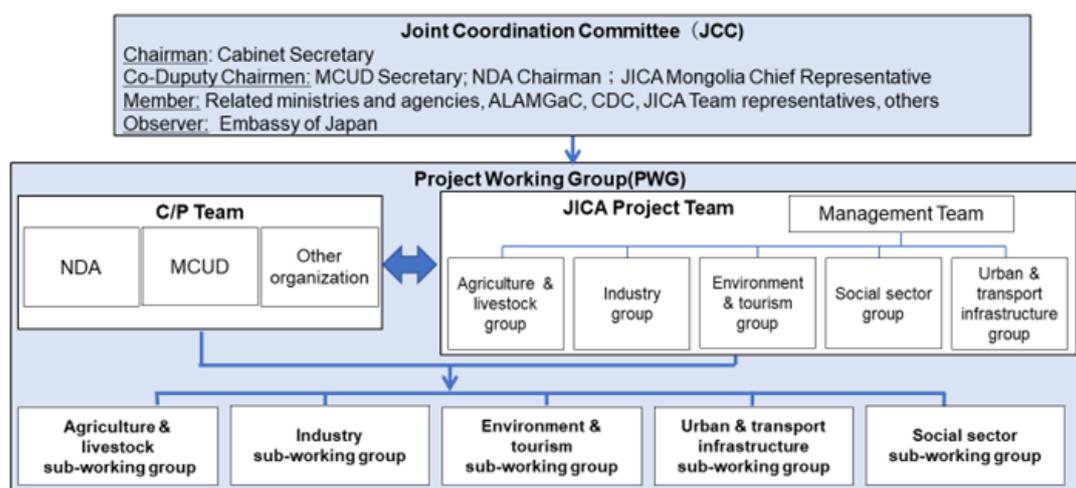
9.1.2 Scenario planning approach for the Project

The Project to formulate the National Comprehensive Development Plan (NCDP) of Mongolia has been implemented to support the preparation of the human settlement plan (HSP) and the regional development policy (RDP). The Project is implemented by the JICA Project Team (JPT) in close collaboration with its counterpart (C/P) team of the Mongolian Government. Main counterpart organizations of the Mongolian Government are the Ministry of Construction and Urban Development

(MCUD) in charge mainly of the HSP and the National Development Agency (NDA) in charge mainly of the RDP.

The Project implementation is supervised by the Joint Coordination Committee (JCC), chaired by the Cabinet Secretary with co-deputy chairpersons of the MCUD Secretary, the NDA Chairman and the Chief Representative of the JICA Mongolia office. JCC members are as specified in the record of discussions (R/D) agreed and signed on August 22nd, 2018 by the representatives of JICA and the Mongolian Government.

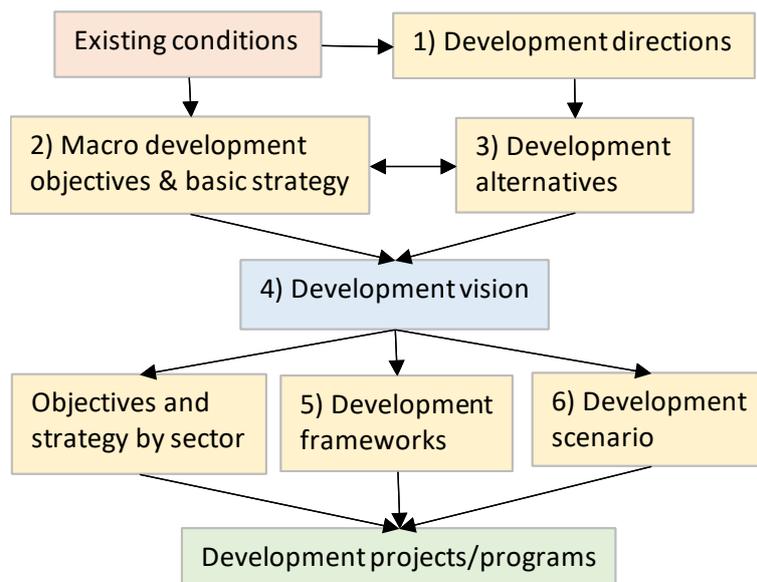
Under the JCC, the Project Working Group (PWG) is organized as the Mongolian counterpart organization to work with the JPT (Figure 9.1.1). The PWG consists of MCUD and NDA as the main counterpart agencies and other related ministries and organizations spelled out in the R/D. For close collaboration and cooperation, the PWG is operated as subgroups: 1) agriculture and livestock, 2) industrial development, 3) environment and tourism, 4) social development, and 5) urban and transport infrastructure. These are informal groups to encourage free and open discussions in smaller number of participants, respectively.



Source: JICA Project Team

Figure 9.1.1 Project Implementation and Management Structure with JCC, PWG and Five Sub-Groups

The Project has been implemented by applying the “scenario planning” approach to reflect ideas, views and opinions of a wide range of stakeholders in the NCDP. As described above, scenario planning is a participatory planning process to build consensus among stakeholders on their shared future. The scenario planning approach applied to the NCDP has followed the procedure shown in Figure 9.1.2. In addition to the formal arrangements for the Project with JCC and PWG/subgroups, multi-stakeholder meetings have been convened at critical stages of the NCDP preparation.



Source: JICA Project Team

Figure 9.1.2 Procedure of Scenario Planning for the NCDP

9.1.3 Strategic Environmental Assessment (SEA)

(1) Concept of SEA

Strategic environmental assessment (SEA) is applied at higher levels of any development intervention such as policy and program levels as against project-wise environmental assessment such as initial environmental examination (IEE) and environmental impact assessment (EIA). Naturally, SEA is applied from an early stage of development interventions typically for policy formulation and master planning.

SEA assesses a wider range of possible impact both temporally and spatially, while project wise environmental assessment looks mainly at marginal effects. That is, SEA assesses long-term effects as well as short- and medium-term effects, and effects on a larger geographic area. SEA is applied also to a wider scope of works, covering all different sectors and aspects that may be affected by any development intervention. SEA assesses also cumulative and complex effects.

In sum, SEA represents effectively planning for environmental development, where environment is taken in the broadest sense. This is in sharp contrast with other economy-oriented developments, where environmental and social concerns are put on the side lines at best. SEA, on the other hand, puts environmental and social concerns on the front of development. To satisfy all these conditions effectively, SEA is conducted by involving a wide range of stakeholders from early stage of any development intervention. This is effected through (1) stakeholders' meetings and (2) disclosure and sharing of relevant information.

Involvement of many stakeholders is quite practical as even the most knowledgeable and experienced experts cannot cover all the sectors and aspects for possible impact in a large geographic area over a long period of time. It is also necessary as many stakeholders should participate in decision making on development intervention having large and long-lasting impact. Such decision making is related, in fact, to major direction of development or development vision.

To conduct SEA, pragmatic approach and methods should be taken as works involved in SEA could be easily beyond any resource availability, time and human resources in particular. Stakeholders' meetings should be convened at early stage of development intervention first to enumerate all conceivable problems related to the development intervention, and second to identify most critical or priority problems. Stakeholders' meetings are, in fact, methods to mobilize knowledge and

information for sharing. Collective identification of most critical or priority environmental problems is, in fact, a pragmatic way to identify such problems that should be addressed in further elaborating the development intervention.

Based on the most critical or priority problems thus identified, objectives of the development intervention should be defined again through stakeholders' meetings. The objectives of new development policy or program are inherently multiple and inter-related to one another. What is important at this stage is to take a broad perspective without confining to economy-related concerns. An effective and pragmatic way to reflect wider concerns in development intervention is to define objectives representing environmental and social concerns as well as economic concerns.

SEA is not carried out in parallel or along with regional development master planning. SEA is, in fact, integral part of regional development master planning. Essential conditions of SEA, stakeholders' meetings and information sharing, are essential conditions for integrated regional development master planning as well.

(2) SEA requirements for the NCDP, the HSP and the RDP

As the NCDP is a long-term development plan, application of SEA in its preparation is imperative. Legal requirements for SEA have been established in Mongolia by a series of laws and regulations stipulated by the Ministry of Environment and Tourism (MET): Law on Environmental Impact Assessment (2012), MET Regulation on SEA (2013), MET Regulation on Public Consultation (2014) and MET Methodology of SEA (2014). For any formal development policies and plans, it is mandatory that designated legally qualified entities carry out SEA.

The NCDP is to be prepared by the Project to support the preparation of the HSP by MCUD and the RDP by NDA respectively as formal policy documents. The NCDP itself, however, is not a formal policy document, and its legal base for SEA application appears to be weak. On the other hand, SEA is to be conducted for the NCDP in principle according to the JICA Guidelines for Environmental and Social Considerations (2010) as stipulated in the R/D of the Project agreed between representatives of the Mongolian Government and JICA.

Mongolian legal requirements for HSP/RDP's SEA as per the Law on EIA (2012) and the JICA Guidelines for Environmental and Social Considerations (2010) are similar in the following aspects:

- (a) Applicable for policy, plan and program (PPP) during their development stages,
- (b) Involvement of stakeholders to address relevant stakeholders' concerns/priorities and improve the draft PPP contents,
- (c) Overall flow and key area of impact assessment, and
- (d) Overall contents of SEA.

Differences between the SEA requirements of the Mongolian law and the JICA guidelines are summarized in Table 9.1.1.

Table 9.1.1 Comparison between JICA Guidelines and Mongolian Law for SEA

JICA Guidelines / R/D / JPT ICR	Law on Environmental Impact Assessment (2012)
1) Not a legal process	1) Legal process approved by MET only
2) Applicable for both legal and none legal documents NCDP: Applicable but no legal status as per relevant laws in Mongolia	2) Only applicable for legal policy, plan or program NCDP: Not applicable due to no legal status HSP/RDP: applicable as per relevant laws in Mongolia
3) SEA conducted by MUCD/NDA/JPT officers/experts in charge	3) SEA conducted by an authorized EIA consultant by MET with support of relevant technical experts and institutions => Costly to hire an authorized EIA consultant

4) Flexible methodologies and defined by MUCD/NDA/JPT officers/experts in charge	4) Draft methodologies prepared by the authorized EIA consultant only Final methodologies approved by MET only
5) Applying SEA for i) scenario planning (only development concept) and ii) primary programme/project selection	5) Whole policy, plan or program

Source: JICA Project Team

Based on the discussions with the Mongolian C/P team, the JPT has decided to conduct SEA as planned according to the R/D. Once MCUD and NDA decide to engage legally qualified entities for the HSP and the RDP respectively, they can benefit from the scenario planning process for SEA of the NCDP.

(3) SEA application to the Project

As stated above, since the Project represents a spatial development planning involving multiple sectors just like any regional development planning, the concept and the conditions for SEA as described above should apply to the NCDP formulation. The scenario planning for the NCDP is applied particularly to examining development concepts, vision and paradigm and also to formulating and evaluating development alternatives. The SEA application involves a wide range of stakeholders sharing relevant information from early stages of the planning just as the scenario planning approach to the NCDP.

Objectives of scenario planning were explained at a seminar conducted on January 15, 2019 as follows:

- (a) To prepare a development vision, scenario and measures of the National Comprehensive Development Plan (NCDP) of Mongolia through discussions by a wide range of stakeholders, and
- (b) To contribute to preparation of the NCDP that is supported widely by all the stakeholders and thus more viable and implementable.

Also clarified at the seminar were conditions for participation of stakeholders as follows:

- (a) All the members of the PWG for the Project are eligible for participation;
- (b) The four sub-working groups of the PWG are effectively utilized for discussions on each theme to be designated by the JICA Team at different stages of the Project; and
- (c) A multi-stakeholder (MSH) meeting is convened as the venue to discuss on the designated theme with the participation of representatives of the four sub-working groups of the PWG and additional participants to be invited depending on the themes, respectively.

The procedure of scenario planning approach to the NCDP was modified through inception works reflecting the following conditions clarified through discussions with the C/P organizations, including the first JCC meeting on January 18, 2019:

- (a) The idea of participatory or bottom-up planning represented by scenario planning is new in the Mongolian society still affected by the influence of planned economy during the pre-1990 period;
- (b) The Mongolian C/P organizations expressed strong wish to learn methodologies for top-down planning; and
- (c) Some skepticism existed on the Mongolian side whether there is a legal base for MCUD as a sector agency to prepare a multi-sector plan for the Country as a whole.

Therefore, the JPT and the C/P team agreed that initial works of the Project should be undertaken by cooperation between the JPT and the C/P team through internal discussions before opening the discussions to other stakeholders. Procedure of the scenario planning approach applied to the Project as SEA is described below by stage.

9.1.4 Participatory Planning with PWG/Sub-groups

(1) Development directions and alternatives

Existing conditions, macro development objectives and basic strategy

Existing conditions were analyzed by sector at meetings of PWG/sub-groups as well as individual discussions between the JPT and experts and government officials on the Mongolian side. Based on these, a problem structure was constructed by the JPT clarifying relationships between many problems. The problem structure clarifies more important problem phenomena to be addressed for the NCDP and more significant problem factors affecting many inter-related problems. Based on the problem phenomena, macro development objectives were defined, and based on the problem factors, basic strategy was established with economic, social, environmental, and institutional components.

To facilitate the discussions on the methodology, the JPT prepared a discussion paper “Methodology for Regional Development Policy Formulation” (January 29, 2019). Through subsequent discussions, the macro development objectives have been slightly modified as follows:

- a) To diversify economic structure and export through increasing capital accumulation (economic objective);
- b) To generate lucrative and stable employment opportunities in rural areas and local towns to reduce poverty and urban-rural disparities (social objective); and
- c) To alleviate urban environmental problems by alleviating adverse effects of over-concentration of population and economic activities in Ulaanbaatar (environmental objective).

Similarly, the basic strategy has also been slightly modified into the following:

- 1) Economic strategy
 - a) Effective utilization of rich natural resources for efficient primary production, and
 - b) Processing of primary products to increase value-added for export markets.
- 2) Spatial strategy
 - a) Utilization of locational conditions neighboring on Russia and China to establish links with global markets, and
 - b) Water resources development and management as instrument of green development.
- 3) Institutional strategy
 - a) Strengthening local administrations by steady decentralization of development administration system.
- 4) Industrial cluster development strategy
 - a) Promotion of vertical industrial clusters based on primary products to integrate value-added production and effective infrastructure development.

Development directions and alternatives

To guide the discussions on development directions for Mongolia to pursue for decades to come, the JPT presented two models. A regional development model defines broad development alternatives by combining resources (indigenous or imported) and markets (domestic or export). Participants at the seminar selected rather easily the export promotion alternative combining indigenous resources and export market as the basic model for the NCDP.

The JPT explained a new development model called alternative socio-economy and compared it with the 20th century development model characterized by intensive resource use and economic efficiency orientation. The 20th century development model sees resources as income or something to realize immediate gains. This applies typically to extraction of fossil fuel and other underground resources as currently undertaken in Mongolia. This view tends to encourage abusive use of resources. The alternative socio-economy sees resources as capital, on which development will be based. Capital needs to be conserved as much as possible to support continuous development activities. Issues on the selection between the two alternatives have been discussed on many occasions throughout the Project.

To facilitate the discussions on development alternatives, the JPT prepared a discussion paper “Preliminary analysis on macro development alternatives of Mongolia” (February 14, 2019). In the paper, the JPT presented a trend projection of Mongolia’s GDP based on the analysis on recent macro economy of Mongolia and three alternative projections. These alternatives were compared with respect to GDP growth rate, employment generation, urbanization and population distribution, social aspects, environmental aspects and development administration.

At the seminar, participants discussed alternatives guided by the following questions:

- a) Is the mining-led development as realized recently desirable? Should it be continued? What would be the possible outcomes of such a trend development?
- b) Can we attain the similar levels of economic growth by reducing the reliance on the mining development?
- c) Which sectors should be emphasized to realize the economic growth other than mining?

Most participants agreed that continuation of the mining-led development for high economic growth would not be desirable as it would result in degradation of natural and social environment, and other sectors should be much developed to reduce reliance on mining. Some participants suggested that an alternative to emphasizes transit trade should also be examined. Incorporating these comments, four macro development alternatives have been examined together as shown in Table 9.1.2 with growth prospects by sector under each alternative.

Table 9.1.2 Macro Development Alternatives Examined for the NCDP

Alternative	Definition
A. Mining-led development	Continued reliance on mining for economic and export growth with minimal processing of mining products and agro-products
B. High manufacturing development	Processing industries of mining and agricultural products as driving force for development
C. Transit trade-oriented development	Transit trade across Mongolia as another driving force for development with highest growth of services sector
D. High growth hybrid development	Processing industries of mining and agricultural products and transit trade to attain highest economic growth

Source: JICA Project Team

The JPT presented also analyses on recent trend and prospects of urban population growth and potentials for corridor development along existing artery roads. It was discussed that the corridor development potentials depend heavily on distance from Ulaanbaatar, and no corridor appeared promising except the north-south economic corridor passing through Ulaanbaatar. Also, three alternatives were presented for the primacy levels of Ulaanbaatar with respect to population shares of the capital. Most participants at the seminar agreed that the concentration of population and economic activities in Ulaanbaatar is a necessary condition for the self-reliant development of Mongolia as a whole. It was agreed that the primacy level of the capital city should maintain the present share of about 46% in the total national population.

(2) Evaluation of development alternatives

The four alternatives defined through discussions by stakeholders were evaluated mainly by the JPT. Results are summarized in Table 9.1.3. In addition to population and economic growth, the alternatives were compared on a broad base in various environmental aspects.

Table 9.1.3 Evaluation of Macro Development Alternatives by Selected Indices

Alternative	A: Mining-led development	B: High manufacturing development	C: Transit trade-oriented development	D: High growth hybrid development
Population in 2030, thousand				3,740
Economic			6.7	7.1

growth, % p.a.				
Per capita GDP in 2030, MNT thousand			17,933	18,848
Labor requirement, thousand	1,562	1,559	1,556	1,555
Manufacturing GDP growth	7.0	9.4	7.6	9.4
Service GDP growth	7.5	7.5	8.0	8.3
Land and related water resources	- Continued land degradation by mining and water shortages in southern areas	- Possible soil contamination and water pollution by some industries	- Relatively small adverse effects on land and water resources	- Smaller but some soil contamination and water pollution by some industries
Air pollution	- More serious air pollution by mining and transport of mineral products	- Possible air pollution by some industries	- Relatively small adverse effects on air	- Smaller but some air pollution by some industries
Bio-diversity	- Loss of bio-diversity in grassland due to mining	- Possible adverse effects due to soil, water and air pollution by some industries	- Localized reduction of bio-diversity along trade corridors and major tourism areas	- Smaller but some reduction of bio-diversity due to industries, trade and tourism
Waste management	- Treatment of mine tailings and restoration of mining sites necessary	- Treatment of some industrial wastes necessary to prevent soil, water and air pollution	- Control of waste littering along trade corridors and tourism sites necessary	- High management needs arising from various industrial, trade and tourism activities
Climate effects	- Water transfer to mining sites to change distribution of climate effects	- Increased use of industrial water to aggravate climate effects	- Relatively small effects	- High management needs to deal with changes in water use pattern
Urban environment	- Aggravation of urban environment in Ulaanbaatar due to continued over-concentration	- Generation of new urban environmental problems in local towns	- Possible aggravation of urban environment in Ulaanbaatar - Generation of urban environmental problems in local towns	- Possible aggravation of urban environment in Ulaanbaatar - Generation of urban environmental problems in local towns
Social environment	- Increased urban-rural disparities due to limited employment generation particularly in rural areas - Disruption of social and family ties due to continued out-migration	- Reduced urban-rural disparities due to employment generation in local towns - Better social and family ties due to processing of primary products and reactivated agriculture and livestock farming in rural areas and local towns	- Continued urban-rural disparities due to concentration of urban population along limited arteries - Social problems associated with urbanization of local towns and service-oriented development	- Decrease in urban-rural disparities - Large employment generation and better social and family ties in rural areas due to processing of primary products - Possible conflicts with in-migrants

Environmental management	<ul style="list-style-type: none"> - Increased management needs to deal with social and environmental problems - Difficult development management due to limited capital accumulation 	<ul style="list-style-type: none"> - Need to support manufacturing industries for products development with technology and market development - Need to deal with environmental problems in local towns by local administration 	<ul style="list-style-type: none"> - Need to expand infrastructure capacity in Ulaanbaatar and local towns - High management need for Ulaanbaatar to enhance competitiveness for services - Need for infrastructure development in local towns by local administration 	<ul style="list-style-type: none"> - High management needs to make Ulaanbaatar a global city - Technology and skill development to support manufacturing industries - Need for infrastructure development in local towns by local administration
--------------------------	---	---	---	---

Source: JICA Project Team

(3) Development vision and framework

Development vision

As part of efforts to formulate long term development vision of Mongolia, a seminar was organized to elicit concepts and value that Mongolian people consider important and expect to be incorporated for national development (Seminar on People’s Happiness as the Basis of National Comprehensive Development Plan, March 5, 2019). Results are summarized in Table 9.1.4.

Table 9.1.4 Important Values for Mongolians to be Reflected in Development Vision

Group 1				
Participants	Pleasure	Purpose	Pride	Other
Women	<ul style="list-style-type: none"> - Family - Vast and free steppe - Family - Spending time with people I am close to - Money and shopping - Friends - Leisure 	<ul style="list-style-type: none"> - To live in a country that is a tourism gateway to the world based on its nomadic culture - Travelling - Healthy life - Live a healthy life - To be healthy - Live a healthy life and have a successful career - To be able to manage my work duties 	<ul style="list-style-type: none"> - Mongolian men who respect and love their mothers, wives and daughters - Work - Work achievements - Family - Education - Work, colleagues, friends and family 	<ul style="list-style-type: none"> - Development of artificial intelligence (AI) by making use of high intelligence quotient (IQ)*children in the country - Learning new things
Men	<ul style="list-style-type: none"> - Stability - Family - Friends - Favorable living condition (housing, safety etc.) 	<ul style="list-style-type: none"> - Governance - Education - Dreams - To be a competent/skilled person 	<ul style="list-style-type: none"> - History - History - Culture - My knowledge and skills 	<ul style="list-style-type: none"> - Reducing income inequality
Group 2				
Participants	Pleasure	Purpose	Pride	Other

Women	Seeing smile on others' face after helping them Embracing my mother's hair Leisure Hobby Ecological balance Being myself To be healthy Family (my three children and husband) To be healthy, to be free, my family being healthy (parents, children and grandchildren) To live in safe and healthy environment To have a job To be able to do what I enjoy	Becoming a chartered financial analyst (CFA) To achieve my dreams To contribute to the development of my country Education To achieve my dreams Financial opportunities Knowledge To do sports Travel around the world Doing what I love (drawing and doing ceramics)	My parents History and culture of my country My nation and my family My profession Keeping my promises To be a citizen of a happy country, Mongolia My profession Being reliable	Travelling Safe and healthy environment Disaster and risk-free environment
Men	Early retirement Family Family and health	Children's education Education Development of my country	Participation in NCDP History A Mongolian man	

Source: JICA Project Team

Incorporating the important concepts and value presented at the seminar, and reflecting the problem structure analysis, a long-term development vision for Mongolia was expressed as shown below. This vision was shared with many stakeholders on various occasions including JCC meetings and multi-stakeholders' meetings, but no further discussion has taken place on the vision.

Vision for Regional Development of Mongolia

Realization of robust and resilient socio-economy, adapting to changing world and open to the global society on the one hand and realizing sustainable and inclusive development on the other, characterized by sensible management and use of resources as capital, diverse economic activities effectively linked to generate sufficient and decent employment opportunities and rich cultural heritage of mixed ethnicity that are managed by responsive and transparent governance systems with people's participation, supported by advanced appropriate technology in all the sectors and human resources with mindset to pursue new value and knowledge.

Socio-economic framework

For the four alternatives presented above, GDP growth by sector has been worked out and the results are summarized in Table 9.1.5. Of the four alternatives examined, the high growth hybrid scenario was adopted as it will generate the largest employment opportunities, fully utilize the potential of Mongolia and be environmentally favorable. Upon request by the Mongolian side, the socio-economic projection has been extended to 2040.

Table 9.1.5 Sector GDP Growth Rates until 2030 for Four Development Alternatives

Sector	A: Mining-led development	B: High manufacturing development	C: Transit trade-oriented development	D: High growth hybrid development
Agriculture	3.5	3.5	3.5	3.5
Mining	6.3	5.0	5.0	5.0
Manufacturing & utilities	7.0	9.4	7.6	9.4
Service	7.5	7.5	8.0	8.3

GDP	6.7	6.7	6.7	7.1
-----	-----	-----	-----	-----

Source: JICA Project Team

Spatial framework

Spatial framework for the NCDP was specified with respect to urban hierarchy, artery network and land use plan. The hierarchical structure of urban centers has been worked out jointly by the JPT and the Mongolian C/P team to identify the regional core cities, the local growth cities and the local service centers as shown below:

- (a) National capital city: Ulaanbaatar including Nalaikh and Zuunmod
- (b) Regional core cities: Erdenet including Bulgan, Darkhan, Choibalsan, Sainshand, Khovd, Bayankhongor
- (c) Local growth cities: Baganuur, Choir, Zamyn-Uud, Sukhbaatar, Murun, Dalanzadgad, Undurkhaan, Mandalgovi
- (d) Local service cities: Remaining 12 cities

(4) PWG/Sub-groups meetings and seminars

Initial participatory planning with PWG/Sub-groups as reported in “(1) Development directions and alternatives” and “(2) Development vision and frameworks” presented above was facilitated by a series of seminars and PWG/Sub-group meetings as well as individual discussions with experts of the C/P team as agreed between the JPT and the C/P team during the inception period. Seminars conducted during the early stage of the Project are summarized in Table 9.1.6. In addition to formal meetings of PWG, sub-working group meetings were organized during this stage as summarized in Table 9.1.7.

Table 9.1.6 Seminars Conducted during Initial Stage of the Project

Date	Title	Resource person	Affiliation
January 15, 2019	Scenario Planning, SDGs and Development Paradigm	Tsuyoshi Hashimoto	JICA Project Team
March 5, 2019	Gross National Happiness for Mongolia: people’s happiness as basis for NCDP	Haruo Yamane	JICA Project Team
March 11, 2019	Experiences of National Comprehensive Development Plans in Japan	Toshiyasu Noda	Seinan Gakuin University
	International Comparison of National Land Plans	Satoru Oba	Research Institute for Urban and Environmental Development
	Spatial Planning Platform and Utilization of GIS on National Land Plan	Eiko Toyama	Ministry of Land, Infrastructure, Transport and Tourism
March 18, 2019	Scenario Planning for the NCDP Formulation: Macro Development Alternatives	Tsuyoshi Hashimoto	JICA Project Team

Source: JICA Project Team

Table 9.1.7 Sub-working Group Meetings during Early Stage of the Project

Sector	Meeting date	Themes
Urban & transport infrastructure	12 March, 2019	General methodology for the survey on infrastructure sector, survey target cities, urban hierarchy, traffic survey and demand forecast
Environment and tourism & social (Joint SWG)	13 March, 2019	Current condition analysis and approaches to NCDP for social and tourism sectors

Industry & agriculture (Joint SWG)	16 April, 2019	Current condition analysis and approaches to NCDP for industry and agriculture sectors
Urban & transport infrastructure (Second)	17 April, 2019	Spatial analysis methods, corridor development and urban functions

Source: JICA Project Team

9.1.5 NCDP Formulation with Multi-stakeholders Meetings

(1) Discussions based on the Progress Report

Compiling all the works during early stage of the participatory planning as reported in the previous section, the Progress Report was prepared by the JPT and submitted in May 2019. The second JCC meeting was convened to discuss on the Progress Report on June 7, 2019. It was resolved at the JCC meeting that discussions on the macro development objectives and basic strategy, development frameworks, and macro development alternatives should be undertaken by involving experts and others concerned outside the PWG as well; for this purpose what is called a multi-stakeholders (MSH) meeting as proposed in the Inception Report should be convened in the nearest future; schedule and subjects for subsequent MSH meetings should be determined at the first MSH meeting (Minutes of Meeting of 2nd JCC Meeting).

In the meantime, the Mongolian Government decided to prepare a long-term development policy (LTDP) 2050 and the Prime Minister's order was issued on April 30 to organize a working group to prepare the LTDP2050 with NDA. The Mongolian side requested that a MSH meeting with many participants should not be convened in the near future to avoid confusion with meetings of the working groups for the LTDP. The JPT accepted this request and decided to have meetings in a small group or individually with Mongolian experts.

(2) NCDP formulation with additional seminars and MSH meetings

Preparation of NCDP first draft

The Project works continued after the submission of the Progress Report for preparation of the first draft of the NCDP reflecting comments by the Mongolian side on the Progress Report, received from Cabinet Secretary, MoF, MLSP, MCUD, CDC, NDA and local governments of the Capital City of Ulaanbaatar and Darkhan City. During this period, meetings of sub-working groups of the PWG were organized occasionally.

The development vision, objectives and strategy presented in the Progress Report were elaborated through discussions with a wider range of stakeholders, while specific development projects were formulated by sector in collaboration with relevant government ministries and agencies, respectively. To discuss and elaborate on development vision/paradigm, development objectives and strategy, and development frameworks, additional seminars were conducted as shown in Table 9.1.8.

Table 9.1.8 Seminars Conducted to Elaborate the NCDP Vision and Frameworks

Date	Title	Resource person	Affiliation
June 19, 2019	Logistics trends between Asia and Europe and the role of Mongolian transport sector	Ryuichi Shibasaki D. Gerelnyam B.Gunbold Yoshiya Nakagawa	Tokyo University MRTD (Ministry of Road and Transportation Development) MCUD JICA Project Team
August 21, 2019	Development paradigm based on SDGs and SDV2030	Yoji Kawamura	JICA Project Team
	Spatial planning of international case	Masaru Tokura	
October 9, 2019	Development paradigm based on SDGs and SDV2030 (second)	Yoji Kawamura	JICA Project Team

	Socio-economic framework	Haruo Yamane	
--	--------------------------	--------------	--

Source: JICA Project Team

To disseminate the initial outcomes of the Project widely, many sessions were organized with politicians, scholars, opinion leaders and representatives of the private sector. These sessions represent multi-stakeholders (MSH) meetings originally planned but conducted individually for different types of stakeholders. These MSH meetings are summarized in Table 9.1.9.

Table 9.1.9 Multi-Stakeholders Meetings with Various Stakeholders

Date	Stakeholders	Subjects
August 2019	Individual discussions with experts 1) Togtokh Chuluun, Director, Institute for Sustainable Development, National University of Mongolia 2) N. Togtokh, Leader of Advisory Team for HSP 3) JargalsaikhanDambadariaa, Founder and representative, DeFacto Institute 4) B. Nasanbileg, President, Japanese University Graduates Association of Mongolia (JUGAMO) 5) Tuvshintug Batdelger, Director of Economic Research Institute, Associate Professor of Economics, National University of Mongolia	Development vision/paradigm, development frameworks
August 21, 2019	Representatives of private light industry associations and others	First draft of NCDP
November 21	Mongolia Japanese Chamber of Commerce and Industry	First draft of NCDP

Source: JICA Project Team

In addition to various meetings for participatory planning, Aimag consultation was conducted to reflect existing conditions in different Aimags, views and opinions of Aimag administrations and residents. This serves as public consultation at the local level as required by strategic environmental assessment (SEA) following the legal requirements in Mongolia.

The JPT prepared a preliminary development diagnosis for each Aimag clarifying existing conditions, constraints and prospects based of readily available statistics and reports. All the 21 Aimags were visited jointly with experts of MCUD and NDA during March throu August 2019. At each Aimag, a working session was organized to present the preliminary diagnosis, discuss and verify its contents with additional data and information, and examine more development prospects as conceived by Aimag participants. Schedule of Aimag visits is shown in Table 9.1.10.

Table 9.1.10 Schedule of Aimag Visits for Consultation Meetings

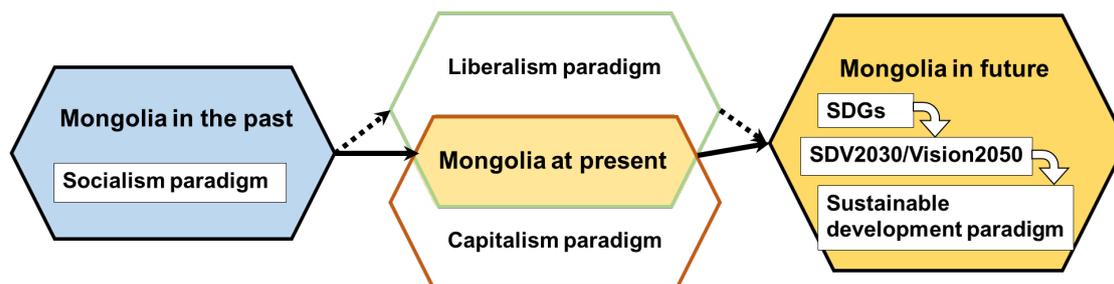
Aimag	Date	Aimag	Date	Aimag	Date
Gobisumber	March 15, 2019	Darkhan-Uul	April 26	Zavkhan	June 18
Khentii	March 26	Uvurkhangai	May 7	Bulgan	June 20
Sukhbaatar	March 27	Arkhangai	May 9	Dornod	August 1
Orkhon	April 8	Gobi-Altai	June 10	Dondgobi	August 6
Khuvsgul	April 10	Khovd	June 12	Umnogobi	August 8
Dornogobi	April 18	Bayan-Ulgii	June 14	Bayankhongor	August 13
Selenge	April 24	Uvs	June 17	Tuv	August 16

Source: JICA Project Team

(i) Formulation of development scenario

Following the procedure of scenario planning shown in Figure 9.1.2, a development scenario was formulated. The JPT clarified that since the NCDP would pursue a shift in development paradigm from the 20th century development to the alternative socio-economy, the development scenario should represent the procedure for the paradigm shift. To facilitate understanding of the development paradigm and the paradigm shift, the JPT utilized the development procedure that Mongolia had followed since the socialistic era before 1990 to the present as shown in Figure 9.1.3 and clarified that

Mongolia had actually started the paradigm shift.



Source: JICA Project Team

Figure 9.1.3 Shift in Development Paradigm Mongolia Has Been Experiencing

Conditions to be satisfied in steps and support one another to realize the new development paradigm of alternative socio-economy as a whole were clarified as follows:

- Management of natural and cultural resources should be improved recognizing these resources as capital to be conserved so that they can continue generating benefits for people for decades to come;
- Development administration should be improved to support the resource management with stronger local administration and more active people's participation;
- Economic activities and exports should be diversified to generate higher value-added and more employment opportunities and to ensure resilient and robust socio-economy; and
- Capital accumulation should be realized for investment into infrastructure and new economic activities to support the diversification.

The development scenario was formulated in three phases up to 2040, and each phase is characterized as shown in Table 9.1.11 with respect to paradigm shift.

Table 9.1.11 Characterization of Three Phases of Development Scenario

Phase 1: ~2025	Phase 2: 2026-30	Phase 3: 2031-40
<p>Preparation for paradigm shift to alternative socio-economy</p> <ul style="list-style-type: none"> - Capital accumulation - Active re-investment in new economic activities - Steady enhancement of local government capacity - Introduction of new methods to mobilize community resources to complement limited public sector resources for development - Accelerated digital transformation in all the sectors 	<p>Active transformation of socio-economic structure fitting to alternative socio-economy</p> <ul style="list-style-type: none"> - Initial localization of development administration starting with environmental monitoring and management - Participatory mechanism to plan and implement community facilities to be institutionalized. 	<p>Completion of paradigm shift to Mongolian model of alternative socio-economy</p> <ul style="list-style-type: none"> - Adjustment of development strategy based on reviews on attainment of SDGs and Vision2050 - Active interactions with Russia, China and other countries and in- and out-migration between Mongolia and these countries - Further devolution of various administrative functions to Aimag governments

Source: JICA Project Team

Multi-stakeholders meeting on the draft NCDP

The JPT compiled the Interim Report 1 (IT/R1) containing the first draft of the NCDP and submitted it in November 2019. The Interim Report was presented at the third JCC meeting on November 25, 2019, and discussed. As the conclusion of the JCC meeting, the JICA side and the Mongolian side agreed that the draft NCDP contained in the IT/R1 will be further elaborated through intensive discussions with a wide range of stakeholders and collaborative works between the JPT and the Mongolian side. It was agreed that at the first MSH meeting after the third JCC meeting, the draft NCDP should be presented

to a wide range of stakeholders for discussion to clarify important issues for elaboration of the NCDP (Minutes of Meeting of 3rd JCC Meeting).

To present the first draft of the NCDP to a wide range of stakeholders, a multi-stakeholders' meeting was convened on January 22, 2020. The participants included researchers/scholars, representatives of media, private firms, governors and councillors of all the 21 Aimags as well as members of the PWG, totalling 162. The presentation of the first draft of the NCDP was followed by group discussions in two sessions on 1) development paradigm, vision, objectives and strategy, and 2) spatial structure and land use plan. For each session, three guiding questions (Q1~Q3) were asked and the participants provided consolidated answers to each question as outcomes of the group discussions. Results of the group discussions are summarized by guiding question below.

1) Development paradigm/vision, objectives and strategy

Q1: Which development paradigm do you consider most appropriate for long-term development of Mongolia?

Group	Development paradigm	Explanation
1	Hybrid development	Good access to social services during socialistic era should be restored.
2	Alternative socio-economy: 4 participants Hybrid development: 2 participants	20th century development model pursued since 1970 needs conversion.
3	Most participants understand 20th century development model but not alternative socio-economy yet.	The best development model should be defined by specifying such sectors that will lead the development.
4	Alternative socio-economy	Mining continues to be necessary but conversion to alternative socio-economy is important.
5	Hybrid	Rapid and inclusive economic development as well as social orientation is necessary under stable administration and policy.

Source: JICA Project Team

Q2: What results do you think we will obtain if we continue the same development as a trend?

Group	Outcome of trend development
1	Unstable administration and policy; failure in implementation of good policy; Long-term Development Policy2050 requires implementing mechanism; implementation only by government initiative to be avoided and cooperation with the private sector indispensable; implementing arrangements with local administrations and people's participation to be proposed.
2	Mining development to continue but converted to value-added processing in coming 30 years; income disparities between urban and rural areas cannot be resolved but each region should create specialty products and services by utilizing local characteristics; Ulaanbaatar should utilize its primacy with concentration by improving efficiency to expand and increase employment; stability of administration and policy and resolution of environmental problems are necessary.
3	Mining, livestock farming, food production and related processing are important together with tourism and transit trade.
4	Consistency between sector policies necessary; emphasis by the Government on mining enlarging income disparity preventing economic diversification and aggravating over-concentration in Ulaanbaatar; this is a fundamental cause of political instability and inconsistent policies; this results in further deficiency of concerns on environment, human resources and cultural heritage.
5	Reliance on mining should be extricated and national wealth should be increased by economic diversification, transit trade development, export promotion, and mineral processing.

Source: JICA Project Team

Q3: What do you think will lead structural changes in national socio-economy, spatial structure and environment?

Group	Factors to lead structural changes
-------	------------------------------------

1	Education and enlightenment to be emphasized; education suffering from limited access, inadequate facilities, shortages of teachers etc.; promotion of ecological products and recycling and measures against climate change; proactive marketing with trade agreements with other countries; conversion from coal to renewable energy; improved transport infrastructure to strengthen links between cities; administrative reform especially strengthening of local administrations as prerequisites.
2	Tourism and transit trade; access improvement to primary education, skill training, advanced education and vocational training; water resources management and proper use; investment promotion, support for new socio-economic activities, and technological innovation.
3	Livestock promotion by proper selection of livestock species suited to local conditions; reduced emphasis on coal and increased gold production; transit trade not significant; establishment of high education institutes in regions to shift quality labor to regions; utilization of youth labor for ICT age; measures to cope with decrease in groundwater in the west and decreased river and lake water due to climate change; reform of Aimag administrations
4	Application of new technologies to mining, livestock and crop farming; smart economy by ICT application supported by vocational training on advanced technology; new value development by pre-school education; lifelong continuous education to change way of thinking; High education and vocational training for advanced technologies; water resources development and management; reforestation and expansion of protection area; protection of pasture land and designation of managed pasture; localization of development administration and regional investment promotion policy.
5	Knowledge industry: application of AI, IoT and technology development.

Source: JICA Project Team

2) Spatial development and land use planning

Q1: Do you think concentration of population and economic activities in Ulaanbaatar a problem for socio-economic development on Mongolia?

Group	Opinions and ideas
1	Concentration in Ulaanbaatar may be reduced if local administrations have secured financial resources to invite firms to trigger population movements, but local tax collected by local administrations is now allocated by the Government to local administrations; Ulaanbaatar has many government officials including police, while employment opportunities by industries are limited; medical and health functions should be devolved and allocated to local cities.
2	Rather than dealing with the concentration in Ulaanbaatar as a problem, regional development should be pursued by utilizing regional characteristics and local resources.
3	Re-distribution to local areas should be pursued as over concentration is not desirable.
4	We should focus on opportunities rather than problems; localization of development administration is indispensable for regional development.
5	No conclusion

Source: JICA Project Team

Q2: If some functions of Ulaanbaatar should be transferred to local cities, which functions should be transferred to where?

Group	Opinions and ideas
1	No conclusion
2	Urban functions of Ulaanbaatar should be transferred to 15 satellite cities around Ulaanbaatar: construction industries in Nalaikh, tourism in Terelj, crop and livestock farming in Partizan etc.
3	Two cities should be identified to counter Ulaanbaatar, but Uliastai and Undurkhan are not candidates; Khovd in Western Region and Choibalsan in Eastern region should be developed on priority as strategic cities; development potentials may be extended along the AH No.4 linking Khovd in the west, through Bulgan and Tsagaannuur, and in the east linking Choibalsan and Ereentsav; Central Asia Regional Economic Cooperation Association in the west and North-east Asia Regional Economic Cooperation Association in the east should be effectively utilized.
4	To resolve over-concentration in Ulaanbaatar, designation of selected urban functions to where locational conditions are favorable is not enough, but localization of development administration is indispensable; the Government should adopt policy to promote private investments to regions, and apply tax and incentive measures so that private firms will

	establish facilities and generate employment.
5	Three Aimags in Western Region have development route linking Tsagaannuur and Yargui, and trade and tourism corridor may be developed linked to Russia, Kazakhstan and China; Central Region has a route linking Artsuuri, Gashuunsukhait, Altanbulag, and Zamiin-Uud; Eastern Region has a route linking Ereentsav and Bichigt, which may be developed by the Tumengoliin project involving Korea, Russia, China and Mongolia.

Source: JICA Project Team

Q3: What functions do you think should be strengthened for Uliastai, Undukhaan, Tsetserleg, Kharkholin and Arvaikheer?

Group	Opinions and ideas
1	Investment in tourism services; head office functions of world class enterprises, especially ICT related firms may be concentrated by upgrading urban infrastructure; increasing labor force by establishing enabling environment and institutions to accept refugees may be an idea.
2	Light industry including forestry in Uliastai, tourism industry in Undurkhan, medical center and logistic center in Tsetserleg, heritage tourism related industries in Kharkholin, livestock industry in Arveikheer
3	No conclusion
4	Seabuckthorn food processing and construction materials industries in Uliastai; livestock farming and processing industry in three Aimags in Western Region; tourism industry in Undurkhaandeclearing “eco-city”.
5	All the cities listed should be developed on priority and education facilities, social infrastructure and industries should be loceted there; localization is difficult to realize due to conflicts of interests by members of the Parliament.

Source: JICA Project Team

The JPT also had a supplemental session with representatives of political parties on January 24, 2019 to explain the draft NCDP and receive comments. Six representatives of National Development Party (NDP established in 2016), World Mongolia Party (WMP established in 2018), and Mongolia Democratic Movement Party (MDMP) participated. Major comments are summarized by party.

NDP

- (a) Mongolia has adopted policy to pursue unique development, which is reflected to policy documents by NDP.
- (b) Important characteristics to be reflected in the NCDP are 1) Administrative capacity of local administrations have not developed during 30 years after democratic reform, 2) No civil society exists in Mongolia, and 3) Mongolia does not have mature private sector yet.
- (c) These problems are due largely to continued administration of People’s Party and Democratic Party; donor supports tend to politicized to benefit these major parties and do not lead necessarily to sustainable development.
- (d) Many possibilities have been discussed for transportation and processing of coal, but they have not realized much benefits including a joint project by NEDO and Kyushu University.
- (e) Use of geothermal energy is promising and heat supply to schools and medical facilities is experimented.

MDMP

- (a) Projects related to rivers are important; trans-basin diversion of river water should be examined to cope with climate change.

- (b) Water will be a constraint in development of Ulaanbaatar.
- (c) MDMP has been working with the team preparing the Long-term Development Plan 2050.

WMP

- (a) There are more than 10 political parties in Mongolia other than People's Party and Democratic Party; WMP is impartial to the right wing nor the left wing.
- (b) According to the Law on Political Parties, small and medium size parties are eligible for projects of international cooperation.
- (c) WMP can cooperate for the four initiatives proposed by the NCDP and promote implementation by incorporating some contents of the NCDP in the manifest of the party.

(3) Elaboration on the NCDP

After the third JCC meeting, many additional comments on the IT/R1 were received from various organizations including Cabinet Secretary, MoE, MET, MLSP, MOF, MRTD, MCUD, NDA, CDC, ALAMGaC and Ulaanbaatar City. The Project works continued to reflect these comments and further elaborate on the NCDP by additional surveys in the field. The Mongolian side requested to advance the Project schedule and submit a first Draft Final Report before the general election in June instead of the Interim Report 2 as originally planned. The JICA side accepted this request.

Unfortunately, the fieldworks were suspended by early March due to the outbreak of COVID-19. Thereafter, the JPT continued the Project works through communication with the Mongolian side by online meetings and e-mail. No PWG/Sub-group meeting was held but the JPT experts communicated occasionally with their C/P experts individually.

An important task in elaborating the NCDP was to strengthen regional dimension of the NCDP by establishing regional development vision, strategy and program for each region. As a prerequisite, the current regional division into six regions was critically reviewed and a new regional division was proposed based on comparative analysis on Aimags by many indices. Based on the proposed new regional division, regional development vision and strategy were derived. To facilitate the understanding and discussions on regional dimension of the NCDP, the JPT prepared the two discussion papers:

- (a) Proposal for new regional division of Mongolia, January 18, 2020, and
- (b) Regional development vision and strategy, January 26, 2020.

The discussion papers were combined into one and submitted to the Mongolian side in February 2020. No substantive comments were received, but the regional division contained in the draft Long-term Development Policy (LTDP) 2050 submitted to the Parliament in May 2020 is the same as proposed in the discussion paper 1). This proposed regional division, however, was not approved by the Parliament, while the draft LTDP2050 was approved as the Vision2050 without the regional development components under the proposed regional division.

A new regional division has been discussed between the JPT and the Mongolian side. The proposed regional development and strategy in the discussion paper 2) have been elaborated by the JPT and an integrated regional development program (IRDP) by region has been proposed together with the Regional Development Council (RDC) by region to facilitate coordinated implementation of the IRDPs.

Another important task was to elaborate spatial framework reflecting comments by MCUD/CDC preparing the HSP. The urban hierarchy has been made consistent, but consistency of artery network has continued to be worked out. Effects of COVID-19 on the world economy as well as the Mongolian socio-economy were examined for some sectors including possible effects on the socio-economic framework. For these additional tasks, collaborative works between the JPT and the Mongolian C/P team were regrettably limited during this period.

9.1.6 Public Acceptance Cultivation for the NCDP

(1) Basic endorsement of the NCDP

Reflecting comments on the IT/R1 and incorporating the supplemental works, the Draft Final Report 1(DF/R1) was compiled and submitted in June 2020. The DF/R1 was presented and discussed at the fourth JCC meeting, which was conducted online on June 11, 2020. As the conclusion of the JCC meeting, both sides agreed that the revised NCDP will be disseminated to raise awareness and understanding by a wide range of stakeholders, while further elaborated through discussions, online and otherwise, with a wide range of stakeholders and collaborative works between the JPT and the Mongolian side (Minutes of Meeting of 4th JCC Meeting).

At the JCC meeting, the Mongolian side expressed basic endorsement over the development direction and vision presented in the DF/R1 and also expectation for further refinement of the development scenario. Also, the JICA side and the Mongolian side agreed that the NCDP proposals should be disseminated widely to raise awareness for the NCDP proposals and cultivate understanding of the new development paradigm presented in the NCDP.

(2) Public acceptance cultivation for the NCDP

In addition to discussions at the fourth JCC meeting, many comments on the DF/R1 were received in writing from Cabinet Secretary, MET, MFALI, MLSP, MMHI, MoE, MRTD, NDA and MCUD. The JPT responded to all the organizations in writing clarifying how their comments would be reflected in the NCDP.

Another MSH meeting was convened online to present and discuss on the NCDP with Mongolian youth groups on August 17, 2020. Over 100 Mongolian youth participated not only in Mongolia (Ulaanbaatar and some Aimags) and Japan but also in 12 other countries. Well over 100 comments were received and the JPT responded to all of them, and the communications have been made open online. Representative comments are summarized in Table 9.1.11.

Table 9.1.12 Representative Comments by Mongolian Youth Groups

Classification	Comments
Comments already reflected in the NCDP	<ol style="list-style-type: none"> 1) Application of advanced technology, 2) Use of indices related to culture, climate and tradition to analyze regional division, and 3) Livestock disease free zone
Comments requiring further considerations	<ol style="list-style-type: none"> 1) Establishment of wood products quality laboratory, 2) Use of grey water, 3) Health information centers to be used also for health education, and 4) Youth development centers.
Comments difficult to reflect in the NCDP	<ol style="list-style-type: none"> 1) Projects for cultural sector, 2) Tavan Tolgoi ~ Zuunbayan railway, 3) Address system to improve postal services, and 4) Export of power as part of Asian power grid.
General comments	Relationships between the LTDP2050, HSP, RDP and the NCDP to be clarified

Source: JICA Project Team

To follow up the meeting, group discussions took place also online on September 7 participated by selected participants of the MSH meeting. The group discussions are summarized in Table 9.1.13 in the form of the responses by the JPT to issues raised by four groups. Most comments received at both sessions are related mainly on specific issues, but many participants expressed appreciation that the

NCDP is a comprehensive long-term development plan prepared reflecting local needs based on extensive surveys and consultation.

Table 9.1.13 Responses by the JPT to Issues Raised by Four Groups at Group Discussions

Group	Issues	Responses by the JPT
A	Livestock and crop farming	<ol style="list-style-type: none"> 1) NCDP proposes industrial cluster development strategy to integrate livestock and crop farming, primary processing and value-added processing linked eventually to export market. 2) Support measures include farmers organizing and strengthening, skill training, R&D for product development and export market development with product quality. 3) Road infrastructure should be improved to link primary production areas, processing centers and export bases.
	Semi-intensive livestock farming	<ol style="list-style-type: none"> 1) Semi-intensive livestock farming should be combined with increased fodder production for integrated farming, which should be developed in steps into a livestock industrial cluster. 2) The cluster may start with processing for meat and dairy products and will develop into total processing of livestock products including high value products for export.
	Disease free zone	The NCDP proposes disease free zone development particularly in the Eastern Region to promote export of meat and dairy products to Asian and other countries.
	Productivity and production increase for crops	<ol style="list-style-type: none"> 1) The NCDP proposes to increase productivity and production of essential food crops such as grains, vegetables and some fruits and industrial crops for processing represented by sea buckthorn and oil seed. 2) For the purposes, the NCDP proposes irrigation development utilizing major rivers, greenhouse agriculture and ICT application including smart agriculture and Agro-IT parks. 3) An agricultural laboratory proposed by Group A may be located in an Agro-IT park.
	Crop production and marketing	<ol style="list-style-type: none"> 1) To support production and marketing, the NCDP proposes food traceability platform, cold chain and ICT monitoring and support services among others. 2) The NCDP would not support the use of vast land for crop production with foreign countries suggested by Group A.
B	Urban infrastructure	The NCDP does not deal with urban infrastructure such as pedestrian ways and bicycle roads, urban parks and urban transport or housing proposed by Group B except urban water supply, sewerage and solid waste management.
	Solid waste management	<ol style="list-style-type: none"> 1) For solid waste management, the NCDP proposes promotion of waste recycling with the automobile recycling park and the eco-park establishment. 2) In addition to waste separation at sources, the NCDP recommends food loss reduction.
	Ger district	<ol style="list-style-type: none"> 1) The NCDP proposes the sanitation improvement project and development guidelines preparation. 2) Expansion of greenery as proposed by Group B will be accommodated in these projects.
	Regional division	<ol style="list-style-type: none"> 1) The NCDP recommends the revised regional division proposed by the draft LTDP2050 based on the analysis on affinity of mutually neighboring Aimags by using 30 indices representing natural, social, economic, land use, financial and other conditions. 2) The new division will allow more effective measures for socio-economic development of each region having largely similar characteristics.

	Local administration	1) The NCDP recommends localization of development administration as suggested by Group B to establish self-reliant and autonomous Aimag governments in steps for transparent and responsible budget management.
	Education sector	1) The NCDP endorses the ongoing comprehensive education sector reform and proposes measures for higher and technical education and lifelong/continuous education as well as general education. 2) In particular, the NCDP strongly recommends general education with value development as a base for pursuing a new development paradigm, which should start at pre-school education. 3) Specific recommendations by Group B on education sector such as improving teachers training, ensuring equal access to education by utilizing distant education with ICT, and curriculum improvement will be reflected in the revised NCDP.
C	Tourism development	1) The NCDP is generally in line with suggestions by Group C on tourism development. 2) The “Urtuu” service stop areas development as proposed is proposed by the NCDP and already pilot implemented as part of the NCDP Project. 3) Community involvement is considered an essential condition for both domestic and international tourism for cultural heritage tourism and rural/farm experience- oriented tourism. 4) Visitors from Ulaanbaatar may enjoy home gardening as domestic tourism during weekends. 5) Local communities can supply local products to tourists and provide tourism services. 6) As Mongolia is joining the international tourism market newly, collaboration by all the stakeholders to create unique and original sets of destinations complementing one another is essential rather than competing tourism areas and products for marketing. 7) The NCDP proposes a platform to share and exchange tourism information that will link not only tourists and service providers but also between various service providers for collaborative marketing.
	Private sector for infrastructure	1) Road construction by the private sector as suggested by Group C may be rather difficult in Mongolia as there exist few major roads having heavy traffic to ensure profitability as toll roads. 2) For the contribution of the private sector to road development, the NCDP proposes establishment of community development fund by contribution of major mining and tourism development for community infrastructure such as access roads and social facilities.
D	Education sector	1) The NCDP for education sector is based on the presumption that Mongolia has agreed to participate in 2021 PISA assessment and financial and technical support have been secured for education sector reform. 2) This involves two conditions ① all schools will conduct 2 shifts, which requires additional teaching staff input and rehabilitation and re-furbishing of some schools; and ② general and high schools will cater to the nomadic population and lifestyle. 3) Most measures suggested by Group D for education will be pursued under these conditions such as teachers’ training, TOT, foreign language education, and upgrading of school facilities. 4) The NCDP proposes supports for vocational schools and technology colleges as well. 5) Only way to reduce the education quality between private and public schools is to improve the quality of public schools with respect to facilities, curricula and teachers’ quality.
	Industrial	Support measures in the NCDP for industrial sector include formulation of legal

	development	and policy framework, human resources development including assistance to SMEs for training of their employees, promotion of FDI and domestic investment including FTZ/SEZ development, improving access to finance, and support of business start-up, incubation and innovation.
	Import and export	1) Development of transport infrastructure for import, export and domestic distribution is naturally part of the NCDP proposal. 2) Producing pet food seems a viable idea but increasing vegetable production for export is a remote possibility.
	Livestock farming	Same as responses to Group A

Source: JICA Project Team

The MSH meeting was shared online, and all the comments by participants and responses by the JPT were made open online. Also, the JPT prepared articles on the Project and the NCDP at a media firm site of “Unread Today”. As part of the efforts to disseminate the NCDP proposals more widely, a publicity video was produced by the JPT and distributed in various media.

9.1.7 Finalization of the NCDP

(1) Preparation of the Draft Final Report 2

As part of efforts to raise awareness for the NCDP by a wide range of stakeholders, several pilot projects have been formulated and implemented after the submission of the DF/R1, mobilizing a team of Mongolian experts respectively supported by limited foreign experts for some pilot projects under the supervision and guidance by the JPT. Procedure, contents and outcomes of the pilot projects are compiled separately.

Sector experts of the JPT updated respective sector reports with the latest data including those contained in Statistical Yearbook 2019 published in the middle of 2020. To reflect comments by JCC member organizations and other stakeholders as well as JICA, the JPT communicated online with related organizations or directly by the national members of the JPT. The Draft Final Report 2 (DF/R2) was compiled containing the revised NCDP and submitted first to JICA on December 15, 2020. After a thorough review by JICA, the DF/R2 was finalized and submitted to the Mongolian side on February 28, 2021.

(2) Coordination between the NCDP and the HSP and the RDP

As the objectives stipulate, the NCDP is expected to be utilized in preparing the HSP by MCUD and the RDP by NDA, respectively having a legal base. Despite the collaborative works to prepare the NCDP, discrepancies were observed between the NCDP and the HSP and the RDP in preparation. Coordination with MCUD/CDC and NDA to resolve discrepancies has been the major task for the final stage of scenario planning.

Online meetings were convened by the JICA Mongolian office on February 19 with NDA and February 24 with MCUD/CDC to discuss on how to coordinate between the NCDP and the HSP and the RDP. Progress and schedule of preparing the HSP and the RDV were clarified respectively by MCUD/CDC and NDA. NDA expressed its expectation for the Project to prepare more details for the Regional Development Vision (RDV) as part of the Regional Development Program rather than the RDP where “P” stands for policy to be newly prepared. MCUD/CDC shared the progress of the HSP. Both the MCUD/CDC and NDA agreed with the JICA side to have continued coordination meetings.

In the meantime, comments on the DF/R2 were received from the Mongolian side including Cabinet Secretary, MES, MOH, MET, MMHI, MOFALI, MOE, MOF, MCUD, CDC, ALAMGaC, MRTD, MLSP and four advisors for the HSP. The JPT prepared a response to all the comments in writing and identified major issues to be resolved to ensure reasonable consistency between the NCDP and the HSP and the RDP. These issues are: 1) Population projection, 2) Economic projection, 3) Urban hierarchy, 4) Ring artery, 5) Relocation of capital city functions, 6) Regional division, and 7) Economic clusters development.

After all the comments were received and reviewed, coordination meetings were convened with

MCUD/CDC and NDA focusing on the key issues identified by the comments on the DF/R2 by the Mongolian side. At the coordination meeting on April 15, the JPT explained the key issues raised by the Mongolian side as above. Through extensive discussions, what needs to be further discussed was clarified while understanding on the NCDP proposals related to the key issues was deepened. In particular, discussions would continue on relocation of capital functions and revised regional division for political reasons as well. Further comments on the issues were received in writing from a few participants.

At the coordination meeting on April 23, CDC made a presentation on the HSP in preparation and discussions continued on the key issues. The JPT proposed how to resolve discrepancies that appeared to exist between the NCDP and the Vision2050 and the HSP, responding also to the comments received from the participants. Additional comments were received after the meeting from one of the participants, and the JPT responded to them in writing.

Another coordination meeting was convened on May 14 and the JPT made a presentation under the title of “NCDP to Support Vision2050”. The JPT emphasized common features of the NCDP and the Vision2050 and clarified the difference between them that should be reflected in the HSP and the RDP. Some discussions were on the same issues but forward-looking discussions also took place on regional division, regional development programs and regional development council proposed by the NCDP.

9.2 Initial Project Evaluation by the NCDP Evaluation System

9.2.1 Principles of Project Evaluation

(1) Need for consistent evaluation system

Many projects and programs have been formulated and contained in the first draft of the National Comprehensive Development Plan (NCDP), and more projects are expected to be formulated in the subsequent stage. These projects should be evaluated to determine priorities for implementation through coordination between implementing agencies and between different sectors. Moreover, the prioritization should be consistent with the on-going national initiative to prepare a Long-term National Development Policy 2050 (LTDP2050). To ensure consistency between the LNDP2050 and the NCDP, a consistent evaluation system should be established to prioritize projects contained in the two documents.

(2) Principles of project evaluation

Principles of project formulation and evaluation are: 1) to formulate projects with respect to needs, and 2) to evaluate them with respect to objectives. Therefore, evaluation criteria should be established on the basis of the development objectives of the NCDP. The NCDP has defined three development objective representing economic, social and environmental aspects as follows:

- (a) To diversify economic structure and export through increasing capital accumulation (economic objective);
- (b) To generate lucrative and stable employment opportunities in rural areas and local towns to reduce poverty and urban-rural disparities (social objective); and
- (c) To alleviate urban environmental problems by alleviating adverse effects of over-concentration of population and economic activities in Ulaanbaatar (environmental objective).

The proposed projects and programs have been packaged into the following four initiatives to clarify their different characteristics and to facilitate coordination between them:

- I. Economic and export diversification initiative,
- II. Broad-based empowerment initiative,
- III. Spatial structure strengthening initiative, and

IV. Green development promotion initiative.

The evaluation system should be consistent with the structure of the NCDP with these four initiatives to facilitate monitoring and evaluation of project implementation by many implementing agencies.

9.2.2 Evaluation System for National Comprehensive Development

(1) Two step evaluation system

A consistent and comprehensive system of evaluation should be established for development projects proposed by the NCDP, which may be applied also to projects of the Long-term National Development Policy 2050 in preparation. Such evaluation at policy and master plan levels is different from project wise evaluation, which provides quantitative evaluation of marginal effects of each project. Policy and master plan level evaluation covers a widely different types of projects for indirect effects and composite effects of multiple projects. Such indirect and composite effects can be evaluated mostly in qualitative ways. It is most important for the policy and master plan level evaluation to maintain a broad base for evaluation covering many and diversified aspects even in qualitative ways.

For evaluation of projects for national comprehensive development, a two-step evaluation system is recommended. Step 1 is for qualitative evaluation on a broad base by many and diversified criteria to evaluate or rather screen many projects in different sectors. Step 2 is for quantitative or semi-quantitative evaluation with selected indices. The evaluation indices should be utilized also for monitoring and evaluation purposes after project implementation.

(2) Evaluation accounts and criteria for Step 1 evaluation

For Step 1 evaluation of projects in the NCDP, application of multi-account evaluation system may be appropriate. This system has been utilized in regional development planning in some developing countries as well as in river basin planning (Level B) in the United States, where it was originally developed. In applying this system to the NCDP, five evaluation accounts are introduced: national economy (NE), regional development (RD), social development (SD), environmental quality (EQ) and institutions (IN). Four criteria are defined for each account as shown in Table 9.2.1, where qualitative evaluation of effects is also suggested.

The first four accounts except the IN account correspond largely to the four initiatives of the NCDP as follows:

Evaluation account	NCDP initiative
National economy (NE):	Economy and export diversification
Regional development (RD):	Spatial structure strengthening
Social Development (SD):	Broad-based empowerment
Environmental quality (EQ):	Green development promotion

The RD account encompasses not only spatial structure strengthening but other aspects included in the other accounts, but spatial structure strengthening is most effective in realizing better regional balance by development of regions. The remaining IN account may represents local ownership of development and local initiative for development. Evaluation by the IN account may be treated separately to identify projects to be implemented by local initiative.

Table 9.2.1 Evaluation Criteria for Five Account Evaluation System for the NCDP

Account	Criteria	Evaluation of effects		
		Highly positive	Positive	Negative
1. National economy: NE				
	1.1 Economic efficiency	High economic rate of return	Medium economic rate of return	Not project objective

	1.2 Contribution to economic diversification	Significant contribution	Some contribution	No or little contribution
	1.3 Contribution to foreign exchange earnings	Significant contribution	Some contribution	No or little contribution
	1.4 Appropriate technology promotion	Significant	Possible/likely	Not intended
2. Regional development: RD				
	2.1 Improvement of income disparities	Improvement of low income people	No or little effects	Negative effects
	2.2 Vitalization of local SMEs	Significant contribution	Some contribution	No or little contribution
	2.3 Community development	Important objective	Not an objective but positive effects expected	No or little consideration
	2.4 Use of local/indigenous resources	Significant use	Some use	Little use
3. Social development: SD				
	3.1 Employment generation	Large employment opportunities to be generated	Sizeable employment to be generated	Relatively small employment opportunities generation
	3.2 Improvement of social services	Significant improvement	Some improvement	No or little improvement
	3.3 Effects on local culture	Positive effects	No or little effects	Negative effects
	3.4 Poverty alleviation	Important objective	Not an objective but positive effects expected	No or little consideration
4. Environmental quality: EQ				
	4.1 Adaptability to natural conditions	Adaptable to local natural conditions	No contradiction to local natural conditions	Conflict with local natural conditions
	4.2 Land requirements and suitability	Adaptable to local land conditions	Some stress on local land conditions	Excessive land requirement and/or unsuitable land use
	4.3 Water use and management	Adaptable to local water availability	Some stress on local water balance	Excessive use of local water
	4.4 Reduction of environmental vulnerability	Significant contribution	Some contribution	No or little contribution
5. Institutions: IN				
	5.1 Implementing arrangements	Implementing entity identified	Possible implementors existing	No implementing arrangements yet
	5.2 Participation of local community and people	Local participation as project components	Local participation expected	No expectation for local participation
	5.3 Promotion of localization	Significant contribution	Some contribution	No or little contribution
	5.4 Local ownership and public acceptance	Direct effects expected	Indirect effects expected	No or adverse effects

Source: JICA Project Team

The five-account evaluation system should apply to all the projects for development at macro, meso and micro levels consistently. Emphasis on different accounts, however, should be different for evaluation at different levels. To reflect varied emphasis, weighting may be applied for the four accounts except the IN account, which should be treated separately. NE may be most emphasized at the macro level, RD at the meso level, and SD at the micro level. Possible weighting for evaluation at different levels is shown in Table 9.2.2 as just an example.

Table 9.2.2 Weighting of Four Accounts for Evaluation at Macro, Meso and Micro Levels

Account	Initiative	Macro	Meso	Micro
NE	Economy and export diversification	0.40	0.20	0.10
RD	Spatial structure strengthening	0.20	0.40	0.20
SD	Broad-based empowerment	0.20	0.20	0.40
EQ	Green development promotion	0.20	0.20	0.30

Source: JICA Project Team

(3) Step 2 evaluation

By Step 1 evaluation, project prioritization is undertaken to select priority projects at the macro, meso and micro levels respectively. For the selected priority projects, Step 2 evaluation is conducted by using quantitative criteria as much as possible. For Step 2 evaluation, the priority projects are classified into three types: 1) infrastructure, 2) economic, and 3) social projects. Evaluation of these three types of projects cannot be compared simply based on the total score as they are different in characteristics and effects. Criteria to be used for Step 2 evaluation and applicability of different criteria for three types of projects are suggested in Table 9.2.3.

Table 9.2.3 Criteria for Step 2 Evaluation and Applicability to Three Types of Projects

Criteria	Infrastructure	Economic	Social
1) Investment cost	✓	✓	✓
2) O&M cost	✓		✓
3) Employment generation		✓	✓
4) Economic rate of return or B/C ratio	✓	✓	
5) Foreign exchange earning	✓	✓	

Source: JICA Project Team

9.2.3 Application to the NCDP projects

(1) Evaluation of projects by development initiative

The five-account evaluation system is applied to all the projects proposed in the NCDP. Only Step 1 evaluation is conducted, and the results are shown in Tables 9.2.4 through 9.2.7 by development initiative. In these tables, each project or program is evaluated by four criteria respectively representing each evaluation account with a score of “2”, “1” or “0”, corresponding to the evaluation of “highly positive”, “positive” and “negative” or not relevant in Table S10.1. The score by each account is calculated by simply adding the scores by the four criteria, and the total score is calculated by adding the scores of all the five accounts. In calculating the total score, equal weight is given to all the accounts.

The following are observed from Tables 9.2.4 through 9.2.7.

- (a) Of the 31 projects evaluated in the economy and export diversification initiative, nine anchor projects have scores higher than 20 except the coal transport and export promotion with 13.
- (b) Other projects in the economy and export diversification initiative have scores between 12 and 17.
- (c) Both the sea buckthorn industrial cluster development and the sea buckthorn development have high scores over 30.

- (d) Of the seven projects in tourism sector, the anchor project of the “Urtuu” service stop areas project has the highest score at 28.
- (e) Of the 20 projects evaluated in the broad-based empowerment initiative, seven anchor projects have scores higher than 25; of the remaining projects, the comprehensive nomad database development has the score 26, while others have scores lower than 20.
- (f) Of the nine projects of the spatial structure strengthening initiative proposed in the NCDP, five anchor projects have scores higher than 17, and the remaining projects have scores 17 or lower.
- (g) Of the latter non-anchor projects, the Orkhon River water diversion to Govi has the highest score with 17.
- (h) Of the 17 projects evaluated in the green development promotion initiative, eight anchor projects have high scores between 23 and 29; the remaining eight projects have scores between 11 and 15.

Table 9.2.4 Step 1 Evaluation of Projects in Economy and Export Diversification Initiative

Account	Criteria	I1.1	I1.2	I2.1	I2.2	I3.1	I3.2	I3.3	I4.1	I4.2	I5.1	I5.2	I5.3	I6.1	I6.2	I6.3	I6.4	I7.1	I7.2	I8.1	I8.2	I9.1	I9.2	I9.3	I9.4	I10.1	I10.2	I10.3	I10.4	I10.5	I10.6	I10.7			
		Border areas FTZs and SEZs promotion																																	
		Ulaanbaatar airport-side SEZ development																																	
		Sea buckthorn industrial cluster development																																	
		Livestock industrial cluster development																																	
		Smart agriculture promotion																																	
		Greenhouse agriculture promotion																																	
		Agro IT Parks development																																	
		Fodder production expansion																																	
		ICT monitoring & support system for livestock																																	
		Irrigation development																																	
		Oil seed development																																	
		Sea buckthorn development																																	
		Cattle ranching system development																																	
		Corn silage production																																	
		TMR feeding centers development																																	
		Spray dry powder milk technology																																	
		Cold chain development																																	
		Food traceability platform																																	
		Rare earth resource exploration																																	
		Metal mineral resources market exploration																																	
		Coal transport and export promotion																																	
		Coal resources survey																																	
		Optimized coal business master planning																																	
		Coal based industrial cluster development																																	
		Dinosaur museum																																	
		"Urtuu" service stop areas*																																	
		Get district handicraft street																																	
		Winter sports and leisure center																																	
		Nalaih mining museum and education center																																	
		Tourism sector database development																																	
		Tourism industrial cluster development																																	
1. National economy: NE																																			
1.1 Economic efficiency		2	2	1	1	2	2	2	1	2	1	1	1	1	1	1	1	1	1	2	0	0	2	1	1	1	1	1	0	1	0	1	1		
1.2 Contribution to economic diversification		2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	0	1	1	1	1	1	1	1	0	1	0	1	1
1.3 Contribution to foreign exchange earnings		2	2	2	2	1	1	2	1	2	1	1	1	1	1	0	0	1	2	2	2	2	2	1	1	1	1	0	0	1	1	1	1	1	1
1.4 Appropriate technology promotion		2	2	2	2	2	2	2	0	2	1	1	1	0	1	2	2	2	2	2	2	1	2	1	1	1	1	1	0	0	0	0	0	1	
Sub-total		8	8	7	7	6	7	8	3	7	4	4	4	3	4	4	4	5	7	6	5	6	5	4	4	4	3	1	3	1	3	3	4		
2. Regional development: RD																																			
2.1 Improvement of income disparities		1	0	2	2	1	1	1	1	2	1	1	2	1	1	0	1	1	1	1	0	0	0	0	1	0	1	1	1	1	0	1	1	1	
2.2 Vitalization of local SMEs		1	1	2	1	0	1	1	0	2	0	0	2	0	0	0	1	1	1	1	0	0	0	0	1	0	1	2	1	1	0	1	1	1	
2.3 Community development		0	0	2	1	0	1	0	1	2	0	0	2	1	1	0	0	0	0	0	0	0	0	1	1	0	1	2	2	1	1	1	1	2	
2.4 Use of local/indigenous resources		1	1	2	2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1	1	2
Sub-total		3	2	8	6	2	4	3	3	8	2	2	8	3	3	1	3	3	3	3	1	1	2	2	4	2	4	7	5	4	2	4	4	6	
3. Social development: SD																																			
3.1 Employment generation		2	2	2	2	0	1	1	1	1	0	1	1	1	1	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	
3.2 Improvement of social services		0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	

3.3 Effects on local culture	0	0	1	2	0	0	0	0	2	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	1	2	1	1	1	1	1	1
3.4 Poverty alleviation	1	0	2	2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	0	0	0	0	1	1	1	2	1	1	1	1	1	1
Sub-total	3	2	5	6	1	2	2	2	7	1	2	4	3	2	1	1	3	2	0	0	0	0	2	2	3	5	3	4	3	4	4	
4. Environmental quality: EQ																																
4.1 Adaptability to natural conditions	1	0	2	2	1	1	1	1	2	1	1	2	2	1	1	0	1	1	1	1	1	1	1	0	1	2	1	1	1	1	1	
4.2 Land requirements and suitability	1	1	2	2	1	2	1	1	2	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	
4.3 Water use and management	1	0	1	2	1	2	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0	1	1	1	1	1	1	1	
4.4 Reduction of environmental vulnerability	0	0	2	2	1	1	1	1	2	1	1	2	1	2	1	0	1	1	0	0	0	0	1	1	0	1	0	0	0	0	0	
Sub-total	3	1	7	8	4	6	4	4	8	4	4	7	5	5	4	2	4	6	3	3	3	3	4	2	3	6	3	3	3	3	4	
5. Institutions: IN																																
5.1 Implementing arrangements	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	1	1	1	2	1	0	1	1	1	1	0	1	0	0	
5.2 Participation of local community and people	0	0	1	2	0	1	0	1	2	1	1	2	1	1	1	1	0	1	0	0	0	1	1	1	1	2	2	1	1	1	1	
5.3 Promotion of localization	0	0	2	2	0	1	1	0	2	0	0	2	1	0	0	0	0	1	0	0	0	1	1	0	0	2	0	1	1	1	1	
5.4 Local ownership and public acceptance	0	0	2	2	0	1	1	1	2	0	1	2	1	1	1	1	1	1	0	0	0	0	1	0	1	2	1	1	0	1	1	
Sub-total	1	1	6	7		4	3	3	7	3	3	7	3	2	2	2	1	4	1	1	2	3	3	2	3	7	4	3	3	3	4	
Total score	18	14	33	34	13	23	20	15	37	14	15	30	17	16	12	12	16	22	11	10	13	13	17	12	17	28	16	17	12	17	22	

Source: JICA Project Team

Table 9.2.5 Step 1 Evaluation of Projects in Broad-based Empowerment Initiative

Account	Criteria	II.1 Herder communities support facilities	II.1.2 Community-based early childhood education for herders' children	II.2.1 Local administrations-nomads communication strengthening	II.2.2 Comprehensive nomad database development	II.3 Skills training and job creation for youth and adults	II.4 Young women's career development and support program	II.5 Scholarship for business-oriented human resources development	II.6 Comprehensive education sector reform program	II.7.1 Primary health care strengthening	II.7.2 Health information center establishment	II.7.3 Prevention of mother to child transmission of HIV, syphilis and hepatitis	II.7.4 Telemedicine and electronic mobile health care for diagnostic purposes	II.8 Social insurance and pension reform	II.9.1 Center of group dynamics	II.9.2 Process consulting for accomplished results	II.10.1 Education sector strengthening by utilizing ICT	II.10.2 Rural ICT development promotion and model ICT city development	II.10.3 Integrated information network for rural people	II.10.4 Offshore development promotion	II.10.5 Open data promotion for organic ICT ecosystem
1. National economy: NE																					
	1.1 Economic efficiency	1	0	1	0	1	2	2	1	1	0	0	1	0	2	1	1	1	1	2	2
	1.2 Contribution to economic diversification	1	0	1	0	1	2	1	2	1	0	0	0	0	1	1	1	1	1	2	1
	1.3 Contribution to foreign exchange earnings	0	0	0	0	0	1	1	2	1	0	0	0	0	1	0	0	0	0	2	1
	1.4 Appropriate technology promotion	1	1	1	1	0	1	1	2	1	1	1	1	1	0	1	1	1	1	2	2
	Sub-total	3	1	3	1	2	6	5	7	4	1	1	2	1	4	3	3	3	3	8	6
2. Regional development: RD																					
	2.1 Improvement of income disparities	2	0	1	1	1	2	1	2	2	0	0	0	1	2	1	2	1	1	0	1
	2.2 Vitalization of local SMEs	2	0	2	1	1	1	1	2	1	0	0	0	1	1	1	1	1	1	1	1
	2.3 Community development	2	2	2	2	2	1	0	1	2	1	1	1	1	2	1	1	1	1	0	1
	2.4 Use of local/indigenous resources	2	1	1	1	1	1	0	2	1	0	1	1	0	1	1	1	0	0	0	0
	Sub-total	8	3	6	5	5	5	2	7	6	1	2	2	3	6	4	5	3	3	1	3
3. Social development: SD																					
	3.1 Employment generation	2	0	1	1	1	2	1	2	2	0	1	0	0	1	1	1	1	1	1	1
	3.2 Improvement of social services	2	2	2	2	1	2	0	2	2	2	2	2	2	2	1	2	2	1	0	1
	3.3 Effects on local culture	2	2	1	2	1	1	0	1	1	0	1	1	1	2	0	0	0	1	0	1
	3.4 Poverty alleviation	2	2	2	2	1	2	1	1	2	1	1	1	2	1	0	1	1	1	1	1
	Sub-total	8	6	6	7	4	7	2	6	7	3	5	4	5	6	2	4	4	4	2	4
4. Environmental quality: EQ																					
	4.1 Adaptability to natural conditions	2	2	2	2	1	1	0	2	1	1	1	1	0	0	1	0	0	0	0	0

	4.2 Land requirements and suitability	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	4.3 Water use and management	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
	4.4 Reduction of environmental vulnerability	2	1	2	2	1	1	0	2	2	1	1	1	1	1	0	0	0	1	1
	Sub-total	8	5	8	6	4	4	2	6	5	4	4	4	3	3	3	1	1	2	2
5. Institutions: IN																				
	5.1 Implementing arrangements	0	1	0	1	1	1	1	2	2	2	1	1	2	0	0	0	0	0	1
	5.2 Participation of local community and people	2	2	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	0
	5.3 Promotion of localization	2	2	2	2	1	1	0	1	1	1	0	0	0	2	0	1	1	1	0
	5.4 Local ownership and public acceptance	2	2	2	2	1	1	1	1	1	0	0	0	1	2	0	1	1	1	0
	Sub-total	6	7	6	7	5	4	3	5	5	4	2	2	4	6	1	3	3	3	1
	Total score	33	22	29	26	20	26	14	31	27	13	14	14	16	25	13	16	14	15	14

Source: JICA Project Team

Table 9.2.6 Step 1 Evaluation of Projects in Spatial Strengthening Initiative

Account	Criteria	III1. Ring artery establishment	III2. Inter-Aimag roads construction & upgrading	III3. Aimag special purpose roads development	III4. UB bypath rail link	III5. North-south corridor rail capacity development	III6. Ulaanbaatar road bypath and network development	III7. Urban redevelopment utilizing freight terminal land	III8. Suburban and local cities bypath development	III9. UB airport satellite city development	III10. Local air transport network development	III11. Regional and local cities development	III12. Orkhon River water diversion to Govi
1. National economy: NE													
	1.1 Economic efficiency	2	1	1	2	2	1	1	1	2	1	2	1
	1.2 Contribution to economic diversification	2	1	2	2	2	1	1	0	2	2	2	1
	1.3 Contribution to foreign exchange earnings	2	1	1	2	2	1	1	0	2	1	2	1
	1.4 Appropriate technology promotion	1	0	1	1	1	0	1	0	2	1	1	1
	Sub-total	7	3	5	7	7	3	4	1	8	4	7	4
2. Regional development: RD													
	2.1 Improvement of income disparities	2	2	2	0	1	0	0	1	1	2	2	2
	2.2 Vitalization of local SMEs	1	2	2	0	0	0	1	0	0	2	2	1
	2.3 Community development	1	1	2	1	1	0	1	0	1	1	1	1
	2.4 Use of local/indigenous resources	1	2	2	0	1	0	1	0	1	2	2	0
	Sub-total	5	7	8	1	3	0	3	1	3	7	7	4
3. Social development: SD													
	3.1 Employment generation	1	1	2	1	1	0	1	0	2	2	2	1
	3.2 Improvement of social services	1	2	2	0	1	1	0	1	2	1	2	1
	3.3 Effects on local culture	0	2	1	0	1	0	0	1	1	1	1	0
	3.4 Poverty alleviation	1	1	2	0	1	0	0	0	0	1	1	1
	Sub-total	3	6	7	1	4	1	1	2	5	5	6	3
4. Environmental quality: EQ													
	4.1 Adaptability to natural conditions	1	1	1	2	1	1	1	1	1	1	1	0
	4.2 Land requirements and suitability	1	1	1	1	1	1	2	1	1	1	1	1
	4.3 Water use and management	2	1	1	1	1	2	1	1	0	0	1	1
	4.4 Reduction of environmental vulnerability	1	2	2	1	1	1	1	2	1	1	2	2
	Sub-total	5	5	5	5	4	5	5	5	3	3	5	4
5. Institutions: IN													
	5.1 Implementing arrangements	2	2	1	2	2	2	1	1	2	1	1	1

5.2 Participation of local community and people	0	1	1	1	0	0	1	0	1	1	1	1
5.3 Promotion of localization	1	2	2	0	0	0	0	1	0	2	2	0
5.4 Local ownership and public acceptance	0	1	2	0	0	1	0	0	0	1	1	0
Sub-total	3	6	6	3	2	3	2	2	3	5	5	2
Total score	23	27	31	17	20	12	15	11	22	24	30	17

Source: JICA Project Team

Table 9.2.7 Step 1 Evaluation of Projects in Green Development Promotion Initiative

Account	Criteria	IV1. Land degradation prevention	IV2.1 Food loss reduction	IV2.2 Automobile recycling park	IV2.3 Solid wastes circulation utilizing cement plants	IV2.4 Eco-park establishment	IV3.1 Ger district development guidelines	IV3.2 Ger district sanitation improvement	IV4. Sanitary landfill site establishment	IV5.1 Longer life-span facilities establishment	IV5.2 Ensuring coherence of legal documents in urban development sector	IV6. Tuul water complex project	IV7.1 Urban centers water supply improvement	IV7.2 Rural water supply expansion	IV8.1 Wastewater treatment plants construction and renovation	IV8.2 UB central sewage treatment plant for industrial water of combined heat plants	IV8.2 Sewerage networks renovation and expansion	IV8.3 Small wastewater treatment plants in Soum centers	IV8.5 Innovative wastewater treatment plant for livestock farms	IV9. Selenge River hydropower dam development	IV10. Local energy system development
1. National economy: NE																					
	1.1 Economic efficiency	0	0	2	1	2	1	1	0	1	1	2	2	1	1	1	1	1	1	2	1
	1.2 Contribution to economic diversification	0	0	2	1	2	1	0	0	0	0	2	2	0	0	0	0	1	0	2	1
	1.3 Contribution to foreign exchange earnings	0	1	2	0	2	0	0	0	0	1	2	1	0	0	0	0	0	0	2	1
	1.4 Appropriate technology promotion	1	1	2	2	2	0	1	2	2	1	2	1	0	1	1	0	0	1	1	2
	Sub-total	1	2	8	4	8	2	2	2	3	3	8	6	1	2	2	1	2	2	7	5
2. Regional development: RD																					
	2.1 Improvement of income disparities	0	0	1	0	1	2	1	0	0	0	1	1	1	0	0	0	1	0	1	1
	2.2 Vitalization of local SMEs	0	0	2	1	2	1	1	0	1	1	1	1	1	1	0	0	2	1	1	1
	2.3 Community development	0	0	0	0	0	2	2	0	0	1	1	1	1	0	0	0	2	1	0	1
	2.4 Use of local/indigenous resources	1	1	2	2	2	1	1	1	0	0	2	2	1	0	1	0	2	1	2	2
	Sub-total	1	1	5	3	5	6	5	1	1	2	5	5	4	1	1	0	7	3	4	5
3. Social development: SD																					
	3.1 Employment generation	0	0	2	1	2	1	1	0	0	1	1	1	1	0	0	0	1	0	1	1
	3.2 Improvement of social services	0	0	0	0	0	2	2	1	1	1	1	2	1	1	1	1	2	1	2	1
	3.3 Effects on local culture	0	1	1	0	1	1	1	0	0	2	0	1	0	1	0	0	2	1	1	0
	3.4 Poverty alleviation	1	1	1	1	1	2	1	0	0	0	1	1	1	0	0	0	2	1	1	1
	Sub-total	1	2	4	2	4	6	5	1	1	4	3	5	3	2	1	1	7	3	5	3
4. Environmental quality: EQ																					
	4.1 Adaptability to natural conditions	2	1	1	1	1	2	2	1	1	1	1	1	0	1	2	1	1	2	1	1
	4.2 Land requirements and suitability	2	1	2	1	1	1	1	1	1	0	0	2	1	1	1	1	2	1	1	1

	4.3 Water use and management	1	1	1	1	1	1	1	1	1	0	2	1	1	1	2	2	1	2	1	1
	4.4 Reduction of environmental vulnerability	2	1	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	1
	Sub-total	7	4	6	4	5	6	6	5	4	3	5	6	3	4	7	5	6	7	5	4
5. Institutions: IN																					
	5.1 Implementing arrangements	1	0	2	0	1	1	1	1	1	1	2	2	1	1	1	1	0	2	0	
	5.2 Participation of local community and people	1	1	0	1	0	2	2	0	0	1	1	0	1	0	0	1	2	2	0	0
	5.3 Promotion of localization	0	0	0	0	0	1	1	0	0	0	1	0	1	1	0	1	2	1	0	1
	5.4 Local ownership and public acceptance	1	1	0	1	0	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1
	Sub-total	3	2	2	2	1	5	6	2	2	3	5	3	4	3	2	4	7	4	3	2
	Total score	1	1	2	1	2	2	2	1	1	1	2	2	1	1	1	2	1	2	1	1
		3	1	5	5	3	5	4	1	1	5	6	5	5	2	3	1	9	9	4	9

Source: JICA Project Team

(2) Evaluation of anchor projects at macro, meso and micro levels

Based on the evaluation by the five accounts, weighting may be given to different accounts to reflect varied emphasis at the macro, meso and micro levels. Weighting in Table 9.2.2 is applied for the four accounts except the IN account and the results are summarized in Table 9.2.8.

Table 9.2.8 Overall Evaluation of Anchor Projects at Macro, Meso and Micro Levels

	NE	RD	SD	EQ	IN	Macro	Meso	Micro
I1.1 Border areas FTZs and SEZs promotion	8	3	3	3	1	5	4	3.5
I2.1 Sea buckthorn industrial cluster development	7	8	5	7	6	6.8	7	6.4
I2.2 Livestock industrial cluster development	6	6	6	7	7	6.2	6.2	6.3
I3.2 Greenhouse agriculture promotion	7	4	2	6	4	5.2	4.6	4.1
I3.3 Agro IT Parks development	8	3	2	4	3	5	4	3.4
I4.2 ICT monitoring & support system for livestock	7	8	7	8	7	7.4	7.6	7.5
I5.3 Sea buckthorn development	4	8	4	7	7	5.4	6.2	5.7
I7.2 Food traceability platform	7	3	2	6	4	5	4.2	3.9
I9. Coal transport and export promotion	5	2	0	3	2	3	2.4	1.8
I10.4 "Urtuu" service stop areas	3	7	5	6	7	4.8	5.6	5.5
II1.1 Herder communities support facilities	3	8	8	8	6	6	7	7.5
II2.1 Local administrations-nomads communication strengthening	3	6	6	8	6	5.2	5.8	6.3
II3. Skills training and jobs creation for youth and adults	7	5	5	4	4	5.6	5.2	4.9
II4.4 Young women's career development and support program	6	5	7	4	4	5.6	5.4	5.6
II4.6 Comprehensive education sector reform program	7	7	6	6	5	6.6	6.6	6.3
II7.1 Primary health care	4	6	7	5	5	5.2	5.6	5.9

strengthening								
II8.1 Center of group dynamics	4	6	6	3	6	4.6	5	4.9
III1. Ring artery establishment	7	5	3	5	3	5.4	5	4.4
III2. Inter-Aimag roads construction & upgrading	3	7	6	5	6	4.8	5.6	5.6
III3. UB bypath rail link	7	1	1	4	3	4	2.8	2.5
III4. North-south corridor rail capacity development	7	3	4	4	2	5	4.2	4.1
III8. UB airport satellite city development	8	3	5	3	3	5.4	4.4	4.3
IV2.2 Automobile recycling park	8	5	4	6	2	6.2	5.6	5.2
IV2.4 Eco-park establishment	8	5	4	5	1	6	5.4	4.9
IV3.1 Ger district development guidelines	2	6	6	6	5	4.4	5.2	5.6
IV3.2 Ger district sanitation improvement	2	5	5	6	6	4	4.6	5
IV6. Tuul water complex project	8	5	3	5	5	5.8	5.2	4.5
IV7.1 Urban centers water supply improvement	6	5	5	6	3	5.6	5.4	5.4
IV8.4 Small wastewater treatment plants in Soum centers	2	7	7	6	7	4.8	5.8	6.2
IV12. Selenge River hydropower dam development	7	4	5	5	3	5.6	5	5

Source: JICA Project Team

In Table 9.2.8, the highest score is highlighted for each project to see at which level the project is most important or effective. Out of 30 anchor projects, 17 projects are significant at the macro level, eight projects at the meso level and nine projects at the micro level. Evaluation by the IN account representing local ownership of development and local initiative for development is treated separately, and 11 projects that are significant with the score 6 or 7 are highlighted in Table 9.2.8. These projects may be candidates for implementation at the local administration level, supported by the Central Government. These projects naturally have comparatively higher scores evaluated at the meso and/or the micro level.

9.3 Initial Environmental Examination of Anchor Projects

9.3.1 Scope, Objectives and Procedure of Initial Environmental Examination

Initial environmental examination (IEE) represents one of project-wise examination procedures of environmental effects conducted at an early stage of project development. Depth of the examination of any environmental aspects is not as deep as the case of environmental impact assessment (EIA), although its scope is not necessarily narrow. In fact, the objectives of IEE are to judge if EIA will be necessary at the next stage of project development, and if necessary to define the scope of the EIA for the project.

IEE consists commonly of two procedures: screening and scoping. Screening is to evaluate whether it is necessary to include the environmental consideration in a development project or not. Scoping is to identify the important environmental aspects and impacts that may be caused by the implementation of a development project. Scope of EIA including surveys necessary to evaluate impacts is also determined by scoping. IEE is conducted typically for development projects proposed in a master development plan.

9.3.2 IEE Application to the NCDP Anchor Projects

IEE is applied here to the anchor projects proposed by the NCDP within the context of the Mongolian environmental and social conditions, and the expected environmental and social impacts without mitigation measures are assessed based on similar projects in Mongolia or common practices widely observed globally. Evaluation of impact is made by a set of indices listed in Table 9.3.1.

Table 9.3.1 Evaluation Indices for Initial Environmental Examination for the NCDP Anchor Projects

Category	1.Permits and explanation	2.Pollution control	3.Natural environment	4.Social environment	5.Others
Aspects	1.1EIA and environmental permits 1.2Explanation to local stakeholders 1.3Examination of alternatives	2.1Air quality 2.2Water quality 2.3Wastes 2.4Soil contamination 2.5Noise and vibration 2.6Subsidence 2.7Odor 2.8Sediment	3.1Protected areas 3.2Ecosystem 3.3Hydrology 3.4Topography and geology 3.5Management of abandoned sites	4.1Resettlement 4.2Living and livelihood 4.3Heritage 4.4Landscape 4.5Ethnic minorities and indigenous peoples 4.6Working conditions	5.1Impact during construction 5.2Accident prevention measures 5.3Climate change impacts

Source: JICA Project Team

Each impact evaluation is supposed to give a singular result either positive or negative. However, in case of two distinct positive and negative impacts foreseen, two evaluation results with slash-mark “/” are given for one evaluation indicator as an exceptional case. Only in case of difficulties to assume the extent of impacts, either “A: significant” or “B: some extent”, the result shows “C: unknown.” The extent of the impacts will be clarified in the future project development stages.

Results of IEE for all the anchor projects of the NCDP are summarized in Table 9.3.2. In Table 9.3.2, results of evaluation by the five-account evaluation system presented in the previous section are also shown for reference. Each anchor project was evaluated by 29 indices listed above. For indices of “Permits and explanations”, evaluation is made for either R: required or NR: not required. For other indices in the other categories, evaluation is made into A: significant or B: some extent or C: unknown.

9.3.3 Recommendation for Next Stage

For those projects with environmental aspects evaluated either A: significant effects or C: effects unknown, reasoning for evaluation and recommendation for the next stage of project development have been clarified as summarized in Table 9.3.3.

Table 9.3.2 Results of Initial Environmental Examination Applied to the NCDP Anchor Projects

	N E	R D	S D	E Q	I N	Macro	Meso	Micro	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	4.4	4.5	4.6	5.1	5.2	5.3
I1.1 Border areas FTZs and SEZs promotion	8	3	3	3	1	5	4	3.5	R	R	R	B-	A-	A-	A-	B-	C-	B-	D	D	B-	D	D	D	A-	B-/A+	D	B-	D	B-	B-	D	D
I2.1 Sea buckthorn industrial cluster development	7	8	5	7	6	6.8	7	6.4	R	R	R	D	B-	B-	D	B-	D	D	D	D	B-	B+	D	B+	A-	B-/A+	D	C-	D	C-	B-	D	D
I2.2 Livestock industrial cluster development	6	6	6	7	7	6.2	6.2	6.3	R	R	R	B-	B-	B-	B-	B-	D	A-	D	D	A-	D	D	B+	A-	B-/A+	D	B-	D	C-	B-	D	D
I3.2 Greenhouse agriculture promotion	7	4	2	6	4	5.2	4.6	4.1	R	R	R	D	B-	B-	D	D	D	D	D	D	B-	D	D	B+	A-	B-/A+	D	A-	D	B+	B-	D	D
I3.3 Agro IT Parks development	8	3	2	4	3	5	4	3.4	R	R	R	D	B-	B-	D	D	D	D	D	D	B-	D	D	B+	A-	B-/A+	D	B-	D	D	B-	D	D
I4.2 ICT monitoring & support system for livestock	7	8	7	8	7	7.4	7.6	7.5	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	D	B+	D	D	D	D	D	D	B+
I5.3 Sea buckthorn development	4	8	4	7	7	5.4	6.2	5.7	R/ NR	R/ NR	R/ NR	B+	B+	D	D	D	D	D	D	D	B-/B+	B+	D	B+	B-	B+	D	B+	D	D	B-	D	D
I7.2 Food traceability platform	7	3	2	6	4	5	4.2	3.9	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	D	B+	D	D	D	D	D	D	D
I9. Coal transport and export promotion	5	2	0	3	2	3	2.4	1.8	R	R	R	A-	B-	B-	B-	A-	D	D	D	D	B-	D	D	B+	B-	B-/A+	D	D	D	B-	B-	B-	A-
I10.2 “Urtuu” service stop areas	3	7	5	6	7	4.8	5.6	5.5	NR	NR	NR	D	B-	B-	B-	B-	D	D	D	D	B-	D	D	D	B-	A+	D	B-	D	D	B-	D	D
II1.1 Herder communities support facilities	3	8	8	8	6	6	7	7.5	NR	NR	NR	D	B-	B-	D	D	D	D	D	D	D	D	D	D	B-	B+	D	D	D	D	B-	D	D
II2.1 Local administrations-nomads communication strengthening	3	6	6	8	6	5.2	5.8	6.3	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	D	B+	D	D	D	D	D	D	D
II3. Skills training and jobs creation for youth and adults	7	5	5	4	4	5.6	5.2	4.9	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	D	A+	D	D	D	D	D	D	D
II4.4 Young women’s career development and support program	6	5	7	4	4	5.6	5.4	5.6	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	D	A+	D	D	D	D	D	D	D
II4.6 Comprehensive education sector reform program	7	7	6	6	5	6.6	6.6	6.3	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	D	A+	D	D	D	D	D	D	D
II7.1 Primary health care strengthening	4	6	7	5	5	5.2	5.6	5.9	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	D	B+	D	D	D	D	D	D	D
II8.1 Center of group dynamics	4	6	6	3	6	4.6	5	4.9	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	D	B+	D	D	D	D	D	D	D
III1. Ring artery establishment	7	5	3	5	3	5.4	5	4.4	R	R	R	B-	B-	B-	D	B-	D	D	D	C-	C-	C-	B-	D	B-	A+	D	B-	D	B-	A-	B-	B-
III2. Inter-Aimag roads construction & upgrading	3	7	6	5	6	4.8	5.6	5.6	R	R	R	B-	B-	B-	D	B-	D	D	D	C-	C-	C-	B-	D	B-	A+	D	B-	D	B-	B-	B-	D
III3. UB bypath rail link	7	1	1	4	3	4	2.8	2.5	R	R	R	B+	D	B-	D	A+	D	D	D	B-	C-	B-	B-	D	B-	B+	D	B-	D	B-	B-	D	B+
III4. North-south corridor rail capacity development	7	3	4	4	2	5	4.2	4.1	R	R	R	B+	D	B-	D	A+	D	D	D	C-	C-	C-	B-	D	B-	B+	D	B-	D	B-	B-	D	A+

	N E	R D	S D	E Q	I N	Macro	Meso	Micro	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	4.4	4.5	4.6	5.1	5.2	5.3
III8. UB airport satellite city development	8	3	5	3	3	5.4	4.4	4.3	R	R	R	B-	B-	A-	B-	B-	C-	D	D	C-	C-	C-	C-	C+	A-	B-/A+	D	B-	D	D	A-	B-	D
IV2.2 Automobile recycling park	8	5	4	6	2	6.2	5.6	5.2	R	R	R	B-	C-	A+	A-	B-	D	B-	D	D	B-	D	D	B+	B-	A+	D	B-	D	B-	B-	D	B+
IV2.4 Eco-park establishment	8	5	4	5	1	6	5.4	4.9	R	R	R	A-	A-	A+	A-	A-	D	A-	D	D	B-	D	D	B+	B-	A+	D	B-	D	A-	B-	D	B+
IV3.1 Ger district development guidelines	2	6	6	6	5	4.4	5.2	5.6	NR	NR	NR	D	D	D	D	D	D	D	D	D	D	D	D	D	B-/A+	B-/A+	D	B+	D	D	D	D	D
IV3.2 Ger district sanitation improvement	2	5	5	6	6	4	4.6	5	R	R	R	D	A+	B+	B+	D	D	B+	D	D	D	D	D	B+	B-	A+	D	B+	D	D	B-	D	D
IV6. Tuul water complex project	8	5	3	5	5	5.8	5.2	4.5	R	R	R	D	C+	D	D	D	D	D	D	A-	C-	C-	D	D	B-	A+	D	B-	D	D	C-	B-	D
IV7.1 Urban centers water supply improvement	6	5	5	6	3	5.6	5.4	5.4	R	R	R	D	B+	D	D	D	D	D	D	D	D	D	D	D	B-	B+	D	D	D	D	B-	D	D
IV8.4 Small wastewater treatment plants in Soum centers	2	7	7	6	7	4.8	5.8	6.2	R	R	R	D	A+	B+	B+	D	D	B+	D	D	B-	D	D	B-	B-	B+	D	D	D	D	B-	D	D
IV12. Selenge River hydropower dam development	7	4	5	5	3	5.6	5	5	R	R	R	D	D	D	D	D	D	D	A-	A-	A-	A-	A-	D	A-	A+	D	A-/B+	D	D	A-	A-	A+

Note: A+/-: Significant positive/negative impact is expected., B+/-: Positive/negative impact is expected to some extent., C: Extent of impact is unknown. (A further examination is needed, and the impact could be clarified as the projects' future development), D: No impact is expected., R: Required by the applicable legislations, NR: Not required by the applicable legislations.

Source: JICA Environmental Checklists, JICA Project Team

Table 9.3.3 Explanation of Evaluation and Recommendation for Next Stage for Each Anchor Project with Environmental Aspects Evaluated Either A or C

Anchor Project with “A-” or “C-”	indicator: evaluation	Evaluation Remarks and Recommendation for Future Development Stages
11.1 Border areas FTZs and SEZs promotion	2.2: A-	Evaluation: Due to the scarcity of water resources along the southern border areas, groundwater as the only available water resource will be easily contaminated without strict pollution controls and resource management. Recommendation: Despite having tremendous economic opportunities to set up FTZs/SEZs along the border with neighboring countries, “Long-term sustainable” water resource management should be considered as the highest consideration in planning the FTZs and SEZs.
	2.3: A-	Evaluation: Toxic and non-toxic wastes as the biproducts of potential light and heavy industries are possible environmental threats unless smart resource management is practiced by potential industries in the FTZs and SEZs without high level waste treatment. Recommendation: Smart resource management among the potential tenant industries shall be planned to maximize the resource efficiency and minimize the waste treatment during FTZ/SEZ planning. In addition, a centralized waste treatment /recycling complex shall be planned to economically treat wastes from FTSs and SEZs.
	2.4: A-	Evaluation: Oil/chemical spill and improper resource/waste management will be the primary sources of the soil contamination, which will ultimately cause groundwater contamination. Recommendation: Proper resource management plans including wastes should be essential part of the FTZs/SEZs planning.
	2.6: C-	Evaluation: Due to the scarcity of water resources along the southern border areas, over exploitation of groundwater as the only available water resource may cause land subsidence without strict quota control and groundwater resource monitoring. Recommendation: As same as the water contamination prevention, “Long-term sustainable” water resource management should be considered as the highest consideration in planning the FTZs and SEZs.
	4.1: A-	Evaluation: In order to realize the scale economy of the FTZs and SEZs, significant land clearance, at least hundreds of hectares, would be required. Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided.
12.1 Sea buckthorn industrial cluster development	4.1: A-	Evaluation: In order to realize the scale economy of the industrial cluster, significant land clearance would be required. Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided. Also, in order to minimize the logistic costs of raw materials and access to the market, locations of the cluster should be carefully examined.
	4.4: C-	Evaluation: Traditional pasture landscape will be changed, but extent of accepting such changes is unknown. Recommendation: Traditionally important places such as places of worship, festivals, tourist destinations should be avoided. In order to ensure the acceptance of landscape changes, understanding and support from the existing land users should be ensured through series of meaningful consultations.
	4.6: C-	Evaluation: Transition of processing technologies from traditional to modern technologies may cause difficulties for labors to adapt, but the extent of such changes is unknown. Recommendation: In order to avoid significant number of accidents, good practices from other industrial sectors and foreign countries should be adapted along with applying modern processing technologies.
12.2 Livestock industrial cluster development	2.7: A-	Evaluation: Significant odor impacts are expected without proper management of excreta and biproducts of livestock processing. Recommendation: In order to avoid impacts, good practices from other industrial sectors and foreign countries should be adapted along with applying modern livestock industry practices and processing technologies.
	3.2: A-	Evaluation: Existing ecosystems will be altered or significantly affected. Recommendation: Sustainable land management plan should be carefully examined before preparing the cluster development and strictly followed.
	4.1: A-	Evaluation: In order to realize the scale economy of the livestock industrial cluster development, significant land clearance, at least hundreds of hectares, would be required. Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided.
	4.6: C-	Evaluation: Transition of processing technologies from traditional to modern technologies may cause difficulties for labors to adapt, but the extent of such changes is unknown. Recommendation: In order to avoid significant number of accidents, good practices from other industrial sectors and foreign countries should be adapted along with applying modern processing technologies.
13.2 Greenhou	4.1: A-	Evaluation: In order to realize the scale economy of the greenhouse agriculture, scattered but significant land acquisition would be required.

Anchor Project with "A-" or "C-"	indicator: evaluation	Evaluation Remarks and Recommendation for Future Development Stages
se agricultur e promotion		Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided.
	4.4: A-	Evaluation: Traditional pasture landscape will be significantly affected by greenhouses. Recommendation: Traditionally important places such as places of worship, festivals, tourist destinations should be avoided. In order to ensure the acceptance of landscape changes, understanding and support from the existing land users should be ensured through series of meaningful consultations.
13.3 Agro IT Parks development	4.1: A-	Evaluation: In order to realize the scale economy and system efficiency of the agro-IT parks, scattered but significant land acquisition would be required. Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided.
19. Coal transport and export promotion	2.1: A-	Evaluation: Increased coal dust will have significant adverse effects along the logistic systems and around handling yards without enforcement of strict dust control. Recommendation: Good practices from existing operators and foreign countries should be adapted along with strict enforcement of monitoring and regulations.
	2.5: A-	Evaluation: Increased frequency of coal transportation will worsen noise and vibration conditions along the logistic systems without proper countermeasures. Recommendation: Improvement/upgrade of the logistic systems should be well planned ahead of the promotion and such improvement/upgrade should be enforced along with the export promotion, which will also realize competitiveness of the Mongolian coal values.
	5.3: A-	Evaluation: Further promotion of coal led by low cost coal and export will discourage the transition to the renewable and sustainable energy and low carbon society development. Recommendation: Advanced zero-emission technologies and carbon recycling technologies such as ammonium fuel co-combustion and carbon capture and storage should also be encouraged to adapt along with coal promotion.
III1. Ring artery establishment	3.1: C-	Evaluation: Despite many alternative sections to plan ring artery routes, there would be difficulties to avoid protected area due to the large extent of the protected area. Extent of the impacts will be only unveiled after the selection of the artery routes. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.2: C-	Evaluation: Despite many alternative sections to plan ring artery routes, there would be difficulties to avoid high ecosystem value area, such as watershed and forests, due to the large extent of such area and financial feasibilities/limitations to avoid such large and high value area. Extent of the impacts will be unveiled only after the selection of the artery routes. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.3: C-	Evaluation: Despite many alternative sections to plan ring artery routes, there would be difficulties to avoid watershed due to the large extent of such area and financial feasibilities/limitations of the arteries development. Extent of the impacts will be unveiled only after the selection of the artery routes. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Watershed and essential aquifer recharge areas should be avoided in the further project planning stages.
	5.1: A-	Evaluation: Due to the length of the artery development, accumulative impacts would be significant. Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the project planning stages. Adaptation of advanced environmental management practices in Mongolia or international practices should be considered for planning as well as construction management.
III2. Inter-Aimag roads construction & upgrading	3.1: C-	Evaluation: As same as III1. Ring artery establishment Recommendation: As same as III1. Ring artery establishment
	3.2: C-	Evaluation: As same as III1. Ring artery establishment Recommendation: As same as III1. Ring artery establishment
	3.3: C-	Evaluation: As same as III1. Ring artery establishment Recommendation: As same as III1. Ring artery establishment
III3. UB bypath rail link	3.2 C-	Evaluation: Despite many possible sections to plan bypath rail links, there would be difficulties to avoid high ecosystem value area, such as watershed and forests, due to the safety design standards and large extent of such high value area. Extent of the impacts will be unveiled only after the selection of the rail link. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.

Anchor Project with "A-" or "C-"	indicator: evaluation	Evaluation Remarks and Recommendation for Future Development Stages
III4. North-south corridor rail capacity development	3.1: C-	Evaluation: There would be difficulties to avoid impacts on protected area due to the existing rail alignment. Extent of the impacts will be unveiled only after the means and scales of upgrading the existing rail tracks. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.2 C-	Evaluation: There would be difficulties to avoid high ecosystem value area, such as watershed and forests, due to the safety design standards and large extent of such high value area. Extent of the impacts will be unveiled only after the selection of the means of north-south capacity development. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.3: C-	Evaluation: There would be difficulties to avoid watershed due to the existing rail alignment. Extent of the impacts will be unveiled only after the means and scales of upgrading the existing rail tracks. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Watershed and essential aquifer recharge areas should be avoided in the further project planning stages.
III8. UB airport satellite city development	2.3: A-	Evaluation: Toxic and non-toxic wastes from potential light industries and household wastes will pose critical environmental threats without sustainable waste management. Recommendation: Smart resource management among the potential industries shall be planned to maximize the resource efficiency and minimize the waste management within the satellite cities. Also advanced household waste management practices from abroad shall be adapted to sustainably manage the waste and sustain the good environment and health conditions.
	2.6: C-	Evaluation: Due to the scarcity of water resources in general, over exploitation of the groundwater may cause land subsidence without strict quota control and groundwater resource monitoring, but the extent of the impacts is unknown at this stage. Recommendation: Long-term sustainable water resource management among existing water users should be considered as the highest consideration in planning the satellite city development.
	3.1: C-	Evaluation: There would be difficulties to avoid protected area due to the large extent of the protected area and access to the existing and/or new connection roads to UB center and other regional centers. Extent of the impacts will be unveiled only after defining the locations of the UB airport satellite cities. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.2: C-	Evaluation: There would be difficulties to avoid high ecosystem value area due to the scale of the satellite city development and access to the existing and/or new connection roads to UB center and other regional centers. Extent of the impacts will be unveiled only after defining the locations of the UB airport satellite cities. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.3: C-	Evaluation: Despite many possible locations to develop the satellite cities, there would be difficulties to avoid watershed due to the large extent of city development. Extent of the impacts will be unveiled only after the selection of the city development. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Watershed and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.4: C-	Evaluation: Despite many possible locations to develop the satellite cities, there would be difficulties to avoid cutting hills and filling lower lands. Extent of the impacts will be unveiled only after the selection of the city development. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Earth work (cut and fill) should be minimized to avoid high cost of development and maintain topographic stabilities. Also, watershed and essential aquifer recharge areas should be avoided in the further project planning stages.
	4.1: A-	Evaluation: Significant land clearance, at least hundreds of hectares, would be required. Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided.
	5.1: A-	Evaluation: Due to the large extent of land use change, accumulative impacts from construction activities would be significant. Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the project planning stages. Adaptation of advanced environmental management practices in Mongolia or international practices should be considered for planning as well as construction management.
IV2.2 Automobi	2.2: C-	Evaluation: Due to the high dependency on groundwater in urban areas, groundwater will be easily contaminated without strict pollution controls and resource management. Possibility of groundwater

Anchor Project with "A-" or "C-"	indicator: evaluation	Evaluation Remarks and Recommendation for Future Development Stages
le recycling park		contamination depends on the location of the recycling parks and extent of the impacts is unknown without actual project plan. Recommendation: Despite essential needs for sustainable resource management in Mongolia, selection of the park location must be carefully examined and avoid any contamination of water resources by strict control of pollutants, such as fuel, oil, and chemical spills. Before planning a specific park location, "Watershed based water resource management master plans" and "Land development master plans" should be prepared and strategic location for the recycling parks and eco-park should be planned. In order to ensure the enforcement of the pollution control, proper monitoring and reporting systems should be also planned and enforced.
	2.4: A-	Evaluation: Fuel, oil and chemical spill and improper waste disposal will be the primary sources of the soil contamination, which could ultimately cause groundwater contamination without proper management. Recommendation: Adaptation of advanced recycling technologies and environmental management practices in Mongolia or international practices should be considered for the park planning and operation as well as enforcement of proper monitoring and reporting systems.
IV2.4 Eco-park establishment	2.1: A-	Evaluation: Significant air quality impacts are expected without strict enforcement of waste process management, such as uncontrolled burning. Recommendation: Advanced practices from existing operators and foreign countries should be adapted along with strict enforcement of monitoring and regulations.
	2.2: A-	Evaluation: Due to the high dependency on groundwater in urban areas, groundwater will be easily contaminated without strict pollution controls. Recommendation: Despite essential needs for sustainable resource management in Mongolia, selection of the eco-park location must be carefully examined and avoid any contamination of water resources by strict control of pollutants, such as fuel, oil, and chemical spills. Before planning a specific park location, "Watershed based water resource management master plans" and "Land development master plans" should be prepared and strategic placement for the eco-park should be planned. In order to ensure the enforcement of the pollution control, proper monitoring and reporting systems should be also planned and enforced.
	2.4: A-	Evaluation: Fuel, oil and chemical spill and improper waste disposal will be the primary sources of the soil contamination, and such contamination could ultimately cause groundwater contamination. Recommendation: Adaptation of advanced recycling technologies and environmental management practices in Mongolia or international practices should be considered for the park planning and operation as well as enforcement of proper monitoring and reporting systems.
	2.5: A-	Evaluation: Uncontrolled processing will cause significant noise and vibration impacts in and around the eco-park. Recommendation: Adaptation of advanced recycling technologies and environmental management practices in Mongolia or international practices should be considered for the park planning and operation as well as enforcement of proper monitoring and reporting systems.
	2.7: A-	Evaluation: Significant odor impacts are expected without proper management of wastes and processing. Recommendation: In order to avoid significant impacts, advanced practices from other industrial sectors and foreign countries should be adapted along with applying modern processing technologies. In addition, strategic placement of eco-parks should be considered to avoid potential conflicts with other land use such as residential area development in the future.
	4.6: A-	Evaluation: Transition of processing technologies from traditional to modern technologies may cause difficulties for labors to adapt, which may cause serious accidents without proper safeguard measures and training. Recommendation: In order to avoid serious accidents, advanced practices from other industrial sectors and foreign countries with continuous vocational trainings should be adapted along with applying modern processing technologies.
IV6. Tuul water complex project	3.1: A-	Evaluation: Despite many flexibilities to develop the Tuul water complex, there would be difficulties to avoid protected area because the certain distance along the surface water body is set as strictly projected area as per the law on state protected area and law on water. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.2: C-	Evaluation: Despite many alternatives to develop the Tuul water complex, there would be difficulties to avoid high ecological value area along the Tuul watershed area due to the natural phenomena of Mongolian eco-systems. Extent of the impacts will be unveiled only after the selection of complex location and facilities. Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the further project planning stages.
	3.3: C-	Evaluation: Despite many alternatives to plan the Tuul water complex, there would be difficulties to avoid watershed impacts/changes. Extent of the impacts will be unveiled only after the selection of complex location and facilities.

Anchor Project with "A-" or "C-"	indicator: evaluation	Evaluation Remarks and Recommendation for Future Development Stages
		Recommendation: Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Watershed and essential aquifer recharge areas should be avoided, or at least size of the essential area should be maintained in the further project planning stages.
	5.1: C-	Evaluation: Depending on the scale of the complex development, the impacts of the construction could be significant. Extent of the impacts will be unveiled only after the selection of complex location and facilities. Recommendation: Land with high ecosystem values, protected areas, and essential aquifer recharge areas should be avoided in the project planning stages. Adaptation of advanced environmental management practices in Mongolia or international practices should be considered for planning as well as construction management.
IV12. Selenge River hydropower dam development	2.8: A-	Evaluation: Sedimentation behind dam and some sections of the Selenge River would occur due to the storage and change of river flow. Recommendation: Not only lifetime sedimentation management plan but also comprehensive impact assessment for both ecosystem and existing beneficiaries should be conducted and mitigated for the dam development plan.
	3.1: A-	Evaluation: As per the applicable laws, certain area along the surface water body is set as strictly protected areas, and dam development project will significantly impact on such protected area. Recommendation: Comprehensive impact assessment for both ecosystem as well as existing beneficiaries should be conducted and adverse impacts should be mitigated for the dam development plan. Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages.
	3.2: A-	Evaluation: There would be difficulties to avoid high ecosystem value area along watershed and forests, and dam development project will have significantly impact on such protected area. Recommendation: Comprehensive impact assessment for both ecosystem and existing beneficiaries should be conducted and adverse effects should be mitigated for the dam development plan. Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages.
	3.3: A-	Evaluation: There would be difficulties to avoid hydrological impacts/changes due to the significant water flow changes by the dam. Recommendation: Comprehensive impact assessment for both ecosystem as well as existing beneficiaries should be conducted and mitigated for the dam development plan. Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages.
	3.4: A-	Evaluation: Topography behind the dam will be completely altered. Recommendation: Comprehensive impact assessment for both upstream and downstream bank stability should be conducted and applied for the dam development plan. Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages.
	4.1: A-	Evaluation: Significant area will be altered permanently as well as temporary effects during construction. Recommendation: Comprehensive impact assessment for both ecosystem as well as existing beneficiaries should be conducted and mitigated for the dam development plan. Three step principles namely, 1) avoidance, 2) minimization, and 3) mitigation, should be strictly applied for initial planning stages. Consensus building among stakeholders shall be considered as one of the most important steps during concept planning and project design.
	4.4: A-/B+	Evaluation: Traditional pasture and watershed landscape will be significantly changed. However, it could be a new tourist destination to enjoy opportunities that the dam lake would offer. Recommendation: Traditionally important places such as places of worship, festivals, tourist destinations should be avoided if it is possible. In order to ensure the acceptance of landscape changes, understanding and support from the existing land and river users should be ensured through series of meaningful consultations.
	5.1: A-	Evaluation: Due to the scale of the dam construction, accumulative impacts would be significant. Recommendation: As long as possible, land with high ecosystem values, protected areas should be avoided at least for temporary construction usages in the project planning stages. Adaptation of advanced environmental management practices in Mongolia or international practices should be considered for planning as well as construction management.
	5.2: A-	Evaluation: Fatal accidents could happen due to the unconventional scale of construction without proper construction planning and implementation and labor safety equipment and continuous safety trainings. Recommendation: Adaptation of advanced safety management practices in Mongolia or international practices should be adapted for planning as well as construction management.

Chapter 10 Project Profiles by Development Initiative

Development programs and projects of the national comprehensive development plan (NCDP) were presented by grouping them into four development initiatives in Chapter 8. Profiles of all the proposed projects and programs are presented in this chapter by development initiative.

10.1 Economic and Export Diversification Initiative

Project No. II.1

Title	Border areas free trade zones (FTZs) and special economic zones (SEZs) promotion*
Location	Altanbulag FTZ (Selenge Aimag), Zamyn-Uud FTZ (Dornogovi Aimag), and Tsagaannuur FTZ (Bayan-Ulgii Aimag)
Implementing agencies	Free Zone Administration Office under Deputy Prime Minister, Ministry of Construction and Urban Development (MCUD), National Development Agency (NDA), Mongolian National Chamber of Commerce and Industry (MNCCI), Private developers through public-private partnership (PPP) scheme
Objectives	<ol style="list-style-type: none"> 1) To create poles for industry, trade/commerce and services through attracting foreign and domestic investment 2) To contribute to establishment of economic corridor connecting Mongolia, China and Russia and gateways to the world 3) To create employment and business opportunities 4) To enhance competitiveness and technological improvement of industries 5) To accelerate development of Western Mongolia (Tsagaannuur FTZ)
Expected effects	<ol style="list-style-type: none"> 1) Expansion of the national and local economy along the border area through linkages between foreign direct investment (FDI) and locally based manufacturers, small and medium-sized enterprises (SMEs), logistics, information and communication (ICT) and service industries. 2) Realization of diversified and balanced economic structure in the whole Country
Project costs	<ol style="list-style-type: none"> 1) Altanbulag FTZ: Total development cost is estimated at US\$ 51.6 million in 2003 master plan. US\$10.6 million was already invested by the government. 2) Zamyn-Uud FTZ: Additional US\$30 million (US\$58.8 million, of which US\$50 million was soft loan from China, has already been invested especially for development of infrastructure.) 3) Tsagaannuur FTZ: US\$0.6 million was already invested by the government. US\$2.3 million will be additionally needed as development costs for buildings and paved road according to the Tsagaannuur FTZ office.
Implementation schedule	<p>Legal and institutional arrangement: 2021-22</p> <p>Phased implementation of the program: 2022-30</p> <p>Full scale operation of the program: 2030~</p>
Project description	<ol style="list-style-type: none"> 1) Background In 2002 the Law of FTZs was passed and initiated the first provisions for the establishment of FTZs. However, these FTZs are still under achievement and do not attract private investors much. According to interviews with private investors, this is mainly due to (i) inconsistency of the government policy for FTZ development, (ii) incompleteness of infrastructure due to the lack of fund, (iii) less effective management of the FTZs administration office, (iv) incomplete Laws of FTZs and (v) incomplete development plans. 2) Project components Revision and upgrading of the current development plans

	<p>Development and completion of infrastructure (road, electricity, water supply, industrial waste treatment, and ICT) within the FTZs and surrounding area</p> <p>Preparation of detailed rules/regulations on FTZ development</p> <p>Formulation of effective investor information package and website, implementation of investment promotion seminars and dispatching a mission</p> <p>Strengthening of coordination and the joint development with (i) China (Zamyn-Uud FTZ and Erenhot SEZ), (ii) Russia (Altanbulag FTZ), and (iii) Russia and Kazakhstan (Tsagaannuur FTZ)</p> <p>Strengthening of coordination with FTZs development and the cross-border point development</p> <p>3) Implementing arrangements</p> <p>Introduction of private developer/operator or PPP scheme for effective management and implementation will be needed.</p> <p>The close coordination among the Mongolian ministries, foreign governments (China, Russia, and Kazakhstan), donor agencies, and private sector is important.</p>
Environment and social impact	Negative environment impact will be reduced by the installation of wastewater treatment facilities and the appropriate handling of industrial waste in the zones.
Remarks	In the project list of Long-term Development Policy (LDTP) 2050, the support of SEZ development at Zamyn-Uud, Khushgiin khundii (New Ulaanbaatar International Airport (NUBIA)), Altanbulag and Tsagaannuur is designated as the Project No. 170 and the list of PPP from 7.9 to 7.17. The project is scheduled to be completed in the period 2020-2030. The project costs are not shown in the list.

Project No. 11.2

Title	Ulaanbaatar new airport-side SEZ development
Location	The new free economic zone (FEZ)/SEZ near the NUBIA, Khushgiin khundii, Tuv Aimag and Ulaanbaatar City
Implementing agencies	Ulaanbaatar Development Corporation (UBDC), Ulaanbaatar City, MCUD, NDA, Deputy Prime Minister's office, MNCCI, Private developers through PPP scheme, etc.
Objectives	<ol style="list-style-type: none"> 1) To serve as a catalyst for economic diversification and export-led growth; and 2) To contribute to an increase of employment opportunities.
Expected effects	This project will exploit international competitiveness of Mongolian enterprises, support the export of domestically produced goods and services, pave the way for economic diversification and create jobs.
Project costs	US\$5million (only consulting service for initial stage) Total development costs are not available.
Implementation schedule	<p>Legal and institutional arrangement: 2021-22</p> <p>Phased implementation of the program: 2022-30</p> <p>Full scale operation of the program: 2030~</p>
Project description	<ol style="list-style-type: none"> 1) Background <p>The new airport 50 km south of the center of Ulaanbaatar will start its operation in 2020. It is expected that more tourists and investments are coming from foreign countries into Mongolia, thanks to this airport. The new airport will be a hub of logistics, which will enable convenient, quick and inexpensive transports from Mongolia to other countries, and vice versa. In this context, the new FTZ/SEZ near the airport should be developed to maximize the opportunities discussed above together with acquisition of new technologies and know-how. According to the land use plan of the Aero City master plan with the total area of 12,000 ha, conducted by MCUD and Ulaanbaatar City and approved in January 2019, the area size of the new FTZ/SEZ amounts to 440 ha.</p> 2) Project components <ol style="list-style-type: none"> a) Formulation of development plans for FEZ/SEZ according to the Aero City Master Plan (M/P) b) Development and completion of infrastructure (road, electricity, water supply, industrial waste treatment, and ICT) within the FEZ/SEZ and surrounding area according to the Aero City M/P

	<p>c) Laws and regulations for investors in the FEZ/SEZ to be enacted to ensure the best conditions and business environment for potential investors.</p> <p>d) Formulation of effective investor information package and website, implementation of investment promotion seminars and dispatching a mission</p> <p>e) FEZ/SEZ to be designed in the accordance with the development of the Aero City as a whole including amenities such as sports facilities, education institutes, hospitals, and so on.</p> <p>f) A trouble-shooting committee for investors to be established in cooperation with the Ministries, MNCCI, and Mongolian Employers' Federation, etc.</p> <p>3) Implementing arrangements</p> <p>The coordination among Ulaanbaatar Development Corporation (UBDC), Ulaanbaatar City, Deputy Prime Minister's office, MCUD, other ministries, MNCCI and private sector will be indispensable.</p>
Environment and social impact	<p>1) Significantly positive social impact</p> <p>2) Mongolia will see potentials to achieve higher GDP per capita due to new era of industrialization.</p>
Remarks	<p>In the project list of LNDP2050, the support of SEZ development at Khushgiin khundii (NUBIA), is designated as the Project No. 170 and the list of PPP from 7.11 to 7.12 with other existing three FTZs. The project is scheduled to be completed in the period 2020-2030. The project costs are not shown in the list.</p> <p>Ulaanbaatar Free Economic Zone International Forum by UBDC was scheduled to be held on March 3, 2020, but it was postponed.</p>

Project No. I2.1

Title	Industrial clusters support program*
Location	See project description
Implementing agencies	NDA, Ministry of Food, Agriculture and Light Industry (MOFALI), Aimag governments, cooperatives, business associations including MNCCI, Mongolian National Association of Fruits and Berries, Mongolian Wool and Cashmere Association, Mongolian Beekeeper Association, non-governmental organizations (NGOs), private entities, universities/research institutes and so on
Objectives	<p>1) To increase the supply of raw materials and semi-processed goods from the rural areas;</p> <p>2) To upgrade the quality of processing activities;</p> <p>3) To improve the access to foreign markets; and</p> <p>4) To formulate groups of competing, collaborating and interdependent businesses within a value chain of clusters.</p>
Expected effects	<p>1) Development paradigm will be changed from 20th century development model characterized by resource-intensive and economic efficiency-oriented development to alternative socio-economy model characterized by social and environmental considerations, largest employment opportunities and introduction of appropriate technology.</p> <p>2) Poverty will be alleviated.</p>
Project costs	See project description
Implementation schedule	Phased or product by product implementation of the program: 2021-30 Full scale operation of the program: 2030~
Project description	<p>1) Background</p> <p>As discussed in the SDV2030, it is an important issue to introduce advanced production methods, technology and innovations, and increase productivity through organizing export-oriented processing industry clusters including processing of agriculture and livestock products. Such industrial clusters help to link livelihood activities by the poor, through indigenous industries to export industries, thus contributing to poverty alleviation and social stability as well.</p> <p>Sea buckthorn (sea berry)</p>

	<p>Mongolian Government has a plan to increase the production area from 6,000 ha to 10,000 ha in 2022. On the other hand, producers/farmers and processors are small and face poor supply chain. Ongoing support by the Trade related assistance for Mongolia (TRAM) of European Union (EU) should be much expanded.</p> <p>Meat products of sheep, goats and others Slaughterhouses are important function for establishment of supply chain as well as primary processing units. Ongoing support by Asian Development Bank (ADB) should be much expanded and made more comprehensive covering all the possibilities of processing.</p> <p>Wool and cashmere product About 80 companies, mainly SMEs, are involved in processing of wool and cashmere products comprising the steps such as primary processing (sorting and classifying), washing, carding, spinning and manufacturing. Some projects by donor agencies are already initiated to formulate an industrial cluster.</p> <p>Honey products The quality of honey produced in Mongolia is gradually improved through supports of ADB and Japan Association for International Collaboration of Agriculture and Forestry (JAICAF), but honey products are not exported yet.</p> <p>2) Project components Industrial clusters mainly based on agriculture and livestock with promotion measures including organization of herders/farmers, research for product development, market development for exports, and livelihood support for the poor will be developed. The selected clusters and promising locations are shown below. Processing sea buckthorn (sea berry) for juice, health products, cosmetics, etc. The project supports processing technology including powderization and non-heated oil, storage, marketing and so on. Promising locations: Uvs, Uvurkhangai, Bulgan, Selenge, Tuv, Ulaanbaatar, and Zavkhan Project costs: US\$ 3 to 10 million</p> <p>Production of meat products of sheep, goats and others, halal food, pet food; utilization of placenta, natural casing of sheep and other internals; The project upgrades the quality of meat processing activities initially. Promising location: Selenge, Ulaanbaatar and the surrounding Aimags; Aimags in Eastern Region such as Dornod and those in Western Region Project costs: US\$ 5 million for slaughterhouse and primary processing unit</p> <p>Production of wool and cashmere products; The project promotes a formulation of industrial clusters especially for SMEs having specific function/sub-system in the value chain respectively. Promising location: Ulaanbaatar and the surrounding Aimags</p> <p>Production of honey for natural honey, propolis, royal jelly for health products The project will improve the quality of the honey products and expand access to the foreign market. Promising location: Selenge, Darkhan-Uul, Khentii, Dornod, Bulgan, and Tuv</p> <p>3) Implementing arrangements Support for products and markets diversification with implementing agencies and stakeholders through organization of small producers Japan International Cooperation Agency (JICA)'s data collection survey (preparatory survey) for master plan project for the development of agricultural value-added chain was completed in February 2019.</p>
Environment and social impact	Positive environmental effects due to more efficient and full utilization of primary products as raw materials for processing
Remarks	<p>The linkage of the ongoing master plan project for the development of agricultural value-added chain by JICA should be taken into consideration.</p> <p>ADB completed TA for “Fostering Value-Added Activities in Western Mongolia” covering agribusiness, livestock and capacity building in 2019 and the Mongolian government requested ADB to implement a similar project in Eastern Mongolia.</p> <p>World Bank conducted Mongolia Central Economic Corridor Assessment; A Value Chain Analysis of the Cashmere-Wool, Meat, and Leather Industries in 2017</p> <p>TRAM was launched by EU in 2018 to enhance Mongolia’s international trade and economic diversification.</p>

Project No. I2.2

Title	Livestock industrial cluster development*																						
Location	Selenge, UB, Dornod, Bayankhongor, Khovd																						
Implementing agencies	NDA, MOFALI, Aimag governments, cooperatives, business associations including MNCCI, Mongolian Wool and Cashmere Association, Mongolian Beekeeper Association, non-governmental organizations (NGOs), private entities, universities/research institutes and so on																						
Objectives	<ol style="list-style-type: none"> 1) To increase the supply of livestock products from rural areas and diversify value-added processed products; 2) To upgrade the quality of processing activities; 3) To improve the access to foreign markets for value-added livestock products; and 4) To formulate groups of competing, collaborating and interdependent businesses within a value chain of clusters. 																						
Expected effects	<ol style="list-style-type: none"> 1) Establishment of fame in international markets for high-quality livestock products 2) Increased income of all involved in the value chain 																						
Project costs	Stage 1: US\$ 2 million for implementing arrangements and planning Stage 2: US\$ million 3 million for slaughterhouse and primary processing unit Stage 3: US\$ 50 million for complete core facilities																						
Implementation schedule	Stage 1: 2021~22; Stage 2: 2023~24; Stage 3: 2025~																						
Project description	<p>The livestock industrial cluster encompasses the following activities.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Primary production</th> <th style="width: 25%;">Primary processing</th> <th style="width: 30%;">Secondary and value-added processing</th> <th style="width: 30%;">Main markets</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Livestock rearing</td> <td>Meat</td> <td>Processed meat products</td> <td>Domestic</td> </tr> <tr> <td>Milk</td> <td>Various dairy products, Omega7</td> <td>Domestic, Export</td> </tr> <tr> <td>Hides and skins</td> <td>Leather products, clothing etc.</td> <td>Domestic, Export</td> </tr> <tr> <td>Placenta</td> <td>Medicines, cosmetics, health products</td> <td>Export</td> </tr> <tr> <td>Intestines, blood & bones</td> <td>Animal feed, sausage casing etc.</td> <td>Domestic</td> </tr> </tbody> </table> <p>Grazing areas, local towns for primary processing, regional cities for value-added processing, domestic consumption areas and export bases should be linked by effective transport and communications system (Figure 1). E-transaction systems should be established at key locations for various livestock products in steps starting with cashmere wool.</p> <pre> graph LR GL[Grazing land] --> LCP[Local city for primary processing] GL --> RCP[Regional city for value-added processing] LCP --> ET[e-transaction] RCP --> ET ET --> DCA[Domestic consumption area] ET --> EB[Export base] </pre> <p>Figure 1 Livestock Cluster with E-transaction System Linked by Transport and Communication System</p> <p>As the central facilities of the livestock cluster, livestock complex facilities may be established at selected locations in or near livestock areas consisting of the following: Warehouse including cold storage to store raw materials of livestock, Slaughter houses for animals satisfying sanitation and other essential conditions, Processing plants for various livestock products, Marketing facilities for local marketing and shipping, Inspection and testing facilities to ensure quality of primary and processed products, Research facilities for new products development and product quality improvement, and Management office with ancillary facilities for staff. The livestock industrial cluster is to be established in stages as follows. Stage 1:</p>			Primary production	Primary processing	Secondary and value-added processing	Main markets	Livestock rearing	Meat	Processed meat products	Domestic	Milk	Various dairy products, Omega7	Domestic, Export	Hides and skins	Leather products, clothing etc.	Domestic, Export	Placenta	Medicines, cosmetics, health products	Export	Intestines, blood & bones	Animal feed, sausage casing etc.	Domestic
Primary production	Primary processing	Secondary and value-added processing	Main markets																				
Livestock rearing	Meat	Processed meat products	Domestic																				
	Milk	Various dairy products, Omega7	Domestic, Export																				
	Hides and skins	Leather products, clothing etc.	Domestic, Export																				
	Placenta	Medicines, cosmetics, health products	Export																				
	Intestines, blood & bones	Animal feed, sausage casing etc.	Domestic																				

	<p>1) Organizing/strengthening of association for livestock farmers and related associations,</p> <p>2) Planning for the entire cluster development in stages and necessary infrastructure,</p> <p>Stage 2:</p> <p>1) Design of components for the first stage with specific contents of raw materials and products,</p> <p>2) Establishment of management organization for the initial cluster development,</p> <p>3) Training of staff in key positions of the management organization,</p> <p>Stage 3:</p> <p>1) Establishment of initial components of the complex facilities together with improvement of necessary infrastructure,</p> <p>2) Research for product development and market development.</p> <p>The Central Government may take the initiative for Stage 1 mustering related associations and private firms as well as livestock farmers, local governments and the private sector will be the main players for Stage 2 supported by the Central Government for training, and Stage 3 will be implemented by the private sector supported by infrastructure improvement by the Central Government and research by research institutes.</p>
Environment and social impact	Positive environmental effects due to more efficient and full utilization of primary products as raw materials for processing
Remarks	<p>The linkage of the ongoing master plan project for the development of agricultural value-added chain by JICA should be taken into consideration.</p> <p>ADB completed TA for “Fostering Value-Added Activities in Western Mongolia” covering agribusiness, livestock and capacity building in 2019 and the Mongolian government requested ADB to implement a similar project in Eastern Mongolia.</p> <p>World Bank conducted Mongolia Central Economic Corridor Assessment; A Value Chain Analysis of the Cashmere-Wool, Meat, and Leather Industries in 2017</p> <p>TRAM was launched by EU in 2018 to enhance Mongolia’s international trade and economic diversification.</p>

Project No. I3.1

Title	Smart agriculture promotion
Location	Arkhangai, Bulgan, Darkhan-Uul, Khentii, Selenge, Tuv, and Uvurkhangai
Implementing agencies	MOFALI Private sector
Objectives	To identify appropriate technologies to make harvest stable and reduce labor input
Expected effects	<p>1) Production of wheat, potatoes, and vegetables to fully meet the demand</p> <p>2) Improved work environment for producers</p>
Project costs	MNT 2,275 million + soft component
Implementation schedule	2021-30
Project description	<p>1) Background</p> <p>Sustainable Development Vision 2030 (SDV 2030) mentions that 100% self-sufficiency of wheat, potatoes, and vegetables will be achieved by 2030. Currently, production of wheat and potatoes almost meet their demand. Contrary, self-sufficiency rate for vegetables in 2018 is 43%. It is expected that the population in Mongolia will reach 3.8 million in 2030 and 4.5 million in 2040, and therefore, production needs to be increased to meet the demand. One of the issues for agricultural production is unstable supply. Annual variation of productivity was too much and there is a large yield variation between Aimags. In order to promote the production, productivity should be maintained at high level and yield gaps between Aimags should be reduced by support measures. Another issue is that number of people who are engaged in agriculture shows decreasing trend, although total labor population has been increasing year by year. The way to figure out these constraints needs to be examined for smart agriculture.</p> <p>2) Project components</p>

	<p>a) Installation of ICT application: the project will install 24/7 full operation meteorological sensor and soil sensor at the field level. All the collected information together with weather forecast and cultivation record in the past year will be uploaded in the cloud system. Then, the system will provide the necessary information such as planting and harvesting time, fertilizer and chemical application, and irrigation requirement, prevention measures from climatic damage, and so on. This allows producers to optimize the input and maximize the production with low cost and low input.</p> <p>b) Utilization of unmanned vehicles: the drone fulfills the tasks including sowing and fertilizer application. Moreover, the drone equipped with sensing devices can quickly and precisely monitor growth conditions and make pinpoint application based on the information collected. Unmanned machineries such as tractor and harvester using satellite positioning technology can work all day and all night, and allow producers to expand the area to be cultivated with less labor input.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of the fields where the system will be installed and deciding the size of operation, providing professional and methodological advices, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with concerned organization for administering and managing the project activities, including production of value-added products, installation and maintenance of the system, and providing professional methodology and capital investment required.</p>
Environment and social impact	The target field to be used is currently under cultivation and basically no negative impact is assumed. On the installation of the system, positive environment impacts will be expected by reducing the amount of input. If any environmentally and socially negative impacts are observed, countermeasures should be identified.
Remarks	

Project No. I3.2

Title	Greenhouse agriculture promotion*		
Location	Darkhan-Uul, Khovd, Selenge, Tuv, and Ulaanbaatar city		
Implementing agencies	MOFALI Mongolian Association of Greenhouse Growers, Private sector		
Objectives	To identify appropriate technologies to make harvest of vegetables in winter season and reduce production cost		
Expected effects	1) Production of vegetables fully meets the demand 2) The production cost of vegetables is reduced		
Implementation schedule	Phase 1: 2021-2022	Phase2: 2023-2026	Phase 3: 2027-2030
Project costs	MNT 3,375 million	MNT 3,600 million	MNT 3,600 million
Equipment/Expert	Equipment: ICT application Heat exchange system	Experts: ICT application Production	Experts: Extension Marketing
Project description	<p>1) Background</p> <p>SDV 2030 mentions that 100% self-sufficiency of wheat, potatoes, and vegetables will be achieved by 2030. Self-sufficiency rate for vegetables has gradually decreased and it is 43% in 2018. It is expected that the population in Mongolia will reach 3.8 million in 2030 and 4.5 million in 2040, and therefore, production needs to be increased to meet the demand. In Mongolia, cultivatable period is limited due to climate conditions in the winter. One of the options is to construct greenhouse which allow us to cultivate vegetables in the winter. However, cultivation area and production under greenhouse in 2017 was still less than 1% of total area and production. As production per unit area of greenhouses is higher in winter season than in summer season, greenhouse cultivation should place more emphasis on winter, but major constraints for expansion is fuel costs. It is said that fuel costs comprise up to 40% of the production cost by greenhouses. Therefore, greenhouse technology with low-cost production system is required. Another issue is that number of people who are engaged in agriculture shows decreasing trend, although total labor population has been</p>		

	<p>increasing year-on-year.</p> <p>2) Project components</p> <p>Installation of environmental control system: the project will install 24/7 full operation environmental control system in a greenhouse. The system collects the required information and makes all the information visible. Through the environmental monitoring, the system autonomously decides whether temperature and humidity should be increased or decreased, and irrigation applied or not to maintain the optimal environment for vegetables in the greenhouse. Timer-control is also available based on the designed schedule.</p> <p>Utilization of geothermal heat exchange system: in the system, geothermal heat absorbed by evaporator converts refrigerant to low-temperature and low-pressure gas. It will be transformed into high-temperature and high-pressure gas by compressor. The gas heats the water through condenser. Geothermal heat, one of natural energies, is stable for use throughout the year and this stable temperature can be utilized for geothermal heat exchange system.</p> <p>Education for younger generation: the environmental control system is composed of modern technologies, and greenhouse with such a system may attract the interest of younger generation. A small model of greenhouse will be used to learn greenhouse horticulture and training course will be established including classroom lecture and on-farm training.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of the fields where the system will be installed and deciding the size of operation, providing professional and methodological advices, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with concerned organization for administering and managing the project activities, including production of value-added products, installation and maintenance of the system, and providing professional methodology and capital investment required.</p> <p><u>Implementing structure</u></p> <p>The proposed implementing structure is as shown below.</p> <pre> graph TD SC[Steering Committee • Head, MOFALI (Chair) • Head, NDA • Head, MOF] --- PCO[Project Coordination Office Project Director] PCO --- MOFALI_PC[MOFALI • Funding • Selection of location • Selection of techniques] PCO --- GA_PC[Greenhouse Association • Provision of necessary information] MOFALI_PC -.-> Collaboration GA_PC PCO --- PIU[Project Implementation Unit] PIU --- MOFALI_PIU[MOFALI • Supervision • Monitoring • Evaluation] PIU --- GA_PIU[Greenhouse Association • Construction • Production] MOFALI_PIU -.-> Collaboration GA_PIU CS[Consulting Service] <--> PCO </pre>
<p>Environment and social impact</p>	<p>On the installation of the system, positive environment impacts will be expected by reducing the amount of input. The geothermal heat exchange system will change land- form due to earth moving and may cause minimal environment disturbance during construction.</p>

Remarks	<p>1) According to officials of MOFALI, there is no specialized companies which provide full range of services with modern greenhouse technologies. Most companies, e.g., Munkh nagoon tal limited liability company (LLC), Nagoon kharsh LLC, and Batkhulemj LLC, are engaged in construction and installation of materials imported from China, South Korea, and Europe. Hence, there is room to introduce Japanese technologies through Mongolia-Japan Center.</p> <p>2) As of February 2020, 125 producers who cultivate agro-products in greenhouses with an area of 25 ha have received discount for electricity from MOFALI. It accounts for approximately one-third of the total cultivation area under greenhouses. This kind of subsidy scheme should be enhanced to encourage introduction of innovative facilities that would fit to local climatic and other conditions.</p>
---------	---

Project No. 13.3

Title	Agro information technology (IT) parks development*
Location	Kharkhorin district in Uvurkhangai Aimag, Selenge district in Bulgan Aimag and Burentogtoh and Murun districts in Khuvsgul Aimag
Implementing agencies	Regional entities supported by the NDA
Objectives	To create bases (i) to process agro-products supplied from the hinterland, both farm crops and animal products, and supply them to markets in Ulaanbaatar, abroad such as Russia and tourists at higher values, and (ii) to experiment various advanced technologies to support crop production and livestock management
Expected effects	<p>1) Creation of job opportunities locally</p> <p>2) Higher income for herders and farmers</p> <p>3) Earning of foreign exchange</p> <p>4) Creation of a new tourist attraction</p> <p>5) Dissemination of new technologies to support crop production and animal management</p>
Project costs	<p>Public or PPP investment: Total cost: US\$ 25.5 million</p> <p>Private investment: Total cost: US\$ 3.0 million</p>
Implementation schedule	<p>Project development</p> <p>Feasibility study: 2021</p> <p>Organizational set-up and fund arrangement: 2022</p> <p>Initial implementation of the project: 2023</p> <p>Full scale operation of the project: 2024~</p>
Project description	<p>1) Background</p> <p>The concept of the Agro-IT park initially aims to consolidate the processing business in four different sectors of vegetable, cashmere/wool/leather, meat products, and dairy products to provide an efficient production and logistics environment. About 40 candidate sites were initially selected. However, in site selection, basic factors such as infrastructure, transportation and balance in location in the whole Country were not fully considered. The concept of the Agro-IT park development should be carefully reviewed from the viewpoint of agro-supply chains including applicable technology and machine/equipment. A few Agro-IT park may be implemented early after establishment of viability from regional development points of view.</p> <p>2) Project description</p> <p>The Agro-IT park project (AIP project) comprises three sub-projects: Bulgan AIP project, Khuvsgul AIP project and Kharkhorin AIP project. These three locations were selected from the 17 candidate sites as the most advantageous locations in terms of the level of infrastructure development, availability and quality of water resources, distance to national road, positive initiative by local body, possibility of intensive livestock in the hinterland and no negative impact of foot and mouth disease.</p> <p>Bulgan Agro IT park is the base for processing mainly farm crops harvested in its hinterland, while Khuvsgul Agro IT park and Kharkhorin Agro IT park provide bases for processing animal related products. The government will take a lead in developing and providing three</p>

	<p>agro-IT parks equipped with all the required infrastructures, while private business will make investments on on-site factories and plants where various processing will take place. AIP project will serve as a base for experimenting and disseminating various ICTs and advanced technologies to support more productive farming and animal herding and rearing activities, too. Various advanced technologies for animal management will be experimented and modified to the Mongolian context to enhance productivities and transparency, for example, better animal control by introducing milking and suckling robot, oestrus detection device, delivery monitoring device and establishing an information collection and management system capitalizing on the newly introduced ICT devices. On the crop farming side, a workshop will be established to experiment various advanced technologies to support crop production such as “biomas gasifier generator water generation”, “compost making”, “small-scale nitrogen manufacturing plant”, “extreme weather resistant greenhouse” including that using geothermal heat exchange system and trench type greenhouse.</p> <p>3) Implementing arrangements</p> <p>The project is implemented by PPP coordinated by NDA. Private sector entities may be established by respective Aimag administrations guided by NDA. Technical support will be provided by MOFALI and related public organizations.</p>
Environment and social impact	Appropriate measures need to be taken to treat wastewater and solid waste generated from food processing.
Remarks	

Project No. I4.1

Title	Fodder production expansion
Location	Arkhangai, Darkhan-Uul, Dornod, Khentii, Selenge, Tuv, and Uvs
Implementing agencies	MOFALI, Institute of Plant and Agricultural Sciences Private sector
Objectives	<ol style="list-style-type: none"> 1) To expand production of fodder crops to support intensive and semi-intensive livestock farming; and 2) To improve national food security and conserve natural environment
Expected effects	<ol style="list-style-type: none"> 1) Intensive livestock is expanded 2) Self-sufficiency rate for fodder crop is increased 3) Overgrazing area is decreased
Project costs	Soft component
Implementation schedule	2021-30
Project description	<ol style="list-style-type: none"> 1) Background Fodder crops in Mongolia are composed of four major categories; green fodder, perennial crops, silage crops, and other crops. Although hay is the most consumed fodder by livestock, green fodder contains much more minerals than hay. Self-sufficiency rate for fodder crops in 2015 is estimated at 55% and deficit amount is imported from abroad. Number of livestock is more than 66 million in 2018, and central and northern part of Mongolia where human population and livestock population are dense is evaluated as overgrazing area. In order to improve quality of animal products and to promote intensive farming for environment conservation, it is reasonable to increase the supply of fodder crop. As producer price of green fodder is 3.3 time and 1.6 times higher than prices of straw and hay respectively, cultivation of green fodder also contributes to improvement of farmers' livelihood. 2) Project components

	<p>a) Selection and multiplication of appropriate crops and varieties: the first step is to search for potential crops and varieties to be introduced fitted to Mongolian environment. Land suitability for fodder crop will be assessed and using such an information, crops and varieties to be employed will be selected. After tentative selection, a cultivation test is conducted on-site and varieties to be disseminated are selected. In the course of selection, performance of the varieties including productivity, growth duration, and nutritious aspect for livestock are evaluated. Seed multiplication also needs to be taken into account to promote cultivation.</p> <p>b) Improvement of cultivation techniques: cultivation techniques could be varied depending on the final form such as hay and silage. In the light of the expected output, sowing amount, fertilizer application rate, drainage measure, and harvesting time should be considered. For example, Italian ryegrass is recommended to harvesting at the time of heading stage to obtain the maximum total digestive nutrients. Therefore, a cultivation calendar with appropriate fodder crops cultivation techniques should be prepared. The cultivation calendar should contain nursery preparations, a schedule for sowing, transplanting, irrigation, weeding, harvesting etc. The formation of cooperative society could contribute to information sharing. Application of minerals to increase productivity may also be considered.</p> <p>c) Establishment of logistic system: logistic hubs including processing factory, storage, and logistic services are necessary to distribute the product as part of an industrial cluster. Logistic hubs may include roadside station and antenna shop to promote the products.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of the fields where fodder crops cultivation will be promoted and deciding the size of operation, providing professional and methodological advices, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with concerned organization for administering and managing the project activities, including production of value-added products and providing professional methodology.</p>
Environment and social impact	Positive environment impact is assumed by reduction of overgrazing. However, the logistic hubs may cause minimal environment disturbance during construction as well as operation period due to earth moving and traffic. Environmental and social impacts will be monitored.
Remarks	

Project No. I4.2

Title	ICT monitoring and support system for livestock*
Location	Arkhangai, Darkhan-Uul, Dornod, Khentii, Selenge, Tuv, and Uvs
Implementing agencies	MOFALI, Institute of Plant and Agricultural Sciences Private sector
Objectives	<p>1) To expand intensive livestock farming as dominant mode to increase production of quality meat and dairy products</p> <p>2) To contribute to preservation of pastureland</p>
Expected effects	<p>1) Meat and dairy products are much increased to meet increasing domestic demand and to export the excess production</p> <p>2) Sustainable farming is developed</p> <p>3) Intensive livestock is increased</p> <p>4) Overgrazing area is decreased</p>
Project costs	MNT 6,475 million + soft component
Implementation schedule	2021-30
Project description	<p>1) Background</p> <p>According to the statistical data, 1.4 million ha is classified as arable land. Out of the arable land, approximately 1.0 million ha is identified as land suitable for farming, and it is also the</p>

	<p>maximum crop farming area from the viewpoint of soil conservation. Currently, many of crop farm households and crop business entities express their concern about soil degradation. In total, 57% of crop farming households and 67% of business entities face the soil degradation to a greater or lesser extent, respectively. Business entities tend to face the situation more severely than crop farming households due to higher usage of chemical fertilizer. Another issue is that overgrazing. Number of livestock is more than 66 million in 2018 and central and northern part of Mongolia where human population and livestock population are dense is evaluated as overgrazing area. To mitigate the land degradation, soil conservation practices through intensive livestock farming associated with crop farming is required.</p> <p>2) Project components</p> <p>a) Installation of ICT application: the project will install 24/7 full operation environment control system in the animal stall. Various information such as temperature, humidity, and amount of feed is collected by sensor and the system makes all the information visible. Through the environmental monitoring, the system automatically decides whether temperature and humidity are increased or decreased, and feed is applied or not to maintain the optimal environment for livestock in the stall. Timer-control is also available based on the designed schedule. All the environmental information is shared with a producer via a network. If the system detects an unfavorable event, it gives alert to a producer. The stall environment is also controlled remotely using digital devices connected with network. This also contributes to animal welfare.</p> <p>b) Combination with other sectors: in order to make intensive livestock more effective, combination with other sectors is recommended. Intensive livestock will be established where crop cultivation is actively implemented or crop cultivation will be promoted. In doing so, by-product from crop cultivation such as bran from wheat, oil cake from rape seed will be utilized as a feed for livestock and by-product from livestock including animal dung will be applied to crop field as fertilizer. This will contribute to natural conservations. The integration with social welfare sector, medical sector, and education sector is another option by employment of disable people, rehabilitation through farming activities, and interaction between urban and rural areas. SDG 11 also aims at supporting positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of the fields where integrated farming will be promoted and deciding the size of operation, providing professional and methodological advices, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with concerned organization for administering and managing the project activities, including production of value-added products and providing professional methodology.</p>
Environment and social impact	Positive environment impact is assumed by reduction of overgrazing. Contrary, high concentration of livestock in the animal stall may cause environment and social impacts due to emission of night soil. Countermeasures should be recommended to mitigate the anticipated negative impacts. Consideration of animal welfare is also required.
Remarks	

Project No. I5.1

Title	Irrigation development
Location	Nationwide
Implementing agencies	MOFALI
Objectives	To increase availability of irrigated land
Expected effects	<p>1) National Irrigation Master Plan (NIMP) is prepared</p> <p>2) Production of wheat, potatoes, vegetables fully meet the demand</p>
Project costs	MNT 37,388 million + soft component

Implementation schedule	2021-40
Project description	<p>1) Background</p> <p>SDV 2030 mentions that 100% self-sufficiency of wheat, potatoes, and vegetables will be achieved by 2030. Currently, production of wheat and potatoes almost meet its demand. Contrary, self-sufficiency rate for vegetables in 2018 is 43%. It is expected that the population in Mongolia will reach 3.8 million in 2030 and 4.5 million in 2040, and therefore, production needs to be increased to meet the demand. One of the issues for agricultural production is instability. Annual variation of productivity was too much and there is a large yield variation between Aimags. Drought and lack of irrigation facilities is one of the reasons of such a yield fluctuation, and therefore target irrigation development area is set at 120,000 ha in SDV 2030. Although more than 80% and 50% of areas at household farms and business entities are irrigated respectively, crop farming in Mongolia is still susceptible to droughts. In addition, of those who did not install irrigation, 45% of household farms and 49.8% of business entities responded that the lack of water is the most severe constraint, followed by lack of financial resources. In order to promote the production, productivity should be maintained at high level and yield gaps between Aimags should be reduced by support measures such as irrigation.</p> <p>2) Project components</p> <p>a) Preparation of the NIMP: the project will prepare the NIMP to achieve 100% self-sufficiency of wheat, potatoes, and vegetables. Conceptual image of the preparation process is depicted in the following figure. At the time of preparation, focus is placed on sustainable irrigation development, management at national level and communal level, contribution to poverty reduction and climate change, and the idea of watershed management.</p> <p>b) Development of irrigation facilities: in the course of preparation of the NIMP, the existing irrigation area to be improved will be identified and a new irrigation development area will be prioritized.</p> <p>c) The NIMP will cover headwork and pump irrigation, dam and reservoir irrigation, lake irrigation, and groundwater irrigation. When development is planned, it is important to incorporate the idea for multipurpose utilization; irrigation water could be utilized for daily life water and drinking water for livestock.</p> <p>d) Reinforcement of the operation and maintenance (O&M) system: once facilities are developed, it is important to operate and maintain the facilities continuously in a proper manner. Guidelines and a manual for O&M are to be prepared and training is to be given to relevant stakeholders including government officers and members of water users' association in the rural area. Installation of ICT application for data collection, O&M, and monitoring to facilitate the capacity should also be considered.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of the</p>

	fields where the irrigation scheme will be developed and deciding the size of operation, providing professional and methodological advices, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with a private entity or water users association for administering and managing the irrigation schemes.
Environment and social impact	Expected positive environment impact is to conserve water resources by using efficient irrigation system. The development of irrigation facilities requires land reform and cause an environment disturbance during construction and after construction. A Strategic Environmental Assessment (SEA) should be carried out to identify the environmentally and socially negative impacts. Countermeasures should be recommended in order to reduce the anticipated negative impacts.
Remarks	

Project No. 15.2

Title	Oil seed development
Location	Bulgan, Darkhan-Uul, Dornod, Khentii, Selenge, Sukhbaatar, Tuv, and Uvurkhangai
Implementing agencies	MOFALI, Institute of Plant and Agricultural Sciences Private sector
Objectives	1) To increase production of oil crops, and 2) To contribute to national food security.
Expected effects	1) Area cultivated with appropriate oil seed crops is expanded 2) Self-sufficiency rate for oil seed crops is increased
Project costs	Soft component
Implementation schedule	2021-30
Project description	<p>1) Background</p> <p>Major industrial crops in Mongolia are oil seed crops such as rapeseed and sunflower. Oil seed crops harvested by producers are transferred to processing company, and final product is delivered to the customers. The processing steps of oil seed crops include (i) pressing, (ii) extraction of gum, (iii) bleaching, (iv) deodorant, and (v) packaging. According to the processing company, a ton of rapeseed purchased at approximately US\$ 350 produces about 250 liter of oil and it is sold at US\$ 1.5-2/liter. Self-sufficiency rate for oil seed crops in 2015 is estimated at 21% and deficit amount is imported from abroad. In order to improve food security, it is reasonable to promote oil seed crop cultivation as import substitution.</p> <p>2) Project components</p> <p>a) Selection and multiplication of appropriate crops and varieties: the first step is to search for potential crops and varieties to be introduced fitted to Mongolian environment. There is land suitability map for oil seed crops, and therefore crops and varieties to be employed will be selected using such an information. After tentative selection, a cultivation test is conducted on-site and varieties to be disseminated are selected. In the course of selection, performance of the varieties including productivity, growth duration, and people's preference are evaluated. In case of rapeseed, the varieties which are not included erucic acid should be selected from the nutritional aspect. From the viewpoint of diversification of crops, perilla could be recommendable. Perilla belongs to mint family and its oil contains more than 60% of Omega-3 fatty acid which is one of the essential fatty acids and is prone to shortages in usual diet. Cultivation of these crops could contribute to healthy Mongolia. Seed multiplication also needs to be considered to promote cultivation.</p>

	<p>b) Improvement of cultivation techniques: oil seed crops, for example rapeseed, can be grown on many types of soil, though appropriate fertilizer application design depending on soil conditions is the key for better harvesting. Other points to be considered are protection from wet damage and adverse effects by continuous cultivation. Therefore, a cultivation calendar with appropriate oil seed crops cultivation techniques should be prepared. Moreover, it is reasonable to make the existing machineries used for other crops available for oil seed crop cultivation. For example, sowing machine for wheat will be able to sow rapeseed when sowing attachment is modified to recommended sowing rate and harvesting can also be done by general combine harvester using attachment for buckwheat. At the processing stage, drying and sorting can be done by the existing machineries if 1 mm metallic mesh is attached. The formation of cooperative society could contribute to information sharing.</p> <p>c) Market-oriented processing: information gathering is the first step for development of market-oriented processing. The information on oil seed crops also needs to be collected through market survey. For example, mixing with vitamin extracted from sea buckthorn may add its value. By-product, i.e., oil cake, can also be used as animal feed and fertilizer.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of the fields where oil seed crops cultivation will be promoted and deciding the size of operation, providing professional and methodological advices, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with concerned organization for administering and managing the project activities, including production of value-added products and providing professional methodology.</p>
Environment and social impact	Basically, no negative impact is assumed, however, environment and social impacts will be monitored. If any environmentally and socially negative impacts are observed, countermeasures should be identified.
Remarks	

Project No. I5.3

Title	Sea buckthorn development*
Location	Bulgan, Selenge, Tuv, Ulaanbaatar, Uvs, Uvurkhangai, and Zavkhan
Implementing agencies	MOFALI, Mongolian National Association of Fruit and Berry, Mongolian Association of Vegetable and Fruit Processing, Private sector
Objectives	To expand sea buckthorn production to strengthen a base for establishing new value chain of sea buckthorn
Expected effects	1) Processed products to be promoted is identified 2) Sea buckthorn-based cluster is developed
Project costs	Soft component
Implementation schedule	2021-30
Project description	<p>1) Background</p> <p>Sea buckthorn is one of the promising agro-products in Mongolia. It can survive below 40 °C and produce a wide range of processed items such as juice, jam, oil, and cosmetics. Sea buckthorn purchased at approximately MNT 4,000/kg is processed and sold at ca. MNT 6,000/kg on average. Market price of 50 ml of sea buckthorn oil is around MNT 20,000 and 250 ml of juice is MNT 2,000. Currently, most part of fruit is processed to juice and jam that are comparatively low value-added products, and therefore other products that offer more value addition needs to be explored.</p> <p>2) Project components</p>

	<p>a) Improvement of cultivation environment: it is known that sea buckthorn can be grown at wide range of soils, even sandy and gravelly soils. Although the fruit has drought tolerant, the cultivation where water is sufficient shows higher and more stable production than in less water availability area. Hence, improvement of cultivation environment is indispensable for further production. There is land suitability map for sea buckthorn and suitable sites will be selected using such and information. Harvesting is normally done by manually and thorn may cause injuries, but there are some thorn-free varieties and introduction of them facilitates the workability of producers. Countermeasures for bird attack during maturity period and post-harvest loss also need to be considered.</p> <p>b) Market-oriented processing: information gathering is the first step for development of market-oriented processing. Juice is the most common product as it contains a favorable balance in its protein, vitamins C and E, and organic acids. The leaves are also utilized as a nutritional tea and animal fodders. The oil extracted from fruit is rich in minerals and can be used for cosmetic and medicinal purposes. The information on sea buckthorn processing needs to be collected through formation of cooperative society.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of the fields where sea buckthorn cultivation will be promoted and deciding the size of operation, providing professional and methodological advices, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with concerned organization for administering and managing the project activities, including production of value-added products and providing professional methodology.</p>
Environment and social impact	Basically, no negative impact is assumed, however, environment and social impacts will be monitored. If any environmentally and socially negative impacts are observed, countermeasures should be identified.
Remarks	

Project No. I6.1

Title	Cattle ranching system development
Location	East Region of Mongolia and Dornogovi and Umnugovi Aimags
Implementing agencies	Regional cooperatives, Research and development (R & D) institutes of universities and the NDA
Objectives	To create a base (i) to organize ranching route corridor to bring livestock through prepared “polygons” offering resting and fattening areas with contracting herders, creating shared livestock supply and payment funds across regions, ensuring feed supply in winter time to increase and keep body weight per head, and establishing local and regional feedlot and ranching centers with specialized fences and equipment, and (ii) to experiment various other feeding and grass improving practices along the route in order to make full year operation successful, create high breeding stock for high genetically improved beef cows, and realize operational and management team strengthening with special machines.
Expected effects	<ol style="list-style-type: none"> 1) Creation of job opportunities locally 2) Higher income for herders 3) Creation of trunk supply network for livestock products 4) Dissemination of new technologies to support dairy production
Project costs	<p>Public or PPP investment and collaboration with limited liable partnership (LLP) with contracted farmers for short term production</p> <p>Selected stock preparation for test on commercial contract base development; creation of shared livestock for milking centers and contract technical service centers (such as milking parlors, milking mobile machines, feeding centers, milk storage and cooling tanks etc.): US\$1.5 million</p> <p>Advanced technology workshop: US\$1.0 million</p> <p>Total cost: US\$2.5 million</p> <p>Private investment</p> <p>US\$ 1 million for on-site facilities such as processing plants and storage</p> <p>US\$100,000/investment * 10 investments assumed</p>

Implementation schedule	Project development Feasibility study: 2021 Organizational set-up and fund arrangement: 2022 Initial implementation of the project: 2023 Full scale operation of the project: 2024~
Project description	<p>1) Background Livestock farming faces many problems such as degradation of grassland, limited fodder availability, diminishing water availability, lack of herders organization, inadequate technical support etc., which make livestock activities vulnerable to natural disasters such as Dzud and droughts as well as climate change. Comprehensive and organized support is necessary for the livestock sector to survive and further develop in the global economy.</p> <p>2) Project description The project will establish routes for animal grazing based on surveys together with a network of local centers seasonally operating, and rest areas in order to improve vegetation and grass for better grazing of cattle stock. Such a network will help remote areas not using economic resource to connect with Govi areas and to meet mining demand of good quality beef and create local supply logistics with contract shared cooperation between herders and operational management team, experts from abroad, and establish data base for better business simulation. Feed supply through this network should be improved. Shared economy will be realized between low income herders of remote rural areas, collecting local resources changing into high value raw materials for other processing manufacture and final product etc.</p> <p>3) Implementing arrangements The project is implemented by PPP coordinated by NDA. Private sector entities may be established by selected Aimags along a designated grazing routes guided by NDA. Technical support will be provided by MOFALI and related public organizations.</p>
Environment and social impact	Pasture degradation risk will be reduced. Planned implementation will help restore and preserve environment due to control of goat population etc.
Remarks	

Project No. 16.2

Title	Corn silage production
Location	Orkhon district in Bulgan Aimag
Implementing agencies	Bulgan Agro LLP and NDA
Objectives	To create a base for silage production and create supply chain of regional dairy farms and to enable constant increase of milk supply to markets in Erdenet, Darkhan and Ulaanbaatar.
Expected effects	<ol style="list-style-type: none"> 1) Creation of job opportunities locally 2) Higher income for herders and farmers 3) Earnings of foreign exchange
Project costs	<p>Public or PPP investment Site development including infrastructures: US\$1.5 million ($\\$30/m^2 * 5 \text{ ha}$) Unit construction cost at $*30/m^2$ was derived from the cost of industrial estate development in other countries. Slaughterhouse construction: US\$9.0 million ($\\$30/m^2 * 3,000 \text{ m}^2 \text{ floor area}$) <u>Assumptions:</u> Required floor area: $100/m^2$ for large animals and $10/m^2$ for small animals Number of animals to be slaughtered: 20 large animals and 100 small animals per day Construction cost per floor area: $\\$30/m^2$ based on the experiences in developed countries (Japan and USA) ICT application workshop: US\$1.0 million Total cost: US\$11.5 million Private investment US\$ 1 million for on-site facilities such as processing plants and storage US\$100,000/investment * 10 investments assumed</p>

Implementation schedule	Project development Feasibility study: 2021 Organizational set-up and fund arrangement: 2022 Initial implementation of the project: 2023 Full scale operation of the project: 2024~
Project description	1) Background Increase in productivity is the key to develop livestock industry further so that it can be competitive in urban and export markets. To increase availability of feed of good quality particularly for dairy farming, silage production is effective. 2) Project description Increased livestock products namely milk, milk powder and cheese production will increase and develop various related products at high quantity with higher qualities competitive enough even in the foreign markets. Corn silage production is possible with crop having short growing period supported by policy measures including finance. The project includes a workshop to experiment various advanced dairy industry including dry treatment of fresh milk to produce powdered milk. Simulation for animal management and production management may be experimented by using big data. 3) Implementing arrangements The Government will mobilize fund, by either allocating government budget or by a PPP arrangement and develop the site and associated infrastructures such as water supply, sewerage, power supply, solid water management facilities and a slaughterhouse. Private investors will make investments on the plants in the park developed by the Government. The land arrangement for tenants will include sales and lease.
Environment and social impact	Appropriate measures need to be taken to treat wastewater generated from the slaughterhouse and tanning process as well as solid wastes. Manure will be used as a substitute of mineral fertilizer and crop rotation will be with alfalfa and barley. Local land management will be simultaneously improved with pasture management.
Remarks	

Project No. I6.3

Title	Total mixed ration (TMR) feeding centers development
Location	Jargalant district in Tuv Aimag (also possible in Bulgan and Selenge Aimag)
Implementing agencies	Regional cooperatives, R & D institutes of universities and the NDA
Objectives	To create a base (i) to grow test plantation of corn, alfalfa and barley with contracted farmers for supply TMR feeding center around Ulaanbaatar, Erdenet and Darkhan as starting point of silage feed value chain, and (ii) to experiment various advanced technologies and field test modern agricultural machineries to support crop production improvement
Expected effects	1) Creation of job opportunities by utilizing crop residues available locally 2) Higher income for herders and farmers 3) Foreign exchange earnings/savings 4) Dissemination of new technologies to support crop production
Project costs	Public or PPP investment and collaboration with local LLP with contracted farmers for short term production Field preparation for test on commercial contract base development including contract technical service centers (such as an agricultural rent service centers of advanced machinery): US\$1.5 million (500 ha in different areas) including machinery workshop with spare parts storages and mobile operators, mechanics preparation etc. Advanced technology workshop: US\$1.0 million Total cost: US\$2.5 million Private investment US\$ 1 million for on-site facilities such as processing plants and storage US\$100,000/investment * 10 investments assumed
Implementation schedule	Project development Feasibility study: 2021 Organizational set-up and fund arrangement: 2022

	Initial implementation of the project: 2023 Full scale operation of the project: 2024~
Project description	<p>1) Background</p> <p>To support intensive and semi-intensive livestock farming, domestic production of fodder crops should be much expanded. The project includes the following components: 1) corn production increase, 2) feed making contractors, 3) mechanized crop farming extension, and 4) TMR promotion. Feed making contractors are individuals or enterprises specializing in collecting raw feed materials from the agricultural fields after harvest of grains by using machines. Total mixed ration is a kind of mixed feed to be produced from locally available feed materials for mixing to produce relatively low cost but nutritious feed.</p> <p>2) Project description</p> <p>TMR feeding center – total mixed ration production centers for dairy farmers include a workshop to experiment various advanced technologies to support crop production for dairy stock, constant high quality output and big manure (organic fertilizer) resource to use for corn production and field management of fertilizers.</p> <p>Field test of machinery is undertaken and increased output of milk per head of cows is realized. Calf heifer farming management involves feeding with milk powder (when milk price low and available in summertime; spray drying of milk will produce milk powder) and better cow off springs will be ensured for better quality in near future.</p> <p>3) Implementing arrangements</p> <p>Private investors (contracted farmers also) will make investments on the plants in the park developed by the Government. The land arrangement for tenants will include contract based leasing for feed fund.</p>
Environment and social impact	Manure will be used as a substitute of chemical fertilizer.
Remarks	

Project No. I6.4

Title	Spray dry powder milk technology
Location	Govi region and Govi-Altai and Sukhbaatar Aimags
Implementing agencies	Regional cooperatives, R & D institutes of universities and the NDA
Objectives	To create a base (i) to organize local cooperatives of low income local herders and create shared camel, goat livestock for milk supply units across regions, ensuring feed supply in winter time to increase and constant camel milk increasing per head, and establishing local and regional spray draying centers in centers of Aimags, and (ii) to experiment various other powder resources in order to allow full year operation like herbal plant powder and horse milk powder, using advanced spry draying technologies and raw milk receiving, concentrating for powder, milking machines and veterinary hygiene services of stock
Expected effects	<ol style="list-style-type: none"> 1) Creation of job opportunities locally 2) Higher income for herders 3) Creation of trunk supply network for dairy products 4) Dissemination of new technologies to support dairy production
Project costs	<p>Public or PPP investment and collaboration with local LLP with contracted farmers for short term production</p> <p>Selected stock preparation for test on commercial contract base development create shared livestock for milking centers and contract technical service centers (such as milking parlors, milking mobile machines, feeding centers, milk storage and cooling tanks etc.): US\$1.5 million</p> <p>Advanced technology workshop: US\$1.0 million</p> <p>Total cost: US\$2.5 million</p> <p>Private investment</p> <p>US\$ 1 million for on-site facilities such as processing plants and storage</p> <p>US\$100,000/investment * 10 investments assumed</p>
Implementation schedule	Project development Feasibility study: 2021

	Organizational set-up and fund arrangement: 2022 Initial implementation of the project: 2023 Full scale operation of the project: 2024~
Project description	<p>1) Background Spray dry powder technology is a state-of art technology to produce powder products. It may be applied to producing dried camel and goat milk to facilitate transportation of the products and expand the market.</p> <p>2) Project description Dairy product economic value creation is undertaken with other powder products such as herbal powders and natural ingredients easy to packing with light weight, high price and easy to transportation with long-lasting shelf life of product resources, which can be exported as natural ingredient for cosmetic or other industries. Shared economy is realized between low income herders of remote rural areas, collecting local resources changing into high value exporting powder product. Goat population is increasing and camel is not economically viable currently, but creation of network of raw milk supplying channel and making powder easy for packing will enhance viability by making expensive storage etc. unnecessary.</p> <p>3) Implementing arrangements The project is implemented by PPP coordinated by NDA. Private sector entities may be established by selected Aimags guided by NDA. Technical support will be provided by MOFALI and related public organizations.</p>
Environment and social impact	Pasture degradation risk will be reduced. Planned implementation will help restore and preserve environment due to control of goat population etc.
Remarks	Rural areas having goat population percentage is high can benefit from this project significantly. Goat and horse milk can be used for an additional income source.

Project No. I7.1

Title	Cold chain development
Location	Darkhan-Uul, Khentii, Khovd, Selenge, Tuv, Uvs, and Uvurkhangai
Implementing agencies	MOFALI Private sector
Objectives	<p>1) To store and transport crops and livestock products without reducing their quality; and</p> <p>2) To contribute to improving national food security.</p>
Expected effects	<p>1) Cold chain for food products is developed</p> <p>2) Self-sufficiency rate for vegetables, meat and milk is increased</p>
Project costs	MNT 3,500 million + soft component
Implementation schedule	2021-30
Project description	<p>1) Background SDV 2030 mentions that 100% self-sufficiency of wheat, potatoes, and vegetables will be achieved by 2030. However, self-sufficiency rate for vegetables has gradually decreased and it is 43% in 2018. It is expected that the population in Mongolia will reach 3.8 million in 2030 and 4.5 million in 2040, and therefore, production needs to be increased to meet the demand. In Mongolia, cultivatable period is limited due to climate conditions in the winter. One of the options is to construct greenhouse which allow us to cultivate vegetables in the winter. Even though production is increased, production itself does not contribute to improvement of self-sufficiency rate for vegetables without distribution to consumers. Hence, it is reasonable to promote cold chain development, mainly storage facilities. For livestock sector, SDV2030 aims to develop a system of supply, preservation and transportation of livestock related commodities and products. As meat and milk constitute important part of diet for Mongolian people, supply of fresh meat and milk to growing population should be ensured by establishing cold chain with refrigerated storage and transport of these products from producers in rural areas to consumers in urban areas. Per capita availability of meat of all kinds is calculated to be 112.6 kg, which probably meets the self-sufficiency level if meat export is not taken into account. The total milk production</p>

	<p>was 661.9 million liter in 2017 and cattle milk accounts for 81.6%. Most milk produced is used for self-consumption by herders. To ensure export of meat products while meeting the growing domestic demand, and to promote milk processing for value added products, cold chain development is vitally important.</p> <p>2) Project components</p> <p>a) Selection of appropriate storage technologies: there are various options of cold storage. The basic cold storage is electrical operational one, but it requires a large investment and running cost. A solar power unit to operate cold storage is another option. The cost in Mongolia is estimated at approximately US\$ 15,000 and this contributes to natural environmental protection. In case of a large-scale storage, hybrid power supply between solar and electricity is recommended as a solar power unit only may not supply sufficient power to maintain it. An ice shelter using natural ice is also available and environment-friendly technique. An ice shelter is a kind of low-temperature storage facilities and it keeps room temperature around zero degree throughout the year using latent heat effect of natural ice. During winter, in the course of transformation from water to ice, water release the heat and it act as warming effect and vice versa in summer. An idea of zeer pot using evaporation from wet sand and the cooling system using emission of radiation may also be utilized as environment-friendly technologies.</p> <p>b) Selection of appropriate locations: from the cold storage, items need to be distributed to specific destinations. Hence, there are possibility of establishing logistic hubs including cold storage, processing factory, and logistic services to constitute part of an industrial cluster.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of the fields where cold storage will be established and deciding the size of operation, providing professional and methodological advice, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with concerned organization for administering and managing the project activities, including production of value-added products and providing professional methodology.</p>
Environment and social impact	Basically, no negative impact is assumed, however, environment and social impacts will be monitored. However, the logistic hubs may cause minimal environment disturbance during construction as well as operation period due to earth moving and traffic. Environmental and social impacts will be monitored.
Remarks	

Project No. 17.2

Title	Food traceability platform*
Location	Darkhan-Uul, Khentii, Khovd, Selenge, Tuv, Uvs, and Uvurkhangai
Implementing agencies	MOFALI (supported by Communications and Information Technology Authority (CITA)) Private sector
Objectives	<ol style="list-style-type: none"> 1) To introduce advanced technology in the food industry, improve the competitiveness, increase domestic supply in main food products, and ensure that citizens are supplied with healthy and safe food products; and 2) To support the business and economics of herders, herder groups, and small and medium sized farmers, provide modern techniques, technologies, and create a financial, economic, and legal environment for sustainable production.
Expected effects	<ol style="list-style-type: none"> 1) Better farm/herd management 2) Disease monitoring and early warning system 3) Capacity building farmers in terms of adoption of new technologies through ICT enabled learning and knowledge management 4) Food traceability and compliance to international standards and best practices 5) Market competitiveness/expansion of export market from food processors
Project costs	US\$5 million

Implementation schedule	2-3 years for platform establishment Year 1: Business requirement gathering and system design. Prototype testing Year 2: Training and capacity building, piloting Year 3: M&E and mainstreaming
Project description	<p>1) Background</p> <p>SDV2030 has established key development goals related to agriculture and livestock sectors; Strengthening of competitiveness to adopt international standard Reconstruction of supply network Introduction of intensive agricultural technology Support for small-scale agricultural enterprises Acceleration of the procedures for trading network</p> <p>For the realization of these goals, appropriate and adequate infusion of digital technologies is critically important. In absence of a national digital technology platform for agriculture and food sector, it becomes difficult for small producers and businesses to implement many of the food quality and safety measures in their business processes while for the government having such digital platform helps in decision making, in-time policy intervention and obtaining feedback and data from the field for further research and analysis.</p> <p>Food and Agriculture Organization, United Nation (FAO) Mongolia, together with International Telecommunication Union (ITU), is helping the Government of Mongolia to develop a national e-agriculture strategy. E-agriculture, or ICTs in agriculture, is about designing, developing and applying innovative ways to use ICTs in the rural domain, with a primary focus on agriculture.” FAO and ITU have developed e-agriculture strategy guide (http://www.fao.org/3/a-i5564e.pdf) that has been used in several countries in developing their national strategies. E-agriculture strategy is critical for a “whole of government” approach in harnessing technological development in the field of information and communication technologies or ICT, rationalize and prioritize investments that gives better leverage and quick progress to solve the key challenges in the agriculture sector that needed to be overcome in order to achieve the country’s sectoral goals.</p> <p>The national e-agriculture strategy of Mongolia will provide a strategic framework and roadmap for development of digital agriculture in Mongolia, especially its highly potential livestock sector. FAO Mongolia, has already undertaken two projects in this direction; one on Animal Identification and Registration and the other on a blockchain enabled traceability solution for animal products. FAO, together with ITU, MOFALI and CITA has organized several consultations with the key stakeholders from the private and public sectors as part of project inception. These projects will also help in linking together various fragmented digital or manual services that are present in Mongolia, under a single national e-government platform.</p> <p>As a next step, FAO Mongolia, with technical assistance from ITU, intends to help the Government of Mongolia to design and develop a national digital technology platform for the food sector which will enable the government to implement, monitor and realize the goals and objectives of agriculture and food sector in Mongolia. This digital infrastructure will be a key asset with the government which will improve the domestic and export food markets by offering high quality, completely traceable food products from Mongolia.</p> <p>Mongolian foods products, especially meat products have high potential in Russian, Chinese and European markets by virtue of being high quality “pasture-fed”, “free-range” meat. However, in absence robust and scalable food traceability system, this potential has not been able to be fully explored. Moreover, by bringing the farmers and herders under one digital network, it will be easier to transfer knowledge and technical know-hows about better pasture management, new crop production technologies etc. for which FAO Mongolia is well capacitated to help MOFALI and other respective agencies. Having partnership with ITU in the project would also make technical design and development easier.</p> <p>Hence, this project concept is well suited to the country’s priorities and is expected to be a key growth driver for agriculture sector, while bringing together multiple national and international agencies working together to achieve this goal.</p> <p>2) Project components</p> <p>Design of enterprise architecture for a digital food and agriculture platform for Mongolia</p> <p>a) Study of business processes/user journeys of the key stakeholders/users groups in agriculture and food sector</p>

	<ul style="list-style-type: none"> b) Technical evaluation of existing digital systems/services c) Integrate existing digital services through a micro-service architecture d) Establish data standards, interoperability and safety standards e) Prototype development and testing f) Identify sample user groups/stakeholders/partners g) Develop mobile/web applications h) Conduct piloting i) Evaluation, improvement and re-iteration of prototype j) Training and capacity building k) Creation of training/capacity building modules as per identified skill/knowledge gaps l) Conduct training programs m) Monitoring & evaluation n) Impact assessment, (technology adoption, economic gain rate etc.) o) PPP sub-projects (e.g., with telecom operators) for scale up <p>3) Implementing arrangements FAO Mongolia, together with MOFALI and CITA will ensure the effectiveness of the project implementation, under the overarching National E-Agriculture strategy implementation</p>
Environment and social impact	<ul style="list-style-type: none"> 1) Improved pasture management 2) Improved management and conservation of natural resources 3) Building climate change resilience 4) Poverty eradication 5) Improved access to safe and nutritious food 6) Economic gain by micro, small and medium enterprises in food sector through enhanced export opportunity.
Remarks	

Project No. I8.1

Title	Rare earth resource exploration
Location	All over Mongolia
Implementing agencies	Ministry of Mining and Heavy Industry (MMHI), Mineral Resources and Petroleum Authority of Mongolia (MRPAM)
Objectives	<ul style="list-style-type: none"> 1) To survey rare earth resources that can be developed early; 2) To contribute to diversification of the mining sector to continue supporting the Mongolian economy; and 3) To enhance strategic position of Mongolia as a supplier of essential input for technological innovation in the world.
Expected effects	Sustainable mining development based on rare earth in Mongolia by identifying promising deposits
Project costs	
Implementation schedule	<p>Survey schedule</p> <p>Phase 1: Umnugovi Aimag, Mushgia Khudag, Khotgor in 2022</p> <p>Phase 2: Khovd Aimag, Khalzan Buregtei in 2023</p> <p>Phase 3: Lugiin Gol, Dornogvobi Aimag in 2024</p>
Project description	<p>1) Background</p> <p>Rare earths are a collective term for 17 mineral elements and, as the name implies, are rare elements that exist on earth. There are five types of rare earth deposits: carbonatite deposits, iron rare earth deposits, ion adsorption deposits, drift sand deposits, and alkaline rock deposits. Each element of rare earths is contained in these deposits. Rare earths are used in a wide range of industries due to the characteristics of each element and are indispensable resources for electric vehicles (EVs), digital cameras, mobile phones, personal</p>

computers, and televisions among others. Their applications will expand in the future to other uses such as abrasives for glass foundation, exhaust gas catalysts for automobiles, small motors, IC semiconductors, liquid crystals, and superconductivity. Therefore, the demand is expected to grow significantly in the future.

The United States was once the largest producer of rare earths in the world. However, production in most countries has been ousted by low price strategy adopted by China with rapid development and export promotion. Since the production in China surpassed other countries production in the 1990s, China has been dominating the international market for a long time. China having a large production share regards rare earths as a national strategic commodity, protecting this important domestic resource with priority supply to domestic market.

In 2018, rare earth production (oxide materials base) was 130,000 tons worldwide, shared by China (79%), Australia (15%), Russia (2%) and Brazil (2%). In 2010, China enacted restrictions on rare earth exports and total mining production, which caused price rise and procurement difficulty of rare earth materials in the world. As a result, several countries expect to develop new mines outside of China to diversify rare earth market. The estimated amount of rare earths reserved in the world is 126 million tons in 2018, and the mining life is sufficiently long in view of the expected production volume. Countries having larger shares of reserves are China (36%), Brazil (18%), Vietnam (18%), Russia (15%) and India (6%). China's share is not as high as production share. Depending on the progress of mine development in the future, China's share can be reduced. Prices of rare earths vary widely depending on the elements, and some elements have a price difference of 10 times or more. The rare earth average price temporarily rose to US\$180/kg in 2011 due to China's export and production restrictions but is now settling at around US\$40-60/kg.

Among the rare metals, neodymium, dysprosium and terbium have the property of increasing the coercive force/magnetic flux density at high temperatures. Therefore, the importance as additives for small magnets has been increasing. Demand for cerium as a glass abrasive for flat panel displays, yttrium as a phosphor, and lanthanum as a catalyst for purifying automobile exhaust gas is growing, and it is said that demand will continue to be strong in the future. Elemental prices for 2018 are US\$70-75/kg of neodymium, US\$3-4/kg of yttrium, and US\$4-5/kg of lanthanum.

In the production of rare earths, ore is first concentrated as rare earth minerals (bastnasite, monazite, xenotime, ion-adsorbed ore, etc.) and then a mixed rare earth compound is produced by decomposition treatment. Then, by separating and purifying the compound, a metal rare earth is produced. In the concentration, flotation for bastnasite and wet specific gravity and magnetic separation for monazite are used. Refining and processing rare metals will increase transportation efficiency and lead to cost reductions.

However, since rare earths behave similarly to radioactive elements such as uranium, they may contain radioactive materials when they are refined, which is a disadvantage in terms of cost. Another issue is the development of technology to extract rare earths from ores at low cost.

2) Current situation

The largest rare earth mine in China is Baiyun Obo mine in Baotou, located in Inner Mongolia. Rare earth production sites outside of China include Mountain Pass in the United States, Hoidas Lake and Thor Lake in Canada, Dabbo Zirconia, Mount Weld and Nolans Bora in Australia.

Demand for rare earths is expected to remain firm in the future as EVs increase and electronic devices become more sophisticated. In addition, countries are hoping to develop rare earth mines outside of China so that rare earth prices will never rise again due to China's export and mining restriction experienced in 2011. The promotion of development of rare earths in Mongolia could have significant effects in curbing the oligopoly of China.

3) Mongolian rare earth potential

China's Baiyun Obo mine is adjacent to Umnogovi Aimag in Mongolia having many geological similarities. It is said that the potential of rare earths in Mongolia is high. According to the US Geological Survey in 2009, Mongolia has 31 million tons of rare earth reserves. There are currently four rare earth deposits identified in Mongolia: Mushgia Khudag and Khotgor in South Govi and Khalzan Buregtei in Khovut and Lugin Gol in Dornogovi. The Mushgia Khudag deposit was jointly surveyed by the Soviet Union and Mongolia in 1983, and drilling exploration has already been carried out from 2007 to 2012.

	<p>Mongolia is surrounded by Russia and China and price control by these countries is a major issue for export of its products. Therefore, it is conceivable to convert rare earth products into commercial products through refining and processing, and to change transport in containers as transit cargo to air transport for direct export.</p> <p>4) Survey scope</p> <p>Resource surveys will be conducted for the four rare earth deposits in Mongolia.</p> <p>Surface reconnaissance: Perform satellite image analysis and geological analysis of this region.</p> <p>Drilling: Acquire detailed data for coring drilling. Sort rocks from collected cores (phosphate ore, carbonatite ore, fluorite ore, etc.). In addition, the host rock structure, mineralization rock structure and shape, etc. are analyzed.</p>
Environment and social impact	Environmental and social considerations should be important part of the survey.
Remarks	

Project No. I8.2

Title	Metal mineral resources market exploration
Location	Throughout Mongolia
Implementing agencies	MMHI, MRPAM
Objectives	<ol style="list-style-type: none"> 1) To survey metal mineral resources to identify promising deposits for early development; and 2) To contribute to diversification of mining sector to continue supporting the Mongolian economy and export.
Expected effects	<ol style="list-style-type: none"> 1) Expansion of export of mineral resources and their products 2) Establishment of processing technology for mineral resources
Project costs	
Implementation schedule	<p>Phase 1: To investigate and analyze the current international supply and demand of copper, gold, molybdenum, silver, tin, and tungsten.</p> <p>Phase 2: 1) To make a global forecast of the supply and demand of these mineral resources, and 2) To analyze international price trends and predict future mineral prices.</p> <p>Phase 3: To evaluate and select export destinations for mineral resources.</p>
Project description	<p>1) Background</p> <p>Mongolia is known to have many mineral resources, but only copper mines are being developed on a large scale. Development of other mineral resources such as gold, silver, iron ore, nickel, zinc, tungsten, fluorite and molybdenum is limited. Reasons include weak infrastructure development, lack of market development, and insufficient forecasting of future demand. In order to solve these problems and increase the amount of mineral resources development in Mongolia, it is necessary to examine export destinations and develop infrastructure based on market prospects and anticipated demand of mineral resources.</p> <p>The global standard prices of metal mineral resources are determined as trade prices at the London Metal Exchange. Demand for metal mineral resources is increasing every year as the world economy develops, resulting in increasing prices.</p> <p>In particular, the rise in prices since 2000 has been remarkable; the international price of copper had been lower than US\$ 3,000 /ton until 2005. However, it has been rising since 2005 and is currently trading at a price above US\$ 5,000 / ton. The highest price in 2019 was US\$ 6,572 /ton. The prices of zinc and lead were below US\$ 1,000 in the past period. It has risen since 2005 and are currently maintaining prices above US\$ 2,000 /ton. The highest prices in 2019 were US\$ 3,018 for zinc and US\$ 2,267/ ton for lead. Nickel and tin prices have risen more rapidly than copper, zinc and lead, and have soared from the past 5,000- US\$ 6,000/ton to US\$ 10,000- 15,000/ton. The price of gold these days is four times higher than that in 2000.</p> <p>Looking at the demand trend of metal mineral resources in the future, the price of copper is expected to rise due to the increase in demand by the spread of EVs and plug-in hybrid vehicles in the future. Copper has traditionally been used in gasoline and hybrid vehicles,</p>

	<p>but EVs require three to four times amount of copper than gasoline vehicle. An estimate indicates the copper demand by EVs will increase by nine times in the next decade. In addition to EVs, copper is expected to see significant demand in the future due to increased demand for electric grids as power generation expands.</p> <p>The production of stainless steel which is the main user of nickel and the demand of nickel for battery are expected to increase year by year causing nickel prices to increase. The demand for lithium will increase with the growth of the EV market, and there is a forecast that lithium prices will rise sharply after 2023 due to a shortage of lithium supply. Rare metals and rare earths are indispensable mineral resources for digital cameras, mobile phones, personal computers, televisions, abrasives of glass substrates, exhaust gas catalysts for automobiles, small motors, IC semiconductors, liquid crystals, superconductivity, etc. The demand is expected to grow significantly in the future.</p> <p>Market development for metal mineral resources should be undertaken reflecting the market prospect and expected demand as outlined above.</p> <p>2) Current situation</p> <p>In 2018, mineral resources accounted for 93% of Mongolia's total export value, of which metal mineral resources accounted for the largest share of 45%, followed by coal 42% and oil 6%. Non-mineral exports account only for 7%. The total export value of metal mineral resources reached US\$3,028 million (45%), and mining of metal mineral resources is a key industry in Mongolia's economy.</p> <p>Copper concentrate accounts for 66.5% (US\$2,013 million) of the total export value of metal mineral resources, followed by iron ore at 11.3% (US\$342 million), zinc 6.5% (US\$197 million), and fluorite 6.3% (US\$191 million), gold 4.8% (US\$145 million), copper ore 2.7% (US\$81 million), molybdenum 1.6% (US\$48 million), and tungsten 0.3% (US\$9 million). Metal mineral resources are an important export product for Mongolia, and stable production and export are expected in the future. To that end, it is indispensable to have a robust mineral resource export strategy based on the market prospect and expected demand.</p> <p>3) Effects</p> <p>By predicting future supply and demand trends and international prices of mineral resources, it will be possible to secure a long-term stable development plan and export destinations.</p> <p>4) Business description</p> <p>First the survey will investigate and analyze the current international supply and demand situation of copper, gold, molybdenum, silver, tin, tungsten, iron ore, fluorite, lead, zinc, etc. After that, a global forecast is conducted of the supply and demand of these mineral resources. Next, the survey will analyze international price trends and predict future mineral prices. Based on this information, a development plan, an export plan, and a processing technology introduction plan are selected.</p>
Environment and social impact	Environmental and social considerations should be integral part of the survey.
Remarks	

Project No. 19.1

Title	Coal transport and export promotion*
Location	Coal mining areas and transport routes
Implementing agencies	MMHI, Ministry of Energy
Objectives	<ol style="list-style-type: none"> 1) To understand market trends in the Asian region including Northeast Asia; 2) To determine optimal routes of coal transportation for export; 3) To establish the Tavan Tolgoi coal supply chain; and 4) To contribute to increasing and enhancing competitiveness of coal export.
Expected effects	Reduced coal transportation costs; and Promotion of coal export by improving and optimizing coal transportation.
Project costs	
Implementation schedule	<p>Phase 1: Global energy and coal supply and demand analysis</p> <p>Phase 2: Coal transportation infrastructure survey, route comparison, analysis</p> <p>Phase 3: Comprehensive evaluation for improving coal export competitiveness</p>

Project description	<p>1) Background</p> <p>Regarding the coal transport of Tavan Tolgoi coalfield, the eastward and southward railways are currently under construction. The eastward railway will connect from Tavan Tolgoi to Sainshand and then to Choibalsan. The southward railway is the route from Tavan Tolgoi to Gashuun Suhait. It is not yet decided which route will connect Tavan Tolgoi coal to the international market. In this study, assuming that Tavan Tolgoi coal is transported to Japan, the economic efficiency of both routes will be evaluated to establish the Tavan Tolgoi coal chain. In addition, the study will survey market trends in the Asian region, including Northeast Asia.</p> <p>Of the two routes of the Russian route and the Chinese route for sending coal from Mongolia to the international market, the Russian route has the same width as the railway track in Mongolia, so transshipment at the border is not necessary. In addition, the Siberian railway itself has the capacity to transport Mongolian coal. However, due to the lack of capacity of the existing port, it is necessary to improve the port to handle a large amount. Another disadvantage is that the transport distance is longer than the Chinese route. The Chinese route has a shorter transport distance than the Russian route and has a sufficient shipping port capacity, but due to the difference in the rail track width with Mongolian railways, transshipment at the border is necessary. In addition, there are disadvantages such as lack of capacity in railway transportation in China. In any case, there is no choice but to send coal using either route, so it will be necessary to consider the route selection in the future.</p> <p>Coal demand is expected to expand, especially in Asia, where economic growth is remarkable. According to the stated policy scenario of the International Energy Agency (IEA), coal demand in 2040 will increase by 97% in India and 91% in Southeast Asia. As for the potential of Mongolia's coal exports, it is important to understand the coal supply and demand conditions in Asia, including Northeast Asia, and to understand future market trends. This study examines coal demand in China and other Northeast Asian countries (Japan, Korea and Taiwan), India and Southeast Asia, and the supply potential of major coal suppliers. If the future competitiveness of Mongolia's coal exports can be analyzed, an effective export strategy can be implemented.</p> <p>Currently, coal exporting countries in the international market include Australia, Indonesia, Mozambique, Colombia, Canada and the United States. However, in order to making the Mongolian coal more competitively with these countries in the international market, it is necessary to consider production costs, transportation costs, port handling costs, and transit costs via China and Russia.</p> <p>The quality of Mongolian coking coal is highly regarded around the world, so there is a high potential for export to East Asia, and steaming coal may also be eligible for export depending on its quality.</p> <p>2) Current situation</p> <p>Four routes are being studied for coal transportation along with coal mine development in Umnugovi Aimag. Route 1 (Nariinsukhait coal mine → Tianjin port) via China, Route 2 (Tavan Tolgoi coal mine → Tianjin port), Route 3 (Tavan Tolgoi coal mine → Bichigt → Jinzhou port), Route 4 via Russia (Tavan Tolgoi → Sukhbaatar → Vladivostok port) were estimated.</p> <p>Estimation of railway transportation costs shows that Route 1 has a total length of 2,056 km, transportation cost US\$58.58/ton, Route 2 has a total length of 1,622 km, transportation cost US\$60.64/ton, and Route 3 has a total length of 2,188 km and transportation cost US\$91.72/ton. Route 4 has a total length of 5,490km and a transport volume of US\$120.61/ ton. Transportation costs include rail fares, customs fees, transshipment costs, port cargo handling, export taxes, etc. Rail fares vary from country to country, and are US\$0.036/ton/km for Mongolia, US\$1.75 + US\$0.009/ton/km for China and US\$0.0193/ton/km for Russia.</p> <p>In 2018 Mongolia exported 36.67 million tons of coal, accounting for 42% of Mongolia's total exports. The breakdown of coal by volume and export by coal quality shows that coking coal after processing is 5.48 million tons (US\$100-120/ton), raw coal 14.4 million tons (US\$60-65/ton), semi coking coal 11.68 million tons (US\$35-40/ton) and steam coal 5.11 million tons (US\$15-20/ton).</p> <p>3) Effects</p> <p>An economic assessment of coal exports from Mongolia to Japan is presented.</p>
---------------------	---

	<p>4) Project scope</p> <p>a) Global energy supply and demand analysis</p> <p>b) Forecast of coal supply and demand in Northeast Asia and other Asian countries</p> <p>c) Infrastructure survey in Mongolia, Russia and China</p> <p>d) Bulk port trends, sea freight estimates</p> <p>e) Consideration of transport fares for Russia and China routes</p> <p>f) Comparison of Russia route and China route and comprehensive evaluation</p> <p>g) Summarization of issues and necessary improvements related to production cost, transportation cost, port handling cost, transit cost via China and Russia affecting Mongolia's export competitiveness</p> <p>h) Summarization of measures to improve coal export competitiveness.</p>
Environment and social impact	Environmental and social considerations should be part of the survey and assessment.
Remarks	

Project No. I9.2

Title	Coal resources survey project
Location	All over Mongolia
Implementing agencies	MMHI, Ministry of Energy
Objectives	To evaluate potentials of Mongolia's coal development through analyses on the geological structure, coal seams and reserves, and coal quality throughout Mongolia
Expected effects	This project will contribute to the addition of coal resources in Mongolia and future mine development strategy by clarifying the areas where coal exists with new development potential.
Project costs	
Implementation schedule	<p>Phase 1: The coal resource survey area will be examined, a survey area will be determined, and a wide area survey will be conducted. (2 years)</p> <p>Phase 2: A detailed study area is selected from the study area, and a detailed geological survey is conducted in this area to clarify the coal development potential. (2 years)</p> <p>Phase 3: Analysis of coal resources (1 year)</p>
Project description	<p>1) Background</p> <p>Coal resources in Mongolia are distributed in 15 coal basins, and about 320 coal deposits have been identified in these basins. The age of coal deposits varies from Carboniferous to Cretaceous, and its properties change from western to eastern Mongolia. The Kharkhiraa basin, Bayan-Ulgii basin, and Mongol-Altai basin, located in western Mongolia, were formed in the Carboniferous. These basins contain bituminous coal (steaming coal and coking coal). These coal basins are characterized by coastal lagoons and advanced carbonization. The Umnugovi basin, located in the southern part of Mongolia, was formed in the Permian, and similarly in-situ bituminous coal (steaming coal and coking coal). This basin, containing promising coal deposits such as the Tavan Tolgoi deposit, is actively developed for coking coal. The Choir-Nyalga basin in central Mongolia and the Tamsag basin in eastern Mongolia are formed in the Jurassic and Cretaceous, respectively. The coal quality is sub-bituminous coal to lignite that is lower than the coal in the western and southern basins and is considered to have been produced in a closed sedimentary environment. The formation of coal seams in Mongolian is characterized by different tectonic movements and sedimentation sites depending on the age.</p> <p>Until 2007, coal mines developed during the socialist era produced less than 10 million tons of Cretaceous lignite for domestic supply. After that, a number of high-quality coking coals contained in Permian were discovered in Umnugovi Aimag, which led to the full-scale development of the Erdenes Tavan Tolgoi coal mine, Ukhua Khudag coal mine, and Nariin Sukhait coal mine.</p> <p>Good coal resources are also known in Bayankhongor Aimag and Govi-Altay Aimag located in west from Umnugovi Aimag, and Khuvsgul and Bulgun near the border with Russia in the north of Mongolia. Unexplored areas still remain within Umnugovi Aimag.</p>

	<p>Coal deposits spreading in these areas have few data and records of coal resource exploration that can evaluate the total amount of resources. Therefore, the full potential of coal resources has not been clarified. At present, the amount of coal resources announced by the Mongolian Government is 162 billion tons, but the resources actually determined by exploration is small. Therefore, it is extremely important to conduct coal resource exploration in unexplored areas spreading throughout Mongolia, and to investigate the geological structure of coal deposits, the state of coal seams, the amount of coal reserves, and the quality of coal, and to evaluate the potential of coal resources.</p> <p>2) Scope of survey</p> <p>Before the development of the coal mine, a coal resource survey will be conducted as follows.</p> <p>Remote sensing survey</p> <ul style="list-style-type: none"> ✓ Obtain the extensive geological and terrain information. Used to selecting expecting areas from a wide area. <p>Geological survey</p> <ul style="list-style-type: none"> ✓ Recognize the actual rock composition, alteration, sedimentary structure, etc. through outcrop surveys on the ground <p>Geophysical exploration</p> <ul style="list-style-type: none"> ✓ Use the underground information by magnetic/gravity/electromagnetic exploration from the ground or in the air, useful for selecting the expecting areas. Exploration from the air can cover a wide area. ✓ Recognize physical properties by physical logging using boreholes. <p>Drilling survey</p> <ul style="list-style-type: none"> ✓ Collect rocks directly from the selected expecting (possible) underground at the ground or sea, and used for direct observation of mineral deposits, chemical analysis of minerals, and physical property tests. <p>Deposit evaluation</p> <ul style="list-style-type: none"> ✓ Visualize the three-dimensional distribution of minerals and resources, geological structure, and grade distribution by utilizing the acquired data with analysis software. <p>As mentioned above, the Tavan Tolgoi coalfield in Umnugovi Aimag has been conducting coal resource exploration for many years, and as a result, it has been confirmed that high quality coking coal for steelmaking has been identified. When coal mine development progressed and full-scale development began in 2018, Mongolia's coking coal supply further increased.</p> <p>Areas other than the Tavan Tolgoi coalfield have not been surveyed so far, and data on geology and coal resources are limited. It is important to conduct a sufficient wide-area basic survey to identify areas with potential coal resources. Until now, new coal mines have been developed mainly in Umnugovi Aimag, but in recent years, a coking coal development project for the Ovoot coalfield has been promoted by Aspire Mining (Australia) in northern Khuvsgul Aimag.</p> <p>3) Effects</p> <p>Understanding of Mongolian coal resources, reserves and coal quality. Promotion of coal mine development along with confirmation of coal reserves, attracting foreign capital Improving export potential by increasing quality coal reserves Diversification of coal production areas</p> <p>4) Implementation scope</p> <p>This survey will be divided into Phase I and Phase II, and a coal resource survey will be conducted in stages. The contents of each phase are shown below.</p> <p>[Phase I] Carry out satellite image analysis, wide-area aeromagnetic exploration, and surface reconnaissance in the survey area of about 120,000 km². Collect existing borehole data and coal analysis data, create a database, and analyze wide area, geological structure, and existence of coal. Based on the analysis results, select the area for detailed survey.</p> <p>[Phase II] <u>Surface reconnaissance</u> Satellite image analysis will be conducted for the area selected as the detailed survey area, geological analysis will be conducted in this area, and a coal and rock outcrop will be</p>
--	---

	<p>conducted on site.</p> <p><u>Trial drilling</u> Detailed coring drilling is performed in the selected area and detailed data contributing to the mining plan is acquired. Check the depth of all coal seams, the existence status of partings etc., coal grades, and rock types other than coal seams by drilling.</p> <p><u>Physical logging</u> In addition to macroscopic observation with the borehole core, physical logging such as natural gamma and density is carried out in all boreholes. (Seismic exploration) Conduct reflection seismic exploration and VSP exploration using boreholes.</p> <p><u>Coal quality analysis</u> Analyzes the quality of major coal seams.</p> <p><u>Creation of topographic/geological database</u> A comprehensive database of this project will be created by adding newly acquired data to the existing database.</p> <p>[PhaseIII] <u>Integrated geological analysis/evaluation work</u> Based on the existing geological data, geophysical exploration data and borehole data obtained, comprehensive geological analysis and evaluation work will be carried out.</p>
Environment and social impact	
Remarks	

Project No. 19.3

Title	Optimized coal washing business master planning
Location	Coking coal mine for steel mill
Implementing agencies	MMHI, Ministry of Energy
Objectives	To contribute value added production and supply of coal and reduction of GHG emissions by washing the raw material coal for steel mill, it will be possible to increase the added value of coal and supply high quality coal at a high level, which will contribute to the national income of Mongolia by raising the unit price. Also, it can be expected that GHG emissions will be reduced due to a significant improvement in transportation efficiency due to local coal processing, contributing to global warming prevention measures. In addition, the efficient use of No. 2 produced coal after coal washing will be established.
Expected effects	<ol style="list-style-type: none"> 1) Coal preparation raises coal sales prices. 2) An increase in transportation efficiency and a significant environmental improvement can be expected. 3) Effective utilization of the currently abandoned No. 2 coal is promoted. 4) Coal preparation improves combustion efficiency at power plants and contributes to GHG reduction.
Project costs	
Implementation schedule	<p>Phase1: Field survey of coal-producing area, possibility of coal washing, master plan target setting in 2021</p> <p>Phase 2: Dry coal washing, wet coal washing, examination of coal preparation methods, evaluation of utilization method for No2 coal produced after washing in 2022</p> <p>Phase 3: Preparing a master plan in 2023</p>
Project description	<ol style="list-style-type: none"> 1) Background Southern Govi region in Mongolia has abundant coking coal for steelmaking. In particular, the Taban Tolgoi coal field, located in the eastern part of the South Govi region, has the world's leading coking coal for steelmaking with reserves reaching 6.4 billion tons. Since production areas of coking coal for ironmaking are limited worldwide, the development of a new production area in Mongolia is regarded as an important coal development in the world. Currently, most of Mongolian coal is exported to China, but since it has been exported as raw coal, the coal prices were kept low, and coal transportation efficiency was low, which had a heavy environmental impact as well. Mined coal (raw coal) contains inorganic minerals (ash, etc.) in addition to organic coal. Coal preparation is a process to produce commercial coal having the quality (particle size,

	<p>moisture, ash, calorific value, sulfur content, etc.) by reducing this mineral substance. By the coal preparation, useless minerals (ash, etc.) is removed.</p> <p>By preparation of coal mined at the coal mine site, many benefits will be generated: 1) reduced transport costs, 2) reduced coal storage need, 3) reduced pulverizer load, 4) reduced ash trouble, 5) reduced dust collector load, 6) reduced flue gas desulfurization equipment load, 7) ash reduced processing volume, 8) reduced air pollution, and 9) improved power generation efficiency as a result.</p> <p>There are two methods of coal preparation: gravity separation method using a difference in specific gravity and a flotation method using hydrophilicity (oleophobicity) of the surface of mineral particles. The most important issue in the design of coal preparation equipment is to optimize the equipment suitable for the quality of coal mined. Preparation equipment includes bulk heavy separation, heavy liquid cyclones, jigs, spiral sorters, Teetered Bed Separator (TBS) and flotation machines. For optimization, the most rational preparation equipment must be selected from these equipment by considering coal properties, particle size, separating accuracy, etc..</p> <p>Coking coal for steelmaking is processed into coke, which is used as a reduction material for iron ore in a blast furnace. The mined raw coal usually varies in quality, and the ash and sulfur content of the coal is high. Coking coal for steelmaking is required to have "constant quality, low ash content and low sulfur content". Therefore, it naturally needs the constant coal quality. If the ash and sulfur contents are high, poor quality coke is generated and the pig iron produced in the blast furnace becomes brittle. For this reason, raw coal for steelmaking is adjusted to a certain quality, and ash and sulfur content are kept low through the coal preparation plant. The issues in this process is the handling of by-products. When producing coking coal (primary products) for steelmaking of good quality, intermediate products (secondary products) are always generated as by-products. This secondary product is called No. 2 coal. No. 2 coal has a large amount of ash but has a calorific value of about 4,000 kcal/kg. It can be used effectively unlike wasted rock and can be used as a thermal coal in coal-fired power plants and industrial boilers.</p> <p>2) Current situation</p> <p>In Mongolia, a coal preparation plant has been set up at Ukuhaa Khudag (UHG) coal mine of Energy Resources, which mines coal at the Tavan Tolgoi coalfield. The raw coal processing capacity of the coal preparation equipment is 5 million ton/year (900 ton/hour) x 3 units, and 15 million ton/year (2,700 ton/hour). Raw coal of 1.2 to 50 mm is separated into three products, coking coal, No. 2 coal and wasted rock by the primary heavy liquid cyclone and the secondary heavy liquid cyclone. Raw coal smaller than 1.2 mm is classified by a classification cyclone until 0.2 mm, and 0.2-1.2 mm is supplied by spiral equipment and 0.2 mm or less is supplied by the flotation machine in order to produce coking coal. The amount of water used is 135m³/hour. This water is taken from a well 20 km away from the coal preparation plant. There are 12 wells in total, but six wells are running to supply 350-400m³/hour of water to coal preparation plants and power plants. At the coal preparation plant of the UHG coal mine, No. 2 coal (secondary product) is generated about 30 million ton/year. It is partially used by a power generation company (18 megawatt (MW)) owned by Energy Resources. The remaining No. 2 coal is discarded at a waste dump without being used. The challenge is how to utilize No. 2 coal.</p> <p>In Mongolia, rainfall is low and securing water for coal mine development is not easy. In order to use a large amount of water, coal preparation plants sometimes supply water by digging deeply for groundwater and through the pipelines from rivers far from the coal mine area. In recent years, people living in coal mining areas have been increasingly opposing water supply to coal mines. For this reason, it is necessary for the coal preparation plant to take measures such as reducing the amount of water and usage of the recycled water. Nowadays, dry coal preparation that does not require water has been developed. A pseudo-fluid having a constant specific gravity is prepared by using sand or the like as a fluidized bed, and dry coal preparation is used the specific gravity selection with no water required. However, the verification test has not started yet.</p> <p>This study examines the coal preparation method according to Mongolia's natural conditions, regional characteristics, and coal mine production scale. In addition, the study examines methods to secure the water necessary for coal preparation, improve the recycling of coal preparation water, promote the effective use of coal No. 2. The study will contribute to improving the coal quality at all coal mines in Mongolia and increasing the added value of coal.</p>
--	---

	<p>3) Effects</p> <p>Coal preparation raises coal sales prices. An increase in transportation efficiency and a significant environmental improvement can be expected. Effective utilization of the currently abandoned No. 2 coal is promoted. Coal preparation improves combustion efficiency at power plants and contributes to GHG reduction.</p> <p>4) Implementation scope</p> <p>In carrying out the study, the emphasis will be placed on field surveys at each mine. The contents of the survey are shown below. Conduct a field survey of the candidate coal mines, and select the coal washing method by examining and evaluating the production scale, coal quality, and water availability of the mines. Examine the development plan of candidate coal mine, utilization of coal No.2 produced after coal washing, and sales plan. Target setting (CO₂ reduction, energy saving, profit, etc.), evaluation, and business proposal. Build a business model and create a final master plan.</p>
Environment and social impact	Contribute to the improvement of the global environment by introducing a coal washing method that does not place a large burden on the environment. In addition, coal washing technology that meets the location and environmental conditions of the coal mine is provided.
Remarks	Erdenes Tavan Tolgoi LLC is currently conducting a dry coal washing demonstration test as a joint project with New Industrial Technology Development Organization (NEDO).

Project No. I9.4

Title	Coal-based industrial cluster development
Location	Candidate sites include Mongolian large coal mine, Tavan tolgoi, and brown coal mine (Baganuur, Shivee-Ovoo).
Implementing agencies	MMHI, Ministry of Energy
Objectives	Formulate a master plan for building a coal-related industry chain from specific coal mining areas, ranging from environmentally friendly coal development to Coal utilization.
Expected effects	<ol style="list-style-type: none"> 1) A coal-related industry chain can be established and contribute to the development of Mongolia's industry and generation of employment. 2) Coal resources can be effectively used, and sustainable coal mine development can be achieved. 3) The environmental load of coal can be minimized. 4) A coal mine town with no mine pollution, low carbon and resource recycling in harmony with the local residents can be formed, contributing to regional development.
Project costs	
Implementation schedule	<p>Phase 1: Selection of target sites, setting of master plan goals, needs survey in 2021</p> <p>Phase 2: Collection, evaluation and selection of potential Japanese seeds technologies to match needs in Mongolia in 2022</p> <p>Phase 3: Preparation of a master plan</p>
Project description	<p>1) Background</p> <p>Mongolia is located close to Japan, China and Korea which are the world's largest coal consumers and is attracting attention of customers in Asia from the viewpoint of stable coal supply. The development of the Tavan Tolgoi coal field which has high-grade coking coal has rapidly developed as well as the other large-scale coal fields. These developments of coal fields have been contributing to the regional economic development in Mongolia.</p> <p>The concept of coal-related industrial chain from coal production, processing to its utilization is an innovative idea that can contribute to urban development centering on coal and inducing related activities with value-added. The coal-related industry chain increases the value added of coal, induces clean use of coal to reduce adverse environmental impact, and optimizes production efficiency by utilizing clean coal technology (CCT), wastewater treatment technology and operation systems from upstream to downstream of coal related activities. It is expected to protect the environment in terms of both energy and materials</p>

while making effective use of resources. For example, it is possible to contribute to the improvement of the environment such as air and water quality by effectively utilizing coal mine drainage, briquetting coal, and producing activated carbon. Furthermore, promotion of employment and establishment of an academic city is realized by formulation and promotion of masterplan based on effective use of coal and environmental improvement. The basic concept is to build a coal-related industrial chain, which aims to operate coal mines efficiently, respond promptly to the environmental conditions, and reduce carbon emissions. In order to secure coal resources over the long term, it is necessary to consider comprehensive coal resource development projects ranging from resource exploration, coal mine development, production with security, environmental protection, and infrastructure development. In establishing effectively combined value chain, these coal-related activities should be considered as a package and upstream fields of coal mining to downstream related industries such as coal-fired power generation, coal chemical industry, and wastewater treatment industry must be linked efficiently.

At the stage of the master plan formulation, targets are set related to energy saving, waste reduction, profit improvement, and reduction of GHG emissions. The effects of introducing seeds technology to coal development and utilization industries will be examined hierarchically and quantitatively. For coal mining areas that already have a regional development plan, the current situation of the plan will be analyzed, and the effect of introducing CCT and environmental and energy saving technologies will be examined.

2) Current situation

The Tavan Tolgoi coal mine, where coal is being developed in Umnugovi Aimag, is expected to be the largest coking coal export base in the Country and is designated as a strategic deposit. The Government has conducted a plan to increase production, and the development of transportation infrastructure and the construction of roads and railways is underway. Several private and state-owned mines coexist in this coal mine, and efforts are being made to improve social infrastructure in response to the Government's policy to increase production. The population of the neighboring town has increased due to the expansion of the coal mine; the population less than 1,000 a decade ago has now reached nearly 10,000. The town has houses, schools, kindergartens and hospitals, as well as small sewing companies. In these areas, mines and local residents are working together to create a harmonious town. However, the town have issues such as securing and purifying water, treating waste and dust from coal mines, greening the town and treating garbage. There is a need for an environment-friendly coal mine town.

The master plan of a coal-related industry chain will solve these issues and form a value chain that aims to add value to coal. In addition, efforts will be made to reduce GHGs from overall viewpoint of the entire coal mine town in order to reduce the carbon emissions of the coal mine. At the state-owned Baganuur coal mine, a master plan to build coal gasification, power plants, cement plants, etc. is already under way to increase the value of coal.

3) Effects

In coal-producing countries where coal mines are being developed, there is concern that unused energy, wastes, and environmental pollutants are emitted in the large quantities. Emissions include methane gas and wastewater generated during coal mining, wastes and sludge generated during coal preparation, coal ash and air pollutants emitted from power plants. However, these can be recycled depending on the processing method, and can improve productivity and reduce environmental load.

In addition, promoting energy interchange and recycling of wastes among industries can strengthen cooperation between industries and create new industries, and can realize low carbon and resource recycling throughout the coal mining region.

This project will formulate a master plan and implementation plan for the construction of a coal-related industry value chain that is an organic and efficient combination of coal-related industries such as coal-fired power generation and the coal chemical industry, with the model coal mine area as the core. In formulating a master plan, CCT available in Japan is examined from upstream to downstream to optimize production efficiency, use resources effectively, and protect the environment from both energy and material flows.

4) Implementation scope and implementing arrangements

The survey is divided into five items and conducted in stages: 1) Selection of candidate sites, 2) Detailed survey on policies, 3) Identification of technologies owned by the Japanese side, 4) Feasibility study, 5) Master plan formulation. Specific methods are shown below (Figure

	<p>1). Conduct field survey of the target candidate areas to examine and evaluate the needs and feasibility of introducing Japanese seed technology and determine whether or not to establish a coal-related industry chain. Examine the needs of the selected candidate sites and the targets of the development plan. Set targets related to CO₂ reduction, energy saving, profit, etc., evaluate seed technology introduction, and prepare business proposal. Propose the final master plan from business model construction (implementation system, policy tools, finance scheme, etc.) and pre-feasibility study (PFS) and plan formation.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 30%;"> <p>1. Establishing objectives and targets of cluster development (CO₂ reduction) 2. Selection of project mine 3. Selection of mining, processing and waste treatment technologies</p> </div> <div style="font-size: 2em;">⇒</div> <div style="border: 1px solid black; padding: 5px; width: 30%;"> <p>4. Feasibility analysis on selected technologies 5. Determination of components of cluster 6. Preparation of stage wise development plan with technology development schedule</p> </div> <div style="font-size: 2em;">⇒</div> <div style="border: 1px solid black; padding: 5px; width: 30%;"> <p>7. F/S of first stage development (raw materials, products and markets, implementing arrangements, profitability, Government support) 8. Research & development for products quality improvement and market development</p> </div> </div> <div style="text-align: center; margin-top: 10px;"> <p>↓</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>9. Implementation of first stage</p> </div> </div> <div style="margin-top: 10px;"> <p>Implementing arrangements</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px; background-color: #e0e0e0;">Public-private partnership</div> <div style="border: 1px solid black; padding: 2px 5px; background-color: #e0e0e0;">Private firms</div> <div style="border: 1px solid black; padding: 2px 5px; background-color: #e0e0e0;">Private firms supported by the Government</div> </div> </div> <p style="text-align: center; margin-top: 10px;">Figure 1 Implementation Stage and Implementing Arrangements</p>
Environment and social impact	Simultaneous achievement of maximum utility and minimum environmental impact caused by coal resources.
Remarks	This project is expected to contribute to the local community centering on Mongolian coal mines and strengthen the multi-layered relationship with the Mongolian Government and related companies. In addition, it contributes to the business development and sustainable development of Japanese companies with environmental technology and coal processing technology.

Project No. I10.1

Title	Dinosaur museum
Location	Govi Desert / Ulaanbaatar
Implementing agencies	Institute for the Study of Mongolian Dinosaurs (ISMD); Institute of Paleontology and Geology of Mongolian Academy of Sciences (IPGMAS); Ministry of Environment and Tourism (MET); Asian Dinosaur Association (ADA); Private sector
Objectives	<p>Ultimate objective: To establish a world class dinosaur museum in the homeland of dinosaur fossil discoveries, attracting dinosaur enthusiasts from all over the world.</p> <p>Specific objectives:</p> <ol style="list-style-type: none"> 1) To establish a dinosaur museum in the Govi desert, and 2) To become the world class authority for displaying the rarest dinosaur fossils and attracting dinosaur lovers.
Expected effects	<ol style="list-style-type: none"> 1) Worldwide advertisement of Mongolia's dinosaur fossils; 2) Increased number of tourists; 3) Production of various value-added products based on the dinosaur theme and increasing tourist export; 4) Education and awareness raising; and 5) Preservation of valuable dinosaur fossils.
Project costs	US\$
Implementation schedule	<p>Project development: 2021-2023 Initial implementation of the project: 2022-2024 Full scale operation of the project: 2024~</p>
Project description	<ol style="list-style-type: none"> 1) Background The first dinosaur egg nests were discovered nearly a hundred years ago by American scientist Roy Chapman Andrews in the Flaming Cliffs – Bayanzag in the Govi desert,

	<p>Umnugovi Aimag. Although being the largest dinosaur fossil reservoir in the world, this scientific heritage remains unknown to many people inhabiting the area, nonetheless the tourists visiting the area. Currently there are no signs, maps or museums to give visitors information about these creatures. There is only one mobile museum operating that strives to educate the locals and spread the awareness about the importance and significance of the area.</p> <p>Moreover, fossil-poaching has become a serious problem throughout years due to lack of education and ownership of this heritage. An earlier BBC investigation revealed that in the past five years US Immigration and Customs Enforcement has seized US\$44 million worth of smuggled dinosaur fossils.</p> <p>Education and dinosaur tourism are the most effective solution for combating with issues such as fossil-poaching, raising awareness and inspiring the next generation of scientists and paleontologists. With this initiative, the local people will also be able to give dinosaur tours, increasing their income while helping protect the area. Cost of inaction (COI) for such kind of projects is enormous, resulting in loss of opportunities that will help educate the tourists and also locals as well who will be the main guardians of the resources available. Mongolia as the homeland of dinosaur fossil discoveries has a high potential in becoming the world class authority for presenting them. There are a large number of dinosaur enthusiasts in the world who would be attracted to coming to the capital of the dinosaurs. The locals should also be involved, taking pride and ownership of this paleontological discoveries contributing to the humanity’s advancement of science.</p> <p>2) Project components</p> <p>The project is to establish a dinosaur museum, including 1) permanent and rotating exhibitions focused on Mongolian fossils and the life of dinosaurs; 2) educational facilities and resources for Mongolian and international school-aged children; 3) outdoor archaeology park featuring recreations of famous fossil discoveries in Mongolia; and 4) partnerships with Mongolian and international universities to facilitate dinosaur-related research.</p> <p>3) Implementing arrangements</p> <p>MET is the government implementing agency responsible for promoting the tourism aspect of the dinosaur museum, whereas ISMD and IPGMAS would be the main body for directing the theme and display of the museum. Technical transfer could be provided from Fukui Prefectural Dinosaur Museum and ADA.</p> <p>The stakeholders will be responsible for selecting the project Site and deciding the size of the operation, providing professional and methodological advice, supporting fund sourcing for international grants and investment for infrastructure. Special consideration should be given to ease of access from Ulaanbaatar and a feasibility of establishing two sites in the long-term, one near Ulaanbaatar and one in the Govi Desert where most Mongolian fossils are discovered.</p>
Environment and social impact	<p>Significantly positive advertisement for Mongolia’s tourism sector; Fundamental social impact through education and engagement; Strengthening of connections between local communities and research universities;</p> <p>Significant increase in the income of locals and preservation of the area; and Contribution towards combating fossil-poaching</p>
Remarks	

Project No. I10.2

Title	“Urtuu” service stop areas
Location	Along the main tourism route (initial focus on the area between Sainshand and Zamyn-Uud)
Implementing agencies	Ministry of Road and Transportation Development (MRTD), MET, MCUD Private sector, Research Institute for Road and Street (RIRS) – Japan
Objectives	<p>Ultimate objective: To establish a network of <i>Urtuus</i> that would enhance the tourism infrastructure, while providing safety and security</p> <p>Specific objectives:</p> <ol style="list-style-type: none"> 1) To establish a model <i>Urtuu</i>, and 2) To set a standard and create a space for tourists and local people to connect through information sharing, and exchange of goods and services

Expected effects	<ol style="list-style-type: none"> 1) Improved infrastructure along the main tourist routes, 2) Provide tourists and locals with information, recreation and a safe rest area with proper utilities and services that also contributes to the local economy.
Project costs	US\$
Implementation schedule	<p>Project development: 2020-22</p> <p>Initial implementation of the project: 2022-2023</p> <p>Full scale operation of the project: 2023~</p>
Project description	<ol style="list-style-type: none"> 1) Background <p>Improvement of the tourist infrastructure is listed as a high priority in the relevant policy documents such as the SDV2030, the Tourism Development National Program (TDNP), and the Three Pillar Development Policy (TPDP). The current service stops along the main tourist routes lack proper facilities and services and proper sustainable facility management. In Japan, All Nippon Michi-no-Eki is a network and organization divided into regional blocks to facilitate information exchange and mutual cooperation within districts. There are about 1,160 <i>michi-no-ekis</i> in Japan, serving three distinct features: refresh, community and information.</p> <p>During the Mongol Empire 800 years ago, the fastest postal system consisted of stations, or “Urtuu,” at discrete intervals for the king’s messengers to rest, change horses, etc. Also, during that time, travel along the Silk Road was safe for everyone including traders carrying goods and treasure. This period was known as the Pax Mongolica.</p> <p>The ultimate objective is to reintroduce the historical Urtuu networks according to the Japanese <i>michi-no-eki</i> standards while retaining the traditional and historic image of Urtuus. The system would be an effective way of marketing the network of Urtuus with historical significance, where anybody traveling would have access to information, rest areas and information about local cultural resources at these designated stations. These stations would further enhance both safety and access for travelers.</p> 2) Project components <p>The project is to establish a model <i>michi-no eki</i> resting area according to a Japanese standard, comprising 1) rest stop for tourists and visitors with facilities; 2) informational and vendor partnerships with local businesses and residents; 3) incorporation of historical regional cultural resources into the facility design; and 4) identifying candidate locations for additional <i>michi-no eki</i> stops.</p> 3) Implementing arrangements <p>MRTD in collaboration with MET, MCUD, private sectors and the Japanese side RIRS would be responsible for finding the location of the stop areas and deciding the size of the operation, providing professional and methodological advice, supporting fund sourcing for international grants and investment for infrastructure. Candidate funding sources for the model facility include JICA, ADB, and World Bank (WB). An important criterion in selecting a funding organization will be if that organization is able to ensure sufficient input for private investment promotion.</p>
Environment and social impact	Significant positive environmental impact due to improved sanitation; Fundamental contribution to the overall tourism image of Mongolia from marketing and safety perspectives; and Increased local economic impact.
Remarks	

Project No. II0.3

Title	Ger district handicraft street
Location	Ger district, Urt Tsagaan (Tourism street), Ulaanbaatar:
Implementing agencies	Tourism Department of Ulaanbaatar; Local communities; Private sector
Objectives	<p>Ultimate objective:</p> <ol style="list-style-type: none"> 1) To establish a street in Ger district/Urt Tsagaan, where locally-made handicrafts are sold to tourist and visitors <p>Specific objectives:</p> <ol style="list-style-type: none"> 2) To establish a market in the Ger district/tourist street, and 3) To facilitate cultural exchanges between the locals and tourists and visitors.

Expected effects	<ol style="list-style-type: none"> 1) Provide additional income opportunities for low-income households; 2) Cultural exchange; and 3) Possibility for capacity building training for residents who want to sell goods at the market.
Project costs	US\$
Implementation schedule	<p>Project development: 2021-2022</p> <p>Initial implementation of the project: 2022-2023</p> <p>Full scale operation of the project: 2024~</p>
Project description	<ol style="list-style-type: none"> 1) Background Ger districts of Ulaanbaatar occupy a widespread area of land and encompass 60% of the UB population. The lack of infrastructure in Ger districts presents challenges but provides a unique linkage between the capital city and the Mongolian national identity rooted in the nomadic way of life. Many foreigners are interested in the Ger districts, however there is not currently a secure and easy way for tourists to access them. The project idea has been derived from proposals by some tourism researchers and educators. 2) Project components <ol style="list-style-type: none"> a) Establishment of a street dedicated to selling local-made handicrafts; b) Linking foreign tourists and visitors to the locals; and c) Support centers for capacity building and training for those interested in learning how to make handicrafts and interact with tourists to increase their income. <p>Location of the handicraft street could be set at the Urt Tsagaan street that has been designated as a tourist street in 2005, and the activities of the handicraft making to be linked to vocational education centers such as sub-centers around the ger area (http://www.ub-subcenter.mn/en/page/1). This project could potentially contribute to increasing the household income, especially for women.</p> 3) Implementing arrangements The Tourism Department of Ulaanbaatar in collaboration with the local communities, private sector and relevant stakeholders would be responsible for selecting the location of the market and deciding the size of the operation, providing professional and methodological advice, supporting fund sourcing for international grants and investment for infrastructure.
Environment and social impact	<p>Significant positive social impact through creation of additional income for low-income households;</p> <p>Fundamental social impact through cultural exchange between the locals of ger districts and visitors</p>
Remarks	

Project No. I10.4

Title	Winter sports and leisure center
Location	Close to Ulaanbaatar
Implementing agencies	MRTD, MET, MCUD Private sector
Objectives	<p>Ultimate objective: To take advantage of Mongolia's harsh climate conditions for the development of tourism and the improvement of health conditions of the locals.</p> <p>Specific objectives:</p> <ol style="list-style-type: none"> 1) To provide recreational and cultural opportunities for Mongolia people, particularly those in Ulaanbaatar, and 2) To facilitate increased wintertime international tourism.
Expected effects	<ol style="list-style-type: none"> 1) Improved health of Mongolian people; 2) Increased cultural awareness; and Increased wintertime tourism.
Project costs	US\$

Implementation schedule	Project development: 2021-2022 Initial implementation of the project: 2022-2023 Full scale operation of the project: 2024~
Project description	<p>1) Background</p> <p>Winter is regarded as off-season for tourism and almost no foreign tourists visit Mongolia in winter. Opportunities for exercise are limited in Ulaanbaatar during winter and many residents are or are at risk of suffering from chronic lifestyle diseases. Poor wintertime air quality further increases health risks in the city. A new complex with winter sports, hot springs and cultural programs is proposed to be established at an appropriate location to address these issues. This initiative will lead to better health conditions of Mongolian people and create jobs through increased international tourism.</p> <p>2) Project components</p> <p>Indoor winter sports arena: ice rink for curling, free skating, ice hockey, gymnasium Hot spring for fun and therapy Outdoor adventure sports experiences: skiing, cross country skiing, dog sledding, horse sledding, hunting, fishing Cultural activities: Igloo, Kamakura, snow festival Restaurants and hotels Vegetable farm: to supply fresh vegetables to guests</p> <p>3) Implementing arrangements</p> <p>Possibilities will be sought for securing budget for planning, design, cost estimation and investment promotion to the private sector. Candidate funding sources for the study phase include JICA, ADB, and WB. An important criterion in selecting a funding organization will be if that organization is able to ensure sufficient input for private investment promotion.</p> <p>Since the project is assumed to be implemented through PPP, identification of candidate private investors at an early stage will be essential. As soon as a feasibility study is completed, the project will be presented to possible investors in Ulaanbaatar, Tokyo, Korea, China and other interested countries.</p> <p>Funds from international and bilateral donor organizations should be explored in parallel for the implementation of the project.</p>
Environment and social impact	Increased awareness of wintertime recreational activities in Ulaanbaatar vicinity; Fundamental social impacts through cultural exchange between Mongolians and international visitors.
Remarks	

Project No. I10.5

Title	Nalaikh mining museum, cultural and education center
Location	Nalaikh district
Implementing agencies	Collaboration of Mongolian and International organizations from Germany, Canada and Japan, and the Governor's office of Nalaikh district
Objectives	<p>Ultimate objective:</p> <p>To establish a mining museum, cultural and educational center that would preserve the culture and history of the mining town of Nalaikh and serve as an educational resource.</p> <p>Specific objectives:</p> <ol style="list-style-type: none"> 1) To establish a mining museum and educational center in Nalaikh, 2) To help preserve the cultural heritage of Nalaikh district, and 3) Serve as a sightseeing attraction for passing tourists.
Expected effects	<ol style="list-style-type: none"> 1) Construction of a mining museum, cultural and educational center as a model case for restoring local identity; 2) Benefit to the local community and visitors to the town; and 3) Significant revitalization of a small town and contribution towards community building; Reviving the sense of identity, history and belonging.
Project costs	US\$

Implementation schedule	Project development: 2021-2022 Initial implementation of the project: 2022-2023 Full scale operation of the project: 2024~
Project description	<p>1) Background</p> <p>The Nalaikh coal mine has a long history spanning from 1905 to 1990 and played a significant role in the industrial mining development across Mongolia. It is also a place where the Mongolian railroad started, carrying coal to the first power plant. Nalaikh has a multiethnic cultural background (Kazakh nationals' historical settlement in the town) and a rich history.</p> <p>School-aged children including kindergarteners both in the Nalaikh district and across Mongolia would benefit from such a museum, cultural and educational center. The German-Mongolian Institute for Resources and Technology (GMIT) is located in Nalaikh district. The Institute generates continuous traffic passing by the district of Nalaikh. Locating such a museum, cultural and educational center would be beneficial for both tourists and locals.</p> <p>The center would also be a place to showcase the hopes, dreams and aspirations of the locals as a community while linking it to their history and pride. It could be a model case for restoring local identity and rejuvenating small communities especially those surrounding the capital city in order to expand the viability and drive of the capital through empowerment and education.</p> <p>The Governor's office of Nalaikh District is the main initiating body of this project. They have gained support from Canadian researchers.</p> <p>The Nalaikh mining museum, cultural and education center can play a significant role for rejuvenating the local community of Nalaikh in various ways, which will positively impact its development.</p> <p>2) Project components</p> <p>The project is to establish a museum in the vicinity of the existing Nalakh coal mining administration building, mining shaft, and railroad station. The three-story administration building would house the main exhibits while shafts would serve as the primary viewing area for guided tours and visitors.</p> <p>3) Implementing arrangements</p> <p>An international collaboration is possible, where various organizations from Germany, Canada, Japan and Mongolia can collaborate on the project with support from the Governor's office of Nalaikh district.</p> <p>GMIT's location in Nalaikh indicates the presence of ongoing German collaboration in Nalaikh. Germany is also quite famous for coal mining towns. There is possibility for inviting potential German companies (such as CDM Smith) that implement official development assistance (ODA) work through international donor funding. There are several Canadian researchers that avidly support such cultural and historical centers.</p>
Environment and social impact	Significantly positive cultural and historical impact; Fundamental social impact through educating and preserving the common history of the mining town.
Remarks	

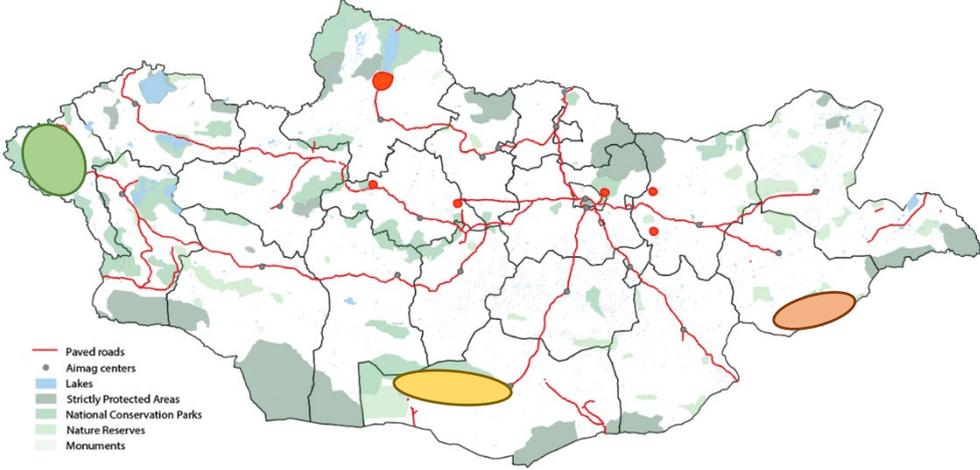
Project No. I10.6

Title	Tourism sector database development
Location	Not specified
Implementing agencies	MET, National Statistical Office (NSO), Aimag governments, Mongolian Tourism Association (MTA)
Objectives	To establish a comprehensive database for tourism sector in order to make informed and evidence-based decision-making
Expected effects	Government policies and rules and regulations will be informed and based on evidence, creating effective systems
Project costs	US\$
Implementation schedule	Continuous implementation through Phase 1 through Phase 3

Project description	<p>1) Background</p> <p>Currently, the tourism sector data collection is not adequate to serve as the sole reliable basis for informed decision-making. There is a lack of systematic data collection or methodology established. In fact, the data currently being collected are not fully and effectively utilized as they are scattered around in different agencies without a single authority in charge to handle and manage them. As for some cases, the forms are outdated or not uniform and in need of improvement. Reliable data collection and accuracy of data will contribute to getting useful insights that will help improve the system. Tourism data to be collected and compiled include availability and distribution of accommodations and rooms, tour packages, tourism facilities and opportunities such as events and human resources. They may be used to formulate effective promotion policies, plans and measures, and in turn to guide tourists to attractive destinations.</p> <p>2) Project components</p> <p>a) Inventory of all the existing data collection methods</p> <p>b) Developing data collection methodology and improving the system</p> <p>c) Preparation of necessary templates</p> <p>d) Data utilization</p> <p>e) Evidence-based decision-making mechanism</p> <p>The IT industry's novel data-collection/storage/analysis methodologies and technological advancements could be used for revolutionizing the tourism sector.</p> <p>3) Implementing arrangements</p> <p>MET in collaboration with NSO, MTA and Aimag governments to establish a methodology and guideline for data collection system. There is also potential collaboration with other international organizations and platforms such as the World Tourism Institute Forum that specifically focuses on emerging markets; connection to WTFI has been established.</p>
Environment and social impact	Significant impact on creating sound policy for tourism sector that will benefit the natural and cultural conservation, while maximizing the economic benefit
Remarks	

Project No. I10.7

Title	Tourism industrial cluster development
Location	Umunugovi, Bayan-Ulgii, Sukhbartar
Implementing agencies	Ministry of Environment and Tourism (MET); Private sector
Objectives	<p>1) To establish major tourism destinations for international and domestic tourists by networking tourism sites and host communities as well as international and domestic tourism agencies; and</p> <p>2) To tourism as major industry for respective Aimags.</p>
Expected effects	<ul style="list-style-type: none"> - Increased tourist visits and tourism income; - Diversification of tourism attractions in Mongolia; and - Improved inter-regional income disparities
Project costs	US\$
Implementation schedule	<p>Master planning for tourism networking: 2022</p> <p>Planning for tourism sites and related infrastructure for each tourism cluster: 2023-24</p> <p>Stage wise implementation: 2025~</p>
Project description	<p>1) Background</p> <p>Mongolia has many potentially significant and attractive tourism resources of various kinds but their potentials have not been much developed. Main reasons are 1) these resources are distributed widely in the huge national territory not well liked by transport and communication infrastructure, and 2) stakeholders involved in tourism, including host communities and international and domestic tourism agencies, are not well cooperating for joint development and marketing of various tourism resources. Tourism industrial cluster development provides effective strategy to link tourism objects in particular locations and also to link local communities as tourism hosts and tourism agencies.</p>

	<p>2) Project components</p> <p>The NCDP has identifies two area development schemes for tourism: the Kharkhorin-Orkhan vally-Tsetserleg tourism triangle, and the Sainshand-Zamyn-Uud-Govi tourism triangle. These are considered instrumental for regional development having effects of national significance as they have good access to artery transport network. In addition, there are numerous tourism resources that have high potential for development but are not served by major artery roads. In particular, the following are identified for linkage by tourism industrial clusters.</p> <table border="1"> <thead> <tr> <th>Aimag</th> <th>Main resources</th> <th>Cities</th> </tr> </thead> <tbody> <tr> <td>Bayan-Ulgii </td> <td>Altai Tavan Bodg national park with Khurgan lake, glacier and alpine animals; Multi-ethnic groups with traditions, cultures and customs</td> <td>Ulgii as tourism base linked to Khovd as tourism gateway in Western Region</td> </tr> <tr> <td>Umnugovi </td> <td>Yolyn Am canyon, Bayanzag, Flaming Cliffs and other natural attractions; Govi dinosaur museum planned</td> <td>Dalanzadgad as tourism base accessed by road, air and rail (in futute)</td> </tr> <tr> <td>Sukhbartar </td> <td>Ganga Nuur national reserve with six lakes, Shiliin Bogd Uul mtn., Taliin Agui cave and cultural heritage; border tourism in Bichit with steppe landscape and shopping opportunities</td> <td>Bichit, Erdenetasagaan and Dariganga as tourism bases</td> </tr> </tbody> </table>  <p>3) Implementing arrangements</p> <p>MET is the government implementing agency responsible for master planning involving local communities in respective areas from the beginning, learning from the preliminary planning for the Govi dinosaur museum undertaken as part of the NCDP. For planning and implementation of related infrastructure including access roads should be undertaken by related ministries and agencies coordinated by MET. Proactive marketing should be conducted by domestic tourism agencies directly linked with international tourism agencies</p>	Aimag	Main resources	Cities	Bayan-Ulgii 	Altai Tavan Bodg national park with Khurgan lake, glacier and alpine animals; Multi-ethnic groups with traditions, cultures and customs	Ulgii as tourism base linked to Khovd as tourism gateway in Western Region	Umnugovi 	Yolyn Am canyon, Bayanzag, Flaming Cliffs and other natural attractions; Govi dinosaur museum planned	Dalanzadgad as tourism base accessed by road, air and rail (in futute)	Sukhbartar 	Ganga Nuur national reserve with six lakes, Shiliin Bogd Uul mtn., Taliin Agui cave and cultural heritage; border tourism in Bichit with steppe landscape and shopping opportunities	Bichit, Erdenetasagaan and Dariganga as tourism bases
Aimag	Main resources	Cities											
Bayan-Ulgii 	Altai Tavan Bodg national park with Khurgan lake, glacier and alpine animals; Multi-ethnic groups with traditions, cultures and customs	Ulgii as tourism base linked to Khovd as tourism gateway in Western Region											
Umnugovi 	Yolyn Am canyon, Bayanzag, Flaming Cliffs and other natural attractions; Govi dinosaur museum planned	Dalanzadgad as tourism base accessed by road, air and rail (in futute)											
Sukhbartar 	Ganga Nuur national reserve with six lakes, Shiliin Bogd Uul mtn., Taliin Agui cave and cultural heritage; border tourism in Bichit with steppe landscape and shopping opportunities	Bichit, Erdenetasagaan and Dariganga as tourism bases											
Environment and social impact	Significantly positive impact on Mongolia's tourism sector; Fundamental social impact through education and engagement; Strengthening of connections between local communities; Significant increase in the income of locals and preservation of the area; and Contribution towards balanced development of the Country												
Remarks													

10.2 Broad-based Empowerment Initiative

Project No. III.1

Title	Herder communities support facilities*
Location	Choibalsan, Govi-Altai, Khovd
Implementing agencies	Inter-agency with MOFALI and MCUD, Aimag administrations

Objectives	<ol style="list-style-type: none"> 1) To educate and train the youth for traditional and modern livestock farming; 2) To ensure active nomadic tradition as essential part of Mongolian culture and important resources for tourism
Expected effects	Sufficient number of herders to be maintained in the future generations Preservation of nomadic culture and practices
Project costs	
Implementation schedule	Phase 1 through Phase 2
Project description	<ol style="list-style-type: none"> 1) Background and justification If the tradition of nomadic livestock farming is to be preserved with viable socioeconomic activities, new generations of herders would have to be continually generated. Bases for upbringing new generation herders may be established close to local towns of Aimags where livestock activities are dominant. Semi-intensive livestock farming may be promoted in combination with traditional grazing system by using these bases. In each base, basic social facilities including primary education and health care and other public facilities for community activities should be provided. At a primary school, environmental education should be conducted so that environment-friendly practices of traditional livestock farming would be properly inherited. These bases would become host communities for alternative tourism including not only cultural and heritage tourism as expressed in SDV2030 but also rural tourism. Then, training for tourism services may also be undertaken starting from primary education. This would diversify income opportunities and help to stabilize livelihood of nomadic herders as well. Home garden agriculture may also be introduced to supply to the tourism industry for additional income as well as to improve the traditional diet of nomadic people. 2) Project components <ol style="list-style-type: none"> a) Pre-education and primary school for environmental education and tourism services, b) Health facilities for preventive health care, c) Public facilities for community activities, d) Semi-intensive livestock farming, e) Home garden agriculture possibly with greenhouses, and f) Some processing and storage facilities for livestock products. 3) Implementing arrangements An inter-agency implementing arrangements are established with MOFALI and MCUD, under the guidance of which Aimag administrations take the initiative in cooperation with selected/voluntary Soum administrations.
Environment and social impact	Positive environmental and social effects by environmental education as part of youth training program encouraging preservation of pastureland
Remarks	

Project No. III.2

Title	Community-based early childhood education for herders' children
Location	Arkhnagai, Dornod, Uvurkhangai and Sukhbaatar Aimags, to be scaled up to national coverage
Implementing agencies	Ministry of Education and Science (MES) NGOs having track record in education sector
Objectives	To improve early childhood education and development outcomes of some 50,000 most vulnerable and hard-to-reach children in rural provinces of Mongolia
Expected effects	A total of 50,000 herders' children will be provided a quality preschool education in their home environment, to become well prepared for schooling and to have solid foundations for their successful learning and development in the primary school years.
Project costs	US\$20 million
Implementation schedule	2021- August 2025

Project description	<p>1) Background</p> <p>A significant proportion of remote rural children enter schools without preparation. Save the Children Japan with the MES successfully implemented a home-based school preparation program for herders' children under the WB's Japan Social Development Fund. A new type of preschool education was piloted in 30 Soums of four Aimags. Five-year old children successfully completed the program and have been performing well in school. The number of 6-year-old children enrolled in school dormitories has increased. Continued support for out-of-school children and compensatory education for less educated primary school children by non-conventional ways should be undertaken to enhance overall education levels to complement the ongoing efforts.</p> <p>2) Project components</p> <p>a) Community- and home-based early childhood education programs</p> <p>b) A variety of afterschool development activities targeting herders' children living at dormitory or relative's family</p> <p>c) Home based primary grade compensatory education programs for out-of-school children for ill health disability, or other reasons</p> <p>3) Implementing arrangements</p> <p>NGOs having track record in education sector such as MES will be the main implementing agency and the Aimag Education Departments and Lifelong Learning Centers will be the implementers of the project in their localities.</p> <p>The NGOs will be providing technical and capacity building support during for the first 2-3 years of the project to assist the NGOs in coordinating the implementation and gradually taking over the management.</p> <p>At Soum level, the Community Education Council (CEC) will be set up under the project which will consist of volunteer representation of the Soum government, school, kindergarten, lifelong learning center, community and parents who will play an important role.</p>
Environment and social impact	Significant positive social impact
Remarks	

Project No. II2.1

Title	Local administrations-nomads communication strengthening*
Location	Remote Aimags
Implementing agencies	Inter-agency with MOFALI and MCUD, Aimag administrations, Private sector
Objectives	<p>1) To facilitate communications between nomadic people and local administrations for livestock related information including climatic data; and</p> <p>2) To contribute to capacity development of both nomads and local administrations</p>
Expected effects	<p>1) Resilient livestock activities with data on water and feed availability, and climatic conditions</p> <p>2) More accountable administrations responding to nomads' needs</p>
Project costs	
Implementation schedule	Phase 1 through Phase 2
Project description	<p>1) Background and justification</p> <p>Implementation of SDV2030 calls for monitoring and evaluation of its effects as it responds to the United Nations (UN) initiative of Sustainable Development Goals (SDGs). To evaluate the SDGs attainment, not only macro data but also micro data are necessary by income class, region, gender and social group. Collection of micro data at the Aimag and Soum levels would increase the administrative costs particularly at the local administration. Local communities and firms are expected to contribute voluntarily to collection of micro data necessary for SDGs monitoring and evaluation in order to reduce administrative costs at the local level.</p>

	<p>This situation should be taken as an opportunity to establish better relationships between local administrations and local people including nomadic people. If composition, size and socio-economic characteristics of nomadic people, their migration routes, procurement of forage and water along the routes, and problems they face are known to administrations in real time, the administrations can take support measures in a timely manner. Conversely, if information on climate and other meteorological conditions, demand and prices of livestock products, availability of measures for livestock diseases and forage supply is provided to nomadic people at right time, livelihood of the nomadic people would be improved to contribute to attainment of SDGs.</p> <p>2) Project components</p> <p>An ICT oriented support system should be established first as a prototype of information exchange system by using smartphones, and pilot tested in a selected area. Micro data obtained by this will complement the statistical data and hearings and help to prepare more appropriate measures to be incorporated in development plans at the Aimag level. It may turn out to be the first step toward the realization of stronger relationships between the administrations and residents.</p> <p>By linking local administrations with local residents and communities by ICT network, capacity on both sides of the network would be enhanced and mutual trust and sense of responsibility would be cultivated. This indeed is considered social innovation. For data collection, Mongolia has an advantage compared to other developing countries with respect to mobile phone service availability and Internet penetration rates covering both settlers and nomads. Therefore, Mongolia has a high potential for ICT application in this aspect.</p> <p>3) Implementing arrangements</p> <p>An inter-agency implementing arrangements are established with MOFALI and MCUD, under the guidance of which Aimag administrations take the initiative in cooperation with selected/voluntary Soum administrations.</p>
Environment and social impact	Significantly positive social impact
Remarks	

Project No. II2.2

Title	Comprehensive nomad database development
Location	
Implementing agencies	NSO Aimag governments
Objectives	1) To establish a comprehensive database for nomadic people and their activities; and 2) To contribute to attainment of SDGs by allowing proper evaluation of livestock performance by Nomads
Expected effects	1) Needs of nomads better met for their improved livelihood 2) More accountable and responsive administrations
Project costs	
Implementation schedule	Continuous implementation through Phase 1 through Phase 3
Project description	<p>1) Background</p> <p>Official statistical data are very well collected and compiled in Mongolia covering many sectors and aspects. Despite this situation, data and information on nomadic people need to be further improved in a systematic way as a prerequisite to providing supports in proper and timely way. A comprehensive nomad database development project may be undertaken possibly starting with the ICT oriented support system proposed for Project No. II2.1. This, together with the earmarking of nomad population target as proposed would convey correct messages to the Mongolian people about the government policy to respect the traditional culture of nomadic life as the basis of national development for decades to come.</p> <p>Data to be collected and compiled include socio-economic characteristics of nomad groups, their grazing areas and migration route, procurement of water, feed and other production</p>

	<p>input, products and their marketing channels, socio-cultural requirements etc. These data are essential for administrations to identify needs and evaluate effectiveness of support measures.</p> <p>2) Project components</p> <p>a) Collection of detailed data on nomadic people including socio-cultural characteristics, traditional customs and events, community rules and regulations etc.</p> <p>b) Establishment of ICT oriented support and sharing system between nomadic people and local administrations</p> <p>c) The database may be effectively utilized to develop tourism products based on traditional culture.</p> <p>3) Implementing arrangements</p> <p>NSO will design the database and the ICT oriented support and sharing system for use by Aimag administrations</p>
Environment and social impact	Positive social impact
Remarks	

Project No. II3

Title	Skills training and job creation for youth and adults*
Location	Ulaanbaatar, including nine districts Five Aimags with the highest population in the region: 1) Bayan-Ulgii , 2) Khuvsgul, 3) Dornod, 4) Orkhon**, 5) Darkhan-Uul. **Orkhon Aimag is the second biggest city in Mongolia
Implementing agencies	General Agency of Labor Welfare Services (GALW) Supporting organization: Mongolian Employers Federation (MEF); MNCCI; MONEF-YOUTH, Young Employers Association of MONEF; YMPA - Young Mongolian Professionals Association ; JICE and agencies developing internships such as JDS and JETRO, for the component of youth internship in Japan
Objectives	To develop partnerships between companies and job seekers: youth and adults, both women and men. The focus will be on marginalized areas (such as Ger district and rural areas) and small businesses/international/domestic firms to provide internship and training and create job opportunities to the unemployed.
Expected effects	<ol style="list-style-type: none"> 1) Unemployment of youth and adults alleviated. 2) Positive work culture and ethics established for participants including the commitment to work. 3) Improved practical skills and knowledge of youth and adults based on real demand of employers 4) Improved interpersonal and soft skills 5) Mutually beneficial partnership of youth and firms 6) Selected employers engaged in guaranteed internship and initial employment for a given period 7) Facilitated by involvement of firms through loans/grants
Project costs	Phase 1: US\$3 million Phase 2: US\$5 million Phase 3: US\$7 million Total: US\$15 million
Implementation schedule	<u>Phase 1 (2022)</u> Situational analyses Conduct research on examining the gaps in the skills of job seekers/youth versus the skills desired by employers. Furthermore, the number of stable jobs and the future of work will be defined. Baseline study

	<p>Drawing up of project strategy, plan, project document, logical framework, monitoring and evaluation.</p> <p>Pilot in two Ger districts of Ulaanbaatar</p> <p>Selection of participating employers</p> <p>Internship program for 10 interns/year</p> <p>Budget breakdown: Consultancy: US\$1 million, Living cost of interns: US\$400,000, Travel: US\$450,000, Equipment: US\$100,000, Survey: US\$400,000, Translations: US\$500,000, Japanese language training: US\$50,000</p> <p><u>Phase 2 (2023)</u></p> <p>Introduction to other Ger districts of Ulaanbaatar</p> <p>Mid-term evaluation</p> <p><u>Phase 3 (2024):</u></p> <p>Introduction to five Aimags</p> <p>End-line evaluation</p>
Project description	<p>1) Background</p> <p>According to the Labor Force Survey (LFS) of 2018, the unemployment rate of young people between the age of 15-29* is higher than the overall unemployment rate by 3%-16.5%. In terms of education level, the unemployment rate is higher among educated youth with secondary and higher education. Nearly one-third of unemployed youth cannot find appropriate jobs due to skills mismatch and lack of experience (LFS,2018). Therefore, capacity building activities are crucial.</p> <p>Employers also pay attention to attitude and soft skills of job candidates and not only to professional knowledge and skill. Over half of employers weren't satisfied with the practical skills of new employees (Survey on employer requirement for employees, 2017). Capacity building will give advantage to job seekers by better match of job skills.</p> <p>Swiss Development Agency intends to provide support to systematically address youth unemployment. In this regard, "Youth Employment Promotion Project" has been implementing through three phases since 2011. Currently, the last phase aims to contribute to increased employment and self-employment of young men and women. The direct beneficiaries of the projects are graduates of vocational education and training (VET). Also, other donors supporting young employment mainly focuses on graduates and students of VET. On the other hand, supporting and strengthening businesses creating vacancy for young employment is weak.</p> <p>In this preceptive, the key added values of the proposed project are (i) focus young men and women in transition to workplace; (ii) make a bridge for preparing for the future work; and (iii) strengthen micro and small businesses/international/domestic firms.</p> <p>* Unemployment rate is 24.5% for age 15-19, 19.4% for age of 20-24, and 10.8% for age 25</p> <p>2) Project components</p> <p>There will be four components:</p> <p>Training on job skills and developing soft skills;</p> <p>Internship program in international and domestic companies that match participants' qualifications; the internship focuses on learning practical and hard skills; for exchange program with Japan, young people will have maximum of 1 year internship with private companies in Japan (not connected to direct employment); and</p> <p>Employment agreement: At the end of the internship in Mongolia, youth and adults who completed successfully will sign an employment agreement for 1 year mutually committing themselves; contract fulfillment will be monitored by project.</p> <p>3) Implementing arrangements</p> <p>Two cycles will be implemented per year. MEF will provide overall guidance and technical advice based on recognized international best practices and identifying domestic demand.</p>
Environment and social impact	No particular adverse impact expected
Remarks	The project will apply lessons from the Program for the Promotion of Youth Employment.

Project No. II4

Title	Young women's career development and support network
Location	Ulaanbaatar and 15 Aimags

Implementing agencies	Independent Research Institute of Mongolia (IRIM) and other institutions
Objectives	To strengthen career orientation for young women through guidance and network with women leaders
Expected effects	Number of females who actively participate in the labor market will increase through the following: Improved career path development of young women Provision of information, orientation and guidance Involvement of successful women leaders, leading activists and professionals in a network with young women Encouraged girls and women to pursue to study in all fields including science and technology The project will contribute to the objective of SDV 2030, which is “ensure gender equality in social development”
Project costs	US\$9.1 million Trainings: US\$4million, Workshops & conferences: US\$1million, Travel:US\$1million, Scholarship/fellowship: US\$1million, Publications: USD500,000, Communications& miscellaneous: US\$100,000, Consultancies and evaluations:US\$500,000, Website/forum, webinars, online courses: US\$1million
Implementation schedule	<u>Phase I: 2021-22</u> Conduct baseline research/needs assessment of trainings Draw up of project strategy and plan Pilot in Ulaanbaatar city Setting up of virtual platform of interested young professional women & students for sharing information, Q & A *Budget breakdown: Contract: US\$500,000, Workshops: US\$500,000, Fellowship: US\$500,000, Travel: US\$1million, Websites and platforms: US\$500,000 <u>Phase II: 2023-24</u> Develop promotion/inspiration materials, seminars Introduction to seven Aimags, followed by additional eight Aimags Mid-term evaluation <u>Phase III: 2025</u> Exchange with Mongolian, and Japanese female parliamentarians End line evaluation
Project description	1) Background According to the NSO, the labor force participation rate in Mongolia has been lower among women than men at executive/managerial level. As of 2018, gender gap in labor force participation is 16.1%. Although 58-59% of total students in universities are female, they are less likely to fully apply their education by reaching the top level of careers. Orientation and information for females to prepare and develop career path is lacking. Particularly, they are not informed of the skills demanded in the labor market and how to identify a job without having help or connection (World bank, 2018). 2) Project components The project will be designed for female students of university/high school through the following components: a) Career orientation and development program: Trainings for female students of the university: on skills demanded by the labor market, and other supporting skills for creation of level playing field. Soft and hard skills including leadership, critical thinking, self-confidence, communication, public speaking, negotiation skills, awareness of barriers to career development, people management and analytical reasoning. b) Career guidance activities for female students of high school: Career guidance activities such as consultation sessions in secondary schools targeted at both students and their parents, facilitation of information collection from international/foreign universities, and preparation to internationally accepted examinations. Course for career orientation introduced in the secondary school curriculum (introduction of occupations, identification of abilities, occupation choice, skills, labor market trend, etc.).

	<p>c) Serial meetings/seminars of successful women leaders: Female students of university/high school to hear from women leaders, about their experience, success and challenges</p> <p>(d) Industry and organizational site visits: Interaction with women leaders in their workplaces to obtain experience in the field.</p> <p>(e) Support program for women and girls in science and technology: Scholarship/fellowship to girls studying in science and young women working in science sector</p> <p>(f) Discussion and consultation on work-life balance: A discussion forum on the traditional roles and expectations on women, educational information on gender-based and domestic violence and creation of support network</p> <p>(g) Exchange between female parliamentarians with students, in Mongolia and in Japan: Mongolia ranks 120th in the world, with 17.1% females in the parliament. Japan ranks 164th, with 10.2%. Mongolia may be proud to share their legacy of strong gender equality.</p> <p>3) Implementing arrangements IRIM will provide overall guidance and technical arrangement based on recognized international best practice and identifying domestic demand.</p>
Environment and social impact	Significantly positive important social impact is expected. No negative environmental impact is foreseen, with minor carbon footprint if air travel takes place. Alternative may be on-line meetings.
Remarks	

Project No. II5

Title	Scholarship for business-oriented human resources development
Location	Ulaanbaatar
Implementing agencies	MECSS
Objectives	To develop Mongolia's professional human resources other than science and technology fields extending the Mongolia-Japan Engineering Development Project (M-JEED) project to other institutes
Expected effects	<p>1) Highly educated human resources developed to meet the future needs for the economic development through industrialization including dairy, cattle breeding and agriculture fields.</p> <p>2) A large number of Mongolian youths will be developed with "Kosen" and other institutes to doctorate degrees with experiences in Japan and third countries.</p>
Project costs	US\$30million
Implementation schedule	<p>Project development: 2022</p> <p>Initial implementation of the project: 2022-2023</p> <p>Full scale operation of the project: 2024~2030</p>
Project description	<p>1) Background M-JEED implemented since 2015 is developing 1,000 young Mongolians in the fields of science and technology through scholarship programs to study at "Kosen (technical high school)" and universities in Japan. As the new airport will be opened in 2020, Mongolia will require a large number of highly educated human resources taking advantages of new logistics and transportation opportunities offered by the airport for the economy of Mongolia in the long term. To meet the needs of professionals in the fields of crop farming, livestock, law, business administration, economics and languages, there should be another project to be implemented by the Government of Mongolia learning lessons from M-JEED as a model.</p> <p>2) Project components a) A preliminary study should be conducted to re-confirm the needs of professionals in the fields other than science and technologies. The fields are cattle breeding, dairy, crop farming, laws, business administration, economics and languages.</p>

	<p>b) The project should develop a scholarship program for 450 young Mongolians who will contribute to sound economic industrial development taking advantage of the logistics using the new airport.</p> <p>c) The study should identify problems and inefficiencies in prospective partnerships by the Mongolian businessmen with foreign businesses with appropriate technologies.</p> <p>d) The study should also identify how prospective businesses can develop in Mongolia by hiring educated youths who study in Japan and come back to Mongolia. A good example would be some agriculture-related industrial projects engaging the school of business administration at Mongolian University of Science and Technology.</p> <p>e) A set of recommendations from skill development through recurrent education, funding and partnerships with businesses with appropriate technologies should be made to make the implementation plan for 8-10 years in Mongolia for the sound economic development.</p> <p>3) Implementing arrangements Prime Minister's office in coordination with the president will coordinate to establish, develop and monitor the project to be implemented by MECSS.</p>
Environment and social impact	Significantly positive social impact; Mongolia will see potentials of the people to achieve higher GDP/capita equivalent to that of Ireland, Scandinavian countries.
Remarks	

Project No. II6

Title	Comprehensive education sector reform program
Location	Nationwide
Implementing agencies	MECSS, Mongolian Institute for Educational Research (MIER), Eurasian Economic Commission (EEC), Institute of Teacher's Professional Development (ITPD), National Center for Informal Education (NCLE), Ministry of Labour and Social Policies
Objectives	<p>1) To improve the qualitative and quantitative aspects of general education with value development on Mongolian heritage as a base for pursuing a new development paradigm;</p> <p>2) To upgrade higher and technical education with improved curricula emphasizing advanced technology and science meeting needs of emerging businesses and international competitiveness;</p> <p>3) To strengthen life-long education for broad and robust labor force.</p>
Expected effects	Broad, robust and qualified labor force to support the new development paradigm based on unique Mongolian heritage and cultural values Cadre of human resources with enlightened mindset to lead economic development in line with the new development paradigm
Project costs	US\$7 million
Implementation schedule	<p><u>Phase I 2021-22</u> Implementation of pilots (Improvement of learning skills for distance learning; establishment of linkage between university – research – industry) in support of Education Sector Mid-Term Development Plan (ESMDTP). Selection of staff, recruitment, management team, workplan, needs assessment, testing, *Budget: Consultancy and staff: US\$1million, Travel: US\$500,000, Equipment, communication, miscellaneous US\$1 million</p> <p><u>Phase II 2023-24:</u> Review of feedback and assessment, and coordination Implementation of components based on Work plan Mid-term review and adjustment of project components, based on the progress of Education Sector Mid-Term Development Plan (EMTDP) 2021 – 2030</p> <p><u>Phase III 2024-25</u> Feedback of project results into Vision2050, Establishment of evaluation mechanism</p>

	Final review, workshop
Project description	<p>1) Background</p> <p>Mongolia faces challenges to pursue a new development paradigm in line with the UN initiative for SDGs and the SDV2030. The attainment of the SDGs and SDV2030 would be dependent on appropriate technological innovation and highly motivated and qualified human resources, which will be the key resource and asset for Mongolia. The broad education sector should be reformed in a results-based manner to generate such technological innovation and human resources.</p> <p>To realize the reform for attaining the objectives of the program, comprehensive measures should be taken based on a single strategy at all the education levels and in different aspects extending the current efforts by the Mongolian Government. To pursue and realize the new development paradigm in the long term, mindset of Mongolian people would have to be changed and strengthened to become more self-reliant and innovative. To realize the changes, efforts would have to start at pre-school education involving the families and community. To improve the quality of general education along this line, teachers would have to be re-trained and more teachers of higher quality would have to be generated.</p> <p>At the same time, higher and technical education would have to be upgraded to meet the increasing demand for human resources specialized in advanced skills and technology supporting the new development paradigm. Also, existing labor force should be given opportunities to train themselves so that no one would be left behind in the pursuit of the new development paradigm. Mongolia has a young population, and whole of its citizens needs to be fully integrated as competent and productive labor force contributing to its prosperity, avoiding the brain drain and incentivizing the return of trained individuals from abroad.</p> <p>All in all, the program will contribute to generating broad, robust and qualified labor force to support the pursuit and realization of the new development paradigm for decades to come. The strong initiative by the Mongolian Government, as indicated in the approved ESMTDP will be critical for the expected increase of young people entering the education cycle. Also, cooperation with the private sector is indispensable for developing and implementing improved curricula meeting demands by private businesses as well as designing and implementing life-long education.</p> <p>The project shall complement and will be integrated into the approved ESMDTP and will be coordinated with its components.</p> <p>2) Project components</p> <p>Distance learning based on the pilot projects is applied widely at all levels and also to continuous life-long education to realize inclusive education. Pre-school education may also be covered.</p> <p><u>Primary education:</u></p> <p>Outcome of the JICA project recently completed will be fully utilized to further improve the performance including monitoring and evaluation. The Objective is to establish the stable process for improving the education curriculum, involving MECSS and related agency such as MIER, EEC, ITPD etc.</p> <p>It is obvious that the qualified education curriculum is the foundation for securing the education quality. In Mongolia, the education curriculum is changed in short cycle without evidence-based analysis, thus education output does not persist. Therefore, the objective is to establish the stable process for improving the education curriculum based on the evidence-based analysis.</p> <p>Component 1: To establish/develop capacity for assessment of students' academic ability</p> <p>Component 2: To improve the capacity for developing educational materials such as textbook, guidebook etc.</p> <p>Component 3: To introduce a cycle of evaluating the results of curriculum implementation, learning lessons and incorporating into the new curriculum</p> <p><u>Secondary education:</u></p> <p>Component 1: Comprehensive support to VET by providing access to all subjects in the curriculum, by transport of pupils to education centres where courses of choice are offered or setting up of mobile teams to teach skills, and providing internship with local enterprises including IT</p>

	<p>Component 2: Supplementary support for achievement of Program for International Student Assessment (PISA) assessment in 2021</p> <p>Other components may be included based on the updated EMTDP.</p> <p><u>Higher education and research:</u></p> <p>Objective: Supporting policy for regulation of private sector education*, establishing coordination between industry, teaching and research in selected pilot topics</p> <p>* MECSS Policy Review based on United Nations Educational, Scientific and Cultural Organization (UNESCO)-led Country Report has just been issued and will be distributed soon which should support activities in policy and multi-sector coordination</p> <p>Component 1: Aligning the intake of students to the departments needed for future of Mongolia, including engineering, industry, agriculture, natural sciences.</p> <p>Component 2: Regulation of private universities, cost-benefit analysis of the cost of education with incidence of debt burden of families; preparation of ceiling of higher education fees, and system of qualification of universities*</p> <p>*There are views that the fees of private secondary education are more problematic than at university level, or both. Further evidence is needed to clarify the focus in this project</p> <p>Component 3: Preparation of research universities, strategic development of research subjects with contents, and research institutions</p> <p><u>Monitoring and multi-sector/donor coordination</u></p> <p>Objective: Setting up of donor coordination unit, establishing a feedback mechanism of lessons into planning, and effecting multi sector coordination</p> <p>Component: Support the establishment of a unit at MECSS to monitor the performance of education reform through SDV2030, LTDP2050, EMTDP and input into the updated plan, and develop capacity for donor coordination.</p>
Environment and social impact	Proper environmental management is integral part of value development for the new development paradigm; appropriate technology should be developed by complementing traditional wisdom and skills by advanced technology.
Remarks	This project will be implemented in line with the approved Mongolia ESMTDP 2021-30. The project will be complementary to the Action Plan of ESMTDP and will not be in duplication, any component implementation will be coordinated with the Action Plan.

Project No. II7.1

Title	Strengthening of primary health care (PHC)
Location	Ulaanbaatar, four Regional Diagnostic and Treatment Centres (RDTCs) in Khovd, Dornod, Uvurkhangai and Umnugovi. Functions in Altai region will be considered in line with RDP proposed by NDA.
Implementing agencies	Ministry of Health (MOH), Centre for Health Development (CDH) and World Health Organization (WHO)
Objectives	To improve the quality of PHC in Aimags through support network from the RDTC. This project will build on the outcome of JICA projects: Project for Strengthening Post-graduate Training for Health Professionals in Primary and Secondary Level Health Facilities and the Project for the Establishment of Hospital Management and Medical Services at the Mongolia-Japan Teaching Hospital
Expected effects	PHC will be strengthened through the following: Improved skills and knowledge of doctors and nurses HR strategy for rotation Improved information management Introduction of technology Provision of medicine and equipment
Project costs	US\$13 million
Implementation schedule	<u>Phase I (2021-22)</u> Review of completed assessments and guidance, including Service Availability and Readiness (SARA) project by WHO and Essential Services Package to be deployed by MOH Desk audit of JICA projects, lessons learned and mainstreaming, support to trained personnel Establishment of Project Management and Monitoring Unit Project strategy and planning Recruitment, procurement of equipment Continuation of training program at Ulaanbaatar, Orkhon and other locations

	<p>Refresher training for doctors with temporary license working in 218 Family Health Center's (FHC)</p> <p>*Budget breakdown: Equipment: US\$1million, Training: US\$2million, Consultants, staff: US\$1million, Travel: US\$500,000, Medicine and materials: US\$500,000, Fellowships: US\$200,000, Communications, supplies & miscellaneous: US\$ 200,000, Furniture, computers; US\$100,000</p> <p><u>Phase II (2023-24)</u> Introduction of on-the-job training at RDTC and Aimags Coaching and shadowing doctors at regional level Provision of refresher training to doctors with temporary license working at 219 Soum Health Centers (SHC; which provide health service to herders, on average 100 kms distance to clients)</p> <p><u>Phase III (2025)</u> Consolidation of results, final review</p>
Project description	<p>1) Background</p> <p>ADB Technical Report on the development of the Health Sector Master Plan (2019-2026) identifies following as one of the key issues: <i>"... need to review and further improve the referral system through development of map of catchment areas and population for each health care facility, introduction of a standardized client friendly system for appointment, efficient system for smooth patient flow and feedback and an improved package of service for each level of care."</i></p> <p>PHC at Aimag and Soum levels requires urgent improvement. The clinics lack trained human resources, equipment, and quality standards, with the medical staff reluctant to take an assignment in regions. Roles of health care service entities, doctors, nurses and staff need delineation and a rotation system established. Introduction of technology, knowledge and information management to be improved and on-the-job training institutionalized.</p> <p>2) Project components</p> <p>Refresher and on-the-job training of doctors with temporary license Formulation of HR strategy for doctors and nurses in PHC Support for the continuation of graduate training</p> <p>3) Implementing arrangements</p> <p>The training of trainer (TOT) program from JICA projects will continue to be supported and doctors, nurses and trainers will be invited to play a role. WHO will provide overall guidance and technical advice based on recognized international best practice on provision of health care services and standards. Training-of-trainers will be introduced, where appropriate to provide support and guidance to young doctors and medical staff.</p>
Environment and social impact	Capacity building using remote and distance connections will be used to the extent possible to minimize carbon footprint.
Remarks	

Project No. II7.2

Title	Health information center establishment
Location	Ulaanbaatar
Implementing agencies	MOH
Objectives	To create a single ICT platform connecting 4,300 organizational units and institutions, hospitals and health centers under MOH for integrated information and data management and coordination within MOH.
Expected effects	<ol style="list-style-type: none"> 1) Standardization of ICT data, which are now scattered and managed by different software at each hospital, clinic and other institutes 2) Efficient information collection for MOH 3) Speedy and effective policy formulation and provision of guidance to health institutes 4) Efficient and accurate diagnosis and treatment at hospitals and clinics 5) Enhancement of patients' convenience

Project costs	US\$10 million for procurement of equipment, rental, furniture, training, installation, testing, and connections
Implementation schedule	2022: Project preparation, tender, procurement 2023: Testing, pilot installation at Department of Policy and selected institutions and units, connection to Aimags (phase 1) 2024: Connection to all relevant units at Aimags (phase 2) 2025: Completion of network; evaluation and review
Project description	<p>1) Background</p> <p>Over the years various ICT systems have been introduced under different health projects for particular branches or discipline supported by international aid organizations including WB, ADB and WHO and bilateral donors such as Luxemburg, China, Korea and Japan. While these individual projects have been significantly contributing to the improvements of the health situation in Mongolia, it has been difficult for MOH and health institutes to share the achievements of each project. Standardized and integrated information management is required to upgrade the health policy formulation and the level of medical services.</p> <p>2) Project components</p> <p>The project components include the following: Establishment of Health Information Centre at MOH including building, and equipment, Training of staff on ICT solutions and application, ICT infrastructure development for non-connected lower level health institutes, and Repair and replacement of outdated equipment.</p> <p>3) Implementing arrangements</p> <p>Management Committee of MOH officials and partners and clients (NSO, Cabinet, etc.) will monitor the progress of the project and its impact in relation to SDV 2030 achievements. Coordination will be made with operational partners and stake holders including WB, WHO and ADB.</p>
Environment and social impact	No negative environmental and social problems are foreseen.
Remarks	

Project No. II7.3

Title	Prevention of mother to child transmission of human immunodeficiency virus (HIV), syphilis and hepatitis
Location	Khuvsgul Aimag and Khan-Uul district of Ulaanbaatar
Implementing agencies	WHO Country Office of Mongolia, National Center for Communicable Diseases (NCCD), National Center of Maternal and Child Health (NCMCH)
Objectives	To reduce incidence of congenital syphilis among pregnant women by scaling up impact interventions towards prevention of mother to child transmission of HIV, syphilis and hepatitis at sub-national level of Mongolia
Expected effects	<ol style="list-style-type: none"> 1) Improved regulatory framework and coordination across programs towards prevention of mother-to-child transmission of HIV, syphilis and hepatitis B at sub-national level. 2) Increased antenatal care coverage of pregnant women as an essential component of ensuring the provision of quality maternal and child health services. 3) Reduced incidence of Sexually Transmitted Infections (STIs) and congenital syphilis among pregnant women. 4) Strengthened STI surveillance system at selected Aimag and district. 5) Increased awareness of decision makers and key population including women at reproductive age and pregnant women on prevention of communicable diseases as HIV, syphilis and hepatitis.
Project costs	US\$220,000
Implementation schedule	2021-23
Project description	<ol style="list-style-type: none"> 1) Background <p>Mongolia has made major progress in reducing maternal and newborn death, through the</p>

	<p>project supported by the WHO in the last two decades. The country has a potential to reach health related SDGs by 2030, however, SDGs 3 and 5 on the universal access to sexual and reproductive health (SRH) would require significant investment, considering country's extremely high rate of STIs including syphilis among reproductive age and pregnant women. According to study conducted in 2019 by NCCD, the viral hepatitis B, C, and D infections among pregnant women was 6,5%.</p> <p>Mongolia is one of the few countries to have achieved the targets for Millennium Development Goals (MDGs) 4 (reduce child mortality) and 5a (reduce the maternal mortality ratio) and is an ideal candidate to achieve triple elimination of mother-to-child transmission in the region.</p> <p>2) Project components</p> <p>Situation analysis/review of three disease programs, establishment of regulatory framework and development of strategy on triple elimination at sub-national level/selected sites, Training of health care workers at PHC level, Procurement of rapid tests, supplies and equipment, and Education and communication materials development and distribution.</p> <p>3) Implementing arrangements</p> <p>The project will be implemented for the duration of two years from 2020 to 2021, and WHO Country Office in Mongolia will act as the Administrative Agent (AA) for the coordination and management of the project among implementing organizations including the NCCD, NCMCH and Health departments of Khuvsgul Aimag and Khan-Uul district of Ulaanbaatar city. The overall day-to-day project management will be overseen by the WHO Country Office in Mongolia that will facilitate policy dialogue and advocacy with active engagement of the Government at provincial and district levels for all proposal activities. Project monitoring will be undertaken in accordance with WHO monitoring and reporting procedures. The project implementation status will be reported annually by WHO to potential resource partner.</p>
Environment and social impact	The proposal intended to enable to pregnant women to access quality essential health care services without incurring significant financial risk.
Remarks	Aimag and district selected on high prevalence of STI including congenital syphilis.

Project No. II7.4

Title	Telemedicine and electronic mobile health care for diagnostic purposes
Location	Ulaanbaatar at the MOH
Implementing agencies	MOH, Policy Planning Department and Centre for Health Development in cooperation with selected implementation partners and IT solution providers
Objectives	<ol style="list-style-type: none"> 1) To create a single platform for information and data management and coordination within the Ministry; 2) To register 4,300 organizational units and institutions, hospitals and health centers in phased manner; 3) To connect all active organizational units under MOH in one single platform with various subsystems connected either off-line, or through PDF during the transition; and 4) To establish case management and referral through the network, patient data base management and communication.
Expected effects	<ol style="list-style-type: none"> 1) Information on all areas of activities under MOH: human resources, assets, health care operations, budgets, investments, case management, patient care and referrals managed through a single platform, connecting first the major organizational units and gradually covering other units. 2) All diverse IT systems installed for specialized branches of health care, i.e. the maternal and child health (MCH), cardiovascular disease connected or integrated through a manual interface during the transition.
Project costs	US\$10 million for procurement of equipment, rental, staff, furniture, training, installation, testing and connections

Implementation schedule	<p>2021: Formulation of Terms of Reference (TOR) for consultants, review of IT projects in MOH and comparable government institutions, needs assessment, workplan, tender, procurement</p> <p>2022: Testing, pilot installation at Department of Policy and selected institutions and units, connection to Aimags (phase 1)</p> <p>2023: Connection to all relevant units at Aimags (phase 2)</p> <p>2024: Completion of network, evaluation and review</p>
Project description	<p>1) Background</p> <p>Health care in Mongolia faces a number of challenges, including integration and management of all activities undertaken by 4,300 departments, hospitals, health centers and other units under the MOH. Over the years various IT systems are operating for particular branches or discipline. The new WB project of US\$19.5 million will help coordinate e-health IT architecture, however a coordinating central function is missing. There are approximately 23,000 users (computers) in the IT systems of MOH, affiliated agencies and units which need to be connected in a single network. The single information platform will enable the Department of Policy and Ministry top management to monitor and manage all operations and activities of public health care, including assets, investment, budget, human resources, patient case documentation, referral history, R & D following international best practice and standards. For patient data management, privacy and confidentiality standards will be maintained. Mongolia has relatively developed network of internet connections in Aimags and Soums for health care patients.</p> <p>2) Project components</p> <p>The project will be built on on-going policy initiatives in MOH, including: Health Sector Strategic Master Plan¹, IT projects funded under China (installation of Desktops), WB, Luxembourg-funded telemedicine projects in MCH and Cardiovascular departments, WHO-supported m-Health² initiative in the Aimags and Soums, and miscellaneous IT platforms.</p> <p><u>Procedure:</u></p> <p>Desk review and formulation of consultancy TOR, recruitment of staff agreeing on roles and responsibilities,</p> <p>Procurement, selection of implementing partners and consultants,</p> <p>Testing, pilot installation in the Department of Policy, network connection to 1st set of selected departments and hospitals,</p> <p>Connection of 2nd round of units, Aimags/Soums, and</p> <p>Mid-term evaluation and recommendation.</p> <p>Components:</p> <p>Establishment of health information center,</p> <p>Assessment and analysis of needs, and preparation of a workplan,</p> <p>Coordination of IT solution, users' consultations and buy-in,</p> <p>Procurement, development and customization of IT solution,</p> <p>Management Committee of MOH officials and partners and clients (NSO, Cabinet, etc.) to monitor progress and in relation to SDV2030 achievements, and</p> <p>Coordination with operational partners/stake holders including WB, WHO, ADB.</p> <p>3) Implementing arrangements</p> <p>MOH as the government implementing agency prepares the TOR for implementing partners including public institutions, IT companies and consultants. They will develop a comprehensive IT based health care system with a database to be installed in steps at Policy Planning Department of MOH to be connected to relevant units at Aimags.</p>
Environment and social impact	
Remarks	

¹ HSSMP 2019-2026 (tbc) is being formulated by a team of ADB consultants, through funding of Japan Poverty Fund.

² Mobile-based health care consultation based on group chats

Project No. II8

Title	Comprehensive social insurance and pension reform
Location	Ulaanbaatar
Implementing agencies	Ministry of Labor and Social Policy, General Authority of Social Insurance
Objectives	<ol style="list-style-type: none"> 1) To continue implementing the on-going social insurance system reform based on evidence-based assessment, including pensions, health insurance, social welfare and benefits; 2) To define, based on a comprehensive analysis, proposals for selection criteria of the beneficiaries, updated benefit packages and fund management; and 3) To put in place a comprehensive and transparent monitoring system, with periodic communication regarding its progress through government websites and other channels.
Expected effects	<ol style="list-style-type: none"> 1) Social insurance package defined for Mongolia ‘fit for purpose’ to meet the criteria of ‘adequacy, sustainability, integrity’(Melbourne Mercer Global Pension Index) , or similar international standard, discussed and supported by Mongolian user public, in particular by the youth between 18 and 40 years of age. 2) Restructured national social insurance system comprising unemployment, old age pensions, industrial accidents and occupational disease (IAOD), benefits including disability, improved in its coherence, logic, cost of living adjustments, and adapted to the demographic profile. 3) Coverage ensured for all informal sectors including the nomadic community in social insurance. 4) Consensus built on reformed social insurance and pension system through broad consultations across generations, including the future workforce to sustain the social insurance system 5) Sound financing cycle of pension payments and derivatives developed, including independent fund management to sustain social insurance payments through growth and income, while assuring security.
Project costs	US\$6 million
Implementation schedule	<p><u>Phase I. 2021-22</u> Problem analysis, examining the gaps of current social insurance system. Conducting case study of countries undergoing pension reform Setting up of a board of experts to review and assess the pension structure Review of eligibility criteria and system of assessment Formulate initial reform ideas by experts Working group consultations *Budget: Consultants: US\$1million, Travel: US\$250,000, Equipment: US\$500,000, Communication: US\$250,000, Workshops: US\$250,000, Selective translation of MSLP reports: US\$100,000</p> <p><u>Phase II. 2022-23</u> Mid-term evaluation, pilot testing of the revised models Final report presentation by expert team to the Ministry of Labor and Social Protection (MLSP)</p> <p><u>Phase III. 2024</u> Adjustments, plan for roll out</p>
Project description	<ol style="list-style-type: none"> 1) Background <p>Currently, a complex system of social insurance is implemented in Mongolia by the Ministry of Labor and Social Policies through four affiliated agencies (Health Insurance is now managed by the MOH). The Social Insurance Fund is comprising: Pension Insurance Benefit Insurance, IAOD Insurance, and Unemployment Insurance.</p> <p>Over the years, the social insurance scheme has become outdated by redundancies and duplications in particular between the pension and benefit insurance. The pension system has not transitioned from the Soviet-era general coverage to an efficient and sustainable fund as Mongolia transitioned to market economy, and entered, and exited upper middle-income category of countries. It does not reflect the demographic pyramid of Mongolia,</p>

	<p>supporting the ageing expected in the future.</p> <p>The current social insurance system is assessed as having following weaknesses:</p> <ul style="list-style-type: none"> - Chronic underfunding of the budget - No adjustments to real costs of living and the benefit payment levels in relation to appropriate proportion of beneficiaries' income - Duplication between the old age pension and other benefits - Insufficient coverage of workers in informal sector including nomadic community - Lack of efficiency in fund management, including growth and income generation as well as sustainability of future distribution among recipients <p>The JICA supported 'Project on Strengthening the Capacity for Social Insurance Operation' (2016 – 2020) has assisted MLSP to upgrade and strengthen training of social insurance staff and developed manuals and guidelines. The project also had an extensive outreach program to disseminate knowledge about concept of social insurance to youth at universities, secondary schools and at public. The project supported the participation of nomadic families and those working in the informal sector into Social Insurance Fund and upgraded the system of registry.</p> <p>In 2015, the State Policy on Pension Reform until 2030 was approved and implemented under WB's support. On website of the Minister of Labor and Social Policy³, it said on 8th February, 2021 the Ministry plans to pass a package of laws within the framework of the State Policy in the spring session of 2021. The Ministry is focusing on system reform, including the following:</p> <p>A multi-layered pension system will be introduced (Layer 1-basic pension insurance, Layer-2-premium based pension insurance, Layer 3-private supplementary pension insurance),</p> <p>Governance and investment system of social insurance will be improved, There will be a premium system that is friendly to employers, insurers and the state budget, Social insurance services will be fully electronic, Pensions will be inherited, The allowance is paid from one fund, and Everyone will be covered social insurance.</p> <p>The Draft Law on Private Pension was developed, opening the way for private sector involvement and technical management. It was not endorsed for discussion in October 2020 session in the Parliament. The work may resume around June⁴, which may revitalize the issue of introducing private pension management. There is indication that ARD group, a major company, is actively lobbying the Private Pension Law.</p> <p>In the beginning of March, the Draft Law on Collective Pension was submitted to the Speaker of Parliament. It has not been discussed in the Parliament yet.</p> <p>The project will directly contribute to the goals listed in Mongolia's Vision2050.⁵</p> <p>The proposed project will build on the experience gained, in particular the staff and public which has gained knowledge on social insurance through the outreach program.</p> <p>The public has become increasingly aware of the state of pensions in Mongolia, especially the younger generation. There have been numerous voices for a pension reform which could sustain the future work force of Mongolia.</p> <p>2) Project components</p> <p>Project components are defined to strengthen further the social insurance and pension system supported by the World Bank. Also, complementarity with the extension of the JICA project just completed should be sought.</p> <p>Translation of studies conducted by MSLP and its agencies into English⁶, Assessment to be conducted by a team of experts, Setting up of a Social Insurance Reform Advisory Board, comprising national and international experts including the private sector, Comparative study of reforms in pension systems and case studies reflecting outcome of the World Bank support, Study tours,</p>
--	---

³ Ms. .Ariunzaya

⁴ Mr. Uchral, the Parliament member leading this law was seriously ill during the winter.

⁵ Relevant Section is found in the Annex I.

⁶ Full list of available studies is attached as Annex II.

	<p>Review of the beneficiary selection in view of current criteria, surveys and roles of committee,</p> <p>Preparation of the model of reform, through broad consultation with the public, stakeholders, users and social insurance operators, and</p> <p>Presentation of reform proposals to MLSP</p> <p>3) Implementing arrangements</p> <p>The project will be implemented by MLSP, which will manage the implementation schedule and plans of the reform as being proposed to the Parliament. It will host the team of experts and act as Secretariat for the Advisory Board.</p>
Environment and social impact	No particular impact expected.
Remarks	

Project No. II9.1

Title	Center of group dynamics*
Location	Ulaanbaatar
Implementing agencies	Center of Group Dynamics, newly established, supported by an institute such as the Mongolian Productivity Organization together with all the Ministries and business partners, e.g., Chamber of Commerce of Mongolia as members of the Center
Objectives	Ultimate objective is to enhance dynamic business culture in management in the public/private sectors e.g., ministries, other institutes through “Small Group (QCC) activities” based on successful practices in Japan, Singapore, etc.
Expected effects	Organizations with higher loyalty among officers to ones’ jobs and higher productivity in overall project implementation realized through monthly meetings with learning session in Kaizen (sound) & Kenzen (ethical) concepts,
Project costs	US\$3million
Implementation schedule	Project development: 2021-22 Initial implementation of the project: 2022-23 Full scale operation of the project: 2024~
Project description	<p>1) Background</p> <p>Mongolia has an excellent image as the largest empire once in the world with outstanding systems represented by communications, printed currency, weapons most advanced at that time. However, traditional nomadic culture, seeking quick profits, and no-compromise even today in business negotiation often makes potential foreign partners walk away after a certain time of their challenges.</p> <p>Immediate needs are seen to create new business culture so that the economy of Mongolia can take advantage of good opportunities by foreign partners with technologies, management knowhow, and foreign markets.</p> <p>2) Project components</p> <p>The project is to establish “Center of Group Dynamics” on a long-term basis more than 20 years, provide training, and enhance new business culture in Mongolia.</p> <p>a) Establish a new institute: Center of Group Dynamics under the Prime Minister’s office, through coordination and consensus building across the ministries, the chamber of commerce, Non- Profit Organization (NPO) etc. in the private sector, together with those in academia, and other experts.</p> <p>b) Develop training manuals of core experts on good Japanese practices: Kaizen & Kenzen, 5S, value-based remuneration system, negotiation with foreign partners, “Small Meetings” to produce action plans for respective participants, organizational behavior, marketing, finance, and production, etc.</p> <p>c) Establish a registration system of “Small Groups” to enhance group dynamics.</p> <p>d) Publication of newsletters and monthly business magazines to introduce/disseminate good practices overseas and in Mongolia.</p> <p>e) Establish nation-wide movements and an awarding system in group dynamics, Kaizen & Kenzen, etc. to commend excellent leaderships and organizations either in the public or the private sector.</p>

	3) Implementing arrangements The Prime Minister's office under the Prime Minister in coordination with the President will take the role of coordinator to establish, develop and monitor the activities of "Center of Group Dynamics", responsible for improving the nomadic culture to more competitive business culture in all the organizations in Mongolia.
Environment and social impact	Significantly positive social impact such as more than doubling the pace of project implementation; those in leadership roles in Mongolia will see potentials of the people to achieve high GDP/capita equivalent to that of Ireland, Scandinavian countries.
Remarks	

Project No. II9.2

Title	Process consulting for accomplished results
Location	Ulaanbaatar
Implementing agencies	Center of Group Dynamics being established
Objectives	Ultimate objective is to produce "tangible results" by facilitation/assistance by consultants by implementation of selected projects for the sustainable development of Mongolia; subjects for consulting services are related to air pollution, wastewater, traffic jam, tourism, industrial development, etc. which require appropriate decision-making based on sound philosophy involving the general public.
Expected effects	Drastically improved success rates of new challenges/ businesses and enhanced people's benefits in the long-term through the process consulting.
Project costs	US\$3million
Implementation schedule	- Project development: 2021-22 - Initial implementation of the project: 2022-23 - Full scale operation of the project: 2024~
Project description	<p>1) Background</p> <p>Many projects good for Mongolia's economic development are discussed for implementation with foreign business partners, who then take initiatives for implementation, but many of them fail within one to two years due to differences in business culture. However, the success rate could have a drastic improvement, by engaging appropriate interventions with sound management philosophy. Typically, JICA projects use 70-80% of the allocated consulting hours for research and reporting and the remaining hours for coordination, meetings, etc. However, barriers in Mongolia are found at the stage of decision-makings and follow-ups for implementation, rather than analysis and planning. The process consulting will remove barriers to implementation by appropriate interventions by consultants as the third party between the government and the relevant companies.</p> <p>2) Project components</p> <p>"Process consulting" is conducted by several management consultants as follows to raise success rates.</p> <ol style="list-style-type: none"> a) Based on a new institute: Center of Group Dynamics under the Prime Minister's office, management consultants are hired respectively for 60-90 man-days per year to visit Mongolia several times/year to provide process consulting. In the total man-days, one third is allowed to use for activities in Japan to seek advice and coordination in the respective business areas. b) The consultants are supposed not to produce papers, but to provide interventions through interviews and coordination so that "tangible results" can be accomplished before the end of the consulting year c) The consultants are supposed to produce a visit report of total five pages (one cover page + taken actions in three pages, and action plan in one page) after one's respective visit to report to JICA and relevant parties. d) During each visit, the consultants are supposed to make and distribute memorandum of one or two pages to convince the relevant parties to implement the solutions. e) The consulting service may be discontinued if the response by the clients is negative after two times of the consultants' visit.

	3) Implementing arrangements The Prime Minister's office under the Prime Minister in coordination with the President will take the coordinator's role to establish, develop and monitor the activities of "process consulting" to achieve "tangible results" in all the relevant projects.
Environment and social impact	Significantly positive social impact; Mongolia will see potentials of the sound economic development to take positive actions to solve long-term problems e.g. air pollution, waste water, traffic jam, tourism, industrial development, etc. which require appropriate decision-makings in timely manners.
Remarks	

Project No. II10.1

Title	Education sector strengthening by utilizing ICT
Location	All Aimags
Implementing agencies	MES, Aimag's administrations, CITA, and NDA
Objectives	1) To train citizens to read and write through e-learning; 2) To strengthen the ICT capacity of rural teachers through e-learning, and 3) To develop and test an IT system for informing and recording violence in the school environment.
Expected effects	1) Component 1: The number of illiterate school dropouts and adults will be reduced, and they will be encouraged to access public and private sector services independently. In the future, reusable models and methodologies will be developed for all levels of education organizations. 2) Component 2: Strengthening the ICT capacity of rural teachers will develop teachers and improve their ability to use ICT in their training activities. It also has the advantage of encouraging ICT use in teaching and improving the quality of education in rural schools through teachers' development. In the future, there will be a reusable model and methodology for distance learning for teachers and their ICT capacity building. 3) Component 3: Software/platform development and testing will support research and data collection, and violence reduction in school environments. The software/platform will allow easily to send/receive, register, and transmit information about violence in the school from mobile phones.
Project costs	US\$0.5 million
Implementation schedule	Project design: 2021-22 Full scale implementation of the project: 2022~2023
Project description	1) Background The project has following three components: Component 1: Many out-of-school children and adults cannot read or write in Mongolia, especially in prisons, the military, and rural herding societies. It is challenging for such people to access public and private services because they cannot read or write. The training will be conducted on mobile phones or tablets, and some pilot project technologies/knowledge which the JPT pilot implemented will be utilized. Component 2: Teachers' knowledge and skills, especially their ICT competencies, play an essential role in using ICT in teaching and improving the quality of teaching. In today's fast-paced ICT world, there is a need to improve teachers' ICT skills continuously. The training targeting the teachers will be modular and can be reused after the project completion. The training may include modules such as working with computers, preparing e-learning materials, and using the Internet. Component 3: Violence against children is common among children and teachers in the school environment. Therefore, based on research, it is possible to develop and test software/platform that can quickly and easily send/receive, register and transmit information about violence from mobile phones. The program determines the level of violence, sends notifications to stakeholders such as teachers, parents and school managers, and then transmits the information directly to the National Center against violence according to

	<p>specific criteria.</p> <p>2)Implementation process</p> <p>An ICT-oriented support system should be established first as an information exchange system prototype using smartphones or tablets and pilot tested in a selected area. Microdata obtained by this will complement the statistical data and hearings and help to prepare more appropriate measures to be incorporated in development plans at the Aimag level. It may be the first step toward the realization of stronger relationships between the administrations, residents and teachers.</p> <p>By linking local administrations with residents and communities by ICT network, capacity on both sides of the network would be enhanced, and mutual trust and a sense of responsibility would be cultivated. It indeed is considered social innovation. Mongolia has an advantage for data collection compared to other developing countries concerning mobile phone service availability and Internet penetration rates covering both settlers and nomads. Therefore, Mongolia has a high potential for ICT application in this aspect.</p> <p>3)Implementing arrangements</p> <p>An inter-agency implementing arrangements are established with MES, Aimag administrations and CITA under the guidance of NDA.</p>
Environment and social impact	Significantly positive social impact
Remarks	The Ministry of Education and Science and all levels of education can use the methodologies, models, and software developed under the project after its implementation.

Project No. II10.2

Title	Rural IT development promotion and model ICT city development
Location	Darkhan and Tsetserleg
Implementing agencies	CITA, National Information Technology Park (NITP)
Objectives	<p>The overall goal is to promote the establishment of the model city that can lead the ICT industrial cluster and ICT development in Aimags.</p> <p>The objectives are:</p> <p>1)To train IT/ICT engineers for ICT human resource capacity building;</p> <p>2)To promote innovative application development by private enterprises such as star-ups; and</p> <p>3)To support the establishment of an ICT industrial cluster in Aimags.</p>
Expected effects	<p>1)Contributing to inclusive development through the promotion of information equality and individual data collection through ICT application;</p> <p>2)Building an ICT industrial cluster in Aimags;</p> <p>3)Further industrial development related to the ICT sector in a rural area, and</p> <p>4)Enhancement of digital society that the Mongolian Government has been promoting.</p>
Project costs	US\$ 1.0 million
Implementation schedule	<p>Project design: 2021-22</p> <p>Full scale implementation of the project: 2023-24</p>
Project description	<p>1)Background</p> <p>Inclusive development is a vital issue involving the entire Mongolia aside from Ulaanbaatar. It is closely related to ICT development, accessibility and usage.</p> <p>By designating a city active in promoting ICT business or has a high potential to realize an attractive ICT environment, industrial cluster development on ICT business should be accelerated to revitalize regional economies. It would ensure that a model city would be established promptly in line with the latest trend in the ICT sector.</p> <p>The JPT selected Tsetserleg city of Arkhangai Aimag and Darkhan city of Darkhan-Uul Aimag as candidate model cities. Application of ICT to livestock and farming activities is promising taking advantage of the high agricultural potential of these Aimags.</p> <p>2)Selected Aimags and cities</p> <ul style="list-style-type: none"> • Darkhan-Uul Aimag has an area of 32,750 km². Over 70% of the total land area

	<p>is agricultural land. It has rich natural resources and mineral deposits as well as an abundance of vegetation and wildlife. Of the total population, 64.5% is under 35 years old. Darkhan was built as the foundation for Mongolia's major industries, particularly construction materials. Darkhan is a major industrial center in Mongolia with well-developed infrastructure, located on the Ulaanbaatar-Altanbulag international road and the Ulaanbaatar-Sukhbaatar railway junction, connected to the central power system, high-speed fiber optic cable and digital radio relay line, with mobile communication service.</p> <ul style="list-style-type: none"> • Tsetserleg is the capital of Arkhangai Aimag. The Aimag has an area of 55,300 km². The agriculture sector dominates the economic activities of the Aimag. Over 70% of the territory of the Aimag is pasture land. <p>3)Implementation process</p> <p>The JPT suggested establishing a model city/Aimag in the Sector Report on Digital Transformation and ICT. Based on this suggestion, some programs/projects are expected to be implemented promptly.</p> <p>Firstly, it is necessary to cultivate the basis for human resources related to the ICT sector. That is because currently, quality engineers or developers are mostly in Ulaanbaatar and there is a necessity to enhance the well-balanced development in the ICT sector.</p> <p>Also, to promote the ICT industry, the public sector and the private sector should cooperate in an organized systematic manner on the basis of mutual supporting concepts. The public sector is preferably responsible for ICT infrastructure development, subsidies for start-up promotion or establishment of cooperative framework among the public, academic, and industrial sectors.</p> <p>On the other hand, the private sector should develop human resources such as engineers/developers and high quality application, and promote offshore development projects.</p> <p>Horizontal development of the ICT industry, including SMEs, would raise the bottom of the whole industry.</p> <p>4)Implementing arrangements</p> <p>An inter-agency implementing arrangements are established with linkage platform, CITA and NITP.</p>
Environment and social impact	Significantly positive social impact
Remarks	The methodology, models, and results of the project can be used to further urban development.

Project No. II10.3

Title	Integrated information network for rural people
Location	Phase 1: Ulaanbaatar and Bulgan Aimag Phase 2: Nationwide
Implementing agencies	Inter-agency with NDA, Aimag administrations, related ministries and agencies such as Mongolian National Data Center (MNDC), Ministry of Labor and Social Protection (MLSP), MoH, National Emergency Management Agency and Meteorological Agency and the private sector
Objectives	1)To facilitate communications between nomadic people and local administrations for livestock-related information including climatic data; 2)To support herders' livelihoods and increase their real incomes; 3)To optimize the distribution of livestock sector by introduction of an ICT platform for further development of livestock sector; and 4)To contribute to developing the capacity on digital technology of local administrations.
Expected effects	1)More accountable administrations responding to nomads' needs; 2)Resilient livestock activities with data on water and feed availability and climatic conditions; 3)Enhanced capability of nomads in the livestock market; and 4)Improved capacity of local administrations.

Project costs	
Implementation schedule	<p><u>Phase 1: 2021-22 (9 months)</u> Formulation of requirement definition of the Local Information Platform (LIP)</p> <ul style="list-style-type: none"> ✓ Survey on the marketing and distribution of livestock products; ✓ Arrangement of cooperation between ministries/agencies and within the administration; ✓ Establishment of data server and connection between the server and the system. <p>Verification of concept at Bulgan Aimag</p> <ul style="list-style-type: none"> ✓ Formulation of the guideline of LIP for system administrators and users and implementation of the training to local administration, herders and livestock distributors; ✓ Setting-up of the necessary equipment to local administration; ✓ Selection of the location for the logistic hub; and ✓ Trial operation of LIP. <p><u>Phase 2: 2022-23 (12 months)</u> Expansion of the LIP to all Aimags</p> <ul style="list-style-type: none"> ✓ Implementation of the training to local administrations, herders and livestock distributors; ✓ Setting-up of the necessary equipment to local administrations; and ✓ Selection of locations for the logistic hubs.
Project description	<p>1)Background and justification</p> <p>In Mongolia, herders are widely scattered throughout the country with limited access to financial information such as information related to livestock business. It reduces their business opportunities and bargaining power over brokers and even impedes market integration for livestock products. Further, they are not provided with good public services and information compared to those living in urban areas. These result in the low economic and social inclusiveness of herders.</p> <p>The introduction of ICT is expected to solve the issues of low inclusiveness by allowing mutual communications. In Mongolia with large territory and the scattered population and inadequate transport infrastructure, the online communication platform must have a role as a fundamental infrastructure of public communications.</p> <p>2)Project components</p> <p>An ICT-oriented support system should be established first as a prototype of information exchange system by using smartphones, and pilot tested in a selected area. Microdata obtained by this will complement the statistical and survey data and help to prepare more appropriate measures to be incorporated in development plans at the Aimag level. It may turn out to be the first step toward the realization of stronger relationships between the administrations and residents. By linking local administrations with residents and communities by ICT network, capacity on both sides of the network would be enhanced and mutual trust and sense of responsibility would be cultivated. This indeed is considered social innovation. In addition, the introduction of the information platform to herders and local distributors may revitalize the market of livestock products.</p> <p>3)Implementing arrangements</p> <p>An inter-agency implementing arrangements are established under the supervision of NDA with related ministries and local administrations.</p>
Environment and social impact	Significantly positive social impact
Remarks	The project will support herders' livelihoods and increase their real incomes.

Project No. II10.4

Title	Offshore development promotion
Location	Ulaanbaatar
Implementing agencies	CITA, National Information Technology Park (NITP), NDA, and private companies
Objectives	1)To publicize Mongolian offshore development potential and increase the number of offshore development projects from foreign countries in Mongolia, and

	2)For the purpose of promoting offshore development, to establish the supportive framework between ICT-related enterprises or start-ups and government organizations such as CITA and NIIP.
Expected effects	1)Building an ICT environment for the promotion of offshore development; 2)Further industrial development related to the ICT sector; 3)Human resource (ICT experts) development through the offshore project experience, and 4)Enhancement of digital society that the Mongolian Government has been promoting.
Project costs	US\$1.0 million
Implementation schedule	Project design: 2021-22 Full scale implementation of the project: 2023-25
Project description	<p>1)Background Outsourcing software development (offshore development) projects are becoming increasingly more popular every year. The total value of outsourcing ICT services may exceed US\$ 413.72 billion by the end of 2021. Such an increase is found in the practice's decreasing cost and increasing efficiency in general. In software development, outsourcing has become one of the top trends in the past couple of years. Non-tech businesses look for expert knowledge outside of their teams, while over 60% of software development companies outsource at least part of their development processes.</p> <p>Mongolia has kinds of advantage for attracting foreign enterprises which aim to develop a large or small digital/IT system. One reason is that Mongolian ICT experts have a high technical education level in domestic universities and other countries such as Japan, the United States or other developed countries. Also, Mongolian experts' English or other language skills are higher, and average salary of Mongolian developers/engineers is generally lower than China, Vietnam, and the Philippines (advanced countries in offshore development sector).</p> <p>However, currently, Mongolia is not a famous country for offshore development due to some barriers.</p> <p>2)Implementation process The JPT implemented the pilot project of “Establishment of Linkage between Industry and Academia” within the framework of NCDP project. In this project, a supporting platform in terms of the ICT sector between industry and academia was established with the MOU signed by related stakeholders.</p> <p>Within this platform, it would be possible to expand the potential of offshore development in Mongolia through the human resource development and supportive measures to enhance the ICT development environment.</p> <p>In parallel, influential publication for attracting investment in offshore development is expected to be promoted. Specific activities for the promotion are 1) inviting government officials related to the ICT sector to Mongolia, 2) formulating collaborative network with foreign ICT stakeholders such as ministry, commission, or chamber of commerce; and 3) survey trip to grasp the condition of offshore development to advanced countries such as Estonia, China or Russia, simultaneously conducting the promotion.</p> <p>3)Implementing arrangements An inter-agency implementing arrangements are established with linkage platform, CITA and NIIP under the guidance of NDA.</p>
Environment and social impact	Significantly positive social impact
Remarks	

Project No. II10.5

Title	Open data promotion for organic ICT ecosystem
Location	Ulaanbaatar
Implementing agencies	CITA, NSO, NDA
Objectives	1)Creating the guidelines targeting at public entities and private companies for publicizing and utilizing open data;

	<p>2) Training for human resources (data scientists) who can promote open data for business;</p> <p>3) Promoting a program to invite suggestions of business plans and brush up the plans through utilizing open data, and</p> <p>4) Creating an organic ecosystem consisting of public entities and private companies through the promotion of open data.</p>
Expected effects	<p>An ICT ecosystem is defined as "the network of organizations that drives the creation and delivery of information technology products and services". The ICT ecosystem is strong in all three of the most important hardware, software, and services sectors.</p> <p>Promoting the utilization of open data, organic ecosystem in the ICT sector shall be created. Also, it applies particularly to ICT services in growth economies where users are eager to use ICT to improve the quality of life.</p>
Project costs	US\$ 1.0 million
Implementation schedule	<p>Project design: 2021-22</p> <p>Full scale implementation of the project: 2022-23</p>
Project description	<p>1) Background</p> <p>Public bodies can produce and commission huge quantities of data and information as an open data. By making their data sets available, public institutions become more transparent and accountable to citizens and private companies. By encouraging the use, reuse and free distribution of data sets, governments can promote business creation and innovative, citizen-centric services.</p> <p>The significance and purpose of promoting open data are as follows:</p> <ul style="list-style-type: none"> ➤ Improving transparency and reliability of government responsibilities and roles; ➤ Promotion of public participation and public-private collaboration, and ➤ Economic revitalization and administrative efficiency. <p>2) Implementation process</p> <p>The guidelines shall be formulated initiated by the related government agencies, then integrated format to publicize and utilize open data would be promoted. In parallel, ICT ecosystem should be enhanced through the collaborative effort by public and private entities. It can promote the technical and marketized cooperation between enterprises and improve offshore development environment.</p> <p>3) Implementing arrangements</p> <p>An inter-agency implementing arrangements are established with linkage platform, CITA and NSO under the guidance of NDA.</p>
Environment and social impact	Significantly positive social impact
Remarks	The methodology, models, and results of the project can be used to further urban development.

10.3 Spatial Structure Strengthening Initiative

Project No. III1

Title	Ring artery establishment*
Location	Central part of Mongolia
Implementing agencies	Ministry of Road and Transport Development
Objectives	<p>1) To establish a ring artery linking cities in Western, Khangai, Central and Eastern Regions in order to contribute to creation of a core development area in a central part of the national territory;</p> <p>2) To link Aimags along the northern section of the artery;</p> <p>3) To improve access from Aimags bordering on Chinese borders to the central area; and</p> <p>4) To improve access from the central area to Western and Easter Regions.</p>
Expected effects	More balanced regional development and more effective provision of social and public functions throughout the Country
Project costs	Phase 1: US\$ 71 million for Darkhan – Erdenet/Orkhon widening (190km)

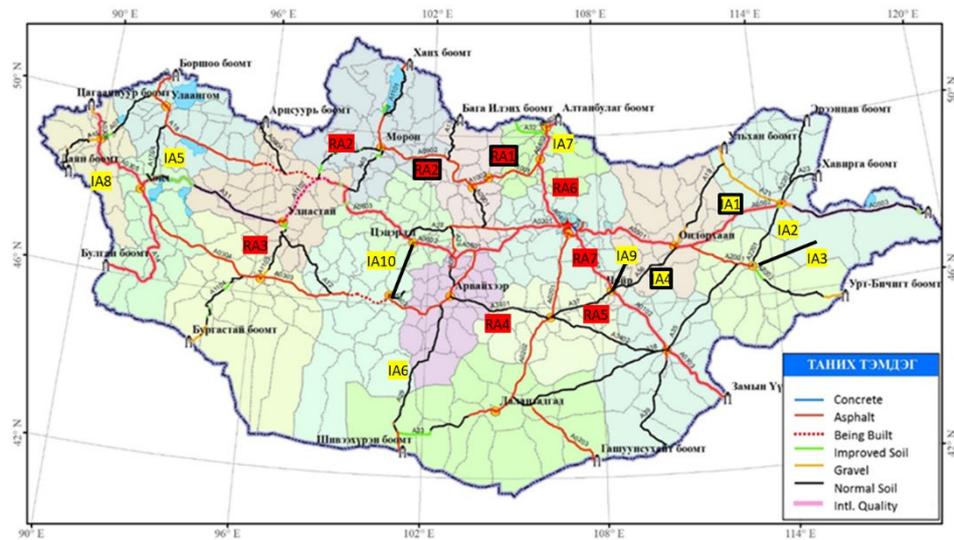
US\$ 52 million for the southern section improvement (Ondorkhan – Choir Arveykhjeer, 274km)
Phase 2: US\$ 125 million for southern and western ring section rehabilitation (Orkhon – Murun – Uliastai – Arveykhjeer, 793km, partially already paved)

Implementation schedule

Phase 1: improvement of unpaved and degraded sections of the proposed ring artery
Phase 2: development of new sections in mountainous areas along the artery
The target project sections, project code, length, present status of the road development, priority (Phase 1-3, code “0” means already completed), terrain condition, necessary number of lanes, length discount option if it is partially completed, and estimated cost are summarized as follows. The pavement conditions are updated as of end of 2019.

Category	Code	Project	Length (km)	Status	Priority	Terrain	Lanes	Length option	Est Cost (USD)
Ring artery	RA1	Darkhan-Erdenet	190	A1001-1002, paved 2 lanes	1	Flat	4	1	71,060,000
	RA2	Bulgan-Murun-A603/A1102 crossing	599	A0902, 50% paved, 50% normal soil	2	Hill	2	50%	67,207,800
	RA3	Uliastai-Altai	194	A1103, normal soil	2	Mount.	2	1	58,044,800
	RA4	Arverkheer-Mandalgovi-Choir	114	A3401 - A37 normal soil	1	Flat	2	1	21,318,000
	RA5		160	A37 normal soil	1	Flat	2	1	29,920,000
	RA6	UB-Darkhan	211	A0401, already on-going by ADB	0	Hill	4/2	1	0
	RA7	UB-Choir	200	A0101, recently upgraded and work is ongoing for Nalakh	0	Hill	4/2	1	0

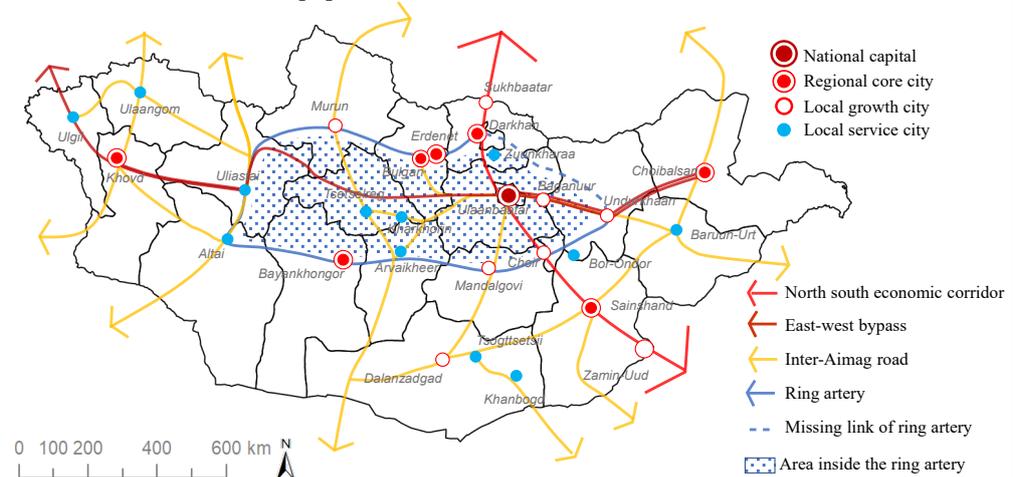
The locations of the target sections are identified in the map with code and color of the category. Codes with bold straight lines are Phase I prioritized sections.



Project description

1) Background

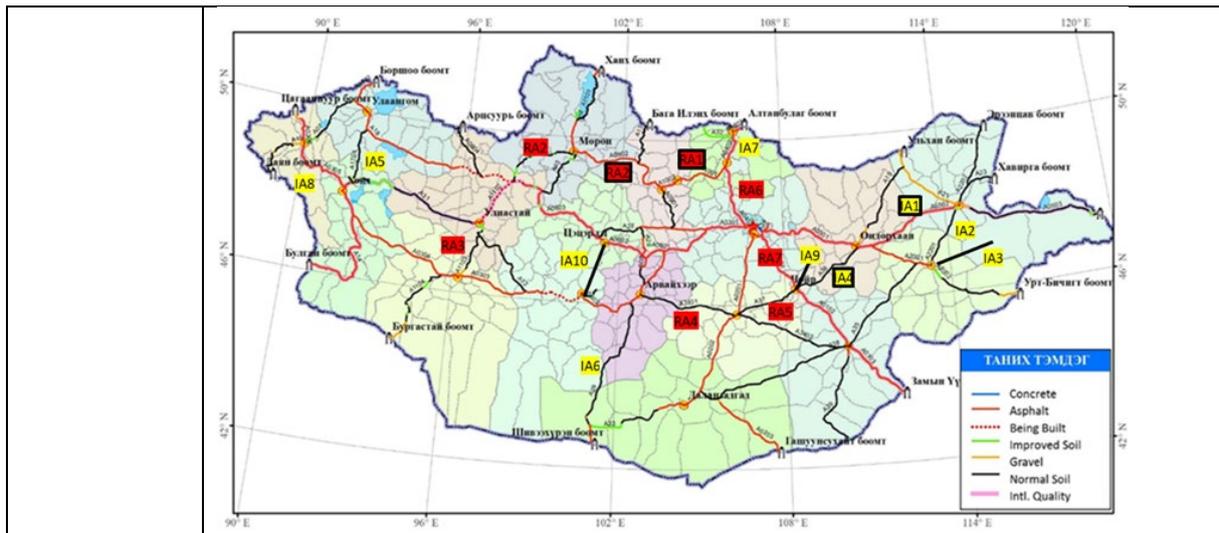
The national spatial structure proposed by the recent studies and adopted partly the Parliament Resolutions is not ideal as it does not serve the entire territory of Mongolia properly. Main development areas are inclined to the east along the north-south economic corridor via Ulaanbaatar and to the north along the east-west green corridor. Four out of five north-south axes designated by the Parliament Resolution No. 9 of 2001 have not been effectively established. Location of the capital city has dominant effects on the distribution of economic activities and population.



	<p>2) Project description</p> <p>The proposed ring artery links larger cities including Uliastai in Western Region, Murun, Bayankhongor and Arveykhjeer in Khangai Region, Choir, Darkhan and Erdenet in Central Region, and Ondorkhan in Eastern Region. It will contribute to the following:</p> <ol style="list-style-type: none"> The area inside the ring artery may be developed as the core region supported by high grade infrastructure to lead the Mongolian development in the 21st century; Some of the important urban functions of Ulaanbaatar will be effectively transferred and shared by the cities along the ring corridor; Urban functions of Uliastai at the western end of the ring artery will be upgraded to strengthen the link of Western Region to the capital; Urban functions of Ondorkhan at the eastern end of the ring artery will be upgraded to strengthen the link of Eastern Region to the capital; The northern section of the ring artery will link the Aimags and cities in the border areas with Russia to realize tourism and trade development potentials; and The southern section of the ring artery will improve the access from the Aimags bordering on China to the advanced region to the north. <p>3) Implementation</p> <p>The project will be implemented by MRTD in steps starting with improvement of existing road sections, followed by construction of new alignments especially through mountainous areas in the west and the southwest. The northeastern section of the artery should avoid the protected area.</p>
Environment and social impact	The improvement of existing road sections will not involve adverse social and environmental effects. Development of new alignments of roads should be subject to careful planning and Environmental Impact Assessment (EIA) before implementation
Remarks	Detail analysis and cost estimate in Sector Report

Project No. III2

Title	Inter-Aimag roads construction and upgrading*									
Location	Throughout the Country									
Implementing agencies	MRTD									
Objectives	To strengthen links between Aimag capitals to facilitate transport of raw materials for processing and promote complementary development of Aimags and trade and communications between them									
Expected effects	Complementary development of Aimags with primary production, processing and marketing More effective provision of social and public services in different Aimags and between urban and rural areas									
Project costs	Phase 1(2021-2025): US\$ 50 million for initial 225km prioritized section Phase 2(2025-2030): US\$ 211 million for secondary 1,023km prioritized section Phase 3(2030-2040): US\$ 129 million for secondary 614km prioritized section with lower engineering standard.									
Implementation schedule	The target project sections, project code, length, present status of the road development, priority (Phase 1-3, code "0" means already completed), terrain condition, necessary number of lanes, length discount option if it is partially completed, and estimated cost are summarized as follows. The pavement conditions are updated as of end of 2019									
	Category	Code	Project	Length (km)	Status	Priority	Terrain	Lanes	Length option	Est Cost (USD)
	Inter-Aimag roads	IA1	Choibalsan-Undurkhan	225	A0502, paved	0	Flat	2	1	0
		IA2	Choibalsan-Baruun-Urt-Sainshand	497	A2201, A35, normal soil	2	Flat	2	1	92,939,000
		IA3	Malad-Khuut-Barun-Uud	163	no road (parallel to A2201 above)	3	Hill	1.5	1	27,432,900
		IA4	Choir-Undurkhan	225	A35 normal soil	1	Hill	2	1	50,490,000
		IA5	Ulaangom-Khovd	163	80% of the section (A1701) are in normal soil.	2	Mount	1.5	1	36,577,200
		IA6	Anverkheer-Shiveekhuren-China	451	A29, normal soil	3	Mount	1.5	1	101,204,400
		IA7	Darkhan-Altanbulag-Russia	122	A0402-0403, paved, under ADB ongoing	0	Flat	2	1	0
		IA8	Khovd-Ulgii	220	A0305, paved recently by ADB	0	Mount	2	1	0
		IA9	Govisumber-Darkhan Soum of Khentii	93	Normal soil, minor, close to Baganuur, parallel to A35	2	Hill	2	1	20,869,200
		IA10	Bayankhongor-Shargaljuut-Naiman lake-Ulaanitsubalan-Khuiirt	270	No road, mountainous, tourist/nature destinations	2	Mount	1.5	1	60,588,000
	The locations of the target sections are identified in the map with code and color of the category. Codes with bold straight lines are Phase1 prioritized sections.									



Project description

1) Background

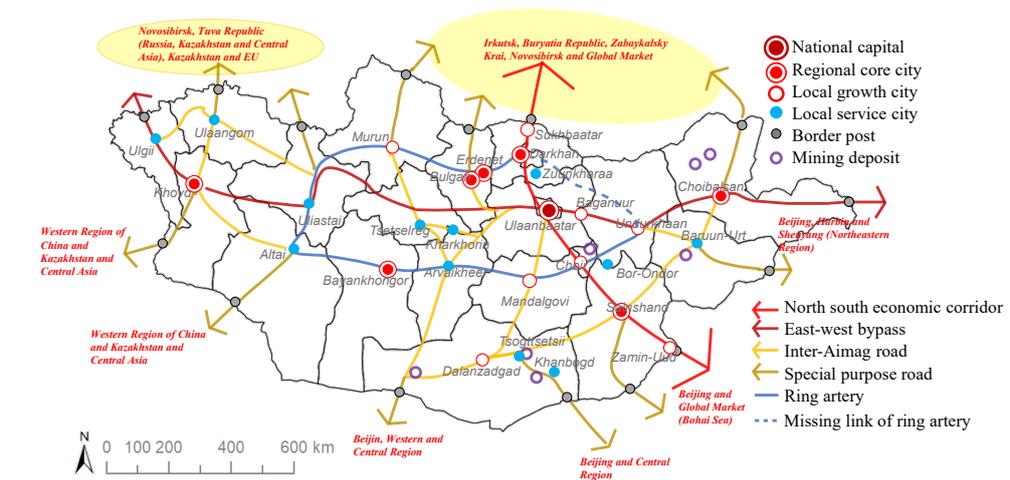
At present, the artery network consists mainly of roads radiating from Ulaanbaatar and road links between even Aimag capitals are not adequately provided especially for Aimags away from the capital. The project will strengthen the artery network by improving roads linking Aimag capitals as shown in the figure below.

2) Project description

The project will help to establish the four north-south development axes as part of the national spatial structure approved by Parliament Resolution No.9 of 2001 and also another multi-access link from Bayan-Ulgii to Tashanta in Russia. In addition, links between Ulaanbaatar and Dalanzadgad, between Sainshand and Gurvantes through Dalanzadgad, and between Sainshand and Choibalsan will be strengthened as well as road links within the proposed ring artery.

3) Implementation

The project will be implemented in steps by MRTD.



Environment and social impact

The road sections through the Gobi and dry steppe areas will involve some adverse environmental effects. Also, social effects on local people including nomads should be carefully assessed.

Remarks

Detailed analysis in Sector Report

Project No. III3

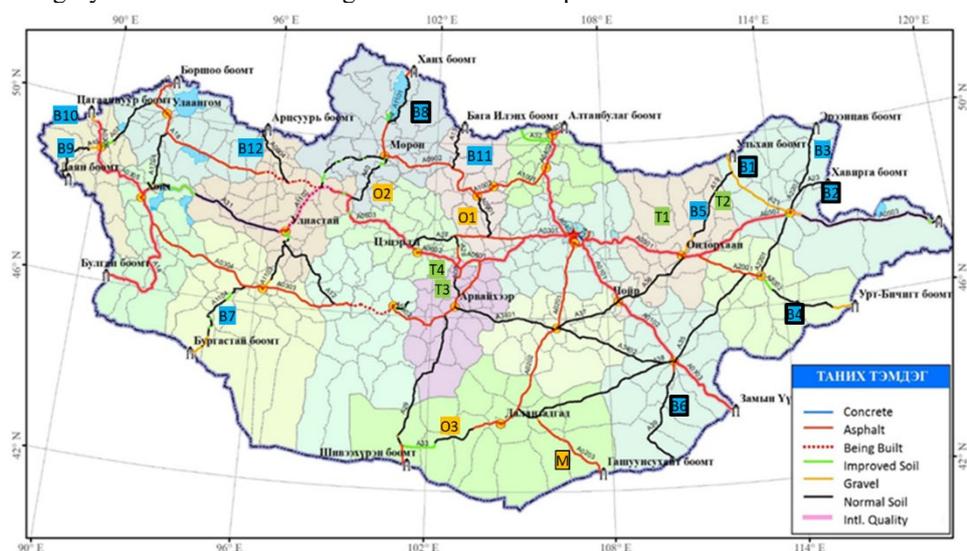
Title	Aimag special purpose roads development*
Location	Throughout the Country
Implementing	MRTD

agencies	
Objectives	To strengthen tourism function and export/import function, links between Aimag capitals to touristic destinations and border crossing points, to promote complementary development of Aimags and trade and communications
Expected effects	Complementary development of Aimags and regions with primary production, processing and marketing More effective provision of social and public services in different Aimags and between urban and rural areas
Project costs	Phase 1 (2021-2025): US\$ 214 million for initial 979 km prioritized section Phase 2 (2025-2030): US\$ 284 million for secondary 1,167 km prioritized section Phase 3 (2030-2040): US\$ 211 million for secondary 1,085 km prioritized section with lower engineering standard.

Implementation schedule
The target sections with category (tourism, border trade, mining, and others), project code, length, present status of the road development, priority (Phase 1-3, 0 means already completed), terrain condition, necessary number of lanes, length discount option if it is partially completed, and estimated cost are summarized as follows.

Category	Code	Project	Length (km)	Status	Priority	Terrain	Lanes	Length option	Est Cost (USD)
Tourism	T1	Jargalkhaan-Umnudelger-Binda	166	Jargait to northeast, normal soil road	2	Hill	2	1	37,250,400
	T2	Norovlin-Dalai	56	A19, Northeast place in Khentii aimag, normal soil	2	Hill	2	1	12,566,400
	T3	Batuicizi-Tuvkhun monastery-Tsenker hot springs-Tsetseleg	100	A0602, Most are in Arkhangai, paved	2	Mount.	2	1	29,920,000
	T4	Arverkheer-Khujir	56	A0602, paved, holspring access	2	Mount.	2	1	16,755,200
Border trade	B1	Choibalsan-Ulkhan port-Russia	224	A21, gravel	1	Mount.	2	1	67,020,800
	B2	Choibalsan-Khavriga port-China	125	A2202, A23, normal soil	1	Flat	2	1	23,375,000
	B3	Choibalsan-Ereentsav port-Russia	215	A2202, normal soil	2	Flat	2	1	40,205,000
	B4	Baruun-Urt-Bichit port-China	272	A2002, expected to be complete in 2020, on-going	0	Flat	2	80%	0
	B5	Undurkhan-Ulikhan port-Russia	250	A19, normal soil. Connecting to T2	2	Mount.	2	1	74,800,000
	B6	Sainshand-Zuunbayan-Khantanbulag	200	A39, Petro processing site, normal soil	1	Flat	2	1	37,400,000
	B7	Altai-Burgastain-China	320	A1104, partially improving, 60% normal soil	3	Mount.	1.5	60%	43,084,800
	B8	Khatgal-Khankh-Russia	180	A1101, Along the Khirngol lake, busfare oriented, 50% paved, 50% normal soil	1	Hill	2	1	40,392,000
	B9	Ulgii-Altai-Tavanbogd	118	A15, very mountainous, normal soil	3	Mount.	1.5	1	26,479,200
	B10	Ulaankhus-Khukh-Ereg port-Russia	113	Unclear but mountainous section	3	Mount.	2	1	33,809,600
	B11	Khulg Undur-Teshig-Baga Ilenkh port-Russia	124	A13, normal soil	2	Mount.	1.5	1	27,825,600
	B12	Numrug-Tes-Artssuuri-Russia	200	Partially the work on A0503 is on going for paving, but A0504, 60% are normal soil	2	Hill	2	1	44,880,000
Mining	M	Tavaltolgoi-Gashuun Sukhait -China	250	A0203 paved on going / completed in 2020	1	Flat	2	1	46,750,000
Other	O1	Bulgan-Khisig Undur-Gurvanbulag	134	A0901, normal soil	3	Mount.	1.5	1	30,069,600
	O2	Murun-Shine Ider -Jargalan -Tsetsuukh	180	A40, normal soil	3	Mount.	1.5	1	40,392,000
	O3	Dalanzadgad-Bayandalai-Gurvanles	220	A33, partially paved, 50% normal soil, 25% improved soil	3	Mount.	1.5	75%	37,026,000

The locations of the target sections are identified in the map with code and color of the category. Codes with bold straight lines are Phase I prioritized sections.



Project description
1) Background
The improvement of artery road network with the ring artery and inter-Aimag roads will not automatically improve the access to vast rural areas. The improvement of access to rural areas is a prerequisite to self-reliant regional development. Rural access roads should be improved in such a way to promote regional and community development having promising potentials such as tourism, trade and mining.
2) Project description

	<p>Most roads serving rural areas are minor roads and located in hilly or mountainous sections. The sections for tourism purpose are selected from Khenti and Uvurkhangai/Arkhangai Aimags as the tourism sector projects (“Urtuu”). The sections for border trade functions are connecting to less developed borders to China and Russia, which will enhance regional trades with local neighboring villages and cities rather than facilitating the core international trades. Mining roads for Tavan Tolgoi to Chinese border are almost developed, but it needs proper widening and upgrade for trade facilitation. The parallel running railway development is on-going, but supporting road functions are essential for mining sector. The following table shows the summary of length by category and priority.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Cost Mil. USD</th> <th>2020-2025</th> <th>2025-2030</th> <th>2030-2040</th> </tr> </thead> <tbody> <tr> <td>Tourism</td> <td>0</td> <td>96</td> <td>0</td> </tr> <tr> <td>Border trade</td> <td>168</td> <td>188</td> <td>103</td> </tr> <tr> <td>Other</td> <td>47</td> <td>0</td> <td>107</td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Length (km)</th> <th>2020-2025</th> <th>2025-2030</th> <th>2030-2040</th> </tr> </thead> <tbody> <tr> <td>Tourism</td> <td>0</td> <td>378</td> <td>0</td> </tr> <tr> <td>Border trade</td> <td>729</td> <td>789</td> <td>551</td> </tr> <tr> <td>Mining / Other</td> <td>250</td> <td>0</td> <td>534</td> </tr> </tbody> </table> <p>3) Implementation The project will be implemented in steps by MRTD.</p>	Cost Mil. USD	2020-2025	2025-2030	2030-2040	Tourism	0	96	0	Border trade	168	188	103	Other	47	0	107	Length (km)	2020-2025	2025-2030	2030-2040	Tourism	0	378	0	Border trade	729	789	551	Mining / Other	250	0	534
Cost Mil. USD	2020-2025	2025-2030	2030-2040																														
Tourism	0	96	0																														
Border trade	168	188	103																														
Other	47	0	107																														
Length (km)	2020-2025	2025-2030	2030-2040																														
Tourism	0	378	0																														
Border trade	729	789	551																														
Mining / Other	250	0	534																														
Environment and social impact	The road sections through the Govi and dry steppe areas will involve some adverse environmental effects. Also, social effects on local people including nomads should be carefully assessed.																																
Remarks	Detail analysis and cost estimation in Sector Report																																

Project No. III4

Title	Ulaanbaatar bypath rail link (Bogd Khan link)*
Location	Ulaanbaatar suburbs
Implementing agencies	Ulaanbaatar Railway (UBTZ)/National Railway (MTZ)
Objectives	<ol style="list-style-type: none"> 1) To create capacity to the north-south railway corridors for transit demand and export demand; and 2) To create the new connection to the new freight terminal in the suburbs of Ulaanbaatar, and interlink to other freight mode, mainly small scale truck delivery to Ulaanbaatar
Expected effects	Speed up of the rail transit delivery and export delivery, not passing Ulaanbaatar section with old engineering design standard Capacity improvement of logistics chain destined to Ulaanbaatar
Project costs	US\$300-400 million
Implementation schedule	2021: Initial assessment (engineering study) 2022-25: Implementation and assessment
Project description	<ol style="list-style-type: none"> 1) Background Ulaanbaatar is the major destination of domestic coal supply and various import products by rail. The north-south rail mainlines are congested by the supply operation to Ulaanbaatar. The railway alignment between Ulaanbaatar and Nalaikh were designed in 1930s with old engineering specifications to pass the steep section in Nalaikh, which makes the rail operation slow. 2) Project description This bypass rail link (Bogd Khan link) is proposed by the ADB rail sector study in 2018 and JICA Ulaanbaatar Masterplan 2010. This new link expects to bypass the congested Ulaanbaatar and connect Nalaikh, the new airport vicinity and the western area of Ulaanbaatar, enabling transit trains operation to avoid the congested sections in Ulaanbaatar. The JICA Ulaanbaatar M/P proposed that the new bypass link will be 170km length from Mandal station to Bagakhangai station, including 2 tunnels, 2 bridges and 20 culverts, which will make the cost larger. The present section from Mandal station to Bagakhangai station is 194km, and therefore, the proposed new link by JICA M/P is 24km shorter. However, the proposed new link by the JICA M/P has some overlapped sections to the present route and it can be rationalized. Further engineering study can be implemented to settle the potential and shorter alignment with latest technology, which may reduce initial investment

	<p>cost. After the new link development, the present section running through Ulaanbaatar will be converted to regional freight and passenger railway services.</p> <p>3) Implementation The project will be implemented by UBTZ/MTZ within their capacity.</p>
Environment and social impact	<p>This project will give large environmental impact along the railway alignment and related sites during the construction period. Social impact during the construction period will be mediated as human settlements along the section are sparse.</p> <p>The social impact of the new bypass railway during operation period will be spread to not only the capital region but also international transit railway operation efficiency.</p>
Remarks	

Project No. III5

Title	North-south corridor rail capacity development*
Location	Along the north-south corridor
Implementing agencies	UBTZ (Russian stakeholders) /MTZ/ MRTD
Objectives	<p>1) To secure the physical and institutional capacity to accept the further transit and export demand by railway network; and</p> <p>2) To maximize the railway utility for freight logistics and minimize the road deterioration due to heavy freight traffic on road.</p>
Expected effects	Operation efficiency in railway with minimum investment, minimizing the delay due to railway traffic
Project costs	<p>US\$ 2.0 million for initial assessment study for portfolio.</p> <p>Total US\$ 250 million (US\$50 million per annum) for rolling implementation.</p>
Implementation schedule	<p>2021: Initial assessment and preparation of the implementation portfolio</p> <p>2022-25: Implementation and assessment</p>
Project description	<p>1) Background The productivity of Mongolian railway operation is considered better than that in other landlocked central Asian countries and considered reasonably high for single-track-based infrastructure. However, the capacity of mainline operation faces saturation due to institutional and physical constraints.</p> <p>2) Project description For capacity development of the north-south railway, the following should be undertaken.</p> <p>a) Analysis on various approaches for capacity development and assessment of present demand patterns.</p> <p>b) Analysis on the capacity development should consider, but not limited to the following: Possibility to minimize/eliminate the passenger car services to enhance freight operation, including international passenger services, Physical improvement including i) adding new passing lanes, ii) adding new locomotives and longer train operation, iii) revision of vertical and horizontal alignment for further speed-up, iv) installation of partial double track, v) electrification, vi) new branch routes development, vii) full double track development, and so forth, Further document control facilitation for the cross-border operation to minimize the delay at the borders, and Efficient wagon operation and further containerization possibility to minimize the biased directional volume.</p> <p>c) Prioritized approaches integrating various approaches to support each other in order to enhance synergy of approaches.</p> <p>3) Implementation The project will be implemented by UBTZ/MTZ under the guidance of MRTD.</p>
Environment and social impact	Positive effects due to promotion of the railway freight traffic which has more energy efficiency than road traffic, and reduction of greenhouse gas (GHG) emission.

Remarks	Project No. I3 should proceed this project.
---------	---

Project No. III6

Title	Ulaanbaatar road bypath and network development
Location	Ulaanbaatar and its suburbs
Implementing agencies	MRTD, Tuv Aimag, Ulaanbaatar municipality
Objectives	1) To realize improved flows of traffic in Ulaanbaatar and its surroundings; and 2) To enhance logistics chain diversity in Ulaanbaatar and its surrounding area
Expected effects	1) Minimized traverse traffic and congestions in Ulaanbaatar 2) Improvement in the logistics chain reliability of Ulaanbaatar and region-wide delivery network
Project costs	1) US\$ 30-40 million for semi-circular corridor development (30km arterials in suburb) 2) US\$ 40 million per North-south link in Ulaanbaatar city.
Implementation schedule	Stage wise development by 2035
Project description	1) Background After the opening of new airport access highway, the regional and national road traffic will be bypassed to the south of Ulaanbaatar region through Nalaikh, Zuunmod and the airport to avoid the congested Ulaanbaatar, and a new semi-circular transport corridor will be created. Also, the freight terminal removal project (Project No. I7) will create another open land in the urban core area, which can be used for transport network development in Ulaanbaatar. 2) Project description The project includes but not be limited to the following. Ulaanbaatar regional road network improvement in accordance with the semi-circular transport corridor development, and Ulaanbaatar city network development, particularly the north-south link development to cross the railway lands. 3) Implementation MRTD is the government implementing agency responsible for coordinating with Tuv Aimag and Ulaanbaatar Municipality to implement the project.
Environment and social impact	Positive effects due to alleviation of traffic congestion in Ulaanbaatar caused by traverse freight demand, and minimization of air pollution, energy consumption, congestion and delay of delivery.
Remarks	Related to Project No. I3 (Ulaanbaatar railway bypass) and Project No. I6 (Ulaanbaatar freight terminal removal)

Project No. III7

Title	Ulaanbaatar urban redevelopment utilizing freight terminal land
Location	Ulaanbaatar suburbs and city centers along the railway
Implementing agencies	UBTZ / Municipalities / Private urban development investors
Objectives	1) To re-develop the land made available by relocation of freight terminal for enhancement of urban functions; and 2) To use the re-development to generate fund for the north-south corridor capacity building projects
Expected effects	1) Congestion alleviation in Ulaanbaatar 2) Alleviation of excessive concentration of urban functions in Ulaanbaatar to surrounding satellite cities
Project costs	Project costs to be recovered by profits from the land re-development.
Implementation schedule	2021-30: New logistics park development in the vicinity of Ulaanbaatar 2030-40: Other associated development
Project	1) Background

description	<p>There are several rail-based freight handling yards in Ulaanbaatar central area, but the site suitability is lower than surrounding sites as they locate on the Peace avenue. The ADB study in 2018 proposed to consolidate those fragmented freight functions and move them to the new freight logistics center developed close to the new airport, where the railway bypass (Project No. I2) will be connected.</p> <p>The reason of recent shift from rail to road in the import demand from China is the poor capacity of railway terminal in Ulaanbaatar, where freight operators suffers high concentration of trucks in the small terminal yards, and the fragmented terminals has less possibility to expand its capacity. The location of terminal also leads the congestion of railway operation along the mainline.</p> <p>2) Project description</p> <p>The project includes but is not limited to the following components</p> <p>Development of a new logistics park in the vicinity of Ulaanbaatar. ADB proposed a potential site close to the new international airport. The new logistics park will integrate rail, road and air logistics services. The major freight delivery to Ulaanbaatar by medium-sized truck shall be based in the new logistics park.</p> <p>Sales or lease out of the fragmented freight sites as commercial or residential sites. Land use regulation should be revised with municipalities.</p> <p>Use of the revenue from selling/leasing the sites for rail bypass development (Project No. I2) or operational capacity development (Project No. I3)</p> <p>Inter Shiodome in Tokyo and Kita-Umeda in Osaka, Japan offer the implementation concepts similar to this project, i.e., re-development low utility of railway freight yard in the urban core and re-invest the financial revenue of the site re-development to the new railway network development.</p> <p>This proposal is prepared for Ulaanbaatar, but it can be applied to Darkhan and Erdenet.</p> <p>3) Implementation</p> <p>The project will be implemented by PPP coordinated by UBTZ involving private urban developers as well.</p>
Environment and social impact	Positive effects due to enhancement of the quality of life in the city center by upgrading unused railway lands for urban development.
Remarks	Related to Project No. I2 (Ulaanbaatar railway bypass)

Project No. III8

Title	Suburban and local cities bypath development
Location	First targets: Erdenet, Murun; Second targets: to be specified
Implementing agencies	MRTD
Objectives	To shift the through and traverse traffic to the bypass in each city, and realize efficient transport operation in the respective city center
Expected effects	Alleviation of traffic congestion in Aimag centers
Project costs	For Erdenet: US\$ 10-15 million (15km), For Murun: US\$ 3-8 million (minimum 5km, maximum 15km)
Implementation schedule	Stage wise implementation by 2030
Project description	<p>1) Background</p> <p>The traffic congestion in Aimag centers has not been revealed as problematic issue so far; however, it is expected that some Aimag centers should face the need to harmonize the urban traffic and intercity traffic in the next decade.</p> <p>For Erdenet, the intercity road (Eldenet-Bulgan highway) is passing through the city center and city traffic and intercity traffic are mixed to cause congestion in the city center. Orkhon and Bulgan Aimag have conceived a bypass route avoiding the developed areas, and prepared a plan to develop the section as two-lanes paved road. The plan also contains development plan of animal meat processing complex along the bypass road.</p> <p>For Murun and other Aimag centers, the present urbanized areas are formed along the existing intercity routes and proper development plans for bypass construction should be considered. For Choir and Sainshand, the main intercity routes are running through the</p>

	<p>outskirts of the city premises, therefore the bypass road are not necessary.</p> <p>2) Project description</p> <p>As the first step for bypass construction, urban development plans for those cities where future traffic congestion is foreseen should be prepared or updated reflecting increase in through traffic and urban population as forecasted by the NCDP. Each plan should designate expansion areas for urbanization and alignment of bypass road in relation to prospective locations of new economic activities and related facilities. Priority for implementation should be determined in view of existing and foreseen congestion of each city.</p> <p>3) Implementation</p> <p>MRTD is the main government agency responsible for coordinating with related organizations including MCUD responsible for guiding Aimag administrations to prepare/update urban development plans and private entities undertaking or planning various economic activities.</p>
Environment and social impact	Positive effects due to alleviation of congestion and traffic accidents in the city centers, improvement in the fuel consumption efficiency
Remarks	

Project No. III9

Title	Ulaanbaatar airport satellite city
Location	Sergelen Soum, Tuv Aimag (53km from Ulaanbaatar)
Implementing agencies	MCUD, Private sector
Objectives	To establish a new base for industrial, logistic, international trade and touristic activities by creating a new satellite city in a location adjacent to the new Ulaanbaatar International Airport. The Project will contribute to mitigating excessive concentration of economic activities and population in Ulaanbaatar and spearheading accelerated economic growth capitalizing on its international gateway function.
Expected effects	<ol style="list-style-type: none"> 1) Creation of a comfortable urban space for the population 2) Mitigation of congestion in Ulaanbaatar 3) Acceleration of economic growth
Project costs	US\$ 10.9 billion
Implementation schedule	2021-22: preparatory works including preparation of master plan, business plan and designs and funding arrangement 2023-: implementation by phase
Project description	<p>1) Background</p> <p>The new Ulaanbaatar International Airport is about to be completed and start operation in 2020. The new airport project was initiated to create a constraint-free new international air gateway substituting the existing Chinggiskhan international airport, which is suffering from operational inefficiency due to geographical constraints. The new airport will have a 3,600-meter runway and a terminal building with a floor area of 37,000 m². It will be able to accommodate 3 million passengers a year.</p> <p>The Mongolian Government plans to construct a railway bypass for the existing north-south railway to circumvent the already congested Ulaanbaatar with the assistance of ADB. This railway bypass will run close to the new international airport, thus generating a possibility for the airport to function as a multi-modal international gateway.</p> <p>Excessive concentration of population and economic activities in Ulaanbaatar is generating environmental and health problems as well as reducing efficiency of economic activities. The government policy is to promote development of provinces and mitigate overloading on Ulaanbaatar.</p> <p>2) Project components</p> <p>The Mongolian Government has secured land for the project for an area of 12,000 ha offered by Sergelen Soum office. MCUD prepared a master plan for the airport satellite city project proposing population at 350,000 and land development and private investment for industrial areas, logistic areas, economic free zone, touristic area and infrastructure facilities. It</p>

	<p>estimates the investment cost at US\$10.9 billion until the year 2038, including both public and private investment.</p> <p>3) Implementing arrangements</p> <p>Further analysis is required to supplement the master plan in such aspects as judgment by private business and their possibility to make investment, market possibility and financing arrangement including public investment and PPP arrangement including various schemes such as viability gap funding and equity back finance as well as the technical aspect, especially availability of water resources. Detailed designs will subsequently be prepared before the implementation.</p>
Environment and social impact	Positive impact in terms of reduction in environmental risk in the existing Ulaanbaatar built-up area. Measures required in realizing an environment-friendly new airport city paying due attention to energy source and management of wastewater and solid wastes

Project No. III10

Title	Local air transport network development
Location	Aimag capitals
Implementing agencies	MRTD
Objectives	<p>1) To improve air transport network within Mongolia, and</p> <p>2) To ensure mobility of people throughout the vast territory of the Country</p>
Expected effects	<p>More active communications between people in different regions</p> <p>Contribution to strengthening national unity and economic diversification</p>
Project costs	<p>US\$2.0 million for local air transport network development planning</p> <p>US\$12 million per airport for airport facility and safety equipment improvement</p> <p>US\$0.5 million per year for subsidy (sustainable operation)</p>
Implementation schedule	<p>Planning for local air transport network development in 2021-22</p> <p>Detailed planning and design of selected local airports to be internationalized during Phase 2</p> <p>Implementation during Phase 2 through Phase 3</p>
Project description	<p>The new Ulaanbaatar international airport (NUBIA) is expected to be operational soon to improve international air access between the Capital City and other international cities in Asia and western countries. Domestic air transport services at present, however, are inadequate with limited regular flights exclusively to link local cities with Ulaanbaatar. The air transport network should be established to ensure mobility of people throughout the vast territory of the Country. Selected Aimag airports should be upgraded as international airports and priority may be given to Khovd and Choibalsan to serve the western and the eastern territories respectively.</p> <p>The project will extend and upgrade runways as necessary and improve terminal facilities with immigration and customs (C.I.Q) functions and safety equipment to accommodate direct services of international flights in the future. Khovd can be connected to Urumqi of China and Novosibirsk of Russia, and Choibalsan has potential to be connected with the North East region of China. Additionally, the necessary human resources development for the regional airport operation should be considered in the planning phase. Referring to the Essential Air Service facility (EAS) of the United States and subsidy system for regional flight operation in Japan, a subsidization system sustaining the regional air services should be considered for Mongolian market in the planning phase.</p>
Environment and social impact	Social and environmental considerations should be incorporated in planning and design.
Remarks	In Japan, the national government subsidizes up to 50% of expenditures for landing at hub airports, discount of jet fuel tax and property tax of the airport facility, in order to complete and sustain the national transport network. The amount of the subsidy in Japan for the sustainable regional air network operation comes up to approximately US\$ 27 million in fiscal year 2019.

Project No. III11

Title	Regional and local cities development
Location	Larger cities throughout the Country

Implementing agencies	MCUD																																								
Objectives	1) To improve selected urban facilities of larger urban centers at higher tiers of the urban hierarchy, and 2) To upgrade selected urban functions to support the regional development																																								
Expected effects	More self-reliant development of different regions throughout the Country utilizing and strengthening regional characteristics																																								
Project costs	US\$2.0 million to prepare stagewise implementation plan with prioritization Approximately US\$10 million per urban center for implementation																																								
Implementation schedule	Preparation of stagewise implementation plan in 2021-22 Phased implementation during Phase 1 through Phase 3																																								
Project description	<p>As part of the NCDP, the hierarchical structure of urban centers has been analyzed and future hierarchy has been proposed together with urban functions to be strengthened in each city at higher tiers of the hierarchy. Those urban functions will support the development of respective regions to make them self-reliant regions by effectively utilizing regional characteristics with indigenous resources respectively. Main urban functions of larger cities including regional core cities and local growth cities are summarized below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">City</th> <th>Major functions</th> </tr> </thead> <tbody> <tr> <td>Ulgii</td> <td>Center for nature and culture tourism</td> </tr> <tr> <td>Ulaangom</td> <td>Center for trade with Russia Distribution center for construction materials and commodities</td> </tr> <tr> <td>Khovd</td> <td>Higher education and research center Tourism gateway in western Mongolia Construction materials industry and supply base.</td> </tr> <tr> <td>Sukhbartar</td> <td>Border trade base</td> </tr> <tr> <td>Darkhan</td> <td>Dissemination center of advanced farming technologies</td> </tr> <tr> <td>Erdenet, Bulgan</td> <td>Service bases for transit trade and tourism</td> </tr> <tr> <td>Tsetserleg</td> <td>ICT center in central Mongolia Base for winter tourism</td> </tr> <tr> <td>Uliastai</td> <td>Social service base for western Aimags</td> </tr> <tr> <td>Altai</td> <td>Renewable energy development and research center Tourism sub-base Training center for education and health personnel</td> </tr> <tr> <td>Bayankhongor</td> <td>Health tourism center</td> </tr> <tr> <td>Arvaikheer</td> <td>Logistic and tourism sub-center</td> </tr> <tr> <td>Kharkhorin</td> <td>Culture and tourism center</td> </tr> <tr> <td>Mandalgovi</td> <td>Logistic center in lower central Mongolia</td> </tr> <tr> <td>Choir</td> <td>Clean energy and logistic center</td> </tr> <tr> <td>Sainshand</td> <td>Logistic and tourism related service center</td> </tr> <tr> <td>Zamyn-Uud</td> <td>Border trade and tourism base</td> </tr> <tr> <td>Choibalsan</td> <td>International logistic and business center Tourism base in eastern Mongolia</td> </tr> <tr> <td>Baruun-Urt</td> <td>Nomadic livestock farming support base</td> </tr> <tr> <td>Undurkhaan</td> <td>Tourism gateway in eastern Mongolia Construction materials supply base</td> </tr> </tbody> </table> <p>Urban facilities of these larger urban centers will be selectively improved to support the designated functions respectively such as water supply, wastewater treatment, urban roads, public and social facilities.</p>	City	Major functions	Ulgii	Center for nature and culture tourism	Ulaangom	Center for trade with Russia Distribution center for construction materials and commodities	Khovd	Higher education and research center Tourism gateway in western Mongolia Construction materials industry and supply base.	Sukhbartar	Border trade base	Darkhan	Dissemination center of advanced farming technologies	Erdenet, Bulgan	Service bases for transit trade and tourism	Tsetserleg	ICT center in central Mongolia Base for winter tourism	Uliastai	Social service base for western Aimags	Altai	Renewable energy development and research center Tourism sub-base Training center for education and health personnel	Bayankhongor	Health tourism center	Arvaikheer	Logistic and tourism sub-center	Kharkhorin	Culture and tourism center	Mandalgovi	Logistic center in lower central Mongolia	Choir	Clean energy and logistic center	Sainshand	Logistic and tourism related service center	Zamyn-Uud	Border trade and tourism base	Choibalsan	International logistic and business center Tourism base in eastern Mongolia	Baruun-Urt	Nomadic livestock farming support base	Undurkhaan	Tourism gateway in eastern Mongolia Construction materials supply base
City	Major functions																																								
Ulgii	Center for nature and culture tourism																																								
Ulaangom	Center for trade with Russia Distribution center for construction materials and commodities																																								
Khovd	Higher education and research center Tourism gateway in western Mongolia Construction materials industry and supply base.																																								
Sukhbartar	Border trade base																																								
Darkhan	Dissemination center of advanced farming technologies																																								
Erdenet, Bulgan	Service bases for transit trade and tourism																																								
Tsetserleg	ICT center in central Mongolia Base for winter tourism																																								
Uliastai	Social service base for western Aimags																																								
Altai	Renewable energy development and research center Tourism sub-base Training center for education and health personnel																																								
Bayankhongor	Health tourism center																																								
Arvaikheer	Logistic and tourism sub-center																																								
Kharkhorin	Culture and tourism center																																								
Mandalgovi	Logistic center in lower central Mongolia																																								
Choir	Clean energy and logistic center																																								
Sainshand	Logistic and tourism related service center																																								
Zamyn-Uud	Border trade and tourism base																																								
Choibalsan	International logistic and business center Tourism base in eastern Mongolia																																								
Baruun-Urt	Nomadic livestock farming support base																																								
Undurkhaan	Tourism gateway in eastern Mongolia Construction materials supply base																																								
Environment and social impact	Social and environmental considerations should be incorporated in planning and design of urban facilities																																								
Remarks																																									

Project No. III12

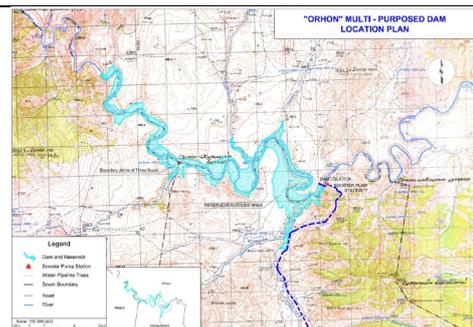
Title	Orkhon River water diversion to Govi
Location	New mining areas in the Govi
Implementing	Ministry of Energy (MoE), MET, Mining Infrastructure Investment Support Project (MINIS)

agencies	financed by the WB, Ministry of MMHI to cooperate with Ministry of Finance (MOF), local governments, River Basin Administration (RBA)
Objectives	1) To expand water supply for mining sector; and 2) To improve water supply to rural areas near the mining sites
Expected effects	Improved water supply for mining and protection of fossil groundwater resources in Southern Govi area
Project costs	Total: US\$730~830 million (Feasibility study in 2015 for US\$29.05 million, Construction in 2017-21 for US\$700~800 million as originally planned) (State budget: 10%, Local budget:-%, Foreign: 90%, Private: -%)
Implementation schedule	2015: Pre-feasibility study and feasibility study (financed by the WB and Australian TF) 2025-30: Construction
Project description	<p>1) Background to justify the project Water demand by mining activities is expected to increase; Water use in mining operations is highly inefficient; Lack of water resources near mineral deposits constrains mining activities; and Decision making on new mining operations is hampered by a lack of information on water resources.</p> <p>2) Project components Pre-feasibility study and feasibility study (before 2025) and construction (after 2025) of Shuren hydropower plant project and water diversion project to transfer water from Orkhon River to the Govi to supply water for mines and other water users.</p> <p>3) Implementing arrangements MoE, MET and MMHI are the government implementing agencies responsible for finding the location of water diversion project to transfer water from Orkhon River to the Govi and deciding the size of the development, providing professional and methodological advice, supporting fund sourcing for international grants and investment.</p> <p>4) Project description <u>Orkhon River:</u> The Orkhon River is the largest tributary of the Selenge River. Its watershed covers 53,786 km², or 143,372 km² including watershed of its tributaries: Tuul, Kharaa, and Eroo Rivers. The total length of the river is 1,124 km and it is the longest river in Mongolia. The Selenge River is international river and flows further north into Russia and Lake Baikal. Therefore, implementation of the project requires the Russian consent.</p> <p><u>Basic description of the system:</u> The system consists of two main parts: dam (roller-compacted concrete (RCC) dam), reservoir and water intake structure for water collection and storage, and the pipelines, pump stations, and water treatment system for transmission and distribution of water to customers.</p> <p><u>Collection and storage:</u> The dam will be located at approximately 20 km upstream from the “Orkhon” observation station. The dam crest will be 300 m long and have a maximum height of 70 m. The dam base is estimated to be 80m wide, the dam volume estimated to be 675,000 m³. It will be constructed from rock and earth fill materials mined from the surrounding area, with an impervious core constructed of concrete. The dam design will incorporate measures for fish passage as required based on the results of the EIA. The drainage and intake structure, which will be concrete construction, will include a 30 MW hydroelectric turbine that will generate electricity for operation of the dam facilities and first pump station. The reservoir impoundment is estimated to be approximately 575 million m³, covering an area of 23 km². The reservoir will extend approximately 18 km upstream from the dam.</p> <p><u>Water transmission and distribution:</u> The piping system will begin at the dam and water will be pumped by the first pump station. The initial pipe diameter is presently set at 1500 mm and the diameter will be reduced along the way as the water is delivered to customers. The route of the pipeline, which will be finally determined in the feasibility study, will generally head south to the Tavan Tolgoi in 613 km, where three branches will continue to the Mandalgovi with 96 km, Dalanzadgad with 85 km and to the Oyu Tolgoi with 123 km.</p> <p><u>Summary of benefits:</u></p>

The Orhon-Govi project will bring positive benefits to the people of Mongolia as follows:
 Improved water supply for two cities and eight Soum centers, benefitting 50,000 people,
 Outlets at 50 locations for people and for animal watering – covering 100,000 ha and capable of supporting 135,000 animals, providing opportunity for economic stability, settlement development, and transition from nomadic herder lifestyle,
 Irrigation water to support 2,000-3,000 ha for planting vegetables, animal feeding improving the yield and quality of harvest,
 Enhanced and sustainable water supply to support mining developments and energy generation,
 Water to support greening projects such as planting trees that can reduce desertification and improve the Govi ecology,
 Hydropower for clean, reliable electricity supply that will contribute to making Mongolia energy self-sufficient and reduce foreign trade deficit, and
 Recreational and tourism opportunities with associated economic benefits.



Location Map of Project Site



Orkhon Multi-Purpose Dam



Route of Pipeline of Orkhon-Govi Project

Source: Mongolian National Water Programme Support Center (Water Center), “Orhon – Govi” Multi-Purposed Water Transmission Complex Project, Oct. 2007.

Feasibility study by WB:

MINIS financed by the WB, delivered studies and assessments aimed at facilitating investments in infrastructure to support mining related activities and to build local capacity to prepare and transact infrastructure projects. Mongolia is becoming one of important global centers for mining. Most of the mineral resources, such as Oyu Tolgoi’s (Turquoise Hill) copper and gold mine, that are under the exploration and newly discovered deposits that have a strategic importance are located in the Govi region of Mongolia.

One of the important issues of infrastructure in this region is to meet the increasing water demands of the developing mining industry, and it is necessary to evaluate the feasibility of continuing the use of the limited groundwater resources in the region. It is also becoming

	<p>a necessity to consider augmenting local water resources from sources located some distance from the Southern Govi.</p> <p>A technical study of the proposed flow regulation of Orkhon River and construction of reservoir complex is a sub-project under the MINIS project. The proposed project would divert water from the Orkhon River and supply it through a pipeline network to the Southern Govi region through Bulgan, Tuv and Dundgovi Aimags. This would involve the construction of a dam and water intake structures approximately 300 km away from Ulaanbaatar city and 30km away from Bulgan Aimag. The main pipeline would have three separate water transmission pipelines, pump stations and supporting facilities to supply water to users along the way and to Mandalgovi, Dalanzadgad and Oyu Tolgoi mine.</p> <p>The dam would be constructed with a hydropower plant with capacity of 30 MW to supply electricity in the Northern Region of Mongolia. The concept of transferring water from the rivers in the Selenge River basin to the Southern Govi region where there is lack of good water was initially discussed at a workshop organized in 1986 and a proposal for this project was developed in 2008.</p> <p><u>Policy documents related to use of surface water:</u></p> <p>Construction of dams and reservoirs on large rivers in Mongolia has been implemented successfully in recent years. A reservoir complex with a compacted concrete dam (Taishir hydropower station) was built over the Zavkhan River and reservoir complex with dam (Durgun hydropower station) constructed on the Chono Kharaiikh River. Flow regulation of the Orkhon River can create opportunities for long-term, positive benefits to urban settlements, pasture lands, agriculture, industrial water supply, tourism, fish habitats and electric power generation. Bringing water to the industrial zones of Govi region and generating electricity by using water flow of the reservoir will have direct economic benefits. The State Great Khural (Parliament) and the Government of Mongolia are highly attentive of these concepts and have mentioned them in the policy documents listed below:</p> <ol style="list-style-type: none"> a) Strategic goal 3 in priority orientation 5 specified in the MDGs based on Comprehensive National Development Strategy as endorsed by the Parliament of Mongolia in its resolution No. 12 of 31 January 2008 - "Solution of Water Supply to Population and Industries using Certain Part of the Surface Water"; b) Item 3.5 of "Plan of Action for 2009-2012 by the Government of Mongolia" approved by the Resolution No. 35 of the State Great Khural dated 21 November 2008 - "Objectives for development of infrastructure including i) implementing integrated state policy on water, ii) regulating flow of rivers, and iii) transferring collected water resources for water consumptions"; c) Item 3.5.1.7 of Mongolian National Security Concept approved by Resolution No.48 by the Parliament of Mongolia, dated 15 July, 2010 - "Regulate flow of large rivers and construct a reservoir in order to improve usage of surface water in Mongolia"; d) Item 3.3.2 of Water National Program approved by Resolution No. 24 by the Parliament of Mongolia dated 20 May 2010 - "Regulate flow of some rivers and construct a reservoir, transmit water in order to improve usage of surface water in Mongolia"; e) Item 3.2 of the Resolution No. 304 on Action Plan towards implementation of "Water" National Program as approved by the Government of Mongolia on 23 November 2010 - "regarding to conduct Feasibility Study on Orkhon Govi Project during 2011-2015 to supply water in the region where there is shortage of water resources"; f) Listed at 15 out of 26 large projects indicated in the Attachment of the Government Resolution No. 320 "Approval on List of Projects to be implemented at the first stage", dated 14 October 2009 - "Water Supply Project from the Orkhon River to the Water Demand in the Govi Region"; g) Item 3.1.3.3 of the "Program for development of Southern Govi" approved by the Government of Mongolia by its Resolution No. 151 on 16 June 2010 - "regarding to focus on policy of using groundwater, surface water or combined method of using both groundwater and surface water resources, and decide water supply alternatives through implementing "Orkhon Govi Project".
--	---

	<p>h) Item 109 in the attachment of the Resolution No. 198 on “Approval of Concession List” by the Government of Mongolia on 21 July 2010 - “Construction of the Orkhon-Govi Reservoir”;</p> <p>i) Item 4 of the “Plan of Action during 2012-2016 by the Government of Mongolia” approved by the Resolution No. 37 of the State Great Khural on 18 September 2012 -“regarding to construct reservoir in a way of regulating flow of large rivers to satisfy water demands of the region”; and</p> <p>j) Resolutions from the meetings held by the National Water Commission in 2012 and 2013.</p> <p>k) Item 6.3.9 of the “Long-term Development Plan Vision 2050 by the Government of Mongolia” as part of the Blue Horse Project, conduct feasibility study and design in order to start construction work of multipurpose serial pools with flow adjustments on large rivers located in high-mountainous zones such as the Selenge, Orkhon, Eg, Kherlen and Khovd.</p> <p>The Government of Mongolia and MET have already begun to take steps for the implementation of the project in association with the WB, through MINIS Project.</p>
<p>Environment and social impact</p>	<p>Significantly positive social impact especially for fossil groundwater conservation in Govi area. Assessment for environmental impact shall be conducted with the full-feasibility study and basic design stage.</p> <p><u>Environmental and social impact assessment (ESIA) by WB</u></p> <p>The Project was classified as Category “A” according to the WB’s Operational Policy 4.01 on Environmental Assessment, and therefore requires that a full, comprehensive EIA be undertaken. Given the proposed project’s scope and scale of its potential impacts, the process of assessing the environmental and social impacts began with a Regional Environmental Assessment (REA). The REA considered the regional and cumulative impacts of flow regulation and partial diversion on the Orkhon River (Selenge River basin) and the introduction of a large new water source to the semi-arid Southern Govi region. The REA was carried out in conjunction with the technical PFS to further refine the definition and scope of the Project.</p> <p>The outcomes of the PFS and REA was informed a further detailed ESIA carried out on key indicative project components (power station, water transmission pipelines, roads and ancillary facilities, etc.) in conjunction with a full technical feasibility study (F/S) informing decisions about whether and how to proceed with project implementation.</p>
<p>Remarks</p>	<p><u>Implementation process /performance:</u></p> <p>MINIS Project is implemented by WB’s loan for F/S and environment, social impact assessment of the “Water diversion and collection project to transfer from Orkhon River and for water supply”. Project goal is to establish water collection systems and water diversion from Orkhon River to Govi region.</p> <p>The working group established by the Resolution of the Prime Minister, on May 24-25, 2019 held consultation meeting with a representative of the Russian Federation on the project on hydropower stations. Preparation of the project EIA task for the public discussion in 6-7 districts of the Republic of Buryatia, in March 2017 was being carried out jointly with the MINIS project unit and MoE. Based on WB s’ regulation, TOR of F/S and EIA were revised by MINIS project unit.</p> <p>The open tender for the selection of companies was announced on 20th September 2016 and the tender materials were received by 24th October 2016. The new tender evaluation committee was established by A/52 Resolution of State Secretary of MET. A total of 19 international and domestic companies submitted proposals for the F/S and 12 companies for EIA development. The Russian side is working on the development of F/S and EIA, and upon approval of the work assignment, a summary list of consulting companies will be submitted to the WB.</p> <p>Source 1):Based on MOE and Green Development (MEDG, Former MET), (2013), Integrated Water Management Plan of Mongolia (IWMP)</p> <p>Source 2):Mongolian National Water Programme Support Center (Water Center), “Orkhon – Govi” Multi-Purposed Water Transmission Complex Project, Oct. 2007.</p> <p>Source 3): “Terms of Reference for Regional Environmental Assessment and Environmental and Social Impact Assessment for Flow Regulation of The Orkhon River and Construction of Reservoir Complex Project”, RFP No.: WB/ Ministry of</p>

	Finance (MOF)/MINIS/CS/QCBS/1.1.1. (d)/2016
--	---

10.4 Green Development Promotion Initiative

Project No. IV1

Title	Land degradation prevention
Location	Nationwide
Implementing agencies	MOFALI Private sector
Objectives	1) To reduce and prevent land degradation by crop farming; and 2) To conserve natural environment.
Expected effects	1) Land degradation measures are disseminated 2) Vegetations are restored in degraded land
Project costs	MNT 2,588 million + soft component
Implementation schedule	Continuous implementation through Phase 1 and Phase 2
Project description	<p>1) Background</p> <p>According to the statistical data, 1.4 million ha is classified as arable land. Out of the arable land, approximately 1.0 million ha is identified as land suitable for farming, and it is also the maximum crop farming area from the viewpoint of soil conservation. Currently, many of crop farm households and crop business entities express their concern about soil degradation. In total, 57% of crop farming households and 67% of business entities face the soil degradation to a greater or lesser extent, respectively. Business entities tend to face the situation more severely than crop farming households due to higher usage of chemical fertilizer. To mitigate the land degradation, proper fertilizer distribution and utilization, and soil conservation practices such as minimum- or zero-tillage cultivation are required. SDV 2030 also mentions that minimum- or zero-tillage cultivation is applied in 90% of farm areas.</p> <p>2) Project components</p> <p>a) Survey on minimum- or zero-tillage: as of 2019, it is reported that soil conservation practices were applied in eight Aimags and total area with these practices was approximately 123,000 ha. Out of the eight Aimags, Selenge showed the highest figure with 45,000 ha, followed by Bulgan with 20,000 ha and Tuv with 15,000 ha. However, these areas are calculated based on number of machineries that each Aimag owns; number of machineries is 631 in total. Hence, it is necessary to gather the detailed information on actual soil conservation practices on the ground for further planning.</p> <p>b) Introduction of land degradation measures: one example is sowing machines for zero-tillage that are equipped with all the necessary attachments. Another example technology is polylactic acid roll planter. It is a bio-degradable material knit into a cylindrical shape, which is stuffed with soil and sand. It could revive vegetation in degraded lands to allow harvesting agricultural products because it promotes root development under the optimum water retention, aeration, and nutrition supply. When it is combined with drip irrigation system, use of water and labour can be economized. These technologies are defined as climate smart agriculture.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the pilot organization and location where the land degradation measures system will be installed and deciding the size of operation, providing professional and methodological advice, supporting fund sourcing for international grants and investment for infrastructure. MOFALI will contract with concerned organization for administering and managing the project activities, including production of value-added products and providing professional methodology.</p>
Environment and social impact	Significantly positive impact is assumed to restore natural environment, however, environment and social impacts will be monitored. If any environmentally and socially negative impacts are observed, countermeasures should be identified.

Remarks	
---------	--

Project No. IV2.1

Title	Food loss reduction
Location	Darkhan-Uul, Selenge, Tuv, and Ulaanbaatar city
Implementing agencies	MOFALI, MET, Ulaanbaatar city Private sector
Objectives	<ol style="list-style-type: none"> 1) To reduce food losses significantly in accordance with the idea of alternative socio-economy; and 2) To contribute to development of recycle-based society
Expected effects	<ol style="list-style-type: none"> 1) Food loss in Ulaanbaatar city is clarified 2) Awareness of people on need for reducing food losses is enhanced 3) Food wastes are recycled and utilized as fertilizer for agriculture
Project costs	MNT 2,500 million + soft component
Implementation schedule	Continuous implementation through Phase 1 and Phase 2
Project description	<ol style="list-style-type: none"> 1) Background <p>In regard to fertilizer usage, 22% of the total harvest area was fertilized in 2010, 16% for household farms and 23% for business entities. Household farms totally depended on the natural and other organic fertilizer and their usage accounts for almost 100%, irrespective of the regions. Even for business entities, the proportion of fertilizer usage other than natural and organic fertilizer is 6% on an average. It is expected that the population in Mongolia will reach 3.8 million in 2030 and 4.5 million in 2040, and therefore consistently increasing food production is needed to meet the urban demand especially in Ulaanbaatar. In order to increase production and enhance productivity, proper distribution of fertilizer needs to be promoted together with soil conservation techniques.</p> 2) Project components <p>The project will install a plant to process food wastes into organic fertilizer. As a prerequisite, present conditions of food loss in Mongolia are clarified by a survey, and realistic methods to collect food wastes for processing will be examined. The pilot plant will clarify conditions for efficient processing of food wastes under local climate and with available technology.</p> <p>Survey on food loss: FAO estimates that 32% of all food produced in the world was lost or wasted in 2009. This estimate is based on weight. When converted into calories, global food loss and waste amounts to approximately 24% of all food produced. Essentially, quarter of food calories intended for people is not ultimately consumed by them. Food loss and waste have many negative economic and environmental impacts. Economically, they represent a wasted investment that can reduce farmers' incomes and increase consumers' expenses. Environmentally, food loss and waste inflict a host of impacts, including unnecessary GHG emissions and inefficiently used water and land, which in turn can lead to diminished natural ecosystems and the services they provide (World Resources Institutes, Reducing food loss and waster). It is reported that there is a positive correlation between income and food loss. SDG 12 also aims at halving per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.</p> <p>Installation of recycling equipment: using a waste disposal processor, the garbage is biologically decomposed and reduced without odor. After putting garbage into the processor, decomposition starts with micro-organisms and garbage turns to fermenting bed. It will be taken out once in half a year. The fermented bed gets fully composed, and then, makes it compost and soil conditioner. They will be sent to production areas such as Darkhan-Uul, Selenge, and Tuv. This way, the urban residents of Ulaanbaatar could also contribute to farming. To promote recycle-based society, equipment will be installed at educational institute as a part of environmental education.</p> 3) Implementing arrangements <p>MOFALI and MET are the government implementing agency responsible for finding the pilot organization and location where the recycling system will be installed and deciding</p>

	the size of operation, providing professional and methodological advice, supporting fund sourcing for international grants and investment for infrastructure. Ulaanbaatar city will contract with concerned organization for administering and managing the project activities, including subsidy for purchase of recycling equipment and providing professional maintenance technology.
Environment and social impact	Significant positive environment impact, however, environment and social impacts will be monitored. If any environmentally and socially negative impacts are observed, countermeasures should be identified.
Remarks	

Project No. IV2.2

Title	Automobile recycling park*
Location	Ulaanbaatar
Implementing agencies	MRTD Private sector
Objectives	The ultimate objective is to establish a complete automobile recycling system as part of “the vein industry”, as against the automobile industry as part of “the artery industry”. Specific objectives are: 1) To establish an automobile recycling park in Ulaanbaatar, 2) To reduce air pollution in Ulaanbaatar, and 3) To alleviate environmental problems due to various solid wastes associated with disposal of old vehicles.
Expected effects	Reduction of air pollution from old and poorly maintained vehicles; Production of various value-added products based on materials recycled from old vehicles; Significant reduction of environmental problems due to improper disposal of solid wastes derived from used vehicles; and Contribution to attainment of targets set by SDV2030.
Project costs	US\$
Implementation schedule	Project development: 2021-22 Initial implementation of the project: 2021-2023 Full scale operation of the project: 2023~
Project description	<p>1) Background</p> <p>The number of vehicles registered in the Mongolian vehicle registration system reached 970,000 in 2018, increased by 70,100 or 7.8% from 2017. Of these vehicles, 789,200 or 81.3% have been used over 10 years.</p> <p>In May 2017, the Mongolian Parliament approved the Law on Wastes to change the public's perception of wastes, introducing the concept of circular economy. The Mongolia Sustainable Development Vision (SDV) 2030, approved by the Parliament in 2016 has set the targets to reduce the amount of wastes by 20% by 2020 and 40% by 2030. The Action Plan of the Green Development Policy, approved in 2016, states MRTD is to implement projects to dismantle and dispose of motor vehicles in collaboration with the Ulaanbaatar governor. The State Automobile Transportation Policy (2018-26) approved by the Government states "Eliminate and recycle the wastes from the operation of vehicles based on the private sector"</p> <p>2) Project components</p> <p>The Project is to establish an automobile recycling park in the 30ha land designated in Ulaanbaatar, including 1) Receipt and storage of abandoned vehicles; 2) End of life vehicle dismantling center; 3) Testing and certification centers for old spare parts to examine possible re-use; 4) Removing ironworks and components and preparing raw materials centers; 5) Recycling plants for waste tires, accumulators, motor oil, alloy and aluminum parts, plastic parts, and car glasses; and 6) Non-recyclable wastes disposal facilities.</p> <p>3) Implementing arrangements</p> <p>MRTD is the government implementing agency responsible for finding the location of the park and deciding the size of the operation, providing professional and methodological advices, supporting fund sourcing for international grants and investment for infrastructure. MRTD will contract with a private entity for administering and managing the project activities, including production of value-added products, recycling and reprocessing of end of life vehicles, and providing professional methodology and capital investment required. The MNCCI has invited foreign investors to cooperate in implementing the project.</p>
Environment and social impact	Significantly positive environmental impact; Fundamental social impact through changing the perception of general public on resources use and recycling

	Possible adverse effects of soil contamination and water pollution due to discharge of toxic substances
Remarks	

Project No. IV2.3

Title	Solid wastes circulation utilizing cement plant																		
Location	Ulaanbaatar and cement plants with rotary kiln																		
Implementing agencies	MECS for study and coordination of implementation MMHI, MET, Universities, cement companies																		
Objective	Ultimate objective: To establish a zero-emission society for realizing of the green development policy. Specific objectives: 1) To reduce the environmentally negative impacts from industrial and hazardous wastes by effective use of cement plants, and 2) To propose the institutional amendment for material circulation by utilizing cement plants. The industrial and hazardous wastes will be treated and used for cement ingredients in calcination process of the cement plant.																		
Expected effects	Reduction of the environmental impact from industrial and hazardous wastes; Reduciton of waste to be treated in final disposal sites.																		
Project costs	US\$1 million																		
Implementation schedule	Project development: 2021-22 Human resource development and analysis of material circulation (Phase 1): 2021-2023 Feasibility study for a pilot project (Phase 2): 2023~2024																		
Project description	<p>1) Background</p> <p>a) Existing policy and ongoing efforts</p> <p>The Green Development Policy (2015-2030) describes the target figure on waste management for “share of waste recycling” at 20% by 2020 and 40% by 2030. A strategic objective is shown by promoting resource efficient, low GHG emission and wasteless production and services. Ulaanbaatar municipality plans to establish an eco-park for waste recycling and proper solid waste management. This project is composed of several recycling system such as wastes to energy station, organic wastes to diesel plant, waste glass recycling plant for artificial stone and so forth.</p> <p>In the socioeconomic framework of the NCDP, the future population is estimated at 4.6 million persons in 2040. The target GDP growth rates are set at 7.5~8.5% for manufacturing and utilities sector and 5.0% for mining sector until 2040. The population growth and economic development will cause an increase in the volume of generated industrial and hazardous wastes.</p> <p>b) Recycling of industrial and hazardous wastes for cement ingredients</p> <p>The cement plans are equipped with a rotary kiln to incinerate limestone, clay, silica stone and other ingredients for producing clinker. The furnace temperature is set at 1,450°C or higher. The high furnace temperature offers advantages to making the chemical characters of ingredients stable and preventing the release of toxic gases. Utilizing the advantages of the high furnace temperature, the industrial and hazardous wastes can be converted to the cement ingredients as shown in the figure below. For instance, 0.474 tons of solid waste was used for the materials to produce 1 ton of cement in Japan in 2016.</p> <p>c) Integrated cement plants in Mongolia</p> <p>There are five integrated cement plants equipped with the rotary kiln in Mongolia as listed below.</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th><u>Name of Company</u></th> <th><u>Location</u></th> <th><u>Design Capacity (ton/year)</u></th> </tr> </thead> <tbody> <tr> <td>EREL Cement</td> <td>Dharhan</td> <td>175,000</td> </tr> <tr> <td>Khutul Cement</td> <td>Khutul</td> <td>500,000</td> </tr> <tr> <td>Nalgar Tusig Cement</td> <td>Naraiha</td> <td>100,000</td> </tr> <tr> <td>Khovd Cement</td> <td>Khovd</td> <td>10,000</td> </tr> <tr> <td>Mongolyn Alt</td> <td>Dalanjalagalan</td> <td>1,000,000</td> </tr> </tbody> </table> <p>An estimated annual consumption of cement was 1.75 million ton/year in 2012. The total cement consumption is estimated to be 969,600 ton in 2018, supplied by domestic production of 933,800 ton and import of 35,800 ton. The cement demand will be increased, as the population increases and economic activities are enhanced.</p>	<u>Name of Company</u>	<u>Location</u>	<u>Design Capacity (ton/year)</u>	EREL Cement	Dharhan	175,000	Khutul Cement	Khutul	500,000	Nalgar Tusig Cement	Naraiha	100,000	Khovd Cement	Khovd	10,000	Mongolyn Alt	Dalanjalagalan	1,000,000
<u>Name of Company</u>	<u>Location</u>	<u>Design Capacity (ton/year)</u>																	
EREL Cement	Dharhan	175,000																	
Khutul Cement	Khutul	500,000																	
Nalgar Tusig Cement	Naraiha	100,000																	
Khovd Cement	Khovd	10,000																	
Mongolyn Alt	Dalanjalagalan	1,000,000																	

	<p>Industrial Waste Composition</p> <table border="1"> <thead> <tr> <th>Example</th> <th>Composition</th> </tr> </thead> <tbody> <tr> <td>Blast Furnace Slug</td> <td>CaO 30~60%, SiO₂ 20~45%, Al₂O₃ 10~20%, Fe₂O₃ ~5%</td> </tr> <tr> <td>Coal Power Fly Ash</td> <td>CaO 5~20%, SiO₂ 40~45%, Al₂O₃ 10~30%, Fe₂O₃ 3~10%</td> </tr> <tr> <td>Car Shredder Dust</td> <td>Glass, Metal, Insulator, Plastics</td> </tr> <tr> <td>Used Tyre</td> <td>Steel Wire, Rubber etc.</td> </tr> </tbody> </table> <p>Cement Composition</p> <table border="1"> <thead> <tr> <th>Material</th> <th>Composition (%)</th> </tr> </thead> <tbody> <tr> <td>CaO</td> <td>63~65</td> </tr> <tr> <td>SiO₂</td> <td>20~23</td> </tr> <tr> <td>Al₂O₃</td> <td>4~6</td> </tr> <tr> <td>Fe₂O₃</td> <td>2~4</td> </tr> <tr> <td colspan="2">Alternative Fuel</td> </tr> </tbody> </table> <p>2) Project components</p> <p>The project consists of the activities specified below.</p> <p><u>Phase 1: Human resource development and analysis of material circulation (1st and 2nd years)</u></p> <p>Site visit to cement plants producing cement ingredients from industrial and hazardous wastes,</p> <p>On-job training and the academic research for cement manufacturing,</p> <p>Review of the institutional solid waste management system with a focus on roles, responsibilities and cost burden for collection and treatment of the industrial and hazardous wastes,</p> <p>Preparation of a material flow of industrial and hazardous wastes in major cities and Mongolia, and</p> <p>Selection of the cement plant and model city for the feasibility study.</p> <p><u>Phase 2: Feasibility study for a pilot project (3rd year)</u></p> <p>Preparation of a process diagram to utilize industrial and hazardous wastes in the cement plant,</p> <p>Identification of best mix of industrial and hazardous wastes for cement ingredients,</p> <p>Cost estimate for improvement of the cement plant,</p> <p>Economic and financial analysis, and</p> <p>Recommendation to amendment of the institutional solid waste management system for implementation.</p> <p>3) Implementing arrangements</p> <p>MECS will be a leading organization to implement the project. MECS will establish a project coordination committee consisting of the representatives of MMHI, MET, universities, and cement companies. Universities and cement companies will provide professionals and experts to carry out the technical study. The ministries will be responsible for administrating the project activities and strengthening institutional coordination.</p>	Example	Composition	Blast Furnace Slug	CaO 30~60%, SiO ₂ 20~45%, Al ₂ O ₃ 10~20%, Fe ₂ O ₃ ~5%	Coal Power Fly Ash	CaO 5~20%, SiO ₂ 40~45%, Al ₂ O ₃ 10~30%, Fe ₂ O ₃ 3~10%	Car Shredder Dust	Glass, Metal, Insulator, Plastics	Used Tyre	Steel Wire, Rubber etc.	Material	Composition (%)	CaO	63~65	SiO ₂	20~23	Al ₂ O ₃	4~6	Fe ₂ O ₃	2~4	Alternative Fuel	
Example	Composition																						
Blast Furnace Slug	CaO 30~60%, SiO ₂ 20~45%, Al ₂ O ₃ 10~20%, Fe ₂ O ₃ ~5%																						
Coal Power Fly Ash	CaO 5~20%, SiO ₂ 40~45%, Al ₂ O ₃ 10~30%, Fe ₂ O ₃ 3~10%																						
Car Shredder Dust	Glass, Metal, Insulator, Plastics																						
Used Tyre	Steel Wire, Rubber etc.																						
Material	Composition (%)																						
CaO	63~65																						
SiO ₂	20~23																						
Al ₂ O ₃	4~6																						
Fe ₂ O ₃	2~4																						
Alternative Fuel																							
Environment and social impact	Significantly positive environmental impact; Fundamental social impact through changing the perception of general public on resources use and recycling																						
Remarks																							

Project No. IV2.4

Title	Eco-park establishment*
Location	Ulaanbaatar
Implementing agencies	Mayor's Office of Ulaanbaatar City Eco Park Ulaanbaatar LLC, consisting of 17 private companies, members of the Mongolian National Recycling Association
Objectives	1) To select wastes that can be recycled, 2) To convert wastes into new recycled resources, and

	3) To recycle construction wastes, used large waste tires, and hazardous substances discharged from companies and factories								
Expected effects	Construction of 20 waste recycling plants with capacity to recycle wastes, produce value-added end products and sell on domestic and foreign markets as an energy, and to reduce environmental pollution and adverse impact on public health.								
Project costs	US\$ 108 million (construction of two eco-parks) Private sector finance: Buildings, facilities and technology State and Ulaanbaatar city budget and donor finance: Infrastructure of the Eco-park, power supply and auto roads								
Implementation schedule	Project design: 2016-18 Implementation of the project: 2018-21 Project fully implemented: 2021~32								
Project description	<p>1) Background</p> <p>In Mongolia, capacity shortages for planning, technology and facilities related to a series of solid waste disposal processes are a major problem. With the rapid increase in the population and the change in consumption style accompanying the transition from traditional lifestyle to the market economy, the amount of wastes discharged has increased, and the problems related to waste management are getting more serious.</p> <p>People in Mongolia have no practice of separating wastes, and there is no law and institution effective for recycling wastes. Therefore, solid wastes from both households and factories is dumped without being separated. As a result, two landfill sites in Ulaanbaatar are mostly full for their capacity. Also, due to lack of consciousness, illegal dumping is widespread in not only Ulaanbaatar, but also other cities.</p> <p>SWITCH-Asia in Czech Republic, the largest program funded by the EU, has been implementing a project since 2016 that can contribute to proper management of construction wastes. Eco-park establishment project should collaborate with this project and reflect experiences and lessons learned.</p> <p>2) Project components</p> <p>The project is to establish two eco-parks at Narangiin Enger (81.47ha) and Tsagaan Davaa (92.6ha) in Ulaanbaatar. The project is composed of several recycling system such as wastes to energy station, organic wastes to diesel plant, waste glass recycling plant for artificial stone and so forth. Production of handicraft products by using recycled materials may also be considered to create original local products attractive for visitors and foreign tourists possible in association with Project No. I10.3.</p> <p>3) Implementing arrangements</p> <p>Eco-park Ulaanbaatar LLC, consisting of 17 private companies, members of the Mongolian National Recycling Association will be in charge of operation. These 17 private companies will be responsible for construction of buildings and facilities.</p> <p>Mayor's Office of Ulaanbaatar City will be responsible for power supply and of auto road construction. The Ulaanbaatar Power Distribution Network (electricity, heat) and Ulaanbaatar Development Corporation can support the project.</p> <p>Creation of job opportunity expected is estimates as follows.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Eco-park</th> <th>Amount of job openings (person)</th> </tr> </thead> <tbody> <tr> <td>Narangiin enger</td> <td style="text-align: right;">270</td> </tr> <tr> <td>Tsagaan davaa</td> <td style="text-align: right;">371</td> </tr> <tr> <td>Total</td> <td style="text-align: right;">641</td> </tr> </tbody> </table>	Eco-park	Amount of job openings (person)	Narangiin enger	270	Tsagaan davaa	371	Total	641
Eco-park	Amount of job openings (person)								
Narangiin enger	270								
Tsagaan davaa	371								
Total	641								
Environment and social impact	<p>1) Significantly positive environmental impact</p> <p>2) Rational recycling of wastes and production of end products enable a significant reduction in air, soil and water pollution. Waste pickers residing at waste disposal sites of Narangiin Enger and Tsagaan Davaa shall be employed at recycling plants, allowing them to improve their living and working conditions.</p>								

Remarks	 <p style="text-align: center;">Narangiin enger Eco-park</p>	 <p style="text-align: center;">Tsagaa davaa Eco-park</p>
---------	---	---

Project No. IV3.1

Title	Ger district development guidelines*
Location	All the major cities
Implementing agencies	MCUD
Objectives	<ol style="list-style-type: none"> 1) Ultimate objective: To structure Ger district that will be flexible for possible redevelopment in the future. 2) Specific objective: To formulate guidelines for land distribution for Ger housing.
Expected effects	<ol style="list-style-type: none"> 1) Prevention of unproper urbanization 2) Enhancement of feasibility of future redevelopment.
Project costs	US\$ 500,000
Implementation schedule	Project development: 2021 Initial implementation of the project: 2022 Full scale operation of the project: 2023~
Project description	<ol style="list-style-type: none"> 1) Background Migrants to urban areas can get land depending on a regulation of each city. A Ger district in Ulaanbaatar spreads almost 50% of built-up area in the city and cause severe environmental pollutions due to a lack of adequate infrastructure. In addition, some areas of Ger district prevent effective land use in good locations nearby the city center because Ger district has expanded gradually from edges of existing urban areas. The Mongolian Government established the property right exchange development scheme and challenges redevelopment projects for improvement of living environment and effective land use in built-up areas. However, it is commonly recognized that a financial issue is one of critical causes which hinder project implementation. On the other hand, Ger district has advantages such as potentially good living environment with fresh air and sunshine to streets and wide space per capita because of low-rise building and low population density during area and population size are proper, and affordability to migrants. It means that role, location and required infrastructure of Ger district change according to progress of urban growth. New areas of Ger district, especially in cities without a large Ger district existing such as local growth cities which will grow in a next few decades, have an opportunity to enjoy future flexibilities for possible redevelopment 2) Project components The project is to develop guidelines of Ger district which will ensure 1) Affordability of Ger housing, and 2) Flexibility for future redevelopment. The guidelines possibly show design concepts and requirements of public and private lands in Ger district planning such as 1) Responsibility of organizations, 2) Concept of Ger district designation and population planning, 3) Allocation concept of public land for roads, parks, drainage and public facilities, 4) Minimum road width, park area and each building lot, 5) Maximum floor area ratio, building cover or building height, and 5) Building setback.

	3) Implementing arrangements MCUD is an agency responsible for developing the guidelines.
Environment and social impact	Reduction of social impact in redevelopment project, and Reduction of risk of environmental pollution by reduction of remaining unproper Ger district in the future.
Remarks	

Project No. IV3.2

Title	Ger district sanitation improvement*
Location	Local cities
Implementing agencies	MET and MCUD in cooperation with local governments
Objectives	To realize better health conditions by improved latrines and water drainage systems in Ger areas
Expected effects	1) Improved health conditions of people in local cities and rural areas 2) Improve pollution of water resources
Project costs	Total: MNT157,575 million (2014-16: MNT42,075 million, 2017-21: MNT115,500 million) (State budget: 10%, local budget: -%, foreign: 10%, private: 80%)
Implementation schedule	2021-24
Project description	<p>1) Background Low coverage of basic services for drinking water supply (59%) and sanitation facilities (41%) in rural areas of Mongolia constitute another priority, aggravated by geographic, income and gender disparities (WHO/UNICEF JMP, 2017). JMP data show that use of basic water sources is much higher in urban areas (95%) than in rural areas (59%) and use of basic sanitation facilities is also higher in urban areas (66%) than in rural areas (41%). Open defecation (or no service in sanitation) is high in rural areas at 31%. JMP data also show improving trends on other indicators, such as households with a specific place (basic service) to wash hands and the availability of soap, which stands at 72% as the national average (49% for rural and 81% for urban households) (WHO/UNICEF JMP, 2017). In general, water related pollution problems in Mongolia include the following: Sanitation in Ger areas needs to be improved to reduce health risks and diseases. There is a general lack of improved sanitation facilities in Ger areas. In 2010, 41,400 occurrences of infection diseases were reported, 30% of which were water related diseases (hepatitis and diarrhea). These infections stem from a lack of access to safe water and poor sanitation. Inadequate sanitation is prevalent in rural areas (69%), where 48% of poor people have no access to improved sanitation, compared to 25% of the more affluent people. Wastewater treatment facilities are lacking in Soum centers. There is a general lack of improved sanitation facilities in Soum centers. The MDG target is to increase the proportion of population with adequate sanitation facilities to 40% by 2015 (or 50% of the urban population) and to increase the number of apartment households that are connected to the central sanitation system to 30% of the total population (or 44% of the urban population) by 2015. Untreated water is released directly to rivers or infiltrates into the soil; Hygienic protection zones around water bodies and water points are not adequately maintained; and Regulations to make polluters pay are ineffective. These problems are directly or indirectly affect the sanitation in Ger district, except those related to agriculture and mining.</p> <p>2) Project components The project provides improved latrines and water drainage systems in Ger areas. Investments in eco- and bio-latrines outside Ulaanbaatar are expected to be smaller due to the limited financial capacity of inhabitants.</p> <p>3) Implementing arrangements MET and MCUD are the government implementing agencies responsible for finding the</p>

	location of sanitation facilities and wastewater disposal in Ger areas and deciding the size of the development, providing professional and methodological advices, supporting fund sourcing for international grants and investment.
Environment and social impact	Significantly positive social impact. Assessment for environmental impact shall be conducted.
Remarks	** This project is consistent with the policies set out in item 6.4.22 (Increase the number of population with standardized sanitary facilities by expanding and building new wastewater treatment plants (WWTPs) of LTDP2050 by the Government of Mongolia”. Source: Based on MOE and Green Development (MEDG, Former MET), (2013), IWMP

Project No. IV4

Title	Sanitary landfill site establishment
Location	Erdenet and Darkhan
Implementing agencies	MET
Objectives	<ol style="list-style-type: none"> 1) To establish sanitary landfilling, 2) To manage the landfill site properly, 3) To transfer technical knowledge and skills for management of the landfill, and 4) To enhance the consciousness of people for waste disposal.
Expected effects	<ol style="list-style-type: none"> 1) Wastes are disposed of properly. 2) Environment at disposal site in Erdenet and Darkhan is improved. 3) Harmful substances generated by fire are reduced.
Project costs	US\$ 5 million (construction of two landfill sites with the land of approximately one ha each)
Implementation schedule	<p>Project design: 2021</p> <p>Implementation of the project: 2021-22</p> <p>Full scale operation of the project: 2022~</p>
Project description	<p>1) Background</p> <p>At present, all the final solid wastes disposal sites in Mongolia are operated for simple dumping. As a result, many problems such as environmental deterioration, garbage fire, soil erosion etc. have been happening in most of the landfill sites in each city and Soum. In order to prevent environmental deterioration and diseases caused by improper management of solid wastes, it would be necessary to adopt sanitary landfill or controlled landfill step by step.</p> <p>At the initial stage, a project to construct sanitary landfill sites shall be launched in Erdenet and Darkhan as the second or the third largest cities respectively. Unmanaged open dumping has been in service in both cities since 50 or 60 years ago.</p> <p>In Mongolia, capacity shortages for planning, technology and facilities related to a series of solid waste disposal processes is a major problem. The project become a model of proper management for landfill sites in all cities.</p> <p>In Erdenet, 840m³/day of solid wastes in the whole of Orkhon Aimag is disposed in the disposal site without segregation of wastes. A total of around 5 million tons of solid wastes including illegal dumping have been accumulated in the site so far. However, the Aimag government is not able to grasp the total amount of accumulation of wastes exactly due to lack of management system. Operation for solid waste management adopting national standards has not been done due to lack of budget and technical capacity.</p> <p>Darkhan-Uur Aimag has been in a similar situation as Orkhon Aimag. The Aimag government are considering relocating the disposal site.</p> <p>2) Project components</p> <p>The project is to establish sanitary landfill sites in Erdenet of Orkhon Aimag and Darkhan of Darkhan-Uul Aimag. A sanitary landfill is an engineered disposal site which controls environmental impacts such as waste scattering, foul odor, fires, proliferation of vermin and germs, contamination of soil and groundwater, etc.</p> <p>3) Implementing arrangements</p> <p>MET will be responsible for construction of sanitary landfill sites. As for O&M, it would be preferable for a private company to conduct.</p>

Environment and social impact	Significantly positive environmental impact Rational recycling of wastes and production of end products enable a significant reduction in air, soil and water pollution. Waste pickers residing at waste disposal sites of each city shall be employed at these landfill sites, allowing them to improve their living and working conditions.
Remarks	

Project No. IV5.1

Title	Longer life-span facilities establishment
Location	Erdenet, Darkhan, Choir and Khovd
Implementing agencies	MCUD Land, Construction and Urban Development of each Aimag
Objectives	1) To prevent deterioration and malfunction of infrastructure facilities due to aging; and 2) To establish appropriate planning for longer lifespan facilities with a concept of preventive maintenance.
Expected effects	Lifecycle cost on infrastructure facilities can be suppressed. Keys to realize longer lifespan are: 1) maintenance cycle with regular inspection for facilities, 2) database system with information necessary to repair and revise, and 3) human capacity development for judging a condition of facilities in a technical manner.
Project costs	US\$ 0.4 million (establishment of database and human capacity development)
Implementation schedule	Project development: 2021 Implementation of the project: 2021-22 Full scale operation of the project: 2022~
Project description	1) Background In Mongolia, many infrastructure facilities such as roads, bridges, water purification plants, sewage treatment plants and network pipes built in the socialist era have become aged over 30 years in recent years. The renewal timing will come all at once in the near future. However, capacity shortages of planning proper maintenance, lack of technology for establishment of database and lack of human resource to judge the condition are the major problems. With the rapid increase of infrastructure facilities along with increase of population, the importance to suppress the maintenance cost is vitally important. Through the technical analysis, lifespan of the facilities can be extended. 2) Project components The project is to establish appropriate maintenance system and plan for extending lifespan for the facilities. The main component is to establish digitized database system with facility lodger consisting of information of installed age, materials, location, license attribution and so forth. Also, it is necessary for the database to be managed by geographic information system (GIS). As a result, it become possible to judge a condition of facilities in a technical manner. Other components are to develop human capacity capable of formulating a proper maintenance and lifecycle plan. 3) Implementing arrangements A technical support should be sought by donors such as JICA. Land, Construction and Urban Development of each Aimag will be responsible for all works. MCUD can support their efforts.
Environment and social impact	Positive environmental impact Due to reduction of accidents by malfunction of facilities, environmental conditions would be maintained.
Remarks	

Project No. IV5.2

Title	Ensuring coherence of legal documents in urban development sector and reforming its legal system
Location	Ulaanbaatar
Implementing agencies	MCUD, CDC, ALAMGaC
Objectives	Review and analyze laws, legal acts, norms, rules, regulations and standards in the urban

	development sector and eliminate duplication while developing a comprehensive set of laws, norms, rules, regulations and standards reforming the legal system to the international level.
Expected effects	Goals and objectives of improving the legal environment set out in the UN’s Habitat III will be implemented; The legal environment for the urban development and construction sector will be improved and the legal system of the sector will be reformed; The rights and responsibilities of citizens, legal entities and other state organizations participating in urban development activities will be clarified; A condition will be created to increase public participation in urban planning and urban development activities, to make the implementation process open and transparent, and to create a green city that meets the needs and requirements of people, and the requirements of green development interconnected with the environment.
Project costs	US\$ 1.5 million
Implementation schedule	2020-2021: Review and analyze laws, legal acts, norms, rules, regulations and standards in the urban development sector 2021-2022: Formulate a comprehensive set of laws, norms, rules, regulations and standards reforming the legal system
Project description	<p>1) Background</p> <p>The Law on Urban Development was first enacted in 1998 and was revised in 2008 in response to new trends of the time in urban development, and since has been amended four times in 2015. Although the law revised in 2008 met the development requirements of the time, it does not meet the modern or current social development requirements.</p> <p>Over the past 20 years, urbanization has accelerated to 67.6% due to people migration from countryside to cities and towns. For example, more than 60% of the total population of Mongolia lives, works, and runs business in 23 cities, namely capital city, regional core cities and Aimag centers. Of these, Ulaanbaatar alone has a population of 1.4 million which resulted in about 70% of entities and organizations to be located in Ulaanbaatar while producing more than 60% of the GDP. In addition, due to the concentration of population, production and services in large cities such as Darkhan, Erdenet and Choibalsan, the capacity of public services such as infrastructure, education and health is overloaded and accessibility is deteriorating, creating number of socio-economic problems. According to the 2015 UN City Development Index, a survey conducted in 60 countries by UN-Habitat, Ulaanbaatar is classified as an underdeveloped city in terms of development indicators and ranked 42th.</p> <p>Currently, there are more than 21 norms, rules and standards related to urban development. Some of these norms and rules were developed and enforced in the 1970s. The Ministry of Justice and Internal Affairs worked on cohesion of the Law on Urban Development with other laws and regulations in accordance with the criteria set out in the “Methodology for eliminating duplications, conflicts and gaps in civil and economic related legislation and improving coherence between them”. It was concluded that there are a total of 56 duplications, gaps and conflicts related to the law.</p> <p>MCUD drafted a revised version of the Law on Urban Development and submitted it to the Parliament on January 22, 2020. In connection with the draft law, it is necessary to amend eight laws, and update and formulate more than 25 norms and rules.</p> <p>2) Project components</p> <p>The project will primarily monitor and evaluate the legal framework for the urban development sector.</p> <p>Coherence, overlaps, and gaps in other legislation will be identified in detail.</p> <p>Legislation, norms, rules, regulations and standards will be improved and approved in a comprehensive manner.</p> <p>3) Implementation:</p> <p>MCUD will be the main implementing agency for the project, and the ministry will collaborate with CDC, ALAMGaC, international consultants and other relevant professional bodies. Aimags and the capital city’s citizens will be involved in the development and formulation process. During the project implementation, project team will work according to the detailed plan.</p>
Environmental and social impact	Mongolia's regional and urban development planning, development policies and implementation regulations will be unified, and duplication, gaps and conflicts in urban

	<p>development legislation will be eliminated and the legal system of the sector will be reformed.</p> <p>A condition will be created to increase public participation in urban planning and urban development activities, to make the implementation process open and transparent, and to create a green city that meets the needs and requirements of people, and the requirements of green development interconnected with the environment.</p> <p>Regulating urban development in the form of regional division and pre-reflecting the proposals of relevant professional organizations and councils will create conditions for creating environmentally friendly urban planning based on resources, investment policy, and integrated national development policy.</p> <p>Coordinating Urban Development Master Plan, partial master plan, and land management plan will limit urban expansion and unnecessary infrastructure investment, and will address all current challenges.</p>
--	---

Project No. IV6

Title	Tuul water complex*
Location	Tuul river basin in upstream of Ulaanbaatar City
Implementing agencies	Ulaanbaatar Water Supply and Sewerage Authority (USUG) in cooperation with MCUD, MET, MoE, Ulaanbaatar governor's office, NDA, MOF, River Basin Administration (RBA)
Objective	<ol style="list-style-type: none"> 1) To identify new or verify existing water resources to meet increase of water demand in Ulaanbaatar; and 2) To promote early implementation of the dam project.
Expected effects	Increased and more reliable water supply for Ulaanbaatar.
Project costs	US\$229.2 million (State budget: 10%, Local budget: 4%, Foreign: 14%, Private: 72%) Benefit/cost (B/C) ratio = 1.210
Implementation schedule	<p>Feasibility study of Tuul dam completed by USUG/ Korea International Cooperation Agency (KOICA) in 2012</p> <p>Engineering design of Tuul Water Complex: in progress</p> <p>Construction of Tuul dam complex: 2026-30 (5 years)</p>
Project description	<ol style="list-style-type: none"> 1) Background <p>The water supply for Ulaanbaatar City depends on groundwater source (underground water of the Tuul River basin). It is predicted that Ulaanbaatar's water resources will become scarce, especially during the dry season (winter), as groundwater potential is low in winter. The total yield of public wells in Ulaanbaatar City after 2026 will be 193.5 million cubic meters (MCM)/year as shown in Table A below. This yield includes new groundwater resources development at 140,000 m³/day (51.1 MCM/year) in the west (lower) part of Ulaanbaatar City by the project of Millennium Challenge Corporation (MCC), which is an independent U.S. Government foreign aid agency. The MCC project consists of the following three components: 1) Drilling of 32 new wells (16 wells x 2 places), 2) Construction of new advanced treatment water treatment plant (reverse osmosis technology), and 3) Construction of water distribution pipelines. Since a new well field for pumping wells by MCC project will be constructed downstream of Ulaanbaatar City, an advanced treatment plant will be required for soil and groundwater pollution control.</p>

Table A Groundwater Development Status in Ulaanbaatar (Public Wells)

Water Source		Potential Resources (m3/day)	Number of Wells after 2026 (nos.)	Current Yield as of 2020 (m3/day)	Developable Yield after 2026 (m3/day)	Total Yield after 2026 (m3/day)	Total Yield after 2026 (MCM/year)
Total of Central Water Supply	Upper	72,000	55	72,000		72,000	26.3
	Central	114,000	93	114,000		114,000	41.6
	Industrial	36,000	16	36,000		36,000	13.1
	Meat-Complex	15,000	11	15,000		15,000	5.5
	Gachurt	25,700	25	25,700		25,700	9.4
	West (Lower) by MCC Project	140,000	32	-	140,000	140,000	51.1
Sub-Total		402,700	232	262,700	140,000	402,700	147.0
Power Plant		83,500	30	83,500		83,500	30.5
Yarmag		20,000	2	20,000		20,000	7.3
Nisekh and Biokombinat		23,800	4	23,800		23,800	8.7
TOTAL		530,000	268	390,000	140,000	530,000	193.5

Source: USUG and MCC



Source: USUG/KOICA, 2012

Figure A Groundwater Sources for Ulaanbaatar

The estimated water demand by 2040 in Ulaanbaatar will be at 268.5 MCM/year as shown in Table B below. A water shortage will occur in 2040 at 75 MCM/year (268.5 MCM-193.5 MCM=75 MCM).

Table B Water Demand Estimation by 2040 in Ulaanbaatar

Aimag / City	Water demand for 2040 (million m3 / year)								
	Household drinking water	Public utilities & Tourism	Industrialization	Other industries, energy, construction and road transport	Industrialization and mining (mining and processing)	Sub-Total	Agriculture (pasture farming)	Irrigated area	Total
Ulaanbaatar	122.8	37.31	15.79	76.25	11.27	263.42	2.3	2.83	268.5

Source: MCUD, NDA, JICA, Progress report on developing a national comprehensive development plan, 2019

According to the “M/P for Water Resources Development in Ulaanbaatar” by KOICA/USUG (2012), a substantive estimate of groundwater recharge volume at the Ulaanbaatar City catchment (7,514 km²) would be 238.5 MCM/year by using the recession curve method. Based on limited experience, sustainable yield (safe yield) is about up to 40% of groundwater recharge and can be up to 70% of groundwater recharge (Miles and Chamber, 1995; Hahn et al., 1997). If the 60% of groundwater recharge is applied, the sustainable yield (groundwater development potential) would be 143.1 MCM/year only as shown in Table C.

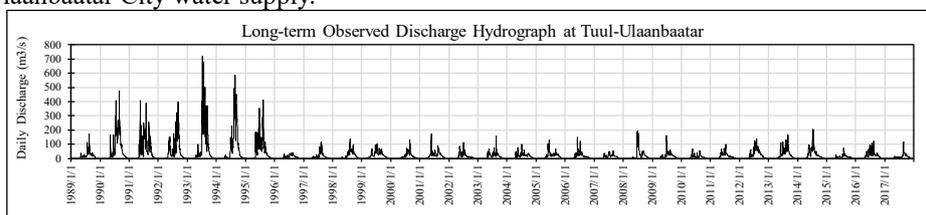
Table C Groundwater Development Potential for Ulaanbaatar

Groundwater resource potential	Groundwater recharge	Sustainable yield coefficient	Groundwater development potential
2,348 MCM/year	238.5 MCM/year	60%	143.1 MCM/year

Source: USUG/KOICA, 2012

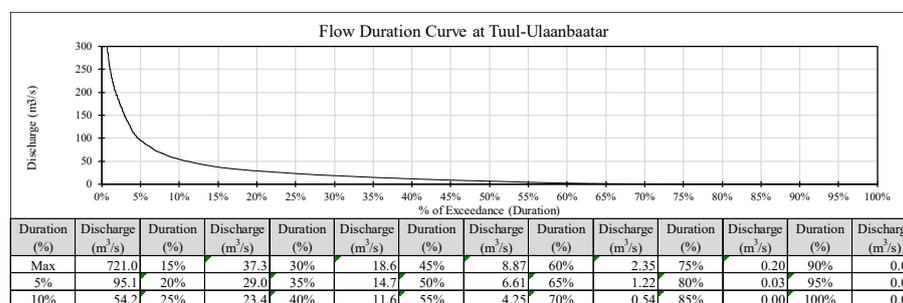
Therefore, the amount of groundwater development in Ulaanbaatar City will have reached

the upper limit, and the development of surface water with dams will be required in the future. Especially in winter (dry) season, it is predicted that the groundwater level will decrease, and water shortage will occur earlier. Figure B and Figure C below show hydrograph of daily observed discharge and the flow duration curve at Tuul-Ulaanbaatar station. As shown in the figure, the river flow is at zero 15% of year in winter (dry) season. The groundwater recharge in winter will also be very limited. Thus, flow regulation facility such as dam/reservoir is required in future for Ulaanbaatar City water supply.



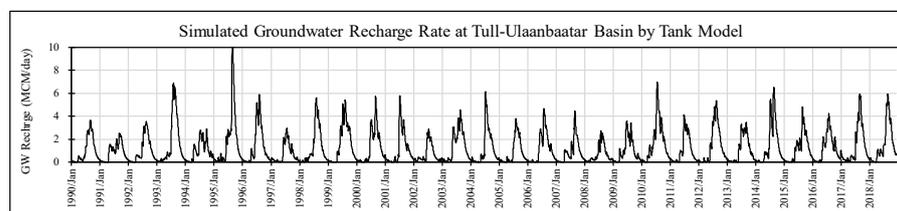
Source: JPT based on National Agency for Meteorology and Environmental Monitoring (NAMEM) data.

Figure B Long-term Observed Discharge Hydrograph at Tuul-Ulaanbaatar



Source: JICA Project Team based on NAMEM data.

Figure C Flow Duration Curve at Tuul-Ulaanbaatar



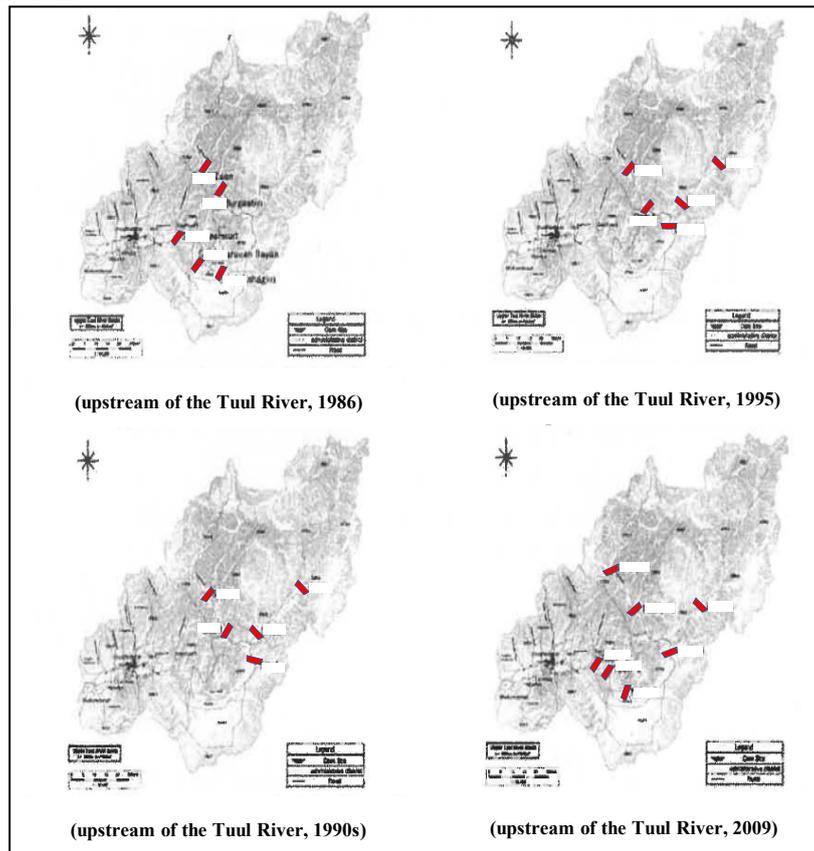
Source: JICA Project Team based on NAMEM data.

Figure D Simulated Groundwater Recharge at Tuul-Ulaanbaatar Basin by Tank Model

A feasibility study for a new water supply source of Ulaanbaatar was executed in 1981-1983 with the assistance of then-Soviet Union's experts. This feasibility study suggested a scenario to use 11 sites with groundwater resources in a 200 km circle around Ulaanbaatar. According to comparison of these sources, one scenario to establish a dam 2.5 km upstream of the Gachuurt village and to supply water to Ulaanbaatar from open reservoir was selected as the most beneficial one. Therefore, investigations and designs were carried out in 1989. Monhydroconstruction LLC implemented a 'pre-investigation work for formulating the feasibility study to establish hydro-construction on the Tuul River between November 2007 and April 2008 upon request of the then Ministry of Nature, Environment and Tourism and the Water Authority. Under this project three dam sites have been selected. The first dam site was selected in Khar Us at a bend of the river in Gachuurt and it overlaps with the dam site which was previously selected by the Soviet Union's experts. The second dam site was selected to be 2 km downstream of the second site previously selected by Soviet Union's experts. The third one was selected to locate 70 km upstream of Ulaanbaatar or 4 km downstream of Tuul-Terelj confluence. Also, Prestige Engineering LLC studied the Tuul Water Complex in 2010-2011 for the

purpose of regulating the Tuul River runoff, safe water supply for Ulaanbaatar in the future, hydro-power production, establishing complex hydro-construction including water refreshing facilities, solution of water supply for large factories and objects, and creating a convenient ecosystem environment in the Tuul River basin. A preliminary feasibility study was carried out and four dam sites were selected.

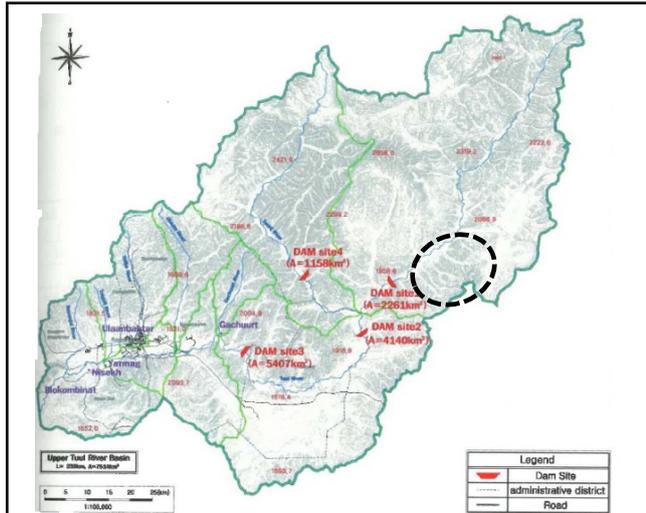
Figure E shows a series of plans for developing the dam in the upstream of the Tuul River to supply water in Ulaanbaatar. The plans include: the Russian development plan (draft), which continued from 1981 through 1986; the development plan (draft) as proposed by JICA from 1993 through 1995; the Mongolian development plan (draft); and a recent Tuul and Terej River Plan as proposed by the Overseas Contractors Association (OCA) in a preliminary survey in 2009. Most of the plans need to be modified and updated because they have been left for a long time without any further concrete progress further since the site selection.



Source: USUG/ KOICA, Dec. 2012

Figure E Previous Plans and Studies of Tuul Water Complex

As seen in Figure F, the four alternative dam sites were finally selected by USUG/KOICA M/P (2012) through examining the existing data from the previous dam development plans and conducting a site investigation to identify a change in surrounding conditions. The determination of an optimal dam site should be based not only on technical details of the dam site, but also social, economic, natural, and political details of the dam site. The M/P focussed on 1) compatibility with the purpose of dam development; 2) problems of construction and natural conditions (e.g. topographic and geologic characteristics); 3) connection with the local economy, and conciliation with vested rights to use water; 4) correlation with future development potential; 5) possible development of single dam or multiple dams; and 6) compatibility with and preservation of natural environment for the determination of an optimal dam site.



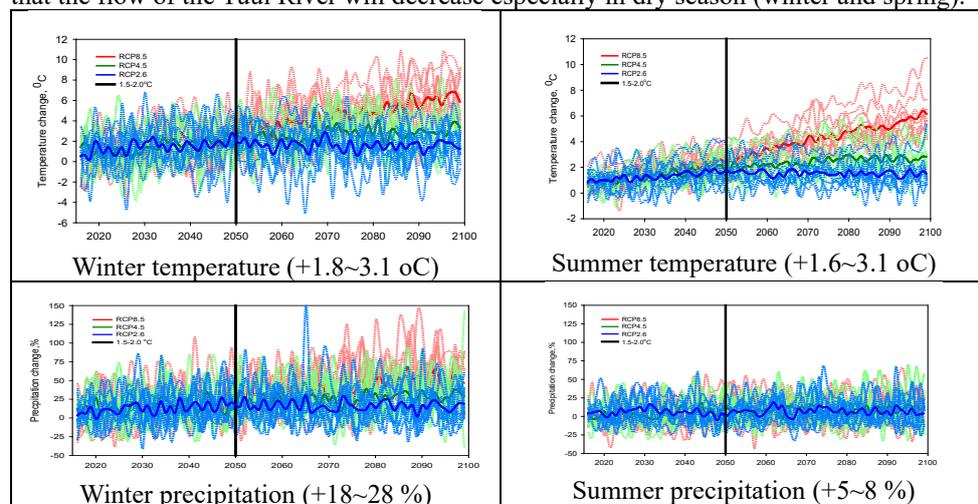
Source: USUG/KOICA, 2012

Figure F Location Map of Alternative Dam Sites

(Dam site-1 was selected by USUG/KOICA, 2012)

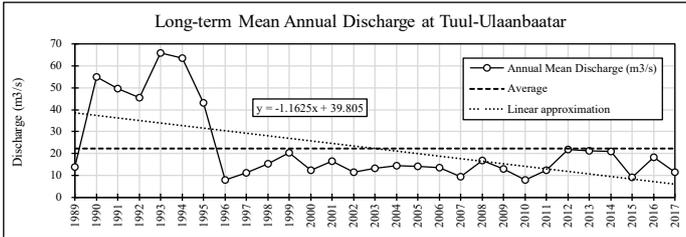
Since it is impossible to meet the water supply of the city only with groundwater supply in 2040 and thereafter, the development of a dam to secure surface water is required. With regard to this, the four alternative dam sites were analytically compared with one another in terms of their optimality for dam development in the M/P by USUG/KOICA (2012). As a result, Site 1 located in the upper Thul River, was found to be the most favorable in terms of the rate of water use and economic feasibility. Accordingly, this site was determined herein as an optimal site for dam development. The optimal scale of such dam development was so determined that it might meet water demand requirements for the target year 2040.

Furthermore, it is expected that evapotranspiration will increase due to temperature rise due to future climate change, and the construction of a reservoir is effective, as there is a concern that the flow of the Tuul River will decrease especially in dry season (winter and spring).



Source: Long-term Development Plan Vision-2050, the Government of Mongolia, 2020

Figure G Future Changes in Seasonal Temperatures and Precipitation

	<p>Figure-H shows the long-term changes in the annual average discharge at the Tuul-Ulaanbaatar station. It can be seen that the annual average discharge has decreased over the past 28 years.</p>  <p>Source: JICA Project Team based on data of NAMEM</p> <p>Figure H Long-term Mean Annual Discharge at Tuul-Ulaanbaatar</p> <p>2) Project components</p> <p>Multipurpose dam for water supply, flood control, hydropower and other indirect benefits, Basic design (B/D) and financial plan, Detailed design (D/D), and Construction of dam together with water supply facilities. Dimensions of the dam are as follows.</p> <p>Catchment area: 2,261 km² (Location: latitude 48-01-31, longitude 107-41-47)</p> <p>Effective storage capacity: 82.6 million m³ of volume</p> <p>Dam type: Concrete faced rockfill dam (CFRD), dam height: 39.6 m</p> <p>Capacity of hydropower plant is 240 kW with annual energy production of 1,754 MWh/year.</p> <p>3) Implementing arrangements</p> <p>USUG and MET are the government implementing agencies responsible for finding the location of the dam site and deciding the size of the development, providing professional and methodological advice, supporting fund sourcing for international grants and investment for B/D, D/D and construction.</p>
<p>Environment and social impact</p>	<p>EIA was conducted in the M/P and F/S by USUG/KOICA in 2012. The results of the EIA indicate that the project will cause inevitable impacts on socioeconomic environment (including an increase in the discharge of various pollutants, ecosystem fragmentation by dam construction, a change in water quality and aquatic ecosystems, residents' resettlement, etc.) in the project area and its surrounding areas during the construction and operation. A project implementer should formulate a proper mitigation plan to reduce the adverse environmental impacts of the project at each stage of the project. A sustainable monitoring plan should also be introduced to minimize unexpected environmental damages. The general mitigation plans to reduce the impacts of the Project on air quality, water quality, noise, and ecosystems are required.</p> <p>The Mongolian Law on EIA (2002) stipulates that the EIA must be conducted prior to the implementation of development projects whose scale is larger than a pre-set level. Accordingly, future water resource development projects, including the development of a dam, should accompany an EIA to assess their environmental impacts in advance. The results of such EIA should be reflected into any detailed planning and designing. An optimal mitigation plan to reduce environmental impacts should also be formulated to achieve environment-friendly and sustainable development.</p> <p>The mitigation plan (including the introduction of new renewable energy, installation of a silt protector and the creation of ecological wetland) and the follow-up monitoring have important implications for the minimization of the possible adverse environmental impacts of the project. In addition, an environmental management system should be implemented to provide systematic environmental management and training.</p>
<p>Remarks</p>	<p>** This project is consistent with the policies set out in item 6.3.9 (As part of the Blue Horse Project, conduct feasibility study and design in order to start construction work of multipurpose serial pools with flow adjustments on large rivers located in high-mountainous zones such as the Selenge, Orkhon, Eg, Kherlen and Khovd) of LTDP2050 by the Government of Mongolia”.</p> <p>Source 1): MOE and Green Development (MEDG, Former MET), (2013), IWMP</p> <p>Source 2): Project for the Development of New Water Supply Sources for the Yarmag Area of Ulaanbaatar, Master Plan for Water Resources Development in Ulaanbaatar, Volume II :</p>

	Feasibility Study for Dam Development, USUG/ KOICA, Dec. 2012. Source 3): The Study on Water Supply System in UB & Surroundings JICA, 1995.
--	--

Project No. IV7.1

Title	Urban centers water supply improvement*
Location	Ulaanbaatar City 21 Aimags centers and Other larger urban areas (Kharkhorin, Bor Undur, Zamiin Uud, Shariin Gol, Saikhan/Khutul, Mandal/Zuunkharaa, Khanbogd, Tsogttsetsii)
Implementing agencies	MCUD, MET MOF, RBA, USUG
Objectives	To supply safe drinking water in urban areas
Expected effects	1) Improved living environment with good water supply 2) Reduction of water-related diseases through safe water supply
Project costs	Total: MNT896,484 million 2014-16: MNT469,379 million, 2017-21: MNT427,105 million (State budget: 40%, local budget: 10%, foreign: 40%, private: 10%)
Implementation schedule	2014-22
Project description	<p>1) Background to justify the project</p> <p>Water supply in Mongolia faces the following problems. Access to safe drinking water is inadequate; Growing demand requires additional water sources; Water supply to Ger districts is inadequate; Water quality standards are not met; Water use in apartments is inefficient and extremely high; Water supply infrastructure does not keep pace with the urbanization; Water sources need better protection; and Existing water supply systems are poorly maintained.</p> <p><u>Supply from protected water sources</u></p> <p>In the base year 2010, 86.7% of the urban population received water from a protected source, which is already above the MDGs target for 2015 (70%). However, the SDV2030 set for the new targets of 90% of the population receiving safe drinking water for the year 2030. In addition, according to the trend of urbanization and population increase, the gap between demand and supply of water supply will be widen in the case of insufficient intervention. Therefore, water supply improvement should be realized step by step. According to the results of water balance analysis in Ulaanbaatar, the future water shortages are estimated to be -38.3MCM, -432.8MCM and -701.3MCM for water supply potential of 120MCM in 2018, 2030 and 2040, respectively (Details in Sector Report). The primary benefit of the water supply project derives from the addition of fresh water to the water supply network in Ulaanbaatar. The downstream wells activity by MCC, an independent US government agency is expected to provide additional supplies of 50 MCM per year with US\$350 million by extracting, purifying and transporting new sources of groundwater into the city. The MCC Water Compact project was started from September 2018. New targets of 90% and 95% of the urban population receiving water from a protected source have been set for the years 2030 and 2040.</p> <p><u>Private water supply connections</u></p> <p>In the base year 2010, the percentage of private connections in urban areas was 32.9%. The construction of new apartments and the planned introduction of private connections in Ger areas (the 40,000 connections program in Ulaanbaatar) will increase the percentage and targets of 45% and 50% were set for 2015 and 2021.</p> <p>2) Project components</p> <p>Extension of water supply distribution network at Ulaanbaatar City, Construction of 400 kiosks, Extension of water supply distribution networks of 21 Aimag centers and other large urban areas, and Taishir-Altai project to improve water supply in Altai City supported by Austria. The MCUD of Mongolia and Austria's Tiroler Rohre GmbH will jointly implement the</p>

	<p>project with the funding of EUR 14 million within the financial cooperation agreement established between the Governments of Mongolia and Austria. According to the project, the water will be supplied from the Taishir hydropower plant water reservoir through 52km water transmission pipeline; this will not involve adverse effect on the environment.</p> <p>3) Implementing arrangements</p> <p>MCUD is the government implementing agency responsible for finding the location of the water source and deciding the size of the development, providing professional and methodological advice, supporting fund sourcing for international grants and investment.</p>
Environment and social impact	<p>Significantly positive social impact.</p> <p>Assessment for environmental impact shall be evaluated.</p>
Remarks	<p>** This project is consistent with the policies set out in item 6.3.14 (Expand water supply facilities, newly construct, and increase the number of people who have adequate drinking water.) of LTDP2050 by the Government of Mongolia”.</p> <p>Source: Based on MOE and Green Development (MEDG, Former MET), (2013), IWMP</p>

Project No. IV7.2

Title	Rural water supply expansion
Location	Rural areas
Implementing agencies	MOFALI in cooperation with General Agency for Specialized Inspection (GASI), National Emergency Management Agency (NEMA), Capital and Local government, RBA
Objectives	To improve water supply in rural areas for livelihood and livestock farming
Expected effects	Improved livelihood and livestock farming by production and grazing capacity
Project costs	<p>Total: MNT104,858 million for construction of new and renovation of existing water sources (boreholes, ponds) based on grazing capacity and desertification condition</p> <p>2014-16: MNT32,270 million, 2017-21: MNT72,588 million</p> <p>(State budget: 60%, local budget: -%, foreign: 25%, private: 15%)</p> <ul style="list-style-type: none"> - Total US\$15.00 million for "G0204- MON" project by ADB's soft loan - Total US\$19.43 million for "MON-3388" project by ADB's soft loan
Implementation schedule	2014-22
Project description	<p>1) Background</p> <p>Low coverage of basic services for drinking water supply (59%) in rural areas of Mongolia constitutes priority issue, aggravated by geographic, income and gender disparities (WHO/UNICEF JMP, 2017).</p> <p>JMP data show that use of basic water sources is much higher in urban areas (95%) than in rural areas (59%). JMP data also show improving trends on other indicators, such as households with a specific place (basic service) to wash hands and the availability of soap, which stands at 72% as the national average (49% for rural and 81% for urban households) (WHO/UNICEF JMP, 2017).</p> <p>Water supply in rural areas of Mongolia face the following problems:</p> <ul style="list-style-type: none"> Operational water points are insufficient; In some pastureland, grazing pressure is excessively high to reduce water availability; Number of operating water points is declining; and Livestock water supply systems are generally inadequate in both water quantity and water quality. <p>2) Project components</p> <p>The project covers the following.</p> <p>Number of boreholes constructed or rehabilitated: 2011-2015 2,466 boreholes, 2016-2021 6,050 boreholes.</p> <p>Number of ponds rehabilitated; 5, constructed: 54 (2011-2015).</p> <p>Number of ponds rehabilitated: 7, constructed: 125 (2016-2021).</p> <p>The project will reflect the following projects.</p> <p>a) "G0204- MON" project of "Umnugovi, Dornogovi Urban Development and Border Towns" with the following major project components:</p>

	<p>General development plan to be prepared and approved for Sainshand, Khanbogd, Tsogtsetsii and Gurvantes Soums and a partial general plan for "New Sainshand" apartment blocks;</p> <p>Facilities for Sainshand consisting of 6.45 km of pure water supply line, 5.06 km of sewage line, 2.7 km of thermal power line, 8.4 MW thermal power plant, accompanying pump, equipment, boiler building, guardhouse, power transmission substation, diesel generator, security fence, 2 km paved road and solid waste disposal;</p> <p>Facilities for Dalanzadgad including 1,000 m³ reservoir, 1.4 km transmission line, deep well, 1.4 km transmission line and 4.7 km sewerage system in Ger district;</p> <p>Zamyn-Uud 13.4 km pipeline, 7.87 km sewage pipeline, 3 kiosks, 2 kiosk pump stations, 3 km pipelines, 3 diesel generators construction, supply of garbage collectors, solid waste disposal and heating of schools and kindergartens;</p> <p>Gurvantes Soum reservoir with capacity of 100 m³, 2 shaft wells, 3.2 km transmission line, 5.7 km of fresh water line, 4.1 km sewage system, WWTP, 3 kiosks, 2 km of paved road and 1.8 km flood dam built and commissioned;</p> <p>Tsogtsetsii Soum facilities consisting of 2 ha of 100 m³ capacity reservoir, 0.6 km transmission line, 3 kiosks, sewage pump station, 6,6 km piped water supply and 5.8 km sewage line; and</p> <p>Khanbogd facilities covering 5.5 km of fresh water pipeline, 8.4 km sewerage system, 5.4 km electricity transmission line, 2 km pipelines, 2 kiosks and WWTPs.</p> <p>b) "Large-scale projects undertaken in the Southern Govi Urban Development and Border Towns Development Project MON-3388" consisting of:</p> <p>Completion of installation of Arvaikheer city WWTP in Uvurkhangai Aimag and completion of commissioning of the building on November 15, 2018 and handed over to the users; Service to 80 households in three Ger areas of Arvaikheer 1st, 9th and 15th khoroo, and 80 households in Tsetserleg city 1st, 2nd, 3rd, 4th and 5th khoroo in Arkhangai Aimag handed over, and also sewer special machines provided for the wastewater of 160 households; and</p> <p>Completion of the construction and installation of building and transformer of the DARZDADD WND plant in Dundgovi Aimag, commissioning for construction on October 5, 2018 and approval by U / 2018/58, mechanical concrete works for mechanical cleaning, industrial buildings, and administrative buildings constructed, 100% of concrete reinforcement works for biological clearance blocks, and up to 4.01 km of sewage and sewerage works completed.</p> <p>3) Implementing arrangements</p> <p>MOFALI is the government implementing agency responsible for finding the location of new and renovation of existing water sources (boreholes, ponds) and deciding the size of the development, providing professional and methodological advice, supporting fund sourcing for international grants and investment.</p>
Environment and social impact	<p>Significantly positive social impact.</p> <p>Assessment for environmental impact shall be evaluated.</p>
Remarks	<p>** This project is consistent with the policies set out in item 6.3.14 (Expand water supply facilities, newly construct, and increase the number of people who have adequate drinking water.) of LTDP2050 by the Government of Mongolia".</p> <p>Source: Based on Ministry of Green Development (MEGD), (2013), IWMP</p> <p>Source: MCUD, 2019.</p>

Project No. IV8.1

Title	Wastewater treatment plants construction and renovation
Location	<p>Ulaanbaatar City</p> <p>21 Aimag centers and</p> <p>Other larger urban areas (Kharkhorin, Bor Undur, Saikhany, Khutul, Zamiin Uud, Shariin Gol, Mandal, Zuunkharaa, Khanbogd, Baganuur until 2015 and Kharkhorin, Mandal, Zuunkharaa, Tsogtsetsii until 2021)</p>
Implementing agencies	MCUD in cooperation with MET, NDA, MOF, Capital and Local government/USUG, RBA
Objectives	1) To provide adequate wastewater treatment in urban areas

Expected effects	<p>1) Reduction of water-related diseases through wastewater treatment</p> <p>2) Realization of pleasant living environment</p>
Project costs	<p>Total: MNT1,029,069 million 2014-16: MNT301,846 million, 2017-21: MNT727,223 million (State budget: 45%, local budget: -%, foreign: 55%, private: -%)</p> <ul style="list-style-type: none"> ✓ Construction of new WWTP in Ulaanbaatar (Chinese soft loan: US\$300 million) ✓ Construction of new WWTPs and rehabilitation of the existing WWTPs in Aimag centers (Polish Government conditional loan) of Bayan-Ulgii, Uvs, Zavkhan, Dornod and Govisumber (MNT 50,697 million) ✓ Darkhan improvement of municipal wastewater management (ADB loan: US\$20.68 million) ✓ Extension of WWTP of Erdenet city (French soft loan: Euro 9,54 million)
Implementation schedule	2014-22
Project description	<p>1) Background to justify the project</p> <p>Access to sanitation is inadequate; Water quality standards are not met; Water sources need better protection; Sanitation infrastructure does not keep pace with the urbanization; and Improved sanitation facilities are lacking in Ger areas.</p> <p>The number of WWTPs in normal operation in urban areas was 17 in 2010. This number was planned to increase to 32 in 2015 and 40 in 2021. With this increase in operational WWTPs the percentage of treated wastewater in urban areas will be nearly 100% in 2021.</p> <p>The water quality of the surface water in 72 rivers and nine lakes is monitored at approximately 140 monitoring sites by Institute of Meteorology, Hydrology and Environment (IMHE). The parameters observed are major cations and anions, total dissolved solids (TDS), pH, O₂, biochemical oxygen demand (BOD) and some trace metals. The effluents from WWTPs of many Aimag and Soum centers are polluting the surface water due to poor operation of the facilities.</p> <p>In Ulaanbaatar, the central WWTP pollutes the Tuul River. The treated sewage water from the treatment plant is still ranked as “very polluted” according to the water quality standards. The efficiency of the plant is low and discharges of wastewater from industries and enterprises disturb the treatment processes of the plant that is designed for the treatment of domestic wastewater only. The discharge of chromium from tanneries is of much concern especially in case where special treatment facilities are not working.</p> <p>About 13% of the urban population and about 56% of the rural population in Mongolian do not have adequate access to safe drinking water not only due to unavailability of water but in many cases because the quality of the water does not meet the required standards.</p> <p>2) Project components</p> <p>Renovation, improvement and extension of WWTP's for Ulaanbaatar City: 1) central WWTP renovation with membrane reactor; 2) central WWTP improvement of equipment and efficiency; 3) Nisekh/Yarmag new WWTP; 4) Emelt new WWTP; and 5) small treatment plants installation.</p> <p>Construction of a new WWTP in Ulaanbaatar City (with Chinese soft loan to cover project cost of US\$300 million) with capacity at 250,000 m³/day, introducing environmentally friendly, advanced technology to treat sewage sludge and produce electricity.</p> <p>Renovation and construction of WWTP's in 21 Aimag centers and other larger urban areas: Kharkhorin, Bor Undur, Saikhan, Khutul, Zamiin Uud, Shariin Gol, Mandal, Zuunkharaa, Khanbogd, Baganuur until 2015 and Kharkhorin, Mandal, Zuunkharaa, Tsogtsetsii until 2021</p> <p>Construction of new WWTPs and rehabilitation of existing WWTPs in Aimag centers (with Polish Government coessional loan) of Bayan-Ulgii, Uvs, Zavkhan, Dornod and Govisumber with total project cost of MNT 50,697 million.</p>

	<p>"Darkhan improvement of municipal wastewater management (with ADB loan: MON-3244/3245, 2015-2020) with US\$18.5 million out of total project cost at US\$20.68 million; the sewage pipeline has been constructed and commissioned with 6.8 km; implementation as of 2019 at 64%.</p> <p>Extension of WWTP of Erdenet (with French soft loan FR-01, 2013-06-28-2018-09-01) with Euro 9.54 million; implementation as of 2019 at 93.3%.</p> <p>3) Implementing arrangements</p> <p>MCUD is the government implementing agency responsible for finding the location of the WWTPs and deciding the size of the development, providing professional and methodological advice, supporting fund sourcing for international grants and investment.</p>
Environment and social impact	<p>Significantly positive social and health impact.</p> <p>Assessment for environmental impact shall be evaluated.</p>
Remarks	<p>** This project is consistent with the policies set out in item 6.4.22 (Increase the number of population with standardized sanitary facilities by expanding and building new WWTPs) of LTDP2050 by the Government of Mongolia".</p> <p>Source: Based on MEGD, (2013), IWMP</p> <p>Source: MCUD, 2019.</p>

Project No. IV8.2

Title	Ulaanbaatar central WWTP for industrial water of combined heat plants
Location	Ulaanbaatar City
Implementing agencies	Ulaanbaatar Water Supply and Sewerage Authority (USUG) in cooperation with MCUD, MET, Ulaanbaatar governor's office
Objectives	To treat industrial effluent from combined heat plant by environmentally sound advanced technology for reuse as cooling water
Expected effects	Safe environment free from contaminations by heavy metals and other chemicals contained in industrial effluents
Project costs	US\$96.0 million for initial construction
Implementation schedule	Construction to start in 2021 and continue for five years
Project description	<p>1) Background</p> <p>The Ulaanbaatar central WWTP for industrial water of combined heat and power plant (CHP) is constructed as MCC project. The project reuses the treated water from the central WWTP in Ulaanbaatar City (constructed by the Mongolian Government with a soft loan by China) as cooling water for CHP3 and CHP4; treated water (greywater) can also be used for toilet drainage.</p> <p>Currently, CHP3 and CHP4 use groundwater of 21.0 million m³/year (50,000 m³/day) for cooling water; approximately 70% (15.0 million m³/year) is covered by groundwater pumping. It is expected that these cooling waters will be provided up to 18.0 million m³/year by 2034 by reusing treated sewage water to conserve groundwater.</p> <p>Ammonia is removed from the WWTP effluent and wastewater is treated through coagulation and flocculation, and carryover biological solid is removed with high-rate Lemella plate sedimentation facilities prior to final filtration and chlorine disinfection. The daily treatment capacity of the central WWTP is 50,000 m³/day (18.0 million m³/year) and can be expanded to 100,000 m³/day (36.0 million m³/year) in the future.</p> <p>A feasibility study was conducted by a French consultant. The design of the central WWTP was implemented by China.</p> <p>2) Project description</p> <p>Construction of central WWTP for industrial water discharged from combined heat plants and reuse of treated sewage for cooling CHP3 and CHP4</p> <p>3) Implementing arrangements</p> <p>A working group (WG) has been established consisting of MET and MCUD. USUG must collect water pollution data and determine its treatment capacity. It is necessary to monitor the treated water quality of sewage treatment plants constructed by China.</p>
Environment and social impact	Sludge containing heavy metals and chemicals such as chromium is a problem, and solving this problem is the key to the success of this project.

Remarks	
---------	--

Project No. IV8.3

Title	Sewerage networks renovation and expansion
Location	Ulaanbaatar City Aimag centers and Other large urban areas (Kharkhorin, Bor Undur, Saikhan, Khutul, Zamiin Uud, Shariin Gol, Mandal, Zuunkharaa, Khanbogd, Tsogtsetsii, Baganuur)
Implementing agencies	MCUD in cooperation with NDA, MR, RBA
Objectives	To ensure adequate wastewater treatment in urban areas
Expected effects	1) Reduction of water-related diseases through wastewater treatment 2) Realization of pleasant living environment
Project costs	Total: MNT739,507 million 2014-16: MNT287,249 million, 2017-21: MNT452,258 million (State budget: 37%, local budget:23%, foreign: 10%, private: 30%)
Implementation schedule	2014-22
Project description	1) Background to justify the project Access to sanitation is poor; Water quality standards are not met; Water sources need better protection; Sanitation infrastructure does not keep pace with the urbanization; and Lack of improved sanitation facilities in Ger areas. 2) Project components Extension and renovation of sewerage system in parts of Ulaanbaatar City, Aimag centers and other larger urban areas: Kharkhorin, Bor Undur, Saikhan, Khutul, Zamiin Uud, Shariin Gol, Mandal, Zuunkharaa, Khanbogd, Tsogtsetsii, Baganuur 3) Implementing arrangements MCUD is the government implementing agency responsible for finding the location of the renovation and expansion of sewerage network and deciding the size of the development, providing professional and methodological advice, supporting fund sourcing for international grants and investment.
Environment and social impact	Significantly positive social and health impact. Assessment for environmental impact shall be conducted.
Remarks	** This project is consistent with the policies set out in item 6.4.22 (Increase the number of populations with standardized sanitary facilities by expanding and building new WWTPs) of LTDP2050 by the Government of Mongolia". Source: Based on MEGD, (2013), IWMP

Project No. IV8.4

Title	Small wastewater treatment plants in Soum centers*
Location	51 Soum centers
Implementing agencies	MCUD in cooperation with NDA, RBA
Objectives	1) To provide adequate wastewater treatment in rural areas; and 2) To improve living environment in rural areas
Expected effects	1) Reduction of water-related diseases through wastewater treatment 2) Realization of more comfortable living environment in rural areas
Project costs	Total: MNT94,830 million 2014-16: MNT26,406 million, 2017-21: MNT68,424 million (State budget: 20%, local budget: -%, foreign: 80%, private: -%)
Implementation schedule	2014-22

Project description	<p>1) Background to justify the project</p> <p>Low coverage of basic services for drinking water supply (59%) and sanitation facilities (41%) in rural areas of Mongolia constitutes priority, aggravated by geographic, income and gender disparities (WHO/UNICEF JMP, 2017).</p> <p>JMP data show that use of basic water sources is much higher in urban areas (95%) than in rural areas (59%) and use of basic sanitation facilities is also higher in urban areas (66%) than in rural areas (41%). Open defecation (or no service in sanitation) is high in rural areas at 31%. JMP data also show improving trends on other indicators, such as households with a specific place (basic service) to wash hands and the availability of soap, which stands at 72% as the national average (49% for rural and 81% for urban households) (WHO/UNICEF JMP, 2017).</p> <p>Toilets are not widely used in Mongolia, and the penetration rate is extremely low at 29% in rural areas and 64% in the capital. In addition, the population of Ulaanbaatar City has increased rapidly from 590,000 (1990) to 1.13 million (2014), and 1.8% of Mongolia's total population of 1.8 million living in capital. Since approximately 50% of the entire Mongolia population is concentrated in Ulaanbaatar City, the Ger district of the city is expanding and overcrowding, and the water/sewerage system has not been developed. In this area, where groundwater is used as drinking water, the water source and environmental pollution caused by unearthened toilets has become a serious problem (JICA, 2014).</p> <p>The background to justify the project are summarized as follows:</p> <p>Access to sanitation is poor; Water quality standards are not met; Water sources need better protection; Sanitation infrastructure does not keep pace with the urbanization; and Lack of improved sanitation facilities in ger areas.</p> <p>According to the “Progress on Drinking-Water and Sanitation - 2014 Update”, (WHO/UNICEF 2014), use of improved sanitation facilities (2012) is 56% and use of drinking-water from improved sources is (2012) 85%. Also, according to the “Preventing diarrhoea through better water, sanitation and hygiene” (WHO 2014), diarrhoea deaths attributable to WASH (2012) is reported at 85.</p> <p>2) Project components</p> <p>Construction of 15 WWTPs until 2015 and for 36 Soum centers until 2021.</p> <p>3) Implementing arrangements</p> <p>MCUD is the government implementing agency responsible for finding the location of the construction of small WWTP and deciding the size of the development, providing professional and methodological advice, supporting fund sourcing for international grants and investment.</p>
Environment and social impact	<p>Significantly positive social and health impact.</p> <p>Assessment for environmental impact shall be conducted.</p>
Remarks	<p>** This project is consistent with the policies set out in item 6.4.23 (Disseminate good practices by implementing a pilot project on disposing sludge from sewage treatment plants and ger areas using environmentally-friendly approaches) of LTDP2050 by the Government of Mongolia”.</p> <p>Source: Based on MEGD, (2013), IWMP</p>

Project No. IV8.5

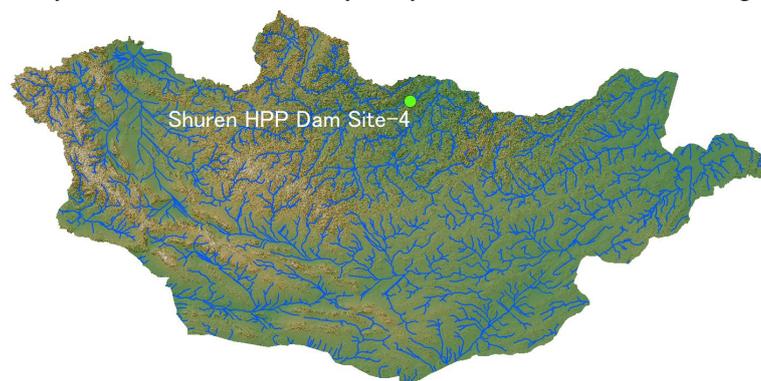
Title	Innovative wastewater treatment plant for livestock farms
Location	Tuul River basin
Implementing agencies	MOFALI, MET and Ulaanbaatar governor's office
Objectives	To experiment innovative wastewater treatment technology adoptable to cold climate for application to wastewater from livestock farms
Expected effects	Improved water quality of the Tuul River to ensure use as source of water supply in the future
Project costs	US\$500,000 for pilot implementation

Implementation schedule	Pilot implementation in 2022 followed by full scale implementation
Project description	<p>1) Background</p> <p>The Tuul River provides water supply for Ulaanbaatar with seven groundwater sources. As the water demand of the capital city continues to increase, use of Tuul River water will become necessary, but the river water is already seriously polluted. In addition to untreated or inadequately treated industrial wastewater, livestock farms are significant sources of pollution. Wastewater from livestock farms, pig and poultry farms are discharged without treatment in most cases. Even where a treatment plant exists, treatment efficiency is reduced during winter due to extremely low temperature.</p> <p>2) Project components</p> <p><u>Pilot implementation</u></p> <p>Study of existing conditions of wastewater generation and treatment by livestock activities, Examination of technological, legal and institutional conditions related to livestock wastewater discharge and treatment in Mongolia,</p> <p>Study of advanced wastewater treatment of livestock wastes and wastewater in other countries,</p> <p>Assessment of alternative technologies for wastewater treatment of livestock farms,</p> <p>Planning for stage-wise development of WWTP for livestock farms, and</p> <p>Pilot implementation of WWTP with selected appropriate technology.</p> <p><u>Full scale implementation</u></p> <p>Full scale implementation is subject to the stage-wise development plan.</p>
Environment and social impact	Assessment of alternative technologies includes social and environmental impact as an important criterion
Remarks	

Project No. IV9

Title	Selenge River hydropower dam development*
Location	Selenge river basin
Implementing agencies	Ministry of Energy (MoE) in cooperation with MINIS financed by the WB, MET, NDA, MOF, RBA
Objectives	<p>1) To contribute to energy production and water supply; and</p> <p>2) To support socio-economic development</p>
Expected effects	<p>1) Increase in domestic renewable energy supply</p> <p>2) Adjustment of seasonal river flow</p> <p>3) Increase in water supply</p>
Project costs	Total: MNT304,160 million 2014-16: MNT4,160 million, 2017-21: MNT300,000 million (State budget: -%, local budget: -%, foreign: 100%, private: -%)
Implementation schedule	F/S: 2021-23 Construction: 2025-30
Project description	<p>1) Background</p> <p>The energy production capacity needs to increase to meet growing demand. Hydropower development provides domestic energy sources to reduce dependence on imported energy. The key goal of the Shuren hydropower plant (HPP) project is to supply the electricity demanded by the mining sector and to cover electricity deficits faced by the Country. Secondary goals are to provide renewable energy, enable energy independence from the Russian power system and increase low-cost supply of renewable energy. The earliest feasibility studies on planning of 400 MW capacity hydropower plant on Selenge River first started during the period of 1974-1975 by former Soviet Institute "Hydro-Project" and Shuren Hydro was conceived without consideration environmental or social impacts of hydropower.</p> <p>A pre-feasibility study was conducted including an options assessment and initial screening for environmental, social, financial and economic impacts of a hydropower plant on the Selenge River. Its results were discussed and agreed with the working group of the Ministry</p>

of Energy. The pre-feasibility study finds that the investigated area at the Selenge River between Khyalganat and Zuunburen is suited for the construction of the proposed Shuren HPP. Within this area, six possible dam sites have been identified based on the pre-feasibility study and the Russian feasibility study from 1973 as shown in the figure below.



Source: JICA Project Team based on MINIS, 2016

Figure A Location Map of Shuren HPP

Site number	Location	
	Latitude	Longitude
Dam Site-1	49°48'24.45" N	105° 9'51.70"E
Dam Site-2	49°44'43.07"N	105° 2'58.63"E
Dam Site-3	49°43'59.27"N	104°57'15.60"E
Dam Site-4	49°42'29.70"N	104°56'25.72"E
Dam Site-5	49°41'60.73"N	104°47'54.18"E
Dam Site-6	49°40'31.20"N	104°45'52.26"E

Source: MINIS, 2016

Two locations, Sites No. 4 and No. 6, were identified as best suited for the construction of a hydropower plant and have to be further investigated in the feasibility study. Thus both sites will need to be studied in sufficient detail to make an informed recommendation based on their environmental and social impacts and performance. Environmental and social criteria will be important part of the decision making for site selection.

The initial screening of potential sites for the proposed Shuren HPP was followed by preliminary investigations for the Site No. 4 in the pre-feasibility study, which indicated that the proposed Shuren HPP is an important and feasible project for the future generation of power for the Central Electric System. The ESIA's conducted in the context of the feasibility study shall review all previously studied sites to confirm the preliminary investigations of Site No. 4 and Site No. 6 to allow an informed choice of the best alternative. For both sites, location-specific factors, and design options would be taken into account by comparing the two alternatives. The best alternative would then be further analyzed in terms of design feasibility.

The key elements of the planned project would consist of a dam (RCC) of an approximate height of 65 m and a crest length of 1,200 m. The dam base is estimated to be 900 m wide, the dam volume estimated to 4,8 billion m³. The project would create a reservoir with a total storage of 4.5 billion m³ of which 3.8 billion m³ would be useful storage. The elevation of the reservoir's full supply level (FSL) would lie at 761m above sea level (ASL), the minimum operational level (MOL) at 739 m ASL.

The project would include a construction camp, later to be converted into logistical support structures (staff housing, storage, workshops); power house; switchyard; new access road (225 km) and connecting roads; and a transmission line of approximately 73 km to connect the HPPs to the grid. During construction, quarries for rock fill and/or aggregates will be operated, the tentative volume to be sourced would be 4 million m³.

2) Project components

Feasibility study and construction of hydropower dam on Selenge river.
 Preliminary estimate of investment costs.

3) Implementing arrangements

MoE is the government implementing agency responsible for finding the location of dam project in Selenge River and deciding the size of the development, providing professional

	and methodological advice, supporting fund sourcing for international grants and investment.
Environment and social impact	<p>The Selenge River is the largest river in Mongolia. It belongs to the Arctic Ocean Basin and it flows from Mongolia across the border to the Russian Federation supplying 50 % of the flows to the Baikal Lake.</p> <p>The proposed HPP site is located at 3km downstream from the tributary Shuren River joining the Selenge River, which is at the town Orgikh Bag, Tsagaannuur Soum, Selenge Aimag. The reservoir area would cover the territory of Selenge and Khangalsoum of Bulgan Aimag as well as Baruunburen, Khushaat and Tsagaannuur Soums of Selenge Aimag. Thus, it is required to conduct detailed studies of the potential positive and negative environmental, ecological and socio-economic impacts of the proposed project.</p> <p>The project area of influence is divided into two zones: the local zone and the regional zone. The local zone covers the vicinity of the site of the reservoir and associated facilities and extends 5 km upstream and downstream on the river. The regional zone includes the entire basin of the Selenge River upstream and downstream from the project site to Lake Baikal including the wetlands estuary and delta. Additional studies on the Irkutsk reservoir, as well as the downstream pool of the Irkutsk HPP on the Angara are to be undertaken where potential impacts are identified in the REA. The ESIA will study the impacts of the proposed Shuren project on the local and regional zones and propose mitigation for these impacts.</p>
Remarks	<p><u>Implementation process /performance:</u></p> <p>The Ministry of Energy on 5th October 2016 selected the contractor to develop FS for the Shuren hydropower plant project to be built on Selenge River and carry out the EIA. The committee compiled a summary of the feasibility study (F/S) and EIA prepared by consulting companies. In Buryatia, Russia prepared for work on public discussion on March 2017.</p> <p>The Government of Mongolia finalized the REA and TOR in January 2019;</p> <p>The MINIS had participated “15th meeting of authorized representatives to implement agreement between Mongolia and Russian Federation on protecting and utilizing trans-boundary water” held in Yekaterinburg, Russia and presented the final REA TOR and provided information in August 2019;</p> <p>The MINIS presented the milestone of the approved TOR for REA and how stakeholders comments were incorporated into the REA TOR at second meeting of “bilateral co-working group to comprehensively consider proposed hydro constructions related matters in Selenge River catchment area” in Ulaanbaatar. Mongolia and Russian counterparts (C/Ps) reached a mutual agreement and understanding on the final REA TOR;</p> <p>In view of the coming project closure, REA cannot be carried out under the MINIS and the Government of Mongolia is considering options of implementing the assessment outside of the project.</p> <p>** This project is consistent with the policies set out in item 6.3.9 (As part of the Blue Horse Project, conduct feasibility study and design in order to start construction work of multipurpose serial pools with flow adjustments on large rivers located in high-mountainous zones such as the Selenge, Orkhon, Eg. Kherlen and Khovd) of LTDP2050 by the Government of Mongolia”.</p> <p>Source: MEGD, (2013), IWMP</p> <p>Source: Terms of Reference (TOR) for a Regional Environmental Assessment (REA) for the Selenge River Basin and Lake Baikal area in the context of the proposed Shuren Hydropower Project and Orkhon Water Diversion project, MINIS, RFP No. WB/MOF/MINIS/CS/QCBS/1.1.4 (d)/2016</p>

Project No. IV10

Title	Local energy system development
Location	Govi-Altai
Implementing agencies	MoE, MOFALI, local administrations, private sector
Objectives	<ol style="list-style-type: none"> 1) To development of renewable energy including solar, wind, hydropower and geothermal; 2) To contribute to reduction of dependence on coal-fired power and heat generation and on imported power; 3) To establish local industries utilizing local energy.
Expected effects	<ul style="list-style-type: none"> - Promotion of renewable energy utilization, - Saving on foreign currencies by import substitution of power, and - Environment friendly economic activities

Project costs	US\$
Implementation schedule	Master planning for renewable energy development and use: 2022 Formulation and implementation of pilot projects: 2023-24 Implementation planning for renewable energy development and use nationwide
Project description	<p>1) Background</p> <p>Mongolia attained one of the highest economic growth rates in the world during 2010s owing much to mining and export of coal. The economic development based on coal cannot be sustained in view of strong head wind against coal utilization worldwide, although Mongolia will have to continue relying on coal to reduce dependency on imported power and to obtain foreign exchange earnings. While Mongolia continues to utilize coal in short-to-medium terms, preparation should be accelerated for use of renewable energy. Mongolia, in fact, has plenty of renewable energy potentials including solar, wind, hydropower and even geothermal. In particular, Govi-Altai is most promising for development of these energy sources.</p> <p>2) Project components</p> <p>Potential for solar energy is high in the southern part of Govi-Altai especially in the Govi area. Also, extensive land is available for installing large scale wind power generation facilities in the south. The high potentials for hydropower development on the Zavkhan River have not been developed fully. In addition, there exist promising geothermal energy potentials in the Aimag, particularly in the depression areas between the Altai and the Khangai mountains.</p> <p>To establish a local energy supply system to complement the grid electricity, a local energy system should be developed combining renewable energy sources. State-of-art technologies for solar and wind power generation may be immediately introduced first as pilot projects. Technologies are readily available for development and utilization of geothermal energy for various purposes. Use of geothermal energy for heating of housing and greenhouses may be introduced early.</p> <p>For full scale development and use of these renewable energy sources, master planning should be conducted under the policy and guidance on the Central Government. Local conditions should be reflected in various use of renewable energy of different forms. Various utilization systems should be pilot implemented first. Govi-Altai will serve as a testing ground for development and use of various renewable energy sources, while comprehensive policy and plan are prepared for nationwide application of renewable energy.</p> <p>3) Implementing arrangements</p> <p>The Ministry of Energy (MoE) is the government implementing agency responsible for master planning in cooperation with MET, local administrations and the private sector. Eventually, a local energy company may be established for supply of power and heat to local communities with capital contributions by the private sector, local communities and the governments.</p>
Environment and social impact	Significant contribution to realization of carbon-free society in line with the international agreements
Remarks	

Chapter 11 Implementation Plan

Development programs and projects of the national comprehensive development plan (NCDP) were presented by development initiative in Chapter 8, and description of the proposed programs and projects were presented in Chapter 10 as project profiles. This chapter presents implementing arrangements for the four initiatives in Section 11.1 and proposed implementing institutions for the integrated regional development programs in Section 11.2. Implementation of all the proposed programs and projects are phased in accordance with the development scenario presented in Chapter 8, and an indicative investment schedule is prepared in Section 11.3. Monitoring and evaluation of projects after implementation are described and measures to improve them are suggested in Section 11.4.

11.1 Implementing Arrangements for Four Initiatives

11.1.1 Development objectives and four initiatives

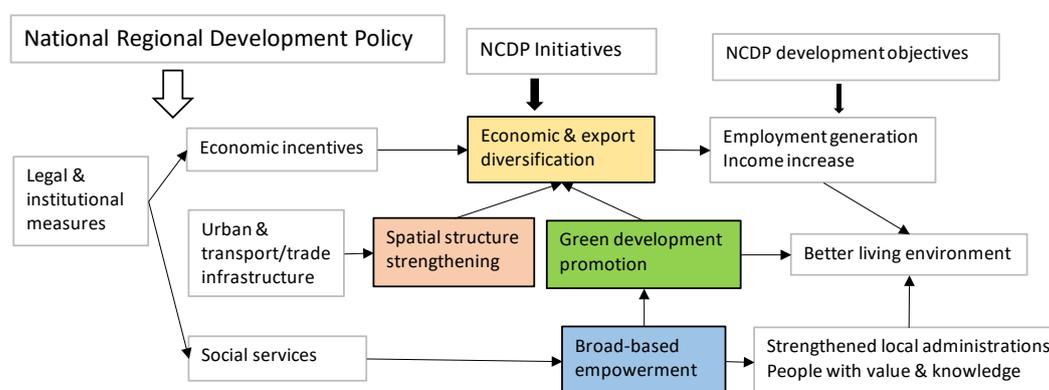
The NCDP has defined three development objective representing economic, social and environmental aspects as follows:

- (a) To diversify economic structure and export through increasing capital accumulation (economic objective);
- (b) To generate lucrative and stable employment opportunities in rural areas and local towns to reduce poverty and urban-rural disparities (social objective); and
- (c) To alleviate urban environmental problems by alleviating adverse effects of over-concentration of population and economic activities in Ulaanbaatar (environmental objective).

The proposed projects and programs have been packaged into the following four initiatives to clarify their different characteristics and to facilitate coordination between them:

- I. Economic and export diversification initiative,
- II. Broad-based empowerment initiative,
- III. Spatial structure strengthening initiative, and
- IV. Green development promotion initiative.

Relationships between the development objectives and the initiatives are shown in Figure 11.1.1 as the structure of the NCDP.



Source: JICA Project Team

Figure 11.1.1 Structure of the NCDP with Four Initiatives and Three Development Objectives

Figure 11.1.1 shows in generic terms policies to be taken by the Mongolian Government for regional development. They consist of economic incentives to encourage diversification of economy and export, urban and transport/trade infrastructure to support the strengthening the national spatial structure, social services provision to empower people, and legal and institutional measures as a basis for all these. Economic incentives may be introduced by region for more balanced spatial development of Mongolia. Legal and institutional measures would improve business environment for the private sector. Social services provision is a prerequisite to realizing healthy labor force, people’s mindset for value and knowledge development, and human resources with high skills and technology, all to pursue the new development paradigm of alternative socio-economy as proposed by the NCDP.

Most proposed projects and programs in the four initiatives are implemented by the initiative of sector implementing agencies of the Mongolian Government. Other entities are involved in some projects and programs to different extent such as regional entities including non-governmental organizations (NGOs), associations, research institutes and the private sector as well as the Ulaanbaatar municipality and Aimag administrations. Depending on the involvement of different types of entities, all the proposed projects and programs are classified into inter-agency projects/programs, sector projects/programs, cooperative projects/programs, municipal/Aimag projects and other projects. Implementing arrangements are described by type of projects/programs in the following.

11.1.2 Inter-agency projects/programs

Inter-agency projects and programs involve multiple ministries of the Mongolian Government in implementation. They are listed in Table 11.1.1. The designated lead agency should take the initiative to organize an inter-agency committee or the like to finalize the project scope and components. Implementation schedule will be determined and each project or program will be budgeted either as a whole or by component assigned to each agency and implemented accordingly.

Table 11.1.1 List of Inter-Agency Projects and Programs with Lead Agency for Each

No.	Lead agency	Title
II.1	National Development Agency (NDA) under Deputy Prime Minister	Border areas free trade zones (FTZs) and special economic zones (SEZs) promotion*
II.2	NDA under Deputy Prime Minister	Ulaanbaatar airport-side SEZ development
I2	NDA	Industrial clusters support program*
II0.2	Ministry of Environment and Tourism (MET)	“Urtuu” service stop areas*
II0.4	MCUD	Winter sports and leisure center
II0.7	MET	Tourism industrial cluster development
II1.1	Ministry of Food, Agriculture and Light Industry (MOFALI)	Herder communities support facilities*
II2.1	MOFALI	Local administrations-nomads communication strengthening*
II10.1	Ministry of Education and Science (MES)	Education sector strengthening by utilizing ICT
II10.3	NDA	Integrated information network for rural people
II10.4	Communications and Information Technology Authority (CITA)	Offshore development promotion
II10.5	CITA	Open data promotion for organic ICT ecosystem
III6	Ministry of Road and Transportation Development (MRTD)	Ulaanbaatar road bypath and network development
III8	MRTD	Suburban and local cities bypath development
III12	Ministry of Mining and Heavy Industry (MMHI)	Orkhon River water diversion to Govi
IV2.1	MET	Food loss reduction
IV2.3	MES	Solid wastes circulation utilizing cement plant
IV6	Ulaanbaatar	Tuul water complex*
IV7.1	MCUD	Urban centers water supply improvement*
II7.3	Ministry of Health (MOH)	Prevention of mother to child transmission of human immunodeficiency virus (HIV), syphilis and hepatitis
IV8.1	MCUD	Wastewater treatment (WWTP) plants construction and renovation
IV8.2	MCUD	Ulaanbaatar central sewage treatment plant for industrial water of combined heat plants

IV8.5	MOFALI	Innovative WWTP plant for livestock farms
IV9	MoE	Selenge River hydropower dam development*
IV10	MoE	Local energy system development

Source: JICA Project Team

11.1.3 Sector projects/programs

The largest number of proposed projects/programs are sector projects and programs listed in Table 11.1.2. For most of them, a single implementing agency has been identified respectively. For projects I8.1, I8.2, I9.1, I9.2, I9.3 and I9.4, MMHI and MoE are identified as implementing agencies as they are related to mineral resources for energy. For projects IV8.3 and IV8.4, MCUD and NDA are designated as implementing agencies. For most projects with MOFALI as the implementing agency, the private sector is naturally involved in implementation. MOFALI should take the initiative to invite private entities for various related activities such as production, system development, installation, operation and management, and investment, while MOFALI will provide support services such as professional and methodological advice, fund sourcing for international grants and investment for infrastructure. Each project/program will be budgeted by respective implementing agency.

Table 11.1.2 List of Sector Projects and Programs with Implementing Agency for Each

No.	Sector agency	Title
I3.1	MOFALI	Smart agriculture promotion
I3.2	MOFALI	Greenhouse agriculture promotion*
I4.1	MOFALI	Fodder production expansion
I4.2	MOFALI	Information and communication (ICT) monitoring and support system for livestock*
I5.1	MOFALI	Irrigation development
I5.2	MOFALI	Oil seed development
I5.3	MOFALI	Sea buckthorn development*
I7.1	MOFALI	Cold chain development
I7.2	MOFALI	Food traceability platform*
I8.1	MMHI, MoE	Rare earth resource exploration
I8.2	MMHI, MoE	Metal mineral resources market exploration
I9.1	MMHI, MoE	Coal transport and export promotion*
I9.2	MMHI, MoE	Coal resource survey
I9.3	MMHI, MoE	Optimized coal business master planning
I9.4	MMHI, MoE	Coal-based industrial cluster development
II0.1	Ministry of Environment and Tourism (MET)	Dinosaur museum
II0.6	MET, NSO	Tourism sector database development
III.2	MES	Community-based early childhood education for herders' children
II2.2	NSO	Comprehensive nomad database development
II5	MES	Scholarship for business-oriented human resources development
II6	MES	Comprehensive education sector reform program
II7.1	MOH	Primary health care (PHC) strengthening*
II7.2	MOH	Health information center establishment
II7.4	MOH	Telemedicine and electronic mobile health care for diagnostic purposes
II8	Ministry of Labor and Social Protection (MLSP)	Social insurance and pension reform
II10.2	CITA	Rural IT development promotion and model ICT city development
III1	MRTD	Ring artery establishment*
III2	MRTD	Inter-Aimag roads construction and upgrading*
III3	MRTD	Aimag special purpose roads development
III4	Ulaanbaatar Railway (UBTZ)/National	Ulaanbaatar bypath rail link (Bogd Khan link)*

	Railway (MTZ)	
III5	UBTZ/MTZ, MRTD	North-south corridor rail capacity development*
III9	MCUD	Ulaanbaatar airport satellite city
III10	MRTD	Local air transport network development
III11	MCUD	Regional and local cities development
IV1	MOFALI	Land degradation prevention
IV2.2	MRTD	Automobile recycling park*
IV3.1	MCUD	Ger district development guidelines*
IV4	MET	Sanitary landfill site establishment
IV5.1	MCUD	Longer life-span facilities establishment
IV5.2	MCUD	Ensuring coherence of legal documents in urban development sector
IV8.3	MCUD	Sewerage networks renovation and expansion
IV8.4	MCUD	Small WWTPs in Soum centers*

Source: JICA Project Team

11.1.4 Cooperative projects/programs

Cooperative projects and programs will involve both government agency and private entities for implementation. They are listed in Table 11.1.3. For each of them, a coordinating agency is designated to work with organizations in the private sector, research institutes and other entities. The coordinating agency will provide guidance by setting criteria and standards, and substantive works will be undertaken by cooperating entities. The coordinating agency will ensure budget allocation necessary to facilitate the project implementation.

Table 11.1.3 List of Cooperative Projects and Programs with Coordinating Agency for Each

No.	Coordinating agency	Title
I3.3	NDA	Agro information technology (IT) parks development*
I6.1	NDA	Cattle ranching system development
I6.2	NDA	Corn silage production
I6.3	NDA	Total mixed ration (TMR) feeding centers development
I6.4	NDA	Spray dry powder milk technology
II3	MES	Skills training and jobs creation for youth and adults *
III7	Ulaanbaatar	Ulaanbaatar urban redevelopment utilizing freight terminal land
IV7.2	MOFALI	Rural water supply expansion

Source: JICA Project Team

11.1.5 Municipal/Aimag projects and other projects

A few projects as listed in Table 11.1.4 are implemented by municipal or Aimag governments. Each local government will work with local communities, private sector and relevant stakeholders as necessary to implement respective projects. It will budget costs for related infrastructure and support fund sourcing from donors and/or private investors.

Table 11.1.4 List of Municipal/Aimag Projects

No.	Implementing agencies	Title
II0.3	Ulaanbaatar Municipality	Ger district handicraft street
II0.5	Nalaikh District	Nalaikh mining museum and education center
IV3.2	UB, selected Aimags	Ger district sanitation improvement*
IV2.4	Ulaanbaatar Municipality	Eco-park establishment*

Source: JICA Project Team

Three projects listed in Table 11.1.5 will be implemented by non-government entities. For projects II9.1 and II9.2, a new entity called Center of Group Dynamics will be established supported by public organizations and business partners and implement the project under the Prime Ministry.

Table 11.1.5 List of Other Projects to Be Implemented by Non-government Entities

No.	Implementing agencies	Title
II4	Independent Research Institute of Mongolia (IRIM)	Young women’s career development and support program*
II9.1		Center of group dynamics*
II9.2		Process consulting for accomplished results

Source: JICA Project Team

11.2 Implementing Arrangements for IRDPs

11.2.1 Conditions for regional development

(1) Basics

Regional development is defined as socio-economic development by utilizing indigenous resources by the local people for the benefits of local people in the region. Development resources to be utilized for regional development include natural resources, human resources, financial resources and technological resources as well as existing socio-economic conditions and historical and cultural heritage in the region. Many regions, however, do not have all these resources sufficiently to support the regional development as planned or perceived, and some resources would have to be introduced from outside the respective regions.

As in the case of Mongolia, human resources with adequate skills and expertise and financial resources would have to be brought in from outside any region to realize its development. Decisions to bring in additional resources should better be made by the local people and the local administration in the region. In many cases, however, such decisions are made by private investors from outside often foreign countries supported by the Government. This may not ensure the resources would be utilized for the best benefits of local people in the region.

It is important for the regional development to utilize indigenous resources as much as possible and additional resources should be introduced from outside by decisions of the local people or local administrations legitimately representing interests of the local people. To ensure these basic conditions for regional development, local administrations in the region should have sufficient strength and capacity supported by local people.

(2) Evolution of laws and institutions related to regional development

Constitution

Article 38.3 of the new Constitution adopted in 13 January of 1992 states that the Government of Mongolia shall exercise the plenary power to “develop and implement the measures on sectoral, inter-sectoral, as well as regional development issues”. This laid the legal foundation for regional development. Amendments to the Constitution was promulgated in November 2019 and took effect in May 2020, which established legal base and additional functions of local administrations such as tax rate determination and asset management.

Specifically related to natural resources, Article 6.2 of the new Constitution reads as follows:

The land, except those given to the citizens of Mongolia for private possession, as well as the subsoil with its mineral wealth, forest, water resources and wildlife shall be the property of the State. In compliance with the country’s long term development policy, the State Natural Resource Exploitation Policy shall aim to ensure citizens’ right to healthy and safe environment and equitably distribute wealth through the Sovereign Wealth Fund.

Also, the Constitution stipulates that Aimag, Capital City, Soum, and Citizen’s Representatives’ Khural of Ulaanbaatar have the right to manage property and set tax rates within the limits set by law. This provides an opportunity to improve local economic independence.

Law on Urban Development

In 1998, the first Law on Urban Development was adopted (revision approved in 2008). Among the purposes of the law is to establish optimal structure for regional development that is capable of leading relatively self-sustained, independent development. According to the law, the urban development document consists of the general plan of human settlement development, the regional development plan, the general development plan of city and village, and other stage designs.

In general in Mongolia, “the state central administrative organization in charge of urban development issues” shall be the customer for the development/formulation of regional development plans; it shall finance the development/formulation of regional development plans from the state budget by authorized business entities and organizations. According to the law, regional development plans identify inter-Soum centers by defining rationally a framework of priority directions of the regional development, and regional core centers and social, culture and utility services frameworks, based on comprehensive urban development assessment as revised and have to meet requirements of integrated development with other regions and promote relatively self-sustained development.

Law on Environmental Impact Assessments

In 1998, the Law on Environmental Impact Assessments was first adopted. Among the purposes of the law is to regulate relations that may arise in connection with the assessment of environmental impacts of and approval decisions on regional and sectoral policies, development programs and plans and projects.

Law on the Regional Development Management and Coordination

In 2003, the Law on the Regional Development Management and Coordination was first adopted. The purpose of the law is to define a legal basis of the regional economic development aimed at balancing the social and economic development of Mongolia and to regulate the relations arising from the regional development administration and coordination. Also in accordance with the law, the State Great Khural shall exercise the following powers: 1) approve the concept of regional development of Mongolia; 2) establish the legal foundation of the Country's regional development; 3) identify the main framework of regional economies; 4) designate the regional development pillar cities; 5) define the policy to establish the main network of regional roads, energy, communications and information technology; and 6) ratify international treaties and agreements concerning the regional development issues in Mongolia.

Law on Development Policy Planning

The Law on Development Policy Planning was adopted in 2015. The purposes of the law are to determine stages of planning, implementation, monitoring and evaluation of the development policy of Mongolia, to set out guiding principles, to outline rights, duties and responsibilities of the engaged parties and to build up a unified development policy planning system. The law defines “Regionalized development policy” means a policy document which is developed on the basis of the development concept of Mongolia and defines the ways of achieving goals, objectives and measures to be implemented in order to support local economic and social development by ensuring consistency of regional and urban planning and environmental sustainability.

According to the decision of the State Planning Commission of the then People’s Republic of Mongolia the “General scheme for human settlement of Mongolia until the year of 2005” (HSP) was initially developed during 1986-1987, but not approved. Subsequently, “General plan on human settlement development of Mongolia” (HSP) was developed by the National Design and Research Center which belonged to the former Ministry of Infrastructure Development between 1992-1995. Within the framework of the HSP, a proposal was made to develop the Country into five main regions.

According to the directions of the Government, the former “Urban Development State Property Enterprise revised the HSP partly since 2000, but it was not revised completely and not approved by the State Great Khural. The Parliament approved the millennium road and five vertical axes, regional development concept, regional pillar center cities, and medium-term regional development strategy.

Regional Development Programs

The Government Resolution No.202 of 2005 approved the Western Region, Eastern Region, Central Region and Khangai Region Development Programs for 2006 - 2015, and Resolution No.197 of 2006 approved the Ulaanbaatar Regional Development Program for 2006- 2015. According to the Government Agency for Policy Coordination on State Property's Resolution no.85 (April 3rd, 2018), the Urban Development, Design and Planning Institute was established under the framework of the development of the HSP within the organizational structure of the Construction Development Center (CDC). The National Development Authority (NDA) was established in 2016 under the framework of the "Law on Development Policy Planning". NDA is due to organize the development of the Aimag development policy and program.

The implementation time of the Western, Khangai, Central, Eastern and Ulaanbaatar regional development programs of Mongolia based on the regional development concept (first phase-2006-2010, second phase-2011-2015) has been expired and it is necessary to analyze the implementation of these programs.

Revisions of Law on Regional Development Administration and Coordination

Since the Law on Regional Development Administration and Coordination was first adopted in 2003, amendments and changes have been made seven times. Article 6.1 of the law states that "The non-staff National Committee shall work under the Prime Minister with function to coordinate the regional development administration and coordinating efforts and determine the general strategy of the Government on the issues of regional development". Article 7.1 states "The non-staff Regional Council shall have functions of organising measures for implementing the government strategies of promoting regional development, and of coordinating social and economic issues of the region".

Article 7.2 states "The Council shall be composed of the Head of the Council, Governor of Aimag(s) located within that region, and Mayor of the regional development pillar center city". Article 7.3 states "The Council members may include representatives of the citizens' representatives for Khural of Aimag or the capital city located in the respective region; non-governmental organization functioning to protect legitimate interests of individual and legal bodies; and domestic and foreign investors and businesses contributing to the regional development". The National Committee for Regional Development and the Regional Council, however, have not been implemented due to financial and other reasons.

In the future, it is necessary to ensure coordination between relevant laws such as the Law on Urban Development, the Law on Regional Development Administration and Regulation, and the revised version of the Law on Development Policy, Planning and Management. There is also a need to further improve the legal framework for linking social and economic development policies with urban development documents.

(3) Existing laws and institutions

The Vision2050 of Mongolia was approved by the Parliament Resolution No.52, May 13th, 2020. The resolution has also approved "Activities to be implemented during 2021-2030 under the framework of "Vision2050" of Mongolia and "Monitoring and evaluation criteria and achievement level for the Vision2050 of Mongolia".

Furthermore, the above resolution annulled the Parliament Resolution No.19 "Approving Mongolia's sustainable development vision 2030" (SDV2030) dated February 5th, 2016 because the indicators reflecting the results of SDV2030 and Mongolia's sustainable development goals are reflected principally in the appendix to the mentioned Parliament Resolution on "Approval of Vision2050 of Mongolia".

In the Vision2050, the goal No.8 for "Regional and local development" provides "Develop competitive and balanced regions and Aimags, involved in the regional economic integration in a way that respects national culture and ensures sustainable urban settlement systems with focus on preserving nature, maintaining balanced ecosystem for future generations and development of green production through economic diversification, specialization and shared economy".

The Ministry of Construction and Urban Development (MCUD) drafted a revised version of the Law on Urban Development and submitted it to the Parliament on January 22, 2020. The draft law was discussed at the 2020 autumn session of the Parliament and is under discussion by a working group of the Parliament as of January 2021.

On May 7th, 2020, the Parliament approved a revised version of the Law on Development Policy, Planning and Management and repealed the Law on Development Policy and Planning, which was adopted in 2015. Clause 1.7 of the Article 25 of the Constitution of Mongolia states that development policy and planning shall be steady. The revised law is aimed at ensuring the steadiness and continuity of Mongolia's development policy and planning, defining national principles, and developing, planning, and effectively implementing development policies.

The National Development Agency (NDA), an implementing agency of the Cabinet Secretariat, will develop a "Regional Development Target Program" that is expected to be approved by the Government in 2022. It is important to include and implement in the relevant laws the legal regulation to develop the Regional Development Target Program in accordance with the spatial planning or territorial document, the "General plan of human settlement development of Mongolia" (HSP) and the Regional Development Plan (RDP).

"Development Target Program" means a medium-term policy document that reflects the sectoral, inter-sectoral and regional and local specifics to implement specific goals and measures in line with Mongolia's long-term development policy at the national level, resource-based, financially backed activities, and quantitative and qualitative indicators.

The revised Budget Law was approved in 2011 and key amendments are implemented and integrated in areas of decentralization and enhancement of local budget authorities with local citizens' participation. For instance, under the law, each Aimag, Soum, district and khoroo are allocated from Local Development Fund the funding to administer for local development projects and programs and the citizens' representatives for Khural are authorized to conduct monitoring on the selection and implementation of such development projects and programs.

(4) Capacity of local administrations

Administrative status

Article 3.1 of the Law on Administrative and Territorial Units of Mongolia and Their Governance, first adopted in 1992, states that "the territory of Mongolia shall be administratively divided into Aimags and the Capital City, Aimags into Soums, Soums into Baghs, the capital city into districts, and districts into khorooos.", and Article 3.2 states that "the Aimag, Capital City, Soum and district are administrative, territorial, economic and social complex with special functions and self-governance, provided by the law." Aimag, the highest local administrative and territorial unit, differs from other units in that they are inter-Soum organizations and intermediate units that cover a system that communicates directly with the Government and are responsible for performing functions that exceed the financial, economic, and population capacity of Soums.

Population and economy

The total population of all the 21 Aimags were 1,757,100 in 2019, making the average Aimag population 83,671. Even the largest Aimag of Khuvsgul had the population of only 135,100 in 2019. The aggregate GRDP of all the 21 Aimags was MNT12,391,123 million, accounting for 33.6% of the Mongolian GDP. Per capita GRDP of all the 21 Aimag was MNT7,052,000, corresponding to 63.0% of the per capita GDP in Mongolia or 44.3% of the per capita GRDP in Ulaanbaatar.

There existed 43,723 legal entities in all the 21 Aimags in 2018, accounting for only 25.7% of the total 170,160 legal entities existing in Mongolia. There existed one entity per population of 40 in the Aimags, compared to 19 in Mongolia and 12 in Ulaanbaatar.

Financial capacity

The total revenues of local and central governments in 2019 are summarized in Table 11.2.1. Per capita

revenue of local governments is only 24.7% of per capita revenue of the Central Government. About 40% of local government revenue is generated with current income consisting of 35% tax revenue and 5% non-tax revenue. The rest is supported by the Central Government in the forms of 8% grants, 42% transfer and 10% from the local development fund.

Table 11.2.1 Total Revenues of Local and Central Governments in 2019

Region/UB/Mongolia	Total revenue (MNT million)	Population (thousand)	Per capita revenue (MNT/capita)
Western	355,001	412.0	861,653
Khangai	495,814	605.2	819,256
Central	526,765	516.6	1,019,677
Eastern	183,877	223.3	823,452
All Regions	1,561,458	1,757.1	888,656
Ulaanbaatar	1,381,386	1,539.8	897,120
All local governments	2,942,844	3,296.9	892,261
Mongolia	11,936,638	3,296.9	3,620,564

Source: Statistical Yearbook 2019

(5) Decentralization policy of Mongolia

Mongolia has successfully reformed its state administrative structure and enhanced the powers of local authorities since the Budget Law was adopted in 1992. The history of decentralization process in Mongolia is summarized as follows. During 1992-96, the decentralization policy was actively supported. As a consequence of implementing decentralization policy, local governments attempted to exercise greater autonomy during 1996-2002. However, weak capacities of local administrations did not result in successful and effective decentralization. This had given strong momentum for re-centralization.

Power was re-centralized during 2002-13, and the autonomous power, administrative structure, organization, staffing and budget of local governments were further weakened. Renewed decentralization efforts started since 2013 with new measures especially towards budget decentralization and increased citizen participation at all state levels. These changes are embodied in the latest amendment to the Constitution as described above.

The SDV2030 adopted by the State Great Khural Resolution 19, 2016, defined the main principles for sustainable development with decentralization initiatives. This has also defined basic conditions for long term sustainable development through decentralization policy and measures. The Vision2050 succeeding the SDV2030 further strengthen them.

Currently the “Decentralization policy support project” is being implemented by the Cabinet Secretariat of Government of Mongolia within the framework of the State Policy on Decentralization since 2016 supported in part by the Government of Switzerland. The second phase of the State Policy on Decentralization for 2020-24 aims at completion of the administrative and fiscal decentralization. An achievement expected is to increase the share employees working at the local level to 60% of the total public sector employees at least from 33%, 66,147 out of 198,463 in 2019.

11.2.2 Proposed institutional measures for regional development

(1) Conditions for necessary measures

As reviewed in sub-section 11.2 (2), the Mongolian Government has been pursuing regional development policy since the new Constitution established in 1992 as legal foundation of regional development. Against the regional development idea described in sub-section 11.2.1 (1), however, the past efforts for regional development were undertaken by the Central Government initiative. The National Committee for Regional Development and the Regional Council established by the Law on Regional Development Administration and Coordination as institutions for regional development, however, have not been implemented due to financial and other reasons. Regional development programs formulated for Western, Khangai, Central and Eastern Region and also for Ulaanbaatar have

been expired without much implemented.

The early efforts for regional development by the initiative of the Central Government is reasonable and realistic in view of very weak administrative and financial capacities of local administrations. It is time to make renewed efforts for genuine regional development by applying its idea in order to realize more resilient socio-economy of Mongolia on the better balance between regions. Essential conditions for regional development are 1) use of indigenous resources and 2) strengthening local administrations.

(2) Case of regional development in Japan as a reference

In pursuing regional development in Mongolia, a case in Japan may have some relevance since Japan used to be a typically centralized country with comprehensive command and supervision authority of the central government. The Local Autonomy Law enacted first in 1947 has established relationships between the central and local governments in Japan. According to the law, local governments have two tiers: prefecture and municipality. Authority and administrative powers of local governments have changed by many amendments in the past.

The Comprehensive Decentralization Law in 2000 has changed the relationship between central government and local governments in a fundamental way to make them in principle partners on equal footing for regional development. The principle of this reform was to expand the scope of responsibility for local governments closer to the people to provide social services. At the same time, the mechanism to entrust some works from the central government to local governments was effectively abolished.

Currently further transfer of responsibilities from prefectures to municipalities is underway. For local governments to perform their functions to serve their residents, various residents' and neighborhood associations play important roles. Also important for local governments to perform their functions is to enhance resource capacity including human and financial resources, which should be supported in part by transfer from the central government. Equally important is to establish proper institutional mechanism to ensure coordination between the central and local governments with clear division of responsibilities.

According to the current Local Autonomy Law, local governments are responsible for a range of functions in the fields of economic development, public infrastructure, public housing, social assistance policies and public health. Local governments have both "local own functions" and "statutory entrusted functions". The latter remain under the supervision of the central government. The central government supervises the local governments by enforcing the policies and regulations. Within the local governments, the prefectures are responsible for:

- Coordination between municipalities; and
- Projects and programs which are beyond the capacity of a municipality in technical, financial and other aspects.

Division of main responsibilities between the central government, prefecture and municipality is summarized in Table 11.2.2.

Table 11.2.2 Main Responsibility by Sector of Central Government, Prefecture and Municipality

	Central government	Prefectures	Municipalities
1. General public services	Communication and coordination affairs relating to prefectures	Communication and coordination affairs relating to municipalities	Internal administration, family registers, resident registrations
2. Public order and safety	Foreign affairs, national defense	Police	Fire fighting
3. Economic affairs and transport	Financial policies, trade, customs, national highways, ports, employment	Economic development, public infrastructure, prefectural roads, national highways,	Local roads, local harbors

	regulations	harbors, agriculture, employment	
4. Environmental protection	National parks	Forest and river conservation, environmental protection	Sewage, waste disposal, parks
5. Housing and community amenities		Public housing	Urban planning, public housing, water supply
6. Health	Health cost insurance	Public health centers	Nursing
7. Recreation, culture, and religion			Leisure services, sport, libraries
8. Education	National universities	Upper secondary schools	Pre-schools, elementary schools, lower secondary schools
9. Social protection	Pensions	Social assistance policies	Child welfare, elderly, national health insurance, ageing insurance

Source: OECD

(3) Proposed measures

Six IRDPs are proposed in Chapter 8 for the six Regions newly defined in Chapter 6, respectively. Component projects of each IRDP have been taken from the four initiatives presented also in Chapter 8. They include transport and logistic infrastructure, energy and water resources development, urban infrastructure, production activities including crop production, livestock and agro-processing, and social services including education and health care. Implementation of any IRDP naturally involves multiple ministries and other organizations as well as the private sector.

Various component projects of each IRDP will have to be implemented in a coordinated and timely manner by multiple implementing agencies. Unlike other inter-agency projects, a lead agency may not be identified for implementation with strong initiative. For effective implementation of IRDPs, two conditions should better be satisfied: 1) a venue for coordination to be participated by multiple implementing agencies, and 2) stronger Aimag administration with enhanced capacity. In view of limited administrative capacity of Aimags at present, however, the Central Government would still have to take the initiative at early stage.

To satisfy these conditions, it is recommended to establish a new institution, which may be called a Regional Development Council (RDC) for each Region newly defined, by the initiative of NDA working closely with related Aimag Governors, respectively. For this purpose, a new department may be established in NDA in charge of regional development policy, planning and implementation. Each RDC will be organized with governors of all the constituent Aimags in the Region and representatives of related ministries and other organizations. The new NDA department may prepare regional development budget for IRDPs, supporting Aimag administrations to prepare respective IRDPs. It is highly recommended that an officer in charge of each region should be assigned in the new NDA department of regional development policy, planning and implementation to promote implementation of respective IRDP on a competitive basis.

This may be the first step to establish regional administration between the National Government and Aimag administrations. At present, Regions are not administrative units and Aimag administrations have very limited capacity mainly due to small population and limited economic activities. The newly defined Regions have combined population of 200,000~500,000 at present as shown in Chapter 6. Each Region may be a better unit to pursue regional development mustering resources of constituent Aimags to establish viable economic activities common to some constituent Aimags.

Each RDC may be established initially as an ad hoc entity to promote the implementation of respective IRDPs but may be institutionalized as the body to promote planned development of Regions. This may be done by amending the Law on Regional Development Administration and Coordination. In amending the law, the following should be clarified:

- (a) RDC should have a multi-stakeholder composition by defining memberships properly;

- (b) Initiatives of Aimag and Capital City Governors should be ensured to convene and operate RDC meetings as well as day-to-day activities;
- (c) RDC functions should be clearly established including step wise expansion of the planning function;
- (d) Representation level of ministries should be clarified and online communication with respective central offices established for timely and responsible decision making; and
- (e) Funding methods should be clarified such as a regional development fund or a separate budget account for the IRDPs.

Initial functions of RDC are:

- (a) To review the component projects of IRDP,
- (b) To modify and/or add some components,
- (c) To determine phased development of IRDP to specify timing of implementing each component project, and
- (d) To determine budgeting for priority component projects by designated implementing agencies.
- (e) Following the determination at RDC, related ministries will budget their projects for timely implementation.

In the future, as the capacity of Aimag administrations are enhanced, RDC may have planning functions to formulate successive IRDPs for each Region. Also, a separate account may be established at the national level for IRDPs, i.e. regional development budget. From the point of view of sector ministries and agencies, the regional development budget will provide additional leverage for them to promote their own sector projects. This may facilitate formulation of IRDPs and coordination between multiple implementing agencies by Aimag administrations.

RDC, once established as a formal institution of the Mongolian Government for regional development, may be prescribed by the following. First, RDC memberships may be defined by:

- (a) Local government units: all the governors of Aimags and mayors of cities, mayors of municipalities with designated as Aimag capitals, and mayors of designated regional core cities or local growth cities,
- (b) Government agencies: NDA, MCUD, MOFALI, MOH, MECSS, MMHI, MET, MoE, MRTD and other selected public agencies and institutes,
- (c) Private sector: representatives of the private sector including private firms active in the Region, NGOs and associations, and
- (d) Special members subject to majority approval of regular members.

Second, RDC functions may be defined by the following:

- (i) To coordinate the preparation, implementation, monitoring and evaluation of regional development plans and programs, and related policies, frameworks and plans;
- (ii) To integrate approved development plans of Aimags and cities, line agencies, state universities and colleges, government owned and controlled corporations and special development authorities in the Region into the integrated regional development plan;
- (iii) To review, prioritize, and endorse to the National Government the annual and multi-year sectoral investment programs of the Region for budgeting;

- (iv) To promote and direct the inflow and allocation of private investments in the Region to support regional development objectives, policies and strategy; and
- (v) To coordinate the monitoring and evaluation of development projects undertaken by government agencies, LGUs, state colleges and universities, government owned and/or controlled corporations in the Region.

11.3 Implementation Phasing and Investment Program

11.3.1 Phasing of the four initiatives

All the proposed projects and programs are presented in Chapter 8 under the four initiatives: 1) Economy and export diversification, 2) Broad-based empowerment, 3) Spatial structure strengthening, and 4) Green development promotion. All the initiatives are implemented over three phases of the planning period, but there exist logical sequences of implementing different projects and programs. Implementation phasing of the four initiatives is clarified in Table 11.3.1 in line with the development scenario presented in Section 8.1 in order to guide prioritization of proposed projects and programs.

Table 11.3.1 Phasing of Four Initiatives

Initiative	Phase 1 (~2025)	Phase 2 (2026-30)	Phase 3 (2031~40)
I. Economy & export diversification	<ul style="list-style-type: none"> -Mining to continue at high rates as driving force, shifting gradually to responsible mining -Simple coal processing to produce briquettes as well as sorting and washing for domestic market -New economic activities to process primary products of crop and livestock farming -Initial development of sea buckthorn and livestock industrial clusters -Semi-intensive livestock farming to expand in vicinities of larger cities and along artery roads to produce quality meats and dairy products -Integrated farming combining livestock and crop production -Crop farming expansion for fodder and basic food for self-sufficiency -Initiation of innovative agriculture and ICT-oriented livestock -Industrial parks near Ulaanbaatar and selected agro IT parks development -Development of man-made tourism attractions 	<ul style="list-style-type: none"> -Wide practice of responsible mining and deceleration of mining sector growth -Establishment of clean coal technology (CCT) -Increasing production of iron and copper based final products -Production of new mining products such as uranium and rare earth materials -Full development of sea buckthorn and livestock industrial clusters with products diversification -Establishment of cold chain and food traceability platform -Initial development of other industrial clusters -Expansion of innovative agriculture and ICT-oriented livestock -Accelerated development of FTZs or SEZs along the borders with Russia and China -Domestic travel agents to associate directly with international travel agents to develop a variety of tour products for international tourism 	<ul style="list-style-type: none"> -Diversification of economy and export products to reach highest possible level with many ICT-supported industrial clusters -Establishment of high productivity agriculture and livestock -Tourism and wellness industry complex to develop by utilizing characteristic local products -Development of service-oriented clusters --Some export products to establish fame for quality in global market -Full development of FTZs or SEZs along borders with Russia and China with increasingly more service-oriented industries to become effectively free cities
II. Broad-based empowerment	<ul style="list-style-type: none"> -Review and reallocation of state budget for social sector as a whole -Comprehensive education sector reform to be initiated to improve higher and technical education and to initiate value development at pre-school -Health care services to shift emphasis on primary and preventive health care 	<ul style="list-style-type: none"> -Pre-school and primary education to be further strengthened for value development to support the alternative socio-economy -Children as change agents for value development to change mindset of society -Realization of healthy labor force supported by primary and preventive health care 	<ul style="list-style-type: none"> -Realization of comprehensive coverage by high quality social services for all people including in-migrants and returnees -Complete eradication of poverty with livelihood activities to become economically viable linked effectively to indigenous industries

	<ul style="list-style-type: none"> -Herder community support program -Skill training and job creation/matching 		
III. Spatial structure strengthening	<ul style="list-style-type: none"> -Improvement of sections of future ring artery -Improvement of unpaved sections of inter-Aimag roads -Initial development of satellite cities in UB suburbs -Urban infrastructure development for base cities for mining, processing and tourism -Initial development of a few selected cities as logistic centers for international trade -Feasibility studies for major facilities constituting the future transport and logistic network such as new railways and border facilities -Rural access roads improvement to ensure adequate access to social services and facilitate collection of raw materials for new agro-processing industries 	<ul style="list-style-type: none"> -Establishment of all links of ring artery -Establishment of another telecommunication backbone linking Uliastai in the west and Undurkhaan in the east through Ulaanbaatar -Accelerated development of UB satellite cities -Larger urban centers at higher tiers of urban hierarchy to be strengthened with designated urban functions respectively -Further improvement of access to rural areas throughout the Country -Infrastructure development associated with mining and major tourism development to be accelerated 	<ul style="list-style-type: none"> -Complete establishment of artery network with the upgraded ring artery road and inter-Aimag roads -Transport and logistic network established as a multi-modal system linking production, processing and logistic centers -Railway lines as part of multi-modal system to be shared increasingly for passenger transportation -Urban hierarchy further developed with clear functional division between major urban centers -City networking with cities in Autonomous Region of Inner Mongolia of China and Bryatia Republic of Russia
IV. Green development promotion	<ul style="list-style-type: none"> -Adverse environmental problems associated with mining-led development to continue -Awareness of people to be steadily enhanced for responsible mining -Satellite cities development in Ulaanbaatar suburbs starting to take effects to alleviate the urban environmental problems -Improvement of living environment of Ger district -Designation of controlled grazing areas -Initiation of recycle-oriented society starting with automobile recycling -Local government capacity enhanced steadily for environmental monitoring with involvement of local people 	<ul style="list-style-type: none"> -Responsible mining practiced increasingly widely to reduce adverse environmental effects associated with mining -Urban environmental problems further reduced as the satellite cities develop in Ulaanbaatar suburbs -Further improvement of Ger district environment -New urban environmental problems generated in local towns -Expansion of recycle-oriented businesses -Environmental monitoring by local administrations strengthened to enforce controlled grazing 	<ul style="list-style-type: none"> -Environmental monitoring capacity to much increase at the local level -Environmental problems at local towns such as solid waste management, water supply and drainage to be alleviated by increased budget allocation to Aimag administrations -Capital city to devote its resources to realizing high quality living environment with plenty of amenity and greenery

Source: JICA Project Team

11.3.2 Indicative investment program for proposed projects and programs

(1) Indicative investment program

Priority of all the proposed projects and programs is broadly assessed to determine implementation timing of each program/project into the three phases. Investment costs estimated as shown in project profiles are allocated to different phases accordingly. Results are presented in Tables 11.3.2 through 11.3.5 by initiative in the form of an indicative investment program. Costs shown in red in Table 11.3.2 are only indicative based on concepts of each project rather than estimates.

The six IRDPs presented in Section 8.3 will also be implemented in phases. Implementation timing of each component project constituting the IRDP respectively should follow in principle the indicative investment program, but implementation of some projects may be advanced to ensure realization of complementary effects earlier. Other considerations may also be reflected to prepare a definitive

investment program.

On the basis of the definitive investment program, individual programs and projects will be included into investment programs of respective sector ministries and agencies. As suggested in subsection 11.2.2, a separate budget account may be established for the IRDPs apart from the sector-wise budget accounts. This may provide an incentive for sector ministries and agencies to cooperate with each other and facilitate formulation of the IRDPs and coordination between multiple implementing agencies by Aimag administrations.

Table 11.3.2 Indicative Investment Program of Proposed Programs and Projects of Economy and Exports Diversification Initiative of NCDP

Project No.	Title	Implementing agencies	Project costs (US\$ million)			
			Total	Phase 1	Phase 2	Phase 3
I1	FTZs and SEZs development program	Public-private partnership (PPP)	164	64	50	50
I1.1	Border areas FTZs and SEZs promotion project*	PPP	300	100	100	100
I1.2	Ulaanbaatar airport-side SEZ development project	PPP	50	25	25	
I2	Industrial clusters support program	Inter-agency (NDA)	15	15		
I2.1	Sea buckthorn industrial cluster development*	Inter-agency (NDA)	5	5		
I2.2	Livestock industrial cluster development*	Inter-agency (NDA)	5	5		
I3	Innovative agriculture development					
I3.1	Smart agriculture promotion	MOFALI	1	1		
I3.2	Greenhouse agriculture promotion*	MOFALI	3	3		
I3.3	Agro IT parks development*	PPP	26	26		
I4	Integrated crop-livestock farming promotion					
I4.1	Fodder production expansion	MOFALI	5	5		
I4.2	ICT monitoring and support system for livestock*	MOFALI	3	3		
I5	Crop production expansion program					
I5.1	Irrigation development	MOFALI	14	14		
I5.2	Oil seed development	MOFALI	5	5		
I5.3	Sea buckthorn development*	MOFALI	5	5		
I6	Integrated cattle production promotion					
I6.1	Cattle ranching system development	PPP(NDA)	3	3		
I6.2	Corn silage production	PPP(NDA)	12	12		
I6.3	TMR feeding centers development	PPP(NDA)	3	3		
I6.4	Spray dry powder milk technology	PPP(NDA)	3	3		
I7	Market environment improvement					
I7.1	Cold chain development	MOFALI	2	2		
I7.2	Food traceability platform*	MOFALI	5	5		
I8	Mining diversification program					
I8.1	Rare earth resource exploration	MMHI, MoE	5	5		
I8.2	Metal mineral resources market exploration	MMHI, MoE	5	5		
I9	Comprehensive coal industry upgrading	MMHI, MoE				
I9.1	Coal transport and export promotion*	MMHI, MoE	50	50		
I9.2	Coal resource survey	MMHI, MoE	10	10		
I9.3	Optimized coal business master planning	MMHI, MoE	5	5		
I9.4	Coal-based industrial cluster development	MMHI, MoE	5	5		
I10	Comprehensive tourism development with new attractions					
I10.1	Dinosaur museum	PPP(MET)	5	5		
I10.2	“Urtuu”*-service stop areas	MRTD, MET, MCUD	15	5	5	5

I10.3	Ger district handicraft street	PPP(UB municipality)	5	5		
I10.4	Winter sports and leisure center	MRTD, MET, MCUD	10	5	5	
I10.5	Nalaikh mining museum, culture and education center	Inter-agency (Nalaikh district)	20	5	10	5
I10.6	Tourism sector database development	MET, NSO	5	5		
I10.7	Tourism industrial cluster development	Inter-agency (MET)	10	10		

Source: JICA Project Team

Table 11.3.3 Indicative Investment Program of Proposed Programs and Projects of Broad-based Empowerment Initiative of NCDP

Project No.	Title	Implementing agencies	Project costs (US\$ million)			
			Total	Phase 1	Phase 2	Phase 3
II1	New generation herders' upbringing program					
II1.1	Herder communities support facilities*	Inter-agency (MOFALI)	80	30	30	20
II1.2	Community-based early childhood education for herders' children	MECSS	60	20	20	20
II2	ICT-oriented support program for nomads					
II2.1	Local administrations-nomads communication strengthening*	Inter-agency (MOFALI)	15	5	10	
II2.2	Comprehensive nomad database development	NSO, Aimag governments	15	5	10	
II3	Skills training and jobs creation for youth and adults	Inter-agency (MES)	15	3	5	7
II4	Young women's career development and support program network*	IRIM	9	4	3	2
II5	Scholarship for business-oriented human resources development	MES	30	6	12	12
II6	Comprehensive education sector reform program*	MES	37	7	20	10
II7	Focused health care improvement program					
II7.1	PHC strengthening*	MOH	43	13	20	10
II7.2	Health information center establishment	MOH	20	10	10	
II7.3	Prevention of mother to child transmission of HIV, syphilis and hepatitis	Inter-agency (MOH)	1	1		
II7.4	Telemedicine and electronic mobile health care for diagnostic purposes	MOH	50	10	20	20
II8	Social insurance and pension reform	MLSP	26	6	10	10
II9	New business culture and mindset development					
II9.1	Center of group dynamics*	CGD (new organization)	13	3	10	
II9.2	Process consulting for accomplished results	CGD (new organization)	13	3	10	
II10	Special program for ICT promotion and application					
II10.1	Education sector strengthening by utilizing ICT	Inter-agency (MES)	1			
II10.2	Rural IT development promotion and model ICT city development	CITA	1			
II10.3	Integrated information network for rural people	Inter-agency (NDA)	1			
II10.4	Offshore development promotion	Inter-agency	1			

		(CITA)				
III0.5	Open data promotion for organic ICT ecosystem	CITA	1			

Source: JICA Project Team

Table 11.3.4 Indicative Investment Program of Proposed Programs and Projects of Spatial Structure Strengthening Initiative of NCDP

Project No.	Title	Implementing agencies	Project costs (US\$ million)	Phase 1	Phase 2	Phase 3
			Total			
III1	Ring artery establishment*	MRTD	248	123	125	
III2	Inter-Aimag roads construction and upgrading*	MRTD	390	50	211	129
III3	Aimag special purpose roads development	MRTD	709	214	284	211
III4	Ulaanbaatar bypath rail link (Bogd Khan link) *	UBTZ,/MTZ	400	300	100	
III5	North-south corridor rail capacity development*	UBTZ/MTZ, MRTD	252	202	50	
III6	Ulaanbaatar road bypath and network development	Inter-agency (MRTD)	80	20	40	20
III7	Urban redevelopment utilizing freight terminal land	PPP (UBTZ)	50	10	40	
III8	Suburban and local cities bypath development	Inter-agency (MRTD)	23	15	8	
III9	Ulaanbaatar airport satellite city development*	PPP (MCUD)	11	6	5	
III10	Local air transport network development	MRTD	72	14	48	36
III11	Regional and local cities development	MCUD	106	42	40	24
III12	Orkhon River water diversion to Govi	Inter-agency (MoE, MET)	830	30	500	300

Source: JICA Project Team

Table 11.3.5 Indicative Investment Program of Proposed Programs and Projects of Green Development Promotion Initiative of NCDP

Project No.	Title	Implementing agencies	Project costs (US\$ million)	Phase 1	Phase 2	Phase 3
			Total			
IV1	Land degradation prevention	MOFALI	1	1		
IV2	Recycle-oriented society development					
IV2.1	Food loss reduction	Inter-agency (MOFALI)	1	1		
IV2.2	Automobile recycling park*	MRTD	50	10	20	20
IV2.3	Solid wastes circulation utilizing cement plants	Inter-agency (MECS)	1	1		
IV2.4	Eco-park establishment*	UB City, MNRA	108	43	45	20
IV3	Ger district development promotion					
IV3.1	Ger district development guidelines*	MCUD	1	1		
IV3.2	Ger district sanitation improvement*	MET, MCUD	57	27	30	
IV4	Sanitary landfill site establishment	MET	5	5		
IV5	Buildings and structure preservation and restoration					
IV5.1	Longer life-span facilities establishment	MCUD	1	1		
IV5.2	Ensuring coherence of legal documents in urban development sector and reforming its legal system		1	5		
IV6	Tuul water complex project*	Inter-agency (MCUD)	229	9	150	70
IV7	Water supply improvement project					
IV7.1	Urban centers water supply improvement*	Inter-agency (MCUD)	322	222	100	
IV7.2	Rural water supply expansion	Inter-agency	38	20	18	

		(MOFALI)				
IV8	Wastewater treatment improvement project					
IV8.1	WWTPs construction and renovation	Inter-agency (MCUD)	369	108	261	
IV8.2	Ulaanbaatar central sewage treatment plant for industrial water of combined heat plants	Inter-agency (MCUD)	96	60	36	
IV8.3	Sewerage networks renovation and expansion	MCUD, NDA	265	103	162	
IV8.4	Small WWTPs in Soum centers*	MCUD, NDA	34	9	25	
IV8.5	Innovative WWTP for livestock farms	MOFALI, MET, UB	41	31	10	
IV9	Selenge River hydropower dam development*	Inter-agency (MoE)	109	9	100	
IV10	Local energy system development	Inter-agency (MoE)	20	100	250	

Source: JICA Project Team

(2) Investment allocation to four initiatives

Allocation of investment to the four development initiatives by indicative investment programs presented in Tables 11.3.2 through 11.3.5 is summarized by phase in Table 11.3.6. As shown, the total investment cost of all the proposed programs and projects is US\$6,507 million over the three phases up to 2040, consisting of US\$774 million (11.9%) for economy and exports diversification, US\$432 million (6.6%) for broad-based empowerment, US\$3,197 million (49.1%) for spatial structure strengthening and US\$2,104 million (32.3%) for green development promotion.

According to the draft Long-term Development Policy (LTDP) 2050, the total investment cost of all the proposed projects is MNT8,428,297 billion or US\$3,025,232 million at US\$1=MNT2,786 million, but if two super mega projects of Tavan Tolgoi mining development are excluded, the total becomes MNT127,443 billion or US\$45,744 million. If other mega projects costing more than MNT1.0 billion are further removed, the total cost of all the remaining projects is MNT 27,014 billion or US\$9,697 million. The total investment cost of all the proposed programs and projects of the NCDP up to 2040 as summarized in Table 11.3.6 corresponds to 67% of the LTDP2050 investment costs excluding all the mega projects proposed up to 2050.

Table 11.3.6 Allocation of Investment to Four Development Initiatives by Indicative Investment Programs

Initiative	Investment (US\$ million)			
	Total	Phase 1	Phase 2	Phase 3
Economy and exports diversification	774	414	200	160
Broad-based empowerment	432	131	190	111
Spatial structure strengthening	3,197	1,026	1,451	720
Green development promotion	2,104	682	1,062	360
Total	6,507	2,253	2,903	1,351

Source: JICA Project Team

11.4 Monitoring and Evaluation

11.4.1 Scope of monitoring and evaluation

Monitoring and evaluation of development are conducted at several levels encompassing policy, plan, program and project levels. Development concept, vision and guidelines to prepare specific policy and planning documents may also be subject to monitoring and evaluation and modified if found necessary.

Monitoring of development projects and programs consists broadly of implementation monitoring and performance monitoring. Implementation monitoring of development projects and programs monitors

timing of implementation, budget execution and schedule of project/program progress and completion. Operation and management of project may also be monitored to evaluate performance of the physical facilities involved in the projects under evaluation as well as performance of operation and management staff. Performance monitoring monitors effects of development to be realized by a project or overall effects of a set of development projects and programs implemented in accordance with a development plan.

A set of indices are used for monitoring and evaluation of development projects and programs. In case of implementation monitoring, physical indices are mainly used to examine if any project is implemented as planned with respect to quantities, qualities or dimensions related to physical facilities such as supply capacity to serve the intended uses. Monetary indices are also used for implementation monitoring to see if the budget is executed in timely manner as allocated. Performance monitoring is more involving with respect to indices used. Various socio-economic indices are widely used and use of additional indices is common representing environmental, cultural, behavioral and other effects.

11.4.2 Implementation monitoring and evaluation

(1) Existing monitoring and evaluation system in Mongolia

The monitoring system for development is well established legally in Mongolia as far as implementation monitoring is concerned. Monitoring and evaluation constitute essential part of the overall development planning and implementation. Monitoring and evaluation of development in Mongolia are stipulated by the Law on Development Policy Planning, 26th November 2015, amended on 20th May 2020.

The law is “to ensure the sustainability and continuity of Mongolia's development policy and planning at the national level, defining principles to be followed in development policy formulation, planning, effective implementation, monitoring, evaluation, and reporting by an integrated and rational system. The law also defines the rights and responsibilities of the participants in the development policy and planning, ensuring the proper partnership of the participants in the development policy and planning, and coordinating between the types and forms of policy and planning documents to strengthen development and management of development policy and planning (Article 1).

The law defines various development policy, plan and program as legal terms. For instance, “Development target program” means a medium-term development policy prepared for specific objectives and measures reflected in Mongolia's long-term development policy at the national level, to be prepared reflecting sectoral, inter-sectoral and regional and local specific conditions and relationships supported by available resources and finance. The law defines monitoring and evaluation of development policy and planning as “comprehensive assessment of the implementation process and results of the policy and planning documents” with respect to adherence to the stated principles, responsibilities and cooperation of participants in implementing the development policy and planning (Article 4).

The law has established principles to be followed in development policy and planning and clarifies meanings of terms representing the principles. According to the law, “Principle of top-down and bottom-up planning” means the following:

Principle of ensuring the participation of all parties” means to prepare development policy and planning documents by participation of relevant governmental and non-governmental organizations. It ensures the participation of research organizations, professional associations, the private sector, citizens and interest groups as well as government organizations. “Principle of ensuring proper public-private partnership” means involvement of proper persons in the private sector in development policy and planning activities in cooperation with governments (Article 5).

The law defines different types of development policy and planning documents. For instance, a medium-term development policy is a 10-year development policy document prepared to attain long-term development goals and objectives with financially guaranteed activities and quantitative and qualitative indicators to measure attainment of the objectives. It encompasses targeted programs for 1) human development, 2) social development, 3) economic and infrastructure development, 4)

environment, 5) governance, 6) regional development, and 7) program to strengthen competitiveness of Mongolia (Article 6).

The law enumerates participants involved in development policy and planning and defines rights and responsibilities of different participants. In addition to national level participants, Governors of Aimags, the Capital City, Souds and districts, citizen's representative Khurals of Aimags, the Capital City, Souds and districts, research institutes, political parties and the private sector are involved (Article 8). Responsibilities of the Government include to manage the implementation of development policy and planning documents at the national level, monitor and evaluate their implementation and performance evaluation, and report the outcomes.

The law defines functions of the state administrative body in charge of national development policy and planning, including integration and organization of development policy and planning activities at the national, sectoral, inter-sectoral and regional and local levels, and creation of conditions for the participation of universities, professional associations, non-governmental organizations and citizens in development policy and planning as well as necessary human resources development (Article 9.4).

Functions of Aimag and Capital City Governors on development policy and planning defined by the law include development of an action plan, annual development plans of Aimags, the Capital City and other cities in accordance with the five-year guidelines for the development of Mongolia, and submission of the proposal of the respective organization to the corresponding Citizens' Representatives Khural of the respective level. The Governor shall ensure the coherence of development policy and planning documents at the Soum and district levels, coordinate their activities and monitor their implementation (Article 9.10).

The law stipulates five-year guidelines for Aimag, Capital City and city development submitted by the Governor of the respective level, Governor's action plan, Aimag, Capital City and city annual development plans shall be examined at the respective Citizens' Representatives Khural in the light of Mongolia's long-term development policy, and Mongolia's five-year development guidelines, taking into account the proposals submitted by the state administrative body in charge of national development policy and planning, and the policy documents shall be approved or rejected (Article 9.11).

Among the functions of the national development institute is to conduct detailed resource surveys on population, labor, raw materials of animal origin, water and land resources as the basis of economic development by location and determine population and labor resource projections and optimal ways to use the resources (Article 9.12).

Concerning monitoring and evaluation, the law stipulates the following. The Government shall monitor and evaluate the implementation of development policy and planning documents to assess implementation of development policy and planning documents and effectiveness of the actions and decisions taken, and to evaluate the impact. The state central administrative body in charge of sector development shall monitor the implementation of development policy and planning objectives within the sector, and results shall be submitted to the Government within the set time each year. Aimag and Capital City Governors shall submit to the Government a progress report and impact report on the implementation of development policy and planning objectives at the local level (Article 21).

(2) Assessment and proposal in view of regional development

The targeted regional development program is prepared as part of a medium-term development policy and planning document. Preparation shall involve Governors of Aimags, Capital City, Souds and districts, citizen's representative Khurals at respective levels, research institutes, political parties and the private sector as well as national level participants. Monitoring and evaluation of the development policy and planning are undertaken by the Government. In other words, the state administrative body in charge of national development policy and planning takes the initiative, while ensuring the participation of other organizations and citizens.

Within the framework of the development policy and planning at the national level, Aimag and Capital City Governors shall prepare an action plan, annual development plan etc. of these lower administrative levels. Governors shall coordinate development policy and planning at Soum and district levels. The

proposals by the Governors shall be examined by the respective Khurals for approval or rejection. The local level development policy and plan preparation represents a bottom-up approach, while the targeted regional development program preparation represents largely a top-down approach. It is not clear in the law whether the Aimag level effectively serves to reconcile the bottom-up and the top-down approaches.

In this connection, the definitions of top-down and bottom-up planning as defined by the law are different from what is universally understood in the international society. The top-down and the bottom-up planning refers generally to planning procedure involving stakeholders at lower tiers of development administration including local governments, local communities and local residents. The top-down planning is undertaken by the development administration at higher level, typically the Central Government, where stakeholders at lower tiers are at the receiving end. The bottom-up planning is initiated by local governments in cooperation with local residents.

The law stipulates responsibilities of the state and local administrative bodies to promote and disseminate development policy and planning documents, which had been already approved (Article 23). The law does not mention public consultation and feedback processes of development policy and planning in a draft form and possible revision based on them. This makes relationships between the central and the local development planning more ambiguous.

In sum, there exists no institutional mechanism to ensure that interests and intentions of local administrations embodied in the development vision and the Governor's action plan are reflected in the development policy and planning documents prepared by the Central Government. In other words, there are two separate lines of development planning and implementation, one by the Central Government and the other by local administrations. They should be integrated first by guidelines prepared by the Central Government for preparation of local development policy and planning documents by local administrations and second by a coherent programming, budgeting, and monitoring and evaluation system linking the development planning and implementation by the Central Government and local administrations. It is highly recommended that actual practices to prepare, implement and monitor the development programs should be traced to see who is doing what at what timing, and based on the results, the entire process should be improved for the consistent PPBS and M&E system.

The integrated regional development programs (IRDPs) and the regional development councils (RDCs) proposed by the NCDP would effectively provide an institutional mechanism to link the central and local development planning and implementation systems. Each IRDP may be formulated by member Aimags of the respective Region guided by NDA coordinating sector agencies of the Central Government through the respective RDC. Initially, budgeting and implementation for each component project may be undertaken by the respective sector agency, and monitoring and evaluation by respective Aimags in cooperation with the sector agency. In the future, regional development budget may be established separately and executed by a new department to be established in NDA in charge of regional development policy, planning and implementation supporting implementation by Aimag administrations.

11.4.3 Performance monitoring and evaluation

(1) Needs for strengthening performance monitoring

Performance monitoring of development has been undertaken by sector implementing agencies. Overall performance of development is compiled by the National Statistics Office (NSO) with many socio-economic and other indices. It is commendable that NSO compiles and makes easily available by public the results of performance monitoring in the Mongolia Statistical Information System, which is comprehensive, detailed and up-to-date as far as macro data are concerned.

The SDGs initiative by the United Nations calls for more micro data to be collected by gender, income class, Aimag/Soum, ethnicity, social groups and other attributes. Responding to this challenge, NSO has started to collect and compile more micro data. Regular periodical surveys such as labor survey by quarter, annual household socio-economic survey and social indicator sample survey conducted every five years have been improved by making questionnaire forms more detailed to accommodate additional

indices and micro data, supported by ADB, UNDP and other donors.

A new initiative is ongoing to collect more detailed and specific data by utilizing non-conventional sources of data such as Big Data, Google-driven data, Facebook and others. Data sources may extend to the National Aeronautics and Space Administration (NASA), satellite data, commercial banks and cellular phone communications. This initiative is first focusing on poverty related data and indices. UNDP is supporting the establishment and operation of SDGs dashboard for private firms and others. Even with these new initiatives, data demand for SDGs monitoring and evaluation cannot be fully satisfied.

(2) Recommendation

For comprehensive and inclusive data collection for SDGs, active involvement of people, private firms and local administrations is indispensable. Otherwise, administrative costs to collect and compile micro data necessary for SDGs monitoring and evaluation would become prohibitively large. A web-based and mobile monitoring and evaluation system should be established by using ICT with smartphones and the cloud system. This system should be supported by voluntary data input by people and private firms and data processing by local administrations supported by the Central Government.

For instance, real time acquisition of data on nomadic people and their activities such as grouping, livestock population and composition, and other attributes of nomad groups, their movements and location, availability of water and feed, and other issues facing them would be useful for local administrations to take support measures in timely manner. Conversely, nomadic people would benefit from timely provision of information by local administrations on local climate, demand and price information for livestock products, measures against livestock diseases, and supply of feed. In both ways, livelihood of nomadic people would be improved to contribute to attainment of SDGs.

For such a two-way communications system to work properly, both people and firms on one hand and administrations on the other should have incentives for voluntary participation. People including nomads can emit information on their needs and local resources available for new socio-economic activities including tourism, and firms may find investment opportunities to utilize local resources and administrative supports. Local administrations can collect micro socio-economic data at the lowest administrative costs.

This system is fundamentally different from conventional data collection by surveyors from outside as it is supported by data generation from within local communities. It will facilitate capacity development on the side of people and communities. At the same time, local administrations will enhance their capacity with more relevant and comprehensive data and ICT tools to communicate with local people and communities. In both ways, more appropriate projects and institutional measures would be formulated and implemented by the local administrations and people working together.

11.4.4 Monitoring and evaluation of Vision2050, HSP, RDP and NCDP

It is expected that the HSP and the RDP, to be prepared reflecting the NCDP, will be monitored and evaluated in accordance with the Law on Development Policy Planning, 26th November 2015, amended on 20th May 2020 as they are formal planning documents with legal bases. The analysis on existing conditions analyzed and contained in the NCDP would provide the baseline for evaluation. The Vision2050 specifies various macro indices for evaluation and targets to be attained by 2030, 2040 and 2050.

For the GDP, per capita GDP and the ratio of mining sector in the GDP, the Vision2050 targets diverge from the targets specified by the NCDP. Therefore, monitoring should focus on these indices among others. The average GDP growth rate specified by the Vision2050 is higher during the period up to 2030 but lower for 2030-40 than specified by the NCDP. The per capita GDP targets of the Vision2050 are significantly higher than specified by the NCDP for 2030 and 2040. Population projections are largely consistent between the Vision2050 and the NCDP for 2030 and 2040, only slightly lower for the Vision2050. The ratio of local population in the national population is projected by the Vision2050 to be 50% even in 2050. Since the NCDP aims at vitalizing local socio-economy by regional

development, the ratio of local population is a good index to measure the effects of regional development.

The Vision2050 specifies as indices related to regional development 1) the number of food processing and other light industries newly established, 2) the number of agro-related and industrial technology parks newly constructed, and 3) the number of international airports. These indices are not considered appropriate in evaluating regional development effects. Better indices are the total investment amount by newly established light industries, and employment opportunities generated by them, and the number of firms established at agro-related and industrial technology parks. The NCDP proposes to internationalize the existing airports in the east at Choibalsan and in the west at Khovd as priorities. The number of regular flights serving these airports and the number of passengers are appropriate indices to evaluate regional development effects.

Other social indices are also important for monitoring and evaluation including not only poverty rate and unemployment rate but also access to water supply, sewage treatment and solid waste management in rural areas. For these indices, micro data by gender, income class and other social attributes of residents should be collected and compiled in steps by the new method proposed by the NCDP to contribute also to the SDGs evaluation.