Data Collection Survey on the Regional Comprehensive Development in Mongolia

Final Report

Main Text

November 2016

Japan International Cooperation Agency（JICA）

ALMEC Corporation
EXe・Idea Ltd.

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ABBREVIATIONS

ADB	Asian Development Bank
Agro IT Park	Agro Industrial Technology Park
ALAGaC	Administration of Land Affaires, Geodesy and Cartography
APTA	Asia Pacific Trade Agreement
ASEAN	Association of South-East Asian Nations
ASEM	Asia-Europe Meeting
BR	Biosphere Reserve
BRICS	Brazil, Russia, India, China and South Africa
CAREC	Central Asia Regional Economic Cooperation
CAS	Cells Arrive System
CBM	Coalbed Methane
CBT	Community Based Tourism
CEO	Chief Executive Officer
CFS	Container Freight Station
CHP	Combined Heat and Power
CNG	Compressed Natural Gas
DME	Dimethyl Ether
DRI	Direct Reducted Iron
EBRD	European Bank for Reconstruction and Development
EPA	Economic Partnership Agreement
ESP	Economic Stabilization Plan
FDI	Foreign Direct Investments
FAO	Food and Agriculture Organization
FS	Feasibility Study
FTZ	Free Trade Zone
GDI	Gender-related Development Index
GDP	Gross Domestic Products
GHG	Greenhouse Gas
GII	Gender Inequality Index
GIS	Geographic Information System
GNI	Gross National Income
HACCAP	Hazard Analysis and Critical Control Point
HDI	Human Development Index

HOB	Heat Only Boiler
IBA	Important Bird Area
IMF	International Monetary Fund
IT	Information Technology
ITS	Intelligent Transport Systems
JCM	Joint Crediting Mechanism
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JOGMEC	Japan Oil, Gas and Metals National Corporation
JPY	Japanese Yen
JST	JICA Study Team
JV	Joint Venture
LPAA	Local Protected Area Administration
LPG	Liquefied Petroleum Gas
LPI	Logistics Performance Index
MCUD	Ministry of Construction and Urban Development
MDGs	Millennium Development Goals
MEGDT	Ministry of Environment, Green Development and Tourism
MIAT	Mongolian Airlines
MICE	Meeting, Incentive, Conference/Convention, Exhibition
MNT	Mongol Tugrik
MOE	Ministry of Energy
MOF	Ministry of Finance
MOFA	Ministry of Food and Agriculture
MOM	Ministry of Mining
MONDEP	Data Collection Survey on the Regional Comprehensive Development in Mongolia
MOU	Memorandum of Understanding
MP	Master Plan
MRAM	Mineral Resources Authority of Mongolia
MRT	Ministry of Roads and Transportation
MTFF	Medium-term Financial Framework
MTZ	Mongolian Railway
NAMA	Nationally Appropriate Mitigation Actions
NDA	National Development Agency
NEDO	New Energy and Industrial Technology development Organization

NP	National Park
NPO	Nonprofit Organization
NSO	National Statistic Office
NUBIA	New Ulaanbaatar International Airport
OD	Origin–Destination
OIE	Office international des épizooties、World Organisation for Animal Health
OT	Oyu Tolgoi
POS	Point OF Sales
PIP	Public Investment Program
PPP	Public-Private Partnership
RD	Research and Development
RFID	Radio Frequency Identification
RTDC	Road and Transportation Development Center
SA･PA	Service Area･Parking Area
SDE	Swiss Agency for Development Cooperation
SEZ	Special Economic Zone
SME	Small Medium-size Enterprise
SNS	Social Networking Service
SPAs	Special Protected Areas
SWOT	Strength, Weakness, Opportunity, Threat
TC	Tourist Camp
TDNP	Tourism Development National Program
TOR	Terms of Reference
TT	Tavan Tolgoi
UB	Ulaanbaatar
UBTZ	Ulaanbaatar Railway
UCG	Underground Coal Gasification
ULTF	Unified Land Territory Foundation
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
USD	United State Dollar
VCD	Value Chain Development
WB	World Bank

WEF	World Economic Forum
WTO	World Trade Organization
WTTC	World Travel and Tourism Council

1 OUTLINE OF THE STUDY

1.1 Study Background and Objectives

(1) Background

1.1 From 2006 to 2013, the GDP per capita of Mongolia grew nearly four times, and this remarkable economic growth was mainly due to the development of its mining resources. However, the economic gap has increased between the capital city of Ulaanbaatar (UB) and other remote areas. The industries and the population are also concentrated in the capital city.

1.2 In the Government Action Plan 2012–2016, the Mongolian Government addressed the following concerns: (i) the stability of the economy and the fairness of the distribution of wealth; (ii) the expansion of employment opportunities in rural areas; (iii) the establishment of funds for loans in the agriculture and animal husbandry sectors; (iv) the promotion of exports; (v) the improvement of the social security system; (vi) the promotion of tourism; and (vii) the development of roads and urban infrastructure in remote areas.

1.3 The Japan International Cooperation Agency (JICA) has focused on strengthening the urban functions in UB. However, to reduce the overconcentration in UB in the medium to long term, it is important to activate rural economics and formulate a plan for a sustainable society. JICA has internally discussed the possibility for corridor development in the north (the agriculture and animal husbandry area) and the south (the mining area), as part of the regional comprehensive development strategy. This study on "Data Collection Survey on the Regional Comprehensive Development in Mongolia" aims at further examining the comprehensive development of the regions.

(2) Study Objectives

This study aims to:

(a) Review completed, ongoing and planned projects to collect information and analyze the issues, needs, and development potentials in Mongolia;

(b) Study the development strategies for regional comprehensive development in regard to corridor development, and propose possibilities for JICA's support in the regional comprehensive development sector; and

(c) Hold study-based seminars targeting Japanese companies that are interested in operating in Mongolia to promote investments.

(3) Expected Outputs

(a) Gathering of basic information on completed, ongoing, and planned policies and projects on regional comprehensive development, which include policy or project implementation bodies, strategies and purposes, project outlines, target areas, (expected) outputs, budget, stakeholders, and so on;

(b) Identification of growth corridors that promote strategic investments and encourage sustainable growth in Mongolia, and determination of the current situations, issues, needs, development potentials, and conditions that constrain the development of corridor areas from the medium to long term;

(c) Drawing up of a draft regional comprehensive development strategy in regard to corridor development through an analysis of spatial, physical or socioeconomic points of views;

(d) Verification of the basic strategy of the growth corridor development following the medium- and long-term policies of the Mongolian Government;

(e) Drawing of directions on required Public-Private Partnership (PPP) with Japan in order to realize the vision of the growth corridor development strategy in accordance with the framework of the "ERCH Initiative Plan" that was agreed upon by Mongolia and Japan, and recommendation of possibilities for JICA's support in the regional comprehensive development sector;

(f) As major components of the development strategy, collecting information, analyzing current conditions and issues, and proposing projects required for corridor development in the following sectors: (1) road and transportation (logistics) and urban infrastructures in rural areas; (2) production, processing, and marketing of agriculture and livestock products; (3) mining related industry; and (4) tourism resource development;

(g) Sharing of the proposals for growth corridor development to Japanese companies, along with the potential of PPP in Japan, and establishment of a platform (e.g., seminars) to share information and promote their operations and investments in Mongolia; and

(h) Sharing of information with Mongolia and preparation of a report on the above results.

(4) Target Areas

1.4 The study targets the following four areas, considered the corridor areas especially to promote the integration of the growing industry and economic industrial hubs (see Figure 1.4.1):

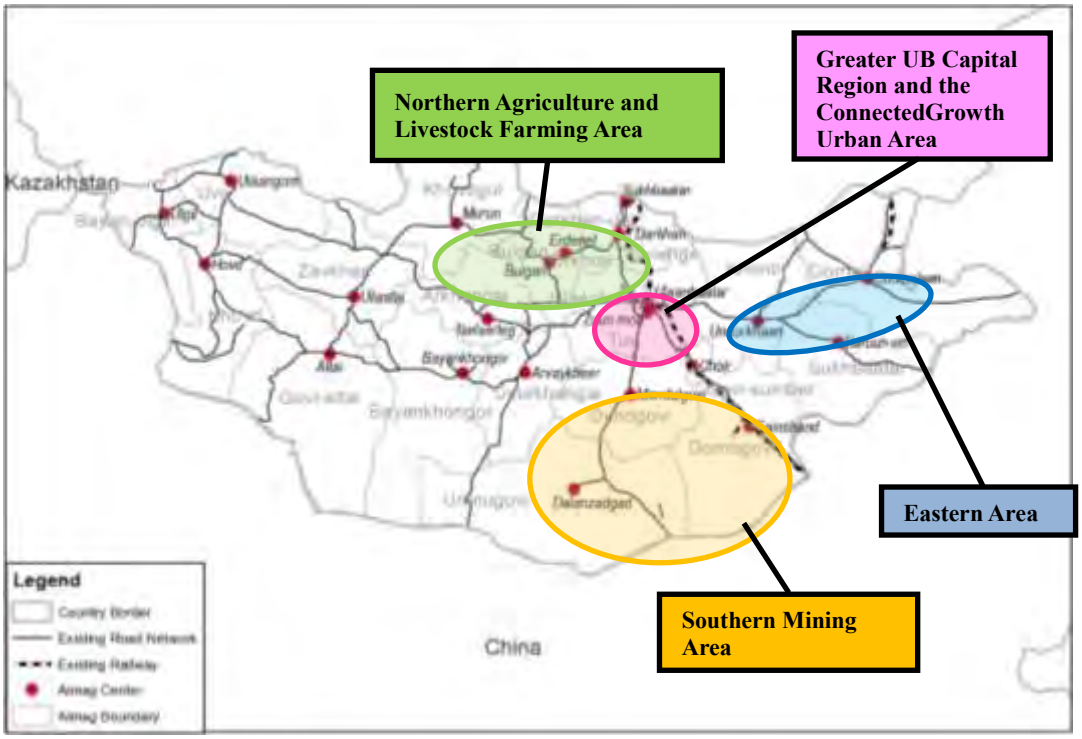
(i) Northern Agriculture and Livestock Farming Area, including Darkhan and Erdenet (Northern Area);

(ii) Southern Mining Area, including Sainshand and Dalanzadgad (Southern Area);

(iii) Eastern Area, including Choybalsan; and

(iv) Greater Ulaanbaatar Capital Region and the Connected Growth Urban Area.

Figure 1.1.1 Study Areas



Source: JICA Study Team

(5) Assumed Duration of Planning Years

1.5 The planning year for the medium term is targeted for the year 2020 and for the long term is targeted for 2025 as well as 2030 which is target year of the "Mongolia Sustainable Development Vision 2030".

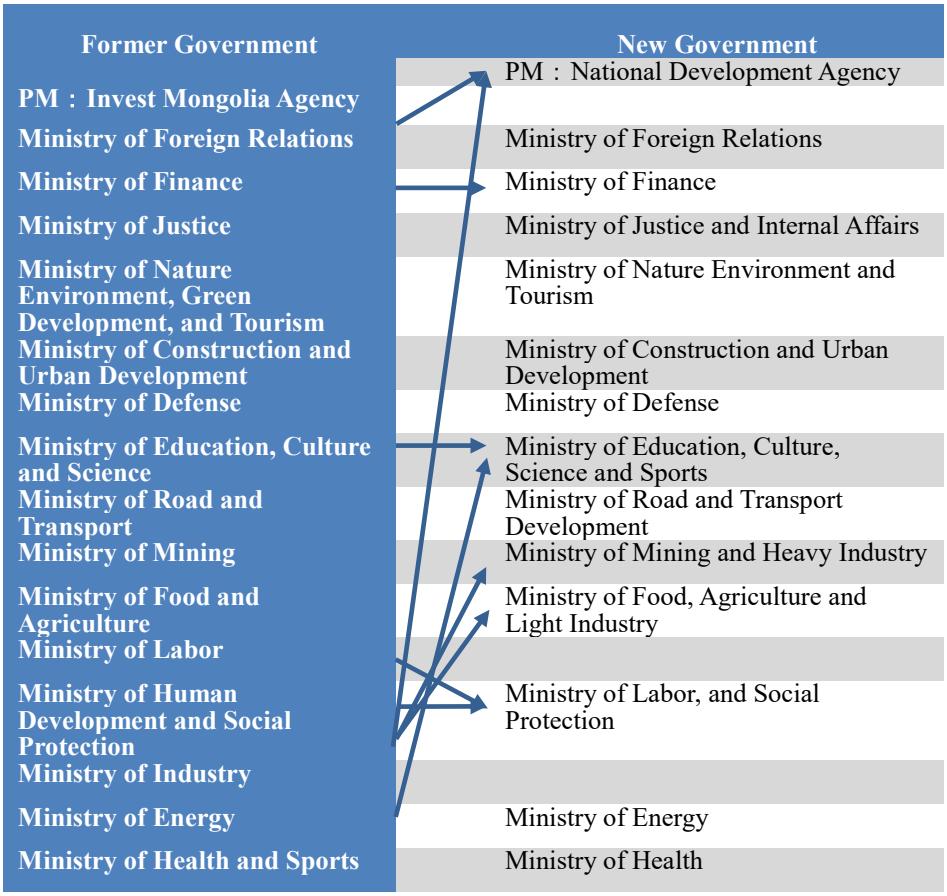
1.2 Study Organization

(1) Relevant Ministries and Other Government Organizations

1.6 Data collection was conducted in the following government organizations: (i) Ministry of Construction and Urban Development; (ii) Ministry of Road and Transportation; (iii) Ministry of Industry; (iv) Ministry of Mining; (v) Ministry of Food, Agriculture and Animal Husbandry; (vi) Ministry of Energy; (vii) Ministry of Environment, Green Development and Tourism; (viii) Ministry of Finance; and (ix) local government offices in Aimags.

1.7 The reorganization of the central government ministries and agencies was conducted under a new government after the general election in June 2016 (see Figure 1.2.1). This study had observed the former government policies, especially under the former Ministry of Industry, the former Ministry of Food and Agriculture and the former Ministry of Mining. However, under the new government, three departments from the former Ministry of industry were dissolved and integrated into other departments. The former Department of Industrial Policy was integrated into a newly-established "National Development Agency," the former Department of Light Industry was integrated into the Ministry of Food, Agriculture and Light Industry, and the former Department of Heavy Industry was integrated into the Ministry of Mining and Heavy Industry. Basically, the major policies related to the entire industrial

policies will be conducted continuously as well as the proposed plan by MONDEP.[1]



Source: JICA Study Team

Figure 1.2.1 Comparison Between the Former and New Ministries and Government Offices in Mongolia (as of September 2016)

(2) JICA Study Team

1.8 The members of the JICA Study Team are listed in Table 1.2.1 below.

Table 1.2.1 JICA Study Team

No.	Position	Name
1*	Team Leader / Comprehensive Regional Development Plan	Katsuhide NAGAYAMA
2*	Industrial and Tourism Development	Masayuki ISHIDA
3	Regional Development	Rieko SASAKI
4	Urban and Industrial Infrastructure	Hiroshi NISHIMAKI
5	Transportation System	Sadayuki YAGI
6	Agriculture and Livestock Farming 1 (Dairy Farming, Agriculture, Processing)	Hirokazu NAGAOKA
7	Agriculture and Livestock Farming 2 (Livestock Farming Improvement)	Hideki SAITO
8	Mining Related Industry	Gota DEGUCHI
9	Economics and Market Analysis	Rie TSUCHIYA (TAJIMA)
10	Tourism Resource Development	Ayako NAKAGAWA
11	Spatial and National Land Use Plan	Kunihiko OZAWA
12	GIS/ Study Coordinator	Natsu OHNO (KANEKO)

Source: JICA Study Team

[1]This was confirmed during the meeting with the ”National Development Agency.”

1.3 Overview of Study Activities

1.9 The overall study work flow is shown in Figure 1.3.1.

1.10 This study was launched in March 2015 and conducted over 19 months until October 2016. This study was undertaken in the following five stages:

I: Information Collection and Situation Analysis (March – April 2015);

II: Evaluation of Development Potential (May – June 2015);

III: Preparation of Future Vision and Development Scenario (August – December 2015);

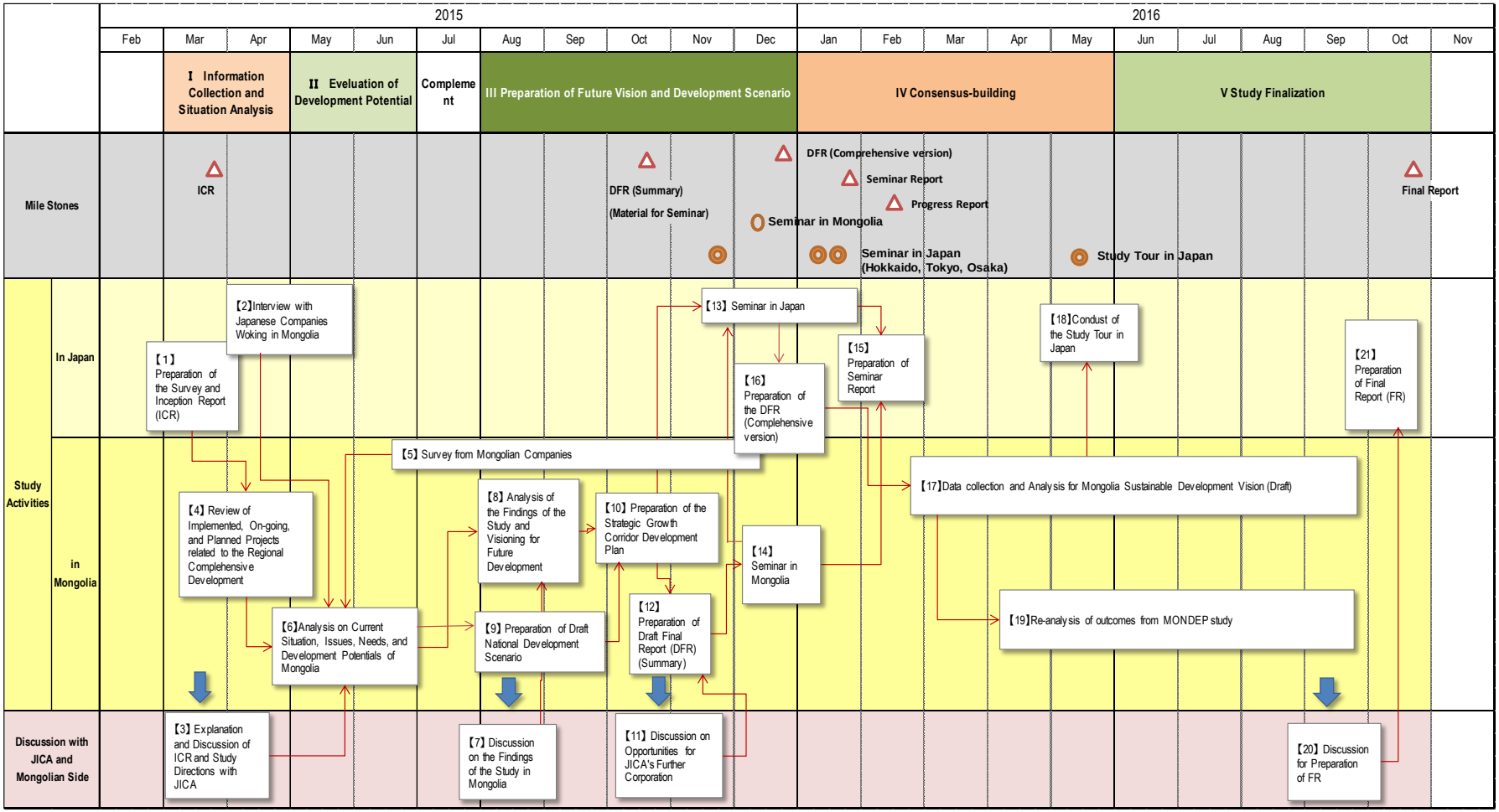
IV: Consensus Building (December 2015 – May 2016); and

V: Study Finalization (June – October 2016).

1.11 During Phases I to III, it was necessary to share the experience and knowledge of Mongolian eminent persons/ experts for each sector in the work on the preparation of the future vision and development scenario based on current situation analysis and evaluation of development potential. Thus, an expert panel (see Table 1.3.1) was established to allow the JICA Study Team (JST) to exchange opinions with the Mongolian experts for each sector. Four expert panels, namely the Agriculture and Livestock Farming Panel, Tourism Panel, Industries and Infrastructure Panel, and Transportation Panel, were organized and useful information was provided to JST.

1.12 Consensus Building was implemented during six months under Phase IV. During this phase, not only consensus building about policies was undertaken with relevant Mongolian governmental organizations but seminars in Mongolia for governmental officers and private sectors were also conducted. Moreover, seminars to provide information and promote the Economic Partnership Agreement (EPA) between Japan and Mongolia were conducted in the three Japanese cities of Tokyo, Osaka and Hokkaido for private sector which have interest in economic development and investment in Mongolia (see Table 1.3.2). Through these activities, opinions from public and private sectors in Japan and Mongolia were collected and necessary revisions for proposals were conducted.

1.13 Furthermore, a study tour in Japan was conducted for eight days on 9-16 May 2016 during Phase IV of the study. There were 11 study tour participants who are mainly members of the working group to formulate the “Sustainable Development Vision 2030.” Knowledge and experience related to regional comprehensive development in Japan were shared through this study tour. There were significant results in sharing the past and current Japanese experiences especially on how to realize a long-term vision for national development, necessary law system, administrative system and organizational system to realize the vision, relationship between public and private sectors, discussion about economic and its connected financial policies, etc. Table 1.3.3 shows the major organizations visited during the study tour and the lecture/observation contents.



Source: JICA Study Team

Figure 1.3.1 Study Work Flow

1.14 Phase V: Study finalization was undertaken in June to October 2016. After the Mongolian general election in June 2016, a new government was established. In this phase, the new government's basic policy framework was confirmed as to whether or not it is on the same track with that proposed in this study, which is consistent with the policy framework of "Sustainable Development Vision 2030" which was prepared by nonpartisan means and approved by the parliament. The proposals of this study are basically on the same track with new government policies, and this was confirmed in October 2016 when the new government presented its "Mid-Term Action Program." An overview of the above confirmation work is included in Chapter 6.6.

Table 1.3.1 List of Expert Panel Members in Mongolia

Panel Name	Date	Member Organizations of Each Panel
Agriculture and Livestock Farming Panel	18 June 2015	Mongolian Association of Zootechnicians and Livestock Breeders, Mongolian Veterinary Medical Association, National Association of Mongolian Agricultural Cooperatives, Mongolian Association of Leather Industry,Mongolian Wool Association, Mongolian Meat Association, Mongolian Dairy Research Association, Project for Strengthening the Capacity for Human Resource Development in the Field of Veterinary and Animal Husbandry
Tourism Panel	7 September 2015	Ministry of Foreign Relations, Ministry of Nature Environment, Green Development, and Tourism (Department of Tourism policy and coordination department, Department of Protected areas management), Ulaanbaatar Tourism Department an Implementing Agency of the Governor of The Capital City, Mongolian Tourism Association, National Tourism Organization, Department of Geography, School of Arts and Science, National University of Mongolia, UB Tourism Association, Mongolian Professional Tour Guides Association, Tavan Bogd Group, New Juulchin Group, Nomadic Hospitality LLC, National Geographic Project
Industries and Infrastructure Panel	11 September 2015	Ministry of Industry, Ministry of Construction and Urban Development, Ministry of Road and Transport, Mongolian National Chamber of Commerce (MNNCI), Mongolian Association of Leather Industry, Mongolian Logistic Association, Mongolian Wool Association, Mongolian Dairy Research Association, Mongolian Wool and Cashmere Association
Transportation Panel	1 October 2015	Ministry of Road and Transport, Road and Transport Policy Implementation and Coordination Department, Railway and Maritime Treansportation Policy Implementaiton and Coordination Department, Road Transportation Development Center, National Auto Transportation Center, Mongolian Railways (MTZ), Ulaanbaatar Railway (UBTZ), Mongolian Logistic Associiation, School of Mechanics and Transportation, Mongolian University of Science and Technology, Erin International LLC, Tuushin Group, Landbridge LLC, Asian Infrastructure Research Institute

Source: JICA Study Team

Table 1.3.2 List of MONDEP Seminars in Japan and Mongolia

Date	Type of Seminar	Place	No. of Participants
25 November 2015 (Wed) 10:00 – 12:30	Seminar for Japanese enterprises	Hokkaido, Japan	51
8 December 2015 (Tue) 14:00 – 18:00	Seminar for government and private sectors in Mongolia	Ulaanbaatar, Mongolia	99
15 January 2016 (Fri) 13:00 – 15:40	Seminar for Japanese enterprises	Tokyo, Japan	91
18 January, 2016 (Mon) 14:00 – 17:00	Seminar for Japanese enterprises	Osaka, Japan	70

Source: JICA Study Team

Table 1.3.3 Schedule of Study Tour in Japan

Date	Time	Schedule	Destination	Location
9 March (Mon)		Move to Tokyo from Ulaanbaatar	–	Tokyo
10 March (Tue)	09:30 - 12:00	Courtesy call to JICA [Lecture] Orientation Presentation on Mongolia Sustainable Development Vision 2030 Presentation on Public Investment Management, Case Studies of Laos and Bangladesh Discussion	JICA HQ	Tokyo
	14:00 - 16:00	[Lecture] Introduction of Japanese case of "Council on Economic and Fiscal Policy" including economic policy formulation and implementation process, relation between economic policy and budget compilation, issues for important policies, etc.	Cabinet Office, Government of Japan	
	16:30 - 17:00	[Courtesy Call] Embassy of Mongolia in Japan	Embassy of Mongolia in Japan	
11 March (Wed)	10:00 - 10:45	[Lecture] Budget compilation and management based on economic development policies	Ministry of Finance Japan	Tokyo
	11:00 - 12:00	[Lecture] History of national spatial planning in Japan and New National Spatial Strategy	Ministry of Land, Infrastructure, Transport and Tourism	
	15:00 - 18:00	[Lecture & Discussion] History of Japanese economic policies especially from 1960 to 1980	The former Economic Planning Agency	
12 March (Thu)	10:00 - 12:00	[Site Observation] Michi no Eki "Tomiura" ・Sextiary industry based on Michi no Eki which is at the core of sextiary industry ・Utilization of native tourism resources, etc.	Michi no Eki "Tomiura"	Tokyo
	15:45 - 17:15	[Site Observation] Kashiwanoha Urban Design Center (UDCK) ・An example of industry-academia-government collaboration ・Smart City	Kashiwa City, Chiba Prefecture	

Date	Time	Schedule	Destination	Location
	18:30 - 20:00	Intermediate discussion with JICA	JICA Global Plaza	
13 March (Fri)	AM	Move to Kyoto from Tokyo by Shinkansen	―	Kyoto
	14:00 - 15:30	[Site Observation] Kansai Science City ・An example of industry-academia-government collaboration	Kansai Science City	
14 March (Sat)	10:00 - 11:30	[Site Observation] Kyoto Research Park ・An example of industry-academia-government collaboration	Kyoto Research Park	Kyoto
15 March (Sun)	AM	Move to Tokyo from Kyoto by Shinkansen	―	Tokyo
	PM	Preparation for wrap-up	―	
16 March (Mon)	9:30 - 11:30	Wrap-up with JICA Evaluation and feedback on program in Study Tour Discussion about future support	JICA HQ	―
	PM	Move to Ulaanbaatar from Tokyo	―	

Source: JICA Study Team

1.4 Structure of This Report

1.15 This report consists of the main report .

1.16 The main report is composed of seven chapters. Chapter 1 provides an introduction of the study. Chapter 2 summarizes the basic information for consideration in the regional comprehensive development in Mongolia such as population movement, socioeconomic trends, current situation and development issues of the industrial, mining, livestock farming, agricultural processing, tourism, transportation and logistics, and environmental sectors. Chapter 3 analyzes the mid- and long-term economic prospects in Mongolia. In this chapter, the necessary conditions for sustainable economic growth that takes into consideration the big impact of market price of mineral resources are considered and analyzed.

1.17 Based on Chapters 2 and 3, the strategic spatial development concept for Mongolia as a regional comprehensive development plan (draft) is proposed in Chapter 4 and regional development strategies by sector are proposed in Chapter 5. Chapter 6 summarizes the legislative systems and issues related to management to support the regional comprehensive development plan (draft) proposed in Chapters 4 and 5. Chapter 7 summarizes issues for regional comprehensive development in Mongolia, and proposes the basic direction for future plan .

2 CURRENT SITUATION AND CHALLENGES FOR MONGOLIAN ECONOMIC AND SOCIAL DEVELOPMENT

2.1 This chapter discusses the physical, demographic, infrastructure and socioeconomic characteristics, situation and challenges of Mongolia. It describes the geographical features in Section 2.1, population in Section 2.2, and social development and life services in Section 2.3 as basic conditions of Mongolia. From Section 2.4 onwards, the country's current situation and challenges to sustainable development in various sectors are described.

2.1 Geographical Features of Mongolia

2.2 This section summarizes the country's geographical features and climate, river basin, vegetation and forest, and soil conditions.

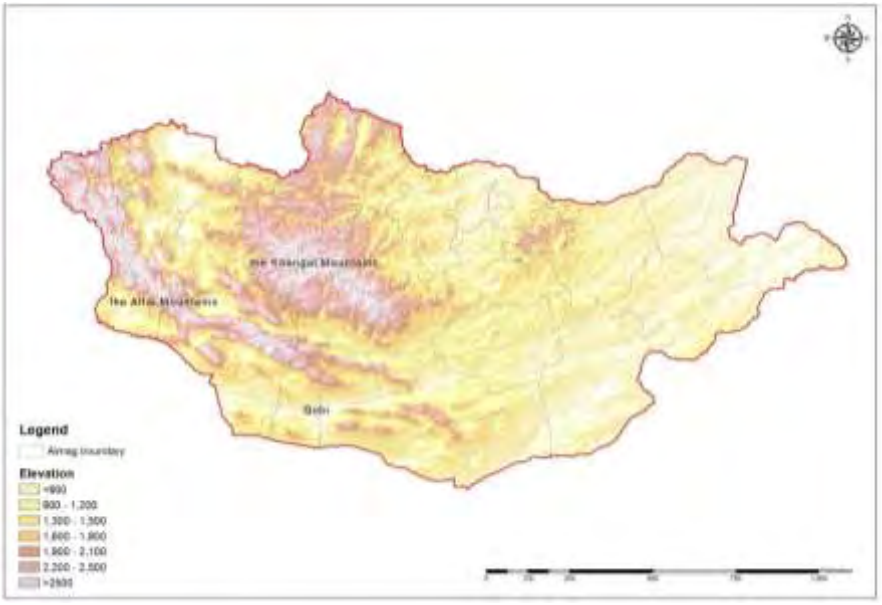
(1) Geographical Features and Climate

2.3 Mongolia is geographically characterized by highlands in the west region and lowlands in the east region. In the west are the Altai mountain which is 4,300m above sea level, and the Khangai mountain which is 3,500m above sea level. There are also highlands which are 900–1,500m above sea level in the east (see Figure 2.1.1). Over 80% of national land is 1,000m above sea level. Since Mongolia has vast plains, there are several climatic zones and different geographical characteristics. The north area around Khuvsgul Lake, or the northern part of Khentii aimag and Tuv aimag, belongs to the subarctic zone. The southern part belongs to the arid region including the Gobi Desert (see Figure 2.1.2).

(2) River Basin

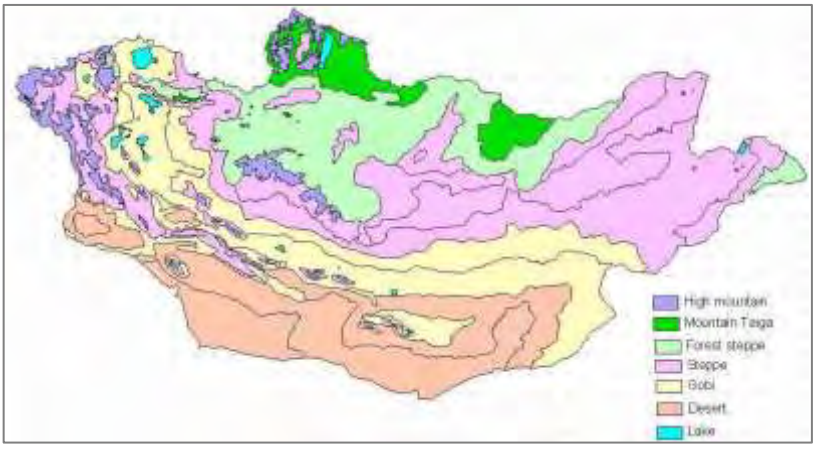
2.4 As shown in Figure 2.1.3, there are rich water resources such as lakes and rivers in the northern part of the country. Mongolia has two international rivers. The Kherlen River which flows in the eastern part connects to the Pacific Ocean through the Amur River, and the Selenge River which flows in the central part connects to the Arctic Ocean via Baikal Lake. In these international river basins, there are organizations in the river basin communities for the maintenance and management of these water resources, including Russia and China.

2.5 According to the water basin map of Mongolia, it is managed by 29 zones, and underground water is the water source in four basins (0-18~18, 20) in the southern part of Mongolia (see Figure 2.1.4).



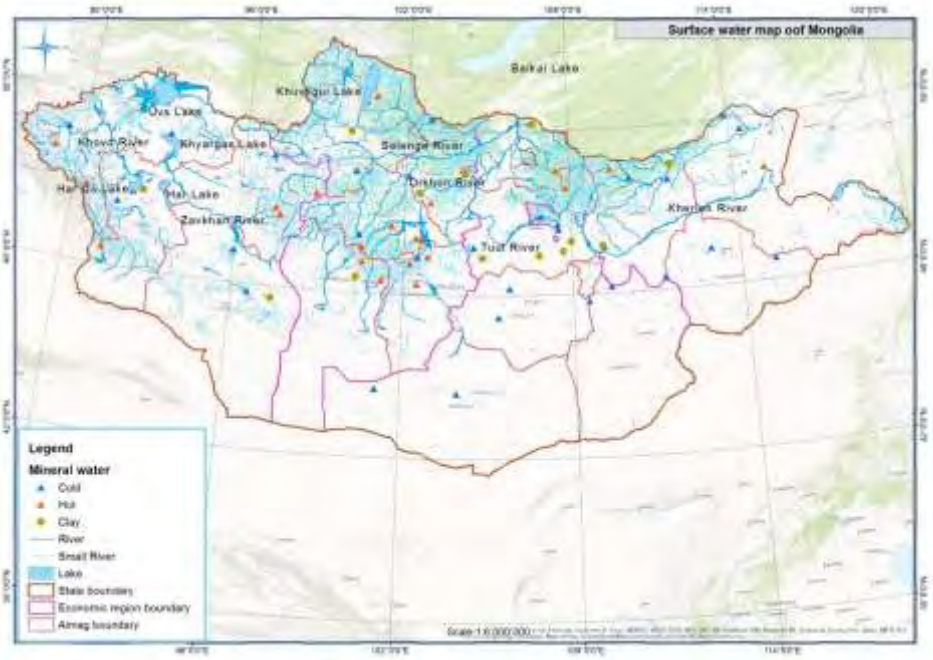
Source: ALAGaC.

Figure 2.1.1 Elevation Map of Mongolia



Source: Integrated Water Management National Assessment Report Vol. II, Strengthening Water Resource Management in Mongolia Project & MEGD, 2012.

Figure 2.1.2 Climatic Zone Map of Mongolia



Source: ULTF, ALAGaC, ESRI.

Figure 2.1.3 Surface Water (Lake and River) Map of Mongolia

Source: ULTF, ALAGaC.

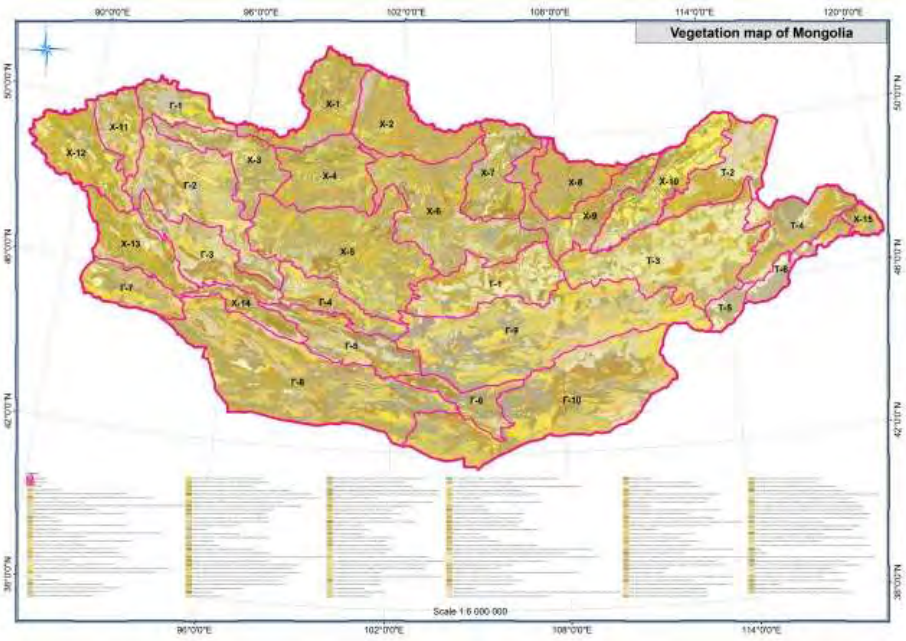
Figure 2.1.4 Water Basin Zoning Map of Mongolia

(3) Vegetation and Forest

2.6 Vegetation distribution is prominent in some regions. Herb is planted in the northern part (X-1 to X-10 in Figure 2.1.5) and needlegrass is planted from the central part to the eastern part. Vegetation in the southern part is low-grass or stony grassland.

2.7 Figure 2.1.6 shows the distribution of forest area. Conifer forest can be seen in the northern part such as Khuvsgul aimag, Alkhangai aimag, Bulgan aimag, Selenge aimag, Tuv aimag

and Khentii aimag. In the southern-western part, saxual, populus and tamarix trees are also planted.



Source: ULTF, ALAGaC.

Figure 2.1.5 Vegetation Map of Mongolia

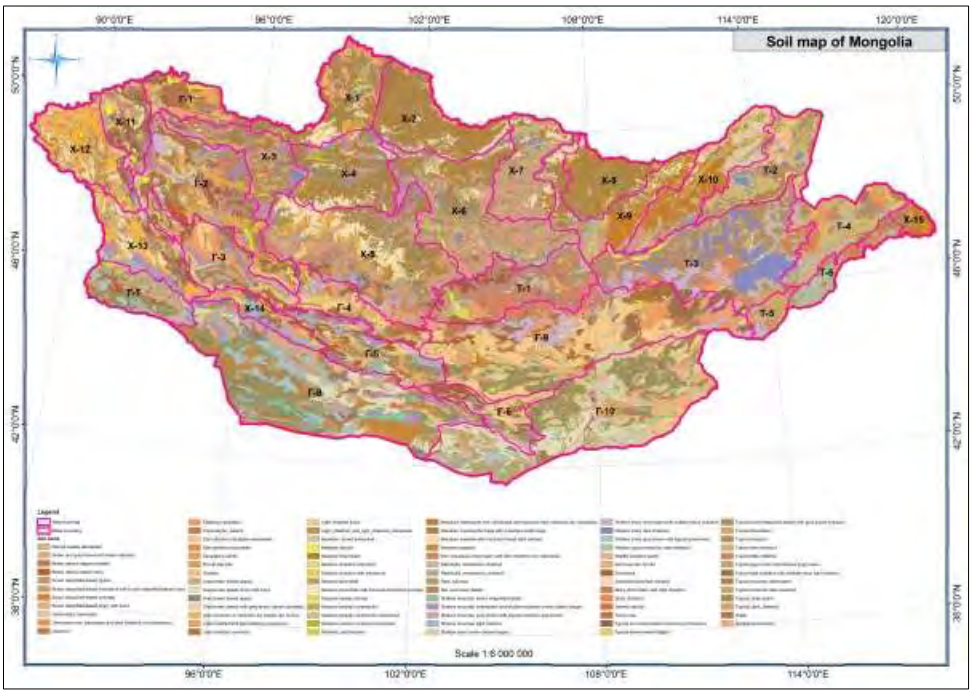
Source: ULTF, ALAGaC, ESRI.

Figure 2.1.6 Forest Map of Mongolia

(4) Soil

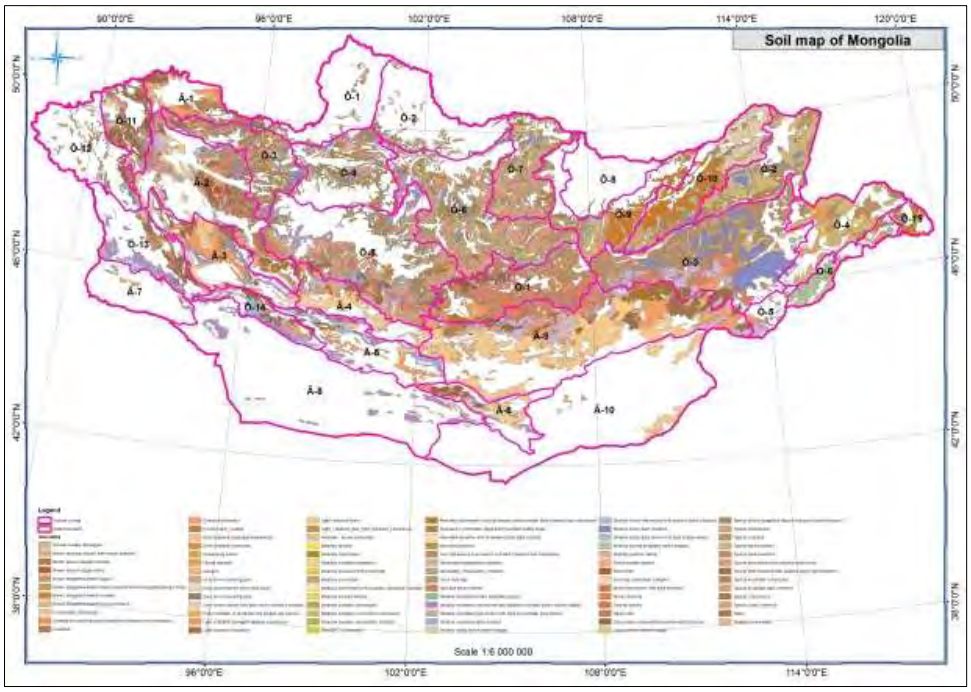
2.8 Various types of soil are formed by area. Fertile alluvial soil is formed around the river basin (see Figure 2.1.7) and chernozem[1] soil, which is suitable for planting wheat, is formed at the area shown in Figure 2.1.8.

[1] Chernozem is the richness of the soil which has a good balance of physical and chemical nature.



Source: ALAGaC.

Figure 2.1.7 Soil Map of Mongolia



Source: ALAGaC.

Figure 2.1.8 Distribution of Chernozem Soil

2.2 Population

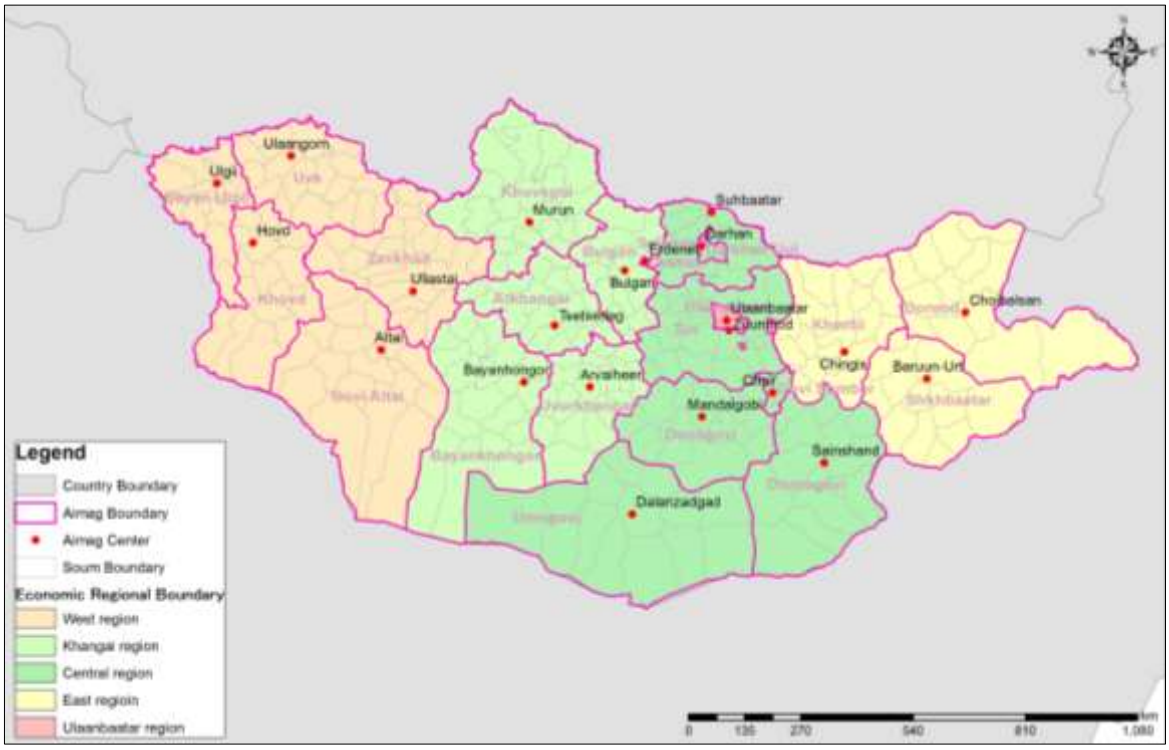
2.9 This section describes the current conditions and issues of population, especially focusing on the population concentration in Ulaanbaatar as one of the major development issues of Mongolia.

(1) Mongolia's Administrative Boundary

2.10 Mongolia is an inland country which is adjacent to Russia in the north, China and the Inner Mongolia Autonomous Region in the east and south, and China and Shinjang Uyghur Autonomous Region in the west.

2.11 Mongolia's administrative units consist of the Aimag (Prefecture), Soum (County) and Bag. Mongolia has 1,681 bags in 347 soums in 21 aimags.

2.12 The country is also divided into five regions, namely the West region, Khangai region, Central Region, East Region and Ulaanbaatar. However, these regions are not administrative units except for Ulaanbaatar[2] (see Figure 2.2.1).



Source: JICA Study Team based on the ALAGaC database.

Figure 2.2.1 Administrative Boundary Map of Mongolia

(2) Demography

1) Mongolia

2.13 Mongolia's population has continued to steadily increase. In 2014, its population was about 3 million, an increase of about half from the 1989 population of about 2 million. Average annual population growth rate was 1.5% from 1989 to 2000, but has increased to 2.1% from 2010 to 2014 (see Table 2.2.1).

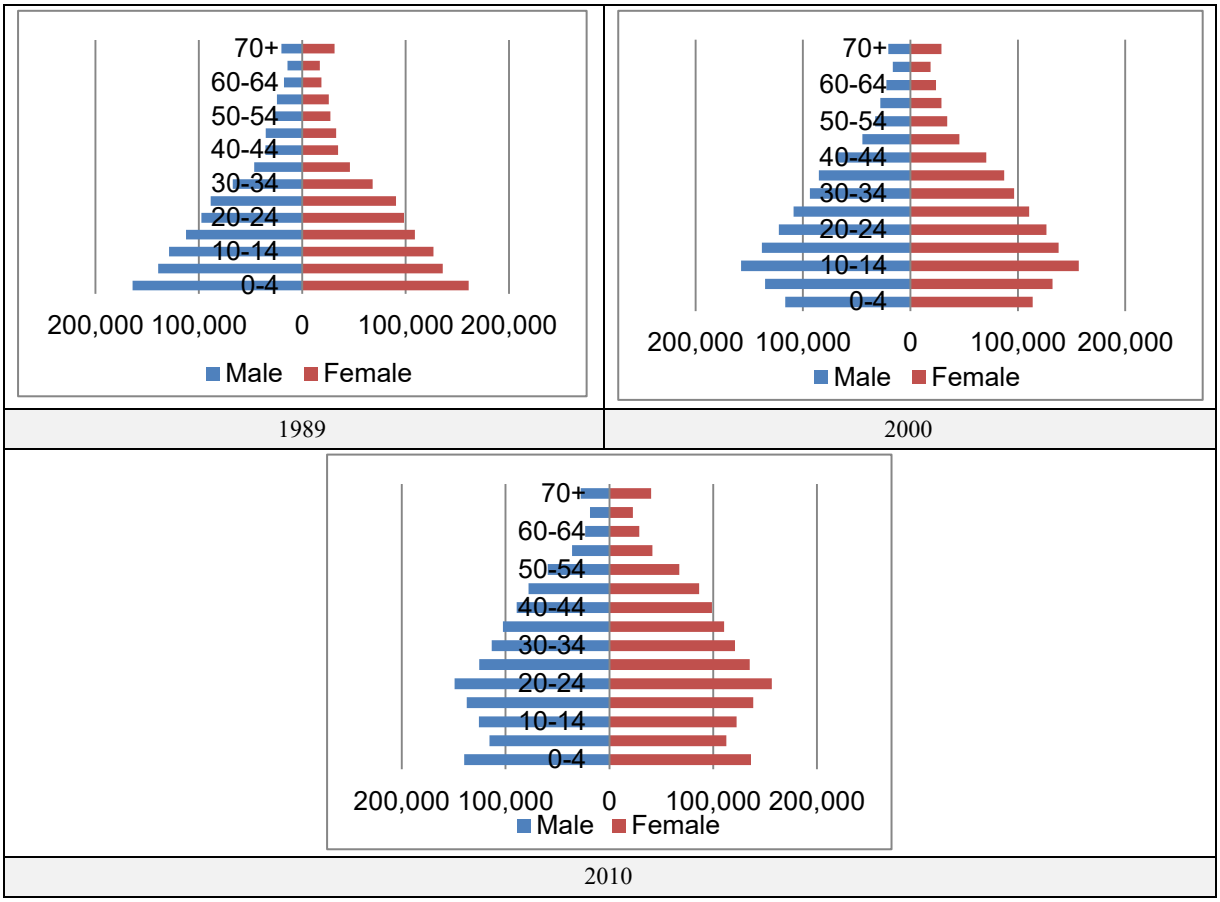
[2] Based on the Development Policy by Region (Parliament Order No. 57 in 2001, see Section 4.1 2).

2.14 The population structure has evolved from the population pyramid shaped Mount Fuji type until the 1990s into the pot type[3], where the 20–24 year-old population is the biggest, in 2010 through the turmoil of socialism collapse in the 2000s (see Figure 2.2.2).

Table 2.2.1 Changes in the Total Population in Mongolia

	1989	2000	2010	2014	Average Annual Growth Rate (1989–2000)	Average Annual Growth Rate (2000–2010)	Average Annual Growth Rate (2010–2014)
Male	1,020,669	1,190,244	1,342,081	1,466,455	1.4%	1.2%	2.2%
Female	1,023,285	1,212,861	1,418,887	1,529,494	1.6%	1.6%	1.9%
Total	2,043,954	2,403,105	2,760,968	2,995,949	1.5%	1.4%	2.1%

Source: JICA Study Team based on the data from the National Statistical Office of Mongolia (NSO).



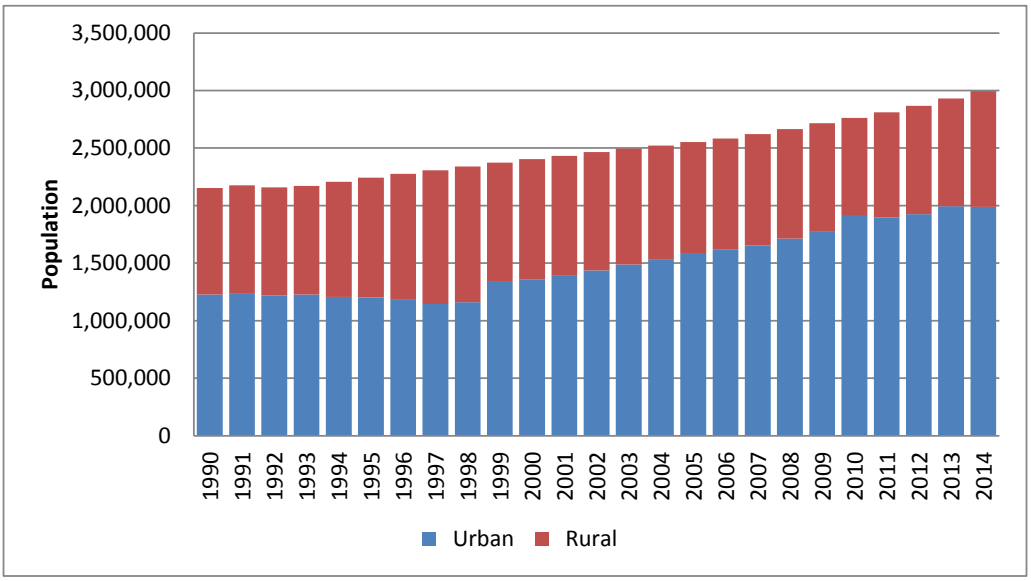
Source: JICA Study Team based on the data from NSO.

Figure 2.2.2 Changes in Population Pyramid in Mongolia

2.15 Before the shift to the market economy, rural population was increasing while that in the urban area was decreasing. After 1999, however, the trend was reversed (see Figure 2.2.3). The population moved to the urban area rapidly and increased population growth concentrated in the urban area. When economic growth is high, the population moves to the urban area, but when it is low, population flow to the urban area is reduced. Much of the population goes to the city to seek higher income work and higher education opportunities. People who come to the urban area are often from the low-income bracket, and this causes urban poverty issues,

[3] Pot-type population pyramid is evident in the 1970s in Japan, 1990s in China and 2000s in Thailand. This means that population aging is advanced in Mongolia.

such as lack of employment opportunities and low- cost housing. The improvement of income in the rural area would be one of the solutions to the problem of overconcentration of population in the urban area.



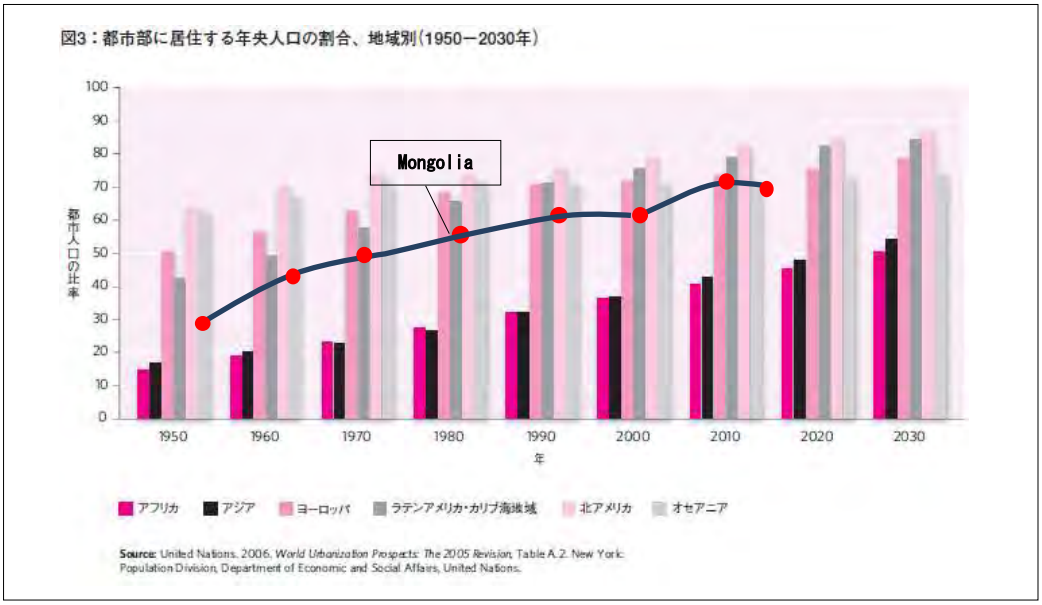
Note: Based on Mongolia Statistical Yearbook 2014, urban population is defined as the population which lives in Ulaanbaatar, aimag centers and towns, and rural population means the population which lives in soum centers and other areas.

Source: JICA Study Team based on the data from NSO.

Figure 2.2.3 Growth of Urban Population

2.16 The rate of urbanization tends to increase, especially in Asia, and this trend is the same in Mongolia (see Figure 2.2.4). The only urban area where the population is more than one million is Ulaanbaatar, while the second largest city of Erdenet only has 110 thousand. This overconcentration of population in the urban area is highest in Ulaanbaatar, where 45% of the country's population (or about 1.32 million[4]) lived in 2014, and is expected to continue in the future (see ***Appendix 2.2.1***). Solving these issues is one of the most important challenges in the capital city.

[4] Data of "Residents in Mongolia" from Mongolia Statistical Yearbook 2014.



Source: UN 2006, World Urbanization Prospects: The 2005 Revision.

Figure 2.2.4 Urbanization Rate by Region in the World (1950–2030) and in Mongolia

Table 2.2.2 Trend of Urbanization Rate

Year	1956	1963	1970	1980	1990	2000	2010	2014
Urban Population Rate	22%	40%	44%	51%	57%	57%	69%	66%

Source: JICA Study Team based on the data from NSO.

2) Population and the Number of Households by Aimag

2.17 Comparing the populations of 2010 and 2014 by aimag, it has increased in all aimags except Omnogovi. Especially in Govisumber, the average annual population increase rate was 3.8% (compared to the average annual national growth rate of 2.1%). Aimags with the large natural population increase were Govisumber and Bayan-Olgii (26 people per 1,000 persons compared with 22 people per 1,000 persons nationwide). Birth rate in these aimags was also higher than in the other aimags (32 and 31 people per 1,000 persons, respectively, compared with 28 people per 1,000 persons nationwide), and the average life expectancy was longer (73 years old compared with 70 years old nationwide). In Bayan-Olgii, the number of population to get married was larger than any other aimags (18 people per 1,000 people compared with 6 people per 1,000 persons nationwide), as well as population per household (4.2 persons/household compared with 3.6 persons/ household nationwide).

2.18 The total number of households in Mongolia was 823 thousand in 2014, with an average of 3.6 persons per household. In all aimags, an increase in the number of households was seen in 2010 and later. The increase was particularly large in Omnugovi and Ulaanbaatar, with the average annual growth rates of 3.8% and 3.7%, respectively, as compared to 2.1% nationwide (*see **Appendix 2.2.2***).

2.19 Nationwide urbanization rate based on the number of households was 65%. Besides Ulaanbaatar (100%), Orkhon (95%) and Darkhan-Uul (83%) where aimag sizes are small and predominantly urban areas, the aimags where 60% of households lived in urban areas are Govisumber and Dornogovi. On the other hand, in the other aimags, more than 60% of the

population live in rural areas. Between 2010 and 2014, the high increase rate in the number of households particularly in the urban areas was seen in Uvurrkhangai and Omnogovi (over 5% compared with 3.0% nationwide), and the one in rural areas was in Omnogovi (3.0% compared with 0.5% nationwide).

3) Population by Soum

2.20 The population distribution by soum in 1990, 2000 and 2010 are shown in Figure 2.2.5. In 1990, the most populous soum was Sainshand at the south. However, there was an emergent shift to a concentration of population in Ulaanbaatar from 1990 to 2000. Moreover, the number of soums with population of over 5,000 people has increased in 2000, especially around Khangai Mountain. However, in 2010, the number of soums with population under 2,500 people increased and the population tends to be concentrated in Ulaanbaatar and the aimag centers.

2.21 In 2010, almost all the cities with population of over 10,000 people are aimag centers. It is remarkable that population concentration seems to be in the north area such as Ulaanbaatar (1,159,899), Darkhan (77,547) and Erdenet (85,783) compared with other aimag centers. Except for aimag centers, there were only 4 soums with population of over 10,000 people in 2010, namely Mandal soum (25,009 people) in Selenge aimag between Tuv aimag and Darkhan-Uul aimag, Zamiin-Uud soum (Dornogovi aimag, 13,799 people) at the border of China, Harhorin soum (Uvurkhangai aimag, 12,933 people) and Darkhan soum (Khentii aimag, 11,196 people) which are neighboring soums of Choir, the center of Govisumber aimag.

2.22 The number of soums with declining population was 78 soums (23% of the total) from 1990 to 2000, increasing to 252 soums (74% of total) from 2000 to 2010. Almost all the soums which population did not decrease from 2000 to 2010 are aimag centers, and population became intensely concentrated in Ulaanbaatar. Moreover, population growth is observed around the soums bordering Russia in Selenge aimag, around Choir in Govisumber aimag, Oyu Tolgoi and Tavan Tolgoi mines in Umnugovi aimag. Population growth rate in Zamiin-Uud, which is a gateway to China, is 125% during the last 5 years. On the other hand, the high rate of decreasing population is observed in the west region especially between Khangai Mountain and Altai Mountain such as Zavkhan aimag. The changes in population from 1990 to 2010 are shown in Figure 2.2.6 and population growth rate is shown in Figure 2.2.7.

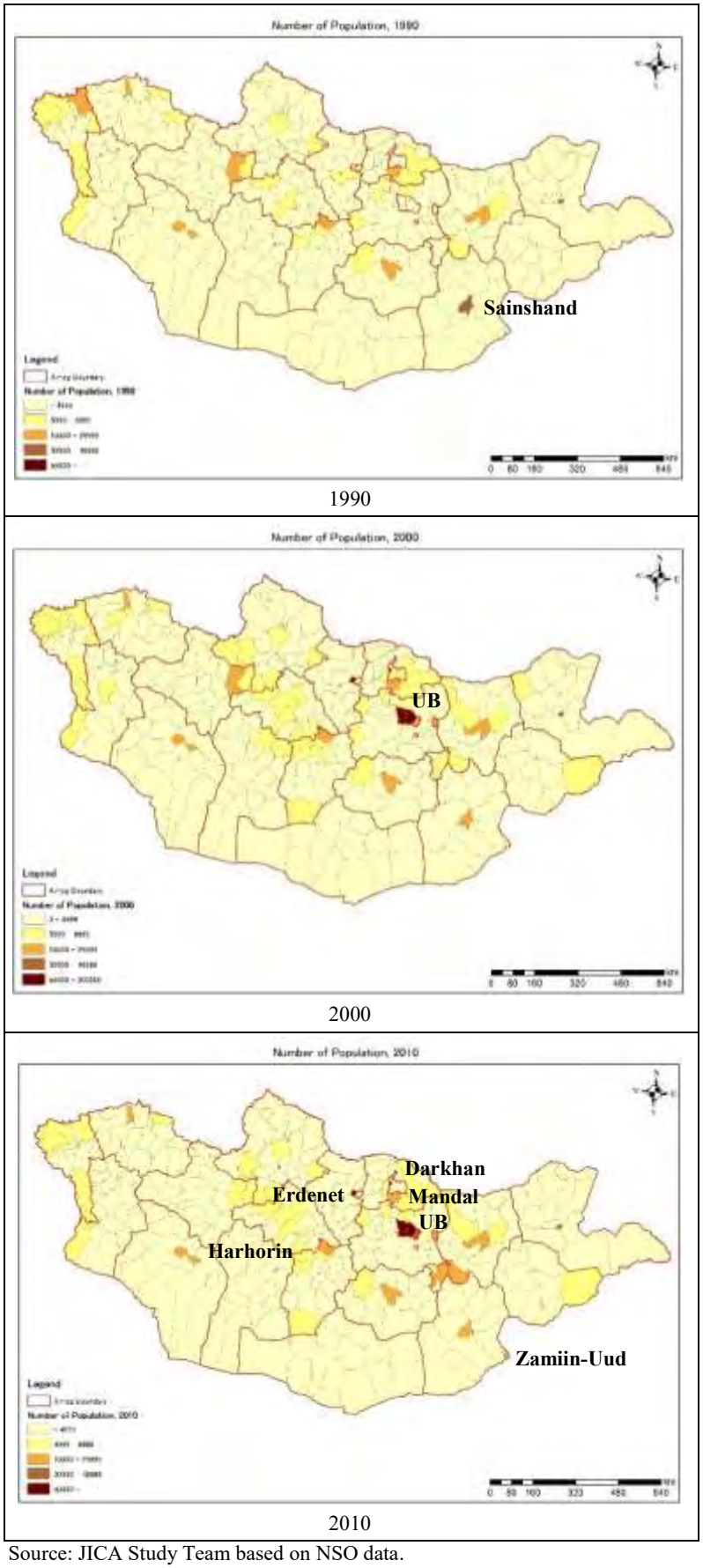
(3) Characteristics of Population Size by City

2.23 Figure 2.2.8 shows the ranking of cities in Mongolia according to population size. The overconcentration of population in Ulaanbaatar stands out remarkably as the population size of Erdenet (in Orkhon aimag), the second largest city in Mongolia, is less than 100 thousand. There is a so-called “Zipf’s Law” which dictates the relationship between ordinal rank number and the comparative population size. The theoretical size of city population sizes are indicated in dotted lines in Figure 2.2.8. As this graphs show, there is a huge discrepancy between theoretical and actual population sizes.

2.24 Urban development is almost synonymous to market development. Under-development of local cities in Mongolia is closely associated with lack of market development. During the socialist regime, the government designated regional hubs such as Choibalsan, Khovd, Murun and Shainsand where they established flour mills and meat plants

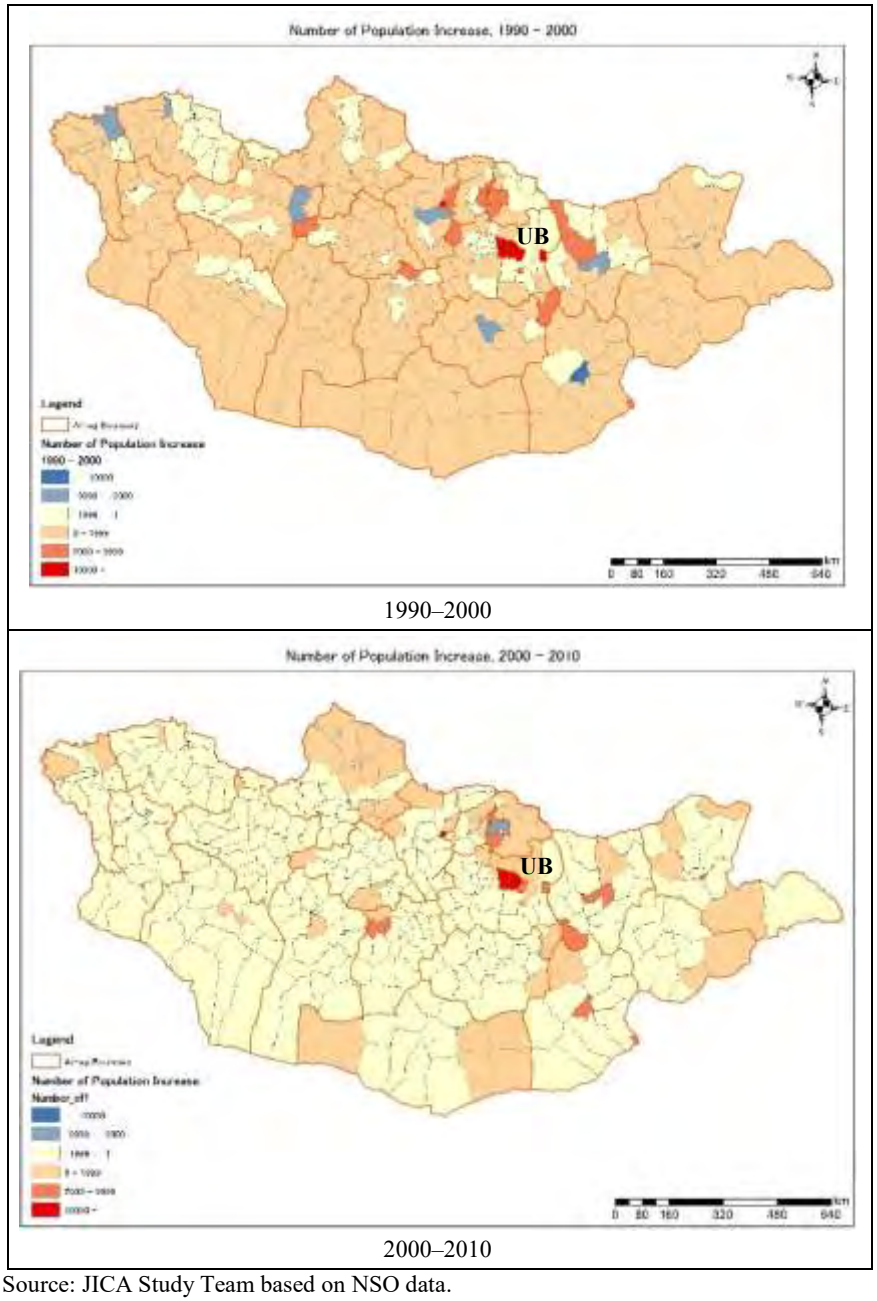
strategically for regions. Transition from socialist to market economy brought negative impacts to the local economies due to stoppage of assistance from the Soviet Union, worsened terms of trade, and broadbased changes in relative prices among goods and services, especially utility and transport costs during the 1990s. The mining resource-based economic boom has pulled local economies out of poverty and led to economic recovery including reinvestments in the agriculture and manufacturing sectors. Where nomadic cattle herding is the mainstay of the local economies, economic transactions are based on self-sufficiency and barters which slowed market deepening. Mono-culture based industrial structure of local economies has manifested itself in single hub structure of the country.

2.25 In other words, the structural deepening of rural economies invoking the need for urban services and finally decentralization had led to the scaling up of rural cities.



Source: JICA Study Team based on NSO data.

Figure 2.2.5 Population by Soum (1990, 2000, 2010)

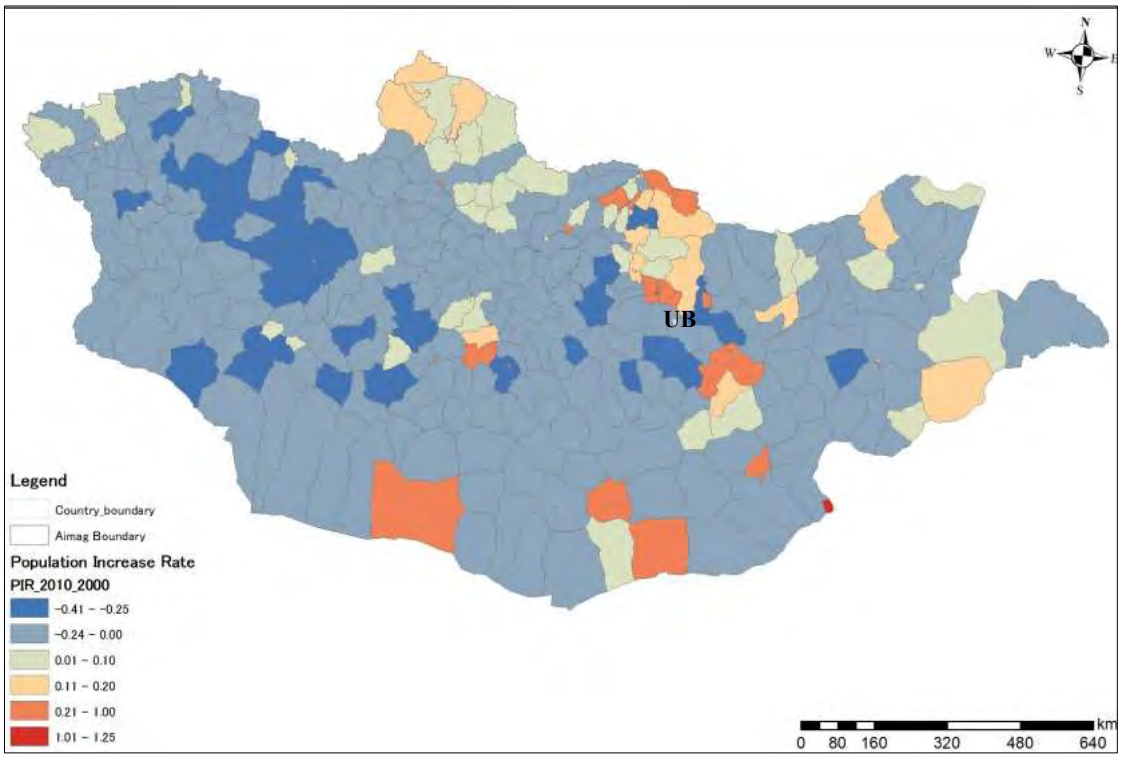


1990–2000

2000–2010

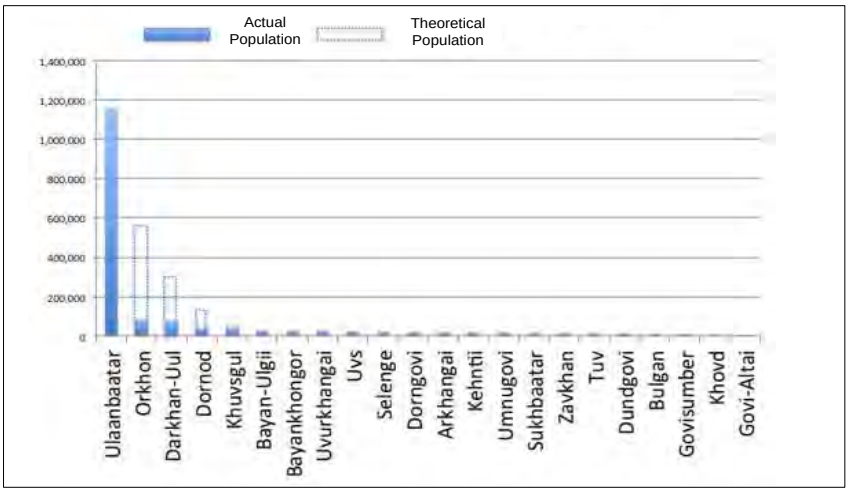
Source: JICA Study Team based on NSO data.

Figure 2.2.6 Changes in Population by Soum (1990–2010)



Source: JICA Study Team based on NSO data.

Figure 2.2.7 Population Growth Rate by Soum (2000–2010)



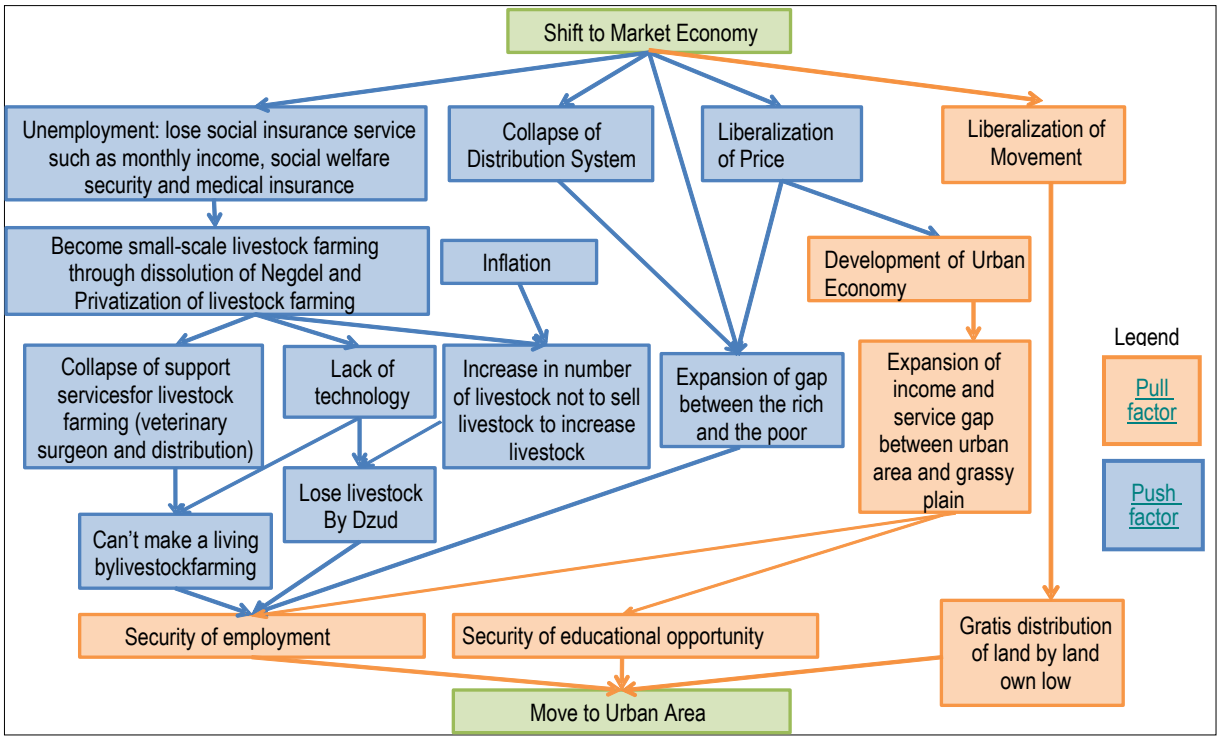
Source: JICA Study Team based on NSO data (2010 Census).

Figure 2.2.8 Urban Population Rank and Size

(4) Major Reasons of the Concentration of Population in Ulaanbaatar

2.26 The reasons for population inflow to the urban area, especially Ulaanbaatar, are shown in Figure 2.2.9. The push factors are shown in blue. There is a population movement of new nomads who were affected by the negative impacts of the shift to a market economy, such as unemployment, collapse of distribution system, liberalization of prices, etc. On the other hand, the acquisition of land in Ger area in the urban area made possible by the policy of private ownership of land, and the population movement to seek new job opportunities in the capital where remarkable economic growth has made wider the economic disparity between urban and rural areas are the pull factors, indicated in orange. Relatives living in the urban and rural

areas have a supportive relationship wherein school-aged nomadic children live in their relatives' house in the urban area while the nomads in the rural area take care of livestock instead of relatives who live in the urban area.



Source: JICA Study Team.

Figure 2.2.9 Reasons for Population Inflow to Urban Area

2.3 Social Development and Life Services

2.27 This section discusses the current situations and issues on social development and life services, focusing on one of the major issues of gaps in Ulaanbaatar and other areas in social development and life services.

(1) Situation and Issues of Social Development

1) Human Development

2.28 By Human Development Index (HDI), Mongolia is ranked 90th among 188 countries, the same as China in 2014. It is higher than the average of East Asia and the Pacific, and Mongolia is categorized as a high human development (HHD) country (see Table 2.3.1). In 10 years from 2000 to 2010, the annual growth rate of Mongolia's HDI was 1.68% and the improvement in human development was obvious after the country's shift to the market economy. Even after 2010, the annual growth rate was more than 1%. HDI goes higher year after year in all aimags, especially for Ulaanbaatar which is considered good at 0.8 compared with 0.7 nationwide (see ***Appendix 2.3.1***).

2.29 Inequality-adjusted HDI, which indicates the loss of human development from domestic gaps, was 12.9% and very close to the one of Japan (12.4%).

Table 2.3.1 Human Development Index

Country	Human Development Index (HDI)				Average Annual HDI Growth			Inequality-Adjusted HDI (IHDI)	
	Value				(%)			Value	Overall Loss (%)
	1990	2000	2010	2014	1990–2000	2000–2010	2010–2014	2014	2014
Mongolia	0.578	0.589	0.695	0.727	0.18	1.68	1.11	0.633	12.9
High Human Development	0.592	0.642	0.723	0.744	0.81	1.20	0.71	0.600	19.4
Developing Countries	0.513	0.568	0.642	0.660	1.02	1.23	0.70	0.490	25.7
East Asia and the Pacific	0.516	0.593	0.686	0.710	1.39	1.48	0.87	0.572	19.4
World	0.597	0.641	0.697	0.711	0.71	0.85	0.47	0.548	22.8

Source: Human Development Report 2015.

2) Education

2.30 The education level of Mongolia is generally high and not much gender gap in the enrollment rate for primary and secondary education is observed. Literacy rate was nearly 100% and the percentage of population with at least some secondary education was 85% (see Table 2.3.2).

2.31 By aimag, enrollment rates were slightly low in Bulgan and Tuvfor primary education (below 95%), and in Tuv, Dondogovi, Arkhangai, and Selengefor secondary education at 95% or less. On the other hand, in Orkhon and Darkhan-Uul, the rate exceeded 110%[5] in both education levels.

[5] There are cases when the enrollment rate exceeds 100% due to early admission, repeating schoolyear, and transferees from other areas.

Table 2.3.2 Education Indices

Country	Expected Years of Schooling	Mean Years of Schooling	Literacy Rate	Population with at Least Some Secondary Education	Gross Enrollment Ratio			
	(Years)	(Years)	(% Aged 15 and Older)	(% Aged 25 and Older)	Pre-Primary (% of Preschool-Age Children)	Primary (% of Primary School–Age Population)	Secondary (% of Secondary School–Age Population)	Tertiary (% of Tertiary School–Age Population)
	2014	2014	2005–2013	2005–2013	2008–2014	2008–2014	2008–2014	2008–2014
Mongolia	14.6	9.3	98.3	84.8	86	109	92	62
High Human Development	13.6	8.2	94.5	64.9	72	118	91	35
Developing Countries	11.7	6.8	79.9	51.2	50	110	70	25
East Asia and the Pacific	12.7	7.5	94.5	60.5	64	118	85	28
World	12.2	7.9	81.2	59.7	54	109	74	32

Source: Human Development Report 2015.

3) Health, Especially Reproductive Health

2.32 The percentage of population suffering from tuberculosis and HIV prevalence was much lower than in other developing countries. However, life expectancy was 74 years old for female and 65 years old for male, which are shorter than those of HHD countries (77 and 76 years old, respectively) and the East Asia and the Pacific (73 and 72 years old, respectively). Moreover, adult mortality ratio particularly for males was much higher (by 1.5 times) than that of developing countries (see Table 2.3.3).

2.33 Maternal mortality rate was 68 deaths per 100,000 live births in 2013, although the Millennium development Goals (MDG) target was 50 deaths per 100,000 live births by 2015. This was lower than the average of East Asia and the Pacific (72 deaths) and higher than the average of HHD countries (41 deaths).

2.34 The MDG targets for infant mortality and the under-five mortality ratios were 15 and 21 per 1,000 live births, respectively, but they were 26 and 32 per 1,000 live births, respectively, for Mongolia in 2013. These were lower than the ones of developing countries but higher than the ones of the HHD countries and East Asia and the Pacific.

Table 2.3.3 Health Care Indices

Country	Adult Mortality Ratio (per 1,000 People)		Maternal Mortality Ratio	Mortality Rates (per 1,000 Live Births)	
	Female	Male	(Deaths per100,000 Live Births)	Infant	Under-five
	2013	2013	2013	2013	2013
Mongolia	148	309	68	26.4	31.8
High Human Development	85	143	41	12.0	13.9
Developing Countries	134	192	225	37	49.3
East Asia and the Pacific	89	130	72	16.1	19.5

Source: Human Development Report 2015.

2.35 There were large differences among aimags in the infant and under-five mortality ratios. These ratios were higher in the western region, especially Bayan-Olgii and Govi-Altai

by 22 per 1,000 live births, but lower in the central region especially Selenge, Govisumber, and Darkhan-Uul by 7 or less per 1,000 live births (infant mortality rate of Darkhan-Uul was 8 per 1,000 live births; nationwide it was 15 per 1,000 live births for the infant mortality rate and 18 per 1,000 live births for the under-five mortality rate).

2.36 Between 2010 and 2014, the situation of both infant and under-five mortality ratios improved, except those in Govisumber and Govi-Altai (infant mortality only). Especially in Khangai region (Ovorkhangai, Khuvsgul, Bayankhongor, and Arkhangai) and Uvs, the situation greatly improved.

2.37 Life expectancy also became longer, especially in the Central Region and Ulaanbaatar.

4) **Employment**

2.38 In Mongolia, the social security system, which also covers pension and mandatory paid maternity leave, is available. However, the percentages of vulnerable employment and child labor are high because many people work in the livestock farming sector. Considering the future development of the national industry, the issues on labor conditions in Mongolia need to be addressed.

2.39 Mongolia's vulnerable employment rate of 51.4% was almost the same as that of developing countries (54%) but was much higher than that of HHD countries (29%). The percentage of child labor exceeded 10% and was higher than that of HHD countries (8%).

2.40 The unemployment rate of Mongolia was 8% and higher than that of HHD countries (5%) as well as of developing countries (6%) (seeTable 2.3.4). Youth unemployment rate was particularly high, nearly twice higher (16.5%) than the unemployment rate as a whole.

2.41 The situation on unemployment differs by aimag. The one in the Western Region and Eastern Region was 13% or more and exceeded the national average of 8%. In particular, it was highest at 22% in Bayan-Olgii. On the other hand, the ones in Ovorkhangai, Arkhangai, and Zavkhan were low, at 4% or less.

2.42 Labor productivity was USD10,921 per worker, which was less than half that of HHD countries.

2.43 The number of recipients of unemployment benefits was at least 10% higher than that of HHD countries (8%) but lower than that of the world (12%). Old age pension was distributed 100%. Mandatory paid maternity leave was 120 days was higher than the averages for developing countries (99 days) and the world (102 days) and almost same as that of HHD countries (125 days).

Table 2.3.4 Work Indices

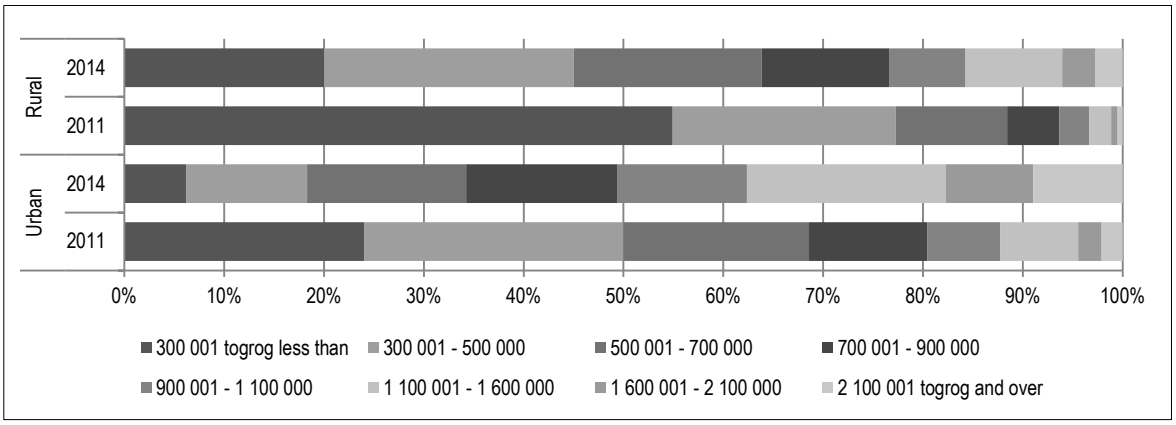
Country	Vulnerable Employment	Unemployment		Labor Productivity	Work that is a Risk to Human Development	Security of Employment		
	(% of Total Employment)	Total (% of Labor Force)	Youth (% of Youth Labor Force)	Output per worker (2011 PPP USD)	Child Labor (% ages 5–14)	Unemployment Benefits Recipients (% of unemployed aged 15–64)	Mandatory Paid Maternity Leave (days)	Old Age Pension Recipients (% of Statutory Pension Age Population)
	2008–2013	2008–2013	2008–2014	2005–2012	2005–2013	2008–2013	2014	2004–2012
Mongolia	51.4	7.9	16.5	10,921	10.4	10.0	120	100.0
High Human Development	28.7	4.7	16.7	23,766	8.3	6.0	125	73.9
Developing Countries	54.0	5.6	14.6	..	14.5	2.5	99	51.0
East Asia and the Pacific	..	3.3	18.6	..	..	1.6	..	65.3
World	47.6	6.1	15.1	24,280	14.5	12.2	109	65.0

Source: Human Development Report 2015.

5) **Income**

2.44 The income level is lower in rural areas compared to urban areas. The average income of urban and rural areas was MNT1,174,005 and MNT915,606, respectively, in 2014, and the gap between the areas was about MNT260 thousand. In the urban area, 57% and 14% of income were sourced from wage and salary and from business, respectively. These percentages were reversed in the rural area, where 23% and 35% of the working population sourced their income from wage and salary and business, respectively.

2.45 In both urban and rural areas, the percentage of low income households decreased between 2011 and 2014 (see Figure 2.3.1). However, the percentage of low income households was higher in the rural area than in the urban area. Some 45% of rural households were at the less than MNT500 thousand income bracket.



Source: Mongolia Statistical Yearbook 2014.

Figure 2.3.1 Household Income

6) **Poverty**

2.46 The trend in poverty rate between 2002 and 2010 is shown by regions of national, urban, rural, Ulaanbaatar, aimag centers, soum centers, and other rural areas (see Table 2.3.5).

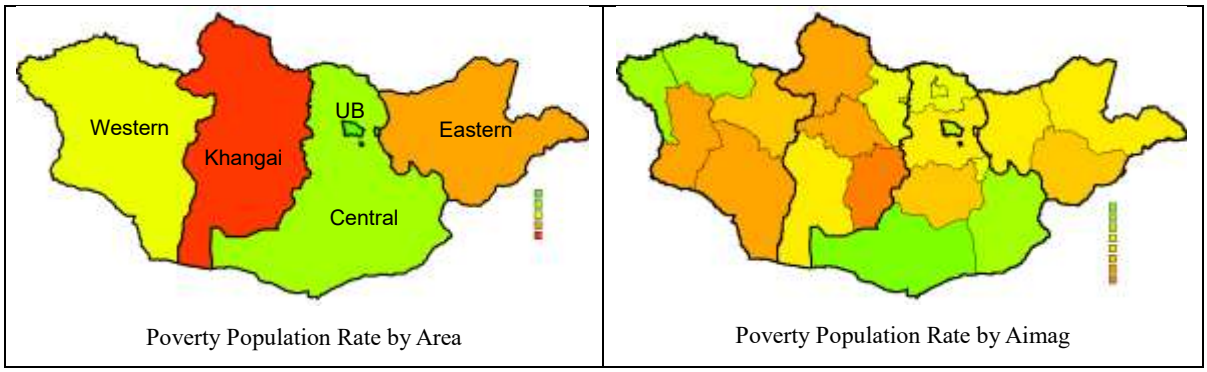
The poverty rate increased in rural areas, especially other rural areas. In the socialist regime, under the planned economy system, agriculture and livestock farming was sustained through a stable market. However, during the transition to market economy, dismantling of collective farms, privatization of livestock, and loss of a stable market occurred. As a result of these impacts, poverty has increased.

Table 2.3.5 Changes of Poverty Rate

	2002-2003	2007-2008	2009	2010
National	36.1%	35.2%	38.7%	39.2%
Urban	30.3%	26.9%	30.6%	32.2%
Rural	43.4%	45.6%	49.6%	47.8%
Ulaanbaatar	27.3%	21.9%	26.7%	29.3%
Aimag centers	33.9%	34.9%	37.0%	36.2%
Soum centers	44.5%	42.0%	42.6%	38.5%
Other rural areas	42.7%	49.7%	53.2%	54.2%

Source: Vulnerability to Sustainability: Environment and Human Development.

2.47 Figure 2.3.2, which was prepared based on the population and housing census of 2010 and household socioeconomic survey of 2011, shows the poverty map indicating the degree of monetary poverty by region and by aimag. The color shows the degree of the population, where green indicates low, yellow as the middle, and red as high. The aimags where the povert population ratio is at least 40% are located in the Khangai region and the western region. This shows that the poor population are concentrated in the western half of the country.



Poverty Population Rate by Area　　Poverty Population Rate by Aimag

Source: Harold Coulombe and Gereltuya Altankhuyag, MDGs and Poverty Map – 2011: Region, aimag, soum and district level results, Ulaanbaatar, 2012.

Figure 2.3.2 Poverty Population Rate

7) Crime

2.48 The prison population in Mongolia was 287 per 100,000 people, and homicide rate was 10 per 100,000 people. These were higher than those of HHD countries (188 and 7 persons, respectively).[6]

2.49 The crime rate in 2014 was very high in Govisumber and Ulaanbaatar by about 1.5 times the national average. Moreover, in both aimags, the number has increased since 2010, particularly in Govisumber where crime rate increased by 1.6 times. Crime rate has increased In Mongolia as a whole, especially in Sukhbaatar, Tuv, and Bulgan where it increased by 1.5 times in five years.

[6] Human Development Report 2015.

8) **Gender**

2.50 The Gender Development Index (GDI), which indicates gender inequalities in the achievement of three basic dimensions of human development (health, education and command over economic resources), was 1.028 in 2014. It is unlike many other countries where female HDI is higher than that for the male. The Gender inequality indicator (GII), which evaluates the loss of human development achievement by the inequality between men and women, was 0.325 and ranks Mongolia 63rd among 188 countries in 2014.

2.51 The following are some factors that contributed to the above situation. Female income in Mongolia is lower than that of the male, although the labor force participation rate of women is high. Males are expected to work in livestock husbandry, and it causes lower enrollment rate and higher dropout rate of males especially in secondary education and higher, as compared to females. For example, the expected years of schooling and mean years of schooling for adults by gender were longer among females than with males. The short life expectancy of males compared to females, and the low representation of women in the decision-making level also affects the situation (see Table 2.3.5).

2.52 On the other hand, the share of parliamentary seats held by women was 14.9%, which was lower than those of HHD countries, developing countries, and East Asia and the Pacific, though it was higher than that of Japan (11.6%).[7] The share of female leading officers in the decision-making level was low at 12% in 2012.[8] To change the situation, an article was added to institute a quota system for government workers (keep more than 40% of each sex in the management posts in the government organizations) in the Law on Promotion of Gender Equality in 2013.[9]

2.53The nationwide GII was not large at 0.3. However, except for Ulaanbaatar, Zavkhan, and Govisumber, the other aimags showed the indicator was bad, at 0.7 or higher (see ***Appendix 2.3.1***).

[7] Based on the JICA Report on Gender Profile: Mongolia, the reasons are 'because of the influence of gender stereotyped cultural norms' and 'because of lack of access to financial resources required to run a campaign and being less prioritized in political party where male's network exists.'

[8] Ministry of Economic Development, Fifth National Progress Report 2013.

[9] JICA Report on Gender Profile: Mongolia, December 2013.

Table 2.3.6 Gender Indices

Country	Gender Development Index	Human Development Index (HDI)		Life expectancy at birth		Expected years of schooling		Mean years of schooling		Estimated gross national income per capita (2011 PPP $)		Gender Inequality Index	Maternal mortality ratio	Share of seats in parliament	Labour force participation rate (% ages 15 and older)		Suicide rate (per 100,000 people)	
	Value	Female (F)	Male (M)	F	M	F	M	F	M	F	M	Value	(deaths per100,000 live births)	(% held by women)	F	M	F	M
	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2013	2014	2013	2013	2012	2012
Mongolia	1.028	0.737	0.716	73.9	65.3	15.3	13.9	9.5	9.0	9,029	12,462	0.325	68	14.9	56.6	69.3	3.7	16.3
High human development	0.954	0.724	0.758	77.4	72.8	13.8	13.4	7.7	8.5	10,407	17,443	0.310	41	20.6	57.0	77.2	6.4	10.3
Developing countries	0.899	0.617	0.686	71.7	68.0	11.6	11.9	5.4	7.3	5,926	12,178	0.478	225	20.2	49.5	78.7	8.3	13.4
East Asia and the Pacific	0.948	0.692	0.730	76.0	72.2	13.0	12.8	6.9	8.0	9,017	13,780	0.328	72	18.7	62.6	79.4	7.3	7.3

Source: Human Development Report 2015.

(2) Situation and Issues on Life Services

2.54 This section summarizes the situation on life services (i.e., health, education, and communication infrastructure) in Mongolia (see Table 2.3.6).

2.55 The number of physicians was 28 per 10,000 people and higher than that of HHD countries (18 physicians). Public health expenditure accounted for 6% of Gross Domestic Product (GDP) and was almost the same as that of HHD countries but much lower than that of the world by 10%.

2.56 The percentage of primary school teachers trained to teach was 100%, but the pupil-teacher ratio was 28 pupils per teacher which was much larger than the ratios of HHD countries and East Asia and the Pacific (19 pupils per teacher). Public expenditure on education was 6% and slightly higher than the ones of HHD countries and East Asia and the Pacific (5%).

2.57 The ratio of internet users was 27% and much lower than the ones of HHD countries and East Asia and the Pacific, which exceeded 40%. The ratio of mobile phone subscriptions was105 per 100 people.

Table 2.3.7 Life Services

Country	Health		Education			Communication	
	Physicians	Public Health Expenditure	Primary School Teachers Trained to Teach	Pupil-TeacherRatio, Primary School	Public Expenditure on Education	Internet Users	Mobile Phone Subscriptions
	(per 10,000 People)	(% of GDP)	(%)	(Number of Pupils per Teacher)	(% of GDP)	(% of Population)	(per 100 People)
	2001–2013	2013	2008–2014	2008–2014	2005–2014	2014	2014
Mongolia	27.6	6.0	100	28	5.5	27.0	105.1
High Human Development	17.6	6.2	95	19	4.9	49.8	104.6
Developing Countries	10.3	5.6	84	27	4.7	31.9	91.2
East Asia and the Pacific	12.2	5.3	..	19	4.9	42.1	100.5
World	13.8	9.9	..	25	5.0	40.5	96.2

Source: Human Development Report 2015.

2.58 Besides Ulaanbaatar, there is no other large city in Mongolia so a large gap exists in life services between Ulaanbaatar and the rural area. This also causes the population to concentrate in Ulaanbaatar. In the socialism period, public facilities were built nationwide equally. Since the introduction of the market economy, however, these were developed based on the development standards by the size of population. Due to difficulties to develop these facilities to follow the increasing needs and burden of maintenance, the quality of life services, including the issues of aging of the facilities, rapidly deteriorated in the rural area.

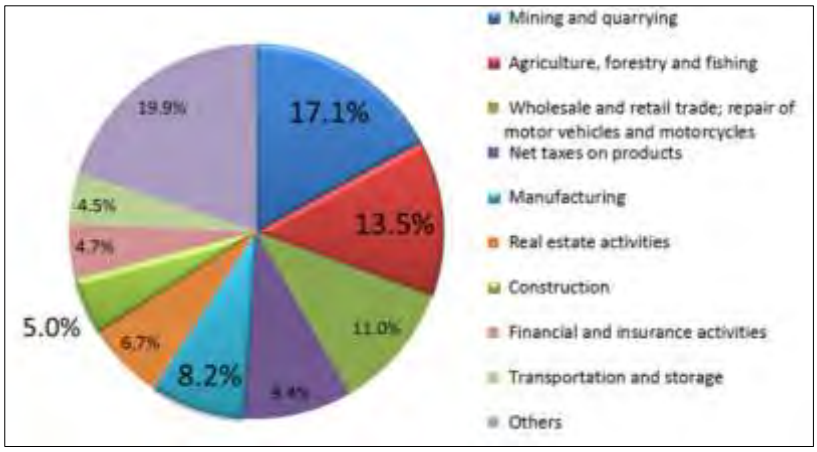
2.59 For settlement of the rural population, expansion and improvement of life services is required. However, to do this in a vast country which has the lowest population density is inefficient and very difficult. Thus, developing public services gradually in Mongolia's second and third largest cities of Erdenet and Darkhan, respectively, and the other aimag centers is one of the biggest challenges for the country.

2.4 Strategic Industrial Sector and Challenges for Sustainable Economic Development

(1) Characteristics of Industrial Structure

1) GDP Shares by Industry

2.60 The shares of the different industries to GDP in Mongolia are very much lopsided, with heavy reliance on the mining sector (see Figure 2.4.1). The foundation of the manufacturing sector is relatively fragile with its share of GDP in 2014 only at around 8%, which is lower than those of neighboring former socialist countries such as Kyrgyzstan and Kazakhstan (13.1% and 10.3%, respectively) (see Table 2.4.1).



Source: National Statistics Office, Mongolia (NSO).

Figure 2.4.1 GDP Share by Industrial Sector (2014)

Table 2.4.1 Comparative Summary of GDP Shares of Major Neighboring Countries (2014)[10]

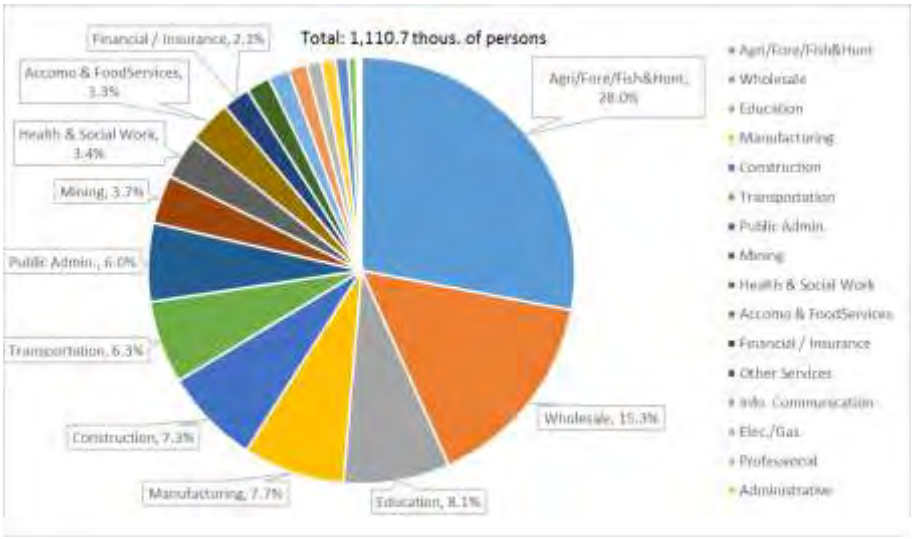
	Myanmar	Viet Nam	Cambodia	Kyrgyz Rep.	Kazakhstan	Mongolia	Thailand	Indonesia	Japan *	China **	Australia
Agriculture	27.9%	18.1%	28.7%	14.8%	4.2%	14.2%	10.5%	13.4%	1.2%	9.5%	2.4%
Mining	7.3%	11.3%	1.1%	0.6%	15.6%	16.8%	3.7%	9.8%	0.1%	4.4%	8.3%
Manufacturing	19.9%	17.5%	15.3%	13.1%	10.3%	8.9%	27.7%	21.0%	18.4%	29.2%	6.4%
Construction	5.8%	5.3%	8.5%	7.4%	6.1%	5.2%	2.6%	9.9%	5.8%	7.0%	7.9%
Commerce	18.7%	13.6%	14.4%	17.4%	16.2%	10.8%	13.9%	0.0%	14.4%	9.8%	8.4%

Source: "Statistics Data Base" (base year 2014), ADB
* : Figures of Japan is in 2013.
** : Figures of China is estimation based on the 2009 data.

2) Working Population by Industrial Sector

2.61 In 2014, the total working population over the age of 15 reached 1.11 million. The largest share is observed in the agriculture and livestock sector with 28% of the total, followed by the commercial sector with 15.3%, and the manufacturing sector with 7.7%. The share of the mining sector, which demonstrates a leading share in GDP with approximately 17%, remains at 3.7% indicating a relatively low labor absorption in the mining sector.

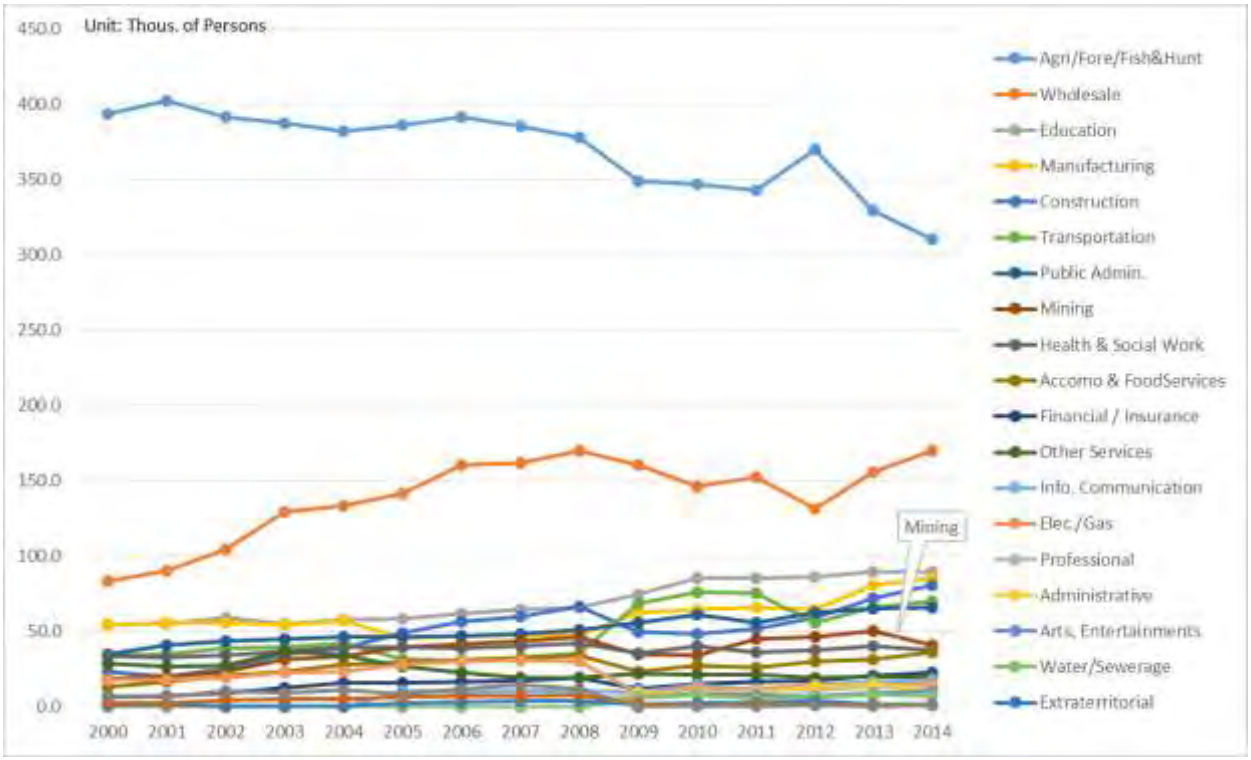
[10] Figures for Japan are in 2013. China's figures for mining and manufacturing are estimates based on data in 2009.



Source: National Statistics Office, Mongolia (NSO).

Figure 2.4.2 Working Population by Industrial Sector, Over the Age of 15 (2014)

2.62 The change in working population from year of 2000 to 2014 shows a decrease in the agro/livestock sector from 400,000 level to 300,000. On the contrary, an increase is observed in the commercial sector from 80,000 level to 170,000. In the mining sector, the working population is maintained at around 40,000 level except for the jump in 2013 to approximately 50,000 which could reflect the booming investment in previous year.



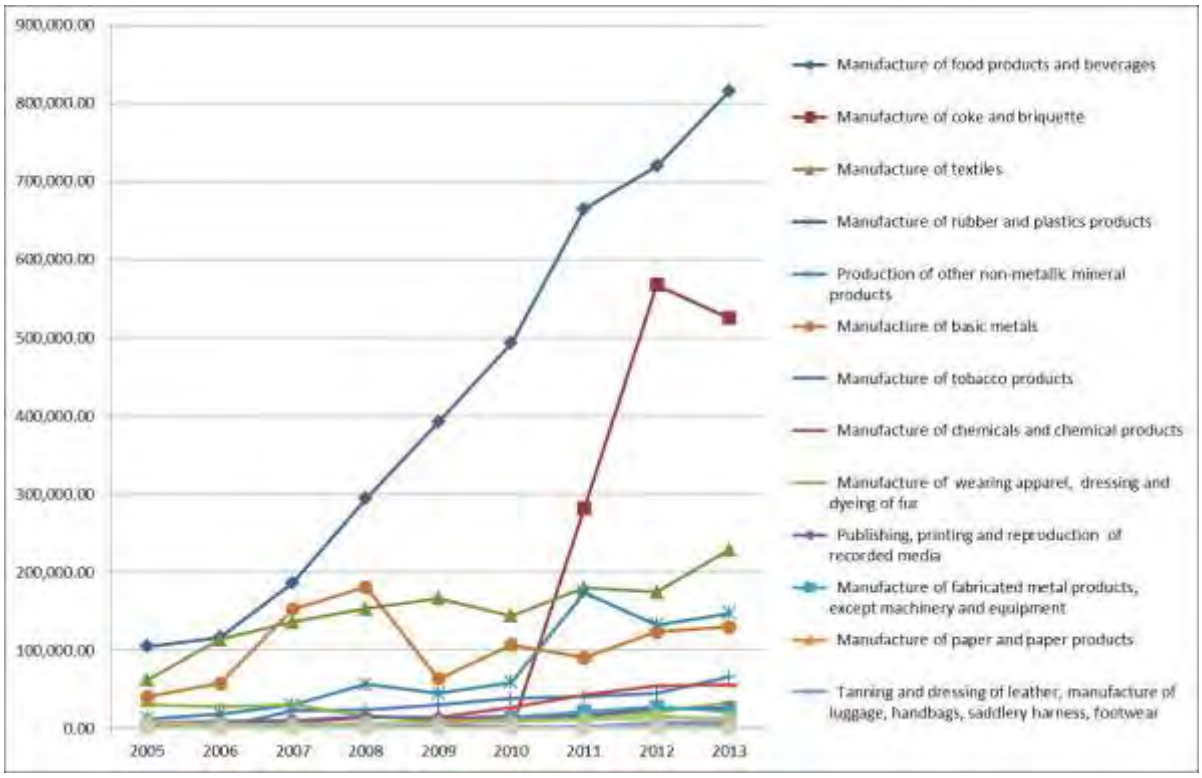
Source: National Statistics Office, Mongolia (NSO).

Figure 2.4.3 Change in Working Population by Industrial Sector, Over the Age of 15 (2014)

3) Subsector Structure of the Manufacturing Sector

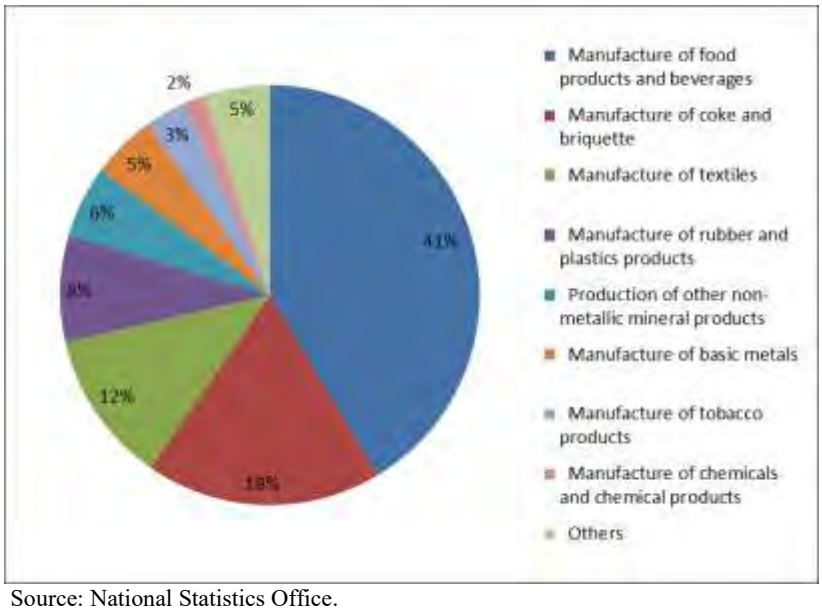
2.63 In Mongolia's manufacturing sector, over 40% of annual total sales value is accounted

for by the food processing subsector, followed by coke and briquette (18%), textiles (12%), and rubber and plastic products (8%) (see Figure 2.4.4). These four subsectors contribute about 80% of total manufacturing output (see Figure 2.4.5). Thus, the lopsided characteristic of GDP share is observed in the manufacturing sector as well.



Source: National Statistics Office.

Figure 2.4.4 Trends in Annual Sales Value in the Manufacturing Sector



Source: National Statistics Office.

Figure 2.4.5 GDP Share in the Manufacturing Sector by Subsector (2014)

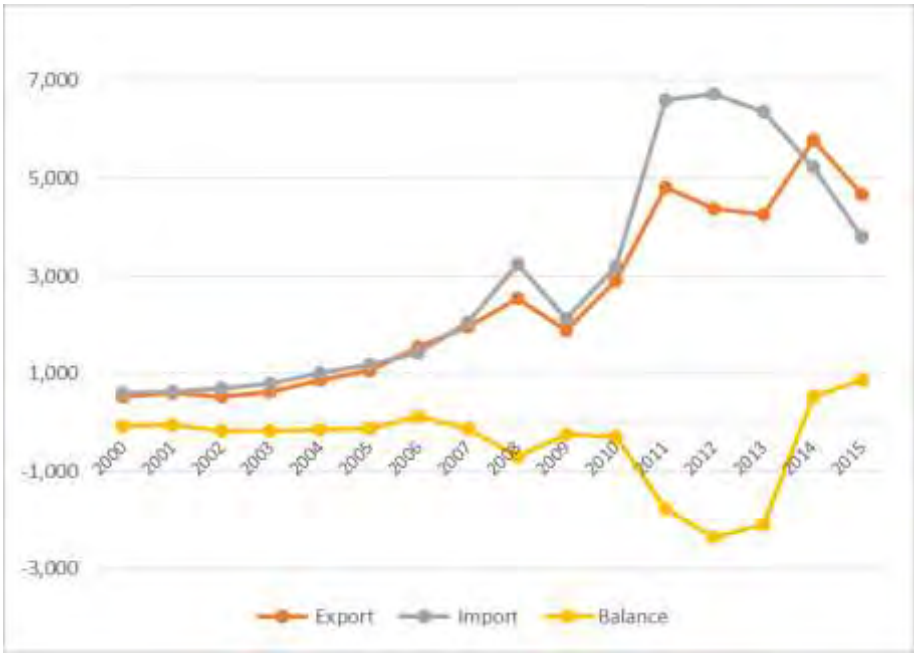
2.64 The growth trends of the subsectors in the manufacturing sector also demonstrate the steady development of the food processing subsector which has been largely contributed by

beverage production. It was successful in taking full advantage of large-scale investment on production machineries made during the former socialist regime. Next to food processing, the manufacture of cokes and briquette is the second most rapidly developing subsector since 2011. The growth of other subsectors, such as textiles, rubber and plastic products, and non-metallic mineral products, remains relatively low as compared to the top two subsectors.

2.65 Due to the limited and decreasing demand in the domestic and export markets, it has been observed that some of the production facilities are not actively utilized to their expected capacities, such as in the machinery and metallic processing sectors. The foundation of the manufacturing sector in general is still considered to be fragile, with heavy dependence on imported raw materials and manufacturing inputs as well as consumer goods.

4) Foreign Trade Structure by Industrial Goods

2.66 Exports have demonstrated an upward trend, which is increasing from approximately USD600 million in 2000 to USD4.7 billion in 2015, with some downward trend after booming investments in 2012 (USD4.4 to 4.8 billion) and peaking out in 2014 (USD5.8 billion). The recent upward trend is mainly due to copper export starting from the expansion of OT mine development. Imports have been rapidly decreasing recently, from a high of approximately USD6.7 billion in 2012 to USD3.8 billion in 2015. The heavy dependence on imports has been one of the major issues in Mongolia especially since it became evident in 2011. Thus, the trade surplus since 2014 seems to be welcomed. However, this declining import trend is not due to import substitution efforts but simply a result of decreasing imports especially of mining related machinery in the mining sector which is slowing down and of construction materials in the construction sector.



Source: National Statistics Office.

Figure 2.4.6 Change in Foreign Trade and Trade Balance (Value in USD Million)

2.67 The high dependency on foreign trade with China is observed. Some 90% of exports goes to China. China is also the largest source of Mongolia's imports with a share of around 34%, followed by Russia with around 30%. Mongolia’s foreign trade heavily relies on these

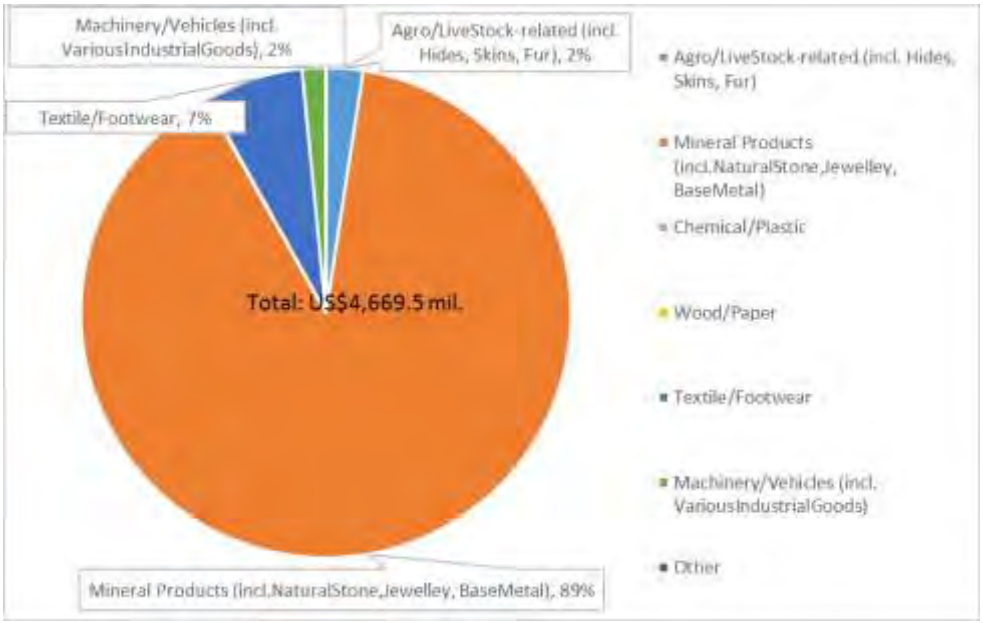
two big neighboring countries.

Table 2.4.2 Foreign Trade by Major Trading Countries (2014)

Unit: mil. USD	Export		Import	
Total	**5,774.3**		**5,236.7**	
China	5,073.4	87.9%	1,767.9	33.8%
United Kingdom	398.7	6.9%	26.4	0.5%
Russian Federation	61.6	1.1%	1,549.3	29.6%
Italy	51.4	0.9%	45.3	0.9%
Switzerland	28.1	0.5%	9.1	0.2%
Japan	24.5	0.4%	367.8	7.0%
USA	15.4	0.3%	229.5	4.4%
Germany	15.0	0.3%	159.2	3.0%
Singapore	14.2	0.2%	52.8	1.0%
South Korea	13.5	0.2%	352.6	6.7%

Source: National Statistics Office.

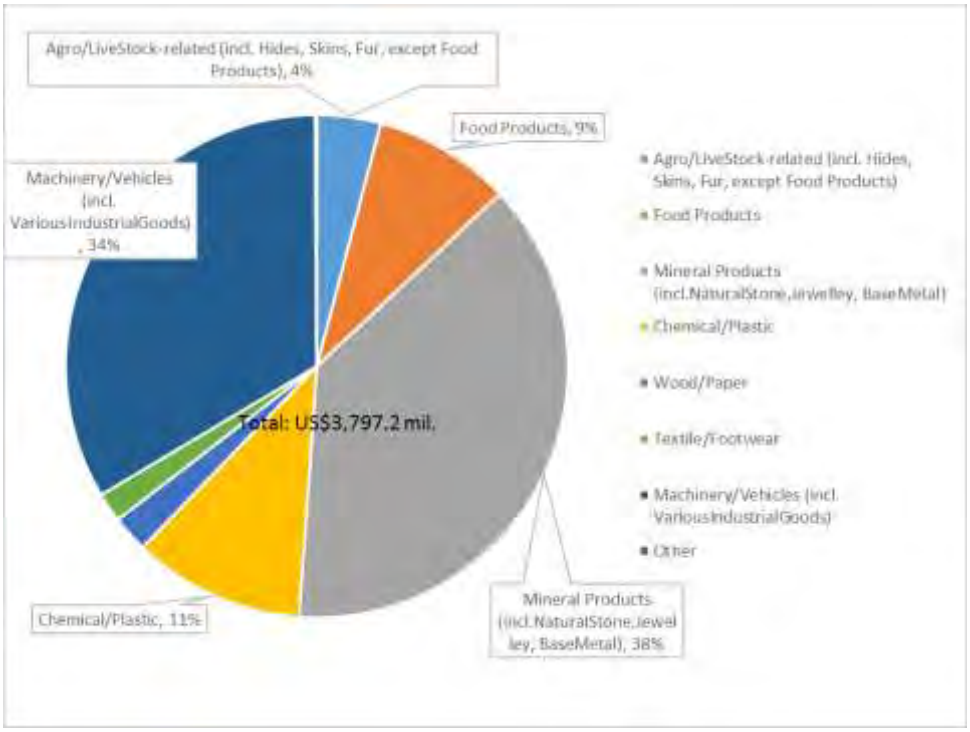
2.68 The major exports are shared by the mining industrial goods group (mineral products) with approximately 90%, followed by textile/footwear with 7%, agro/livestock related, and machinery/vehicles with 2%, respectively.



Source: National Statistics Office.

Figure 2.4.7 Exports by Major Industrial Goods Group (Value in USD Million), 2015

2.69 The major imports are shared by the mining industrial goods group (mineral products) with 38% and machinery/vehicles with 34%. The large import share in the mining sector reflects the scale of petroleum imports. Mongolia is rich in mineral products for export but dependent on imported energy. The import share of food products is also noted at 9% although the food processing industry is one of the major domestic industrial sectors to be further promoted for import substitution.



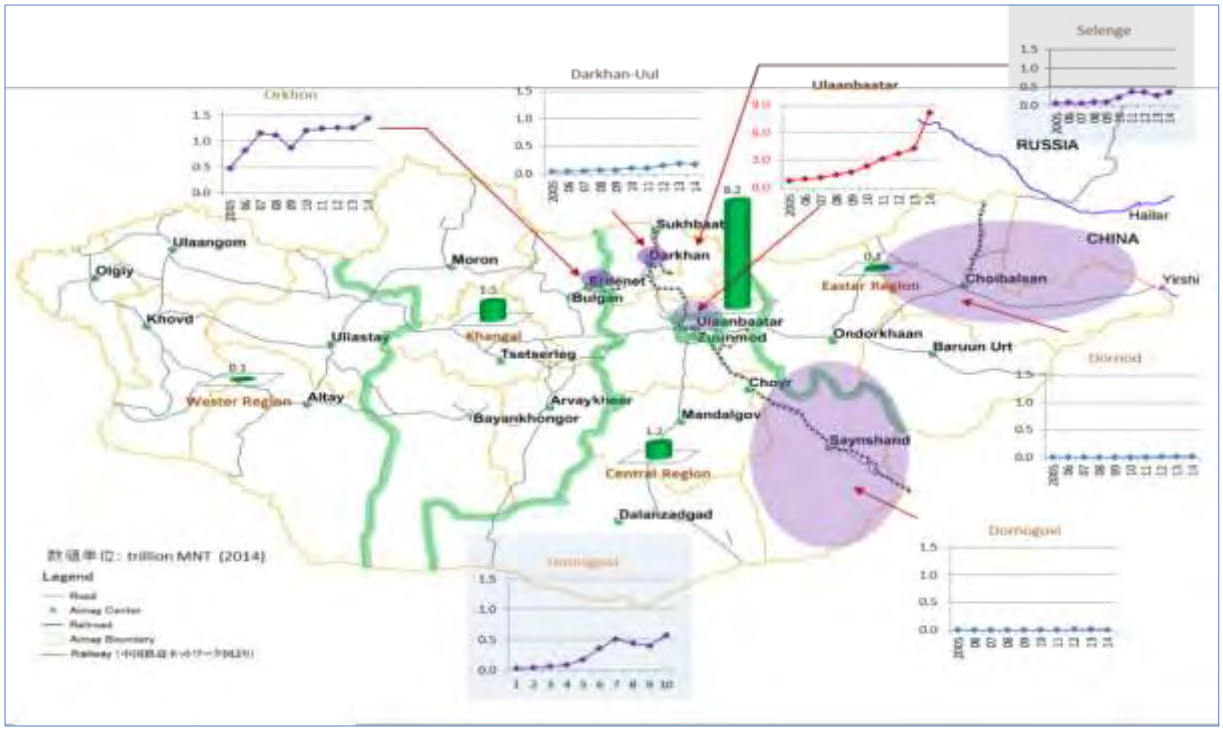
Source: National Statistics Office.

Figure 2.4.8 Imports by Major Industrial Goods Group (Value in USD Million), 2015

5) Regional Characteristics of the Manufacturing Sector

2.70 Another notable characteristic of the manufacturing sector is the large regional gaps and overconcentration of industrial activities in the national capital, Ulaanbaatar. The total sales value in UB reached over MNT820 billion in 2014, which accounts for a 74% share of total sales value in the manufacturing sector (see Figure 2.4.9). The sales value of the second largest region, Orkhon aimag (where the second largest city, Erdenet, is located), is around MNT140 billion, which is only 1/6 of Ulaanbaatar's. The rest of the top 5 aimags and their sales value shares are Umnugobi aimag (where TT and OT mines are located) with MNT57 billion, Selenge aimag with MNT35 billion, and Darkhan-Uul aimag with MNT17 billion. The total sales value of these top 5 aimags[11] accounts for a 96.9% share of the total. Only the three regions of Ulaanbaatar, Erdenet, and Darkhan are recognized as the major core of the manufacturing sector in Mongolia.

[11] Substantially, the major concentrations are observed in the city areas in each aimag.



Source: National Statistics Office; Ministry of Industry.

Figure 2.4.9 Overview of the Sales Value of the Manufacturing Sector by Region

6) Characteristics of Establishments in the Manufacturing Sector

2.71 The total number of registered establishments (companies) in Mongolia was 113,602 in 2014. Of these, the number of active establishments was 59,843 (see Table 2.4.2). The largest number is observed in the commercial sector with 22,793 (38.1%) active establishments, while those in the manufacturing sector were only 4,996 (8.3%).

2.72 Regional overconcentration is also observed among the establishments. Approximately 70% of active establishments are concentrated in the three cities of Ulaanbaatar, Erdenet and Darkhan, with 37,124 (62%) in Ulaanbaatar alone.

2.73 Based on company size, 58,019 (97% of the total) of active establishments are small-scale businesses with less than 50 employees. Some 50,932 establishments (85.1%) have less than 10 employees.

Table 2.4.3 Number of Establishments by Sector (2014)

by Sector (2014)	Number Registered		Number Active	
total	113,602	100.0%	59,843	100.0%
Agriculture, forestry and fishery, hunting	6,374	5.6%	3,409	5.7%
Mining and quarrying	945	0.8%	608	1.0%
Manufacturing	9,188	8.1%	4,996	8.3%
Electricity, gas and water supply	381	0.3%	297	0.5%
Construction	8,940	7.9%	4,770	8.0%
Wholesale & retail trade, repair, household goods	48,865	43.0%	22,793	38.1%
Hotels and restaurants	3,254	2.9%	2,018	3.4%
Transportat, storage and other business activities	5,063	4.5%	2,294	3.8%
Financial services	2,069	1.8%	915	1.5%
Real estate, renting and other business activities	11,642	10.2%	6,045	10.1%
Public administration and others	1,433	1.3%	1,433	2.4%
Education	3,598	3.2%	2,659	4.4%
Health and social work	3,472	3.1%	2,900	4.8%
Other community, social and personal services	8,353	7.4%	4,681	7.8%
Others	25	0.0%	25	0.0%

Source: Statistical Yearbook 2014, NSO.

(2) Strategic Industrial Sectors (Strategic Sectors in Industrial Development Policy)

1) Objectives of Industrial Development Policy

2.74 Since the change of political regime in 2013, government reforms have been conducted. Basically, industry-related authorities have been reorganized and merged into the Ministry of Industry, which were formerly spread out among different ministries including small and medium enterprise (SME) issues (formerly with the Ministry of Labor), light industry (formerly with the Ministry of Agriculture), and foreign trade (formerly with the Ministry of Foreign Affairs and Trade). This development has provided a sound foundation for a comprehensive industrial promotion policy. In June 2015, the "Industrial Development Policy" was adopted in the Parliament, followed by the adoption of the first wave of the "Action Plan" in September. The policy objectives include the strengthening of the legal system and industrial promotion environment, adoption and transfer of technology, human resource development, and so on (see Table 2.4.4). Aside from the basic direction of promoting the legal foundation, technology enhancement, and human resource development, notable points are recognized in identifying priority focus on regions for investment and strategic sectors. Clear focus is placed on promoting comprehensive regional industrial bases through industrial agglomeration (clustering and industrial parks, etc.), and networking (especially logistics infrastructure).

2.75 In terms of policy, especially in provincial areas due to the limited scale of economy through industrial agglomeration rather than the UB area, the improvement and enhancement of productivity and efficiency is one of the current priority issues to be tackled in industry. It is also important to develop an efficient logistics network for more efficient industrial ties among regional agglomerations as well as with global supply chains in terms of logistics cost as well as interregional business development. Geopolitically, Mongolia is landlocked and has to bear relatively disadvantageous costs for international transportation which has to go through neighboring countries such as China and Russia. Mongolia has to overcome this comparative disadvantageous structure in logistics, which often causes the bottleneck of inbound foreign direct investment in industry.

Table 2.4.4 Policy Goals in Industrial Development Policy

1	Establishment of a sound legal environment in the area of industry for further development.
2	Clear identification of regional investment zoning for industrial development (formulation of a "Mongolian Comprehensive Industrial Development Planning and Mapping" corresponding to the significances of related policies on eco-system, population settling/migration, natural resources, and infrastructure).
3	Identification of strategic sectors in industry, and comprehensive development of their industrial clustering, Free Trade Zones (FTZs), Industrial Parks, and transportation/ logistics network.
4	Establishment of and investment in the processing facilities effective for social and economic development based on the latest technology, high quality machineries, and innovation (supported by the policy on financial scheme).
5	Establishment of an effective foundation for industry-academia-government collaboration for industrial development and its support.
6	Enhancement of industrial human resource development.
7	Formulation of the optimal business environment and diversification of export.

Source: Based on information from the Ministry of Industry.

2) Strategic Priority Sectors

2.76 In the general provision, the policy focuses on agriculture and livestock farming and on mining processing (value-added production of the mining sector)[12] as strategic priority sectors. It also places significant attention on the promotion of value-added goods and services and on the diversification of industries. Based on the principles in the general provision, the particular provision elaborates on the goals and specific directions of policy measures for priority sectors (see Table 2.4.5). This includes identification of regional characteristics, promotion of clustering, and development of domestic full range manufacturing, effective logistics network, infrastructure, and comprehensive facilities for value-added mining.

Table 2.4.5 Direction of Policy Measures for Industrial Promotion in the Priority Sectors (Adopted in June 2015)

1	Identify development priorities based on regional characteristics.
2	Develop clusters for heavy industry, light industry and SMEs, and formulate their strategies.
3	Develop domestic industries to fully process the resources from the agriculture and livestock farming sector and mining sector.
4	Develop the logistics network system corresponding to the cluster development, including a shipment consolidation system for raw materials and products selling network.
5	Specify and adopt the locations and lists for clustering, FTZs, and Industrial Parks.
6	Construct totally utilizable facilities with processing factories for crude oil, coal, coal chemicals, non-metallic, and ironworks.

Source: Based on information from the Ministry of Industry.

[12] Mining itself is not included in the Industrial Development Policy. It is covered by the specific strategy for mining promotion.

3) Regional and Sectoral Priorities

2.77 The policy indicates prospective priorities for industrial development in terms of investment priorities in 27 areas in 5 regions and by 19 industrial sectors (classifications). As indicated in Table 2.4.6, further investment is suggested in the agriculture and livestock farming related sectors in general for most of the areas. Regional differences are observed more in the mining and heavy industry related sectors where it is clear which areas are targets for investment promotion and which are to be limited.

2.78 With regard to the agriculture and livestock farming related sectors, the regional investment priorities are placed on Ulaanbaatar, Erdenet, Darkhan, and Selenge for access to both the domestic and Russian markets. Other priority areas, such as Hatgal and Erdenemandal, are targets for Agro-Industrial Technology Parks (Agro-IT Park). Promotion of the cashmere/wool/leather industry is still the investment priority in Khangai Region where high quality cashmere/wool is produced.

2.79 For the mining and heavy industry related processing sectors, clear priority is placed on Hovd (where the Industrial Park is planned), Erdenet (where further industrial diversification is to be promoted for its sustainable economic development), Dornogobi (where the OT project is developing), Choir (hub of the North-South economic corridor between UB and Sainshand), and Choibalsan (the access hub to Inner Mongolia and Russia).

Table 2.4.6 Priorities for Industrial Development by Region and Sector

Industrial Region		Western Region						Khangai Region						Central Region						Gobi Region					Eastern Region			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Industrial Sector		Altai-Dayan	Ungii-Tsagaan nuur	Hovd	Uvs	Darvi-Umugovi	Altai-Shargiin	Zavhan-Tosontsenge	Zavhan-Uliastai	Huvsgul-Hatgal	Bulgan-Hutag-Undur-Erdenemandal	Umnud Hangai	Erdenet	Darkhan-Sharin gol	Selenge	Ulaanbaatar	Tuv	Haraa	Baganuur	Mandalgovi	Choir	Dornogovi	Umunugovi	Gurvantes	Undurhaan	Ih Hentii	Choibalsan	Suhbaatar
	Meat, Meat Processing	■	■	■	■			■	■	■	■	■	■	■	■	■	■	■	■	■	■				■	■		■
	Milk, Dairy Products							■		■	■		■	■		■			■				■				■	
	Leather Production	■	■	■	■			■	■	■	■	■	■	■		■		■							■			■
	Wool Production	■	■		■			■	■	■	■	■	■	■	■	■		■	■	■	■		■		■	■		■
	Cashmere Procduction		■	■	■	■	■	■	■	■	■	■	■	■		■			■	■	■	■	■		■			■
	Crops, Feed Production	■	■							■	■		■	■	■		■	■	■						■			
	Vegetable Cultivation	■	■	■	■						■		■	■	■	■	■	■	■						■			
	Fruites,			■	■				■	■	■				■	■									■	■		
Tourism		■	■	■	■	■	■		■	■	■					■			■			■		■	■		■
Woodwork								■		■	■		■	■	■	■									■			
	Coals - Chemical	■	■		■	■	■		■	■	■				■		■	■	■		■	■		■			■	■
	Coke - Chemical	■	■		■	■	■	■	■		■	■		■	■	■	■	■	■		■	■	■			■	■	■
	Refinery	■		■		■	■	■	■	■	■			■	■		■	■	■	■	■	■	■	■	■	■	■	■
	Iron	■	■	■	■		■	■	■	■		■	■	■			■					■	■	■	■	■	■	
	Non-metallic Products	■		■		■	■	■		■	■		■				■	■		■	■	■		■	■	■	■	
	Construction Materials	■		■	■	■	■		■	■	■	■	■	■			■			■		■		■	■	■	■	
	Machinery & Metallic	■	■		■	■	■	■	■	■	■	■	■	■	■		■	■		■			■	■	■	■	■	■
	Chemical	■	■		■	■	■	■	■	■	■	■	■		■		■	■	■	■	■		■	■	■	■	■	■
Indsutrial Park		■	■	■	■	■	■	■				■	■	■		■	■	■	■		■	■				■	■	■

凡例	
	Investment promotion area
	Investing area
	Maintaining current investment area
	Investment limiting area

Source: Ministry of Industry.

4) Direction of Industrial Agglomeration

2.80 In the implementation of the Industrial Development Policy, in addition to the Industrial Parks and FTZs which are in the development stage, there is an ongoing plan to

establish Agro-IT Parks[13] which mainly aim at the agglomeration of agro-livestock related industries.

2.81 The concept of the Agro-IT Park aims to consolidate the food processing business in four different sectors (vegetable, cashmere/wool/leather, food meat, and dairy products) to provide an efficient production and logistics environment. It also plans to provide R&D facilities in the Park to pursue product development in these sectors by upgrading and adding value to product quality. There are 40 Parks planned of which 8 priority sites are nominated for initial establishment.

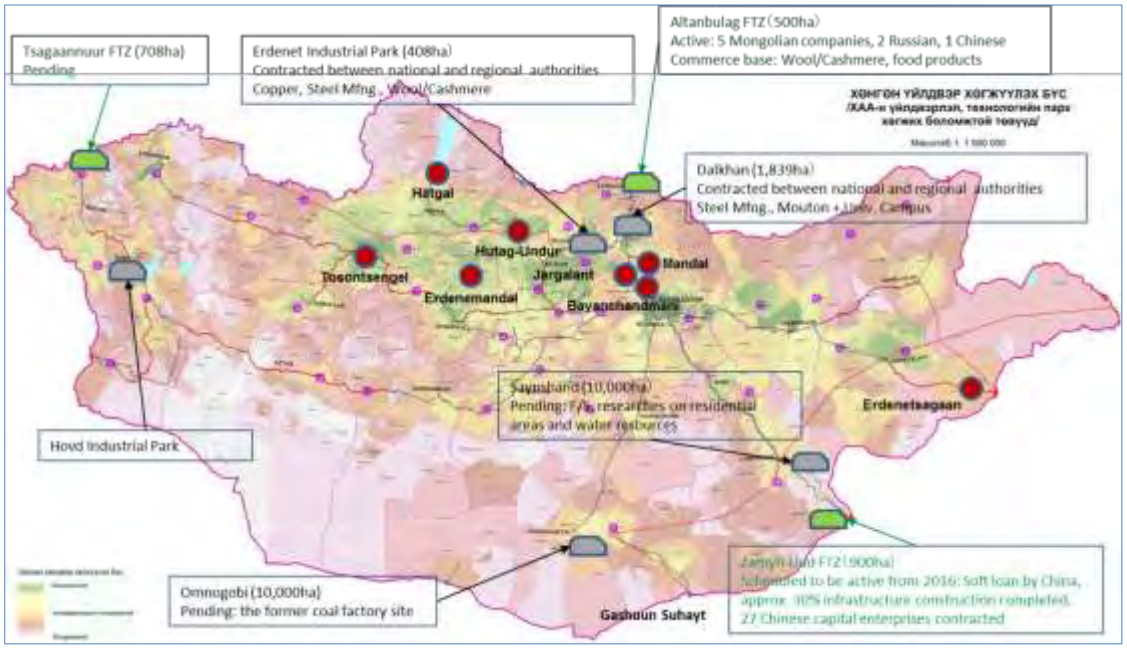
2.82 At the initial stage, the Agro-IT Park development was to be supported by the government budget in terms of basic infrastructure–which was considered the major incentive for the tenant private sectors to be in the Park. However, due to budgetary constraints, the initial plan was reconsidered and direct support by government budget was not realized. In order to compensate this, the government has set out a fund totalling MNT2 trillion for regional/soum development and SME promotion, and designed it to be utilized also for implementation of regional Agro-IT Park projects. At the soum level, an average of MNT500 million (approximately USD300,000) was to be expected as the substantial governmental support for developing basic infrastructure, renewal of required machinery, introduction of technology, and various start-up supports as well as exemption from the charge of land usage. As of April 2016, prior to the official approval for the Parks, several tenant companies are applying for their establishment in the Parks in some candidate locations. The construction works have also been started in some candidate Park locations.[14]

2.83 Figure 2.4.10 maps the locations of the Agro-IT Parks, Industrial Parks and FTZs. The color-coded map indicates active areas of the agro-livestock sectors; with green representing very active areas, and yellow as active. The 8 priority sites are nominated in the range of the active areas. Although the Industrial Parks and FTZs are also (or planned to be) established along the axis of the north-south and east-west economic corridors, there is another aspect for the industrial development in the western region to be more independent from other areas but to link with the neighboring countries to form a western economic zone. The Omnogobi Industrial Park can be the new industrial hub corresponding to the development of TT and OT projects on the prospective new economic corridor from Ulaanbaatar to GashuunSukhait.

2.84 As indicated, regional development and networking is considered in the industrial agglomeration of priority sectors in the Policy.

[13] In the former administration, the Agro-IT Park was discussed under the authority of the former Light Industry Department of the Ministry of Food, Agriculture and Light Industry. This undertaking has been transferred to the Ministry of Industry and dealt in the context of the Industrial Development Policy.

[14] The medium sized food meat processing company is already approved to become a tenant and a local small-sized food meat processing company is preparing for actual establishment in Hutag-Undur. Accordingly, a pilot intensive livestock farming project is initiated with local nomadic groups. In Erdenemandal, prior to the official approval for the Park, construction work has been initiated for the basic infrastructure under the soum's initiative.



Note: The red large dots indicate the 8 priority sites of Agro-IT Parks and the purple small dots show the rest of the 32 sites.

Source: Based on information from the Ministry of Industry.

Figure 2.4.10 Location of Agro-IT Parks, Industrial Parks and FTZs

2.85 In terms of selection criteria for the 8 priority locations for Agro-IT Park candidates (see Table 2.4.7), statistical data and a GIS program were utilized at the soum level for around 40 categories of data, such as population scale, number of livestock, distribution of food meat processing factories, agro/livestock production scale, and so on. Priority was set for the districts where a variety of data results are highly concentrated and through consultations with authorities in aimags and soums (the Ministry of Industry dispatched officials to each aimag and soum for consultation).[15]

[15] As of March 2016, the Ministry of Industry is in the process of preparing an additional 10 more priority locations for Agro-IT Park. The selection process is giving more importance on regional initiatives at the aimag and/or soum level, such as establishing actual implementing entities at the regions, through the direct interviews of dispatching officials for the second round.

Table 2.4.7 Priority Locations for Agro-IT Park

No.	Aimag	Sum	Initiatives	Sectors Focused	Regional Characteristics	Scale of Park
1	Arkhangai	Erdenemandal	Ministry of Industry, Investment Mongolia Agency	Food Meat, Milk, Vegetable Processing, Leather Processing, Storage Warehouse	Largest live-stock number among all the aimags. Good quality in food meat and wool. Large number in sheeps. Major raw material supplying region for the large scaled wool carpet factory. Rich in water resouce. Delay in infrastructure development.	Small scale (approx. 5ha) 1 of 40 candidates
2	Bulgan	Hutag-Undur	Ministry of Industry, Investment Mongolia Agency	Food Meat, Milk, Vegetable Processing, Leather Processing, Storage Warehouse	Well hervested, rich in agriculture including vegetable farming. Milling factories location. Along the UB-Huvsgul major corridor. Rich in water resource. Partial infrastructure development.	Small scale (approx. 5ha) 1 of 40 candidates
3	Zavkhan	Tosontsengel	Ministry of Industry, Investment Mongolia Agency	Light industry, Food Meat, Milk, Vegetable Processing, Leather Processing, Storage Warehouse	The former timber factories location during socialist regime. Partial infrastructure development.	Small scale (approx. 5ha) 1 of 40 candidates
4	Huvsgul	Hatgal	Ministry of Industry, Investment Mongolia Agency	Dairy Products, Tea, Fruits, Food Fish, Tourism related Industry	Major tourism destination sum along side of Lake Huvsgu, Rich in fruits, mushrooms, harval tea production. Regional branding in smoked and canned food fish, reindeer leather foot wear and bags. Rich in water resource. Partial infrastructure development.	Small scale (approx. 5ha) 1 of 40 candidates
5	Tuv	Bayanchandmani	Ministry of Industry, Investment Mongolia Agency	Fodder, Fertilizer, Food Meat, Milk, Vegetable, Intentive Live-stock/Diary Farming	Close location to UB. Large supplying district of vegetable and eggs to UB. Along the Zamiin-Uud-Altanbulag corrido. Partial infrastructure development.	Large scale (over 500ha) 1 of 40 candidates
6	Tuv	Jargalant	Ministry of Industry, Investment Mongolia Agency	Vegetable, Live-stock/Diary farming	Traditionally known as a well hervested district in vegetable including potatos. Major supplying district to UB, Darkhan, Selenge. Milk processing factory location. Well developed in infrastructure.	Large scale (over 500ha) 1 of 40 candidates
7	Selenge	Mandal	Ministry of Industry, Investment Mongolia Agency	Agriculture, Milling Factory, Vetetable, Live-stock/Diary Farming	The largest agro-farming district in Selenge aimag. A well hervested sum in vegetable together with greenhouses and diary farming. Rich in water resource. Partial infrastructure development.	Large scale (over 500ha) 1 of 40 candidates
8	Sukhbaatar	Erdenetsagaan	Ministry of Industry, Investment Mongolia Agency	Food Meat, Leather Processing, Storage Warehouse	Good quality Uzemchin sheep. Large scale in grazing with rich pasture. Close location to food meat exporting gateway of Bichigt. Demerits in the number of aphthous fever infected districts, low quality water resource, and delay in infrastructure development.	Small scale (approx. 5ha) 1 of 40 candidates

Source: Based on information from interviews of the Ministry of Industry.

(3) Issues in Industrial Promotion

2.86 In the JICA Study, a series of interviews was conducted with various sectoral industrial associations, major industrial associations (such as the Mongolian National Chamber of Commerce and Industry (MNCCI) and the CEO Club), line ministries and related governmental organizations, as well as individual companies. Aside from the interviews, an interview survey was conducted in collaboration with a private Mongolian research firm covering over 160 individual companies.

1) Highlights of Interview Results

2.87 Based on the interviews with major industrial associations (such as MNCCI[16], CEO Club[17], and other industrial associations[18]) and discussion with ministries and related organizations, the "significance of industrial diversification" was stressed because the

[16] The Mongolian National Chamber of Commerce and Industry was established in 1960 and reorganized as an industrial NGO in 1990 for SME promotion. Currently, over 800 companies are enrolled as members forming 34 sectorial councils for major industrial sectors. It has 19 regional offices, including one in Japan.

[17] The CEO Club was established by 29 relatively large-scale companies that split from MNCCI in 2014. Petrobis (energy sector), MCS Group, UFC (beverage sector), UC Group (developer), etc. are member companies.

[18] As for the other industiral associations, the interviews were conducted with the Leather Association (established in 1997, with 150 members), Wool Association (360 members), and Food Industry Association (established in 1991, with 300 members). Separate interviews were also held with MNCCI industrial councils, besides MNCCI, such as the Council for Food Processing, and for Wool Cashmere.

un-balanced lopsided industrial structure with heavy dependence on the mining sector is considered a fragile foundation for sustainable economic development. To address this issue, it was recommended to pursue a "strategic promotion of the agro-livestock sector" where Mongolia enjoys a comparative advantage of having rich resources. In particular, there are more than 60 million livestock resources (wool, cashmere and leather–which are the promising resources next to mining resources) to be utilized better with value-added processing. It was mentioned that the issues to be addressed in this sector are the "establishment of an efficient and consistent system to constantly preserve quality raw materials" and the "enhancement of productivity and high value-added products development" in order to demonstrate competitiveness in the global market. With regard to the agricultural resources with Mongolian comparative advantage, such as sea buckthorn, it was strongly suggested that value-added products should be promoted by processing raw agricultural products. The unsaturated fatty acid known as "Omega 7", which is getting popular in the healthfood market, can be processed from sea buckthorn and from camel milk, both of which are good agro-livestock resources in Mongolia. Placenta extract products, which can be processed from placentas of horses and sheep, were also mentioned for the healthfood and cosmetics markets.

i) Issues related to raw material procurement (collecting raw materials)

2.88 In the wool/cashmere and leather sectors, as mentioned above, the consistent and efficient collection of quality raw materials is the major issue. According to estimates by the association related to the wool/cashmere sector, almost 90%of raw cashmere wool produced in Mongolia was exported as raw materials in the early 2000s. This improved since the introduction of a government subsidy program[19] in 2003. However, approximately 60% of raw materials is still exported mainly to China with low value-added and, in many cases, are re-imported as woolen and worsted yarn after their yarning process in China. One of the reasons for this situation is the nomadic characteristic of Mongolia. Actual production sites are hardly fixed, making the systematic collection of raw materials also difficult. The large-scale wool/cashmere companies can hire and keep commissioned agents, either contracted or in-house, for consistent collection. They have full-range manufacturing lines from cleaning of raw wool/cashmere to final garment products. However, the SMEs in the sector cannot afford to keep those agents, thus making their raw material collection difficult. It is mentioned that an efficient supply chain should be developed from the upstream to the downstream production. Government support measures are expected to assist in this supply chain development as well as enhancement of productivity and value-added. The Agro-IT Park program in the Industrial Development Policy is welcomed in terms of collection of raw materials linked with primary processing as well as upgrading and standardization of quality through agglomeration of agro-livestock sectors.

ii) Issues related to productivity and value-added

2.89 The identified major challenges for the enhancement of productivity and value-added are "introduction of relevant technology" and "industrial human resource development." In the current cashmere manufacturing sector in Mongolia, the popular thread size is count number 26[20] as many of Mongolian manufacturers are not capable of producing yarn of thinner thread.

[19] The subsidy program provides subsidy based on the volume of raw materials delivered to the designated places by the raw material producers.

[20] The thread count number measures the ratio of yarn length per gram of raw wool. "Count number 1" is the thread size of 1 meter of yarn from 1 gram of raw wool.

In order to produce better quality final garment products, thinner yarns (such as count 40, 50 to 100) are required but they are mostly imported (or re-imported) from China.[21] The technology to produce thinner thread is required. It is also mentioned that a yarn-making technology for new types of yarn is needed, such as a technology for wool/cashmere yarn worsted with silk yarn, a technology for textile fabrication with raised fabric, etc. Personnel with the required operational skills are also needed to take full advantage of these technologies. The lack of these industrial human resources has been pointed out, which causes inefficiency in production due to dependency on outsourcing technological support for the technologies adopted (e.g., new production machinery).

iii) Issues related to product development in the Agro/Livestock sector (Value-adding product development)

2.90 While there is still a challenge in the procurement system for quality raw materials, the trial and error approaches are now developing in the food processing sector for new processed products, such as Omega 7[22] (from sea buckthorn, camel milk, etc.) or placenta extract. With regard to the sea buckthorn processing, one of the largest food processing companies, the UFC Group,[23] is making a grand entrance into the sea buckthorn processing business, taking the lead among 10 or so other companies in the same business. They recently formed an association for the sea buckthorn business. They are internationally competitive in the quality of sea buckthorn processed products but the production of sea buckthorn itself is still limited, which is the immediate issue to be addressed for improvement. The yield of Mongolian sea buckthorn is less than that of the Chinese breed variety, thus the technology on breed improvement is becoming a keen necessity[24] for the sector as well as product development. With regard to placenta extract products, one foreign capital company is currently introducing a new raw material collection system.

iv) Potential diversification issues (new entry to Agro/Livestock sector from other sectors)

2.91 In the agriculture sector, new entrants from other sectors are observed recently. One of the leading mining groups[25] recently entered the flour milling business as part of its business diversification. They are now considering to move into the wheat production in the agriculture sector in order to preserve efficiency in collecting raw materials through internal supply chain. Another foreign capital company originally from the ironworks related business[26] is now developing a buckwheat flour milling business involving buckwheat farmland based on their in-house business portfolio policy. The significance of these business trends was pointed out for the effective and efficient interaction and linkage between the agriculture sector and food processing sector.

v) Other dimensions for diversification

2.92 Other than the agro-livestock related sector, there are also basic needs for “market

[21] A limited number of large-scale companies, such as GOBI, have the capability and facilities to yarn thin thread up to count 100. However, this is more or less exceptional for cashmere manufacturers in Mongolia in general.

[22] Synthesized unsaturated fatty acid. Applications are extending to cosmetics and health foods/supplements.

[23] One of the leading beverage manufacturers.

[24] The association for the sea buckthorn sector is planning to receive technology assistance from Ibaragi Prefecture of Japan.

[25] The Nuudelchin Group, one of the leading mining companies, has developed a new business and entered the flour milling operation. They established Erdenet Foods LLC in Erdenet.

[26] MegaTech, a Japanese-owned iron manufacturing company, went into the buckwheat milling business and the development of a buckwheat farmland along the Halh river basin.

development" and in-bound "foreign direct investment." A large-scale machinery parts manufacturer related their current situation that their factory has almost stopped operating totally for a couple of months due to the continuous decrease in demand. As huge investments were made on their factory machinery and facility during the socialist regime, as the second largest factory in the sector, they can take advantage of the full range of facilities from the electric smelter for metallic casting to various heavy metal processing machines including computerized turning machines. They also have facilities for plastic injection moulding. However, all these facilities are currently being unutilized. They explained that the general situation in that sector was more or less similar. Their intention was to supply machinery parts for the foreign capital mining companies for which they have both the capacity and quality. However, those companies tend to rely on their own supply chain and opportunities since the domestic procurement of their machinery parts are often limited. It is expected that a new market is developed for domestic procurement of machinery parts by foreign investing companies including mining companies. In order to do so, further attraction of foreign direct investment is also indispensable.

2.93 On the issue of "technological development and promotion of industry-academia-government collaboration," it was strongly suggested (requested) that there should be certain measures to improve outdated laboratory facilities at the national research and testing centers. The information assistance function of those centers is also suggested to be further promoted. The centers are developing and providing utilizable new technology for light industry, such as development of a new combing machine for sheep wool, environment-friendly dyeing chemicals for leather processing, and so on. Certain centers are also providing business incubation services for SMEs. These functions are very important for domestic industrial development but not often well informed and utilized among private sectors yet. The government has been exerting efforts to improve the situation through restructuring of the centers; however, due to the budgetary constraint, adequate support is not yet provided in terms of assignment of experts, planning and improvement of facilities/equipment at the centers, and introduction of new technology–which all are the areas to be covered by further governmental support and expected possible assistance from international development partners.

2) Highlights of Interview Survey Results

2.94 The survey covered 160 private companies including industry associations in 15 industrial sectors (including services, mining, and agro-industries) in 4 major regions that the JICA Study covered as a scope of research, namely Ulaanbaatar, Darkhan/Erdenet, Choibalsan, and Sainshand.

2.95 The survey was designed to determine the actual situation directly from representatives of the industrial sectors rather than by statistical precision as the initial planned sample number was very limited for the whole range of industrial sectors to be analyzed with statistical significance. At the initial stage, the survey was to be conducted through 100 questionnaire survey and 50 Delphi interviews (interviews afterwards of the respondents to the questionnaire based on the result of the questionnaire survey). However, it was considered rather unrealistic to have a theoretical sampling from the total number of enterprises of 59,800 to 100 samples covering all the important sectors to identify the current situation, and reconfirmed the necessity of gathering the top managements' views. The survey was, thus,

redesigned to be conducted with 150 face-to-face interviews with top management representatives. Sampling was conducted manually based on directories of enterprises of industrial associations. Although the details of survey results as well as details of samples, distribution, and methodology is elaborated in a separate volume for the collected data of this report, the following tables outline the sampling design and a brief overview of the survey results.

Table 2.4.8 Sample Distribution of the Survey by Coverage Region

Region	GDP[27] Share	Enterprises Operated[28] Share	Enterprises Interviewed	
			Number	%
Ulaanbaatar Region	61%	62%	123	77%
Northern Region (Darkhan/Erdenet)	11%	11%	18	11%
Eastern Region (Choibalsan)	3%	2%	10	6%
Southern Region (Sainshand)	2%	1%	9	6%
Total	77%	76%	160	100%

Table 2.4.9 Sample Distribution of the Survey by Industrial Sector[29]

Industrial Sector	Sector's share out of total GDP	Interviewed companies	
		Number	Percentage
A: 10.Agriculture	14%	21	13%
B: 20. Mining and quarrying	18%	17	11%
C: 30. Manufacturing	11%	58	36%
D: 40. Electricity, gas, and steam	2%	5	3%
E: 50. Water supply; waste management	0%	5	3%
F: 60. Construction	6%	7	4%
G: 70. Wholesale and retail trade	16%	8	5%
H: 80. Transportation	4%	8	5%
I: 90. Accommodation and food service	1%	7	4%
O: 100. Administrative and support service activities	1%	3	2%
J: 110. Information and communication	2%	2	1%
K: 120. Financial and insurance	4%	7	4%
S: 130. Professional, scientific and technical activities	3%	6	4%
P: 140. Education	4%	3	2%
Q: 150. Human health and social work	2%	3	2%
Total	89%	160	100%

(a) **Human Resources, Access to Finance**

2.96 The following points are raised as the specific difficulties in human resources: (i) limited discipline and commitment; (ii) lack of skills (operational); and (iii) high labor turnover rate (see Figure 2.4.11). On the issue of access to finance, the following specific points are identified: (i) high loan interest rate, the most significant response; (ii) limited

[27] Source: National Statistics Office.

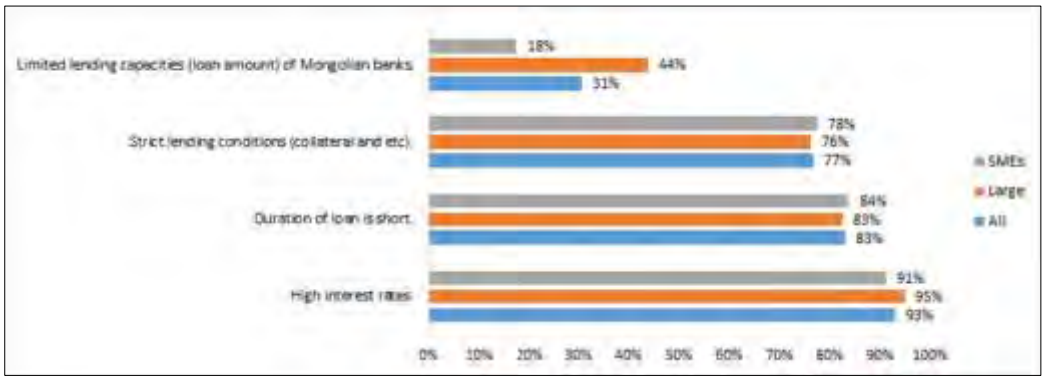
[28] Source: National Statistics Office.

[29] As for the sectoral classification of the samples, the ISIC (International Standard Industrial Classification) Code was applied.

lending period; and (iii) complexity of conditions for loans (see Figure 2.4.12).

Source: JICA Interview Survey.

Figure 2.4.11 Issues Related to Human Resources

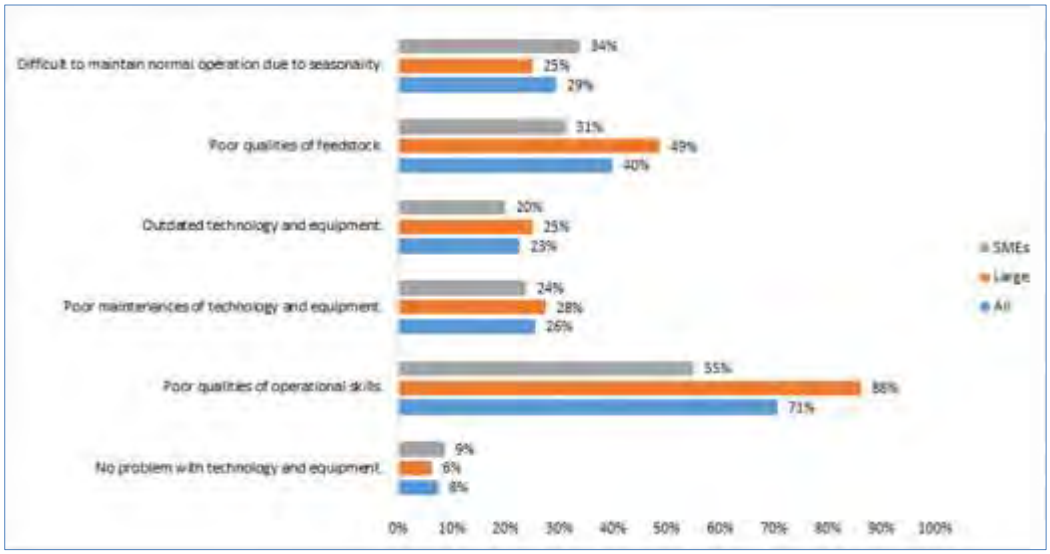


Source: JICA Interview Survey.

Figure 2.4.12 Issues Related to Access to Finance

(b) **Technology Adoption**

2.97 With regard to the adoption of technology, "outdated technology and equipment" was not found to be the largest difficulty, probably because many of the respondents were large-scale companies in the manufacturing sector (see Figure 2.4.13). For them, the technology issues more or less concern the human resource development rather than equipment in the service sector. The most significant issue was identified as "poor quality of operational skills," which mirrors the strong need and requirement for operational skills and technology. Furthermore, it was reported in the actual interviews that some SMEs were still in need of upgrading their equipment and adopting new technology in the manufacturing sector.



Source: JICA Interview Survey.

Figure 2.4.13 Issues Related to Adoption of Technology and Equipment

(c) Raw Material Supply

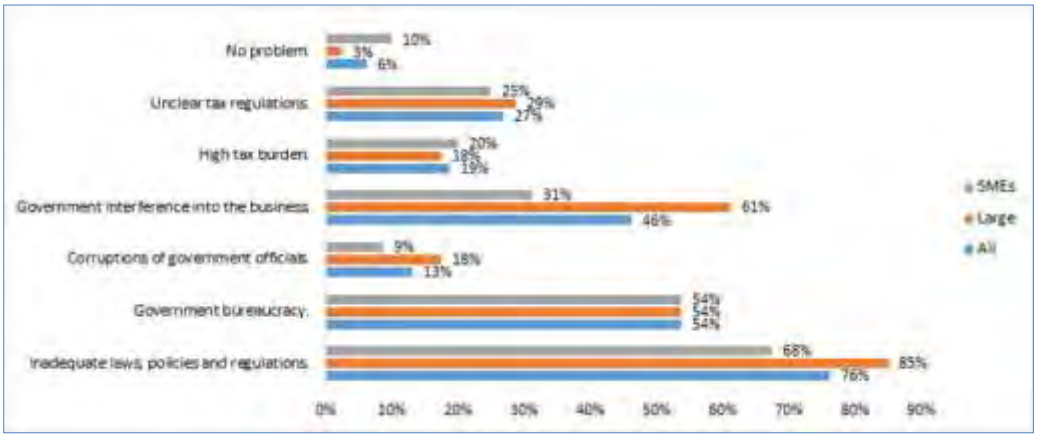
2.98 The issues on raw material supply reflect the characteristic structure of Mongolia's heavy dependence on imports, with “high fluctuation of exchange rate” and “high volatility of raw material prices” pointed out to be the major difficulties (see Figure 2.4.14). It was reconfirmed that imports are still the major channel for raw material procurement.

Source: JICA Interview Survey.

Figure 2.4.14 Issues Related to Raw Material Procurement

(d) Need for Policy Measures

2.99 The major issues identified in relation to government policies are, in general, the need for improving the legal foundation and for enhancing the efficiency of bureaucratic procedures (see Figure 2.4.15). The highest interest of the industry for this section is the expectation of concrete and consistent policies and implementation (of the legal system).



Source: JICA Interview Survey.

Figure 2.4.15 Issues Related to Government Policy

2.100 This survey was not limited to the manufacturing sector but also covered the mining and services sectors. This is because the main objective of the survey is to get an overview of the overall situation of industry in the larger context and to highlight leads for further detailed study in each relevant sector. The statistical significance, thus, is not to be counted but referred to as "trend value" for further study.

3) Summarized Points on Issues Related to Industrial Promotion

2.101 Based on the statistical information, the policy analysis, interviews and the survey, the points on issues related to industrial promotion are summarized in Table 2.4.10 below.

Table 2.4.10 Issues for Industrial Promotion

A	Overall Issues for Industry as a Whole
	(i) Unbalanced and lopsided industrial structure depending on specific limited sectors and regions (fragile manufacturing foundation, inefficient industrial dispersion);
	(ii) Heavy dependence on imports (raw materials, parts, final products, consumer goods, etc.);
	(iii) Comparative disadvantages in foreign direct investment other than mining (high logistics cost [landlocked], limited domestic supply of raw materials);
	(iv) Limited industrial human resources (discipline, skills, craftsmanship, high quality know-how); and
	(v) Difficulty in access to finance (high loan interest rate, lending period and conditions).
B	Issues for Industrial Promotion in Priority Sectors
	(i) Limited interaction and linkage between agro-livestock sectors and related processing sectors (difficulties in efficient procurement of raw materials);
	(ii) Weak foundation of supply chain development, delay in scale of economy (productivity, technology transfer/adoption, market development);
	(iii) Delay in value-added (export of raw materials, import of finished goods);
	(iv) Delay in upgrading processing in the mining sector;
	(v) Limited utilization of existing industrial resources (utilization of government run R&D centers contributing to the promotion of industry-academia-government collaboration).

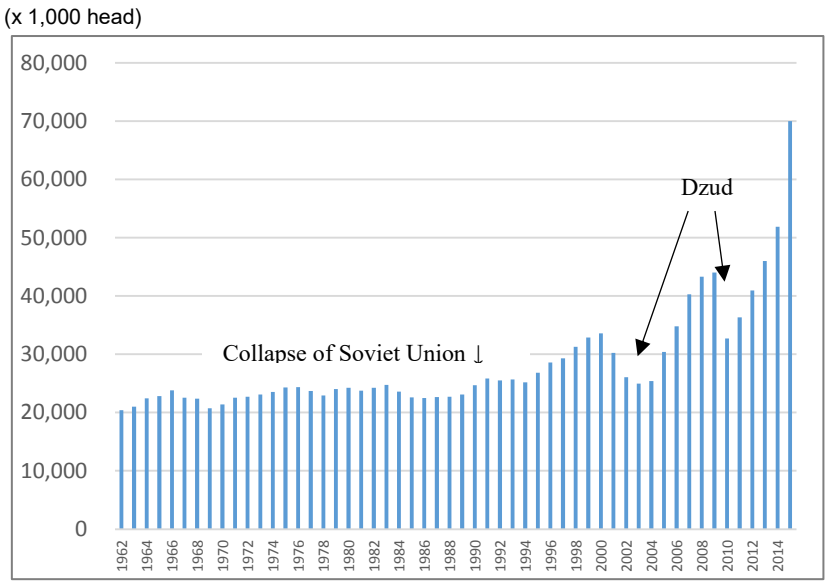
Source: JICA Interview Survey.

2.5 Current Situation and Challenges to "Healthy Livestock" for Sustainable Livestock Farming Development

(1) Current Situation of Livestock in Mongolia

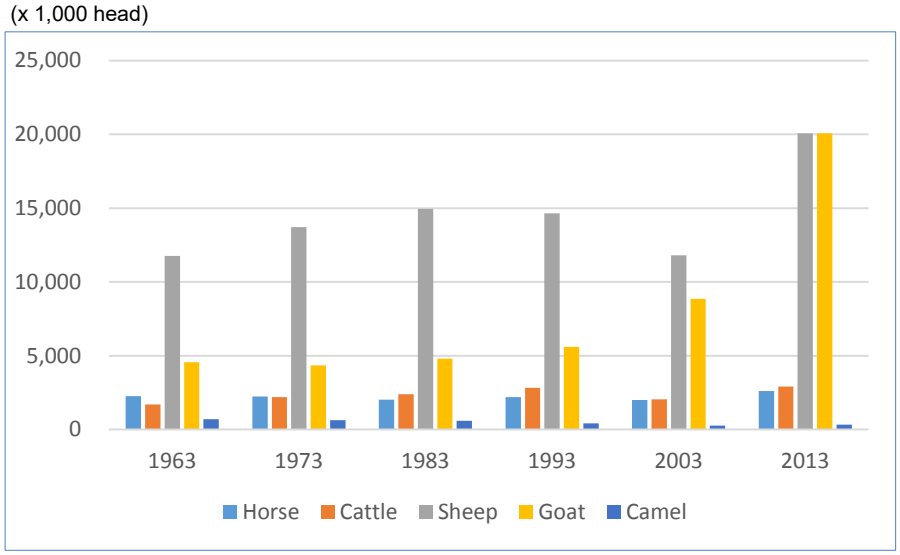
2.102 Of Mongolia's total land area, which is slightly more than four times that of Japan, 80% is under pasture, though its potential for general cash crops is extremely limited due to arid and cold climatic conditions. Consequently, the mobile livestock-keeping, based on this vast grassland, has long been the mainstay of the nation accounting for 85% of agricultural GDP (see Figure 2.5.1). The main livestock species in Mongolia consist of horses, cattle, sheep, goats and camels, raised by approximately 150,000 herders in 2014. The total number of these five species has been increasing, reaching 70 million, a record high as of June 2015. The number of livestock fluctuated within a relatively narrow range of 20 to 25 million during the 1964 to 1994 period. After the collapse of the Soviet Union in 1992, however, the number has increased nearly threefold to date with an average annual grow rate of 3.4% during the aforementioned period. This figure, next to the world average in the same period, which is 0.8%, seems very high. Also important is that the ratio of the five major animals (horses, cattle, sheep, goats and camels), which had been 1:1:7:3:0.5, respectively, during the socialist era has changed dramatically in the last two decades, especially the sheep and goat numbers being noticeably higher (see Figure 2.5.2).

2.103 Although both utilize domestic animals as commodity providers, the mobile livestock-keeping in Mongolia has distinct features from the specialized livestock operation commonly observed in temperate countries where animals are housed and fed commercial feeds. Mobile livestock-keeping in Mongolia is a farming lifestyle in which so-called herders move from place to place, normally following a fixed annual or seasonal pattern of movements and settlements, as a way of obtaining pasture and water for herbivorous livestock , producing meat, milk, fiber, hides, etc. This report considers such mobile livestock-keeping, which has long been exploited in a sustainable way in Mongolia, as the epitome of "Healthy Livestock" and conducted the investigation by paying special attention to how the current situation has changed, and whether or not the changes are harmful. The three primordial points about the Healthy Livestock are as follows: (1) Healthy animal: individual health without disease; (2) Healthy population: robust herds and flocks in an appropriate number and ratio of the five major animals conforming to the availability of pasture and water; and (3) Healthy farming: a stable income generator for herders.



Source: FAOSTAT, Mongolian Statistical Yearbook.

Figure 2.5.1 Livestock Population Trend in Mongolia, 1962 to 2015



Source: FAOSTAT.

Figure 2.5.2 Trend in Livestock Numbers Comprising the National Herd, 1962 to 2013

(2) Methods of Fact-Finding

2.104 Prior to the visit to Mongolia, considering the limited amount of time, the most important tasks and institutions to be visited were decided as shown in Table 2.5.1.

Table 2.5.1 Important Tasks and Institutions to be Visited

<table>
<tr><td>Tasks</td><td colspan="2">To maximize efficiency in conducting the investigation, the mission team will:
・ Review as much information as possible on Mongolian livestock before the visit;
・ Contact experts in Mongolian livestock and its surrounding issues both in Japan and Mongolia;
・ Decide institutions to be visited, based on the information gathered prior to the visit;
・ Adding to general information on Mongolian livestock, investigate whether or not they face problems, difficulties or challenges; and
・ Then, in case they face any of them, scrutinize further why they face them, how they can work them out or alleviate them.</td></tr>
<tr><td rowspan="4">Institutions to be visited</td><td>Ministries and Agencies</td><td>Livestock Institutions and Private Sector</td></tr>
<tr><td>・ Ministry of Food and Agriculture, Department of Strategic policy and Planning
・ Ministry of Food and Agriculture, Department of Coordination for Animal Husbandry Policy Implementation
・ Ministry of Food and Agriculture, National Animal Gene Bank
・ Ministry of Food and Agriculture, Department of Veterinary and Breeding Service, Division of Registration and Information
・ Ministry of Food and Agriculture, Department of Veterinary and Breeding Service (OIE[30] delegation)
・ Ministry of Finance, Economic Policy Department
・ Central Veterinary Office in Tov</td><td>・ Mongolian Veterinary Medical Association
・ Mongolian Meat Association
・ Mongolian Association of Leather Industry
・ Mongolian Association of Zootechnicians and Livestock Breeders
・ Mongolian Dairy Science Research Association
・ Mongolian Wool Association
・ Private companies: meat packers, dairy plants, etc.</td></tr>
<tr><td>Universities and Research Institutes</td><td>Others</td></tr>
<tr><td>・ Research Institute of Animal Husbandry
・ Mongolian University of Life Sciences, School of Veterinary Medicine</td><td>・ Herders
・ Mongolian National Broadcaster</td></tr>
</table>

2.105 Based on the information gathered from the survey[31] and the dialogues with Mongolian experts, livestock-related persons, and herders, the major concerns facing the mobile livestock-keeping can be synthesized and summarized into the following three points:

- Degradation of grasslands;
- Ever-worsening dzud; and
- Negligence of epidemic and plague control.

2.106 The following section expands on each of the three major issues including backgrounds, reasons, and possible solutions to prevent or mitigate them.

[30] OIE (originally in French): World Animal Health Organization.

[31] *Among others*, Janzen, J. 2005. Mobile livestock-keeping in Mongolia: Present problems, spatial organization, interactions between mobile and sedentary population groups and perspectives for pastoral development. Senri Ethnological Studies 69: 69-97., World Bank. 2008. Mongolia Livestock sector study, World Bank., USA., Konagatani. 2007. Characteristics and transformation of pastoral system in Mongolia. E-journal GEO 2: 34-42.、Kamimura, A., Natinshonhoru, G. U., Jagaruzaihan, L, Kodama, K. and Konagatani, Y. Livestock and agriculture in terms of land use, Chapter 6. In Mongolia: Breakdown and recovery of ecological network in grasslands, Fujita, N., Kato, S., Kusano, E. and Koda, R. (eds.). 2013. Kyoto University.

1) Major reasons for grassland degradation and challenges

2.107 As mentioned in the previous section, traditional mobile livestock-keeping, semi-nomadic pastoral livelihoods, has long been practiced in Mongolia for millennia. Thus, although the practice in and of itself proved sustainable, for some reasons grassland degradation is rampant as of late. In fact, during the mission, almost all the interviewees mentioned how serious the problem is. What is also interesting is that there are a number of different kinds of views on the degradation being expressed by distinct scholars and herders. For instance, rapid desertification,[32] widespread decline of vegetation observed by satellite,[33] decrease in biomass,[34] and rapid desiccation due to global warming[35] as well as livestock population explosion especially of goats,[36] compaction by ever-increasing heavy vehicles,[37] and even rapid urbanization were all identified as reasons for grassland degradation. By contrast, there are some arguments against those views. A senior officer at the Department of Coordination for Animal Husbandry Policy Implementation, Ministry of Food and Agriculture says that the vegetation decline observed by satellite does not necessarily mean that edible grass is in the decrease proportionally. Thus, he insists, this indicator is not viable for evaluating grassland as "feedstuff." Also, a herder interviewed mentioned that, despite being frequently told that grassland is getting worse, he does not see any sign of it. As such, grassland degradation issues or phenomena in Mongolia may appear to be so multifaceted that it is not easy to judge. Nevertheless, putting the definition of grassland degradation aside, the most important point for mobile livestock-keeping would be, as mentioned by the senior officer of the Ministry, whether or not the grassland has a capacity for grazing animals. In this context, it should be noted that areas identified by the Government as the most affected pasturelands are, except for the long-standing deserted areas in the southern regions, broadly overlapping with areas where the livestock density has rapidly increased recently, as shown in Figure 2.5.3. Therefore, it is believed that there is a cause-and-effect relationship between the grassland degradation and the unprecedented livestock population explosion.

2.108 Also, the concentration of livestock is most noticeable in the Central and Khangai regions to which major cities such as Ulaanbaatar and Erdenet belong, as well as the steppe regions where the most favorable vegetation for grazing is found in Mongolia. As such, it could be said that the concentration is taking place at the east-west (the green corridor), and along the north-south (economic corridor) axes where the study is giving priority attention. Such difference between regions is not necessarily a consequence of higher breeding rates of livestock but also out-migration of large numbers of herders with their animals to these regions

[32] Kawamura, K. and Akiyama, T., 2010. Simultaneous monitoring of livestock distribution and desertification. *Global Environmental Research* **14**: 29-36.

[33] Hilker, T., Natsagdorj, E., Waring, R. H., Lyapustin, A., and Wang, Y., 2014. Satellite observed widespread decline in Mongolian grasslands largely due to overgrazing. *Global Change Biology* **20**: 418-428.

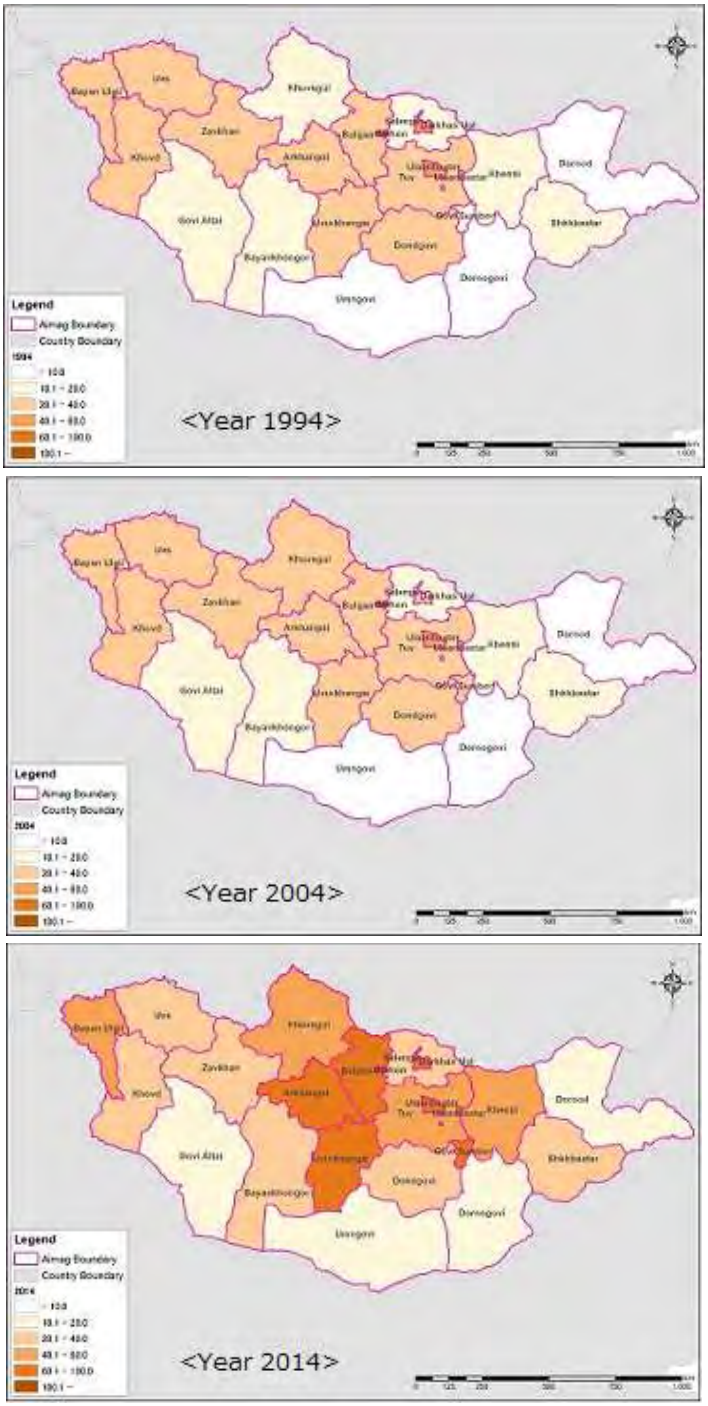
[34] Sekiyama. A., Takeuchi, W., and Shimada. S., 2014. Detection of grassland degradation using MODIS data in Mongolia. *Journal of Arid Land Studies* **24**: 175-178.

[35] In terms of grassland maintenance, one of the most important damages caused by global warming would be desiccation or desertification. At a high latitude, however, desiccation process is relatively slow. Thus, since Mongolia is one of the high-latitude countries, the negative impact due to global warming should be relatively less. Nevertheless, since grassland degradation is progressing so fast recently, this could fuel the desiccation process. Besides, in the desert regions, desertification process is fast and that is why herders are moving towards the North, causing concentrations of livestock (Kamimura, A. *et al.*, 2013. *Op. cit.*).

[36] Sekiyama *et al.*, 2014. *Op. cit*.

[37] Based on dialogues with officers of the Ministry of Food and Agriculture, Tuv Regional Veterinary Office, Mongolian Meat Association, and some meat packers.

seeking for a better life.[38] This phenomenon, which is one of the most relevant issues in contemporary Mongolian mobile livestock-keeping, would also be crucial to urbanization problems, especially in a large city such as Ulaanbaatar because there are a lot of ex-herders who had lost their animals in Dzuds, and consequently started squatting in cities or their environs,[39] thereby fuelling poverty in urbanized areas.[40]



Source: JICA Study Team based on Mongolian Statistical Yearbook.

Figure 2.5.3 Livestock Population Density by Aimag

[38] Janzen, J. 2005. *Op. cit*., and Kamimura *et al*. 2013. *Op. cit.*

[39] Ganbat and Sakazume. 2012. Development of concentrated feed production and distribution channels in Mongolia: A case study of Company A. *The Review of Agricultural Economics* **67**: 105-112.

[40] Janzen, J., Taraschewski, T., and Ganchimeg, M. 2005. Ulaanbaatar at the Beginning of the 21st Century: Massive In-Migration, Rapid Growth of Ger-Settlements, Social Spatial Segregation and Pressing Urban Problems. GTZ.

2.109 Based on the information gathered and dialogues conducted during the survey, the following section discusses why the number of livestock has increased so rapidly, the ratio of animals has disproportionately changed, and so many herders migrated to the cities or their environs.

(a) **Aftermath of Decollectivization Due to Collapse of the Soviet Union**

2.110 The negdel, a local collective organization, was essentially a comprehensive unit meeting every single aspect of the herding household's production scheme as well as social and economic needs.[41] During the socialist era, every soum has its own negdel (see Figure 2.5.4). Thus, consequences for the herders were devastating and long-standing. Among them, directly linked to the rapid rise of animal numbers are the following:

(i) **Elimination of restrictions on the number of animals per household and quota deliveries after privatization of animals:** As part of a national program to privatize state assets, livestock which belonged to the negdel were all allocated to the former state employees and herders. Simultaneously, the government eliminated both restrictions on the number of animals which a herder household could keep, and quota deliveries to the state for autumn slaughter. Consequently, the number of animals has risen as a whole.

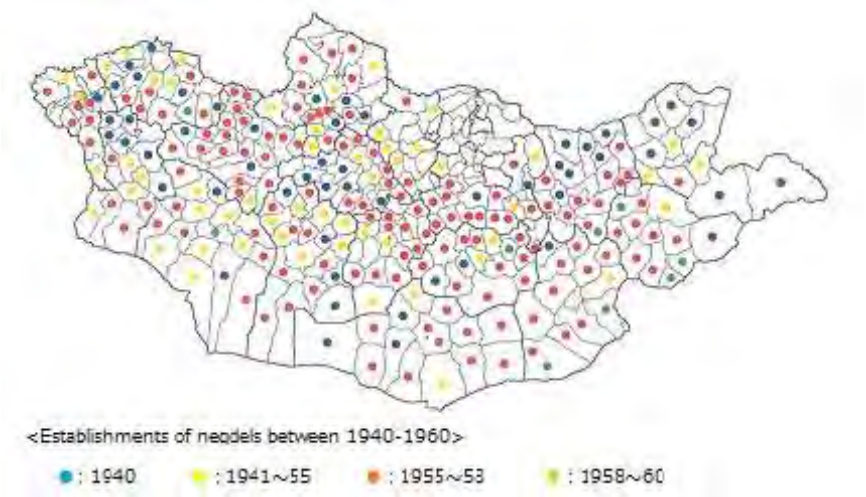
(ii) **Breakup of transportation and logistics**: During the socialist era, the negdel implied nationwide logistics, especially in transporting livestock from herders to slaughterhouses. After decollectivization, however, herders themselves now became liable for all the transportation expenses. Since the farther they live from sites favorable for transport the higher the costs, the herders began to move to or stay in the vicinity of larger cities where marketing is much easier and transport costs are less expensive, thereby causing a concentration of herders and, consequently, animals.

(iii) **Decline in offtake due to Inflation:** Following the liberalization in 1991, in an inflationary economy, herders preferred to hold assets in the form of livestock and avoided selling their animals, thereby causing a significant increase in the number of livestock.

(iv) **Broken-down wells:** During the socialist period, the negdel was in charge of water well maintenance. Thus, following the decollectivization, many broken-down wells were abandoned without the necessary maintenance, thereby causing a higher concentration of herders with animals around water sources, especially in Khangai and Central regions.

(v) **Decline in export markets:** Among so many responsibilities of the negdel as a comprehensive unit, international trading was one of its most important duties. After the break-up of the negdel, however, its share of the trade dramatically dropped especially sheep meat exportation (see Figure 2.5.5.), thereby causing an increase in the number of livestock.

[41] Bruun, O. 1996. The herding household: economy and organization,in Mongolia in Transition. Bruun and Odgaard (eds.), Nordic Institute of Asian Studies, UK.



Source: National Association of Mongolian Agricultural Cooperatives

Figure 2.5.4 Negdel Map During the Socialist Era

Source: FAOSTAT and Taxation Office.

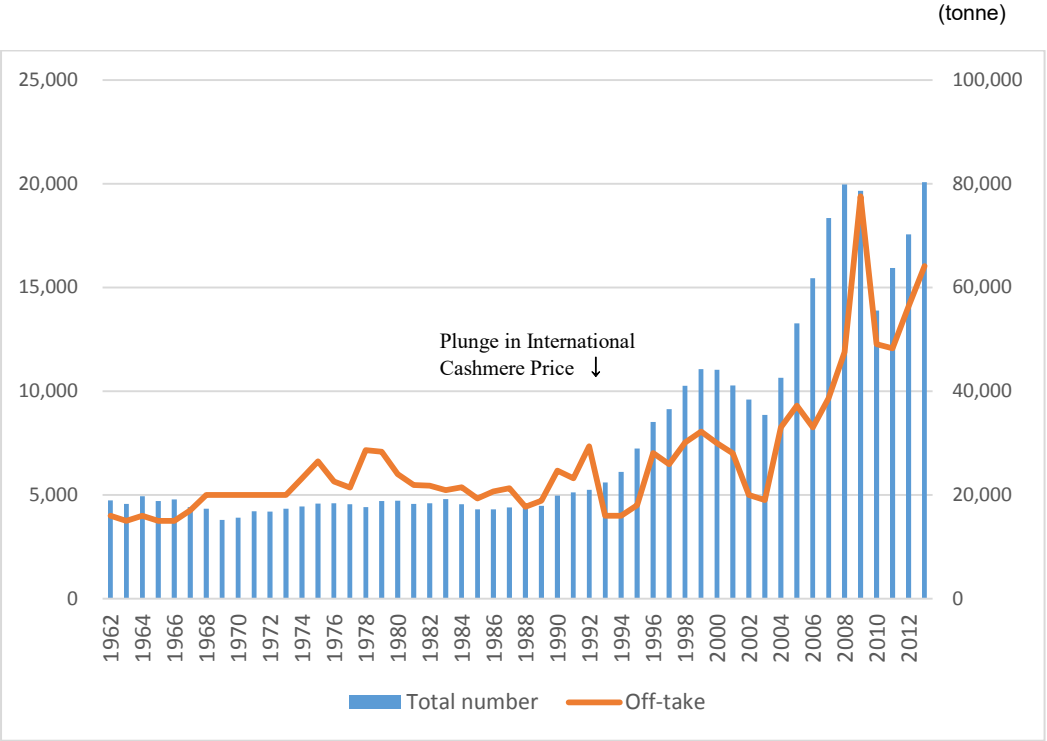
Figure 2.5.5 Total Off-take of Sheep Meat and Its Share in Export, 1962 to 2013

(b) Cashmere International Market Crash

2.111 Cashmere, one of the most liquid and profitable commodities in Mongolia, is a principal source of livelihood for herders, especially for the poor. Goats, the producer of cashmere, are well known for their ability to withstand thirst and to utilize a considerably wider range of plant species than other domestic animals such as cattle, sheep and horses. Thus, goats in Mongolia, together with camels, traditionally used to be raised in the harshest and driest areas such as Dornogovi, Dundgovi, and Umnugovi, resulting in ecological segregation among the five major Mongolian domestic animals, the other three species occupying mainly steppes or less harsh areas. This usually advantageous trait, however, could work the other way especially when a large number of goats are grazed on a limited pasture by eating grass down to the roots, thus preventing the plants from recovering.[42] In fact, this actually happened after a drastic plunge from USD127 to USD37 in cashmere prices in the international market in

[42] Promer Consulting. 2011. Report on agriculture and livestock industries in Mongolia. Program for free trade agreement survey in 2011.

1993.[43] This market crash triggered off both the sudden increase in goat numbers and decrease in goat off-take (see Figure 2.5.6). Also important is the fact that the number keeps an upward trend to date. Thus, preventive measures should be taken immediately. Merely enacting a habitual legal regulation would not be sufficiently effective in Mongolian grasslands, thus, some incentive measures should also be implemented to encourage herders to destock goats.



Source: FAOSTAT and Taxation Office.

Figure 2.5.6 Goat Number and Its Off-take, 1962 to 2013

(c) **"No Cost" for Feed and Land**

2.112 Compared with other livestock industries in other countries, one of the most peculiar things about Mongolian pastoralism is that the herders virtually do not need any payment for feed and land,[44] which are two of the most crucial issues when a farmer makes a decision on whether or not he would increase the number of his animals for production. Thus, in Mongolia herders might as well have no hesitation in increasing their livestock.

2.113 Nevertheless, this peculiar point about herding should also be considered as one of the great advantages Mongolia has because with this, Mongolian herders can afford to feed their animals without depending on grain feeds, especially imported ones which account for more than 30% of the world's grain production.[45]

(d) **Others**

2.114 Some other points which may be considered as detrimental effects, together with the aforementioned issues on grasslands are: Concentration of herders in areas where mobile

[43] Baldan, C. 2006. Challenges to cashmere industries in Mongolia.Economic Research Institute for Northeast Asia.
[44] Batuul.2004. Review of agriculture in Mongolia: paying special attention to market economy. *NogyokeieiKekyu* 30: 139-158.
[45] Guyomard, H.,Manceron, S., and Peyraud, J. 2013. Trade in feed grains, animals, and animal products: current trends, future prospects, and main issues. *Animal Frontiers,*3: 14-18.

phone signals are available, and Inadequate waste disposal after mining activities.

2) Major reasons for dzud damages and challenges

2.115 As shown in Figure 2.5.1, Mongolia was hit by a series of dzuds in 2000-2001, 2001-2002, 2009-2010 and 2010, in which 20-25% of the entire national herd were killed. It seems that there is a general understanding that dzud is a natural hazard. Based on information gathered during the investigation, however, dzud is rather a phenomenon caused or worsened by negligence on the part of herders, especially to realize winter camp preparation. In fact, herders who are ready for winter suffer much less or nothing at all than those who are not. Thus, reasons why some herders do not prepare themselves for winter would be a clue to solutions. The following are possible explanations:

(a) "New Nomads": Back to the Land

2.116 As mentioned earlier, after decollectivization in 1992, many former employees of socialist institutions acquired livestock under the national program to privatize state assets, and moved back to the countryside as herders, some of them preferring to retain their livestock in an inflationary economy,[46] and still some of them considering mobile livestock-keeping as a social safety net.[47] As a result, by 2002, the number of herding families more than doubled from 75,000 to around 200,000,[48] and the great majority of them, despite their lack of basic skill to herd, would try to increase their animals with the intention of holding assets in the form of livestock.[49] Thus, these new nomads, without appropriate preparedness for winter, such as hay-making, shelters as windbreak, or site finding of winter camp, would suffer severely from dzuds causing high mortality.

(b) Upsurge of Herders Retaining Profitable Livestock Species

2.117 In a market economy, it is only natural for producers to focus on achieving higher profits through economies of scale. In this sense, goats in Mongolia are by definition the most profitable animals because of cashmere. Many herders, especially after the cashmere international market crash, started keeping goats. Usually, those herders live a nomadic life concentrating with their animals in sites favorable for marketing, thus causing stiff competition for ever-dwindling resources for winter preparation with their counterparts. Furthermore, according to dialogues with herders visited during the survey, winter preparation is definitely a heavy burden to herders, even to veterans. Based on this observation, Batuul's report (2005)[50] which says that the more animals a herder keeps the worse he suffers in dzuds, would be quite understandable. Interpreted in a larger context, the more animals a country keeps, the worse it may suffer in dzuds as observed in 2010.

(c) Breakup of Hay-making System by Negdel

2.118 During the socialist era, through 22 centers strategically situated in different parts of the country, the negdel used to provide needy herders with hay.[51] Although hay-making is part

[46] Edstrom, J. 1993. The reform of livestock marketing in Mongolia: problems for a food-security and equitable market development. *Nomadic Peoples,* 33: 137-152.
[47] Fratkin, E. and Mearns, R. 2003. Sustainability and pastoral livelihoods: lessons from East African Massai and Mongolia. *Human Organization,* 62: 112-122.
[48] Mori, S. and Burneebaatar, G. 2002. Revolution of meat industry *In*The day nomadic life will change Mongolian economy, Konagatani, Y. (ed.), Shuppanbunkasya, Tokyo.
[49] Janzen, J. 2005. *Op. cit.*
[50] Batuul.2005. Discussion on Mongolia's herding economy and preparedness for dzuds. *NogyoKeieiKenkyu,* 31: 1-21.
[51] FAO. 2005. Chapter 7: Mongolia *In* Grasslands of the World. FAO.

of the usual winter preparation for herders, the service for sure helped them to mitigate dzud disasters.

2.119 Last but not least, special mention should be made concerning the dzud as man-made disasters. The point is that the rapid increase in the livestock number has a crucial role in this scenario as well. Thus, degradation of grasslands and ever-worsening dzud issues should be addressed together and common solutions for these related issues should be found.

3) Negligence of Epidemic and Plague Control and Challenges

2.120 Since "Healthy Livestock" is the study's goal, this issue is highly relevant. Based on the information gathered from institutions linked to animal health, such as the OIE delegation at the Ministry of Food and Agriculture and the Mongolian Veterinary Medical Association, although there is a good number of serious epidemics such as brucellosis, glanders and parasitosis, in Mongolia, foot-and-mouth disease has the most devastating impact on the national economy and, therefore, requires immediate action. The disease is an infectious and sometimes fatal viral disease that affects cloven-hoofed animals, which include all the major Mongolian domestic animals except horses. Since it is highly infectious and can be spread by infected animals through aerosols, contact with contaminated farming equipment, vehicles, clothing, and feed, foot-and-mouth disease has severe implications for animal farming. Its containment demands considerable efforts in vaccination, strict monitoring, quarantines and trade restrictions as well (Defra, 2011).[52] In fact, various dialogues the survey team had with the Mongolian Wool Association and the Mongolian Association of Leather Industry clearly showed this point. They reported that "all the raw materials we use are coming from healthy animals. Besides, wool and leather are all chemically or physically treated products, so rationally speaking, they could not be a source of infection. But, just because Mongolia has some endemic zones, we have difficulty exporting our products."

2.121 As for trade restrictions between countries, it is important to recognize that although there are internationally recommended basic principles, the ultimate decision lies with the interested countries. In fact, some Mongolian large meat packers have recently succeeded in reaching an agreement with, for instance, Chinese companies to export their products.[53] Nevertheless, involvement of the common herding household in these success stories is quite limited. Therefore, a measure by which both foot-and-mouth disease will be controlled and herders will be involved efficiently would be most ideal.

[52] Defra. 2011. Foot and Mouth Disease Control Strategy for Great Britain. UK.
[53] Mongolian 12 meat packers have reached an agreement with Chinese companies (*Mongolian Correspondence*. 2015, 532: 3).

2.6 Current Situation and Issues in the Agriculture and Processing Sector

2.122 The survey included the actual situation of crop farming, processing technologies for agricultural products, degrees of dependence on imported agricultural products, and food value chains. Collecting, organizing and analyzing these information and data provide a better understanding of this sector as well as its future development challenges.

(1) Crop Farming

2.123 Since there is a constraint that the production period for crop farming is limited to five months of the summer (May–September), the study looked into the production of wheat, which is a major cereal, as well as potato and vegetables.

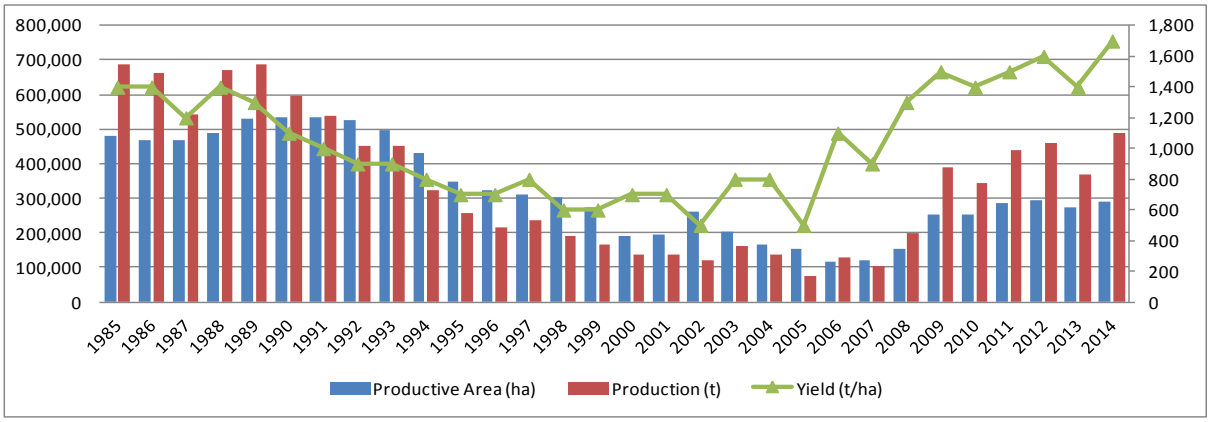
1) Wheat

2.124 In Mongolia, farmers usually cultivate spring wheat, seeding from late April to early May, fertilizing from early to late June, weeding in mid-July, and harvesting and preparation in early September.

2.125 In order to avoid replant failure and to maintain soil fertility, the basic cultivation scheme is to repeat the rotation between planting and fallow every year.

2.126 Before shifting to the market economy in 1990, over 600,000 tons of wheat were harvested (see Figure 2.6.1), and there had been a period when production surplus was exported to the former Soviet Union. However, under the market economy and the privatization of state-run farms, production volume decreased sharply. The reasons for this included the fragmentation of farms, decreased work efficiency from obsolete agricultural machines, reduced business size due to shortage of labor force, lowered soil capacities, and insufficient farming.

2.127 To address the massive reduction in crop yields, the government implemented a measure in 2008 to raise the upper limit of the cultivated acreage from 3,000 ha to 20,000 ha and started the "3rd campaign to bring virgin lands under cultivation" to assist in purchasing agricultural machinery and seeds. With these policies in place, crop yields rose to 390,000 tons in 2009, achieving a 100% domestic self-sufficiency rate. The crop yields between 2009 and 2014 reached about 350,000 tons or more, meeting the domestic demand.

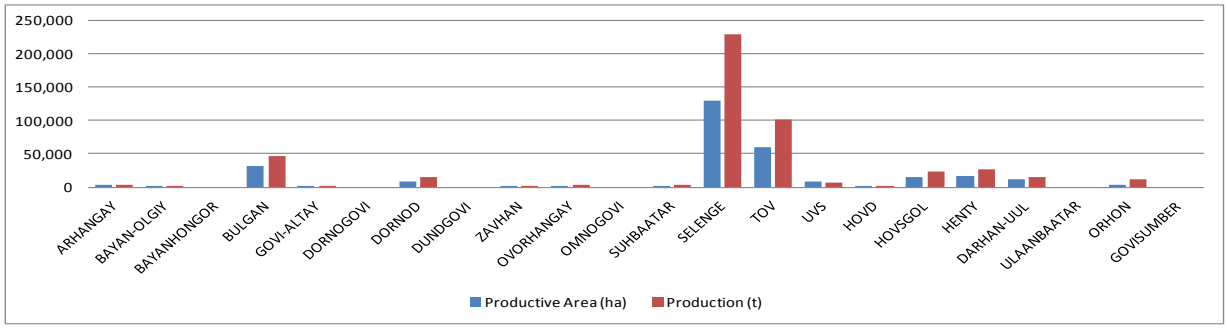


Source: Ministry of Food and Agriculture of Mongolia_http://www.mofa.gov.mn/new/images/banners/sector/gazar01.

Figure 2.6.1 Trend in Production Area, Production and Yield of Wheat, 1985–2014

2.128 Wheat production is carried out by corporate entities, with 1,100 corporations participating in production activities nationwide. The ratio in terms of scale is 10% large-scale (over 6,000 ha), 50% medium-scale farming enterprises (over 1,000 ha to less than 6,000 ha), and 40% small-scale farming enterprises (less than 1,000 ha). Some 80% of production corporations are concentrated in the Selenge, Tov, Bulgan and Henty aimags.

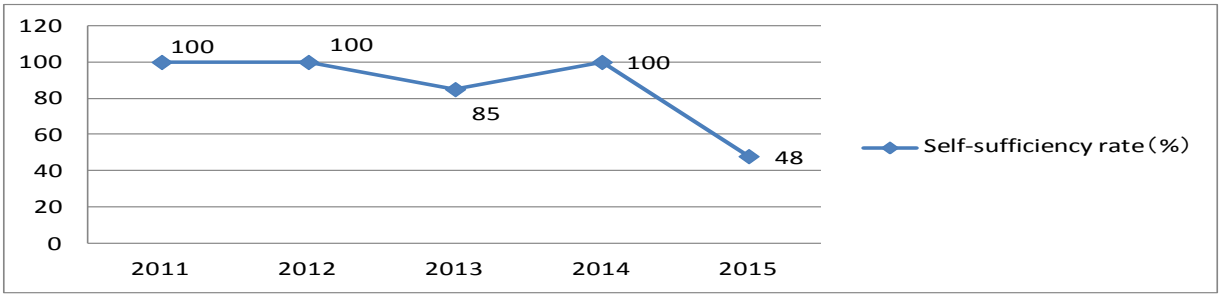
2.129 Figure 2.6.2 shows the distribution of crop acreage and yield volume by aimag for 2014. The total national yield was 489,000 tons, 77% (378,000 tons) of which is accounted for by the three aimags in Selenge, Tov and Bulgan.



Source: Ministry of Food and Agriculture of Mongolia_http://www.mofa.gov.mn/new/images/banners/sector/gazar02

Figure 2.6.2 Trend in Productive Area and Production of Wheat by Aimag (2014)

2.130 The rates of internal self-supply in 2011-2015 are shown in Figure 2.6.3, satisfying domestic demands except for 2013 and 2015. Particularly in 2015 due to damages caused by drought, harvest decreased considerably, and it became necessary to import urgently from overseas.



Source: Ministry of Food and Agriculture of Mongolia.

Figure 2.6.3 Trend in Domestic Self-sufficiency Rate of Wheat (2011-2015)

2.131 In light of the current situation, the problems besetting wheat production are presented in Table 2.6.1 below.

Table 2.6.1 Issues on Wheat Productivity

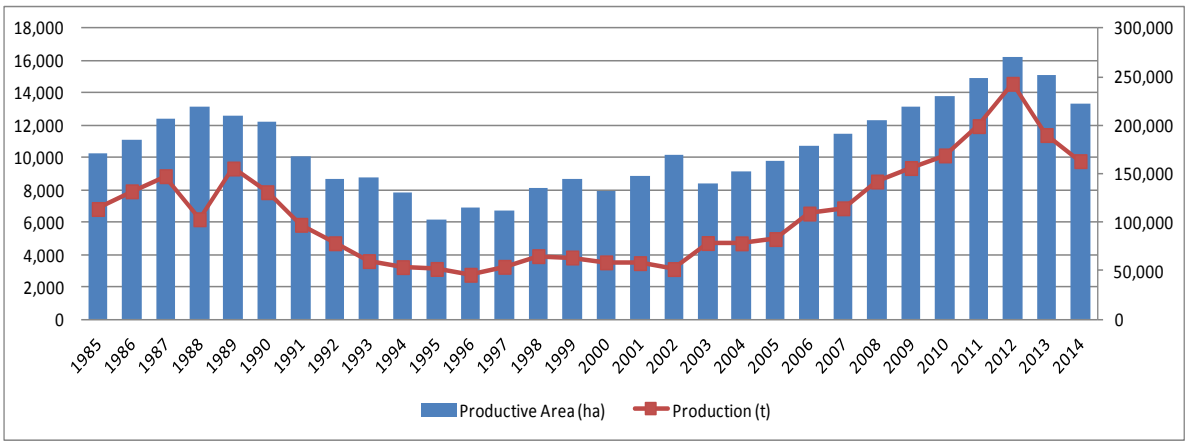
a.	Need for development/improvement, breeding and dispersal of domestic superior breeds.
b.	Development and promotion of irrigation/watering facilities, taking into account the damage from the drought of 2015.
c.	Development of a financing facility to promote replacement of obsolete agricultural machines.
d.	Continuity of a subsidy system.
e.	Securing of management continuity in production corporate entities.
f.	Formulation of a flexible export framework in case of surplus production.

Source: JICA Study Team based on interviews of relevant agencies.

2) Potato

2.132 As in the case of wheat production, after moving to the market economy and with the privatization of state-owned farms, potato crop yields from 1990 to 2002 were greatly reduced to approximately 50,000 tons, or one third of the pre-market economy crop yields (see Figure 2.6.4).

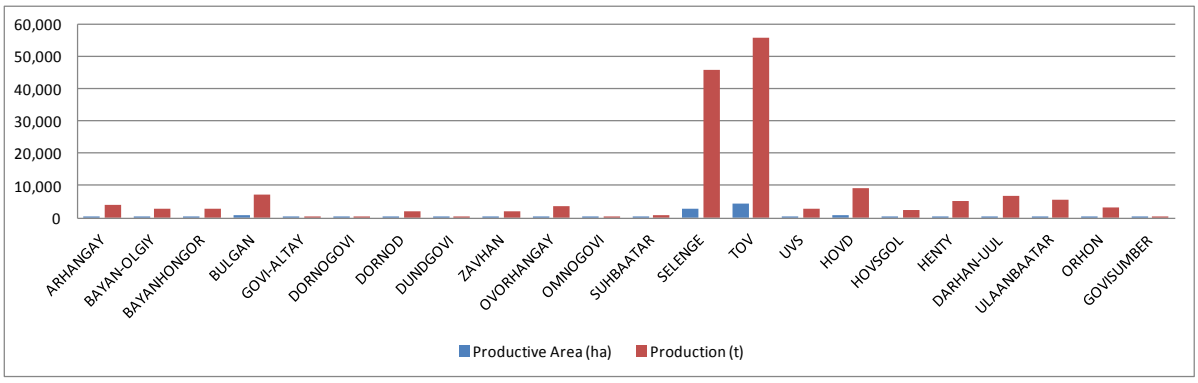
2.133 The Potato Program has been implemented in three phases with the support of the Swiss Agency for Development and Cooperation (SDC) since 2004. With the selection and propagation of superior breed potatoes and the establishment of a supply system, the yield amount increased year by year. As a result, a 100% domestic self-sufficiency level of over 150,000 tons was achieved in 2009 and has been maintained since then.



Source: Ministry of Food and Agriculture of Mongolia_http://www.mofa.gov.mn/new/images/banners/sector/gazar01

Figure 2.6.4 Trend in Productive Area and Production of Potato, 1985–2014

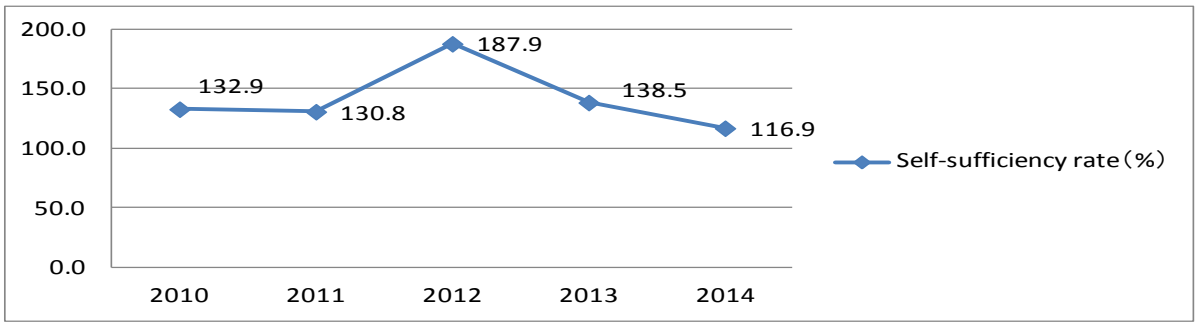
2.134 The distribution of crop acreage and yield by aimag in 2014 is shown in Figure 2.6.5. Total national yield was 163,000 tons, 62% (102,000 tons) of which was produced by the two aimags in Selenge and Tov.



Source: Ministry of Food and Agriculture of Mongolia_http://www.mofa.gov.mn/new/images/banners/sector/gazar02

Figure 2.6.5 Trend in Productive Area and Production of Potato by Aimag (2014)

2.135 The rates of internal self-supply in 2010-2014 are shown in Figure 2.6.6, satisfying domestic demand each year and achieving surplus.



Source: Ministry of Food and Agriculture of Mongolia.

Figure 2.6.6 Trend in Domestic Self-Sufficiency Rate of Potato (2010-2014)

2.136 Table 2.6.2 presents the current problems in potato production.

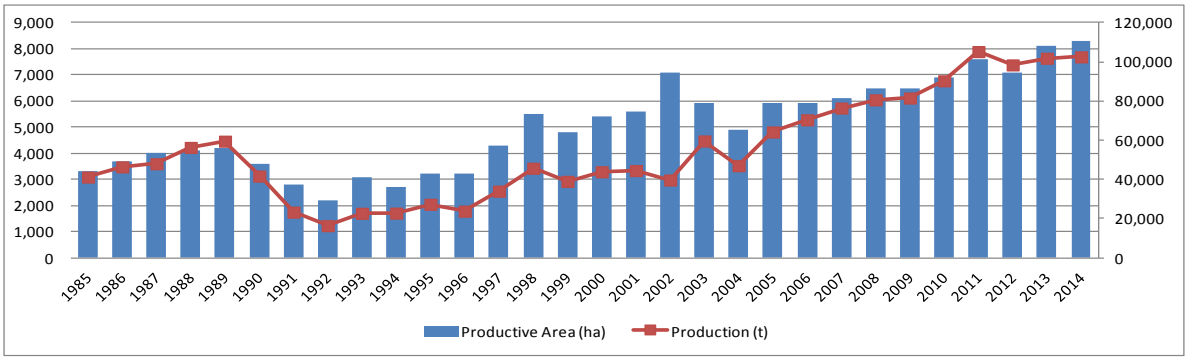
Table 2.6.2 Issues on Potato Productivity

a.	Shortage of post-harvest storage buildings: As a consequence, the difference in producer selling price from right after harvest and the off-season is doubled.
b.	Problems in the distribution and sales system: There is a strong tendency for sales brokers to drive down the price at production sites and buying them at cheap prices.
c.	Construction of starch processing factories as an alternative measure: There is currently no starch processing plant within the country, so that starch powders are being imported.

Source: JICA Study Team based on interviews of relevant agencies.

3) Vegetables

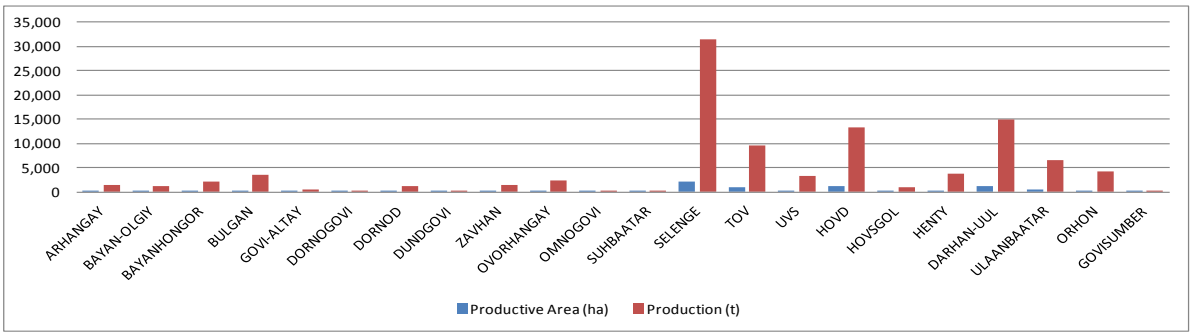
2.137 With the privatization of state-run farms after shifting to a market economy, vegetable yield decreased for six years running (see Figure 2.6.7). However, with the implementation of the "Green Revolution National Program" Phase 1 (1998–2004) and Phase 2 (2005–2012) which supported the increase in production of vegetables/fruit trees, development of wells/irrigation systems, provision of technical support on plastic greenhouse cultivation, and improvement of access to seedlings/fertilizers as well as with the expansion of planted area, yield amount has increased as well. By 2014, 52% of the domestic demand was being supplied domestically.



Source: Ministry of Food and Agriculture of Mongolia_http://www.mofa.gov.mn/new/images/banners/sector/gazar01

Figure 2.6.7 Trend in Productive Area and Production of Vegetables, 1985–2014

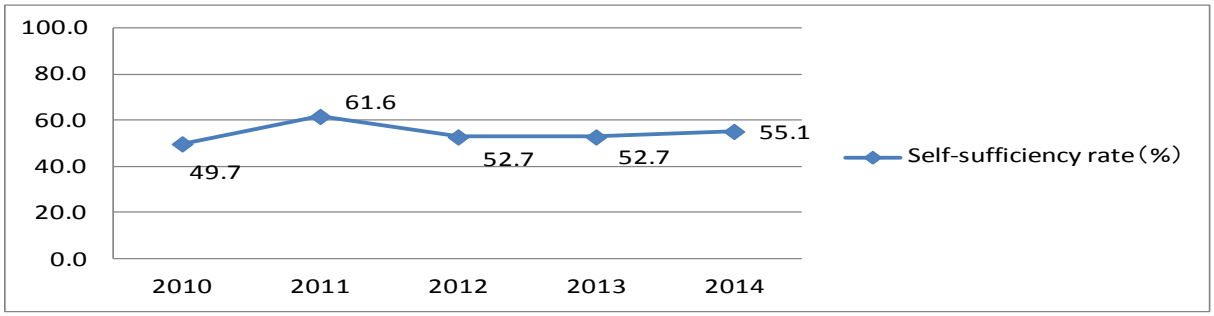
2.138 Figure 2.6.8 presents the distribution of vegetable crop acreage and yield by aimag in 2014. The total national yield was 102,000 tons, of which 68% (69,000 tons) was contributed by the four aimags in Selenge, Darhan-Uul, Hovd and Tov.



Source: Ministry of Food and Agriculture of Mongolia_http://www.mofa.gov.mn/new/images/banners/sector/gazar02

Figure 2.6.8 Trend in Productive Area and Production of Vegetables by Aimag (2014)

2.139 The rates of internal self-supply in 2010-2014 were not able to satisfy domestic demand, and that situation is continuing (see Figure 2.6.9).



Source: Ministry of Food and Agriculture of Mongolia.

Figure 2.6.9 Trend in Domestic Self-sufficiency Rate of Vegetables (2010-2014)

2.140 Table 2.6.3 presents the current problems in vegetables production.

Table 2.6.3 Issues on Vegetable Productivity

a.	Cultivation technology support for the right crop for the right land.
b.	Formulation of production/supply framework of domestically produced vegetables during the cold season.
c.	Formulation of supply framework for consumer oriented vegetables.
d.	Formulation of a system for distributing superior vegetable seeds.

Source: JICA Study Team based on interviews with relevant agencies.

(2) Processing Technologies for Agricultural Products

1) Wheat Flour

2.141 There are 70 milling plants in Mongolia for wheat, which is the staple grain, with a reported total annual processing capacity of approximately 1.5 million tons (see Figure 2.6.10 and Table 2.6.4). However, only 47 of those milling plants were operated in 2014.

Table 2.6.4 Number of Wheat Flour Milling Plants

	Aimag	Number of Plants	Zonal Classification
1	Arkhangai	1	Khangai
2	Bayan-Ulgii	0	
3	Bayankhongor	0	
4	Bulgan	7	Khangai
5	Govi-Altai	1	Western
6	Dornogovi	0	1
7	Dornod	1	Eastern
8	Dundgovi	0	1
9	Zavkhan	1	Western
10	Uvurkhangai	2	Khangai
11	Umnugovi	0	
12	Sukhbaatar	0	
13	Selenge	2	Northern
14	Tuv	0	
15	Uvs	5	Western
16	Khovd	0	
17	Khuvsgul	6	Khangai
18	Khentii	3	Eastern
19	Darkhan-Uul	6	Northern
20	Ulaanbaatar	7	Central
21	Orkhon	5	Khangai
22	Govisumber	0	
Total		**47**	

Source: Ministry of Food and Agriculture of Mongolia,
http://www.mofa.gov.mn/new/index.php?option=com_content&view=article&id=125&Itemid=197

Source: Ministry of Food and Agriculture of Mongolia
http://www.mofa.gov.mn/new/index.php?option=com_content&view=article&id=125&Itemid=197

Figure 2.6.10 Wheat Flour Milling Plants Distribution Map

- **An Advanced Case of Milling Plant**

2.142 A wheat flour milling plant that started production in Erdenet in 2014 introduced state-of-the-art equipment from a milling equipment manufacturer of Turkey at an initial investment of MNT20 billion (about JPY1.3 billion) to perform a series of processing from the procurement of wheat species up to cleaning, milling and bagging, producing 4,500 tons of wheat flour a month. Sales destinations include Darkhan and Ulaanbaatar for about 50-60% of total production and 21 provinces, allowing it to secure the fourth share in the domestic milling industry. This milling plant has already introduced the 5S activities and hopes to actively introduce the hygiene management approach. In addition, they intend to actively export their products overseas. At present, they have started to export rye flour to Russia.

2.143 Figure 2.6.11 shows the average retail price of 1 kg of wheat flour in Ulaanbaatar from 2010 to 2015 (in April each year). After 2013, prices of both domestic and Russian products have remained high, exceeding MNT1,000 per kg. Among the reasons why the price of Russian wheat flour is higher than that of Mongolia's domestic product is that they pay VAT for the import duties and further pay a 26.5% or more tax than the domestic millers. Also, there is a quota set for imported products to protect the domestic millers.

2.144 Based on the interview survey, the selling price of wheat flour from milling factories in 2014 was MNT770 per kg.

Source: Economic and Social Situation of Ulaanbaatar Statistical Monthly Bulletin for 2015.

Figure 2.6.11 Average Retail Price of 1 kg of Wheat Flour in Ulaanbaatar, 2010 to 2015 (in April)

2) Processed Vegetables

2.145 For processed vegetables, the processing of pickled and salted vegetables is common, making them very effective as preserved foods especially in the long cold season.

2.146 In general, when autumn harvest has come, each home uses cucumbers and carrots or the like as preserved foods for self-consumption during the cold season, performing extremely primary processing to make bottled foods.

2.147 Some vegetable producers and processors also sell their produce at an agricultural exhibition held in autumn.

2.148 Although there are many imported bottled products of processed vegetables in the market, the domestic giant vegetable processing companies negotiate their own contracts with local vegetable producers, manufacturing the bottled products using domestic vegetables as

raw materials with China-made processing equipment. General hygiene management has been conducted for the manufacturing process. There are about 20 kinds of bottled products, and bottled vegetables of 500 g are sold in supermarkets, etc. at a price of around MNT2,000.

3) Processed Fruits

2.149 There are 38 fruit processing plants in Mongolia, with a total annual processing capacity of approximately 2,000 tons. Sea buckthorns and blueberry are mainly processed into juice and jam. There are 14 factories in Uvs (with a total annual processing capacity of 128 tons) and 8 factories in Khovd (with a total annual processing capacity of 206 tons). However, the processing capacities of all these factories are low. On the other hand, the two processing factories in Bayan-Ulgii have a high combined annual processing capacity of 1,500 tons. All the fruit processing factories are concentrated in the western region, and 9 new factories are scheduled to be constructed in the future. Three of them will be constructed in Selenge, with a total annual processing capacity of 3,100 tons.

4) Processed Foods: Dairy Products, Edible Meat

2.150 Currently, traditional products such as dried and smoked dairy and meat products are primarily processed for the purpose of preservation. These include dry cheese which is effectively utilized for the Mongolian climate (dry at low temperature). During the cold season, the weather frequently serves as a "natural refrigerator" for preserving foods, particularly meat.

2.151 On the other hand, major domestic food processing companies ensure that general hygiene management of products is observed in the manufacturing plant and they also introduce the hygiene management and quality standards that meet the more advanced international standards (e.g., ISO 22000, HACCP [Hazard Analysis and Critical Control Point], ISO 9001, etc.) for their products that target the export markets.

2.152 Currently, processing equipment made in Europe (especially Germany) are predominantly used by domestic food processing plants.

2.153 Table 2.6.5 shows the current problems in the production of value-added goods in Mongolia.

Table 2.6.5 Issues on Value-Added Production

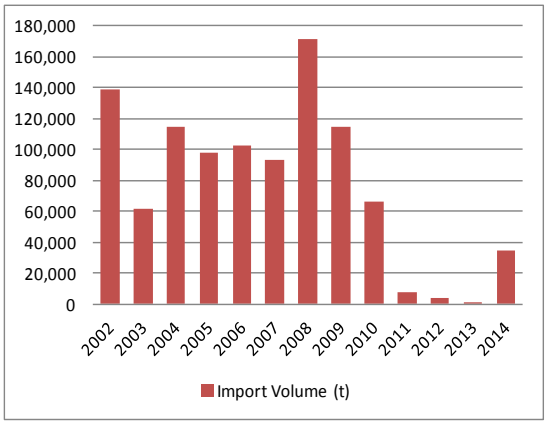
a.	The purchase of raw materials by milling plants depends on the climate of the said year (wheat flour).
b.	Production volume has acute seasonal variation (processed vegetables, fruits and dairy products).
c.	Limited production scale (processed vegetables, fruits, dairy products and edible meat).
d.	Low processing technical capabilities (processed vegetables, fruits, dairy products and edible meat).
e.	Inadequate cold chain system (dairy products and edible meat).
f.	Lack of hygiene management/quality standards that satisfy global standards (processed vegetables, fruits, dairy products and edible meat).
g.	Low market competitiveness of milling plants (wheat flour) and processing plants (processed vegetables, fruits, dairy products and edible meat).

Source: JICA Study Team based on interviews with relevant agencies.

(3) Dependence on Imported Agricultural Products

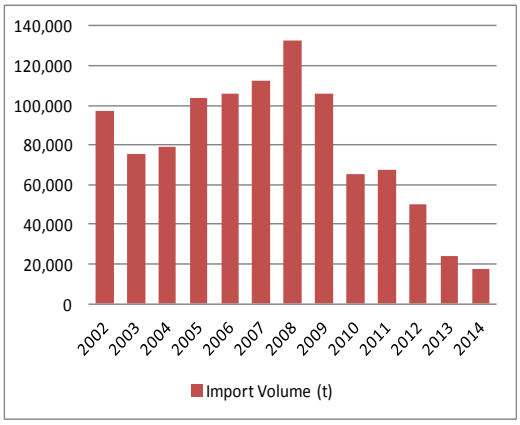
2.154 Because of its characteristic long cold season, Mongolia imports fruits throughout the year from neighboring China, as well as vegetables except during summer time which is the main cultivation period. This results in the country's high degree of dependency on imports.

2.155 Figures 2.6.12 to 2.6.17 show the trends in import volumes of main agricultural products from 2002 to 2014. Importation of vegetables and fruits has been on an upward trend in recent years.



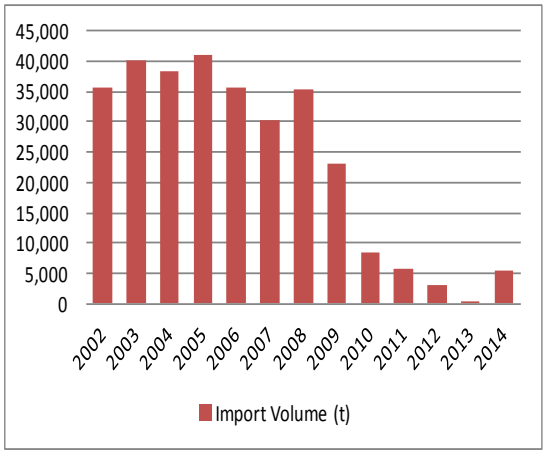
Source: Mongolian Statistical Yearbook, 2002–2014.

Figure 2.6.12 Wheat Imports (2002–2014)



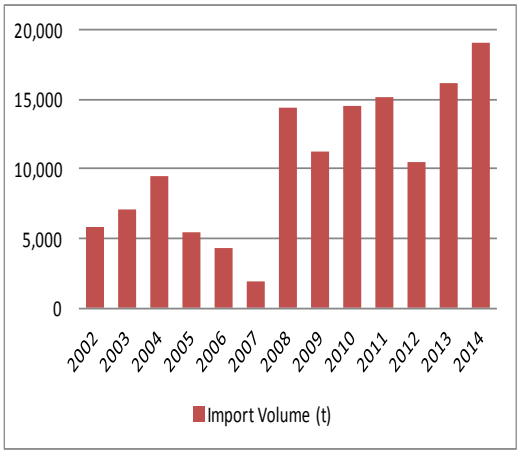
Source: Mongolian Statistical Yearbook, 2002–2014.

Figure 2.6.13 Flour Imports (2002–2014)



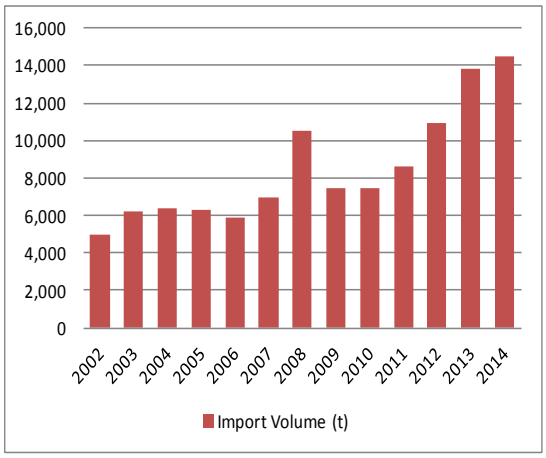
Source: Mongolian Statistical Yearbook, 2002–2014.

Figure 2.6.14 Potato Imports (2002–2014)



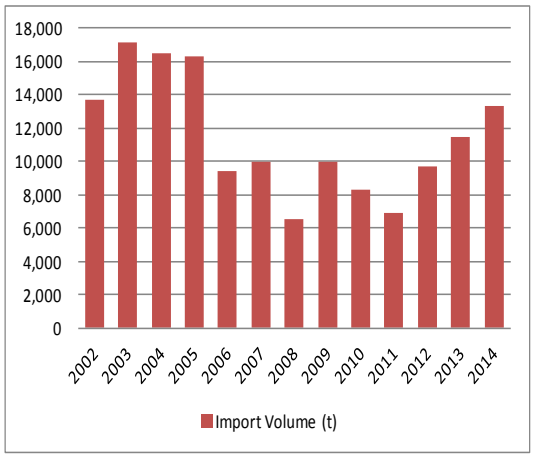
Source: Mongolian Statistical Yearbook, 2002–-2014.

Figure 2.6.15 Onion and Carrot Imports (2002–2014)



Source: Mongolian Statistical Yearbook, 2002–2014.

Figure 2.6.16 Fruit Imports (except Apple and Pear) (2002–2014)



Source: Mongolian Statistical Yearbook, 2002–2014.

Figure 2.6.17 Apple and Pear Imports (2002–2014)

2.156 With the imported agricultural products, retail shops have a rich assortment of goods even in winter (see Figure 2.6.18). Although domestic vegetables are also sold in stores, they are primarily potato and carrot, a root vegetable with a long preservation (storage) period.

Source: JICA Study Team.

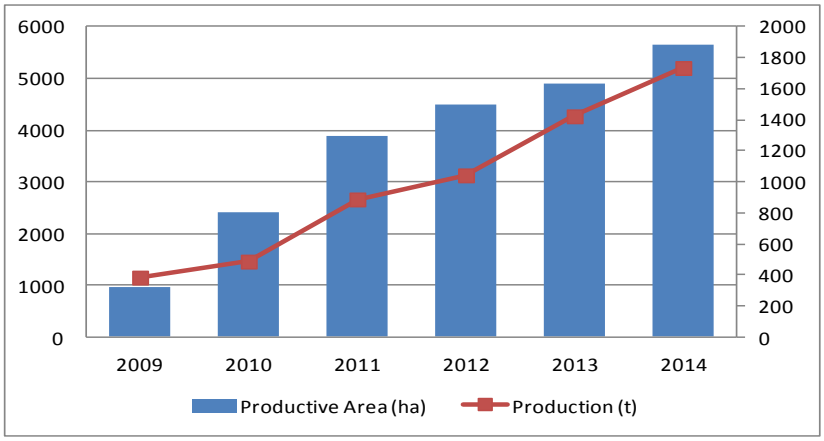
Figure 2.6.18 Retail Shops of Vegetables and Fruits in Winter

2.157 The average retail prices of 1 kg carrot, onion and cabbage in Ulaanbaatar from 2010 to 2015 (in April each year) are shown below.

Source: Economic and Social Situation of Ulaanbaatar Statistical Monthly Bulletin for 2015.

Figure 2.6.19 Average Retail Price of 1 kg of Vegetable in Ulaanbaatar, 2010 to 2015 (in April)

2.158 Figure 2.6.20 shows the productive area and production of fruits in the country from 2009 to 2014. In 2014, the cultivation area was 5.64 thousand ha and the yield was 1,743 tons, indicating an increase of 5.8 times for the cultivated area and 4.5 times for the yield over the five-year period. However, it should be noted that these statistics are mainly for sea buckthorn (90-94% of the data) while the rest are for apple, blueberry, etc.



Source: Ministry of Food and Agriculture of Mongolia
http://www.mofa.gov.mn/new/images/banners/monitoring/2014chatsargana

Figure 2.6.20 Trend in Productive Area and Production of Fruits, 2009–2014

2.159 The current problems related to Mongolia's dependence on agricultural imports are presented in Table 2.6.6 below.

Table 2.6.6 Issues on Dependence on Agricultural Imports

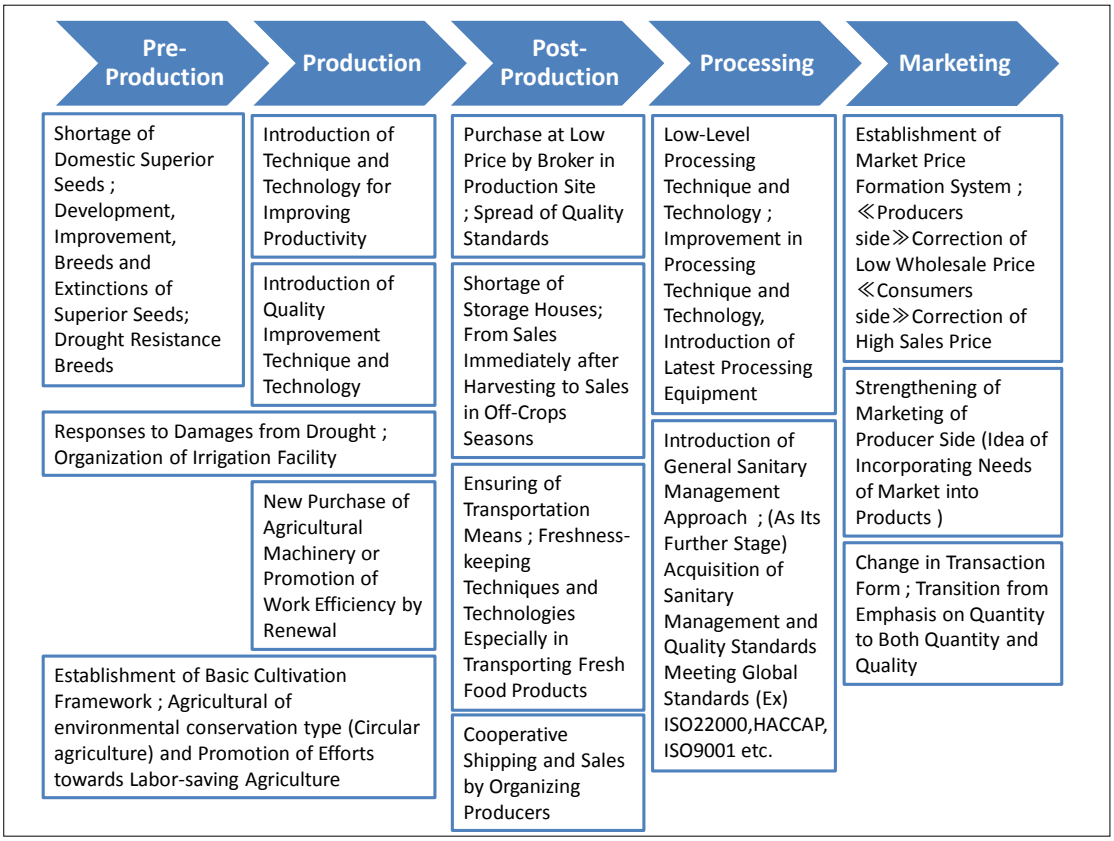
a.	Development of cultivation technology/facility that can supply vegetables throughout the year: plastic greenhouses that can be used for cultivation during cold season, and plant factories - Construction of plastic greenhouses which make cold season cultivation possible: initial investment, maintenance costs (especially heating cost) and cultivation technical support; - Construction of plant factories: initial investment, maintenance costs and cultivation technical support
b.	Currently, quarantine activities are carried out at national border gates of Zamyn-Uud and Altanbulag, and at Buyant-Ukhaa airport where logistic volumes are large, but at 5 other locations of national border gates, quarantine equipment is in shortage, therefore, sufficient quarantine activities are not implemented.
c.	Spreading of fruit-tree cultivation technology.
d.	Limitation on domestic cultivation of vegetables/fruits during long and severe cold season: in view of such limitation, endeavor to further reinforce the quarantine framework and attempt to ensure safety of foods ⇒"Food hygiene management"

Source: JICA Study Team based on interviews with relevant agencies.

2.160 As a sample of efforts to cultivate vegetables and fruit trees in the long severe cold season, a case of a domestic private company is presented in ***Appendix 2.6.2***.

2.7 Current Situation and Issues in Formation of the Food Value Chain and Strengthening of the Market Function

2.161 In the study, the current situation, problems and challenges in the agricultural sector are analyzed at each stage of the food value chain, namely: "Pre-production" ⇒ "Production" ⇒ "Post-production" ⇒ "Processing" ⇒ "Marketing" as shown in Figure 2.7.1 below.



Source: JICA Study Team.

Figure 2.7.1 Current Situation and Issues on Food Value Chain

2.162 The current situation and issues are discussed by specific items below.

1) Wheat Production

2.163 The basic cultivation system for wheat production has been established but difficulties in obtaining domestic superior seedlings at pre-production stage should be noted. Moreover, increasing productivity/improving quality and promotion of irrigation facility provision are issues to be resolved in production. In the post-production stage, corporate entities that do not own storage buildings tend to be forced to sell at a low price to milling plants immediately after harvest.

2) Potato and Vegetable Production

2.164 There are also difficulties in obtaining superior potato and vegetable seedlings at the pre-production stage. Improving productivity/increasing quality are issues to be resolved in production. At the post-production stage, the low purchase price by sales brokers at production sites is an issue, requiring the establishment/spread of quality/standard, and shifting from the current quantity-focused type of transaction to quantity-and-quality-focused one. Moreover, it is important to set up storage facilities to enable sales during the pre-harvest season. In

distribution/sales, involvement by the producer side to strengthen marketing and formulation of market pricing system needs to happen without delay.

3) Food Processing: Dairy Products, Edible Meat

2.165 Particularly at the "post-production" and "marketing" stages, not only the freshness preservation technology during the transport of raw materials and products is required, but also improvement of the processing technology at the stage of "processing" as well as the introduction of general hygiene management techniques and the acquisition of hygiene management and quality standards that meet international standards (e.g., ISO 22000, HACCP, ISO 9001, etc.).

2.8 Current Situation and Issues in the Mining and Energy Sector

(1) Overview of the Mining Sector

2.166 With 80 kinds of mineral resources having been identified in the 1,947 mineral deposits and around 9,000 mineral occurrences in Mongolia, the mining sector's potential is very high. The mining sector accounted for 17% of GDP, 90% of export value and 19% of fiscal revenue in 2014. The sector is the key industry supporting Mongolia's economic growth. However, it employs only 5% of the labor force. The volume of mineral resource reserves of the country are listed in Table 2.8.1.

Table 2.8.1 Reserves of Mineral Resources in Mongolia (2013)

Resources	Unit	Volume	Resources	Unit	Volume
Gold (primary)	ton	2,550	Coal	G ton	175.5
Gold (placer)	ton	292	Coalbed Methane (~1,200m)	G m^3	3,118
Copper	M ton	117	Oil	M ton	333
Silver	ton	42,137	Shale oil	G ton	788
Molybdenum	K ton	1,268	Limestone	M ton	1,864
Iron	M ton	1,634	Fluorspar	K ton	47,843
Lead	K ton	2,090	Building stone	K ton	531,537
Zinc	K ton	6,215	Sand	K ton	466,901
Wolfram	K ton	561	Clay	K ton	371,267
Tin	K ton	127	Magnesite	K ton	2,764
Rare earth	K ton	2,985	Phosphorite	K ton	54,053
Uranium	K ton	181	Zeolite	K ton	53,586

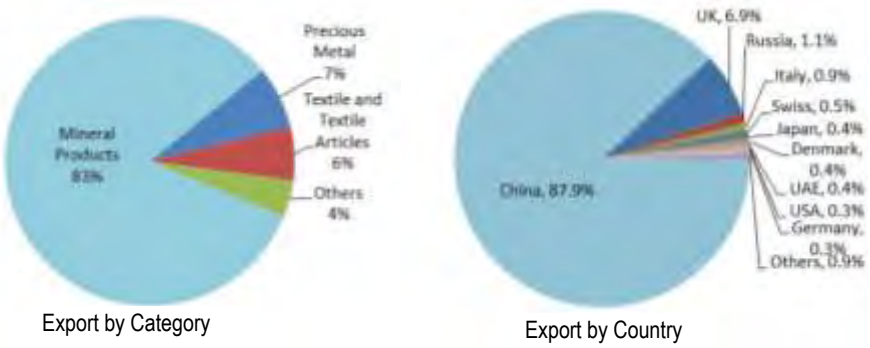
Source: Mineral Resource Authority of Mongolia (MRAM) and Ministry of Mining (MOM).

2.167 Development of industries such as smelting, ironworks and processing products are retarded due to the low domestic demand of mining-related end products made from raw materials such as steel and copper. Currently, Mongolia depends on the supply-demand structure in which primary materials are exported and finished products are imported. On the other hand, brown coal and sub-bituminous coal produced for domestic consumption have robust demand as the major energy source for electricity and heat.

2.168 As a landlocked country between China and Russia, Mongolia finds it difficult to ensure its own export route. As a result, it has no other choice but to export to a limited number of countries (see Figure 2.8.1). Most of its export performance depends on its neighboring country, China, which is the most populated country in the world. As such, the economic situation of China has a big impact on the export of mining products from Mongolia. Furthermore, as mining products are commodities dominantly affected by the price in the international market, the slump in the market has a negative impact on the mining sector as well as on the Mongolian economic growth since 2012.

2.169 In 2008, exploration and mining licensed areas covered 44% of the entire Mongolian territory. However, the licensed areas decreased to 9.1% and only 0.5% were mined due to the downturn of mineral commodities and the enforcement of the law known as "The Law to Prohibit Mineral Exploration and Mining Operation at Headwaters of Rivers, Protected Zone of Water Reservoirs and Forested Areas, 2009." Mining activities were carried out only in 0.01% of the land. The number of licenses decreased from 5,202 in 2008 to 2,732 in 2014 but

later increased slightly to 2,997 in early 2015.[54]



Source: Statistical Yearbook 2014.

Figure 2.8.1 Share of Mining in Total Export Value by Category and by Country

(2) Coal

2.170 Coal-bearing basins are found throughout Mongolia, as shown in Figure 2.8.2. The coal reserve, estimated at 176 billion tons, is ranked among the top ten in the world. Bituminous coal deposits are found in the southern and western regions of the country while sub-bituminous and brown coal deposits are found in the central and eastern regions.

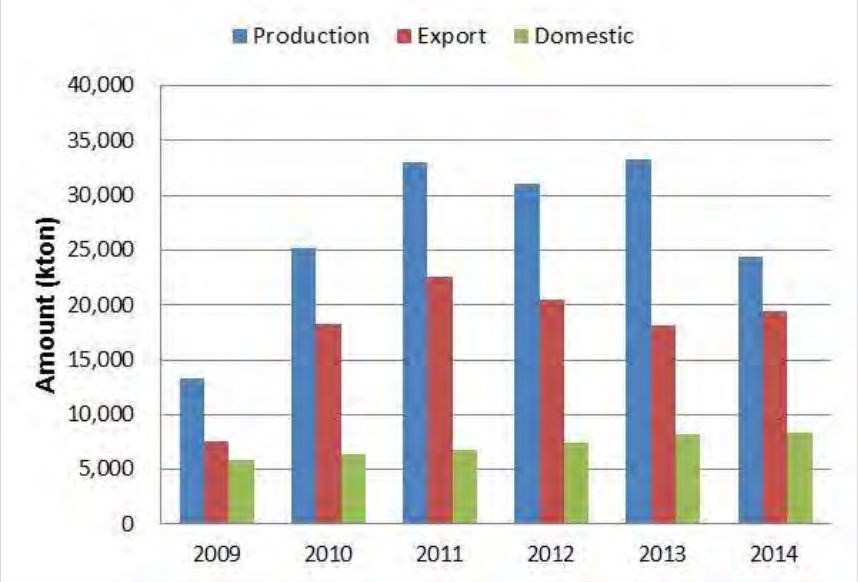
Source: MRAM.

Figure 2.8.2 Distribution of Coal Basins

2.171 Coal production increased from 9.7 million tons in 2008 to 33 million tons (peak production) in 2011. About 23 million tons of the produced coal were mainly exported to China. Most of the coal are exported as raw coking coal without preparation process. With the decline in demand in China and the slump in world prices, coal production and export decreased in 2014 to approximately 25 million tons and 20 million tons, respectively (see Figure 2.8.3). The mean export unit price decreased by over 50% from USD107/ton in 2011 to USD43/ton in 2014.[55] For this reason, only 45 mines of the 190 companies that held coal mining licenses operated in 2013 and only half of the 14 companies producing export coal had

[54] MRAM; Mining and Geology Statistics, 2015 mid-year data.
[55] Japan Mongol Economic Committee: Mongolian trade in 2014, March 2015.

non-stop mining operation.[56]



Source: MRAM.

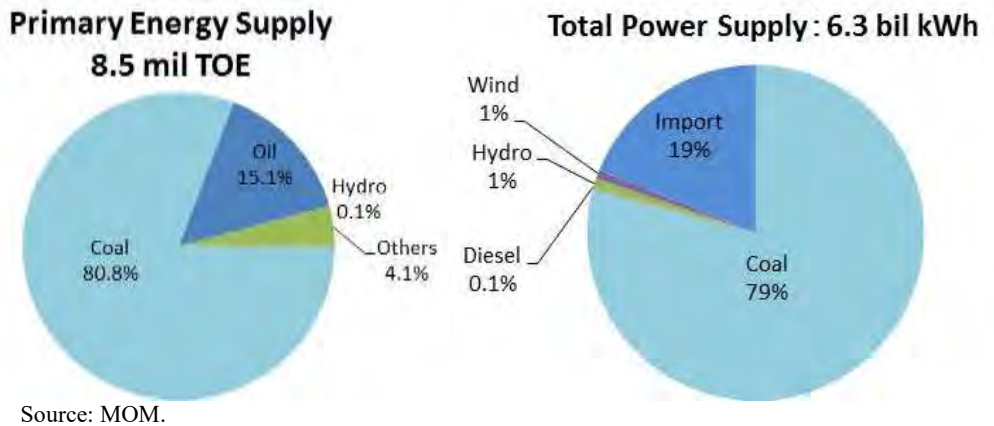
Figure 2.8.3 Volume of Coal Production, Export and Domestic Consumption

2.172 Coal for domestic use is the major energy source for electricity and heat. It accounted for 81% of the primary energy supply in 2012 and 79% of the electrical energy (secondary energy) in 2013.[57] It is anticipated that domestic coal demand would remain strong based on the country's economic growth and construction plans for large capacity power stations. However, state-owned mines producing low-grade coal for the domestic market are seeking to reduce their operation costs due to the price control by the government. To cite an example, the selling price of brown coal from the Baganuur mine, located in the suburbs of Ulaanbaatar, was kept at MNT25,500/ton in 2014 but production cost was at MNT27,882/ton, which exceeded the selling price.[58]

2.173 Coal mines producing coking coal for export are mainly located in South Gobi. These mines have to depend on costly trucking transportation due to the delay in the construction of the railway. Almost all coal exports are transported about 250 km from T.T. to Gashuun Sukhait by trucks on unpaved road, and also cross the border by other trucks to Gants Mod. Then the coal is transhipped on Chinese railway cargo. It is said that the transportation cost by trucks is USD27/ton[59] and it is nearly three times higher than ship transportation over several thousand kilometers from Australia. Nonetheless, since almost all raw coking coal are exported without preparation process, the coal price is kept low. Coal preparation process produces about 20% of the energy coal as the intermediate product, which can be utilized for power generation and heating. Some of the coal mines which operate preparation plants (see Table 2.8.2) have abandoned the production of energy coals due to the lack of supply destinations. This issue should be solved in order to increase the value of produced coal through the coal preparation process.

[56] Oxford Business Group; The Report Mongolia 2015.
[57] MOE; Situation of Mongolian Power Sector, Policy Challenges and Approaches, GSEP Power Working Group Workshop, 2014.
[58] Baganuur JSC.
[59] Erdenes TT; Overview of Tavantolgoi Project, 2015.

2.174 If all the preparation plants including proposed facilities are operated, over 10 million tons of energy coal can be produced by these plants. However, the preparation process will aggravate the water shortage issue in the South Gobi region as the process consumes much water. In this connection, the Japanese dry preparation technology may address Mongolian needs. NEDO has a plan to conduct a trial project for dry preparation technology.[60] The technology has various merits such as unnecessity of waste water treatment and drying process for clean coal and operation without water supply. Cost estimation of the technology which replaces a part of equipment for a preparation plant is difficult because the plant consists of many processes and equipment. However, it is considered that the total cost of dry preparation would be reduced relative to the wet type. The running cost of the dry type is estimated to be cut down considerably.[61]



Source: MOM.

Figure 2.8.4 Share of Sources in Primary Energy Supply in 2012 and in Power Supply in 2013

Table 2.8.2 Existing and Proposed Coal Preparation Plants

No.	Company	Field	Type	Capacity (kton/y)
Existing Plants				
1	Energy Resorce LLC	UkhaakhudagUmnugovi	Wet	15,000
2	MAK Company	Eldev MineDornogovi	Dry	75
3	Mo En Co LLC	Khushuut MineKhovd	Wet	2,400
4	Sharyn Gol Co., Ltd.	Darkhan-Uul	Wet	600
Proposed Plants				
5	Edrenes Tavantolgoi	East Tsankhi Umnugovi	Wet	20,000
6	Erdenes Tavantolgoi	Tavantolgoi Umnugovi	Dry (NEDO)	300

Source: MRAM.

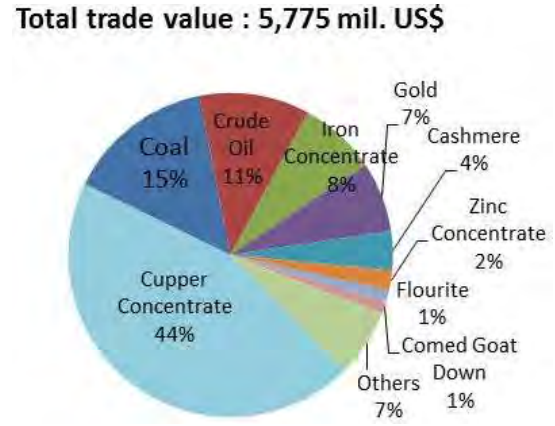
(3) Copper and Iron

2.175 The export volume and total value of copper concentrate have increased considerably with the commencement of production of Oyu Tolgoi mine (OT) in the latter half of 2013. In 2014, copper concentrate export accounted for 44% of total export value, taking the lead from coking coal which was at 15%. OT is operated by Oyu Tolgoi LLC owned by Turquoise Hill

[60] Mitsui Matsushima Co., Ltd.: http://www.mitsui-matsushima.co.jp/pdf/other_552773cf5a026.pdf.
[61] Nagata Engineering Co., Ltd.: Ref. No.12-003, Dry type specific gravity preparation system.

Resources (51% owned subsidiary of Rio Tinto) with 66% ownership shares while 34% shares is held by the Mongolian government. The mine produces 540 thousand tons of copper concentrate and is planning to start production of their underground pit where higher copper content would be expected by around 2020. About 450 thousand tons of copper concentrate, 650 thousand ounces of gold and 3 million tons of silver will be produced from this underground pit. The mine is expected to be the second largest copper mine in the world, contributing one third of the country's GDP by 2020. Meanwhile, OT depends on electricity that is imported from China since there is a shortage of electricity in the South Gobi area. It is anticipated that the construction of a power station would supply domestic electricity to the mine.

2.176 Erdenet mine was developed in cooperation with Russia and commenced production in 1978. Erdenet Mining Co., which is a joint venture between the Mongolian government with 51% ownership and Russian government with 49%, is operating the mine. In 2014, the mine produced 520 thousand tons of copper concentrate. Another copper mine expected to produce 300 thousand tons of copper concentrate is under development in South Gobi. Evidently, copper concentrate will dominate the export sector of Mongolia for the time being (see Figure 2.8.5).



Source: Statistical Yearbook 2014.

Figure 2.8.5 Share of Export Value by Commodities, 2014

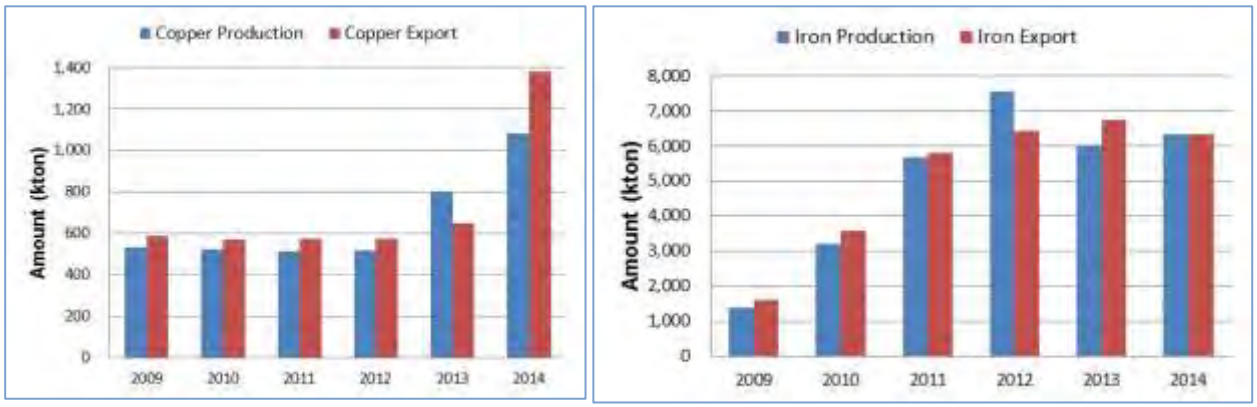
2.177 Construction of large-scale copper smelting plants are planned according to the state minerals policy but there are currently no plans to make progress because profitability is low and new export markets are difficult to find. The Sainshand Industrial Complex Program that includes a copper smelting plant has never advanced yet.

2.178 Two companies produce and export copper cathode by the SX-EW method from dumped copper oxide at a large-scale copper mine. Total production capacity is 13 thousand tons. Inasmuch as one company is equipped with a processing line for final products, the company is restricted to produce 180 tons of final products corresponding to only 18% of its capacity due to the limited domestic demand.

2.179 Almost all of the country's iron concentrate are exported to China. In 2012 and 2013, the volume and value of iron concentrate exports have increased considerably following the growth of iron ore imports of China. In 2014, however, the value of iron concentrate export decreased drastically due to the slump in the world market prices.

2.180 Construction of ironworks are advancing with one producing 500 thousand tons of

direct reduction iron (DRI) in Darkhan and another producing 100 thousand tons of pig iron by blast furnace in Erdenet. Both ironworks have plans to produce construction materials but achieving full-capacity operation may be difficult because domestic demand is limited to around 400 thousand tons only after the construction boom passed.



Source: MRAM.

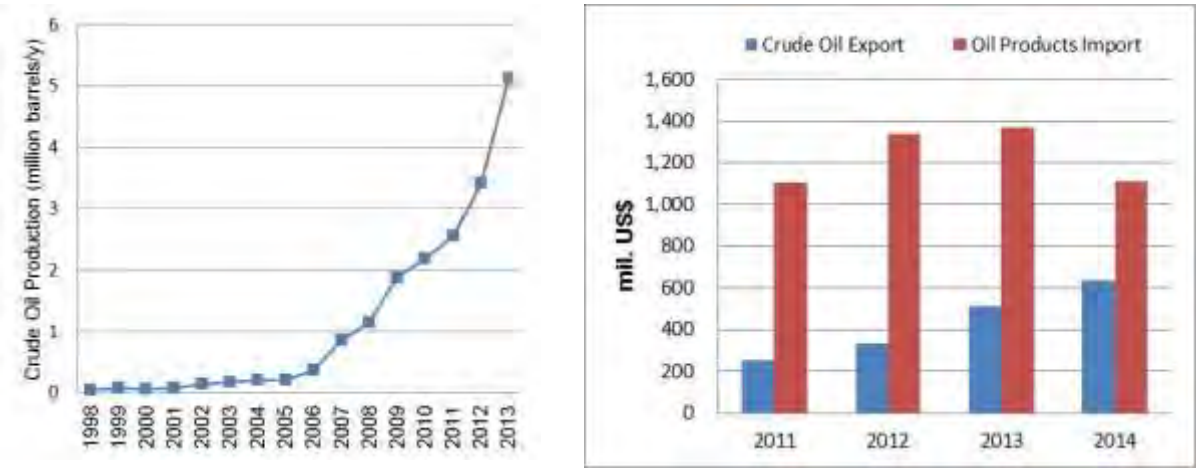
Figure 2.8.6 Amount of Production and Export of Copper Concentrate and Iron Concentrate, 2009–2014

(4) Other Mineral Resources

2.181 Crude oil production has resumed in 1998 and increased every year recently (see Figure 2.8.7). It is presumed that there is an increase of exploration activity and Production Sharing Contract (SPC). However, no published data have been obtained. By 2011, a total of 28,300 km² of 2D seismic work, 5,920 km² of 3D seismic work, 249,570 of gravity survey, 154,521 of magnetic survey, 844 deep well drilling were conducted and 239 wells were put into production.[62] There have been no published data at international institutes on Mongolian recoverable oil reserves yet. On the other hand, the considerable increase of oil production is attributable to large-scale developments by Chinese oil developing company such as Petro China and Sinopec. Although 14 PSCs have been contracted in 2012, 33% of the contractors are Mongolian companies, 39% are Chinese companies and the remaining 28% are companies from other countries.[63] A major Chinese oil company is developing two basins with PSC. Zuunbayan, in the southeast Gobi Desert (50 km south of Sine Shand), has produced 2.66 million barrels of oil as of end February 2012. The Tamsag basin has produced approximately 2.07 million barrels by 2011.[64]Those production have a higher proportion of total Mongolian oil production. According to a news release,[65] a plan to construct an oil refinery with 2 million tons of crude oil treatment capacity at Darkhan-Uul had been approved by the government and a Japanese trading firm and engineering company had accepted an order. However, the construction has never proceeded after that. On the other hand, the Cabinet has approved in February 2016 the construction of a new oil refinery with 2.3 million capacity and a pipeline from the oil basin at Bor Ondor,[66] Khentii. The construction of the refinery would be completed in 2020.

[62] Petro Matas Ltd.: Oil in Mongolia, http://www.petromatad.com/mongolia/oil-in-mongolia.
[63] Ibid.
[64] Ibid.
[65] InfoMongolia.com: http://www.infomongolia.com/ct/ci/5482, January 2013.
[66] Mongolian Press, No. 07 (vol. 547), February 2016 (in Japanese).

2.182 There is no oil refinery in Mongolia, so most of all crude oil extracted is exported to China while the country imports much of oil products such as diesel oil and gasoline from Russia. Although the import value of oil products decreased due to the drop in the world market price in 2014, the total import value remained high at USD1.1 billion as against USD630million of total export value (see Figure 2.8.6).



Source: USEIA. Source: Statistical Yearbook 2014.

Figure 2.8.7 Amount of Crude Oil Production, and Export and Import of Oil Products

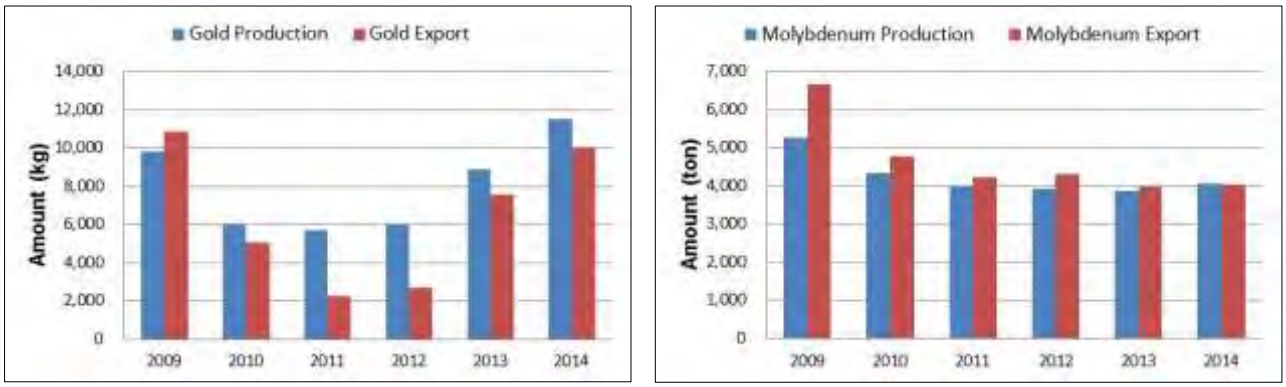
2.183 Although production of gold had fallen below its peak in 2009 due to the mining restriction within 200m from the river and the forest, production recovered in 2014 with government support. The government is supportive of small-scale mining, with several kinds of measures such as reduction of the royalty for gold to 2.5%, increase in the purchase of gold by the Bank of Mongolia from 4.5 tons in 2013 to 10 tons in 2014, and the offering of USD120 million in soft loan from Golomt Bank.[67]

2.184 UK had a 94% share in gold export from Mongolia, followed by 6% of Canada in 2014. It is rare that a country except China has the major share in Mongolia's export market. Development of new gold mines is also in progress.

2.185 Around 100 thousand tons of zinc concentrate (45–52% quality) are produced in Mongolia and most of them are exported. Similarly, around 120 tons of tin concentrate are produced and exported. Fluorite production, on the other hand, places Mongolia third in the world in 2014 with 310 thousand tons exported. However, most of the fluorite were of low metallurgical grade.[68] An advanced refining processor is required to produce higher grade products known as acid grade fluorite.[69]

2.186 Molybdenum, classified as a rare metal, is mined at Erdenet mine with copper ore. In 2014, the mine produced and exported 4 thousand tons of molybdenum concentrate (50% quality) together with 1.5 thousand tons of tungsten concentrate (42–69% quality) (see Figure 2.8.8).

[67] Oxford Business Group; ; The Report Mongolia 2015.
[68] It is used as flux for steel making and smelting process and concentration of CaF2 is lower than 97%.
[69] It is used as raw material and concentration of CaF2 is over 97%.



Source: MRAM.

Figure 2.8.8 Production and Export Volumes of Gold and Molybdenum Concentrate, 2009-2014

2.187 The exploration and pilot mining for uranium has been continuing in the northeast region of Dornod aimag and the central area of Dornogovi aimag by a French company as the lead institution. A Japanese trading company also has a share of this project. Similarly, exploration for rare earth elements is ongoing with a German institution carrying out three exploration activities as the lead institution in three areas. Four probable deposits were found (see Figure 2.6.9). Full-scale exploration activity for rare metals, on the other hand, has never been carried out. Deposits and occurrence of wolfram, molybdenum and tin were found as by-products of copper exploration activities. JOGMEC already has started a cooperation project, which includes exploration of rare earth and rare metals.[70]

Source: MRAM.

Figure 2.8.9 Promising Rare Earth Deposits

(5) New Energy Resources Development Technology

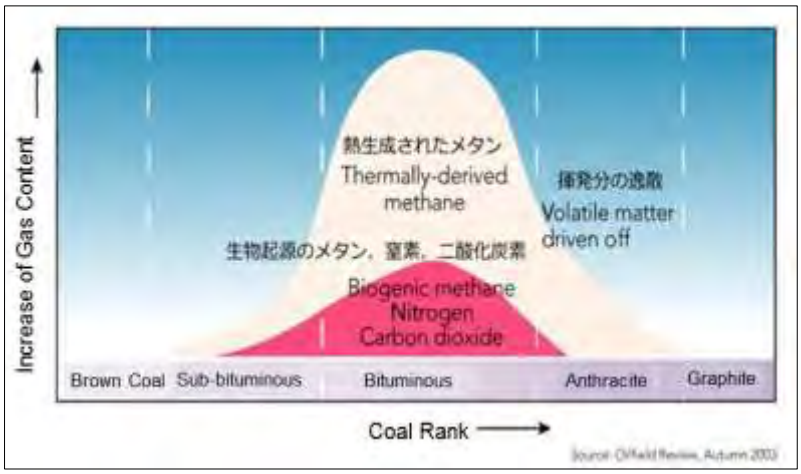
2.188 Mongolia has rich coal resources and is foreseen to depend on coal in order to meet increasing domestic energy demand for some time in the future. Coal utilization in burning, however, creates environmental issues such as air pollution and CO_2 emission. It is for this reason that the technology for an environmentally sound use of coal for energy is desired. Technologies such as the Coalbed Methane (CBM) and the Underground Coal Gasification (UCG) for harnessing energy from coal without the traditional mining and burning are outlined

[70] JOGMEC : http://www.jogmec.go.jp/news/release/release0276.html.

below.

1) Coalbed Methane (CBM)

2.189 CBM is a gas which remains absorbed in the coal. It is during the coalification process that methane and other carbon hydride gases are released from the coal by thermal effect and microbe activity. Generally, bituminous coal contains much CBM than any other coal such as brown coal, sub-bituminous and anthracite (see Figure 2.8.10). CBM is a clean gas mainly composed of methane and existing technologies to develop and use natural gas can be utilized. Since CBM is usually developed by drilling holes to reach the coal seam, the impact on the surface environment is less than by traditional coal mining. Furthermore, emission of contaminants and CO_2 during CBM combustion is relatively less than that of coal combustion. A pre-feasibility study had been carried out with the support of the U.S. EPA at several coal mines in Mongolia.[71] Although a full-scale estimation of the CBM reserves has not been carried out yet, 3 trillion m^3 of CBM resources were estimated based on the amount of regional coal reserves and the volume of their CBM contents.[72] Commercial production and utilization of CBM have been advancing already in countries like the USA, Canada, Australia and China. The technology to enhance CBM production by CO_2 injection and storage into the coal seam has also been developed. In Japan, a verification trial subsidized by METI had been carried out at Yubari, Hokkaido.[73]



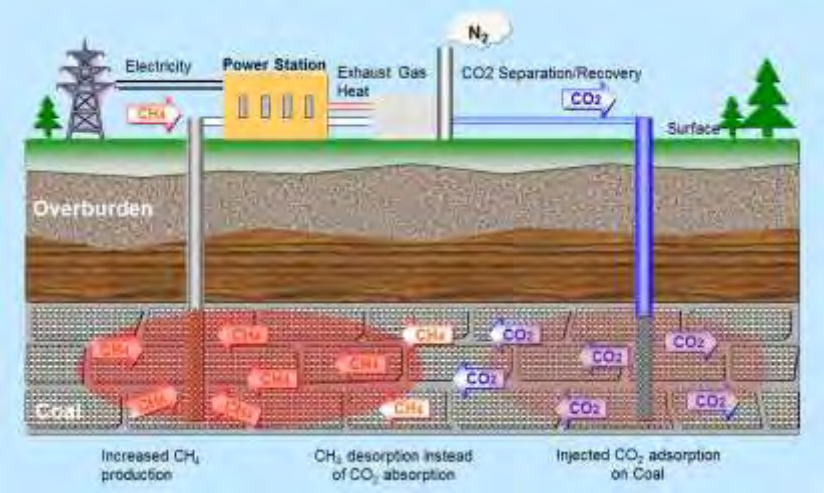
Source: Schulumberger, Oilfield Review 2003.

Figure 2.8.10 Coal Rank and Gas Content

2.190 The South Gobi area and the western part of Mongolia are promising areas for CBM development because large-scale bituminous coal deposits exist here, as indicated in Figure 2.8.11. A sub-bituminous coal deposit in the northern part of the central area is also pointed out as a possible area for CBM development. Although a more detailed investigation on CBM content and permeability of the coal seam is crucial for CBM development, the CBM development technology is expected to recover clean energy from coal seams laid deep in the earth where it is difficult to extract coal by open pit mining. Erdenes TT has already commenced full-scale CBM investigation in cooperation with KOGAS at TT and drilled 5

[71] U.S. EPA, Pre-feasibility Study for Coal Mine Methane Recovery and Utilization at Baganuur Mine, Mongolia, 2014.
[72] Mongolian Nature and Environment Consortium,Coal Mine Methane (CMM) Resource Assessment and Emissions Inventory Development in Mongolia, 2014.
[73] General Environmental Technos Co., Ltd., Development of CO_2 Geo-sequestration Technology with ECBM in Japan, March 2008.

CBM wells approximately 800m deep.[74]



Source: Underground Resources Innovation Network.

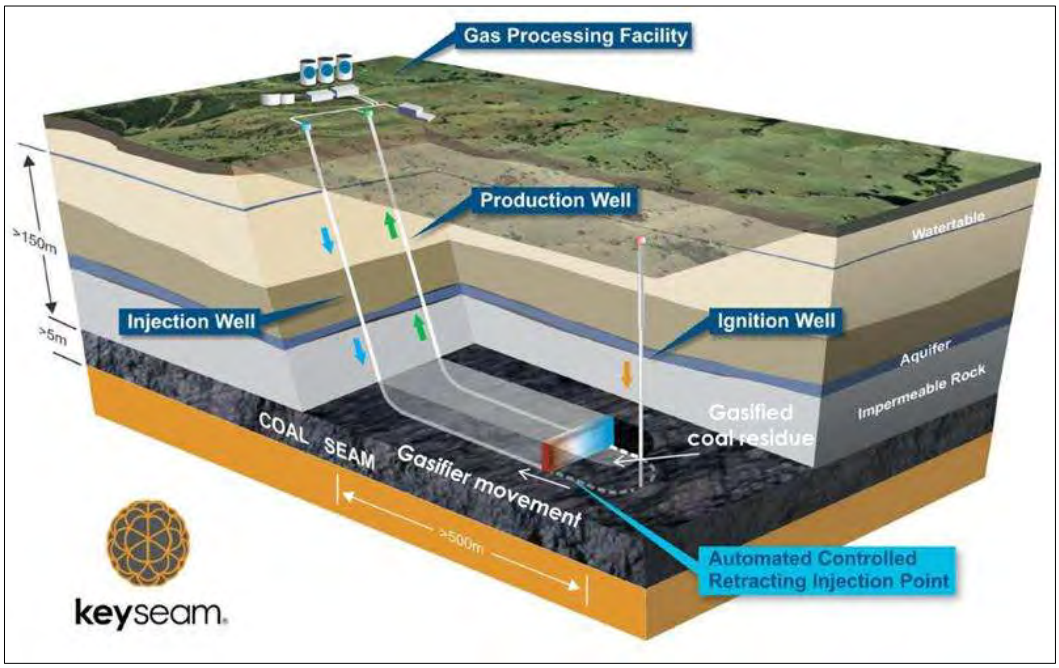
Figure 2.8.11 Schematic View of CBM Process with Enhanced Gas Recovery by CO_2 Injection

2) Underground Coal Gasification (UCG)

2.191 UCG is an in-situ gasification process carried out in non-mined coal seams using the injection of oxidants (oxygen and/or air) and the recovery of syngas containing gases such as CO, H2, CH4, and CO_2 through production wells drilled from the earth's surface. Since UCG can be applied to deep coal seams, which are difficult to mine economically, it increases the recovery of coal reserves. UCG fundamentally consists of injection wells to supply oxidant, production wells to recover syngas, and linking holes to link injection and production wells (see Figure 2.8.12). Recently, as more easy linking technologies have been developed with the use of advanced directional drilling methods which enable the drilling of holes in any direction, UCG became attractive and gained a great deal of attention in the world.

2.192 UCG may supply electricity more economically than the existing Integrated Gasification Combined Cycle (IGCC) power station because mining coal and construction of gasification plant are not required. Carbon Energy Co. estimated that UCG could generate electricity at the cost of USD0.035/kWh through a combination of 300MW combined cycle power generation system.[75] UCG syngas can be utilized as raw materials for chemical industries the same as syngas produced by a CTG plant on the surface. Furthermore, UCG have merits such as no-need to treat coal ash and the low emission of contaminants. However, there are risks such as underground water contamination due to gas leakage and ground subsidence. These risks can be avoided through screening procedures such as selecting appropriate depth and geological conditions as well as monitoring of implementation. Large-scale demonstration trials have already been carried out in Australia, Canada, South Africa and China. In Australia, power generation with 5MW gas generators[76] and production of liquid fuels[77] via the Fischer Tropsch (FT) process[78]are successful.

[74] Erdenes Mongol LLC.
[75] C. Mallett, Underground Coal Gasification in the Surat Basin -The Logical Clean Coal Option, Clean Coal 2007.
[76] http://www.carbonenergy.com.au.
[77] http://www.lincenergy.com/clean_energy_australia.php.
[78] Fischer-tropsh process is a chemical reaction that converts a mixture of carbon monoxide and hydrogen into liquid



Source: Carbon Energy Co.

Figure 2.8.12 Schematic View of Underground Coal Gasification (UCG) Process

(6) Renewable Energy

2.193 The mining sector consumes much electricity for many kinds of equipment and fuels for mining machines and transportation vehicles. Dependence on the importation of electricity and oil products increases due to the growth in the demand for energy along with the development of new mines and the scale of expansion of existing mines. The share of coal, oil and others (including renewable energy) accounts for 81%, 15% and 4%, respectively, in the primary energy supply of Mongolia. On the other hand, the share of coal, imported electricity and renewable energy are 79%, 19% and 2%, respectively, in the supply of electricity. Given this situation where the energy supply-demand structure depends highly on coal, improvement should be considered in terms of air pollution and GHG emissions.

2.194 Increase of alternatives for renewable energy, upgrading coal quality (by coal preparation and reforming), improvement of heat-only boiler (HOB) efficiency and household stove, and reforming efficiency of power stations are set in the Nationally Appropriate Mitigation Actions (NAMA) of Mongolia.

2.195 The potential of renewable energy such as wind, solar, hydro and geothermal is quite high and it is estimated that electricity of 2.6TW could be generated in total (see Figure 2.8.13). The Mongolian government has set a high target for the introduction of renewable energy by up to 20% of total installed capacity by 2020 and up to 30% by 2030.[79]

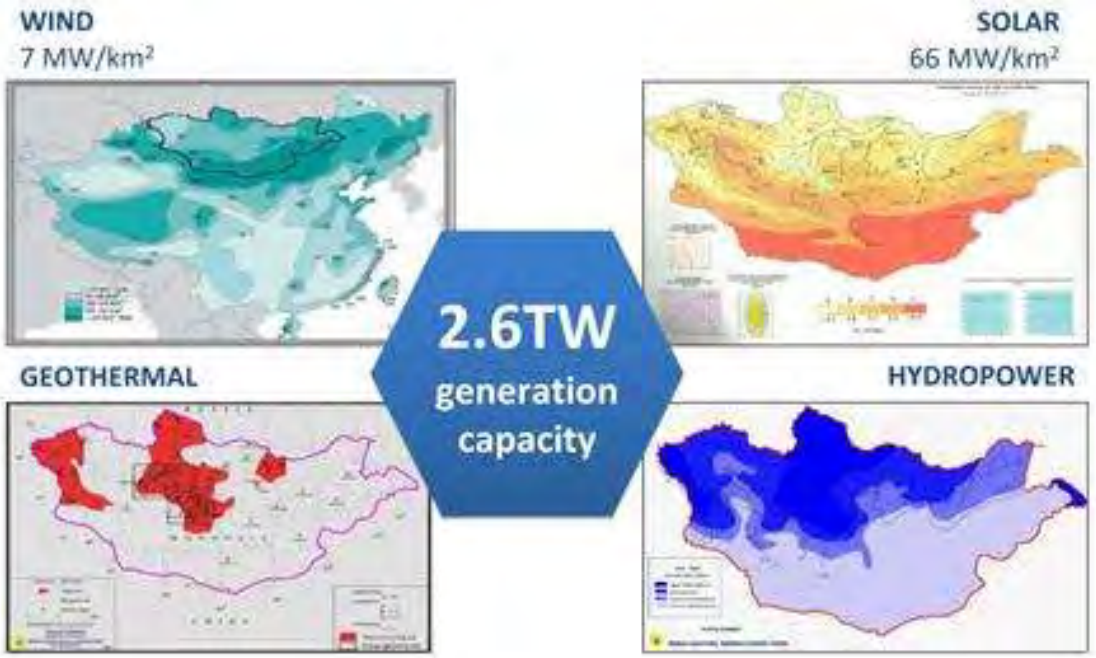
2.196 A wind power generation plant of 50MW has been completed and operated at Salkit in 2013. A project to construct a large-scale hydro power station, the EgiinGol hydro power station with 315 MW generation capacity, has proceeded with funding of USD827 million from a USD1 billion soft loan from China.[80] However, that project has been put on hold over

hydrocarbons.

[79] State Policy on Energy (Parliament Resolution No. 63, 2015), Green Development Policy 2014.

[80] http://www.infomongolia.com/ct/ci/9929.

Russian fears that it could affect the water level in Lake Baikal at November 2016.[81] The first solar power generation facility connected to the national grid, which has 450 MW capacity, was completed with a JICA grant assistance in 2012. In 2014, the Joint Crediting Mechanism (JCM) project planning study for a 10 MW-scale solar power generation[82] was carried out and further progress is anticipated. It may be effective to utilize the JCM mechanism in order to introduce the technology and facilities related to renewable energy and energy saving which contribute to the reduction of GHG emissions.



Source: Mongolian National Renewable Energy Center.

Figure 2.8.13 Potential for Renewable Energy

(7) Social and Environmental Issues

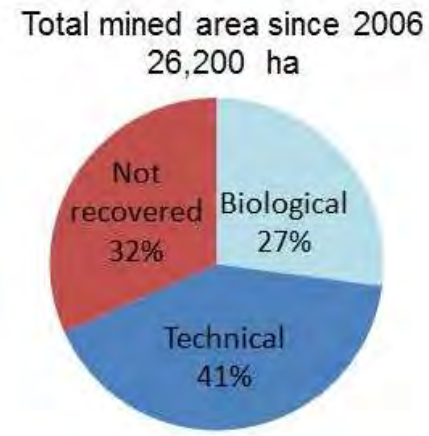
2.197 Air pollution is an issue in a populated city such as Ulaanbaatar, which is caused mainly by combustion of low grade coal in a small-scale HOB industry and in the stoves of ger areas for heating. Although the government has promoted the use of semi-cokes or liquefied petroleum gas (LPG) in order to improve air pollution, no effective measure has replaced coal burning due to several factors such as quality, production volume and price of those substitutes. Furthermore, coal ash discharged from coal-fired power stations is one of the major issues.

[81] http://www.globalconstructionreview.com/news/russian-objections-ha7lt-1bn-mong7olian-da7m/
[82] JCM web page, GEC; http://gec.jp/jcm/projects/14ps_mgl_01.html.

Source: https://a2k0bgmt.wordpress.com/.

Figure 2.8.14 Air Pollution in Ulaanbaatar

2.198 Rehabilitation work has been abundant in some cases of the mined areas and some environmental concerns emerged. A total area of 26,200 ha was mined between 2006 and 2014 as recorded in the statistical data of MRAM. Although about 68% of the mined areas have been rehabilitated, only 27% were biologically rehabilitated while the rest of the areas were merely covered with rocks and soil. Rehabilitation of the mined areas is the obligation of the mining operators but there are many cases of non-compliance. The absence of technical guidelines for the rehabilitation and the weak institutional function to reserve funds for the eventual closure of mines constitute part of the reasons for the non-compliance.[83] On the other hand, some coal mining firms are undertaking research work and trial cultivation to identify suitable vegetation for field soil and prevailing climate for their rehabilitation work.



Source: MRAM; Mining and Geology Statistics, 2015 mid-year data.

Figure 2.8.15 Rehabilitation Work for Mined Areas, 2006 to 2014

2.199 Transportation of mining products by large capacity trucks on unpaved road is common in Mongolia due to the infancy stage of the railway infrastructure. In such areas, pavement cracks and poor road conditions, occurrence of fatal accidents, dusts, and destruction of green land environment are becoming a problem. It is suggested that plans to construct more paved roads, improve present road conditions and develop the railway network should be achieved as soon as possible.

[83] National Mongolian Mining Association.

Source:http://mongoliaeconomy.blogspot.jp/2010/12/coal-transportation-damages-roads.html.

Figure 2.8.16 Heavy Coal Trucks on Unpaved Roads

2.200 There are an estimated 100,000 artisanal miners called “ninja” who mine gold, fluorite and coal illegally. In a population of 3 million people, they represent 20% of the rural workforce.[84] The shift away from pastoral activity due to droughts and severe winters between 1997 and 2002 contributed to the dramatic rise of "ninja" miners. Depletion of mineral resources, disturbance of the riverine system brought about by permafrost, water and soil pollution with the usage of mercury, rangeland degradation and desertification are becoming major environmental concerns directly linked to illegal mining activities. The policy to give artisanal miners legal rights and obligate them to pay taxes and the rehabilitation of mined areas has been attempted.[85] Mining companies are allowed to mine areas with promising deposits while only limited land rights were provided to artisanal mines. As a result, artisanal miners have no other choice but to return to illegal mining again.

Source: JICA Study Team.

Figure 2.8.17 Small-Scale Coal Mines in Naraih

[84] Villegas C., Ninja miners and rural change in Mongolia, http://www.asm-pace.org/blog/item/11-ninja-miners-and-rural-ch.

[85] MOM (former Ministry of Mineral and Energy) carried out the ”Sustainable Artisanal Mining Project” from 2005 to 2014 with the support of the Swiss Agency for Development and Cooperation. In 2010, the Mineral Resources Act, Land Act and Individual Income tax Act have been amended, and Artisanal Small Gold Mining (ASGM) has been defined as Small-Scale Mining (SSM).

(8) Summarized Points on Current Situation and Issues in the Mining and Energy Sectors

2.201 The issues in the mining and energy sector are summarized in Table 2.8.3.

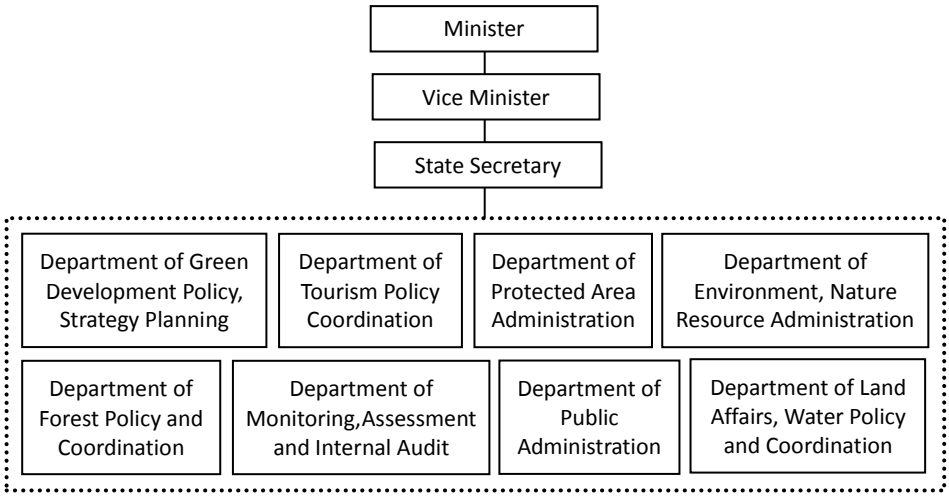
Table 2.8.3 Issues in the Mining and Energy Sector

a)	Excessive economic dependence on the mining sector (Impact of the slump of mining products market).
b)	Excessive dependence of mining products export on China (Impact of Chinese economic slowdown).
c)	Retardation of mining products processing and high value-added production (Low materials export and final end-products import).
d)	Environmental destruction due to mining and transporting (Rehabilitation of mining area, unpaved road and illegal mining activity).
e)	Excessive dependence of domestic energy on coal (Environmental destruction and air pollution).
f)	Energy dependence on imported fuels and electricity (Energy security).
g)	Shortage of professional human resources (Higher education and professional training).

2.9 Growth Potential in Tourism and Issues on Comprehensive Tourism Development

(1) Current Tourism Policy in Mongolia and Its Critical Issues

2.202 The Ministry of Environment, Green Development and Tourism (MEGDT) is in charge of preparing the policy and legal framework relevant to tourism development and promotion in Mongolia. The former responsible agency was the Ministry of Culture, Sports and Tourism, which was merged with the ministry in charge of the environment to form MEGDT in 2014. Although the responsible agency for tourism has been changed according to the change in government administration, MEGDT seems to be the more appropriate responsible agency than the previous agencies due to the need to integrate tourism with the environment. As illustrated in Figure 2.9.1, there are 8 departments in MEGDT as of January 2016.



Source: JICA Study Team.

Figure 2.9.1 Organizational Chart of MEGDT

2.203 MEGDT has conducted various projects for establishing the legal framework and promoting tourism since the democratization in 1990, as shown in Figure 2.9.2. JICA has supported this establishment of the foundation for tourism promotion through the implementation of projects such as “The Master Plan on National Tourism Development in Mongolia” (1998–1999) and “The River Basin Management Model Project for the Conservation of Wetland Ecosystem and its Sustainable Use in Mongolia” (2005–2010).

Source: JICA Study Team.

Figure 2.9.2 Milestones of Tourism Promotion and Planning in Mongolia

2.204 The Tourism Development National Program (TDNP) was formulated under the new structure of MEGDT and approved by the national assembly in 2015. While the TDNP covers various issues on tourism in Mongolia, the contents are too comprehensive to implement without specific priorities. Any policy cannot be implemented without prioritization due to the limited financial and human resources. Therefore, the Study identified the following two aspects as the most significant issues in the TDNP: (i) Unclear priorities in the TDNP; and (ii) Lack of a common vision for tourism development shared by the stakeholders, which is necessary for clarifying the priorities.

2.205 The development of Ulaanbaatar's policy also has a significant influence on tourism in Mongolia as 95% of the tourists visiting Mongolia go to or through UB.[86] Similar to the TDNP, the Hospitality UB Program (UB's development plan in tourism) faces the significant issue on prioritization while it covers various aspects of tourism development and promotion. The outline of the TDNP and Hospitality UB Program are summarized in the following section.

1) TDNP

2.206 The TDNP lists the following six strategic objectives to implement the overall goals of (i) Solving the fundamental issues on tourism in accordance with the principles of sustainable development as well as international standards and guidelines; and (ii) Formulating and implementing the national policy for tourism development which nurtures the tourism sector as one of the priority economic sectors in order to enhance its competitiveness in the international market:

(i) Development of infrastructure including the increase of capacity (accommodations and transportation);
(ii) Development of tourism products and services including Community-Based Tourism (CBT) as well as improvement of services;
(iii) Development of the survey method and information system, and improvement of data collection and quality of data;
(iv) Human resource development and capacity enhancement;
(v) Promotion of international collaboration and marketing; and
(vi) Promotion of domestic tourism and raising of tourism awareness among the local residents.

2.207 These strategic objectives are proposed to be implemented by phased planning over the short term (2016–2020) and the long term (2016–2025). The program aims to increase the number of inbound tourists to 2 million in the short term and to 3 million in the long term. An implementation plan was also prepared and attached to the TDNP as an appendix. It includes 91 programs to achieve the 6 strategic objectives listed above. Each program specifies the implementing agencies and supporting agencies. MEGDT is listed as the implementing agency for 52 programs (including joint programs with other agencies) mainly aiming at the achievement of objectives (ii), (iii), and (iv).

2) Hospitality UB Program

2.208 The Hospitality UB Program sets the target year as 2020 in accordance with the UB

[86] According to Professor Monkhotomor (member of the Tourism Research Association), Orkhon University.

City Master Plan. Similar to the TDNP, the Hospitality UB Program lists the following 7 objectives to bring in 2 million inbound tourists to UB by 2020. Although the planning period is set until 2020, the program also states the long-term goal of bringing in 5 million inbound tourists by 2030.[87]

(i) Increase of positive economic impact, mitigation of negative impact on socioeconomic and environmental aspects, and enhancement of support for entrepreneurs;

(ii) Safety management including emergency measures, establishment of information collection system, and improvement of safety in UB City;

(iii) Development of tourist facilities (resort facility, tourist center, rest area, etc.);

(iv) Enhancement of international marketing;

(v) Development of tour packages, commodity and services which bring out the uniqueness and strengths of UB City;

(vi) Hosting of events to attract large numbers of visitors (concert, sports contest, etc.); and

(vii) Improvement of hospitality, and dissemination of urban culture of UB.

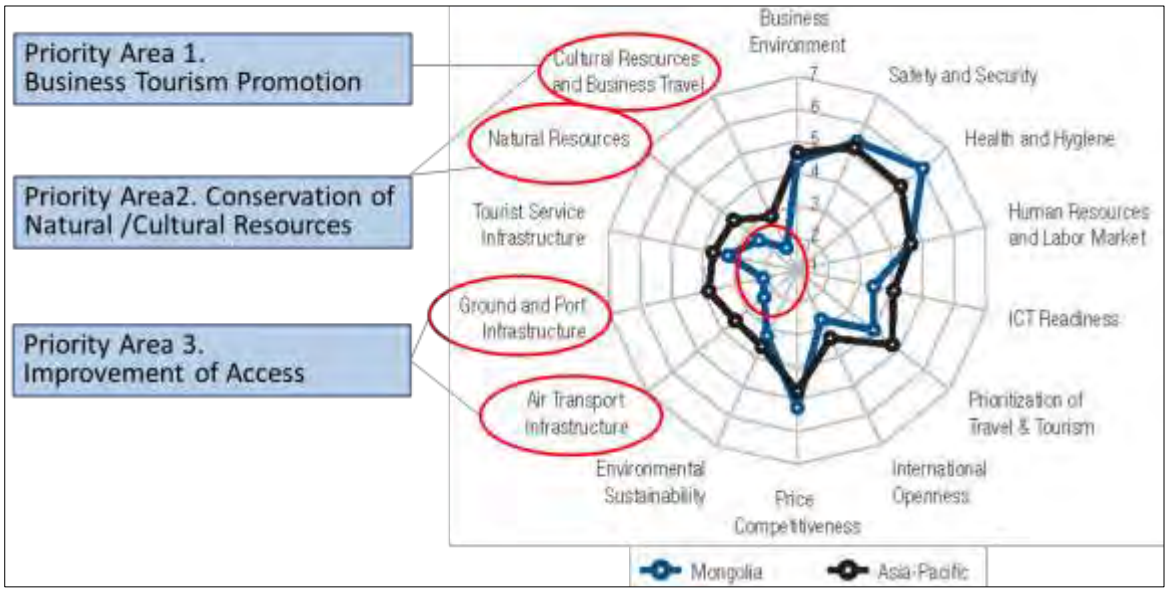
2.209 Phased planning was proposed to implement these objectives similar to the TDNP. While 85 proposed programs are planned to be implemented in 3 phases (Phase1: 2014–2016, 30% of the entire programs to be implemented; Phase 2: 2016–2018, 30% implementation; and Phase 3: 2018–2020, remaining 40% implementation), prioritization among the programs is not clarified.

2.210 As previously described, phased planning cannot be implemented in an efficient and effective manner without clear prioritization among the proposed programs due to the limited human and financial resources and budget. Therefore, priority areas need to be identified and analyzed to find out the issues and solutions through the Study.

(2) Priority Areas for Tourism Promotion in Mongolia

2.211 Priority areas need to be identified to prioritize the tourism development and promotion programs and activities in Mongolia. According to the latest annual evaluation by the World Economic Forum (WEF) of Mongolia's competitiveness in tourism (see Figure 2.9.3), the ratings for cultural resources and business travel, natural resources, ground and port infrastructure, and air transport infrastructure are relatively low among the 14 indices. As a result, Mongolia is ranked 99th among 141 surveyed countries based on their total scores. This ranking is significantly low compared with Japan (9th) and other newly industrialized countries in Asia (China, 17th; Malaysia, 25th; Thailand, 35th, etc.). Since the significance of the issues on these indices with low scores were also recognized through the survey of the Study, the following are identified as the top 3 priority areas for tourism promotion in Mongolia: (i) Business tourism promotion; (ii) Conservation of natural/cultural resources; and (iii) Improvement of access.

[87] Considering the current number of inbound tourists (0.4 million as of 2014) and level of services and infrastructure, the 5 million target by 2030 seems to be too ambitious to implement as it requres about 17% of annual growth rate. Therefore, long-term national strategy (Mongolia's Sustainable Development Vision 2030) approved by the parliament in February 2016 adjusted the target to 2 million by 2030.



Source: WEF, Travel and Tourism Competitiveness Index Ranking 2015; JICA Study Team.

Figure 2.9.3 Evaluation of Competitiveness of Tourism in Mongolia

1) Business Tourism Promotion

(a) Current Situation

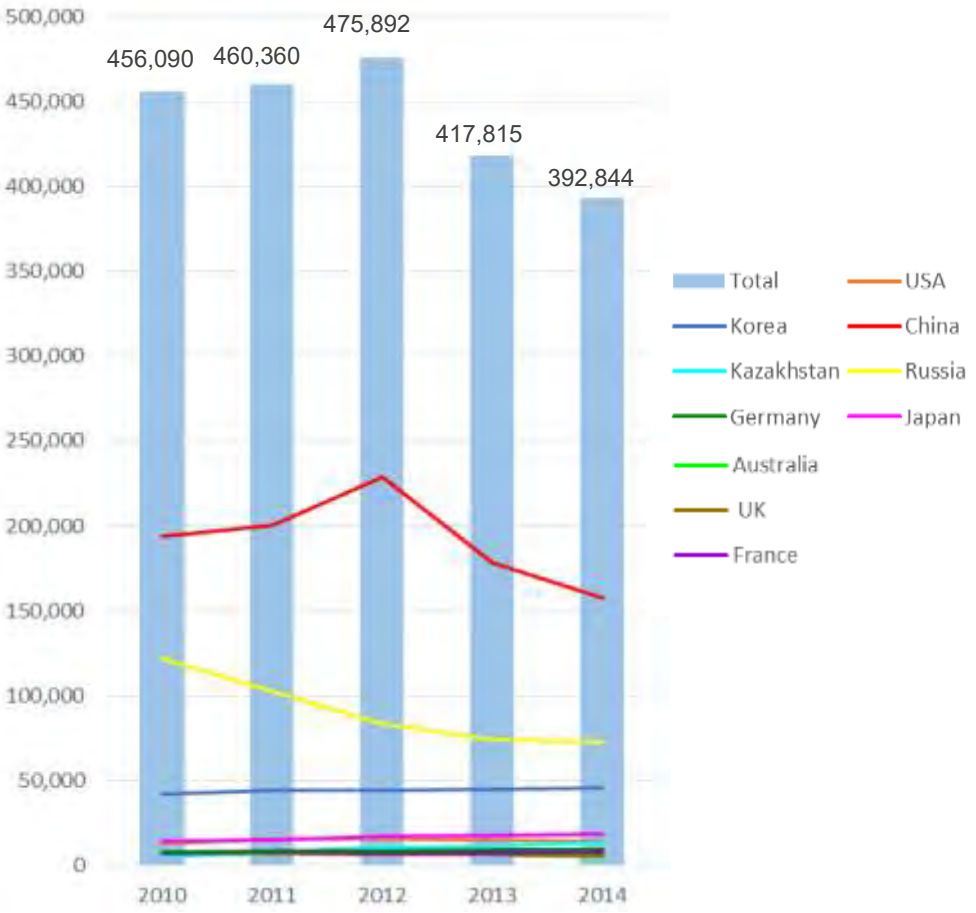
2.212 The current total number of inbound tourists in Mongolia is about 0.4 million (see Figure 2.9.4). As Table 2.9.1 indicates, approximately 70% of inbound tourists are from China, Russia and Korea. Although statistical data is not available, leisure tourists are estimated to compose only a quarter to one third of total inbound tourists[88] according to the local stakeholders and the remainder are business tourists mostly from these top 3 countries. The correlation between the decrease in total number of inbound tourists and the decline of certain industries such as wholesale, retail and construction since 2012 certifies the large number of business tourists. In other words, such dominance of business tourists points to the significant potential for the promotion of business tourism.

Table 2.9.1 Inbound Tourists by Country (2014)

Rank	Country	Number of Tourists
1	China	157,561
2	Russia	73,055
3	Korea	45,476
4	Japan	18,282
5	U.S.A.	13,987
6	Kazakhstan	13,562
7	Germany	9,551
8	France	7,733
9	U.K.	5,758
10	Australia	5,118
Total		392,844

Source: National Statistical Office.

[88] Oxford Business Group, The Report – Mongolia, p.150.



Source: National Statistical Office.

Figure 2.9.4 Number of Inbound Tourists in Mongolia

(b) **Issues**

2.213 Statistical data required for tourism promotion and development such as numbers of leisure and business tourists including their nationalities are not accurately collected. The number of domestic tourists is not aggregated except for some major tourist attractions due to the difficulty to distinguish the visitors of friends and relatives. This lack of accurate statistical data prevents a more thorough analysis for a better understanding of the trends in inbound tourism and to conduct strategic marketing necessary for sustainable tourism development and promotion. Such insufficient data makes current tourism planning broad and without priorities.

2.214 Although the MICE (Meetings, Incentives, Conferences, and Exhibitions) market represents a major component of business tourism which requires hotels with large facilities, currently only Shangri-la Hotel has a large banquet room with a capacity of over 500 people. There is also a limited number of 5-star class hotels (i.e., only 4 hotels that are members of the Hotel Association in Mongolia as of December 2015 in addition to 4 non-member hotels). Further investment by international hotel chains is needed to promote MICE tourism in addition to the 4 large hotels (Radisson, Holiday Inn, Sheraton, and City Tower) currently under construction or planning for the upcoming Asia-Europe Meeting (ASEM) in 2016. However, the lack of planning and implementation of strategic marketing and tourism promotion causes low occupancy rates during winter and discourages foreign investment in high quality, large-scale hotels.

2.215 The difficulty of maintaining stable revenues all year round has a negative impact on employment and human resource management in tourism. According to Professor Monkhtomor, a member of the Tourism Researchers' Association, the number of students majoring in tourism has been decreasing due to the unstable employment conditions and limited income during winter. This trend has triggered many universities to close their tourism departments and/or decrease the number of faculty members. Since practical training becomes more difficult than ever under such circumstances, Professor Monkhtomor highlighted the importance of training by Japanese practitioners in the hotel industry with international renown for high quality services. Similar comments were made by several relevant agencies such as the Mongolian Hotel Association and the Mongolian National Chamber of Commerce and Industry during the interviews conducted in the Study. Insufficient capacity development and enhancement in tourism directly relates to the lack of experienced human resources in the hotel industry as well as in marketing and results in decreased level of services and number of tourists.

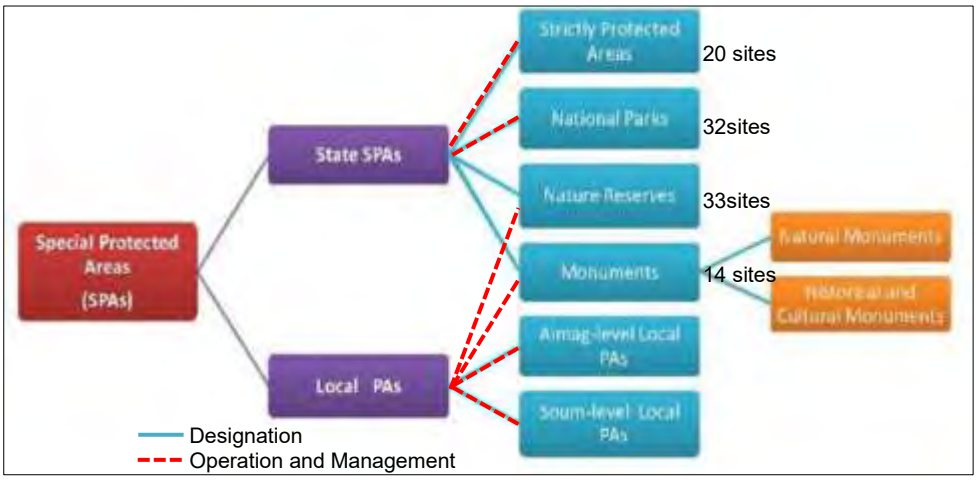
2.216 Although MEGDT has been actively working on promoting business tourism during winter, such as MICE promotion for international agencies and discount winter rate offered by major hotels in UB, these efforts have not produced significant results. The lack of urban attractiveness due to the limited number of entertainment facilities and events in UB, which tourists can enjoy all year round, prevents business tourism promotion during winter. In addition, development of information system including necessary software can be easily accessed by tourists has been fairly behind compared to other Asian countries. Since such system can also be integrated and utilized for strategic marketing, insufficient and inconvenient information system has lost significant opportunities in promoting business tourism.[89]

2) Conservation of Natural/Cultural Resources

(a) Current Situation

2.217 Mongolia has 99 Special Protected Areas (SPAs), as shown in Figure 2.9.5, as well as various natural resources such as 11 Ramsar wetlands, 70 Important Bird Areas (IBAs), and 6 Biosphere Reserves (BRs). The total area of SPAs is about 27.2 million ha, or 17% of the entire country. Four sites (3 Cultural Heritage sites, namely Great Burkhan Khaldun Mountain and its surrounding sacred landscape, Orkhon Valley cultural landscape, and Petroglyphic complexes of the Altai Mountain), and 1 Natural Heritage site (Uvs Nuur Basin) are registered as UNESCO World Heritage sites as of December 2015 (see Figure 2.9.7). Seven traditional festivals, songs, and dances etc. are registered in the list of UNESCO Intangible Cultural Heritage, including Naadam (Mongolian traditional festival) and Urtiin Duu (traditional folk long song). These intangible cultural heritages are highly evaluated by WEF through the assessment of competitiveness in tourism previously discussed and ranked 6th among 141 surveyed countries.

[89] While the operas and ballets performed every weekend at the Opera House in UB have the reputation for world-class high quality, tourists cannot obtain these tickets nor basic information such as schedule and program online. Information technology services have much room for improvement.



Source: Law on Special Protected Areas; JICA Study Team.

Figure 2.9.5 Special Protected Areas in Mongolia

(b) **Issues**

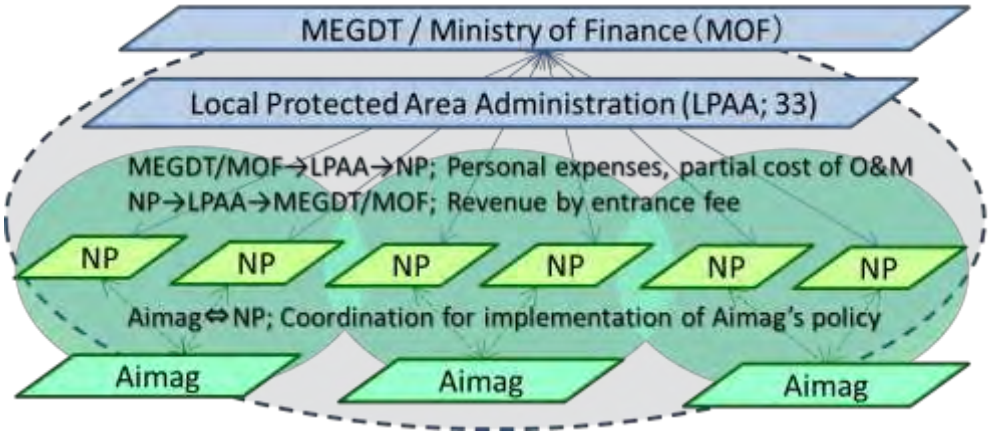
2.218 The fact that evaluations of Mongolia's natural and cultural resources are low in spite of its possession of a variety of resources indicates the inappropriate conservation of such resources. Although values of the resources need to be identified and shared by the local residents for sustainable conservation, currently even information dissemination has not been sufficiently conducted to recognize the existence of these resources. There is a strong preconception among local residents that SPAs are supposed to be technically and financially operated and managed by the national and provincial governments, which prevents the involvement and commitment of local residents in the conservation of the resources. While human and financial resources of MEGDT, the main agency taking a lead in conservation of natural and cultural resources, are limited, the necessary role sharing among MEGDT, aimags, and local communities to make up for the shortage of MEGDT's resources is not clarified. The financial scheme also has not been established due to the lack of policy for the coordination between MEGDT and relevant agencies to make the most of the current budget and supplement the gap to secure the funds necessary for conservation. For example, currently there is no system for the local aimags to collect taxes from the tour operators and travel agencies conducting the tours to the aimags since majority of them are based in Ulaanbaatar and they do not have to pay taxes to the local aimags.

2.219 Regarding the management of National Parks (NPs), MEGDT does not provide any holistic policy and budget for conservation to both aimags and NPs except for personal expense and partial cost of operation and management (O&M) as Figure 2.9.6 indicates. Although coordination and cooperation are needed between aimags and NPs in various aspects, they are rarely implemented due to the difficulty of aimags to secure sufficient budgets to support NPs. Therefore, many NPs rely on the funds from donors to supplement the O&M cost due to MEGDT's limited financial availability. Such reliance of NPs on other financial sources stem from their inability to generate their own revenues since they have to return their income from the entrance fees (MNT3,000 for foreigners, free for Mongolians) to the National Treasury managed by the Ministry of Finance through the Local Protected Area Administration according to the current Law on Special Protected Areas. Consequently, a bill to revise the law to raise the entrance fee (MNT5,000 for foreigners, MNT2,000 for Mongolians) and confer the flexibility on NPs to utilize the revenue from entrance fees is currently under process to be

approved by the Cabinet and the Parliament (as of April 2016).

2.220 Hustai NP is the only NP in Mongolia operated and managed by a Non-Profit Organization (Hustai NP Trust). Although it charges entrance fees of MNT15,000 for foreigners and MNT2,000 for Mongolian domestic tourists (free for local Mongolians), their revenue from the entrance fees is still not sufficient for its sustainable O&M.[90] Hustai NP Trust has been actively working on the conservation of the buffer area as well for its sustainable O&M. With the assistance of the Dutch government, Hustai NP Trust established the buffer management fund to provide financial support for the nomads living in the buffer area of Hustai NP to start side businesses such as farming and operating guest houses to mitigate overgrazing and to increase their income.

2.221 While Hustai NP was approved as an exception for its self-supporting O&M due to its long-term partnership with the Dutch government and scholars, international attention for its uniqueness of biodiversity etc., other SPAs do not have the flexibility to manage the budget by the establishment of funds and exploration of additional funding sources under the current law. They are also not able to fully manage either the buffer areas of SPAs or inside the SPAs. Thus, some SPAs selected as the pilot sites of donor projects started to adopt a self-supporting accounting system by the establishment of the NPOs to conduct independent O&M including financing (e.g., IkhNart National Reserve, project site of Strengthening the Protected Area Network [SPAN] by UNDP).

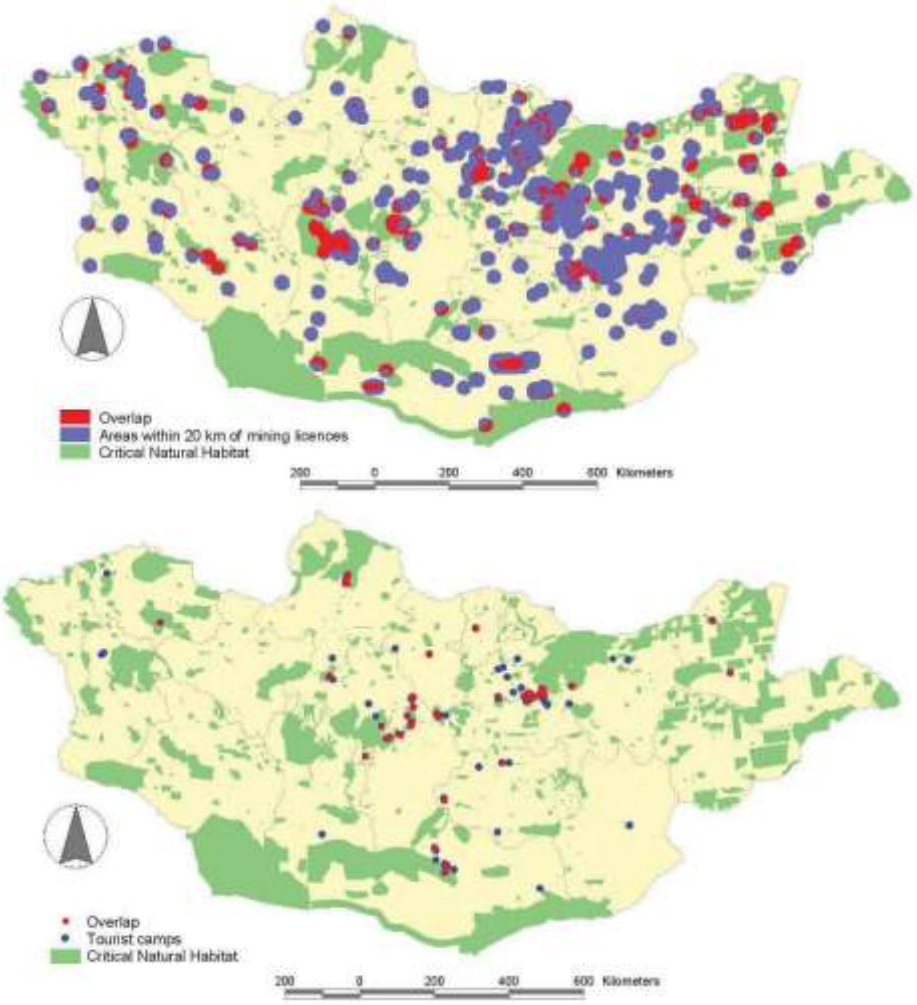


Source: JICA Study Team.

Figure 2.9.6 O&M System of National Parks

2.222 According to the current Law on Special Protected Areas, any type of development is prohibited, not only mining related activities but also construction of facilities such as Tourist Camp (TC) in the Strictly Protected Area (most stringent area among SPAs as shown in Figure 2.9.5). However, many mines are developed in or near important areas for preservation of biodiversity such as Strictly Protected Area, Important Bird and Biodiversity Area (IBA), and Biosphere Reserve (BR) as shown in Figure 2.9.7. TCs are also constructed in many tourist attractions located in SPAs such as Khovsgol Lake NP and Terelj NP.

[90] According to Mr. Tserendeleg, Director of Hustai NP Trust, Hustai NP Trust still needs to invite the universities around the world for joint researches as well as to apply for the projects by donors to conduct necessary researches to generate more funds to sustain its operations. These efforts indicate the difficulty to ensure the sustainable conservation including human and financial resources.



Source: Bird Life Asia. 2009; Safeguarding Important Areas of Natural Habitat alongside Economic Development; Mongolia Discussion Papers; East Asia and Pacific Region Sustainable Development Department, World Bank.

Figure 2.9.7 Location of Important Areas for Preservation of Biodiversity, Mines with Licenses (above) and TCs (below) Including Overlapped Areas (shown in red)

2.223 According to the Tourism Law in Mongolia, the number and location of TCs are supposed to be determined by the government. Although there is also a guideline suggesting a minimum of 5km distance between TCs to mitigate environmental impact and secure sustainable operation, such regulations are not followed especially in popular tourist spots. While official TCs with operating licenses issued by the government are required to meet certain standards for solid waste and wastewater management, there are many unofficial TCs called “Ger Camps” and private guest houses called “Guest Gers” which are completely out of control by the government and have significant potential for negative environmental impact.

2.224 For example, the number of domestic tourists is rapidly increasing in Khuvsgul Lake area due to the completion of the paved access road and mitigation of their environmental impact becomes urgent issues. Although major local tourism stakeholders such as the TC association and Ger Camp association have regular meetings (twice a year) with the Hatgal village (local center for tourism) to discuss such major issues, they have not found the fundamental solutions due to the lack of financial sources to construct the necessary facilities. Mr, Ganbaatar, governor of Hatgal village, expressed his significant concern for environmental

degradation due to the inappropriate management of solid waste and waste water. According to him, currently the village has only one open dump site and wastewater discharge pond. Thus, the dump site has been filled up and each TC has to transport its wastewater all the way to the discharge pond with significant safety issues (i.e., potential of contamination in case of accident) and cost.

2.225 In response to such urgent conditions, ADB commenced a project on "Integrated Livelihood Improvement and Sustainable Tourism in Khuvsgul Lake National Park Project" under the Japan Fund for Poverty Reduction (JFPR). However, its scope of solid waste and water management is limited to site-scale solutions such as establishment of community-based waste management system and introduction of biodegradable toilet through the pilot projects and will not reach the fundamental, regional solution. Interviews with local stakeholders also highlighted the significant issues by increasing domestic tourists such as uncontrolled stay at the undesignated camp sites and illegal dispose of waste. Therefore, training and awareness rising for domestic tourists are essential in addition to the development of infrastructure to mitigate the environmental impacts.

3) Improvement of Access

(a) Current Situation

2.226 While the roads between UB and major tourism resources have been improved, as shown in Figure 2.9.8, rural areas such as mountainous (khangai) and western regions still have many unpaved sections. Road improvement significantly contributes to domestic tourism promotion. For example, completion of the paved road section between UB to Khuvsgul Lake in early 2015 has brought in over 60,000 domestic tourists from end of May to mid-July in 2015, which exceeded the total number of domestic tourists in 2014 (about 50,000). On the other hand, the number of inbound foreign tourists visiting Khuvsgul in 2015 is expected to be around 5,000, which is the same as in 2014.

Source: WWF Mongolia; Administration of Land Affairs, Geodesy and Cartography; UNESCO website (accessed in December 2015); Ramsar Site Information Services; The Alliance of Religions and Conservation.

Figure 2.9.8 Location of Major Tourism Resources and Conditions of Road Improvement

2.227 Regarding railway development, a Memorandum of Understanding (MOU) has been signed at the Brazil, Russia, India, China and South Africa (BRICS) Summit in 2015 among Russia, China and Mongolia for the development of an international tourism route over 3,000 km from Beijing-UB-Moscow (see Figure 2.9.9). This development includes a plan to operate a sightseeing train introducing a historic "Great Tea Road" in the current railway section and intends to make the train service as a catalyst for promoting cross-border tourism.

Source: The Siberian Times.

Figure 2.9.9 Tourism Route of the "Great Tea Road"

2.228 For air transport, the state enterprise Mongolian Civil Air Transport (MIAT) operates international flights to 6 cities (Beijing, Hong Kong, Moscow, Berlin, Tokyo and Seoul) as of April 2016 (the flight to Berlin is operated via Moscow). The Mongolian private airline Hunnu Air also operates international flights to Manzhouli and Hailar in Inner Mongolia, and Aeromongolia operates to Hoh hot in Inner Mongolia and Irkutsk in Russia. Five international airlines (Aeroflot Russian Airlines, Air China, Yangtze River Express, Korean Air, and Turkish Airline) operate flights between UB and Moscow, Beijing, Tianjin, Seoul, and Istanbul (via Bishkek in Kirgizstan). Although both international flight operators and MIAT decrease the number of flights in winter, the number of destination cities of international flights has not changed all year round. As Figure 2.9.10 shows, Hunnu Air and Aeromongolia also operate domestic flights to 9 cities (Choibalsan, Dalanzadgad [summer only], Altay, Uliastai, Khovd, Ulgii, Ulaangom, Murun [summer only], and Ovoot). All international and domestic flights depart from and arrive at UB except for the flight between Choibalsan and Hailar operated by Hunnu Air.

Source: The Tourist Map of Mongolia, 2015; Hunnu Air Homepage (accessed in December 2015); Aeromongolia Homepage (accessed in December 2015).

Figure 2.9.10 Routes of Domestic Flights in Mongolia

(b) **Issues**

2.229 The urgent issue that needs to be solved is the necessity to increase the international flights from/to UB considering the fact that 95% of tourists in Mongolia visit UB and majority of flights depart or arrive at UB as previously mentioned. Although the number of passengers using Chingis Khaan International Airport has increased from 0.61 million in 2008 to 1.1 million in 2013, the gap from the target number of inbound tourists (2 million by 2030) proposed by the long-term national strategy is still significant. To address this, the New Ulaanbaatar International Airport (NUBIA) is currently under construction under a JICA yen loan and a JICA technical assistance project for human resource capacity development. The airport hydrant system and terminal operation improvement for NUBIA is also underway aiming to accommodate 2 million passengers from both international and domestic flights as the short-term goal. While certain efforts have been made to solve the issues in terms of infrastructure and management, the strong dominance by MIAT prevents the entry of new international airlines and still remains as a significant issue.[91]

2.230 According to Orkhon Valley National Park Administration, an MOU was signed between the Mongolian and Turkish governments for the construction/renovation of the airport in Kharkhorin by the Turkish government to commence an international service between Kharkhorin and Istanbul by Turkish Airlines. However, no concrete progress has been made as of December 2015. Currently, Mongolia has lost many potential inbound tourists especially during summer due to the difficulty of international airlines to increase their international

[91] Although TDNP clearly states the promotion of an Open Sky Policy in its implementation program, several stakeholders during the interviews indicated that MIAT and relevant companies are lobbying to prevent the entry of new international airlines, which is expected to lower the cost of tickets and fuel.

flights as it prevents them from securing a sufficient number of seats during high season and causes the increase in prices. Thus, the implementation plan of the TDNP includes the promotion of an Open Sky Policy to increase the flights and provide flexibility in pricing. However, since the plan designates the Ministry of Roads and Transportation as the implementing agency while MEGDT, relevant airline companies, and the Tourism Research Association are assigned as supporting agencies, MEGDT needs to take the initiative to coordinate these agencies and let MRT proceed with the Open Sky Policy.

2.231 The limited number of inbound tourists affects the operation of domestic flights and railways. Although inbound tourists generally rely on public transportation such as air and railway transportation for long distance travel, the current ticketing service is not user-friendly without online ticketing service in multi-languages (especially in English). Such inconvenience contributed to the decrease of inbound tourists which, in turn, has a negative impact on domestic public transportation. As a result, domestic public transportation mainly caters to domestic tourists. Since domestic tourists tend to use the road transportation system once pavement section is completed regardless of the additional travel time, the domestic airlines and railway running the same routes tend to be reduced or closed as their operating costs are generally higher than that of road transportation. For example, the number of airline companies operating flights between UB and Murun (the gateway city to Khuvsgul Lake) has been reduced from 4 to just 1, in addition to the frequent cancellation of flights and change of flight routes due to the completion of paved roads. Khuvsgul Lake is one of the major scenic areas in Mongolia, famous for its second highest transparency of water in the world after Baikal Lake in Russia, with convenient access from UB (1.5-hour flight and 0.5-hour drive from Murun Airport to Hatgal village located at the south side of Khuvsgul Lake). Despite such significant tourism potential, it has become less convenient to access by inbound tourists since the completion of road improvement has reduced flights as well as suspended the shuttle bus service between Murun Airport and Hatgal village. For that reason, while the number of domestic tourists has increased dramatically, the number of inbound tourists has been the same as before the construction of the paved roads. A similar phenomenon occurred in other tourist attractions such as the energy center and the Khamaryn temple near Sainshand. According to the Department of Nature and Tourism in Dornogobi aimag, the number of tourists visiting Sainshand by train has decreased in spite of the promotion by the state-owned Mongolian Railway Company for the weekend trip by night train due to the reduced travel time for private vehicle users since the completion of the paved road connecting to Ulaanbaatar.

2.232 As Figure 2.9.8 shows, while roads to the major tourist attractions have been improved, majority of internal roads of SPAs is still unpaved. Such road conditions prevent tourists from making excursions even to a single SPA for a short period of time. Since current road construction mostly relies on the national budget, other approaches such as Public-Private Partnership (PPP) need to be considered to expand the improvement of local/feeder roads.

2.233 TDNP includes 91 programs with specific implementing and relevant agency and implementation period as previously described. Since programs promoting the open sky policy, improving the reservation system and infrastructure development along major routes for the tourist specify the Ministry of Roads and Transportation as the implementation agency, the Ministry should recognize these essential roles to develop Mongolia as an internationally popular tourist destination. As these programs assign MEGDT as the relevant agency together with airline companies and professional association in tourism, MEGDT should take a lead to

coordinate these agencies for the implementation.

2.234 The carrying capacity needs to be considered to prevent excessive impacts by the rapidly increasing tourists due to the road improvements such as the recent phenomenon in Khovsgol Lake area. Good practices to carefully accept tourists within the range of carrying capacity to preserve natural resources have been conducted in many developed countries. Based on such practices, compatibility of access improvements and preservation of natural resources should be secured through the appropriate O&M system.

2.10 Current Situation and Issues for Developing Transportation and Logistics Systems

(1) Road

2.235 Roads in Mongolia are classified into national roads and local roads that are under the jurisdiction of aimags. The total length of the national road network is 12,722km, and they form an extensive network throughout the country with various functions such as connection between Ulaanbaatar, the capital, and aimag centers, connection among aimag centers, and function as part of the Asian Highways (AH3, AH4, AH32) as shown in Figure 2.10.1. All these national roads are to be developed as paved roads, and the pavement work has been in progress for the past few years. While the current ratio of paved roads to all the national roads is 41.6% as of 2014, all the national roads are to be paved by 2016 (See Table 2.10.1). Ongoing road pavement projects in 2016 are listed in Table 2.10.2.

Source: Asian Infrastructure Research Institute, based on the data from the Ministry of Transportation.

Figure 2.10.1 Road Network of Mongolia

Table 2.10.1 List of Road Pavement Projects in 2016

Item	2010		2014		2016 (planned)	
	Whole road	National Road	Whole road	National Road	Whole road	National Road
Whole Length, km	49,250	12,615	49,250	12,722	49,250	12,722
Length of paved road, km	3,015.6	2,470.6	6,461.0	5,291.4	13,891.6	12,722
Length of the paved road / Whole length, %	6.12%	19.58%	**13.1%**	**41.6%**	**28.2%**	**100%**

Source: the Ministry of Road and Transport.

Table 2.10.2 List of Road Pavement Projects in 2016

No.	Project Name / Road Section	Length	Progress	Funding Source	Contractor
1.	Uliastai-Tosontsengel	67 km remaining	51%	Development Bank	“Zansnii zam” LLC
2.	Ulgii-Hovd	189.7 km		ADB	“China Huashi interprices ” LLC
3.	Myangad Bridge – Saihairhan	20 km	58%	National Budget	"Tum delgereh" LLC
4.	Hovd aimag center Hovd, Jargalant	5 km		National Budget	
5.	Hovdaimag Zereg soum	3 km		National Budget	
6.	Bagaulaan－Manhan	103.3 km	82%	ADB	China Jiangsu Jianda Construction Co.,Inc
7.	Bulgan-Uyench-Hovd	60 km	59%	National Budget	"Jiangsu Junjian Janshin" LLC /China/
8.	Zavhan,Tosontsengel	3 km		National Budget	
9.	Zavhan, Ih-Uul Ider River Bridge Construction	169.08m	94%	National Budget	"Tosgol" LLC
10.	Bayanhongor aimag	2 km		National Budget	
11.	Elsentasarhai－Harhorin	77 km	82%	National Budget	"Hurdnii zam” LLC
12.	Elsentasarhai-Arvaiheer	40 km	94%	National Budget	"Uilsiin zam" LLC, "Suuri" LLC, "Och naran" LLC consortium
13.	Tuv	1.5 km		National Budget	
14.	Dornogovi, Urgun	18.25 km	39%		“Shine hugjil zam” LLC
15.	Hentii, Bayanmunkh Herlen Bridge	217.2 m	60%	National Budget	“Zamch ireedui” LLC
16.	Undurkhaan-Munkhhaan-Baruun-Urt	132.6 km	95%	Development Bank	Arj capital LLC
17.	Undurkhaan-Choibalsan	53.6 km	73%	National Budget	“China geo engineering corporation”LLC
18.	Batsumber area	29.6 km	54.6%	KFW	China Railway First Group & Ochir Nyam LLC concersum
19.	Undurkhaan-Choibalsan	143km	73%	Development Bank	“Badrah oil" LLC, "Uvur zalaat" LLC, "Hansuun zam" LLC, "Arj capital" LLC, "Nasnii zam" LLC
20.	Dornod, Hulunbuir Herlen River Bridge	290.1 m		National Budget	"ZMZ" LLC
21.	Uvs, Tes River Bridge	127 m		National Budget	"HKB International Holdings" LLC
22.	Tsahir-Tosontsengel	127.1 m	37.8%	Development Bank	“Hurdnii zam” LLC
23.	Halzanburged-Solongot	100 km	53%	Development Bank	“Monroad”LLC
24.	Hanh-Mond	22.08 km	48%	National Budget	“HUvsgul zam” LLC
25.	Huvsgul, Murun	9.8 km		Development Bank	"Hotgor zam" LLC
26.	Huvsgul, Rashaant	253.3 m		Transferred from National Budget to Development Bank	"Erdenet suvraga" LLC

Source: the Ministry of Road and Transport

1) Road Network

2.236 While the development of the national road network is nearing completion as stated above, the development of local feeder roads connecting the national roads has remained as a

significant issue. Some local roads are necessary to be developed into feeder roads (access roads connecting to the arterial roads) that connect aimag and soum centers as part of the transportation and logistics systems.

2.237 Although the paved national road network will be completed soon, most of the roads will have only two lanes of Class III with a carrying capacity of 10 tons per axle. Furthermore, there are significant issues in the maintenance of the national roads such as overloaded trucks and severe climate in winter.

2) Freight Transport

2.238 In the freight transport sector, the major issues are lack of fixed logistics system, inability to grasp the comprehensive flow patterns of freight vehicles including information on origins and destinations due to insufficient monitoring of freight vehicles, lack of development and enforcement of the comprehensive legislation to solve the issues of poor control of overloaded trucks and labor management, as well as a lack of insurance system and checking for traffic safety. Meanwhile, trucks are banned from entering the city of Ulaanbaatar.

3) Passenger Transport

2.239 The operations of the intercity bus transport used to be monitored by the National Auto Transportation Center under the Ministry of Transportation. However, since the contract with the Bulgarian system provider was terminated in June 2015, monitoring has become impossible. Hence, some measures should be urgently taken such as introduction of an alternative system. Furthermore, there are issues of lack of development and enforcement of the comprehensive legislation such as the existence of informal passenger transport and the lack of insurance system and vehicle inspection system. In addition, development of roadside service stations for general traffic including intercity buses is an important issue.

(2) Railway

2.240 The railways currently operated in Mongolia consist of Sukhbaatar–Ulaanbaatar–ZamynUud including the Erdenet branch line (1,577km) as a north-south corridor and Bayantumen (Choibalsan)–Ereentsav (238km) in the north-eastern region of the country, totalling 1,815 km (see Figure 2.10.2). These are being operated by Ulaanbaatar Railway (UBTZ), which is owned by Russia and Mongolia on a 50/50 shares of stock. Therefore, while the current railway operation has issues as described below, decision making in the railway sector cannot be done only by the Mongolian side. As for the north-south corridor, Japan's yen loan projects of improving and updating the railway tracks, trains, and workshops were implemented from 1993 till 2000.

2.241 At present, UBTZ has 156 locomotives and 2,949 wagons, more than half of which are over 20 years old. The railway is a non-electrified single track with a broad gauge (1,520mm). The existence of many sharp curves has also caused a slow operation speed, making especially the freight transport operate with a nearly full capacity (21.04 million tons in comparison with the current capacity of around 20 million tons per year) and unable to catch up with a growth in future demand. In order to make up for the shortage of the freight carrying capacity as well as to serve as a bypass for the transit freight and hazardous goods transport around Ulaanbaatar, the development of Bogd Khan railway is being studied (refer to Section 5.5 (2) 2) of Chapter 5). Intercity passenger transport is reaching its capacity, but it may be hard to envisage that the nationwide passenger demand will increase in future as the

demand for road transport is expected to increase due to the development of the arterial road network. On the other hand, Ulaanbaatar Metro Project is currently under way for the purpose of improving the living environment of the citizens by reducing emission from vehicles, alleviating traffic congestion, and decreasing the number of traffic accidents; thus, measures are being taken against the overconcentration in the metropolitan area.

№	Section	Length (km)
1	Tavan Tolgoi ~ Gashuun Sukhait	230
2	TavanTolgoi ~ Zuunbayan	400
3	TsagaanSuvraga ~ Zuunbayan	200
4	Arts Suuri (Tsagaantolgoi) ~ Erdenet	670
5	NaiinSukhait ~Shiveekhuren	45

№	Section	Length (km)
6	Choybalsan ~ Hoot ~ Sainshand	550
7	Choybalsan ~ Hoot ~ Bichigt	320
8	Choybalsan ~ Nomrog	540
9	Choybalsan ~ Ereentsav	238
10	Existing railway's double track	1,111

Source: Asian Infrastructure Research Institute, based on the data from the Ministry of Transportation.

Figure 2.10.2 Railway Network in Mongolia

1) Freight Transport

2.242 For freight transport by railway, not only the freight flow to/from the neighboring countries of China and Russia is important, but also trading with third countries via Tenjin Port (China) or Nahtoka Port (Russia). Transit freight transport between China and Russia via Mongolia also need to be promoted, thus it is important to increase the freight railway capacity. It is also necessary to meet the growing demand for special wagons such as refrigerated wagons.

2) Future Plans

2.243 In the future national railway network, many lines have been planned mainly for the purpose of transporting mining products. However, only the line from Tavan Tolgoi to Gashuun Sukhait (blue line in Figure 2.10.2) has been implemented for construction, and the earthwork is nearly complete while other works such as bridge, culvert, and ballast are halfway done. Since all the planned railway lines are to be operated by MTZ as a rule, the Ministry of Transportation has an important issue about improvement of the railway traffic

control and monitoring as well as the signalling system, taking into consideration the future possibility of operation by multiple railway operators.

EPC Contractor	Samsung C&T
Owner's Engineer	Deutsche Bahn International
Length	225 km
Earthwork Subcontractors	13 local company
Construction Duration	2013-2016
Axle load	25 ton
Major Structures	• 2 stations • 5 passing sidings • 16 bridges /1356 m/ • 126 culverts • 8 animal passes
Throughput Capacity	30 Mtpa
Manpower & Equipment	• Over 1000 personnel • Over 400 equipment

Source: MTZ.

Figure 2.10.3 Construction Status of Tavantolgoi - GashuunSukhait Railway Line[92]

(3) Air Transport

2.244 At present, only about six countries are connected with Mongolia by international air routes. Direct flights to Japan are served only by MIAT Mongolian Airlines including the Ulaanbaatar–Tokyo Narita flights (3–6 flights per week) and Ulaanbaatar–Osaka Kansai flights (only in the summertime). The aircraft used is the B373-800, which accommodates 162 passengers and 4 tons of cargo. In addition, Korean Air and Air China connect Ulaanbaatar and major cities of Japan via Seoul and Beijing, respectively. Meanwhile, regular domestic flights are operated between Ulaanbaatar and 9 airports in Mongolia by two private airline companies (AeroMongolia andHunnu Air) while 2 airports are operated only in the summertime.

2.245 At Chinggis Khan Airport, which is located 10km southwest from Ulaanbaatar, a transit hall is currently under construction (to be completed in November 2015) to serve the transit air passengers. A current drawback in the air freight transport is that the existing air cargo terminal is too small. Construction of a new airport about 30km to the south from Ulaanbaatar is underway with targeted inauguration in June 2017, and the access road and railway have also been planned.

(4) Logistics

2.246 Mongolia's features as a landlocked country sandwiched between China and Russia, its vast lands, severe climate, relatively small population, and undeveloped transport

[92] About construction of Tavantolgoi - Gashuun Sukhait Railway Line, "Udriin sonin" newspaper reported that the contract with Samsung CT had been canceled (page 2 on October 22, 2016).

infrastructure are causing various obstacles in the domestic and international logistics.

2.247 The World Bank (WB) has been conducting a Logistics Performance Index (LPI) Survey every two years since 2007. The LPI measures 6 indicators including quality of customs and borders services, trade and transportation quality of infrastructure development, possibilities of setting up competitive prices of international shipments, logistics services quality and its competence, tracking and tracing (optimization possibilities of auto transportation) system, and punctuality of supplying. A partial ranking of LPI for selected countries is presented in Table 2.10.3. Accordingly, Mongolia ranks at around 135th–140th out of a total of 160 countries and regions covered by the survey.

2.248 Mongolia could compare itself with Botswana as they are both landlocked countries with abundant mining resources. WB has implemented foreign trade facilitation projects in countries around the world. The same foreign trade facilitation projects had been implemented in Mongolia and Botswana since 2000. As a result of this foreign trade facilitation project implementation, Botswana's LPI improved, whereas Mongolia's LPI did not improve but remained low in rank. A main reason is that the project implementing agency in Mongolia was the General Customs Office as a single window, not focusing on the infrastructure but concentrating only on customs. While improvement of the logistics system through agreements with its two neighbors is of course necessary, development and improvement of the logistics infrastructure are primarily considered the most important and necessary in the case of Mongolia.

Table 2.10.3 Ranking of Logistics Performance Index

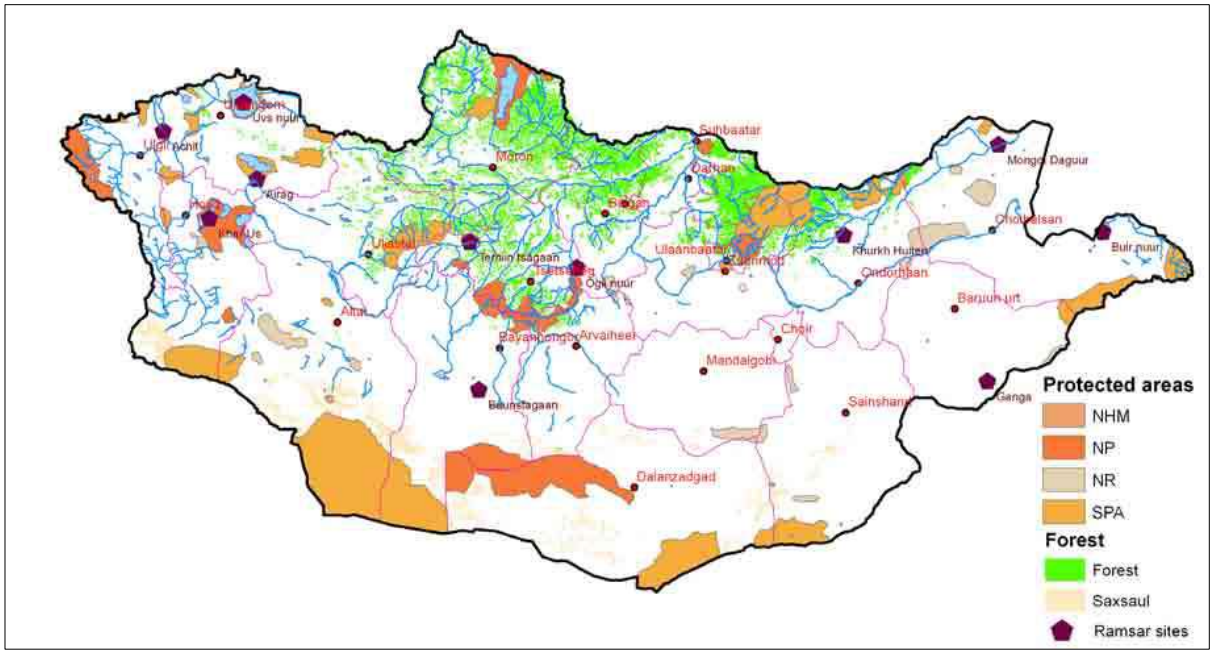
	LPI rank			LPI score			% of highest performer	Customs		Infrastructure		International shipments		Logistics quality and competence		Tracking and tracing		Timeliness	
Economy	Rank	Lower bound	Upper bound	Score	Lower bound	Upper bound		Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Germany	1	1	1	4.12	4.07	4.17	100.0	2	4.10	1	4.32	4	3.74	3	4.12	1	4.17	4	4.36
Netherlands	2	2	5	4.05	3.97	4.12	97.6	4	3.96	3	4.23	11	3.64	2	4.13	6	4.07	6	4.34
Belgium	3	1	6	4.04	3.96	4.13	97.5	11	3.80	8	4.10	2	3.88	4	4.11	4	4.11	2	4.35
United Kingdom	4	2	5	4.01	3.96	4.07	96.6	5	3.94	6	4.16	12	3.63	5	4.03	5	4.08	7	4.33
Singapore	5	2	7	4.00	3.95	4.06	96.2	3	4.01	2	4.28	6	3.70	8	3.97	11	3.96	9	4.25
Sweden	6	1	20	3.96	3.68	4.24	94.9	16	3.75	9	4.09	3	3.76	6	3.98	7	3.98	8	4.26
Norway	7	1	19	3.96	3.69	4.22	94.8	1	4.21	4	4.19	30	3.42	1	4.19	31	3.50	5	4.36
Luxembourg	8	1	21	3.95	3.65	4.24	94.4	10	3.82	15	3.91	1	3.82	14	3.78	22	3.68	1	4.71
United States	9	6	10	3.92	3.87	3.97	92.5	16	3.73	5	4.18	26	3.45	7	3.97	2	4.14	14	4.14
Japan	10	6	12	3.91	3.85	3.97	93.4	14	3.78	7	4.16	19	3.52	11	3.93	9	3.95	10	4.24
Ireland	11	5	17	3.87	3.73	4.01	91.5	12	3.80	16	3.94	27	3.44	9	3.94	3	4.13	16	4.13
Canada	12	9	17	3.86	3.77	3.95	91.5	20	3.61	10	4.05	23	3.46	10	3.94	8	3.97	11	4.18
France	13	9	17	3.85	3.77	3.92	91.2	18	3.65	13	3.98	7	3.88	15	3.75	12	3.89	13	4.17
Switzerland	14	11	17	3.84	3.78	3.91	91.1	7	3.92	11	4.04	15	3.58	16	3.75	18	3.79	21	4.06
Hong Kong SAR, China	15	11	17	3.83	3.77	3.89	90.5	17	3.72	14	3.97	14	3.58	13	3.81	13	3.87	18	4.05
Australia	16	11	17	3.81	3.74	3.88	90.0	9	3.85	12	4.00	18	3.52	17	3.75	16	3.81	26	4.00
Mongolia	135	102	155	2.38	2.09	2.62	43.4	132	2.20	120	2.29	110	2.62	126	2.33	149	2.13	147	2.51
Equatorial Guinea	136	85	158	2.35	1.98	2.73	43.4	119	2.35	139	2.11	153	2.11	143	2.20	110	2.53	112	2.86
Zimbabwe	137	97	158	2.34	1.98	2.70	42.9	154	1.89	123	2.25	143	2.26	108	2.50	143	2.22	104	2.93
Tanzania	138	108	154	2.33	2.10	2.56	42.6	136	2.19	114	2.32	137	2.32	145	2.19	150	2.11	107	2.89
Togo	139	105	158	2.32	2.04	2.59	42.2	139	2.09	146	2.07	124	2.47	150	2.14	116	2.49	140	2.60
Turkmenistan	140	107	158	2.30	2.04	2.57	41.8	122	2.31	148	2.06	116	2.56	155	2.07	134	2.32	153	2.45

Source: The World Bank (2014).

2.11 Current Situation and Issues in the Environmental Sector

(1) Ecologically Important Areas (Forests, Lakes and Protected Areas)

2.249 Forest area accounts for more than 9% of Mongolia's land area (see Figure 2.11.1). The northern forest area is a water resource area and 70% of the surface water sources in the country is located in the mountainous regions (Khangai Mountain Range, Khentii Mountain Range, and around Khovsgol Lake) which occupy 30% of the national land.



Source: Integrated Water Management National Assessment Report Volume II, Strengthening Integrated Water Resource Management in Mongolia Project; and MEGD, 2012.

Figure 2.11.1 Ecologically Important Areas (Forests, Lakes and Protected Areas)

(2) Increase of Unproductive Lands (Barren Lands)

2.250 Barren lands have become a critical issue in Mongolia. The major causes are destruction and degradation of forests and pasture, and desertification.

1) Destruction and Degradation of Forests

2.251 The forest area in the country has decreased by 4% from 11,161,000 ha in 1994 to 10,775,300 ha in 2012,[93] caused by deforestation, forest fires, damage from insects, logging and uncontrolled grazing. Growth of the forest is slow and it has been gradually turned into steppe vegetation. The causes of this destruction and degradation of forests are summarized in Table 2.11.1 below.

[93] FAO、Global Forest Resources Assessment 2015 Country Report Mongolia.

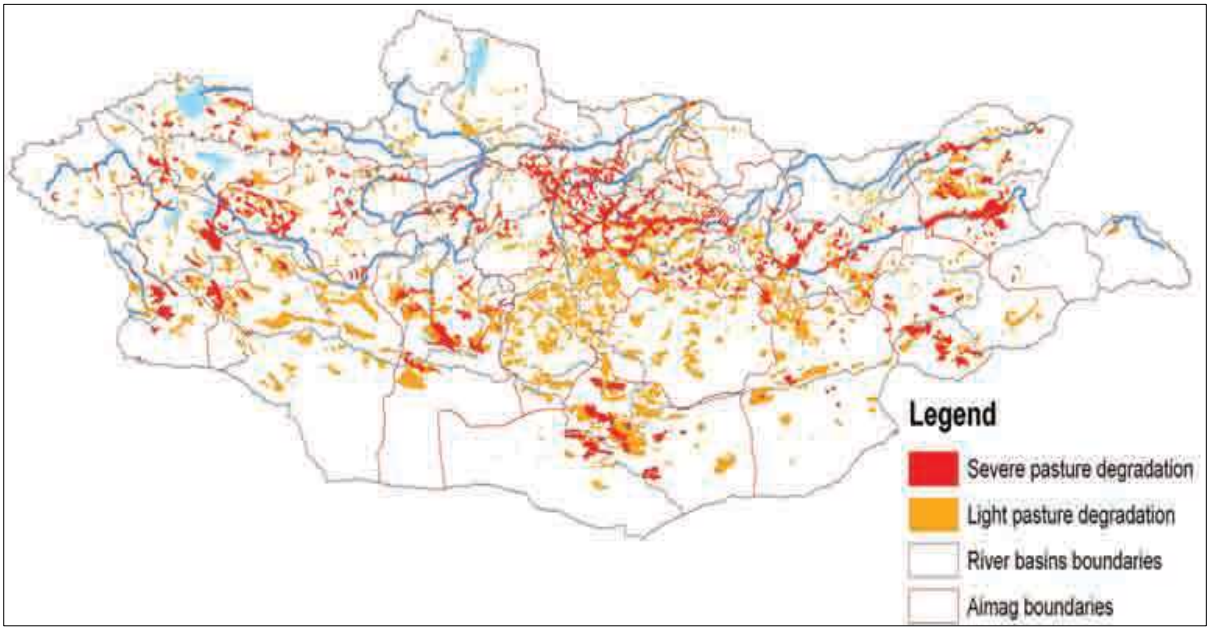
Table 2.11.1 Causes of Destruction and Degradation of Forests

Phenomenon	Causes
Destruction and Degradation of Forests →Change into steppe vegetation	(i) A result of large-scale equipment and transport system has been introduced for forest clearing in the past, forest depletion occurred.
	(ii) Forest fires
	(iii) Damages from insects and epiphytotic
	(iv) Inappropriate commercial logging for utilization of architectural material and illegal logging for fuel wood
	(v) Unmanaged grazing in forests
	(vi) Land degradation

Source: JICA Study Team based on Human and Environmental Studies and Region: Mongolia –Collation and Regeneration of Glass Land Ecosystem Network, Kyoto University Press, 2013.

2) Pasture Degradation

2.252 Deterioration of pasture land has also occurred. Pasture degradation happens primarily in the steppe band in the vicinity of the river basin and the settlement area (see Figure 2.11.2). The causes of such pasture degradation are summarized in the following table.



Source: Integrated Water Management National Assessment Report Volume II, Strengthening Integrated Water Resource Management in Mongolia Project; and MEGD, 2012.

Figure 2.11.2 Distribution of Deteriorating Pasture Land

Table 2.11.2 Causes of Deterioration of Pasture Land

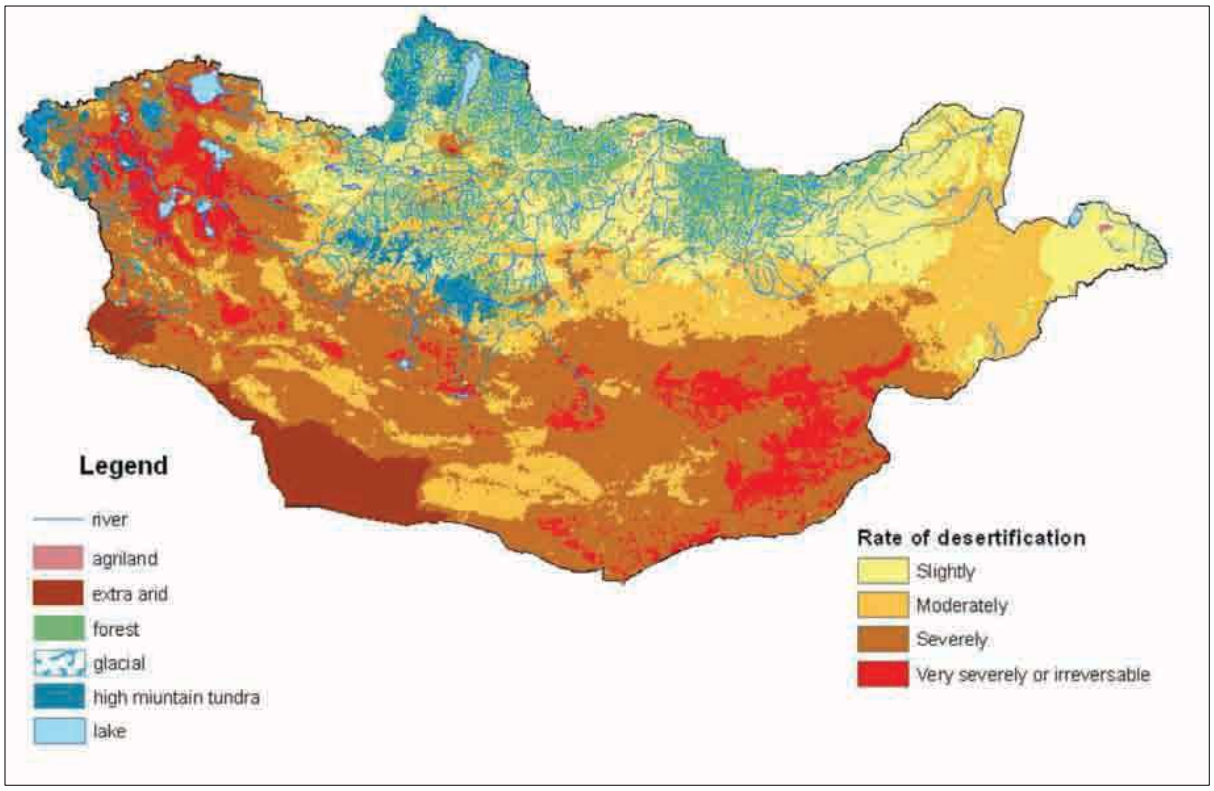
Phenomenon	Causes	
Deterioration of Pasture Land • Reduction in the diversity of plant species • Reduction in plant production volume • Changes in the species composition of the feeding -resistant plants - Reduction of livestock dependents force - Decrease of grassland by soil erosion	(a) Vulnerable grassland located in the arid and cold regions	
	(b) Small rainfall, and only 20–30cm from the ground is wet in the grassland (moisture does not penetrate the soil).	
	(c) High evaporation rates	
	(d) Vehicle travel (land has become about 150 times harder than the normal, and will not return to normal even after 10 to 15 years of use)	
	(e) Grazing (around wells and camp grazing pressure is high, and degradation and land bare of vegetation can be seen.)	
	(f) Overgrazing (such as continuation of overgrazing, use of the same camp site repeatedly for years, overcrowding of livestock, etc.)	(i) The roots are eaten by livestock due to the food shortage; the decline of perennials and small shrubs occurs and as a result recovery becomes poor.
		(ii) Because repeatedly mowing at the surface height (goat and sheep eat grass at a height of more than 3cm; horse and cattle eat at a height of more than 5cm) causes the decrease of the perennial underground storage material, the year production decreases and as a long-term impact the transition to the feeding-resistant plants and alkaline of the soil occurs.
		(iii) The continuation of overgrazing state of livestock causes decline and extinction of small shrubs as a long-term impact.

Source: JICA Study Team based on Human and Environmental Studies and Region: Mongolia –Collation and Regeneration of Glass Land Ecosystem Network, Kyoto University Press, 2013.

3) Desertification

2.253 Desertification of Mongolia's land has progressed. Some 72.8% of homeland is in a vulnerable situation, and in particular 59.4% (929,600km^2) is very vulnerable.[94] The main reasons for desertification are natural factors such as drying rivers caused by climate change and drought and human factors such as mismanagement of use of water resources and grassland and the devastation of the land by various developments.

[94] Integrated Water Management National Assessment Report Volume II, Strengthening Integrated Water Resource Management in Mongolia Project; and MEGD, 2012.



Source: Integrated Water Management National Assessment Report Volume II, Strengthening Integrated Water Resource Management in Mongolia Project; and MEGD, 2012.

Figure 2.11.3 Desertification Map (2008)

(3) Warming

2.254 Mongolia has experienced the following changes since the 1940's and is believed to transit to a climate zone of drying zone and the semi-arid zone caused by global warming in the future.[95]

(i) Annual average temperature between 1940 and 2007 rose by 2.1 degrees Celsius. The most significant rise of the average temperature was observed during winter, by 3.6 degrees Celsius. Moreover, temperature rise was observed by 1.8 degrees Celsius in spring, 1.3 degrees Celsius in autumn, and 0.5 degree Celsius in summer.

(ii) The change in the annual precipitation amount was very diverse; annual precipitation decreased in some areas but increased in other adjacent areas. By season, rainfall increased in autumn and winter by 4–9% but decreased in spring and summer by 7.5–10%.

(iii) The annual rainfall has decreased or increased in the range of 5 to 2.5% since 1940. It decreased by 30–90mm in the central part, increased by 2–60mmin most of the western part, and increased by 30–70mm in most of the southeast part of the country.

(iv) The average of the longest continuous dry period did not statistically significantly change. The longest continuous dry days slightly increased in central Mongolia where the annual average rainfall decreased, but decreased in southeast Mongolia where the average annual rainfall increased.

(v) The amount of potential evapotranspiration increased by 7–12%.

[95] Human and Environmental Studies and Region: Mongolia – Collation and Regeneration of Glass Land Ecosystem Network, Kyoto University Press, 2013..

2.255 Based on the trend of this past climate change, the scenario drawn about how future weather changes is shown in Table 2.11.3. The scenario of vegetation change about "shift of vegetation zone to the north, and expansion of semi-desert zone and steppe band" indicates the future change of the conditions of livestock farming. That is the scenario that "the areas which are unsuitable for grazing increase from the current 40% to about 70% by 2050" will impact. If this becomes into a reality, the style of livestock farming needs to be changed from the current grazing style into the intensive or cluster style.

Table 2.11.3 Future Weather Scenario

Weather	• Hot and drier summer and warmer winter but with larger amount of snowfall • Increase of evaporation amount that exceeds the predicted amount from rainfall • Degree of extreme climate such as drought will double by 2080
Climate Zones and Vegetation	• Shift of vegetation zone to the north, and expansion of semi-desert zone and steppe band • Decrease of standing stock and quality of plant of the above-ground part between 2020 and 2080
Water Resource	• Increase of the river flow slightly by 2020, but not coinciding with the amount of standard evaporation that is expected to increase rapidly (the potential amount of evaporation)
Livestock	• The areas which are unsuitable for grazing increase from the current 40% to about 70% by 2050 and about 80% by 2090. • Extreme climate that results from climate change significantly disturbs the livestock industry development, and this disturbance will drastically increase in the next 80 years.

Source: Human and Environmental Studies and Region: Mongolia –Collation and Regeneration of Glass Land Ecosystem Network , Kyoto University Press, 2013.

(4) Amount of Available Water Resources and Limitation of Agriculture and Livestock Farming

2.256 As seen above, the impact of global warming is expected to affect the amount of available water resources. The increase in rainfall and evaporation offset each other, and the total amount of water resources will not change. Yet, if the frequency of dry weather is predicted to increase, it is important to study appropriate water resource management and water use.

2.257 The condition of water resources are as follows:

(a) Extremely Low Effective Water

2.258 The amount of water per person is very high in Mongolia but the amount of possessed water as a whole country is low.[96] The average annual rainfall is only 220mm and 90% of this evaporates, so only 10% of rainfall is available in the country. Four percent of this 10% of water stays as groundwater and 6% run as surface water into the rivers and lakes. However, the water running through the rivers mostly goes to Russia or China. As a result, the amount of effective water available for use in Mongolia is only 3-4% of total rainfall.[97]

(b) High Dependence on Groundwater

[96] Ministry of Environment and Green Development. Integrated Water Management Plan: Mongolia, 2013.

[97] Altansukh, N. 1995. Mongolia: Country Report to the FAO International Technical Conference on Plant Genetic Resources. FAO.

2.259 In addition to the above point, the use of surface water is limited because rivers freeze half of the year or more. In the South Gobi region and part of the steppe region, rivers and lakes are not available so water use depends on groundwater. Yet, in the places where wells are not available, land is impossible to use for agriculture. Even pastureland is usable only in winter and spring time.

(c) **Lowering of the Groundwater Level**

2.260 In places where large amount of groundwater is used for livestock farming and agriculture, a lowering of groundwater level is reported. According to a recent report, water was available 25m in depth 20 years ago but is currently at 90m in depth.

(d) **Fossil Water Distribution Area**

2.261 In many places where the aquifer contains fossil water, the salt level is too high to use as drinking water. In mining sites, fossil water is largely utilized but it is uncertain if taken water recovers under the ground.

2.262 Currently, 80% of the state is used as grassland and 1% is used for agricultural land. If the situation of high dependence on groundwater continues, the percentage of grassland and agricultural land becomes smaller than it is now. It is also expected that intensive farming will increase and depletion of water will occur in places where livestock concentrates.

(5) Heating and Air Pollution

2.263 The biggest environmental problem in rural areas is air pollution. Coal burning heaters especially in ger housing is the largest contributor to increased air pollution. On the other hand, there are some aimag centers which have developed a heating system with power centralization boiler or combined heat and power (CHP) system.

2.264 According to the survey carried out by the Ministry of Energy, there are four cities with CHP and nine aimag centers with decentralized boilers (Bulgan completed the centralized heating system in 2014). From a viewpoint of reducing air pollution and energy efficiency, the government is pursuing the switch to centralized heating systems for the nine cities (see Figure 2.11.4)

Source: Ministry of Energy.

Figure 2.11.4 Heating System of Aimag Centers in Mongolia

(6) Solid Waste Reuse

2.265 Normally, cities rely on landfills to dispose solid wastes for economical reasons. However, some of the landfills have reached their maximum capacities and wastes are dumped on the ground surface and drift in the wind. Plastic waste constitutes a large proportion of the total waste. There is a possibility of waste separation for recycling as fuel in combination with coal for high efficiency boilers for heating.

2.266 The next table shows the summarized status of urban solid waste disposal in major local cities in Mongolia.

Table 2.11.4 Urban Solid Waste Disposal in Selected Cities

	Dharhan	Erdenet	Choibalsan	Shainsand	Choir	Chingis
Disposal Method	Landfill	Simple landfill	Free disposal	Free disposal	Landfill	Free disposal
Area	15 ha	80 ha	40 ha	−	14 ha	10 ha
Remaining Capacity（In case of Landfill）	4-5 years	Very little	Very little	10 years	5 years	Nearly zero
Distance to Center	8 km	18 km	4 km	5-6 km	−	5 km
Waste Separation	Yes	No	Yes	Yes	Under study	No
Status of Separation	Plastic separation and recycling (San Orgiu)	–	A recycling plant constructed but not in operation due to breakdown	Plastic separation and reselling (Tsever Agaar company shipping to UB）	Pet-bottle separation and reselling (4 companies shipping to UB）	–
Plan on Incineration Plant	Study underway (Takhi Goo)	Study underway by German TA	A project under consideration	No specific plan	–	Study underway with Korean assistance
Issues	Methane gas emission in landfill	No remaining fill capacity	Lack of finance for an incineration plant	Nothing specific	Aimag is making an aimag-wide disposal plan	Garbage is littered by wind

Source: Data from interviews of municipalities.

2.267 The composition of solid waste indicates a fairly large percentage of plastics. There is some possibility to adopt a waste collection system by separation and then mix plastics with coal to feed high efficiency boilers for urban heating. In many cities in Japan, solid waste including plastics are disposed in an incineration plant. It is also possible to convert the existing heating boiler to accept plastic waste. However, it is necessary to analyze the size and shape of the furnaces as well as flue gas emission system for the redesign. There are some precautions to be taken in the (1) proper treatment of volatile matters such as chloride, sulfur, fluorine, boron; and (2) protection measures of the furnace caused by high temperature of incineration of plastics. Plastics have a much higher calorific value than coal. Water vapor injection is often applied for temperature control of the furnaces.

3 MACROECONOMIC SCENARIO AND MEDIUM- AND LONG-TERM ECONOMIC FORECAST

3.1 Conditions for a Sustainable Economic Growth in Mongolia

(1) Current Status of the Mongolian Economy

3.1 As described in Chapter 2, the Mongolian economy is mainly composed of the mining and agricultural industries. In 2014, the mining sector accounted for 17% of GDP and 60% of total sales by industry, and mineral products contributed 83% of the total export value (see Table 3.1.1). This shows that the economy highly depends on the mining sector. Moreover, 90% of total exports is bound for China and exports to China make up 42% of GDP. As the Mongolian economy relies heavily on mining and on China, it is considered an extremely fragile economic structure.

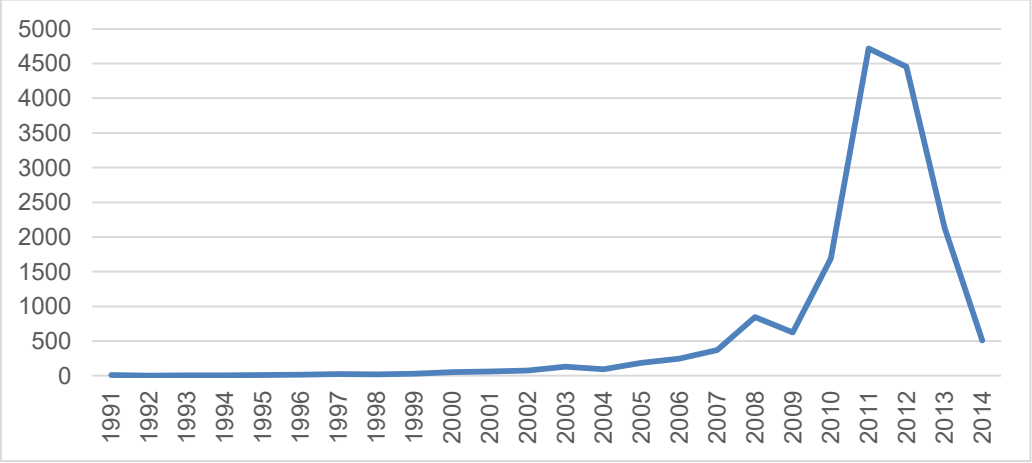
3.2 Since 2000, Mongolia has enjoyed a rapid growth, thanks to its rich natural resources. From 2010 to 2013, the economy significantly grew due to the inflow of foreign direct investments (FDI) for mining development and the expansionary macroeconomic policy of the central government. GDP growth rate reached over 17% in 2011 and maintained its double-digit growth since then. However, the Law on Regulation of Foreign Investment in Entities Operating in Strategic Sectors influenced by resource nationalism was discussed in the parliament and concerns on a change in the investment environment have emerged. Furthermore, the Mongolian economy was affected by a slowdown of the Chinese economy together with a simultaneous decline in resource prices. As a result, FDI and coal exports declined significantly (see Figure 3.1.1 and Figure 3.1.2) and the economy started to slow down. Coal export value sharply declined by -41% in 2013, -24.3% in 2014 and -34.5% in 2015. Consequently, GDP growth fell to 7.8% in 2014. This trend continues and GDP growth is 2.3% in 2015.

Table 3.1.1 Major Economic Indicators, 2009-2015 (at Constant Price)

	2009	2010	2011	2012	2013	2014	2015
GDP Growth Rate	-1.3%	6.4%	17.3%	12.3%	11.6%	7.9%	2.3%
Metal Export (mill.USD)	1,132	1,478	1,827	1,782	2,161	3,688	3,205
Growth Rate	-39.4%	30.6%	23.6%	-2.5%	21.3%	70.6%	-13.1%
Coal Export (mill. USD)	305	882	2,273	1,902	1,122	849	556
Growth Rate	65.2%	189.0%	157.7%	-16.3%	-41.0%	-24.3%	-34.5%
Total Exports (mill.USD)	1,903	2,909	4,817	4,385	4,269	5,775	4,669
Growth Rate	-24.9%	52.9%	65.6%	-9.0%	-2.6%	35.3%	-19.1%
Total Imports (mill.USD)	2,138	3,200	6,598	6,738	6,358	5,237	3,797
Growth Rate	-34.1%	49.7%	106.2%	2.1%	-5.6%	-17.6%	-27.5%
Manufacture of Food Products and Bevarages (mill.USD)	376,899	454,438	437,353	463,038	591,392	640,344	685,538
Growth Rate	34.6%	20.6%	-3.8%	5.9%	27.7%	8.3%	7.1%
Manufacture of Textiles (mill.MNT)*	177,180	143,369	187,349	151,878	192,529	230,514	247,705
Growth Rate	21.0%	-19.1%	30.7%	-18.9%	26.8%	19.7%	7.5%
Manufacture of Leather (mill.MNT)*	2,796	1,524	2,213	7,068	7,741	11,188	16,532
Growth Rate	-0.8%	-45.5%	45.2%	219.4%	9.5%	44.5%	47.8%
Government Consumption (mill.MNT)*	984,199	1,237,928	1,402,441	1,738,650	1,931,190	2,015,323	1,877,653
Growth Rate	4.4%	25.8%	13.3%	24.0%	11.1%	4.4%	-6.8%
Household Consumption (mill.MNT)*	4,074,810	5,387,294	5,891,872	6,814,702	8,007,495	8,810,531	9,309,547
Growth Rate	12.5%	32.2%	9.4%	15.7%	17.5%	10.0%	5.7%

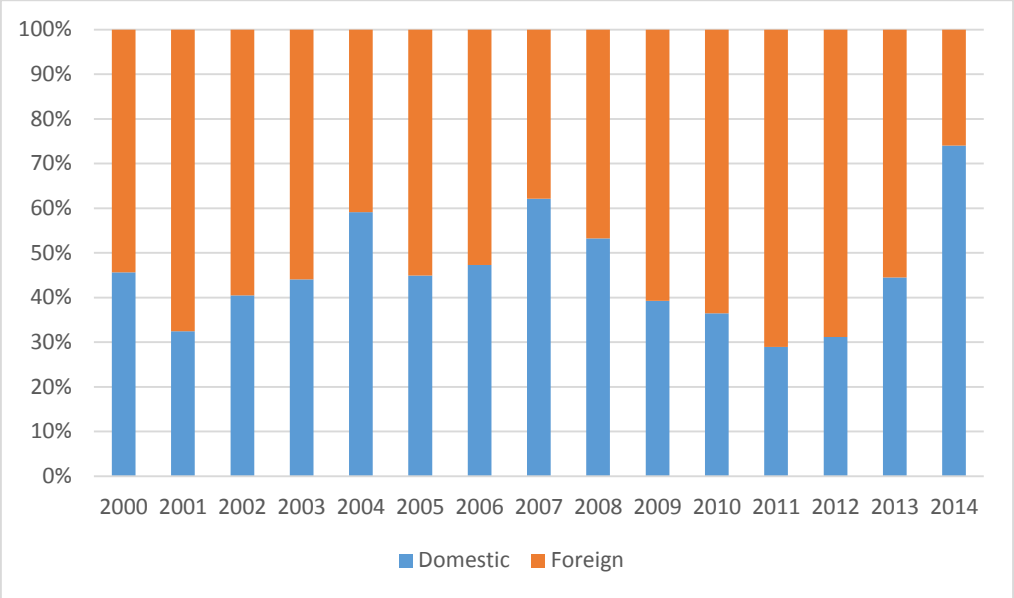
Source: JICA Study Team based on National Statistic Office (NSO) data. *Converted to the constant price by JST based on IMF GDP deflator.

Unit: million USD



Source: JICA Study Team based on UNCTAD data.

Figure 3.1.1 Foreign Direct Investment

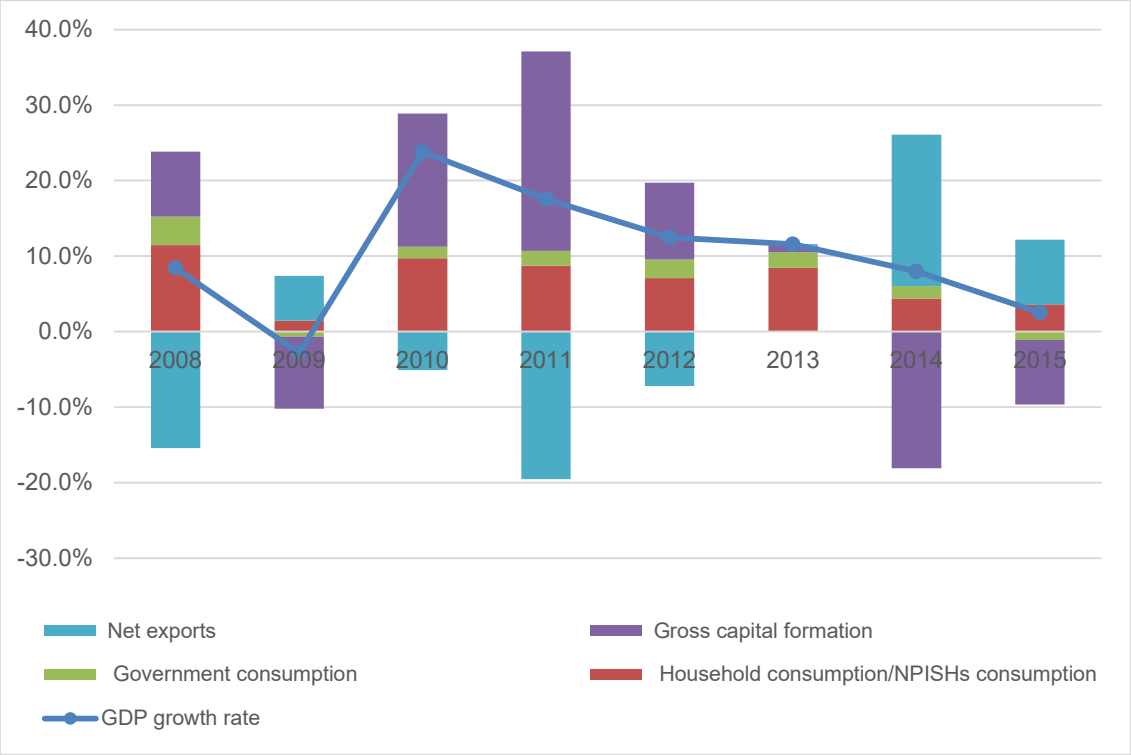


Source: JICA Study Team based on NSO data.

Figure 3.1.2 Ratio of Domestic Investment and Foreign Investment

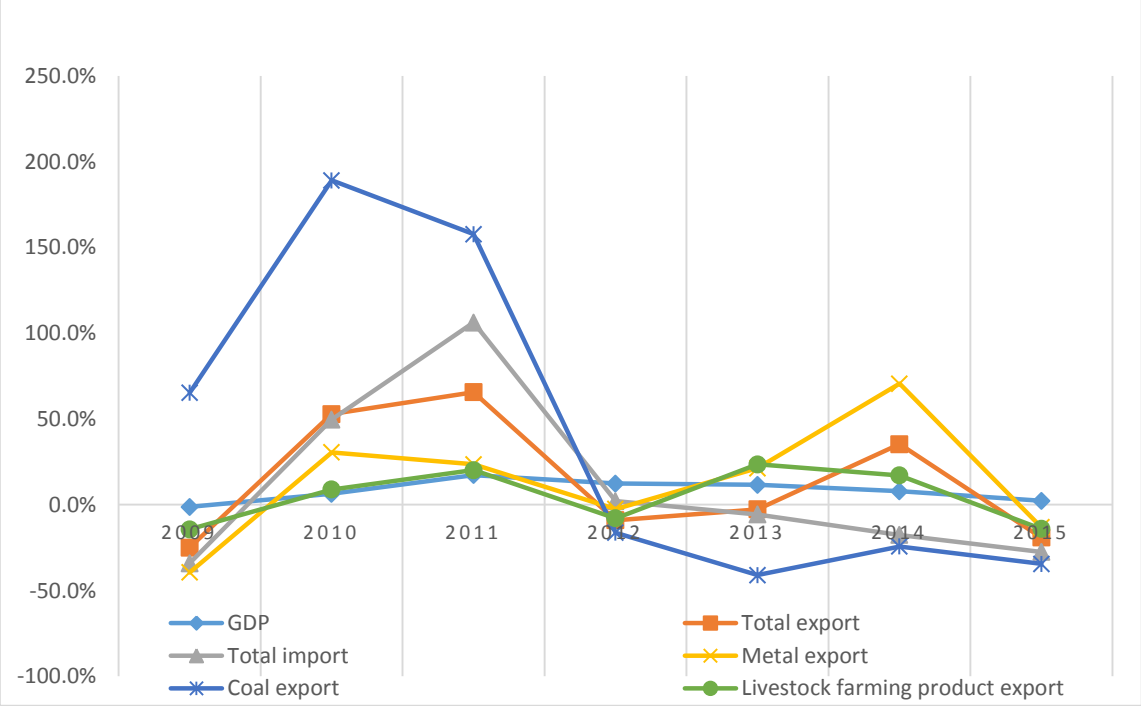
3.3 As shown in Figure 3.1.3, the contribution of final consumption expenditure (household and government consumption) and gross capital formulation (investment) to GDP growth have been maintained high until 2012, except in 2009 when the economy fell due to the worldwide economic downturn triggered by the bankruptcy of Lehman Brothers and other major financial institutions. Gross capital formation, however, plunged after 2013. Meanwhile, net exports rapidly increased in 2014 due to the increase in the mineral export value after OyuTolgoi (OT) commenced production and the reduction in import due to the sluggish domestic economy. In 2015, iron and coal exports were reduced and imports were also largely down which resulted in a small increase in net exports compared to 2014.

3.4 As to contribution by industrial sector, the construction and wholesale/retail industries pushed down GDP growth while the mining sector, supported by full-scale copper production, positively contributed to GDP though coal production continued to drop.



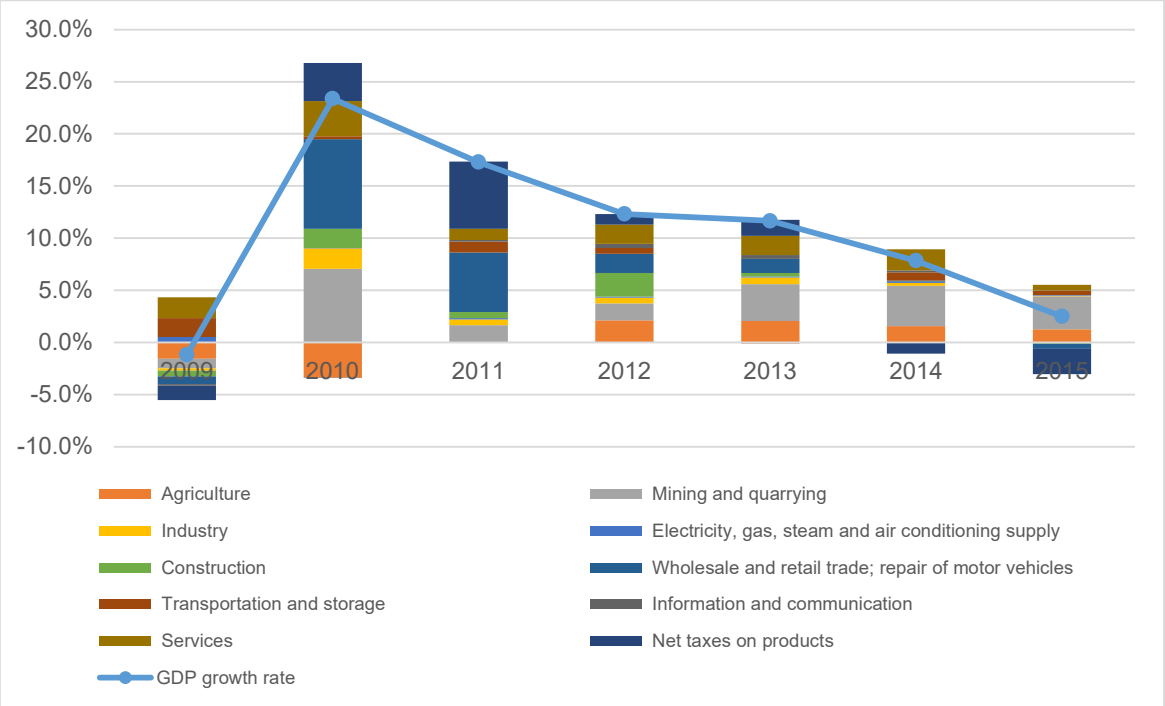
Source: JICA Study Team based on NSO data.

Figure 3.1.3 Contribution of Expenditure to GDP Growth



Source: JICA Study Team based on NSO data.

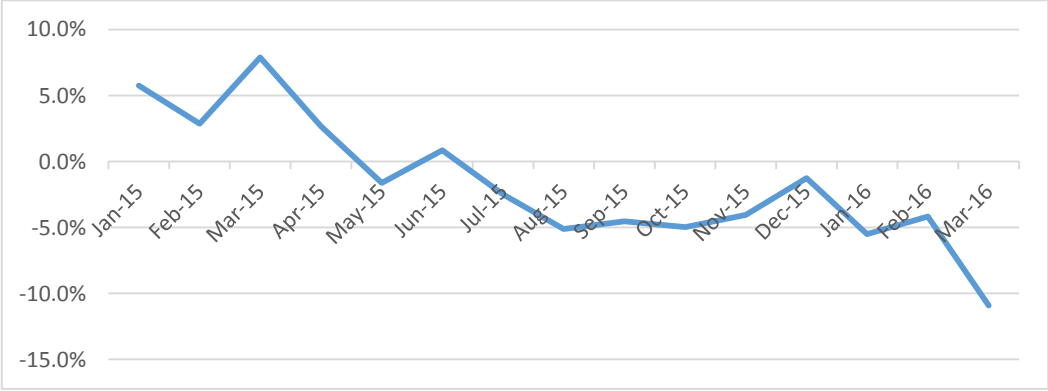
Figure 3.1.4 Export and Import Growth Trends



Source: JICA Study Team based on NSO data.

Figure 3.1.5 Sectoral Contribution to GDP Growth

3.5 Regarding the trend in government tax revenue (see Figure 3.1.6), the tax revenue in 2015 has largely decreased compared with the original target and the fiscal deficit is getting larger due to the recent sluggish economy. Aside from the decrease in revenue from VAT and customs tax, revenue from corporate tax and mining royalties also sharply dropped because of reduced imports. As a result, the annual revenue shortage will reach MNT1 trillion.[1] For the first four months of 2015, the growth rate was positive but it declined by -1.3% in December 2015 and below -10% in March 2016, which indicates that the tax revenue has been declining significantly.



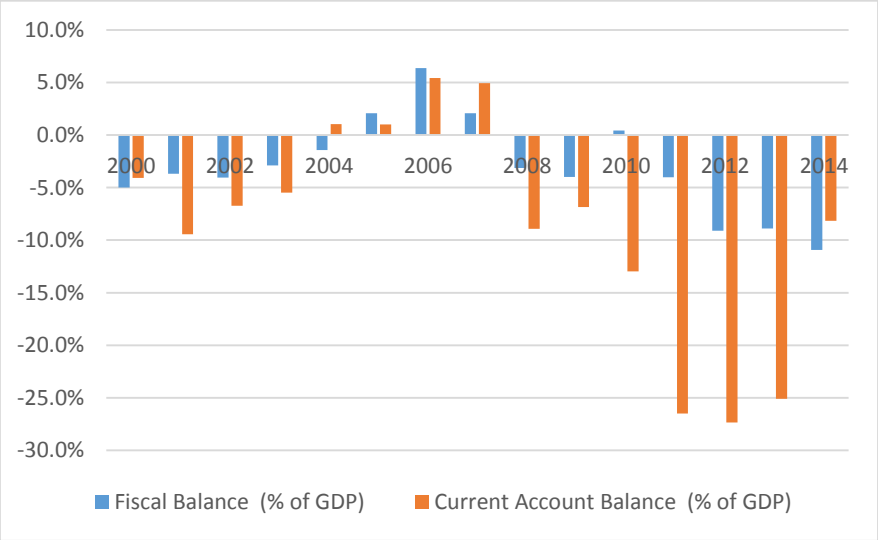
Source: JICA Study Team based on NSO data.

Figure 3.1.6 Monthly Tax Revenue Growth Rate in 2015 (year on year)

3.6 The international balance of payments faces pressure since FDI decreased. As Figure 3.1.7 shows, since the current account balance to GDP ratio changed to a negative value in 2008, it has registered around -25% from 2011 to 2013. Furthermore, the fiscal balance to

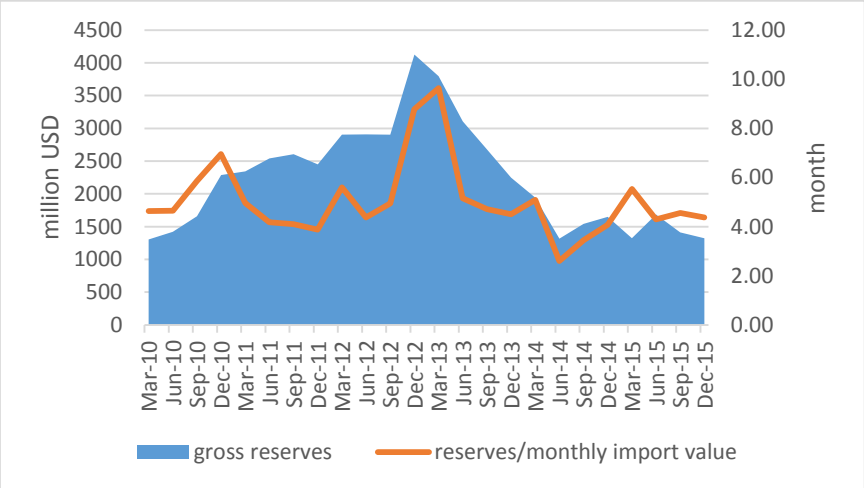
[1] Mongolia Economic Update November 2015, World Bank.

GDP ratio has been around -10% since 2012, which shows that the fiscal deficit got larger. Foreign reserve balance reached its peak in December 2012 and rapidly started to drop in 2013 (see Figure 3.1.8). It registered USD1.3 billion as of December 2015, which is equivalent to the four months average monthly value of import (USD320 million between January 2015 and December 2015).



Source: JICA Study Team based on NSO data.

Figure 3.1.7 Fiscal Balance and Current Account Balance (% of GDP)



Source: JICA Study Team based on NSO data.

Figure 3.1.8 Foreign Reserve Balance

3.7 Under the recent severe economic circumstances, the government is implementing tight fiscal and monetary policies towards fiscal reconstruction. As a result, the budget deficit is narrowing and the inflation rate also decreased to single-digit levels in 2015. However, the government issued bonds in foreign currency successively in May and June 2015 in order to finance the balance of payments deficit which has widened due to the decline in FDI. In the first quarter of 2017, foreign currency bonds equivalent to USD1.29 billion will be redeemed (see Table 3.1.2). In 2018, USD657 million worth of bonds including the additional external financing in 2015 will mature. Therefore, the government is required to do rigid fiscal management and secure sufficient foreign reserves through recovery of FDI inflows.

3.8 In addition, the situation of the banking sector continues to worsen, with nonperforming loans reaching 5.0% of outstanding loans and past due loans reaching 6.1%. While the growth of private consumption remains positive, that of real household income declined to negative levels.[2] As the indicators reveal, the stagnant economy spreads to every sector.

Table 3.1.2 Maturity Schedule of Foreign Currency Bonds

Issuers	Issue Date	Maturity Date	Balance (mill. MNT)	Currency	Balance (mill. USD)	Coupon	Interest Payment (mill. USD)
Trade and Development Bank of Mongolia	2014/1/21	2017/1/21	700	CNY	110	10.000	11.0
Development Bank of Mongolia	2012/3/21	2017/3/21	580	USD	580	5.750	33.4
Mongolian Mining Corp.	2012/3/29	2017/3/29	600	USD	600	8.875	53.3
Government of Mongolia	2012/12/5	2018/1/5	500	USD	500	4.125	20.6
Government of Mongolia	2015/06/30	2018/06/30	1,000	CNY	157	7.500	11.7
Trade and Development Bank of Mongolia	2015/05/19	2020/05/19	500	USD	500	9.375	46.9
Government of Mongolia	2012/12/5	2022/12/5	1,000	USD	1,000	5.125	51.3
Development Bank of Mongolia	2013/12/25	2023/12/25	30,000	JPY	244	1.520	3.7
Total					3,690		202.5

Source: JICA Study Team based on the data from Newsletter No. 3 2015 "Current Situation and Key Issues of Mongolian Economy -Trend of International Balance of Payments (*Mongoru Keizai no Genjo to KadaiChumokuSareruKokusaishusi no Doko*)", Institute for International Monetary Affairs.

USD1 = JPY122.93 = CNY6.38815

OANDA as of 1st December, 2015

(2) Conditions for a Sustainable Economic Growth

3.9 As explained above, the Mongolian economy is mainly supported by the mining and agricultural sectors.The three sectors of agriculture, mining and manufacturing account for 40% of both total production and GDP. In particular, with FDI inflows into the mining sector, Mongolia has been achieving remarkable economic growth. The result of analysis using the input-output table (see *Appendix 3.1.1*) also shows the great contribution of mining exports to GDP growth. The basic policies are to strengthen mining and agriculture as major industries and to expand manufacturing which has large spillover effects to domestic production in order to attain a stable economic growth.

3.10 However, the high dependency on the mining sector is one major factor for the recent economic slump in Mongolia. It highly relies on mining resources as well as on China in terms of destination for its exports. Therefore, a rise in resource prices and a downturn of the Chinese economy caused a sharp drop in coal exports. Furthermore, the government has tightened the conditions for foreign investment due to the caution with increase in influence of the Chinese economy and the dispute on agreement and tax of OT development that occurred between the government and Rio Tinto. This uncertain foreign investment environment caused foreign investors to withdraw their investments in Mongolia. These resulted in the decelerating economy including the decline in consumption, larger balance of payments deficit, and downturn of fiscal balance due to the reduction in tax revenue.

[2] Mongolia Economic Update November 2015, World Bank.

3.11 Considering the above, the following conditions are required in order to attain a stable and sustainable economic development in Mongolia.

(a) **Stable Mining Exports and Policy on Promotion of Locally Produced and Consumed Coal**

3.12 Mining exports have a large contribution to Mongolia's economic development. The mining sector also plays an important role in supporting economic growth in terms of balance of payments and foreign currency acquisition. However, the problems are that exports are heavily dependent on China and that the economy is easily affected by international market prices. Thus, it is very important to develop the suitable environment for a stable mining production and exports such as diversification of export destinations, development of appropriate investment policies, and enhancement of value-added. It is essential to adopt policies to increase domestic demand such as the increase in local use and consumption of coal in order to promote import substitution of electricity in the southern area which is currently imported. It is obviously important to increase self-sufficiency in energy in Mongolia through capacity building and introduction of new techniques so that the mining sector growth has larger effects on the economic growth of the whole country.

(b) **Expansion of Manufacturing**

3.13 As the recent sluggish economy shows, high dependency on the mining sector has high risks because a downturn of the mining sector has a large impact on the Mongolian economy. On the other hand, manufacturing has a high spillover effect on domestic production, particularly in agriculture and livestock farming. Accordingly, expansion and diversification of manufacturing, including processing of agricultural and livestock products, have greater effects on economic growth and make the economic structure more stable.

(c) **Appropriate Macroeconomic Policy**

3.14 As described above, the Mongolian government is currently facing the crisis of fiscal balance and debt management. Overstated revenue projection and sloppy debt management has led to a crisis of economic slowdown and a drop in FDI. The government has been increasing external financing and a cautious financing plan in accordance with the repayment capacity and rigid debt management are necessary. In addition, government fiscal management is important with careful consideration of revenue projection and expenditure plans. Thus, debt ceilings were set by the Fiscal Stability Law (FSL) and appropriate fiscal and debt management is indispensable for sustainable development. Hence, it is necessary to improve the current bureaucratic system with strong political control by using capable civil servants or experts with abundant experiences on macroeconomic management.

(d) **Development of Environment to Attract Foreign Investors**

3.15 The Mongolian government has projected unfair and unclear policies to foreign investors due to its resource nationalism. As a result, FDI sharply dropped and the government suffers from a shortage of foreign reserves. In particular, most foreign investments are investment in the mining sector and the stable growth of the mining sector and recovery in FDI by the development of a proper investment environment are closely connected and indivisible. Hence, it is necessary to develop a favorable environment for foreign investors such as a legal system to invite FDI.

(e) Promotion of Production Base Development for Stable Growth in the Agricultural Sector

3.16 In 2015, agricultural production declined because of the drought in the summer season. In addition, severe winter conditions such as dzud considerably affect agricultural and livestock production. Therefore, in order to maintain stable economic growth, it is vital to develop a farming system which includes establishment of organizations as a main activity such as farmers' cooperatives responsible for sales management and providing guidance on farming so that farmers learn techniques to minimize damages by dzud, and constantly produce and sell agricultural products. Agriculture and livestock farming have a large growth potential and it is highly expected that capital and advanced techniques will be introduced by FDI and the government will strengthen efforts to develop domestic and foreign markets.

3.2 Economic Forecast

(1) Recent Forecasts by International Organizations and Research Companies

3.17 As discussed in Section 3.1, the Mongolian economy has been experiencing weak fiscal and monetary conditions since 2014. It is expected that economic growth will continue to be slow in 2015 and 2016. International organizations such as IMF, World Bank and Asian Development Bank as well as private research companies have lowered their economic forecasts for Mongolia in 2015 and 2016.

3.18 In 2015, although mining sector production has increased due to the start of OT production, the non-mining sector is still weak due to the drop in FDI. Aside from this, a shortage of rain reduced crop harvests. As of the third quarter of 2015, grain harvest was only 28% of 2014 level and harvests of vegetables and potatoes were only 66% and 83%, respectively. Considering this economic situation, GDP growth in 2015 was projected by international organizations and research companies to be only 2-3%.

3.19 In 2016, the Mongolian economy is expected to maintain its low growth trend but will start to recover since the underground works at OT will begin by the middle of 2016 and production of minerals such as copper and gold is expected to increase. Most organizations project a 3-4% GDP growth in 2016, except WB which forecasts a decline in mining production with the lower mineral concentration in ores produced by the OT mine and the weak global commodity market.

3.20 The recovery in tax revenues is expected to be slow and, therefore, the fiscal condition remains under pressure. As for the international balance of payments, current account deficit will be narrowed since the trade account will improve in 2015. Thus, the current account deficit is supposed to increase in 2016 since imports will grow for the OT Phase 2 development. In 2017, the government and banks are scheduled to sequentially redeem foreign loans amounting to a total of USD1.29 billion in the first quarter. Accordingly, it is necessary to maintain tight monetary and fiscal policies and take measures to recover FDI until natural resource exports increase and there are clear signs of economic recovery.

3.21 It is surmised that the Mongolian economy is under pressure in the short term. However, the start of the OT Phase 2 operation is expected to bring a recovery in FDI and a rise in natural resource exports in the long run. It is projected that the economy will be on the track to recovery after 2018 and that GDP growth rate will reach 9-11% in 2020.

3.22 The following table summarizes the projection of economic growth rate by international organizations and a private research company.

Table 3.2.1 GDP Forecasts

	2015	2016	2017	2018	2019	2020	Remarks
IMF	3.5%	3.6%	3.7%	6.2%	6.6%	9.1%	2015
WB	2.3%	0.8%	3.0%	6.4%	7.9%	11.0%	2015
ADB	2.3%	3.0%	-	-	-	-	
BMI Research		3.1%		4.5%	7.5% on average		Private research company

Source: World Economic Outlook Database October 2015, IMF; Mongolia Economic Update November 2015, WB; Asian Development Outlook 2015 Update, ADB; Mongolia Country Risk Report, BMI Research.

(2) Economic Outlook

3.23 The environment surrounding the Mongolian economy has changed since 2014 when an upward trend reflecting abundant natural resources suddenly turned into a negative outlook. In the short term, the economy is expected to continue to be weak because of worsening balance of payments due to the drop in FDI and growing external financial risk. On the other hand, the contract of the OT Phase 2 project was concluded in May 2015[3] and there are some positive signs of economic recovery in the medium and long term. According to IMF and WB forecasts, the economy will grow and income levels will increase through investment in the mining sector such as OT and natural resources exports in the medium and long term. In addition to OT, TavanTolgoi (TT) coal mining is also expected to have a positive impact on economic growth after starting mine development, although as of May 2016, no progress has been seen since the bidding for the coal project. However, as one of the conditions for sustainable development, the future economic trend depends on appropriate macroeconomic policy management by the government and, thus, there is a possibility for the weak economy to continue in the long run if the government adopts the wrong policies. Therefore, sound policy management by the government is extremely important at this stage especially in light of the national election in 2016 which results will decide the future policies.

[3] Financing of USD4.4 billion out of USD6 billion required for construction of buildings in OT underground mining was determined. The loan agreement was concluded on 6 December 2015 (Mongolian News No. 50 2015). Construction is scheduled to begin in the first half of 2016 and it is expected that the OT Phase 2 project will smoothly proceed, apart from political issues.

3.3 Retrospective Forecast and Short- and Medium-Term Economic Scenarios

(1) Macroeconomic Growth Factor Analysis

1) Methodology and Assumption

3.24 This section carries out regression analysis in order to examine factors of Mongolian economic growth using time-series data based on its current status and industrial structure. The assumptions and conditions are as follows:

(a) Assumption: miningexports and agricultural and livestock production mainly contribute to GDP growth rate

(b) Explained Variable: GDP

(c) Explanatory Variables: mining export value, coal export value, output of textile manufacturing, output of leather manufacturing, output of apparel and fur manufacturing, and output of food products and beverages manufacturing[4]

(d) Data: quarterly data from 2008 to 2015

(e) Sample Size: 32

2) Result of Factor Analysis

3.25 Table 3.3.1 summarizes the results of the regression analysis. It shows that the mineral exports, coal exports and output of food products and beverages manufacturing are statistically significant and the increase in these three variables contribute to GDP growth. However, textile, leather, and apparel and fur were not significant and no contribution to GDP was shown.

Table 3.3.1 Result of Regression Analysis

	Sample Size	=	32
Log likelihood = -442.1465	Wald chi2(6)	=	530.02***

GDP	Coef.	Std. Err.	P>z
Mining export value	812,743	(302,952)	0.007***
Coal export value	240,524	(115,298)	0.037**
Textile production	-176,951	(270,959)	0.514
Leather production	88,726	(109,437)	0.418
Apparel and fur production	189,589	(188,088)	0.313
Food and beverages production	1,268,775	(550,117)	0.021**
First quarter dummy	-95,379	(195,404)	0.625
Second quarter dummy	583,328	(296,706)	0.049**
Third quarter dummy	435,178	(203,369)	0.032**
Constant term	-26,000,000	(3,386,478)	0***

* P<0.1, **P<0.05, ***P<0.001
Source: JICA Study Team.

[4] Food products and beverages manufacturing includes production, processing and preserving of maat, fish, vegetables and fruits, manufacture of dairy products, manfufacture of grain mill products, starches and starch products and beverages.

(2) Alternative Scenario by Industrial Sector

1) GDP Estimation by Alternative Scenario

3.26 Alternative scenarios in the following four cases are examined based on the regression equation. Growth rates in the four cases are indicated in Table 3.3.2.

(a) Case 1: Both mining and agriculture and livestock farming are strong

(b) Case 2: Mining is weak and agriculture and livestock farming is strong

(c) Case 3: Mineral export is in a slump, coal export growth is negative and agriculture and livestock farming is on an upward growth track

(d) Case 4: Mineral export and agriculture and livestock farming are strong and coal export is weak

Table 3.3.2 Assumptions of Four Cases (%)

	Year	Mineral Export	Coal Export	Agricultural Production
Case 1	until 2020	15	10	10
	until 2025	15	20	15
	until 2030	12	18	15
Case 2	until 2020	8	4	10
	until 2025	4	2	13
	until 2030	3	2	15
Case 3	until 2020	4	-14	20
	until 2025	2	-8	15
	until 2030	2	-10	18
Case 4	until 2020	10	4	10
	until 2025	10	2	13
	until 2030	12	4	15

Source: JICA Study Team.

2) Result of GDP Estimation by Alternative Scenario

3.27 GDP estimation in the four cases by benchmark years 2020, 2025 and 2030 was conducted based on the abovementioned assumptions. The results are summarized in Table 3.3.3 and Figure 3.3.1. For Case 1, the results show that the average growth rate until 2020 is 13.7%, until 2025 is 15.2%, and until 2030 is 12.9%, which indicate that economic growth is expected to be strong in the medium and long terms. For Case 4, growth rates in 2020, 2025 and 2030 are 9.8%, 10.6% and 12.7%, respectively, which show steady growth with double-digit growth in 2025. On the other hand, for Cases 2 and 3, GDP growth rate is single-digit and modest economic growth is expected.

3.28 These results indicate the following two implications: (i) a downturn in mineral and coal exports greatly obstructs GDP growth; and (ii) the agricultural and livestock farming sector has the possibility to compensate for the slump of metal/coal exports as long as it is on the track of full-scale growth. Hence, it is a key objective for government to maintain stable exports of minerals and coals and to bring the agricultural and livestock farming sector to a strong growth path.

3.29 However, as shown by the drop in resource prices and downturn of the Chinese economy, circumstances of mineral resources have been uncertain recently. Therefore, under

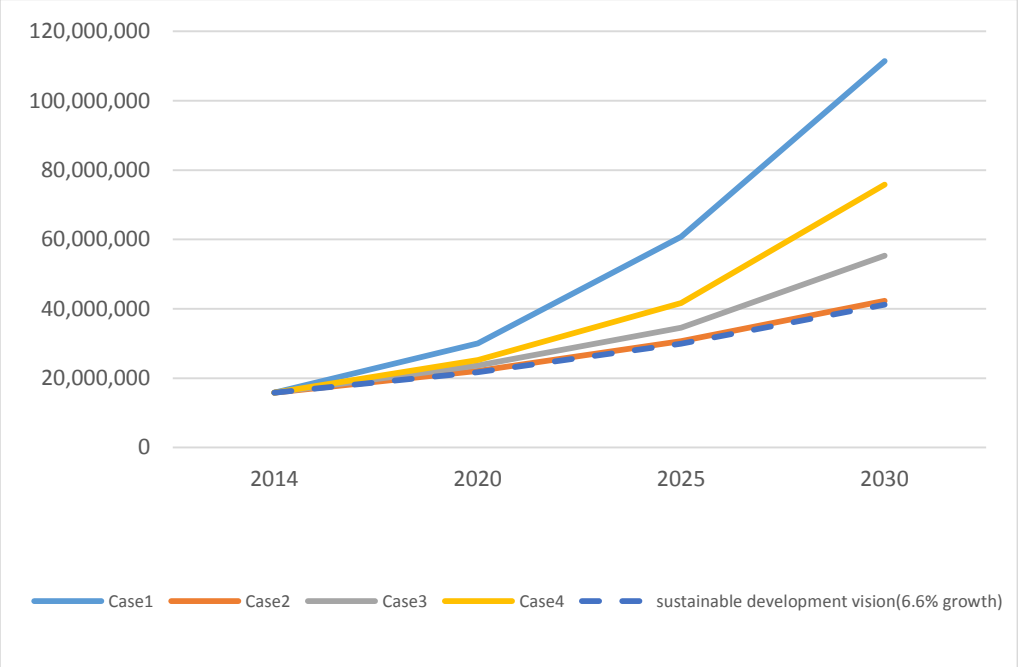
the current situation, it is difficult to expect that metal/coal exports will continue to significantly increase. The Mongolia Sustainable Development Vision 2030 approved in the parliament in Feburary 2016 sets an annual economic growth target of 6.6% until 2030 (see Section 3.4 for details). In order to achieve a 6.6% GDP growth rate without a large growth of metal/coal exports, a high growth rate in the agriculture and livestock farming sector is required. As shown in Figure 3.3.1, in Case 2, the growth path is almost the same as that of the sustainable development vision scenario. This indicates that if agriculture and livestock farming achieves double-digit growth, the target of the sustainable development vision is achieved.

Table 3.3.3 Results of GDP Estimation by Industrial Scenario

Unit: million MNT

		2014	2020	2025	2030
Case 1	Real GDP	15,796,681	30,012,019	60,814,624	111,479,982
	Growth Rate		13.7%	15.2%	12.9%
Case 2	Real GDP	15,796,681	22,105,126	30,651,443	42,303,433
	Growth Rate		7.0%	6.8%	6.7%
Case 3	Real GDP	15,796,681	23,624,203	34,556,328	55,349,048
	Growth Rate		8.4%	7.9%	9.9%
Case 4	Real GDP	15,796,681	25,210,243	41,662,939	75,808,711
	Growth Rate		9.8%	10.6%	12.7%

Source: JICA Study Team.



Source: JICA Study Team.

Figure 3.3.1 GDP Estimation by Development Scenario

3.4 Medium- and Long-Term Prospects of the Mongolian Economy

(1) Review of Development Policies in Mongolia

1) Law on Development Policy Planning

3.30 In 2015, the current system of national development policy formulation was reviewed. As a result, the "Law of Mongolia on Development Policy Planning" was newly formulated and approved on 26 November 2015. Before the new law was enacted, the legal framework was not sufficiently developed although there were various kinds of strategies, policies and plans at several levels (national, local, and sector-wise) and by timeframe. Therefore, policy coordination was weak, and an integrated system and methodology of policy planning was not established. In addition, financing sources of development policies were unclear. To address such issues, the new law was developed for the purpose of defining basic principles and procedures on planning, implementation and monitoring and evaluation of development policies, stipulating authority and responsibility of organizations responsible for development policies, and building an integrated development policy planning system.

3.31 The development policy planning law organizes development policies by timeframe and institutional level (national, local and sector-wise) and stipulates relations between the policies, monitoring systems and approving authority (see Table 3.4.1). A long-term national development vision shall be the "Development Concept of Mongolia" and medium-term and short-term policies stipulate specific plans and activities according to the Development Concept.

Table 3.4.1 Policy Document Stipulated by Law on Development Policy Planning

	Policy Document	Duration (years)	Related Policy Document	Monitoring and Evaluation (M&E) Period	Approval Authority
1	National Development Vision	15-20 Long	-	M&E in 2 years Independent monitoring in 4 years	State Great Khural
2	State Policy	8-10 Medium	National Development Vision	M&E in 2 years Independent monitoring in 4 years	Government of Mongolia
3	Regional Development Policy	8-10 Medium	National Development Vision	M&E in 2 years Independent monitoring in 4 years	Government of Mongolia
4	Aimag, Capital city Development policy	8-10 Medium	Regional Development Policy	M&E in 2 years	Local representative khural
5	Government Action Programme	4 Medium	National Development Vision, State Policy	M&E in 2 years Independent monitoring in 2 years	State Great Khural
6	Governor Action Programme	4 Medium	Regional Development Policy, Aimag, Capital City Development Policy	M&E in 2 years	Local representative khural
7	State Investment Plan	4 Medium	Government Action Programme, National Programme	M&E in 2 years	Government of Mongolia
8	National Programme	3-5 Medium	Government Action Programme	M&E every year, if necessary independent monitoring	Government of Mongolia
9	Sub Programme	3-5 Medium	Government Action Programme, National Programme	M&E in 2 years, if necessary independent monitoring	Local representative khural
10	Annual Socio-economic Development Guideline	1 year Short	Government Action Programme, National Programme	M&E every year	State Great Khural
11	Local Socio-economic Development Guideline	1 year Short	Government Action Programme, National Programme	M&E every year, if necessary independent monitoring	Local representative khural

Source: JICA Study Team based on presentation materials by Mr. Chimeddava D.

3.32 Based on the Law on Development Policy Planning, the National Long-Term Strategy Working Group, consisting of nonpartisan groups of parliament members, has developed the "Mongolia Sustainable Development Vision 2030" which was approved in the parliament in February 2016. The vision indicates the final goals to be achieved in 2030 and 20 key result indicators for the achievement of the goals (see the following box and Table 3.4.2).

Goals to be Achieved by 2030

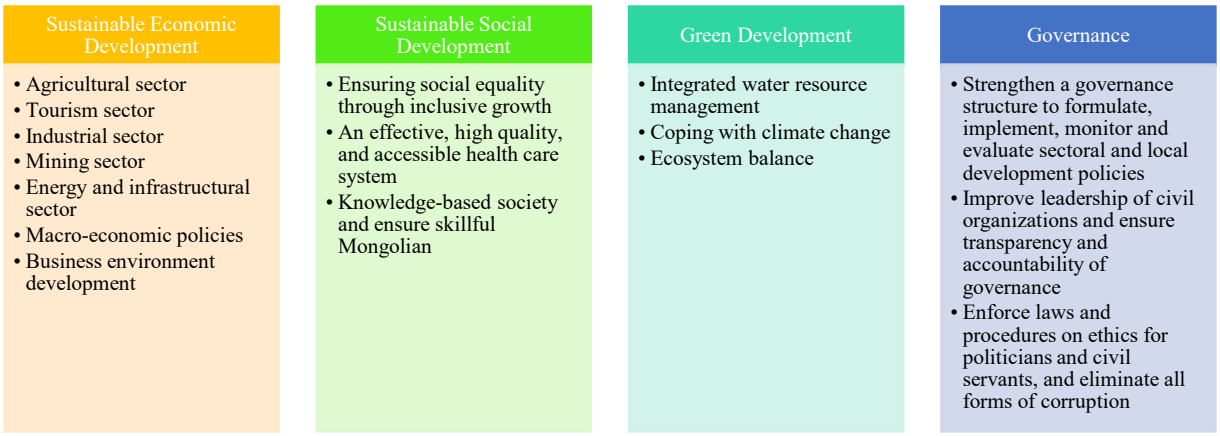
1. Increase its GNI per capita to USD17,500 and become an upper-middle income country based on its income per capita.
2. Ensure average annual economic growth of not less than 6.6 percent through 2016-2030.
3. End poverty in all its forms.
4. Reduce income inequality and have 80 percent of the population in the middle and upper-middle income class.
5. Increase the enrollment rate in primary and vocational education to 100 percent, and establish lifelong learning classes.
6. Improve the living environment of Mongolian people to lead a healthy and long life; increase life expectancy at birth to 78 years.
7. Be placed among the first 70 countries in the ranking of countries by the Human Development Index.
8. Preserve ecological balance and be placed among the first 30 countries on the rankings of the countries by the Green Economy Index in the world.
9. Be ranked among the first 40 countries by the Doing Business Index and among the first 70 countries by the Global Competitiveness Index in the world.
10. Build professional, stable and participative governance, free of corruption that is adept at implementing development policies at all levels.

Table 3.4.2 Key Results Indicators for Sustainable Development Vision 2030

No.	Indicator	Measuring Unit	Base Level (2014)	Target Level (2030)
1	Annual average economic growth	percent	7.8	6.6 (average in 2016–2030)
2	Gross national income per capita	USD	4,166	17,500
3	Human development index	rank	90	70
4	Life expectancy	years	69.57	78
5	Poverty rate	percent	21.6	0
6	Global competitiveness index	rank	104	70
7	Doing business index	rank	56	40
8	Environmental performance index	rank	111	90
9	Share of the population with social insurance coverage in the total economically active population	percent	84.4	99
10	Gini coefficient of inequality	score	36.5	30
11	Infant mortality ratio per 1,000 live births	ratio	15.1	8
12	Maternal mortality ratio per 100,000 live births	ratio	30.6	15
13	Number of students in a class at high school (national average)	number	27.3	20
14	Area of the land with disease free status for international trade certified by World Animal Health Organization	percent	0	60
15	Area of desertified land	percent	78.2	60
16	Area of specially protected land	percent	17.4	30
17	Number of foreign tourists travelling in Mongolia	million persons	0.392	2.0
18	Share of households using reliable electricity	percent	89	100
19	Share of the processing sector exports in total exports	percent	17	50
20	Share of main fuel products supplied from domestic production	percent	0	100

Source: Mongolia Sustainable Development Vision 2030.

3.33 The sustainable vision is classified into four policies (see Figure 3.4.1). The development period consists of the following three phases: Phase 1: 2016–2020, Phase 2: 2021–2025, and Phase 3: 2026–2030. Benchmarks are set by phase and the specific objectives are included in the medium-term development policies, government action plans, annual socioeconomic guidelines, and government budget to implement.



Source: JICA Study Team based on Mongolia Sustainable Development Vision 2030.

Figure 3.4.1 Four Policies in the Long-Term Vision

3.34 These proposed policies are evaluated to be rational and appropriate. In particular, Policy 1 on "Sustainable Economic Development" incorporates macroeconomic policies and business environment development as well as strategies for the major sectors of agriculture, tourism, mining and energy, and infrastructure. The principles for macroeconomy and sectoral development, and strategies for sustainable economic development are summarized in Figure 3.4.2 and Figure 3.4.3. The strategies aim to achieve sustainable economic growth by industrial diversification, strengthening global competitiveness in exports and investment promotion, specifically the strengthening of the agricultural sector such as measures for animal disease control, intensive stock farming, and capacity development of farm business, shifting to processing industry, promoting processing exports, and the improvement of trade and investment systems. The vision also aims to enhance self-sufficiency in energy, develop transport networks, and expand information technology and telecommunications coverage to improve international competitiveness as well as to develop infrastructure and brand tourism resources for tourism development.

3.35 In addition, strategies for macroeconomic policies include a medium-term debt management strategy, reduction in debt-service cost, strict compliance with the debt ceiling requirements, sound planning of the state budget revenue and expenditure, and proper expenditure management.

Principles for Macro Economy

- Sustain long-term economic growth at no less than 6.6%
- Achieve zero overall budget deficit
- Maintain appropriate budget balance
- Strictly comply with the debt-ceiling requirements
- Implement policies to hedge the country from international market and commodity price
- Accumulate foreign reserves at the proper amount
- Keep the trade balance free of deficits and maintain the stability of the Tugrik
- Ensure long-term sustainability, credibility and accountability in the banking and financial sectors and implement proper credit and interest rate policies
- Cooperate with international economic cooperation organizations
- Promote public-private partnership, utilize international cooperation funds and long-term concessional loans, and cooperate with international financial organizations

Principles for Sectoral Development

- Adopt advanced technology with high productivity and encourage new products, production and services adopting innovations
- Encourage production methods that is natural resource-efficient
- Strictly comply with the principles of efficiency and effectiveness in all economic and social sectors

Source: Mongolia Sustainable Development Vision 2030.

Figure 3.4.2 Principles for Macroeconomic and Sectoral Development

Agriculture and Livestock Farming : Priority on livestock farming

- Measures for animal disease control and reduction of land deterioration by using advanced technology, development of intensive stock farming and increase in manufacture of meat and dairy products, and enhancement of farm business capacity towards promotion of exports

Industry/Manufacturing : Shift to processing

- Enhancement of productivity by advanced techniques (food industry), high value-added products, and increase in the share of production of processing sector in total exports.

Promotion of Mining Exports and Strengthening Competitiveness

- Improvement of research techniques in geology, expansion of explorations sites with mineral resource deposits, development of investment environment and roads and transportation infrastructure.

Tourism Development

- Development of infrastructure, improvement of service quality, promotion of nomadic culture and Mongolian brand tourism and increase in revenue from tourism and number of foreign tourists.

Energy and Infrastructure

- Self-sufficiency in energy, increase in the share of renewable energy, development of roads and transportation logistics network, and development of public transportation services, improvement of the legal environment for urban and land development, creating a healthy, safe and comfortable living environment in line with green development models, expansion of IT coverage and high-speed networks

Appropriate Macro-Economic Policy

- Implementation of sound planning of the state budget revenue and expenditure and proper expenditure management, establishment of financial market system, establishment of a system for development finance, and improvement of a proper foreign and domestic debt system

Development of Business Environment

- Improvement of trade and services, development of transportation and logistics networks, simplification of a system for license issuance and improvement of tax payments and state registration systems

Source: JICA Study Team based on Mongolia Sustainable Development Vision 2030.

Figure 3.4.3 Strategies of Policy 1 on "Sustainable Economic Development"

3.36 As described above, the law on development policy planning stipulates the long-term development policy (the sustainable development vision), and medium- and short-term policies. The law also stipulates that the long-term sustainable development vision shall be the Development Concept of Mongolia and that the candidates for presidential election and political parties that participate in the election of the State Great Hural and Citizen's Representative Hural of aimag, capital city, soum and district, shall develop their platforms in conformity with the Development Concept of Mongolia.

(2) Stable and Sustainable Development Scenario in Mongolia

3.37 As previously discussed, mining exports and proper macroeconomic policies are important for the stable and sustainable development in Mogolia. Therefore, strategies in the sustainable development vision incorporates improvement of the competitiveness of the mining sector and strengthening of macroeconomic policies. The development of high value-added products including agricultural processed products and industrial diversification, tourism development, and development of transportation and infrastructure which support such industrial development are also indispensable for the stable and sustainable growth.

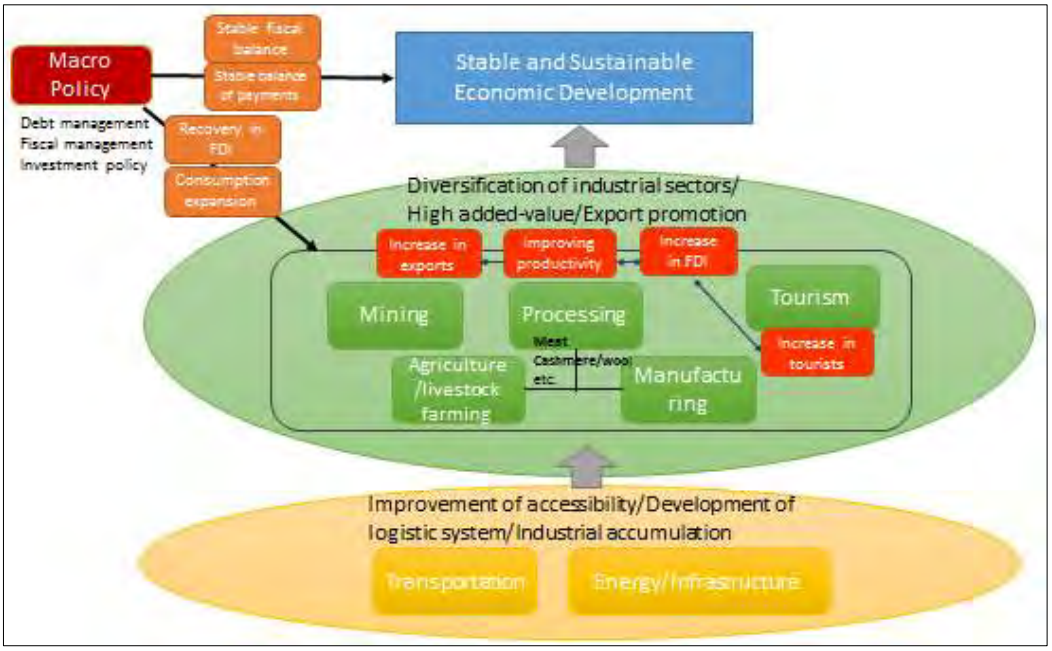
3.38 The structure of development factors for the stable and sustainable development in Mongolia is shown in Figure 3.4.4. Macroeconomic policies keep government finance and financial systems stable and promote significant increase in consumption and investment. Infrastructure development, including transportation and energy, provides a basis for indusrial clusters and logistics. The stable and sustainable development scenario proposed by the JICA Study Team is to promote the growth of major sectors by using such basis, such as diversification of industries and enhancement of value-added by development of the processing industry, increase in exports of mainly mining and processing and other sectors, and development of tourism.

3.39 Specifically for the processing industry, the priority area is food processing as the sustainable development vision indicates. Agriculture and livestock farming also has high potential in processing such as processed foods, textile and leather. Hence, improvement of industrial environments such as enhancement of techniques, introduction of advanced technology and development of infrastructure with assistance from foreign investors as well as the Mongolian government is very important. Such improvement enables the expansion of industries in cooperation with manufacturing in the areas of food, dairy products and cashmere. In addition, an increase in export value by the development of export products is expected if the quality and vaue-added of products are improved with the advanced technology and under the stable management.

3.40 FDI in the mining and related sectors is expected to increase while the investment environment is being developed for a stable economy by proper macroeconomic policy and appropriate investment policy while mining production is scheduled to increase after the OT Phase 2 operation starts. At the same time, FDI in agriculture and manufacturing will also be promoted through cooperation between different industries and industrial clusters. Furthermore, productivity will be enhanced with technical transfer by foreign investment which will enhance production of high value-added products and exports promotion. As the "tourism sector" has not been sufficiently developed despite abundant tourism resources, the strategy is to formulate a foundation for tourism development and strengthen the tourism industry through development of infrastructure, institutional framework, organization and

human resources in Mongolia in order to attract FDI and develop it into a major industry that supports the Mongolian economy.

3.41 In summary, in order to attain the stable and sustainable development in Mongolia, the following process is important. First, the foundation of industrial clusters and logistics systems is developed through the development of transportation logistics, energy and infrastructure. Second, the proper macroeconomic policy is adopted to make the macroeconomy and investment environment stable to promote FDI. Based on these foundations, diversification of industries, development of high value-added products, and exports promotion are realized.



Source: JICA Study Team.

Figure 3.4.4 Stable and Sustainable Development Scenario

4 NATIONAL SPATIAL STRUCTURE AND STRATEGIC AND COMPREHENSIVE DEVELOPMENT PLAN (NATIONAL DEVELOPMENT SCENARIO)

4.1 Existing National Land Development Policies and Positioning of Strategic Growth Corridor

4.1 This section describes the policies before the establishment of the Law of National Development Policy discussed in Section 3.4. After the National Development Policy Law and the Mongolia Sustainable Development Vision 2030 were approved by the Parliament in November 2015 and February 2016, respectively, the highest national policy is the Mongolia Sustainable Development Vision 2030.

(1) Millennium Development Goals (MDG)-Based Comprehensive National Development Strategy of Mongolia

4.1 The MDG-Based Comprehensive National Development Strategy of Mongolia, which was approved by the Parliament in 2008, aimed to achieve its national development vision that "Mongolia is a country with vast lands, abundant natural resources, admirable history, and glorious future" by target year 2021. These objectives were divided into two stages, namely from 2007 to 2015 and from 2016 to 2021, targeting its medium- and long-term outcomes of achieving the MDGs by 2015 and transitioning to a knowledge economy by 2021. These covered both the national and regional programs, as summarized in Table 4.1.1.

4.2 The policies on regional and urban development address the following: (i) planning and implementation of regional development particularly in Khovd, Uliastai, Erdenet, Kharkhorin, Darkhan, Zamiin-Uud, Undurkhaan (now named Chingis), and Choibalsan; (ii) national rural development program; (iii) construction of free economic and trade zones in Zamiin-Uud, Altanbulag, Tsagaannuur, etc.; (iv) reduction of disparity between urban and rural areas; and (v) knowledge economic development in rural areas.

Table 4.1.1 Existing National Development Strategies

6 Priorities	(i) Achieve the Millennium Development Goals and provide for an all-around development of the Mongolian people. (ii) Intensively develop export-oriented, private sector-led, high technology-driven manufacturing and services, with particular focus on information, communication development, promoting bio- and nano-technology, transit transportation, logistics, financial mediation services, deeper processing of agricultural products, and create a sustainable knowledge economy. (iii) Exploit mineral deposits of strategic importance, generate and accumulate savings, ensure intensive and high economic growth, and develop modern processing industry. (iv) Ensure intensive development of the country's regions, their infrastructure, and reduce urban-rural development disparities. (v) Create a sustainable environment for development by promoting capacities and measures on adaptation to climate change, halting imbalances in the country's ecosystems and protecting them. (vi) Consolidate further political democracy, foster a transparent, accountable, just system free from corruption and red tape.
Regional Programs	• Western, Eastern, Central and Khangai Regional Development Programs • Industrial, technological and business incubator parks in Nalaikh, Bagahangai and Baganuur districts of Ulaanbaatar City "Air service International" park • "Darkhan" industrial technological park • "Selenge" industrial technological park in Sukhbaatar City • "Altangobi" industrial technological park in Choir City • "Dornod" industrial technological park • "Erdenet" industrial technological park • "Kharkhurem (Kharkhorin)" training, scientific, technological park • "Khovd", "Uliastai", "Undurkhaan" industrial technological parks will be established • Zamiin-Uud, Altanbulag, Tsagaannuur free economic and trade zones will be established.

Source: JICA Study Team based on The MDG-Based Comprehensive National Development Strategy of Mongolia (2008-2021).

(2) Development Policy by Region (Parliament Order No. 57 in 2001)

4.3 The development policy by zone aims to eliminate the imbalance and inequality of national development by using land, resources, agriculture and animal husbandry production, and human resources capacity in accordance with the environmental load capacity. This also realizes the advantages of nomadic special management to suit the natural environment by adapting the development of modern settlement culture.

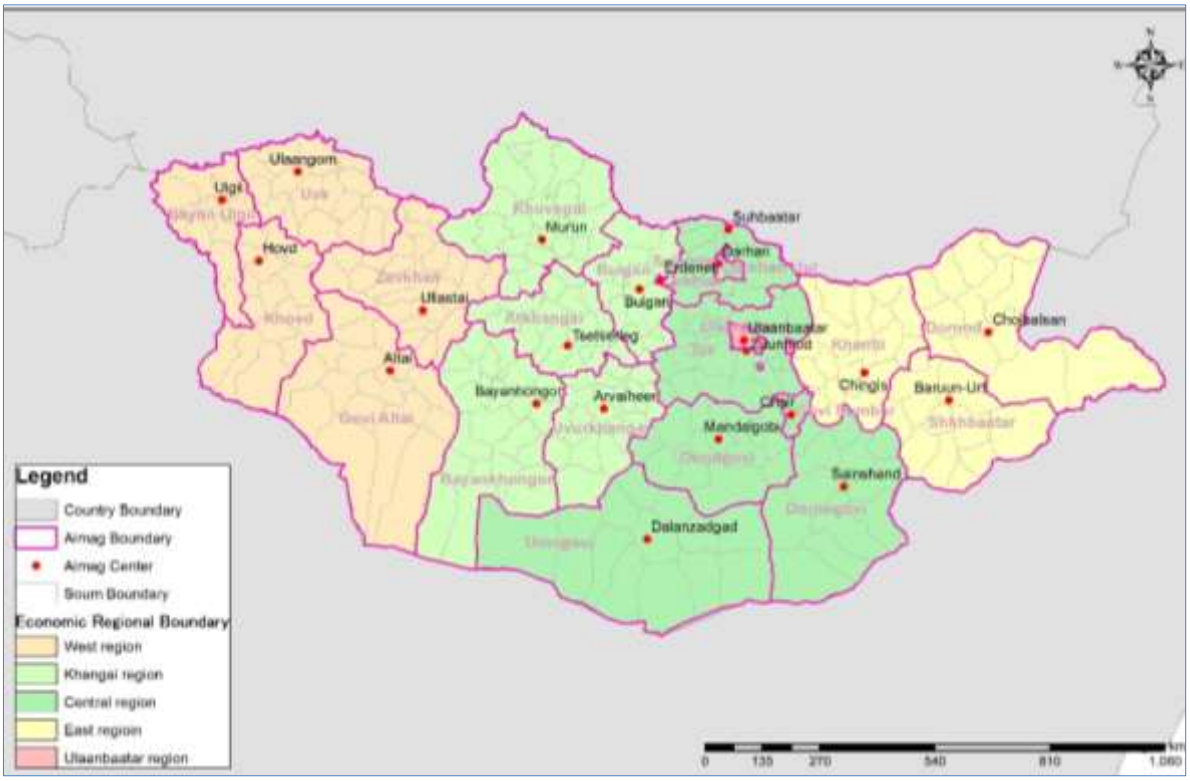
4.4 Construction of the "Millennium Road" and the nationwide comprehensive "Population Settlement Development Master Plan" are also addressed. The Ministry of Construction and Urban Development (MCUD) is currently considering to prepare this master plan.

4.5 Regional development programs for each zone were also formulated, targeting the years between 2006 and 2010 (see Table 4.1.2 and Figure 4.1.1).

Table 4.1.2 Summary of Development Policy by Region

	Western Region	Khangai Region	Central Region	Eastern Region	Ulaanbaatar
Development Priority Sector	Livestock farming, agriculture, small and medium processing factories	Livestock farming, agriculture, tourism, rest center, small and medium enterprises, mining processing, forestry	Livestock farming, agriculture, mining processing, small and medium enterprises, rest center, state-of-the-art technology industry	Mining processing, agriculture, livestock farming, small and medium enterprises, tourism	Production by the latest technology, services, international banking and finance network
International Network	Connect to Russia's and China's trade and economic network through Tsagaan Nuur, Handgait, Art Suuri, Bulgan, Bargastai routes, and explore the possibility of connecting the East-West corridor to Central Asian countries in the future through Tavan Bogd route.	Connect to Russia's and China's trade and economic network through Bagay-Ilenh, Hanha, Teshug, Shivee Huren routes gradually.	Via Altanbulag-UB-Shainshand-Zamiin–Uud route, connect road and railway network to Asia and become a hub of international trade and transportation between Asia and Europe.	Connect to Asian railway network through Choibarsan-Ereentsav and Choibarsan-Sumber –Rashaant routes.	

Source: JICA Study Team based on Development Policy by Region.



Source: JICA Study Team based on ESRI and ALAGaC database.

Figure 4.1.1 Location of Five Regions

(3) New Medium-Term Development Program (2010–2016)

4.6 In 2010, the National Assembly approved the New Medium-Term Development Program until 2016. It aimed to bring urban planning, energy, infrastructure, and the road network up to international standards by promoting development projects nationwide. It also

aimed to ensure and guarantee the right to live under a healthy and safe environment by comprehensively solving the economic and social issues that people of the country face by providing housing and increasing employment. The goals and measures are raised in the sectors of urban development and planning, infrastructure, housing supply, increase of employment and educational support, air pollution in Ulaanbaatar, rural development, enterprise and manufacturing support, and immigration measures. The major focus of the program is Ulaanbaatar but in order to improve the logistics, the highway between Altanbulag–Ulaanbaatar–Zamiin–Uud and a logistics center construction are also addressed.

(4) Policies on Development of Each Aimag and Aimag Center

4.7 In aimags besides the capital city, medium- and long-term plans and development programs for the aimags have been formulated. The medium- and long-term plans are like a pledge during the four-year term of the aimag governor after winning the elections. It is not necessarily consistent with the development program which needs to be prepared based on the MDG-Based Comprehensive National Development Strategy of Mongolia.

4.8 The progress of plan preparation varies by aimag (see ***Appendix 4.1.1***). Some aimags have already prepared it while others are still in the process of preparation. In some aimags, development plans for the soums are also prepared in addition to their aimag plans. Although they are few, development plans of some aimag centers have likewise been formulated.

4.9 The development programs for the aimags as well as soums are mainly responsible for the development of the road network and the arrangement of urban facilities such as utilities and housing.

(5) Ulaanbaatar 2020 Master Plan and Development Approaches for 2030

4.10 For Ulaanbaatar, the capital city of Mongolia, the Ulaanbaatar 2020 Master Plan and Development Approaches for 2030, which was prepared by the Ulaanbaatar municipal government with the support of JICA, was approved by the Parliament in May 2013. Also, the five-year implementation plan of the master plan was prepared and approved by the Parliament in March 2016 with the support of JICA's Project on Improvement for Planning and Implementation Skills of Ulaanbaatar Master Plan.

4.11 According to the Ulaanbaatar 2020 Master Plan and Development Approaches for 2030, the capital city's population was projected to reach 1.8 million by 2030. Of this, from 1.3 to 1.5 million people were expected to stay in existing urban areas, while the rest were expected to live in satellite towns to be newly developed. In reality, however, the population is still concentrated in existing urban areas of Ulaanbaatar City and urban issues, including enhancement of the urban transportation system, water and sanitation, and electricity, and provision of housing, etc., have become more serious.

4.12 To achieve the realization of the master plan, JICA has provided support through the development of the legal system for urban redevelopment. Yet, to solve the fundamental issue of overconcentration of population in Ulaanbaatar, the promotion of urban development in the other aimags is crucial.

(6) Positioning of Strategic Growth Corridor

4.13 The concept of a strategic growth corridor, which this study proposes, is not addressed in the current Mongolian policy. At the moment, the developments that are addressed in many

policies of relevant ministries and agencies in Mongolia, including the above policies, are mainly developments by “points” or “lines” and not the development of an area in a comprehensive way. Even if developments are planned by points or lines, they are rarely thought out comprehensively as a spatial plan, identifying sizes and locations. It is also seldom that development programs are planned and implemented together and in coordination with other development projects.

4.14 The study team explores corridor development within the context of Mongolia’s development program and aims to coordinate the development by “points” and "lines" that the Mongolian government thinks are necessary. As a result, the development of Mongolia will be possible to grow as a corridor, which will guide development by area.

4.15 There was a proposal to develop the strategic growth corridor as part of the concept of five regions recognized to be the current framework of the spatial plan for the country, but this concept of five regions needs to be reconsidered. The state land is huge and its natural environment and economic activities vary, so dividing it by five regions vertically is not rational, at least in terms of spatial development.

(7) Expectations from the Mongolia Sustainable Development Vision 2030

4.16 As earlier mentioned, the Mongolia Sustainable Development Vision 2030 was approved by the Paliament in February 2016. Along with the National Development Policy Law approved in November 2015, this vision sets directions for national development which should be followed by a superpartisan. This vision covers four major policies, namely economic development, social development, green development, and development of governance and business environment.

4.17 The new policy vision has not been elaborated yet. To make the national development vision effective, it is essential to develop a comprehensive national development plan which is expected to set effective regional development guidelines for the strategic corridor development concept.

4.2 Socioeconomic Characteristics of the Study Target Areas

4.18 Looking at Mongolia's socioeconomic characteristics based on statistical data, an overview of the limitations and potentials for the development of each of the four study target areas is provided.

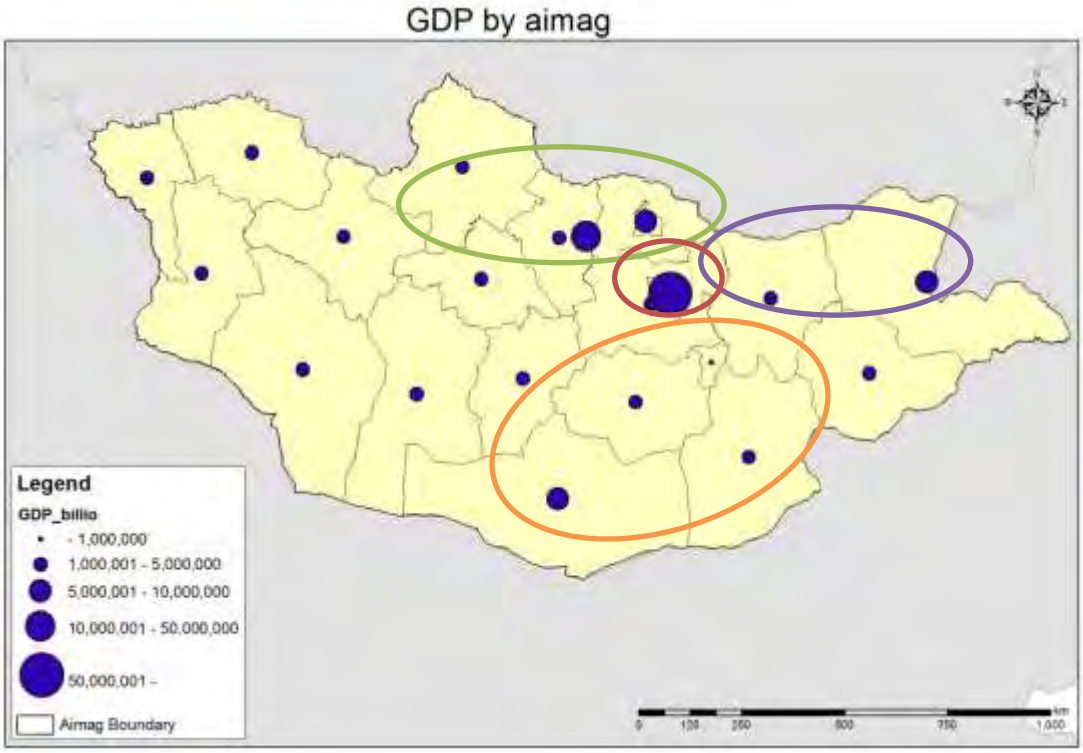
4.19 The HDIs by aimag show that the aimags where the indicators are high were concentrated in the study target areas in 2000 and 2010. In many targeted aimags, the indicator was higher than 0.7, and it was particularly the highest at 0.845 in Orkhon in 2010.

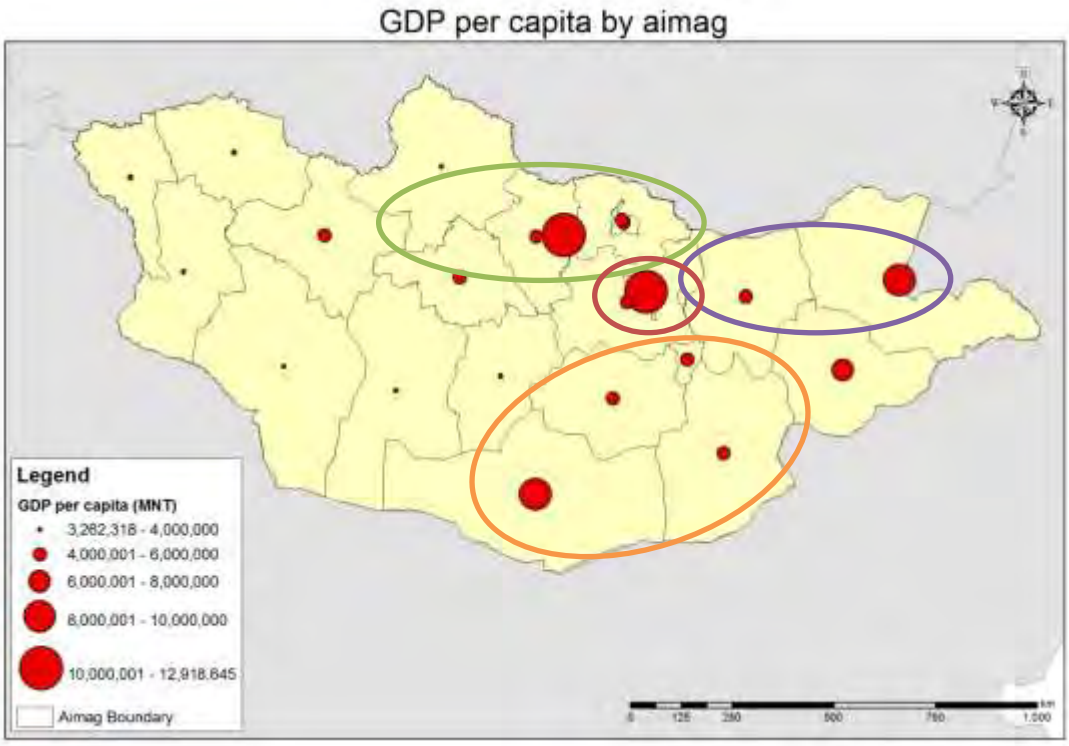
4.20 Figure 4.2.1 shows the comparisons by aimag of GDP and GDP per capita in 2014. In the figure, the circles indicate the study targets. It shows that the highest GDP is in the central region around Ulaanbaatar, and economic activities were also good in the northern region.The GDP of Ulaanbaatar was at MNT13,332.9 billion, accounting for 61% of the whole country's GDP of MNT21,937.2 billion in 2014. This indicates that economic activities are very much concentrated in Ulaanbaatar. Although there are big differences by aimag, Orkhon (MNT1,197.6 billion) is second to the capital city, followed by Dornod (MNT619.5 billion), Selenge (MNT586.1 billion), Omnogovi (MNT574.5 billion), Tov (MNT484.3 billion), Khovsgol (MNT464.0 billion), and Darkhan-Uul (MNT415.9 billion). The aimags where GDP is particularly high are located in the northern part of the study target area.

4.21 The per capita GDP by aimag shows that Orkhon has the highest at MNT12.92 million per capita, followed by Ulaanbaatar at MNT10.14 million, Omnogovi at MNT9.62 million, and Dornod at MNT8.27 million.

4.22 The GDP composition by industry and by aimag shows that agriculture is the major industry in many aimags. In the target aimags of the study target areas, agriculture accounted for about 60–65% of GDP in Tov, Bulgan, Dornogovi, and Khentii (see Figure 4.2.2). On the other hand, industry and construction were the major industries in Orkhon (86%), Omnogovi (59.5%), Dornod (58.5%), Selenge (43.6%), Govisumber (42.4%), Darkhan-Uul (39.7%), and Ulaanbaatar (36.2%).

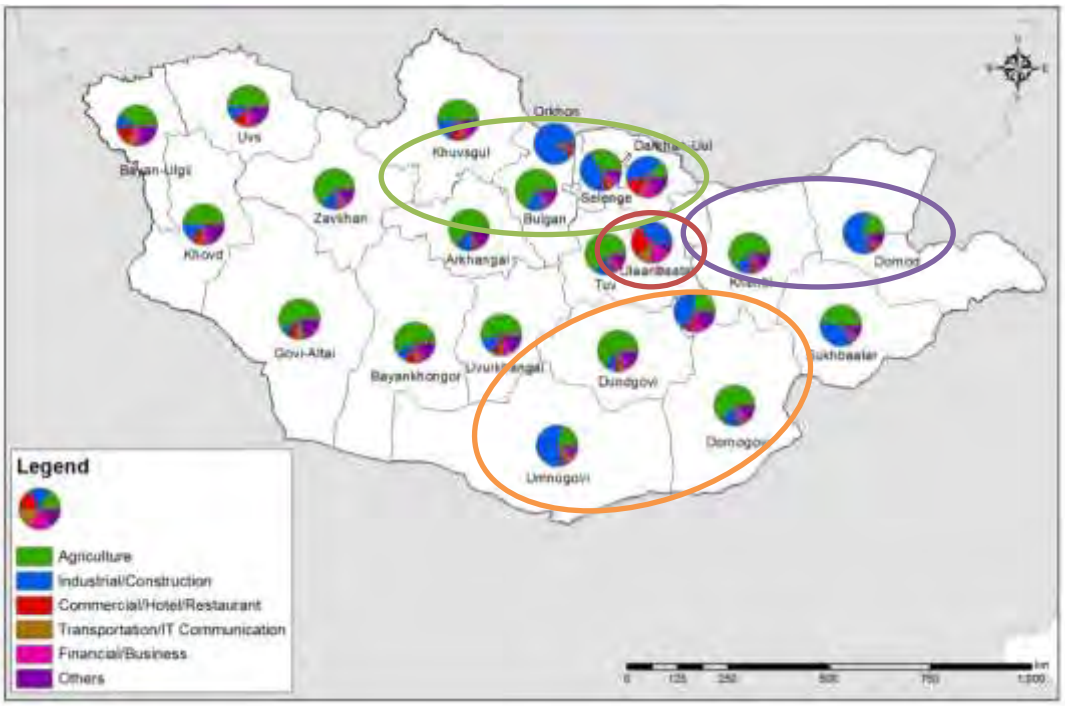
4.23 Ulaanbaatar dominated 88% of the nation's commerce and service, 86% of transportation, IT and communication, 83% of finance and business, and 62% of industry and construction. Again, this points to the extreme concentration of economic activities in Ulaanbaatar.





Source: Statistical Yearbook 2014.

Figure 4.2.1 GDP by Aimag



Source: Statistical Yearbook 2014.

Figure 4.2.2 GDP Rate by Industry and by Aimag

4.24 A private company, the Economic Policy Competitiveness Research Center (EPCRC), has carried out the survey on the competitiveness of 21 aimags since 2011. Based on a set of competitive indices, it conducts the survey every year to observe improvement and changes in the aimags' competitiveness. There are four parameters of competitiveness indices, namely economic efficiency, government efficiency, business efficiency, and infrastructure. Each index has four sub-indices and the survey compares and evaluates each aimag based on a total of 180 standards under the total 16 sub-indices.

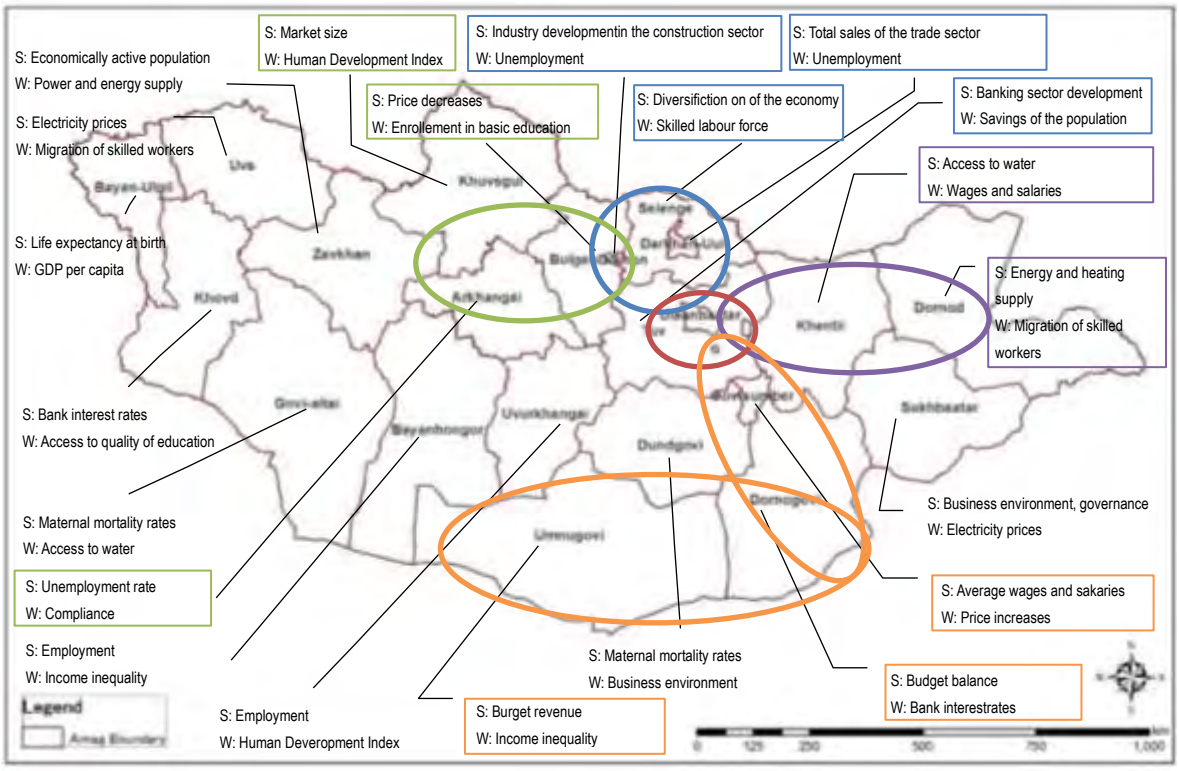
4.25 Since the survey is a comprehensive and comparative evaluation of the aimags, the socioeconomic characteristics of the study target areas is examined based on the results of this competitiveness report in 2014. Table 4.2.1 summarizes the results of this competitiveness evaluation and Figure 4.2.3 shows the strengths and weaknesses of each aimag.

Table 4.2.1 Characteristics of Aimags in the Study Target Areas

Study Target Area	Aimag	Rank-ing 2014 (2013)	Overall Competitive-ness Scoreboard 2014 (2013)	Competitive-ness Factors	Breakdown of Competitiveness Factors
Northern Area	Darkhan-Uul	3 (3)	86.4 (82.0)	Business efficiency improved.	**Management practices:** Measures of entrepreneurship of managers, adaptability of companies, social responsibility of business and auditing and accounting practices all improved.
	Selenge	6 (6)	69.1 (75.5)	Economic performance and business efficiency both weakened.	**Economic sectors:** Total percentage of GDP in industry and construction rose to 19 from 11%, industrial sector sales dropped from MNT348 to 267 billion. Total wheat production decreased from 97,033 to 91,495 tons, and seeds production fell from 240,733 to 186,986 tons. The diversification of the economy is also slowing. **Management practices:** Measures for the entrepreneurship of managers and adaptability of companies decreased.
	Orkhon	1 (1)	100.0 (100.0)	Government efficiency, business efficiency and infrastructure all improved.	**Economy:** Newly created jobs rose by 688 from 2006, however, unemployment also increased from 14.2 to 21.1%. **Institutional framework:** Reduced corruption, increased transparency of public spending decisions, and reduced unnecessary bureaucracy and its impact on the business environment.
	Bulgan	13 (12)	53.2 (57.2)	Infrastructure and economic performance both weakened.	**Economy:** The percentage share of state GDP has decreased from 1.57 to 1.52%. **Education and culture:** Enrollment in the secondary education decreased from 90.4 to 88.1%; performances of professional art organizations rose by to 192 events from 187; the availability of public libraries decreased; the pupil-teacher ratio grew from 35 to 38. **Health and environment:** Quality of life has not improved; the number of deaths per 1,000 increased from 5 to 7, while the infant and under-five mortality rates per 1,000 live births increased from 14 to 21, respectively.
	Arkhangai	19 (21)	49.8 (41.1)	Economic performance, government efficiency and business efficiency improved.	**Standard of living:** Average value of deposits per capita increased from MNT431,000 to 521,000, the number of livestock per herder household rose from 249 to 275. **Societal framework:** Income inequality and the rate of crime decreased, the Human Development Index increased. **Business environment:** The ease of doing business has improved, the number of private enterprises rose from 510 to 567. **Labor market efficiency:** A more skilled labor force, finance skills have improved, GDP per employed person has risen.
Southern Area	Omnogovi	2 (2)	86.8 (90.0)	Economic performance and business efficiency weakened	**Economy:** The rate of economic development declined from the previous year. The consumer price index increased from 112.1 to 116.1%. **Management practices:** Measures of entrepreneurship of managers, adaptability of companies, and social responsibility of business all declined relative to the previous year.
	Dornogovi	7 (4)	68.7 (80.6)	Economic performance and government efficiency both	**Economy:** Consumer Price Index increased from 113.8 to 118.6%, the rate of economic development deteriorated. **Standard of living:** The standard of living decreased, loans per capita increased from MNT1.7 to 2.5 million. **Provincial budget:** Provincial budget management remains ineffective.

Study Target Area	Aimag	Rank-ing 2014 (2013)	Overall Competitive-ness Scoreboard 2014 (2013)	Competitive-ness Factors	Breakdown of Competitiveness Factors
				weakened.	**Institutional framework:** Provincial administration officials are exposed to corruption, transparency of local government policy is not satisfactory, and bureaucracy continues to hinder business activity.
	Govisumber	8 (8)	65.7 (70.8)	Economic performance improved, business efficiency weakened.	**Employment:** The percentage of the youth population currently employed increased from 68 to 85%, the average wage rose from MNT734,000 to 844,000, and the economically active population (percentage of total population) increased from 22.3 to 35.7%. **Finance:** Banking and financial services supporting business activities, including access to credit, remains inefficient; the percentage of the total population of lenders has increased from 38.9 to 40.7%.
Greater UB Capital Region	Tov	5 (5)	69.2 (76.1)	All competitive factors weakened.	**Economic sectors:** Industrial sector sales dropped from MNT34 to 32 billion, total sales of wholesale and retail fell from MNT23.2 to 15.1 billion. Total crop production declined from 112,177 to 78,725 tons (by 30%) and of this, wheat production fell from 107,871 to 80,979 tons (by 25%).
Eastern Area	Dornod	9 (9)	65.6 (65.0)	Economic performance improved.	**Economy:** GDP per capita has increased from MNT2,089,000 to 5,350,000, the rating for economic development improved from 4.3 to 6.1, the Consumer Price Index fell from 116.7 to 110.7%. **Employment:** The average wage increased from MNT559,000 to 681,000, the employment rate improved to 92.5%.
	Khentii	14 (16)	52.5 (54.1)	Economic performance, government efficiency and infrastructure all weakened.	**Economy:** The Consumer Price Index rose from 109.7 to 110.0%. **Institutional framework:** Bureaucracy has increased, further hindering business activity. **Health and environment:** The general death rate, the number of deaths per 1,000 people, increased from 5 to 7, while cancer afflictions per 10,000 people rose from 14 to 20.

Source: JICA Study Team based on Provincial Competitiveness Report 2014.



Source: JICA Study Team based on Provincial Competitiveness Report 2014.
Note: S = Strength, W = Weakness.

Figure 4.2.3 Strengths and Weaknesses by Aimag

4.26 From the above, the socioeconomic characteristics of the study target areas are summarized in Table 4.2.2.

Table 4.2.2 Socioeconomic Characteristics of the Study Target Areas

Strategic Corridor Areas	Socioeconomic Characteristics
Northern Area	• Darkhan and Erdenet as the center of the area. • Concentration of population and economic activities after Ulaanbaatar. • Economic activity, particularly the industry and construction sector, is active. • Socioeconomic development condition is good. • In the west of Erdenet, agriculture is the major industry of the area, but economic condition is less than the other strategic corridor areas. • The condition of social development is not well compared to the other strategic corridor areas, through it has improved. HDI is slightly low, and especiallyenrollment ratio does not reach 100% in Arkhangai and Bulgan, and poverty population is high in Khovsgol and Arkhangai.
Southern Area	• Especially in Omnogovi, the economic condition is very good, because there is a mine to represent the country. In Govisumber, the industry and construction sector shared 40% of its GDP, and in Dornogovi agriculture is the major industry. In both aimags, the economic condition is relatively good, but the unemployment rate exceeds 10% and the business environment is not good. • Poverty is not a major issue but HDI is lower than the average of the country. Especially in Dornogovi, maternal and child health is a serious issue, and in Govisumber the crime rate is high.
Greater UB Capital Region	• Concentration of population and economic activities as the center of the country. The satellite towns are expected to be a logistics center and new industrial area in Naraikh, and an energy center based on coal in Baganur. Zuunmod of Tuv has a plan to be a new town near the new Ulaanbaatar airport which will open in 2017. • Socioeconomic development condition is relatively good.
Eastern Area	• Especially in Dornod as the center of the Eastern Area, economic activity, especially the industry and construction sector, has been good due to border export with China, but the unemployment rate exceeds 10%. • On the other hand, in Khentii, the economy is not good. The major industry is agriculture, though the economic size is not that large. Additionally, wage and salary is not good and the unemployment rate is high at 17%. • The condition of social development is not good. HDI is lower than the national average and the poor population is slightly high.

Source: JICA Study Team.

4.3 Basic Discussion on Comprehensive Regional Development and Strategic Corridor Development

4.27 To put into context the requirements for the regional comprehensive development and the strategic corridor development in Mongolia, this section discusses the geographical conditions, land use, and the potentials of resources and development in the country.

(1) Geopolitical Conditions: Landlocked Country Surrounded by Large Countries

1) Security Guarantees

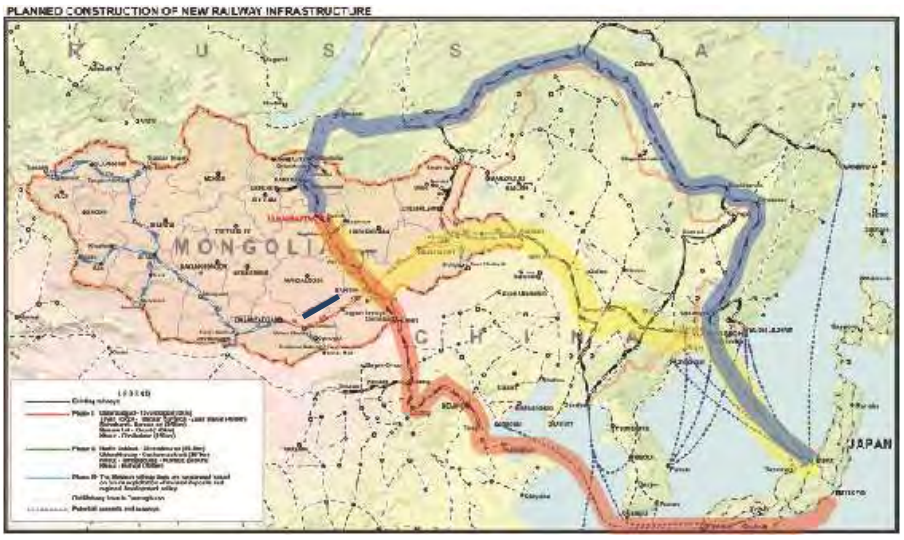
4.28 Mongolia is a landlocked country between the two large countries of China on the south and Russia on the north. Mongolia has been influenced by these two countries since it wholly depends on oil from Russia and China is the biggest trading country for Mongolia.

4.29 Thus, its National Security Guarantees Plan[1] states that "As a policy, the amount of investment from a foreign country should be one-third of total investments from foreign countries" and it is planned to strengthen linkages with other countries aside from the two large countries and to diversify investors.

2) Transportation Issue

4.30 As Mongolia is a landlocked country and is required to pass through its neighboring countries for exportation and importation, it is important to ensure efficient land transportation and trade routes in order to promote trade with countries besides its neighboring countries.

4.31 Considering transport routes from Mongolia to Japan, there are two current routes, namely (i) Ulaanbaatar–Zamiin-Uud–Tianjin Port–Yokohama; and (ii) Ulaanbaatar–Siberia railroad–Vladivostok–Japan (Niigata, Akita) (see Figure 4.3.1). In addition, there is a plan for a new route from Ulaanbaatar–Jilin Province–Tumen River–Niigata, etc. However, construction of a new railway is necessary to complete this third route.



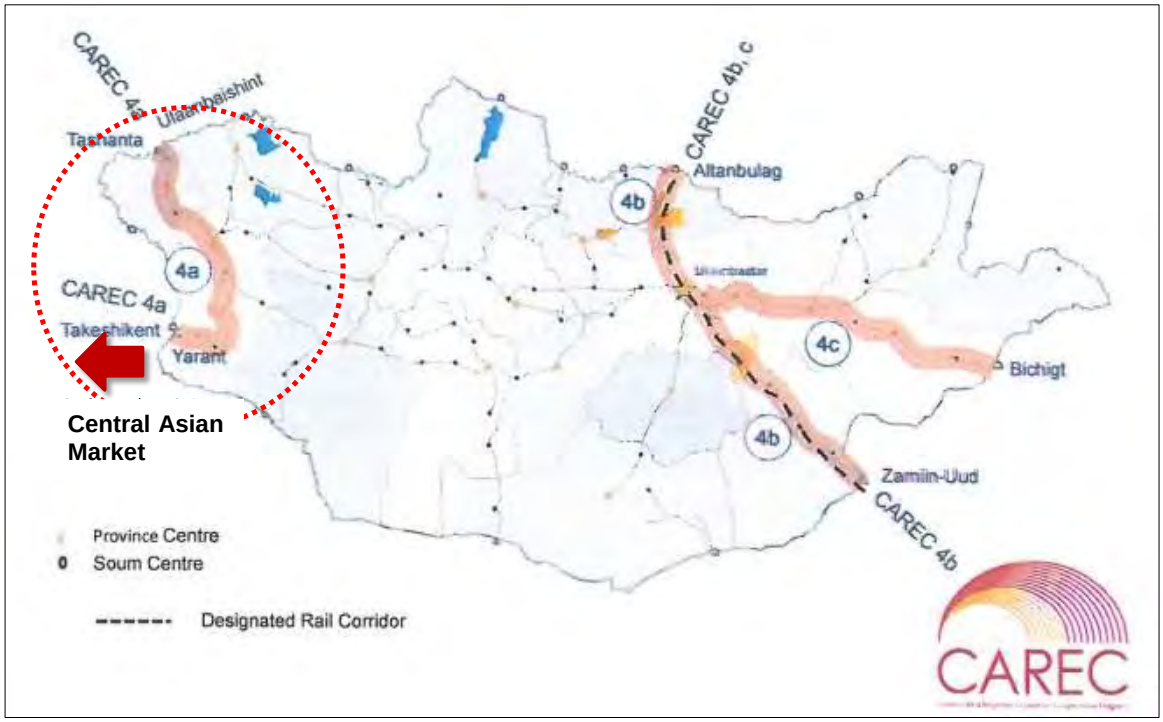
Note: (i) Ulaanbaatar–Zamiin-Uud–Tianjin Port–Yokohama (Red Line Route), (ii) Ulaanbaatar–Siberia Railroad–Vladivostok–Japan (Niigata, Akita) (Blue Line Route), (iii) Ulaanbaatar–Jilin Province–Tumen River–Niigata (Yellow Line Route).
Source: Ministry of Road and Transportation.

Figure 4.3.1 Transport Corridor Plan for International Resources (Planned by Mongolia)

[1] "New Mongolian National Security Guarantees Plan" which was adopted in Mongolia in 2010.

3) International Economic Corridor Plan in Eastern Asia Region

4.32 The international economic corridor development that is proposed under the "Central Asia Regional Economic Cooperation (CAREC) Program" led by ADB (see Figure 4.3.2) has been discussed as well as the international resource transport corridor concept proposed by Mongolia. The target of this concept is to spread the cooperative relationship between Mongolia and neighboring countries not only on an existing South-North corridor based on the Asian Highway Network but also on an East-West direction in view of markets in Central Asia.



Source: CAREC

Figure 4.3.2 Economic Infrastructure Corridor in Mongolia Proposed by CAREC

4.33 Moreover, some other international economic corridors are planned such as the Far East Development Plan by Russia, the Steppe Road Plan proposed by Mongolia (namely One Belt One Road proposed by China), and the Northeastern Corridor in China to develop the Tumen River area which has gained attention from UNDP, etc. Thus, there are several political motivations by each country or institution. Nevertheless, it is necessary for Mongolia to break away from its "landlocked country" limitations and to strengthen its international trading corridor with the implementation of the international transport system development plan by Russia and China.

4.34 The development of the economic corridor not only secures a stable physical distribution but is also expected to usher in big economic impacts such as market development, spreading of trade and distribution businesses, expansion of infrastructure investments by more liberalized movement of people, products and money within the area.

4) Mongolian Racial Community Based on History

4.35 The current population of Mongolia is no more than three million. However, there are about 23 million people in the whole world who are blood relatives of Mongolians (such as the

Mongolian race, the Kazakh race, the Buryat race, etc.) in East Asia, Central Asia and South Asia. Though the feeling as a racial community is not that strong, with the development of the transportation network (and development of the trade corridor) in the future, it is necessary to consider potentials for spreading new trade activities with these areas influenced by Mongolia. Moreover, it could be an export market for food and processed items based on the Mongolian living culture.

(2) Existing Land Use and Land Use Plan in Mongolia

4.36 The existing land use in Mongolia is summarized in the Unified Land Territory Foundation of Mongolia (ULTF). The ULTF shows 10 items of existing stuation maps (see Table 4.3.1) and 21 types of planning maps for several sectors, which are planned or show the basic concept from existing situations (see Table 4.3.2).

Table 4.3.1 List of Existing Situation Maps in ULTF

	Map Name
1	The unified land territory foundation of Mongolia
2	Land of forest foundation of Mongolia
3	Communication and electricity network map of Mongolia
4	Mongolia road and railway network map
5	Special protected area map of Mongolia
6	Surface water map of Mongolia
7	Land use map of Mongolia
8	Soil map of Mongolia
9	Vegetation map
10	Population settlement map by aimag

Source: ULTF, ALAGaC.

Table 4.3.2 List of Planning Maps in ULTF

	Map Name
1	Plan of agricultural intensive region
2	Plan of aimag level otor reserved area
3	Pastureland irrigation plan
4	Industrial land use plan
5	Settlement areas plan
6	Settlement areas waste water treatment plant plan
7	Urban structure (regional center, aimag center, settlement center) of settlement area
8	Developing direction of satellite cities of Ulaanbaatar
9	Mineral resource exploration and mining restricted area plan
10	Exploration and mining licensed area of mineral resources plan
11	Eco-tourism plan
12	Special tourism plan
13	Road network plan 2013–2023
14	Railway network plan 2013–2023
15	Plan of power production plant
16	Plan of power suppy network
17	Plan of forest land foundation
18	Water fund protected area plan
19	Water basin management zoning plan
20	Plan of special protected area
21	Oil production sharing contracted area plan

Source: ULTF, ALAGaC.

4.37 There are four types of administrative plans by scale related to land use in Mongolia, and their planning terms are different (see Table 4.3.3). Because of the difference in planning terms, there is disagreement on which is a higher ranked plan and a lower ranked plan.

Table 4.3.3 List of Land Use Plans in Mongolia

	Plan	Term (Years)
1	The Unified Land Territory Foundation (ULTF)	16–20
2	Regional Land Use Plan	10–15
3	Aimag Land Use Plan	12– 6
4	Soum Land Use Plan	1

Source: JICA Study Team based on interview with ALAGaC.

4.38 The current ULTF, with a planning term from 2004 to 2023, was approved in 2003 (see Table 4.3.4 and Figure 4.3.3). The forest area and the protected area are about 9% and

13% of national land, respectively. About 74% of national land can be used as agricultural land and 71% as pastureland.

4.39 The northern part of Mongolia is mainly forest area, agriculture and livestock farming area, and urban area. The eastern and western parts are mainly agriculture and livestock farming areas. In the southern part, although resource development has been conducted, land use for mining is about 0.1% of national land.

Table 4.3.4 Areas and Occupancy by Land Use in ULTF

Land Type		Area (km^2)	Rate (%)
Agricultural Land	Agricultural Land	115,399,856	73.8
	Pasture Land	111,032,541	71.0
	Hayland	1,712,303	1.1
	Total Cropland	1,031,099	0.7
	Unsustainable Land for Agricultural Needs	701,968	0.4
Land Under Urban Settlement Area	Land Under Urban and Settlement Area	701,968	0.4
	Industrial Land	31,056	0.0
	Mining Land	215,127	0.1
Land Under Road Network	Land Under Road Network	435,279	0.3
Forest Land	Forest Land	14,256,535	9.1
Land with Water Fund	Land with Water Fund	686,805	0.4
Special State Needs	Special Protected Area	20,948,321	13.4
	Border Strip Lands	3,111,994	2.0
Total		156,411,575	100.0

Source: ULTF, ALAGaC.

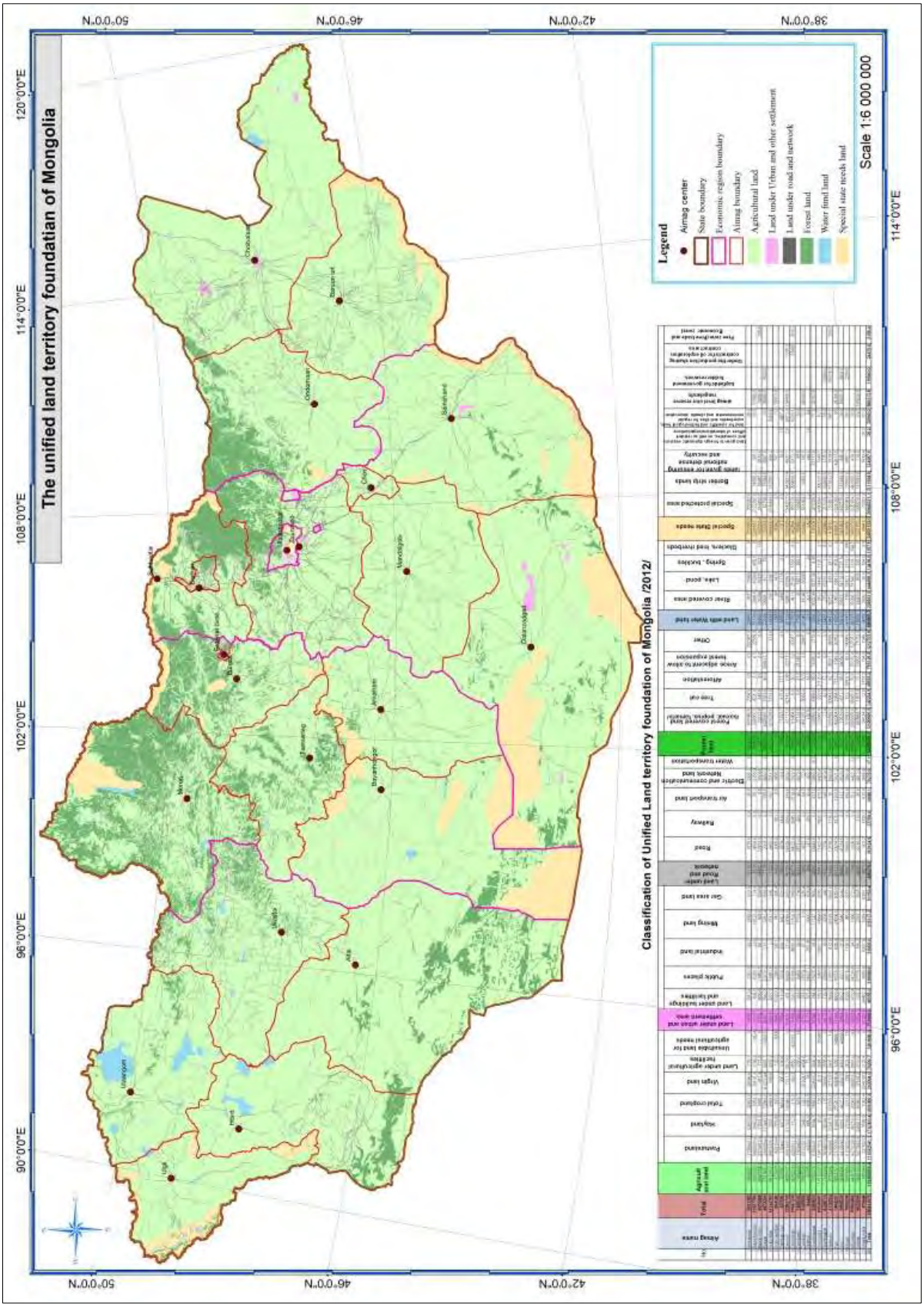


Figure 4.3.3 The Unified Land Territory Foundation in Mongolia

Source: ULTF, ALAGAC

(3) Distribution of Resources and Development Potentials

1) Special Protected Area (SPA)

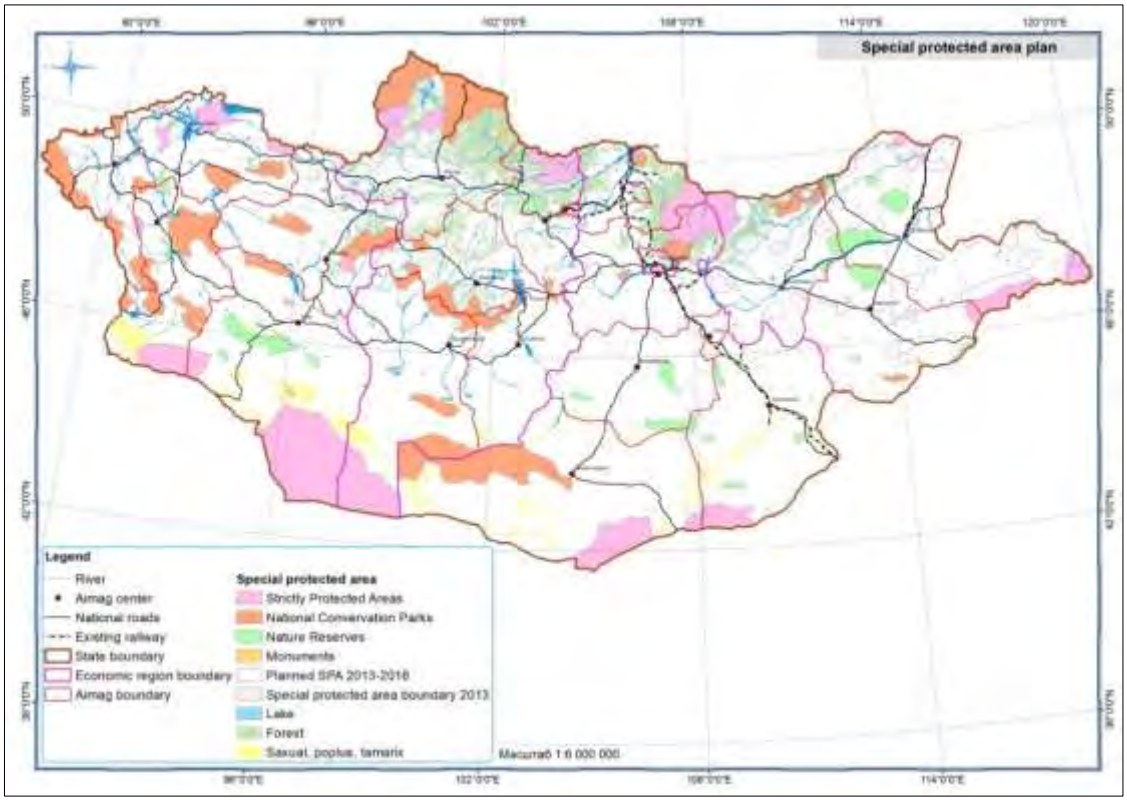
4.40 The existing Special Protected Areas (SPAs) and planned SPAs in Mongolia are shown in Table 4.3.5 and Figure 4.3.4. SPAs include Strictly Protected Areas, National Conservation Parks, Nature Reserves, and Monuments, as described in Section 2.9. The total area of SPAs is about 2,720,000ha, which is about 17% of national land. Strictly Protected Areas are located near state borders and many National Conservation Parks are located in the center to the western part of Mongolia.

4.41 New SPAs are planned for 2013 to 2016. In particular, new SPAs of about 311,000ha are planned in the eastern region. It is necessary to have appropriate measures, such as development regulations for these SPAs, when future land use is considered.

Table 4.3.5 Area of Special Protected Areas

	Name	Area (ha)
Existing	Strictly Protected Areas	12,411,006
	National Conservation Parks	11,711,815
	Nature Reserves	2,958,142
	Monuments	126,848
Planned	Planned SPAs 2013–2016	3,107,598

Source: ULTF, ALAGaC.



Source: ULTF, ALAGaC.

Figure 4.3.5 Special Protected Areas

2) Agriculture and Livestock Farming

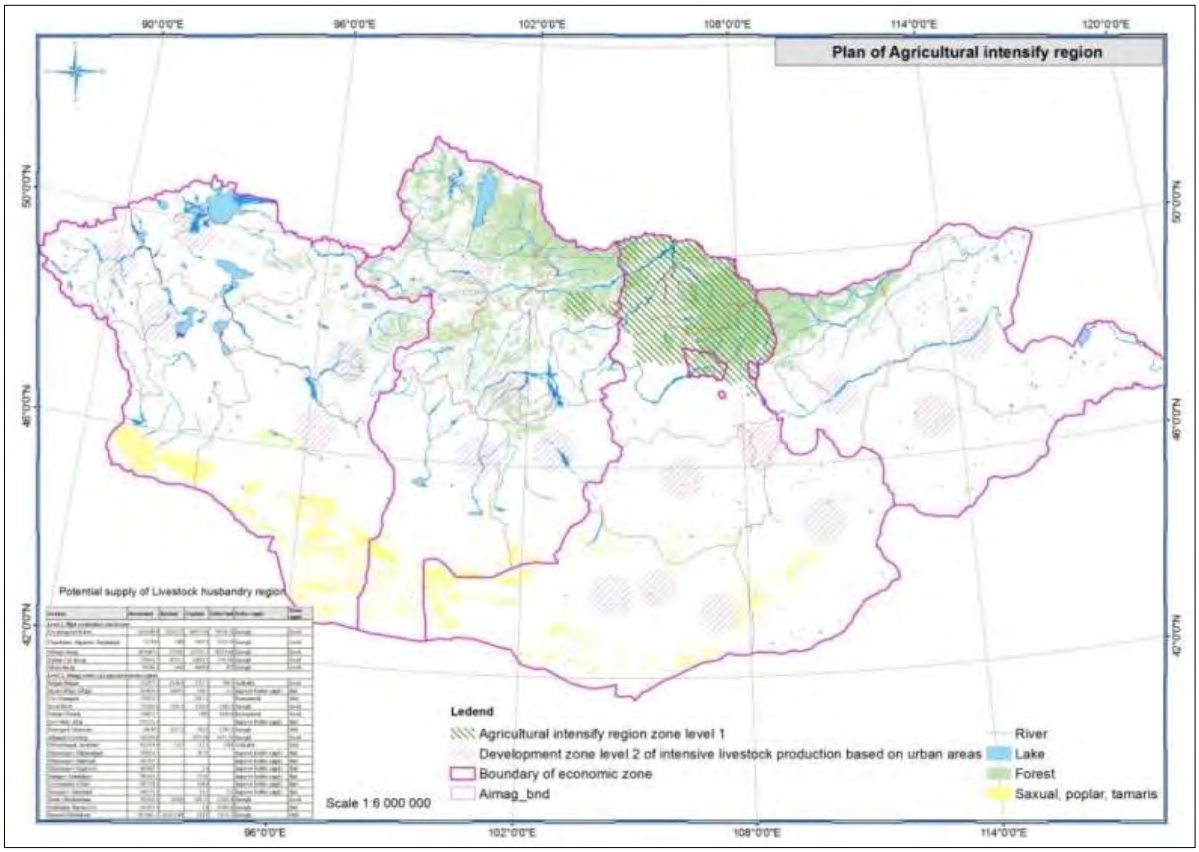
4.42 Table 4.3.6 summarizesthe potential areas for agriculture and livestock farming supply categorized into pastureland, hayland, cropland and fallow land, and in terms of adequacy of fodder supply and water supply. Since there are enough grass for feed and water supply in population concentrated areas such as the capital city of Ulaanbaatar, Darkhan-Uul aimag, Orkhon aimag, Selenge aimag, and the north area of Tuv aimag, those are planned as the first stage of agricultural intensified areas in the ULTF, as shown in Figure 4.3.5. The development zones for livestock production as the second intensified area are also planned mainly in the aimag centers. It is necessary to implement strengthening of agricultural areas based on these plans.

Table 4.3.6 Potential Areas for Agriculture and Livestock Farming Supply

Location	Pastureland	Hayland	Cropland	Fallow Land	Fodder Supply	Water Supply
Level 1 - High Residential Central Zone						
Tov aimag North area	1,410,189.9	32,103.7	84,977.6	79,749.7	Enough	Good
Ulaanbaatar, Baganuur, Bagakhangai	227,633.0	5,588.0	7,003.4	3,220.5	Enough	Good
Selenge aimag	1,630,485.1	123,410.0	313,705.5	28,724.5	Enough	Good
Darkhan-Uul aimag	178,442.7	9,072.5	34,819.1	5,741.9	Enough	Good
Orkhon aimag	39,589.5	1,400.0	4,938.6	427.0	Enough	Good
Level 2 -Aimag Center						
Bulgan, Bulgan aimag	111,677.3	9,148.4	2,757.5	789.1	Available	Good
Ulgii, Bayan-Ulgii aimag	613,859.4	1,609.5	338.7	0.5	Needs to be improved	Bad
Ulaangom, Uvs aimag	575,871.3		2,917.1		Available	Mid
Hovd, Hovd aimag	572,035.6	7,233.2	3,570.3	1,182.3	Enough	Good
Uliastai, Zavkhan aimag	536,952.7		1,000.0	1,640.6	Available	Good
Altai, Govi-Altai aimag	671,125.4				Needs to be improved	Bad
Murun, Khuvsgul aimag	465,972.0	4,227.2	392.2	1,293.3	Enough	Mid
Tsetserleg, Arkhangai aimag	423,470.8		3,077.1	5,975.8	Enough	Good
Arvaiheer, Uvurkhangai aimag	613,339.9	1,517.0	512.3	2,794.0	Available	Mid
Dalanzadgad, Umnugovi aimag	503,054.7		29.7		Needs to be improved	Bad
Hanbogd (Gashuunshkhait),	445,302.3				Needs to be	Bad

Location	Pastureland	Hayland	Cropland	Fallow Land	Fodder Supply	Water Supply
Umnugovi aimag					improved	
Tsogttsetsii,Umnugovi aimag	402,067.7		2.4		Need to be improved	Bad
Mandalgovi, Dundgovi aimag	783,193.1		27.8		Needs to be improved	Bad
Choir, Govisumber aimag	405,758.2		166.9		Needs to be improved	Bad
Sainshand, Dornogovi aimag	644,571.2		45.5	0.5	Needs to be improved	Bad
Undurkhaan (Chingis), Khentii aimag	591,203.1	20,530.0	365.3	15,203.8	Enough	Good
Baruun-Urt, Sukhbaatar aimag	611,932.4		3.8	10,383.8	Enough	Bad
Choibalsan, Dornod aimag	497,961.5	85,623.0	3,282.0	5,874.2	Enough	Mid

Source: ULTF, ALAGaC.



Source: ULTF, ALAGaC.

Figure 4.3.6 Agricultural Intensified Area Plan

4.43 The ULTF shows existing and planned otor reserved areas (see Table 4.3.7). An otor reserved area is a grassy plain that is reserved and secured during the summer season to prepare for the winter season or for disasters. To minimize the damage by dzuds, it is necessary to properly manage the use of otor land. Existing and planned otor areas have a total of 586,214ha and 310,781ha, respectively.

Table 4.3.7 Existing and Planned Otor Areas

Aimag	Existing Otor Areas (ha)	Planned Otor Areas (ha)
Arkhangai		12,981
Bayankhongor	51,860	9,879
Bayan-Ulgii	8,000	
Bulgan	26,989	
Govisumber	55,074	
Dornod	124,400	192,127
Zavkhan	68,300	10,740
Uvurkhangai	20,282	
Sukhbaatar		30,621
Tuv	24,786	23,449
Uvs	20,900	
Khuvsgul		23,749
Khentii	185,623	7,236
Total	586,214	310,781

Source: ULTF, ALAGaC.

4.44 An important issue from the viewpoint of land use planning is that the extent of ruined grassy plains in Mongolia has been spreading in recent years. This is caused by social factors such as privatization of livestocks, collapse of cooperative associations, and the impact of the increasing number of goats, which are negotiable financial livestock, as discussed in Chapter 2.

4.45 Moreover, it is hard to control livestock increase since pastureland in Mongolia can use natural grass as feed, which lowers feed cost. This situation leads to the expansion of overcrowded livestock areas especially along trunk roads since many nomads locate along trunk roads to make delivery of livestock and feed convenient. Since insufficiency of glassland is expected in the long-term future, it is necessary to improve the livestock farming and management system from the viewpoint of land use.

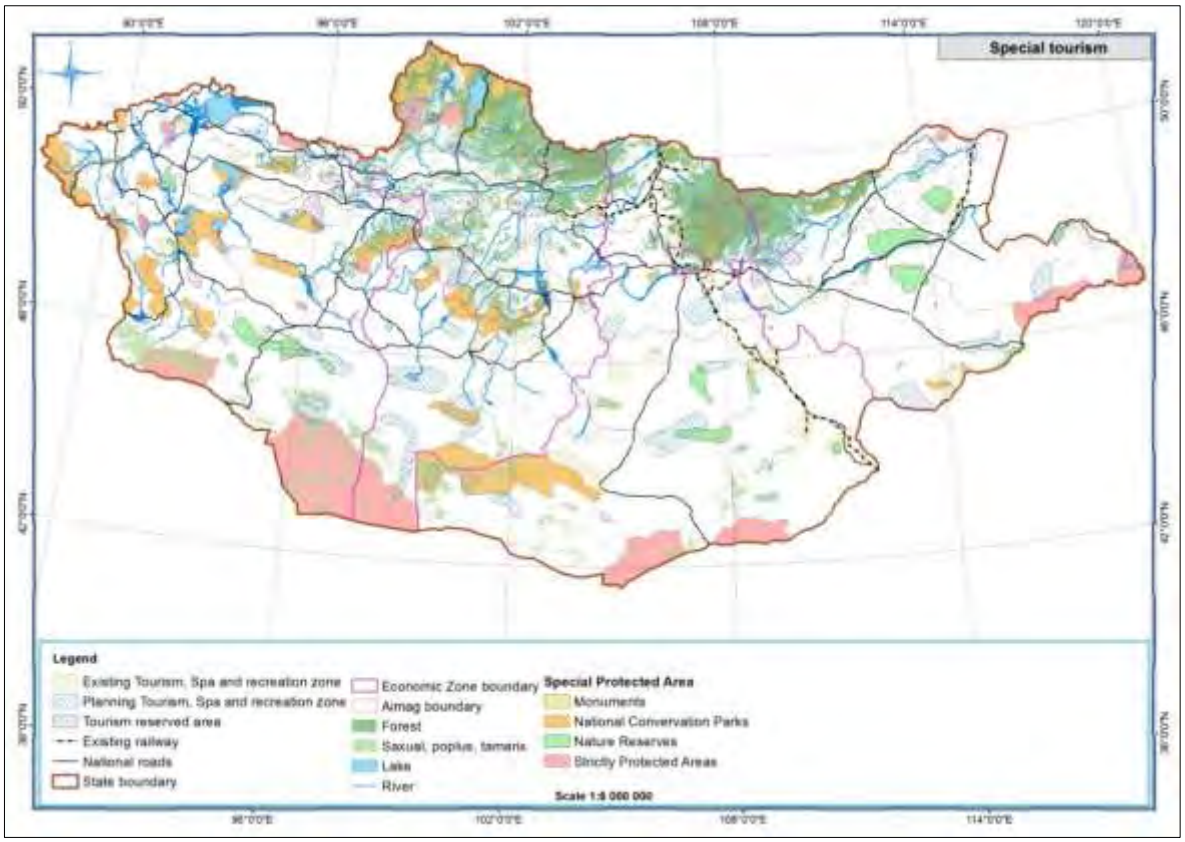
4.46 Global warming is another reason for the deterioration of grassy plains (see Chapter 2.11). The vegetation zone has been moved to the northern part of Mongolia, and semi-desert and steppe zones have expanded.

3) Tourism Resources

4.47 As discussed in Chapter 2.9, tourism resources based on the natural environment exist all over Mongolia. Its natural landscape is different by area such as mountainscape in the west region, Gobi desert in the south part, forest area in the north part, some waterscape around lakes including Khuvsgul Lake, vast grassy plains, etc.

4.48 The country is also a natural habitat of wild animals such as the wild sheep in Altai mountain and Gobi desert, wild goats in Altai Mountain and Central Region, wild deer in the forests of Selenge and Tuv aimag and Altai Mountain. Taimen, which belongs to the salmon species and is the biggest fish in the world, inhabits the basin of Selenge River and Amur River. Bird habitats are also different by area. It is possible to observe the eagles in Bayan-Ulgii and Khovd aimags in the west region and the cranes in Khentii and Dornod aimags in the west region. Thus, it is possible to develop various ecotourism destinations by taking advantage of each habitat's characteristics.

4.49 Based on the above tourism resource distribution, tourism development areas are planned in the ULTF, however, it is interspersed and not unified with regional development (see Figure 4.3.6). It shows that potential areas for nature-based tourism development dot the whole of Mongolia. These areas should be developed for tourism based on the natural characteristics by area as well as with consideration to preserving the natural environment.



Source: ULTF, ALAGaC.

Figure 4.3.7 Existing and Planned Tourism Development Zones

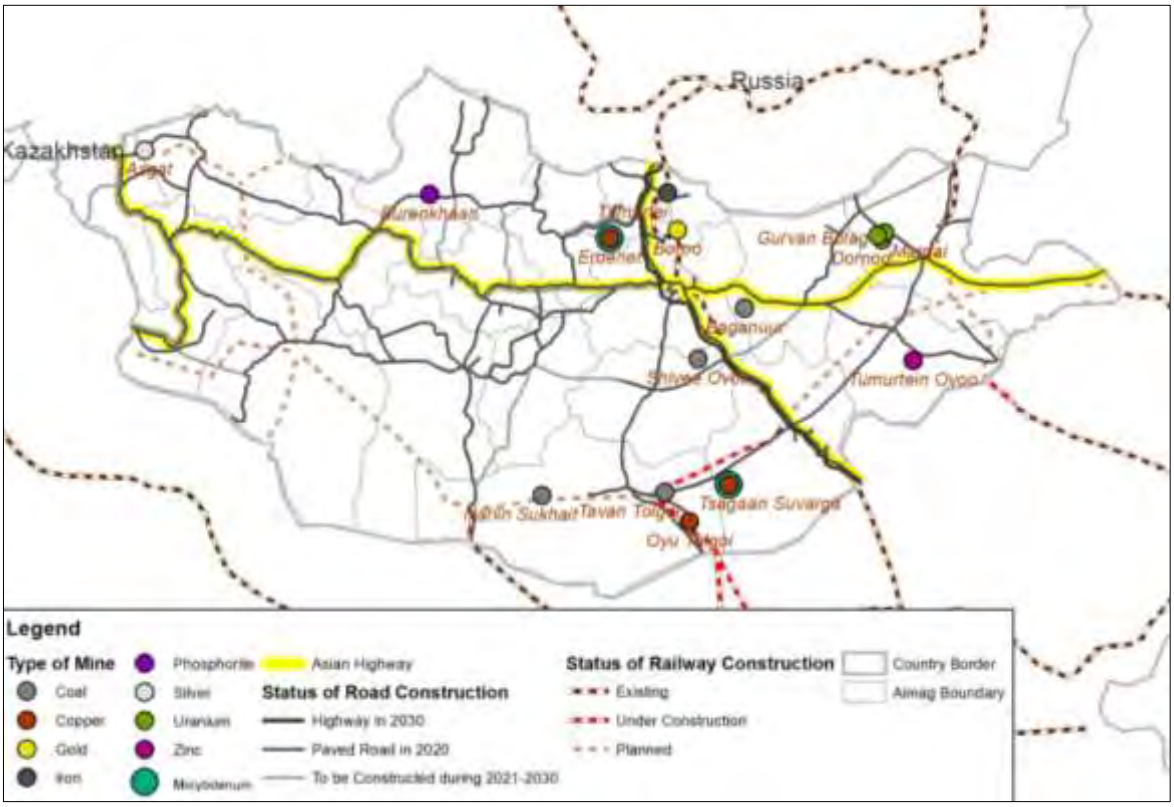
4) Mining

4.50 As discussed in Chapter 2.4, the mining sector based on vast mineral resources is the

key contributor to the Mongolian economy. The location of the major mines is shown in Figure 4.3.7. Coal can be mined at the Tavan Tolgoi (TT) mine, Baganuur mine and Shivee Ovoo mine which are located in the Ulaanbaatar metropolitan area.

4.51 Copper can be mined at Oyu Tolgoi (OT) mine and Tsagaan Suvarga mine at the south part of Mongolia, and Erdenet mine at the north part of Mongolia. Molybdenum can be mined at Tsagaan Suvarga mine and Erdenet mine. Gold can be mined at Boroo mine (Selenge aimag), iron at Tumurtei mine (Selenge aimag), phosphorite at Burenkhaan mine (Khuvsgul aimag), and zinc at Tumurtein Ovoo mine (Sukhbaatar aimag). There are also some uranium mines near Choibalsan at the northeastern part of the country.

4.52 The access roads to these mines are under development and paving of the main access road will be completed by 2020. Although the arterial road pavement project is expected to proceed as scheduled, there is also a big expectation on the construction of a railway as a more efficient transportation measure (refer to Chapter 5.7 for details).



Source: JICA Study Team based on ALAGaC Database.

Figure 4.3.8 Location of Major Mines

4.4 Approach for Comprehensive Regional Development Between Urban Areas and Local Areas

4.53 For the comprehensive development of Mongolia, two types of development approaches are necessary in consideration of urbanization and regional characteristics. One is the "comprehensive development approach in a metropolitan area" in the over-concentrated Ulaanbaatar metropolitan area and the other is the "comprehensive regional development approach" in local areas except for Ulaanbaatar.

4.54 For the development of the Ulaanbaatar metropolitan area, the "Ulaanbaatar 2020 Master Plan Amendment and Development Approaches for 2030," which was formulated based on the masterplan study supported by JICA, was approved at the Parliament. On the other hand, formulation of the comprehensive regional development plan including local cities has not progressed satisfactorily because of planning difficulties. In developing the local area, it is necessary to consider complex planning issues related to land use of the agricultural area, economic discrepancy between cities, population outflow, local economic stagnation, living services including education and medical care, as well as the transportation network which interrelate between regional hubs, rural areas, and Ulaanbaatar.

4.55 A spatial frame related to local city development is shown in this chapter.

(1) Functional Hierarchy and Nodal Structure in Local Cities

4.56 In the Administrative Area Management Law (2006),[2] there are three levels in the classification of local administration, namely aimag (province), soum (district), and bag. Each administrative unit has an administrative head. Administrative units of aimag and soum each has an administrative office.

4.57 The Municipal Law (enacted in 1993 and revised in 1995 and 2003) identified the city (Khot) and village (Toskhon). Khot is an area witha population of over 15,000 and half of its population works at the industrial sector such as factories, has an urban infrastructure function, and whose head of the administrative unit lives in it. Toskhon is an area with a cumulative population of 500–15,000 and which is developed as a center of industry such as agriculture and livestock farming, tourism, leisure and commerce.

4.58 The "Urban Development Basic Plan/ Construction Standard/ Regulation" issued by ALAGaC (2004), prescribes the classification standards of the city and village as shown in Table 4.4.1. However, it is not applied as it now stands.[3]

4.59 In this regulation, the way to calculate access to a public facility by city size is prescribed as follows: "for calculating the number or volume of public facilities in a mega city and big-sized city, it is planned in consideration of residents, visitors, tourists and other people who can access those facilities within two hours. In case of a small- and medium-sized city, access time to a public facility by a user should be set within one hour." In short, there is a

[2] As to the administrative classification in the metropolis, Ulaanbaatar, there is a "District" under the metropolis and "Khoroo" under the "District." Ulaanbaatar has a metropolis and a city. The city includes 6 central districts (Songino-Khairkhan, Bayangol, Khan-Uul, Sukhbaatar, Bayanzurkh and Chingeltei) and the metropolis includes the city and 3 remote districts (Naraikha, Baganuur and Bagakhangai). It was resolved at the city assembly in April 2015 that Naraikh and Baganuur will become a satellite city and those districts will have an independent administrative unit like Ulaanbaatar City.

[3] According to an officer of the Ministry of Construction and Urban Development (MCUD), "it is just to report Russian standards."

guideline to suggest the sphere of urban services, which is an important concept in spatial planning.

4.60 It is unclear about the difference of urban functions by this classification. Incidentally, only Ulaanbaatar is a mega city which has over 500,000 population and there is no big-sized city. Only Erdenet and Darkhan are classified as medium-sized cities. Almost all other aimag centers are classified as small-sized cities, except for seven aimag centers which population is under 20,000 and are not classified even as small-sized cities.

Table 4.4.1 Classification Standards of City and Village

Classification of City and Village	Population (thousand persons)	Note	Applied City
City:			
Mega City	Over 500		Ulaanbaatar
Big-sized City	100–500	-	-
Medium-sized City	50–100	-	Erdenet, Darkhan
Small-sized City	20–50	-	Choibalsan, Ulgii, Arvaiheer, Bayanhongor, Ulaangom, Khovd, Sukhbaatar, Sainshand, Dalanzadgad, Tsetserleg, Chingis (Undorkhaan)
Village: Village like Town	0.5–20	Village with mining, transportation, resort area, tourism area	-
Rural Village	0.5–10	Soum center, Bag center	-

Souce: JICA Study Team based on "Urban Development Basic Plan/ Construction Standard/ Regulation" issued by ALAGaC (2004).

4.61 The planning process and implementation measures are prescribed in the National Comprehensive Development Policy based on the MDGs, which are summarized in Chapter 4.1. However, the parliamentary resolution on January 2, 2013 provides that the following eight cities are regional hubs: Choibalsan (41,812 population), Harhoin (12,569), Darkhan (76,428), Erdenet (87,837), Uliastai (15,553), Khovd (26,342), Zuunmod (15,397), and Chingis (Undurkhaan, 19,230).[4]

4.62 In view of their population size, quality and volume of urban functions, situation of the population, industrial distribution and economic conditions, etc., this study evaluated the following cities as regional hubs: the second largest city of Erdenet, the third largest city of Darkhan, Choibalsan and Chingis in the east region, and Choir and Sainshand in the south part. These cities should be treated and developed as major regional core cities.

4.63 To develop these urban cities, it is necessary to foster local industry with application of local resources and to provide living services step by step to meet its population size. In short, it is necessary to strengthen living services and develop the main industry based on each population size. Therefore, the necessary functions of a regional hub are enumerated below. To provide these service functions to residents of neighboring aimags or soum centers and nomads who locate around those cities, it is necessary to build a city nodal structure to connect between a regional hub and peripheral cities and to formulate an economic corridor to strengthen the connection between those hubs and Ulaanbaatar.

[4] Population data from Mongolian National Statistics Office.

(i) Function of supply and management of industrial infrastructure;

(ii) Function as base city for business, trade, market and finance;

(iii) Function of information and technology and living services; and

(iv) Function of higher education and medical treatment services.

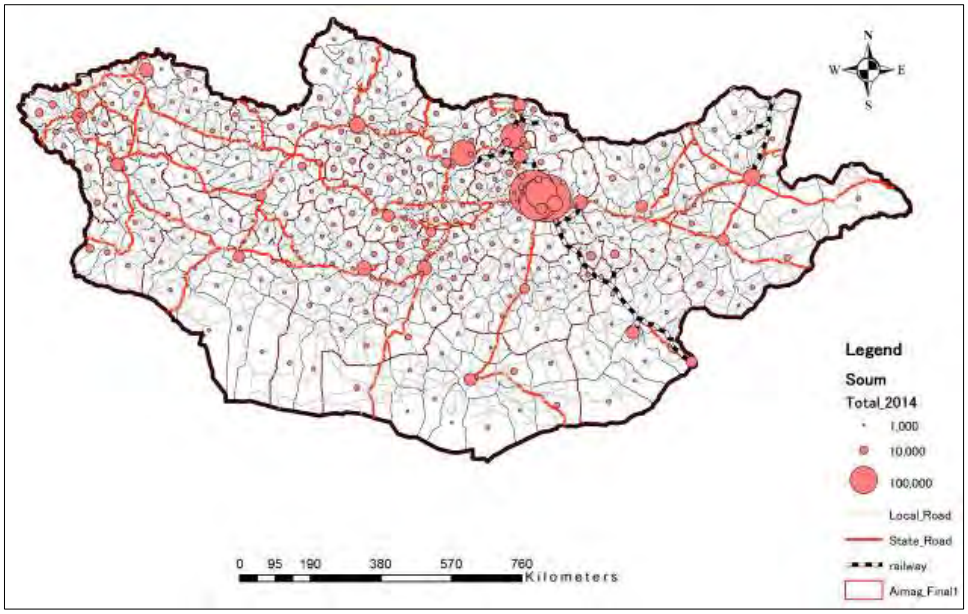
(2) Expansion of One-Day Living Sphere by Paving of Arterial Road

4.64 Although there are 21 aimags in Mongolia, the population size of almost all aimag centers is about 20,000 to 50,000 because of its vast land area. This is small compared with the population size of Ulaanbaatar City, thus there is a big gap in life services between Ulaanbaatar and other aimag centers.

4.65 In the local area where there is a high ratio of nomad population, the soum center plays an important part as a living sphere in a day because it is difficult to develop a hub to supply life services as the nomads change their habitation area seasonally. Therefore, it is examined how much area will be expanded as a service sphere from the aimag center as a consideration for pursuing the paving of arterial roads.

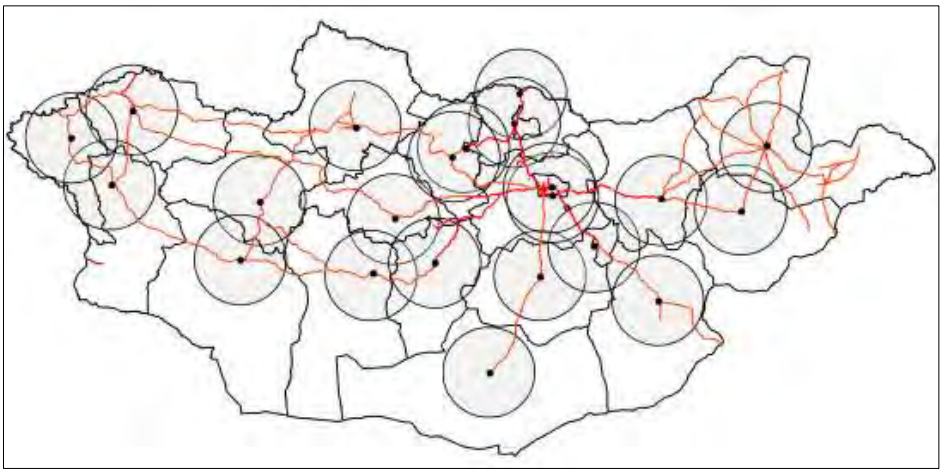
4.66 Construction of the local arterial roads connecting 21 aimags around Ulaanbaatar is making steady progress. Some 41.6% of the roads have been paved as of 2014 (see Figure 4.4.1) and paving of the national roads is expected to be completed in 2016.

4.67 Development of paved road creates efficiency in travel speed of vehicles and allows travel at 60 kilometers per hour depending on traffic volume. Assuming that the travel area in a day is within the area which needs a maximum of three hours to move, travel area in a day will be expanded compared with the current travel sphere (see Figure 4.4.2) and it will be possible to move between almost all neighboring aimag centers in a day in the whole country by completing the road paving (see Figure 4.4.3). This means that reduction of travel time can lead to improved access to markets and high urban life services from the local area. However, Khovd aimag, Bayan-Ulgii aimag and Ulgii aimag in the west region are outside of the above network and can form a semi-independent area.



Source: JICA Study Team based on ALAGac Database and National Statistics Office in Mongolia.

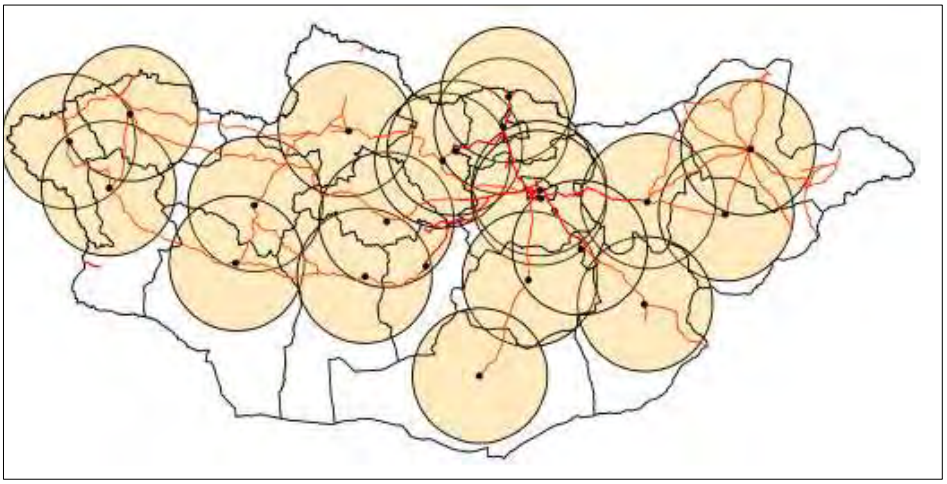
Figure 4.4.1 Population of Soum Centers and Road Network



Note: Calculated 3 hour-sphere based on ALAGaC database about location of aimag centers and road pavement situation.

Source: JICA Study Team.

Figure 4.4.2 Current Travel Area in a Day



Note: Calculated 3 hour-sphere based on ALAGaC database about location of aimag centers and road pavement situation.

Source: JICA Study Team.

Figure 4.4.3 Travel Area in a Day after Completion of Pavement

4.5 Suggestions for Strategic Corridor Development Plan

4.68 To develop Mongolia, which has a huge land area, prioritization of development is important. Based on the analyisis made in the previous sections, this section proposes ideas for corridor development, considering the industrial development via utilization of regional resources.

(1) Development Scenario

1) Basic Objectives of Development

4.69 It is proposed to set the "establishment of a new development base in Mongolia" as a major goal and to realize the following objectives to address the above development issues:

(i) To boost the regional economy by strengthening regional economic development targeting mining development, mining related industry development, and creation of high added-value agriculture and livestock farming;

(ii) To build a new system which contributes to the improvement of local living services by implementing development programs focused on "corridor development" led by effective public investment;

(iii) To maintain a sustainable natural environment by strengthening the conservation of valuable natural resources such as national parks and special protected areas, as well as mitigating adverse environmental effects from the mining industry, etc.; and

(iv) To achieve the above goals and to establish balanced development structure by correcting local economic disparity.

2) Strategic Significance of Corridor Development

(i) Three Major Elements of Regional Comprehensive Development

4.70 To realize the abovementioned basic development objectives, the spatial strucuture for Mongolian national development is composed of the three elements of point, line and area. Points need to consider two development elements, i.e. the local growth hub for industrial development and the regional hub. The former includes industrial areas to promote agroprocessing, and light and heavy industries, SEZs, logistics center, public transportation terminal, and so on. The latter includes the human resources and urban service supply center to support regional industries.

4.71 Lines means transportation facilities of roads and railway, and infrastrucuture facilities of energy and IT. These perform their functions well when the proper network is established. Areas include special resource elements, such as land, natual environment resources, mineral resources, tourism resources, forest resources, etc. to utilize land properly.

4.72 Combining these three elements, to establish a functional and effective regional development system, corridor development is the most effective way as a new planning concept.

(ii) Proposal for Corridor Development as an Axis for Industrial Development

4.73 To achieve regional comprehensive development considering the vast land size of Mongolia, the strategic functions of the economic growth corridor are as follows:

- The strategic corridors have a key role for sustainable economic development in

Mongolia as basic axis of industrial and economic development.

- Industrial development will be promoted along a transportation network of the east-west and south-north corridors which is connected to Ulaanbaatar, the metropolitan economy (formulation of industrial value chain).
- By connecting Erdenet as the second largest city, Darkhan as the third largest city, and other major aimag centers as regional hubs along the east-west and south-north corridors, a growth network of new regional cities will be formulated.
- It is important to strengthen the connection to Russia and China, as Mongolia is a landlocked country. In particular, it is necessary to develop and strengthen the logistics function and the distribution network to connect to both neighboring countries in order to develop access to new markets at the east-west direction connected to Central Asia, the northeastern area in China, and countries in the Far East Asia.
- Development is required to utilize abundant resources in Mongolia more effectively and sustainably and to develop them for further economic growth and social development. For this, it is necessary to implement "corridor development" to integrate various developments of points, lines and areas organically, and to promote public and private investments strategically in the corridor development areas. In particular, economic infrastructure such as transportation system, electric power and energy supply system, communication system, etc. are important to be developed intensively and strategically in order to promote industrial investment..

(2) Components of Strategic Economic Development Corridors

4.74 Two strategic economic development corridors are proposed, namely the "South-North Industrial Growth Corridor" and the "East-West Green Development Corridor."

4.75 The "South-North Industrial Growth Corridor" is on top of a major trunk road to connect Russia and China. This corridor is directly connected to the economy in Ulaanbaatar, has a large accumulation of population and main industries along the corridor, and various goods pass through it. Nowadays, this corridor functions as a basic axis for the industrial economy in Mongolia and this function will not change in the future. This growth corridor is expected to form the industrial value chain.

4.76 The "East-West Green Development Corridor" is the agricultural promoting corridor which spreads from the western edge connected to the market in Central Asia to the eastern edge connected to the north area of Inner Mongolia in the northern area of Mongolia which has a relatively rich water foundation and development potential for the agriculture and livestock farming sector. This corridor will strategically implement the improvement and diversification of agricultural productivity according to local characteristics, promote a value-added agroindustry, and establish an agricultural value chain.

4.77 The whole structure of national development is that a node point of those two corridors is located in the Ulaanbaatar metropolitan area with high-level urban functions (market, capital, technology, management, human resources, education and medical care, etc.).

4.78 The South-North and East-West Economic Corridors will function as trade corridors with China and Russia which are located along a long stretch of these corridors. The East-West

Corridor especially has the potential to develop a new trade corridor connected to new markets in the future including the Central Asian countries on the west, the northeastern part of China on the east, and the Far East Asian countries (Democratic People's Republic of Korea, Republic of Korea, Japan) further on the east (see Figure 4.5.1).

Source: JICA Study Team.

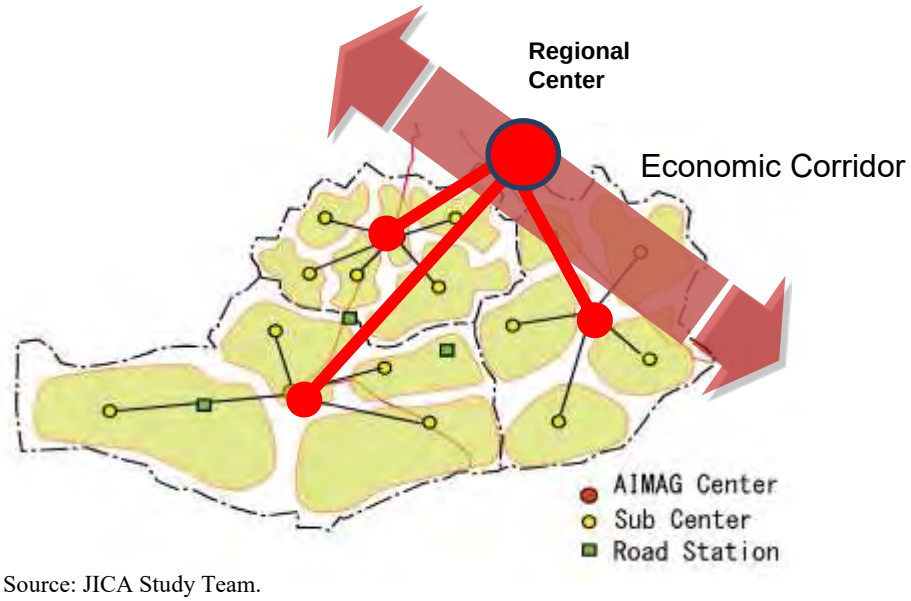
Figure 4.5.1 Main Industrial Development Corridors

(3) Expansion of Corridor Development and Local Area Development

4.79 Corridor development is important to effectively promote the growth of regional hubs to guide their balanced industrial growth as well as to prevent overconcentration of the population in Ulaanbaatar. In particular, five cities (Darkhan, Erdenet, Choir, Sainshand and Zamiin-Uud) along the "South-North Industrial Growth Corridor" and two cities (Chingis and Choibalsan) along the "East-West Green Development Corridor" will become the regional hub cities (secondary cities) after Ulaanbaatar. These secondary cities need to strengthen various urban functions such as all kinds of commercial services, market services, financial and insurance services, medical care and education, administrative services, information service as well as to increase employment opportunities by improving those services. The promotion of agriculture and livestock farming, the improvement of quality of living services in local areas, and the creation of regional hubs that can provide a comfortable and affluent life to people without going to Ulaanbaatar will lead to the formation of a comprehensive environment for human settlement as well as a balanced national land use in the long run (see Figure 4.5.2).

(4) Concept of Strategic Economic Corridor Development

4.80 The concept of strategic economic corridor development based on the above is shown in Figure 4.5.3.



Source: JICA Study Team.

Figure 4.5.2 Concept of Local Settlement Centering on Regional Hubs

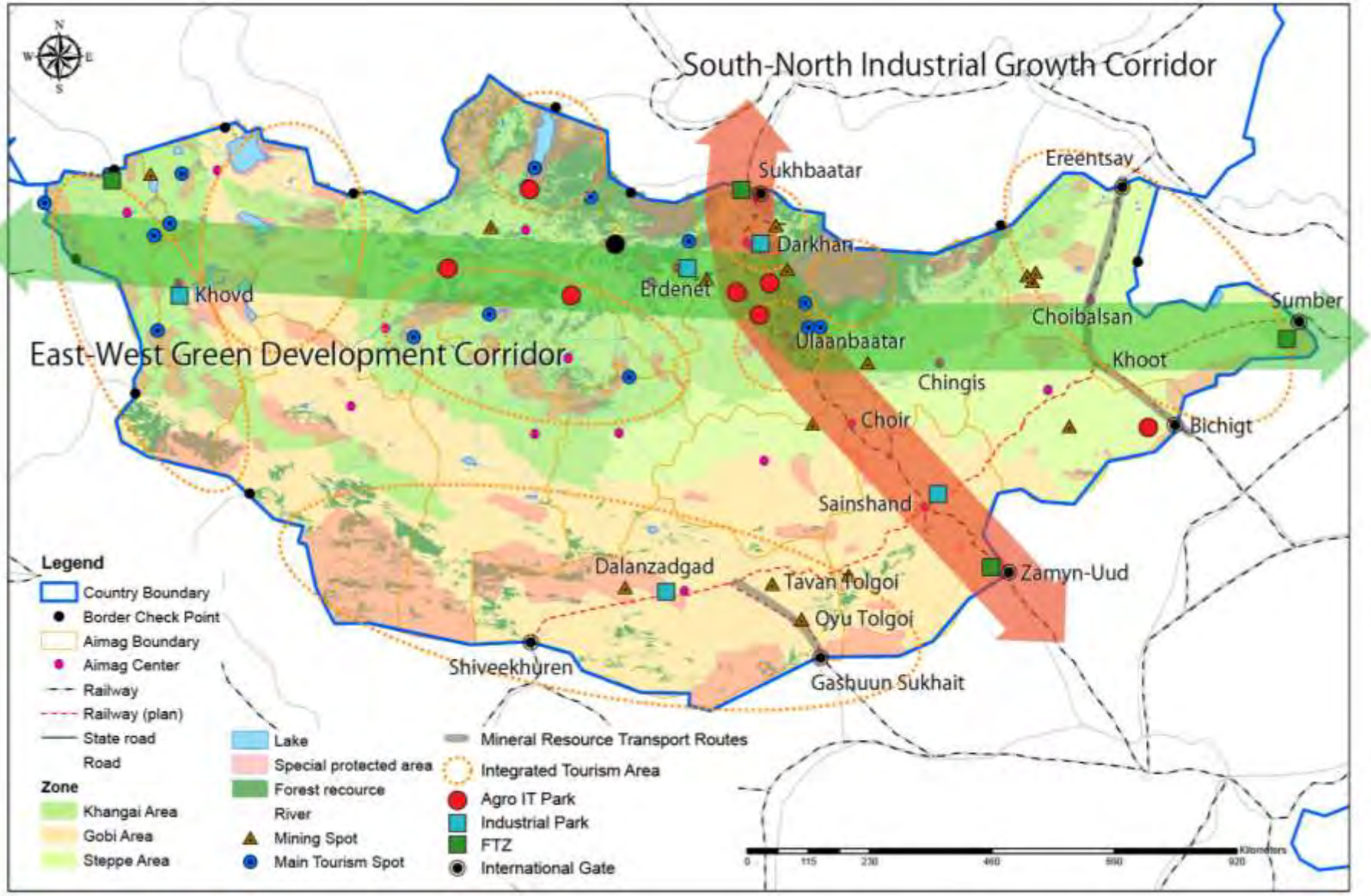
(5) Spatial Characteristics of the Strategic Economic Corridor and Potentials of Roadside Development

4.81 This section explains the characteristics and roadside development potentials for the two corridors proposed in the previous section about the concept of strategic economic corridor development.

1) South-North Industrial Growth Corridor

4.82 The current transport axis of the country is the route provided by Ulaanbaatar Railway operated from Russia to China via Ulaanbaatar and the highway running parallel from Erdenet-Darhan-Ulaanbaatar-Sainshand. Passengers and cargo from all over the country flow into this axis, the South-North Industrial Growth Corridor, which divides the country in half into east and west. Being located in the center, it was inevitable to have Ulaanbaatar dominate the flow of various industrial goods. However, it is possible to form a stable and sustainable structure of economic development in the future by resolving the unbalanced economy and spreading the momentum of economic development along this corridor.

4.83 As functions of mining and its related industry, industrial linkages according to characteristics of the areas along the corridor can be established, considering the roles of Ulaanbaatar which has a management function as the center, the mine area in the south and north, and the trade function at the border region. Also, as functions of agriculture and livestock farming development, production of agricultural and farming products such as vegetables and dairy, and the food processing industry can be developed to supply food to large cities.



Source: JICA Study Team.

Figure 4.5.3 Concept for Strategic Economic Corridor Development

Menu (List) for Area Development

4.84 Following a multiple menu can be considered in promoting the growth of traditional industry such as cashmere, wool, leather, etc. and modern industry and new business services in Ulaanbaatar metropolitan area, fostering of value-added industry related to existing mines, building of a coal value chain focusing on local production for local consumption, and creation of its related industry.

(i) Menu to improve value-added services for traditional industry and new businesses:

- Producing further value-added traditional industry (cashmere, wool, leather, etc.);
- Opening of modern industry and new business services in Ulaanbaatar metropolitan area;
- Development of facility and function for transport and logistics service; and
- Fostering of high-level living services such as healthcare, education, etc.

(ii) Menu to improve value-added mining, agriculture and livestock farming:

- Producing value-added coal by coal preparation industry;
- Utilization of steam coal (intermediate) discharged from preparation work;
- Development of local energy system to utilize steam coal;
- Utilization of small-scale or settled digging coal mine as energy resource (UGS);
- Multiple food processing center (milk, meat, processed meat products); and
- Vegetable plant factory.

(iii) Menu to improve the living environment:

- Living service facility for nomads such as Michi-no-Eki, etc.;
- Supply of life information, education and medical care system to utilize information infrastructure in this corridor;
- Program for improvement of old facilities and IT utilization; and
- Program to support care for aged persons and children.

2) East-West Green Development Corridor

4.85 Mongolia has a vast plain of rich grazing land nurtured by the two international rivers of Selenge and Herlen that stretch from east to west in the north. Thus, rich agriculture and livestock farming related resources spread in the north part of the country.

4.86 The Mongolian government is well aware of the strategic importance of developing the east-west corridor. JICA provided a grant to construct a high standard highway extending 300km eastward from Ulaanbaatar to reach Undorhaan (now renamed as Chingis City) to be completed in 2007. The extension of the road continued to reach Choibalsan with the additional 50km to complete the route. The westward route extends from Ulaanbaatar through Darkhan along the north-south corridor and turns west to Erdenet and then to Bulgan and Murun. There is another route extending directly west to Tsetseleg which is almost completed except for a small section left. The route will be extended to Khovd in the future.

4.87 The development of the east-west highway is rapidly improving transport access for agricultural products. In the east, Chingis City is now emerging as an eastern hub to serve the aimags of Khentii, Sukhbaatar and Dornod. In the west, Erdenet and Hutag-Undurare are becoming a western hub to serve the aimags of Bulgan and Arkhangai.

4.88 It is expected to realize the main artery for land transportation to connect to the east-north part in China via Choibalsan from Ulaanbaatar for the east direction, and connect to Kazakhstan via Khovd from Ulaanbaatar for the west direction. It is expected that the development of this main artery will promote value-added local industrial products in accordance with local characteristics and improve local incomes. It will also improve the distribution function for agricultural and industrial products and expand various distribution systems, rapidly improving market access by corridor development. With consideration of the potential for regional development based on agriculture and livestock farming, this corridor will be called the "East-West Green Development Corridor."

4.89 The former Ministry of Industry (MOI) has planned to develop Agro-IT Parks as logistical and processing hubs for livestock and agricultural products. In order to succeed in the Agro-Techno Park Project, reinforcement of access to production areas is of utmost importance in addition to the trunk routes development now underway. The first step of the techno-park is to attain a critical volume of livestock/agro products by improving the distribution functions and gradually expanding the markets and level of processing. In this regard, the East-West Green Development Corridor, which ultimately aims at the industrial deepening of the agriculture and livestock sectors, is proposed as an important strategy to promote the stable and sustainable economic development of Mongolia in the future (see Figure 4.5.4). The Concept of the "Agro-IT Park" was approved in September 2016 as one of the mega projects to be managed by the National Development Agency (NDA) under the new government, and the suitable measures to realize Agro-IT Parks will be discussed in coordination with relevant ministries and government offices.

Source: JICA Study Team.

Figure 4.5.5 East-West Green Development Corridor

Menu for Area Development

4.90 The East-West Green Development Corridor aims to improve local incomes by enhancing value-added agricultural and livestock farming. To do this, it is necessary to

develop Agro-IT Parks, strengthen industrial connection within the area, and build an internal-oriented industrial circulation structure.

(i) Menu to improve value-added in agriculture and livestock farming:

- Food processing industry (food processing of agriculture and livestock farming);
- Improvement of the mechanism of product distribution (joint shipment, public market, etc.);
- Strengthening of R&D function (establishment of agricultural examination station);
- Development of local speciality (commercialization of local products); and
- Establishment of standards for specific agricultural and livestock farming products (securing of food quality in the market).

(ii) Menu to improve the living environment:

- Living service facility for nomads such as Michi-no-eki;
- Supply of life information, education and medical care system to utilize information infrastructure in this corridor;
- Program for improvement of old facilities and IT utilization; and
- Program to care for aged persons and children.

(iii) Menu for local revitalization:

- Utilization of nature and culture, linkage with tourism industry (local speciality, attraction of tourists, production of souvenirs, promotion of local dishes, culture and performing arts);
- Health and welfare business with food and agriculture;
- Promotion of direct selling system for agricultural, forest and fishery products;
- Strengthening of local hub functions;
- Community development by local retail services and activity for improvement of eating habits, etc.;
- Local development by utilization of local brand speciality;
- Promotion of development of new products in agriculture and livestock farming sector by R&D based on collaboration between government, industry and academia; and
- Support in production and selling of local agricultural and livestock farming products, etc. by utilization of local energy.

5 RECOMMENDATIONS FOR REGIONAL DEVELOPMENT STRATEGY BY INDUSTRIAL SECTOR

5.1 Development of Priority Sectors and Industrial Strategy

(1) Direction for Strengthening Mongolia's Industrial Foundation

5.1 As discussed in Chapter 2, the major issues in industrial promotion in Mongolia that need to be addressed are the lopsided industrial structure with heavy dependence on the mining sector and the weak foundation of the manufacturing sector, the comparative disadvantage of high transportation cost due to its geopolitically landlocked nature, and the relatively limited (small) market, among others. Representatives of the business community voiced out their needs for human resource development, technology adoption, and access to finance. It is, therefore, important to strengthen and enhance the strategy for promoting the industrial foundation utilizing comprehensive, strategic, and sustainable approaches.

1) Sustainable Development of Industrial Foundation

5.2 It should be an important priority to promote import substitution in the industrial sector which is the basic backbone for economic activities. The import substitution approach should comply with the principles under the regime of the World Trade Organization (WTO) and free trade agreements. Instead of being protective, it should promote and activate industrial activities through introduction of a fair and competitive business environment and the development of an effective supply chain built on an efficient logistics network. Priority should be given to the following:

(i) Promotion of industrial foundation development for manufacturing machinery, equipment and parts for construction, mining, agro-livestock, and machine-tool itself that should build upon a consistent supply procurement system; and

(ii) Promotion primarily of an efficient parts supply system for consumer goods (e.g., electric appliances, motorcycle/automobile parts, etc.) and then for advancement of the supply system to be integrated into and/or to interact with the manufacturing sector.

2) Development of Strategic Industrial Foundation

5.3 As stated in the Industrial Development Policy and based on the results of research and analysis of the current industrial situation in Mongolia, the agro-livestock raw materials and mining resources are deemed valuable (and competitive) industrial resources. The country's global competitiveness in these sectors should be further developed. This should include, for example, development of sophistication of the domestic supply chain and industrial diversification and regional development triggered by this process of strengthening the strategic sectors. Following are the major directions for development of the industrial foundation in strategic sectors:

(i) Promotion for agro-livestock sectors, particularly the wool/cashmere/leather industries, which have potential for further comparative advantage in the international market through technology adoption, quality upgrading, and product development. It is essential to develop a reliable and comprehensive domestic manufacturing line from primary processing to final products manufacturing. Promotion of linkage with foreign direct investment and global supply chains is also important. The enhancement of

productivity and quality upgrading should be tackled in these promotional undertakings.

(ii) Promotion of specific product development in the agro-livestock processing sectors such as Omega 7, placenta extract, pet food products, heat insulating materials, and automobile parts such as leather seats and dashboards. Collaboration with the tourism strategy is also important especially for the product development for the wool/cashmere/leather sectors.

(iii) Promotion of processing in the mining sector is a key element for further industrial growth to enhance value-added. In promoting coal gasification and/or coal liquidation, for example, it is important to consider the efficient way of local production of energy for local consumption to be utilized as a core of regional development. Industrial agglomeration can be designed along this development (such as energy production-cored castle city formation).

3) Comprehensive Industrial Infrastructure Development

5.4 The development of hard infrastructure should correspond to the above industrial development promotion. Soft infrastructure should also be discussed in the context of strategies for industrial promotion. It is necessary to consider the appropriate soft infrastructure (e.g, legal system, policy measures) for the promotion of an optimal investment and competitive environment. Industry should also take advantage of tourism promotion in this context of soft infrastructure promotion. It is a precondition that the basic legal system should be strengthened, as the Industrial Development Policy stated. Other priorities in soft infrastructure development should be measures and/or policy systems for technology adoption and access to financing to back it up (e.g., support measures for technology adoption for SMEs), as well as for promotion of economies of scale and industrial agglomeration (e.g., clustering of small and micro businesses, corporatives).

(2) Direction of Industrial Promotion from the Viewpoint of Regional Comprehensive Development

5.5 In the context of comprehensive national land development, it is important to consider raising the level of nationwide infrastructure evenly. In the case of industrial development, the variety of regional characteristics should be reflected in the development process that could promote regional industrial diversification. The regional specific advantage is an important element for industrial development and may well be elaborated primarily at the regional level. The national level industrial development should encompass those regional specificities and coordinate them to work mutually complementary and synergistic. With regard to the four regions covered in the JICA study, following are the primary directions for industrial development in each region. As they are based on primary research works, further elaboration and substantiation in detail are required.

1) Darkhan / Erdenet Region

5.6 This region, especially Erdenet, is pursuing industrial diversification in the post-“copper mining castle town” development strategy. Such diversification is important to sustain its economy. It is essential to develop a more sophisticated logistics system addressing local markets in Darkhan and Erdenet as well as Ulaanbaatar. Market development in the Russian side should be promoted through the strengthening of FTZs in Altanbulag (further collaborating with the mining processing and food processing sectors), and through the

Industrial Parks to be launched shortly in Darkhan and Erdenet. This region should enhance its gateway function to the Ulaanbaatar market for the northern regions and to the Russian market.

2) Ulaanbaatar Region

5.7 Further promotion of the middle-scale enterprises (groups of enterprises in the second pack) and start-up businesses is important in this region to assist industrial diversification. Developing new businesses in satellite cities is the priority, such as coal liquidation and/or gasification projects in Nalaikh and Baganuur, and industrial supporting regional development in Zuunmod close to the location of the new airport. The Industrial Park development plan in Baganuur should also be coordinated with the overall promotion strategy. There is already a large-scale investment being considered by a leading Mongolian company in the coal liquidation business. The potentials are also observed in the wool/felt processing sector entering into heat insulation material production, dairy products processing, and woodworking in SMEs. Ulaanbaatar being a leading region in industrial development, its experiences and good practices (successful cases) in this area should be disseminated and shared as models of development to be applied to industrial development (agglomeration) in other regions.

3) Sainshand Region

5.8 The bottleneck in industrial development in this region is the limited water resources for heavy industrial use. To be realistic, the existing plan for Industrial Parks can be reviewed and given flexibility to attract industrial investment more in light industries (such as manufacture of agro-livestock equipment) and not focus too much only on heavy industries. Tourism promotion also has good potentials in this region by utilizing regional characteristic tourism resources. In addition to tourism, there are other potential elements for industrial development such as attraction and up-taking of large-scale movement of persons in Zamiin-Uud (for the construction sector, habitation). A realistic development strategy is the key for this region.

4) Choibalsan Region

5.9 As the comparative advantage of this region lies in its agricultural products, agro-processing should be promoted to attract investments in crop and vegetable processing. Large-scale development is ongoing in the buckwheat farmland in the Halh River Basin that may generate a new buckwheat milling industry.[1] The priority sectors should be further reviewed in detail, as focus is also placed on investment in the mining and iron-manufacturing sectors in the aimag strategy for industrial development.

(3) Direction of Industrial Promotion in View of Economic Corridor Development

5.10 Considering the direction of industrial promotion in view of economic corridor development, which is a major aspect of the JICA study, two strategic directions can be projected: one direction is agro-livestock development along the East-West corridor and another is mining development along the North-South corridor.

[1] Buckwheat farming is being developed, covering some thousand hectares in the Halh River Basin. Buckwheat export to Japan has been started.

1) East-West Green Development Corridor

5.11 The outputs of the agro-livestock sectors are primarily collected in Ulaanbaatar area through the East-West and then dispatched to the consumption destinations including exports to neighboring countries.

(a) **Corridor Development**

- A route from Hovd, where an Industrial Park is planned, to Erdenet, Darkhan and UB. In order to link with raw material collecting and processing sites to the corridor, feeder roads development is vital for the Agro-IT Parks;
- A route from Halh River Basin, where the large-scale farmland development is planned, to Choibalsan, Chingis (Undurkhaan), through Baganuur/Nalaikh, and UB; and
- A route from Erdenetsagaan, where the only priority location of an Agro-IT Park is designated in the Eastern region, to Chingis and linked with the abovementioned routes.

(b) **Infrastructure Development of Cities and Regions**

- Infrastructure development for industrial agglomeration in Hatgal, Tosontsengel, Erdenemandal, and Erdenetsagaan (where the priority locations of Agro-IT Parks are designated);
- Development of further coordination system (logistics) among Hutag-Undur, Jargalant, Mandal, and Bayanchandmani, where another set of priority locations of Agro-IT Parks are designated, with Industrial Parks and industrial agglomeration in Darkhan and Erdenet (development priority is to be defined corresponding to the division of processing function of sectors coordinated);
- Prioritization of strategic sectors in the regional industrial development plan as well as city development plan in Baganuur and Chingis, major cities in between Erdenetsagaan and UB; and
- Coordination of regional city development plans and regional industrial development plans.

2) North-South Industrial Growth Corridor

(a) The major stream of mining products remains through Zamiin-Uud. It may well be carefully reviewed in the feasibility of the long-planned conventional mining rail route concept from TT/OT east bound through Sainshand. There is a plan to activate a new route from TT/OT to China through Gashuunsukhait. The development plan for Sainshand should include further coordination scenario with Zamiin-Uud such as taking advantage of its logistics center function.

(b) At the border to Russia in the northern region centered in Suhbaatar is the gateway of food product imports (commercialization in FTZ is progressing) and raw wool material exports (linking with the East-West corridor). At the border to China in the southern region, Zamiin-Uud is a large gateway of workforce from China as well as imports of consumer goods and intermediate/raw materials. The FTZ in Zamiin-Uud is going to operate in 2016 where Chinese capital companies are already preparing processing sites. The corridor development should correspond to the current and prospective structure of movement of

goods and persons.

(c) Prospects for a new route from UB to Dalanzadgad should be studied (including significance of the location and function of Madalgovi, a halfway point of the route).

(4) Industrial Promotion Strategy (Recommendations by the Industry Promotion Component)

5.12 Based on the current situation and challenges of industry in Chapter 2 and the above points discussed in this section, and in line with the industrial diversification strategy, the following four strategic directions are focused on strengthening industrial promotion, which will be achieved through 7 recommended strategies:

(i) Industrial diversification through the "Sixth Industrialization" of the agriculture and animal husbandry sector:

- **Recommendation 1:** Assistance for promotion of the food processing sector where the potential competitiveness lies in the agriculture and animal husbandry resources.
- **Recommendation 2:** Promotional assistance through "agglomeration and diversification of food processing businesses" and "market price formation" through the development of Agro-IT Parks.

(ii) Industrial diversification through further development of efficient supply chains in strategic sectors (SME Promotion Strategy):

- **Recommendation 3:** Development and upgrading of the supply chain and SME promotion to serve as strategic components of the supply chain.
- **Recommendation 4:** Assistance for linkage to the global supply chain through enhancing value-added from promotion of industrial agglomeration and technology adoption.
- **Recommendation 5:** Assistance for development of products for industrial use.

(iii) Industrial diversification through development of the light industry and parts manufacturing sectors supported by local energy production for local consumption:

- **Recommendation 6:** Promotional assistance for industrial diversification through "localization" of energy production and consumption.

(iv) Industrial promotion through the revitalization of dormant industrial resources:

- **Recommendation 7:** Assistance for access to information on technologies and revitalization of dormant industrial resources.

1) Industrial Diversification through the Mongolian Version of "Sixth Industrialization"

5.13 The “Sixth Industrialization” is a concept developed in Japan to promote the creation of new businesses, employment and income opportunities in the domestic agriculture sector by combining the secondary industry (food processing) and tertiary industry (retail and services) with the primary industry (agriculture) to increase consumption of agricultural products. The term “six” comes from the sum of primary (1) + secondary (2) + tertiary (3) industries.

5.14 In the original concept, the primary industry is encouraged to take initiatives to enter into and integrate with the secondary industry. In Mongolia, however, especially for the animal husbandry (livestock) sector, it is not easy to industrialize the primary industry to the

secondary by the initiatives of the primary sector as its nomadic nature makes it difficult to start processing activities at fixed sites. A Mongolian version of the "Sixth Industrialization" has to be considered, which should focus on mutually-beneficial coordination between the primary industry (agro-livestock sectors) and secondary industry (related processing sectors) and tertiary industry (retail and services), instead of just promoting the primary to enter into secondary and tertiary but promotion from the industrial side as well. In this way, industrial diversification can be also promoted in the process of coordination.

(a) **Recommendation 1:** Assistance for promotion of the food processing sector where the potential competitiveness lies in the agriculture and animal husbandry resources.

5.15 It is vital to design and plan policy measures in the agriculture and animal husbandry (agro-livestock) related sectors to promote a Mongolian version of the "Sixth Industrialization" and extend to the promotion for linkage to the global supply chain.

5.16 The agro-livestock study component of the Study suggests potential development areas for the "Sixth Industrialization" as follows:

(i) Omega 7[2] processing from sea buckthorn and camel milk;

(ii) Extract of placenta[3] of livestock (e.g., horses, sheep);

(iii) Processed meat food products (e.g., sausages, pet food); and

(iv) Milling products development (e.g., flour, buckwheat flour).

5.17 There is already ongoing development in some of the above areas. In the sea buckthorn business, the farming business was integrated into the food processing (beverage) sector diversifying the beverage business to chemical processing. In the placenta business, the placenta collecting system has been introduced in the livestock sector, building bridges between nomadic activities and processing activities. In the flour/buckwheat milling business, there are developments from the milling side going into farmland operation, at the same time, one buckwheat farmland business is entering into the milling business.

(b) **Recommendation 2:** Promotional assistance through "agglomeration and diversification of food processing businesses" and "market price formation" through the development of Agro-IT Parks.

5.18 The agglomeration of various agro-related processing sectors, such as meat processing, dairy products processing, leather/wool/cashmere processing, and vegetable processing, aims to increase the economic benefits of efficiency in the undertaking of the Agro-IT Park[4]. It is important to consider the direction of industrial diversification at this initial stage of the Agro-IT Park, which can serve as the initial foundation for a future diversified sectoral structure. Further consideration is necessary for promoting this mechanism for the initial foundation to link with the actual and wider supply chain.

5.19 In the case of livestock related primary processing, for example, there should be a variety of ways of processing such as processing for food meat, for processed meat products (sausages, pet food, etc.), or for chemically processed products (placenta extracts, etc.). In this

[2] Unsaturated fatty acid, recently often used for healthfood.
[3] Often used for healthfood and cosmetics.
[4] The project is now taken over by the National Development Agency (NDA) from the former Ministry of Industry under the new administration. Please refer to "(iii) Development under the New Administration" in the following section for status of the project.

respect, the Agro-IT Park could serve more than just as a consolidating area of agro-livestock resources but as for upgrading value-added in food/livestock processing sectors as well as manufacturing sector in general depending on how it is designed taking into consideration the potential supply chain. Concrete strategies should be considered for the direction and type of agglomeration and mechanism to link with the supply chain.

5.20 The market price formation mechanism should be integrated into the strategies for the Agro-IT Park development. In this mechanism, it is important to preserve transparency on prices (e.g., basic unit prices) of products under business transaction in the Park and exchange the information among all the Parks and make all prices open to provide market price indicators for optimal business transactions.

Agro-IT Park Development Plan

(i) Overview of Agro-IT Parks

5.21 The Agro-Techno Park Project, initiated by the Ministry of Industry, aims at the development of 40 such distribution and processing hubs throughout the country in order to increase value-added generation and job creation in rural areas. The Parliament has approved the project in June 2015. At present, the Ministry is undertaking the priority projects at eight locations in advance. Moreover, additional 10 soums are selected as locations for Agro-IT Parks in April 2016 as shown in Figure 5.1.1 below.

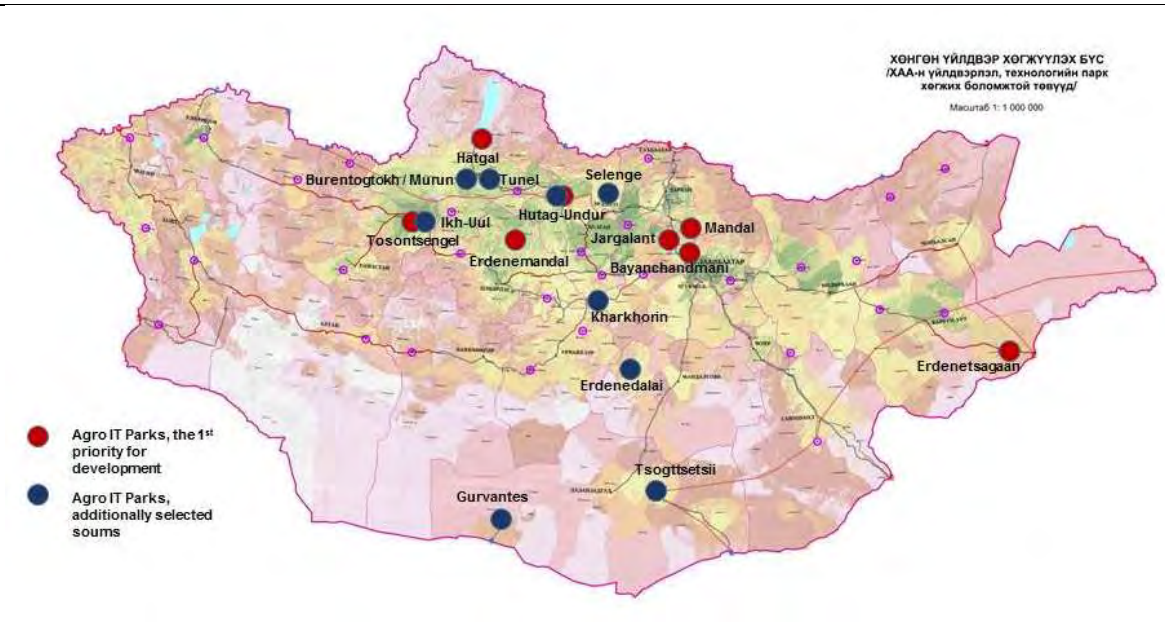
5.22 The ultimate development of Agro-Techno Parks envisages four sets of meat/leather processing, agro-processing, greenhouse and dairy products, as well as administrative and R&D centers. Instead of investing in the full-fledged facilities, it is more prudent to engage in phased development according to the development of corresponding markets in order to minimize risks. Based on interviews with the concerned officials from soums and the ministry, they, too, have the phase-wise development strategy as follows:

(a) **Phase 1:** Collection and shipping to attain market access;

(b) **Phase 2:** Simple processing; and

(c) **Phase 3:** Value-added processing.

5.23 For example, in Phase 1, the main target is the establishment of a trading post for products from nomads. In the case of cashmere and wool products, Phase 1 should offer aggregation, cleaning, packaging and transportation. In the case of meat processing, it should offer final fattening and slaughtering as well as the collection of leather as by-products. Phase 2 adds value to Phase 1. In the case of cashmere, the process should start washing wool and producing insulation materials from wool and meat processing should add shipment timing adjustment by adding storage capacities either live or as meat in cold storage. Phase 3 aims at producing final products such as apparel products for cashmere and wool, leather products, or as processed meat products like ham, sausages, and canned foods. Actual implementation needs to be based on more elaborate evaluation of markets and is left to the decision of each investor. At the same time, close collaboration between farmers and investors are critical.



Source: JICA Study Team.

Figure 5.1.1 Eight Priority Locations of Agro-Techno Parks

(ii) **Conceptual Plan for Agro-Techno Parks Proposal**

5.24 The conceptual plan (see Table 5.1.1) proposed by the Ministry of Industry for the parks is a pragmatic proposition, covering the four basic sectors of meat/leather processing, agro-product processing, greenhouse, and dairy products as well as administration/HRD. The general design reflects the economic composition of the country. However, the actual feasibility rests on the market viability and supply system of each location, development strategies as well as entrepreneurship of participating investors.

5.25 As a general guideline, the first step is to establish distribution functions firmly and plan for the second step onward after examining the market responses. In addition to the physical development of facilities, it is important to establish the information collection function. One of the key functions in reinforcing distribution is storage. Storage is necessary not only to maintain product quality but also to ship products when best prices are available, in other words adjusting to the demand and supply situation in the target markets. The primary role of the Agro-Techno Park is to enhance values for local production. As discussed in the Livestock section of this report, the biggest threat to Mongolia's livestock sector is the dzud, which can decimate the cattle stock in regions. The pragmatic ways to prevent these damages are to slaughter and ship animal products prior to the dzuds, provide shelter and rancho-style winter-feeding ground as practiced during the socialist regime. The meat slaughtered during winter can be frozen and stored under natural conditions. However, during summer, it is necessary to store them under controlled temperature.

5.26 In terms of infrastructure development, the emphasis during Phase 1 is improvement of market access. Especially for Agro-techno Parks distant from national road networks, access should be improved in terms of travel time by improving the damaged, rough sections, and providing proper drainage to protect feeder roads. In Phase 2, higher specification roads should be developed to correspond to increased volume of shipments. In Phase 3, the Agro-techno Park should add utility capacities to provide for more sophisticated

manufacturing activities to offer energy efficiency and environmental compliance.

Table 5.1.1 Conceptual Plan of Agro-IT Parks (Draft)

Phase	Functions	Infrastructure Development
Phase 1 Distribution Reinforcement Phase	Market data collection, meat processing, storage of meat and meat products	Improvement of weak linkage of feeder roads, power distribution line connections, heat line connections
Phase 2 Simple Processing Phase	Increasing of values for products with comparative advantage by simple processing	Wastewater recycling, establishment of feeder roads
Phase 3 Value-Added Processing Phase	Product differentiation	Biomass/solid waste + coal combined power and heat generation

Source: JICA Study Team.

(iii) **Development Under the New Administration**

5.27 As of October 2016, the project was taken over by the National Development Agency (NDA) from the former Ministry of Industry. The project was listed as one of the 29 National Investment Projects (the so-called "Mega-Projects[5]") under the NDA's initiative. The approach for the establishment of Parks has been strategically improved by shifting from concession approach to the initial conventional plan wherein the government shall provide the initial basic infrastructure of the Parks. The additional public budget shall be allocated in addition to the Regional Development Fund utilizable for the project (MNT50mil. Scale)[6].

5.28 Currently, the regional initiatives are developing in some of the aimags, including Erdenemandal, Hutug-Undur, and Bayanchandomani. The initiatives are taken by various entities such as soum/aimag centers, and/or NGOs of consortium of public and private sectors. With this development, NDA is considering making priority/strategic aimag regions for further promotion. NDA is also interested in a further detailed study and development of plans, planning for management, effective utilization of Japanese techniques and models, and cooperation with Japanese firms. They are requesting for possible comprehensive technical assistance in this regard.

5.29 According to the NDA's Mega-Projects list, the Agro-IT Park Project (a total of 40 sites) was estimated to cost USD300 million.

2) Industrial Diversification through Further Development of Efficient Supply Chains in Strategic Sectors (SME Promotion Strategy)

5.30 Based on the variety of assistance from international development partners for over 25 years[7] and together with its own efforts, the wool/cashmere sector has developed steadily. However, it is not yet fully utilizing the potential comparative advantage in the wool and cashmere related sectors, including the leather related sector. It is expected to increase

[5] According to the provisions of the Investment Law and the regulation establishing the NDA, the national investment projects scaled over USD15 million are subject to the PIP listing. Among them, the projects of over USD25 million scale are called "Mega-Projects" and NDA shall take the initiative for managing them. Currently, there are 29 Mega-Projects listed including the TT and OT Projects.

[6] The budget was allocated from the Sustainable Livelihood Project of the World Bank. (Phases II and III)

[7] For example, various assistance has been provided (starting with GOBI company) by the Japanese government since 1997. USAID has provided assistance related to the supply chain in 2005–2007.

recognition of Mongolia as the second ranked in the world for cashmere production and that the wool/cashmere/leather sectors could further contribute to industrial diversification of the Mongolian economy aside from the mining sector. In order to do so, further development of value-added and quality products is essential through enhancing productivity and stemming the drain of raw wool/cashmere/leather to neighboring countries without adding value. Effective coordination and collaboration should be realized in the sector as a whole. The initiatives of the leading large-scale companies in the sector are important and should be promoted.

(a) **Recommendation 3:** Development and upgrading of the supply chain and SME promotion to serve as strategic components of the supply chain.

5.31 The strategies should be developed for enhancing productivity through effective division of each production process in the supply chain (see Figure 5.1.2).

5.32 It is assumed that there are approximately 5,000–8,000 tons of raw cashmere wool produced annually in Mongolia, 60% of which is exported (procured by the brokers) mainly to China. There are about 90 companies in the sector, and 15 of them have a full range manufacturing line from the collection and cleaning process of raw cashmere wool to the finishing process of the final products (garments), about 20 companies have capacities for spinning, and about 50 are for knitting. It was reported that production capacity of the sector is not adequate to respond to the requirements of the foreign capital garment manufacturers, and level of quality did not meet the requirements of those manufacturers. The outflow of raw materials without adding value can be considered as economic loss of potentially competitive industrial resources.

5.33 It is vital for the wool/cashmere/leather sector to upgrade the quality of its products and enhance its productivity. Standardization of quality and technology is another significant objective for the development of the sector through the initiatives of the large-scale companies that can cover full-scale processing stages. Based on the foundation of this initiative, the SMEs should be promoted to take part in certain components of the processing stages (division of production process[8]) in the supply chain. The relevant SME-specific support mechanism should also be considered to create economies of scale at the each stage and to link them with each other and with the large-scale supply chain for a more efficient cooperative foundation. Application and adoption of new technology and standards are essential for enhancement of productivity and upgrading of quality as part of this strategic sector.

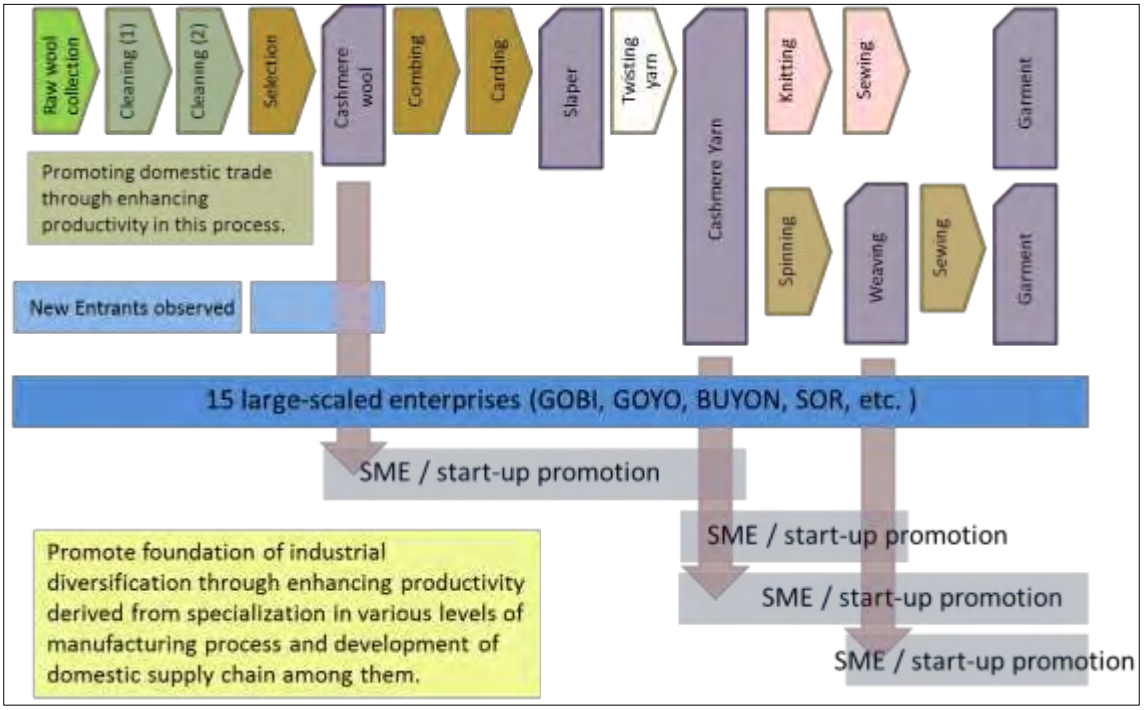
5.34 This strategy should include promotion of start-up businesses (e.g., primary processing of raw wool/cashmere materials[9]) and, in order to contribute to industrial diversification, promotion of product development of final products not limited to garments (e.g., woolen heat insulation materials[10]). JICA is considering introducing special assistance in

[8] In the case of Taiwan, the IC sector was developed through effective coordination and collaboration of small and medium manufacturers. While individual manufacturers could not meet the requirements of foreign capital companies for large quantity and high quality orders, the industry side organized the collaboration foundation in the sector preserving the standards of high quality. In the case of Mongolia, "IC" can be read "wool/cashmere/leather" where its national comparative advantage lies.

[9] New entrants from other sectors are relatively likely in this production process. Some cases are already developing; however, the new entrants are out of the conventional supply chain that domestic sectors are involved and, thus, their products are exported to neighboring countries without adding higher value.

[10] Related to Recommendation 5 (Product development in the wool/cashmere/leather sector in addition to garment products, especially for industrial use products).

Phase III (under preparation process) of its Two-Step Loan Program for SMEs by including a special loan condition on Japanese technology adoption, which can also be a good vehicle for the promotional strategy.



Source: JICA Study Team.

Figure 5.1.2 Conceptual Development Overview of the Cashmere and Wool Sector

(b) **Recommendation 4:** Assistance for linkage to the global supply chain through enhancing value-added from promotion of industrial agglomeration and technology adoption.

5.35 The assistance measures should be designed according to how efficient the industrial agglomeration could be developed at the initial stage of the clustering approach for SME promotion. An effective way of promoting linkages with large-scale enterprises and the global supply chain is triggered by technology adoption. To promote technology transfer from multinational enterprises, it is essential to promote industrial agglomeration of certain "sectors (industries)" and/or individual "companies" to be recognized for the cooperation with the larger supply chain side. Industrial agglomeration does not only contribute to enhancement of efficiency but also increases the recognition of the potential investing parties to be linked with. The clustering approach and industrial zone measures (such as Industrial Parks, Agro-IT Parks) can provide the initial basis of recognition through industrial agglomeration.

5.36 Currently, the issues related to limited human resources are quite significant in the wool/cashmere sector in Mongolia. In particular, "experienced operators" are among their immediate needs. They are very much in need of the experienced craftsmanship skills (technologies) but hardly able to train personnel in-house in a short time. They expect foreign investment and assistance from the developing partners in this technology area. Linkage with foreign capital companies with technology is a realistic way to share the required skills and technology. Some large-scale companies in Mongolia, under their own initiatives, have already adopted the required technology to train internally or employ human resources with skills through linkage (technical cooperation) with foreign capital companies. This, however, is difficult for SMEs to do with their limited capital and information resources. Thus, it is

expected that the supporting assistance scheme should be designed to promote this aspect of the sector.

5.37 With regard to the direct supporting scheme for technology, there should be certain technical assistance programs in specific technology areas and/or arrangements to assist in training programs for human resource development. Some of the assistance schemes for investors are already in place such as EGP (Enterprise Growth Programme[11]) provided by EBRD and the information exchange schemes for technology and human resources by various trade promotion organizations. For the near future, there should be further advanced and comprehensive schemes to support the linkage with the global supply chain. In this respect, the CAVAC[12] program by AusAID in Cambodia can be referred. The program provides a package of value chain development through support of business matching, technology cooperation and assistance, business consulting, and special financing in private agro-industry sector.

5.38 At JICA, the Two-Step Loan Program for SME promotion (Phase III) is now considering a new loan condition for adoption of Japanese technology. Further arrangement should be considered in detail to promote technological cooperation between the Mongolian business community and the Japanese through, for example, the undertaking of activities at the Japan Center to enhance business communication functions including business matching.

(c) **Recommendation 5:** Assistance for development of products for industrial use.

5.39 As observed in the recent development of manufacturing thermal insulators made of sheep wool as construction material (rather than apparel or consumer goods), it is high time to provide relevant policy measures to assist in further development of products to be utilized as inputs for other industrial goods. Business development opportunities are observed for prospective product lines such as leather covers for steering wheels and seats and interior panel and woolen heat insulating materials for automobiles. It is also significant to pursue this strategy in the context of the needs of the Japanese industries which could serve as a breakthrough for new markets especially at the initial stage of the launch of Mongolia's Economic Partnership Agreement (EPA) with Japan.

3) Industrial Diversification through Development of the Light Industry and Parts Manufacturing Sectors Supported by Local Energy Production for Local Consumption

(a) **Recommendation 6:** Promotional assistance for industrial diversification through "localization" of energy production and consumption.

5.40 As an energy importing country, it is a strategic consideration for Mongolia to promote the “localization” of energy production and consumption (“local production for local consumption”) through efficient utilization of existing mining resources, such as coal-bed methane (CBM/UCM) development utilizing coals. In CBM/UCM undertakings, there are often cases that the transportation cost may be bottlenecks for development and economic performance is always compared with petroleum price. Thus, if this is utilized for “localization” objectives, it should be a feasible strategy to apply.

[11] The former TAM (Turn Around Management) Programme, which is a special financial arrangement to adopt technology from the advanced country.
[12] CAVAC: Cambodia Agriculture Value Chain Programme.

5.41 Integration of this undertaking with industrial promotion is another important aspect. In the mid to long term, the comprehensive regional development plan should be considered in the context of the efficient use of energy and heating system for local industrial development purposes such as development of vegetable processing factories, attraction of the commercial sector, and light industry promotion for the local market. This could be another way to diversify and promote industry in relation with regional development after the conventional development of the "mining castle town" such as that of Erdenet.

4) Industrial Promotion through the Revitalization of Dormant Industrial Resources

(a) **Recommendation 7:** Assistance for access to information on technologies and revitalization of dormant industrial resources.

5.42 Not limited to the strategic priority sectors, the following aspects should be the focus of further assistance policy measures to form the foundation of industrial development: access to information on technologies, strategic promotion of public financial assistance measures (including measures for CAPEX for renewal of facilities, increase of company scale), identification of potential industrial resources and mechanism for them to be utilized in the context of investment policy, and domestic and international market development. Further detailed study on these issues is suggested for the actual implementation of measures. These are to provide the foundation to consolidate relevant information for industrial development.

5.43 Other issues needing the most urgent consideration for action should include the utilization of government-run institutions of research, development and testing, and the revitalization and promotion of dormant large-scale factory facilities which were formerly built under the socialist regime but are now run by the private sector.

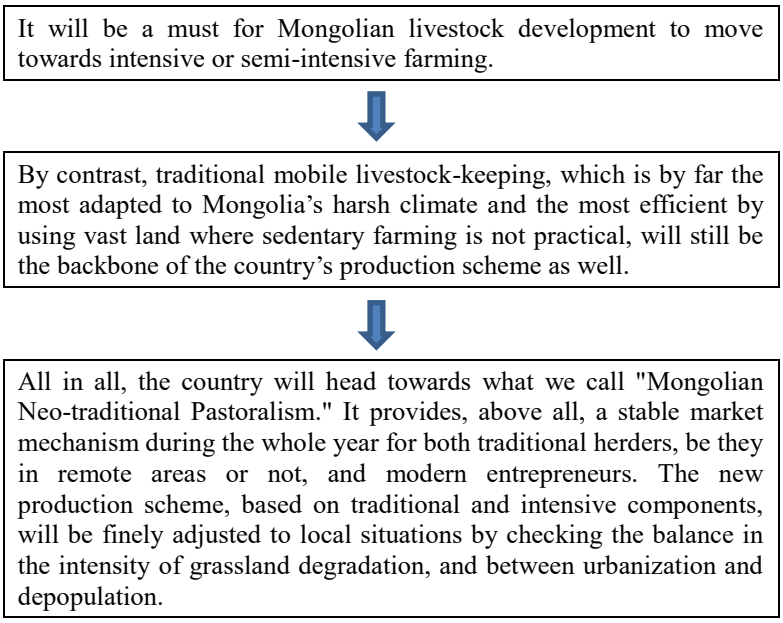
5.44 There are 23 government-run institutions that can be utilized by the private sector. Their functions are to conduct research and development to provide necessary technologies for industry and to test and assess for regulatory conformity with technical requirements and standards. Some of the institutions are providing incubator facilities and consulting services. Unfortunately, the information on their functions and activities are not often widely disseminated and not many private sector stakeholders are taking advantage of their services. Also, some of the facilities are outdated and require improvement. Together with the dormant factories mentioned above, there should be effective measures to utilize these facilities as resources for industrial development. In this respect, measures for revitalization and improvement of these facilities should be considered.

5.2 Promotion of Agriculture and Livestock Farming

(1) Strategies for "Healthy Livestock"

5.45 To address the three challenges of the livestock industry discussed in Chapter 2.5, namely (i) degradation of grasslands, (ii) ever-worsening dzud, and (iii) negligence of epidemic and plague control, especially foot-and-mouth disease, the Study has formulated the following strategies.

5.46 Figure 5.2.1 presents a conceptual framework on which all the discussions and recommendations for the future livestock development in Mongolia are based. This is a general consensus reached among the Mongolian and Japanese members of the survey's panel discussion held on June 18, 2015 in Ulaanbaatar.[13]



Source: JICA Study Team.

Figure 5.2.1 Conceptual Framework for Livestock Development

5.47 It should be noted that "intensive farming" and "traditional pastoralism," which may appear mutually exclusive, are not a contradiction of terms but both can be true in the same context, and this "Neo-traditional Pastoralism" is the most striking feature of this newly proposed Mongolian scheme. The point is that the scheme does not intend for individual herders to be modernized but encourages them to be part of the integrated and synergistic production cycle which would be established at national or local levels.

5.48 For instance, a small enterprise being run by a Canadian owner in Bulgan may give a prototypical idea for the integrated scheme. The owner, a sedentary livestock farmer, fattens beef cattle by giving grain feeds for a period of six to ten months before slaughter. Then he sells them to some contracted restaurants or meat shops in Ulaanbaatar at two to three times higher than the normal price range. Nevertheless, he buys the cattle from common local herders. Thus, in this production cycle, the owner's semi-intensive method which gives herders stable market opportunities, and the herders' traditionalism which brings the owner stable supplies of healthy grass-fed young cattle, are ideally interdependent.

[13] As to the Expert Panel, please refer to Section 8 in Part II of the report.

5.49 The survey team also distributed questionnaires to various institutions that were visited on the necessary factors for ideal development of the livestock industry. Interestingly, the results clearly showed that the great majority of the components belonging to the former systems run by the negdel, such as systematization, freight and storage, and trade promotion, are desired by the present institutions (see Table 5.2.1).

Table 5.2.1 Desired Factors for Livestock Development[14]

Institutions	Intensive Farming	Freight & Storage	Systematization	Ger Organization	Trade Promotion	Genetic Improvement	Fodder Production	TechnologyTransfer
Governmental Agencies	X	X		X	X	X	X	X
Research Institutions	X					X	X	
Cooperatives	X	X						X
Mongolian Meat Association	X	X	X	X	X	X	X	
Mongolian Wool Association		X	X	X	X	X		
Leather Association		X	X	X	X	X		
Zootechnit.	X	X	X		X	X		
Mongolian Dairy Science Research Association	X	X	X					
Meat Packers	X	X	X		X	X		
Dairy Plants	X	X	X	X	X	X	X	X
Herders		X					X	X

Note: Zootechnit.- Mongolian Association of Zootechnicians and Livestock Breeders.
Source: MONDEP.

5.50 Another point which should be considered carefully in formulating strategies is that, as mentioned in ***Appendix 2.6.1***, habitual approaches such as pasture regulation, land privatization, and policies of sedentarization, have never been successful in Mongolia. Thus, based on this idea, the following are all defined.

1) Plan for a Healthy and Strong Market

5.51 As mentioned earlier, the plan's goal is to establish stable markets which backbone is based on both intensive farming and traditional herding.

(a) **Agro-IT Park**

5.52 This strategy, which is conceptually the same as the one mentioned in Section 5.1 (4), would be a powerful tool for mitigating the three major problems. It is based on an industrial complex with a number of different kinds of production lines in various regions. A park which is most appropriate to future mobile livestock-keeping should provide a highly efficient production system including an export facility such as reduction of trade barriers. Its main features are as follows:

(i) **Integrated Crop-Livestock Farming:** In Agro-IT Parks, crop-livestock farming especially wheat and oats as well as cattle and sheep is practised in an integrated cycle. Particular emphasis is placed on a holistic management approach looking at the whole zone as a cross-linked unit and on nutrient cycles which are balanced and adapted to the

[14] Based on the factors of interest, on which the representatives of the aforementioned institutions laid emphasis, we put "X" in the corresponding cells. Thus, a cell without "X" does not mean no interest at all.

demand of the crops and animals. Also important is that all the youngstock will be brought from traditional local herders, especially from those who work together forming a well-institutionalized community group.

(ii) **All-in-One Type Plant:** It handles a set of sequential operations such as the fattening, slaughtering, processing, and packaging for livestock as well as planting, harvesting, and processing for crop in parallel with logistics such as storing and distribution, as in the case of a highly sophisticated production line of a large factory.

(iii) **Specific Disease-Free Zone, Especially from Foot-and-Mouth Disease:** Also important is that the facility will be a specific disease-free zone, especially from foot-and-mouth disease, thereby enabling it to export its products. In this regard, the veterinary cordon fence of Namibia could be a case in point. Namibia, a country in southwest Africa in which foot-and-mouth disease is sporadically endemic, established a foot-and-mouth disease-free zone by setting up a series of wooden fortifications along an east-to-west line measuring around 1,200 km long and 2 m high. Additionally, all the youngstock coming from herders will be subject to quarantine. Lastly, it should be mentioned that this idea is much the same as the concept of the Foot-and-Mouth Disease Buffer Zones proposed by Mongolia, China and Russia at a technical conference held in Ulaanbaatar recently (see ***Appendix 2.6.1***[15]).

5.53 The Agro-IT Park should be established strategically in various parts of the country. In this context, the most densely populated livestock areas, namely, as already mentioned, regions situated at the East-West Green Development Corridor, and along the North-South Industrial Growth Corridor should be given priority so a great majority of herders could participate in the production cycle offered by the zones.

(b) **Agro-Techno-Renaissance**

5.54 As indicated in the title, this plan's basis is the technical rediscovery of the system controlled by former socialist institutions, especially the negdel. In fact, almost all the people interviewed including representatives of the institutions visited, professionals and herders appreciated the technical and logistical facilities of the negdel. Among others, two of the major projects which should be restored in the Mongolian livestock industry are the following:

(i) **Dairy Farming:** As shown in the section 2.6 and Appendix 5.2.1,[16] dairy farming was one of the most vital activities in the negdel. Although the number of dairy farmers has increased recently, the milk self-sufficiency rate is still low in Mongolia, making it highly dependent on imported milk and dairy products. Besides, productivity of the national herd for milk is very poor. Thus, it is urgent to re-establish hardy and efficient dairy farming in Mongolia by improving the general management and introducing genetically upgraded breeds.

5.55 Another point to consider carefully in promoting dairy farming is that it is impossible for traditional herders to participate in the modern dairy farming scheme as such. Since the dairy product, milk, should be collected on a daily basis all year round, it is not realistic for common herders to be part of the production cycle. Thus, the case of Mont Fresh Company,[17] a half-traditional and half-modern type of practice in which the

[15] Please refer to the section: *Animal health control and border inspection* of Appendix 2.6.1.

[16] Please refer to the section: *Commercial dairy farming* of Appendix 5.2.1.

[17] Please refer to the section: *Commercial dairy farming* of Appendix 5.2.1.

seasonal move is less frequent, would be ideal for herders especially those living in urban areas. Since the rapid increase of herders around larger cities is one of the most serious urbanization problems, this type of dairy scheme might be an efficient measure for mitigating it.

(ii) **Fodder Production:** As mentioned earlier, fodder production was one of the strongest tools among negdel activities. In Mongolia, since some modern farming such as pig-raising, poultry and dairy farming is on the increase, it is more than likely that on top of roughage fodder such as hay, demand for grain-based diet will be much higher in the near future. Therefore, restoring and strengthening fodder production would be indispensable.

(c) **Establishment of New Ingenious Value Chain**

5.56 This plan's basis is "matchmaking" to arrange the relationship between two parties, one in Mongolia and the other abroad, who would like to do business ideally by transforming otherwise valueless materials such as some livestock by-products into marketable goods. The following items are worthless or so cheap that no one in Mongolia finds them marketable. In Japan or some other countries, however, these are highly marketable if processed appropriately. The crucial point is who will act as a go-between to make the arrangements.

(i) **Dog Food:** As the number of sheep and goats in Mongolia is increasing so rapidly, it would be ideal if more sheep and goat by-products could be marketed. According to representatives of some Japanese pet food companies, some by-products which are virtually not in any use in Mongolia such as hooves or tendons (see Figure 5.2.2), are now becoming so popular in Japan as snack food for dogs. Furthermore, Japanese pet owners are increasingly preferring smaller dogs, thereby making sheep's or goats' hooves and tendons more suitable for pet snack than those of horses or cattle. In fact, though few, there are some small factories which have started doing this type of business by using horse by-products (see Figure 5.2.2).

Sheep Hooves (MafImpex)

Processed Horse By-Products (OFE)

Source: MONDEP.

Figure 5.2.2 Cut-off Limbs and Processed By-Products

(ii) **Placenta (Extract):** According to representatives of some placenta extract dealers or manufacturers, animal placenta is becoming increasingly popular as pharmaceutical and cosmetic products in Japan, especially among ladies, providing a market worth JPY30 billion a year. In Japan, where the use of horses' and pigs' placenta is dominant,[18] demand is currently exceeding supply, thus requiring importation from other countries such as

[18] Due to BSE, the so-called "mad cow disease," placenta derived from cattle are not used in Japan.

Vietnam and Kyrgyzstan. By contrast, in rural areas in Mongolia, placenta is thrown away after animals give birth. Thus, as long as arrangements for collection and pre-treatment of raw placenta are made appropriately,[19] there might be a business opportunity in this area.

(iii) **Wool as Building Insulation Material:** Wool, which is one of the most efficient insulators, is among the cheapest materials derived from herders. Japan, a country using a huge amount of wool insulator, buys the material mainly by importing from Australia and New Zealand at relatively high prices. According to representatives of wool dealers visited in Japan, they once had tried to import Mongolian wool but they had to reject it because of unacceptable quality. Scouring, the process of cleaning the greasy wool, was very poor. Thus, as long as the scouring technique is developed sufficiently, this might be another business opportunity.

2) Infrastructure for Sustainable Livestock Development

5.57 The previous section principally discussed business-oriented strategies with the intention of creating a mechanism in which herders could market their livestock and its products constantly. On the other hand, although they are not income generating methods on their own, there are some necessary systems or services which would be indispensable for sustainable production, such as infrastructure. The following are some of those infrastructures.

(a) Remote Control Technology Transfer Program for Herders

5.58 Although traditional livestock-keeping is encouraged, it does not mean the herders do not have to learn any modern techniques and technologies. Rather, they should be familiar with many knowledge areas, for instance, as shown in Table 5.2.2. The point here is that the program should be accessible to every herder and, considering Mongolia's development level, this should be organized still by the Government. In this context, in Mongolia, due to its vast land and a long distance between herder households, group extension activities, which is seen commonly in other countries, has long been negligible. Recently, however, in Mongolia more than 70% of herders enjoy access to broadcast media. Thus, by using the system a remote control technology transfer program can be established.

[19] According to information gathered during the survey, there are mainly two types of pre-treatment: the freeze-drying type and the extract type.

Table 5.2.2 Recommended Extension Program (Tentative)

Conventional (Livestock)		Topical (on an ad hoc basis)	
・General management:(1) Nutrition in grazing, (2) Winter preparation (fence, hay-making, site finding for camp)	・Grassland management: (1) Rotation, (2) How to judge the quality of grass, (3) Carrying capacity and over-grazing, (4) Silage, etc.	・Environmental education: (1)Climatic change and global warming, (2) Desertification in grassland in Mongolia, etc.	・Climatology and geography: (1) Precipitation, (2) Weather in winter, (3) Weather and grassland, etc.
・Animal health: (1) Vaccination program, (2) Instruction for animal pharmaceutics including withdrawal period[20], etc.	・Animal welfare: (1) Productivity and stress, (2) Density and fencing, (3) Slaughtering method and quality of product (meat and milk, etc.)	・Market information: (1) Comparison of prices between markets, (2) Trading information, etc.	・Others: any topical and useful information, for instance, agricultural practices in general, and traffic information, regional events, etc.

Source: JICA Study Team.

(b) Genetic Improvement Program (Especially for Goats and Dairy Cows)

5.59 Although the Mongolian livestock animals are well adapted to the harsh natural climate, their productivity is very low. Thus, as shown in Table 5.2.2, as a desired factor, genetic improvement would be a prudent option. In the case of goats, the breeding goal will be a trait which gives a good yield of cashmere with high quality, thus, mitigating the tendency for herders to retain many goats with genetically lower values. In this regard, since the modern genetic improvement scheme has not yet been implemented in Mongolia to date and individual traits vary greatly from animal to animal, researchers see that outcomes would be most promising and fast-acting.[21],[22]

(c) Sustainable Water Well Management Program

5.60 In Mongolia, after the breakdown of the negdel, many wells are now broken-down or not maintained, exposing herders to increased risks and consequently causing higher concentrations of animals on sites where water is available. Since water is one of the basic needs, immediate action such as a water well development program should be taken, including the establishment of a sustainable water management scheme.

5.61 The volume of renewable water available per capita in Mongolia exceeds 10,000 m^3/year, which is much higher than in other countries. In reality, however, this seemingly higher rate is due to the country's population density, which is the lowest in the world. Also, water availability is unevenly distributed in space and in time.[23] Thus, Mongolia, in general, has limited water resources. Rainwater is the only source of water. However, the average annual precipitation is as low as 220mm, of which 90% is lost to evapotranspiration mainly due to the extremely arid climate. Of the remaining 10%, 63% is surface runoff most of which flows out of the country, while 37% infiltrates into the soil. Thus, only roughly 3-4% of total precipitation becomes potentially available as a water source.[24] Furthermore, rivers and lakes

[20] Recently, even herders use vaccines or antibiotics. Nevertheless, instructions for administration such as withdrawal period are not followed, affecting food security (please refer to the section: *Animal health control in communities* of the Appendix 2.6.1).

[21] Restall, B. J. 2001. USAID cashmere breeding program evaluation, Mongolia. USAID.

[22] Nomura, K. 2009. In search of genes of Asian goats. Shin-Jitsugaku Journal 9: 3-5.

[23] Ministry of Environment and Green Development. 2013. Integrated water management plan: Mongolia.

[24] Altansukh, N. 1995.Mongolia: country report to the FAO international technical conference on plant genetic resources.FAO.

are frozen for about six months a year, preventing their general use. Consequently, dependency of both the general public and livestock on groundwater is extremely high, reaching 99%.[25] As for groundwater, its distribution and quality are not stable and detailed investigations have not been carried out so far.[26],[27]

5.62 As earlier mentioned, 80% of Mongolia's total land area is under pasture, giving pastoral farming great advantages. Taking the water supply issue into account, however, the picture would be totally different. According to Janchivdorj,[28] the most part of water resources (about 70%) is formed on only 30% of the whole territory of Mongolia. Furthermore, the main part of groundwater exploitable resources and water reserves are fossil and vulnerable.[29] Therefore, pastureland which is truly available for herding should declines markedly, all the more reason to justify the sustainable water well management program.

(d) **Foot-and-Mouth Disease Vaccine Production Facility**

5.63 A vaccination program is one of the indispensable tools for controlling the foot-and-mouth disease. In Mongolia, however, there is no vaccine production center. Consequently, the country is totally dependent on buying imported vaccines from Russia at a price of MNT1,100 (about USD0.55) per lot which is a dose for one cow or four sheep. This unit price may appear quite economical, but Mongolia has a huge number of animals and the foot-and-mouth disease virus continually evolves and mutates, thus occurring in a series of serotypes for each of which another vaccine is needed (a vaccine for one serotype will not protect against any other). Therefore, the establishment of a domestic facility for vaccine production would be ideal. Representatives of relevant institutions such as the Mongolian Veterinary Medical Association OIE delegate of the Ministry of Food and Agriculture, and the Biocombinate, the only national institute manufacturing animal vaccines in Mongolia, who were interviewed during the survey have recommended that the country should produce foot-and-mouth disease vaccine domestically.

3) Potential Tools for Small Businesses

5.64 The following livestock products were all recommended for future business development by Mongolian interviewees during the survey, pointing out that they are invariably abundant, available and inexpensive in Mongolia.

(a) **Halal Meat**

5.65 On the issue of halal meat, all the relevant institutions' representatives such as the Mongolian Meat Association, Mongolian Association of Zootechnicians and Livestock Breeders, and meat packers (MakhImpex and Makh Market) mentioned that the meat industry should go for halal meat, especially for export. Mongolia used to export sheep meat as halal to Middle Eastern countries, especially Iran, reaching more than 2,000 tons in 2010.[30] Currently, due to some bureaucratic issues such as excessive regulations, rigid conformity and prohibitive transport costs, there has been no trade at all with those countries from 2013 onwards.

[25] Ministry of Environment and Green Development. 2013.Op. cit.
[26] Kensetsugikenkenkyusyo, Kokusaikennsyukouryukyoukai, Toyo kaihatsu consultant, Kensetsugiken International. 2007. Kaihatsu tojokokuminkatsujigyoseibisienjigyoujitugenkanouseichosa.
[27] Ministry of Environment and Green Development. 2013. Op. cit.
[28] Janchivdorj, L. 2012. Ground water governance in Mongolia.International regional consultation on groundwater governance in Asia and the Pacific region.
[29] Janchivdorj, L. 2012. Op. cit.
[30] Mongolian Taxation Office.

Nevertheless, taking into consideration the rapid increase of livestock especially sheep and goats, it would be extremely important to tap foreign markets including those for halal meat. In this context, since the Muslim population in Japan is now growing to a market worth JPY54 billion a year,[31] it might be possible for Mongolia to enter the Japanese market aiming at selling Mongolian meat to Muslims there.

(b) **Leathers, Hides and Fibers**

5.66 All the representatives of the Mongolian Association of Leather Industry, the Mongolian Wool Association and the Mongolian Wool and Cashmere Association who were interviewed in the survey clearly expressed a strong interest in exporting their products. Mongolian cashmere, in particular, despite its production volume being eclipsed by China at the world level, is still at second place and remains as one of the leading export commodities of Mongolia. Nevertheless, there is still a lot of room for improvement technically as mentioned in the previous section on genetic improvement. On the other hand, other animal products are all still in their infant stage of development. Therefore, those industries should be supported technically and financially by, most probably, the government. In this regard, wool from yaks and camels (see Figure 5.2.3), which are exclusively available in some Asian regions including Mongolia, could be highly competitive as differentiated products due to their scarcity value and, consequently, higher farm-gate prices.[32]

Yak Wool

Camel Wool

Source: MONDEP (Mongolian Wool Association).

Figure 5.2.3 Wool from Yak and Camel

(c) **Bone, Blood, Fat, Ruminal and Intestinal Contents, and Feces**

5.67 These miscellaneous items from livestock, which are available in huge amounts in slaughterhouses, are not necessarily peculiar to Mongolia. Thus, it would be unlikely to utilize them for trading. Nevertheless, since many professionals at the Mongolian meat industry institutions and even the CEO of the Mongolian National Chamber of Commerce and Industry were extremely concerned with these untapped and occasionally pollutive by-products, there should be a mechanism by which these items will be used in a sustainable and hopefully profitable manner. In this context, bone for building materials,[33] blood, and ruminal and intestinal contents for fertilizers could be rewarding alternatives. Interestingly, some researchers reported that feces in powder form are efficacious in the relief of some "modern

[31] Tanaka, A. 2014.Outlook of Halal Market in Japan. Brand Research Institute, Inc.

[32] According to the Mongolian Wool Association, farm-gate prices/kg are MNT800 to 900 (about USD0.40 to 0.45) for sheep, MNT1,500 (about USD7.50) for yaks, and MNT6,000 to 7,000 (about USD3.00 to 3.50) for camels. The farm-gate price in 2015 for cashmere per kg is MNT65,000 (about USD32.00).

[33] Adam, D. 2002. Controversial animal feed builds concrete career in construction. Nature 418: 807.

day diseases" such as allergies, asthma, especially severe whooping cough, and hay fever[34],[35]. Animal fat, especially from Mongolian sheep, would also be a successful option for a niche market. The breeds of sheep commonly seen in Mongolia are different from the ones in Japan which is the merino breed. Mongolian sheep, called fat-tailed sheep or fat-rumped sheep (see Figure 5.2.4), are known for their distinctive fat-storing large tails and hindquarters, and this tail fat has long been used by herders for cookery, sweets, and soaps. According to a recent study, the fat from these sheep has been reported to have anti-atherosclerotic effects.[36] Thus, it might be another business opportunity in Japan where healthy dieting or fitness foods are becoming increasingly popular recently.

Fat-Tailed Sheep in Grassland

Skinned Fat-Tailed Sheep

Source: MONDEP.

Figure 5.2.4 Tail Fat of Mongolian Sheep

(d) **Casein**

5.68 Casein is one of the proteins commonly found in mammalian milk, being a major component of cheese or yogurt. It is also used as paint, especially for glamour magazines or scenery paintings. Dialogues with some resident officers of Japanese trading companies in Ulaanbaatar revealed that Japan, where there is a high demand for paint casein, cannot meet such demand because the domestically produced casein is just enough for dietary use. Consequently, Japan has to import casein from other countries such as Australia, New Zealand, the Netherlands, and France. They mentioned that the transport costs are so prohibitive (USD7,000 to 10,000/ton) that Mongolia was considered as one of the alternative sources. However, the qualities of Mongolian casein such as color, consistency and variance between individuals were not acceptable to the Japanese market. Therefore, it is possible to develop this product for future business if Mongolia could improve its milk quality through the national herd improvement as recommended earlier.

(e) **Dairy Products, Especially from Yaks and Camels**

5.69 During the interviews, the president of the Mongolian Dairy Science Research Association, who was one of the leading members of the project on "Increasing the Supply of Dairy Products in Mongolia by Reducing Post-Harvest Losses and Re-stocking" conducted by the Mongolian and Japanese governments and the FAO, gave special importance to the quality of the Mongolian dairy herd. She described milk from the Mongolian grassland as "a gift from nature, all free from contaminants that's why it should be justly marketable, especially milk

[34] May, S., Romberger, D. R., and Poole, J. A. 2012.Respiratory Health Effects of Large Animal Farming Environment. J Toxicol EnvironHealth B Crit Rev 15: 524–541.

[35] Schuijs, M. J., Willart, M. A., Vergote,K., Gras, D., Deswarte, K., Ege, M. J., Madeira, F. B., Beyaert, R., Loo, G., Bracher, F., Mutius, E., Chanez, P., Lambrecht, B. N., and Hammad. H. 2015.Farm dust and endotoxin protect against allergy through A20 induction in lung epithelial cells. Science 349: 1106-1110.

[36] Tsunoda.2010. Sheep In World history in terms of animal genetic improvement, Shoda (ed.),Yusyokan. Tokyo.

from yaks and camels due to its scarcity value." As for price differences among dairy animals in Mongolia, she said that during summer, the average farm-gate price per liter is MNT400 (about USD0.20) for cow milk, MNT600 (USD30.00) for goat milk, MNT700 (USD0.35) for yak milk, and MNT2,000 (USD1.00) for camel milk. In winter, however, the prices more than double due to scarcity.

(f) **Domestic Animals Other than the Five Major Species (Horses, Cattle, Sheep, Goats, and Camels)**

5.70 The market share of domestic animals other than the five major animals, such as pigs and poultry or so-called "household animals" in Mongolia, are still negligible. Nevertheless, there is an increased demand for products such as pork, chicken and eggs these days, especially in large cities. In fact, although still quite a few, some factory-type farms for chicken-raising and pig-raising are booming in the surrounding areas of Ulaanbaatar (see Figure 5.2.5). In terms of livestock products from those "household animals," Mongolia has been highly dependent on imports. Therefore, it would be ideal to develop this type of intensive farming, especially in the environs of a large city. Also important is to explore possibilities for integrating these intensive enterprises with the aforementioned special economic zone since both of them have a lot in common.

5.71 One other point which should be added to this new type of livestock enterprise is the fact that there is a sign of development in small-scale livestock-keeping in urban areas. For instance, in Choibalsan, the capital city of Dornod aimag and the fourth-largest city in Mongolia, smallholdings of livestock-keeping such as a few pigs or quails are becoming common (see Figure 5.2.5). Since this type of livestock-keeping method should be managed only by the sedentary, it would be viable and important for herders in transition facing urbanization problems.

High-Tech Mega Poultry Farm

Modern Pig-Raising Farm

Small-Scale Pig-Raising

Quail Eggs

Source: MONDEP.

Figure 5.2.5 Relevant Livestock Models

(2) Agriculture and Processing

5.72 It is proposed to formulate a new Mongolian style food value chain and to carry out

the following specific industrial promotion activities (see Figure 5.2.6):

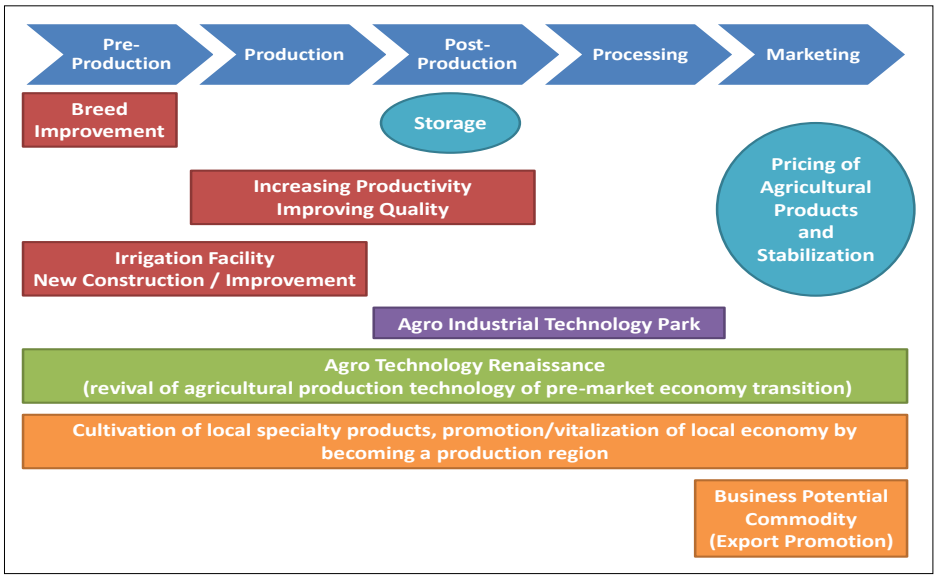
(i) High quality seeds production and distribution;

(ii) Increasing productivity/improving quality;

(iii) Promotion of irrigation facility provision;

(iv) Agro-Technology Renaissance (revival of agricultural production technology of pre-market economy transition); and

(v) Promotion of agribusiness (export-oriented): Cultivation of local specialty products, promotion/vitalization of local economy by becoming a production region.



Source: JICA Study Team.

Figure 5.2.6 Formulation of New Mongolian Style Food Value Chain

1) High Quality Seeds Production and Distribution

5.73 Because of the damage from a drought in 2015, when rainfall in the May-July period was extremely small, the height of plants was about a half of usual years and it was so dry that the number of real crops was also very low (see Figure 5.2.7). The forecast crop yields is as low as 265,000 tons for the crop acreage of 389,300 ha, a 46% decline compared with the previous year. Due to this domestic supply shortage, the plan is to import 100,000 tons of flour from Russia, which is equivalent to 30% of the domestic consumption volume. This points to a need to rethink and reconsider the use of imported seeds that are unsuitable for the climate of Mongolia.

5.74 There is a need to implement the development/propagation of domestic superior wheat varieties that are suited to the climate of Mongolia, endeavor to introduce selected superior varieties, and formulate a system to distribute them to agricultural producers.

Source: JICA Study Team.

Figure 5.2.7 Wheat Cultivation Field (2015)

2) Increasing Productivity / Improving Quality (Wheat and Vegetables)

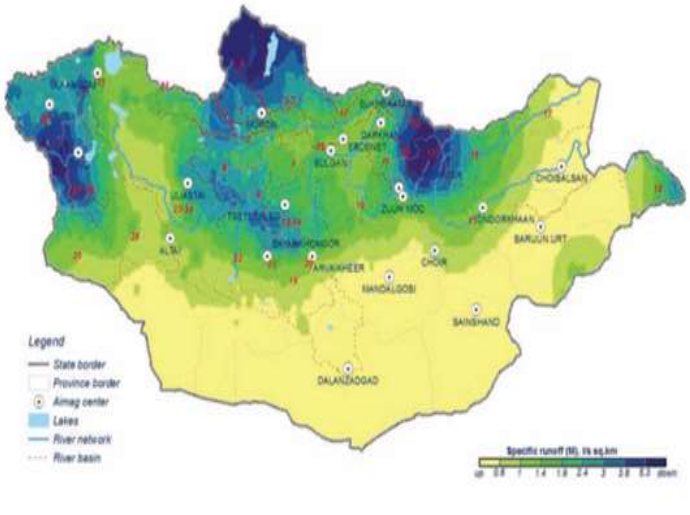
5.75 Since wheat cultivation is an extensive production system, it is necessary to improve cultivation management technology and to increase productivity/quality from effective utilization of water resources.

5.76 With vegetable production, there is a need to spread cultivation related facilities and cultivation technologies to increase productivity and improve quality.

3) Promotion of Irrigation Facility Provision

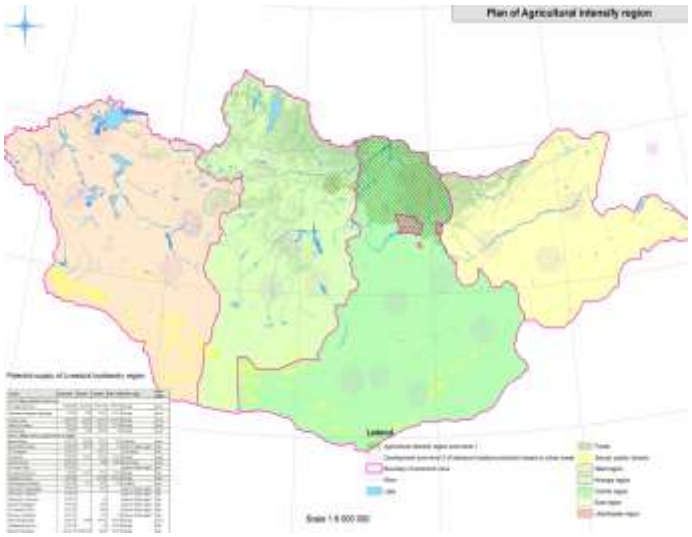
5.77 In the current situation, the agricultural land area utilizable for irrigation inside the country is about 52,000 ha, but there is an urgent need to respond to the extremely low rainfall and the damages from the drought of 2015.

5.78 The country is implementing a national "water" program since 2010 as the irrigation policy, which is carrying out the promotion for expanding the farmland area utilizable for irrigation. Targeting 80,000 ha in 2016 and 100,000 ha in 2020 for irrigation, the development of irrigation facilities will take into account the irrigation promotion land plan and the agriculture promotion land plan of the country (see Figures 5.2.8 and 5.2.9).



Source: "Strengthening Integrated Water Resources Management in Mongolia" 2012.

Figure 5.2.8 Discharge Diagram

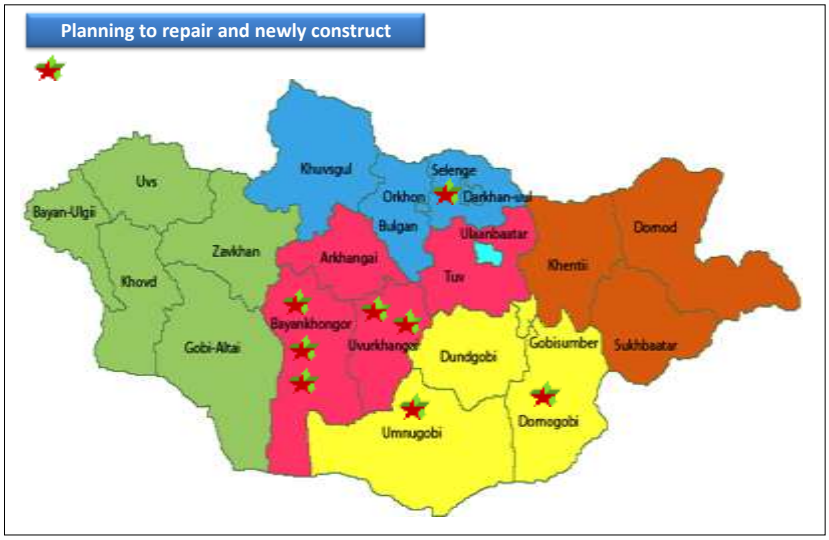


Source: ALAGaC.

Figure 5.2.9 Plan of Agricultural Intensification Region

5.79 The above figures show the flow rates and the agriculture promotion land plan areas, but it can be seen that the agricultural land capable of confirming the flow rate has been selected for the promotion plan area.

5.80 While taking into account the agriculture promotion plan land that has been selected in the country, Figure 5.2.10 shows the candidate sites for promoting the irrigation facility development and areas planning to repair and newly construct irrigation facilities.

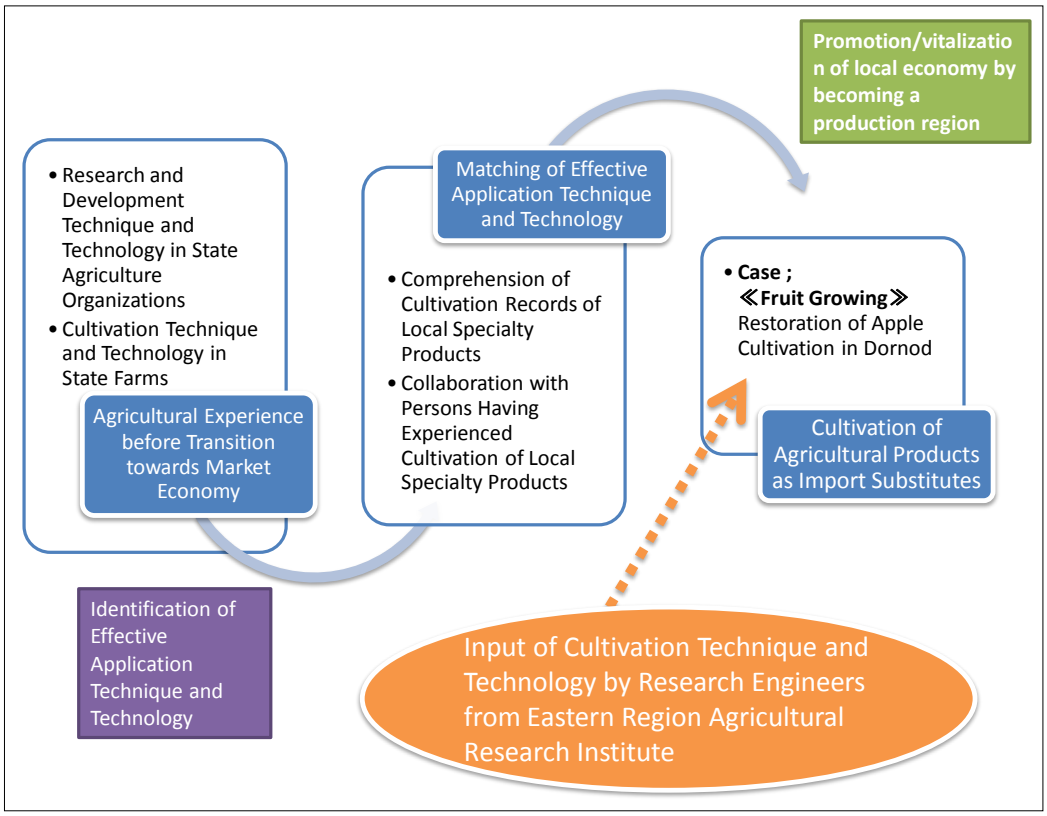


Source: JICA Study Team.

Figure 5.2.10 Areas Planning to Repair and Newly Construct Irrigation Facilities

4) Agro-Technology Renaissance (Revival of Agricultural Production Technology of Pre-Market Economy Transition)

5.81 Under this concept (see Figure 5.2.11), it is important to examine closely the useful technologies that had been lost since shifting to the market economy, match them with cultivation technologies for local specialty goods that cater to regional characteristics, and utilize those useful technologies.



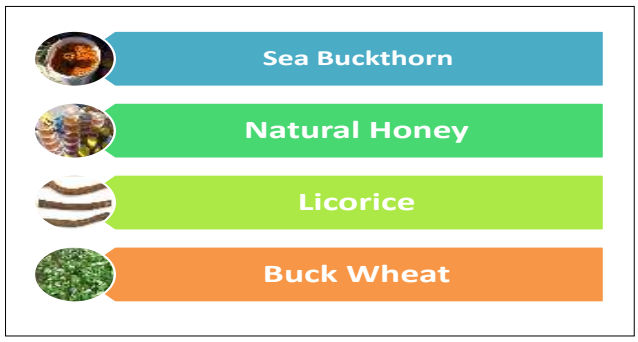
Source: JICA Study Team.

Figure 5.2.11 Concept of Agro-Technology Renaissance

5) Promotion of Agribusiness (Export-Oriented): Cultivation of Local Specialty Products, Promotion/Vitalization of Local Economy by Becoming a Production Region

5.82 Among local specialty goods with high business potential are sea buckthorn, natural honey, licorice and buckwheat (see Figure 5.2.12).

5.83 In particular, sea buckthorn and natural honey are items subject to tariff elimination or tariff quota since the conclusion of the EPA between Japan and Mongolia in 2015, so they have high potentials as export-oriented goods inasmuch as domestic demand for such products has been fulfilled.



Source: JICA Study Team.

Figure 5.2.12 Commodities with High Business Potential

(a) **Sea Buckthorn:** This is naturally grown and produced in Uvs and Selenge and is considered to have high quality.

(b) **Natural Honey:** Selenge and Tov have high honey collection volume, so it is desirable to build up brands there.

(c) **Licorice:** At Bayanhongor, naturally grown licorice can be gathered. Going forward, along with consideration of cultivation, there is a plan to make this into a source of income as a local specialty product.

(d) **Buckwheat:** At Domogobi, the Agriculture Bureau of Shizuoka Prefecture Economy and Industry Department from Japan is giving guidance on cultivation methods. In addition, Domod has started cultivation of approximately 5,000 ha for buckwheat from 2015 and is considering exporting to Japan. The domestic production volume of buckwheat in Japan is 33,000 tons with an import volume of 95,000 tons and a domestic consumer destination volume of 141,000 tons. The self-sufficiency rate in 2013 was 23%. The main importers are China (80%), America (7%) and Canada (3%). With high dependency on China, the supply is heavily dependent on one single country. With exclusive reliance on a few countries, such a buckwheat supply system poses significant risks in meeting the domestic demand. Mongolia is anticipated as a new importer and distributor.

(3) Improvement and Standardization of the Distribution System for Agricultural Products

5.84 During the socialist era, agriculture and livestock farming has been maintained by a stable market and the security of life under the planned economy. However, in the transition to a market economy that resulted in the dismantling of collective farms, privatization of livestock, and loss of a stable market of COMECON, the poverty rate has increased in the rural areas where agriculture and livestock farming is the major industry .

5.85 To increase the income of small-scale agricultural and livestock producers, it is necessary to have organizations that will collect certain amounts of products and ship them.

1) Formation of the Agriculture and Livestock Products (Perishable Food) Market

5.86 There is a need to introduce the market (auction) system wherein fair deals/transactions are carried out through cooperative shipping, instead of the current system where shipment of the products is mainly done through individual negotiations with middlemen. This aims to stabilize the supply and prices of perishable goods by optimizing trading and facilitating the production and distribution of perishable foodstuffs.

(a) Market Functions

5.87 Following are the required market functions of an effective distribution system:

- **Collection, Repacking for Distribution, and Logistics Function:** To repack products that wholesalers pick up from all over the country through intermediate wholesalers and distribute products appropriately to retailers;
- **Price Formulation Function:** To formulate appropriate prices with high transparency based on rapid and fair evaluation reflecting demand and supply followed by competition principally through auctions conducted by wholesalers and where many buyers participate;
- **Merchandise Assortment Function:** To provide products which meet the demand of retailers; and

- **Price Settlement Function:** To cash-in producers' products quickly.

(b) Standardization to Formulate a State-Level Perishable Food Market

Issues on the distribution of perishable goods:

- In Mongolia, agricultural products are difficult to preserve and transport over long distances so they are mainly distributed for semi-subsistence or in a region.
- Large fluctuations and soaring food prices have become a social problem, so the needs for "rationalization" of the physical distribution, fairness of price formation, and transparency increase.
- There are needs for specialized production, the formation of the main production area and transport system to scale-up commercial agriculture, and improvement of storage facilities, corresponding to the expansion of the market sphere of agricultural products.

Requirements for the formation of a national market for stable supply:

- For a stable supply of perishable foods and price stability, it is essential to expand the market targeting from region to the nation.
- In order to establish nationwide market transaction prices, quality standardization of agricultural and livestock goods is important.
- By publishing the standard prices of products in the country, an efficient agricultural goods market will be created.

Standardization of agriculture and livestock products:

- As the market sphere is expanded to the whole country from the region, standardization in quality and volume becomes very important for trade.
- In order to commercialize agricultural products, post-harvest sorting of products is required based on certain standards (standardization).
- Standards bring about price formulation based on grading and breeding of products and livestock.

Market to be established by public and managed through privatization:

- A public-private market is required to enable small-scale producers to collect their products and trade in bulk, optimize market transaction fees, introduce the competition principle such as publication of transaction prices, facilitate rapid trading settlement function, and so on.

2) Establishment of Agricultural Experiment Station

5.88 Agriculture and livestock breeding aims to develop varieties with new characteristics that producers and consumers want, such as taste, high crop yields, strength against diseases, resistance to cold weather or high temperature. Breeding efforts in Japan, for example, began from the Meiji era and as a result of many years of development, regional specialty products have been created throughout the country and the products have come to be known to have the best taste in the world.

5.89 The agriculture testing laboratory in Mongolia is under the jurisdiction of the Ministry of Education so it tends to be a research center. It is said that its impact on actual products is small. In order to contribute to agriculture, it is necessary to reorganize this facility as a

research institute under the Ministry of Agriculture's jurisdiction, to place a facility in each region, and to share the results of their programs to the farmers of the regions.

5.90 The functions of an agricultural experiment station are as follows:

(i) To create and grow new varieties of agricultural crops and livestock;

(ii) To develop efficient production technologies;

(iii) To develop technologies that preserve the quality of agricultural products;

(iv) To develop techniques to prevent pests and diseases;

(v) To develop a soil-making technology to grow pasture and crops well; and

(vi) To disseminate newly developed technologies to farmers.

5.3 Industrial Promotion Based on Mining and Manufacturing

(1) Basic Principles

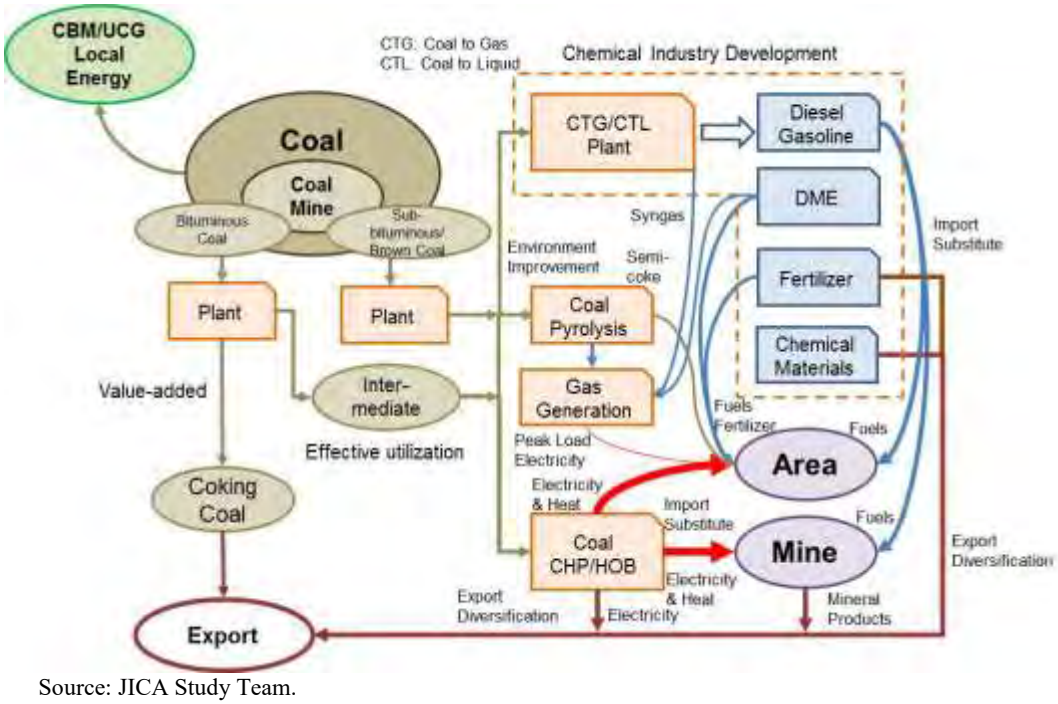
5.91 Around 30% of the coal produced in Mongolia is for domestic use. It is anticipated that domestic demand for coal will remain strong based on the country's economic growth and the construction of large-scale coal fired power plants. Other mining products are mainly for the export market. Copper smelting plants or ironworks could be constructed in order to increase the value of the mining products and to develop related downstream industries but this does not seem plausible since domestic demand is low for the finished products such as copper or steel. High transportation cost and establishing export trade relations with countries remain as issues to be solved in order to export copper or steel as final products. Therefore, establishment of a value chain based on coal utilization is proposed as a strategy for regional development linked to the development and promotion of associated industries because domestic coal demand is expected to steadily increase in the future.

5.92 Figure 5.3.1 shows the overall concept of the value chain based on coal utilization. It fundamentally consists of the following three concepts:

(i) Producing value-added coal based on coal preparation plants and utilization of intermediate products;

(ii) Energy diversification and chemical industry development based on coal-to-gas (CTG)/coal-to-liquid (CTL) plants, and

(iii) Development of local energy supply system based on Coalbed Methane (CBM) and underground coal gasification (UCG) utilization.



Source: JICA Study Team.

Figure 5.3.1 Overall Concept of Value Chain of Coal Utilization

5.93 These proposals are parallel with the direction of the general provision and policy guideline for the mineral sector described in the State Mineral Policy (2014–2025), which was brought into force by a parliamentary resolution in January 2014 in line with the Comprehensive National Development Strategy based on the Mongolian Millennium Development goals.[37]

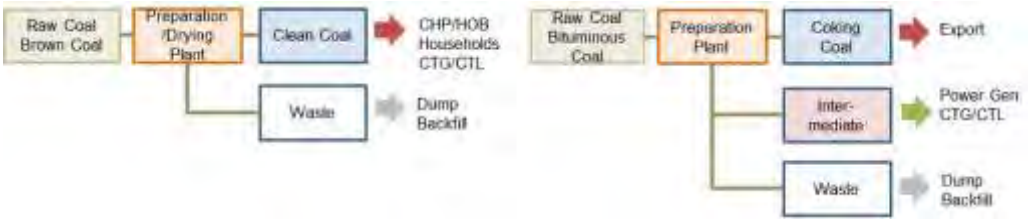
(2) Producing Value-Added Coal by Coal Preparation Plants and Utilization of Intermediate Products

5.94 Most of the coking coal are exported without undergoing further processing. Preparation processing (see Figure 5.3.2) will increase the price of the coal by up to 25–40% and provide opportunities to develop new markets for export to other countries as a result of the improved quality of the coal (see Figure 5.3.3). Furthermore, a reduction in transportation cost will be expected in terms of delivered price for processed coal as against raw coal. Although energy coal, as an intermediate product, is recovered by as much as 20% from processed raw coal, the volume of energy coal utilized at this time is still low. In addition, energy coal is dumped at a number of mines. If all planned preparation plants are constructed, over 10 million tons of energy coal can be recovered. Securing the demand for domestic energy coal is, therefore, a very important issue to be considered.

5.95 As an example, construction of a coal-fired power plant in South Gobi contributes to the utilization of surplus coal and the improvement of the poor condition of power supply in South Gobi. The electricity generated from this plant substitutes for imported electricity from China and there is an export potential to China in the future as well. A planned 600 MW power station at Tavan Tolgoi (TT) is expected to utilize almost 3 million tons of energy coal annually.

5.96 Coal preparation plants consume large amounts of water. The dry preparation technology is desired in areas where water shortage is a concern such as in South Gobi. However, it is better to introduce a test plant with dry preparation technology in order to master the preparation process and to determine the applicability of the technology under Mongolian conditions because the technology has never been applied in large capacity and has been under development for processing pulverizing coal. The New Energy and Industrial Technology Development Organization (NEDO) has a plan to conduct a verification project on Japanese dry preparation technology in Mongolia.

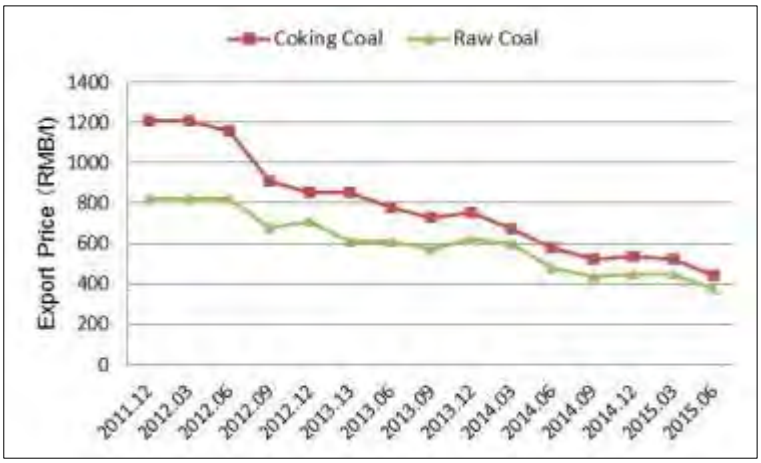
5.97 Brown coal or sub-bituminous coal could also be processed into cleaner coal having higher and stabilized quality by preparation or drying process and supplied to CHP/HOB and CTG/CTL plants. It would contribute to improving efficiency of low grade coal utilization and reduce environmental burden.



Source: JICA Study Team.

Figure 5.3.2 Preparation Process for Brown Coal and Bituminous Coal

[37] See Chapter 5, Part 2, Review of existing policies and projects for comprehensive area development.



Source: Erdenes TT.

Figure 5.3.3 Washed and Raw Coking Coal Prices at Gants Mod Station

(3) Energy Diversification and Chemical Industry Development Based on Coal-to- Gas (CTG)/ Coal-to-Liquid (CTL)Plant

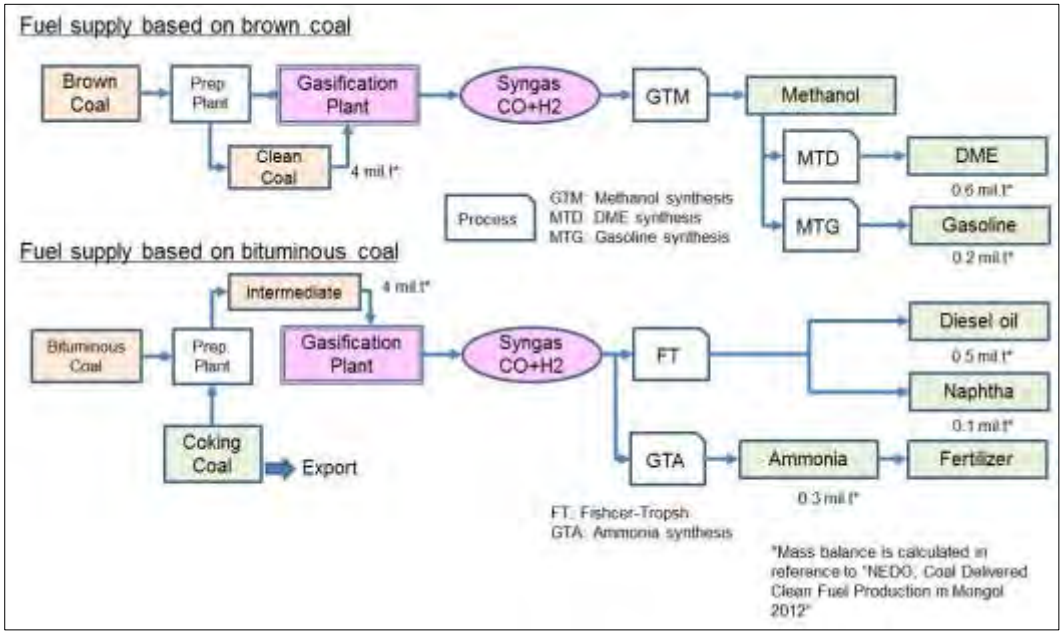
5.98 Synthesizing and supplying fuels by the CTG/CTL process substitutes for oil products being imported from Russia. This contributes to improving the degree of energy self-sufficiency, reducing import volume, and promoting diversification of export commodities such as naphtha and chemical fertilizer, as well as contributes to the development of a chemical industry which has a wide range of supporting industries.

5.99 Air pollution becomes an issue in populated cities such as Ulaanbaatar mainly by combustion of low grade coal. The value chain including clean fuel supply by the CTG/CTL process is effective considerably as a countermeasure for environment protection.

5.100 Figure 5.3.4 shows a schematic diagram of a CTG/CTL project. In the case of brown coal for the domestic market, DME and gasoline are synthesized via the methanol synthesis process. It is estimated that 600 thousand tons of DME and 200 thousand tons of gasoline could be synthesized from 4 million tons of brown coal. As DME liquidizes in low pressure at normal temperature (25^{o}C, 0.62 MPa) in the same manner as propane, it is advantageous for transportation by pressurized cylinders. DME use is spreading especially in China gradually, because sulphur oxides and particle matters are not emitted by the combustion of DME. Furthermore, it has advantages to utilize the infrastructure and equipment for propane gas without modification in the case of mixture use of DME and propane.[38] The Mongolian government proceeds to disseminate DME as a substitute fuel for low grade coal for heating and cooking specially in the ger area surrounding big cities. As a result, Energy Resources has supplied DME stoves and DME, being imported from China on a trial basis, to households in the ger area and conducted a demonstration trial with the aid of a subsidy from the government. The private sector also has plans to construct a CTG/CTL plant and Posco, Korea and MCS already established Baganuur Energy Co. for construction of a CTG/CTL plant at the adjacent area of Baganuur coal mine which produces brown coal. MAK Co., Tsetsens Mines LLC and Ger Mon Gas LLC also have a plan to produce liquid fuels such as gasoline via the CTG/CTL process.[39]

[38] LP Gas Center; http://www.lpgc.or.jp/corporate/dme/dl/tori01.pdf
[39] The Mineral Resources Authority of Mongolia (MRAM).

5.101 On the other hand, in the case of energy coal prepared from bituminous coal for export, diesel oil and naphtha are synthesized via the FT process. Ammonia is also synthesized through the ammonia synthesis process, which is a raw material for chemical fertilizer. It is estimated that 500 thousand tons of diesel oil, 200 thousand tons of naphtha and 300 thousand tons of ammonia could be synthesized from 4 million tons of energy coal. Diesel oil is a major fuel for wheeled vehicles at mining sites and sufficient demand is prospective in the South Gobi area where many large mines are operating. The type and volume of fuels and chemical products produced at the CTG/CTL plant need to be determined based on the trend of demand and price of the products.



Source: JICA Study Team.

Figure 5.3.4 Schematic Diagram of a CTG/CTL Project

5.102 NEDO carried out the "Feasibility Study on Clean Fuel Production from Coal in Mongolia"[40] in 2011. The study estimated the economic potential of two plants, one producing methanol, DME and gasoline using syngas generated via brown coal gasification process and the other producing methanol and DME by reforming of coke oven gas generated from coking plant of 1 million tons capacity. A brief summary of the study results presented in Table 5.3.1 indicates that a CTG/CTL plant utilizing brown coal as raw materials has a high economic potential. However, the study was carried out based on the price of the products that was set out to bring out competitiveness against imported oil products. If substantial price variation of imported oil products occurs, another feasibility study shall be carried out.

[40] NEDO, The Report on Feasibility Study to Perform Initial Investigation of Potential Implementation of the Coal Derived Clean Fuel Production in Mongolia, March 2012.

Table 5.3.1 Results of Feasibility Study on Clean Fuel Production from Coal

	Coal to Gas Scheme	Reforming of Coke Oven Gas
Plant site	Baganuur Coal Mine	UHG Coal Mine (South Gobi)
Capacity of the plant		
Feedstock, kton/y	2,080 (45% moisture)	All coke oven gas from 1,000 kton/y coke oven
Methanol production, kton/y	720	140
DME production, kton/y	100	100
Gasoline production, kton/y	271	-
EPC Cost, MUSD	1,600	460
Operation Cost, MUSD/y	106	45
Sales Amount, MUSD/y	> 399	> 74
IRR(ROI)	5.5–13.4	Below zero
Evaluation	Potentially feasible	Not feasible, due to small production

Source: NEDO.

5.103 The outline of the CTG/CTL plant proposed by Baganuur Energy Co. is presented in Table 5.3.2.[41] Canadian and Chinese engineering companies already carried out a feasibility study on the proposed project and both results were almost the same for total investment.[42]

Table 5.3.2 Outline of CTG/CTL Plant Proposed by Baganuur Energy Co.

Project Owner	Baganuur Energy LLC (BECo)
Major Activity	Liquid fuels production from Mongolian coal, Clean gas fuels production to solve the air pollution issue in UB
Project Site	Baganuur, UB
Total Investment	USD2 billion
Production Capacity	Diesel 450,000 t/y Gasoline 90,000 t/y DME 100,000 t/y

Source: MCS International Co. Ltd.

5.104 Huge amounts of investment and number of technical engineers who have knowledge and skills are crucial for the construction and operation of a CTG/CTL commercial plant. Even if it is possible to construct the commercial plant with support of countries having advanced technology, sustainable operation of the plant seems to be difficult. Hence, it is better to construct and operate a pilot scale plant as an international cooperation project by the initiative of the government and to promote technical development and nurturing of domestic engineers as a first step. Then, in the next step, expanding to construct a commercial scale plant is a preferable way in order to develop chemical industries into the future.

(4) Development of Local Energy Supply System Based on CBM/UCG Utilization

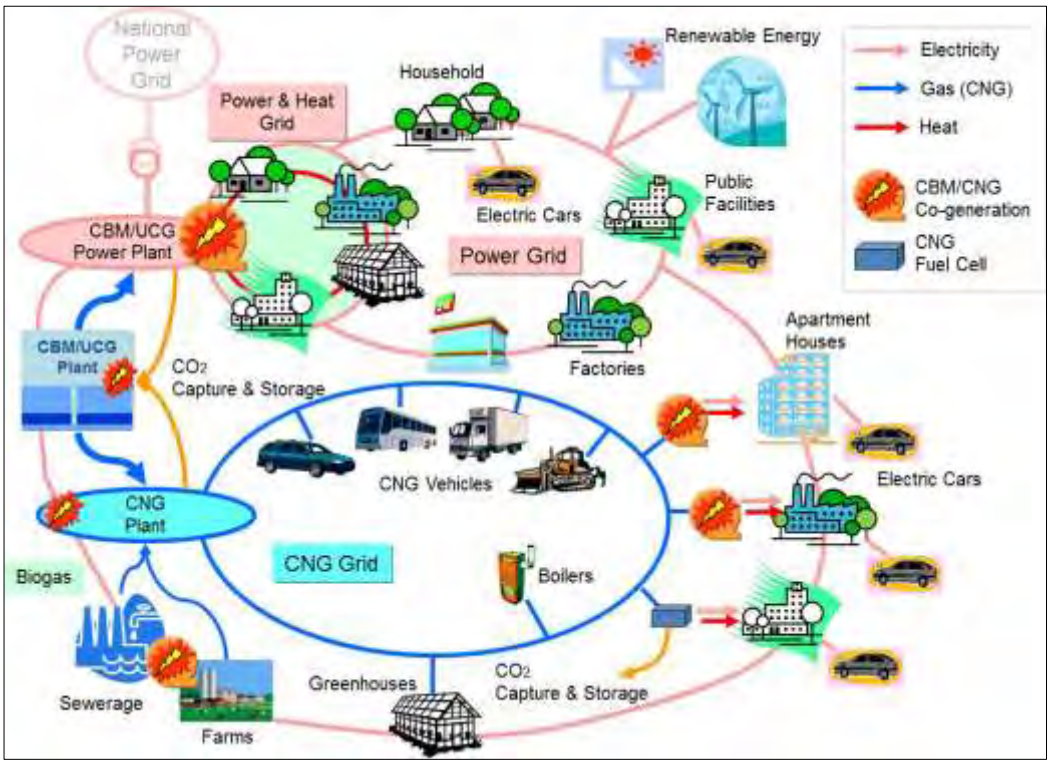
5.105 The development of a local energy supply system based on CBM/UCG utilization as a main energy source for local areas contribute to efficient utilization of domestic energy

[41] MCS International Co. Ltd., web page: http://international.mcs.mn/eng/pages/Oxford%20business%20group
[42] Baganuur Energy Co.

resources and sustainable development of the area.

5.106 A local energy supply system (see Figure 5.3.5) brings about the effective use of local energy resources and realization of local energy production for local consumption. The system also contributes to reducing the loss of power transmission and cost of coal transportation. The model consists of a power/heat grid and a CNG grid. Electricity generated at the CBM/UCG power station is supplied to end users such as households, public entities, commercial facilities and factories through the power grid. If a co-generation system is introduced, heat is also provided to the vicinity of the power station. Since output power of the CBM/UCG power station is easy to control, the fluctuation of solar photovoltaic and wind power generation system connected with the grid may be complemented by the electricity of the station. Even though the cost of CO_2 capture should be reduced, it is possible to collect CO_2 from a relatively large-scale power generation unit. Injection and sequestration of CO_2 into the coal seam will increase CBM production as well as a possibility of zero-emission power generation.

5.107 The CNG grid supplies compressed CBM to end users via a pipeline or high pressure cylinders. Compressed CBM is utilized as fuel for co-generation units at apartment houses, public facilities and factories which are expected to use both electricity and heat energy. It is also possible to use CBM as fuel for CNG vehicles, industrial and agricultural machines, and heating units.

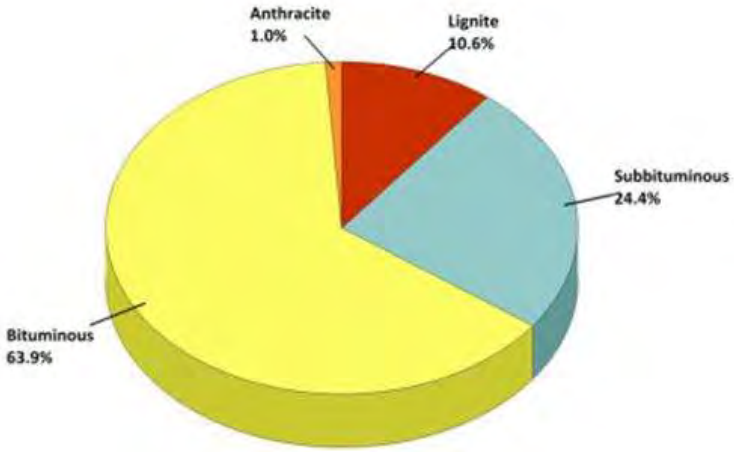


Source: Underground Resources Innovation Network.

Figure 5.3.5 Local Energy Supply System Based on CBM/UCG Utilization

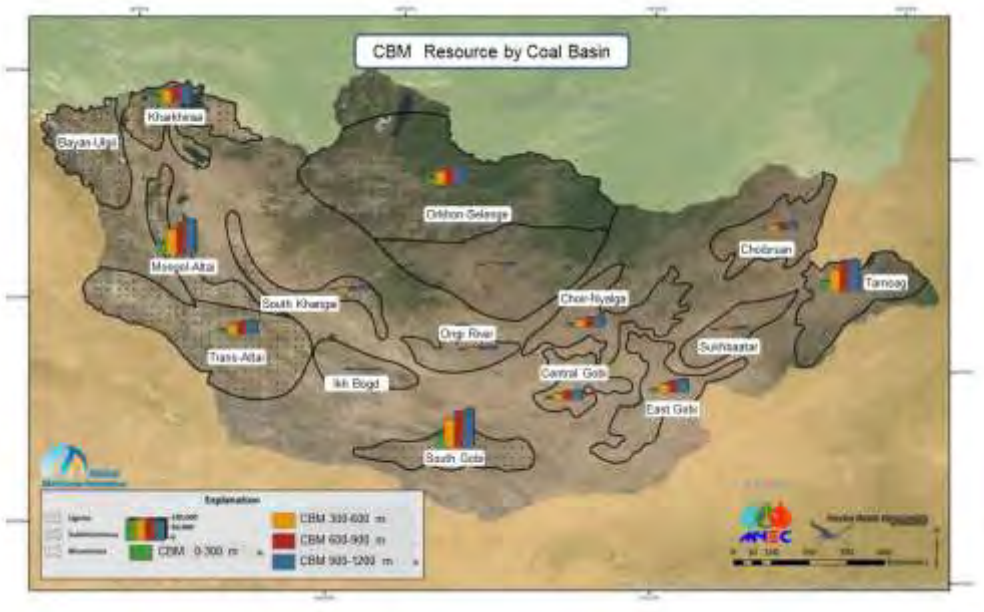
5.108 As indicated in Figure 5.3.6, almost 90% of Mongolian CBM resources are contained in bituminous coal and sub-bituminous coal basins. Considering the CBM resources' existing condition, the area where bituminous or sub-bituminous coal seams exist under the ground has a high potential to introduce a local energy supply system by CBM. Figure 5.3.7 shows the

amount of CBM resources of each coal basin by depth. A large quantity of CBM is estimated to be contained in the basin such as South Gobi, Trans-Altai, Mongol-Altai, Kharkhiraa, Orkhon-Selenge and Tamsag. More CBM is also contained in coal seams at a deeper level. The promising areas for CBM development are widely distributed around the populated area such as UB, where major energy depends on lignite coal. More detailed study is required to estimate CBM production rate and periods, including CBM contents and the permeability of the coal seam, in order to develop and utilize CBM as a local energy source. However, CBM is a promising energy source to recover clean gas energy from coal seams in the area where it is difficult to develop coal seams by open cut method due to existing of deeper level goal seam or surface environmental constraint.



Source: Mongolian Nature and Environment Consortium (MNEC)

Figure 5.3.6 CBM Resources by Coal Rank



Source: MNEC

Figure 5.3.7 CBM Resources of Mongolian Coal Basin

5.109 Daily CBM production volume from one production well depends on many kinds of factors such as gas contents and permeability, depth of the seam, well stimulation and

completion, and distance between production wells. Thus, it is difficult to estimate production capacity without trial well and production test. Generally, a production well produces between hundreds and thousands of cubic meters CBM per day (conversely, commercial feasibility is low, if daily CBM production is less than a hundred cubic meters). It is estimated that a typical 1,000 m^3/d CBM production could operate 150 kW gas power generators with 35% generating efficiency based on 36 MJ/m^3 of CBM calorific value. This means that seven CBM production wells are required to supply CBM to the area where 1MW generation capacity is proposed. In the case of utilization as CNG, 1,000 m^3 of CBM could substitute for 1,000 liters of diesel oil because the calorific values of 1 m^3 of CBM and 1 liter of diesel oil are almost the same. The required number of production wells for the local energy supply system depends on the CBM production capacity of the well and the energy demand of the area where the system is installed. It is possible to design the system in combination with generators and CNG compressor required based on the type of energy demand in the area.

5.110 As almost all coal such as lignite, sub-bituminous and bituminous coal are preferable to be applied in UCG technology, UCG applicable area is spread extensively in Mongolia. However, it is important to protect against syngas leakage to the surface and into the aquifer, and to prevent subsidence due to collapse of the UCG cavity in the underground in order to introduce UCG technology. Geological screening, such as existence of the target coal seam at a certain depth (normally deeper than several hundred meters) and overlying thick strata having low permeability as mudstone, is required to make a short list of feasible sites to introduce UCG technology.

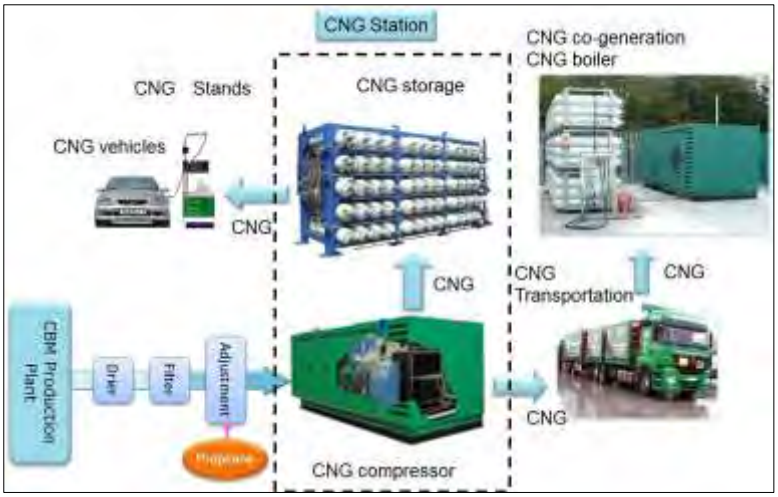
5.111 The typical calorific value of UCG syngas is 10MJ/m^3 and lower than 36MJ/m^3 of CBM. However, the recoverable amount of energy from one ton of coal is 15,000 MJ by UCG (assuming that 1,500 m^3 syngas with 10 MJ/m^3 is produced from 1 ton of coal) whereas 180 MJ by CBM (assuming 10 m^3/t gas contents and 50% recovery ratio). As it is difficult to utilize UCG syngas directly to substitute for liquid fuels such as diesel oil, methane synthesis or GTL (Gas to liquid) process is required to produce liquid fuels. But the reality is that only a large-scale synthesis plant has economic potential. Therefore, electricity supply by power generation utilizing UCG syngas is the fundamental way for local energy supply based on UCG.

5.112 In general, a large-scale facility for energy supply system may be more economically advantageous due to economy of scale. The proposed system is aimed at local energy production for local consumption and has a relatively small scale of several megawatts considering Mongolian energy consumption in the local area. Thus, energy cost seems to become rather expensive. Although a detailed feasibility study and estimation of CBM/UCG resources in the area is required to design and realize a local energy supply system, it is important to evaluate not only its economic potential but also the importance of a distributed energy system, merits of energy diversification, and environmental considerations.

Left: Separator and water tank
Right: Well head, pump, and gas engine for pump

Source: http://blogs.crikey.com.au/.

Figure 5.3.8 Example of CBM Production Equipment in Australia



Source: Underground Resources Innovation Network, NPO.

Figure 5.3.9 Schematic Diagram of CNG Supply and Utilization

(5) Utilization of Coal Ash Discharged from a Power Plant

5.113 Most of the coal ash discharged from all but a few of the power stations is dumped or stored at an open space within the station without utilization. Securing a place for dumping coal ash and transportation cost are among the issues. As some large capacity power stations are planned to be constructed, a huge amount of coal ash would be generated from those power stations. More than 97% of 13 million tons of coal ash is utilized as a useful resource for cement production and in the civil engineering sector in Japan.[43]

5.114 Some universities have research programs for coal ash utilization as construction materials.[44] Since it is possible to use coal ash for various purposes such as cement production, civil engineering, construction materials, agriculture, filling of mined area and sewage treatment, a lot of interest has been generated in the Japanese technology for coal ash utilization.

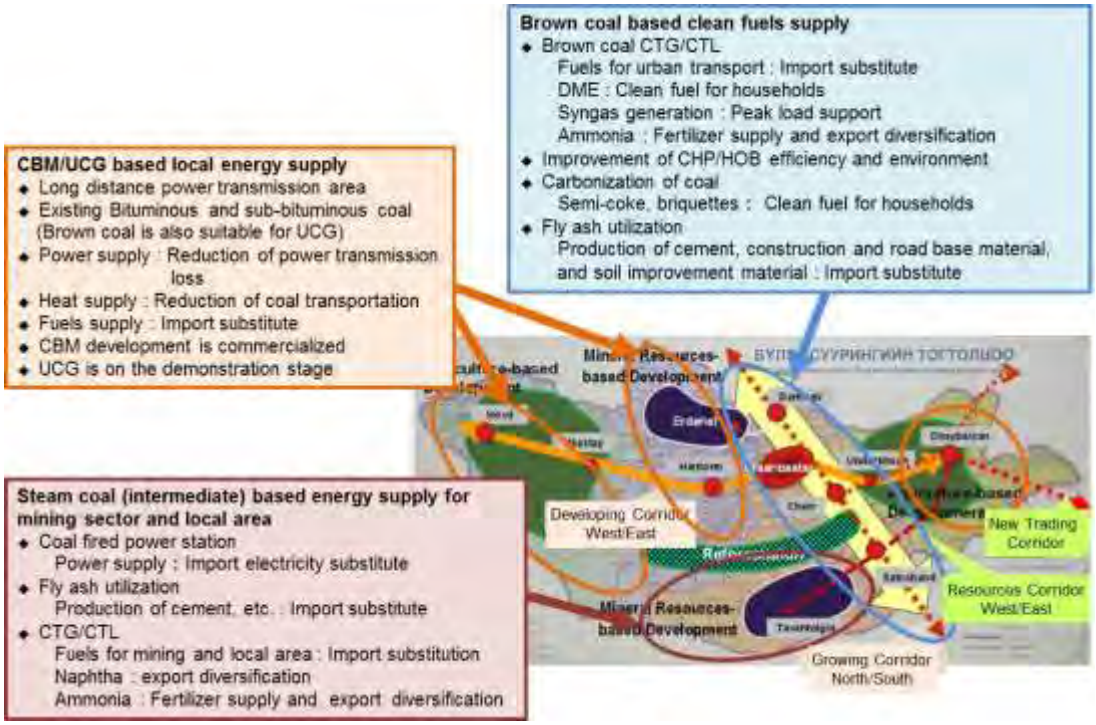
(6) Features by Region

5.115 As is clear from Figure 2.8.2, the bituminous coal basin is spread widely in the southern and western regions of Mongolia. In contrast, the brown coal and sub-bituminous coal basin is located in the central, northern and eastern regions. From a standpoint of shortening transporting distance of raw coal or processed coal, the development of an energy supply model for the mining sector and local area based on energy coal is preferable in the

[43] JCOAL; http://www.jcoal.or.jp/coaldb/tech/coalash/
[44] School of Technology in Darkhan, Mongolian University of Science and Technology.

South Gobi region. Similarly, the clean fuels supply model based on brown coal and sub-bituminous coal is proposed for a region where those types of coal have been utilized for a long time, such as in UB.

5.116 In addition, the CBM/UCG based local energy supply model is preferred to be introduced in the region where energy is supplied by electricity transmitted via a long distance or local diesel power station as well as transportation cost of coal for heating energy is relatively high, if coal resources exist within a short distance from a proposed energy supply station.



Source: JICA Study Team.

Figure 5.3.10 Zoning of Industry Development Strategy Based on Coal Utilization

(7) Railway Construction

5.117 Sound management of a coal mining company is indispensable to build a functioning value chain based on coal utilization. In addition to a decreasing volume of exports to China and the price slump since 2012, high transportation costs due to insufficient infrastructure development has pressed the management of coal mining companies. Most of exported coking coal is transported by trucks from Tavan Tolgoi to Gashuun Suhait near the border on unpaved roads, and then crossed over the border to Gants Mod by other trucks. Usually, the coal is transhipped to the Chinese railway cargo at Gants Mod. As a result, the cost of truck transportation is sometimes USD27/ton[45] and almost three times the shipping cost from Australia to China thousands of kilometers away. In 2011, MMC constructed a paved road and succeeded to reduce domestic transportation cost. However, the issue of the cost for crossing the border by tracks remains unsolved. Moreover, the adverse impact on the surrounding environment of driving on unpaved road is not negligible.

5.118 The railway construction from Tavan Tolgoi to Gashuun Suhait (Southing railway) is

[45] Erdenes TT; Overview of Tavantolgoi Project, 2015.

the one of key routes approved by the Parliament in 2010 as the state policy on railway transportation (see Figure 5.3.11). The key routes have 1,800 km total extension and consist of five routes (UkhaaKhudag – GashunSukhait, UkhaaKhudag – Tavan Tolgoi – Sainshand – Baruun Urt – Khuut – Choibalsan – Ereenstav, Khuut –Bichigt, Khuut – Numrug). According to the original construction plan, the total construction cost was estimated at USD5.2 billion and estimated date of completion was in 2016.[46] In 2012, construction of southing railway had commenced ahead of other routes by the government decision. At the first stage, a special-purpose entity (SPV) would provide financing based on the BOT (Build-Operate-Transfer) contract with MTZ, and Samsung C&T won the contract to construct the route.[47] After that, as the private side handed over the license, MTZ had carried out the construction funded by USD300 million of Chingis bonds. Although it has been reported that almost 87% of construction had finished, the construction work for bridges and track had never been carried out.[48] The completion of the southing railway would be delayed considerably. It has been decided to construct this route according to Chinese standards. The connection with the Chinese border railway which has been constructed by China Shenhua Energy brings not only significant cost reduction and enhancement of export competitiveness but also a direct railway connection between the Mongolian coal mines and the Chinese ports, based on the progress of negotiation with the Chinese side. As a result, Mongolia may have more choices for the export route to third countries.

Source: Ministry of Road and Transportation.

Figure 5.3.11 Railway Construction Route fromTavan Tolgoi and Gashuun Suhait

(8) Local Development Not Dependent Only on Mining Industries

5.119 If mine development activities and settlement of workers are in place in an area, the demand for construction of houses, consumption of foods and retail sales will increase rapidly and the construction of infrastructure such as electricity, water, education and healthcare will be advanced. However, once the resources are depleted and the mine is closed, only the burden to maintain the infrastructure will remain and the area will be impoverished. This is a major issue experienced on many occasions also in Japan. Although it is not easy to link mine development and sustainable local development, it is important to design a local development plan from the start which takes into consideration prospects for development after the mine closure.

[46]Ministry of Road and Transportation, Railway developments of Mongolia, June 2014.
[47] Ibid.
[48] Invest Mongolia Agency, New Railroad Project, Invest in Mongolia 2015.

5.120 In South Gobi, mine workers are often constrained to leave behind their families at their home city and to stay at the mining camp during working days due to the harsh living environment and primitive infrastructure that constrain the workers' settlement itself. Not to develop the so-called "castle town" depends on a single mining operation but the general idea of constructing major city/town for the entire region in cooperation with several mining companies operating in the region is desirable. It is also important to reallocate profits and benefits, including infrastructure, from mining industries extensively to agriculture, manufacturing and tourism resource development. For example, if the rehabilitation technology that is premised on diversion of agricultural land is introduced to rehabilitate a mined area step by step, a development strategy as a farming area will be in sight.

5.121 Erdenet, the capital city of Orkhon province, is the city that has been advancing as a castle city of the Erdenet copper mine and developed as the second largest city in Mongolia, where 90,000 people live (see Figure 5.3.12). There was a concern about depletion of the mine's geological reserve recently, but the life of the mine was extended by 30 to 40 more years due to the discovery of new deposits through additional exploration activity.[49] Making a plan for mining-independent urban development in anticipation of future mine closure is going on together with local residents and the company, including construction of a logistics center to utilize developed infrastructure and mining-related industries.

Source: Wikimedia Commons.

Figure 5.3.12 Urban District of Erdenet and Copper Mine

[49] Erdenet Mining Co.

5.4 Development and Promotion of the Tourism Industry

(1) Clarification of the Vision for Tourism Development in Mongolia

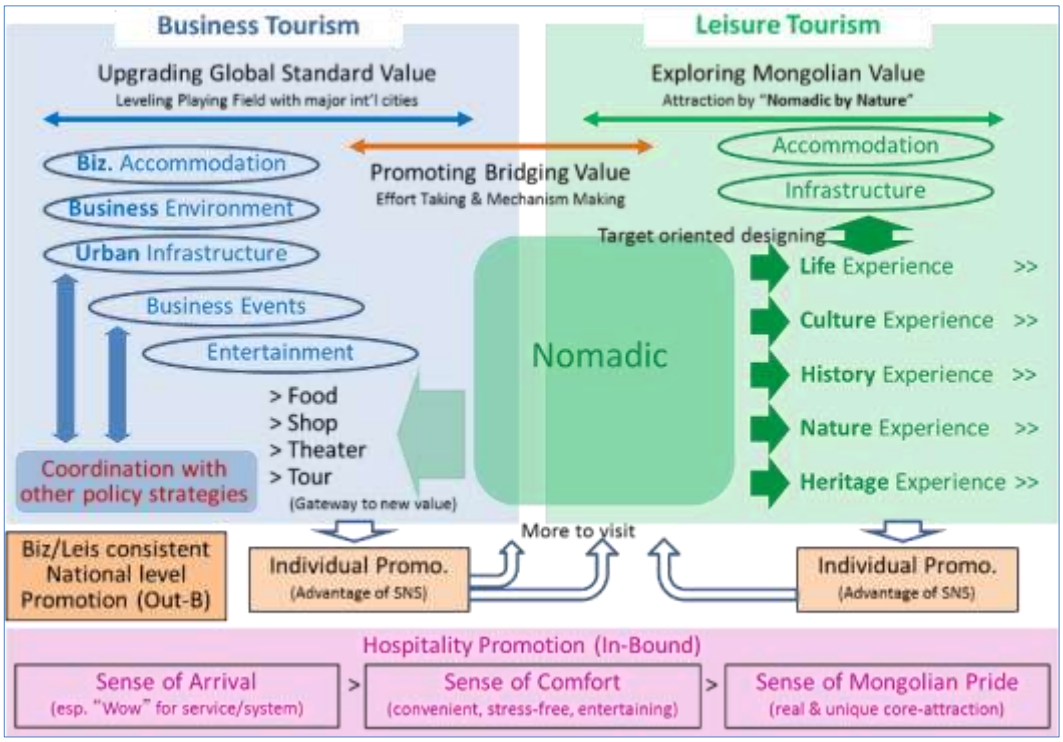
5.122 The most significant issues for tourism development and promotion in Mongolia are the unclear prioritization in policy and the lack of a common vision for tourism development among the stakeholders which are necessary to clarify priority tourism programs and activities. While the government of Mongolia has conducted various tourism campaigns, the vision for tourism development has not been established based on such activities. MEGDT developed the catch phrase"MONGOLIA–Nomadic by Nature" for tourism promotion at ITB Berlin[50] in 2015 and the phrase is still used for the various tourism promotion campaigns conducted by MEGDT. Nomadic culture is identified in the Study as Mongolia's significant unique philosophy of harmonizing with nature, which is also highly recognized internationally such as a UNESCO intangible cultural heritage. Therefore, the Study proposes to adopt "Nomadic" as a theme in prioritizing tourism policy, coordinating various tourism development programs, and implementing tourism development and promotion in an effective and efficient manner.

1) Strategic Tourism Promotion Based on the Common Theme

5.123 Since "Nomadic" is not sufficient to clarify the vision for tourism development, the narrative of Nomadic Tourism needs to be elucidated through the integration of nomadic culture with various tourism development and promotion activities. The establishment of Nomadic Tourism clarifies the vision for tourism development and enables stakeholders to implement strategic tourism promotion through various tourism development activities coordinated under the common theme of nomadic culture.

5.124 Conservation of natural and cultural resources is listed as one of the priority areas of tourism in Mongolia as discussed in Section 2.9. Since the conservation of resources is a significant issue for both business and leisure tourism, linking these tourism segments to the "Nomadic" theme will address the issue in an effective and efficient manner based on the coordination between business and leisure tourism including the financial aspect (see Figure 5.4.1). As the figure shows, strategic marketing utilizing the most of individual information provision such as SNS as well as awareness raising among the Mongolian people to nurture their pride in Mongolian culture are necessary to successfully implement this strategic tourism promotion.

[50] ITB Berlin (Internationale Tourismus-Börse Berlin) is the world's largest class tourism industry fair and platform of international tourism industry.

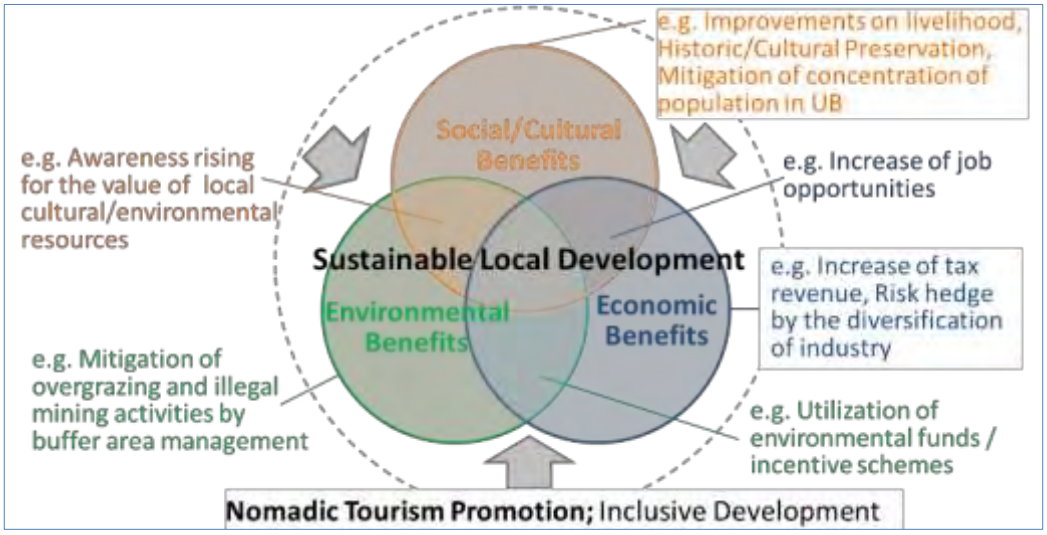


Source: JICA Study Team.

Figure 5.4.1 Strategic Tourism Promotion Based on the Clarified Theme

2) Clarification of Benefits from Tourism Development and Promotion

5.125 Holistic tourism development based on the well-balanced consideration of social/cultural, economic and environmental aspects is necessary for the sustainable Nomadic Tourism promotion, as shown in Figure 5.4.2. Clarification of the benefits from Nomadic Tourism is important to promote sustainable tourism development. Quantification of the benefits is effective in motivating the stakeholders by sharing the objective for the implementation of strategic tourism development and marketing.



Source: JICA Study Team.

Figure 5.4.2 Examples of Benefits from Tourism Development and Promotion

5.126 For example, the Shangri-la Hotel completed in 2015 and four other major large-scale hotels currently under planning are estimated to generate total annual sales of USD108 million, which will contribute to increasing GDP by 0.14% (see Table 5.4.1).

Table 5.4.1 Economic Impact of Major Large-Scale Hotels in UB

(also showing the scale of the hotel facilities)

	Statistics in 2014	Economic Impact of Hotel Development
Total Economic Contribution	USD382.1 million	+ USD16.4 million
% of GDP	3.2%	+0.14%
Employment (% of Total Workforce)	1.4%	+0.12%
Indirect Employment	2.8%	+0.25%

Assumptions: Room and function occupancy rate: 50%; Profit ratio: Room 75%, Function 25%

	Number of Rooms	Number of Beds	Function Capacity (persons)	Number of Employees (persons)
Shangri-la	290	580	854	370
Radisson*	200	400	589	255
Holiday Inn*	200	400	589	255
Sheraton*	200	400	589	255
City Tower	320	640	942	408
Total	1,210	2,420	3,563	1,544

* Assumptions based on the interview with the Hotel Association.
Source: JICA Study Team, MEGDT.

5.127 The GDP ratio that MEGDT adopts is based on the estimation by the World Travel and Tourism Council (WTTC), indicated as Scenario 1 in Table 5.4.2 below. However, when the result of direct revenue by inbound tourists (USD0.087 billion) in Scenario 1 is divided by the number of inbound tourists in 2014 (392,844), the average expense per person becomes USD221 only. Therefore, the Study revised the average expense of inbound tourist per person according to the results of the interview survey conducted in 2015 (Scenario 2). The revised scenario increased the GDP ratio of the tourism industry to 6.6% which is more than double compared to the WTTC estimate. Although the basis of analysis is not clarified, the TDNP described in Section 2.9 indicated the GDP ratio of the tourism industry as 5.3%. Considering these figures, the actual current GDP ratio of the tourism industry is expected to be around 5–6%.

5.128 Table 5.4.3 indicates the GDP ratio in 2020 and 2030 based on the target number of inbound tourists listed in the UB Hospitality Program. Although this estimate includes uncertainties due to many assumptions such as GDP growth rate, it surely indicates the possibility for tourism to become a key industry like the mining industry (with a current GDP ratio of 18%) once the necessary infrastructure (airports, roads, hotels, etc.) and skills are appropriately developed. This quantification process enables to share the concrete vision among stakeholders to clarify the measures to nurture the tourism industry into one of the key industries in Mongolia.

Table 5.4.2 Current GDP Ratio of Tourism Industry

Scenario 1 (Estimation by WTTC, 2014)		Scenario 2 (Revised Estimation by JST)	
GDP(billion USD)	10.9	GDP(billion USD)	10.9
Direct Revenue by Tourism Industry (billion USD)	0.17	Average Expense of Inbound Tourist in Mongolia (USD)*	1,173
Direct Revenue by Inbound Tourists (billion USD)	0.087	Number of Annual Inbound Tourists	392,844
Percentage of GDP byDirect Revenue of Tourism Industry	1.6%	Direct Revenue by Inbound Tourists (billion USD)	0.461
Total Revenue by Tourism Industry (Direct＋Indirect; billion USD)	0.348	Direct Revenue by Tourism Industry (billion USD)	0.547
Percentage of GDP by Total Revenue of Tourism Industry	3.2%	Percentage of GDP by Direct Revenue of Tourism Industry	5.0%
		Total Revenue by Tourism Industry (Direct＋Indirect; billion USD)	0.721
		Percentage of GDP by Total Revenue of Tourism Industry	6.6%

* Estimated value; USD1,173(60% of average expense of USD1,995) is calculated from the average of private tourists (USD1,526) and participants of package tours (USD2,383).
Source: WTTC 2014, Tourism Survey 2015, National Statistical Office.

Table 5.4.3 Estimate of GDP Ratio of Tourism Industry According to the Target Number of Inbound Tourists Listed in Hospitality UB Program

	2020	2030
GDP(billion USD)	17.3	37.4
Average Expense of Inbound Tourist in Mongolia (USD)	1,200	1,400
Number of Annual Inbound Tourists	2,000,000	5,000,000
Direct Revenue by Inbound Tourists(billion USD)	2.40	7.00
Direct Revenue by Tourism Industry(billion USD)	2.49	7.09
Percentage of GDP by Direct Revenue of Tourism Industry	14.3%	18.9%
Total Revenue by Tourism Industry (Direct + Indirect; billion USD)	2.66	7.26
Percentage of GDP by Total Revenue of Tourism Industry	15.4%	19.4%

Assumptions:
- Annual GDP growth rate: 8%
- Direct and indirect revenue by domestic tourists is the same as 2014 (conservative estimate)
- Average expense by inbound tourist will be USD2,100 in 2020 and USD2,300 in 2030.

Source: WTTC 2014, Tourism Survey 2015, JICA Study Team.

(2) Promotion of Business Tourism

5.129 As previously described in Section 2.9, the lack of urban attractiveness in UB becomes a major issue in the promotion of business tourism in Mongolia. Therefore, the promotion of business tourism aims at making UB as an information center disseminating nomadic culture and relevant information to all over the world. To achieve this goal, the following tourism promotion programs are proposed.

1) MICE Promotion

5.130 The amount of spending done by MICE tourists is generally high (some statistics show six times more than the average individual tourist[51]) and with significant economic impact. Therefore, the integration of MICE with the Nomadic Tourism theme enhances the

[51] "Current Situation of Mongolian Tourism" presented by MEGDT at IFNAT Conference 2015.

linkage between business tourism and leisure tourism in a very effective and efficient manner (see Figure 5.4.1). This includes the establishment of a system to enjoy natural and cultural resources in a casual manner over the weekend or after business hours through the enhancement of coordination between major hotels in UB and tourist attractions in the vicinity of UB such as Terelji NP and Hustai NP as well as major theatres promoting various cultural events (play, concert, fashion show, etc.). Since these cultural events stimulate promotion of the relevant industries, close collaboration for the integration of MICE with Nomadic Tourism is essential. To enhance the linkage between business and leisure tourism by Nomadic Tourism, a financial scheme needs to be established such as a cross-subsidy system which allows to utilize the revenue from MICE promotion for the conservation of natural and cultural resources. The legal framework should also be developed to support the proposed financial scheme.

2) Improvement of Hospitality as a Center of Nomadic Culture

5.131 Improvement of the level of service in the tourism industry as well as the development of infrastructure are necessary for the improvement of hospitality in addition to the awareness raising among local people on the value of natural and cultural resources and the benefits from tourism promotion. Regarding the improvement of quality of service, in view of frequent requests by various stakeholders during the Study for technical assistance by Japan, concrete supporting measures are expected to be actively discussed soon. The legal framework to assure quality of service such as the Travel Agent Act and the Act on Development of Hotels for Inbound Tourists also needs to be established.

5.132 In terms of infrastructure development, the integration of public facilities such as airport and signage with the nomadic theme as well as the introduction of menu and activities at hotels and restaurants to interact with nomadic culture for business tourists in a casual manner are highly effective and important.

(3) Conservation of Natural and Cultural Resources

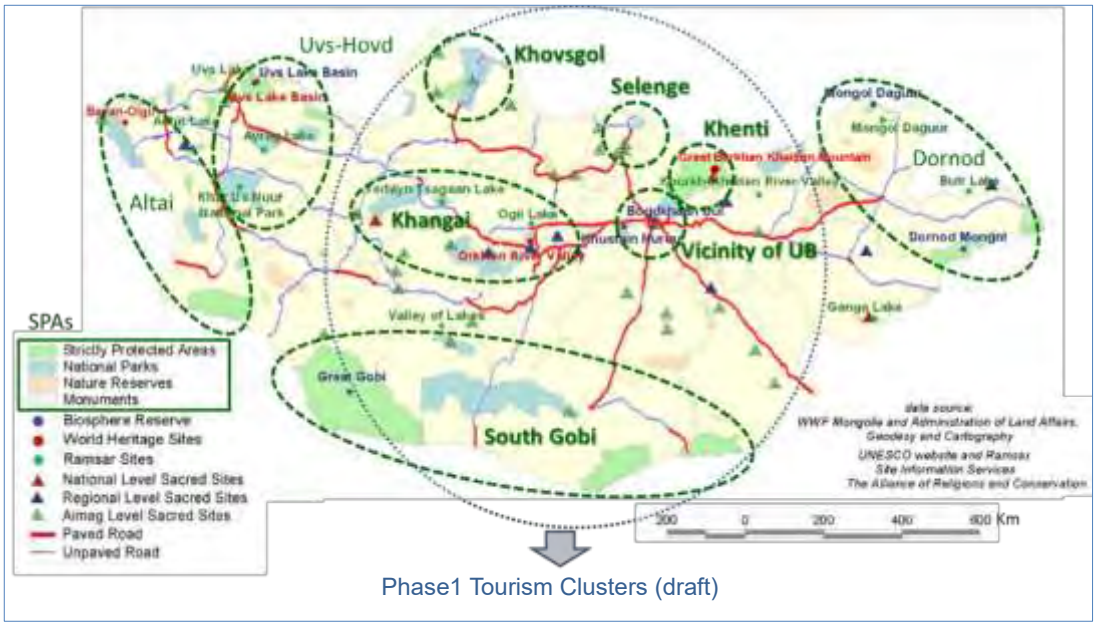
5.133 The most significant issue in the conservation of natural and cultural resources is the fact that the current conservation system led by MEGDT is not working appropriately due to insufficient financial and human resources. In order to solve the issue, the system needs to be transformed from a top-down approach by the national and provincial governments to a bottom-up approach by the local community. Since the cooperation among local communities is necessary for effective and efficient conservation, it is desirable to establish Tourism Clusters with SPAs sharing similar geographical and biological characteristics as the foundation for coordination of the local stakeholders. Therefore, the following measures are proposed for the establishment of Tourism Clusters as well as for the implementation of sustainable conservation of natural and cultural resources.

1) Establishment of Implementation System to Foster Independent Tourism Clusters and Supporting Legal Framework

5.134 A radical transformation from the top-down approach to the bottom-up approach is not feasible and a certain degree of management by MEGDT is necessary even after establishment of the bottom-up approach. Thus, the national policy on the conservation of natural and cultural resources needs to be clarified based on the necessary consultation and training for MEGDT. In order to cope with the urgent issues such as overgrazing and waste

management in and at the periphery of SPAs, the bottom-up approach is effective. A holistic operation and management system beyond provincial administration needs to be established to formulate a strategic development plan for Tourism Clusters as a proposal for the provincial and national governments. The legal framework also needs to be established to foster sustainable operation and management by the Tourism Clusters including financial schemes such as local taxation for the tour operators in UB offering tours to local aimags as well as a flexible budget acquisition and spending by SPAs.

5.135 Since all the examples of Tourism Clusters shown in Figure 5.4.3 cannot be established simultaneously, phased planning and implementation are essential based on the priority clarified through the consideration for the East-West and North-South Economic Corridors. A certain flexibility in phased planning is required since it includes some possible changes in relevant policies and projects. For example, although the Dornod Tourism Cluster in eastern Mongolia is currently outside the Phase 1 area, its development may occur in Phase 1 depending on the progress of the Greater Tumen Initiative under implementation through the collaboration among China, Russia, Korea, and Mongolia.



Source: WWF Mongolia; Administration of Land Affairs, Geodesy and Cartography; UNESCO website (accessed in December 2015); Ramsar Site Information Services; The Alliance of Religions and Conservation; JICA Study Team.

Figure 5.4.3 Examples of Tourism Clusters

2) Implementation of Community-Based Tourism (CBT)

5.136 Conservation of natural and cultural resources requires the sustainable use of resources by the local residents. Although recognition of the existence and value of the resources by the local residents is essential for sustainable use, this is not clear among the local residents as they take the resources for granted. Therefore, promotion of CBT helps the local residents to understand the existence and value of the resources and their sustainable use in entertaining the tourists. Such involvement of local nomads also contributes to the promotion of Nomadic Tourism as well as the improvement of their livelihood through tourism-related side businesses. Hustai NP established a Buffer Area Management Fund as a tool to make the natural preservation in the buffer area of NP and improvement on livelihood compatible. The

fund supports to diversify the source of income of the local nomads. Since many nomads started to be involved in agriculture and the tourism industry through the utilization of the fund, it also contributes to the promotion of both industries and the establishment of the foundation of agro-tourism in the near future. Such diversified business decreases the dependence on the cattle raising and consequently, it is expected to mitigate over-grazing that has become a critical issue lately.

3) Introduction of Eco-City through Collaboration with the Relevant Industries

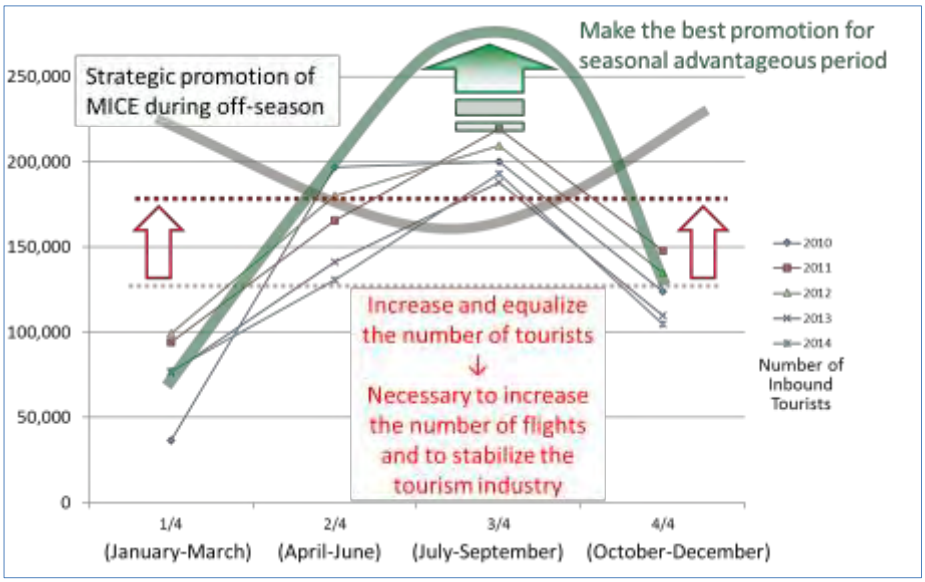
5.137 Negative environmental impacts should be mitigated through the implementation of both sustainable conservation and utilization of natural/cultural resources. Trends in relevant industries (agriculture and livestock raising, transport, energy, waste management, etc.)need to be considered to maximize the coordination among them in the Tourism Clusters. In some Tourism Clusters that include a leading industry such as mining in South Gobi, consideration should be given to fostering a healthy co-existence between urban growth from the industry and conservation of natural/cultural resources. Therefore, the introduction of an Eco-City adopting cutting edge technologies such as renewable energy and gasification of coal to mitigate the environmental impact based on the nomadic cultural philosophy of harmonizing with nature is highly important.

4) Promotion of Cross-Border Tourism

5.138 Cross-border tourism between Mongolia and Russia has flourished since 2014 when visa-free tourism was approved. The number of inbound and outbound tourists has been increasing in the border areas such as Shkhbaatar in Selenge Province and north of Lake Khuvsgul. The conservation of Lake Khuvsgul and the scenic areas along Selenge River near Shkhbaatar should be enhanced by the promotion of cross-border tourism. The implementation of visa-free tourism with China has been currently discussed to enhance the relationship with Inner Mongolia. In response to this consultation, some Mongolian border areas have already started to coordinate with the cities in Inner Mongolia and such activities are expected to be accelerated from now on due to the high potential of border tourism with Inner Mongolia. For example, South Gobi Province is currently negotiating with China to open the border gate for the tourists at Shiveekhren, which is currently restricted only to the stakeholders of the mining industry. Since the border area creates the first impression for inbound tourists by land, active conservation and utilization of natural and cultural resources to represent the nomadic culture in an effective manner are desirable.

(4) Improvement of Access

5.139 Improvement of access aims to maximize the opportunities and potential in tourism promotion since currently limited access deprives the tourism industry of full utilization of such opportunities. Figure 5.4.4 illustrates the concept of strategic tourism promotion to maximize the potential in tourism. As indicated, both the maximization of opportunities during summer and strategic business tourism promotion during winter are necessary to increase the number of inbound tourists throughout the year, as well as the increase in number of flights and stable employment in the tourism industry.



Source: National Statistics Office, JICA Study Team.

Figure 5.4.4 Concept of Strategic Tourism Promotion to Maximize the Potential of Tourism

5.140 The following measures for the improvement of access are proposed to maximize the potential and opportunites in tourism:

(i) Increase of flights during summer through the Open Sky Policy;

(ii) Development of multi-modal transportation facilities to ensure convenient transfers for inbound tourists relying heavily on public transportation;

(iii) Improvement of strategic marketing and online ticketing services to promote public transportation (domestic flights and railways);

(iv) Promotion of infrastructure development (roadway, airport, etc.) through PPP; and

(v) Development of multi-use transportation and commercial facilities (e.g., rest areas along the highway) to increase convenience and comfort for the tourists.

5.141 Implementation of these measures will improve the access in and around the vicinity of SPAs, enhance the linkage among SPAs, and contribute to the growth of the Tourism Clusters.

(5) Desirable Tourism Development and Promotion, Technical Transfer

5.142 The tourism master plan for Mongolia was formulated through the JICA project on "The Master Plan on National Tourism Development in Mongolia" and various tourism development and promotion activities have been implemented. Considering the fact that the TNDP, which covers various issues in tourism with phased planning until 2025, was already prepared and under implementation, an entire re-formulation of the tourism master plan is not desirable and the necessary revision should be sufficient. The desirable planning of tourism development and promotion in Mongolia is a roadmap that has both strategic/holistic policy with a common vision shared by the stakeholders as well as a concrete action plan/program for immediate implementation to solve the urgent issues and achievement for the goals of the policy. Following are the industries with high demand for technical transfer assistance from the Japanese government and/or companies through the formulation, revision and implementation of the planning for tourism development and promotion mainly in the priority areas previously introduced:

(i) Service Industry (Development of a training system and legal framework to ensure the quality and safety of services, etc.);

(ii) Construction Industry (Infrastructure development through the introduction of appropriate technology for access improvements such as soil-bag construction technology, etc.); and

(iii) Environmental Industry (Introduction of operation and management system for SPAs).

5.143 Following are examples of projects/programs identified in the Study with high demand for JICA technical assistance:

(i) Formulation of a roadmap for sustainable tourism promotion (establishment of standards for infrastructure of tourism [environmental standard, safety standard, service standard, qualification standard etc.] and establishment of the necessary implementation scheme [financial scheme including cross-subsidy utilizing the revenue of business tourism for the preservation of natural/cultural resources, legal framework etc.]);

(ii) Capacity enhancement in the formulation and implementation of planning for operation and management of SPAs;

(iii) Capacity enhancement in the formulation and implementation of planning for solid and liquid waste management in SPAs;

(iv) Capacity enhancement in the formulation and implementation of planning for strategic Tourism Cluster development (including Eco-City development);

(v) Capacity enhancement in the formulation and implementation of planning for promotion of CBT;

(vi) Capacity enhancement in the formulation and implementation of planning for promotion of cross-border tourism; and

(vii) Capacity enhancement in the formulation and implementation of training programs.

5.144 Consistent technical assistance from the formulation of policy to action plan/program including implementation is required for relevant national agencies such as MEGDT as well as for relevant local agencies in the Tourism Clusters (e.g., SPAs, provinces, stakeholders in the community, etc.) for the projects/programs listed above. In response to such requests, long-term cooperation fostering the capability to conduct the entire process from formulation to implementation of the planning for sustainable development and promotion in tourism is required.

5.5 Development of a Functional Transportation (Logistics) Network

(1) Road

5.145 In the road sector, it is necessary to try to expand the road network with low-cost road construction or anti-freezing technologies in which Japan could assist Mongolia, to apply an asset management system utilizing the existing technologies as well as ITS (Intelligent Transport System), and to promote efficient and effective road development as a base of transportation by adopting a Michi-no-Eki network system that originated in Japan.

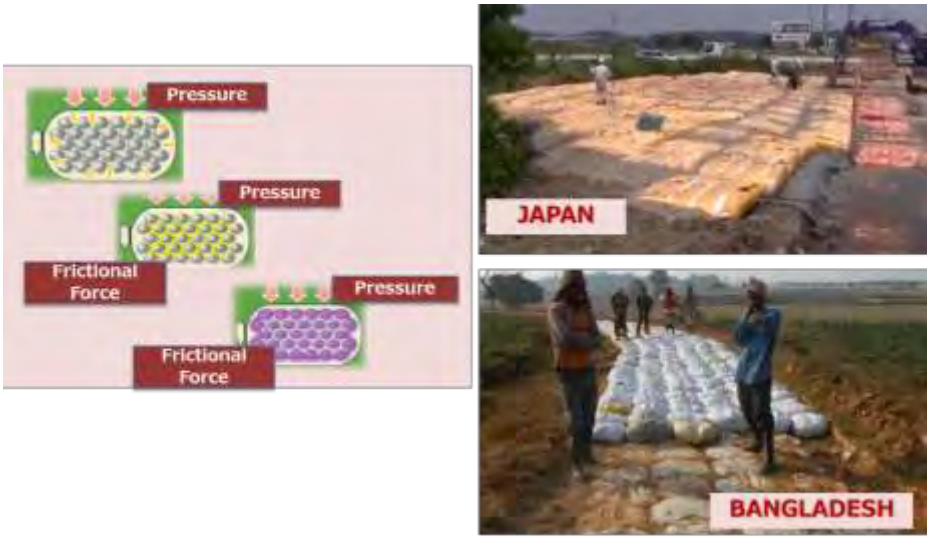
1) Application of Japanese Road Technologies

(a) **Soil Bag Technology**

5.146 The major obstacle in the course of developing a functional transportation (logistics) network is the problem of time and cost for transportation to large cities, among others, Ulaanbaatar. As such, the development of local feeder roads becomes an important key. Traffic volumes on rural roads are so small that development of standard-class roads would not be economically feasible at all.

5.147 Thus, the soil bag technology has been proposed as a low-cost method of road construction, where strong inter-participle force and frictional force greatly increase the withstanding pressure to the same level as concrete while keeping excellent drainage capacity (see Figure 5.5.1). This soil bag technology has been applied not only in Japan and the U.S. but also in developing countries such as Bangladesh, Kenya, and Uganda with over 2,000 examples. In terms of its future application in Mongolia, it is necessary to examine its durability and standardization since issues such as congelation of the road bed in winter and degradation of the road after sustaining repetitious pressures from running vehicles at an extremely low temperature of around minus 30 degrees should be studied.

5.148 Appendix 5.7.1 shows construction of cattle shelters using soil bags as an example of application of soil bag technology in Mongolia.



Source: http://www.soilbag.com/

Figure 5.5.1 Concept of Soil Bag Technology and Examples of its Application

(b) **Road Surface Technology: Pavement Recycling and Subsurface Stabilization**

5.149 The methodology for pavement recycling and subsurface stabilization is presented in Figure 5.5.2. A surface heating machine heats the existing surface and scraps about 2cm of the upper surface layer with spring tines installed at the rear. Then, an asphalt finisher lays evenly a new layer of mixed materials so that its thickness would be about 2cm, which is then finished by a regular compaction machine. Thus, the new surface layer is composed of two layers, namely a recycled layer of compaction of scrapped surface and a new layer of mixed materials.

Source: Ohshima, Yoshihito "Japan's Current Pavement Technology."

Figure 5.5.2 Road Surface Technology: Pavement Recycling and Subsurface Stabilization

5.150 Following are the benefits of this road surface technology:

(i) Little waste occurs at the work site since it reuses the existing surface layer by heating and scrapping;

(ii) Emission of CO_2 can be reduced by 30% compared to reconstruction of asphalt pavement; and

(iii) It also achieves 20% cost reduction compared to reconstruction of asphalt pavement.

(c) **Zapeck Method Type G: Anti-freeze Pavement Technology**

5.151 In the Zapeck Method Type G, grooves are formed in the pavement surface and filled with anti-freezing materials consisting of rubber chips, anti-freezing agents and urethane resin (see Figure 5.5.3). It can be applied particularly in the following places that are slippery:

(i) Shaded road surfaces in mountainous areas or on bridges;

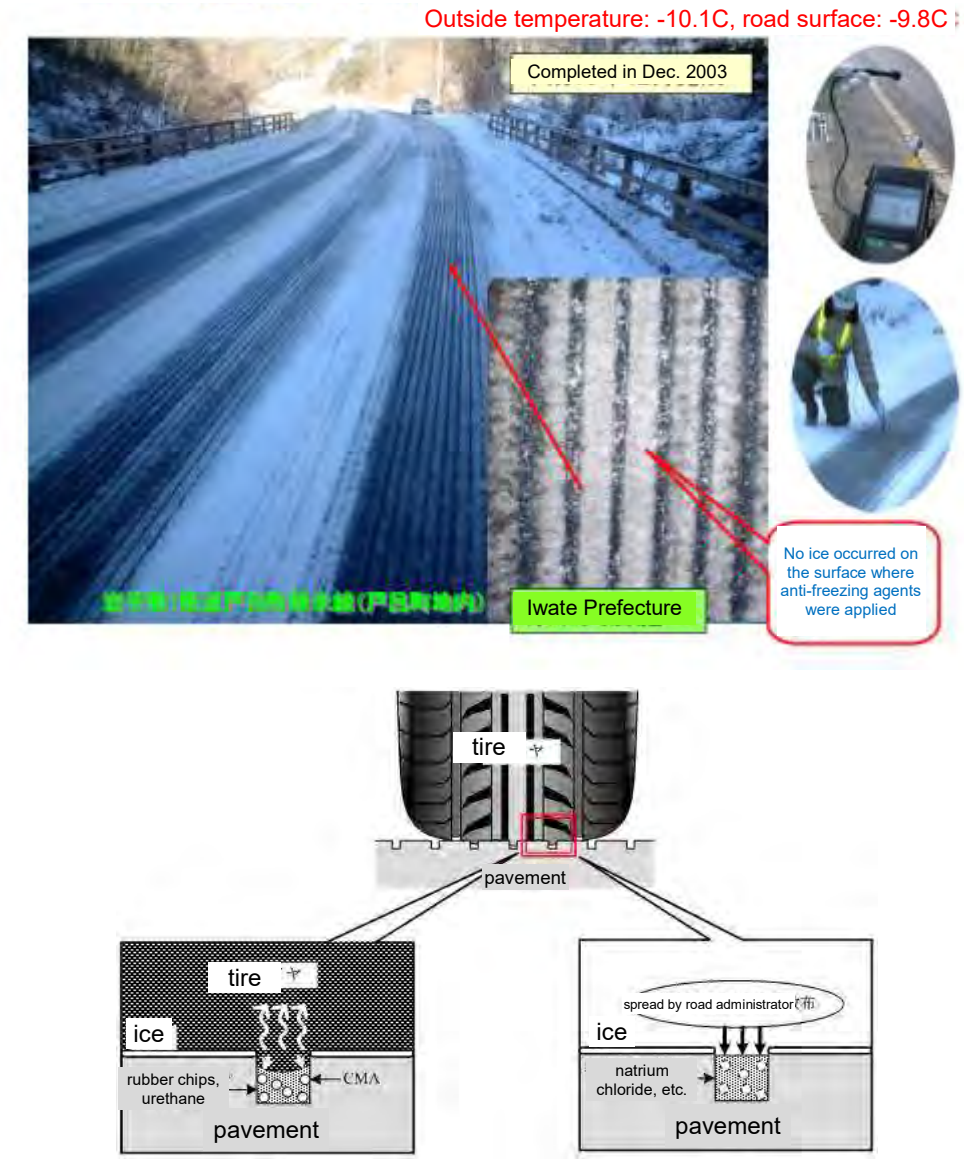
(ii) Entrances and exits of tunnels and snow sheds where the road surface conditions tend to change suddenly; and

(iii) Near intersections, sharp curves, railway crossings, and slopes where vehicles are required to decelerate or stop.

5.152 The benefits of this technology are as follows:

(i) Reduction in the amounts and frequencies of spreading anti-freezing agents and enhanced efficiency of snow clearing work will ease the burden of road maintenance in winter; and

(ii) Elasticity of anti-freezing agents will enable the vehicle load to destroy the icy road surface layer, realizing excellent anti-freezing effect.



Source: Ohshima, Yoshihito "Japan's Current Pavement Technology."

Figure 5.5.3 An Example of Application of Zapeck Method Type G

2) Establishment of an Asset Management System

5.153 Supported by the Millennium Fund of USAID and other funds, pavement of the arterial roads has been moving on and the national road network is nearing completion. Meanwhile, with regard to the issue of maintenance and management of the arterial roads, its systems development becomes extremely important. Under the current situation in which periodical maintenance is not conducted due to budget shortage, it is foreseen that many roads will deteriorate within a few years.

5.154 With such a limited budget for maintenance and management, an asset management system will play an important role. It is a system to manage and utilize assets, human resources, budget, etc., and it aims at accumulating and managing information and methodology derived from paper and electronic documents. HIMS, which is a software

application for asset management that has widely been utilized, can be applied in the following fields:

(i) Road Information System;

(ii) Pavement Management System;

(iii) Routine Maintenance Management System;

(iv) Bridge Management System;

(v) Accident Information System;

(vi) Project Monitoring and Evaluation System;

(vii) Asset Valuation System (AVS);

(viii) Traffic Information System; and

(ix) Environmental and Social Information System.

5.155 Asset management is a tool which will enable the Ministry of Transportation and its relevant agencies to utilize their existing methods through IT (Information Technology) for decision making in terms of maintenance and management. In cases where international standard software is costly, it is possible to develop an inexpensive system suitable to Mongolia by narrowing down the above features.

5.156 The Department of Roads of MRT once had a project of applying asset management software from New Zealand called dTIMS as a technical assistance from ADB from 2011 to 2012. However, the asset management system has not functioned yet because the government information data center was not completed so the database could not be hosted on its servers. The government was also unwilling to make road data available to the public as it was deemed confidential. Furthermore, the two staff trained in database operation left the government service.

3) Utilization of ITS

5.157 For development of transportation under special conditions such as limited human resources and traffic volume and severe climate in winter, full utilization of an Intelligent Transport System (ITS) is recommended in the road sector such as electronic toll collection, freight vehicle tracking, and automatic control of overloaded vehicles (weigh in motion) with a view to tackling the issues in the road sector. Among others, the use of RFID (Radio Frequency Identification) tags is relatively inexpensive and, hence, is applied in developing countries as well, mostly for electronic toll collection.

(a) Monitoring and Control of Overloaded Vehicles

5.158 The total number of trucks in Mongolia as of 2014 was 96,581; thus, it is relatively easy to register all freight vehicles with RFID for monitoring purposes. Targeting these vehicles, automatic weighbridges with RFID readers could be installed on the state road (see Figure 5.5.4), and a control system will be developed in which registered persons for overloaded vehicles are subject to penalties in the name of compensation for road damage.

Source: http://www.imagicsolution.com/Unattended_Weighbridge_System.php.

Figure 5.5.4 An Example of Automatic Weighbridge

5.159 Though weighbridges do not always need to be unmanned, it is desirable that they should be automated taking into consideration small traffic, shortage of labor, severe weather, etc. While there are currently only four manned weighbridges in the whole country, the conceptual plan envisages the development of automatic weighbridges at a total of 70 to 80 locations along the state roads (see Figure 5.5.5), thereby enabling allocation of the revenue from overloading fines to road maintenance. For actual implementation of this project, however, it is necessary to improve the legal framework. Furthermore, law enforcement and collaboration between the police who will be primarily in charge of monitoring, the Ministry of Road and Transportation, and the Road and Transportation Development Center (RTDC) are essential for the success of this project.

Source: JICA Study Team.

Figure 5.5.5 Proposed Locations of Automatic Weighbridges

(b) **Electronic Toll Collection System**

5.160 In Mongolia, toll gates are supposed to be located at entrances of every aimag to collect toll from vehicles that come from other aimags. In fact, in most cases the toll cannot be properly collected due to small traffic, shortage of labor, severe weather, etc. Therefore, it is proposed to develop an electronic toll collection system by equipping all vehicles in Mongolia (a total of 437,677 vehicles as of 2014) with RFID tags. The system will make it possible to save on labor cost and to secure funds for maintenance of state roads as well as local roads. Though a significant initial cost is expected for electronic toll collection, a stable revenue from the toll will be secured in the future.

5.161 In addition to the current 16 toll gates in the whole country, in the conceptual plan it is envisaged that electronic toll gates will be developed at a total of 42 locations assuming two locations for each of the 21 aimags (see Figure 5.5.6), thus also enabling allocation of toll revenue for road maintenance. However, as in the case of automatic weighbridges, improvement of the legal framework will be necessary for actual implementation of this project. Likewise, it will require effective law enforcement and collaboration between the police who will be primarily in charge of monitoring, the Ministry of Road and Transportation, and RTDC.

Source: JICA Study Team.

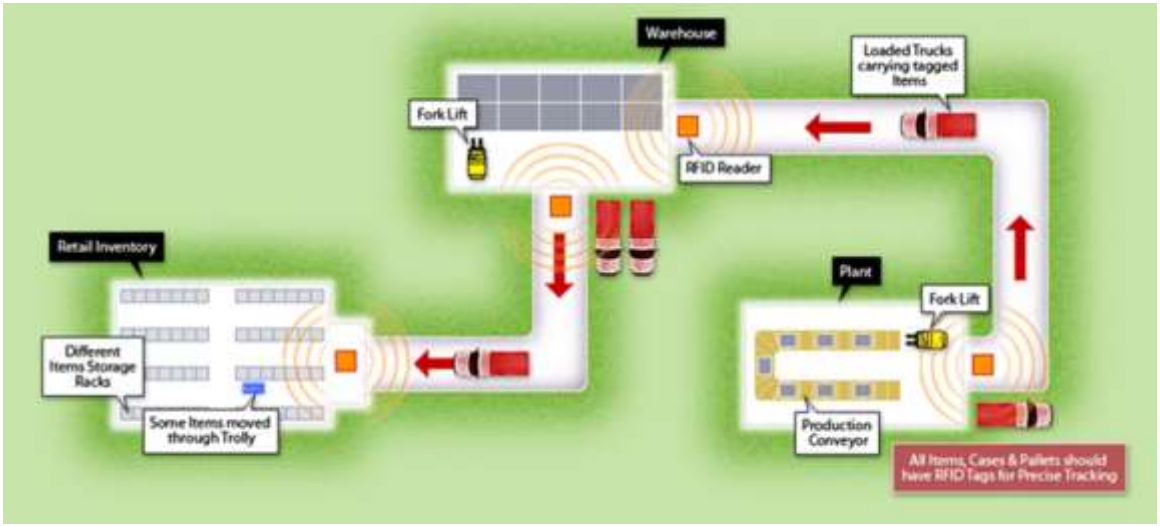
Figure 5.5.6 Proposed Locations of Electronic Toll Gates

(c) **Tracking System of Freight Vehicles, etc.**

5.162 In the same manner, as vehicles equipped with RFID will pass the abovementioned electronic toll gates, automatic weighbridges, and other checkpoints with RFID readers, it will be possible to track approximate locations of the vehicles. In the first phase, tracking can be utilized for monitoring locations of freight vehicles and intercity buses. Furthermore, data of passing vehicles obtained from the electronic toll gates could be utilized for analyzing origins and destinations as well as traffic flow patterns of vehicles in the whole country, and the result could be utilized for various planning purposes in terms of economic development.

(d) **Utilization and Issues of RFID in the Transportation Sector in Mongolia**

5.163 In the road sector, utilization of RFID is recommended as part of the ITS, such as electronic road (toll) pricing, tracking of freight vehicles, and weigh-in-motion for control of overloaded trucks. The recommended use of RFID is further extended to the railway sector for monitoring of train operations and for maintenance and management of railway infrastructure. Moreover, it is also extended to the logistics sector for development of a supply chain management system (see Figure 5.5.7).



Source: http://www.satcomlimited.com/system_integration.html.

Figure 5.5.7 Supply Chain Management System by RFID

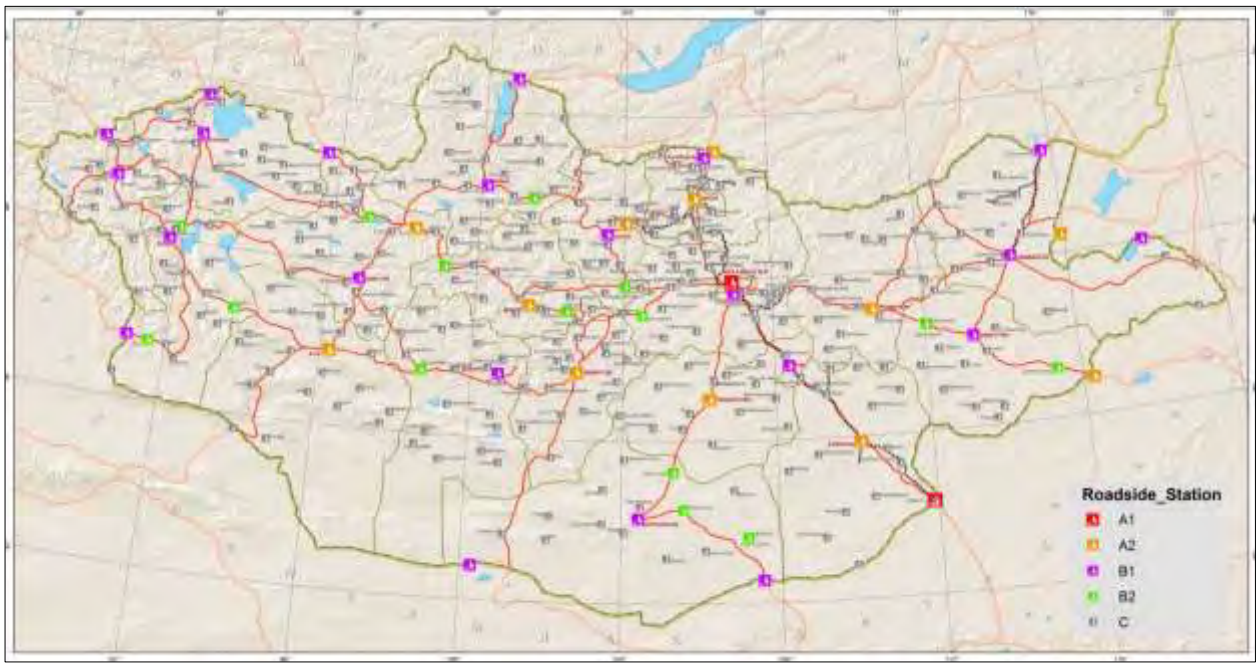
5.164 On the other hand, in the actual application of RFID, there are various issues such as the need for amending the legislation on road transport, need for security measures to solve the problems of breach of privacy and fraudulent procurement and abuse of personal information, etc. There are also other issues such as high initial investment cost and necessity of standardization of the operation system including an internationally available band of frequencies especially in accordance with neighboring countries. In terms of technology, there are also problems of inaccuracy and variation in reading RFID as well as subsequent problems of loss of time to complete reading at a satisfactory level. Among others, metal and liquid are serious obstacles to the accurate reading of RFID. Trial and error is a must in order to adapt to various fields of application.

4) Vision of Mongolian Michi-no-Eki

5.165 Since there are currently very few resting facilities and service stations along the arterial roads in Mongolia, development of roadside stations for all kinds of road users is also an important issue. In the general road network in Japan, roadside facilities called Michi-no-Eki, where resting facilities and regional development facilities are integrated, are promoted by the Ministry of Land, Infrastructure and Transportation. It has three major functions, namely to provide rest for road users, to transmit information to road users and local residents, and to foster regional cooperation among local residents with a Michi-no-Eki station as a core.

5.166 For the Mongolian Michi-no-Eki, it is recommended to include not only the abovementioned functions but also maintenance workshop-related services, vehicle inspection

centers, terminals, logistics hubs to consolidate agricultural and livestock products, postal services, distributing functions, etc. Thus, the Mongolian Michi-no-Eki will become essential facilities that should be systematically placed at certain intervals depending on the scale (large-scale facility A: about 300km, medium-scale facility B: 100–150km, small-scale facility C: tens of km) as shown in Figure 5.5.8 and Table 5.5.1.



Source: Asian Infrastructure Research Institute.

Figure 5.5.8 Concept of Mongolian Michi-no-Eki Network

Table 5.5.1 Class and Locations of Michi-no-Eki in Mongolia

Class	Locations
A1	Ulaanbaatar (2 locations), Zamiin-Uud
A2	8 Aimag centers, 1 Soum center, 3 border ports
B1	13 Aimag centers, 9 border ports
B2	17 Soum centers
C	Other Soums and settlements (about 300 locations)

Source: Asian Infrastructure Research Institute.

(2) Railway

1) Improvement of the Existing North-South Main Railway

5.167 An urgent issue in the railway sector is to expand the existing operational capacity of freight and passenger transport to meet the future transportation demand. Above all, rehabilitation of the track and signaling system on the north-south main railway, improvement of the curves, upgrading of the rolling stock, and development of a railway traffic control system for faster service and punctuality are most important in order to enhance the comfort of passenger transport and the safety of freight transport. Details of improvement of the north-south main railway implemented by UBTZ are presented in Table 5.5.2.

Table 5.5.2 Improvement Items for the North-South Main Railway

Indicators	Current Situation	2020 Target Plan
Railway classification	III - Class	II - Class
Carried freight capacity	21–23 million tons	50 million tons
Train speed	Passenger - 90 km/hour	Passenger - 120 km/hour
	Freight - 80 km/hour	Freight - 90 km/hour
Technical speed	46.02 km/hour	55 km/hour
Section speed	37.38 km/hour	45 km/hour
Wagon turnover	4.5 days	2.5 days
Straightening line drawings, softening profile	For high traffic volume area, the rail line has less than 600m radius, rail track will be changed.	For high traffic volume area, the rail line has less than 600m radius, rail track will be changed.
Upgrade railway track	There are vital needs of upgrade for mainline 5,590 km and for Branch line 320 km	
Upgrade base part	Built in 1949–1956. 194 bridges need improving.	
Capacity for railway terminal	Length for reception and departure yard is 850-1,250m. Number of railway line in reception yard is not sufficient. There is no sorting yard.	Expand reception and departure yards
Locomotives	Total: 153	Total new locomotives: 75
	Steam locomotives: 117 (48 are over 20 years old)	New steam locomotives: 50
	Shunting locomotives: 36 (28 are over 30 years old)	New shunting locomotives: 25
Freight wagon	Total: 2,673 (1,361 are over 25 years old)	New freight wagons: 4,000; 100 refrigerated wagons
Passenger cars	Total 325: (186 are over 25 years old)	New passenger cars: 72 cars and 6 diesel trains

Source: UBTZ.

2) New Railway Development

5.168 As for the bottleneck section between Ulaanbaatar and Maanit on the north-south railway, since limited improvement is expected for the existing curves and slopes, the development of Bogd Khan railway (see Figure 5.5.9), which is implemented by ADB, is also important. Bogd Khan railway is expected to make up for the shortage of the freight carrying capacity as well as to serve as a bypass for the transit freight and hazardous goods transport. Furthermore, it will provide a railway access to the nearby new airport (to be completed in spring 2017) and logistics center, thereby realizing intermodal transport that is also to be highlighted. A feasibility study by ADB is currently under way.

Source: Ministry of Transportation.

Figure 5.5.9 Bogd Khan Railway Plan

5.169 Besides Bogd Khan railway, the new railway line from Tavan Tolgoi to Gashuun Sukhait (see Figure 5.5.10), of which work is currently 50% complete, should be completed as soon as possible. This railway will have the same standard gauge as Chinese railway tracks, enabling transportation without trans-loading.

Source: MTZ.

Figure 5.5.10 Tavan Tolgoi–Gashuun Sukhait Railway Plan

3) Meeting the Global Standards of the Railway System

5.170 Since MTZ will operate the new railway, it will be necessary to establish laws for railway operation by multiple railway operators including the existing railway lines and to develop signal control, monitoring, and communication systems for the entire railway operation. In the Directorate of Railway of the Ministry of Road and Transportation of Mongolia, a Unified Center for Management of Railway Traffic has been established under the technology and research division, and remote control of some railway crossings has already been in operation. For this center, it is desirable to introduce new technologies such as development of automatic monitoring and control of train movements, installation of automatic switching equipment, and development of a railway traffic information system.

5.171 Furthermore, for tracking and control of freight trains, maintenance of the related equipment, monitoring of passenger train operation, and utilization of the abovementioned RFID tags are anticipated.

(3) Air Transport

5.172 Whether it is a landlocked country or not, Mongolia's potential for air transport development is nearly equal to all countries. Therefore, major airports in many countries are competing with each other and aspiring to become hub airports. The current state of the air transport sector in Mongolia is lagging behind international trends. However, taking into consideration Mongolia's location in the Eurasian continent, particularly accessibility to the metropolitan cities in many developing countries in Central Asia that can be reached within 3,000–5,000 km, the shortest air routes connecting Tokyo, Seoul, or Beijing in East Asia and cities in Central and West Asia via Ulaanbaatar (see Figure 5.5.11) could be realized since those air connections are not yet served by direct flights. In this sense, Ulaanbaatar also has a good potential as a hub airport in the region.

Source: JICA Study Team (base map from http://www.miat.com/pagecontent.php?pageId=11&lang=en).

Figure 5.5.11 Vision of Air Transport Network from/to Ulaanbaatar

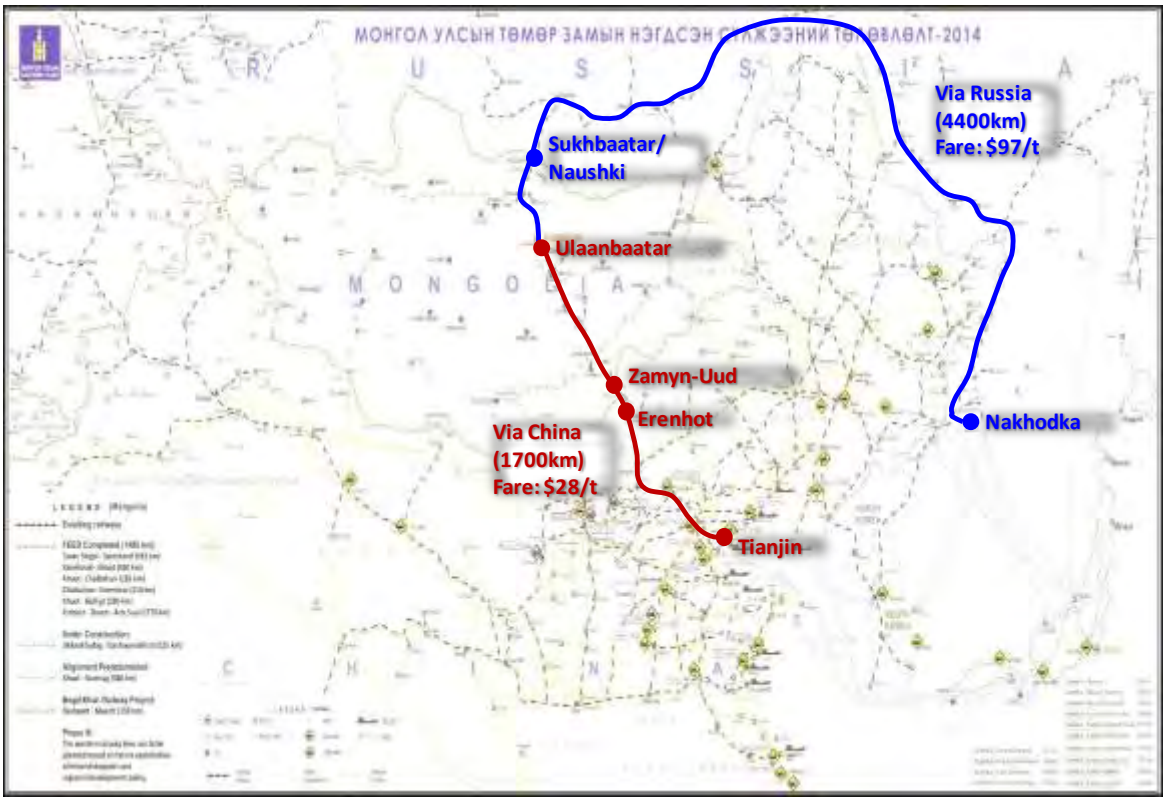
5.173 The development policies in the air transport sector are the promotion of the open sky policy, deregulation in the international passenger and air freight market, and stimulation of the air passenger and freight demand. Specifically for the development of air freight transport, it is necessary to develop and expand the current small air freight terminal and to introduce domestic and international freight transport of fresh products and lightweight high-value products.

5.174 However, major industries may wish for more air cargo services, though the contents of the demand such as necessary number of flights, capacity of freight, and destinations are not yet clear. Therefore, further study including interviews with industries would be important in this regard. Likewise, for passenger air transport, it is necessary to clarify potential demand of tourism and business passengers including transit passengers.

(4) Approximation to the International Market and Development and Reinforcement of the Logistics Industry

1) International Logistics

5.175 As international logistics corridors, there are two major international railway routes connecting from Mongolia, especially Ulaanbaatar, to the gateway ports to third countries, namely the China route (Ulaanbaatar–ZamiinUud–Tenjin Port) and the Russia route (Ulaanbaatar–Sukhbaatar/Naushki–NahtokaPort), as illustrated in Figure 5.5.12. The China route is shorter (less than half) and less expensive (less than one third) than the Russia route. The China route also has an alternative mode which is truck, and it has other advantages such as relatively smooth customs clearance and available freight tracking. As a result, the majority of freight is transported to Tenjin Port (or Shanghai Port in part) via the China route.



Source: JICA Study Team (based on the map from the Ministry of Transportation).

Figure 5.5.12 Major International Railway Access from Ulaanbaatar

5.176 However, since there is a significant risk if all the freight transport will depend on the China route, the Russia route should always be maintained as a back-up route. Moreover, as the railway in Mongolia has the same broad gauge as Russia's, no trans-loading of freight is necessary at the border and the time spent for transport to the port is nearly the same as in the China route (about 10 days). In addition, freight wagons on the Russia route have a greater capacity due to its broad gauge. Thus, the Russia route also has some advantages. Therefore, utilization of the two major international railway routes will enable Mongolia to keep a stable logistics flow to third countries.

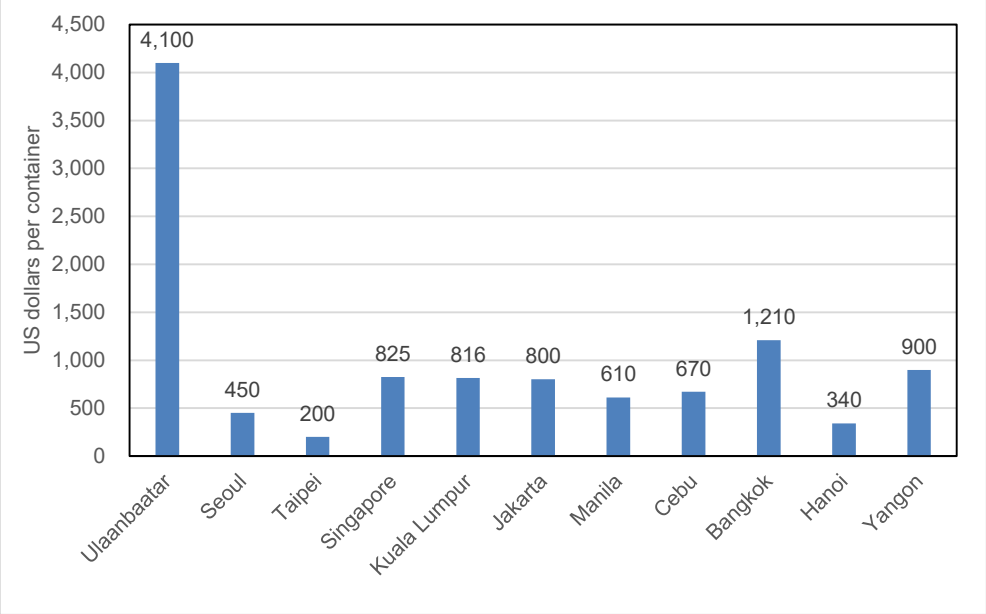
5.177 A comparison of transport cost per TEU (twenty-foot equivalent unit) and per km in landlocked countries is presented in Table 5.5.3. This shows that the Mongolian unit cost per TEU (taking the distance from Ulaanbaatar to Tianjin Port, China) is much higher for both export and import, partly because both China and Mongolia (UBTZ) impose high tariffs. However, since the Mongolian and Russian governments have an equal 50/50 share in UBTZ, Mongolia cannot control transport tariff freely.

Table 5.5.3 Comparison of Transport Cost per TEU and per km in Landlocked Countries

Variables	Alma-Ata, Kazakhstan	Tashkent, Uzbekistan	Dushanbe, Tajikistan	Bishkek, Republic of Kyrgyz	Ulaanbaatar, Mongolia Export	Ulaanbaatar, Mongolia Import
Distance to the closest seaport (km)	3,380	2,720	2,040	3,100	1,700	1,700
Cost/TEU/km (USD)	0.37	0.35	0.59	0.34	0.61	0.87

Source: Mongolian Logistics Association.

5.178 Figure 5.5.13 shows a comparison of export cost to Japan (Yokohama Port) per 40-foot container. Though the distance from Ulaanbaatar to Yokohama is in the same range as the distance from Manila, Cebu, and Hanoi, exporting cost from Ulaanbaatar to Japan is very high compared to the cost from other major Asian or cities as it includes a land route.



Source: Comparison of investment cost in metropolitan cities of Asia and Oceania.

Figure 5.5.13 Comparison of Export Cost to Japan (Yokohama Port) per 40ft Container

5.179 While solutions to these problems of high transport cost to Japan and other countries

are limited, there is a need to address the following issues that are appropriate for the Mongolian international logistics:

(i) Management of the routes for transportation and the logistics corridors to reach the seaport / improvement of the transit transport agreements with the two neighbors;

(ii) Border management / improvement of collaborative cooperation between the neighboring countries' border offices (integration, simplification, and electronification of customs clearance documents); and

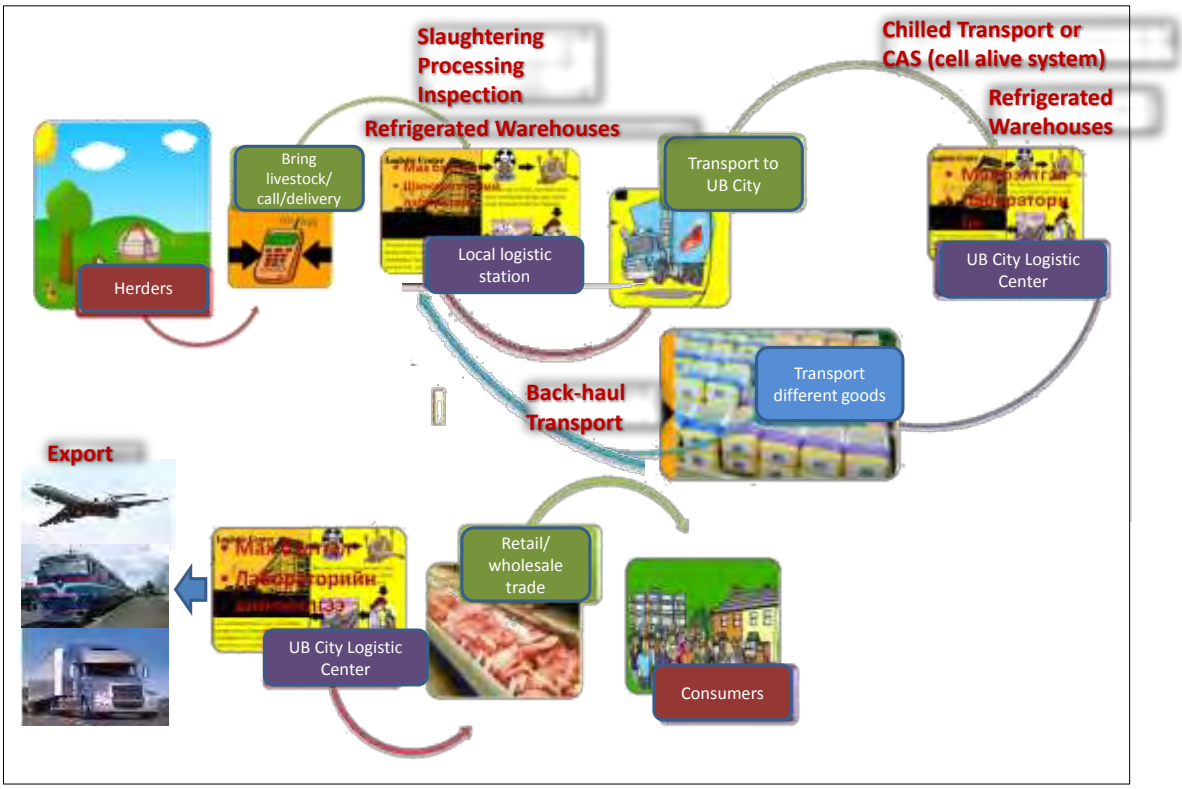
(iii) Transportation and logistics quality of domestic transportation / timeliness and technology for transportation / transportation cost.

5.180 Though (i) and (ii) of the above issues may depend on politics with the neighboring countries, there still seems to be room for improvement as to (iii) or the domestic logistics.

2) Domestic Logistics

5.181 As there is no well-developed logistics system in Mongolia, distribution costs such as transport cost is said to account for a large part of the price of agricultural and livestock products. Moreover, the higher prices may also cover the cost of brokers as well as corruption, and spoilage of fresh products that happen in long-distance transport. For fresh products, the increase in the retail price per unit weight caused by evaporation in the course of room-temperature transport has been pointed out as a problem.

5.182 Therefore, development of a transport system that includes refrigerated and chilled transport that will cover the whole country should be urgently implemented. As shown in Figure 5.5.14, it is necessary to consolidate local collection points that are currently scattered, to develop regional logistic hubs with warehouses, to establish logistics centers where the total transport cost is expected to be minimized depending on the type of products, and to develop and improve the transport system that will connect these logistics hubs and centers with points of consumption and gateway border stations.



Source: Asian Infrastructure Research Institute.

Figure 5.5.14 Domestic Logistics: An Example of Distribution of Meat Sales

5.183 It should also be noted that at the regional logistic hubs, adding value to the products through primary processing or inspection will contribute to the efficiency of the transport system as well as the regional industrial development. The Cell Alive System (CAS) in the figure is a new freezing technology which minimizes reduction of taste quality caused by freezing and melting processes in the conventional freezing method. Through CAS, the flavor of freshly picked or produced goods can be preserved for a long time, thereby adding value to the products. Research on the demand for CAS or a feasibility study will also be necessary for actual introduction of CAS.

5.184 Another effective idea may be to integrate development of these stations for consolidation, processing, storage, transport, and distribution with the development of the Mongolian Michi-no-Eki in order to expand the latter's functions from rest, meal, and vehicle services to retail of local products, supply of essential commodities, educational and communication facilities, etc.

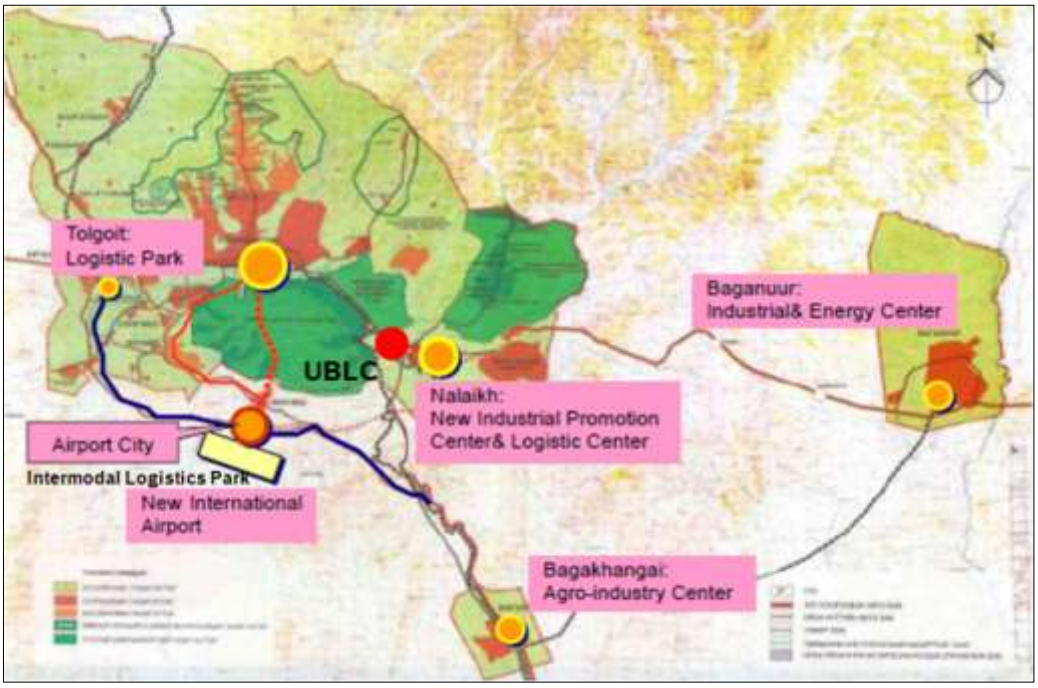
5.185 While the domestic logistics need monitoring and control functions for freight transport as well as development of an intermodal freight transport system, at present Mongolia has separate laws on rail, road, sea and airways and no unified laws. That seems to encourage only competition with each other but not cooperation. Therefore, Mongolia should have a single unified law with branches, which should encompass all the logistics issues. The RFID system could also be utilized for freight monitoring.

5.186 Below are descriptions of the plans for two major logistic centers, namely Ulaanbaatar Logistics Center and the Zamiin-Uud Logistics Center, which should be promoted as a key for development of the logistics infrastructure in Mongolia.

(a) **Ulaanbaatar Logistics Center Project**

5.187 Currently about 90% of the total freight in Mongolia are concentrated while ten container yards are scattered in Ulaanbaatar. Generally, the facilities are old and lacking efficiency and creating delays in processing. Furthermore, more bonded (and refrigerated) warehouses are urgently necessary as well as additional CFS (Container Freight Station).

5.188 With this background, the government of Mongolia has been pursuing the development of a new logistics center (see Figure 5.5.15) beside the new Ulaanbaatar airport that is currently under construction. This project will be funded by ADB, the European Infrastructure Development Bank (EIDB), etc. and a feasibility study by ADB is under way. However, it should be noted that implementation of the Bogd Khan railway and access highway projects that will serve as a bypass for Ulaanbaatar is a premise for this logistics center to fully function as an intermodal facility. It is also important that the logistics center be developed through a PPP scheme. That is, the government should prepare the land and necessary infrastructure including the new railway, leaving the private sector to develop their own facilities.



Source: DB International GmbH.

Figure 5.5.15 Planned New Logistics Center in Ulaanbaatar

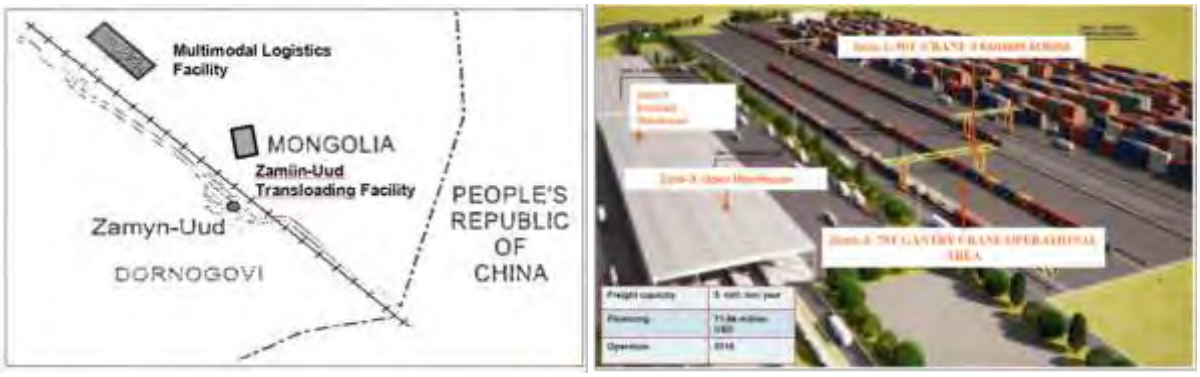
5.189 Located just close to the new airport, there is also a possibility that this logistics center will be developed as an FTZ. With local human resources of relatively younger generation and higher education in Mongolia, it could be possible to invite foreign companies in different industries, especially manufacturing stations for high-value products, while stimulating air passenger and freight transport demand for multiplier effect.

(b) **Zamiin-Uud Logistics Center Project**

5.190 For Zamiin-Uud, about 70% of the total import from overseas to Mongolia passes through the Zamiin-Uud border, thus giving Zamiin-Uud the potential as a dry port. However, development of the mining sector will create a huge demand in the future for transporting

minerals (except for coal that is not allowed to be exported through Zamiin-Uud), and this demand cannot be met by the existing logistics facilities, including the two facilities used for trans-loading between the two railway tracks of standard and broad gauges.

5.191 At Zamiin-Uud there is a project to develop a multimodal facility, with facilities for road-to-road, road-to-rail, and rail-to-rail transhipment. The project will include an integrated intermodal container terminal with customs and quarantine facilities, as well as rail and road access (see Figure 5.5.16). Out of the total 400 ha area for the logistics center, the ADB project component will be constructed on 50 ha which will include temperature control warehouses, transhipment facilities of different gauge railways, and road-to-road transhipment facilities as well. The remaining 350 ha will be operated by private companies.



Source: Mongolian Railway.

Figure 5.5.16 Planned New Logistics Center in Zamiin-Uud

5.192 Furthermore, the Mongolian and Chinese Governments have signed a Memorandum of Understanding on the Mongolian government's plan to rent 10 ha of land at Dunzian in Tianjin Port. This port area in Tianjin would create a unique opportunity for Mongolia to expand its sea trade and conduct trade operations faster and in a more economically viable way. A feasibility study for this port project is currently underway. The Dunzian Logistics Center is planned to be established in this area by a Chinese-Mongolian joint enterprise, which could lead to a reduction in transport cost in the Chinese section.

6 ISSUES RELATED TO CONSISTENT AND SUSTAINABLE LEGAL SYSTEM AND MANAGEMENT

6.1 This chapter discusses issues related to administrative management and the legal system to support sustainable economic growth in Mongolia. Though there are many issues, the following six issues have been identified as the main focus of this study:

(i) Strengthening of Local Governance Ability (Section 6.1);

(ii) Strengthening of Cooperation and Coordination in the Global Supply Chain by Foreign Direct Investment (Section 6.2);

(iii) Development of the System and Management of Agricultural Land Ownership and Strengthening of its Capacity (Section 6.3);

(iv) Promotion of Mutual Cooperation in the Mid- and Long-Term Policies on Trade, Investment Incentives and Industrial Development (Section 6.4);

(v) Promotion of the Economic Partnership Agreement (EPA) Between Mongolia and Japan and PPP (Section 6.5); and

(vi) Management System for the Realization of the Sustainable Development Vision (Section 6.6).

6.1 Strengthening of Local Governance Ability

6.2 The regional hubs on the economic corridors proposed in this study are shown in Table 6.1.1. Except the two cities of Choibalsan and Chingis on the East-West Green Development Corridor, the population growth rate after 2000 is higher in all other cities on the strategic economic corridors compared to the national average.

6.3 The concept of corridor development has the important aspects of improving the living services in rural areas, coping with issues of overcrowded population and depopulation, balancing national land use, and formulating a comprehensive human living environment. It is important to manage the issue of aging utility facilities including the water supply and heating supply systems, and environmental issues such as wastewater treatment and solid waste management. Except in Erdenet, solving these basic issues are critical for the other regional hubs. Although the local infrastructure development needs are high, there are big challenges in capacity development of officials in the local governments and in the increase of financial demand.

Table 6.1.1 Regional Hubs on the Strategic Economic Corridor

	Aimag	**Regional Hubs**	Population (2014)	Annual Growth Rate per Capita* (2000-2014)
South-North Industrial Growth Corridor	Darkhan-Uul	**Darkhan**	79,938	**1.40%**
	Orkhon	**Erdenet**	88,670	**1.99%**
	Govisumber	**Choir**	11,609	**1.85%**
	Dornogovi	**Sainshand**	22,666	**1.54%**
East-West Green Development Corridor	Khentii	**Chingis**	20,585	0.96%
	Dornod	**Choibalsan**	41,932	0.32%
	Orkhon	**Erdenet**	88,670	**1.99%**
	Darkhan-Uul	**Darkhan**	79,938	**1.40%**
Ulaanbaatar Metropolitan Area	Ulaanbaatar	**Baganuur**	28,000**	**2.62%****
	Ulaanbaatar	**Nalaikh**	33,000**	**2.93%****
	Tuv	**Zuunmod**	16,094	0.58%

Notes**:** * Underlined figures are those which are higher than the national average of 1.20%.
**These are the annual average rates between 2000 and 2010.
Source: NSO.

(1) Challenges in Capacity Development of Officials in the Local Governments

6.4 There are cases where a standard infrastructure development plan set by the central government is directly applied to the development plan of a local city, since it is difficult to have experts in several administrative sectors, local consultants and engineers in an aimag center except for Erdenet, Darkhan and Choibalsan. While there are many similarities among local cities, there are also some differences in their conditions such as arrangement of housing districts, urban size, topography, water foundation, etc. It is expected that a plan which ignores those differences causes a discrepancy in the economic side or operation and maintenance side of those infrastructure. Therefore, while it is difficult for the current administrative system of the Mongolian government to develop within the local government unit special abilitiessuch as engineers, it is necessary for local officers to develop basic planning capabilities such as estimating project budgets and a suitable network for road and water and sewage services.

6.5 For example, in the case of specialistsin urban development, 16 officials are assigned in the department in charge of land management, construction and urban development in each aimag. In the case of Orkhon, for instance, there are five specialists in the land management section and six specialists in the construction and urban development section, besides the administrative officials including director, lawyer, IT, and accountant. On the other hand, the balance of human resources are disproportionate in Dornod, where only three are architects and 15 are land management specialists among its 18 officials. The tasks in the aimag level include engineering, as shown in Table 6.1.2, but there is no engineer in Dornod.

6.6 The progress of the aimag center's urban development plan which is prepared by the department in charge of land management, construction and urban development in each aimag (see ***Appendix 4.1.1***) indicates gaps in progress by aimag, even though the work started in the same year.

Table 6.1.2 Local Government Organizational Structure (Case of Orkhon)

	Land Management Section	Construction and Urban Development Section
Officials	• Director • Official in charge of urban area, mining, and infrastructure • GIS • Cadastral map • Land for agriculture and livestock farming	• Director • Infrastructure facilities • Construction and technical management • Housing and public supply • Construction materials and laboratory • Laboratory worker
Major Tasks	• Management of application of the Land Law • Implementation of the action plan of the national government and aimag governor • Implementation of Aimag Act • Provision of technical support and advice on land related matters • Preparation of aimag's land management plan and explanation in aimag assembly • Submission of opinions to aimag's socioeconomic development basic vision • Work related to bidding and selection of land possession rights • Based on decision by aimag governor, making contracts on land rights • Management of cadastral information database • Preparation of cadastral map based on the Land Law • Issues on land tax • Information sharing on the Land Law • Submission of information and reports on land to the national government	• Management of implementation of standards, norms, rules and regulations of construction, infrastructure, public services • Technical management for building, renovation, expansion and repair • Management of conduction works in each stage • Submission of opinions for preparation of and implementation of urban development and settlement long-term plans, area detailed plans, • Naming of streets and open spaces and numbering of buildings • Participation in special management committee for new buildings • Management of design, survey, construction and construction materials related companies and submission of documents to the national government • Preparation of an action plan for the urban master plan, infrastructure development plans, budgets • Preparation of drawings of construction and urban development and information sharing to residents • Preparation of location maps • Preparation of TOR for design work • Preparation of information database on infrastructure facilities, and information sharing to residents • Management of private companies in the construction and urban development sector and reporting to the national government

Source: Orkhon

(2) Increase in Financial Demand in the Local Area

6.7 There is much demand for infrastructure development in local cities. However, the necessary funds for individual projects for roads, water and sewage, power supply, etc. can cost a number of billion MNT, which are considered small-scale projects under Japanese financial assistance programs. Local government units greatly depend on budget allocation from the central government as they have few investment funds at present to develop infrastructure. Although this central government-dependent financial structure is observed not only in Mongolia but also in other developing countries, social capital development by budget allocation from the central government makes local cities pursue development projects based on ease of securing a budget. This situation leads to a high possibility for urban development not to be considered a priority for those local cities.

6.8 To promote independence of local cities and develop their planning capacity, it is

necessary to first promote ownership of investment. In other words, it is desired to increase the ratio of independent revenue sources in local government units. The latest IT technology enables them to collect information by Point-of-Sales (POS) about value-added tax or sales tax, taxation and distribution, which can supplement local taxes. These improvements of the local financial system are necessary to implement local city development programs.

6.9 Urbanization in Mongolian cities and occurrence of urban environmental issues have followed almost the same pattern in local cities, wherein the ger housing area has sprawled and taken over traditional planned core urban areas. Table 6.1.3 shows the population, ger population ratio, and air pollution in rural cities in Mongolia which are the focus areas in this study. The ratio of ger housing districts among all the residential population surpasses 50% in large rural cities, somewhat exceeding that in Ulaanbaatar. This unplanned urbanization has imposed many restrictions on the development of urban infrastructure as well as on urban planning. The issue of air pollution becomes tangible as ger population ratio is higher.

Table 6.1.3 Population, Ger Population Ratio and Air Pollution in Rural Cities of Mongolia

Aimag	Aimag Center	Population (2014)	Population Ratio in Ger Area	Air Pollution Problems
Dornod	Choibalsan	41,932	50%	▲
Orkhon	Erdenet	88,670	60%	▲
Govisumber	Choir	11,609	40%	-
Khentii	Chingis	20,585	80%	▲
Ulaanbaatar City	Baganuur	28,000	60%	-
Ulaanbaatar City	Naraih	33,000	-	-
Dornogovi	Sainshand	22,666	60%	-
Darkhan-Uul	Darkhan	799,938	40%	-
Ulaanbaatar	Ulanbaatar		50%	○

Legend: ○ - Ambient air quality regularly exceeds the standards.
▲ - Ambient air quality does comply with the air quality standards but residents make complaints.
Source: Population data: National Statistics Office, Population ratio in Ger Area: MCUD and JICA Study Team, Air pollution problems: based on interviews with administrative officer of each aimag office.

6.10 Table 6.1.4 shows the ambient air quality measurements in Choibalsan. The city started its measurements on sulphuric dioxide and nitric dioxide since 1987. The monitoring results indicate that the measurements are below the standard limits.

Table 6.1.4 Sulfuric Dioxide and Nitric Dioxide Concentrations in Ambient Air in Choibalsan

	SO2mg/m^3			NO^2mg/m^3		
	Average	Max	Min	Average	Max	Min
2012	0.013	0.069	0.001	0.019	0.074	0.004
2013	0.009	0.055	0.0	0.018	0.061	0.003
2014	0.009	0.095	0.0	0.019	0.061	0.003
Standards（20 min. measurement）	0.450			0.085		

Source: Dornod Aimag Weather Monitoring Station.

6.11 Aside from air pollution, there are other environmental concerns in local cities such as issues of undeveloped or decrepit facilities for solid management system, water supply system, sewage and drainage system, and heating supply system in the city center, even though the level of problems depends on the situation in each city. There are some infrastructure improvement projects supported by ADB or EBRD in some local cities but the maintenance

and management of these infrastructures is the responsibility of each local government unit. Therefore, it is urgent to strengthen their financial capacity to enable them to secure adequate funds for maintenance of public facilities or for the rehabilitation budget as well as to secure the original budget of the local government unit. These are big political issues related to local governance.

6.2 Strengthening of Cooperation and Coordination of Local Industry, the Potential Supporting Industry

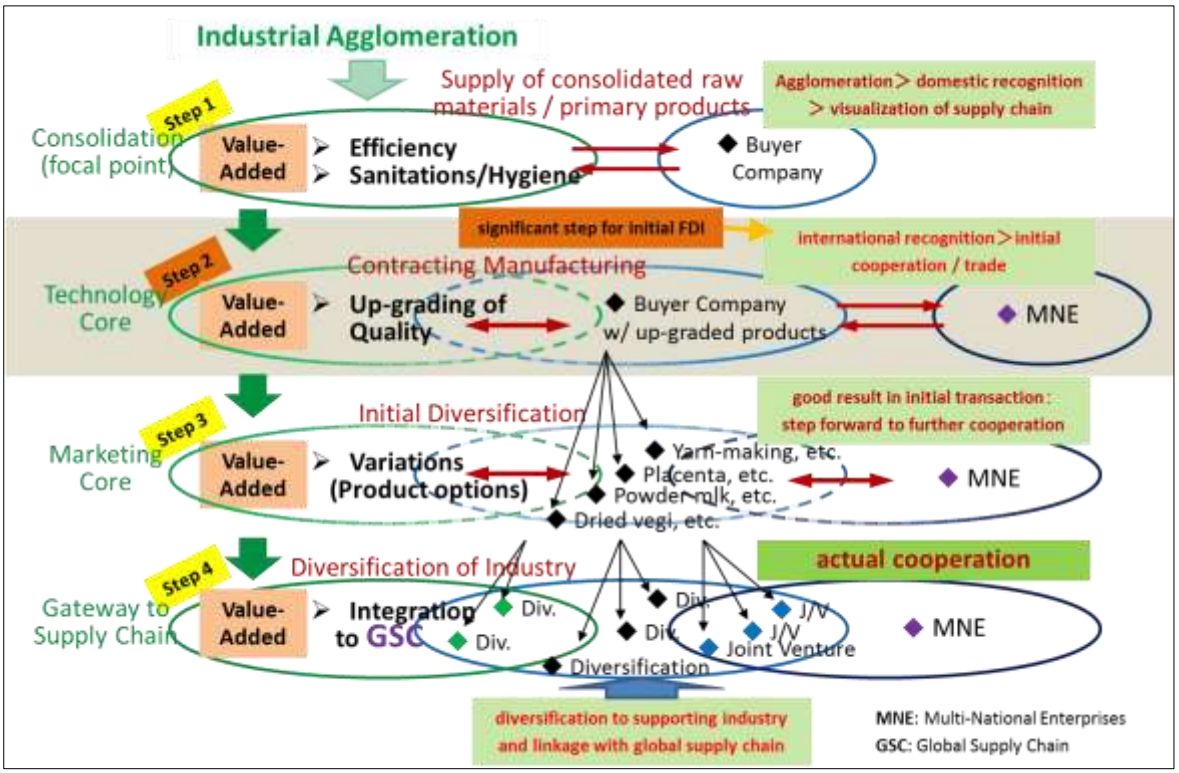
(1) Technical Transfer through FDI

6.12 For a sustainable economy, it is important for industrial development in Mongolia to prevent sectoral and regional overconcentration of the economy and to diversify the industrial structure. The recommendations in Chapter 5 are drawn based on this aspect. In general, the development of supporting industries and the promotion of local industries in the region are essential elements of their foundation.

6.13 In order to promote potential support industries, the enhancement of productivity and efficiency through the promotion of economies of scale is of prime importance. This is especially so in the case of Mongolia where the foundation of the manufacturing sector is relatively fragile. It is then necessary to link the industry agglomerated with the relevant and wider-scale supply chain.

6.14 Currently, industrial economies of scale are being promoted through the development of infrastructure such as FTZ, Industrial Park, and Agro-IT Park. With regard to the legal system to support them, there are already relevant laws and regulations in place such as the Concession Law (2011), FTZ Law Amendment (2015), and Industrial Park Law (2009). Based on the Industrial Development Policy, the legal framework for the establishment of Agro-IT Parks has been adopted in 2015. With this as the foundation, there should be further elaboration expected on soft-oriented strategy (e.g., technology adoption) for effective industrial agglomeration and cooperation. This includes the application of support measures under the SME Law (2007) for the promotion of local industry, and the clustering approach stated in the Industrial Development Policy (2015). More legal arrangements are necessary to back up the strategy especially in the areas of upgrading and expanding standards and guidelines for technology, special financial support scheme for industrial agglomeration, and industry-government-academia cooperation.

6.15 In terms of linkage with the supply chain, the basic legal foundation is already in place with the Competition Law (2010) and Investment Law Amendment (2013). The Industry Promotion Law (2015) further promotes the local industry and the export industry--which is enhancing the support environment for linkage with the global supply chain. For the optimal implementation of these supporting legal measures, the formulation of a consistent mid- to long-term strategy is expected for effective coordination in the promotion of linkage with the supply chain and for industrial promotion. A step-by-step approach can be considered for the strategy, wherein the domestic supply chain development will be promoted in the short term based on the initial industrial agglomeration; then through attraction of foreign direct investment, the global supply chain development will be pursued based on value-added soft orientation (e.g., technology) and not just on simple incentives like the low cost of labor; and finally, the support industry should be vigorously promoted in the broader market through establishment of a firm linkage with the global supply chain (see Figure 6.2.1).



Source: JICA Study Team.

Figure 6.2.1 Conceptual Scenario of Coordination Strategy on Global Supply Chain Linkage and Industrial Promotion

6.3 Development of the System and Management of Agricultural Land Ownership and Strengthening of its Capacity

(1) Law on Land (2002 revised) and Land Ownership Law (2003)

6.16 Under the Law on Land (2002 revised) and the Land Ownership Law (2003), private ownership classification of land is being undertaken. Three types of land tenure were established under Mongolia's 2003 Law on Land, as follows:

(a) **Ownership:** Legitimate control of land that entitles the owner to sell, rent or lease land;

(b) **Right of Possession:** Legitimate control of land in accordance with the purpose of its use (unable to sell land) and terms and conditions specified in the contract on land possession (with specific duration and exclusive right of land use) concluded between the land possessor and the state. Possession licenses may be given to Mongolian citizens, companies and organizations as well as entities with foreign investment.The Law on Land provides the following three types of right on land possession:

(i) Given by license for periods of up to 60 years, renewable for a further 40 years;

(ii) Land possessor may lease land in its possession in whole or in part; and

(iii) Land possessor may transfer its license to other Mongolian citizens, companies and organizations, or put its license as collateral in a legally allowed manner.

(c) **Right of User:** Legitimate and concrete activity to make use of some of the land's characteristics in accordance with contracts made with owners (the state or citizens of Mongolia) and possessors of land.

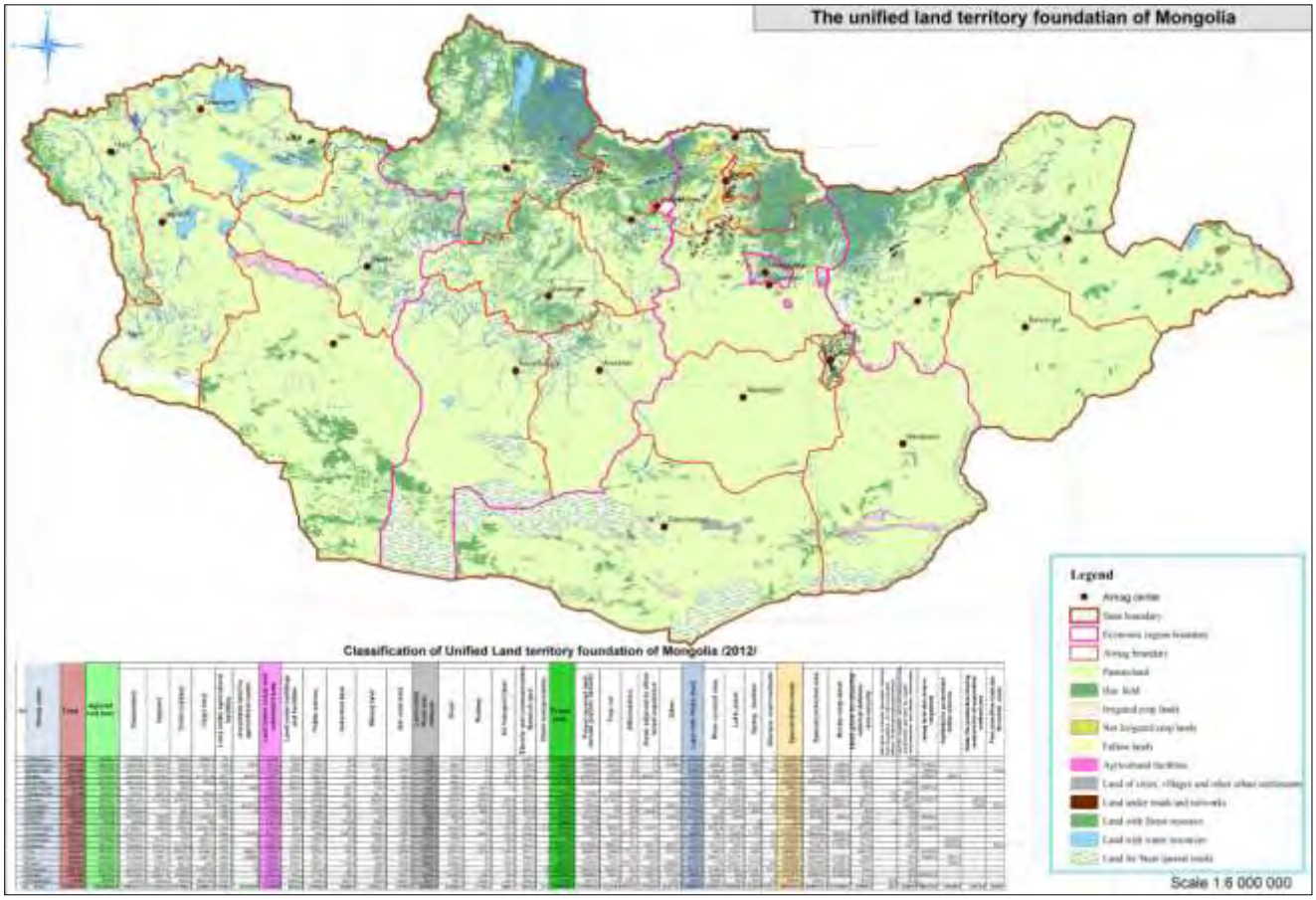
6.17 For agricultural land (see Table 6.3.1), ownership of pastureland is basically not allowed. There is such a case as right of possession for winter and summer pasture, however, this right for pastureland is only limited basically to the right of user. On the other hand, it is permitted in the case of arable land to have three types of rights such as ownership, right of possession, and right of user.

Table 6.3.1 Land Classification and Private Ownership

Land Classification	Land Use Pattern	Ground Classification	Private Ownership
Settled Land	Urban, Rural, Industrial Zone, Mining Area, etc.	District of Residence	Ownership Right of Possession Right of User
Agricultural Land	Pastureland	Winter Pasture, Spring Pasture	Right of Possession Right of User
		Summer Pasture, Autumn Pasture, Otor Land	Right of User
	Settled Livestock Farming Region		Based on the determination of the region
	Meadows Land		Right of Possession Right of User
	Arable Land	Arable Land Abandoned Land	Ownership Right of Possession Right of User

Source: "Nomadic Pastoralists and Land Privatization Policy in Post-Socialist Mongolia: A Methodological Examination of Land Use in Local Society"(2008).

6.18 Figure 6.3.1 shows the territorial coverage of agricultural lands in Mongolia, indicated in pale lime green-colored sections. Information on land categorized as farmland goes to the aimag via registration to the soum, which is submitted to ALAGaC for recording of the data after the information has been checked.



Source: ALAGaC.

Figure 6.3.1 Land Territory of Agricultural Land

6.19 The maximum size to be possessed by Mongolian citizens or companies in the rural area as provided in the 2003 Law on Land is as follows:

(i) Land given to citizens for cultivating crops and fodder plants may not exceed 3,000ha; and

(ii) Land given to citizens for cultivating potatoes, vegetables and other plants may not exceed 50ha.

6.20 However, an amendment to the law on allocation of land made in 2008 raised the maximum size to be possessed by citizens or companies in the rural area to 20,000ha for land given for cultivating crops and fodder plants, and to 200ha for land given for cultivating potatoes, vegetables and other plants. This revision stemmed from the fact that the capital investment in the agricultural sector by mining-related companies have increased and they now possess tens of thousands of hectares of agricultural land to expand their businesses into large-scale agricultural farms. The terms and conditions of land possession under the 2008 law revision are shown in Table 6.3.2.

Table 6.3.2 Upper Limit of the Land Use Condition

Condition	Local (Enterprise / Individual)	Ulaanbaatar
Cereals, fodder crops cultivation	20,000ha	200ha
Potato, vegetable cultivation, etc.	200ha	5ha
Meadows Land	1,500ha	100ha
Forage harvest (domestic demand)	400ha	50ha

Source: ALAGaC.

(2) Institutional Issues

6.21 The pastureland utilization system which was managed under the traditional order has several types of issues in light of the current system for land ownership and land management. Following are some concrete examples observed from the interview survey of nomads, administrative officers, and other well-informed persons.

1) Inadequate Implementation of Rights Registration for Agricultural Land and Pastureland

6.22 The maximum size of land use for agricultural land and pastureland is determined by area (by soum and aimag). However, land is not available for possession or use (landlessness) especially in the central area (Govisumber, Darkhan-Uul, Dornogovi, Dundgovi, Umnugovi, Selenge and Tuvaimags), owing to the fact that land for farming and pasturing are in possession or in use. In practice, land use problems occur such as, for example, the annual land management plan for the relevant fiscal year is often disapproved by soum governors or land officers due to their own interests.

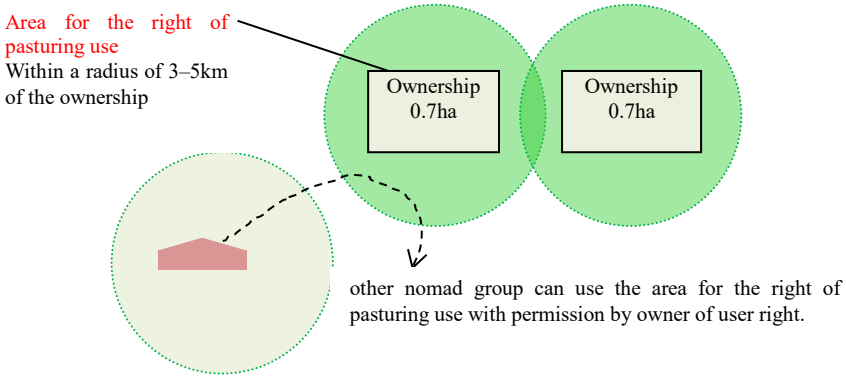
2) Land Rights Registry

6.23 Pasturelands must be used collectively by nomadic neighborhood communities, as stated in Article 52.2 of theLaw on Land. It provides that, upon receipt of the application for using rangeland from a nomadic community, the land may be given for use under specific terms and conditions whichwere discussed and agreed by the Cabinet. Moreover, the Citizens Representatives' Khurals of soums review and discuss applications for using rangeland for the winter and spring pasture requested by herders who moved from other territories. If the application is approved, it shall have been marked in the annual land management plan by land officers, and the plan will be ultimately determined by order of governors of soums. The details of boundaries in rangeland use are mainly determined by land use traditions, so-called dialogues and agreements.

6.24 Regarding the range of land use, the area for ownership of winter pastureland is 0.7ha per household and the area for the right of pasturing use is within a radius of 3–5 km[1] of its ownership area (see Figure 6.3.2). This area for the right of pasturing use is not regulated by law but by unspoken rules. There is a case that part of the area for the right of pasturing use is shared with other nomads. If a nomad wants to use pastureland which is owned by other nomads or its pasturing use right belongs to other nomads, it is necessary to consult with and get the permission of the owner of pastureland. Though it is easy to be accepted to use another owner's pastureland until June, it becomes difficult to be permitted to use another owner's

[1] The range of pasturing use depends on a district.

pastureland after August since it is possible that storing up feed for the winter may become hard.

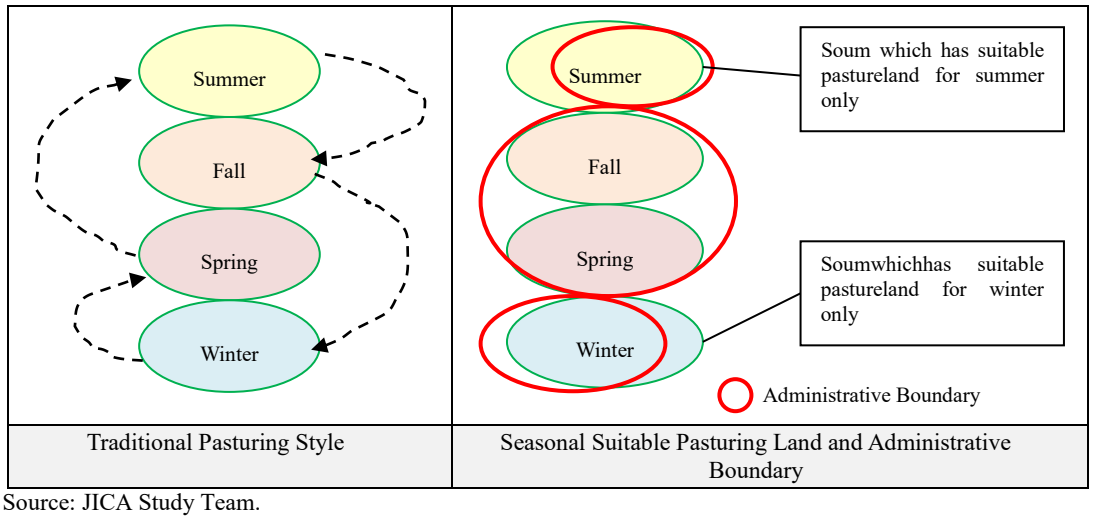


Source: JICA Study Team.

Figure 6.3.2 Ownership and Range of Pastureland Use

3) Conflict Between Geographical Characteristics and Administrative Boundary Line

6.25 In traditional nomadic life, the boundary of pastureland use is decided based on geographical characteristics such as naturally occurring river, forest, mountain and valley, etc. During the socialist regime, there was no limitation on the area for pasturing use and pastureland was used seasonally to meet the natural characteristics of each area. On the other hand, the current system for pasturing land use is managed by an administrative unit and pasturing should be done within the administrative boundary (see Figure 6.3.3). However, pastureland which is suitable for both winter and summer does not always exist in a soum. Under the current situation, there are about 100 soums with unbalanced natural conditions. For instance, some soums have only pastureland that is suitable for summer while other soums have pastureland suitable only for winter. In such an unbalanced soum, there is a trend that there are many damaged (dead) livestock by dzud as compared with a balanced soum. Though it is desirable to put livestock out to pasture freely on seasonal suitable land based on geographical characteristics, it is difficult to conduct desirable pasturing in the traditional style because of the current management system by administrative boundary.



Source: JICA Study Team.

Figure 6.3.3 Conflict Between Geographical Characteristics (Seasonal Suitable Pastureland) and Administrative Boundary

4) Issues on Relationship Between Nomadic Income Level and Base Location

6.26 Though it is desirable to pasture based on natural characteristics in each area, the nomadsdecide their location based ontheir income level. More specifically, the following characteristics of nomads by income level are observed (see Figure 6.3.4):

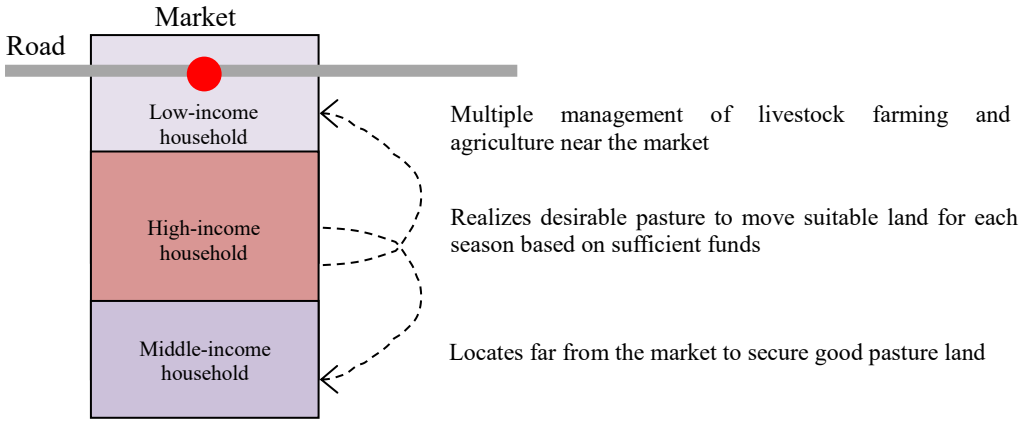
(a) **Low-income Level:**These households own a few livestock and locate near the market. Because of little funds, their pasturing style is not to move over long distances. There are many nomads in this income level who conduct multiple management of livestock farming and agriculture to supplement their small income. In other words, this can be called"the settled nomad style."

(b) **Middle-income Level:**To increase their number of livestock, this household class locates far from the market to secure good quality pastureland.

(c) **High-income Level:**This household class locates between the areas of the low-income and middle-income nomads, and move to all areas seasonally. Because of sufficient funds, it is possible for them to move over long distances to secure good pastureland for each season. If there is a necessity to cross the administrative boundary, the high-income nomads solve the situation by establishing a relationship with aboriginal land usersin thefollowing ways: pay money to the landowner or user, or employ the land user who locates the area where they want to move.There are some caseswhere they establishthis relationship through marriage ties[2] with other nomadic groups who locate in the area where they want to stay.

6.27 Since nomadic life needs the abovementioned land-related money, it leads to an increase in the number of nomads who locate near the market. This is one of the factorsthat cause overgrazing.

6.28 Almost all the nomadic household members in their twenties and thirties live in Ulaanbaatar, and the actual nomads are mostly thesenior generation in theirforties to sixties. Thus, as the population ages in the nomadic society, it becomes difficult to manage long distance pasturing and to pasture along suitable geography.



Source: JICA Study Team.

Figure 6.3.4 Relationship Between Nomadic Income Level and Base Location

[2] Because of the strong connection between blood relatives, there are many cases where the land with ownership or right of use is available for use between relatives.

5) Issues on Monitoring Related to Management Plan on Characteristics and Quality of Agricultural Land and Pastureland

6.29 Article 58 of the Law on Land regulates the characteristics and quality management of lands. Article 58.9 provides that "Provisions and evaluation indicators on characteristics and quality management of agricultural land shall be regulated by the Agricultural Law of Mongolia." Article 5 of the Agricultural Law stipulates that "Monitoring on efficient and rational use of agricultural land and its soil quality shall be carried out once every 5 years." The responsible organization is the Ministry of Food and Agriculture of Mongolia, but inspections of farmland and quality of soils are done by technical examination organizations that are entrusted by the Ministry.

6.30 However, there is an issue that monitoring is not implemented as planned due to budget constraints. This situation causes the organization (soum) responsible for addressing overgrazing issues to miss the chance for suitable measures. It is necessary to recognize that maintenance of a management and monitoring system for pastureland is one of the important issues.

6.31 Other institutional systems or regulations are shown in ***Appendix 6.3.1***.

6.4 Promotion of Mutual Cooperation in theMid- and Long-Term Policies on Foreign Trade, Investment Incentives and Industrial Development

(1) Current Status of Foreign Trade and Investment, and Industrial Development Policies

1) Trade Policy and Bilateral and Regional Trade Agreements

6.32 As explained in Chapters 2 and 3 of this report, the trade structure of Mongolia is extremely unbalanced. In 2014, mineral exports accounted for more than 80% of total exports, 88% of which is bound for China. United Kingdom (UK) follows China as the export destination for Mongolia's mineral resources,then followed by Russia. However, the shares of the two countries are very small,at 6.9% for UK and 1.1% for Russia. Imports into Mongolia are mostly industrial products such as mining products, machinery and equipment and China and Russia account for over 60% of imports. Japan is Mongolia's 6th ranking export trade partner, accounting for 0.4% of exports. With a 7% share of imports, Japan has surpassed Korea as Mongolia's third ranking source of imports, following Russia and China.

6.33 As stated in the MDG-based Comprehensive National Development Strategy of Mongolia, Mongolia's trade policy is to reform the unbalanced trade structure that highly depends on primary products such as mineral resources. Specifically, the policy includes: (i) diversifying export products, (ii) increasing exports of high value-added products, (iii) reducing exports of primary raw materials such as mineral resources and increasing exports of final products, (iv) promoting import substitute products and increasing imports of "knowledge-intensive" technology, machinery and equipment which are important from the long-term economic point of view. In addition, the objectives of the draft "Long-term Sustainable Development Vision" approved by the Parliament in February 2016 include the growth of stock farm processing and export of processed products.

6.34 As for import duties, upon acceding to the WTO in 1997, Mongolia drastically lowered its customs tariff rates. According to the Customs Tariff Law, which is the main legislation regulating matters relating to customs tariffs, Mongolia's customs tariffs consist of general rates and most-favored-nation (MFN) bound and applied rates. Under the law, MFN applied rates apply to goods from Mongolia's trading partners that offer MFN status to Mongolia (e.g., WTO Members, Kazakhstan, and Belarus); goods originating in other countries are dutiable according to the general rates, which are double the MFN applied rates. The MFN bound rates vary from duty-free to 75%, with an average bound rate of 17.7%. The range of applied MNF tariff rates was zero to 25% in 2013 and the average rate is 5.0%, which applies to most import goods although 15% applies to flour as a seasonal tariff.

6.35 The objectives of applying a uniform tariff rate are to simplify customs processes, provide incentives for the efficient production of goods, refrain from protection of individual domestic industries, and to have low-priced import products available in the domestic market. Furthermore, tariff exemptions apply to some imports to be used by small and medium-sized enterprises as provided by a Government Resolution in 2011. Mongolia does not use tariff rate quotas nor any import quotas.

6.36 On the other hand, Mongolia applies export taxes on camel wool and timber/balk[3] to protect domestic industries. The government does not provide subsidies for any export goods

[3] Export taxes are MNT200/kg for unprocessed camel wool (female), MNT100/kg for unprocessed camel wool (male), and MNT150,000/m^3 for timber/balk.

but exports are exempt from excise duties and VAT. In addition, the establishment of SEZs is being encouraged to increase production of export goods, promote FDI, create job opportunities, and develop national border areas. Currently, Zamyn-Uud and Choir are designated as SEZs and Altanbulag and Tsagaannuur are designated as FTZs.

6.37 For export promotion, the government intends to establish a better institutional climate for "support of exporters who enter new markets" in order to increase financing by the government for exporters and exports of knowledge-intensive products and services. For instance, in the cashmere and wool industry, Turkey and Europe via Turkey are considered prospective destinations of raw wool export. In addition, Mongolian enterprises are seeking new markets such as the expansion into the Korean market in agricultural processing industry and the advance into the Japanese market triggered by the EPA agreement. The Development Bank of Mongolia established in 2001 is providing such services as export finance, export credit guarantees and export credit insurance.

6.38 With regard to bilateral and regional trade agreements, Mongolia concluded a trade agreement with Vietnam and Cuba as well as "Agreements on Trade and Investment" with the United States. Mongolia also acceded to the Asia-Pacific Trade Agreement (APTA) in 2013, and finally concluded the first EPA with Japan in 2015 (refer to Section 6.5 in this chapter).

2) Investment Policy

6.39 In 1993, the Foreign Investment Law was enacted in Mongolia, but the government strengthened regulations on foreign investment by establishing the Law of Mongolia on the "Regulation of Foreign Investment in Business Entities Operating in Sectors of Strategic Importance"[4] stemming from the caution with Chinese investors reflecting natural resource nationalism. As a result, however, foreign investors resented the unfair and uncertain investment environment and withdrew from the Mongolian market. The government abolished constraints on private and foreign investments stipulated in the Regulation on Foreign Investment in 2012 and enacted the new Law on Investment in 2013. A uniform legal basis for domestic and foreign investments was developed and made investment procedures more simplified and open. The new law enables both domestic and foreign investors, except foreign-government-owned legal entities,[5] to make investments without parliamentary approval and other constraints. No approval of the Parliament is necessary for investment in the sectors of strategic importance.

6.40 However, in order to do business in Mongolia, foreign investors need to register as a foreign-invested entity which is defined as a business entity incorporated in Mongolia in which foreign investors hold at least 25% equity and the foreign investors' capital contribution is at least USD100,000.

6.41 The Invest Mongolia Agency[6], an implementing agency under the Prime Minister's Office, is responsible for promoting and regulating investments in Mongolia, including providing information to investors and support for establishment of companies.

[4] Mining, banking and finance, information and communications.

[5] Companies holding 33% or more of the shares in a Mongolian company investing in mining, banking and finance, or media and communications.

[6] The Invest Mongolia Agency was transferred to NDA.

3) Relation Between Industrial Development and Trade and Investment

6.42 As Chapter 2 explains in detail, Mongolia's industrial structure depends on specific sectors and countries and foreign trade and investment also rely heavily on the mining sector. The results of an interview survey conducted by the JICA Study Team indicate many challenges in relation to foreign trade and investment such as high dependency on importation of raw materials, limited access to import market due high import costs, etc. Table 6.4.1 summarizes the current challenges in industrial development and relations with foreign trade and investment.

Table 6.4.1 Challenges in Industrial Development and Relations with Foreign Trade and Investment

Challenges	Measures	Relation with Foreign Trade and Investment
Unbalanced Industrial Structure	Policy on industrial diversification; Shift to processing industry in agricultural and mining sectors	Domestic investment and industrial cooperation; Expansion of global supplychain; Increase in investment opportunities by industrial diversification and high value-added
Dependency on Importation of Raw Materials	Introduction of techniques and production of import substitution products; Development and efficiency of supply chain	Expansion of global supplychain; Imports of advanced technologies, knowledge-intensive machinery and equipment
Constraints on Foreign Investment (high export cost and parts supply)	Industrial clusters, reduction in transportation cost by networking	Establishment of Industrial Parks and Free Zones (Free Trade Zone and Free Economic Zone)
Shortage of Industrial Human Resources	Human resource development	Job creation and human resource development through FDI
Financing Accessibility	Financing system development	Financing through FDI; Support for exports by Government (exemptions and export finance)
Delay in Value-Added Product Development	Human resource development; Introduction of advanced technology	Technical transfer and human resource development through FDI
Development of Processing Industry in Agricultural and Mining Sectors	Industrial clusters; Introduction of processing techniques	Establishment of Industrial Parks and Free Zones (Free Trade Zone and Free Economic Zone)

Source: JICA Study Team.

6.43 As often mentioned, one big challenge in industrial development is to increase economic stability through diversified industries, which brings sustainable development. Institutional development, human resources, advanced technology and funding are also required to realize diversified industries and high value-added which are key issues as well.

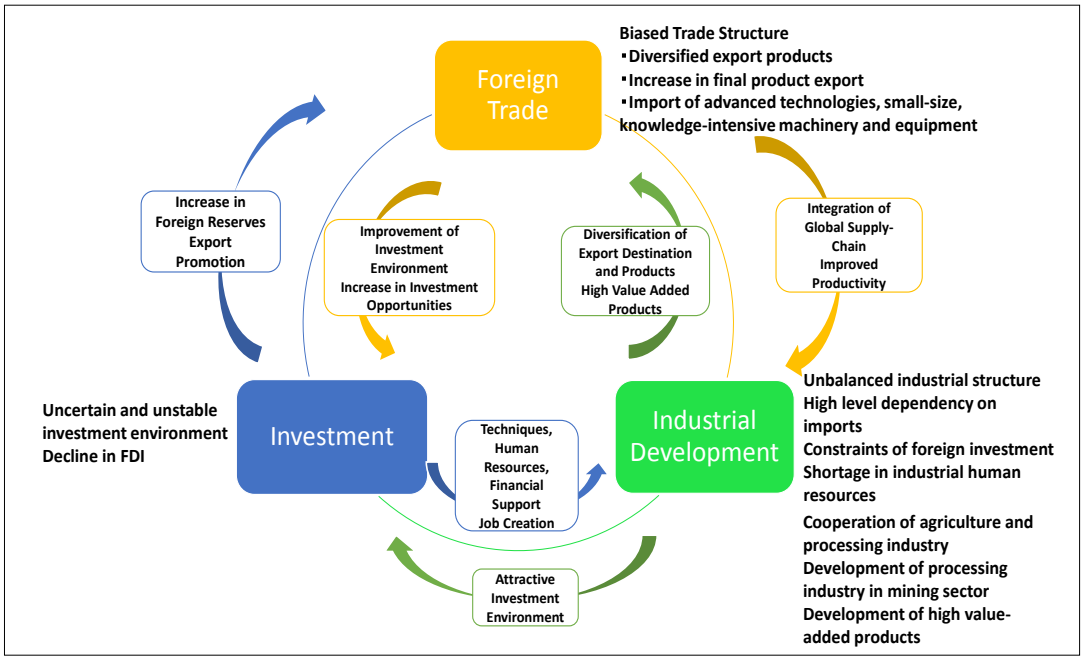
6.44 Regarding the relation between foreign trade and investment, encouraged cooperation between industries for industrial diversification and development of high value-added industries such as processing industries will diversify export and import goods, increase value-added, increase investment opportunities, and create a stable investment environment. Thus, these improvements in foreign trade are expected to also increase foreign investment. On the other hand, advanced technology, capable and skilled labor and investment funds are necessary to diversify industries and increase value-added. Therefore, aggressive policies are required to acquire advanced techniques and funds for industrial development and to build the capacity of human resources through FDI. It is also important for industrial development such

as supply chain development, diversified industries and processing development to encourage industrial clusters and build transport logistics networking in coordination with the Free Economic Zone and Industrial Park concepts.

(2) Challenges and Relation Among Foreign Trade, Investment and Industrial Development

6.45 As seen in the previous sections, trade, investment and industrial structures in Mongolia are unbalanced. The Mongolian economy heavily depends on a few specific sectors and countries, which results in a fragile economy and an inappropriate environment for stable economic development. To improve this situation, the government has been examining and formulating policies for industrial diversification and development of investment foundation. However, as explained in the previous section, foreign trade, investment and industrial development are closely related and, therefore, it is necessary to formulate policies in a manner where these three sectors cooperate with each other for sustainable development. Figure 6.4.1 presents the challenges and relationship of the three sectors of trade, investment and industrial development.

6.46 In order to improve the unbalanced economic structure, industrial diversification is essential by making use of advanced technology, human resources and financing through foreign investment as well as government support. In addition, industrial diversification and increase in high value-added production will lead to diversification of foreign trade goods and trading partner countries. The diversified foreign trade will promote integration of the Mongolian economy into the global supply chain and develop its domestic industries. Therefore, the most important factor for foreign investors is an attractive investment environment.



Source: JICA Study Team.

Figure 6.4.1 Challenges and Relation of Foreign Trade, Investment and Industrial Development

(3) Integrated Policy of Trade, Investment and Industrial Development Strategies

6.47 The key toMongolia's economic development is to invite FDI. Towards this objective, it is vital to obtain the confidence in the country of risk-averse foreign investors. Therefore,

policies related to foreign trade, investment and industrial development should be consistent. The following policies are the three basic pillars to achieve this (see Figure 6.4.2):

1) Strengthened Global Exchange Promotion

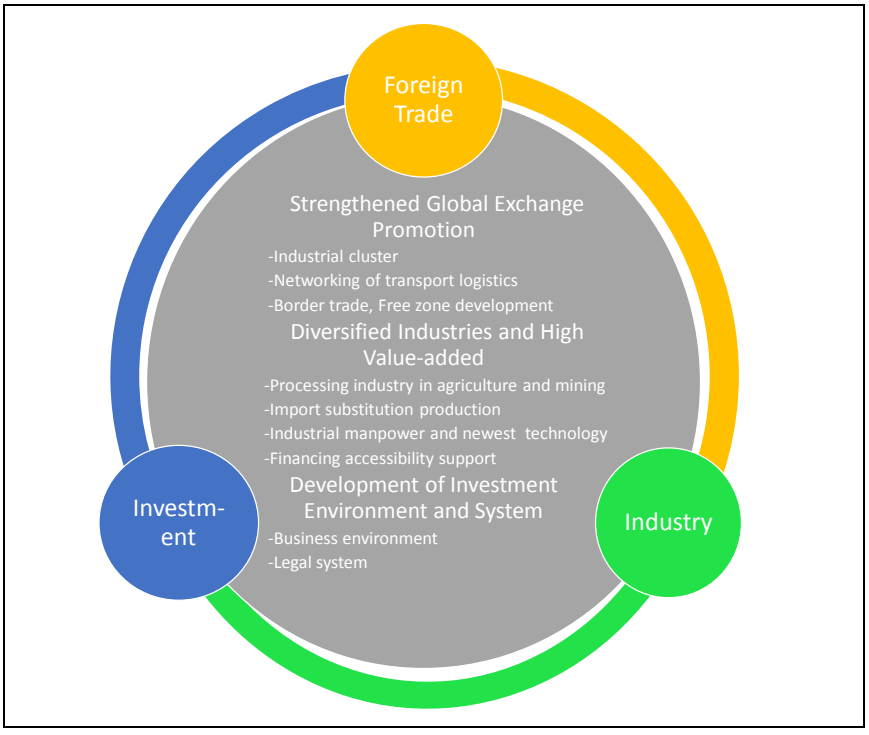
6.48 The policy is to encourage foreign trade and investment by increasing productivity and reducing transportation costs which are achieved by the development of industrial clusters and transport logistics network making use of free trade zones, free economic zones and industrial parks.

2) Diversified Industries and High Value-Added

6.49 The policy is to promote industrial diversification and high value-added products by developing the processing industry in agriculture and livestock farming (cashmere, meat and dairy products) and mining sectors. In addition, import substituting industrialization will be pursued to address the high dependence on imported industrial raw materials. Tourism development will focus on development of an operating and maintenance system for protected areas and improvement of transport accessibility. Recognizing the current insufficiency of advanced technology, skilled manpower and funds to implement the abovementioned activities, capacity building systems for industrial development will be established and accessibility to financing will be improved such as through development of financing systems.

3) Development of Environment for Foreign Investment

6.50 The policy is to develop the legal systems regarding foreign investment and designate investment promoting zones such as industrial parks and free economic zones. In addition, the business environment will be enhanced by the development of transportation networks.



Source: JICA Study Team.

Figure 6.4.2 Integrated Policies of Foreign Trade, Investment and Industrial Development

6.5 Promotion of the Economic Partnership Agreement (EPA) Between Mongolia and Japan and Public-Private Partnership (PPP)

(1) Outline of EPA Between Mongolia and Japan

6.51 The EPA was signed in February 2015 when the former Prime Minister Chimed Saikhanbileg of Mongolia visited Japan. On October 22, 2015, a law to implement the EPA was approved by the Mongolian Parliament and it took effect in June 2016. The following four objectives were set forth:

(i) Further strengthen the strategic partnership between Mongolia and Japan through trade expansion and enhancement of the investment environment, including the energy and mining resource sectors;

(ii) Contribute to a steady supply of energy and mining resources such as coal, fluorite, rare metals, gold, copper, etc. from Mongolia;

(iii) Include Mongolia's economic growth, which high-rate growth is expected in the medium and long term, into Japanese economic growth; and

(iv) Inclusive agreement which incorporates rules on trade of goods, services, investment, e-commerce, competition, intellectual properties, and so on.

1) Customs Duty

(a) Elimination of tariffs in approximately 96% of the total amount of trade between the two countries within 10 years of the agreement;

(b) Mongolia will get approximately 96% duty-free in the total amount of imports from Japan in a span of 10 years; and

(c) Japan will get 100% duty-free in the total amount of imports from Mongolia.

2) Access to the Mongolian Market by Japan

6.52 Expand the proportion of duty-free exports from Japan to Mongolia, from less than 1% of the total export value at present to about 50% effective immediately when the EPA comes into force, and up to about 96% in 10 years.

(a) **Vehicles and Vehicle Parts:** Immediate elimination of tariffs mainly for finished vehicles of 4500cc or less (0–3 years after production) and immediate elimination of tariffs for auto parts and other finished vehicles mostly within 10 years (nearly 70% of total exports);

(b) **Machinery:** Elimination of tariffs within 10 years in a phased manner, including an immediate tariff elimination on major construction machineries such as bulldozers, etc. (less than 20% of total exports);

(c) **Cutflowers, Fruits, Fermented Bean Paste and Soy Source, etc.:** Real time elimination or gradual elimination of customs duties; and

(d) **Sake and Distilled Spirits:** Real time elimination of customs duty.

3) Access to the Japanese Market by Mongolia

(a) **Mining Products:** For almost all of the items, immediate elimination of tariffs or elimination in a phased manner within 10 years;

(b) **Part of Beef Meat Preparation, etc.:** Tariff quota (no actual imports at the moment); and

(c) **Pet Food:** Immediate elimination of tariff or elimination in a phased manner within 10 years (no actual imports at the moment).

4) Noteworthy Agreements

(a) **Trade in Services:** To promote trade service in both countries, regulate market access, national treatment, MFN treatment, and transparency; Promise liberalization to exceed the General Agreement on Trade in Services (GATS);

(b) **Movement of Natural Persons:** Promise entry and temporary stay in the country for short-term business visitors, relocation by a company, investors, and their spouses and children; Regulate to ensure official procedures for entry and temporary stay;

(c) **E-Commerce:** Regulation on non-imposition of customs duty for electronic transmission to promote e-commerce, different treatment of digital products, consumer protection, etc.; Prohibition to seek the establishment of a computer center in the home country as a condition for doing business in the home country;

(d) **Investment:** Exceed existing investment agreement between Mongolia and Japan to regulate granting national treatment and MFN treatment at the stage of investment permission, forbid the interruption by the governments for technical license contract (forbid loyalty regulation), mandate fairness and equal treatment and compliance of contracts between investors and governments in all sectors including energy and mining resources, and resolve conflicts between investors and the states through the Investor State Dispute Settlement (ISDS);

(e) **Improvement of Business Environment:** Secure participation of specialists from both governments and the private sector as well as establish a small committee to develop and enhance the business environment for private companies in both countries; Regulate to establish liaison offices to receive and manage claims and referrals from companies from the other side; and

(f) **Cooperation:** Promote cooperation in the sectors of agriculture, forestry and fishery (food value chain, etc.), SMEs, tourism, information and communication technology, environment, and so on.

(2) Investment Promotion Support for Japanese Private Companies

6.53 The investment relationship between Japan and Mongolia started in 1977 when an Economic Cooperation Agreement was signed. Under this agreement, the Gobi Cashmere factory was established. During the socialist regime, the relationship of both countries in trade and economics was limited but after 1990 when a trade agreement was signed between them, it has become strong again.

6.54 Official Development Assistance (ODA) including grants-in-aid and loans from Japan to Mongolia was appreciated by Mongolia because it helped a lot to strengthen its democratization, to establish a new socioeconomic structure, and to lay the foundation for its development today.

6.55 Many Mongolian private companies are expected to take advantage of the EPA between Japan and Mongolia with the inflow of investments from Japan for diversification of

industry. It is also expected to accelerate the creation of employment opportunities, improvement of productivity in agriculture, livestock farming and mining, and ensure a stable food supply.

6.56 Among these variety of possibilities, the following are particularly expected as fields of cooperation and coordination with Japanese private companies:

(i) To raise agriculture and livestock farming or other industry and business as new industries;

(ii) To develop the distribution system in support of industries existing for the last 25 years from 1990, including wool and cashmere, and to improve production for value-adding industries;

(iii) To upgrade industries by integrating modern production systems into traditional production and techniques;

(iv) To link with Japanese traditional and local industries;

(v) To develop the production structure to supply alternatives to imported foods;

(vi) To participate in investment to internationalize and modernize logistics;

(vii) To modernize production machines and to contribute to the solution of problems in energy and environment through the introduction of Japanese technology;

(viii) To invest in tourism facilities and services and to link up for the promotion of tourism-related industrial development and improvement of services;

(ix) To participate in new mining development such as rare metals, rare earth, fluorite, and uranium, and invest in mining-related industry;

(x) To cooperate in developing the downstream industry of the mining and minerals industry;

(xi) To participate in investingin construction and real estate development; and

(xii) To establish and promote various businesses to deepen linkages of medium- and small-scale companies.

(3) Expected Application of Japanese Technologies

6.57 To further support the development of Mongolia, it is greatly expected that Japanese technology will be introduced. Applicable Japanese technologies and systems which are particularly expected to be applied are listed in Table 6.5.1. These are limited to the ones that already have some track record available or planned, so they are expected to further transfer various other techniques.

Table 6.5.1 Examples of Japanese Techniques and Systems

Sector	Japanese Techniques
Renewal Energy	Biomass technology/ methane fermentation/ waste-to-energy/ energy recovery/effluent treatment technique/ solar energy generation/ wind-power generation/ geothermal power generation/ hydropower generation/ Hydrogen generation technology
Effective Utilization of Coal	Coal cleaning including dry coal cleaning/ coal gasification and liquefaction/ coal bed methane development and use/ iron making and future generation coke oven/ other clean coal technologies
Logistics	Ice temperature refrigerationtransportation/ Cells Alive-System/ refrigerated transportation system/ RFID system/ delivery system
Agriculture and Livestock Farming	Expansion of beef meat production (from pasturing to farming)/ livestock health control/ protection from foot-and-mouth disease (FMD)/ Improvement of techniques for leather industry/ organic farming/ price formulation/ agriculture quality standards/ market system / breed improvement
Tourism/ Nature Protection	Preservation management of special protected areas/ training of service workers/ legal system to ensure quality of service and safety (e.g., tourist business law, etc.)/ ecosystem approach
Environment	Protection of grassland/ control of placer mining projects/ recovery system after mining activities
Waste	Sterilizationtechnique/ PET recycling technology/ home electronics recycling technology/ biomassutilization technology/ refuse incineration plant/ waste landfill technique
Ecology	Energy service company (ESCO) projects/ home energy management system (HEMS)/ solar and lithium battery/ smart technology
Life Services	Convenience store system (distribution system of consumer goods)
Health	Remote medical care system/ advanced medical testing equipment/ nursing and caring technique/ referral medical system / obstetric and pediatric healthcare/ checkup system/ advanced medical care technique/ improvement of public health
Education	Establishment of kindergarten, primary and secondary schools/ science and technology higher education
Roads and Related Techniques	Road base and pavement standard/ bridge and tunnel technique/ earthwork quality technique/ construction inspection/ cold weather construction technique/ construction labor safe management/ quality control/ sandbag construction method
Transportation System	Metro System (MRT, LRT) / Bus system(BRT)/ Bus Operation Information System (Location System)/ ITS/ IC card technology (FeliCa etc.)/ service area (SA) and parking area (PA) / Michi no Eki/ e-RAIL Service
Production	Industrial robotics/ IT technology / Business Process Outsourcing (BPO)
Mining	Resource exploration/ mapping/ mining development planning/ automated digging and transport/ processing and value adding/ bioleaching

Source: JICA Study Team.

6.6 Management System for the Realization of the Sustainable Development Vision

(1) Necessity of the New Policy Adjustments

6.58 The "Mongolian Sustainable Development Vision 2030" was approved by the National Parliament in February 2016 and even with the new government, there is no doubt that this major policy of the country forms its basic development guidelines. In line with this vision, the past policies and measures need to be readjusted and reformulated and this is one of the important concerns of the new government.

6.59 As of October 2016, the new government, based on the vision as well as the manifesto, has instructed various ministries (including those in Ulanbaaatar City) to go through the tasks of selecting policies and projects that are implementable within the new government's term. This "Action Program (2016-2020)" is currently in the process of being coordinated. The Mongolian government has raised the following five policies as its basic governmental policy direction and has insisted that these basic directions for the policies should be given priority:

(i) Special policy to overcome economic troubles;

(ii) Policies to support stable economic growth;

(iii) Societal policies;

(iv) Natural environment, green development policies; and

(v) Governance policies.

6.60 Among these priority policies, the "special policy to overcome economic troubles" as well as "policies to support stable economic growth" in the related action program are indicated in Table 6.6.1. In order to understand the table, with regard to the main objectives of the governmental policies, various policy directions as well as actions are raised. So as not to deviate from the true essence for achieving the various objectives, a "Sustainable Development Vision 2030" is required. However, in the implementation of policies and actions, there is a need to further examine in detail the means for cooperation, the outlook for financial demands as well as the preferential order. From now onwards, the new government recognizes the important issues it needs to focus its efforts on.

(2) Re-examination of the Medium-Term Financial Framework

6.61 Mongolia's economic growth after 2014 has been slowing down and amidst financial imbalance and seriously deteriorating national finances, the "Financial Stability Law" was enacted in 2015. Based on this law, overly optimistic forecasts of economic growth have been discarded and upon thorough re-examination, a Medium-term Financial Framework (MTFF) aimed at 2018 has been presented.

6.62 For the MTFF, relatively speaking, it is difficult to forecast a real economic growth rate of 4-5%. At the same time, based on the Financial Stability Law, it aims to reduce the budget deficit to GDP ratio to 2%. In 2016, the goal is for a budget deficit ratio of 4% and by 2018, the plan targets to further reduce this budget deficit ratio to 2%.

6.63 The Chinggis bond is a USD2.1 billion foreign currency bond that is due to mature in 2017 (although there will be no maturity in 2018). In order to repay the bond, the government was contemplating in April 2016 to issue a national bond worth USD500 million by borrowing from the IMF.

6.64 However, in recent years, the macroeconomic conditions in the country have become more severe. Thus, under the new government, there is ongoing work on revising the mid-term financial framework. Meanwhile, in order to realize the long-term development vision as well as the action program, there is no choice but to have huge restraints in financing/spending.

(3) Necessity of the Public Investment Program Formulation and Economic Stabilization Plan

6.65 Related with efforts to improve the country's macroeconomy, the division of the Mongolian government tasked with fiscal reform is faced with political issues. The Ministry of Finance aims to institute fiscal reform by formulating an Economic Stabilization Plan (ESP), the so-called “18-Month Plan” and in 2017, the main issue is to raise funds for the Chinggis bond redemption. At the same time, however, the financial plan seeks to improve the financial capacity of the government sector for public investment.

6.66 International lending agencies, particularly the IMF, are concerned about how much limits to put on lending, and are currently refraining from making important decisions that will greatly influence financial policy. Thus, it is necessary to formulate the public investment program that is being considered in the medium-term outlook.

6.67 As mentioned before, the action program that was selected by the new government has a lot of political “wish lists.” However, based on the financial restraints, the public investment plan (PIP) that was assumed in the action plan needs to be ascertained. For this reason, the action plan’s contents will be scanned in detail and prioritized through political coordination as well as cooperation from the various ministries.

(4) Expectations for the "National Development Agency" as Key in the Development Management System

6.68 Towards the realization of the "Sustainable Development Vision 2030" and the recently announced "Action Program 2016-2020," the new government is facing major implementation challenges under the fiscal restrictions of the macroeconomic situation and the government sector. Among them, the function of policy adjustment granted by the newly established "National Development Agency (NDA)" is expected.

6.69 NDA, which combines the functions of the Strategic Policy Planning Bureau of the former Ministry of Industry and the Investment Agency, is responsible for coordination of "mega projects" which were under the supervision of the Deputy Prime Minister. As of October 2016, the organizational structure of NDA is composed of the (1) Development Policy Planning Department, (2) Development Policy Division, (3) three practical divisions of the Investment General Policy Department, (4) Registration, Information and Public Relations Division, and (5) the Management Department of the General Affairs Department. Administrative and coordination work like PPP and concessions belongs to the Investment IntegratedPolicy Department. The mining industry related TT and OT mega projects are continuously operated by the existing ministries, but NDA is in charge of coordination for implementation of future new mega projects.

6.70 Among the NDA functions of adjustment, the "Medium-Term Public Investment Program (PIP)" is expected, but in order to operate PIP effectively, it is necessary to coordinate with the Ministry of Finance which is responsible for the fiscal framework in the government sector. Basically, among the action programs, the PIP selects prioritized actions (policies and

projects) with implementation effectiveness and clarifies their position in a possible financial resource frame, but the level of achievement will be requested owing to political requirements.

6.71 It is certain that to take on such an important responsibility, it is necessary to increase the coordination ability of NDA itself, but in order to supply the function of coordination from an integrated viewpoint, the establishment of an advisory organization such as an "Economic and Fiscal Committee" in NDA is desired. This committee should include members of the State Council, administrative specialists, experts, and representatives from private companies, and should ensure the transparency and reliability of their discussions.

(5) Comments on the Economic Corridor Development Concept Proposed in this Study

6.72 The "Economic Corridor Development Concept" proposed in the study is a spatial planning concept to effectively formulate value chains which are aimed at effective utilization of development resources and industry upgrade in Mongolia, but there is also a spatial framework for regionally developing the policies described in the "Sustainable Development Vision 2030." Also, it is believed that there is basically no major discrepancy in policy theory with the "action program" stated by the new government.

6.73 Several policy makers under the new government were asked for their views on the policy availability of the proposed corridor development concept. The results are summarized below.

- I agree with the Mongolian national strategy development corridor proposed in the MONDEP survey. Mongolia lacks development plans involving population composition, spatial position, economic potential, etc. Consequently, the FTZ construction projects in Altanbulag and Zamiin-Uudare are still not operational. The proposed development corridors covering geographical conditions, infrastructure development status, mineral resource deposits, future prospects of core populated areas with an integrated and consistent plan, are reasonable and expected. (Prime Minister's Economic Advisor)
- I strongly feel the development possibility of the economic corridors proposed in the MONDEP survey. I agree with the East-West Green Development Corridor, which will improve main roads and strengthen the potentials for agriculture, livestock industry and tourism development as a green zone. With regard to the North-South Industrial Growth Corridor, trade will be promoted because of the transit agreement among Russia, China and Mongolia which is planned to expand transport capacity and electricity business. It is also possible to link the development projects such as a "one region one road" program which prospers agricultural industry, logistics development, energy development, etc. along the corridor. (MOF Policy Bureau)
- I checked the summary of the MONDEP research report (Mongolian version). The concept of the East-West Green Development Corridor and the North-South Industrial Growth Corridor are generally correct, but I think it is necessary to compare it with our new "Action Program," which contains several projects including the railway construction project "Bichigt ~ Khoot ~ Choibalsan ~ Russia" in the eastern region. The reason for this is that there are three country transport agreements and various economic corridor concepts between Russia and China. We intend to utilize it, so the possibility of development of regional industry is expected. That is to say, although

crude oil is produced near Choibalsan, there are also plans to build refineries and power plants for gasoline and diesel. Besides, there is a large coal deposit in Khoot, and it is possible to develop the corridor by connecting the rails to Bichigt's border across China. This north-south corridor can be recognized as a new economic corridor. (Head of NDA)

- I agree that it is difficult to realize the southern east-west resource transport route of "TT ~ Sainshand" in the near future. Further discussion is needed. (Head of NDA)
- I support the corridor concept proposed in MONDEP because there is no discrepancy with the survey results done by the former Ministry of Industry. Regarding the mining industry, it is necessary to compare it with heavy industrial policy. Because the "Economic Corridor" is a new development concept for Mongolia, I would like to see how it can connect with national land development and regional development. (Director of Development Policy Department, NDA)
- The Agro IT Park project, which is important in MONDEP, is included in the "Action Program" of the new government, so for NDA now it is regarded as a priority project. Currently, we are collecting lists of action programs from each ministry and agency, but since NDA is the coordinating department, we have a system to coordinate ministries and agencies towards the implementation of the Agro IT Park. As to the priority areas for the Agro IT Park, we plan to start in the spring of next year in the three aimags of Selenge, Arkhangai and Bulgan. As for the detailed location, I would like to match the East-West Green Development Corridor of MONDEP as much as possible. (Director of Development Policy Department, NDA)

(6) Mineral Resource Transport Routes and the Corridor Development

4.82 In regard to production activities and transport systems of mineral resources of mainly coal and copper, attention is given to two mineral resource transport routes. One is the Mineral Resources Transport Route in the South covering the railway route toward the south from Tavan Tolgoi (TT) in Umnugovi province to Gashuun Sukhait at the Chinese border and continuing up to Shainshand of Dornogovi province. Another one is the North-South Resource Transport Route in the East, covering Choibalsan of Dornod province to Bichigt at the Chinese border through Khoot in Sukhbaatar province.

4.83 To establish the Mineral Resource Transport Route in the South, it is necessary to consider several issues calmly, though there were many policy discussions. First is the transportation issue to connect TT’s and OT’s production activities to the Chinese market. With the slowing down of the Chinese economy, the price of coal dropped, so the development of a stable and effective transportation means is required soon, particularly the construction of the railway system directly connecting TT or OT to the Chinese border of Gashuun Sukhait.

4.84 The second issue is the possibility of a new railway to connect between TT and Sainshand, which has been discussed for a long time. This depends on the possibility of establishing heavy industrial area development in Shainshand. However, the economic feasibility of the planned factories of coke and copper refining is not good enough, and the possibility of developing value-added industries based on mineral resources is not high enough considering the competition with China’s industry.

4.85 Particular attention is given to the North-South Resource Transport Route in the East construction of a new railway along this new trade route was approved as one of the priority mega projects under the new government. This connection from Choibalsan, Khoot, and Bichigt is required firstly to ensure the development of the resource transport route to the Chinese markets. Then, maintenance of the existing railway between Choibalsan and Russia is required in order to formulate the second south-north transportation route between China and Russia. Based on the transportation agreement among Mongolia, Russia and China, Mongolia needs to provide the transit cargo transportation service. This second south-north transportation route is expected to create a favorable environment for Mongolia to build a logistics system among the three countries.

4.86 Generally, it is necessary to develop a transport system to establish stable physical distribution as a basic condition for formulating the economic corridor. However, just the development of transport facilities is not enough to promote industrial activities along the corridor and establish an “economic corridor.” In the area along the corridor, it is expected to establish a new economic corridor based on mineral resources, as there are existing mineral resources such as coal, copper, crude oil, molybdenum and uranium. To realize this, however, long-term and sustainable development investment on related urban activities and accumulation of other industries is required.

Table 6.6.1 Action Program of the Government of Mongolia (2016～2020)：Summary

Policy Pillars	Implementation Action
1. **Special Policy to Overcome the Economic Crisis:** To increase immunity of the economy, and to implement in the medium term continually expanding policy by overcoming the economic crisis in a short period, securing a macroeconomic balance, diversifying the economy, eliminating the influence on resource prices, and mitigating the pressure of repayment of medium-term government bonds.	1. To overcome the economic crisis in a short period and to propose a stabilization program. 2. To ensure macroeconomic sustainability and to increase foreign and domestic investments. 3. To improve the effect by securing fiscal consistency, withdrawing expenditure on non-budget items, and improving policies and planning concerning public investment. 4. To reduce budget loss by strengthening fiscal management, reducing inefficient expenditure, and reducing costs. 5. To ensure efficient and transparent expenditure of regional development funds. 6. To solve citizen, company and national debt problems, to support civic lives, and to increase income levels. 7. To pay individuals and companies which have not been paid their fees as contractors of public works. 8. To reduce the conditions of national debt, to negotiate repayment deadlines, and to mitigate fiscal deficit step by step. 9. To evaluate the issued loan under “stabilized price” program, and to increase efficiency. 10. To evaluate the national bonds of the development bank, loans, projects and programs, and to repay inappropriate usage and overdue loans. 11. To control the amount of new taxes, to do business in specific fields within the framework of domestic industrial promotion policies, and to reduce income tax to 1% for companies with annual income lower than MNT1.5 billion. 12. To distinguish income tax on enterprises and individuals by income. 13. To establish legislation for reduction of individual income tax with minimum wage. 14. To fully support domestic investors, and to adopt legal measures such as tax reduction and exemption until the first investment is reclaimed. 15. To support domestic enterprises with tax delinquency by delayed payment of taxes, penalties and interest, extension of payment deadline, and reopening of closed bank accounts. 16. To provide an opportunity to repay debts and improve their credit history for companies and individuals registered in the “creditor blacklist” which were influenced by the economic crisis and delayed repayment of loans. 17. To continually operate for more than five years, and to deliver long-term soft loans to SMEs which are creating employment. 18. To reduce service charges and fees for public services. 19. To reduce the number of the national licenses and approvals to operators by three times, to extend the term of validity, and to eliminate redundant management and auditing. 20. To collaborate with international and regional banks and financial institutions to overcome the economic crisis and vulnerable situations, and to reduce risks. 21. To hold a council with partner countries, international banks and financial institutions. 22. To bring up the basic indicators of the economy and national bonds of Mongolia, and to obtain confidence of foreign investors. 23. To implement the “Made in Mongolia Program” and to improve the competitiveness of the industrial sector. 24. To promote “Erdenes Mongolia” OT project, and to start strategic deposits such as TT.
2. **Policy to Support Stable Economic Growth**	1. To increase GNI in Mongolia and to enhance its ranking among high-middle income countries. 2. To create industrial map of Mongolia, and to develop a heavy industrial development program. 3. To support companies, other than those in the mining industry, which export more than 50% of products produced in Mongolia with tax collection measures. 4. To increase the value of the shares owned by all citizens. 5. To distribute profits to citizens from mega projects such as OT, TT, Erdenet, etc. 6. To extend the deadline of receivables delivered to companies conducting mega projects, and to improve the environment for reducing interest. 7. To build a financial market which is friendly to the people and benefits the economy. 8. To revise the legislation of standards and surveying in accordance with international

Policy Pillars	Implementation Action
	standards, and to implement the "national quality program." 9. To adapt the mechanism which accepts and introduces the standard and evaluation of survey in order to enhance the competitiveness of products and eliminate technical obstacles in transactions. 10. To stabilize the fee for industrial steams, water, heating, electricity, etc. and to reduce the cost gradually. 11. To build a system concerning shipment, transport, processing, and consistency of livestock materials. 12. To strengthen activities of the free zone, and to support domestic and foreign investment. 13. To support the fair competition in the market, and to strengthen the legislation to protect consumer rights. 14. To support domestic industries through customs clearance and tax policies. 15. To implement a one-stop export policy, and tocentralize public service such as customs clearance, tax collection and audit for digitization. 16. To issue trust loans and to support SMEs, family businesses and small business owners. 17. To implement the "regional assistance" policy to support businesses in local and remote areas. 18. To adjust the fuel price to global standards. 19. To start "Healthy Food - Healthy Mongolian Program," "Industrialization 21:100 Program," "Domestic Industry Program," and "Meat and Milk Program Phase I" for the purpose of supporting sustainable development of food in the food, livestock and light industry sector, and to continue to Phase III.
3. **Food Industry Sector**	1. To implement Phase I of the "Meat and Milk Program" for stabilizing public food supply and reducing the seasonal impact of strategic food supply, and to supply healthy and safe products to citizens. 2. To increase the competitiveness of food products and to create an environment for value-added product exports. 3. To improve the legal environment of organic and macrobiotic foods, and to implement funds, investment and tax collection policies for industry promotion. 4. To support the construction of a model factory of the small, medium-sized food processing factory with the latest technology to meet the needs of the aimag, city, soum, and residential area. 5. To build a registry and integrated information database for food safety. 6. To improve the environment of healthy and safe food provision to citizens, and to build a system of food production, processing, preservation, transport, and sales for food safety improvement. 7. To increase the category of domestic food products, to implement sub-programs of chickens, pigs, bees, fish ,etc., and to expand the supply of goods.
4. **Livestock Industry**	1. To implement the "Mongolian livestock" national program for improving livestock industry productivity, economic circulation, and for introducing the latest machinery, technology reform and innovation. 2. To implement "national nomadic policy," "Mongolian nomads," and "domestication" programs. 3. To support the export of meat and meat products by combining grazing, intensive pastoralism and farming, to increase annual export volume to 50 thousand tons, and to raise the income level of nomads. 4. To learn the experiences from other countries about the training of livestock industry experts, re-training, livestock industry, and to implement a "knowledge and information program" to local nomads. 5. To implement a flexible policy of soft loan, investment, insurance and tax collection for the livestock industry, and to ensure income of nomadic households, life quality and fund expansion of direct industry development to prevent devaluation of livestock raw materials and burden on nomads. 6. To establish a system to clarify the registration of livestock, collection of livestock raw materials, collection quality, improvement of standards and product origin. 7. To encourage nomads to participate in the housing program, and to practice welfare measures. 8. To ensure smooth and consistent operation of the veterinary system with international standard, to implement prevention, management and countermeasure strategy of

Policy Pillars	Implementation Action
	livestock infections in zoning based on the border gateway, and to increase raw materials of livestock industry and the possibility of product export. 9. To convert the quantity to quality of livestock, to improve efficiency, to protect genetic resources and breeding, and to carry out introduction of new technologies of biotechnology, development of new species, and capacity building of regional breeding units. 10. To increase loan support for the construction of livestock feed plants, and storage of feed. 11. To improve wells in grasslands, construction of artificial ponds, and management maintenance for increasing the water supply of residents and livestock. 12. To enhance grassland efficiency, and to challenge latest ecological technology against regeneration, decomposition and desertification for better grasslands for insects. 13. To improve and implement legislation about genetic resources of livestock for the stable growth of livestock, the health of livestock, and the development of livestock. 14. To protect the traditions and wisdom of the livestock industry, and to implement an intensive pastoral development program to ensure livestock numbers, types and composition.
5. **Realization of Fertile Lands**	1. To improve the working rate of farmland, and to domestically produce 100% of grain, potatoes, main vegetable demand and 50% of feeds in agricultural and intensive livestock developed area. 2. To increase fruit categories and productivity, network of sea buckthorn production, and provision of nutritious fruits for more export incomes. 3. To increase nutrition and productivity of lands, to accumulate greenhouse cultivation, and to improve categories and quality. 4. To introduce new technologies to integrated cultivation projects,such as countermeasures against decomposition and withering of farmland, to increase organics in land, and to carry out crop rotation. 5. To annually increase the area of irrigated farmland by construction of irrigation system based water exploration and survey, and introducing renovation, new technology, machinery. 6. To develop an accumulated farm for greenhouse cultivation in summer and winter, and to provide fresh vegetable to citizens. 7. To support tax policy of latest agricultural technology, machines and fertilizer according to lease conditions. 8. To build an integrated system for storage, elevators, threshing machines, machine capacity improvement, and sales. 9. To improve legislation of agricultural insurance.
6. **"Domestic Product" Program**	1. To improve legislation, business environment improvement, and to increase domestic production of value-added products in export-oriented SMEs, business, and service industry. 2. To build legislation of price arrangement of agricultural and animal husbandry products. 3. To implement a long-term investment and soft loan policy for light industry and SMEs. 4. To build a system for raw materials of wool, cashmere, and leather shipping, transporting, stable supply, and raw materials storage. 5. To support businesses in international business and border gateway areas. 6. To develop light industry, SME talent cultivation, re-retraining, training system, and to implement a "specialist" program. 7. To establish information centers and incubator centers to hold information and training seminars for the purpose of developing the light industry sector with the cooperation of specialized associations. 8. To learn from overseas franchising plants with advanced technology and to support construction of "development model" plants in the light industry and SME sectors. 9. To hold global advanced technical and mechanical exhibitions in the light industry sector regularly, and to encourage domestic manufacturers to attend overseas exhibitions. 10. To support light industrial park development, cooperation among plants and companies, and cluster development under governmental policies. 11. To increase goods from the agricultural market, categories of raw materials and quantity for operation improvement.
7. **Mining Industry and**	1. To improve competitiveness of Mongolia in the international market by improving the

Policy Pillars	Implementation Action
Heavy Industry	investment environment, and sustainable development in the mining industry. 2. To support sustainable development in the mining sector by conducting more surveys in geological mapping, fundamental investigation, geophysics, geochemistry, water quality and ecology. 3. To build a national geological information database according to international standards for public provision. 4. To improve the investment environment in the geological and mining sector, and to implement cooperative projects and programs. 5. To join the mining industry county union, to improve the cadastral registration system, and to simplify the process of license approvals. 6. To expand oil exploration, excavation and mining businesses. 7. To revise the legislation for individuals about cooperation in the micro-mining industry. 8. To propose a long-term plan for infrastructure development in the mining industry sector and to strengthen the cooperation among sectors. 9. To establish a research institute for the mining industry, and to improve mineral resources investment environment. 10. To build legislation of mineral resource (type II) utilization, and update natural generation and closedown with international standard. 11. To deal with financing and procurement of "Gold II" program with Bank of Mongolia. 12. To increase gold yield, and to build legislation of gold acquisition for small mine owners. 13. To increase oil yield and to build oil processing factories. 14. To support the construction of copper smelters. 15. To support the construction of steelmaking parks in Darkhan and Selenge areas. 16. To support coal selection and manufacturing, and gasification industry under governmental policies. 17. To support the construction of liquid fuel and coal plants under governmental policies. 18. To develop metal structure and plant construction.
8. **Infrastructure, Construction, Urban Development Sector:** To support construction projects to match the conditions of safe cities, urban planning, natural environment, and human health, and to help improve legislation of safe and reasonable congestion mitigation.	1. To expand the scale and subject of loans by mitigating housing loan restriction providing diverse loan program. 2. To make an integrated policy to meet public housing needs, and conduct "affordable houses" program. 3. To do environmental improvements using international quota and standards. 4. To clarify the reasonable direction for planning of human habitation, emigration, and living area system. 5. To construct land integrated policy/system, and to improve legislation of land use, occupation and possession. 6. To providespatial information by mapping the national territory of Mongolia, and building a geographic database. 7. To build legislation of Ulaanbaatar development. 8. To conduct a sub-program of "street" and "bicycle lane" to integrate Ulaanbaatar masterplans. 9. To increase by three times the green facilities of aimag centers in Ulaanbaatar. 10. To implement projects and programs of re-development reconstruction in Ulaanbaatar, Ger areaand other cities, and to reduce air pollution. 11. To plan an underground system and to improve infrastructure in new residential areas in cities and urban areas. 12. To implement a development policy on construction equipment for lowering construction costs, reducing construction period and construction weights, preventing heat loss, and enhancing fire resistance. 13. To plan and implement countermeasures for earthquake frequency identification in cities, risk setting, seismic design and safety improvement of current buildings. 14. To conduct national public service policies to reflect urban development masterplan. 15. To separate drinking water and normal water in newly planned residential region in Ulaanbaatar, to reuse used water for grey water, and to introduce sewage system and green facility reuse technology. 16. To reform the sewage treatment plants in Ulaanbaatar and other cities by foreign and domestic investment with urban masterplans.

Policy Pillars	Implementation Action
	17. To explore the feasibility of treated grey water and soiled water in plants. 18. To expand the area of wireless Internet in leisure regions, libraries, etc. 19. To expand the flow of Tuul, Selbe and Dund rivers for water supply improvement in Ulaanbaatar, and to construct leisure environment along the riverside. 20. To increase by twice the residential area and public space for parking in Ulaanbaatar. 21. To complete infrastructure in Ulaanbaatar Selbe and Bayankhoshuu sub-downtown.
9. **Energy Sector:** To ensure stable and reliable supply of energy for national economic security, and to aim for export.	1. To expand the capacity of current thermal power plants, and to reform them (Choibalsan Power Station, 3rd Thermal Power Plant of Ulaanbaatar). 2. To construct a new power station for stable supply of energy, and a thermal power plant for TT coal supply in the mining area of South Gobi. 3. To construct export-oriented large-scale thermal power plant and DC transmission line to utilize coal deposits such as Shivee-Ovoo and Tevshiin Govi. 4. To develop renewable energy at an increasing ratio. 5. To build a regional energy system, heavy industry, power transmission lines between major customers and electricity origin and sub-station, and to construct an integrated energy system. 6. To establish heating plants, pipelines in aimag centers, cities and urban areas for energy supply. 7. To connect soum centers with CS, and to implement a whole business linking renewable energy and CBM based intensive infrastructure, heating, water and sewer service system. 8. To implement specific measures, projects, and programs by introducing new technology of energy saving, efficiency improvement, reduction of energy loss, innovation. 9. To stabilize costs of heating and electricity, and to make a policy for future price reduction. 10. To construct plants which make coal to gases and produce smokeless fuel with new technology, and to reduce air pollution by conducting a detailed survey about fault gases for TT and coal deposit in the central area, confirming applicable resources, and conducting a project for modernization of regional gas supply.
10. **Road Transport Sector:** To develop safe and comfortable roads, transport, and logistic networks with regard to economic growth and needs of the society.	1. To expand the network of international, long-distance and local level paved roads, to connect aimag centers with paved roads, and to proceed with the Millennium Road project. 2. To conduct the railway construction business to TT-Gashuun Suhait and Huut-Bichigt. 3. To construct the gateway railway from TT-Gashuun Suhait railway to OT railway and Shiveehuren-Sehe. 4. To start the railway construction business to Zuunbayan-Hangi. 5. To start the Bogd Han railway construction business for UBTZ technical improvements. 6. To start the railway construction business to Erdenet-Ovoot. 7. To develop domestic and international transport, logistic network, and to construct a logistics center in “Hushug Valley” (near the new international airport). 8. To increase domestic and international flights basedon national air transport policy, and to reduce flight costs caused by competition supporting. 9. To expand the light aircraft and helicopter market in the fields of disaster measures, food, agriculture, livestock industry, emergency medical care, civil aviation, and tourism. 10. To encourage international exchange in the transport sector, and to develop transit transport by introducing regional infrastructure and transport network. 11. To establish a regional cooperation planning center via tripartite cooperation among Mongolia, Russia, China, and conduct a feasibility study survey in the infrastructure sector. 12. To develop ecological tourism water transport in tourism in domestic rivers and lakes. 13. To establish a logistics center at Dunzyan FTZ, Tianjin, China. 14. To introduce an open transport smart system owing to needs. 15. To build roads to Bayanzurh, Yarmag, Sonsgolon bridge and UB-Nalaikh for road network improvements based on the Ulaanbaatar Development Masterplan. 16. To build viaducts and BRT to mitigate traffic congestion in Ulaanbaatar.

Source: Reference materials from the Government of Mongolia, edited by JICA Study Team.

7 SUMMARY AND RECOMMENDATIONS

7.1 This chapter organizes the key issues that Mongolia should address considering the medium- and long-term socioeconomic development vision based on discussions in the previous chapters. Then, it will confirm the effectiveness of the "Strategic Economic Corridor Development Concept" which is the main purpose of this Study and propose basic policies of land and spatial development.

(1) Planning Issues on Regional Comprehensive Development in Mongolia (SWOT Analysis with a Vision of Sustainable Development in Mongolia)

7.2 The previous chapters have examined the key issues of each sector to be addressed hereafter. This section conducted a SWOT analysis that evaluates the overall "Strengths (S)" and "Weaknesses (W)" of Mongolia and the "Development Opportunities (O)" and "Constraints and Threats (T)" based on the proposed corridor development. The resultsof the analysis are summarized in Table 7.1.1.

Table 7.1.1 SWOT Analysis of Regional Development based on the Corridor Development in Mongolia

Strengths	**Weaknesses**
• Vast land area • Moderate but steady population growth • Experiences in rapid economic growth and decrease in the population living in poverty • Accumulation of central urban functions in Ulaanbaatar • Increase in investment opportunities mainly in the service sector, though dropping in the short term • Adjacent to the giant markets of China and Russia • Agriculture and livestock farming by using nature and tradition spread all over Mongolia and ample agricultural and livestock resources • Abundant mineral resources, which is the driving force of the Mongolian economy • Plentiful tourism resources for tourists to enjoy nature and traditions • Abundant human resources with high educational background	• Maldistribution of wealth and decline in vitalities of local areas due to the unipolar concentration of population and economy in Ulaanbaatar • Increase in external diseconomies such as traffic congestion by overconcentration in Ulaanbaatar • Regional disparities • Insufficiency of skilled workers in the manufacturing sector • Increase in wage level in the manufacturing sector (no comparative advantage with Asian countries) • Constraints as a landlocked country, high logistics cost due to lack of logistics systems and weak international competitiveness in transport and logistics due to high costs • Decreased international competitiveness in the transport and logistics sectors • Economy heavily relies on mining which is influenced by international commodity prices • Overdependence on China for foreign trade • Recent worsening of financial and macroeconomic situation
Opportunities	**Threats**
• New market development through promotion of economic exchange with Europe and Central Asian countries and improvement of access to logistics • Promotion of production technical transfer through implementation of EPA with Japan • Improvement of access to the local economy by progress of main trunk road pavement project • Possibilities of revitalization and stability of local economy by agriculture, livestock farming, tourism and industrial diversification • Reducing disparities by increase in job opportunities in regional urban cities and improvement of social services	• Fragile natural environment that is affected by climate change (increase in drought), global warming and decrease in meadows • Overdependence on the Chinese economy • Increase in country risk by failure of the natural resource policy and management of macroeconomic policy • Confusion in policy decision on development of economic infrastructure supporting sustainable growth and delay in investment • Increased risks of infectious diseases (concerns on serious damage to livestock) by expansion in travel of people and transaction of commodities

Source: JICA Study Team.

7.3 In implementing a sustainable and balanced land development in Mongolia, there are many strengths and opportunities as well as weaknesses and threats. Conditions to promote an effective economic corridor development are identified based on the above SWOT analysis. It is important to particularly consider these conditions in implementing Japan's ODA projects in the future.

7.4 With regard to strengths, the following points are emphasized:

(i) There is a possibility that solid basic industries will be developed in the medium and long

terms in a variety of mineral resources, although this will depend on international commodity prices. At the first stage, the export of raw materials to the Chinese market and domestic consumption would increase. At the second stage, processing industries involved in the supply chains of China are expected to be developed. At the third stage, value-added production and strengthening services based on cooperation with capital and techniques of countries other than China are expected. Reinforcement of accessibility to international markets and integrated economic corridor development will enable this process of upgrading the industries efficiently.

(ii) Economic concentration in the Ulaanbaatar metropolitan area causes economic disparity between Ulaanbaatar and the provinces. At the same time, however, accumulation of economic activity and higher level service functions in the financial and IT sectors are necessary to become competitive with other major Asian countries in attracting foreign capital and advanced technology. Accumulation of higher grade urban functions is an indispensable condition to develop strong international competitive advantages.

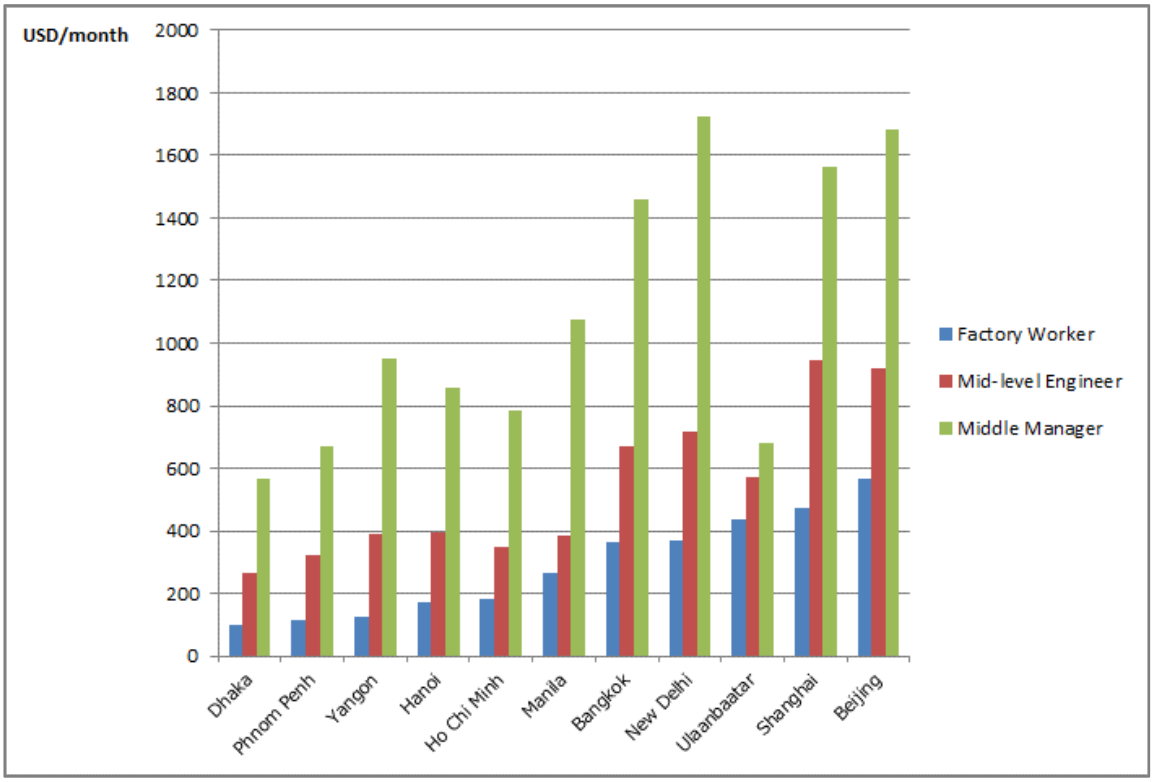
(iii) It is obvious that mining and mining related industries are an important driving force for the Mongolian economy, but another driving force to support a stable and sustainable economy is agriculture and livestock farming. It is necessary to optimize agriculture and livestock farming by making use of nature and tradition implemented all over the country and its abundant agricultural and livestock farming resources to ensure Mongolia's growth. To implement this, economic corridor development will be able to promote the efficient development of modern markets and the food value chain.

(iv) The literacy level is extremely high and there are plenty of highly educated human resources in Mongolia. These are great positive factors that contribute to a large potential for modernization of industries.

7.4 The following two issues are pointed out in relation to weaknesses:

(i) The most critical weakness pertains to geographical and geopolitical conditions, that is, Mongolia being a landlocked country between Russia and China. Hence, the Mongolian government is trying to nurture the Far Eastern market of Korea and Japan under its "third neighboring country policy." However, transport costs of exports and imports in Mongolia are relatively high, making it difficult to ensure the competitiveness of Mongolian products in these foreign markets. In particular, the transport of coal and other mineral resources is a big issue because those transport costs which the traffic bear are generally small.

(ii) A comparison of wage levels of manufacturing industries in major Asian cities based on the results of a "survey on business conditions of Japanese companies in Asia and Oceania" conducted by JETRO in 2014 (see Figure 7.1.1) shows that the average wage of a manufacturing worker in Ulaanbaatar is already higher than in other major cities in ASEAN and South Asia, although still slightly lower than in Shanghai and Beijing in China. In addition, the wage level of a mid-level engineer in UB is lower than in Shanghai, Beijing, New Delhi and Bangkok but much higher than in other cities. An increase in FDI is necessary to promote upgrading and value-adding of Mongolia's industries, but its wage level is not competitive with those of other major ASEAN cities. Thus, other comparative advantages that will compensate for its relatively high wage level are necessary.



Source: Survey on Business Conditions of Japanese Companies in Asia and Oceania (2014), JETRO.

Figure7.1.1 Comparative Wages in Manufacturing Industry in Major Asian Cities

7.5 Regarding opportunities, the basic policy is to make use of the abovementioned strengths and overcome the weaknesses. In particular, the following should be noted:

(i) A condition of corridor development is to integrate it with the strengthening of the transport infrastructure, which brings opportunities to find new markets in Far East Asia (Korea, Taiwan and Japan) via China and in Europe via Russia by train. Furthermore, such development generates possibilities for the Mongolian market economy to be linked with new partners, such as market cooperation with Central Asian countries which are connected from the western area through Asian Highway 4 (AH4). On June 23, 2016, a draft development plan for economic corridors was agreed between Russia, China and Mongolia. In order to implement the above policy, it is required to acquire a superior position in roundtable meetings on rail transport of transit cargo among the three countries of Russia, China and Mongolia.

(ii) The growth potential in agriculture and livestock farming, agricultural and livestock processing, and tourism industries is recognized as a strength. To take advantage of this strength, it is expected that an exchange of capital, techniques and knowledge, and human resources by mainly the private sector will be increased. In Mongolia, the “Top 20 Index” as the main indicator of the Mongolian stock market makes known to the public the companies with excellent capital strength. It is expected that foreign and domestic investors will expand their investments for diversification and upgrading of industries in the future. With the EPA with Japan coming into effect in June 2016, it is expected that Japanese companies and capitalists will start actively seeking good partners in Mongolia.

7.6 As for threats, the natural and human factors are specifically mentioned, as follows:

(i) As described above, the growth potential of agriculture and livestock farming is a strength but one survey forecasts risks that devastation of meadows and farmlands and depletion of water resources will occur in the future due to climate change. Therefore, in addition to the promotion of agriculture and livestock farming, it is important to plan and implement measures to preserve the natural environment resources and to effectively recharge water resources. Furthermore, measures are required to respond to the risks of animal disease and epidemics brought about by conventional nomadic livestock farming which will hinder the growth of "Healthy Livestock Farming."

(ii) The Mongolian economy heavily relies on the Chinese economy in terms of mineral resources. Therefore, if the government adopts unbalanced macroeconomic and fiscal policies and manages projects without transparency, it needs to shoulder critical problems in politics and public administration, as what it has actually been facing since 2014. In order to overcome these threats, prudent management by the national government is strongly desired.

(2) Planning Issues on Regional Comprehensive Development in Mongolia and Basic Direction of Measures to Address the Issues

7.7 Figure 7.1.2 summarizes basic directions of key development issues, policies and measures to address the issues. The measures are limited to the development of physical regional centers and infrastructure development in alignment (axis) forming development corridors.

Current Status and Issues	Directions of Policies	Measures	
		Regional Center	Axis
Location of Mongolia from the Geopolitical Viewpoint ・ Located between two major countries of Russia and China ・ Cooperation with other Asian countries and western European countries	Strengthening GlobalExchange Promotion ・ Border trade and industrial development (FTZ) ・ Expansion of aviation and rail network ・ Development of logistics network with international competitiveness ・ Development of compound and integrated distribution system in east-west corridors	• Strengthening of urban functions of UB City • Development of industrial regional base such as FTZ • Development of international logistic hubs in the international airport and border gates	• North-south axis development • East-west axis development
Key Issueson Economic Development ・ Diversification of industries from an economy centered on the mining sector, such as agriculture and livestock farming, agroprocessing, and tourism industries ・ Sustainable economic growth policy ・ Measures to create employment ・ Development of international markets	Development of Foreign Investment Environment ・ FDI promotion and re-establishment of incentives for the promotion of investment in the strategic sectors ・ Development of a favorable business environment for foreign companies ・ Living environment development for technical experts and highly skilled persons from foreign countries	• Mining development • Industrial Park development • Agro IT Park development • Strengthening of urban environment of UB City	• Railway development • Development of compound and integrated transport system such as road networks • National aviation networking improvement with development of local airports all over the country
Key Issues on Industrial Development ・ Industrial diversification and industrial priority investment in the strategic sector ・ Strengthen domestic markets ・ Agricultural products quality standard and stable supply ・ Long-distance transport system for perishable food ・ Strengthening of research and development in agriculture ・ Comprehensive tourism development ・ Government support for development of import substitution and value-added production	Industrial Diversification ・ Mining (adding a high value and compound industrialization of energy resources) ・ Industry (import substitution industry and use of resources) ・ Agriculture and livestock farming (cashmere, meat, dairy products and others) ・ Tourism (management system in protected areas, access roads, and tourist service facilities)	• Industrial park development around mining sites • Industrial park development in the suburbs of UB • Agro IT Park development • Development of new industrial technology development center • Development of tourist sites	• Railway and road development
Regional Disparities ・ Growth management of big cities to narrow the regional disparities and promotion of regional city development ・ Poverty alleviation in urban areas ・ Urban infrastructure development ・ Improvement of urban services in regions ・ Housing, medical, educational and cultural disparities	Regional Revitalization ・ Use of local resources ・ Development of special products ・ “Sixth Industrialization” of agriculture and livestock farming (value chain development) ・ Links and complex of local industries	• Compound industrial park development • Regional research and development function development • Development of agricultural and livestock market	• Development of access roads to trunk roads
	Development of Core Cities ・ Development of infrastructure in core cities ・ Employment creation policy	• Housing • Social infrastructure (e.g., education and medical treatment) • Development of urban environment	

Source: JICA Study Team.

Figure 7.1.2 Summary of Key Development Issues, Policies and Measures

Appendix 2.2.1 DEMOGRAPHY OF MONGOLIA BY AIMAG

Aimag	Resident Population in Mongolia (thousand persons)	Residents in Mongolia (thousand persons)	Annual Average Population Increase and Decrease Rate 2014/2010	Births	Deaths	Natural Increase	Marriages[1]	Divorces[1]	Life Expectancy at Birth (years)
	2010	2014		2013 (Per 1000 Population)					2014
Total	2 653.8	2 937.9	2.1%	28	5.6	22.4	5.8	1.3	69.57
Western Region	352.4	376.7	1.3%	28.8	5.5	23.3	12.6	0.7	
Bayan-Olgii	85.4	93.2	1.8%	31.4	5	26.4	17.5	0.8	72.76
Govi-Altai	53.2	56.7	1.3%	24.9	5.3	19.6	7.4	0.7	68.84
Zavkhan	64.8	69.6	1.4%	27.1	5.9	21.2	7.9	0.7	69.19
Uvs	72.8	75.7	0.8%	30.3	6	24.3	14	0.6	68.28
Khovd	76.2	81.5	1.4%	28.6	5.5	23.1	14.1	0.7	71.71
Khangai Region	515.2	567.4	1.9%	28.7	5.9	22.8	7.6	1.5	
Arkhangai	84.1	92.9	2.0%	29	5	24	7.5	0.7	70.54
Bayankhongor	75.8	82.9	1.8%	29.4	5.9	23.5	7.8	0.8	68.89
Bulgan	53.1	60.3	2.6%	25.5	5.5	20	6.6	1.3	72.3
Orkhon	87.4	92.7	1.2%	28.8	6	22.8	8.2	3.5	70.83
Ovorkhangai	100.5	112.6	2.3%	28.8	5.6	23.2	5.5	0.9	69.32
Khovsgol	114.3	126.0	2.0%	29.4	6.9	22.5	9.6	1.4	65.79
Central Region	442.0	475.9	1.5%	27.3	5.1	22.2	7.5	1.7	
Govisumber	13.2	15.9	3.8%	32.2	5.4	26.8	6.1	2	72.86
Darkhan-Uul	90.9	97.3	1.4%	30.1	5.8	24.3	8.2	2.6	68.51
Dornogovi	58.2	63.5	1.8%	27	5.7	21.3	8.8	2.1	70.17
Dundgovi	38.4	44.2	2.9%	27	5.7	21.3	6.1	1.3	73.22
Omnogovi	61.1	59.7	-0.5%	25.6	5	20.6	6.4	1.3	71.44
Selenge	96.1	105.3	1.8%	26.1	4.6	21.5	7.9	1.5	71.87
Tov	84.1	90.0	1.4%	26.5	4.4	22.1	7.1	1	72.06
Eastern Region	185.5	203.4	1.9%	28.6	5.9	22.7	9.3	1.3	
Dornod	68.9	74.9	1.7%	29.4	6.1	23.3	9.2	1.6	68.41
Sukhbaatar	51.2	57.4	2.3%	28.3	6.4	21.9	11.4	1.2	71.78
Khentii	65.4	71.1	1.7%	28	5.3	22.7	7.7	1.1	70.94
Ulaanbaatar	1 158.7	1314.5	2.6%	27.5	5.6	21.9	8.9	2.6	71.24

Source: Statistical Yearbook 2014.

Appendix 2.2.2 NUMBER OF HOUSEHOLDS IN MONGOLIA

Unit: thousand households

Aimags and the Capital	2010	2014	2014	Change 2014/ 2010	2010		2014			Change Between 2010-2014 (%)	
			Per. per HH		Urban	Rural	Urban	Rural	Urban (%)	Urban	Rural
Total	742.3	823.4	3.6	2.1%	463.7	278.6	537.7	285.7	65%	3.0%	0.5%
Western region	96.5	100.5	3.7	0.8%	29.6	66.9	32.8	67.7	33%	2.1%	0.2%
Bayan-Olgii	20.7	22.4	4.2	1.6%	7.0	13.7	7.9	14.5	35%	2.4%	1.1%
Govi-Altai	15.7	15.8	3.6	0.1%	5.0	10.7	5.2	10.6	33%	0.8%	-0.2%
Zavkhan	20.1	20.5	3.4	0.4%	4.3	15.8	4.8	15.7	23%	2.2%	-0.1%
Uvs	19.7	20.7	3.7	1.0%	6.2	13.5	7.5	13.2	36%	3.9%	-0.4%
Khovd	20.3	21.1	3.9	0.8%	7.1	13.2	7.4	13.7	35%	0.8%	0.7%
Khangai region	158.6	165.5	3.4	0.9%	58.9	99.7	65.1	100.4	39%	2.0%	0.1%
Arkhangai	26.5	26.8	3.5	0.2%	5.5	21.0	5.6	21.2	21%	0.4%	0.2%
Bayankhongor	23.2	24.5	3.4	1.1%	7.8	15.4	8.8	15.7	36%	2.4%	0.4%
Bulgan	16.8	18.2	3.3	1.6%	4.0	12.8	4.1	14.1	23%	0.5%	2.0%
Orkhon	24.4	26.0	3.6	1.3%	23.0	1.4	24.7	1.3	95%	1.4%	-1.5%
Ovorkhangai	32.6	33.0	3.4	0.2%	7.3	25.3	9.5	23.5	29%	5.4%	-1.5%
Khovsgol	35.1	37.0	3.4	1.1%	11.3	23.8	12.4	24.6	34%	1.9%	0.7%
Central region	134.6	142.9	3.3	1.2%	57.9	76.7	62.7	80.2	44%	1.6%	0.9%
Govisumber	4.3	4.7	3.4	1.8%	2.6	1.7	2.8	1.9	60%	1.5%	2.2%
Darkhan-Uul	28.3	28.0	3.5	-0.2%	23.4	4.9	23.3	4.7	83%	-0.1%	-0.8%
Dornogovi	17.8	19.2	3.3	1.5%	10.7	7.1	11.5	7.7	60%	1.5%	1.6%
Dundgovi	13.1	13.5	3.3	0.6%	2.9	10.2	3.4	10.1	25%	3.2%	-0.2%
Omnogovi	16.1	19.4	3.1	3.8%	5.6	10.5	7.2	12.2	37%	5.2%	3.0%
Selenge	28.4	30.1	3.5	1.2%	8.2	20.2	9.8	20.3	33%	3.6%	0.1%
Tov	26.6	28.0	3.2	1.0%	4.5	22.1	4.7	23.3	17%	0.9%	1.1%
Eastern region	58.2	61.7	3.3	1.2%	22.9	35.3	24.3	37.4	39%	1.2%	1.2%
Dornod	21.6	22.4	3.3	0.7%	11.7	9.9	11.9	10.5	53%	0.3%	1.2%
Sukhbaatar	15.5	16.7	3.4	1.5%	4.3	11.2	4.9	11.8	29%	2.6%	1.0%
Khentii	21.1	22.6	3.1	1.4%	6.9	14.2	7.5	15.1	33%	1.7%	1.2%
Ulaanbaatar	294.4	352.8	3.7	3.7%	294.4	-	352.8	-	100%	3.7%	-

Source: Statistical Yearbook 2013 and 2014.

Appendix 2.3.1 SITUATION OF SOCIAL DEVELOPMENT IN MONGOLIA

AIMAGS AND THE CAPITAL	HDI	GII	GROSS ENROLLMENT RATIO (GER) at the academic year 2014/2015		INFANT MORTALITY RATE PER 1000 LIVE BIRTHS			UNDER-FIVE MORTALITY RATE PER 1000 LIVE BIRTHS		
			Primary (1-5th grade)	*Secondary (6-9th grade)*						
	2014	2014			2010	2014	Changes 2014-2010	2010	2014	Changes 2014-2010
TOTAL	**0.748**	**0.294**	**103.6**	**100.3**	**20.2**	**15.1**	**-5.1**	**25.6**	**18.2**	**-7.5**
Western Region	**0.680**	**0.250**	**104.6**	**102.5**	**26.9**	**20.6**	**-6.4**	**35.2**	**23.9**	**-11.3**
Bayan-Olgii	0.675	0.722	106.9	107.3	24.9	22.4	-2.4	36.2	25.2	-11.0
Govi-Altai	0.675	0.813	102.6	98.7	22.3	22.6	0.3	28.9	24.8	-4.1
Zavkhan	0.685	0.261	104.3	100.2	27.7	20.9	-6.8	34.0	23.7	-10.4
Uvs	0.666	0.798	103.4	100.5	33.7	17.6	-16.1	43.5	21.6	-21.9
Khovd	0.699	0.789	104.4	102.3	24.9	19.6	-5.3	30.8	24.4	-6.4
Khangai Region	**0.774**	**0.795**	**103.7**	**99.4**	**25.3**	**13.4**	**-11.9**	**30.9**	**16.5**	**-14.4**
Arkhangai	0.674	0.794	99.4	93.0	25.1	11.2	-13.9	30.0	15.4	-14.6
Bayankhongor	0.666	0.821	103.8	96.8	28.3	13.9	-14.4	35.1	18.1	-17.0
Bulgan	0.684	0.827	92.5	87.6	15.8	14.3	-1.5	19.0	16.4	-2.6
Orkhon	0.793	0.804	118.5	120.8	16.2	15.1	-1.1	20.0	16.9	-3.0
Ovorkhangai	0.652	0.817	100.6	95.9	29.9	11.3	-18.6	34.9	14.3	-20.7
Khovsgol	0.649	0.776	104.8	101.7	30.2	14.8	-15.5	38.6	17.8	-20.8
Central Region	**0.716**	**0.834**	**102.3**	**97.5**	**13.5**	**9.5**	**-4.0**	**17.4**	**11.9**	**-5.5**
Govisumber	0.742	0.346	106.1	102.3	2.9	6.0	3.2	5.8	6.0	0.3
Darkhan-Uul	0.741	0.832	115.5	112.2	9.7	6.7	-3.0	14.1	8.0	-6.1
Dornogovi	0.703	0.834	102.0	97.9	23.8	11.7	-12.1	27.5	17.0	-10.5
Dundgovi	0.684	0.836	96.5	89.5	19.5	14.5	-5.0	26.7	17.2	-9.5
Omnogovi	0.730	0.827	104.3	100.7	22.4	17.9	-4.6	26.7	23.4	-3.3
Selenge	0.708	0.834	98.7	94.8	6.8	4.8	-2.0	10.6	6.6	-4.0
Tov	0.689	0.825	93.7	87.1	12.0	9.4	-2.6	14.0	9.9	-4.1
Eastern Region	**0.704**	**0.833**	**103.3**	**99.2**	**19.3**	**12.5**	**-6.8**	**24.6**	**15.7**	**-8.8**
Dornod	0.723	0.842	105.3	103.5	20.5	8.8	-11.7	24.4	12.1	-12.3
Sukhbaatar	0.697	0.821	100.8	97.0	20.5	17.3	-3.3	24.6	21.1	-3.5
Khentii	0.687	0.832	103.1	97.3	17.1	12.9	-4.2	24.7	15.5	-9.3
Ulaanbaatar	**0.818**	**0.253**	**103.8**	**101.3**	**18.2**	**16.6**	**-1.6**	**23.3**	**19.8**	**-3.5**

AIMAGS AND THE CAPITAL	LIFE EXPECTANCY AT BIRTH (years)	UNEMPLOYMENT RATE (%)			SUMMARY OF RECORDED OFFENSES RATE PER 10000 POPULATION AGED 18 AND ABOVE (Per 10000 Population)		
	2014	2010	2014	Changes 2010-2014	2010	2014	Changes 2014/2010
TOTAL	**69.57**	**9.9**	**7.9**	**-2.0**	**109**	**140**	**128%**
Western Region		**10.1**	**13.3**	**3.2**	**67**	**65**	**98%**
Bayan-Olgii	72.76	2.8	22.5	19.7	71	52	73%
Govi-Altai	68.84	9.0	10.2	1.2	50	54	109%
Zavkhan	69.19	14.8	4.0	-10.8	62	69	110%
Uvs	68.28	15.0	14.8	-0.2	88	80	91%
Khovd	71.71	9.2	11.7	2.5	59	71	121%
Khangai Region		**11.9**	**6.8**	**-5.1**	**69**	**82**	**118%**
Arkhangai	70.54	7.0	3.9	-3.1	80	77	96%
Bayankhongor	68.89	3.6	5.6	2.0	85	82	97%
Bulgan	72.30	15.2	9.7	-5.5	62	87	140%
Orkhon	70.83	25.9	12.3	-13.6	84	90	107%
Ovorkhangai	69.32	4.9	3.5	-1.4	61	67	110%
Khovsgol	65.79	17.1	7.9	-9.2	51	88	171%
Central Region		**9.3**	**9.2**	**-0.1**	**107**	**127**	**119%**
Govisumber	72.86	14.3	5.5	-8.8	128	208	163%
Darkhan-Uul	68.51	11.0	9.3	-1.7	96	135	141%
Dornogovi	70.17	15.8	13.6	-2.2	138	128	93%
Dundgovi	73.22	10.1	5.2	-4.9	76	89	117%
Omnogovi	71.44	15.4	11.3	-4.1	94	111	118%
Selenge	71.87	2.1	10.2	8.1	118	106	90%
Tov	72.06	6.0	6.2	0.2	106	159	150%
Eastern Region		**10.5**	**13.1**	**2.6**	**106**	**109**	**103%**
Dornod	68.41	12.3	10.8	-1.5	105	112	106%
Sukhbaatar	71.78	13.8	10.1	-3.7	53	86	163%
Khentii	70.94	4.2	17.7	13.5	150	126	84%
Ulaanbaatar	**71.24**	**8.7**	**5.1**	**-3.6**	**141**	**194**	**137%**

Source: Statistical Yearbook 2014

Appendix 2.6.1 BASIC INFORMATION ON THE LIVESTOCK SECTOR IN MONGOLIA

As mentioned in the main study report, following are the basic information on Mongolia's livestock sector, as compiled from the field visits, dialogues and discussions made, and reference materials gathered during the survey.

(1) Mobile Livestock-Keeping in Mongolia

(a) **General Herd Management:** Although it is sometimes cited as a survival of ancient times, mobile livestock-keeping in Mongolia that exploits rangelands which cannot be used by conventional agriculture, is the mainstay industry of the national economy as well as the people's spiritual basis. This production scheme, so-called nomadism, is practiced in Mongolia with the regular movement of herds between fixed points to take advantage of seasonal availability of pastures. In this regard, mobile livestock-keeping in Mongolia should not be called nomadism in which herders wander from place to place without any logic (Blench, 2001[1]), but referred to as transhumance in which the movement is planned (Minato, 2005[2]). As for the classification of the world livestock production system, which is generally divided into 11 categories, the Mongolian system belongs to Temperate Zones and Tropical Highlands of Grasslands-based Systems (Sere and Steinfeld, 1995[3]).

According to the Mongolian Statistical Yearbook 2013,[4] 23.8% of the national labor force, or 1.2 million persons, belong to the semi-nomadic livestock-keeping sector. Basically, almost all of them in varying degrees keep some of the Mongolian major livestock species such as horses, cattle, sheep, goats and camels, and move seasonally between fixed points to exploit the grasslands to produce, consume, use and sell their livestock products such as meat, milk, hides, fibers, and feces as well. Also important is that some species, especially horses and camels, are used for transport. All in all, the manner of livestock production they practice is totally different from that which is generally seen in intensively operated farms, for instance in Japan or the USA, that use a lot of grain-based feeds in a confined area.

(b) **Vegetation in Summer and Winter, Soil, and Grass Species:** As mentioned in the main report, of Mongolia's total land area that is slightly more than four times that of Japan, 80% is under pasture. According to the Koppen climate classification, the climate of Mongolia can broadly be classified as continental subarctic, with the exception of the southern parts and the Gobi Desert which have a cold desert climate. Nevertheless, according to the interviews with Mongolian professionals and relevant reference works, it is more common to classify the Mongolian grassland types into six categories, as shown in Table 2.6.1.

Conveniently, the target areas of the survey, which are planned to be transformed into strategic corridor areas and economic industrial hubs, include all types of vegetation. As to soil type in forests and steppes, chestnut soil is common, while in the desert steppes, semi-desert soil is dominant. Furthermore, in overgrazed areas, alkalization of soils is quite obvious (Fujita, 2005[5]). In terms of forage yield, mountain taigas, forest and steppes, and steppes have higher productivity and deserted areas, obviously, lower. Nevertheless, the growing season is generally limited only from May to September. Thus, one of the most crucial points for herders in Mongolian grasslands is the fact that they all depend on the year-round availability of pasture which grows only in a short period. As to species of plants in

1 Blench, R. 2001."You can't go home again" Pastoralism in the new millennium. ODI, UK.
2 Minato, K. 2005.On the economy of nomadic pastoralism in Mongolia.Thesis of Dissertation.Kobe University.
3 Sere and Steinfeld, 1995. World livestock production system: current status, issues, and trends. FAO, Rome.
4 Mongolian Statistical Yearbook 2013.
5 Fujita, N. 2005. Impact of human activity on Mongolian pastureland viewed from grazing pressure of livestock and land use. Kyoto University.

grasslands, there are more than 2,000 species (Imaoka, 1988[6]), of which about 200 species are the dominant ones which are mainly grazed by animals (Yokohama, 2011[7]). Of these, the most palatable to the major animals are Gramineae (commonly known as true grasses) and Asteraceae (commonly known as sunflower family). Herders who were interviewed mentioned that "our animals grazing on Mongolian grasslands have a wide and varied selection of plants, and those plants keep them always healthy, and an experienced herder can tell which plant is their animals' favorite and where to grow." It is also worth noting that many Mongolian professionals and herders commented that plenty of naturally grown plants in Mongolian grasslands have pharmaceutical effects.

Table 2.6.1 Vegetation Type of Grassland

Types	Ratio (%)
- Alpine tundra	4.5
- Mountain taiga	3.8
- Forest steppe	23.8
- Steppe	25.9
- Desert steppe	21.5
- Desert	15.4
- Interzonal vegetation/lakes	5.1

Source: Palmer, 1993, National Report. Mongolia, UNDP.

(c) **Seasonality in Pastoralism (dung use included):** During the survey, 5 herders living in typical Mongolian tents, or gers which are cylindrical domed structures, were visited. All of them each kept 100 to 200 animals, which range could be considered as average, and they moved four times a year with a frequency of every 3 to 4 months. The routes they take are fixed and the distance between camping sites are, on average, 12 to 15km unless some unexpected disasters such as dzud occur. In the vicinity of larger cities, especially Ulaanbaatar, however, herders recently find themselves forced to change their routes for previously unusual reasons such as the existence of newly cultivated areas or recently developed urbanization. As to the frequencies and distances of moves, for instance in the desert zone, 8 to as many as 15 moves are more common (Bruun, 1996[8]), and even in the same regions, some travel just a few kilometers while others move more than 50km at a time (Fernandez-Gimenez, 2006[9]).

Concerning the use of animal feces (dung), all the herders interviewed mentioned that dried dung is indispensable as fuel (see Photos 2.6.1).

[6] Imaoka, R. 1988. Ecological characteristics of Mongolia: From a viewpoint of negdel and agricultural community in Japan. Mongolian Research 11: 2-30.

[7] Yokohama, M., Shimada, S., Sekiyama, A., Gombojav, A., and Ariunsren, A. 2011.Grassland Vegetation and Palatabilityin Mongolian Grassland. Journal of Agricultural Science 56: 203-211.

[8] Bruun, O. 1996.The herding household: economy and organization In Mongolia in transition.Bruun and Odgaard (eds.), Nordic Institute of Asian Studies, UK.

[9] Fernandez-Gimenez, M. 2006. Land use and land tenure in Mongolia: A brief history and current issues. USDA*Forest Service Proceedings* RMRS-P-39: 30-36.

Photos 2.6.1 Use of Dung in Herder Households

1: Cattle dung being dried on top of the roof

2: Dried dung put in the can for fuel

Source: MONDEP.

(d) **Pastureland Management in Summer and Winter:** The issues of pasture regulation or grazing rights are old but the same time new in Mongolia. During the socialist era, pastureland management was under the systematic control of a local collective organization, the negdel, to which almost all the Mongolian herders belonged back then (Batuul, 2004[10]). As such, the negdel, essentially a comprehensive unit meeting every single aspect of the herding households' needs, had herders prepare hay as supplementary fodder and refrain from grazing common winter and spring pastures during the summer and autumn, so that those pastures will be available during the harsh and non-growing seasons (Nakamura, 2013[11]). Currently, however, such systematic management of pasturelands and usage of fodders are negligible and, in turn, uncontrolled wanderings or year-long grazing are so rampant, consequently causing chronic overgrazing leading to degradation of grasslands, especially in slopes, crumbly areas, along main roads, areas with random track-making by heavy vehicles, near water facilities, and above all in the surrounding areas of larger cities (see Photos 2.6.2). It must be remembered that overgrazing just on its own never causes grassland degradation. In fact, intensive rotational grazing, wherein a good number of herbivorous animals are being put in a portion of pasture (paddock), apparently overgrazing condition, is one of the most efficient and recognized methods for grassland utilization (Voisin, 1988[12]). The point here is the period of occupation of the animals grazing in a given paddock before being sent to another. If the period is too long, then the grazed land could not allow the plant to re-grow, and this is the very cause of the grassland degradation. In this context, it is really admirable that, without knowing it, traditional Mongolian herders used to practice a form of sustainable rotation on a grand scale: semi-nomadic pastoralism.

Incidentally, Mongolia has had a land law for pasture utilization. According to the interviews with Mongolian officers during the survey, it appears that the land law is well respected and, therefore, pasturelands are being used appropriately. So if any disorder exists, that comes from the negligence of herders. Nevertheless, some prominent scholars on Mongolian studies report that land laws, in general, provide a broad regulatory latitude and flexibility to local authorities; however, the lack of clarity and poor understanding by herders and local officers totally limit their utility (Fernandez-Gimenez and Batbuyan, 2004[13]).

[10] Batuul.2004. Review of agriculture in Mongolia: paying special attention to market economy. Nogyokeiei Kekyu 30: 139-158.

[11] Nakamura, T. 2013. Socialist livestock: from a viewpoint of hay-making in Mongolia In Governance and social resilience for ecological hazard, Investigative report (Chap. 5), Institute of Developing Economies.

[12] Voisin, A. 1988.Grass productivity. Island Press, USA.

[13] Fernandez-Gimenez, M. and Batbuyan, B. 2004.Law and Disorder: Local Implementation of Mongolia's Land Law. Development and change 35: 141-165.

Photos 2.6.2 Sites with Degradation of Grasslands

1: In slopes

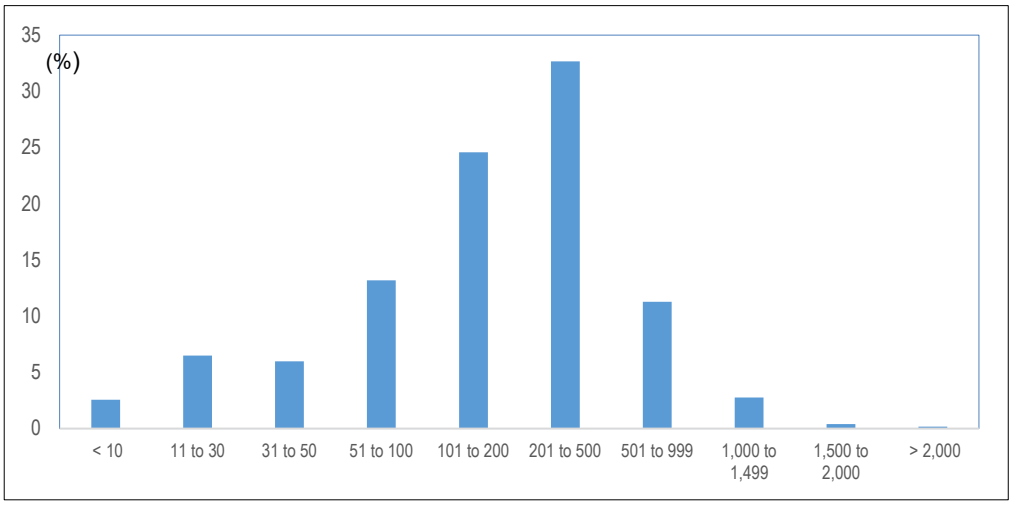
2: Crumbly areas

3: Along main roads

4: Track-making by heavy vehicles

Source: MONDEP.

(e) **Herd Sizes of Semi-Nomadic Households:** Based on the Mongolian Statistical Yearbook 2013, the breakdown of grouping of herder households by number of livestock is shown in Figure 2.6.1. The average herd size of a herder household is about 300 animals, and herders with 50 to 500 animals account for more than 70% of total households. Although herders with more than 500 animals account for only 15%, their share in the total number of animals, which have reached 45 million in 2013,[14] is as many as about 20 million. Based on the interviews with professionals, the emergence of those oligarchic large-scale herders has provoked chronic overgrazing especially in the vicinity of larger cities, thereby causing grassland degeneration.



Source: Mongolian Statistical Yearbook 2013.

Figure 2.6.1 Grouping of Herder Households by Number of Livestock in 2013 (n=145,311)

[14] According to the article published in Mongolian Correspondence No. 526, 2015, the total number of livestock as of the first quarter of 2015 has reached as much as 70.6 million.

(f) **Grazing Lands in Summer and Winter:** The content of this section, basically, would be quite similar to that of the previous section: Pastureland management in summer and winter, putting special emphasis on the seriousness of grasslands degradation which has become pronounced in sites such as in the vicinity of larger cities and along the main roads especially after decollectivization. Therefore, a countermeasure should be taken as soon as possible. However, it should be remembered that as witnessed in Mongolia and Inner Mongolia as well (Fernandez-Gimenez and Batbuyan, 2004[15]; Li and Hao, 2011[16]), habitual approaches such as pasture regulation, land privatization, and policies of sedentarization are not promising in Mongolia. For instance, land privatization which was one of the most common countermeasure practices in some pastoralist societies, had backfired in Mongolia since, sometime after fencing their lands, herders would graze again outside because the grass was scarce by then so the competition outside with other herders for the ever-dwindling common land is more serious and disastrous (Taylor, 2006[17]). Furthermore, even after privatization the great majority of the herders really could not afford to fence their properties, thus boundaries are unclear, letting others trespass (Fujita et al.,2013[18]). In fact, as anyone who was in the middle of the Mongolian great plains may imagine, it would be extremely unrealistic to divide the huge grassland into a small portion of someone's property by fencing. In this regard, as argued by Oniki and Konagatani (2004[19]), measures neither by mere restrictions nor legislation but by positive incentive methods, such as establishing a stable market, appear to be much more effective and efficient. Therefore, the study's recommendations as countermeasures for grassland degradation are mainly based on this concept, namely economic incentive measures.

(g) **Causes of Death (Temperature, Wind, Fodder Shortage, etc.):** It seems that damages caused by dzuds are ever-worsening recently, as witnessed in 2002 and 2009 in which about 4 million and 11 million animals were killed, respectively (FAOSTAT). In comparison with, for instance, Japan which has about 4 million cows as the entire national herd, one may notice how enormous and serious the scale of the loss would have been. As for the damage during dzuds, although there is a general understanding that extremely harsh weathers and low temperatures are direct causes of the loss, in reality, nature alone cannot be held responsible for the death of millions of animals. In fact, based on the information, be it verbal or in writing, gathered during the survey, dzud is rather a "man-made" disaster caused or worsened by negligence on the part of herders especially to realize winter preparation. The main preparation activities are as follows:

(i) **Site Finding of Winter Camp:** The criteria for site finding include not only good pastures for winter but also terrain relief such as slope, aspect, and elevation, in order to make sure of higher ambient temperature and being less windy.

(ii) **Fodder Preparation:** Preparation of fodder, especially hay before winter, is one of the most important and laborious duties for herders (see Photos 2.6.4).

(iii) **Shelters as Windbreak:** Shelters to avoid strong and cold winds are also extremely indispensable for livestock protection during winter (see Photos 2.6.4).

(iv) **Off-take as Quota:** Delivery of a good number of animals before winter has an effect of keeping herders' animal numbers within the same range, thereby mitigating the laborious job for preparation. Incidentally, during the socialist era, this type of delivery used to be done much more

[15] Fernandez-Gimenez and Batbuyan, 2004.Op.cit.
[16] Li and Hao.2011. Grazing resources and grassland degradation in Northern China.J. Resour. Ecol. 2: 286-288.
[17] Taylor, J. L. 2006. Negotiating the grassland: the policy of pasture enclosures and contested resource use in Inner Mongolia. Human Organization 65: 374-386.
[18] Kaminura, A. et al., 2013. Op. cit.
[19] Oniki, S. and Konagatani, Y. 2004.Preservation of grassland and development of pastoral economy in Mongolia. International Cooperation of Agriculture and Forestry 27: 8-20.

systematically by negdel.

As such, one of the lessons learnt during the survey is that herders who do not prepare themselves for winter would suffer more from dzuds. Another point to consider is the fact that the number of herders has more than doubled in the transition from the planned to market economy (Mori and Burneebaatar, 2002[20]). Furthermore, the great majority of those "new" herders, though geared towards increasing livestock numbers (Fujita et al., 2013[21]), have no technical know-how for nomadic livestock-keeping (Janzen, 2005[22]), thereby fueling the damage of dzuds. All in all, as shown in a study reporting that the more animals a herder has the worse he suffers during winter disasters (Batuur, 2005[23]), human aspects such as socioeconomic factors also have much to do with consequences of the dzud damage.

Photos 2.6.4 Winter Preparations

1: Wilting for hay making

2: Shelters from wind

Source: MONDEP.

(h) **Seasonality in Livestock Marketing:** As broadly mentioned in the above explanation on the delivery quota, there are distinctive seasonal patterns in animal marketing in Mongolia. The great majority of livestock are sent to market from August through December. Thus, prior to this, deliveries from herders start during the months from March to June, depending on the species of animals and the body weight after the long winter season. Generally in Mongolian grasslands, animals lose as much as 20 to 40% of their live weight and, according to the dialogues with vendors at local markets as well as with herders, the body weight losses of sheep and goats are less severe than those of horses and cattle. Thus, the first delivery is of sheep and goats starting in March, followed by horses and cattle, reaching the peak between June and July (see Photos 2.6.5). Correspondingly, according to the interviews with the Mongolian Meat Association and large meat packers, slaughtering between late December and early March is negligible. Besides, shearing of wools is done during the period from March to April, first with goats for cashmere, the most profitable commodity for herders, then followed by sheep.

Incidentally, there is one other factor which causes seasonality in livestock marketing. In Mongolia, schools begin in early September, thus herders with schoolchildren tend to sell a good number of animals to buy school supplies beforehand.

[20] Mori, S. and Burneebaatar, G. 2002. Revolution of meat industry In The day nomadic life will change Mongolian economy, Konagatani, Y. (ed.), Shuppanbunkasya, Tokyo.
[21] Fujita el al., 2013.Op. cit.
[22] Janzen, J. 2005. Op. cit.
[23] Batuul. 2005. Discussion on Mongolia's herding economy and preparedness for dzuds. NogyoKeiei Kenkyu 31: 1-21.

Photos 2.6.5 Delivery of Horses and Shearing of Goats

1: Delivery of horses in September

2: Shearing of goats for cashmere in March

Source: MONDEP.

(i) **Attitudes of Herders and the General Public to Livestock:** The survey tried to interview as many herders as possible by first asking the following two questions: "Where should Mongolian mobile livestock-keeping head?" and "What kind of problems are herders facing in transition from a planned to a market economy?" Later, however, it was noticed that the questions were not intelligible so they were reworded as follows:"Today there are so many people who recommend that herders be sedentary and head intensive farming. What is your stance on that?" and "Do you have any difficulties in your daily life?" The most representative answers are as follows: "Honestly I do not know well about the meaning of intensive farming. But I think herding is just suitable for us and I don't think we have other options." The most common reply to the second question is: "Our market is unstable and shrinking on and on." Since semi-nomadic mobile livestock-keeping is ecologically appropriate for the Mongolian lands, it is understandable that herders themselves find their own traditional production style suitable both for lands and for themselves. Nevertheless, as mentioned often, herders have been put in both ecologically and economically unstable climates recently (Fujita et al., 2013[24]), thus just keeping traditional herding methods would not guarantee sustainable production in the future at all. In this context, if other average herders who account for more than 70 % of the total herders share the opinion of the ones who do not think they have an option other than herding, then that would really be lamentable and may cause serious problems since, as shown earlier, large-scale herders have recently taken over the best parts of grasslands, thereby driving ordinary herders away and putting them into hardships, especially grassland degradation (Onodera, 2009[25]). Most probably, the aforementioned worry of herders that their market is unstable and continuously shrinking may have something to do with the herders' keen productivist attitudes which has become more prominent in the transition from the planned to the market economy (Fujita et al., 2013[26]).

As for the attitudes of the general public, it appears that there is a general and strong belief among Mongolian nationals, especially urbanites, that all the livestock products coming from Mongolian grasslands are organic and free of contamination, thus much safer than those from conventionally raised animals. Nevertheless, this is not necessarily based on scientific studies. In fact, they seem to think that way rather blindly.

(2) Domestic Animal Health

(a) **Animal Health Act and Regulations (Transhumance Control Included):** As in the case with other countries, Mongolia has an Animal Health Act. It consists of 5 chapters, 16 parts and 150 sections, covering the necessary issues about animal health such as prevention and treatment of epidemics,

[24] Kamimura, A., Natinshonhoru, G. U., Jagaruzaihan, L, and Kodama, K. and Konagatani, Y. Livestock and agriculture in terms of land use, Chapter 6. In Mongolia: Breakdown and recovery of ecological network in grasslands, Fujita, N., Kato, S., Kusano, E. and Koda, R. (eds.). 2013. Kyoto University.

[25] Onodera, T. 2009. Attitudes of Mongolian herders to grasslands degradation and land use.Thesis for Master, Hokkaido University.

[26] Kaminura, A. et al., 2013. Op. cit.

control of animal pharmaceutical products, transhumance control and quarantine in trading, especially with Russia and China. Nevertheless, judging from dialogues made with the president of the Mongolian Veterinary Medical Association as well as local veterinarians, compliance with the law, in general, does not appear satisfactory.

(b) **Animal Health Control and Border Inspection:** As mentioned in the previous section, although Mongolia has laws including border inspection, the views gathered from field veterinarians are not necessarily in accordance with each other. For instance, the president of the Mongolian Veterinary Medical Association said that export of live animals has not been done since 2010 when the country had an outbreak of foot-and-mouth disease, while the representative of OIE[27] mentioned that "the only port where we currently export live animals s(horses) is Sukhbaatar." Furthermore, according to the director of the Veterinary Office at Dornod, live horses are being exported constantly. Thus, all in all, it seems that on top of the questionable compliance issue, information sharing is not adequate either.

As for physical structure of border barriers between Mongolia and China or Russia, as shown in Photos 2.6.6, it is a mere simple steel fence, so not recommendable from an aethiological point of view, especially in terms of foot-and-mouth disease prevention. Foot-and-mouth disease, which causes devastating economic loss in Mongolia, is highly infectious and can be spread by a variety of ways including windborne dispersion over a long distance (Mikkelsen et al., 2003[28]). Thus, in Mongolia, a country of windy vast plains and deserts, the aforementioned barriers are by no means effective. In Japan, for instance, a restricted zone of 10km to 20km in width has to be set up and maintained around the site where an outbreak occurred.

Lastly, one other point which should be added to this section is that just recently Mongolia, China, and Russia have reached, under the guidance of OIE, an agreement which guarantees scientific and technical cooperation for control and prevention of further spread of transboundary and emerging animal diseases, ensuring safety of international trade in live animals and animal products, and enhancement of research cooperation in the field of animal health among leading research institutions of the member countries. Furthermore, according to the Mongolian representative seconded to OIE, three countries are now planning to establish specific disease-free zones, especially foot-and-mouth, in Mongolia. Thus, this will be conceptually and technically in line with the Special Economic Zone introduced in section 5.2 of the main report.

Photos 2.6.6 Border Fences and Veterinary Office

1: Buffer zone near border in Zamiin–Uud

2: Central Veterinary Office in Tuv

Source: MONDEP.

(c) **Animal Health Control in Communities (Vaccination Program Included):** The present animal health control scheme at the community level is, functionally, in keeping with the operation done by negdel. At every aimag, the first level administrative subdivision in Mongolia, a central veterinary

[27] World Organization for Animal Health, situated in Paris, originally named OIE after its French version: Office International des Epizooties, is an intergovernmental organization coordinating, supporting and promoting animal disease control.

[28] Mikkelsen, T., Alexandersen, S., Astrup, P., Champion, H. J., Donaldson, A. I., Dunkerley, F. N., Gloster, J.,Sørensen, J. H., and Thykier-Nielsen, S. 2003. Investigation of airborne foot-and-mouth disease virus transmission during low-wind conditions in the early phase of the UK 2001 epidemic. Atmospheric Chemistry and Physics 3: 2101–2110.

office is located under which there are smaller posts at regional or district levels. According to the information gathered from the Mongolian Veterinary Medical Association, currently there are 21 central veterinary offices which corresponds with the number of aimags, and 347 small posts in soums or county subdivisions. The small posts, generally manned by 1 to 3 veterinarians or para-vets, are in charge of prevention of epidemiology at grassroots level and minimum clinical veterinary treatment when necessary. In the case of Tuv aimag, two hours south of the capital Ulaanbaatar, the central veterinary office (shown in Photos 2.6.6) has 27 small regional posts. The veterinarians at these small posts, public officers, and private veterinary practitioners who work for the regional office on a contractual basis, actually go out to attend to herders, carry out collaboratively their preventive activities such as vaccination and deworming.[29] According to the interviews with 26 private veterinarians from Tuv, on average a practitioner attends to 300 herders and treats 30,000 to 40,000 animals a year. During the interview, they were asked a question about vocation: "Do you find it rewarding to work as vet for herders?" to which everyone replied with a big yes. Interestingly, however, none nodded when asked if they got paid well.

Lastly, according to the information from the Mongolian Veterinary Medical Association, Mongolian Wool Association, Mongolian State University of Agriculture, Central Veterinary Office at Tuv, meat packers, and herder households, specific challenges in the area of animal health in the field are shown in Table 2.6.3.

Table 2.6.3 Challenges in Animal Health Issues

Types		Diseases or Problems	Measures
1	Infectious diseases	Foot-and-mouth diseases	Vaccination
		Brucellosis	Periodical check and vaccination
		Glanders	Slaughter
2	Parasitosis	Scabies	Deworming
		Cutaneous myiasis	
3	Deficiencies	Vitamins	Vitamin supplement
		Minerals	Mineral supplement
4	Others	High mortality in youngstock	Extension program
		Negligence of compliance with regulation about drug usage	

Source: MONDEP.

Among these challenges, foot-and-mouth disease is the most urgent one in terms of the economic and epidemiological impacts. In this regard, a specific disease-free zone, which could be a part of the so-called economic zone, or the Agro-IT Park strategy, would be all the more reason important as a practical and effective countermeasure.

Another issue worth mentioning here is that there seem to be some diseases undermining both the production and productivity of the entire herds in Mongolia in a latent manner. In fact, although this was not mentioned by the herders and even field veterinarians during the interview, a recent study conducted at the national level says that the number of samples diagnosed as having a tick-borne disease caused by the intraerytrocytic protozoan parasites, especially in horses is so high. Thus, a program for updating both technicians and herders on such crucial information would be necessary.

Adding to the animal health issue, negligence of compliance with regulation about drug usage, on

[29] According to the Mongolian Statistical Yearbook 2013, vaccination coverage such as foot-and-mouth disease and brucellosis among herders is 60.3% and coverage of deworming is 46.2%. Considering the size of the country and difficulty of access to herder households, these values are by no means low.

which the president of the Mongolian Veterinary Medical Association laid special emphasis, might be a new problem for the Mongolian livestock industry. In terms of food security, when administered veterinary drugs especially antibiotics, treated animals or their products such as meat or milk should not be consumed until pharmaceutical substances have sufficiently cleared out from the animals' system (withdrawal periods). In most developed countries, conformity with the regulation is a must for producers. In Mongolia, however, due to a lack of awareness-raising on this issue among both veterinarians and herders, herders do not observe the withdrawal periods. In this context, since the great majority of Mongolian nationals feel proud of their livestock products as safe and healthy, it would be important to inculcate among Mongolian herders those relatively new principles (please see Section 5.2: "Remote Technology Transfer Program for Herders" in the main report).

Finally, another point which could be a breath of fresh air for Mongolian mobile livestock-keeping is weather index-based livestock insurance. Since the great majority of herders are highly vulnerable to weather changes in Mongolia, such insurance system seems quite reasonable. In reality, however, investing in insurance has by no means been a usual expenditure for herders at least to date. Therefore, it is rather unexpected to learn that about 7% of the total number of herders have currently insured their animals amounting to about 2.7 million head.[30] As for the breakdown of the species for insurance, sheep and goats are the dominant ones.[31] Based on this observation, it appears that hazard perception among herders is shifting.

[30] Mongolian Correspondence. 2015. 530: 4.
[31] The breakdown of species insured are: Goats, 47.6%; Sheep, 42.7%; Cattle, 6.7%; Horses, 2.7%; and Camels, 0.23%.

Appendix 3.1.1 INPUT-OUTPUT ANALYSIS AND THE MONGOLIAN ECONOMIC STRUCTURE

This appendix analyzes the features of the Mongolian economic structure from the viewpoints of production and demand and examines the spillover effects by applying the methodology of Input-Output analysis based on the data of an input-output table (20 sectors, 2013) produced by the Mongolian National Statistics Office.

(1) Features of the Economic Structure

As Table 3.1 indicates, intermediate consumption accounts for 30% of total demand and final demand has a 70% share. Table 3.2, which shows the distribution ratio of final demand by individual final demand items, indicates that the share of exports is relatively higher, accounting for 30%. This figure is influenced by the mining sector, which ratio of exports is 80% (see Table 3.3).

Table 3.1 Distribution Ratio of Total Demand (%)

	Intermediate Consumption	Final Demand	Total Demand
Agriculture, forestry and fishery	36	64	100
Mining and quarrying	7	93	100
Manufacturing	27	73	100
Electricity, gas, steam and air conditioning supply	91	9	100
Water supply; sewerage, waste management and remediation activities	70	30	100
Construction	20	80	100
Wholesale and retail trade; repair of motor vehicles and motorcycles	41	59	100
Transportation and storage	52	48	100
Accommodation and food service activities	45	55	100
Information and communication	47	53	100
Financial and insurance activities	86	14	100
Real estate activities	25	75	100
Professional, scientific and technical activities	54	46	100
Administrative and support service activities	75	25	100
Public administration and defense; compulsory social security	9	91	100
Education	2	98	100
Human health and social work activities	7	93	100
Arts, entertainment and recreation	15	85	100
Other service activities	13	87	100
Other activities	0	100	100
Domestic intermediate consumption	31	69	100

Source: JICA Study Team based on National Statistics Office (NSO) data.

Table 3.2 Distribution Ratio of Final Demand by Individual Final Demand Items (%)

	Final Consumption Expenditure	Gross Capital Formation	Exports	Total
Agriculture, forestry and fishery	30.1	59.4	10.5	100.0
Mining and quarrying	1.8	18.4	79.9	100.0
Manufacturing	67.0	8.1	24.9	100.0
Electricity, gas, steam and air conditioning supply	97.3	2.1	0.7	100.0
Water supply; sewerage, waste management and remediation activities	71.8	2.9	25.3	100.0
Construction	2.0	96.3	1.7	100.0
Wholesale and retail trade; repair of motor vehicles and motorcycles	54.1	32.5	13.4	100.0
Transportation and storage	46.5	4.4	49.1	100.0
Accommodation and food service activities	77.1	1.1	21.8	100.0
Information and communication	87.0	0.8	12.2	100.0
Financial and insurance activities	89.6	0.0	10.4	100.0
Real estate activities	99.9	0.1	0.1	100.0
Professional, scientific and technical activities	23.1	15.3	61.7	100.0
Administrative and support service activities	90.6	1.3	8.0	100.0
Public administration and defense; compulsory social security	100.0	0.0	0.0	100.0
Education	99.4	0.0	0.6	100.0
Human health and social work activities	98.7	0.5	0.8	100.0
Arts, entertainment and recreation	99.7	0.1	0.2	100.0
Other service activities	89.3	0.1	10.6	100.0
Other activities	100.0	0.0	0.0	100.0
Total	42.8	27.4	29.8	100.0

Source: JICA Study Team based on NSO data.

Table 3.3 Distribution Ratio of Final Demand by Industrial Sector (%)

	Final Consumption Expenditure	Gross Capital Formation	Exports
Agriculture, forestry and fishery	6.7	20.6	3.4
Mining and quarrying	1.0	16.2	64.7
Manufacturing	21.6	4.1	11.5
Electricity, gas, steam and air conditioning supply	0.8	0.0	0.0
Water supply; sewerage, waste management and remediation activities	0.5	0.0	0.2
Construction	0.6	47.2	0.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	10.2	9.6	3.6
Transportation and storage	5.9	0.9	8.9
Accommodation and food service activities	2.1	0.0	0.8
Information and communication	3.4	0.0	0.7
Financial and insurance activities	1.3	0.0	0.2
Real estate activities	11.0	0.0	0.0
Professional, scientific and technical activities	1.1	1.2	4.4
Administrative and support service activities	1.4	0.0	0.2
Public administration and defense; compulsory social security	12.3	0.0	0.0
Education	11.6	0.0	0.1
Human health and social work activities	5.3	0.0	0.1
Arts, entertainment and recreation	1.2	0.0	0.0
Other service activities	2.0	0.0	0.3
Other activities	0.0	0.0	0.0
Total	100.0	100.0	100.0

Source: JICA Study Team based on NSO data.

As for the ratio of intermediate inputs and value-added, value-added ratio is relatively high at 63% (see Table 3.4 and Table 3.5). In particular, agriculture, forestry and fishery is 78% which is higher than the 65% ratio of mining and 47% of manufacturing. In addition, agriculture, forestry and fishery account for 42% in both domestic production and value-added. As for value-added ratio, agriculture, forestry and fishery is 15.1% which is the second largest share following 16.8% of mining. The import rate of mining is extremely high, which indicates that mining production highly depends on imports (see Table 3.6).

Table 3.4 Domestic Production Ratios and Value-Added Ratios (%)

	Production Ratio	Value-Added Ratio
Agriculture, forestry and fishery	11.8	15.1
Mining and quarrying	16.6	16.8
Manufacturing	13.6	9.8
Electricity, gas, steam and air conditioning supply	2.9	1.6
Water supply; sewerage, waste management and remediation activities	0.7	0.5
Construction	9.3	5.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	10.6	13.3
Transportation and storage	6.0	5.0
Accommodation and food service activities	1.5	1.2
Information and communication	2.1	2.4
Financial and insurance activities	3.4	4.6
Real estate activities	5.1	6.8
Professional, scientific and technical activities	3.1	2.6
Administrative and support service activities	2.0	1.3
Public administration and defense; compulsory social security	4.4	4.6
Education	4.0	5.0
Human health and social work activities	1.7	2.1
Arts, entertainment and recreation	0.5	0.5
Other service activities	0.8	0.9
Other activities	0.0	0.0
Total	100.0	100.0

Source: JICA Study Team based on NSO data.

Table 3.5 Distribution Ratios of Intermediate Input and Value-Added by Industrial Sector (%)

Industrial Sector	Domestic Intermediate Consumption	Gross Value-Added at Basic Prices	Domestic Total Output
Agriculture, forestry and fishery	22	78	100
Mining and quarrying	35	65	100
Manufacturing	53	47	100
Electricity, gas, steam and air conditioning supply	70	30	100
Water supply; sewerage, waste management and remediation activities	61	39	100
Construction	54	46	100
Wholesale and retail trade; repair of motor vehicles and motorcycles	23	77	100
Transportation and storage	44	56	100
Accommodation and food service activities	48	52	100
Information and communication	28	72	100
Financial and insurance activities	19	81	100
Real estate activities	19	81	100
Professional, scientific and technical activities	45	55	100
Administrative and support service activities	58	42	100
Public administration and defence; compulsory social security	35	65	100
Education	24	76	100
Human health and social work activities	21	79	100
Arts, entertainment and recreation	33	67	100
Other service activities	37	63	100
Other activities	0	100	100
Intermediate Consumption	37	63	100

Source: JICA Study Team based on NSO data.

Table 3.6 Import Rate and Self-Sufficiency Rate

Industrial Sector	Import Rate	Self-Sufficiency Rate
Agriculture, forestry and fishery	4.3	95.7
Mining and quarrying	88.0	12.0
Manufacturing	15.4	84.6
Electricity, gas, steam and air conditioning supply	8.4	91.6
Water supply; sewerage, waste management and remediation activities	7.4	92.6
Construction	33.5	66.5
Wholesale and retail trade; repair of motor vehicles and motorcycles	6.4	93.6
Transportation and storage	46.5	53.5
Accommodation and food service activities	15.4	84.6
Information and communication	21.2	78.8
Financial and insurance activities	6.9	93.1
Real estate activities	2.3	97.7
Professional, scientific and technical activities	26.6	73.4
Administrative and support service activities	13.4	86.6
Public administration and defense; compulsory social security	8.5	91.5
Education	4.5	95.5
Human health and social work activities	18.0	82.0
Arts, entertainment and recreation	4.2	95.8
Other service activities	7.4	92.6
Other activities	0.0	100.0

Source: JICA Study Team based on NSO data.

(2) Domestic Production Induced by Individual Final Demand Items

This section examines the domestic production inducement effects by an increase in demand. Table 3.7 summarizes the inverse matrix coefficients which indicate how much production will be ultimately induced in what industry by a one unit demand increase in a certain industry. Inducement effects of domestic production, value-added and imports are examined by using the inverse matrix coefficients.

First, the index of power dispersion and index of sensitivity of dispersion were computed to see the relative effects between industrial sectors (see

Table **3.8**). The results show that the indices of power dispersion of "electricity, gas, steam and air conditioning supply" and "water supply; sewerage, waste management and remediation activities" are relatively high at 1.471 and 1.325, respectively. As for index of sensitivity of dispersion, "manufacturing", "electricity, gas, steam and air conditioning supply" and "wholesale and retail trade; repair of motor vehicles and motorcycles" have higher figures, indicating that they are influenced by other sectors more greatly than others.

Furthermore, Figure 3.1 plots the figures of combination of both indices of power dispersion and of the sensitivity of dispersion. The figure reveals characteristics and functions of each industrial sector. Sectors plotted in Quadrant "I" can both exert a strong influence on entire industries and are most affected by other industries. These are "electricity, gas, steam and air conditioning supply" and "manufacturing." In particular, both indices of "electricity, gas, steam and air conditioning supply" are exceptionally high compared with other industries. Quadrant "II" includes sectors whose influence on the entire sector is weak, but whose sensitivity is high. They incorporate sectors such as "wholesale and retail trade; repair of motor vehicles and motorcycles", "financial and insurance activities" and "agriculture, forestry and fishery." Quadrant "III" includes sectors whose influence and sensitivity are both weak. They include the mining sector, which indicates that from the viewpoint of ripple effects on domestic production, the mining sector has a weak influence on other industries compared with others. Finally, Quadrant "IV" includes sectors with a strong influence on entire industries but relatively weak production repercussions. They include "construction" and "accommodation and food service activities."

Table 3.7 Inverse Matrix Coefficients

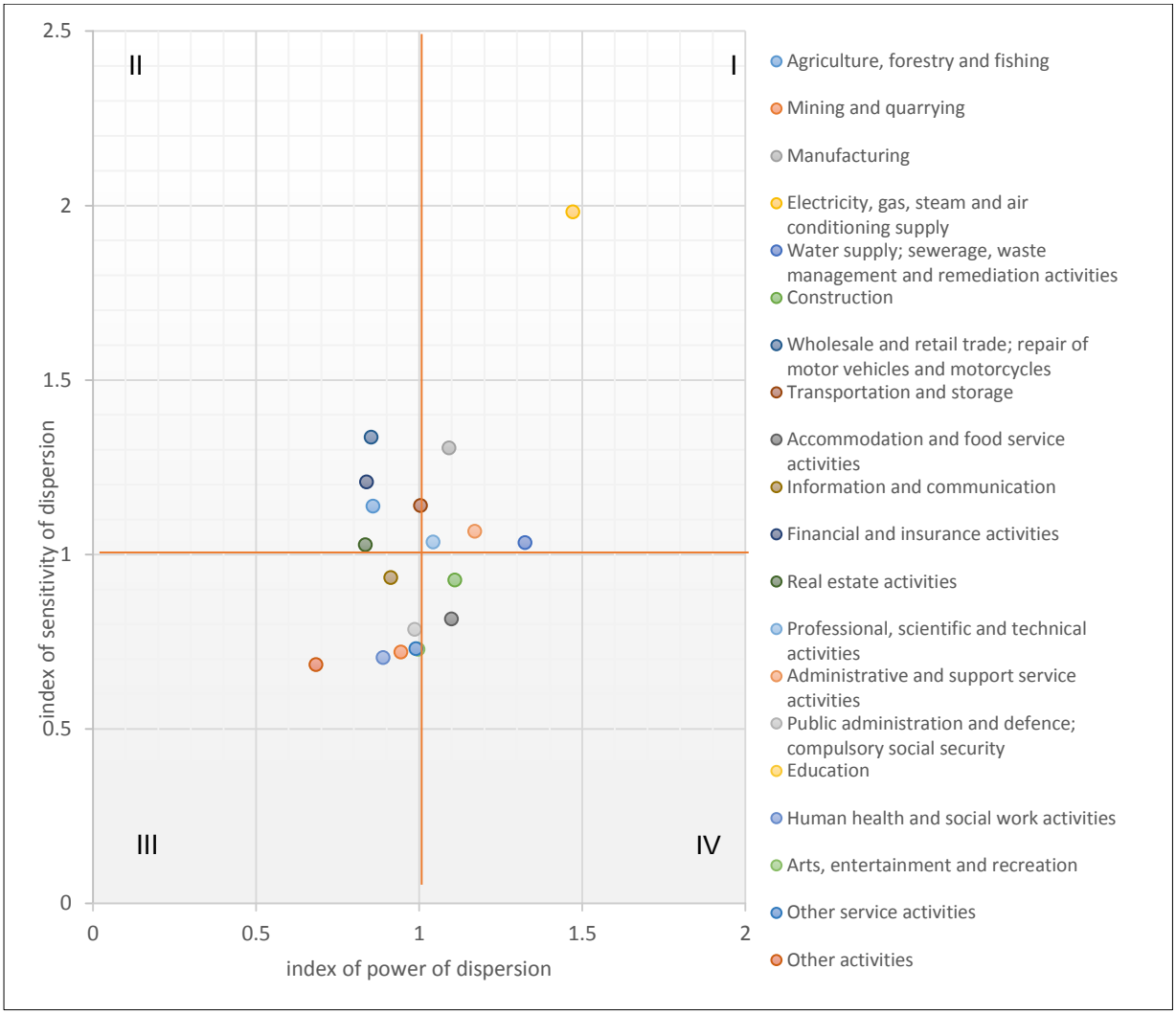
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	Agriculture, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Water supply; sewerage, waste management and remediation activities	Construction	Wholesale and retail trade; repair of motor vehicles and motorcycles	Transportation and storage	Accommodation and food service activities	Information and communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical activities	Administrative and support service activities	Public administration and defence; compulsory social security	Education	Human health and social work activities	Arts, entertainment and recreation	Other service activities	Other activities	Sum of Column
1 Agriculture, forestry and fishing	1.078921	0.012310	0.277432	0.026888	0.014562	0.035175	0.004287	0.005947	0.088085	0.008773	0.003069	0.002939	0.012859	0.011065	0.011739	0.025859	0.015703	0.011608	0.017363	0.000000	1.6646
2 Mining and quarrying	0.000932	1.002349	0.006899	0.012238	0.004370	0.003841	0.000702	0.000828	0.003367	0.001846	0.000543	0.000824	0.002472	0.004166	0.001443	0.001535	0.001264	0.001822	0.001099	0.000000	1.0525
3 Manufacturing	0.011598	0.041261	1.086643	0.075846	0.036584	0.125460	0.014330	0.019715	0.169866	0.030032	0.009872	0.009667	0.044192	0.031883	0.028615	0.056554	0.034595	0.030058	0.051170	0.000000	1.9079
4 Electricity, gas, steam and air conditioning supply	0.007983	0.025097	0.026771	1.747971	0.256094	0.043902	0.021436	0.019312	0.053529	0.038514	0.037976	0.028322	0.053248	0.120847	0.063243	0.078266	0.094325	0.143581	0.036629	0.000000	2.8970
5 Water supply; sewerage, waste management and remediation activities	0.004856	0.006240	0.004681	0.062091	1.302489	0.009816	0.002641	0.003004	0.011765	0.005364	0.004239	0.003303	0.006543	0.013706	0.007267	0.008759	0.013650	0.015974	0.004465	0.000000	1.5109
6 Construction	0.003429	0.042529	0.007967	0.047222	0.014661	1.090119	0.006160	0.007394	0.013120	0.008737	0.004201	0.035922	0.014899	0.011667	0.010837	0.007353	0.006598	0.012525	0.008670	0.000000	1.3540
7 Wholesale and retail trade; repair of motor vehicles and motorcycles	0.029423	0.065175	0.085615	0.056245	0.038227	0.136302	1.022868	0.109353	0.076815	0.047601	0.014252	0.014231	0.050719	0.050234	0.029468	0.027090	0.049207	0.024753	0.028712	0.000000	1.9533
8 Transportation and storage	0.014298	0.050738	0.018784	0.031385	0.045302	0.036034	0.056878	1.111086	0.023188	0.017668	0.018015	0.009918	0.063898	0.060237	0.023165	0.026362	0.010272	0.016529	0.031226	0.000000	1.6670
9 Accommodation and food service activities	0.003278	0.016833	0.004075	0.003777	0.008766	0.008163	0.008670	0.009775	1.006453	0.011094	0.006305	0.001610	0.018121	0.020991	0.007702	0.007569	0.006998	0.023961	0.017373	0.000000	1.1915
10 Information and communication	0.003143	0.008900	0.006907	0.010130	0.009055	0.025754	0.014006	0.026257	0.013338	1.032384	0.017906	0.008031	0.040447	0.058942	0.026278	0.012401	0.009932	0.018270	0.022471	0.000000	1.3646
11 Financial and insurance activities	0.077745	0.055249	0.038488	0.018385	0.145478	0.035914	0.030182	0.058724	0.023496	0.015720	1.044166	0.008460	0.033596	0.064350	0.013606	0.016613	0.010649	0.031346	0.043016	0.000000	1.7652
12 Real estate activities	0.007018	0.009762	0.008680	0.004803	0.010270	0.015139	0.027754	0.013210	0.040062	0.035917	0.026275	1.072063	0.031134	0.077914	0.015595	0.008711	0.013622	0.029825	0.054740	0.000000	1.5027
13 Professional, scientific and technical activities	0.007710	0.014723	0.009219	0.009783	0.011442	0.017689	0.012165	0.019348	0.024437	0.022685	0.023043	0.009867	1.061743	0.054328	0.116986	0.018499	0.012802	0.025854	0.041067	0.000000	1.5134
14 Administrative and support service activities	0.006550	0.018508	0.008404	0.017248	0.028089	0.015837	0.016212	0.047170	0.042139	0.034480	0.013102	0.012272	0.065384	1.107846	0.075963	0.006180	0.005860	0.017318	0.019916	0.000000	1.5585
15 Public administration and defence; compulsory social security	0.000504	0.005486	0.002051	0.004040	0.008725	0.015000	0.003639	0.007363	0.013507	0.011134	0.001032	0.002534	0.016606	0.016687	1.003407	0.005245	0.012925	0.002026	0.015723	0.000000	1.1476
16 Education	0.000177	0.002392	0.000636	0.000781	0.000984	0.001086	0.000484	0.000624	0.001132	0.007552	0.001018	0.000701	0.001629	0.001519	0.001854	1.001867	0.000832	0.002885	0.004250	0.000000	1.0324
17 Human health and social work activities	0.000210	0.001705	0.001184	0.000700	0.000587	0.004932	0.001454	0.003925	0.001300	0.002030	0.000465	0.000343	0.001310	0.001194	0.000566	0.000500	1.000602	0.000795	0.005896	0.000000	1.0297
18 Arts, entertainment and recreation	0.000085	0.000738	0.000159	0.000290	0.000266	0.000336	0.000414	0.001407	0.000546	0.000512	0.000177	0.000218	0.004697	0.002132	0.003699	0.000331	0.000177	1.047216	0.000505	0.000000	1.0639
19 Other service activities	0.000322	0.000944	0.000984	0.001328	0.001193	0.001248	0.000851	0.003619	0.000931	0.003540	0.000560	0.000325	0.001062	0.002543	0.000956	0.001050	0.000531	0.001499	1.043062	0.000000	1.0665
20 Other activities	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	1.0000
Sum of Row	1.2552	1.3809	1.5958	2.1512	1.9371	1.6217	1.2471	1.4681	1.6071	1.3356	1.2262	1.2215	1.5246	1.7123	1.4424	1.3107	1.3005	1.4578	1.4474	1.0000	

Source: JICA Study Team based on NSO data.

Table 3.8 Index of Power of Dispersion and Index of Sensitivity of Dispersion

	Index of Power of Dispersion	Index of Sensitivity of Dispersion
Agriculture, forestry and fishery	0.858	1.138
Mining and quarrying	0.944	0.720
Manufacturing	1.091	1.305
Electricity, gas, steam and air conditioning supply	1.471	1.981
Water supply; sewerage, waste management and remediation activities	1.325	1.033
Construction	1.109	0.926
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.853	1.336
Transportation and storage	1.004	1.140
Accommodation and food service activities	1.099	0.815
Information and communication	0.913	0.933
Financial and insurance activities	0.839	1.207
Real estate activities	0.835	1.028
Professional, scientific and technical activities	1.043	1.035
Administrative and support service activities	1.171	1.066
Public administration and defence; compulsory social security	0.986	0.785
Education	0.896	0.706
Human health and social work activities	0.889	0.704
Arts, entertainment and recreation	0.997	0.728
Other service activities	0.990	0.729
Other activities	0.684	0.684

Source: JICA Study Team based on NSO data.



Source: JICA Study Team.

Figure 3.1 Index of Power of Dispersion and Index of Sensitivity of Dispersion

Domestic production inducement distribution ratios by final demand items are proportion ratios of domestic production induced by final demand of respective industrial sectors. Table 3.9 shows the ratios by industrial sector. The largest ratio in total is final consumption expenditure followed by export and gross capital formation. However, the ratios by industrial sector indicate that the ratios are different from sector to sector. As for the main industry of agriculture, forestry and fishery, the ratio of gross capital formation is the largest but the ratio of export in mining is 96.39%, which indicates that mining production is induced mostly by exports. For the wholesale and retail trade; repair of motor vehicles and motorcycles and manufacturing, final consumption expenditure has the largest share at 45% and 57%, respectively. Accordingly, the recovery of exports is necessary for growth of the mining sector but an increase in investment is effective for revitalizing agriculture. The expansion of final consumption expenditure is essential for the economic recovery of wholesale and retail trade; repair of motor vehicles and motorcycles, and manufacturing.

Secondly, the domestic production inducement coefficient indicates the rate of increase of domestic production in an industry, derived from the total increase of one unit of a certain final demand item (see Table 3.10). The trend is different from the inducement distribution ratios and the figures show that the inducement effect of export is the largest followed by final consumption expenditure and gross capital formation. Therefore, for economic recovery, expansion of exports is effective. As 90% of exports is accounted by mining, it indicates that the mining sector greatly contributes to the high coefficient of exports.

As for agriculture, forestry and fishery and wholesale, and retail trade; repair of motor vehicles and motorcycles, the coefficient of gross capital formation is relatively high, and final consumption expenditure is the highest in manufacturing. These figures indicate that increments in investment and consumption are effective for production increases in these respective industries. Comparing inducement coefficients between industries, the mining sector is the highest, with manufacturing as the second, then followed by agriculture, forestry and fishery. However, as stated above, mining highly depends on exports and an increase in consumption and investment is effective for agriculture and manufacturing.

Table 3.9 Domestic Production Inducement Distribution Ratios by Individual Final Demand Items (%)

		Domestic Production Inducement Distribution Ratios (%)			
		Final Consumption Expenditure	Gross Capital Formation	Export	Total
1	Agriculture, forestry and fishery	38.56	45.00	16.44	100.00
2	Mining and quarrying	0.73	2.88	96.39	100.00
3	Manufacturing	57.43	13.61	28.95	100.00
4	Electricity, gas, steam and air conditioning supply	62.00	15.37	22.63	100.00
5	Water supply; sewerage, waste management and remediation activities	55.26	15.32	29.42	100.00
6	Construction	5.63	84.06	10.31	100.00
7	Wholesale and retail trade; repair of motor vehicles and motorcycles	44.81	30.93	24.26	100.00
8	Transportation and storage	32.64	10.04	57.32	100.00
9	Accommodation and food service activities	55.71	7.65	36.64	100.00
10	Information and communication	65.84	12.08	22.07	100.00
11	Financial and insurance activities	39.77	21.34	38.89	100.00
12	Real estate activities	89.68	4.31	6.01	100.00
13	Professional, scientific and technical activities	38.02	13.37	48.61	100.00
14	Administrative and support service activities	59.18	10.98	29.83	100.00
15	Public administration and defense; compulsory social security	93.94	2.84	3.22	100.00
16	Education	97.96	0.29	1.75	100.00
17	Human health and social work activities	93.56	2.93	3.51	100.00
18	Arts, entertainment and recreation	94.10	1.20	4.70	100.00
19	Other service activities	84.37	1.73	13.90	100.00
20	Other activities	100.00	0.00	0.00	100.00
Total		43.15	22.01	34.84	100.00

Source: JICA Study Team based on NSO data.

Table 3.10 Domestic Production Inducement Coefficients by Individual Final Demand Items

		Domestic Production Inducement Coefficients			
		Final Consumption Expenditure	Gross Capital Formation	Export	Total
1	Agriculture, forestry and fishery	0.1284	0.2345	0.0787	0.1426
2	Mining and quarrying	0.0034	0.0211	0.6494	0.2009
3	Manufacturing	0.2205	0.0818	0.1597	0.1644
4	Electricity, gas, steam and air conditioning supply	0.0511	0.0198	0.0268	0.0353
5	Water supply; sewerage, waste management and remediation activities	0.0116	0.0050	0.0089	0.0090
6	Construction	0.0148	0.3450	0.0388	0.1123
7	Wholesale and retail trade; repair of motor vehicles and motorcycles	0.1344	0.1451	0.1045	0.1284
8	Transportation and storage	0.0558	0.0268	0.1406	0.0732
9	Accommodation and food service activities	0.0236	0.0051	0.0223	0.0181
10	Information and communication	0.0393	0.0113	0.0189	0.0256
11	Financial and insurance activities	0.0386	0.0324	0.0542	0.0415
12	Real estate activities	0.1284	0.0097	0.0124	0.0613
13	Professional, scientific and technical activities	0.0329	0.0181	0.0605	0.0371
14	Administrative and support service activities	0.0328	0.0095	0.0237	0.0237
15	Public administration and defense; compulsory social security	0.1167	0.0055	0.0057	0.0532
16	Education	0.1114	0.0005	0.0029	0.0487
17	Human health and social work activities	0.0445	0.0022	0.0024	0.0204
18	Arts, entertainment and recreation	0.0124	0.0002	0.0009	0.0057
19	Other service activities	0.0198	0.0006	0.0047	0.0101
20	Other activities	0.0004	0.0000	0.0000	0.0002
Total		1.2209	0.9745	1.4160	1.2116

Source: JICA Study Team based on NSO data.

Finally, this part examines value-added inducement effects. In terms of gross value-added inducement distribution ratios, the proportion of the final consumption expenditure is the largest in total and the ratio in manufacturing is 57% and that of wholesale and retail trade is 45% (see Table 3.11). In the mining sector, exports account for 96% while the proportion of gross capital formation is high in agriculture, forestry and fishery.

As for gross value-added inducement coefficients, export is the highest followed by final consumption and gross capital formation (see Table 3.12). Hence, expansion of exports is the most effective measure for GDP growth. In addition, in the aspect of total demand, the inducement coefficient of mining is the highest followed by agriculture, forestry and fishery and manufacturing. However, as described above, most of the export products are from mining and have a large influence on economic growth. This Input-Output analysis proved that the industrial structure in Mongolia is distorted, highly dependent on one sector, mining, and on external demand.

Table 3.11 Gross Value-Added Inducement Distribution Ratios by Individual Final Demand Items (%)

		Gross Value-Added Inducement Distribution Ratios (%)			
		Final Consumption Expenditure	Gross Capital Formation	Export	Total
1	Agriculture, forestry and fishery	38.56	45.00	16.44	100.00
2	Mining and quarrying	0.73	2.88	96.39	100.00
3	Manufacturing	57.43	13.61	28.95	100.00
4	Electricity, gas, steam and air conditioning supply	62.00	15.37	22.63	100.00
5	Water supply; sewerage, waste management and remediation activities	55.26	15.32	29.42	100.00
6	Construction	5.63	84.06	10.31	100.00
7	Wholesale and retail trade; repair of motor vehicles and motorcycles	44.81	30.93	24.26	100.00
8	Transportation and storage	32.64	10.04	57.32	100.00
9	Accommodation and food service activities	55.71	7.65	36.64	100.00
10	Information and communication	65.84	12.08	22.07	100.00
11	Financial and insurance activities	39.77	21.34	38.89	100.00
12	Real estate activities	89.68	4.31	6.01	100.00
13	Professional, scientific and technical activities	38.02	13.37	48.61	100.00
14	Administrative and support service activities	59.18	10.98	29.83	100.00
15	Public administration and defense; compulsory social security	93.94	2.84	3.22	100.00
16	Education	97.96	0.29	1.75	100.00
17	Human health and social work activities	93.56	2.93	3.51	100.00
18	Arts, entertainment and recreation	94.10	1.20	4.70	100.00
19	Other service activities	84.37	1.73	13.90	100.00
20	Other activities	100.00	0.00	0.00	100.00
Total		44.36	21.26	34.38	100.00

Source: JICA Study Team based on NSO data.

Table 3.12 Gross Value-Added Inducement Coefficients by Individual Final Demand Items

		Gross Value Added Inducement Coefficients			
		Final Consumption Expenditure	Gross Capital Formation	Export	Total
1	Agriculture, forestry and fishery	0.0998	0.1822	0.0611	0.1108
2	Mining and quarrying	0.0022	0.0138	0.4237	0.1311
3	Manufacturing	0.1042	0.0387	0.0755	0.0777
4	Electricity, gas, steam and air conditioning supply	0.0155	0.0060	0.0081	0.0107
5	Water supply; sewerage, waste management and remediation activities	0.0045	0.0020	0.0034	0.0035
6	Construction	0.0069	0.1603	0.0180	0.0522
7	Wholesale and retail trade; repair of motor vehicles and motorcycles	0.1031	0.1113	0.0801	0.0985
8	Transportation and storage	0.0310	0.0149	0.0781	0.0406
9	Accommodation and food service activities	0.0123	0.0026	0.0116	0.0094
10	Information and communication	0.0284	0.0082	0.0137	0.0185
11	Financial and insurance activities	0.0314	0.0264	0.0441	0.0338
12	Real estate activities	0.1047	0.0079	0.0101	0.0500
13	Professional, scientific and technical activities	0.0180	0.0099	0.0331	0.0203
14	Administrative and support service activities	0.0137	0.0040	0.0099	0.0099
15	Public administration and defense; compulsory social security	0.0757	0.0036	0.0037	0.0345
16	Education	0.0847	0.0004	0.0022	0.0370
17	Human health and social work activities	0.0350	0.0017	0.0019	0.0160
18	Arts, entertainment and recreation	0.0084	0.0002	0.0006	0.0038
19	Other service activities	0.0125	0.0004	0.0030	0.0063
20	Other activities	0.0004	0.0000	0.0000	0.0002
Total		0.7923	0.5943	0.8820	0.7648

Source: JICA Study Team based on NSO data.

Appendix 4.1.1 DEVELOPMENT POLICIES FOR AIMAGS AND AIMAG CENTERS

	WESTERN REGION				
	Basic Mission of Western Region Development Program: To be the area where people are respected, characteristics of the natural environment are adopted, growth is high based on knowledge, information technology and scientific advance, and the local production is for local consumption. Phase 1 (2006～2010): trade is developed and the industrial complex and FTZ are established, and GDP growth rate becomes 20%. The Asgat silver mine in Bayan-Ulgii, Bayan Airag copper and gold mine in Zavkhan, and Myangad rare earth mine in Khovd will start their operation. Moreover, the hydropower plants in Durgun and Taishir, and the north-south and west-east national roads are constructed. The percentage of GDP of industry grows by 9 times. Phase 2 (2011～2015): GDP growth rate becomes 9.7% and the annual growth of industrial products becomes 11.7%. Unemployment rate decreases and the poverty rate is reduced to half of 1998.				
	Bayan-Ulgii	**Govi-altai**	**Zavkhan**	**Uvs**	**Khovd**
Population (thousand)*1	93.2	56.7	69.6	75.7	81.5
Population Density (persons/km2)*2	2.1	0.4	0.9	1.1	1.1
Number of Soums*2	13	18	24	19	17
GDP (hundred million MNT)*2	3,040,480	2,239,634	3,268,263	2,969,937	3,030,016
Major Industry (percentage of GDP)*3 ① Agriculture and Livestock Husbandry ② Industry and Construction ③ Trade, Hotel and Restaurant ④ Transportation, IT and Communication ⑤ Finance and Business ⑥ Others	 41.2% 12.5% 13.1% 6.8% 6.7% 19.8%	 57.9% 6.7% 6.1% 1.4% 7.0% 20.9%	 63.9% 13.4% 2.8% 1.6% 5.2% 13.1%	 50.2% 12.5% 9.7% 2.6% 7.2% 17.8%	 49.5% 15.1% 6.8% 3.3% 5.7% 19.6%
Year of Publication of Aimag Medium- and Long-Term Plan	Bayan-Ulgii Development Program (2010～2021) approved by aimag council on December 24, 2009	Govi-altai Development Comprehensive Policy (2008～2021) published in 2008	Zavkhan Development Comprehensive Policy (2009～2021) published in 2008	Uvs 2020 Program	Khovd Development Strategy (2015～2025) published in 2014
Major Development Policy of Aimag Medium- and Long-Term Plan	Phase 1 (2010～2016) sets goals of: 1. GDP growth rate by 18% and promote industrial and tourism development; 2. Support small and medium enterprises related to agriculture and livestock farming; and 3. Reduce unemployment rate by 20%. Phase 2 (2016～2021) sets goals of: 1. GDP growth rate by 20%; 2. Increase export manufacturing and transform to modern industry and agriculture models.	1. Achievement of the Millennium Development Goals, and development of human beings; 2. Development of competitive export-oriented industries; 3. Infrastructure development of road, transportation, energy, IT communication, and so on; 4. Eliminating the gap between urban and rural areas through development of aimag and soum centers; and 5. Ensuring the ability to adapt to climate change, preserving desertification, and keeping the ecosystem balance.	1. Achievement of the Millennium Development Goals, and development of human beings; 2. Development of competitive export-oriented industries; 3. Infrastructure development of road, transportation, energy, IT communication, and so on; 4. Eliminating the gap between urban and rural areas through development of aimag and soum centers; and 5. Ensuring the ability to adapt to climate change, preserving desertification, and keeping the ecosystem balance.	1. Agriculture and livestock farming development (feed culture and meat export); 2. Continuation of Tsatsargana program implementation; 3. Tourism development (natural resource utilization of Uvs Lake and others and cross-borrder route development); 4. Infrastructure development (power plants, mining, long-term railway plan); and 5. Business environment development.	1. Continuation of population growth; 2. Education and health; 3. Becoming the center of economics, culture and tourism in Altai region based on traditional culture; 4. Harmony with the natural environment; 5. Establishment of smart government opening to people; 6. Living environment; 7. Continuation of traditional livestock farming and industry; 8. Industrial cluster development; and 9. Infrastructure development.
Year of Publication for Aimag Development Program	Aimag Governor Program 2012～2016 (Council Decision No. 77 in 2013)	Aimag Economic and Social Development Policy 2015 published in December 2014	Aimag Economic and Social Development Policy 2014	Annual implementation plan for Uvs 2020 Program	Aimag Development Program prepared in 2013
Major Development Policy of Aimag Development Program	1. Ensuring employment and income 2. Health 3. Education 4. Safe society and environment 5. Freedom for people	1. Improve effectiveness of local budget, transparency, and internal management 2. Support specific industry development such as mining, agriculture and livestock industry, food processing, and urban planning 3. Protect environment 4. Social development	1. Economic development 2. Infrastructure, urban and soum development 3. Social development 4. Administrative control 5. Environment, legal system, defense		
Location of Aimag Center (Soum)	Ulgii (Ulgii)	Altai (Yesunbulag)	Uliastai (Uliastai)	Ulaangom (Ulaangom)	Hovd (Hovd)
Population of Aimag Center	30,404	19,053			26,343
Aimag Center Soum GDP					
Major Industry of Aimag Center Soum	Construction (bricks), light industry (food processing)				
Year of Publication of Aimag Center Town Master Plan (as of April 2015)	Revising by the national budget 2013 (90% progress)	Revising by the national budget 2014 (90%% progress)	Prepared in 2005	Revising by the national budget 2014 (40% progress)	Revising by the national budget 2013 (90% progress)
Population Projection of Aimag Center					
Major Development Policy of Aimag Center Town Master Plan					
Remarks					

Source : *1 Mongolian Statistical Yearbook 2014, 'Residents in Mongolia'.
*2 Mongolian Statistical Yearbook 2014.
*3 http://cabinet.gov.mn/provinceplan.php.

	KHANGAI REGION					
	Phase 1 (2006 - 2010): Develop business environment and the annual growth rate of the region becomes 10%. Improve current composition of agriculture products to suit market needs and demand, aiming to be able to produce locally for local consumption and expand the markets. 70% of wheat and 100% of potatoes and vegetables which are consumed locally are produced locally. The amount of livestock production increases 10 times compared to that in 2005. Phase 2 (2011～2015): The percentage of GDP in industry and service sectors continuously rises. Develop the base of intensive agriculture and livestock husbandry. Encourage agriculture through expanding production of irrigated agriculture and increasing the yield amount per ha. Develop manufacturing and industrial complex. Renovation and expansion of old factories and construction of new factories. Prepare tourism development master plan in the region.					
	Arkhangai	**Bayanhongor**	**Bulgan**	**Orkhon**	**Uvurkhangai**	**Khuvsgul**
Population (thousand)*1	92.9	82.9	60.3	92.7	112.6	126
Population Density (persons/km2)*2	1.7	0.7	1.2	118.0	1.8	1.3
Number of Soums*2	19	20	16	2	19	23
GDP (hundred million MNT)*2	3,939,147	3,314,914	3,157,387	11,975,584	3,897,185	4,639,855
Major Industry (percentage of GDP)*3 ① Agriculture and Livestock Husbandry ② Industry and Construction ③ Trade, Hotel and Restaurant ④ Transportation, IT and Communication ⑤ Finance and Business ⑥ Others	 63.8% 13.5% 2.8% 1.6% 1.6% 16.7%	 57.2% 10.5% 6.6% 3.6% 6.3% 15.8%	 65.9% 15.3% 1.4% 0.9% 4.7% 11.9%	 1.5% 86.1% (mining) 5% 2.7% 1% 3.7%	 52.9% 13.9% 6.5% 3.1% 7.2% 16.3%	 50.9% 17.5% 8.9% 2.6% 6.3% 13.8%
Year of Publication of Aimag Medium- and Long-Term Plan	Arkhangai Development Strategy (2011～2021) published in 2011	Bayanhongor Development Strategy (2006～2020) published in 2006	Bulgan Development Strategy (2010～2021) published in 2010	Orkhon Development Strategy (2009～2021) published in 2009	Uvurkhangai Development Strategy (2007～2015) published in 2006	Khuvsgul Economic and Social Development Program (2008～2015) published in 2008
Major Development Policy of Aimag Medium- and Long-Term Plan	1. Achievement of the Millennium Development Goals, and development of human beings; 2. Development of competitive export-oriented industries; 3. Infrastructure development of road, transportation, energy, IT communication, and so on; 4. Eliminating the gap between urban and rural areas through development of aimag and soum centers; and 5. Ensuring the ability to adapt to climate change, preserving desertification, and keeping the ecosystem balance.	1. Economic growth and poverty reduction; 2. Development of small and medium enterprises, infrastructure, cities and towns and tourism; 3. Education and culture; 4. Livestock farming, agriculture, environment, and land management; and 5. Health, sport, and social welfare.	1. Achievement of the Millennium Development Goals, and development of human beings; 2. Development of competitive export-oriented industries; 3. Infrastructure development of road, transportation, energy, IT communication, and so on; 4. Eliminating the gap between urban and rural areas through development of aimag and soum centers; 5. Development of tourism sector; and 6. Ensuring the ability to adapt to climate change, preserving desertification, and keeping the ecosystem balance.	1. Achievement of the Millennium Development Goals, and development of healthy city; 2. Development of education environment based on global standards; 3. Establishment of fund based on mining and development of manufacturing industry for final products; 4. Support for export-oriented manufacturing and service industry and import alternatives with international standards; 5. Infrastructure development; and 6. Promotion of eco-friendly technology and ensuring the ecosystem balance.	Priority development sectors: 1. Mining related industry; 2. Small and medium enterprises; 3. Construction and construction materials industry; 4. Intensive livestock farming; 5. Agriculture; and 6. Tourism.	1. Achievement of the Millennium Development Goals, and development of human beings; 2. High technology in IT, bio, Nano, logistics, mining, agriculture and livestock farming-related manufacturing, participatory tourism development; 3. Renewable energy development; 4. Latest processing industry for strategic mining; 5. Infrastructure development between soums; 6. Adaptation to climate change; and 7. Anti-corruption and the establishment of a transparent and accountable system.
Year of Publication for Aimag Development Program						
Major Development Policy of Aimag Development Program			1. Agriculture and livestock 2. Industry 3. Tourism 4. Infrastructure 5. Finance			
Location of Aimag Center (Soum)	Tsetserleg (Erdenebulgan)	Bayanhongor	Bulgan	Erdenet (Bayan-undur)	Arvaiheer	Murun
Population of Aimag Center				97,367		
Aimag Center Soum GDP						
Major Industry of Aimag Center Soum				Mining, heavy industry		
Year of Publication of Aimag Center Town Master Plan (as of April 2015)	Prepared in 2008	Revising by the national budget 2013 (70% progress)	Prepared in 2012	Prepared in 2005 Revising the master plan	Prepared in 2009	Revising by the local budget in 2011 (70% progress)
Population Projection of Aimag Center						
Major Development Policy of Aimag Center Town Master Plan				Develop as a mining related education and technology center		
Remarks						Tarialan Soum Economic Development Program (2007～2015) published in 2007

Source : *1 Mongolian Statistical Yearbook 2014, 'Residents in Mongolia'.
*2 Mongolian Statistical Yearbook 2014.
*3 http://cabinet.gov.mn/provinceplan.php.

	CENTRAL REGION						
	Phase 1 (2006～2010): GDP growth rate becomes 25% through development for economic growth, expansion of the percentage of GDP of export industry and services, and establishment of mine complex and FTZ. The economy becomes active through appropriate management of Oyu Tolgoi and Tsagaan Suvarga copper and silver mines, Tumurtein iron ore deposit in Selenge, and TavanTolgoi coal deposit. The poverty rate is reduced by 30% compared to 1998. Phase 2 (2011～2015): GDP growth rate becomes 20% through improvement of economic structure, introduction of advanced technology, increase of production and services in mine complex, increase of mine and processing industry, and establishment of base for knowledge-based economy. The poverty rate decreases to half of 1998.						
	Govisumber	**Darkhan-Uul**	**Dornogovi**	**Dundgovi**	**Omnogovi**	**Selenge**	**Tov**
Population (thousand)*1	15.9	97.3	63.5	44.2	59.7	105.3	90.0
Population Density (persons/km2)*2	2.9	30.3	0.6	0.6	0.4	2.6	1.2
Number of Soums*2	3	4	14	15	15	17	27
GDP (hundred million MNT)*2	900,135	4,158,708	3,305,105	2,290,325	5,745,309	5,861,230	4,843,489
Major Industry (percentage of GDP)*3 ① Agriculture and Livestock Husbandry ② Industry and Construction ③ Trade, Hotel and Restaurant ④ Transportation, IT and Communication ⑤ Finance and Business ⑥ Others	 24.4% 42.4% 5.6% 0.5% 8.5% 18.6%	 13.3% 39.7% 15.5% 3.4% 11.4% 16.7%	 63.9% 13.4% 2.8% 1.6% 5.2% 13.1%	 62.5% 9.8% 4.6% 2.5% 6.5% 14.1%	 19.9% 59.5% 3.7% 4.9% 5.3% 6.8%	 33.7% 43.6% 4.7% 2.9% 5.8% 9.4%	 65.9% 12.7% 3.7% 0.8% 5.9% 11.0%
Year of Publication of Aimag Medium- and Long-Term Plan	Govisumber Development Strategy (2010～2021) published in 2010	Darkhan-Uul Development Strategy (2009～2021) published in 2009	Dornogovi Development Master Plan (2011～2021) published in 2011	Dundgovi Development Strategy by 2020 (2003～2020) published in 2003	Omnogovi Development Program - Natural Resource - Good Governance (2010～2020) published in 2009	Selenge Development Program (2007～2021) published in 2007	Tov Development Program (2008～2023) published in 2008
Major Development Policy of Aimag Medium- and Long-Term Plan	1. Achievement of the Millennium Development Goals, and development of human beings; 2. Development of competitive export-oriented industries targeting global markets and diversification of economy; 3. Infrastructure development of road, transportation, energy, and IT communication; 4. Development of aimag and soum centers; 5. Development of tourism sector; and 6. Ensuring the ability to adapt to climate change and keeping the ecosystem balance.	1. Improvement of unemployment rate, poverty reduction, social welfare, education and health system; 2. Industrial development (mining resource processing, construction materials, industrial park, agriculture and livestock farming, and tourism development); 3. Infrastructure development and urban development; and 4. Minimization of negative impacts through reduction of environmental pollution, natural disaster, climate change measures and prevention of desertification.	1. Priority development of the heavy industry, mining, intensive livestock farming, small and medium enterprises, road and transportation, and tourism sectors; 2. Expansion of and improvement of quality and utilization in the social infrastructure sector to suit the needs; 3. Ensuring environmental safety and sustainability; 4. Establishment of transparency of the government administration and ensuring speedy and equal service provision.	1. Development of the aimag as the sub-center of the central region; 2. Spread of IT communication technology; 3. Conduct and use of geological survey of mining resources; 4. Development of export-oriented industry, considering ecology, by using natural resources; 5. Development of tourism industry; 6. Improvement of effectiveness of energy use; and 7. Specialization of domestically and internationally competitive industry which harmonize environment of the region and diversification of industry and cooperative promotion between areas.	1. Development of mining related industry; 2. Development of construction machinery industry; 3. Intensive agriculture and livestock faming and its industrialization; 4. Promotion of healthy livestock and daily production manufacturing and healthy food program; 5. Infrastructure development; 6. Sanitation program; 7. Housing program; 8. Waste management and biomass energy program; 9. Human development, environmental protection, and sustainable development; 10. IT education and IT industry; 11. Tourism development; and 12. Waste water recycling and ecology program.	1. Economic development; 2. Social policy; 3. Protection and use of natural environment; 4. Governance; and 5. Implementation, management and evaluation of programs.	1. Economic development; 2. Social policy; 3. Protection and use of natural environment; 4. Governance; and 5. Implementation, management and evaluation of programs.
Year of Publication for Aimag Development Program	Govisumber Sustainable Development Program for the 21st Century (2003～2020) published in 2003	Darkhan-Uul Agriculture and Livestock Husbandry Development Comprehensive Strategy by 2021 published in 2009; Darkhan-Uul Fruits Program (2007-2012)	Aimag Regional Development Program published in 2002	Aimag Population Growth Supporting Policy (2009～2015) published in 2009			
Major Development Policy of Aimag Development Program	1. Technical updates of coal mine, coal and chemical plant development; 2. Support of small and medium-sized livestock products manufacturing enterprises; and 3. Development of green belt as overgrazing and desertification measures, natural regeneration projects and waste recycling plant.	1. Aim to increase domestic demand in crop, vegetables, and feed production through development of complex and intensive farms for agricultural and livestock farming; 2. Link meteorological research and other research and development in agriculture and livestock farming with production; 3. Introduce the latest technology according to the weather forecast in order to reduce the risk of agriculture and livestock farming; and 4. Increase the research level through level-up of the experiment and observation skills.		1. Protection of the livestock and grassland from natural disasters; 2. Support of the private sector; 3. Support of mining and agricultural and livestock husbandry production processing; 4. Infrastructure development to be the foundation of the industrial service sector; and 5. Education.			
Location of Aimag Center (Soum)	Choir	Darkhan	Sainshand	Mandalgovi	Dalanzadgad	Sukhbaatar	Zuunmod
Population of Aimag Center	11,600	76,428	22,011	13,894	21,600	22,693	15,397
Aimag Center Soum GDP		1.60%					1.90%
Major Industry of Aimag Center Soum							
Year of Publication of Aimag Center Town Master Plan (as of April 2015)	Prepared in 2014 by the national budget 2013	Prepared in 2005	Preparing by ADB loan in 2014 (90% progress)	Revising by the national budget 2014 (90% in progress)	Revising by the national budget 2013 (70% progress)	Prepared in 2013 by the local budget in 2012	Revising by the national budget 2013 (90% progress)
Population Projection of Aimag Center	30,000 by 2020				60,000 by 2030		
Major Development Policy of Aimag Center Town Master Plan					Daranzadgad Master Plan 2030		
Remarks		Requesting the national budget for revision (contract was cancelled)			Revising each soum master plan		

Source : *1 Mongolian Statistical Yearbook 2014, 'Residents in Mongolia'.
*2 Mongolian Statistical Yearbook 2014.
*3 http://cabinet.gov.mn/provinceplan.php.

	EASTERN REGION			
	Phase 1 (2006－2010): Expand industry through development of the business environment to activate export businesses and increase economic growth rate. Connect eastern and central energy grids, construct the millennium roads, and expand mining and processing in Tumurtein zinc deposit in Sukhbaatar, Tsav misch metal in Dornod, Bargilt iron ore and Tamsag crude oil in Hentii. Phase 2 (2011 - 2015): Increase advanced technology and management companies and industry. Increase economic effect of agriculture and livestock industry and the amount of export. The poverty rate is reduced to half of 1998.			
	Dornod	**Sukhbaatar**	**Khentii**	**Ulaanbaatar**
Population (thousand)*1	74.9	57.4	71.1	1,314.5
Population Density (persons/km2)*2	0.6	0.7	0.9	290.0
Number of Soums*2	14	13	18	9
GDP (hundred million MNT)*2	6,195,311	3,827,839	3,472,943	133,298,797
Major Industry (percentage of GDP)*3 ① Agriculture and Livestock Husbandry ② Industry and Construction ③ Trade, Hotel and Restaurant ④ Transportation, IT and Communication ⑤ Finance and Business ⑥ Others	 21.7% 58.5% 4% 1.1% 4.7% 9.9%	 46.4% 36.8% 1.8% 0.6% 4.3% 10%	 61.3% 13.6% 5% 1.1% 5.4% 13.6%	 0.4% 36.2% 25.9% 10.6% 16.5% 10.3%
Year of Publication of Aimag Medium- and Long-Term Plan	Dornod Development Comprehensive Strategy (2009～2016)	Sukhbaatar Development Program (2007～2015) published in 2007	Khentii Development Strategy (2010～2021) published in 2009	Ulaanbaatar 2020 Master Plan and Development Approaches for 2030 approved by the Parliament in 2013
Major Development Policy of Aimag Medium- and Long-Term Plan	1. Human development; 2. Industrialization; 3. Infrastructure development; 4. City development as the regional center; 5. Expansion of international relations; and 6. Tourism development.	1. Economic development; 2. Social policy; 3. Protection of natural resources and environment; 4. Population settlement and urban development; and 5. Implementation of programs.	1. Achievement of the Millennium Development Goals, and development of human beings; 2. Development of competitive export-oriented industries; 3. Infrastructure development of road, transportation, energy, and IT communication, etc.; 4. Development of aimag and soum centers and reducing gaps between urban and rural areas; 5. Development of tourism sector; and 6. Ensuring the ability to adapt to climate change and keeping the ecosystem balance.	1. Healthy and safe green city; 2. City with comfortable living environment; 3. City with good governance based on participation of people and the private sector; 4) Multipolar dispersal type city; 5) Center city for tourism; and 6) Advanced city with international competitiveness.
Year of Publication for Aimag Development Program				
Major Development Policy of Aimag Development Program				
Location of Aimag Center (Soum)	Choibasan (Herlen)	Baruun-Urt	Chingis	Ulaanbaatar
Population of Aimag Center	41,700	17,463	19,230	-
Aimag Center Soum GDP				-
Major Industry of Aimag Center Soum				-
Year of Publication of Aimag Center Town Master Plan (as of April 2015)	Preparing by the national budget 2014 (40% progress)	Preparing by the national budget 2014 (40% progress)	Revising by the national budget 2014 (contract cancelled)	Ulaanbaatar 2020 Master Plan and Development Approaches for 2030 approved by the Parliament in 2013
Population Projection of Aimag Center				1,763,000 by 2030
Major Development Policy of Aimag Center Town Master Plan				-
Remarks	Prepared soum center development master plan in 2013			

Source : *1 Mongolian Statistical Yearbook 2014, 'Residents in Mongolia'.
*2 Mongolian Statistical Yearbook 2014.
*3 http://cabinet.gov.mn/provinceplan.php.

Appendix 5.2.1 THE LIVESTOCK INDUSTRY IN MONGOLIA TODAY

1) Meat Packing Industry

As often mentioned, the meat packing industry was one of the most systematically operated activities by negdel during the socialist era in Mongolia. Back then, herders used to deliver their animals to negdel as quota, especially before winter, after which cut meat, processed products and by-products were consumed domestically or exported (JICA, 2005[1]). Today, although they are on a much smaller scale, there are at least 40 meat packing plants and more than 100 slaughterhouses in Mongolia.[2]

During the survey, two of the largest packers were visited, namely MahaImpex and Maha Market, as well as some smaller ones. MahaImpex used to be a state-run meat processing facility while Maha Market and others are all newly established packers after the decollectivization[3]. Curiously, in spite of the obvious difference in their scale of operation, all the representatives interviewed expressed their strong interest in export, which is in agreement with the dialogues made at the Ministry of Food and Agriculture,[4] and the Mongolian Meat Association. Thus, such a trend may have something to do with the fact that some five Mongolian meat packers got the export approval[5] for countries such as Russia, China, and Kazakhstan recently. Nevertheless, it should be remembered that to start actually exporting, further action is required such as new legislation and quarantine, especially for foot-and-mouth disease control. In fact, foot-and-mouth disease is by definition one of the most serious hindrances in terms of trading for the Mongolian livestock industry. Taking the rapid increase of the livestock number and resultant grassland degradation into consideration, however, export promotion will be highly effective for these concerns. Thus, despite hurdles, Mongolia should head for foreign markets, and, this is one of the most important recommendations in the study report.

2) Commercial Dairy Farming

Dairy products are one of the traditional diets in Mongolia. All the five major Mongolian animal species are utilized for milking, and a variety of products are available such as aaruul (dried hard cheese), and airag (mares' fermented milk) as well as cheese, and yogurt. Nevertheless, as commercial dairy farming, cow's milk is the most dominant. Also important to note is that dairy farming used to be one of the major industries operated by negdel during the socialist era. In fact, in the 1980s, 39 state-owned dairy farms with an average number of 400 cows were in operation (Tuvshinbat and Niinuma, 2008[6]). Despite this fact, demand exceeded supply back then, and the situation is still the same today. Besides, there is a distinct seasonality in the milk production trend in Mongolia. During the non-growing season of plants, the great majority of herders stop milking, thus, causing great fluctuations in farm-gate prices. According to the president of the Mongolian Dairy Science Research Association, in summer when milk production reaches its peak, an average farm-gate price per liter, in turn, could plunge to as low as MNT400 (around USD0.20). By contrast, in winter when milk production becomes scarce, the average price could rise up to MNT1,000 (around USD0.50).

According to representatives of the dairy plants visited, they compensate for shortfalls in winter by importing dried milk and reconstituting it by adding water in their plants. Under such circumstances, the government has been trying to boost domestic milk production through the Mongolian National Livestock

[1] JICA. 2005. Report of Meat processing technique in Mongolia.JICA.

[2] *Mongolian Correspondence*. 2015. **526**: 3.

[3] The president of Maha Market is a lady who still looks in her thirties, and curiously is an ex-officer for MahaImpex.

[4] Import promotion is also one of the goals clearly mentioned in the Mongolian National Livestock Program (see Section 5.1 in the main report).

[5] *Mongolian Correspondence*. 2015. **526**: 3, **532**: 3.

[6] Tuvshinbat, D. and Niinuma, K. 2008. The development changes in Mongolia agricultural management during the transition to market economy: a case study of the intensive dairy farming. *NousonKenkyu***106**: 96-107.

Program.[7] In 2014, for instance, more than 700 special dairy breeds such as Friesian-Holstein and Montbeliard were imported. At present, the number of dairy farms including smallholders is on the increase, of which about 80% are concentrated in the Central region (2011[8]). In the case of some small-scale dairy "farmers" who were interviewed on site during the survey, they are all contracted members of a milk plant (Mont Fresh Co.). In winter, however, only about 30 out of 400 members are able to deliver milk. Furthermore, one of the most striking features about this group is that basically, the members are all still herders but, since they work for the plant selling milk on a daily basis, they move only twice a year, in March and November. This type of operation may put forward an idea for the Mongolian neo-traditional pastoralism, in which the study team tries to crystallize an intensive, but at the same time, traditional production scheme into a tangible form.

On the other hand, there are also some large commercial dairy farms. One of them was visited during the survey. Nuudelchin Co., whose diversified business includes mining, building materials, and agriculture, runs a dairy operation in a surrounding area of Ulaanbaatar. They imported 155 imported dairy cows, Montbeliard from France, last year. Although the cows still spend some time grazing on pasturelands, they are all kept in confined spaces equipped with modern machinery (see Photos 5.2.1.1 and 5.2.1.2). As mentioned in the main report, in Mongolia, there is a distinct seasonal fluctuation, the production being high with a lower farm-gate price in summer, and the production low with a higher farm-gate price in winter. Thus, taking advantage of this trend, Nuudelchin farm intentionally manipulates the breeding season of cows so that they will produce more milk in winter. The reason why Nuudelchin is able to do it is that they could provide feedstuffs such as hay and grain feed all year-round.

Photos 5.2.1-1 and 5.2.1-2.: Modern Cow Shed and Milking Parlor

1: Modern cow shed with a feeding space

2: Milking parlor with high-tech machines

Source: JICA Study Team

3) Domestic Animals Other than the Five Species (Horses, Cattle, Sheep, Goats and Camels)

Initially, the study thought of exploring a wide range of possibilities that herders could diversify production schemes by raising other livestock species such as pigs, and chicken which are not the aforementioned major five animals. During the survey, however, it was noticed that this is not possible, at least for a typical herder who moves four times a year, because of the required preparation or purchase of feedstuffs, construction and management of pens or cages.

Table 2.5.1-1 shows a breakdown of the number of non-five major domestic animals according to the Mongolian Statistical Yearbook 2013. It is clear that the number of pigs and bees (hives) are increasing. As mentioned above, these animals are not practical options for herders to raise; however, products derived

[7] Please refer to Section 5.1.

[8] Promer Consulting. 2011. Report on agriculture and livestock industries in Mongolia. Program for free trade agreement survey in 2011.

from those animals are becoming increasingly popular among city dwellers, and the great majority of shortfalls in demand are compensated by import currently. Thus, this should be considered in the context of Mongolian livestock development in the future.

In this regard, NVT Co., a large layer poultry farm, and Tumen hoshuut Co., a large intensive pig farm, are the pioneers in commercial production of these animals in Mongolia. Currently, NVT has 300,000 layers and Tumen hoshuut raises 1,500 sows, and both of them are strategically located in the vicinity of Ulaanbaatar. According to their representatives interviewed, demands for eggs and pork are both high, and one of the most pressing issues in both operations is their heavy dependency on imported grain feeds which cost them a lot. Thus, increasing self-sufficiency of animal feed, for instance by establishing animal feed plants (Komiyama, 2007[9]), would be ideal and quite timely not only for herders but also for all the livestock activities in general.[10]

Lastly, linked to diversification, though conducted without introducing other livestock species, it is noteworthy to mention that a livestock project for herders, operated by FAO and World Bank, has included horticulture into their activities and has shown positive results.[11]

Table 5.2.1-1 Number of Some Domestic Animals in Mongolia

Species	2010	2011	2012	2013
Pigs	24,842	30,397	40,421	51,864
Reindeers	1,344	1,396	1,421	1,574
Donkeys	99	198	75	51
Rabbits	736	1,110	1,533	1,262
Chickens (x 1,000)	425	596	469	489
Bees (hives)	1,628	896	2,128	3,677

Source: Mongolian Statistical Yearbook 2013.

[9] Komiyama, H. 2007. Trend in intensive livestock industry in Mongolia. Workshop on vegetative changes in Mongolia. Tsukuba University.

[10] In the socialist era, negdel also operated 27 feed production plants (Ganbat, U. and Sakazume, H. 2012. Development of concentrated feed production and distribution channels in Mongolia. *Review of Agricultural Economics* **67**: 105-112). Also important is that the animal feeds prepared by these plants were all for ruminants, so those are not apt for pigs or poultry.

[11] World Bank. Mongolia integrated livestock-based livelihoods support project.

Appendix 5.5.1 APPLICATION OF SOIL BAG TECHNOLOGY IN MONGOLIA: CONSTRUCTION OF CATTLE SHELTERS USING SOIL BAGS

Herders in Mongolia build enclosed cattle shelters for protection against the cold by utilizing wooden boards and large stones. However, this is hard work and does not offer enough protection, resulting in massive deaths of cattle when a severe hazard of *dzud* occurs. Thus, in response to the request for a pilot project of Bayan-Unjuul Soum of Tov Aimag, Professor Haruyuki Yamamoto of Hiroshima University, in cooperation with an NGO (the Clean Energy Non-governmental Organization or CEO), has initiated a project since 2011 of constructing a total of five buildings using soil bags to serve as cattle shelters with varying sizes. This project was also supported by a small fund from the Global Environment Facility (GEF) Small Grants Programme of the United Nations Development Programme (UNDP).

The making of soil bags and construction of shelters are largely done by local people such as herders, who collect with shovels a certain volume of earth (including stones of up to 2cm) from the nearby grasslands to evenly fill the soil bags. They reuse washed nylon (permeable) flour bags as soil bags. Filled soil bags are heaped up into walls, netted with a metallic mesh, and covered with mortar (lath mortar that is about 5cm thick to avoid ultraviolet ray degradation) to complete the soil bag walls. Thus, it is a very simple construction method (see photos below).

Source: Prof. Yamamoto of Hiroshima University

For the construction of cattle shelters using soil bags, “hard work” and “precision of accumulation” for heaping up the soil bags vertically as walls may be issues to be addressed. Meanwhile, subsequent investigations indicate no problems in durability have occurred so far in spite of the severe winter

conditions of temperature of around minus 30 degrees Centigrade. Now the completed cattle shelters are utilized by herders. With their total useful life expected to last some 10 years, this type of shelters has started to garner a good reputation among the herders.

Appendix 6.3.1 INSTITUTIONAL SYSTEMS AND REGULATIONS ON AGRICULTURAL LAND USE AND LAND OWNERSHIP

(1) Management Plan on Characteristics and Quality of Agricultural Land and Pastureland

Article 58 of the Law of Mongolia on Land regulates the characteristics and quality management of lands. Article 58.9 provides that "Provisions and evaluation indicators on characteristics and quality management of agricultural land shall be regulated by the Agricultural Law of Mongolia." Article 5 of the Agricultural Law stipulates that "Monitoring on efficient and rational use of agricultural land and its soil quality shall be carried out once every 5 years." Soil condition and quality must be confirmed by agrochemical inspection.

Land possessors and users are responsible for financing the expenses for their land characteristics and quality, while expenses for state certification of the characteristics and quality of land to be given for possession and use to citizens, companies and organizations for the first time as well as that for the rest of the land must be financed by central and local government budgets, as provided in Article 58.7 of the Law on Land. In reality, however, this financing of expenses is not implemented yet due to budget constraints. If individuals and companies wish, they can apply and implement agrochemical inspection on soil quality by private inspection organizations at their own expenses.

The Law on Land provides that lands shall be returned to the state ownership if agricultural land is not used within two years after obtaining the license. However, the monitoring on land use for its intended purpose has not been well managed. Enterprises possess rights for large-scale agricultural land, but they do not use this for its intended purposes. "The Regulation of monitoring on pastureland" was revised in May 2015, aiming to simplify monitoring procedures and to measure characteristics and vegetation composition of lands, and the level of soil degradation using special software from the pictures of relevant land.

(2) Land Rights Registry

Regarding "cropland" use, the Citizens Representatives' Khurals of soums review and discuss applications for croplands, taking into consideration their relevance to the land management plan. If the application is approved, it shall have been marked in the annual land management plan by land officers, and the plan will be ultimately determined by order of governors of soums, as is the case with pastureland. The land registration process takes an average of one month. Citizens, companies and organizations using land must pay land fees, while they do not pay land taxes. The land taxation system applies for landowners only. In 1997, the guidelines on land valuation and land fees were formulated by the Cabinet through No. 52 Rule.

(3) Land Administration and Management System

The Agency of Administration of Land Affairs, Geodesy and Cartography (ALAGaC), an affiliated office of the Ministry of Construction and Urban Development, governs land management at the national level, including agricultural land and pastureland. The Land Management and Urban Development Department, an affiliated office of ALAGaC, administers capital city-level and aimag-level land management, and land officers in charge of soum-level land related issues who are authorized by ALAGaC. In urban areas where infrastructure is developed, land use licenses and their termination are determined by governors of city and aimags taking into consideration the annual land management plan, the master and partial plans for urban development. Regarding the rest of the lands, governors of soums and districts mayor have the right to determine their use taking into consideration the annual and partial plans for land management. Soum- and district-level land management plans must be developed pursuant to the land management plans of aimags and the capital city, and shall be approved by the Citizens Representatives' Khurals of soums. Land management plans at aimag level must also be approved by the Citizens Representatives' Khurals of aimags.

(4) Regulations on Cultivated Area

Under Article 29.3 of the Law on Land, land for farming can be given to citizens who have long experience in the agricultural field, in accordance with opinions of Bag Public Khurals and decisions of the Citizens Representatives' Khurals of soums. Land given to citizens for cultivation of crop plants may not exceed 100 ha, and for cultivation of potatoes and vegetables may not exceed 50 ha. The Cabinet has the right to determine the size of land accorded to a company for cultivation of crop plants (Article 29.6 of the Law on Land). In 2003, the size of land accorded to a company for production and industry was formulated by the Cabinet through No. 28 Rule.

(5) Pastureland, Its Rational Use and Protection

Article 52 of the Law on Land regulates pastureland, its rational use and protection. Citizens Representatives' Khurals of soums and districts must mark the relevant land on the land management plan, ratify the plan taking into consideration its characteristics, land use traditions, rational use and conservation requirements, and shall initiate land management activities according to the general schedule of pasture separation for winter, spring, autumn and summer settlements and reserve rangelands. Summer and autumn settlements and reserve rangelands shall be allocated to bags and hot ails and shall be used collectively. Winter and spring pastures shall be prevented from livestock grazing during summer and autumn, and shall be carefully protected with public efforts. Governors of soums shall determine the duration of prohibition from livestock grazing. Governors of soums may give approval to herder communities to use lands under specific terms and contracts for the purpose of rational use and protection of winter and summer settlements, taking into consideration the characteristics of land, land use traditions and land capacities.

(6) Features of Land Policy with Environmental and Social Considerations

Article 52.4 of the Law on Land provides that "Governors of aimags, the capital city, soums and districts may establish pastoral or settled livestock breeding areas within their territories, taking into consideration their environmental, social and economic conditions," with respect to features of land policy with environmental and social considerations. Also, pastureland fenced for purposes of developing intensive settled livestock breeding or farming of tamed animals can be given for use to citizens, companies and organizations under specific terms and contracts on land, based on Article 52.5 of the Law on Land.

(7) Settlement of Pastureland Related Disputes

Disputes arising from the use of pastureland shall be resolved by discussing them on Bag Public Khurals based on traditional land use practices and customs of herders. If an agreement cannot be reached, the issue shall be resolved by governors of soums (Article 52.10 of the Law on Land). In the event of a need of movement to territories of other aimags or soums due to natural disasters or other emergencies, governors of soums or aimags shall make a decision to reach an agreement (Article 52.8 of the Law on Land). Citizens Representatives' Khurals of aimags determine soum-level reserve rangelands to be used in the event of natural disasters, dzud[1] and droughts, including their boundaries and limits. The Cabinet determines aimag-level reserve rangelands, including their boundaries and limits upon request of authorities of aimags or soums (Article 52.9 of the Law on Land).

In recent years, disputes related to the use of pastureland have been decreasing. In most cases, disputants reach an agreement through collaborative processes.

[1] Refer to 2.5 Current Situation and Challenges to "Healthy Livestock" for Sustainable Livestock Farming Development