

REPUBLIC OF THE PHILIPPINES

**DATA COLLECTION SURVEY
ON
URBAN INFRASTRUCTURE DEVELOPMENT
IN GREATER COTABATO CITY**

FINAL REPORT

**MAIN TEXT
< VOLUME 1 >**

FEBRUARY 2022

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

CTI ENGINEERING INTERNATIONAL CO., LTD.

ORIENTAL CONSULTANTS GLOBAL CO., LTD.

IC NET LIMITED

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TABLE OF CONTENTS

< VOLUME 1 >

CHAPTER 1 INTRODUCTION	1-1
1.1 Background of the Study	1-1
1.2 Objectives of the Study	1-2
1.3 Scope of the Study	1-2
1.4 Study Schedule	1-2
1.5 Organization to Carry Out the Study	1-4
1.6 Major Activities Undertaken	1-5
1.7 Organization of the Final Report	1-12
CHAPTER 2 OVERVIEW OF THE STUDY AREA	2-1
2.1 Natural Conditions	2-1
2.1.1 Topography	2-1
2.1.2 Geology	2-1
2.1.3 Elevation and Slope	2-1
2.2 Natural Calamities	2-3
2.2.1 Flood	2-3
2.2.2 Storm Surge	2-8
2.2.3 Earthquake	2-9
2.2.4 Tsunami	2-10
2.2.5 Other Calamities	2-12
2.3 Socio-Economic Conditions	2-13
2.3.1 Population	2-13
2.3.2 Households	2-19
2.3.3 Culture and Ethnic Diversity	2-19
2.3.4 Poverty and Displacement	2-23
2.3.5 GRDP and Economic Structure	2-26
2.3.6 City Economy	2-30
2.3.7 Income and Expenditure	2-31
2.3.8 Labor Force and Employment	2-34
2.3.9 Access to Basic Social Services	2-36
2.4 Environmental Issues	2-44
2.4.1 Climate Change	2-44
2.4.2 Environmentally Critical Areas	2-44
2.4.3 Priority Concerns	2-46
CHAPTER 3 DEVELOPMENT AND SPATIAL CONTEXT FOR GREATER COTABATO AND CITY	3-1
3.1 Regional Development Plans and Frameworks	3-1
3.1.1 Regional Setting by the Key Framework Plans	3-4
3.2 Greater Cotabato and Its Status	3-18
3.2.1 Definition of Greater Cotabato	3-18
3.2.2 Defining the Study Area for Greater Cotabato	3-18
3.2.3 Development Conditions for Greater Cotabato	3-19
3.3 Development Plans for Cotabato City	3-20

3.3.1	Overview of Development Plans for Cotabato City	3-20
3.3.2	Comprehensive Development Plan (CDP) 2017-2022	3-21
3.3.3	Disaster Risk Reduction and Climate Change Adaptation Plan	3-23
3.3.4	Local Development Investment Plan 2017-2022.....	3-24
3.4	Socio-economic Development Status and Spatial Implications	3-26
3.4.1	Current Economic Status in Greater Cotabato City	3-26
3.4.2	Current Status of Urban Services in Greater Cotabato City	3-40

CHAPTER 4 CLUP REVIEW AND DEMAND-SUPPLY ANALYSIS FOR COTABATO CITY4-1

4.1	Reviews on the Comprehensive Land Use Plan (CLUP) 2011-2020.....	4-1
4.1.1	Current Status of the CLUP 2011-2020 of Cotabato City	4-1
4.1.2	Identified Planning Issues and Measures in the CLUP 2011-2020	4-1
4.1.3	CLUP 2011-2020 and Further Considerations	4-4
4.2	Land Supply and Demand for Cotabato City	4-10
4.2.1	Inhabitable Land Analysis (Supply Side)	4-10
4.2.2	Land Demand Analysis.....	4-13
4.2.3	Demand and Supply Assessment.....	4-16

CHAPTER 5 PRESENT CONDITION OF VARIOUS URBAN INFRASTRUCTURE 5-1

5.1	Transport Infrastructure and Services	5-1
5.1.1	Road Network.....	5-1
5.1.2	Road and Drainage Condition.....	5-5
5.1.3	Location of Major Traffic Attractors/Generators (Facilities)	5-12
5.1.4	Public Transport Services and Routes	5-12
5.1.5	Road Traffic Management and Enforcement.....	5-25
5.1.6	Traffic Volume	5-26
5.1.7	Travel Speed	5-31
5.1.8	Level of Service	5-33
5.1.9	Public Transport Terminals	5-35
5.1.10	Offices/Agencies Involved in Transport Development	5-40
5.1.11	Future Plans	5-41
5.1.12	Summary of Issues.....	5-42
5.2	Airport	5-43
5.2.1	Overview.....	5-43
5.2.2	Description of Existing Airport Facilities.....	5-44
5.2.3	Service Routes	5-51
5.2.4	Air Traffic Statistics	5-51
5.2.5	Organization and Budget of Offices/Agencies Involved in Airport Development.....	5-52
5.2.6	Summary of Issues at Awang Airport.....	5-52
5.2.7	Current Development Initiatives.....	5-53
5.3	Port	5-55
5.3.1	Overview.....	5-55
5.3.2	Institutional Framework.....	5-56
5.3.3	Polloc Port	5-56
5.3.4	Timako Port (Construction is On-going)	5-73
5.3.5	Major Issues in Port Development.....	5-76
5.4	Water Supply	5-77
5.4.1	Existing Facilities and Service Area.....	5-77
5.4.2	Organization and Budget of Offices/Agencies Involved in Water Supply	5-86
5.4.3	Summary of Issues on Water Supply in Cotabato City	5-89
5.4.4	Current Condition of Water Supply in Surrounding Municipalities.....	5-89
5.5	Sewage	5-106
5.5.1	Sanitary Condition in Cotabato City.....	5-106
5.5.2	Related Laws and Regulations.....	5-108
5.5.3	Current Development Initiatives in Cotabato City	5-109
5.5.4	Current Condition of Sanitation in Surrounding Municipalities.....	5-113
5.5.5	Summary of Issues on Sanitation.....	5-114

5.6	Solid Waste Management.....	5-115
5.6.1	Solid Waste Management condition in Cotabato City.....	5-115
5.6.2	Institutional Framework.....	5-124
5.6.3	Related Laws / Regulations and Policy	5-127
5.6.4	Current Condition of SWM in Surrounding Municipalities	5-129
5.6.5	Summary of Issues on Solid Waste Management.....	5-136
5.7	Power Sector.....	5-137
5.7.1	Overview of the Mindanao Power Sector.....	5-137
5.7.2	Power and Electrification Situation in Cotabato City and Nearby Municipalities	5-145
5.7.3	Institutional Framework.....	5-149
5.7.4	Major issues in Power Sector Development	5-153
5.7.5	Current Condition of Power Supply in the Surrounding Municipalities	5-156
5.8	Disaster Risk Reduction	5-161
5.8.1	History of Major Disasters in Cotabato City	5-161
5.8.2	Natural Condition of Cotabato City and History of Disasters	5-164
5.8.3	National Government’s Plans and Programs to Address Disasters in the City	5-177
5.8.4	Local Government’s Plans and Programs to Address Disasters in the City	5-181
CHAPTER 6 PLANNING PROCEDURE AND BUDGETING.....		6-1
6.1	Position of CLUP and CDP in the overall Planning System.....	6-1
6.2	Preparation Process of Cotabato City’s CLUP.....	6-4
6.3	Current Status of Cotabato City’s Comprehensive Land Use Plan (CLUP)	6-9
6.3.1	CLUP 2020-2028 for Updating	6-9
6.3.2	Current Status of CLUP 2020-2028 Preparation	6-9
6.4	Budgetary Framework of Cotabato City	6-11
6.4.1	Sources of Revenues.....	6-11
6.4.2	Income Versus Expenditure.....	6-11
6.4.3	Infrastructure Budget	6-12
6.5	DPWH Budget allocation for Cotabato City	6-13
6.6	Budgetary Framework of BARMM	6-15
CHAPTER 7 GROWTH DIRECTION AND SCENARIOS FOR GREATER COTABATO AND CITY		7-1
7.1	Growth Direction for Greater Cotabato and City	7-1
7.1.1	Spatial Development Opportunities and Challenges	7-1
7.1.2	Directing Spatial Development Greater Cotabato and City.....	7-2
7.2	Alternative Growth Scenarios for Greater Cotabato and Cotabato City	7-9
7.2.1	Approach and Assumptions for Growth Scenarios.....	7-9
7.2.2	Spatial Development Scenarios of Greater Cotabato and Cotabato City.....	7-10
7.2.3	Assessment of Growth Scenarios and Preferred Development for the Greater Cotabato Area	7-14
7.2.4	Possible Spatial development Direction of Cotabato City.....	7-16
7.2.5	Overall Evaluation of Favorable Spatial Development Direction for Greater Cotabato Area and Cotabato City	7-21
7.3	Strategic Environmental Assessment	7-22
7.3.1	Framework of a Strategic Environmental Assessment	7-22
7.3.2	Relevant Legislation on SEA and Environmental Impact Assessment	7-24
7.3.3	Legislation on Land Acquisition.....	7-29
7.3.4	Responsible Authorities for the Environmental and Social Considerations and Land Acquisition in the Study Area.....	7-31
7.3.5	Legislation and Authorities Related to the Conservation of Biodiversity	7-32
7.3.6	Legislation and Authorities Related to the Protection of Cultural Properties.....	7-33
7.3.7	Legislation and Authorities Related to Socially Vulnerable People and Ethnic Minorities	7-33
7.3.8	Legislation and Authorities Related to Waste Management.....	7-36
7.3.9	Legislation and Authorities Related to Labor Conditions	7-36
7.3.10	Legislation and Authorities Related to Climate Change.....	7-37
7.3.11	Environmental Standards.....	7-38

7.3.12	International Treaties Related to Environmental and Social Considerations.....	7-39
7.3.13	Scoping	7-39
7.3.14	Additional Information Collection.....	7-44
7.3.15	Stakeholders Meetings.....	7-44
7.3.16	Evaluation of Development Scenarios and the Selection of the Optimum Scenario...	7-54
7.3.17	Comparison of the Three Scenarios and Selection of the Optimum Scenario.....	7-58
7.3.18	Mitigation Measures and Monitoring System.....	7-59
CHAPTER 8 VISION AND DEVELOPMENT FRAMEWORK FOR GREATER COTABATO AND CITY		8-1
8.1	Vision and Goals	8-1
8.1.1	Vision for Greater Cotabato and City	8-1
8.1.2	Spatial Development Goals for Greater Cotabato and City.....	8-2
8.2	Socio-economic Development Framework for Greater Cotabato and City.....	8-3
8.2.1	Rationale and Assumptions for Socio-economic Development Framework	8-3
8.2.2	Population and Socio-economic Development Framework.....	8-5
CHAPTER 9 SPATIAL DEVELOPMENT FRAMEWORK FOR GREATER COTABATO AND CITY		9-1
9.1	Greater Cotabato Spatial Development Policies and Strategies	9-1
9.1.1	Overall Spatial Development Policies	9-1
9.1.2	Economic Development Policies for Greater Cotabato and City	9-2
9.1.3	Spatial Development Strategies for Greater Cotabato Area	9-3
9.2	Guiding Spatial Development Principles Toward the Formulation of a Land Use Plan for Cotabato City	9-11
9.2.1	Strategies and Principles in Land Use and Urban Function for Cotabato City.....	9-11
9.2.2	Spatial Development Framework for Cotabato City	9-14
9.3	Implementation Guidance for Greater Cotabato Development.....	9-15
9.3.1	Development Staging for Spatial Development	9-15
9.3.2	Institutional Arrangement for Growth Management	9-17
9.3.3	Further Considerations.....	9-25
CHAPTER 10 LAND USE PLAN FOR COTABATO CITY		10-1
10.1	Current Land Use Situation of Cotabato City for the Last Ten Years.....	10-1
10.1.1	Features of the Function of Cotabato City	10-1
10.1.2	Trends in Land Use.....	10-2
10.1.3	Trends by Land Use Category	10-4
10.2	Basic Consideration to the Policy Making	10-6
10.2.1	Assessment of Hazard.....	10-6
10.2.2	Setting up Resilience Land Use Planning.....	10-7
10.2.3	A consideration of Urban Forms	10-9
10.3	Demand of Land Use to Supply for Development	10-11
10.3.1	Setting Up New Urbanized Area to Accommodate Residential Demand	10-11
10.3.2	Prospect of Land Use Demand Related to Industries Use	10-12
10.3.3	Prospect of Land Use along with Institutional Use	10-13
10.4	Urban Land Use Policy and Strategy	10-13
10.4.1	Current Trend of Land Use.....	10-13
10.4.2	Spatial Development Strategy	10-13
10.5	The Land Use Plan	10-15
10.5.1	Setting Up Development Population	10-15
10.5.2	Setting Up Land Use Area	10-15
10.5.3	Summary of Land Use Plan.....	10-22
CHAPTER 11 TRANSPORT DEVELOPMENT PLAN		11-1
11.1	Background on Transportation Development Plan	11-1
11.2	Issues of Transport Sector	11-5
11.3	Goal for Transport Development Plan (TDP)	11-6
11.4	Objectives for Transport Development Plan	11-7

11.5	Strategies for Transport Development Plan	11-7
11.5.1	Strategy to Establish Functional Hierarchical Road Network	11-8
11.5.2	Strategy to Strengthen the Road Network	11-8
11.5.3	Strategy to Improve Public Transport System	11-11
11.5.4	Strategy to Improve Traffic Management.....	11-13
11.6	Transport Development Plan and Programmes	11-15
11.6.1	Establishment of Road Functional Hierarchy Sub-Programme	11-15
11.6.2	Road Network Development Sub-Plan.....	11-21
11.6.3	Public Transport Improvement Sub-Plan.....	11-33
11.6.4	Traffic Management Sub-Plan.....	11-43
11.7	Cost of Transport Development Plan and Programme	11-49
11.7.1	Cost Estimation of Transport Development Plan	11-49
11.7.2	Cost Estimation and Implementation Program of Road Improvement Project.....	11-50
11.8	Implementation Schedule	11-62
11.9	Selection of High Priority Projects.....	11-64
11.9.1	Project Profiles of High Priority Projects	11-65
11.10	Environmental and Social Consideration of Transport Development Plan.....	11-69
11.11	Peacebuilding	11-70
CHAPTER 12 AIRPORT DEVELOPMENT PLAN.....		12-1
12.1	Background of the Airport Development Plan	12-1
12.1.1	Background.....	12-1
12.2	Issues on Airport Development	12-2
12.2.1	Limitation on Improvement of Aviation Safety.....	12-2
12.2.2	Limitation on Improvement of User Convenience	12-2
12.2.3	Constraints Under the Current Operational Situation of CBO	12-2
12.3	Objectives for Airport Development	12-3
12.3.1	Objectives of Existing Airport Development	12-3
12.3.2	Objectives of New Airport Development	12-3
12.4	Strategies for Airport Development	12-3
12.4.1	Strategies of Existing Airport Development.....	12-3
12.4.2	Strategies of New Airport Development	12-4
12.5	Airport Sector Plan.....	12-4
12.5.1	Improvement of Existing Airport	12-4
12.5.2	Development of New Cotabato Airport.....	12-6
12.6	Air Traffic Demand Forecast.....	12-8
12.7	Cost of Airport Sector Plan	12-9
12.7.1	Cost Estimation for Existing Airport Improvement Project	12-9
12.7.2	Cost Estimation for New Cotabato Airport Construction Project.....	12-10
12.8	Proposed Priority Projects	12-12
12.8.1	Proposed Priority Project for Existing Cotabato Airport.....	12-12
12.8.2	Proposed Priority Project for New Cotabato Airport.....	12-15
12.9	Environmental and Social Considerations of Airport Sector Plan	12-17
12.10	Peacebuilding	12-19
CHAPTER 13 PORT DEVELOPMENT PLAN.....		13-1
13.1	Background	13-1
13.1.1	Cotabato Port	13-1
13.1.2	Polloc Port	13-1
13.1.3	Timako Port	13-3
13.2	Issues on Port Development	13-4
13.2.1	Cotabato Port	13-4
13.2.2	Polloc Port	13-4
13.2.3	Timako Port	13-6
13.3	Objectives for Port Development	13-7
13.3.1	Polloc Port	13-7
13.3.2	Timako Port	13-7
13.4	Strategies for Port Development	13-7

13.4.1	Polloc Port	13-7
13.4.2	Timako Port	13-7
13.5	Port Sector Plan and Estimated Cost	13-8
13.5.1	Polloc Port Future Development Plans (Short-term plan and Long-term plan).....	13-8
13.5.2	Timako Port	13-11
13.6	Selection of High Priority Project	13-19
13.6.1	Project Development Prioritization Criteria	13-19
13.6.2	Project Profile of High Priority Projects	13-19
13.7	Implementation Schedule	13-24
13.7.1	Polloc Port	13-24
13.7.2	Timako Port	13-25
13.8	Environmental and Social Considerations.....	13-26
13.8.1	Polloc Port	13-26
13.8.2	Timako Port	13-26
13.9	Peacebuilding	13-27
 CHAPTER 14 WATER SUPPLY DEVELOPMENT PLAN		14-1
14.1	Background on Water Supply Sector	14-1
14.1.1	Water Supply Study Area for Greater Cotabato	14-1
14.1.2	Water Supply Users in Cotabato City.....	14-2
14.1.3	Water Supply Service Coverage Area in Cotabato City	14-2
14.1.4	Organization and Budget of Offices/Agencies involved in Water Supply	14-5
14.2	Issues on Water Supply Development.....	14-8
14.3	Objectives for Water Supply Development.....	14-9
14.3.1	Corresponding to the Increase in Water Demand due to Population Growth and Urbanization	14-9
14.3.2	To Repair and Renew Existing Water Treatment Facilities and Water Pipe Networks	14-9
14.3.3	To Improve and Strengthen the Management of the Water Supply Business	14-9
14.3.4	To Reducing Water-borne Diseases	14-9
14.4	Strategies for Water Supply Development.....	14-10
14.4.1	Present Situation of Water Supply System	14-10
14.4.2	Future Prospect for Water Demand	14-20
14.5	Water Supply Sector Plan.....	14-21
14.5.1	Cotabato City Priority Projects	14-21
14.5.2	Priority Projects in the Five Surrounding Municipalities	14-24
14.6	Selection of High Priority Projects.....	14-25
14.6.1	Project Prioritization Criteria.....	14-25
14.6.2	Project Profile of High Priority Projects.....	14-25
14.7	Implementation Schedule and Project Cost.....	14-35
14.8	Initial Environmental and Social Assessment of Water Supply Sector Plan.....	14-36
 CHAPTER 15 SEWERAGE DEVELOPMENT PLAN		15-1
15.1	Background	15-1
15.1.1	Overview.....	15-1
15.1.2	Sanitation Sector Challenges	15-1
15.1.3	Initiatives to Improve Sanitation and Water Quality	15-2
15.2	Issues on Sewerage Development	15-2
15.2.1	Environmental Degradation and Poor Health Conditions	15-2
15.2.2	Sanitation Sector Challenges	15-2
15.3	Goal and Objectives for Sewerage Development.....	15-4
15.3.1	Goal.....	15-4
15.3.2	Objectives	15-4
15.4	Strategy on Sewerage Development Plan.....	15-4
15.4.1	Enhance the Ability of LGUs to Build and Operate Septage Management Systems ..	15-4
15.4.2	Improving Drainage Systems and Creek Environment	15-4
15.4.3	Reducing Unhygienic Behaviors and Practices	15-5
15.5	Sewerage Development Plan.....	15-5
15.5.1	Basic Premise for the Plan.....	15-5

15.5.2	Septage Management in Cotabato City	15-6
15.5.3	Septage Management in Surrounding Municipalities	15-8
15.5.4	Enhancement of Creek Environment	15-10
15.5.5	Reduction of Unsanitary Practices	15-12
15.6	Selection of High Priority Projects for Sewerage Development Plan	15-13
15.6.1	Capacity Building for Sanitation Improvement in Greater Cotabato Area	15-14
15.6.2	Development of Septage Treatment Facilities for Surrounding Municipalities	15-15
15.6.3	Enhancement of Creek Environment using De-centralized Treatment Plant	15-15
15.7	Implementation Schedule for Sewerage Development Plan	15-17
15.8	Cost of Sewerage Development Plan	15-18
15.9	Environmental and Social Considerations of Sewerage Development Plan	15-18
CHAPTER 16 SOLID WASTE MANAGEMENT PLAN		16-1
16.1	Background of the Solid Waste Management (SWM) for Cotabato City	16-1
16.1.1	Background	16-1
16.1.2	City's Goals and Objective	16-1
16.1.3	City's Strategy	16-2
16.2	Issues on Solid Waste Management	16-6
16.2.1	Implementation Frameworks on SWM	16-6
16.2.2	Waste Reduction	16-6
16.2.3	Waste Collection and Transport	16-6
16.2.4	Intermediate Treatment and 3R Facility	16-7
16.2.5	Final Disposal	16-7
16.3	Goal and Objective on Solid Waste Management Plan	16-8
16.4	Strategy on Solid Waste Management Plan	16-8
16.4.1	Waste Collection and Transportation	16-8
16.4.2	Intermediate Treatment and 3R Promotion	16-9
16.4.3	Final Disposal	16-9
16.4.4	Implementation Framework Strengthening	16-9
16.5	Solid Waste Management Plan	16-10
16.5.1	Basic Premise for the SWM Plan	16-10
16.5.2	Volume of the Waste in the Future	16-10
16.5.3	Implementation Framework Strengthening Plan	16-13
16.5.4	Waste Collection and Transportation Plan	16-15
16.5.5	Intermediate Treatment and 3R Promotion Plan	16-20
16.5.6	Final Disposal Plan	16-27
16.6	Selection of High Priority Projects for Solid Waste Management Plan	16-35
16.6.1	Integrated Solid Waste Management Master Plan in Greater Cotabato City	16-37
16.6.2	Construction of New Sanitary Landfill	16-38
16.6.3	Improvement of Existing Solid Waste Management Facilities	16-39
16.6.4	Capacity Enhancement of Solid Waste Management	16-40
16.6.5	Procurement of Solid Waste Management Equipment	16-41
16.6.6	Construction of Intermediate treatment facilities	16-42
16.7	Implementation Schedule for Solid Waste Management Plan	16-44
16.8	Cost of Solid Waste Management Plan	16-45
16.9	Environmental and Social Considerations of Solid Waste Management Plan	16-45
CHAPTER 17 POWER SUPPLY DEVELOPMENT PLAN		17-1
17.1	Background on Power Supply	17-1
17.1.1	The future policy of DOE in the Philippines	17-1
17.1.2	The Status of Power Supply in Greater Cotabato City	17-3
17.2	Issues on Power Supply Development	17-9
17.3	Objectives for Power Supply Development	17-11
17.4	Strategies for Power Supply Development	17-11
17.5	Power Supply Sector Plan	17-11
17.6	Cost of Power Sector Plan	17-13
17.7	Proposed Priority Projects	17-13
17.7.1	Project Prioritization Criteria	17-13

17.7.2	Project Profile of High Priority Projects.....	17-16
17.8	Implementation Schedule.....	17-20
17.9	Environmental and Social Considerations for Power Supply Sector Plan.....	17-22
17.10	Governance and Peacebuilding.....	17-24
CHAPTER 18 DISASTER RISK REDUCTION (DRR) PLAN.....		18-1
18.1	Background on Disaster Risk Reduction (DRR) Plan.....	18-1
18.1.1	Premises.....	18-1
18.1.2	Summary of Present Condition.....	18-5
18.1.3	Problem Analysis.....	18-6
18.2	Issues on DRR Plan.....	18-9
18.2.1	Desired Condition in Disaster risk Management.....	18-9
18.2.2	Issues on Flood.....	18-10
18.2.3	Issues on Earthquake.....	18-24
18.2.4	Issues on Tsunami.....	18-27
18.3	Objectives of DRR Plan.....	18-32
18.4	Strategies of DRR Plan.....	18-33
18.4.1	Preventing/Controlling New or Increasing Risks.....	18-33
18.4.2	Reducing Existing Disaster risks.....	18-34
18.4.3	Managing residual risks.....	18-37
18.5	Disaster Risk Reduction (DRR) Plan.....	18-37
18.5.1	Overview of the proposed projects.....	18-37
18.5.2	Ambal-Simuay River and Rio Grande de Mindanao Flood Control Projects.....	18-40
18.5.3	Tamontaka River Flood Control Project.....	18-42
18.5.4	Flood Control and Drainage Improvement Project in Cotabato City.....	18-44
18.5.5	Project for Developing Flood Forecasting and Warning System for the Lower Mindanao.....	18-46
18.5.6	Project for Enhancing Flood Response Capacity.....	18-48
18.5.7	Project for Building Tsunami Disaster Resilient Community.....	18-50
18.5.8	Project for Strengthening Capacity of Tsunami Early Warning System.....	18-53
18.5.9	Project for Building Earthquake Disaster Resilient Community in Cotabato City....	18-55
18.6	Cost of DRR Plan.....	18-57
18.7	Selection of High Priority Projects.....	18-60
18.7.1	Project Prioritization Criteria.....	18-60
18.7.2	Prioritization of the proposed projects.....	18-60
18.8	Implementation Schedule.....	18-64
18.9	Initial Environmental and Social Assessment of DRR Plan.....	18-65
18.10	Peacebuilding.....	18-66
CHAPTER 19 PEACEBUILDING.....		19-1
19.1	Peacebuilding Survey and Plan.....	19-1
19.1.1	Historical Review of the Mindanao Conflict and Cotabato City.....	19-1
19.1.2	Purpose of the Peacebuilding Survey.....	19-4
19.1.3	General Social Conditions in Cotabato City and Five Adjacent Municipalities.....	19-6
19.1.4	Infrastructure Development and Technical Project for Peacebuilding.....	19-11
19.1.5	COVID-19 and Peacebuilding.....	19-14
19.2	Peacebuilding Development Plan.....	19-16
19.2.1	Factors That Affect the Peacebuilding Conditions in Cotabato City.....	19-16
19.2.2	Guidelines of the Community Peacebuilding Development Plan.....	19-17
19.2.3	Priority Community Infrastructure Development and Technical Projects.....	19-18

TABLE OF CONTENTS
- OTHER VOLUME -
< VOLUME 2 >

**CHAPTER 20 INSTITUTIONAL ARRANGEMENT FOR THE INTEGRATED
DEVELOPMENT OF THE GREATER COTABATO AREA**
CHAPTER 21 OVERALL DEVELOPMENT PLAN
CHAPTER 22 SELECTION OF PROJECTS FOR PRE-FEASIBILITY STUDY
CHAPTER 23 PRE-FEASIBILITY OF THE WEST DIVERSION ROAD
CHAPTER 24 PRE-FEASIBILITY OF THE MINDANAO RIVER SOUTH SIDE ROAD
**CHAPTER 25 PRE-FEASIBILITY OF THE WATER SUPPLY IMPROVEMENT IN
GREATER COTABATO**
CHAPTER 26 RECOMMENDATIONS

< ANNEXES >

Note: Annexes are available only in electronic files.

ANNEX OF CHAPTER 4

Annex 4.1 – Land Demand and Supply Analysis for Cotabato City

ANNEX OF CHAPTER 5

Annex 5.1 - Transportation Surveys

Annex 5.2 - Road Condition Survey Sheet with Photographs

Annex 5.3 - Drainage Condition Survey Sheet with Photographs

Annex 5.4 - Straight Line Diagram of Surveyed Roads

ANNEX OF CHAPTER 7

Annex 7.1 – 1st Stake Holders Meeting

Annex 7.2 – 2nd Stake Holders Meeting

ANNEX OF CHAPTER 23

Annex 23.1- Traffic Demand Forecast Condition

DRAWINGS

Part1-West Diversion Road

Part2-Mindanao River South Side Road

LIST OF FIGURES

Figure 1.5-1	Organizational Chart to Carry Out the Study.....	1-4
Figure 2.1-1	Elevation Profile of Greater Cotabato Area.....	2-2
Figure 2.1-2	Slope Profile of Greater Cotabato Area.....	2-2
Figure 2.2-1	Flood Susceptibility Map of the Greater Cotabato Area.....	2-4
Figure 2.2-2	Flood Level in Cotabato City (Typhoon Frank, 2008).....	2-5
Figure 2.2-3	Flood Level in Cotabato City (Typhoon Jolina, 2009).....	2-6
Figure 2.2-4	Flood Level in Cotabato City (2011).....	2-7
Figure 2.2-5	Storm Surge Hazard Map of the Greater Cotabato Area.....	2-8
Figure 2.2-6	Active Faults, Trenches and Volcanoes Near Cotabato City.....	2-9
Figure 2.2-7	Tsunami Hazard Map of the Greater Cotabato Area.....	2-11
Figure 2.2-8	Landslide Susceptibility Map of the Greater Cotabato Area.....	2-12
Figure 2.3-1	Population and Land Distribution among Municipalities in the Greater Cotabato Area.....	2-14
Figure 2.3-2	Population of Major Cities in Mindanao (1990-2015).....	2-15
Figure 2.3-3	Population Growth Rate of Major Cities in Mindanao (1990-2015).....	2-15
Figure 2.3-4	Population Density of Cotabato City, by Barangay (2015).....	2-16
Figure 2.3-5	Population and Population Density of Cotabato City, by Barangay (2015).....	2-17
Figure 2.3-6	Most Common Ethnic Groups in Cotabato City (2010).....	2-20
Figure 2.3-7	Most Widely Spoken Dialects among Households in Cotabato City (2000).....	2-21
Figure 2.3-8	Most Common Religious Affiliations in Cotabato City (2015).....	2-22
Figure 2.3-9	Poverty Incidence Among Highly Urbanized Cities in Mindanao.....	2-24
Figure 2.3-10	Subsistence Incidence among Highly Urbanized Cities in Mindanao.....	2-24
Figure 2.3-11	Annual GDP/GRDP Growth Rates of All Regions in the Country (2016-2018)..	2-26
Figure 2.3-12	Region XII GRDP and GRDP Growth Rate (2010-2018).....	2-26
Figure 2.3-13	Region XII GRDP Growth Rate, Per Industrial Origin (2010-2018).....	2-27
Figure 2.3-14	ARMM GRDP and GRDP Growth Rate (2010-2018).....	2-27
Figure 2.3-15	ARMM GRDP Growth Rate, Per Industrial Origin (2010-2018).....	2-28
Figure 2.3-16	ARMM GRDP Distribution, Per Industrial Origin (2010-2018).....	2-28
Figure 2.3-17	Summary of GDP/GRDP Distribution, by Industrial Origin (2015).....	2-29
Figure 2.3-18	Annual Income and Expenditure of Cotabato City (2011-2017).....	2-30
Figure 2.3-19	Rank of Cotabato City among All Component Cities in the Competitiveness Index (2015-2019).....	2-31
Figure 2.3-20	Annual Average Family Income and Expenditure (2006-2012).....	2-32
Figure 2.3-21	Distribution of Families by Main Source of Income (2015).....	2-32
Figure 2.3-22	Purchasing Power of Peso (PPP) in Cotabato City (2013-2017).....	2-33
Figure 2.3-23	National and Regional Historical Data on Labor Force Participation Rate and Employment Rate (2016-2019).....	2-34
Figure 2.3-24	Population Distribution of Cotabato City by Age Group and Sex (2015).....	2-35
Figure 2.3-25	Infant Mortality Rate of Cotabato City (2016-2020).....	2-36
Figure 2.3-26	Maternal Mortality Ratio of Cotabato City (2016-2020).....	2-37
Figure 2.3-27	Percent Distribution of Child Deliveries in Cotabato City, by Place/ Health Facility (2016-2020).....	2-37
Figure 2.3-28	Proportion of Fully Immunized Children (%) in Cotabato City (2016-2020).....	2-38
Figure 2.3-29	Supply of Government Physicians in Cotabato City (2016-2020).....	2-38
Figure 2.3-30	Supply of Barangay Health Workers in Cotabato City (2016-2020).....	2-39
Figure 2.3-31	Households with Access to Improved Water Supply (2014 - 2018).....	2-39
Figure 2.3-32	Households with Sanitary Toilet (2014 - 2018).....	2-40
Figure 2.3-33	Net Enrolment Rate in Public and Private Primary Schools in Cotabato City.....	2-41
Figure 2.3-34	Completion Rate in Public and Private Primary Schools in Cotabato City.....	2-41
Figure 2.3-35	Net Enrolment Rate in Public and Private Secondary Schools in Cotabato City.....	2-42
Figure 2.3-36	Completion Rate in Public and Private Secondary Schools in Cotabato City.....	2-42
Figure 2.3-37	Simple Literacy Rate of Population 10 Years Old and Over in Cotabato City, by Sex (2000-2015).....	2-43

Figure 2.3-38	Simple Literacy Rate of Population 10 Years Old and Over in Greater Cotabato Area, by Sex (2015).....	2-43
Figure 2.4-1	Location Map of Protected Areas and Identified Areas with Rich Biodiversity	2-45
Figure 3.1-1	Physical Framework and Urban Centers of M-PDFP 2014-2023.....	3-9
Figure 3.1-2	Key Infrastructure Developments Proposed in R12-RDP 2017-2022	3-12
Figure 3.1-3	Coverage of BIMP-EAGA with Mindanao	3-16
Figure 3.2-1	Study Area for Greater Cotabato	3-19
Figure 3.3-1	Total Investment Amount by Sector of LDIP 2017-2022.....	3-25
Figure 3.3-2	Funding Investment by Types of Funding by Year by Sector in LDIP 2017-2022	3-25
Figure 3.4-1	Map of the Empire Province of Cotabato (1914 – 1967) where Cotabato City Serves as Administrative Capital.....	3-26
Figure 3.4-2	Economic Influence of Cotabato City.....	3-28
Figure 3.4-3	Comparative Family Income and Expenditure (2009).....	3-35
Figure 3.4-4	Major Urban Institutions and Attractions in Cotabato City	3-41
Figure 3.4-5	Photo of a Public School in Cotabato City	3-42
Figure 3.4-6	Mix of Educational Institutions (Public and Private).....	3-43
Figure 3.4-7	Gate of Albert Einstein School	3-43
Figure 3.4-8	Photo of College of Health Sciences, Notre Dame University	3-44
Figure 3.4-9	Photo of United Doctors Hospital.....	3-46
Figure 3.4-10	Tourist Attraction Map of Cotabato City	3-47
Figure 3.4-11	Photo of Paragon Hotel.....	3-49
Figure 3.4-12	Photo of Alnor Convention Center	3-51
Figure 4.1-1	Land Use Changes from Existing Land Use 2010 in the CLUP 2020.....	4-5
Figure 4.1-2	Location of Flood Control Project Components	4-7
Figure 4.1-3	Proposed Typical Cross Sections of Dike Roads.....	4-7
Figure 4.2-1	Flood Risk Hazard Map (100 years probability)	4-11
Figure 4.2-2	Urbanization Potential Areas (UPA) in Consideration with Dikes and Dike Roads Concept including the Flood Control Project for Inhabitable Land Analysis Assessment	4-12
Figure 5.1-1	Road Network of Cotabato City.....	5-3
Figure 5.1-2	Road Network of the “Old Historic Core” of Cotabato City	5-3
Figure 5.1-3	Current Road Network of Greater Cotabato	5-4
Figure 5.1-4	Example of Roads in Very Bad Condition in Cotabato City	5-7
Figure 5.1-5	Road Surface Condition of Greater Cotabato’s Road Network	5-8
Figure 5.1-6	Road Surface Condition of Cotabato City’s Road Network	5-8
Figure 5.1-7	Photos of Non-functional drainage in Cotabato City.....	5-9
Figure 5.1-8	Example of Details of Drainage Condition Survey Result	5-10
Figure 5.1-9	Drainage Condition of Cotabato City’s Road Network	5-11
Figure 5.1-10	Location of Major Traffic Attractors/Generators.....	5-12
Figure 5.1-11	Percent composition of motor vehicles in Cotabato City, Maguindanao, and Region XII, by type (2019).....	5-13
Figure 5.1-12	Number of registered motor vehicles in Region XII, by classification (2012-2017)	5-14
Figure 5.1-13	Photos of Public Transport Modes in Cotabato City	5-15
Figure 5.1-14	Jeepney Routes and Terminal Locations of Informal Transport.....	5-16
Figure 5.1-15	Tricycle Services Routes concentrated at the Old Historic Core	5-17
Figure 5.1-16	Photos of Various Public Transport Terminals (Inter-city Routes)	5-19
Figure 5.1-17	Inter-city Public Transport Routes between Cotabato City and Other Towns.....	5-20
Figure 5.1-18	City Routes of Water Transport.....	5-22
Figure 5.1-19	Photos of Water Transport for City Routes	5-22
Figure 5.1-20	Inter-city Routes of Water Transport	5-24
Figure 5.1-21	Photos of Water Transport for Inter-city Routes (Motorized Boats for Libungan Torreta/Liguasan Marsh- about 120 boats are operating this route).....	5-24
Figure 5.1-22	Photo of the Terminal Building of Water Transport for Inter-city Routes	5-25
Figure 5.1-23	Traffic Regulated Streets in Cotabato City	5-26
Figure 5.1-24	Location of Traffic Count Stations (Cotabato City and Surrounding Areas)	5-27
Figure 5.1-25	Location of Traffic Count Stations (within Cotabato City)	5-27
Figure 5.1-26	Traffic Volume along Road Sections outside Cotabato City	5-29

Figure 5.1-27	Traffic Volume along Road Sections within Cotabato City	5-30
Figure 5.1-28	Travel Speed Map at AM Peak Hour (Cotabato City and Surrounding Areas)	5-31
Figure 5.1-29	Travel Speed Map at AM Peak Hour (Within Cotabato City)	5-32
Figure 5.1-30	Travel Speed Map at PM Peak Hour (Cotabato City and Surrounding Areas)	5-32
Figure 5.1-31	Travel Speed Map at PM Peak Hour (Within Cotabato City)	5-33
Figure 5.1-32	Hourly Level of Service along Sinsuat Ave.....	5-35
Figure 5.1-33	Location of Surveyed Public Transport Terminals in Cotabato City.....	5-36
Figure 5.1-34	Physical Evaluation of Facilities at A2Z Transport Service Cooperative.....	5-38
Figure 5.1-35	Physical Evaluation of Facilities at Husky Tours Terminal.....	5-39
Figure 5.2-1	Location of Awang Airport in relation to other Airports in Mindanao.....	5-44
Figure 5.2-2	Runway End No. 10 (western end) of Awang Airport.....	5-45
Figure 5.2-3	Middle section of the Runway of Awang Airport.....	5-45
Figure 5.2-4	Taxiway of Awang Airport.....	5-46
Figure 5.2-5	Apron of Awang Airport.....	5-46
Figure 5.2-6	Passenger Terminal Building of Awang Airport	5-47
Figure 5.2-7	Cargo Building of Awang Airport	5-47
Figure 5.2-8	Non-Passenger Waiting Area of Awang Airport	5-48
Figure 5.2-9	CAAP Administration and Operations Building	5-48
Figure 5.2-10	Aircraft Rescue and Firefighting Facilities	5-49
Figure 5.2-11	Air Traffic Control Tower at Awang Airport	5-50
Figure 5.2-12	Vehicle Parking Area of Awang Airport	5-50
Figure 5.2-13	Access Road with Checkpoint from Awang Airport to National Highway.....	5-51
Figure 5.2-14	Location of Candidate Sites for a New Cotabato Airport.....	5-54
Figure 5.3-1	Active Ports in Cotabato City and surrounding areas	5-55
Figure 5.3-2	Location Map of Polloc Port in Relation to Other Major Ports in Mindanao.....	5-57
Figure 5.3-3	Location Map of Polloc Port in Relation to Cotabato City and Timako Port.....	5-58
Figure 5.3-4	Aerial view of Polloc Port.....	5-58
Figure 5.3-5	Chronology of the Management of Polloc Port	5-60
Figure 5.3-6	Area of Polloc Freeport and Economic Zone.....	5-61
Figure 5.3-7	Organizational Structure of the PFEZ.....	5-61
Figure 5.3-8	Current Sea Routes of Polloc Port	5-63
Figure 5.3-9	Envisioned Future Sea Routes within BARMM.....	5-64
Figure 5.3-10	Number of Vessels Per Year Handled by the Port (2013-2019).....	5-65
Figure 5.3-11	Annual Cargo Throughput of Polloc Port, Per Flow of Cargo (2013-2019).....	5-66
Figure 5.3-12	Annual Cargo Throughput of Polloc Port, Per Type of Cargo (2013-2017).....	5-67
Figure 5.3-13	Short-term Development Plan for Polloc Port (2028).....	5-72
Figure 5.3-14	Long-term Development Plan for Polloc Port (2043).....	5-72
Figure 5.3-15	Short-term Development Plan for Timako Port	5-73
Figure 5.3-16	Long-term Development Plan for Timako Port (2036).....	5-74
Figure 5.3-17	Current Condition of Timako Port (Phase 1)	5-75
Figure 5.4-1	Location map showing source of water by MCWD.....	5-78
Figure 5.4-2	MCWD Service Area.....	5-80
Figure 5.4-3	Vicinity Map of Water Source to Treatment Plant in Dimapatoy, Awang, DOS ...	5-81
Figure 5.4-4	Schematic Diagram of Dimapatoy Water System	5-82
Figure 5.4-5	Location of the Proposed Riverbank Protection of Dimapatoy River	5-83
Figure 5.4-6	Schematic Diagram of the Treatment Plan in Dimapatoy	5-84
Figure 5.4-7	Photos of the Treatment Plan in Dimapatoy	5-85
Figure 5.4-8	Photos of Pumping Station in Dimapatoy.....	5-85
Figure 5.4-9	Organization Structure of MCWD.....	5-87
Figure 5.4-10	Map of Water Bodies in Datu Odin Sinsuat	5-91
Figure 5.4-11	Summary of Water Supply Service in Datu Odin Sinsuat	5-93
Figure 5.4-12	Map of Water Facilities in Datu Odin Sinsuat	5-93
Figure 5.4-13	Summary of Water Supply Service in Sultan Kudarat Municipality (2015)	5-96
Figure 5.4-14	Photos of the Level 2 Water Supply System in Sultan Mastura	5-97
Figure 5.4-15	Summary of Water Supply Service in Sultan Mastura (2019).....	5-98
Figure 5.4-16	Photos of the Level 3 Water Supply System in Parang	5-100
Figure 5.4-17	Map of Water Facilities in Parang	5-100
Figure 5.4-18	Summary of Water Supply Service in Parang (2019).....	5-101

Figure 5.4-19	Photos of the On-going Level 2 Water Projects in Pigcawayan	5-104
Figure 5.4-20	Summary of Water Supply Service in Pigcawayan	5-105
Figure 5.5-1	Sectional Map of Coverage Area	5-110
Figure 5.5-2	Proposed Site of the Septage Treatment Plant	5-111
Figure 5.5-3	Septage Management Project Operations Organizational Chart.....	5-113
Figure 5.6-1	Waste Composition within Cotabato City (2017).....	5-117
Figure 5.6-2	Photos of the Materials Recovery Facility (MRF).....	5-120
Figure 5.6-3	Location of Existing Major SWM Facilities.....	5-122
Figure 5.6-4	Photos of the RCA in Biniruan	5-123
Figure 5.6-5	MRF in Sultan Kudarat Municipality	5-132
Figure 5.6-6	MRF in Sultan Mastura.....	5-133
Figure 5.6-7	Newly-developed Sanitary Landfill at Brgy. Gadungan, Parang.....	5-134
Figure 5.6-8	Sanitary Landfill in Pigcawayan	5-136
Figure 5.7-1	General Flow of Power in Mindanao.....	5-137
Figure 5.7-2	Mindanao Gross Power Generation Mix (2019).....	5-138
Figure 5.7-3	Mindanao Peak Demand (2010-2019)	5-139
Figure 5.7-4	Supply and Demand Margins in Mindanao (2003-2019)	5-140
Figure 5.7-5	Mindanao Transmission Network.....	5-141
Figure 5.7-6	Mindanao Grid Substation Capacity (2009-2018).....	5-142
Figure 5.7-7	Mindanao Grid Transmission Line Length (2009-2018).....	5-142
Figure 5.7-8	Annual Total Electricity Consumption (2010-2019)	5-143
Figure 5.7-9	Barangay Electrification in Mindanao (2017)	5-145
Figure 5.7-10	Household Electrification in Mindanao (2017).....	5-145
Figure 5.7-11	Breakdown of CLPC Customers, Per Sector (2017).....	5-147
Figure 5.7-12	Flow of Power to Cotabato City Under Normal Condition	5-148
Figure 5.7-13	Flow of Power to Consumers in Case of Major Interruption.....	5-148
Figure 5.7-14	Flow of Power to Consumers in Case of Minor Interruption.....	5-148
Figure 5.7-15	Transmission and Distribution Lines in Cotabato City.....	5-149
Figure 5.7-16	Structure of the Power Business Sector for on-Grid Systems in Mindanao	5-150
Figure 5.7-17	Structure of the Power Business Sector for Off-grid Systems in Mindanao.....	5-150
Figure 5.7-18	Mindanao Supply and Demand Outlook Under the Reference High Scenario (2017-2040)	5-154
Figure 5.7-19	Power Generation Projection Under the Reference High Scenario (2017-2040)	5-155
Figure 5.7-20	Franchise Area of the Three Power Distribution Companies	5-157
Figure 5.8-1	Damage of the 1976 Earthquake and Tsunami in Cotabato City.....	5-162
Figure 5.8-2	Flood level of the Recent Three Major Floods in Cotabato City.....	5-163
Figure 5.8-3	Mindanao River Basin Map Showing the Location of Cotabato City at the Discharge Point.....	5-164
Figure 5.8-4	Flash Flood Map and Storm Surge Map of Cotabato City.....	5-165
Figure 5.8-5	Philippine Plate in Relation to Other Major Tectonic Plates of the World.....	5-166
Figure 5.8-6	Major Earthquake Events in Mindanao and the World (2019)	5-167
Figure 5.8-7	Epicenters of Major Earthquakes Within the Vicinity of Mindanao Since 1990..	5-168
Figure 5.8-8	Location of Cotabato Trench and Active Faults	5-168
Figure 5.8-9	Climate Map of the Mindanao River Basin	5-169
Figure 5.8-10	Location of Rainfall Stations in the Mindanao River Basin and its Vicinity.....	5-170
Figure 5.8-11	Location of Streamflow Stations in the Mindanao River Basin and its Vicinity	5-173
Figure 5.8-12	Mean Monthly Streamflow of the Mindanao River.....	5-174
Figure 5.8-13	Geological Map of the Mindanao River Basin	5-175
Figure 5.8-14	The Mindanao River System and its topography.....	5-176
Figure 5.8-15	The Schematic Mindanao River System.....	5-176
Figure 5.8-16	DPWH's Flood Control Plan for Cotabato City and Sultan Kudarat Municipality	5-178
Figure 5.8-17	Telemetry Hydrometeorological Data on the Philsensor Website	5-180
Figure 5.8-18	Early Warning System and Hydromet Data on the DEWS Project Website	5-180
Figure 5.8-19	Composition of Cotabato City DRRM Council.....	5-181
Figure 5.8-20	Functional Chart of Cotabato City DRRM Council.....	5-182
Figure 5.8-21	Exposed Barangays Based on The Type of Hazard.....	5-183
Figure 5.8-22	Location of Evacuation Facility and Sites During Disaster	5-188

Figure 6.1-1	Hierarchy and Linkage of Plans.....	6-2
Figure 6.2-1	Twelve-Step Process, General Procedures for CLUP Preparation	6-4
Figure 6.2-2	Details of the Review, Adoption and Approval of the CLUP and ZO under Step 10.....	6-5
Figure 6.4-1	Distribution of Expenditures, 2016.....	6-12
Figure 6.5-1	DPWH Total Budget by Project Category in Cotabato City, 2015-2020	6-14
Figure 6.6-1	CY 2018 DPWH-ARMM Infrastructure Budget for ARMM by Project Category (PhP '000).....	6-16
Figure 6.6-2	CY 2018 DPWH-ARMM Infrastructure Budget for ARMM by Province/Region (PhP '000).....	6-17
Figure 6.6-3	CY 2019 DPWH-ARMM Infrastructure Budget for ARMM by Project Category (PhP'000).....	6-18
Figure 6.6-4	CY 2019 DPWH-ARMM Infrastructure Budget for ARMM by Province/Region (PhP'000).....	6-19
Figure 6.6-5	CY 2020 MPW Infrastructure Budget for BARMM by Project Category (PhP '000).....	6-21
Figure 6.6-6	CY 2018-2020 Infrastructure Budget for ARMM/BARMM (PhP'000)	6-21
Figure 6.6-7	CY 2020 MPW Infrastructure Budget for BARMM By Province (PhP '000).....	6-22
Figure 6.6-8	CY 2021 MPWH Infrastructure Budget for BARMM, By Project Category.....	6-23
Figure 6.6-9	CY 2021 MPWH Infrastructure Budget for BARMM, By Province (PhP '000)....	6-24
Figure 7.1-1	Overall Direction for Spatial Development Direction of Greater Cotabato Area Spatial development direction of Cotabato City.....	7-7
Figure 7.1-2	Spatial Development Directions for Cotabato City	7-9
Figure 7.2-1	Planning Process of Alternative Spatial Development Scenarios and Assessment for Greater Cotabato and City.....	7-10
Figure 7.3-1	Organizational Structure of MENRE.....	7-27
Figure 7.3-2	Procedures of PEISS	7-29
Figure 7.3-3	Photographs of the first SHM	7-50
Figure 7.3-4	Photographs of the second SHM.....	7-54
Figure 8.1-1	Step-wise Spatial Development Goals for Visions of Greater Cotabato and City	8-2
Figure 8.2-1	Flowchart for Setting Socio-economic Development Framework of Greater Cotabato and City	8-3
Figure 8.2-2	Population Growth Scenarios of Cotabato City 2015 – 2040.....	8-5
Figure 8.2-3	Population Growth of Greater Cotabato (Cotabato City and Other Municipalities) 2015 – 2040	8-7
Figure 9.1-1	Economic Cluster Development Direction of Greater Cotabato and City.....	9-5
Figure 9.1-2	Spatial Development Strategies for Greater Cotabato Area	9-7
Figure 9.1-3	Spatial Development Strategies for Climate and Environment Resilience.....	9-9
Figure 9.1-4	Spatial Development Structure for Greater Cotabato Area.....	9-10
Figure 9.2-1	Key Principles in Land Use and Urban Function in line with the Spatial Development Strategies for Cotabato City	9-11
Figure 9.2-2	Spatial Development Structure for Greater Cotabato Area.....	9-14
Figure 10.1-1	Current Land Use in 2020.....	10-3
Figure 10.1-2	Development Changes in Cotabato City between 2011 and 2019.....	10-4
Figure 10.2-1	Classification of Land Use.....	10-7
Figure 10.2-2	Assumed inhabitable land	10-8
Figure 10.2-3	Model of Residential Area	10-10
Figure 10.2-4	Example of land use with good road network.....	10-10
Figure 10.3-1	Setting Up the Development Area	10-12
Figure 10.5-1	Residential Development Area	10-16
Figure 10.5-2	Expansion Area of Residential Use	10-17
Figure 10.5-3	Location of Local Commercial Areas	10-18
Figure 10.5-4	Change of Industrial Use.....	10-19
Figure 10.5-5	Location of Parks for the Residential Development Area	10-20
Figure 10.5-6	Location of School for the Institutional Uses	10-21
Figure 10.5-7	Proposed Land Use Map (Central Area) (2040)	10-24
Figure 10.5-8	Proposed Land Use Map (2040)	10-25
Figure 10.5-9	Land Use Map in Phase I (~2028)	10-26

Figure 10.5-10	Land Use Map in Phase II (~2035).....	10-27
Figure 11.1-1	Current Road Network of Greater Cotabato	11-2
Figure 11.1-2	Jeepney Routes and Tricycle Routes	11-3
Figure 11.1-3	Level of Service of the Arterial Road in Cotabato City.....	11-4
Figure 11.3-1	Framework of Transport Development Plan.....	11-7
Figure 11.5-1	Administrative Classification of the Greater Cotabato's Road Network.....	11-8
Figure 11.5-2	Transforming Fishbone-type Network of Cotabato City into Ladder-type Network to Expand its Capacity and Flexibility.....	11-9
Figure 11.5-3	Road Pavement Type in Greater Cotabato.....	11-10
Figure 11.5-4	Shifting from Low-Capacity (Jeepney) to High-Capacity (Bus) Public Transport by Transforming the Network from Direct Line to Trunk and Feeder Network	11-12
Figure 11.5-5	Traditional Approach (Infrastructure-based) vs TDM-based Approach.....	11-14
Figure 11.6-1	Proposed Road Functional Hierarchy in Greater Cotabato.....	11-18
Figure 11.6-2	Proposed Road Names and Length (1/2)	11-19
Figure 11.6-3	Proposed Road Names and Length (2/2)	11-20
Figure 11.6-4	Target Roads for Rehabilitation (Bad and Very Bad Sections)	11-22
Figure 11.6-5	Target Drainage for Rehabilitation (Non-Functional)	11-23
Figure 11.6-6	Roads for Improvement (Earth/Gravel and New Road)	11-26
Figure 11.6-7	Relationship of the Future Road Network (2040) (showing Road Surface) and Future Land Use Map (2040).....	11-27
Figure 11.6-8	Relationship of the Future Road Network (2040) (showing Road Hierarchy) and Future Land Use Map (2040).....	11-28
Figure 11.6-9	West Diversion Road will Expand the Network Capacity and Protect Cotabato City and Two Other LGUs from the Possible Impact of Tsunami	11-32
Figure 11.6-10	Surveyed Public Transport Terminals in Cotabato City	11-35
Figure 11.6-11	Physical Evaluation of Facilities at A2Z Transport Service Cooperative.....	11-36
Figure 11.6-12	Water Transport Routes	11-37
Figure 11.6-13	Transforming the River Port to an Important Facility	11-38
Figure 11.6-14	Efficient Road Space Usage.....	11-39
Figure 11.6-15	Conceptual Image of High Capacity Bus System along Sinsuat Avenue, Cotabato City	11-40
Figure 11.6-16	Proposed Future Public Transport Routes and Integrated Public Transport Terminals (Roads and Water).....	11-42
Figure 11.6-17	Candidate Site for Pedestrian Improvement Plan and Parking Improvement Plan (plus Sinsuat Avenue and Gov. Gutierrez Ave. for Parking Improvement Plan)	11-46
Figure 11.6-18	Possible Candidate Sites for Intersection Improvement Plan	11-47
Figure 11.6-19	Example of Intersection Improvement by Road Marking at Quezon Avenue..	11-47
Figure 11.6-20	Example of Intersection Improvement by Road Marking at Quezon Avenue (Channelization Method).....	11-48
Figure 11.9-1	Location Map of West Diversion Road	11-66
Figure 11.9-2	Location Map of Mindanao River South Road.....	11-68
Figure 12.5-1	New Terminal Area Development Plan in Cotabato Airport.....	12-5
Figure 12.5-2	General Facility Layout Plan of New Cotabato Airport	12-6
Figure 12.5-3	Terminal Layout Plan of New Cotabato Airport	12-7
Figure 12.6-1	Global GDP and Global RPK Forecast.....	12-9
Figure 12.6-2	Air Passenger and Cargo Forecast	12-9
Figure 13.1-1	Present Condition of Cotabato River Port.....	13-1
Figure 13.1-2	Aerial View of Polloc Port.....	13-2
Figure 13.1-3	Annual Cargo Throughput of Polloc Port, Per Flow of Cargo (2013-2019).....	13-3
Figure 13.1-4	Construction of Part of Short-Term Development Plan of Timako Port (Under Construction).....	13-4
Figure 13.2-1	Present Cotabato Port (No Port Operation on the Apron).....	13-4
Figure 13.2-2	Corrosion of Steel Pipe Piles	13-5
Figure 13.2-3	Corroded Steel Bars of Concrete Beam	13-5
Figure 13.2-4	Informal Settlers in Short-term Development Plan.....	13-5
Figure 13.5-1	Short-term Development Plan for Polloc Port (2028).....	13-10
Figure 13.5-2	Long-term Development Plan for Polloc Port (2043).....	13-11
Figure 13.5-3	Master Plan of Timako Port Year 2036	13-15

Figure 13.5-4	Short-Term Development Plan of Timako Port	13-17
Figure 13.6-1	Extension of 50m of Marginal Wharf	13-20
Figure 13.6-2	Short-term Development Plan for Polloc Port (2028).....	13-22
Figure 13.6-3	Scale Down of Short-term Development Plan	13-23
Figure 13.8-1	Certificate of Non-Coverage for Timako Port Provided by PPA.....	13-26
Figure 14.1-1	Water Supply Study Area	14-1
Figure 14.1-2	MCWD Service Area.....	14-3
Figure 14.1-3	Water Supply Barangay Map (Cotabato City Only)	14-4
Figure 14.1-4	Organization Structure of MCWD	14-6
Figure 14.4-1	Location Map Showing Source of Water by MCWD	14-11
Figure 14.4-2	Location of MCWD Water Source and Transmission Water Pipe Line	14-12
Figure 14.4-3	Vicinity Map of Water Source to Treatment Plan in Dimapatoy, Awang, DOS	14-13
Figure 14.4-4	Schematic Diagram of Dimapatoy Water System	14-14
Figure 14.4-5	Location of the Proposed Riverbank Protection of Dimapatoy River	14-15
Figure 14.4-6	Schematic Diagram of the Treatment Plan in Dimapatoy.....	14-16
Figure 14.4-7	Photos of the Treatment Plan in Dimapatoy	14-17
Figure 14.4-8	Photos of Pumping Station in Dimapatoy.....	14-17
Figure 14.4-9	Existing Pipeline of MCWD in Dimapatoy	14-18
Figure 14.4-10	Number of Households by Water Supply Level in the Surrounding Municipalities	14-19
Figure 14.5-1	Location of MCWD Proposed Projects	14-23
Figure 14.5-2	Location of MCWD Water Sources and Transmission Lines.....	14-24
Figure 14.6-1	Photos of MCWD Facilities.....	14-28
Figure 14.6-2	Image of Water Supply Master Plan Area	14-32
Figure 14.6-3	Image Photo of Water Physical Losses.....	14-33
Figure 14.6-4	Sample Handbook.....	14-33
Figure 14.6-5	Sample of Water Loss Volume	14-33
Figure 14.6-6	Location of MCWD Proposed Water Supply Pipe Extension Projects	14-34
Figure 15.1-1	Sanitary Condition in Cotabato City	15-1
Figure 15.5-1	Basic Concept of Sewerage Development Plan for Cotabato City	15-6
Figure 15.5-2	Sectional Map of Coverage Area	15-7
Figure 15.5-3	Process Diagram of the Proposed Septage Treatment Plant	15-8
Figure 15.5-4	Concept Image of Septage Management for Surrounding Municipalities.....	15-8
Figure 15.5-5	Example of Sludge Drying Bed	15-9
Figure 15.5-6	Current Condition of City Drainage in Cotabato CBD.....	15-10
Figure 15.5-7	Mechanism of Johkaso.....	15-11
Figure 15.5-8	Example of Installation of Johkaso in the Philippines	15-11
Figure 15.6-1	Basic Concept of Priority Projects	15-13
Figure 16.5-1	Waste Generation and Handling Flow in Cotabato City in 2017.....	16-11
Figure 16.5-2	Projection of Waste Collected Volume in Cotabato City	16-16
Figure 16.5-3	Projection of Waste Collected Volume in Greater Cotabato City	16-17
Figure 16.5-4	Estimated Waste Recovered Volume in Cotabato City	16-21
Figure 16.5-5	Concept of Projected Waste Volume in Cotabato City.....	16-28
Figure 16.5-6	Location Proposed SLF in Cotabato City	16-30
Figure 16.5-7	Investigation flow for site selection of a new SLF	16-31
Figure 16.5-8	Typical Structure of a Sanitary Landfill	16-32
Figure 17.1-1	Transmission Development Plan 2020-2040	17-1
Figure 17.1-2	Future Plan for Transmission Line to Greater Cotabato City	17-1
Figure 17.1-3	Ongoing Transmission Plan for Greater Cotabato City	17-2
Figure 17.1-4	Franchise Area of the Three Power Distribution Companies	17-4
Figure 17.1-5	Sample Picture of Elevated Metering Center.....	17-5
Figure 17.1-6	Ongoing Feeder Improvement Project of MAGELCO.....	17-6
Figure 17.1-7	Boom Trucks Provided by Japan	17-6
Figure 17.1-8	Sample Diagram for CLPC Franchise Area.....	17-8
Figure 17.1-9	Sample Diagram for MAGELCO and COTELCO-PPALMA.....	17-8
Figure 17.2-1	Rate of Distribution Loss	17-9
Figure 17.2-2	Distribution Area of Sultan Kudarat Substation	17-10
Figure 17.2-3	Diesel-fed Generator Operating Time in 2019.....	17-10

Figure 17.5-1	Sample Diagram During Power Outages in MAGELCO and COTELCO-PPALMA Franchise Area.....	17-12
Figure 17.5-2	Sample Image of Solar Power Generated by Microgrid.....	17-12
Figure 17.7-1	Residential/Regional Microgrid.....	17-17
Figure 17.7-2	Residential/Regional Microgrid for Surrounding Municipalities of Cotabato City.....	17-18
Figure 17.7-3	Community Microgrid for Surrounding Municipalities of Cotabato City.....	17-18
Figure 17.7-4	Proposed Area for Residential/Regional Microgrid.....	17-19
Figure 18.1-1	Location and Topography of Cotabato City and Neighbor Municipalities.....	18-3
Figure 18.1-2	Image of DRR by Developing DRR Plan and its Implementation.....	18-5
Figure 18.2-1	Topography of the Mindanao River Basin with its Sub-basins.....	18-11
Figure 18.2-2	Schematic River Flow of the Mindanao River.....	18-13
Figure 18.2-3	Proposed Structural Measures in the Mindanao River Downstream in MRBIMDMP.....	18-14
Figure 18.2-4	Location Map of the Ambal-Simuay River and Rio Grande de Mindanao Flood Control Projects.....	18-15
Figure 18.2-5	Location of CCCER comparing to Cotabato City's CLUP.....	18-15
Figure 18.2-6	Overview of the Rio Grande de Mindanao Flood Control Project.....	18-17
Figure 18.2-7	Changes in the Ambal-Simuay River Downstream.....	18-18
Figure 18.2-8	Proposed Structural Measures in the Ambal-Simuay River Downstream in the MRBIMDMP.....	18-19
Figure 18.2-9	Proposed Structural Measures in the Ambal-Simuay River Downstream in the DPWH National Project.....	18-20
Figure 18.2-10	Current Condition of Drainage Channels Based on the Drainage Survey in this Project.....	18-21
Figure 18.2-11	Proposed Early Warning and Flood Forecasting System in the MRBIMDMP.....	18-22
Figure 18.2-12	Present Riverside Condition Along Natural Rivers and Creeks in Cotabato City.....	18-23
Figure 18.2-13	Large (>M5.5) Seismic Events Around Philippine Sea Plate (1900-2016).....	18-24
Figure 18.2-14	Philippine Seismic Network.....	18-27
Figure 18.2-15	Estimated Epicenters of Historical Large Tsunamigenic Earthquakes.....	18-28
Figure 18.2-16	Tsunami Hazard Map by PHIVOLCS.....	18-29
Figure 18.2-17	Demarcation of SCSTAC and NWPTAC from 6 November 2019.....	18-31
Figure 18.2-18	Communication Scheme for Trans-Pacific Tsunami Warning Information.....	18-31
Figure 18.4-1	Identified Main Hazards by Previous Studies.....	18-35
Figure 18.5-1	Overview of Proposed Priority Projects (Including Existing DPWH National Projects).....	18-39
Figure 18.5-2	Overview of the Ambal-Simuay River and Rio Grande de Mindanao Flood Control Projects.....	18-42
Figure 18.5-3	Project Location Map (Project No.3).....	18-46
Figure 18.5-4	Project Location Map (Project No.6).....	18-53
Figure 18.10-1	Conceptual diagram of building a resilience state.....	18-66
Figure 19.1-1	Barangays in Cotabato City.....	19-5

LIST OF TABLES

Table 1.4-1	Study Schedule.....	1-3
Table 1.6-1	Summary of Major Activities.....	1-6
Table 1.6-2	Summary of Major Activities by the JICA Study Team	1-8
Table 1.6-3	Coordination Meetings by JICA Study Team’s Liaison Office in Cotabato City	1-9
Table 2.2-1	Historical Record of Major Floods in Cotabato City (2008 - 2011)	2-3
Table 2.2-2	Potentially Affected Barangays in Cotabato City by an 8.0M Earthquake- Induced Tsunami	2-10
Table 2.3-1	Population Distribution in the Philippines, by Major Island Group.....	2-13
Table 2.3-2	Population and Population Density of Municipalities in the Greater Cotabato Area.....	2-14
Table 2.3-3	Historical Data on the Population of Cotabato City, by Barangay (1990-2015).....	2-17
Table 2.3-4	Number of Households and Average Household Size in the Greater Cotabato Area (2015).....	2-19
Table 2.3-5	Historical Household Data of Cotabato City (2000-2015).....	2-19
Table 2.3-6	Most Widely Spoken Dialects Among Households in the Greater Cotabato Area ..	2-20
Table 2.3-7	Most Common Religious Affiliations in the Greater Cotabato Area	2-21
Table 2.3-8	Number of Reported IPs in the Greater Cotabato Area.....	2-22
Table 2.3-9	Poverty Threshold and Poverty Incidence of Cotabato City (2009-2018)	2-23
Table 2.3-10	Food Threshold and Subsistence Incidence of Cotabato City (2009-2018).....	2-23
Table 2.3-11	Number of Active 4Ps Beneficiaries in the Greater Cotabato Area (2020)	2-24
Table 2.3-12	Number of Reported IDPs in the Greater Cotabato Area (2020).....	2-25
Table 2.3-13	Summary of Key GRDP Statistics, Region XII and ARMM.....	2-29
Table 2.3-14	Banking Institutions in Cotabato City	2-30
Table 2.3-15	Distribution of Total Family Expenditures, by Expenditure Group (2015)	2-33
Table 2.3-16	National and Regional Key Indicators on Labor and Employment (2019).....	2-34
Table 2.3-17	Annual Labor and Employment Estimates for Cotabato City (2011-2020).....	2-35
Table 2.3-18	Enrolment Statistics in Public Schools in Cotabato City (2011-2015)	2-40
Table 3.1-1	Regional Development Plans relevant to Greater Cotabato and Cotabato City	3-2
Table 3.1-2	Urban Centers in the Development Plans for Greater Cotabato and Cotabato City...	3-3
Table 3.1-3	Mindanao Socio-economic Framework in the MSS/DF 2015-2045	3-4
Table 3.1-4	Policy Option and Priority Programs, Activities and Projects Proposed in the MSS/DF 2015-2045.....	3-5
Table 3.1-5	Relevant Development Plans concerning Greater Cotabato and Cotabato City Proposed in the MSS/DF 2015-2045	3-5
Table 3.1-6	Socio-economic Target Indicators of the ARMM-RDP 2017-2022	3-6
Table 3.1-7	Intermediate Outcomes Proposed in ARMM-RDP 2017-2022.....	3-7
Table 3.1-8	Policy Option and Priority Programs, Activities and Projects Proposed in ARMM-RDP 2017-2022	3-8
Table 3.1-9	Physical Framework and Urban Centers of M-PDFP 2014-2023	3-8
Table 3.1-10	Socio-Economic Target Indicators of the R12-RDP 2017-2022.....	3-10
Table 3.1-11	Strategic Frameworks and Strategies Proposed in R12-RDP 2017-2022	3-10
Table 3.1-12	Priority Strategies Proposed in Economic Development of R12-RDP 2017-2022	3-11
Table 3.1-13	Proposed Tri-Corridor Development of the Regional Spatial Strategy in R12-RDP 2017-2022	3-13
Table 3.1-14	Socio-economic Target Indicators of the BDP 2020-2022	3-14
Table 3.1-15	Regional Spatial Strategy of the BDP 2020-2022 in conjunction with Greater Cotabato Area	3-14
Table 3.1-16	Regional Spatial Strategy of the BDP 2020-2022 in conjunction with Greater Cotabato Area	3-15
Table 3.1-17	Strategic Pillars for Economic Corridors Programs and Projects in BIMP-EAGA Vision 2025.....	3-17
Table 3.2-1	Urban Centers concerning Greater Cotabato Area.....	3-20
Table 3.3-1	Development Plans for Cotabato City	3-21
Table 3.3-2	Socio-economic Target Indicators of the CDP 2017-2022	3-21
Table 3.3-3	Programs, Projects, and Activities concerning Spatial/Physical Development in the CDP 2017-2022	3-22

Table 3.3-4	Key Objectives by Thematic Areas in the LDRRMP 2016-2022	3-23
Table 3.3-5	Housing Program for Vulnerable Communities in LSP 2012-2020	3-24
Table 3.3-6	Types of Programs/Projects/Activities in LDIP 2017-2022.....	3-24
Table 3.4-1	Summary of the Roles of Cotabato City through the Years	3-27
Table 3.4-2	Present Economic Influence Areas of Cotabato City	3-29
Table 3.4-3	Major Economic Sectors and their Contribution to GDP and GRDP (2018).....	3-30
Table 3.4-4	Number of Registered Business Firms, By Sector (2016)	3-30
Table 3.4-5	Registered Business Firms in Cotabato City (Agriculture and Industry), 2016.....	3-31
Table 3.4-6	Registered Business Firms in Cotabato City (Services).....	3-32
Table 3.4-7	Business Name Registration in Cotabato City, 2016 and 2018.....	3-33
Table 3.4-8	Commercial Banks Operating in Cotabato City	3-34
Table 3.4-9	Major Establishments in the City (Established 2010 to Current Year)	3-34
Table 3.4-10	Average Family Income and Expenditure (2012)	3-35
Table 3.4-11	Current and Future Outlook of Economic Sector and Sub-Sectors of the City (Agriculture and Industry)	3-36
Table 3.4-12	Current and Future Outlook of Economic Sector and Sub-Sectors of the City (Services)	3-37
Table 3.4-13	Business Establishments and Institutions in the Central Business District	3-38
Table 3.4-14	Business Establishments and Institutions Outside the Central Business District...	3-39
Table 3.4-15	Public and Private Schools in Cotabato City.....	3-42
Table 3.4-16	Comparison of Number of Enrollees, Pre-School to Secondary Levels	3-45
Table 3.4-17	Bed Capacity of Hospitals in Cotabato City	3-46
Table 3.4-18	Major Tourist Attractions in Cotabato City	3-48
Table 3.4-19	Tourist Arrivals, Region 12 and Cotabato City (2013-2017).....	3-49
Table 3.4-20	Number of Accredited Hotels and Hotel Rooms (2013-2017).....	3-50
Table 3.4-21	Hotel Occupancy Rate in Cotabato City and Other Cities of Region 12 (2014-2017)	3-50
Table 3.4-22	Comparative Average Family Income and Expenditure (2012).....	3-52
Table 3.4-23	Current and Future Outlook of Urban Services of the City.....	3-52
Table 4.1-1	Identified Issues, Opportunities and Counter Measures Proposed in the CLUP 2020-3	
Table 4.1-2	Key Land Use Changes from Existing Land Use 2010 in the CLUP 2020.....	4-5
Table 4.1-3	Components of Ambal-Simuay River and Rio Grande de Mindanao River Flood Control Project	4-6
Table 4.1-4	Example: Potential Smart City Solutions to the Urban Development Issues on Cotabato City	4-9
Table 4.2-1	Type and Criteria utilizing Flood Risk Data	4-10
Table 4.2-2	Three Urbanization Potential Areas (PUAs) as Supply-side Condition.....	4-12
Table 4.2-3	Land Supply Capacity by Three Cases with UPAs and their Dike Conditions.....	4-13
Table 4.2-4	Referable Standards by Authorities in the Philippines for Semi-gross Population Density.....	4-14
Table 4.2-5	Existing Population Density by Built-up Areas (2015).....	4-15
Table 4.2-6	Preliminary Population by Two Growth Cases (AAGR: 1.86% and 2.93%) in 2028 and 2040	4-15
Table 4.2-7	Demand and Supply Assessment in All Cases by AAGR 1.86%	4-16
Table 4.2-8	Demand and Supply Assessment in All Cases by AAGR 2.93%	4-17
Table 4.2-9	Area to be Improved Coping with Acceptable Inundation Areas in Habitable Area in PUA and SUA	4-18
Table 5.1-1	Road Classification, Type, and Length (2016).....	5-1
Table 5.1-2	Road Condition Evaluation Criteria	5-6
Table 5.1-3	Result of Road Surface Condition Survey	5-7
Table 5.1-4	Number of registered motor vehicles in Cotabato City, Maguindanao, and Region XII, by type (2019).....	5-13
Table 5.1-5	Inter-city Public Transport (From Cotabato City to Northern Towns)	5-18
Table 5.1-6	Inter-city Public Transport (From Cotabato City to Southern Towns)	5-18
Table 5.1-7	Number of Inter-city Public Transport Operators	5-21
Table 5.1-8	Hourly LOS along Major Roads in Cotabato City	5-34
Table 5.1-9	Components of the Public Transport Terminal Survey	5-36
Table 5.1-10	Profile of Surveyed Public Transport Terminals.....	5-40

Table 5.1-11	Roles and Functional Responsibilities of Transport Infrastructure Development in Cotabato City and surrounding areas.....	5-41
Table 5.2-1	Flight Schedules and Airlines Operating at Awang Airport	5-51
Table 5.2-2	Aircraft, Passenger and Cargo Movement at Awang Airport (2008-2018)	5-51
Table 5.2-3	Characteristics of the three (3) candidate sites	5-53
Table 5.3-1	General Characteristics of Polloc Port	5-57
Table 5.3-2	Technical Description of the Port Area and Support Facilities	5-59
Table 5.3-3	Natural and Physical Environment Advantage of the Port.....	5-59
Table 5.3-4	Key Stakeholders Involved in the Operations of Polloc Port.....	5-62
Table 5.3-5	Foreign Vessel Arrivals at Polloc Port (2018-2020).....	5-63
Table 5.3-6	Top Inbound and Outbound Commodities Passing Through Polloc Port	5-65
Table 5.3-7	Port Usage Fees Imposed on Vessels by Polloc Port	5-67
Table 5.3-8	Wharfage fees collected by Polloc Port (PhP)	5-68
Table 5.3-9	Income collected by Polloc Port (2013-2019).....	5-68
Table 5.3-10	Berth Occupancy Rates of Polloc Port in 2013 and 2017	5-69
Table 5.3-11	Recommended Berth Occupancy Ratios.....	5-69
Table 5.3-12	Summary of Required Port Facilities (Both Short-term and Long-term Plans).....	5-71
Table 5.3-13	Summary of Preliminary Project Cost (Both Short-term and Long-term Plans) ...	5-71
Table 5.4-1	Sources of Water and their Production Volume.....	5-78
Table 5.4-2	Annual Water Consumption (cu. m.)	5-79
Table 5.4-3	Number of Service Connection (2009-2018).....	5-79
Table 5.4-4	Summary of Annual Budget in Million PhP (2014-2018)	5-88
Table 5.4-5	Budgetary Outlay and Gross Revenue (PhP)	5-88
Table 5.4-6	Priority Projects of MCWD.....	5-89
Table 5.4-7	Levels of Water Supply Service.....	5-90
Table 5.4-8	Water Supply Level System in the Five Surrounding Municipalities	5-90
Table 5.4-9	Existing Water Resources in Datu Odin Sinsuat	5-91
Table 5.4-10	Summary of Level 1 Water System in Datu Odin Sinsuat (2015)	5-92
Table 5.4-11	Summary of Level 2 Water System in Datu Odin Sinsuat	5-92
Table 5.4-12	Summary of Level 3 Water System in Datu Odin Sinsuat.....	5-93
Table 5.4-13	Existing Water Resources in Sultan Kudarat Municipality.....	5-94
Table 5.4-14	Summary of Level 1 Water Supply System in Sultan Kudarat Municipality (2015).....	5-94
Table 5.4-15	Summary of Level 2 Water Supply System in Sultan Kudarat Municipality	5-95
Table 5.4-16	Summary of Level 3 Water Supply System in Sultan Kudarat Municipality	5-95
Table 5.4-17	Existing Water Resources in Sultan Mastura	5-96
Table 5.4-18	Summary of Level 1 Water Supply System in Sultan Mastura (2019)	5-97
Table 5.4-19	Summary of Level 2 Water Supply System in Sultan Mastura (2019)	5-97
Table 5.4-20	Summary of Level 3 Water Supply System in Sultan Mastura (2019)	5-98
Table 5.4-21	Water Resources by Type and Primary Uses in Parang	5-98
Table 5.4-22	Summary of Level 1 Water Supply System in Parang	5-99
Table 5.4-23	Summary of Level 2 Water Supply System in Parang	5-99
Table 5.4-24	Summary of Level 3 Water Supply System in Parang	5-99
Table 5.4-25	Existing water resources in Pigcawayan	5-101
Table 5.4-26	Summary of Level 1 Water Supply System in Pigcawayan.....	5-102
Table 5.4-27	Summary of Level 2 Water Supply System in Pigcawayan.....	5-103
Table 5.4-28	On-going Level 2 water System Projects in Pigcawayan (2020)	5-103
Table 5.4-29	Summary of Level 3 Water Supply System in Pigcawayan (2015)	5-105
Table 5.4-30	Summary of Issues on Water Supply in the Surrounding Municipalities	5-106
Table 5.5-1	Statistics on Morbidity (2013).....	5-107
Table 5.5-2	Projected Number of Household Clients.....	5-110
Table 5.5-3	Summary of Capital Costs (in million Pesos, 2018 prices).....	5-112
Table 5.5-4	Financing Plan.....	5-112
Table 5.5-5	Summary of Sanitation in the Surrounding Municipalities.....	5-114
Table 5.6-1	Waste generation per sector (2017).....	5-116
Table 5.6-2	Summary of the Amount and Composition of Disposed Waste per Sector	5-117
Table 5.6-3	Collection Schedule per Barangay in Cotabato City (2017)	5-118

Table 5.6-4	Collection Schedule for Institutions and Business Establishments in Cotabato City (2017).....	5-119
Table 5.6-5	List of Equipment Used for Collection and Transport of Wastes (2017).....	5-119
Table 5.6-6	List of Facilities for Waste Processing (2017)	5-121
Table 5.6-7	Price of Recyclable Materials (2017)	5-121
Table 5.6-8	List of Junk Shops in Cotabato City (2017)	5-122
Table 5.6-9	Description of the Biniruan RCA Facility.....	5-123
Table 5.6-10	List of Heavy Equipment for the Operations and Maintenance of Disposal Facility (2017).....	5-123
Table 5.6-11	Roles and Responsibilities of Agencies on SWM.....	5-125
Table 5.6-12	Monthly Fees Collected per Type of Establishment	5-126
Table 5.6-13	Budget and Revenues Collected from Garbage Fees	5-127
Table 5.6-14	National Laws and Regulations Related to SWM.....	5-128
Table 5.6-15	Enacted City Ordinances and Resolutions Related to SWM.....	5-128
Table 5.6-16	Type and Volume of Solid Waste Generated in Datu Odin Sinsuat	5-130
Table 5.6-17	Type and Volume of Waste Generated in Sultan Mastura	5-132
Table 5.6-18	Type and Volume of Wastes Generated in Pigcawayan	5-135
Table 5.6-19	Waste Composition per Type of Waste in Pigcawayan	5-135
Table 5.7-1	Operating Power Plants in Mindanao (2019)	5-138
Table 5.7-2	Total Electricity Consumption, Per Region (1990-2017).....	5-144
Table 5.7-3	Total electricity consumption, per sector (1990-2017)	5-144
Table 5.7-4	Number of Barangays Served by CLPC (2013-2017).....	5-146
Table 5.7-5	Number of Consumers Served by CLPC, per sector (2013-2017).....	5-146
Table 5.7-6	List of Major Electricity Consumers	5-147
Table 5.7-7	Energization Profile of Households in the Surrounding Municipalities.....	5-157
Table 5.7-8	Power Supply Service Providers in Datu Odin Sinsuat.....	5-158
Table 5.7-9	Households With and Without Power Supply in Datu Odin Sinsuat (2016).....	5-158
Table 5.7-10	Power Supply Service Providers in Sultan Kudarat	5-159
Table 5.7-11	Households with and Without Power Supply in Sultan Kudarat	5-159
Table 5.7-12	Households with and Without Power Supply in Sultan Mastura	5-160
Table 5.7-13	Households with and Without Power Supply in Parang	5-160
Table 5.7-14	Households with and Without Power Supply in Pigcawayan	5-161
Table 5.8-1	Historical Major Disaster Events in Cotabato City	5-161
Table 5.8-2	Contributory Elements to Natural Disaster in Cotabato City	5-165
Table 5.8-3	Major Earthquakes in Mindanao (2019)	5-167
Table 5.8-4	Mean Annual Rainfall of the Rainfall Stations in the Mindanao River Basin	5-171
Table 5.8-5	Stream-gauge Stations in the Mindanao River Basin and Its Vicinity	5-172
Table 5.8-6	Mean Monthly Streamflow of the Mindanao River	5-174
Table 5.8-7	Details of the Ambal – Simuay River and Rio Grande de Mindanao Flood Control & Riverbank Protection Project.....	5-179
Table 5.8-8	Exposed Barangays to Four Identified Hazards	5-184
Table 5.8-9	Summary of Identified Projects, Program and Activities.....	5-185
Table 5.8-10	Indicative Cost of Identified Projects, Program and Activities	5-186
Table 5.8-11	Plans and Programs for Adaptation Pillar	5-190
Table 5.8-12	Plans and Programs for Mitigation Pillar	5-190
Table 6.1-1	Description of Physical/Spatial Plans and Socioeconomic Plans at Different Hierarchy of Governance	6-3
Table 6.1-2	Related Laws and Regulations on the Planning System in the Philippines	6-4
Table 6.2-1	Parameters for the Review of the Cotabato City CLUP by the Member-agencies of the RLUC and Other Agencies That may be Requested	6-5
Table 6.3-1	Current Status of CLUP 2020-2028 Preparation.....	6-9
Table 6.4-1	Cotabato City Sources of Revenues, 2010-2016.....	6-11
Table 6.4-2	Cotabato City Income, Expenditures, and Surplus, 2010-2016	6-12
Table 6.4-3	Infrastructure Allocation vis-a-vis Total Expenditures, 2012-2016.....	6-12
Table 6.4-4	Distribution of Infrastructure Allocation by Project Category, 2012-2019.....	6-13
Table 6.5-1	DPWH Total Annual Budget for Infrastructure Projects in Cotabato City, 2015-2020... ..	6-14

Table 6.5-2	DPWH Annual Budget by Project Category, Cotabato City, 2015-2020 (PhP '000).....	6-15
Table 6.6-1	CY 2018 DPWH-ARMM Infrastructure Budget for ARMM (PhP '000)	6-16
Table 6.6-2	CY 2019 DPWH-ARMM Infrastructure Budget for ARMM (PhP '000)	6-18
Table 6.6-3	CY 2020 MPW Infrastructure Budget for BARMM (PhP '000).....	6-20
Table 6.6-4	CY 2021 MPWH Infrastructure Budget for BARMM as Contained in the Bangsamoro Expenditure Program (BEP) FY 2021 (PhP '000)	6-23
Table 7.1-1	Opportunities and Challenges for Spatial Development for Greater Cotabato	7-1
Table 7.1-2	Opportunities and Challenges for Spatial Development for Cotabato City	7-2
Table 7.1-3	Roles and Functions of Cotabato City in Greater Cotabato Spatial Development Direction	7-8
Table 7.2-1	Three Alternative Scenarios for Spatial Development for Greater Cotabato and City	7-11
Table 7.2-2	Three Alternative Scenarios for Spatial Development for Greater Cotabato and City	7-11
Table 7.2-3	Alternative Spatial Development Scenarios for Greater Cotabato 2040	7-13
Table 7.2-4	Assessment of Three Alternative Scenarios by Assessment Criteria	7-15
Table 7.2-5	Three Alternative Scenarios for Spatial Development for Greater Cotabato and City	7-16
Table 7.2-6	Spatial Development Directions for Cotabato City (1)	7-18
Table 7.2-7	Spatial Development Directions for Cotabato City (2)	7-19
Table 7.2-8	Overall Evaluation of Three Alternatives by Assessment Criteria.....	7-20
Table 7.2-9	Overall Assessment of Three Alternative Scenarios for Spatial Development for Greater Cotabato and City	7-21
Table 7.3-1	Tentative Schedule and Main Issues to Discuss at the SHMs.....	7-23
Table 7.3-2	List of ECPs and ECAs	7-25
Table 7.3-3	PEISS Category Type and Location of the Project	7-26
Table 7.3-4	Project Categories, Report Types, Decision Documents, and Deciding Authorities	7-28
Table 7.3-5	Main Contents of the Right-of-Way Act of 2015 (RA 10752)	7-30
Table 7.3-6	Responsible Authorities for the Environmental and Social Considerations and Land Acquisition	7-31
Table 7.3-7	Environmental Quality Standards for Noise in General Areas	7-38
Table 7.3-8	International Treaties Related to Environmental and Social Considerations and Their Membership Statuses in the Philippines	7-39
Table 7.3-9	Environmental Items and Activities Affecting the Environment	7-40
Table 7.3-10	Scoping for the Urban Spatial Plan for Greater Cotabato City	7-41
Table 7.3-11	Items Considered at SEA and EIA Stages.....	7-43
Table 7.3-12	Questions / comments and Answers on the Project.....	7-45
Table 7.3-13	Summary of Advantages and Disadvantages of Three Scenarios	7-47
Table 7.3-14	Brief Comments on the Selected Scenario by the Three Groups	7-51
Table 7.3-15	Questions and Answers on the Plans and Programs.....	7-52
Table 7.3-16	Comparative Evaluation of Scenarios of the Urban Spatial Plan for Greater Cotabato City	7-55
Table 7.3-17	Comparison of the Three Scenarios	7-58
Table 7.3-18	Mitigation Measures for the Optimum Scenario	7-59
Table 7.3-19	Points to Monitor.....	7-61
Table 8.2-1	Three Population Growth Scenarios of Cotabato City in Greater Cotabato Area.....	8-5
Table 8.2-2	Estimated Population Framework: Greater Cotabato Area and Relevant Upper Regions (BARMM and Maguindanao Province including the City and Pigkawayan)	8-6
Table 8.2-3	Three Population Growth Scenarios of Other Municipalities including Pkgawayan in Greater Cotabato Area	8-7
Table 8.2-4	Population Frameworks in Greater Cotabato Area	8-7
Table 8.2-5	Target Indicators for Labor and Employment of Cotabato City	8-8
Table 8.2-6	Estimated GRDP by Sector in 2028 and 2040 for Cotabato City	8-8
Table 8.2-7	Estimated Employment by Sector in 2028 and 2040 for Cotabato City	8-8
Table 8.2-8	Target Indicators for Labor and Employment of Other Municipalities in Greater Cotabato Area	8-9

Table 8.2-9	Estimated GRDP by Sector in 2028 and 2040 for Other Municipalities in Greater Cotabato Area.....	8-9
Table 8.2-10	Estimated projection for Other Municipalities of Greater Cotabato Area.....	8-9
Table 8.2-11	GRDP for Other Municipalities of Greater Cotabato Area in 2028 and 2040	8-10
Table 9.1-1	Proposed Roles and Functions of City and Municipalities in Greater Cotabato Area	9-4
Table 9.1-2	Proposed Cluster Development in Greater Cotabato Area.....	9-5
Table 9.3-1	Implementation Guidance on Spatial Development for Greater Cotabato Area	9-16
Table 9.3-2	Four Management Effects Assisting in Spatial Development Strategies	9-19
Table 9.3-3	Measures for Integrated Spatial Growth Management to Greater Cotabato Area....	9-20
Table 9.3-4	Desirable Institutional Measures for Regional Disaster and Climate Resilience Management for Greater Cotabato Area.....	9-21
Table 9.3-5	Desirable Institutional Measures for Corrido Growth Management for Greater Cotabato Area	9-22
Table 9.3-6	Desirable Institutional Measures for Urban Growth Management for Greater Cotabato Area	9-23
Table 9.3-7	Desirable Institutional Measures for Coastal Area Growth Management for Greater Cotabato Area	9-24
Table 9.3-8	Status of Land Ownership in BARMM and Recommendation.....	9-26
Table 10.1-1	Changes in Land Use between 2011 and 2020.....	10-2
Table 10.1-2	Key Land Use Changes from Existing Land Use 2010 in the CLUP 2020.....	10-4
Table 10.2-1	Classification of Land Use	10-6
Table 10.2-2	Example of Relationship between population density and urban environment	10-9
Table 10.3-1	Setting up Industrial Land Requirements	10-12
Table 10.3-2	Assuming the Required Amount of School Location.....	10-13
Table 10.5-1	Balance between Population Growth and Development Population.....	10-15
Table 10.5-2	Prospect of Residential Land Use	10-17
Table 10.5-3	Prospect of Commercial Land Use.....	10-17
Table 10.5-4	Prospect of Industrial Land Use	10-19
Table 10.5-5	Prospect of Parks and Open Spaces Land Use	10-19
Table 10.5-6	Prospect of Institutional Land Use	10-21
Table 10.5-7	Prospect of Agricultural Land Use	10-21
Table 10.5-8	Prospect of Agro-industrial Land Use.....	10-22
Table 10.5-9	Prospect of Controlled Dumpsite Land Use.....	10-22
Table 10.5-10	Proposed and Existing Land Use.....	10-23
Table 11.5-1	Issues and Strategies to Improve Traffic Management	11-14
Table 11.6-1	Summary of Transport Development Plan and Programme.....	11-15
Table 11.6-2	Length per Road Class (km).....	11-16
Table 11.6-3	Proposed Road Design Standard	11-16
Table 11.6-4	Proposed Road Function (inside Cotabato City only).....	11-16
Table 11.6-5	Summary of Road Surface Condition	11-21
Table 11.6-6	List of Roads composing the Road Network Masterplan.....	11-24
Table 11.6-7	Training Needs Expressed by the Cotabato City Engineering Office, Cotabato LGU	11-29
Table 11.6-8	Road Development Flow for a New Road Construction (Planning to Construction Supervision of Road Project).....	11-29
Table 11.6-9	Scope of Work for Road Network Development Sub-plan.....	11-30
Table 11.6-10	Estimated Number of People Affected by Tsunami with and without West Diversion Road (Tsunami barrier).....	11-32
Table 11.6-11	Scope of work for Public Transport Improvement Sub-Plan	11-41
Table 11.6-12	Summary of Causes of Traffic Congestion in Cotabato City	11-43
Table 11.6-13	Profile of the Traffic Management Center (TMC) of Cotabato City	11-45
Table 11.6-14	Proposed Program and Scope of Work	11-45
Table 11.7-1	Cost estimation of the proposed projects in the Transport Development Plan	11-49
Table 11.7-2	Implementation Priority of Identified Projects (1/5)	11-52
Table 11.7-3	Implementation Schedule of Road Improvement to Establish Hierarchical Road Network.....	11-57
Table 11.7-4	Rehabilitation of Non-functional Roadside Drainage	11-61
Table 11.8-1	Implementation Schedule for Each Project under the TDP (1/2).....	11-62

Table 11.8-2	Implementation Schedule for Each Project Under the TDP (2/2)	11-63
Table 11.9-1	Summary of Quick Evaluation of the Two High Priority Projects	11-64
Table 11.10-1	Environmental and Social Consideration of the Transport Development Plan..	11-69
Table 12.6-1	Summary of Air Traffic Demand Forecast for CBO (2020-2030).....	12-8
Table 12.7-1	Cost Estimation for CBO Development Project (Up to 2030)	12-10
Table 12.7-2	Construction Cost Estimation for the New Cotabato Airport	12-11
Table 12.7-3	Total Project Cost Estimation for New Cotabato Airport	12-11
Table 12.8-1	Development Plan by Phase for CBO (Up to 2030).....	12-12
Table 12.8-2	Summary of Practical Development Target for CBO (Up to 2030).....	12-14
Table 12.8-3	Development Plan by Phase for New Cotabato Airport (Up to 2037)	12-15
Table 12.8-4	Summary of Practical Development Target for New Cotabato Airport (Up to 2037)	12-16
Table 12.9-1	Environmental and Social Considerations of Airport Development Plan	12-18
Table 13.2-1	Urgent Project for Polloc Port	13-6
Table 13.5-1	Summary of Required Port Facilities (Both Short-term and Long-term Plans).....	13-9
Table 13.5-2	Summary of Preliminary Project Cost (Both Short-term and Long-term Plans) .	13-10
Table 13.5-3	Natural and Physical Environment of the Timako Port.....	13-12
Table 13.5-4	Summary of Projected Cargo and Passenger Traffic of Timako Port	13-13
Table 13.5-5	Summary of Required Port Facilities for Year 2036.....	13-14
Table 13.5-6	Summary of Short-Term Development Plan for Year 2012	13-15
Table 13.5-7	Construction Cost of Short-Term Development of Timako Port	13-16
Table 13.5-8	Results of the Economic Feasibility of Timako Port.....	13-17
Table 13.5-9	Results of the Financial Evaluation (Project Viewpoint)	13-18
Table 13.5-10	Results of the Financial Evaluation (Equity Viewpoint).....	13-18
Table 13.6-1	Recommended BOR.....	13-20
Table 13.6-2	BOR of Polloc Port in 2013 to 2025	13-21
Table 13.6-3	Urgent Project for Polloc Port	13-22
Table 13.6-4	Tentative Demarcation between Timako and Polloc Port.....	13-23
Table 13.7-1	Estimated Implementation Schedule of Short-term Development Plan of Polloc Port	13-25
Table 13.7-2	Estimated Implementation Schedule of Short-term Development Plan of Timako Port	13-25
Table 13.8-1	Initial Environmental and Social Considerations Assessment Matrix for Polloc Port Short-term Development Plan	13-26
Table 14.1-1	Annual Water Consumption (cu. m.)	14-2
Table 14.1-2	Number of Service Connection (2009-2018)	14-3
Table 14.1-3	Summary of Annual Budget in Million PhP (2014-2018)	14-7
Table 14.1-4	Budgetary Outlay and Gross Revenue (PhP)	14-7
Table 14.4-1	Number of Service Connection (2009-2018)	14-10
Table 14.4-2	Sources of Water and their Production Volume.....	14-11
Table 14.4-3	Water Supply Level System in the Five Surrounding Municipalities	14-19
Table 14.4-4	Future Projections for Total Water Demand	14-20
Table 14.4-5	Required Water Projection	14-20
Table 14.5-1	Priority Projects of MCWD.....	14-22
Table 14.5-2	Summary of Issues and Priority Projects of LGUs	14-24
Table 14.6-1	Priority Projects of MCWD.....	14-27
Table 14.6-2	NRW Defined by IWA.....	14-33
Table 14.6-3	Water Supply Pipe Extension Project	14-34
Table 14.7-1	Implementation Schedule for the Water Supply Sector Project.....	14-35
Table 14.7-2	The Costs for the Water Supply Development Project	14-35
Table 14.8-1	Environmental Impact Matrix of the Water Supply Sector	14-36
Table 15.1.1-1.	Summary of Sanitation Situation in Surrounding Municipalities	15-1
Table 15.5-1	Projected Number of Household Clients in Cotabato City	15-7
Table 15.5-2	Projected Number of Household for Surrounding Municipalities.....	15-9
Table 15.5-3	Staging of the Project for Creek Environment	15-11
Table 15.5-4	Sanitation & Hygiene Promotion Program Activities	15-13
Table 15.7-1	Implementation Schedule for Each Project on Sewerage Development Plan	15-17
Table 15.8-1	Cost on Sewerage Development Plan	15-18

Table 15.9-1	Environmental and Social Considerations on the Sewerage Development Plan..	15-19
Table 16.1-1	Specific Objectives.....	16-2
Table 16.1-2	Waste Reduction Program, By Year	16-3
Table 16.1-3	Waste Recycling Program, By Year.....	16-4
Table 16.1-4	Programs for the Management of Biodegradables	16-4
Table 16.1-5	Solid Waste Disposal Program.....	16-5
Table 16.1-6	Waste Diversion Target.....	16-5
Table 16.5-1	Estimated Waste Generation Volume in Cotabato city	16-12
Table 16.5-2	Estimated Waste Generation Volume in Greater Cotabato city	16-13
Table 16.5-3	Example of Data Collecting Method.....	16-14
Table 16.5-4	Current Status of Waste Collection in Surrounding Municipalities	16-15
Table 16.5-5	Estimated Waste Collected Volume in Cotabato city	16-16
Table 16.5-6	Estimated Waste Collected Volume in Greater Cotabato City	16-17
Table 16.5-7	Capacity of waste collection vehicles in Cotabato city	16-18
Table 16.5-8	Planned Waste Collection Vehicles in Surrounding Municipalities	16-19
Table 16.5-9	Current Status of Material Recovery in Surrounding Municipalities.....	16-20
Table 16.5-10	Estimated Waste Recovered Volume in Cotabato city.....	16-21
Table 16.5-11	Estimated Waste Recovered Volume in Greater Cotabato city.....	16-22
Table 16.5-12	Initial Evaluation of Intermediate Treatment Options.....	16-23
Table 16.5-13	Technical Option for Recovery of Recyclable Waste	16-25
Table 16.5-14	Current Status of waste disposal in Surrounding Municipalities	16-27
Table 16.5-15	Estimated Waste Disposal Volume in Cotabato city.....	16-28
Table 16.5-16	Estimated Waste Recovered Volume in Greater Cotabato city.....	16-29
Table 16.5-17	Category of SLF in Philippines	16-30
Table 16.5-18	Requirement for SLF Location.....	16-31
Table 16.5-19	Assumed Additional Work for the Existing Dumping Site.....	16-33
Table 16.5-20	Accumulation Volume of the Waste Disposal	16-33
Table 16.5-21	Proposed Necessary Equipment for the SLF.....	16-34
Table 16.6-1	Criteria for the Selection of the Two Priority Projects.....	16-36
Table 16.7-1	Implementation Schedule for Each Project on SWM Plan	16-44
Table 16.8-1	Cost on SWM Plan	16-45
Table 16.9-1	Environmental and Social Considerations on the SWM Plan	16-46
Table 17.1-1	Ongoing Transmission Plan for Greater Cotabato City	17-2
Table 17.1-2	Number of Barangays Supplied by Each Company	17-4
Table 17.1-3	Existing Programs and Future Plans of CLPC	17-5
Table 17.1-4	Future Approved Projects of MAGELCO.....	17-7
Table 17.1-5	Proposed Projects of MAGELCO	17-7
Table 17.1-6	Ongoing Plan of COTELCO-PPALMA.....	17-8
Table 17.2-1	Causes of Power Outages	17-9
Table 17.5-1	Renovation of the Distribution Network	17-11
Table 17.5-2	MAGELCO's Financial Challenges	17-13
Table 17.6-1	Cost of Power Sector Plan.....	17-13
Table 17.7-1	Evaluation of Priority Criteria for Distribution Network Renovation.....	17-14
Table 17.7-2	Evaluation of Priority Criteria for Distribution Substation Rehabilitation and Development.....	17-14
Table 17.7-3	Evaluation of Priority Criteria for Power Capacity Enhancement in the Event of Power Outage.....	17-15
Table 17.7-4	Evaluation of Priority Criteria for Installation of Smart Meters for Collecting Electricity Charge	17-15
Table 17.7-5	Distribution Wires for Replacement.....	17-16
Table 17.7-6	Distribution Poles for Replacement	17-16
Table 17.7-7	Electrical Equipment Life	17-17
Table 17.8-1	Implementation Schedule of Short-Term Development Plan of Distribution Network Renovation for CLPC Franchise Area	17-20
Table 17.8-2	Implementation Schedule of Short-Term Development Plan of Distribution Substation Rehabilitation and Development for MAGELCO Franchise Area.....	17-21

Table 17.8-3	Implementation Schedule of Short-term Development Plan of Power Capacity Enhancement in the Event of a Power Outage for MAGELCO and COTELCO-PPALMA Franchise Area.....	17-21
Table 17.8-4	Implementation Schedule of Medium-Term Development Plan of Installation of Smart Meters for Collecting Electricity Charge for Greater Cotabato City	17-22
Table 17.9-1	Environmental and Social Considerations for Power Supply Sector Plan	17-23
Table 18.1-1	Scope of DRR Plan	18-2
Table 18.1-2	Terminology on “Disaster Risk” by UNDRR	18-4
Table 18.1-3	Summary of Natural Condition on DRR.....	18-5
Table 18.1-4	Summary of Social Condition on DRR.....	18-6
Table 18.1-5	Breakdown of Flood Problem	18-8
Table 18.1-6	Breakdown of Earthquake Problem	18-9
Table 18.1-7	Breakdown of Tsunami Problem.....	18-9
Table 18.2-1	Proposed High Priority Projects in the MRBIMBDMP	18-12
Table 18.2-2	Ruled Easement of Rivers in Presidential Decree No. 1067 (1976)	18-23
Table 18.2-3	Amplification of Seismic Shaking by Topography	18-25
Table 18.2-4	Historical Great Earthquakes Beneath the Moro Gulf Area or the Immediately Neighboring Celebes Sea since 1897.....	18-28
Table 18.3-1	Goal and Objective of DRR Plan	18-32
Table 18.3-2	7 Global Targets and 4 Priority Actions of SFDRR.....	18-32
Table 18.4-1	Guidebooks and Frameworks by HLURB	18-34
Table 18.4-2	Basic Strategy to Prevent or Mitigate Disaster Risks for Cotabato City.....	18-35
Table 18.4-3	Examples of Countermeasures for Cotabato City and its Vicinity.....	18-36
Table 18.4-4	Basic Strategy to Minimize Disaster Damage for Cotabato City.....	18-37
Table 18.5-1	Proposed Priority Projects in DRR Plan.....	18-38
Table 18.5-2	Summary of the Ambal-Simuiay and Rio Grande de Mindanao Flood Control Project	18-41
Table 18.5-3	An Example of Flood Fighting Station	18-49
Table 18.6-1	Cost Estimation of the Proposed Projects in the DRR Plan	18-57
Table 18.7-1	Prioritization of the Proposed Projects	18-61
Table 18.8-1	Implementation Schedule of the Proposed Projects	18-64
Table 18.9-1	Initial Environmental and Social Assessment of DRR Plan	18-65
Table 19.1-1	Summary of Recent Annual Crime Records in Cotabato City.....	19-3
Table 19.1-2	Proposals for Reducing Serious Crimes in Cotabato City.....	19-4
Table 19.1-3	Report of Security-related Incidents and Threat Scores of Barangays.....	19-7
Table 19.1-4	Report of “rido” -related Incidents and Threat Scores of Barangays.....	19-7
Table 19.1-5	Report on Gangs and Common Criminals and Threat Scores of Barangays.....	19-7
Table 19.1-6	Existence of Measures Implemented for Peace and Security in Barangays.....	19-8
Table 19.1-7	Existence of Problems with Indigenous Peoples in Barangays.....	19-9
Table 19.1-8	Existence of Problems Among People of Different Religions in Barangays.....	19-9
Table 19.1-9	Existence of Serious Poverty Problem in Barangays	19-10
Table 19.1-10	Existence of Serious Land Disputes in Barangays	19-10
Table 19.1-11	Existence of Socially Vulnerable People in Barangays and Discrimination Against These People.....	19-11
Table 19.1-12	List of Needed Infrastructures in Barangays	19-11
Table 19.1-13	List of Needed Technical Projects for Capacity Development in Barangays	19-12
Table 19.1-14	List of Other Related Infrastructure and Technical Projects in Barangays	19-14
Table 19.1-15	Most Serious Damages to Barangays from COVID-19	19-15
Table 19.1-16	Needs for Infrastructure and Technical Projects Against COVID-19 Damages	19-15
Table 19.2-1	Priority Community Infrastructure and Technical Projects.....	19-18

ACRONYMS AND ABBREVIATIONS

AAGR	: Annual Average Growth Ratio
AAIIB	: Aircraft Accident Investigation and Inquiry Board
AC	: Aircraft
ADB	: Asian Development Bank
ADM	: Administration
ADSDPP	: Ancestral Domains Sustainable Development and Protection Plan
AG	: Agriculture
AGR	: Agrometeorological Station
AIP	: Annual Investment Program
AIS	: Aeronautical Information Service
AMACC	: AMA Computer College
AQ	: Aquaculture
ARMM	: Autonomous Region in Muslim Mindanao
ASEAN	: Association of Southeast Asian Nations
ASEP	: Access to Sustainable Energy Project
ASG	: Abu Sayyaf Group
ASTI	: Advanced Science and Technology Institute
AUB	: Asia United Bank
B/D	: Basic Design
BARMM	: Bangsamoro Autonomous Region in Muslim Mindanao
BAU	: Business as usual
BC	: Black carbon
BDA	: Bangsamoro Development Authority
BDC	: Bangsamoro Development Corridor
BDO	: Banco de Oro
BDP - I	: Bangsamoro Development Plan
BDP - II	: Bangsamoro Development Plan for the Bangsamoro
BHERT	: Barangay Health Emergency Response Teams
BHW	: Barangay health workers
BI	: Bureau of Immigration
BIMP – EAGA	: Brunei Darussalam – Indonesia – Malaysia – Philippines East ASEAN Growth Area
BIMP – FC	: BIMP Facilitation Center
BNR	: Business Name Registration
BOC	: Bureau of Customs
BOR	: Berth occupancy rate
BPDA	: Bangsamoro Planning and Development Authority
BSP	: Bangko Sentral ng Pilipinas
BTA	: Bangsamoro Transition Authority
BTSI	: Bangsamoro Terminal Services, Inc
CAAP	: Civil Aviation Authority of the Philippines
CADT	: Certificate of Ancestral Domain Title
CAGM	: Coastal area growth management
CBD	: Central Business District
CBO	: Cotabato Airport
CC	: Cooperative Climatological
CCA	: Climate Change Adaptation
CCEDR	: Cotabato City East Diversion Road
CCF	: Central Composting Facility
CCI	: Cotabato City Institute

CCLM	:COSMO Climate Limite - Area Model
CCTV	:Close - Circuit Television
CCWD	:Cotabato City Water District
CDC	:City Development Council
CDEO	:Cotabato City District Engineering Office/DPWH
CDP	:Comprehensive Development Plan
CDPs	:Comprehensive Development Plans
CDRRMC	:City Disaster Risk Reduction Management Council
CDRRMO	:City Disaster Risk Reduction Management Office
CebuPac	:Cebu Pacific Air
CENRO	:City Environment and Natural Resources Office
CEO	:City Engineering Office
CEPALCO	:Cagayan Electric Power and Light Company
CGM	:Corridor growth management
CLPC	:Cotabato Light and Power Company, Inc
CLUP	:Comprehensive Land Use Plan
CMGC	:Council of Mayors for Greater Cotabato
CNC	:Certificate of Non - Coverage
CNS/ATM	:Communication Navigation and Surveillance/Air Traffic Management
CO ₂ e	:CO ₂ equivalent
COM - BIZ	:Commercial and business
COTELCO - PPALMA	:Cotabato Electric Cooperative / Pikit-Pigkawayan, Alamada, Libungan, Midsayap & Aleosan
CPDO	:City Planning & Development Office
CR	:Cooperative Rain Station
CRMC	:Cotabato Regional and Medical Center
CRP	:Cotabato River Port
CSOs	:Civil society organizations
CSPC	:Cotabato State Polytechnical College
CSTI	:Coland Systems Technology Institute
CSWMB	:City Solid Waste Management Board
CTKs	:Cargo Ton Kilometers
D/D	:Detail design
DAO	:Department Administrative Order
DBM	:Department of Budget and Management
DDI	:Domestic direct investment
DENR	:Department of Environment and Natural Resources
DENR - EMB	:Department of Environment and Natural Resources – Environmental Management Bureau
DEO	:District Engineering Office
DFR	:Draft Final Report
DHSUD	:Department of Human Settlements and Urban Development
DICT	:Dept. of Information and Communication Technology
DILG	:Department of the Interior and Local Government
DLPC	:Davao Light and Power Company
DOE	:Department of Energy
DOH	:Department of Health
DOS	:Datu Odin Sinsuat
DOST	:Department of Science and Technology
DOTr	:Department of Transportation and Communication
DPWH	:Department of Public Works and Highways
DRRM	:Disaster Risk Reduction and Management
DRRMC	:Disaster Risk Reduction and Management Council
DRRMP	:Disaster Risk Reduction and Management Plan
DSWD	:Department of Social Welfare and Development

DTI	:Department of Trade and Industry
DUs	:Distribution utilities
EC	:Electric Cooperatives
ECAs	:Environmentally Critical Areas
ECC	:Environmental Compliance Certificate
ECPs	:Environmentally Critical Projects
ECs	:Electric cooperatives
EIA	:Environmental Impact Assessment
EIS	:Environmental Impact Statement
EM	:Effective Microorganisms
EMB	:Environmental Management Bureau
EMP	:Environmental Management Plan
EO	:Executive Orders
EPIRA	:Electric Power Industry Reform Act
EPRMP	:Environmental Performance Report and Management Plan
ERC	:Energy Regulatory Commission
ESWM Plan	:Ecological Solid Waste Management Plan
EWB	:East - West Bank
F/S	:Feasibility Study
FDI	:Foreign Direct Investment
FGD	:Focus Group Discussion
FHSIS	:Field Health Services Information System
FIC	:Fully Immunized Children
FMR	:Farm to Market Road
FNRI	:Food and Nutrition Research Institute
FR	:Final Report
FY	:Fiscal Year
GAA	:General Appropriations Act
GC	:Greater Cotabato
GIDA	:Geographically Isolated and Disadvantaged Areas
GIS	:Geographic Information System
GL	:Guidelines
GOCC	:Government Owned and Control Corporation
GOP	:Government of the Philippines
GRDP	:Gross regional domestic product
HF	:High Frequency
HLURB	:Housing and Land Use Regulation Board
HPBS	:High Priority Bus System
HT	:Handheld transceiver/radio
HUC	:highly urbanized cities
HUDGC	:Housing and Urban Development Coordinating Council
IATA	:International Air Transport Association
ICAO	:International Civil Aviation Organization
ICC	:Independent Component City
ICR	:Inception Report
ICTs	:Information and communication technologies
IEC	:Information, Education and Communication
IEEC	:Initial Environmental Examination Checklist Report
ILPC	:Iligan Light and Power Company
IM4Davao	:Infrastructure Modernization for Davao City
IMR	:Infant mortality rate
IPPs	:Independent Power Producers
IRR	:Implementing Rules and Regulations
ITR	:Interim Report
IWA	:International Water Association

JICA	:Japan International Cooperation Agency
JV	:Joint Venture
LARAP	:Land Acquisition and Resettlement Action Plan
LCCAP	:Local Climate Change Action Plan
LDIP	:Local Development Investment Program
LDRRMP	:Local Disaster Risk Reduction and Management Plan
LFPR	:labor force participation rate
LFS	:Labor Force Survey
LGOO	:Local Government Operations Office
LGU	:Local Government Units
LGUOU	:Local Government Unit Owned Utilities
LOS	:Level of Service
LTFRB	:Land Transportation Franchising and Regulatory Board
LTO	:Land Transportation Office
LWUA	:Local Water Utilities Administration
M/P	:Master Plan
MAGELCO	:Maguindanao Electric Cooperative
MCRAIC	:Metro Cotabato Regional Agri – Industrial Center
MCWD	:Metro Cotabato Water District
MENRE	:Ministry of Environment, Natural Resources and Energy
MET	:Meteorological Facilities
MFBM	:Ministry of Finance, Budget and Management
MILF	:Moro Islamic Liberation Front
MinDA	:Mindanao Development Authority
MLIN	:Mindanao Logistics Infrastructure Network
MMR	:Maternal Mortality Ratio
MNLF	:Moro National Liberation Front
MOOE	:Maintenance and other Operating Expenses
MOTC	:Ministry of Transportation and Communication
MPO	:Maguindanao Provincial Office
MPW	:Ministry of Public Works
MRB	:Mindanao River Basin
MRBIMDMP	:Mindanao River Basin Integrated Management and Development Master Plan
MRCRAIC	:Metro Cotabato Regional Agri – Industrial Center
MRF	:Materials Recovery Facilities
MSS/DF	:Mindanao Spatial Strategy/Development Framework
NA	:National Authority
NBSAP	:National Biodiversity Strategy and Action Plan
NCCA	:National Commission for Culture and the Arts
NCIP	:National Commission on Indigenous Peoples
NCMA	:North Central Mindanao Area
NDRVMCC	:Notre Dame RVM College of Cotabato
NDU	:Notre Dame University
NDU - URC	:Notre Dame University - University Research Center
NEA	:National Electrification Administration
NEDA	:National Economic Development Agency
NEMA	:North Eastern Mindanao Area
NGCP	:National Grid Corporation of the Philippines
NGO	:Non-governmental organizations
NHCP	:National Historical Commission of the Philippines
NIPAS	:National Integrated Protected Areas System
NM	:National Museum
NOAH	:Nationwide Operational Assessment of hazards
NPC	:National Power Corporation

NPC - SPUG	:National Power Corporation - Small Power Utilities Group
NPFP	:National Physical Framework Plan
NRW	:Non Revenue Water
NSS	:National Spatial Strategy
NSSMP	:National Sewerage and Septage Management Program
OC	:Official Climatological Station,
OD	:Origin - Destination
ODA	:Official Development Assistance
OGS	:Office on General Services
OIC	:Office in Charge
OJT	:On the Job Training
OLS	:Obstacle Limitation Surface
OPAPP	:Office of the Presidential Adviser on the Peace Process
OR	:Official Rain Station
PAF	:Philippine Air Force
PAGASA	:Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAL	:Philippine Airlines
PAMANA	:Payapa at Masaganang Pamayanan
PB104	:Power Barge 104
PBSAP	:Philippine Biodiversity Strategy and Action Plan
PC	:Provincial Center
PCCP	:Portland cement concrete pavement
PCG	:Philippine Coast Guard
PCU	:Passenger Capacity Unit
PD	:Presidential Decrees
PDP	:Philippine Development Plan
PDPFP	:Provincial Development and Physical Framework Plan
PDR	:Project Description Report
PEISS	:Philippine Environmental Impact Statement System
PEPRMP	:Programmatic Environmental Performance Report and Management Plan
PFEZ	:Polloc Freeport and Ecozone
PFPEZ	:Polloc Free Port Economic Zone
PHIVOLCS	:Philippine Institute of Volcanology and Seismology
PIOUs	:Private Investor - Owned Utilities
PMP	:Philippine Maritime Police
PNP	:Philippine National Police
PPA	:Philippine Ports Authority
PPP	:Public Private Partnership
PR	:Progress Report
PRD	:Production
Pre-F/S	:Pre - Feasibility Study
PSA	:Philippine Statistics Authority
PSALM	:Power Sector Assets and Liabilities Management
PSSR	:Philippine Sustainable Sanitation Roadmap
PTB	:Passenger Terminal Building
PTF	:Presidential Task Force
PUA	:proximity to an urban area
PUC	:Primary Urban Center
PUV	:Public Utility Vehicles
R/W	:Runway
RA	:Regional Authority
RAIC	:Regional Agro - Industrial Center
RBCO	:River Basin Control Office
RC	:Regional Center

RCA	:Residual Containment Area
RDC	:Regional Development Council
RDCRM	:Regional disaster and climate resilience management
RDP	:Regional Development Plan
RDRMSF	:Regional Disaster Risk Management Spatial Framework
REDPE	:Regional Economic and Development Planning Board
RESA	:Runway End Safety Area
REZA	:Regional Economic Zone Authority
RFF	:Rescue and Fire Fighting
RNA	:Radio Navigational Aids
RNDP	:Road Network Development Project in Conflict - Affected Areas in Mindanao
RO	:Regional Office
RoCond	:Road Condition Assessment
RoRo	:Roll On – Roll Off
RPKs	:Revenue Passenger Kilometers
RPMA	:Regional Port Management Authority
RVR	:Runway Visual Range
SC	:Steering Committee
SCMDC	:South - Central Mindanao Development Corridor
SDF	:Special Development Fund
SEA	:Strategic Environment Assessment
SEMA	:South Eastern Mindanao Area
SEZ	:Special Economic Zones
SGCC	:State Grid Corporation of China
SHMs	:Stakeholders Meetings
SIDA	:Swedish International Development Cooperation
SLCPs	:Short - lived climate pollutants
SLF	:Sanitary Landfill Facilities
SMEs	:Small and Medium Enterprises
SMP	:Septage Management Program
SOCCSKSARGEN	:A region of the Philippines, located in central Mindanao, and is officially designated as Region XII
SRC	:Sub - Regional Center
ST	:Stage
STI	:Systems Technology Institute
SUC	:Secondary Urban Center
SUC-A	:Secondary Urban Center (A)
SUC-B	:Secondary Urban Center (B)
SWM	:Solid waste management
SWMA	:South Western Mindanao Area
SYN	:Synoptic Station
T/W	:Taxiway
TADP	:Third Airport Development Project
TAF	:The Asia Foundation
TDM	:Transportation Demand Management
TDP	:Transport Development Plan
TMC	:Traffic Management Center
TMP	:Traffic Management Program
TMU	:Traffic Management Unit
TransCo	:Transmission Corporation
TRSC	:Multi Transceiver
UC	:Urban Center
UGM	:Urban growth management
UHPAP	:United Harbor Pilot Association of the Philippines
UNCTAD	:United Nations Conference on Trade and Development

UNFPA	:United Nations Population Fund
UPA	:Urbanization Potential Area
USAID	:United States Agency for International Development
USGS	:United States Geological Survey
VHF	:Very High Frequency
VPA	:Vehicle Parking Area
WACS	:Waste Analysis and Characterization Study
WASAC	:Water and Sanitation Corporation

CHAPTER 1 INTRODUCTION

1.1 Background of the Study

After more than forty (40) years of conflict, the Comprehensive Agreement on Bangsamoro (CAB) was signed between the Government of the Philippines (GOP) and Moro Islamic Liberation Front (MILF) in March 2014 and the establishment of Bangsamoro Autonomous Government was recognized. The Organic Law for the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) which enabled the establishment of autonomous government was signed by the President on July 27, 2018.

A plebiscite was held in January 21 and February 6, 2019 to ratify the Organic Law and to determine area of the BARMM. Similarly, the Bangsamoro Transition Authority (BTA) was organized in February 2019. Efforts are undertaken to transition towards the establishment of the first regular autonomous government in 2025.

Cotabato City functions as the socio-economic center of the BARMM, particularly the surrounding municipalities of Maguindanao and Lanao del Sur, as well as, to certain municipalities belonging to Region 12. The city's population as of 2020 census is 325,079 which is 8.56% higher than the previous figure of 299,438 (2015 census). The population of the city has increased by an annual average of 4.1% over the past 15 years, beginning in year 2000. It is expected to continue to serve as the primary socio-economic center of BARMM and part of Region 12 hence further growth of the population is expected.

One of the challenges to the growth of the city is its location which is squeezed by two major rivers to the north (Rio Grande de Mindanao) and south (Tamontaka river) and by the open sea (Illana Bay) on the west and marsh on the east (Liguasan Marsh). These four natural barriers limit the space available for development. In addition, the city is vulnerable to floods and storm surges and it has recently experienced 6.6 magnitude earthquake in 2019 although its epicenter was in Tuluhan Municipality. In August 17, 1976, a magnitude 7.9 earthquake destroyed most of the buildings in the Central Business district and claimed the lives of dozens of city residents.

In order to attain peace and prosperity in BARMM, it is necessary to determine the development direction of Cotabato City and its surrounding areas and to proceed with strategic development with consideration of function the city should play. In April and May 2019, the Interim Chief Minister of the BARMM Government has made a request to the Ministry of Foreign Affairs of Japan and JICA to assist in formulating a master plan for the Greater Cotabato Area. Similarly, the City Government of Cotabato made a separate request which was endorsed by the Department of Foreign Affairs (DFA) to the Government of Japan (GOJ) in July 2019 to assist the city in formulating a master plan.

Based on these requests, JICA decided to implement this study for a basic information gathering to formulate a Master Plan.

1.2 Objectives of the Study

This study aims to collect and confirm information on the comprehensive development plan of the Greater Cotabato City and to identify high priority projects for the preparation of development program and to undertake Pre-F/S of priority projects.

1.3 Scope of the Study

In order to achieve the above objectives, the Study shall cover the following:

- 1) Preparation and Discussion of Inception Report
- 2) Presentation and Agreement on Study Methodology
- 3) Analysis and Understanding of the Present Conditions of Greater Cotabato
- 4) Discussion and Understanding of the Present Conditions of Greater Cotabato
- 5) Review and Establishment of Future Visions for Greater Cotabato
- 6) Preparation of (Draft) Future Socio-Economic Framework
- 7) Preparation and Discussion of Progress Report
- 8) Preparation of (Draft) Urban Spatial Plan
- 9) Preparation of (Draft) Land Use Plan
- 10) Preparation of (Draft) Sectoral Plan
 - i) Transport Sector
 - ii) Port and Airport
 - iii) Water Supply Sector
 - iv) Sewage Sector
 - v) Solid Waste Sector
 - vi) Power Supply Sector
 - vii) Disaster Risk Reduction
 - viii) Peace Building Plan
- 11) Preparation of (Draft) Action Plan
- 12) Preparation of Candidate Program for Japan's Cooperation
- 13) Preparation and Discussion of Interim Report
- 14) Seminar on Urban Development Plan
- 15) Selection and Conduct of Pre-Feasibility Study of High Priority Projects
- 16) Preparation and Discussion of Draft Final Report
- 17) Preparation of Final Report

1.4 Study Schedule

The Study commenced in March 2020 and is scheduled to be completed by the end of April 2021 as shown in Table 1.4-1. The schedule however was extended to February 2022 after it was decided that a Pre-Feasibility Study will be carried out to the three selected high priority projects identified in the study.

1.5 Organization to Carry Out the Study

The Study was carried out by the Study Team organized by JICA in close collaboration with the City Government of Cotabato, BARMM Regional Government and other organizations concerned.

Steering Committee (SC) was established to make various decisions regarding the comprehensive development of the Greater Cotabato Area and the implementation of this study. The City Government of Cotabato (CGC) had created its SC on July 30, 2020. The organization for executing the Study is shown in Figure 1.5-1.

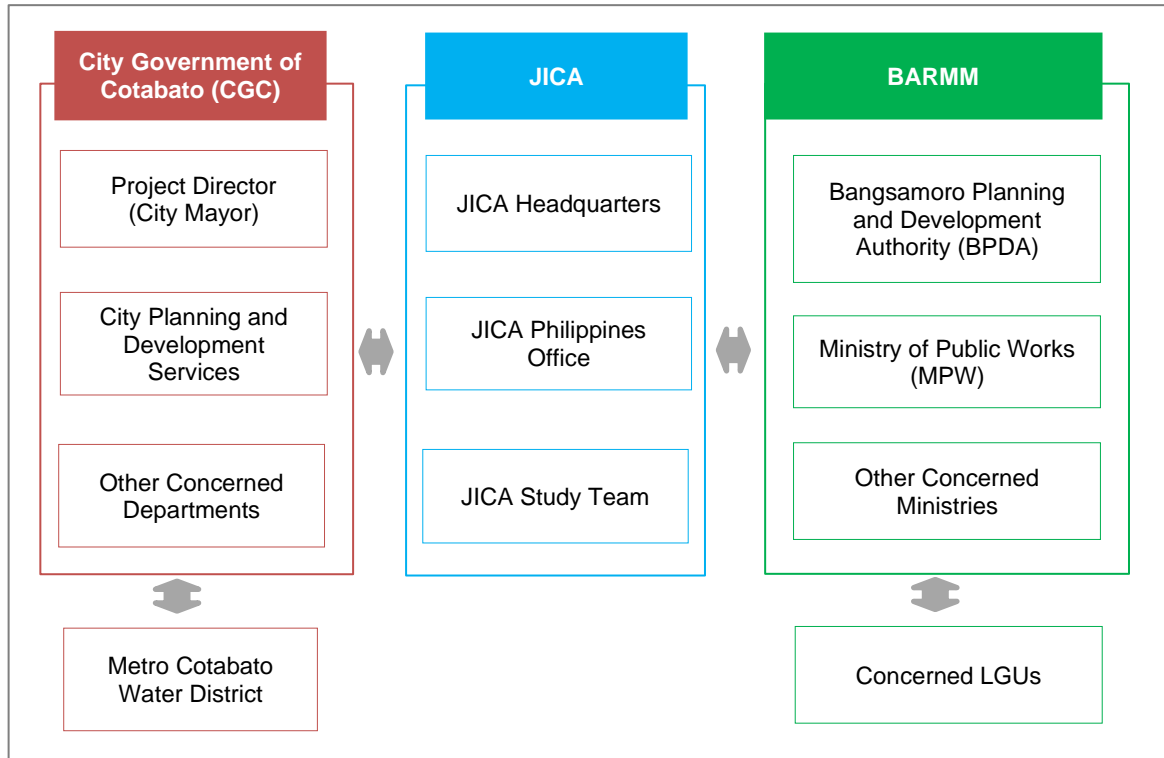


Figure 1.5-1 Organizational Chart to Carry Out the Study

Technical Working Group (TWG) was established as well to work hand-in-hand with the JICA Study Team and to provide support to the Steering Committee.

The JICA Study Team is composed of the following experts:

Mr. Mitsuo KIUCHI	Team Leader/ Urban Planner (1)/ Transport Planner (Road and Bridge) (1)
Dr. Nashreen SINARIMBO	Deputy Team Leader/ Transport Planner (Road and Bridge) (2)
Mr. Makine KUSANO	Urban Planner (2)
Mr. Yuki MORINAGA	Airport Planner
Mr. Isao HINO	Seaport Planner
Ms. Mikayo YAMAZAKI	Socio-Economic Analyst
Mr. Kiyotaka OWADA	Land Use Planner
Mr. Kazuhiko UEHARA	Water Supply Planner
Mr. Toru ASAKURA	Sewage Planner
Mr. Shumpei ICHIKAWA	Solid Waste Planner
Mr. Yota KIKUCHI	Power Supply Planner
Mr. Hirokazu SAKAI	Disaster Prevention Planner
Mr. Michimasa NUMATA	Peace Building Planner
Mr. Shunji USUI	Environmental and Social Considerations Specialist
Mr. Suguru IWAMA	Coordinator/ Traffic Engineer

Additional experts for the Pre-Feasibility Studies are:

Mr. Ryuichi UENO	Road Engineer/Road Designer (1)
Mr. Alan Anthony L ACACIO	Road Engineer/Road Designer (2)
Mr. Norio KOYANAGI	Bridge Engineer/Bridge Designer
Mr. Kenichi WAKABAYASHI	Water Supply and Sewage Planner
Mr. Hiroshi KANEKO	Economic Analyst
Mr. Ronald CARTAGENA	Environmental and Social Considerations Specialist (2)
Mr. Kozo SUGA	Construction Planner/Cost Estimator (1)
Mr. Masatoshi ANAKURA	Construction Planner/Cost Estimator (2)

1.6 Major Activities Undertaken

The list of the major activities undertaken to prepare the study is summarized in Table 1.6-1, Table 1.6-2 and Table 1.6-3. A Liaison Office is established in Cotabato City to maintain close coordination with the counterparts. List of activities of the members of the Liaison Office is available in Table 1.6-3.

Table 1.6-1 Summary of Major Activities

Activity	Date	Details
1. Project Launching	Kick-off Meeting (virtual meeting) 25 June 2020	<ul style="list-style-type: none"> • The project was officially launched with full attendance from the City Government of Cotabato including the Mayor, the Administrator, and other members of the Planning Team of Cotabato City.
2. Major Surveys	Traffic Count Survey (Aug- Sept 2020)	<ul style="list-style-type: none"> • 12-hr and 40 traffic count stations inside Cotabato City and surrounding municipalities
	Travel Speed Survey (Aug- Sept 2020)	<ul style="list-style-type: none"> • Covering 10 routes
	Public Transport Terminal Survey (Sept 2020)	<ul style="list-style-type: none"> • Covering 5 public transport terminals in Cotabato City
	Road Inventory, Road Surface Condition Survey and Drainage Condition Survey (July 2020)	<ul style="list-style-type: none"> • Covering 101 km of national road and other important roads inside Cotabato City and surrounding municipalities
	Peace Building Survey (Jun- Sept 2020)	<ul style="list-style-type: none"> • Face-to-face interview (and sometimes by online) with barangay officials. It covered 37 barangays of Cotabato City plus interview with security sectors (Police and Military) • Face-to-face interview with the officials of 5 LGUs (Datu Odin Sinsuat, Sultan Kudarat, Sultan Mastura, Parang, Pickawayan)
	July 2021	<ul style="list-style-type: none"> • OD (Origin-Destination) Survey for the Pre-Feasibility Roads • Traffic Count Survey for the Pre-Feasibility Roads
3. Online Planning Activities between the JICA Study Team and TWG	1 st Online Planning (Seminar/ Workshop) 17 July 2020	<p>Through the request of the City Government of Cotabato, the 1st of the series of Planning Activities through online seminar/workshop was held. The following topics were covered:</p> <ul style="list-style-type: none"> a) How to Plan and Undertake Road Condition Survey - Dr. Nashreen Sinarimbo, JICA Study Team b) Population of Cotabato City and Future Projection – EnP Ma. Teresa Bataga, CPDO, Cotabato City c) Steps and Status of Preparation of CLUP (2022-2028) - Engr. Oscar Rendon, CPDO, Cotabato City
	2 nd Online Planning (Seminar/ Workshop) 29 July 2020	<ul style="list-style-type: none"> a) How to Prepare Spatial Development Plan for Greater Cotabato – Mr. Makine KUSANO, JICA Study Team
	3 rd Online Planning (Seminar/ Workshop) 12 August 2020	<ul style="list-style-type: none"> a) How to Undertake Strategic Environmental Assessment – Mr. Shinju USUI, JICA Study Team b) Cotabato City Tourism Development Plan- Ms. Norianne FRONDOZA, CGC c) Local Economic Development Plan of Cotabato City- EnP Jenny SINSUAT, CGC d) Housing Development Plan- Ms. Clara UBAS, CGC e) Local Shelter Plan- Ms Vernalyn PAGENTE, CGC
	4 th Online Planning (Seminar/ Workshop) 7 Sept 2020	<ul style="list-style-type: none"> a) How to Plan and Undertake Traffic Survey and Travel Speed Survey – Mr. Suguru IWAMA, JICA Study Team b) Supplemental Explanations for Population and Spatial Development Scenarios – Mr. Makino KUSANO, JICA Study Team c) Preparation of the 1st Stakeholder Meeting d) Review of SEA Presentation for Stakeholder Meeting
	5 th Online Planning (Seminar/ Workshop) 1 October 2020	<ul style="list-style-type: none"> a) Sewage Development Plan (Draft) -Mr. Toru ASAKURA, JICA Study Team b) Solid Waste Management Plan (Draft) - Mr. Shumpei ICHIKAWA, JICA Study Team c) Disaster Risk Reduction Plan (Draft) - Mr Hirokazu SAKAI, JICA Study Team d) Follow-up Discussion on the 1st Stakeholder Meeting
	6 th Online Planning (Seminar/ Workshop)	<ul style="list-style-type: none"> a) Updates from the City Government of Cotabato (re: Consultation on the 3 Development Scenarios)

*Data Collection Survey on Urban Infrastructure Development in Greater Cotabato City
Final Report*

Activity	Date	Details
	28 October 2020	<ul style="list-style-type: none"> b) Port Development Plan (Draft) - Mr. Isao HINO, JICA Study Team c) Power Supply Devt Plan (Draft) - Mr. Yota KIKUCHI, JICA Study Team d) Water Supply Devt Plan (Draft) - Mr. Kazuhiko UEHARA, JICA Study Team e) Finalization of the 1st Stakeholder Meeting Preparation
	7 th Online Planning (Seminar/ Workshop) 28 January 2021	<ul style="list-style-type: none"> a) Progress of the CLUP Preparation (Engr. Oscar Rendon) b) Transportation Survey Results (Engr. Suguro Iwama & Engr. Joshua Suarez) c) Transport Development Plan (Draft) (Mr. Mitsuo Kiuchi & Dr. Nashreen Sinarimbo)
	8 th Online Planning (Seminar/ Workshop) 10 February October 2021	<ul style="list-style-type: none"> a) Proposed Land Use Plan of Cotabato City (Mr. Kiyotaka Owada)
	9 th Online Planning (Seminar/ Workshop) 7 July 2021	<ul style="list-style-type: none"> a) Progress (Schedule and current activities of the JICA Study Team) b) Current Status of CLUP and CDP of Cotabato City c) Proposed Institutional arrangement for Greater Cotabato Area (GCA) (Mr. Mikino Kusano)
4. Steering Committee Meeting to discuss Progress Report SC	1 st Steering Committee Meeting 16 October 2020	The Steering Committee Meeting was held by virtual meeting attended by the Chairperson (Mayor Cynthia Guiani- Sayadi), the Vice-Chairperson (Administrator Danda Juanday) and other members of the SC. Members of the TWG also attended the meeting. During this meeting, the Progress Report of the study was discussed.
	2 nd Steering Committee Meeting 22 March 2021	Presentation of Interim Report (including Selection of Projects for Pre-Feasibility)
	3 rd Steering Committee Meeting 25 January 2022	Presentation of Draft Final Report (including results of the 3 projects selected for Pre-Feasibility Study)
5. Stakeholders Meetings	First Stakeholders Meeting 25 November 2020	1 st Stakeholders Meeting in Cotabato City was held attended by 104 participants (including those in ZOOM)
	Second Stakeholders Meeting 30 March 2021	2 nd Stakeholders Meeting in Cotabato City was attended by 76 participants (including those that participated via ZOOM)
6. Other Activities	Participation from the City Government of Cotabato on the Road condition survey 6 July 2020	<ul style="list-style-type: none"> • Staff from different units of the City Government of Cotabato (Engr. Julieta Zambrano from City Engineering Office, Engr. Gerwin Gampon from City Assessor's Office, Engr. Faustino Guerra from City Planning & Development Coordinator Office) participated in the survey. • Other officials of the CGC including the Dr. Danda Juanday (City Administrator), Engr. Samuel Jorolan (City Engineering Office), Engr. Rommel Pausal (City Assessor's Head) and Engr. Oscar Rendon (Assistant City Planning & Development Coordinator) observed the activity.
	Observation visit of the City Government of Cotabato on the Traffic Count Survey 11 August 2020	Officials from the various units of the City Government of Cotabato visit the traffic count survey station to observe the activity. These include: Dr. Danda Juanday (City Administrator), Engr. Adela Fiesta (City Planning & Development Coordinator – Head), Engr. Romel Pausal (City Assessor's Head), Engr. Julieta Zambrano (Office of the City Engineer – Engr. III), Engr. Gerwin Gampon (City Assessor's Office - Staff), Engr. Faustino Guerra (City Planning & Development Coordinator - Staff), Mr. Rolando Guanzon (Consultant of City Engineering Office)

Table 1.6-2 Summary of Major Activities by the JICA Study Team

No.	Meeting	Date	Comments
1)	Kick-Off Meeting	25 June 2020	Virtual Kick-Off Meeting; Presentation of Inception Report
2)	1 st Planning Session	17 July 2020	Online Training on Road Condition Survey
3)	2 nd Planning Session	29 July 2020	Online Training How to Prepare Spatial Development Plans for Greater Cotabato City
4)	3 rd Planning Session	12 August 2020	Online Training on How to Plan and Undertake Strategic Environmental Assessment (SEA)
5)	4 th Planning Session	07 September 2020	Online Training How to Plan and Undertake Traffic Count and Traffic Speed Survey, Population Projection and Spatial Development Scenarios, and Strategic Environmental Assessment (SEA)
6)	Meeting with MCWD	17 September 2020	Consultation meeting with MCWD to discuss Water Supply Development Plan
7)	5 th Planning Session	01 October 2020	Online Training on Sewerage Development Plan, Solid Waste Development Plan, and Disaster Risk Reduction Plan
8)	Meeting with CENRO of Cotabato City	07 October 2020	Consultation with CENRO to discuss Solid Waste Management Plan
9)	Meeting with CPDO on Land Use Plan	13 October 2020	Consultation meeting CPDO to discuss Land Use Map of Cotabato City
10)	6 th Planning Session	28 October 2020	Online Training on Port Development Plan, Water Supply Development Plan, and Power Supply Development Plan
11)	1 st Stakeholders' Meeting	25 November 2020	Introduction of the Study to various stakeholders and to get their opinion on the three Development Alternatives.
12)	Meeting with CPDO on the Land Use Plan	14 December 2020	Consultation meeting CPDO to discuss Future Land Use Map of Cotabato City
13)	Meeting with CPDO on the Land Use Plan	22 December 2020	Continuation on the discussion for the preparation of Future Land Use Map with the CPDO
14)	7 th Planning Session	28 January 2021	Presented Transportation Survey Reports, Transport Development Plan
15)	8 th Planning Session	10 February 2021	Presented Land Use Plan
16)	2 nd Stakeholders' Meeting	30 March 2021	Presented response of JICA Study Team to comments/suggestions made during the 1 st Stakeholders Meeting; Presented Interim Report to stakeholders, particularly identified major projects per sector
17)	9 th Planning Session	07 July 2021	Presented possible Institutional Arrangements for Greater Cotabato Area; Updates on Status of CLUP and CDP preparation

Table 1.6-3 Coordination Meetings by JICA Study Team’s Liaison Office in Cotabato City

No.	Meeting	Date	Purpose/Agenda
1)	City Planning Development Office (CPDO)	09 March 2020	To discuss the project and request for support including request for a copy of CLUP and other relevant documents
2)	City Administrator’s Office	10 March 2020	To discuss the project and request for support including request for a copy of CLUP and other relevant documents
3)	Philippine Ports Authority 12 – Cotabato City	12 March 2020	To introduce the study and request for a copy of relevant data
4)	Regional Ports Management Authority – BARMM	12 March 2020	To introduce the study and request for a copy of relevant data
5)	City Planning Development Office (CPDO)	04 May 2020	Discussion on the definition of SMART City envisioned by the City Government of Cotabato
6)	Philippines Statistic Authority (PSA – Maguindanao)	11 May 2020	To introduce the study and request for a copy of relevant data
7)	Philippine Ports Authority 12 – Cotabato City	18 May 2020	Data request and discussion on the on-going Timako Port construction
8)	Bangsamoro Planning and Development Authority (BPDA)	19 May 2020	To introduce the study and request for data provision on the LGUs under the BARMM.
9)	Regional Port Management Authority (RPMA – BARMM)	20 May 2020	Meeting and quick assessment of the physical condition of various facilities of the port.
10)	Regional Economic Zone Authority (REZA)	22 May 2020	Coordination with REZA Manager
11)	Metro Cotabato Water District (MCWD)	28 May 2020	To discuss MWCD’s condition of facilities and request for GIS data of pipe distribution network
12)	MPDC and Municipal Engineer of Sultan Kudarat Municipality	08 June 2020	To introduce the project and request their support during the road surface condition survey and traffic count survey
13)	Mayor and Municipal Administrator of Datu Odin Sinsuat Municipality	09 June 2020	To introduce the project and request their support during the road surface condition survey and traffic count survey
14)	Cotabato City Administrator	09 June 2020	To discuss the Road Surface Condition Survey
15)	Secretary of the Cotabato City Mayor’s Office	16 June 2020	To discuss the Peace Building Survey to the 37 barangays in Cotabato City
16)	Conduct of Peace Building Survey to 37 barangays	June to August June 2020	Survey on Peace Building
17)	Cotabato Light and Power Company	26 June 2020	Meeting with CLPC to understand current condition and future plan
18)	Civil Aeronautics and Aviation Management (CAAM) Office, Awang Airport	03 July 2020	To introduce the project and request for permission to take pictures of the Cotabato Airport and its facilities for assessment
19)	Ceremony for the start of Road Surface Condition Survey	06 July 2020	Ceremony for the official start of the Road Surface and Drainage Condition surveys (with the City Administrator, City Engineer, City Assessor, Assistant City Planning and Development Coordinator, City Environment and natural Resources officer, and other technical staff of the City Government)
20)	Department of Public Work and Highways (DPWH 12 – CCDEO)	8 July 2020	Coordination with the DPWH regarding the proposed and completed flood control and revetment wall for Cotabato City
21)	Ministry of the Interior and Local Government - BARMM	8 July 2020	Request for support for data gathering to the LGUs under BARMM

*Data Collection Survey on Urban Infrastructure Development in Greater Cotabato City
Final Report*

No.	Meeting	Date	Purpose/Agenda
22)	Cotabato City Administrator's Office	13 July 2020	Coordination meeting with the City Government on formal order for the creation of Steering Committee and Technical Working Group
23)	Cotabato City Budget Office; CPDO	15 July 2020	Coordination to request Budget documents from Budget Office and comments on Inception Report from CPDO
24)	City Administrator's Office	17 July 2020	Discussion on the 1 st Online Planning Session
25)	Ministry of the Interior and Local Government - BARMM	23 July 2020	Request for support to secure copies of CLUP and CDP of Maguindanao towns
26)	Municipal administrator of Pigcawayan	28 July 2020	Coordination meeting with the LGU and observation visit to various social infrastructure (water, solid waste management, etc)
27)	Municipal administrator of Datu Odin Municipality	29 July 2020	Coordination meeting with the LGU (Municipal Mayor) to request data and their proposals, if any and observation to important facilities
28)	CPDO, Cotabato City	04 August 2020	Coordination meeting with the technical personnel of the City Government and the Road Survey Team for briefing on the conduct of the Traffic Count Survey
29)	Traffic Survey Observation Tour by the CGC	11 August 2020	Conduct of joint observation of start of Traffic Count Survey with City Government officials (City Administrator, City Planning and Development Coordinator, City Assessor, representatives of the City Engineer, and other technical personnel of the City government)
30)	Office of the City Police Director	17 August 2020	Coordination Meeting to brief the Police Director on the Study particularly the surveys of barangays and security assessment for the Peace Building component
31)	TWG discussion on the 3 Spatial Development Options	18 August 2020	Participated in the meeting of the City's TWG to discuss Spatial Development Options among the TWG members and some SC members
32)	Municipal administrators of Sultan Kudarat, Sultan Mastura, and Parang, Maguindanao	19 August 2020	Coordination meeting with the LGUs regarding the data gathering of JICA, discuss and request for a copy of the CLUP and CDP of the Municipalities, conduct of Peace Building Survey, request for data regarding Inventory on Socio-Economic Facilities.
33)	CLUP Planning Session by CPDO	26 August 2020	Participated in the CLUP planning session being conducted by the CPDO
34)	CPDO discussion on Travel Speed Survey	01 September 2020	Coordination meeting with the TWG to discuss Travel Speed Survey
35)	Ceremonial Closing of Traffic Count Survey with TWG members	02 September 2020	Closing ceremony for the Traffic Count Survey. Attended by the City Administrator, Assistant City Planning and Development Coordinator, representatives of the City Assessor and City Engineering Offices
36)	Ministry of Public Work (MPW – Malabang)	03 September 2020	Meeting with the OIC District Engineer regarding the Malabang Airport Status
37)	Ministry of Public Work - BARMM	09 September 2020	Coordinated with Engr. Danny Ong to request for available information on the status of the Mindanao Basin River Flood Control Project
38)	Department of Labor and Employment (DOLE) – Cotabato City Office	14 September 2020	Coordination meeting to request for time-series data on the employment situation of Cotabato City for the last 10 years
39)	Cotabato City Administrator's Office	27 November 2020	Coordination meeting on the possible inclusion/consideration of the Joint DILG-OPAPP Memo Circular in the Peace Building component of the Study
40)	Metro Cotabato Water District (MCWD)	15 January 2021	Coordination meeting to arrange appointment with contracted bulk water supply company
41)	MCWD and Hanabana Company	26 January 2021	Discussion on the Bulk Water Project. Later visited the site at Matampay Bridge 2.
42)	MPW-BARMM	12 March 2021	To know the MPW allocation for infrastructure, particularly on the 37 barangays of Cotabato City.

*Data Collection Survey on Urban Infrastructure Development in Greater Cotabato City
Final Report*

No.	Meeting	Date	Purpose/Agenda
43)	Presentation of Interim Report to City Government Officials, City Hall Conference Room	22 March 2021	In partnership with Steering Committee/TWG Members, the Interim Report and upcoming 2 nd Stakeholders' Meeting were discussed with key city officials
44)	Metro Cotabato Water District (MCWD), Dimapatoy River Site	29 June 2021	Photo-taking of water facility of MCWD at Dimapatoy area for reference in the Pre-FS preparation
45)	MLGOO Office, Sultan Kudarat	05 July 2021	Coordinated with MLGOO and then interviewed barangay officials under the influence of the Mindanao River Southside Road project to know their agricultural product and transport cost.
46)	MLGOO Office, Pigcawayan	07 July 2021	Coordinated with MLGOO and then interviewed barangay officials under the influence of the Mindanao River Southside Road project to know their agricultural product and transport cost.
47)	MLGOO Office, Mother Kabuntalan	09 July 2021	Coordinated with MLGOO and then interviewed barangay officials under the influence of the Mindanao River Southside Road project to know their agricultural product and transport cost.
48)	MLGOO Office, Northern Kabuntalan	21 July 2021	Coordinated with MLGOO and then interviewed barangay officials under the influence of the Mindanao Southside Road project to know their agricultural product and transport cost.
49)	Ministry of Human Settlements and Development (MHSD)	11 August 2021	Conducted interview on institutional arrangement for GCA and proposed transfer of BARMM offices to Parang
50)	Mayor Cheryl Lu-Sinsuat, Mayor of Datu Odin Sinsuat	17 August 2021	Conducted interview with the Mayor Cheryl on the institutional arrangement for GCA.
51)	Bangsamoro Planning and Development Authority (BPDA)	18 August 2021	Conducted interview on institutional arrangement for GCA and proposed transfer of BARMM offices to Parang
52)	LGU Parang	20 August 2021	Conducted interview on institutional arrangement for GCA.
53)	Human Resource Management (HRM) Office, Office of the Chief Minister (OCM), BARMM	31 August 2021	Conducted interview for data on BARMM personnel to estimate possible traffic attraction on the West Diversion Road if BARMM Administrative Center is transferred close to Polloc Port
54)	Office of the City Assessor, People's Palace	06 September 2021	Coordinated with City Assessor on land valuation for ROW Cost Estimate for two Pre-FS projects.
55)	Office of the City Assessor, Sultan Kudarat	07 September 2021	Coordinated with Municipal Assessor on land valuation for ROW Cost Estimate for two Pre-FS projects.
56)	Office of the City Assessor, Sultan Mastura	07 September 2021	Coordinated with Municipal Assessor on land valuation for ROW Cost Estimate for two Pre-FS projects.
57)	Office of the City Assessor, Parang	07 September 2021	Coordinated with Municipal Assessor on land valuation for ROW Cost Estimate for West Diversion Road.
58)	Ministry of Public Works (MPW), BARMM	13 September 2021	Interviewed on the road and bridges projects
59)	Office of the City Assessor, Pigcawayan	15 September 2021	Coordinated with Municipal Assessor on land valuation for ROW Cost Estimate of the Mindanao River Southside Road
60)	Office of the City Assessor, Mother Kabuntalan	22 September 2021	Coordinated with Municipal Assessor on land valuation for ROW Cost Estimate of the Mindanao River Southside Road
61)	Mayor's Office, People's Palace	04 October 2021	Met with Former City Administrator and new City Administrator to discuss the status of Master Plan preparation, ongoing pre-feasibility studies, and other matters.
62)	Office of the City Administrator, Cotabato City	21 October 2021	Meeting with City Administrator and personnel of City Engineer's Office and City Planning and Development Office to assist them in their assessment of drainage system of the City.

No.	Meeting	Date	Purpose/Agenda
63)	Ministry of Environment, Natural Resources, and Energy, BARMM	25 October 2021	Coordinated with the CENRO (Maguindanao 2) on the Key Bio-Diversity Area delineation of Liguasan Marsh which might be affected by the Mindanao River Southside Road
64)	Ministry of Public Works, BARMM	27 October 2021	To request data on personnel in relation to the assessment of the capacity of the MPW and possible needed trainings
65)	Ministry of Public Works, BARMM	09 November 2021	Facilitated Kick-Off Meeting for the Capacity Assessment of the Ministry with the Director General and other key personnel of the Ministry in attendance (JICA Study Team – Tokyo joined the meeting via Zoom)
66)	DPWH National RPMO for Bangsamoro	10 November 2021	Meeting with the Director to discuss plans of the new office and assessment
67)	Weekly Meeting by Zoom	11 November 2021	Weekly meeting with MPW Assessment Team
68)	Ministry of Public Works, BARMM	17 November 2021	Meeting with Planning Division of MPW to discuss Budget Cycle and Budgeting Processes
69)	Ministry of Public Works, BARMM	22 November 2021	Meeting to request data on budget and budget utilization of MPW
70)	Weekly Meeting by Zoom	26 November 2021	Weekly meeting with MPW Assessment Team
71)	Ministry of Public Works, BARMM	02 December 2021	Coordination with MPW to obtain Fund Utilization Data
72)	Weekly Meeting by Zoom	03 December 2021	Weekly meeting with MPW Assessment Team
73)	City Administrator’s Office	07 December 2021	Provided technical assistance to the Transport Planning Group of the City Government of Cotabato
74)	Ministry of Public Works, BARMM	09 December 2021	Meeting to verify the project proposal preparation and the budget process.
75)	Weekly Meeting by Zoom	10 December 2021	Weekly Meeting with MPW Assessment Team
76)	Weekly Meeting by Zoom	24 December 2021	Weekly Meeting with MPW Assessment Team
77)	Weekly Meeting by Zoom	07 January 2022	Weekly Meeting with MPW Assessment Team
78)	Human Resource Management Office, People’s Palace	02 February 2022	Coordination meeting with the Steering Committee and Technical Working Group to discuss the possible comment regarding the presentation of the Draft Final Report
79)	Office of the Secretary to the Mayor, People’s Palace	03 February 2022	Meeting to follow-up status of preparation of comments of the City Government on the Draft Final Report.
80)	Office of the City Mayor, People’s Palace	07 February 2022	Meeting with the Mayor and her staff to follow-up status of preparation of comments of the City Government on the Draft Final Report.

1.7 Organization of the Final Report

The Final Report is organized as follows:

Volume 1 (Main Text; Chapter 1 to Chapter 19)

Covers situational analysis, vision, future economic development framework, spatial development framework, land use plan, and sector plans.

Volume 2 (Main Text; Chapter 20 to Chapter 26)

Covers proposed institutional arrangement in Greater Cotabato Area, Overall Development Plan, and results of the Pre-Feasibility Studies.

Annexes (available in electronic files only)

Annex of Chapter 4

Annex 4.1 – Land Demand and Supply Analysis for Cotabato City

Annex of Chapter 5

Annex 5.1 - Transportation Surveys

Annex 5.2 - Road Condition Survey Sheet with Photographs

Annex 5.3 – Drainage Condition Survey Sheet with Photographs

Annex 5.4 - Straight Line Diagram of Surveyed Roads

Annex of Chapter 7

Annex 7.1 – Materials of the 1st Stakeholders Meeting

Annex 7.2 – Materials of the 2nd Stakeholders Meeting

Annex of Chapter 23

Annex 23.1- Traffic Demand Forecast Condition

Drawings

Part 1 - West Diversion Road

Part 2 - Mindanao River Southside Road

CHAPTER 2 OVERVIEW OF THE STUDY AREA

2.1 Natural Conditions

2.1.1 Topography

Cotabato City is a low-lying delta, bounded by the Rio Grande de Mindanao on the north and Tamontaka River on the south. It is located at the lowest portion of the province of Maguindanao, with around 70% of its total land area below sea level (Local DRRMP 2016-2022). The city is traversed by meandering bodies of water, including the Tarbung River, Pamang Creek, and Matampay River, among others. Low-lying marshlands and fishponds are situated in the outlying areas in the southeast and northwest portions of the city.

2.1.2 Geology

The soil profile of Cotabato City is primarily made up of soils classified as Tamontaka Clay and Faraon Clay. Tamontaka Clay is commonly found in the marshlands located at the southeastern portion of the city. This type of soil has high fertility and is suited for cultivation. It is also characterized by high water holding capacity, which means that the soil remains waterlogged after precipitation.

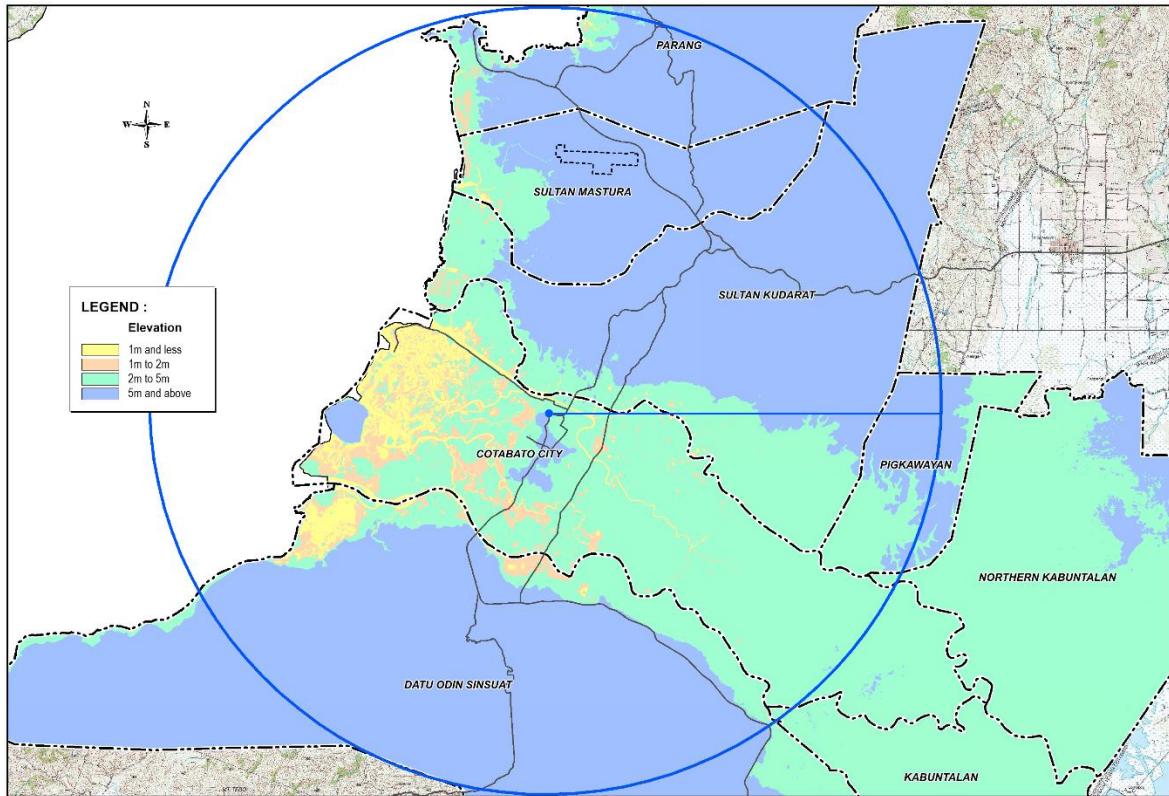
Faraon clay is the dominant soil type in the western portion of the city and is commonly found in fishponds. This type of soil has limited arability and is less suited for urban development due to its soil characteristics.

Currently, settlements continue to concentrate and expand in lands whose soil is classified as San Manuel Clay, which is suitable for cultivation and high-density urban development.

2.1.3 Elevation and Slope

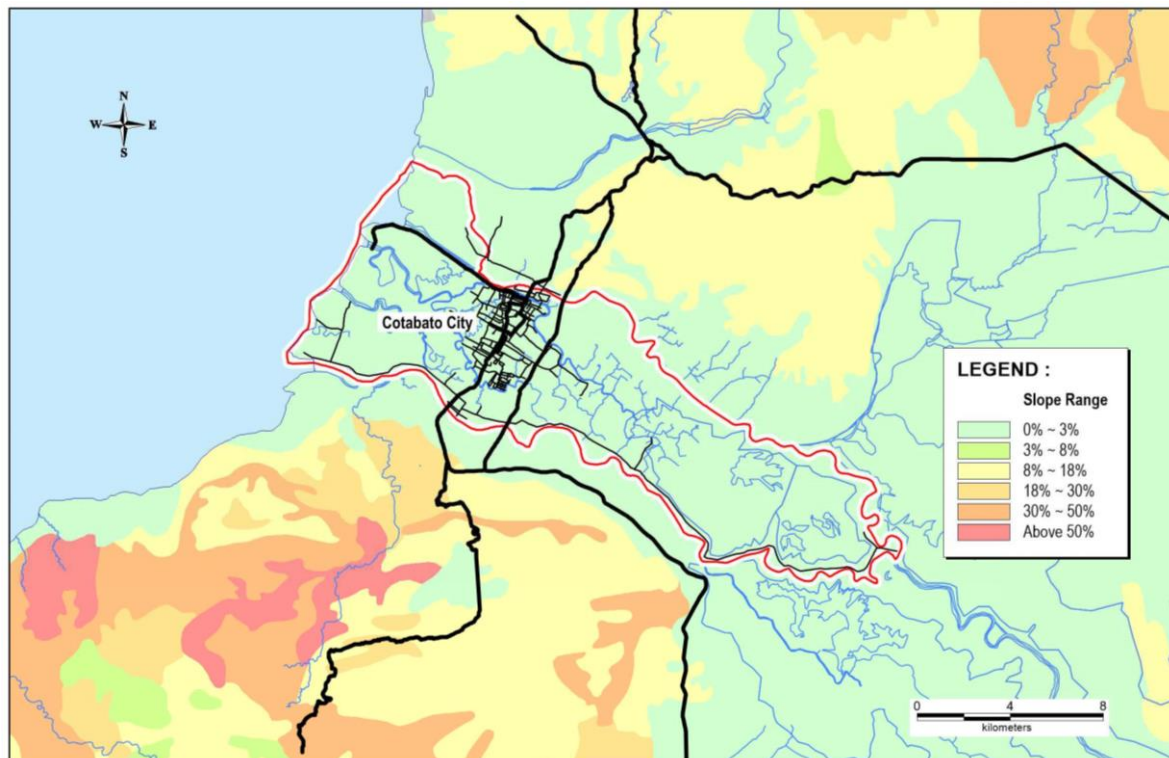
The elevation (Figure 2.1-1) and slope (Figure 2.1-2) profile of the Greater Cotabato Area show that Cotabato City is surrounded by municipalities of higher altitude in the north and south.

The city is generally characterized by low and flat terrains, except for two elevated areas – the Timako Hill along the coastline bordering the Illana Bay, and the Pedro Colina (PC) Hill. The central area of the city, where urban development takes place, is situated within the vicinity of PC Hill, with elevations ranging from 1 to 20 meters. The flat to mildly undulating slope profile of Cotabato City suggests that no significant erosion has occurred within the city.



Source: Prepared by the JICA Study Team based on IFSAR data of RNDP, 2018

Figure 2.1-1 Elevation Profile of Greater Cotabato Area



Source: Prepared by the JICA Study Team based on PhilGIS data

Figure 2.1-2 Slope Profile of Greater Cotabato Area

2.2 Natural Calamities

2.2.1 Flood

Cotabato City is susceptible to flooding, mainly due to the presence of major rivers and tributaries passing through several barangays. More than half of the city's total land area is below sea level and is therefore, highly vulnerable to tidal intrusion from sea water or from the overflow of the river system caused by incessant rains. The flood susceptibility map, as shown in Figure 2.2-1, indicates that the flood-prone areas include the low-lying barangays adjacent to the Rio Grande de Mindanao in the northern portion of the city and Tamontaka River in the southern part.

While Cotabato City experiences low chances of getting hit directly by typhoons, the city is surrounded by areas of higher elevation, and therefore serves as a catch basin for the floodwater of nearby provinces. Headwater coming from the mountain ranges of Agusan del Norte and Bukidnon all flow into the Liguasan Marsh before flowing into the Rio Grande de Mindanao, whose major outlets are in Cotabato City.

The city experienced three successive major flooding incidents from 2008 to 2011. Two of these incidents were caused by the damage brought by strong typhoons which did not even hit the city directly.

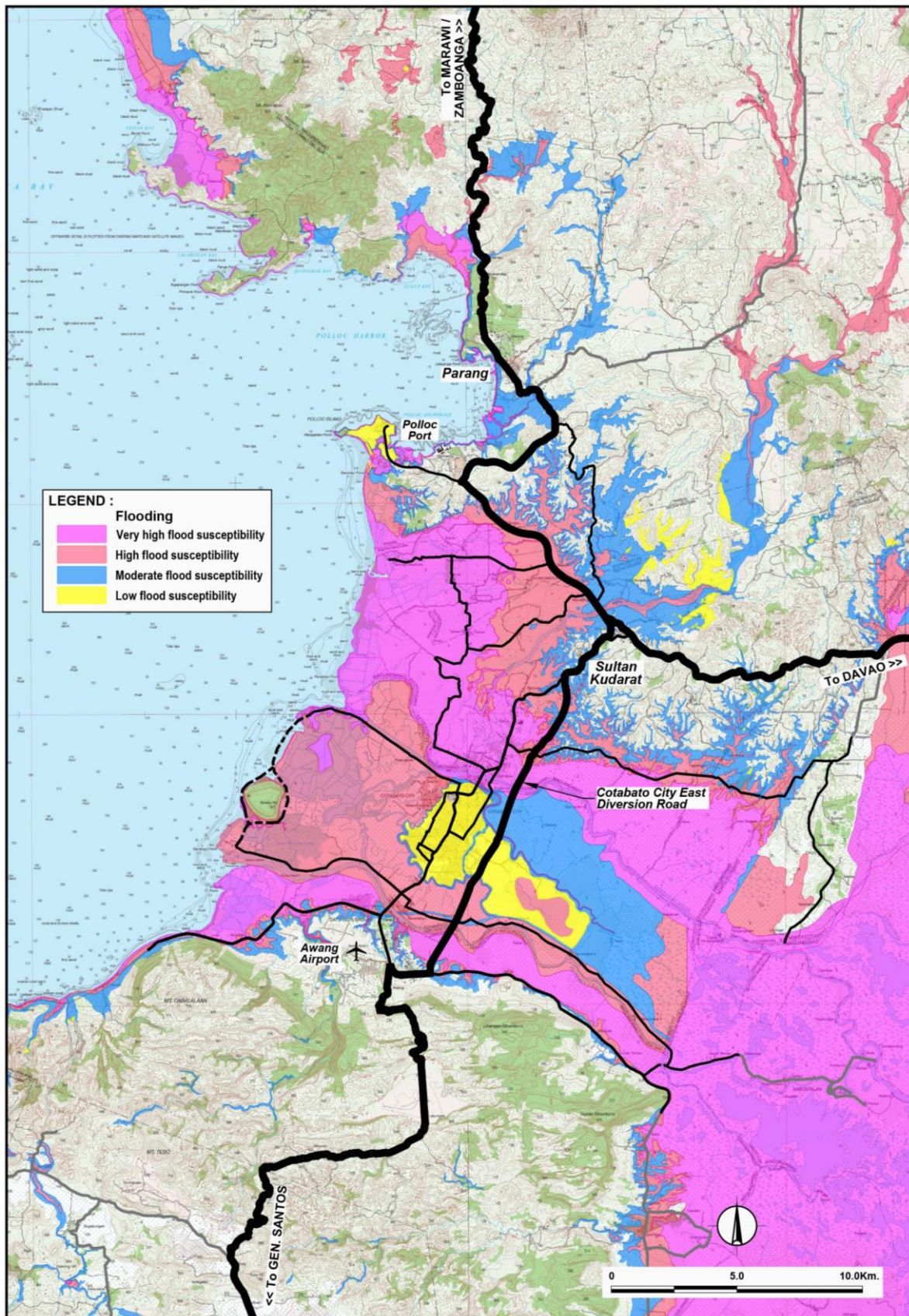
In 2008, the effects of Typhoon Frank (International Name: 'Fengshen') were magnified due to the water hyacinth accumulation at the Delta Bridge. The infestation blocked the natural flow of water from the Rio Grande de Mindanao to other tributaries, causing water to spill over to low-lying areas, as shown in Figure 2.2-2. A total of 32 barangays were affected in Cotabato City and 9 casualties were recorded. In 2009, Typhoon Jolina (International Name: 'Pakhar') inundated 36 out of 37 barangays, affecting over 36,000 families for several weeks. Figure 2.2-3 shows the areas mostly affected by the typhoon.

In 2011, heavy rains took place for about two weeks, even though no typhoon was expected to hit any part of Mindanao. Two casualties were recorded, and the number of families affected was higher by 64% compared to Typhoon Frank. The city government estimated that around one-third of the entire population of Cotabato City were affected by the 2011 flood.

Table 2.2-1 Historical Record of Major Floods in Cotabato City (2008 - 2011)

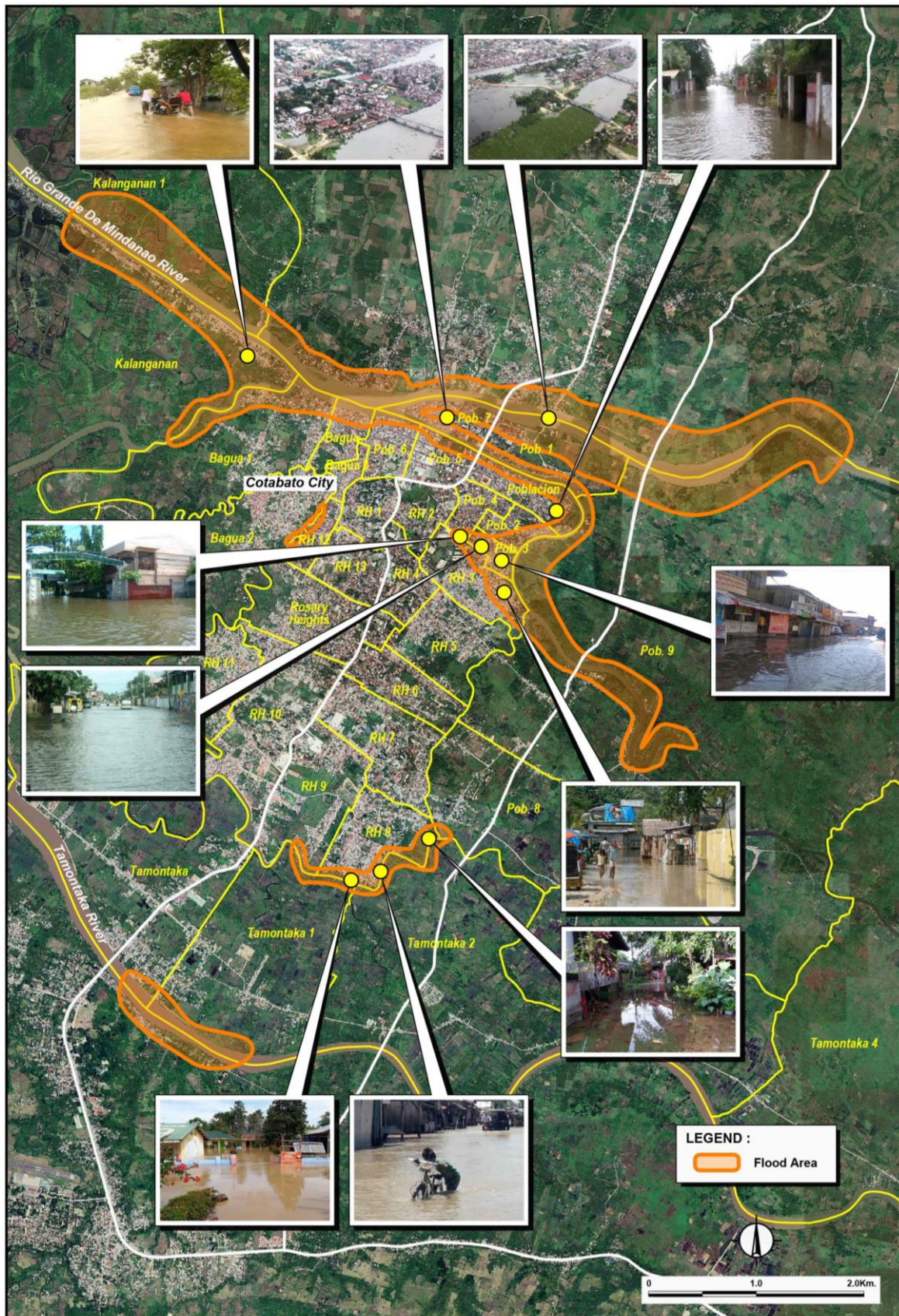
Occurrence	Date of occurrence	Number of families affected	Number of families in evacuation centers	Number of casualties	Number of totally damaged houses
Typhoon Frank (I.N. Fengshen)	June 2008	23,916	3,723	9	148
Typhoon Jolina (I.N. Pakhar)	July 2009	36,051	3,171	6	40
2011 Flood	June 2011	39,112	8,333	2	650

Source: Comprehensive Land Use Plan of Cotabato City (2011-2020)



Source: Prepare by the JICA Study Team based on DENR – EMB data

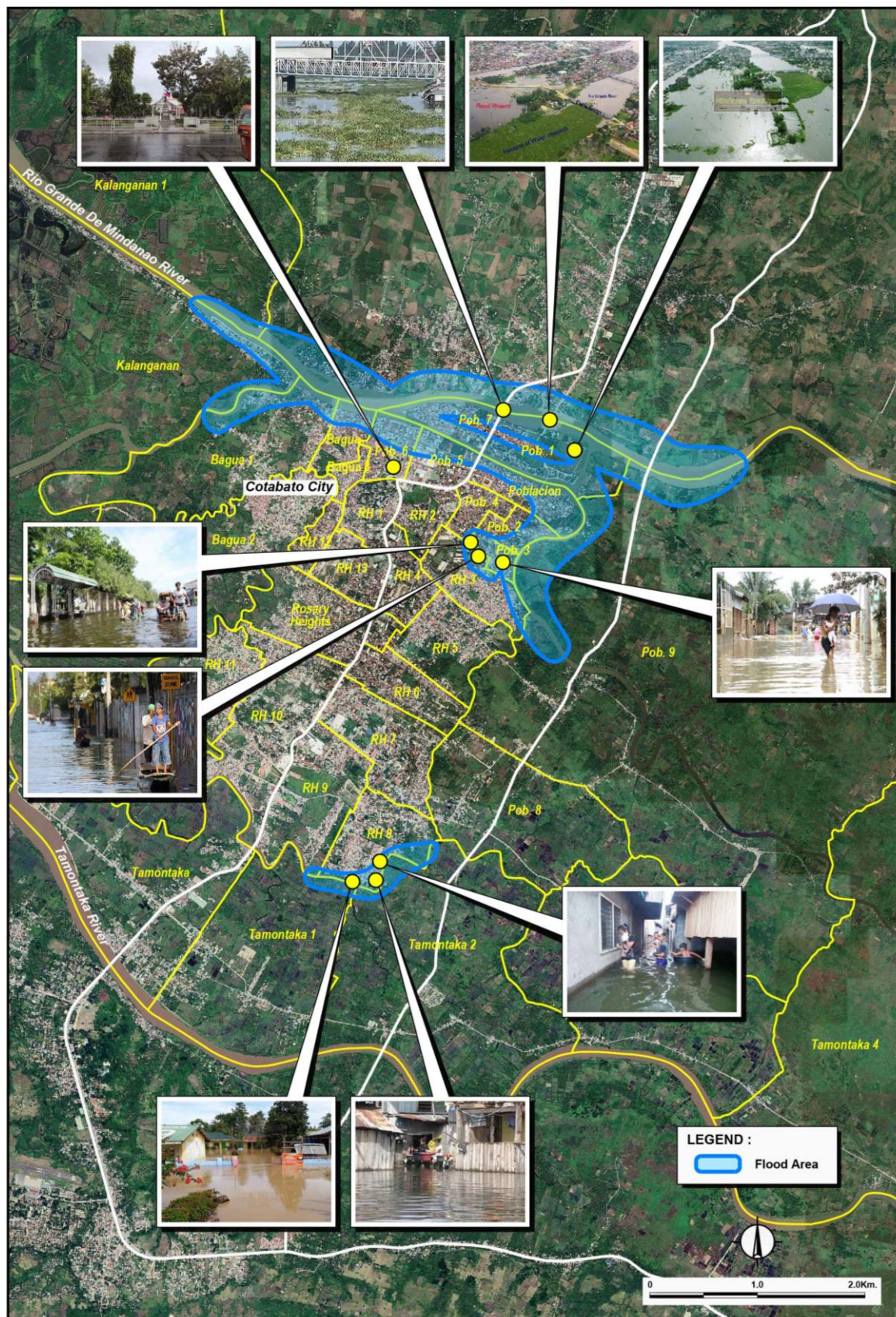
Figure 2.2-1 Flood Susceptibility Map of the Greater Cotabato Area



Note: Map shows some parts only of the inundated area. Not indicative of the actual flood line which varies regularly.

Source: Prepared by JICA Study Team based on various plans including CLUP 2011-2020, DRRMP 2016-2022 among others

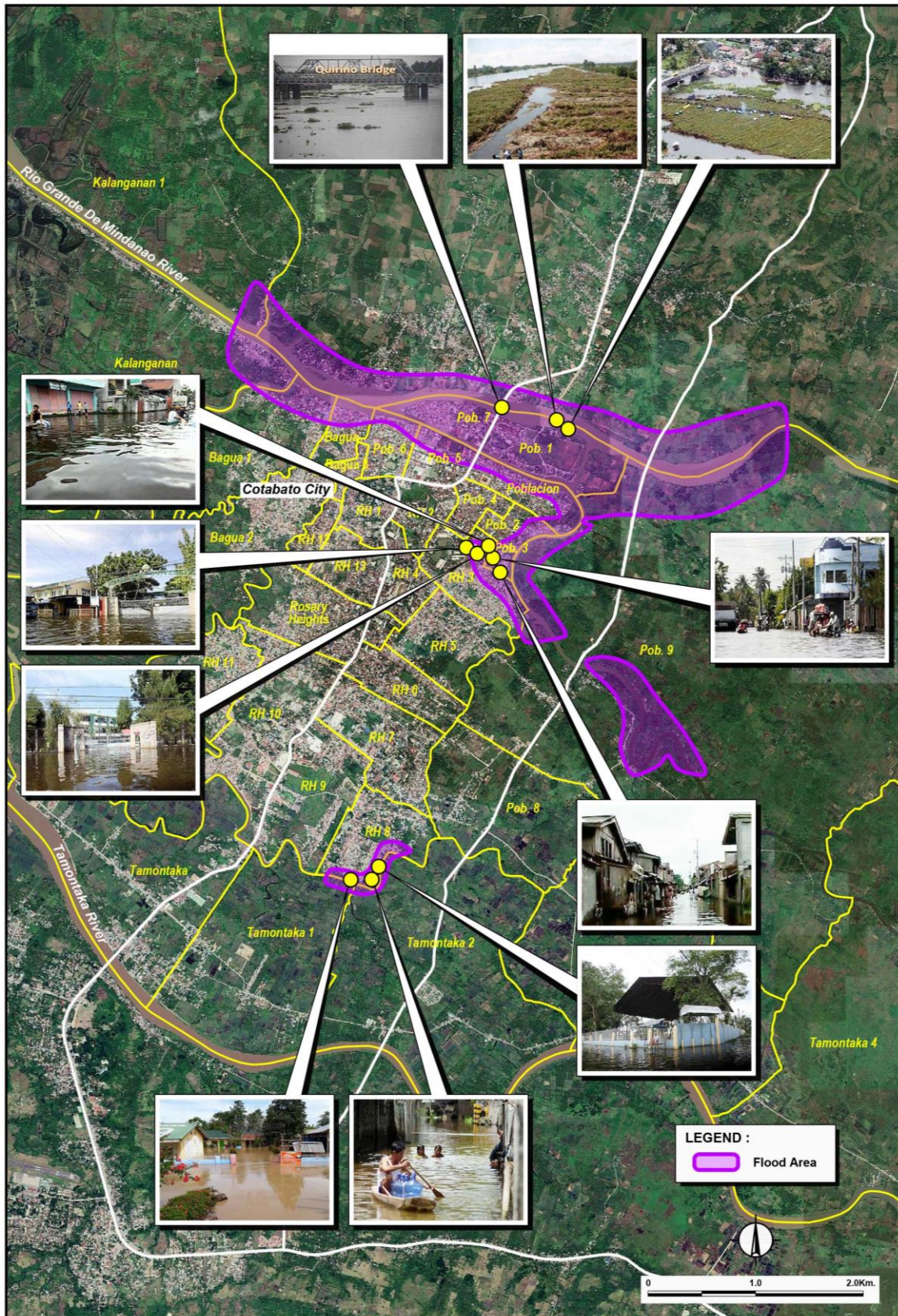
Figure 2.2-2 Flood Level in Cotabato City (Typhoon Frank, 2008)



Note: Map shows some parts only of the inundated area. Not indicative of the actual flood line which varies regularly.

Source: Prepared by JICA Study Team based on various plans including CLUP 2011-2020, DRRMP 2016-2022 among others

Figure 2.2-3 Flood Level in Cotabato City (Typhoon Jolina, 2009)



Note: Map shows some parts only of the inundated area. Not indicative of the actual flood line which varies regularly.

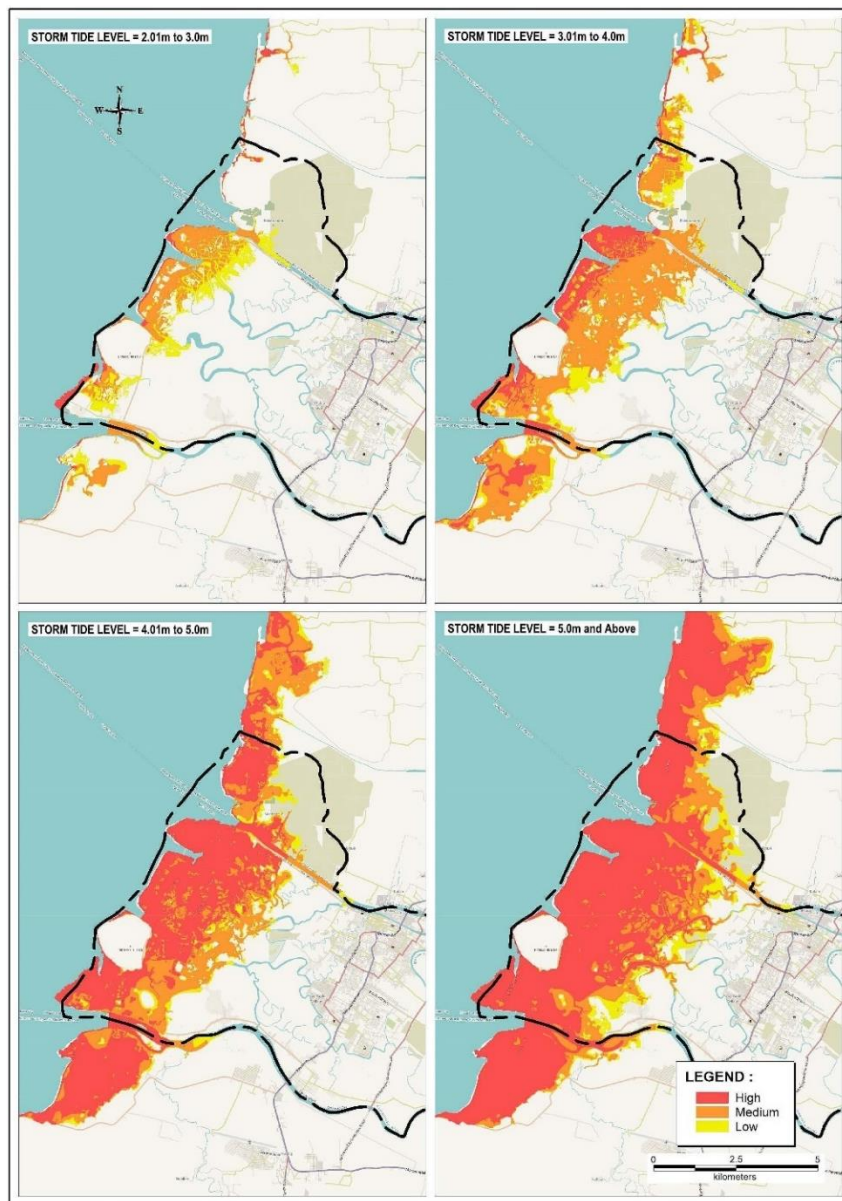
Source: Prepared by JICA Study Team based on various plans including CLUP 2011-2020, DRRMP 2016-2022 among others

Figure 2.2-4 Flood Level in Cotabato City (2011)

2.2.2 Storm Surge

A storm surge refers to the abnormal rise of seawater that is pushed inland by a storm. Project Nationwide Operational Assessment of Hazard (NOAH) under the Department of Science and Technology (DOST) had identified Cotabato City among the coastal areas of the country which are vulnerable to storm surges.

The project also developed different hazard maps that could predict the level of floodwaters depending on the projected height of the storm surge, as shown in Figure 2.2-5. The map indicates that a storm surge that is up to five meters or above in height could potentially submerge the following barangays near the coastline: Kalanganan Mother, Kalanganan I, Kalanganan II and portions of Bagua I and Bagua II.

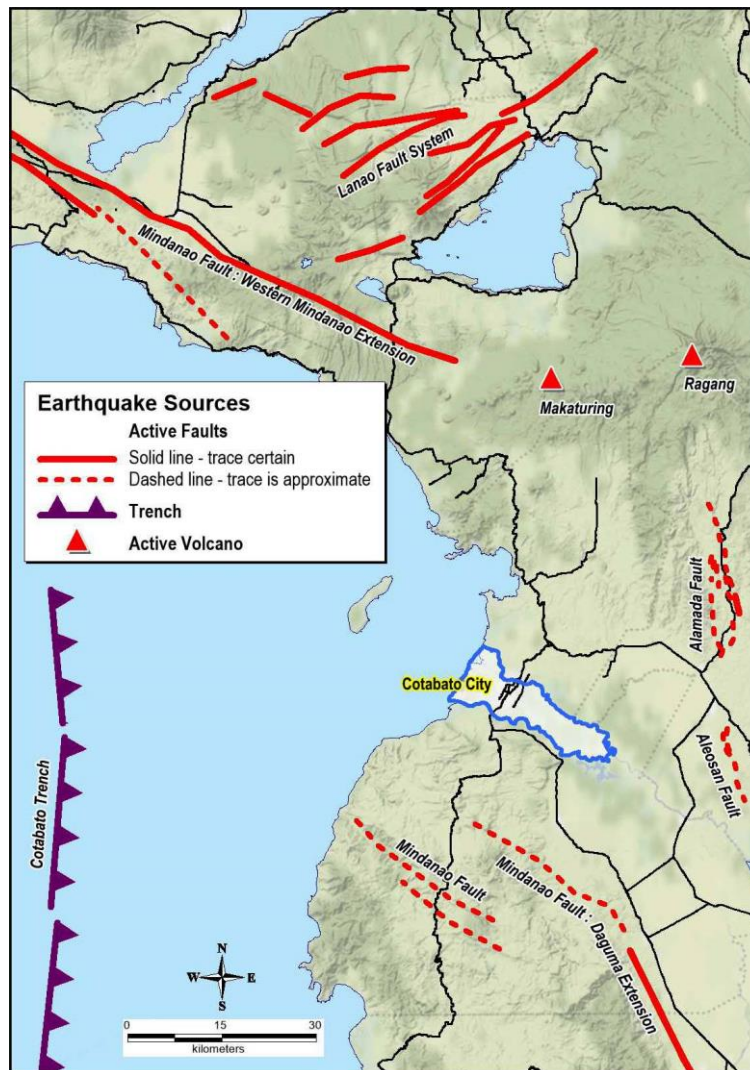


Source: DOST – Project NOAH

Figure 2.2-5 Storm Surge Hazard Map of the Greater Cotabato Area

2.2.3 Earthquake

Mindanao is one of the most seismically active regions in the country, mainly due to the presence of several active fault systems, as shown in Figure 2.2-6. The nearest active fault from Cotabato City is the Mindanao Fault (Daguma Extension), which is approximately 25 km. away from the city center. According to the seismic hazards assessment of the Philippine Institute of Volcanology and Seismology (PHIVOLCS), the city is generally safe from ground rupture, but is susceptible to ground shaking and liquefaction.



Source: DOST – PHIVOLCS

Figure 2.2-6 Active Faults, Trenches and Volcanoes Near Cotabato City

The most damaging earthquake recorded in Cotabato City was the Moro Gulf Earthquake, which occurred on August 17, 1976. The 7.9 magnitude earthquake, whose epicenter was located 60 miles offshore from the city, was classified as destructive (Intensity VII) leaving an estimated total of 8,000¹ people dead or missing.

In March 2002, another major earthquake – the 6.8 magnitude Palimbang Earthquake was felt in Cotabato City. According to PHIVOLCS, the occurrence was caused by the

¹ Moro Gulf Tsunami of 17 August 1976, Badillo, V.L. and Astilla, Z.C.

subduction along the Cotabato Trench and its epicenter was very near the location of the 1976 M7.9 earthquake.

2.2.4 Tsunami

A tsunami is defined as a series of sea waves, with heights that could be greater than 5 meters and often generated by earthquakes, volcanic eruptions, or underwater landslides. The coastal areas of the Philippines are vulnerable to tsunamis due to the existence of offshore faults and trenches such as the Philippine Trench, Manila Trench, and Negros Trench. The hazard maps produced by PHIVOLCS identify majority of Cotabato City’s coastal areas as prone to potential damages caused by tsunamis due to their proximity to the Cotabato Trench.

The tsunami hazard map of the Greater Cotabato Area, as shown in Figure 2.2-7, is produced via the simulation of an 8.0 magnitude earthquake generated by the Cotabato Trench. The earthquake model yielded an 8.82-meter wave height approaching the coast of the city, which could potentially affect an estimated 64% of the total population of Cotabato City. The impact of an 8.0M earthquake-induced tsunami could lead to thousands of casualties, and destruction of properties including national roads.

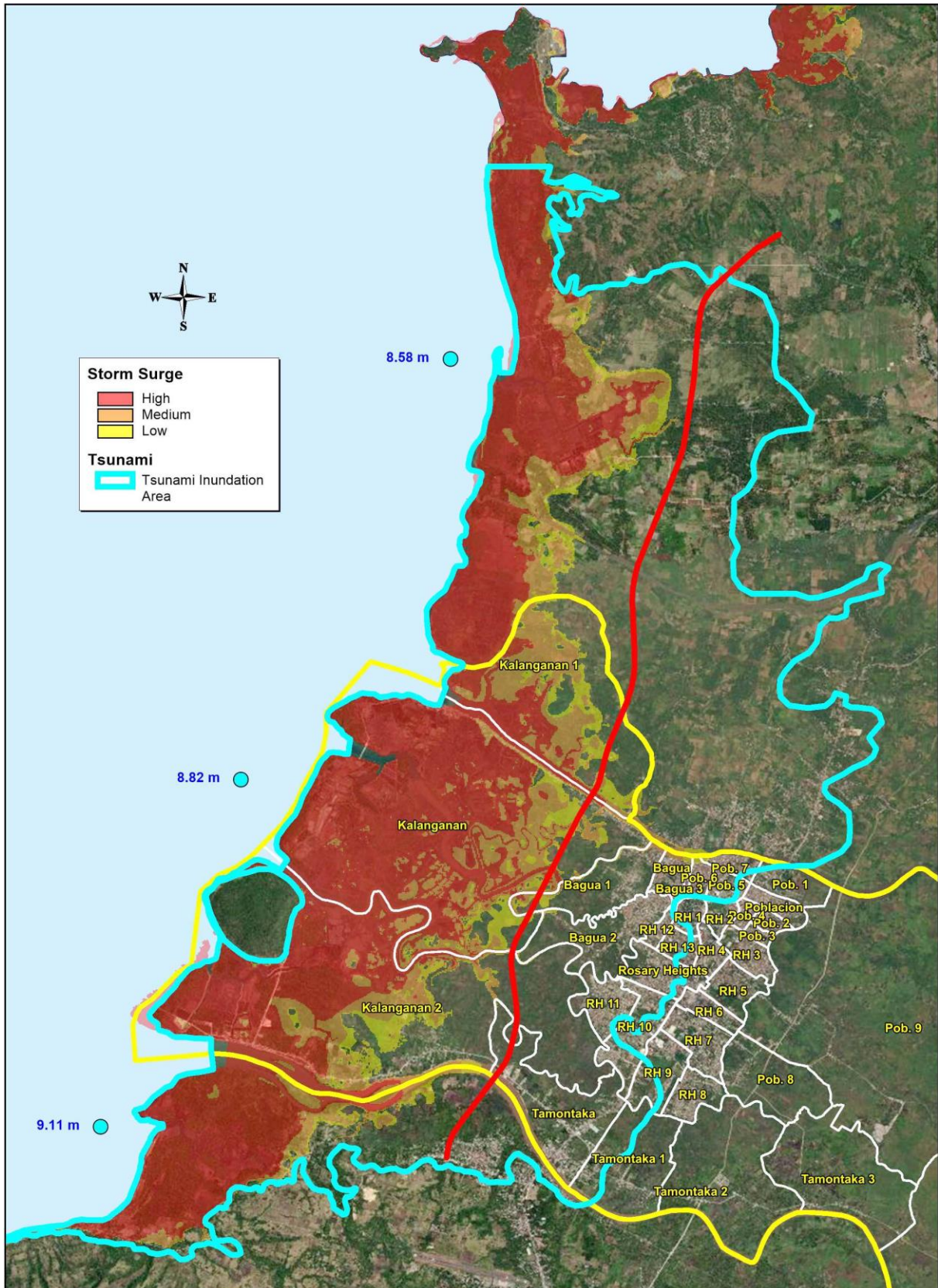
Table 2.2-2 Potentially Affected Barangays in Cotabato City by an 8.0M Earthquake-Induced Tsunami

Barangay	% Share in the City Population	Barangay	% Share in the City Population
Bagua Mother	6.1%	Rosary Heights Mother	4.7%
Bagua 1	3.1%	Rosary Heights 1	1.3%
Bagua 2	6.6%	Rosary Heights 2	1.7%
Bagua 3	2.3%	Rosary Heights 9	2.6%
Kalanganan Mother	5.0%	Rosary Heights 10	5.3%
Kalanganan 1	1.9%	Rosary Heights 11	2.6%
Kalanganan 2	2.0%	Rosary Heights 12	1.6%
Poblacion 1	1.9%	Rosary Heights 13	1.7%
Poblacion 5	1.0%	Tamontaka Mother	4.0%
Poblacion 6	1.7%	Tamontaka 1	1.5%
Poblacion 7	5.2%		
Estimated Total		63.7%	

Source: JICA Study Team, based on the tsunami hazard map produced by PHIVOLCS

Cotabato City was among the communities directly affected by the 1976 Moro Gulf Tsunami, which is considered as the most devastating tsunamigenic earthquake experienced by the Philippines. The tsunami waves went as far as 1 to 2 kilometers inland of Cotabato City damaging at least 1,300 houses, 8 school buildings, 4 public buildings and 200 fishponds. The tsunami waves alone left around 57 people dead, 21 people missing, and 3,474 homeless² within the areas of Kalanganan and Tamontaka.

² Moro Gulf Tsunami of 17 August 1976, Badillo, V.L. and Astilla, Z.C.



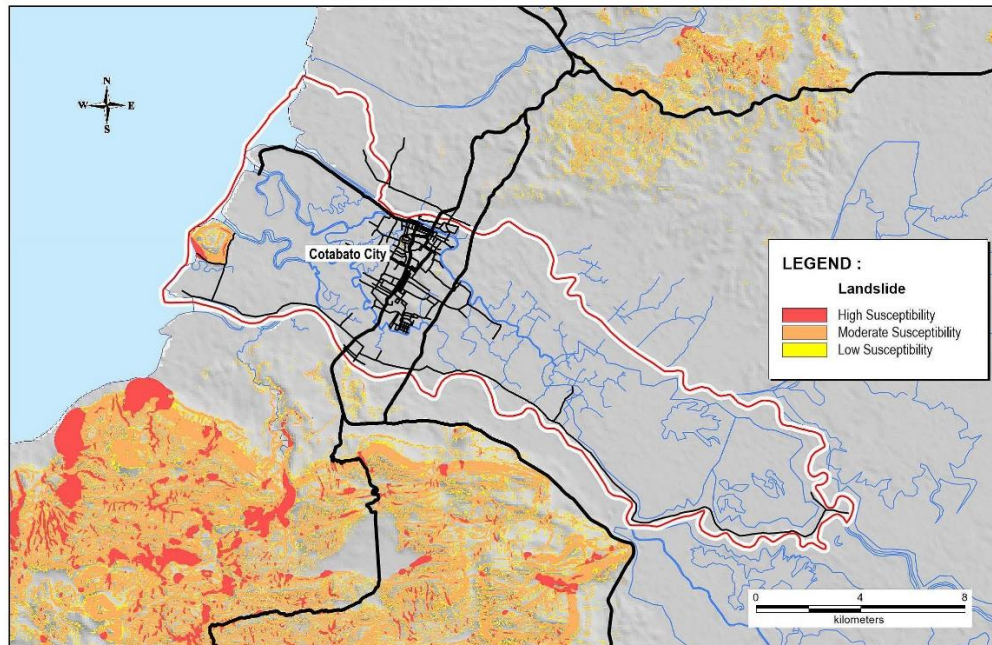
Source: Philippine Institute of Volcanology and Seismology

Figure 2.2-7 Tsunami Hazard Map of the Greater Cotabato Area

2.2.5 Other Calamities

Landslides

Landslides are often associated with mountainous regions, particularly in areas with steep slopes. Figure 2.2-8 suggests that the flat landscape of Cotabato City makes it generally safe from earthquake-induced landslides, except for the steep slopes found in Timako Hill.



Source: DOST – Project NOAH

Figure 2.2-8 Landslide Susceptibility Map of the Greater Cotabato Area

Volcanic hazards

Likewise, PHIVOLCS has identified the entire Cotabato City to be safe from volcanic hazards (e.g. pyroclastic flow and surge, lava flow, ballistic bomb, and tephra flow). The nearest active volcano from the city center is Mt. Makaturing (around 50 km. away), whose last recorded volcanic activity was in 1882.

Severe wind

Mindanao has been reported as nearly free from severe wind conditions such as severe storms and tropical cyclones. According to the severe wind risk assessment of PAGASA, Cotabato City, in particular, has the potential to experience a tropical storm (60 to 88 kph wind speed) with a 20-year return period (5% chance of happening in any given year) or a severe wind tropical storm (88.1 to 117 kph wind speed) with a 500-year return period (0.2% chance of happening in any given year). Historical records³ show that such typhoons occurred within the area in October 1898 and October 1909.

³ Selga, M. (1935) Charts of remarkable typhoons in the Philippines 1902–1934. Catalogue of typhoons 1348–1934. Manila Weather Bureau, Manila

2.3 Socio-Economic Conditions

2.3.1 Population

The Philippine population officially crossed the 100-million mark, according to the 2015 national census. The country's population of 101 million in 2015 was 8.6 million (9%) higher than the population in 2010, translating into an annual growth rate of 1.72% over the five-year period. This rate is slower than the 1.90% annual growth experienced by the country from 2000 to 2010. The population distribution in the Philippines is shown in Table 2.3-1.

Among the three major island groups, Mindanao held the second highest share in population, comprising 24% of the national total in 2015. Mindanao also recorded the highest annual growth rate at 1.81% from 2010 to 2015.

Table 2.3-1 Population Distribution in the Philippines, by Major Island Group

Area	Population			% share to the national total (2015)	Average Annual Growth Rate (%)	
	2000	2010	2015		2000-2010	2010-2015
Philippines	76,506,928⁴	92,337,852⁵	100,981,437⁶	100%	1.90	1.72
Luzon	42,822,878	52,362,999	57,470,097	57%	2.03	1.79
Visayas	15,528,346	18,003,940	19,373,431	19%	1.49	1.41
Mindanao	18,133,864	21,968,174	24,135,775	24%	1.94	1.81

Source: Philippine Statistics Authority

The total population of the Greater Cotabato Area reached 672,100 in 2015. Cotabato City had the highest share in the population at 45%, followed by Datu Odin Sinsuat (15%) and Sultan Kudarat (14%). Sultan Mastura had the lowest share among all municipalities at 3%. In terms of land area, Parang and Sultan Kudarat had the highest share at 31% and 26%, respectively.

The population within the study area grew at an annual rate of 2.6% from 2010 to 2015. The fastest growing municipalities over the five-year period (2010-2015) include Datu Odin Sinsuat (5.1% per annum) and Parang (3.8% per annum).

⁴ Includes the counts in the disputed barangays (19,181) and Filipinos in Philippine Embassies, Consulates and Mission Abroad (2,851)

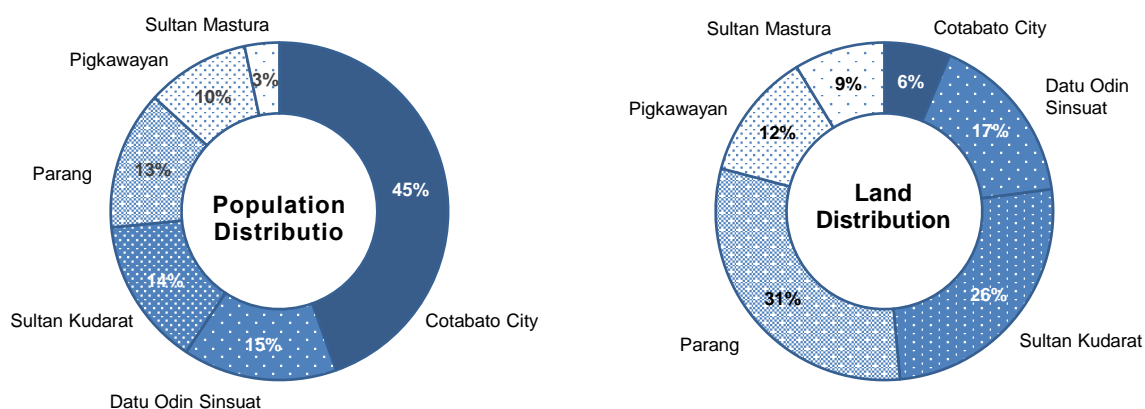
⁵ Includes Filipinos in Philippine Embassies, Consulates and Mission Abroad (2,739)

⁶ Includes Filipinos in Philippine Embassies, Consulates and Mission Abroad (2,134)

Table 2.3-2 Population and Population Density of Municipalities in the Greater Cotabato Area

City/Municipality	Population		Annual Growth Rate, 2010-2015	Land Area (ha.)	Population Density, 2015 (person/ha.)
	2010	2015			
Cotabato City	271,786	299,438	1.9%	17,600	17
Datu Odin Sinsuat	76,332	99,210	5.1%	46,180	2
Sultan Kudarat	82,758	95,201	2.7%	71,291	1
Parang	73,328	89,194	3.8%	85,078	1
Pigkawayan	59,975	66,796	2.1%	34,011	2
Sultan Mastura	21,712	22,261	0.5%	24,207	1
Total	585,891	672,100	2.6%	278,367	2

Source: Philippine Statistics Authority

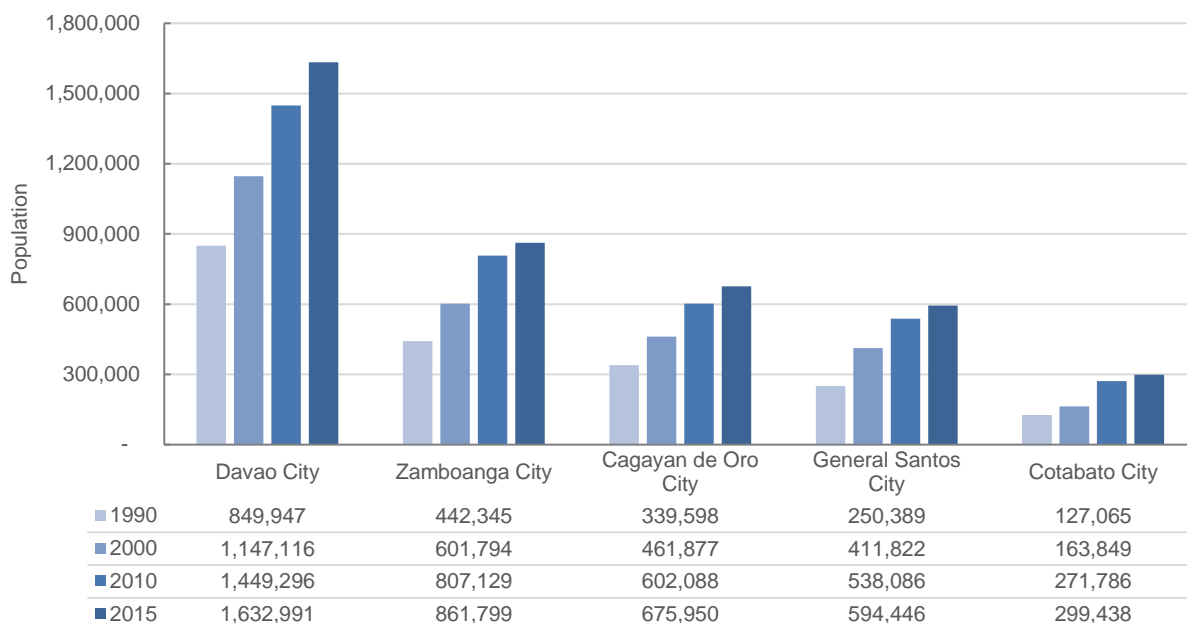


Source: Philippine Statistics Authority

Figure 2.3-1 Population and Land Distribution among Municipalities in the Greater Cotabato Area

Cotabato City, with a population of 299,438, was the seventh most populous city in Mindanao in 2015. The independent component city had a share of 1.2% of the entire Mindanao population and 0.3% of the national population.

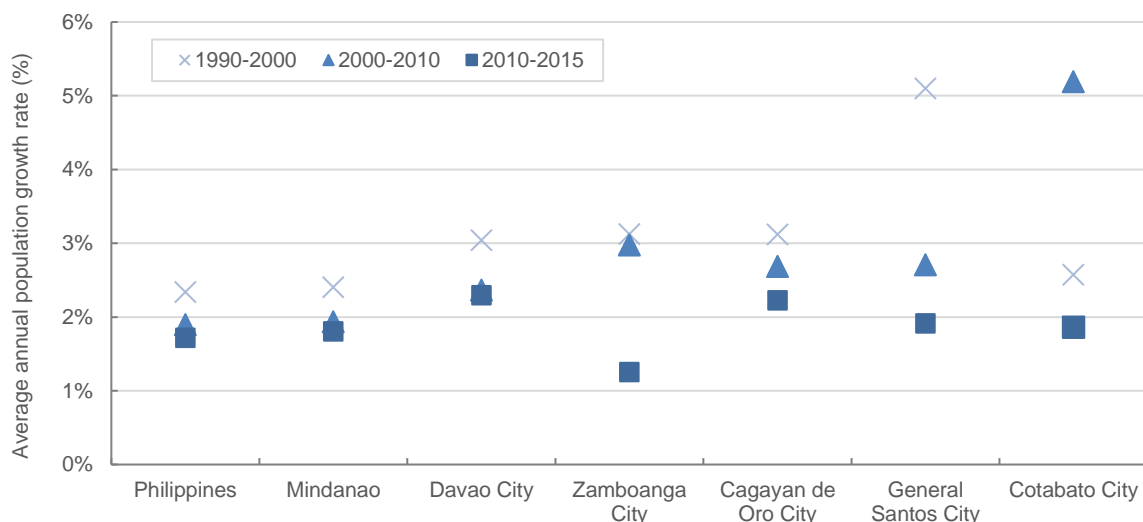
The 2015 population of Cotabato City represented an increase of 27,652 (10%) over the 2010 census figure (271,786), indicating an annual growth rate of 1.86%. If this trend continues, the population of Cotabato City is expected to double in 38 years. The rapid growth of population of major cities in Mindanao for the past 25 years is reflected in Figure 2.3-2.



Source: Philippine Statistics Authority

Figure 2.3-2 Population of Major Cities in Mindanao (1990-2015)

While this expansion is slower than the 5.19% growth experienced from 2000 to 2010, Cotabato City consistently recorded annual growth rates higher than the national average since 1990. The population growth rates of major cities in Mindanao are visualized in Figure 2.3-3.



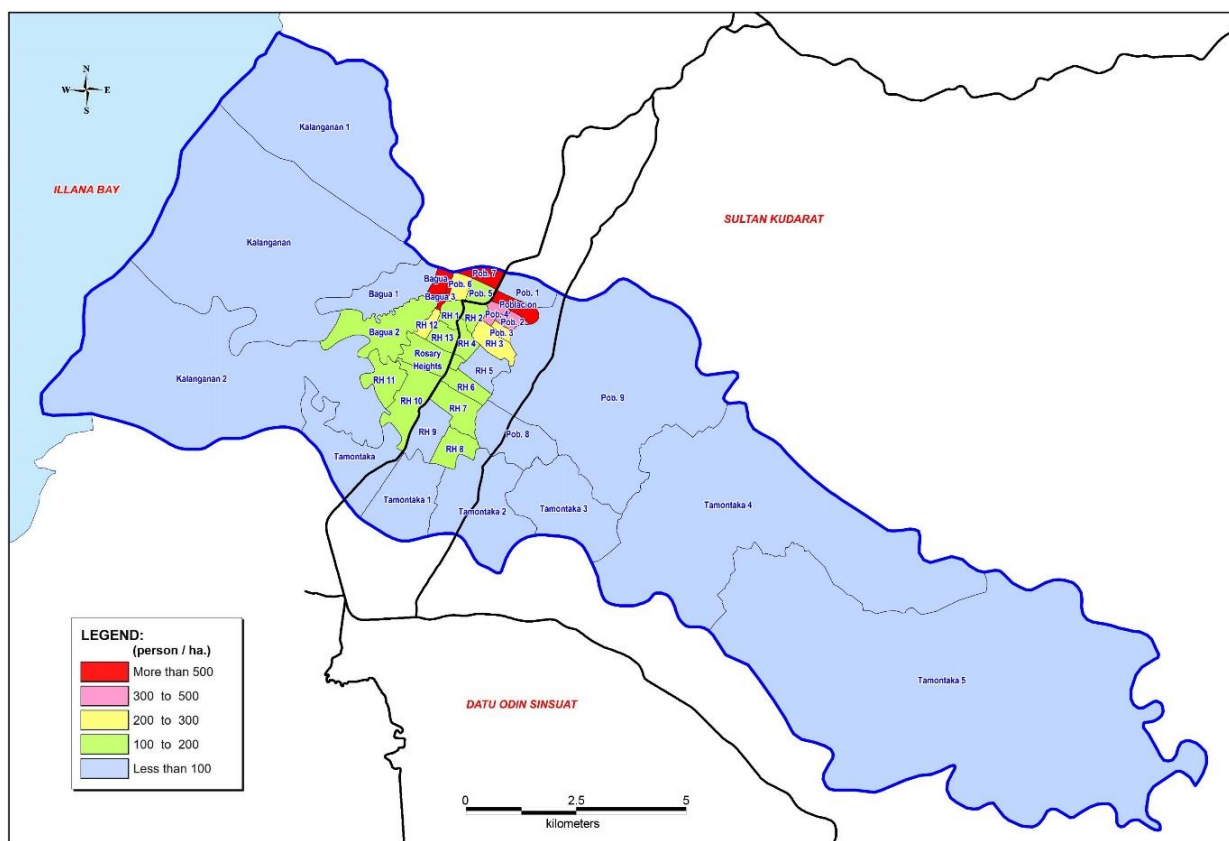
Source: Philippine Statistics Authority

Figure 2.3-3 Population Growth Rate of Major Cities in Mindanao (1990-2015)

The population density map, as shown in Figure 2.3-4, describes the spatial distribution within Cotabato City. The map reveals that the population tends to cluster within the central areas of the city, resulting into densities greater than 300 and 500 persons per hectare in some barangays. The four most densely populated barangays (Poblacion Mother, Poblacion VII, Bagua Mother and Bagua III) are located adjacent to the Rio Grande de Mindanao, which is the longest river in Mindanao. Sparsely populated barangays are observed to be situated radially outward from these areas.

In general, there is an on-going effort by the City Government of Cotabato to relocate informal settlers who have high presence in these four barangays. Aside from the hazard of having their houses along the water flow, provision of services is difficult due to the lack of road access. However, the total number of informal settlers to be addressed by the City Government is too high (14,040), hence it was difficult to provide them housing projects.

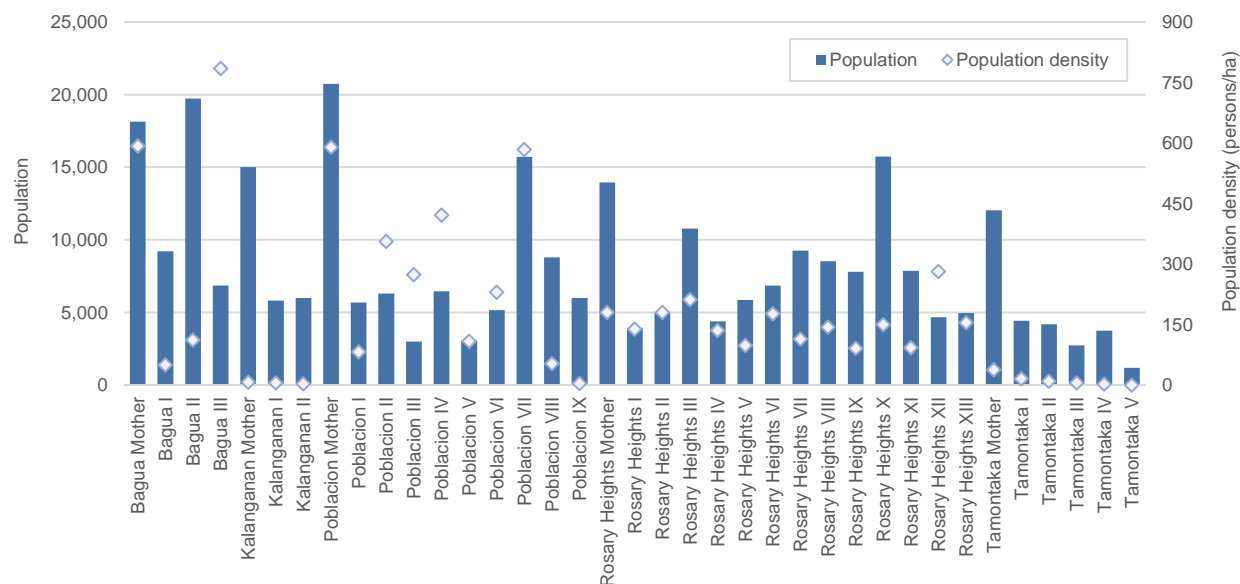
The population density of the entire Cotabato City (17 persons/ha.), with a land mass of 15.2 hectares (out of the 17,599 hectares of total area of the city) is still low, but slightly above Cagayan de Oro City (16 persons/ha.) and Davao City (7 persons/ha.). In contrast, the City of Manila recorded a population density of 713 persons/hectare in 2015.



Source: JICA Study Team

Figure 2.3-4 Population Density of Cotabato City, by Barangay (2015)

Poblacion Mother was the most populous among 37 barangays, making up 6.9% of the total population of Cotabato City. In contrast, Tamontaka V was the least populated barangay with 0.4% share. The population and population density per barangay of Cotabato City are shown in Figure 2.3-5 and Table 2.3-3.



Source: Philippine Statistics Authority

Figure 2.3-5 Population and Population Density of Cotabato City, by Barangay (2015)

Table 2.3-3 Historical Data on the Population of Cotabato City, by Barangay (1990-2015)

Barangay	Area (ha.)	Population				Average Annual Growth Rate (%)			Population density (persons/ha.) ⁷
		1990	2000	2010	2015	1990-2000	2000-2010	2010-2015	
Cotabato City	17,599.2	127,065	163,849	271,786	299,438	2.58	5.19	1.86	17
Bagua Mother	30.6	9,239	9,521	18,050	18,137	0.30	6.61	0.09	592.8
Bagua I	185.6	3,598	4,605	7,036	9,206	2.50	4.33	5.25	49.6
Bagua II	176.6	3,195	4,037	19,301	19,720	2.37	16.94	0.41	111.7
Bagua III	8.7	4,351	4,148	6,802	6,847	(0.48)	5.07	0.13	784.7
Kalanganan Mother	2206.7	4,187	6,377	14,810	15,019	4.30	8.79	0.27	6.8
Kalanganan I	1158.5	1,688	2,172	5,718	5,808	2.55	10.16	0.30	5.0
Kalanganan II	2107.4	1,609	1,426	5,115	5,999	(1.20)	13.62	3.08	2.8
Poblacion Mother	35.2	8,377	9,707	18,857	20,734	1.48	6.87	1.82	589.4
Poblacion I	68.6	3,125	3,163	4,463	5,677	0.12	3.50	4.69	82.8
Poblacion II	17.7	3,454	4,437	6,241	6,302	2.54	3.47	0.19	356.4

⁷ The area used in the computation of population density excludes creeks and rivers.

*Data Collection Survey on Urban Infrastructure Development in Greater Cotabato City
Final Report*

Barangay	Area (ha.)	Population				Average Annual Growth Rate (%)			Population density (persons/ha.) ⁷
		1990	2000	2010	2015	1990-2000	2000-2010	2010-2015	
Poblacion III	10.9	2,272	2,259	2,807	2,985	(0.06)	2.20	1.18	274.0
Poblacion IV	15.3	4,975	3,579	6,406	6,456	(3.24)	5.99	0.15	420.9
Poblacion V	28.3	3,559	1,494	2,929	3,070	(8.31)	6.96	0.90	108.4
Poblacion VI	22.4	3,119	2,055	5,096	5,151	(4.09)	9.51	0.20	230.2
Poblacion VII	26.9	6,897	11,149	15,485	15,712	4.92	3.34	0.28	583.6
Poblacion VIII	166.8	914	2,250	6,580	8,786	9.43	11.33	5.66	52.7
Poblacion IX	1594.5	1,176	1,726	5,893	5,998	3.91	13.07	0.34	3.8
Rosary Heights Mother	77.3	6,147	7,450	13,031	13,943	1.94	5.75	1.30	180.3
Rosary Heights I	28.3	3,510	5,060	4,708	3,931	3.73	(0.72)	(3.38)	138.7
Rosary Heights II	27.8	5,319	5,829	4,742	5,006	0.92	(2.04)	1.04	179.9
Rosary Heights III	50.9	4,156	8,760	9,123	10,786	7.74	0.41	3.24	212.0
Rosary Heights IV	32.3	2,897	3,412	4,304	4,377	1.65	2.35	0.32	135.7
Rosary Heights V	59.9	2,480	3,000	3,994	5,870	1.92	2.90	7.61	98.0
Rosary Heights VI	38.7	4,849	4,654	5,107	6,846	(0.41)	0.93	5.74	176.8
Rosary Heights VII	81.2	2,761	3,460	7,566	9,257	2.28	8.14	3.92	114.1
Rosary Heights VIII	59.5	5,008	6,729	6,523	8,524	3.00	(0.31)	5.23	143.1
Rosary Heights IX	85.9	2,389	4,332	6,008	7,802	6.13	3.32	5.10	90.9
Rosary Heights X	105.0	5,293	10,699	13,025	15,732	7.29	1.99	3.66	149.9
Rosary Heights XI	84.7	801	4,426	6,027	7,864	18.64	3.14	5.20	92.8
Rosary Heights XII	16.5	2,411	2,601	4,554	4,664	0.76	5.76	0.46	281.9
Rosary Heights XIII	32.0	4,590	4,281	4,500	4,947	(0.69)	0.50	1.82	154.7
Tamontaka Mother	315.0	3,552	6,200	11,669	12,027	5.73	6.53	0.58	38.2
Tamontaka I	280.9	1,023	1,775	3,743	4,423	5.67	7.75	3.23	15.7
Tamontaka II	461.9	1,044	1,856	4,034	4,184	5.92	8.07	0.70	9.1
Tamontaka III	525.5	1,023	2,256	2,679	2,730	8.23	1.73	0.36	5.2
Tamontaka IV	1880.3	988	1,591	2,446	3,741	4.88	4.39	8.43	2.0
Tamontaka V	5494.8	1,089	1,373	2,414	1,177	2.34	5.81	(12.79)	0.2

Source: Philippine Statistics Authority

2.3.2 Households

Table 2.3-4 shows the household population of all city/municipalities in the Greater Cotabato Area. All municipalities, except for Pigcawayan (4.2), recorded household sizes above the national average (4.4) in 2015.

Table 2.3-4 Number of Households and Average Household Size in the Greater Cotabato Area (2015)

City/Municipality	Household Population	Number of Households	Average Household Size
Cotabato City	298,223	58,866	5.1
Datu Odin Sinsuat	98,774	17,088	5.8
Sultan Kudarat	95,193	15,652	6.1
Parang	89,143	5,307	5.8
Pigcawayan	66,604	15,826	4.2
Sultan Mastura	22,221	3,864	5.8

Source: Philippine Statistics Authority

The recorded household population of Cotabato City reached 298,223, making up 99.6% of the total population in 2015. The remaining 0.4% (1,215 persons) is comprised of institutional persons (i.e., persons living in prisons, convents/seminaries, military camps, etc.).

The total number of households in 2015 was 58,866, translating into an average household size (AHS) of 5.1 persons. The recorded figure in 2015 was higher than the AHS of 4.9 persons in 2010. The household population of Cotabato City from 2000 to 2015 is shown in Table 2.3-5.

Table 2.3-5 Historical Household Data of Cotabato City (2000-2015)

Census Year	Household Population	Number of Households	Average Household Size
2015	298,223	58,866	5.1
2010	271,609	55,171	4.9
2000	161,517	31,227	5.2

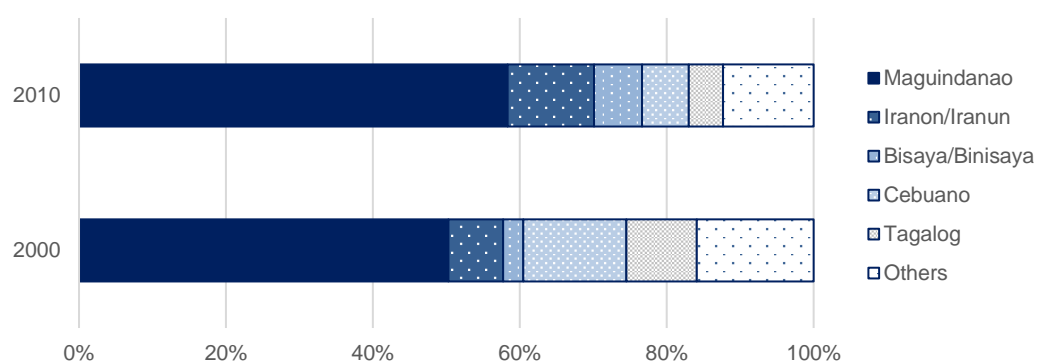
Source: Philippine Statistics Authority

2.3.3 Culture and Ethnic Diversity

(1) Ethnic Diversity

Maguindanaon remained the dominant ethnic group in Cotabato City, with almost three-fifths share of the household population in 2010. The Maguindanaon population increased from 81,205 (50% share) in 2000 to 158,496 (58%) in 2010. Iranon/Iranun was the second most common ethnic group in the city, comprising 11.7% of the household population in 2010. The others identified themselves belonging to the following ethnic groups: Bisaya/Binisaya (6.5%), Cebuano (6.4%), Tagalog (4.6%), Hiligaynon/Ilonggo (2.6%), and others.

The ethnic diversity within the city is visualized in Figure 2.3-6.



Source: Philippine Statistics Authority

Figure 2.3-6 Most Common Ethnic Groups in Cotabato City (2010)

(2) Dialect

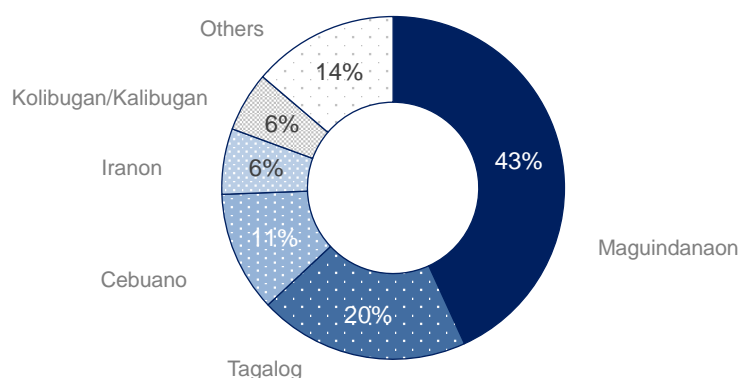
Similarly, Maguindanaon and Iranun were the most widely spoken dialects among households in the Greater Cotabato Area. The Maguindanaon dialect was predominantly spoken in Cotabato City and Datu Odin Sinsuat, while Iranun was the most common dialect among households in Sultan Kudarat municipality and Sultan Mastura. The other major dialects widely used within the Greater Cotabato Area were Tagalog, Cebuano, and Ilonggo.

Table 2.3-6 shows the most common dialects per city/municipality, while Figure 2.3-7 presents the percent distribution of spoken dialects in Cotabato City.

Table 2.3-6 Most Widely Spoken Dialects Among Households in the Greater Cotabato Area

City/Municipality	Most common dialects among households						Source
	First	% Share	Second	% Share	Third	% Share	
Cotabato City	Maguindanaon	43%	Tagalog	20%	Cebuano	11%	POPCEN 2000
Datu Odin Sinsuat	Maguindanaon	76%	Tagalog	5%	Cebuano	5%	POPCEN 2015
Sultan Kudarat	Iranun	47%	Maguindanaon	43%	Cebuano	3%	POPCEN 2010
Parang							
Pigkawayan							
Sultan Mastura	Iranun	60%	Maguindanaon	15%	Ilonggo	10%	POPCEN 2015

Source: Philippine Statistics Authority, and CLUP of various municipalities



Source: Philippine Statistics Authority

Figure 2.3-7 Most Widely Spoken Dialects among Households in Cotabato City (2000)

(3) Religious Affiliation

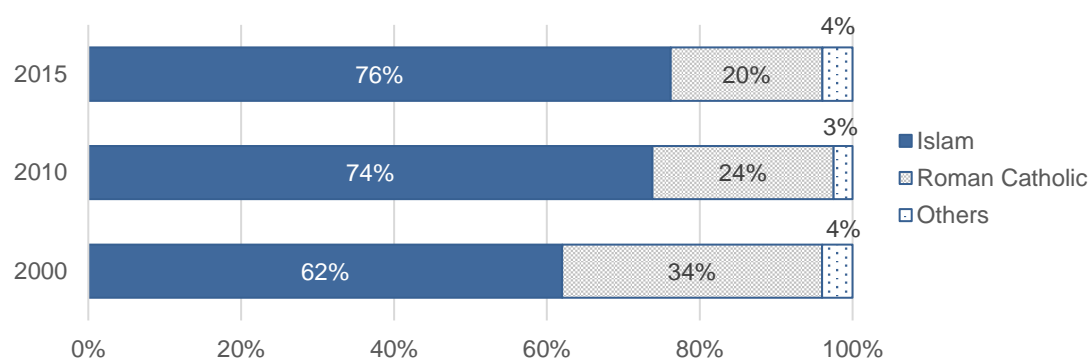
Islam was the dominant religious affiliation in the Greater Cotabato Area, as shown in Table 2.3-7. In ARMM, nine in every ten persons belonged to the Muslim population (Census of Population, 2015).

Table 2.3-7 Most Common Religious Affiliations in the Greater Cotabato Area

City/Municipality	Most common religious affiliations among the household population						Source
	First	% Share	Second	% Share	Third	% Share	
Cotabato City	Islam	76%	Roman Catholic	20%	Evangelicals	0.4%	POPCEN 2015
Datu Odin Sinsuat	Islam	76%	Roman Catholic	17%	Philippine Episcopal Church	4%	POPCEN 2015
Sultan Kudarat	Islam	90%	Roman Catholic	4%	Iglesia ni Cristo	3%	POPCEN 2010
Parang							
Pigkawayan							
Sultan Mastura	Islam	55%	Roman Catholic	32%	Lutherans	8%	POPCEN 2015

Source: Philippine Statistics Authority, and CLUP of various municipalities

In Cotabato City, Islam accounted for more than three-fourths of the total population in 2015. The Islam population increased from 99,565 (62% share) in 2000 to 228,036 (76%) in 2015. Roman Catholic was the next largest religious affiliation, comprising 20% of the total population. Others were reported to be affiliated with the Evangelicals (0.4%) and Iglesia ni Cristo (0.3%).



Source: Philippine Statistics Authority

Figure 2.3-8 Most Common Religious Affiliations in Cotabato City (2015)

(4) Indigenous People (IPs)

The closest known traditional ancestral domains of the Indigenous People in the study area are those in the Municipalities of Upi, South Upi, and Datu Blah Sinsuat which are inhabited by the Teduray tribe. However due to armed conflict among groups (e.g., AFP vs various armed groups) which affect their communities and further pushed by poverty, some IPs left their homeland to re-settle in some of the towns within the study area. The estimated number of IPs in the study area which was secured through interview with various agencies/organizations are presented in Table 2.3-8.

Table 2.3-8 Number of Reported IPs in the Greater Cotabato Area

City/Municipality	Number of reported IPs (year of data)	Remarks	Source of Information and Data
Cotabato City	4,967 (2020)	Around 90% of them are Teduray tribe.	National Commission for Indigenous People, Region 12
Datu Odin Sinsuat	14,170 (2018)		Ministry of Indigenous Peoples' Affairs
Sultan Kudarat	No known significant concentration of IPs (2018)		Froilyn T. Mendoza, Executive Director of the Teduray Lambangian Women Organization, Inc. (TLWO)
Parang	About 1,500 people/ 300 families (2018)	90% of them are Teduray tribe. Migrated in 1970s at the height of the conflict.	Municipal Planning & Development Coordinator of Parang municipality
Pigkawayan	947 individuals (2020)		National Commission for Indigenous People, Region 12
Sultan Mastura	No known significant concentration of IPs (2018)		Froilyn T. Mendoza, Executive Director of the Teduray Lambangian Women Organization, Inc. (TLWO)

2.3.4 Poverty and Displacement

The Philippine Statistics Authority (PSA) releases data on poverty every three years, with the aim of helping government agencies and policy makers in their efforts to alleviate poverty.

Poverty threshold is defined by the PSA as the minimum income required to meet the basic food and non-food requirements of an individual. Poverty incidence, on the other hand, refers to the proportion of the population with incomes below the poverty threshold.

Cotabato City recorded an annual per capita poverty threshold of PhP 30,349 in 2018. This means that a family of five needed to earn at least PhP 12,645 monthly to meet their essential needs. While poverty incidence among the entire city population decreased from 49% in 2015 to 42% in 2018, the proportion of poor people remained well above the national average of 17%. The magnitude of poor people in Cotabato City was estimated at 130,100 in 2018.

Table 2.3-9 Poverty Threshold and Poverty Incidence of Cotabato City (2009-2018)

Area	Annual Per Capita Poverty Threshold (PhP)				Poverty Incidence among Population (%)			
	2009	2012	2015	2018	2009	2012	2015	2018
Philippines	16,871	18,935	22,747	25,813	26	25	24	17
Region XII	16,405	18,737	21,341	25,023	38	45	38	28
ARMM	16,683	20,517	22,650	27,715	47	56	59	62
Cotabato City	18,103	20,567	25,581	30,349	34	44	49	42

Source: Philippine Statistics Authority

Similarly, food threshold is defined as the minimum income required to meet the basic food needs, satisfying the nutritional requirements set by the Food and Nutrition Research Institute (FNRI) to ensure that an individual remains economically and socially productive. Subsistence incidence is a parameter used to calculate the proportion of the population with incomes below the food threshold. Subsistence among Filipinos is often referred to as the proportion of the population living in extreme poverty.

Table 2.3-10 below shows the recorded per capita food threshold and subsistence incidence of Cotabato City every three years from 2009 to 2018. The proportion of the food poor among the city population was at 14%, translating to approximately 44,900 people with incomes that are not sufficient to meet the basic food needs.

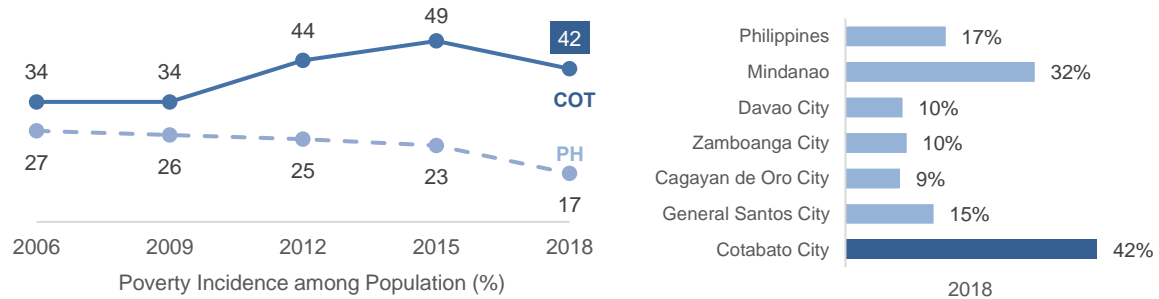
Table 2.3-10 Food Threshold and Subsistence Incidence of Cotabato City (2009-2018)

Area	Annual Per Capita Food Threshold (PhP)				Subsistence Incidence among Population (%)			
	2009	2012	2015	2018	2009	2012	2015	2018
Philippines	11,780	13,232	15,887	18,126	11	10	9	5
Region XII	11,444	13,006	14,841	17,352	17	23	21	11
ARMM	11,725	14,747	16,116	19,557	14	25	25	30
Cotabato City	12,532	14,424	17,854	21,152	10	10	21	14

Source: Philippine Statistics Authority

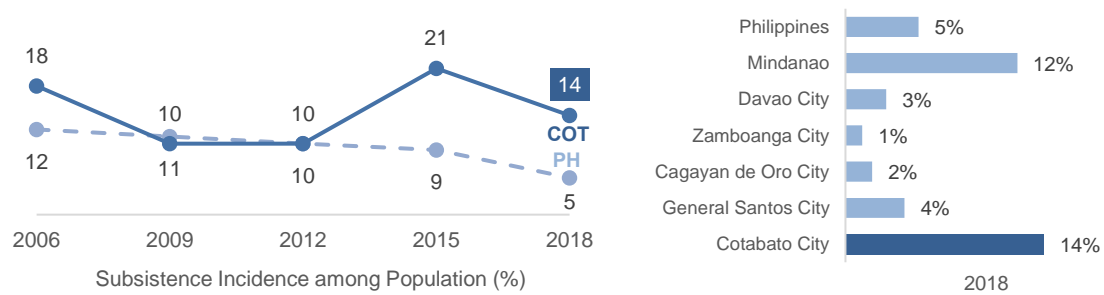
Figure 2.3-9 and Figure 2.3-10 present the comparison between the poverty incidence and subsistence incidence among highly urbanized cities (HUC) in Mindanao. Cagayan de Oro City

and Davao City had the lowest share of poor people among its city population in 2018, with poverty incidences of 9% and 10%, respectively. Zamboanga City had the lowest subsistence incidence at 1%. Among the cities included, only Cotabato City recorded a poverty incidence and subsistence incidence above the national average in 2018.



Source: Philippine Statistics Authority

Figure 2.3-9 Poverty Incidence Among Highly Urbanized Cities in Mindanao



Source: Philippine Statistics Authority

Figure 2.3-10 Subsistence Incidence among Highly Urbanized Cities in Mindanao

The Pantawid Pamilyang Pilipino Program (4Ps) was established in 2008 as part of the poverty reduction strategy of the national government. 4Ps is the country's pioneer conditional cash transfer program, with the Department of Social Welfare and Development (DSWD) as the lead implementing agency. The program provides cash grants to qualified household beneficiaries to aid in the development of the health and educational welfare of children aged 0-18 years old.

The number of active 4Ps beneficiaries in the Greater Cotabato Area, as of 2020 is listed in Table 2.3-11.

Table 2.3-11 Number of Active 4Ps Beneficiaries in the Greater Cotabato Area (2020)

City/Municipality	Number of beneficiaries
Cotabato City	11,703
Datu Odin Sinsuat	8,394
Sultan Kudarat	10,753
Parang	5,266
Pigkawayan	3,546
Sultan Mastura	2,265
Total	41,927

Source: Department of Social Welfare and Development

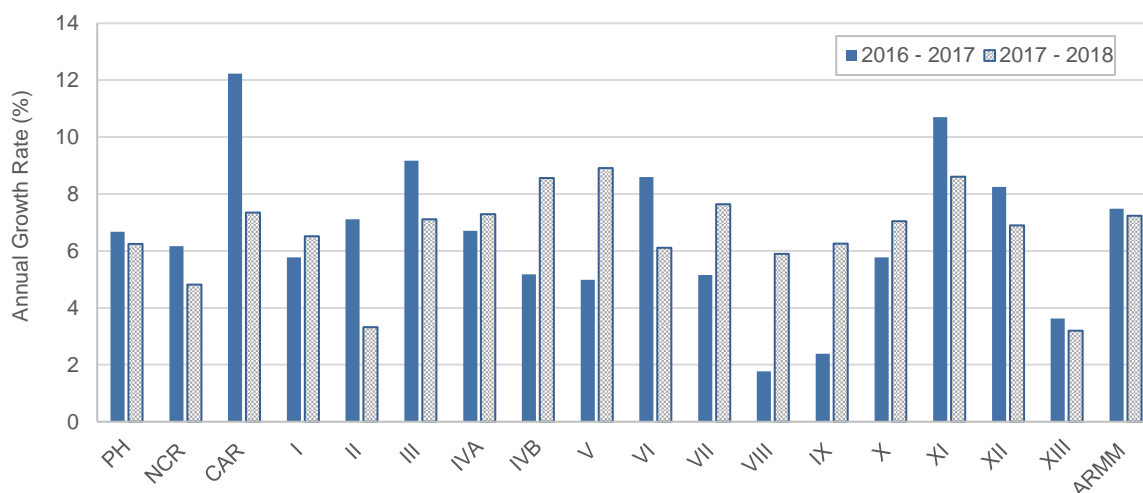
No unified data and information on displacement in Cotabato City and five (5) adjacent municipalities were available. The following table shows the collected data from different sources. The causes and reasons of the Internally Displaced People (IDPs) were reported to be not only due to armed conflict but also from natural disasters, land disputes between rival clans and escape from persecution in their original homeland. The difference of the causes and reasons also meant the difference in period of being IDPs. It was also observed that IDPs in Mindanao had tendency to immediately and voluntarily return to their original places after the initial recovery of the critical situation.

Table 2.3-12 Number of Reported IDPs in the Greater Cotabato Area (2020)

City/Municipality	Number of reported IDPs (2019-21)	Remarks	Source of Information and Data
Cotabato City	1,000 or more families	Since 1990s.	Cotabato City Social Welfare and Development Office (CSWDO)
Datu Odin Sinsuat	779 families	Sum of the IDPs in 4 different locations	Social Welfare Office of Maguindanao
Sultan Kudarat	None		Social Welfare Office of Maguindanao
Parang	1,232 families	Displaced due to Road Clearing and other government projects. No IDPs due to war conflict	CFSI (an international NGO)
Pigkawayan	3,422 families	Displaced due to Natural Disaster (Flooding - Typhoon Quinta) in October 2020.	CFSI (an international NGO)
Sultan Mastura	None		Social Welfare Office of Maguindanao
Total	6,433 families		

2.3.5 GRDP and Economic Structure

The Philippines' real gross domestic product (GDP) was recorded at PhP 9.2 trillion in 2018. The country's economy grew at a rate of 6.2% in 2018, slower than the 6.7% growth recorded in the previous year. Region XII and ARMM posted annual growth rates above the national average in 2017 and 2018, as shown in Figure 2.3-11.

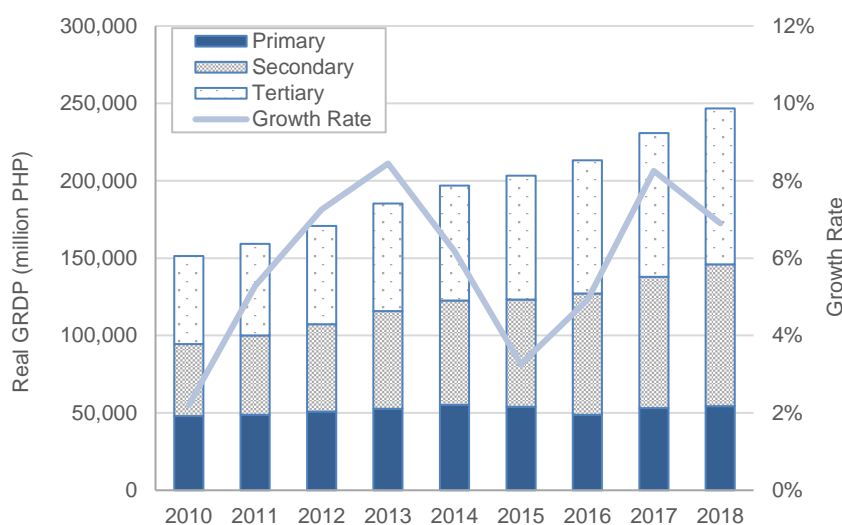


Source: Philippine Statistics Authority

Figure 2.3-11 Annual GDP/GRDP Growth Rates of All Regions in the Country (2016-2018)

(1) Region XII

The gross regional domestic product (GRDP) of Region XII was estimated at PhP 246.7 billion (at Constant 2000 prices), comprising 2.7% of the Philippine GDP in 2018. Real per capita GRDP went up to PhP 50,644 in 2018, about 5% higher compared to the PhP 48,240 recorded in 2017.

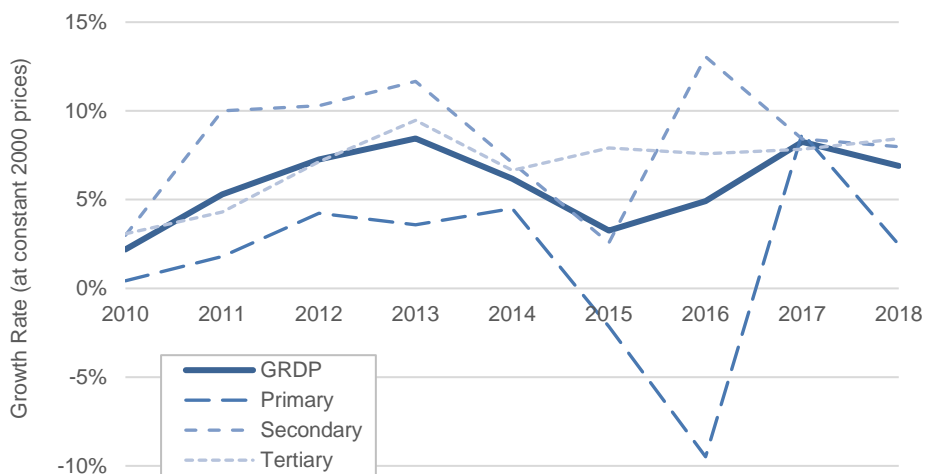


Source: Philippine Statistics Authority

Figure 2.3-12 Region XII GRDP and GRDP Growth Rate (2010-2018)

The tertiary sector (i.e. services) accounted for the largest share of the region’s total economy at 41%, followed by the secondary sector (i.e. industry) at 37%. The primary sector (i.e. agriculture, hunting, forestry, and fishing) had the lowest share at 22%.

SOCCKSARGEN’s economy, at 6.9% expanded at slower pace in 2018 from 8.3% in 2017. This is primarily due to the deceleration of the primary sector from 8.7% in 2017 to 2.5% in 2018. The trend of GRDP growth per sector from 2010 to 2018 is shown in Figure 2.3-13 below.

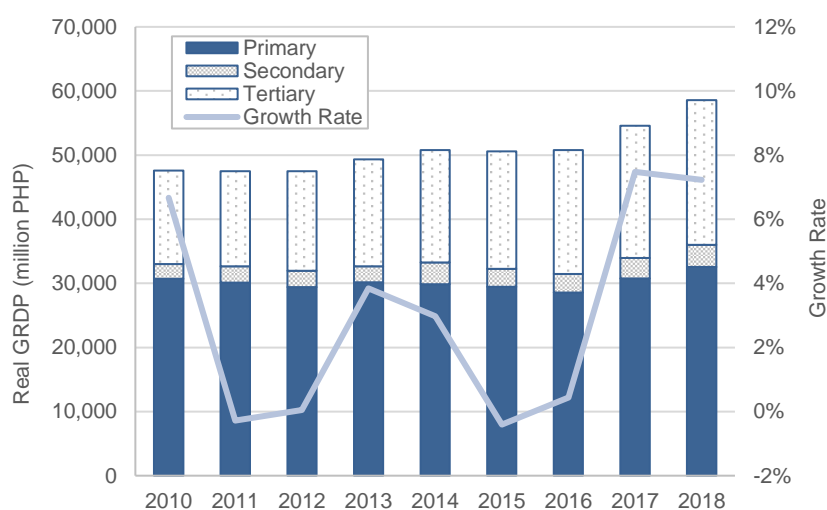


Source: Philippine Statistics Authority

Figure 2.3-13 Region XII GRDP Growth Rate, Per Industrial Origin (2010-2018)

(2) ARMM

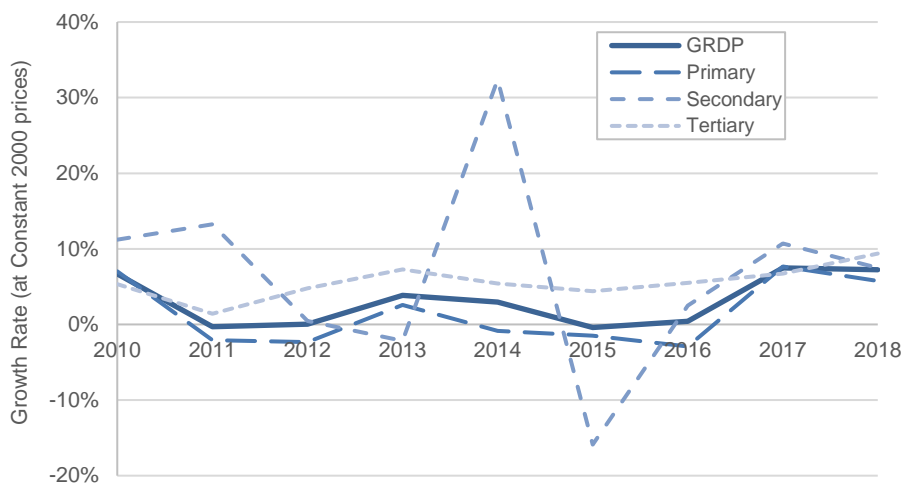
The gross regional domestic product (GRDP) of ARMM in 2018 was estimated at PhP 58.5 billion (at Constant 2000 prices). The region had the lowest share among all 17 regions in the country, accounting for only 0.6% of the Philippine GDP.



Source: Philippine Statistics Authority

Figure 2.3-14 ARMM GRDP and GRDP Growth Rate (2010-2018)

ARMM’s fluctuating economy from 2010 to 2018 is reflected in Figure 2.3-15. The region recorded negative growth in 2011 (-0.28%) and 2015 (-0.41%) before achieving growth rates above the national average in 2017 and 2018. The acceleration of the region’s economy from 0.4% in 2016 to 7.3% growth in 2017 was attributed to the expansion of the secondary sector, which grew from 2.51% to 10.8%.

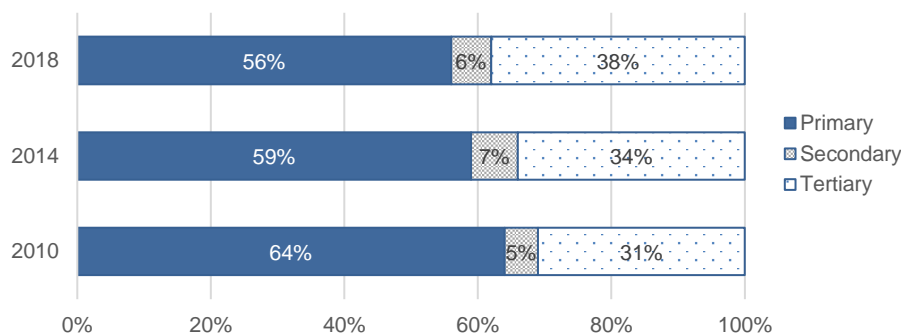


Source: Philippine Statistics Authority

Figure 2.3-15 ARMM GRDP Growth Rate, Per Industrial Origin (2010-2018)

The primary sector continued to account for the largest share of the region’s economy at 56% in 2018. The sector’s expansion of 5.8% was the fastest recorded growth in the primary sector among all regions in 2018. This suggests that the ARMM (now BARMM) economy was highly dependent on agriculture.

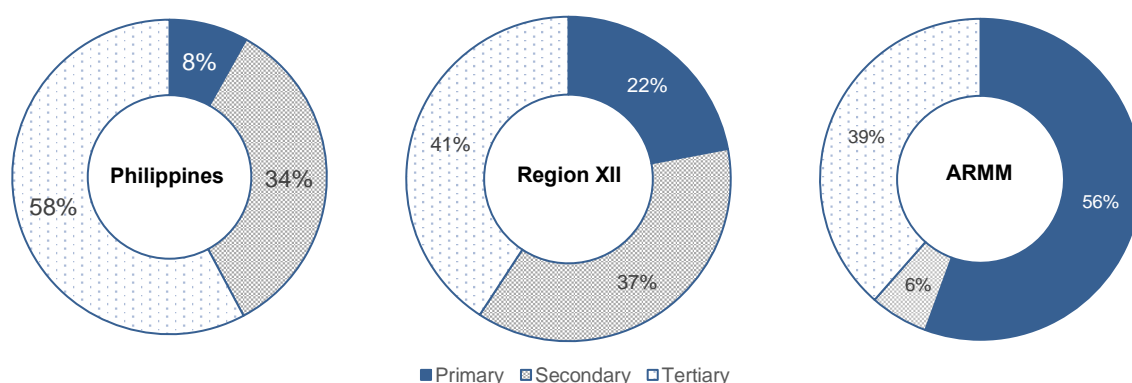
However, the share of the primary sector decreased over the past few years, as shown in Figure 2.3-16. The primary sector recorded shares of 65% and 59% of the region’s economy in 2010 and 2014, respectively. In contrast, the tertiary sector had the highest increase in share from 31% in 2010 to 39% in 2018. The tertiary sector was the only sector which consistently recorded positive growth rates from 2011 to 2018. This trend suggests a shift to diversify the economy from predominantly agriculture-based livelihood.



Source: Philippine Statistics Authority

Figure 2.3-16 ARMM GRDP Distribution, Per Industrial Origin (2010-2018)

Cotabato City, as economic center of BARMM, shall complement the region’s economic growth. According to the National Spatial Strategy, the regional center is expected to provide advanced urban services and linkages to other metropolitan centers. The presence of readily available infrastructure such as hospitals, financial institutions and commercial buildings are expected to support the acceleration of BARMM’s secondary and tertiary sectors. The SOCCSKSARGEN Regional Development Plan’s (2017-2022) vision of establishing an agri-industrial corridor passing through Cotabato City is expected to complement the agriculture industry of BARMM.



Source: Philippine Statistics Authority

Figure 2.3-17 Summary of GDP/GRDP Distribution, by Industrial Origin (2015)

Table 2.3-13 Summary of Key GRDP Statistics, Region XII and ARMM

	Region XII	ARMM
Gross Regional Domestic Product (2018)*	PhP 246.7 B	PhP 58.5 B
Per Capita GRDP (2018)	PhP 50,644	PhP 14,657
% of Philippine GDP (2018)	2.7%	0.6%
GRDP Growth (2017-2018)	6.9%	7.2%
Primary Sector	2.5%	5.8%
Secondary Sector	8.0%	7.5%
Tertiary Sector	8.4%	9.5%
Fastest growing subsectors (2017-2018)	Construction (13.6%)	Construction (16.4%)
	Public Administration (13.6%)	Public Administration (13.2%)

* At Constant 2000 prices

Source: Philippine Statistics Authority

2.3.6 City Economy

Cotabato City is a third-class income city, which serves as the center for economic activities in BARMM. It is formerly part of Region XII (SOCCSKSARGEN) and served as its regional center before the issuance of Executive Order No. 304 in 2004 which designated Koronadal City as the new regional center of SOCCSKSARGEN Region (XII).

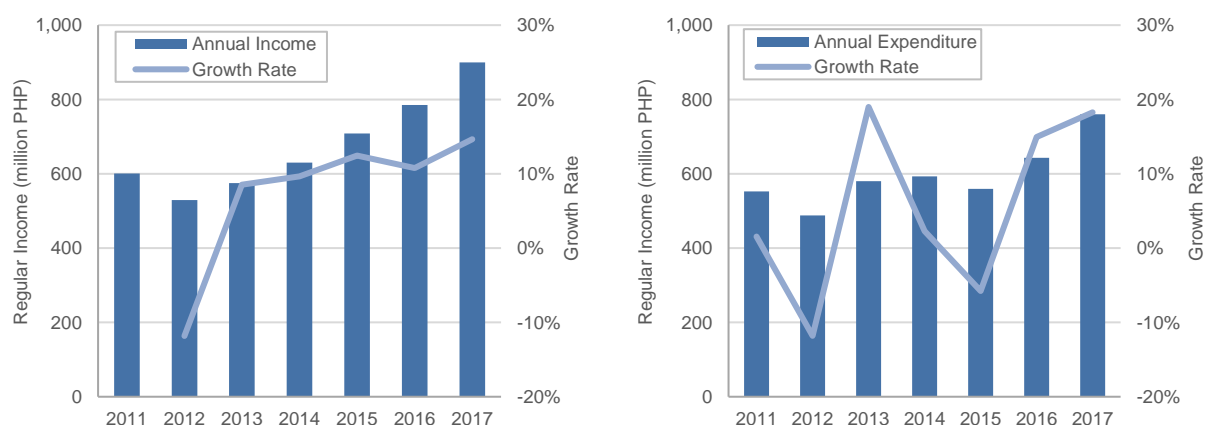
SOCCSKSARGEN’s Regional Development Plan (2017 – 2022) has designated Cotabato City as the primary growth node to realize the region’s vision as an agri-industrial and ecotourism center in southern Philippines. In line with the National Spatial Strategy, Cotabato City is expected to become a special economic zone that will generate new investment and job opportunities for Central Mindanao.

Majority of the economic activity within the city revolve around the Central Business District (CBD), which stretches from Barangay Poblacion 6 going to Poblacion 5 and Poblacion Mother (within the vicinity of the Mega Market). Realizing its economic potential, several enterprises and major commercial banks have established operations within the CBD. Apart from one of the regional branches of Bangko Sentral ng Pilipinas (BSP), 80 other banking institutions were registered in the city in 2017 (Table 2.3-14). The annual regular income of the city has been growing at a fast rate since 2013, as shown in Figure 2.3-18.

Table 2.3-14 Banking Institutions in Cotabato City

	2013	2014	2015	2016	2017
Universal and Commercial Banks	17	18	18	72	76
Rural and Cooperative Banks	1	1	1	4	4

Source: Regional Social and Economic Trends, Philippine Statistics Authority Region XII

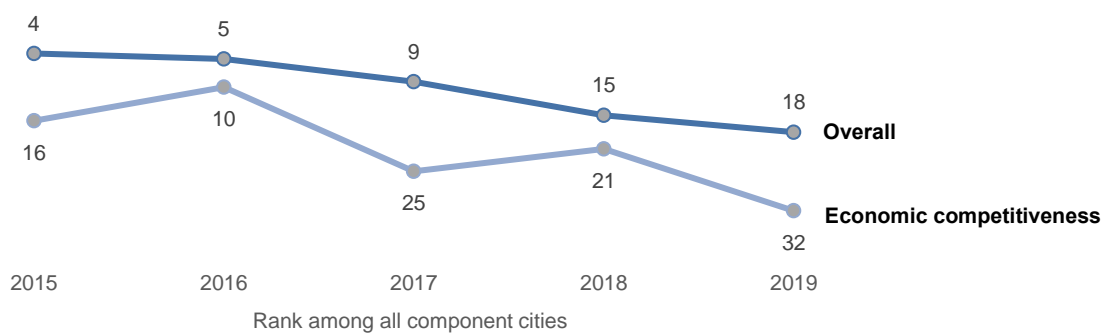


Source: Regional Social and Economic Trends, Philippine Statistics Authority Region XII

Figure 2.3-18 Annual Income and Expenditure of Cotabato City (2011-2017)

According to the Census of Agriculture and Fisheries (2012), agricultural land comprised only 18% of Cotabato City’s total land area. Over 6,000 farms covering 11,000 hectares were reported to be operating within the city. Among the top permanent crops planted include coconut, mango and banana. On the other hand, data from the Office of the City Agriculture places the total area used for agriculture at 12,323 hectares (4,488 hectares utilized for fishery purposes) or about 44.52% of the city’s total land area.

Cotabato City ranked 32nd among all component cities in terms of economic dynamism in 2019, according to the Cities and Municipalities Competitiveness Index. Economic dynamism is an indicator developed by the National Competitiveness Council which reflects the stable expansion of business and other industries within the locality. Among the factors considered in the computation include: size and growth of the local economy, capacity to generate employment, cost of doing business, and financial deepening.



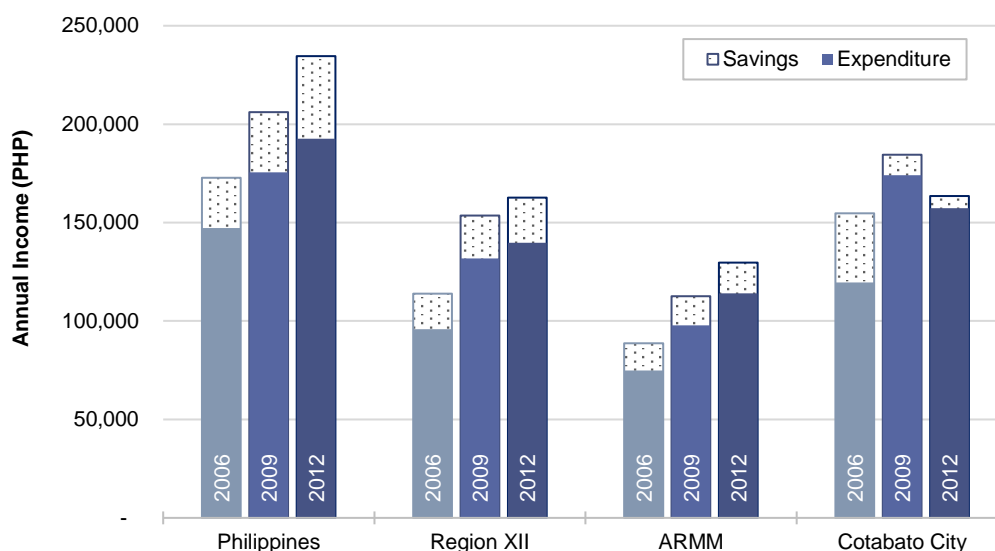
Source: National Competitiveness Commission, Department of Trade and Industry

Figure 2.3-19 Rank of Cotabato City among All Component Cities in the Competitiveness Index (2015-2019)

2.3.7 Income and Expenditure

The average annual family income in Cotabato City was estimated at PhP 163,579 in 2012, 11% less than PhP 184,489, recorded three years before. Families in the city had incomes above the averages of Region XII (PhP 163,000) and ARMM (PhP 130,000), which posted the lowest income among all Philippine regions. The national average income per family in 2012 was PhP 235,000.

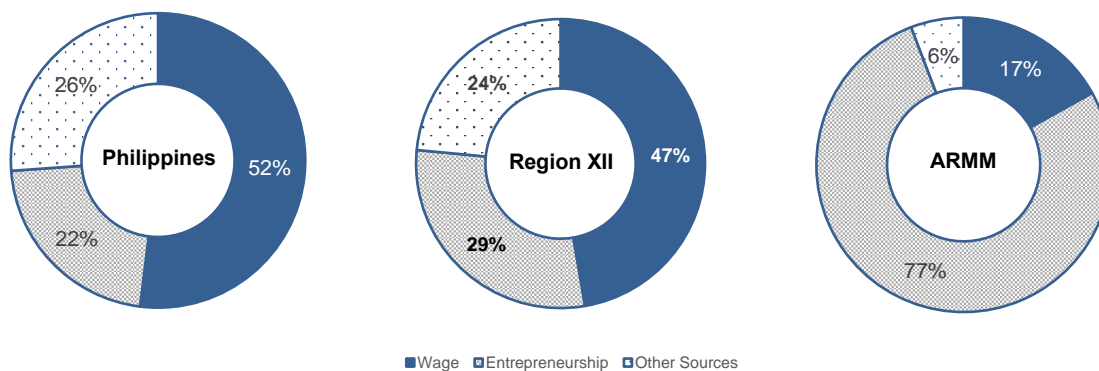
The average family expenditures in Cotabato City was PhP 157,346 in 2012. This translated to an average family savings of PhP 6,233 per annum, which was significantly lower than the regional (Region XII: PhP 23,000; ARMM: PhP 16,000) and national (PhP 42,000) averages.



Source: Philippine Statistics Authority

Figure 2.3-20 Annual Average Family Income and Expenditure (2006-2012)

In 2015, about 47% of families in Region XII sourced their incomes from wages and salaries. In contrast, entrepreneurial activities (77%) were the primary source of income in ARMM, reflecting the region’s high reliance on the primary (i.e. agriculture, hunting, forestry, and fishing) sector. The distribution of families by main source of income is illustrated in Figure 2.3-21.



Source: Philippine Statistics Authority

Figure 2.3-21 Distribution of Families by Main Source of Income (2015)

Food expenses accounted for majority of the total family expenditures in 2015, as shown in Table 2.3-15. A significant portion were also spent on the following expenditure groups: house rent, transport, education, and water, electricity, and gas.

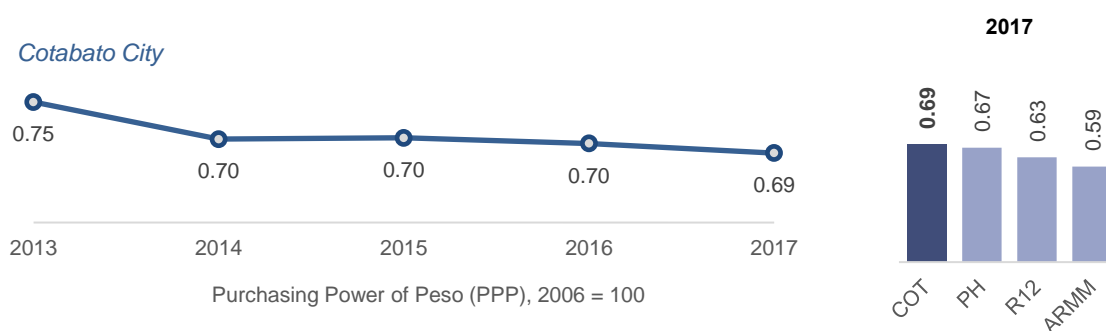
Table 2.3-15 Distribution of Total Family Expenditures, by Expenditure Group (2015)

Expenditure Group	Share to total expenditure (%)		
	Philippines	Region XII	ARMM
Food	41.9	44.7	59.0
Health	3.7	4.2	0.8
House rent/rental value	12.2	7.9	8.5
Water, electricity, gas, and other fuels	7.9	7.9	6.5
Transport	6.2	6.2	4.3
Communication	2.2	1.6	1.2
Clothing and footwear	2.4	2.7	2.5
Furnishing and routine household maintenance	2.5	2.3	1.3
Recreation and culture	0.8	0.7	0.4
Education	3.8	4.3	3.8
Miscellaneous goods and services	6.3	6.7	6.1
Durable furniture and equipment	2.5	2.9	0.8
Special occasion	2.5	2.9	1.1
Alcoholic beverages	0.5	0.6	0.1
Tobacco	1.1	1.7	1.8
Other expenditure	3.5	2.7	1.9

Source: Philippine Statistics Authority

The Purchasing Power of Peso (PPP) is an economic indicator used to determine the effects of inflation in the market. Inflation causes the purchasing power of money to drop over time, and PPP measures the real value of the peso in a given year relative to a chosen reference period.

The average PPP in Cotabato City in 2017 was estimated at PhP 0.69. This indicates that PhP 100.00 in 2017, can only purchase about 69% of the same basket of goods and services in the base year (2006).



Source: Philippine Statistics Authority

Figure 2.3-22 Purchasing Power of Peso (PPP) in Cotabato City (2013-2017)

2.3.8 Labor Force and Employment

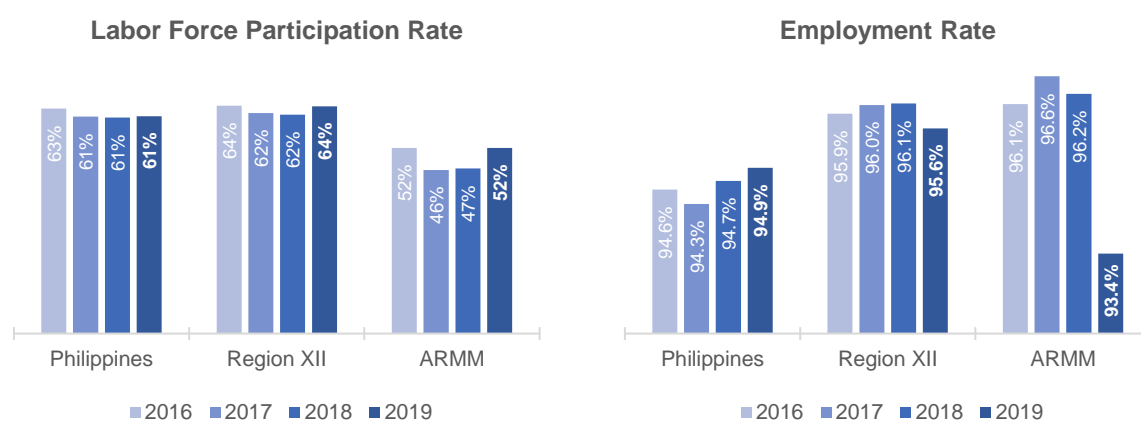
The Philippine Statistics Authority (PSA) conducts the Labor Force Survey (LFS) every quarter of the year to monitor the changes in the employment status of the working age population (i.e. household population aged 15 years and above). PSA defines ‘labor force’ as the members of the working age population who actively support the production of goods and services. The labor force includes both employed people, and unemployed people who are actively seeking for work.

In 2019, Region XII recorded a labor force participation rate (LFPR) of 64.1%. This suggested that about 64 people for every 100 in the working age population belonged to the labor force in 2019. The annual employment rate in Region XII was estimated at 95.6%. Region XII recorded an LFPR and employment rate above the national average from 2016 to 2019. The national and regional statistics on labor and employment are shown in Table 2.3-16 and Figure 2.3-23.

Table 2.3-16 National and Regional Key Indicators on Labor and Employment (2019)

Data	Philippines	Region XII	ARMM
Population 15 Years and Over (in thousands)	72,932	3,222	2,469
Labor Force Participation Rate	61.3%	64.1%	52.4%
Employment Rate	94.9%	95.6%	93.4%
Unemployment Rate	5.1%	4.4%	6.6%

Source: Philippine Statistics Authority



Source: Philippine Statistics Authority

Figure 2.3-23 National and Regional Historical Data on Labor Force Participation Rate and Employment Rate (2016-2019)

The current design of the LFS was intended to generate information at the regional level only. The processing of data at the provincial and municipal level would require an increase in the sample size, which will then lead to additional cost. Due to the absence of data at the city level, Cotabato City’s labor and employment indicators were derived from Region 12’s annual LFS estimates. The underlying assumption is that the percentage share of Cotabato City’s population to Region XII is proportional to the city’s contribution to the annual regional labor and employment statistics.

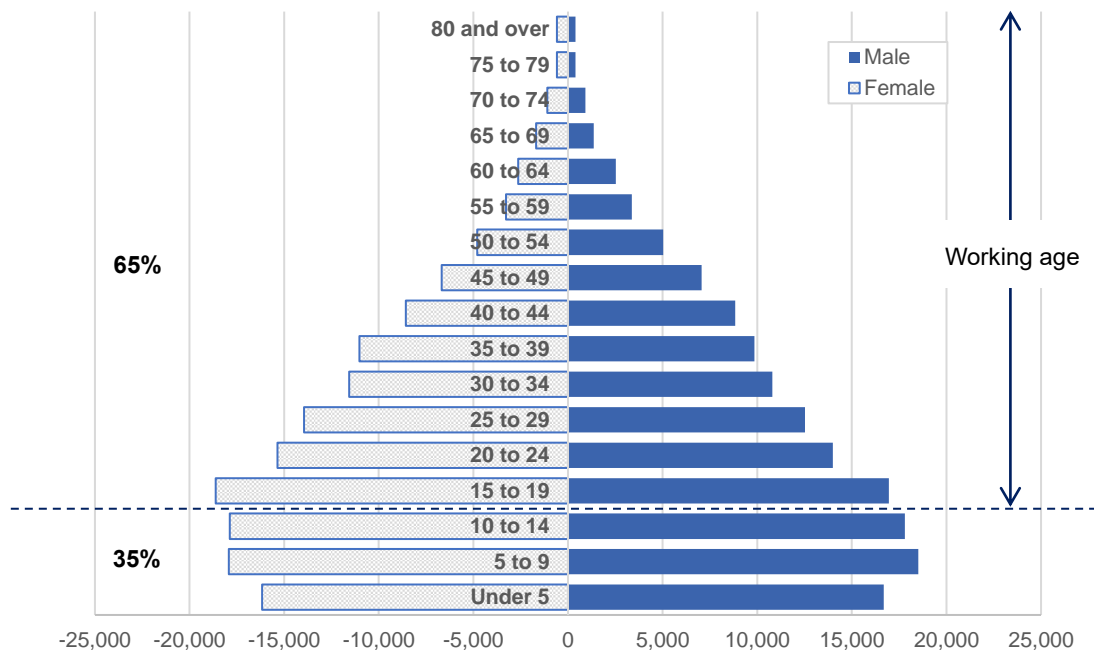
Table 2.3-17 presents the annual labor estimates for Cotabato City.

Table 2.3-17 Annual Labor and Employment Estimates for Cotabato City (2011-2020)

Data	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Population 15 Years and Over	176,448	176,946	180,639	184,183	184,340	193,702	199,237	201,508	204,338	205,743
Labor Force Participation Rate	66.3%	66.4%	65.5%	65.3%	65.1%	65.1%	62.2%	61.7%	64.1%	62.6%
Employment Rate	96.1%	95.8%	95.6%	96.5%	96.5%	95.9%	96.0%	96.1%	95.6%	96.0%
Unemployment Rate	3.9%	4.2%	4.4%	3.5%	3.5%	4.1%	4.0%	3.9%	4.4%	4.0%

Source: Department of Labor and Employment, Regional Office (Region XII)

In 2015, an estimated 65% of the household population in Cotabato City belonged to the working age population. The remaining 35% consisted of the young dependent population (0-14 years old). Figure 2.3-24 shows the age distribution among the population, separated by sex.



Source: City Planning and Development Office (CPDO)

Figure 2.3-24 Population Distribution of Cotabato City by Age Group and Sex (2015)

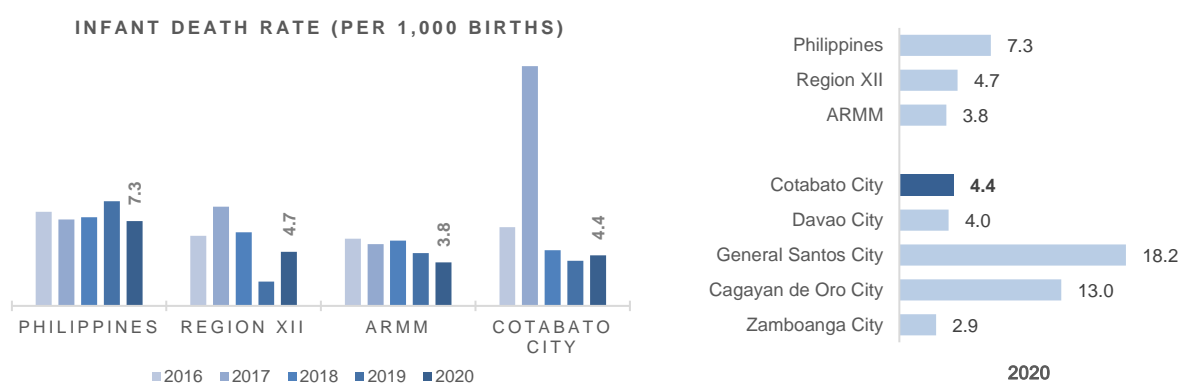
The pyramid structure reflects the continuous expansion of the city population, as previously discussed in Chapter 2.3.1. This shows that the Cotabato City population is characterized by high birth rates and lower than average life expectancies. The decreasing magnitude at the bottom portion, however, suggests a slower expansion dictated by the declining population growth rate.

2.3.9 Access to Basic Social Services

(1) Health

The Department of Health (DOH) publishes the Field Health Services Information System (FHSIS) report every year. The FHSIS contains data sets on indicators which determine if basic human medical needs in a community are met, such as, mortality, natality, and access to immunization.

The infant mortality rate (IMR), as shown in Figure 2.3-25, refers to the number of deaths of children under one year of age. The infant mortality rate of Cotabato City has significantly dropped from 21 deaths per 1,000 live births in 2017 to only 4 in 2020. The IMR of Cotabato City from 2018 to 2020 were below the national average.

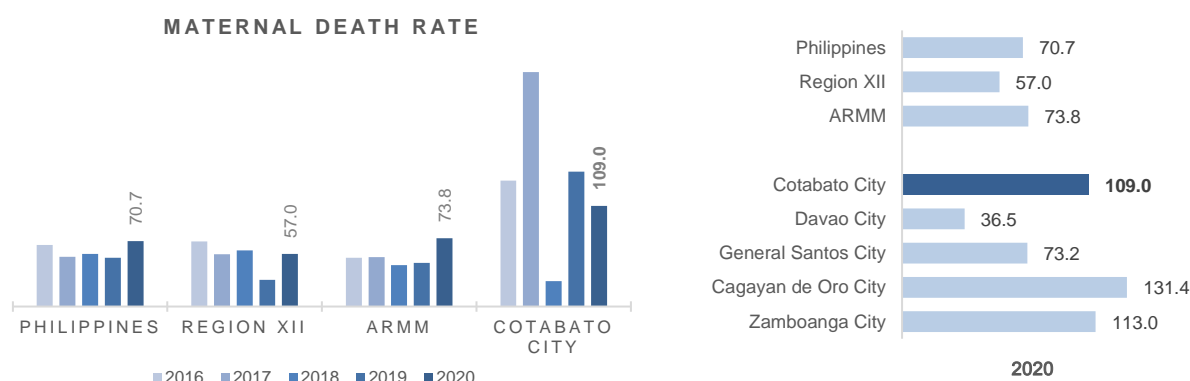


Source: Field Health Services Information System, Department of Health

Figure 2.3-25 Infant Mortality Rate of Cotabato City (2016-2020)

The maternal mortality ratio (MMR) measures the number of deaths due to pregnancy-related complications per 100,000 live births. Figure 2.3-26 shows that the MMR of Cotabato City has fluctuated over a five-year period (2016-2020). In 2018, the MMR has significantly dropped, and the city recorded its first figure below the national average since 2014. Cotabato City's MMR of 109 maternal deaths per 100,000 live births in 2020, however, was still above the national program target of 103 maternal deaths per 100,000 live births⁸

⁸ Field Health Services Information System Annual Report 2018, Department of Health



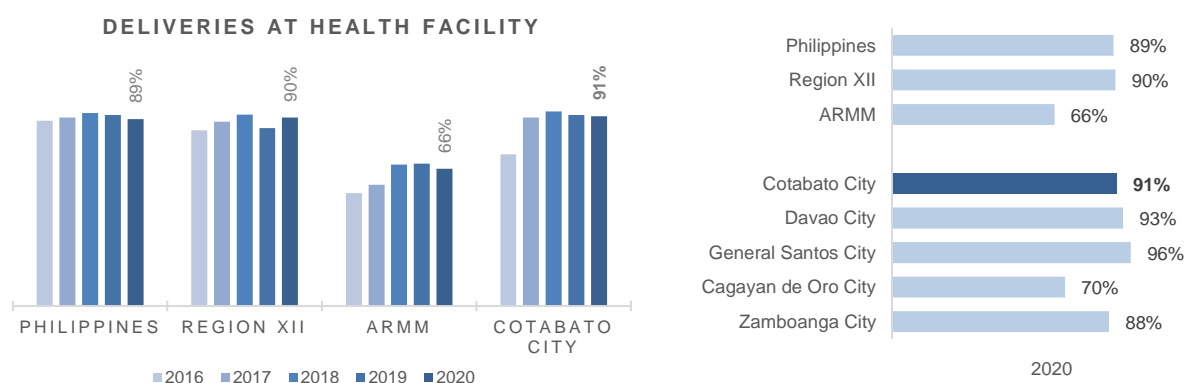
Source: Field Health Services Information System, Department of Health

Figure 2.3-26 Maternal Mortality Ratio of Cotabato City (2016-2020)

Statistical data indicate that the IMR and MMR of Cotabato City have fluctuated from 2010 to 2020. While there had been sufficient evidence in recent years of the city’s initiative to address safe child delivery, the recent spike of IMR and MMR in 2019 and 2020 suggest that mortality may not have been reduced significantly. It should be noted, however, that the city’s hospitals cater to other towns and the deaths of these non-resident patients were recorded as part of the data for Cotabato City.

Among the City Government’s efforts to address maternal care include the training of Barangay Health Emergency Response Teams (BHERT) to respond to emergencies involving pregnant women. An initiative was also launched to ensure that essential medical services (e.g., pre-natal check-up, etc.) were made available.

In addition, a campaign was launched to promote facility-based deliveries in Cotabato City. Out of the 5,502 child deliveries in 2020, 4,997 (91%) were delivered at a health facility. This represented a significant increase from only 72% in 2016, as shown in Figure 2.3-27. In contrast, ARMM’s percentage of facility-based deliveries (66%) in 2020 was the lowest among all regions in the Philippines.

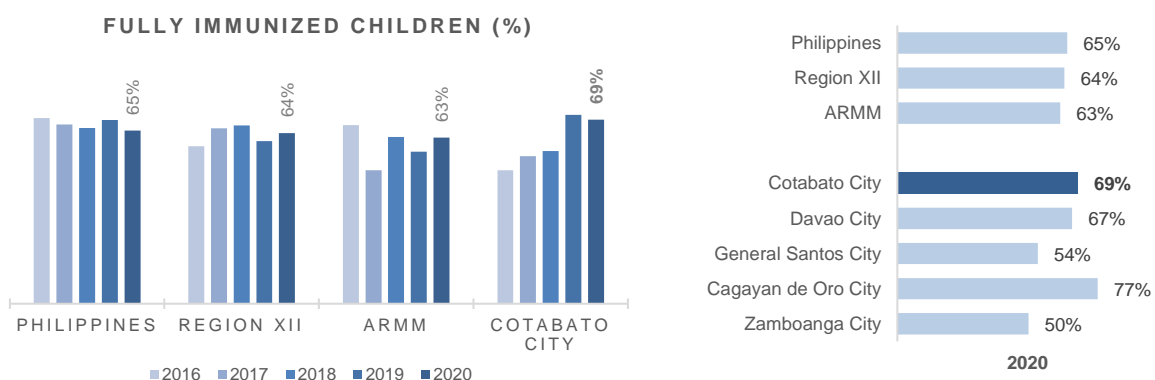


Source: Field Health Services Information System, Department of Health

Figure 2.3-27 Percent Distribution of Child Deliveries in Cotabato City, by Place/Health Facility (2016-2020)

The immunization rate is a parameter used by health agencies to determine the effectiveness of a community’s fight to reduce mortality among children against vaccine-preventable diseases. A low percentage of fully immunized children (FIC) suggests that the public is vulnerable to outbreaks.

Figure 2.3-28 shows that the health services of Cotabato City were characterized by low immunization coverage, which was below the national average from 2016 to 2018. The proportion of fully immunized children in the city improved to 69% in 2020, significantly lower than the country’s target of achieving 95% FIC coverage (Expanded Program on Immunization).

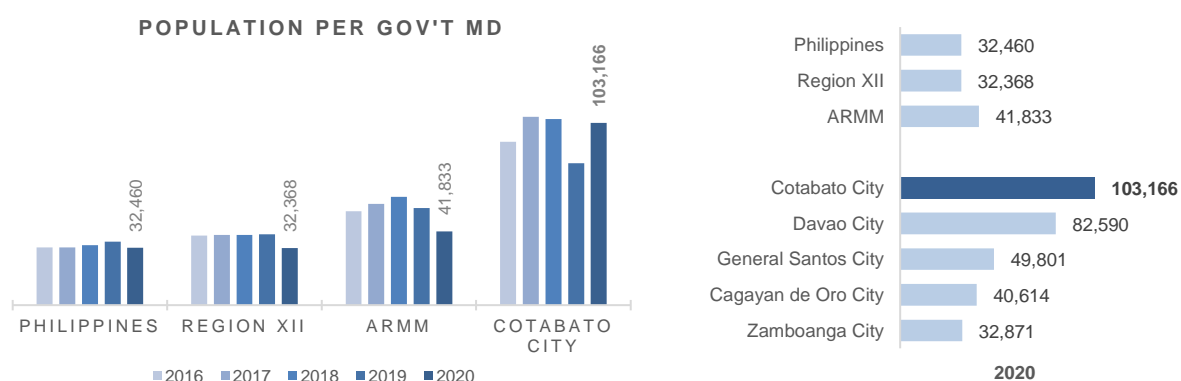


Source: Field Health Services Information System, Department of Health

Figure 2.3-28 Proportion of Fully Immunized Children (%) in Cotabato City (2016-2020)

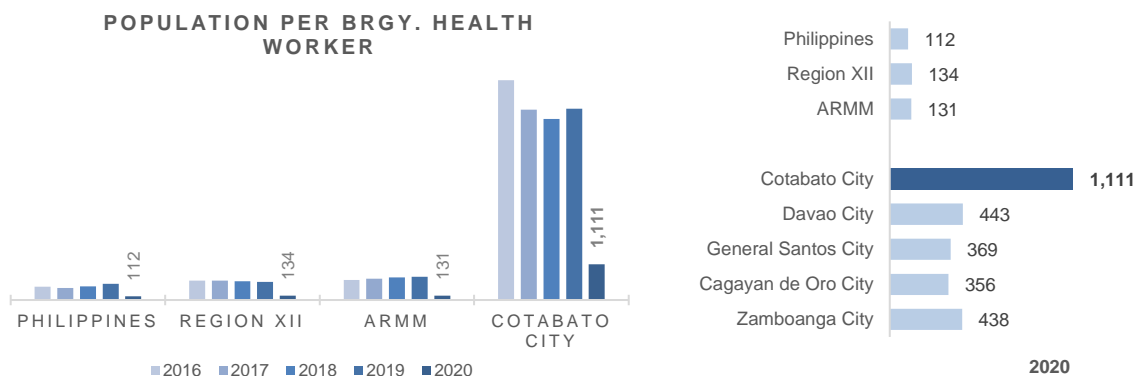
In addition, social conditions for health service are also defined by the supply of key medical personnel, such as medical doctors and barangay health workers (BHW). In 2020, Cotabato City recorded ratios of one government physician for every 103,166 persons (Figure 2.3-29), and one BHW for every 1,111 persons (Figure 2.3-30).

While there are several other private hospitals available to the public, the lack of government medical practitioners and corresponding facilities often lead to the overcrowding of rooms in the Cotabato Regional and Medical Center (CRMC). The CRMC, under the jurisdiction of the Department of Health, serves as the primary public health institution in Cotabato City.



Source: Field Health Services Information System, Department of Health

Figure 2.3-29 Supply of Government Physicians in Cotabato City (2016-2020)



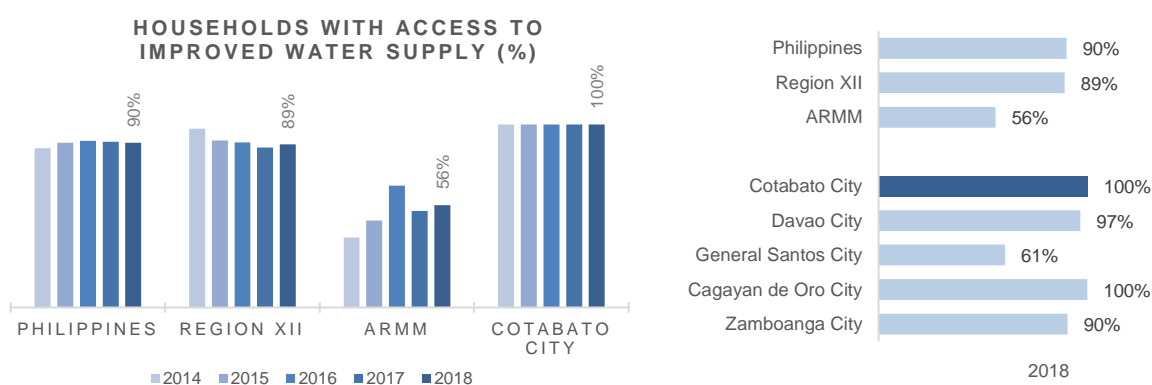
Source: Field Health Services Information System, Department of Health

Figure 2.3-30 Supply of Barangay Health Workers in Cotabato City (2016-2020)

(2) Water Supply and Sanitation

Universal access to clean drinking water and improved sanitation are essential human rights, as acknowledged by the United Nations Sustainable Development Goal (SDG) #6. The Philippines established targets of 100% access to clean water supply by 2025⁹, and sanitation by 2028¹⁰.

Figure 2.3-31 shows that from 2014 to 2018, all households in Cotabato City had access to improved water supply (i.e. not necessarily they have water connection from MCWD but they have access to “improved water source” through other means such as through bulk water suppliers). In 2018, the average coverage for the entire Philippines was at 90%, while ARMM recorded the lowest percentage among all regions at 56%. The average coverage for cities was 95.66% and that for provinces was 87.27%. All households in Cotabato City had access to waterworks system, while the average coverage of waterworks system among households with access to improved water supply in cities was 85.73%.



Source: Field Health Services Information System, Department of Health

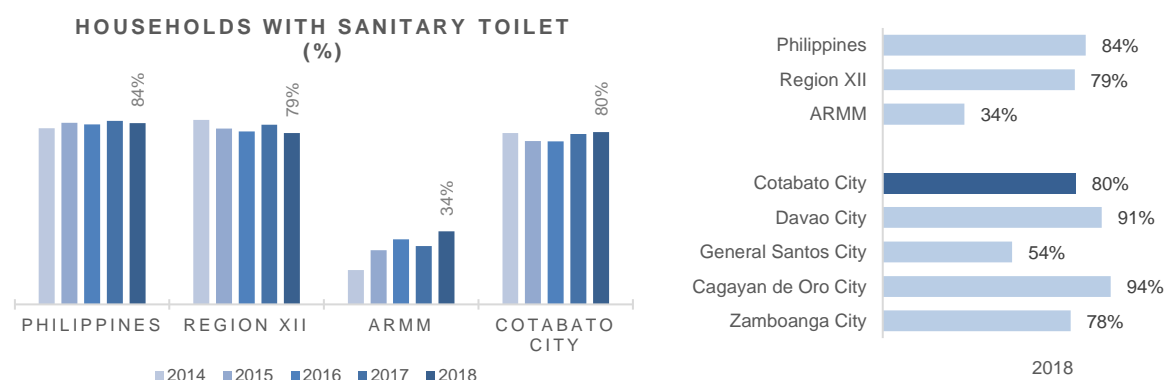
Figure 2.3-31 Households with Access to Improved Water Supply (2014 - 2018)

In contrast, the share of households with access to sanitary toilets was below the national average from 2014 to 2018. While the city has seen improvement since 2016, the household coverage is

⁹ Philippine Water Supply Sector Roadmap, 2007

¹⁰ Philippine Sustainable Sanitation Roadmap, 2007

still significantly low compared to the share of households with sanitary toilets in Davao City and Cagayan de Oro City.



Source: Field Health Services Information System, Department of Health

Figure 2.3-32 Households with Sanitary Toilet (2014 - 2018)

(3) Education

A total of 30,500 students registered in 28 public elementary schools in Cotabato City during the SY 2015-2016. This represented a 6.2% decrease from the 32,397 students enrolled in the previous school year. Teacher-student ratio was maintained at 1:35, which was the target class size for public schools in the proposed House Bill No. 473¹¹ (Public School Class Size Law of 2016).

Public secondary enrolment reached 13,648 pupils in SY 2015-2016, about 7.4% lower compared to the previous school year. The enrolment situation in public schools in Cotabato City is shown in Table 2.3-18.

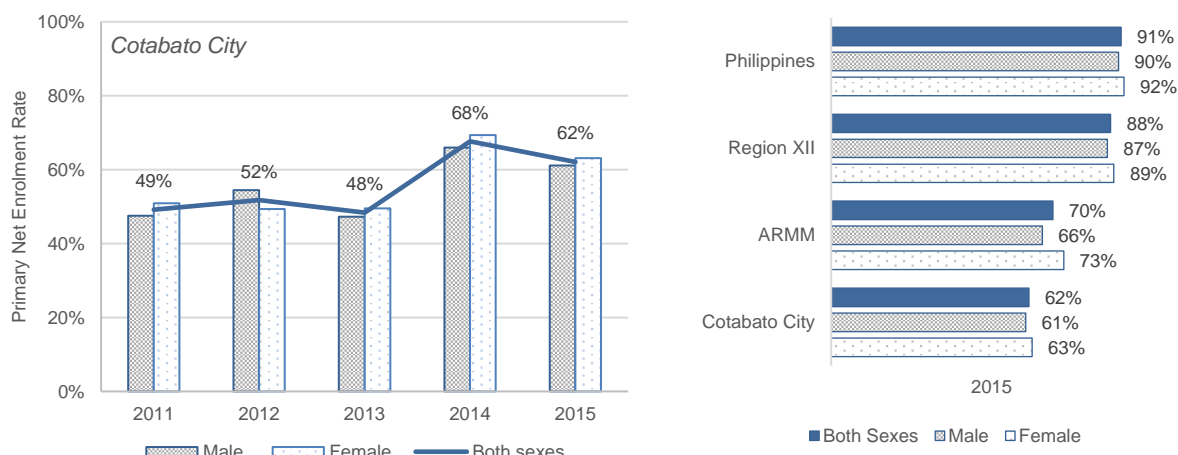
Table 2.3-18 Enrolment Statistics in Public Schools in Cotabato City (2011-2015)

Indicators	2011	2012	2013	2014	2015
Primary (Elementary)					
Number of public schools	27	28	28	28	28
Number of public school teachers	796	804	807	924	868
Teacher-student ratio	1:42	1:41	1:41	1:35	1:35
Classroom-student ratio	1:51	1:50	1:48	1:45	1:37
Secondary (High school)					
Number of public schools	15	15	15	15	16
Number of public school teachers	460	469	509	591	552
Teacher-student ratio	1:32	1:29	1:26	1:24	1:25
Classroom-student ratio	1:78	1:75	1:65	1:53	1:51

Source: Regional Social and Economic Trends, Philippine Statistics Authority Region XII

The primary net enrolment ratio (NER) refers to the proportion of enrolled children aged 6-11 years to the total population in that age range. The NER for both public and private elementary schools in Cotabato City went down to 62% in SY 2015-2016, from 68% in the previous academic year. This is significantly below the recorded national NER average of 91%, as shown in Figure 2.3-33. Males and females had similar NER at 61% and 63%, respectively.

¹¹ House Bill No. 473: An Act Regulating Class Size in All Public Schools and Appointing Funds Therefore

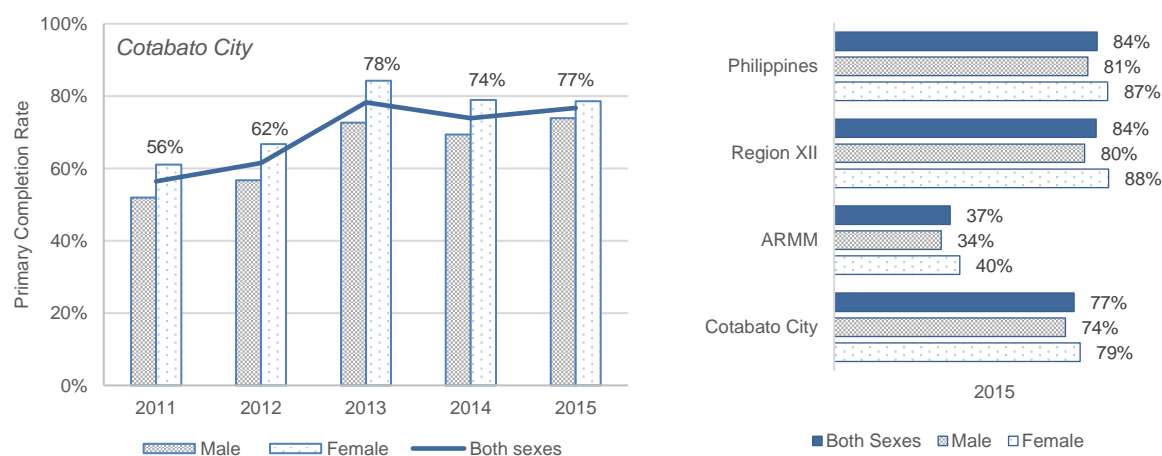


Source: Philippine Statistics Authority

Figure 2.3-33 Net Enrolment Rate in Public and Private Primary Schools in Cotabato City

The primary completion rate, as shown in Figure 2.3-34, refers to the proportion of grade 1 entrants who were able to graduate from elementary school. The completion rate in both public and private elementary schools increased to 77% in SY 2015-2016. ARMM recorded the lowest primary completion rate among all regions at 37%.

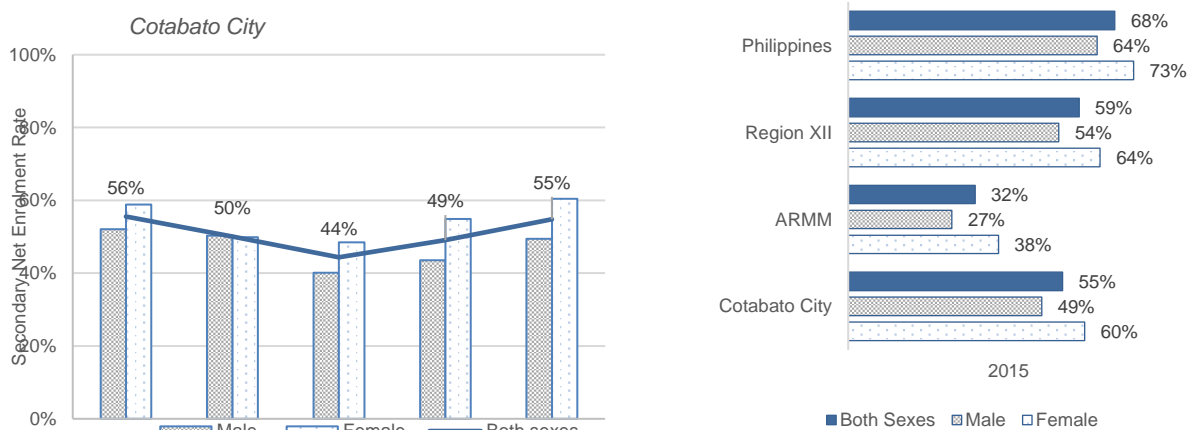
The general trend all over the country indicated that females are more likely to finish primary education than males. The recorded primary completion rate among females in Cotabato City in SY 2015-2016 was 79%, compared to the 74% completion rate among male students.



Source: Philippine Statistics Authority

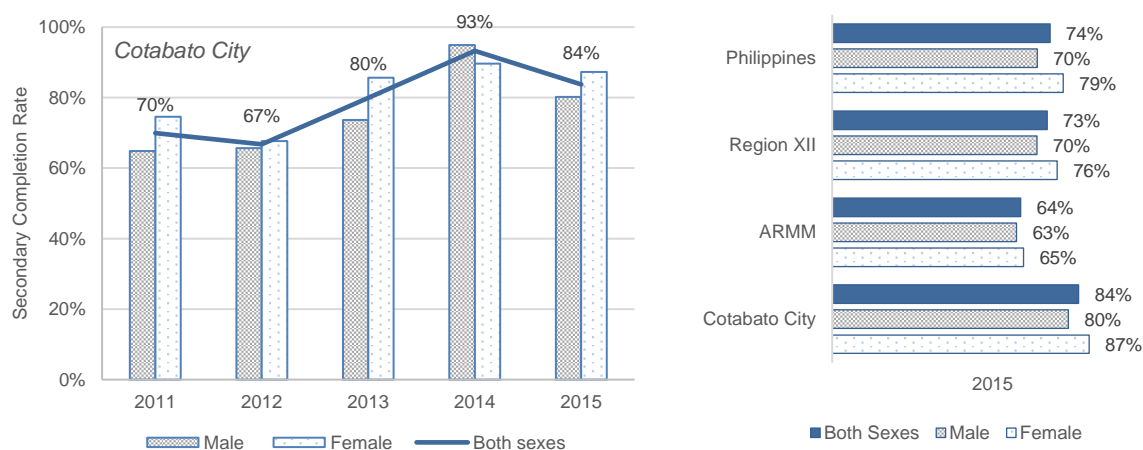
Figure 2.3-34 Completion Rate in Public and Private Primary Schools in Cotabato City

The NER in both public and private secondary schools went up to 55% in SY 2015-2016, as shown in Figure 2.3-35. The trend continued as females aged 12-15 years recorded higher enrolment rates (60%) over males (49%). Completion rate in both public and private secondary schools in Cotabato City was at 84% in SY 2015-2016.



Source: Philippine Statistics Authority

Figure 2.3-35 Net Enrolment Rate in Public and Private Secondary Schools in Cotabato City

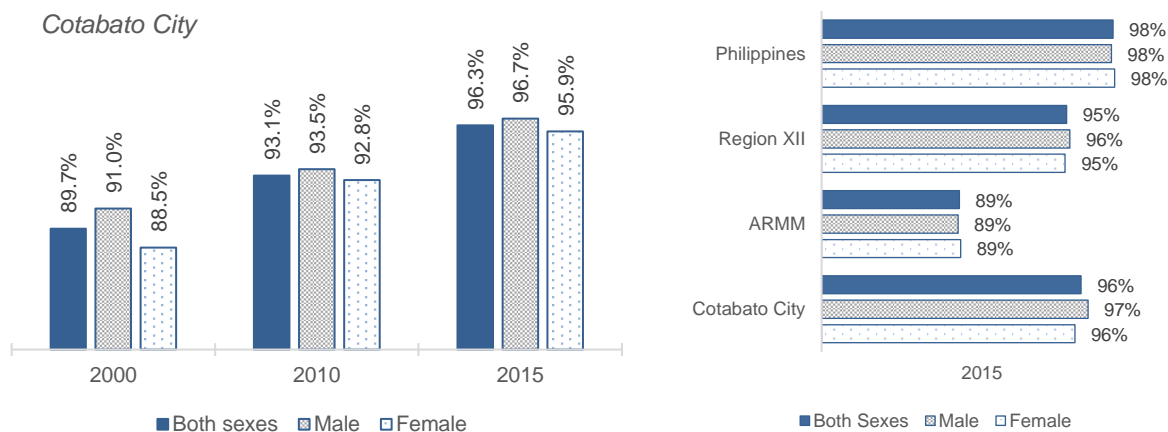


Source: Philippine Statistics Authority

Figure 2.3-36 Completion Rate in Public and Private Secondary Schools in Cotabato City

The simple literacy rate in Cotabato City (population 10 years old and above) has also increased from 89.7% in 2000 to 96.3% in 2015. PSA defines literate persons as individuals who could read and write a simple message in any language or dialect.

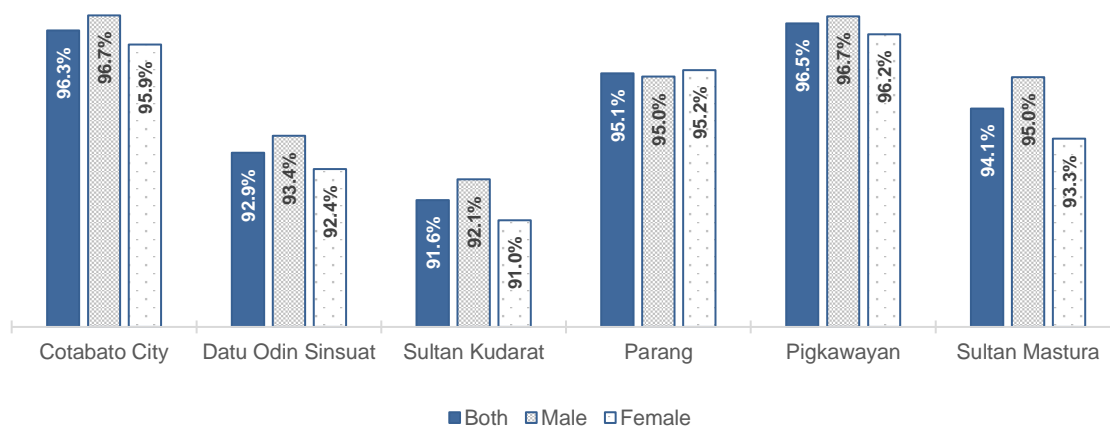
In addition, gender inequality in terms of basic literacy has also been reduced through time. In 2015, males and females have similar literacy rates at 96.7% and 95.9%, respectively. Figure 2.3-37 illustrates how the gap in literacy between males and females decreased from 2000 to 2015.



Source: Philippine Statistics Authority

Figure 2.3-37 Simple Literacy Rate of Population 10 Years Old and Over in Cotabato City, by Sex (2000-2015)

In the Greater Cotabato Area, Pigkawayan (96.5%) and Cotabato City (96.3%) recorded the highest simple literacy rate in 2015. Figure 2.3-38 shows the simple literacy rate among municipalities.



Source: Philippine Statistics Authority

Figure 2.3-38 Simple Literacy Rate of Population 10 Years Old and Over in Greater Cotabato Area, by Sex (2015)

2.4 Environmental Issues

2.4.1 Climate Change

The effects of climate change in Cotabato City have emerged, marked by the increased seawater intrusion to low-lying agricultural lands and the succession of major floods from 2008 to 2011. In 2009, a World Bank study¹² identified Cotabato City as one of the ten cities in the East Asia and Pacific region most vulnerable to the intensified effects of storm surge due to climate change.

In order to address this issue, the City Government of Cotabato, through an addendum, has integrated climate change adaptation to its Comprehensive Land Use Plan (2011 – 2020). This is consistent with the Climate Change Act of 2009, which designated local government units (LGU) as the frontline agencies in the development of action plans in their respective areas.

Pursuant to the Philippine DRRM Act of 2010 (RA 10121), the city adopted a strategic direction, where the emphasis shifts from reactive to proactive measures that focus on disaster prevention and preparedness. Among the priority programs and projects identified in the climate change action plan include the: (1) evaluation of disaster risk reduction and management plan, (2) creation of city and barangay DRRMC, (3) creation of mass casualty management system, and the (4) establishment of incident command post.

2.4.2 Environmentally Critical Areas

(1) Protected Areas and Other Important Habitats

The Philippine legislation discourages infrastructure development in areas of environmental importance. According to Section 4 of Presidential Decree 1586, “no person, partnership or corporation shall undertake or operate any such declared environmentally critical project or area without first securing an Environmental Compliance Certificate (ECC).”

As shown in Figure 2.4-1, all currently declared protected areas (PA) in Mindanao are located outside Cotabato City. Nonetheless, several areas with rich biodiversity, such as the Liguasan Marsh, Pulangi River and Timako Hill are situated in or within the vicinity of the city. These areas are either identified as key biodiversity areas (KBA) or are being endorsed by the LGU to become a PA or KBA, with the goal of preserving its wide array of flora and fauna.

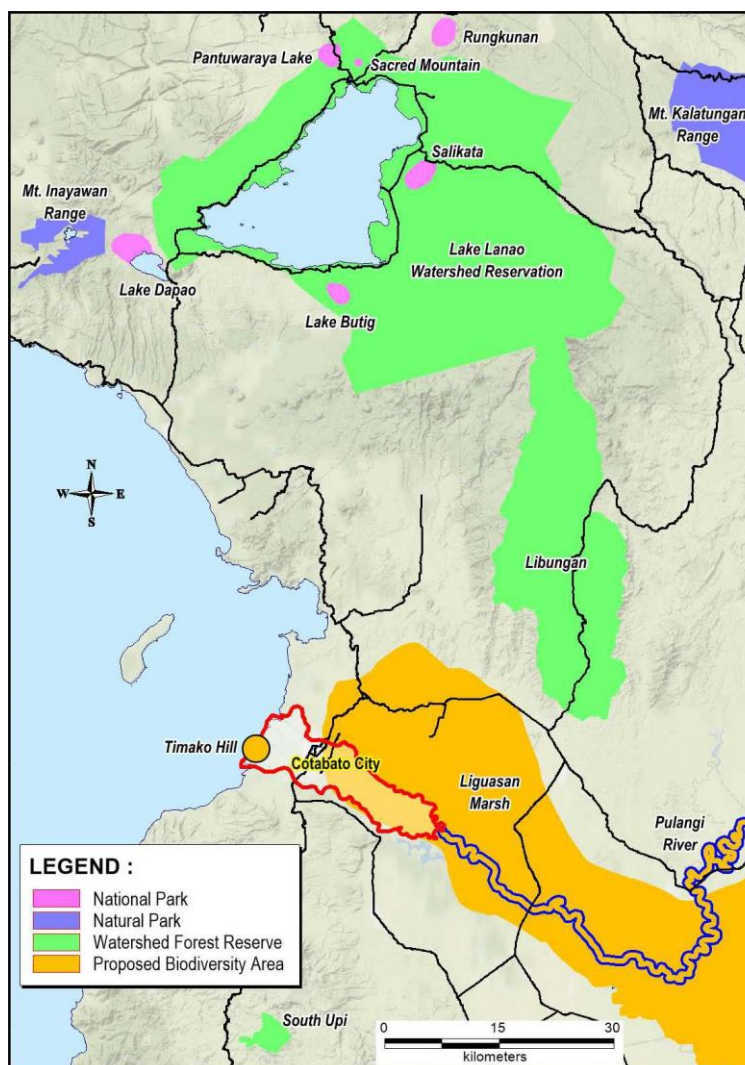
Liguasan Marsh

The Liguasan Marsh is the largest swamp and marsh area in Mindanao, spanning 288,000 hectares across the provinces of Maguindanao, North Cotabato and Sultan Kudarat. It is identified as a key biodiversity area (KBA) and was recommended by the National Economic and Development Agency (NEDA) to be included as a protected area in 1998. The marsh is known to support at least 201 species of flora and 206 species of terrestrial vertebrates¹³, and is also home to several

¹² Dasgupta, Susmita, et. al. (2007). The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis. World Bank Policy Research Working Paper No. 4136.

¹³ The Wetland Biodiversity Component for Liguasan Marsh Study (Dec. 2004). Retrieved from: <https://faspelib.dnr.gov.ph/sites/default/files//Publication%20Files/Volume%20III%20-%20Project%20Brief.pdf>

endangered species such as the Philippine Eagle (*Pithecopaga jefferyi*), the Philippine crocodile (*Crocodylus mindorensis*), and the Philippine duck (*Anas luzonica*)¹⁴. The Liguasan Marsh Development Master Plan (1999-2025) has identified the following activities as major threats to biodiversity: (1) increase in built up areas, (2) illegal logging and fishing, and (3) pollution of marsh water.



Source: Prepared by the JICA Study Team using data from Department of Environment and Natural Resources (DENR), City Planning and Development Office

Figure 2.4-1 Location Map of Protected Areas and Identified Areas with Rich Biodiversity

Pulangi River

Pulangi River is a 320-km river system which traverses the provinces of Bukidnon, North Cotabato and Maguindanao. It is one of the major tributaries of the Rio Grande de Mindanao and is part of Pulangi Watershed, the second largest watershed in the Philippines. The river is identified

¹⁴ De La Paz, M. and Colson, L. (2008). Population, Health, and Environmental Issues in the Philippines: A Profile of the Autonomous Region in Muslim Mindanao (ARMM). Population Reference Bureau.

as a candidate KBA¹⁵ and its forests are home to the Philippine Eagle and other endangered species. The challenges faced by the river include massive erosion and siltation¹⁶.

*Timako Hill*¹⁷

Timako Hill is one of only two elevated areas in Cotabato City. The forested areas of the hill, spanning over 148 hectares, are home to several species of monkeys, bats, and birds. The Government of Cotabato City moved to declare Timako Hill as a protected area to preserve its biodiversity from indiscriminate logging and conflicting land uses.

The hill is located along the coast in Barangay Kalanganan II, overlooking the Illana Bay. Its ideal location is one of the primary reasons why it is viewed as a potential destination for eco-tourism. The CLUP of Cotabato City has envisioned it to be built with nature-friendly beach resorts and theme park, promoting activities such as mountain climbing and trekking.

(2) Important Areas Designated under International Treaties

The Philippines is a member state of the following two international treaties: Convention on Wetlands of International Importance especially as Waterfowl Habitat (known as Ramsar Convention); and Convention Concerning the Protection of the World Cultural and Natural Heritage (known as World Heritage Convention).

In the country, there are seven (7) Ramsar sites¹⁸, six (6) World Heritage (cultural and natural) sites, and 19 sites on the Tentative List of the World Heritage sites¹⁹. None of them are located within the vicinity of the city.

2.4.3 Priority Concerns

(1) Solid Waste Management

The rapid growth of population within the city has led to the sudden upsurge in waste generation. If not properly managed, solid wastes have the potential to intensify the perennial threat of flooding.

According to the Waste Analysis and Characterization Study (WACS) conducted in 2017, the daily volume of wastes generated within the city is approximately 109 tons and is expected to increase to 167 tons per day by 2027. The city currently lacks a sanitary landfill and solely relies on a temporary Controlled Dumpsite coupled with Residual Containment Area (RCA) for waste disposal. The Controlled Dumpsite and RCA is expected to reach its full capacity by 2020²⁰.

¹⁵ Environmental and Social Assessment (ESA) Report, Harnessing Agribusiness Opportunities through Robust and Vibrant Entrepreneurship Supportive of Peaceful Transformation (HARVEST). Retrieved from: <https://www.landbank.com/sites/default/files/products/HARVEST%20ESA.pdf>

¹⁶ Japan International Cooperation Agency (April 2016). Comprehensive Capacity Development Project for the Bangsamoro.

¹⁷ Comprehensive Land Use Plan (CLUP) of Cotabato City

¹⁸ The List of Wetlands of International Importance (published 13 May 2020): <https://www.ramsar.org/sites/default/files/documents/library/sitelist.pdf>

¹⁹ UNESCO World Heritage Centre: Philippines: <https://whc.unesco.org/en/statesparties/ph>

²⁰ 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

However, these will not yet be closed until the construction of the City's Central Material Recovery Facility (MRF) shall have been completed and made operational.

With the Information and Education Campaign (IEC) being conducted by the City Government, the level of awareness on proper solid waste management is high but the level of practice/application is low which, apart from the inadequate infrastructure, had aggravated the issue on solid wastes. In the outlying communities of the city, where the waste collection is limited to set schedules, throwing of garbage into the river and indiscriminate burning were still practiced by some individual.

(2) Degradation of Coastal and Marine Ecosystems

Cotabato City is home to at least eight (8) species of mangroves, covering an area of 409 hectares (2.31% of the total city area) spread throughout the western coastal barangays of Kalanganan. Mangroves have been known to provide spawning grounds for an abundant species of fishes and have protected inland communities from storm surges and strong tidal currents. Over the past years, the coastal ecosystems of the city have been threatened by the rapid conversion of mangrove stands into settlements and fishponds. Reports have also surfaced that mangroves have been unsustainably cut for commercial purposes²¹.

The gradual exploitation of the coastal environment has prompted the degradation of the marine ecosystem. The loss of mangroves translated into less filtering of wastes from inland communities, which eventually caused the loss of juvenile fishes, mollusks, and other organisms. Illana Bay, which was once a rich source of livelihood for at least 700 fishermen, now hosts only five (5) species of reef fishes²². In addition, the decrease of the fish population is aggravated by dynamite fishing and use of small-eyed fishnets.

(3) Delay in the Delineation of Protected Areas

The National Integrated Protected Areas System (NIPAS) Act of 1992 provided the initial framework for the protection and management of the declared protected areas in the Philippines. The passage of the Expanded NIPAS Law in June 2018 strengthened the initiative through the expansion of areas covered, provision of bigger budget, and imposition of stricter penalties to violators of the law.

Despite the availability of scientific information and strong consensus among stakeholders²³, the Liguasan Marsh was among the important habitats excluded in the newly established list of protected areas covered by the Expanded NIPAS Law. The delineation of the Liguasan Marsh as a protected area will provide the needed legislation and funding against potentially destructive activities such as illegal logging and fishing.

²¹ Comprehensive Land Use Plan (CLUP) of Cotabato City

²² Comprehensive Land Use Plan (CLUP) of Cotabato City

²³ The Wetland Biodiversity Component for Ligawasan Marsh Study (Dec. 2004). Retrieved from: <https://faspelib.denr.gov.ph/sites/default/files//Publication%20Files/Volume%20III%20-%20Project%20Brief.pdf>

CHAPTER 3 DEVELOPMENT AND SPATIAL CONTEXT FOR GREATER COTABATO AND CITY

3.1 Regional Development Plans and Frameworks

The Philippine National Physical Framework Plan (NPPF) 2016-2045 aims to guide policy and decision-makers in the public sector in bringing about efficient settlement, production, and service delivery systems consistent with sustainable use of land and other natural resources and disaster risk reduction. It has four basic components namely: settlements, production, protection, and infrastructure. The NPPF is now being reoriented to be more prescriptive with its policies and spatial recommendations. The National Spatial Strategy (NSS) is intended to be the core strategy of the NPPF of the Philippines.

The NSS has three interrelated strategies: concentration (agglomeration), connectivity, and vulnerability reduction. The strategies focus on settlements because the spatial distribution of the population drives all other components of production, protection, and infrastructure. These national spatial strategies lay down the foundation for regional development structures for Mindanao with the formulation of the Mindanao Spatial Strategy/Development Framework 2015-2045. The formulation of the development framework for Greater Cotabato should, therefore, be consistent with the overall spatial strategies enunciated in the NPPF 2016-2045, with great consideration of the important roles of Mindanao as stipulated in different development framework plans.

(1) Overview of Regional Development Plans Relevant to Greater Cotabato/Cotabato City

Within two decades, development or physical land use plans were formulated from the provincial to Mindanao Island levels which considered the role of Greater Cotabato and Cotabato City. Table 3.1-1 shows the list of development plans, including an exceptional plan by the BIMP-EAGA Vision 2025 to ensure that member countries (Mindanao and Palawan in the Philippines) are attuned to global development trends that would influence the future of economic cooperation.

Regarding development plans supported by international development partners, Bangsamoro Development Plan (BDP-I) was prepared in 2015 which identified short to medium term projects through the support of the World Bank, JICA, ADB among others in partnership with the Bangsamoro Development Agency (BDA), then the development arm of the MILF. In addition to the BDP-I, the Comprehensive Capacity Development Project for the Bangsamoro Development Plan for the Bangsamoro (BDP-II) was formulated through the technical assistance by JICA which identified various projects from short, medium to long-term development.

Table 3.1-1 Regional Development Plans relevant to Greater Cotabato and Cotabato City

Name of the Plan	Abbreviation	Year	Publisher	Reference
1, Mindanao Spatial Strategy / Development Framework Plan 2011-2045	MSS/DFP	2014	NEDA	--
2, Mindanao 2020 Peace and Development Framework Plan 2011-2030	M2020PDFP	2012	MinDA	Supported by Australian AID
3, Mindanao Strategic Development Framework 2010-2020	MSDF	2010	NEDA	
4. ARMM Regional Development Plan 2017-2022	ARMM-RDP	2017	NEDA	--
5, ARMM Regional Physical Framework Plan 2011-2045	ARMM-RFPF	2005	REDPE	--
6. Bangsamoro Development Plan	BDP-I	2015	BDA	Supported by Multi-donors (WB, JICA, UN, etc.)
7. Comprehensive Capacity Development Project for the Bangsamoro Development Plan for the Bangsamoro (BDP II)	BDP-II	2016	JICA	Technical Assistance of JICA
8. 1 st Bangsamoro Development Plan 2020-2022	BDP2020	2020	BPDA	
9, Soccsksargen Regional Development Plan 2017-2022	RXII-RDP	2017	NEDA	--
10, Soccsksargen Regional Physical Framework Plan 2004-2030	RXII-RFPF	2004	NEDA	--
11. Maguindanao Provincial Development Physical Frameworks Plan 2014-2023	M-PDPFP	2014	MPO	--
12. BIMP-EAGA Vision 2025	BEV2025	2014	BIMP-FC	Supported by ADB

Note: NEDA: The National Economic and Development Authority, MinDA: Mindanao Development Authority, BDA: Bangsamoro Development Authority, BPDA: Bangsamoro Planning and Development Authority, REDPE: Regional Economic and Development Planning Board, ADB: Asia Development Bank, TAF: The Asia Foundation MPO: Maguindanao Provincial Office. BIMP-FC: BIMP Facilitation Center
Source: Each relevant report

(2) Urban Centers in the Development Plans for Greater Cotabato and Cotabato City

Urban centers play fundamental roles in promoting and leading regional socio-economic development. The application of the NSS core strategies on concentration (agglomeration), connectivity, and vulnerability resulted in the proposed 5-tiered hierarchy. Based on the National Spatial Strategy and MSS/DF, Mindanao is composed of five hierarchy of settlements: a) Metropolitan Center (Davao); b) Regional Center; c) Sub-regional Center; d) Provincial Center; and, e) Local Center. However, the functional names or municipalities designated as urban centers had been modified in the new development plans. Table 3.1-2 presents the urban function in each relevant development plan concerning Cotabato City and the municipalities in the Greater Cotabato area.

According to the BPDA's Bangsamoro Development Plan 2020-2022, the area similar to the Greater Cotabato area (study area of this JICA assisted study) is proposed as "Metro Cotabato" as one of the regional centers of BARMM consisting of six urban centers: Cotabato City and five municipalities of Parang, Sultan Mastura, Sultan Kudarat, Datu Odin Sinsuat, and Upi. The plan

states that Cotabato City with an international airport and ecozone and further expansion of economic bases will promote economic development for neighboring municipalities while adjacent municipalities will provide a range of services and linkages to other growth centers outside the region.

Table 3.1-2 Urban Centers in the Development Plans for Greater Cotabato and Cotabato City

Name of the Plan	Function of Municipalities by Each Plan									Reference
	Involved by Greater Cotabato					Outside				
	Cotabato City	Parang	Sultan Mastura	Sultan Kudarat	Datu Odin Sinsuat	Upi	Shariff Aquak	Metro Jplo	Lamitan	
1, Mindanao Spatial Strategy / Development Framework Plan 2011-2045	RC	SRC	--	PC	--	--	--	--	--	Following NSS
2, Mindanao 2020 Peace and Development Framework Plan 2011-2030	--	--	--	--	--	--	--	--	--	
3. ARMM Regional Development Plan 2017-2022	--	SRC	SRC	SRC	--	SRC	--	RC	PC	Lamitan for Basilan
4, ARMM Regional Physical Framework Plan 2011-2045	--	PUC	PUC	--	--	--	SUC	--	--	
5. Bangsamoro Development Plan (BDP-	UC	--	--	--	--	--	--	--	--	
6, Soccsksargen Regional Development Plan 2017-2022	PUC									Cotabato City only covered by RXII
7, Soccsksargen Regional Physical Framework Plan 2004-2030	PUC									
8. Maguindanao Provincial Development Physical Frameworks Plan 2014-2023	PUC	SUC-A	SUC-B	SUC-B	SUC-B	SUC-B	SUC-B			
9. 1 st Bangsamoro Development Plan 2020-2022	RC	RC	RC	RC	RC	RC	--			One City and Five Municipalities as Regional Center

Note1: NSS: The National Spatial Strategy, RC=Regional Center, SRC=Sub-regional Center, PC=Provincial Center, PUC=Primary Urban Center, SUC=Secondary Urban Center, SUC-A=Secondary Urban Center (A), SUC-B=Secondary Urban Center (B), UC=Urban Center,

Note2: In case of the urban centers in the ARMM Regional Development Plan 2017-2022, four municipalities are described as Sub-regional Centers by Parang, Sultan Mastura, Sultan Kudarat and Upi headed by Parang. Gray color indicates that the plan does not mention about the urban center.

Source: Each relevant reports

In this study, the urban functions for relevant municipalities in the Greater Cotabato area are taken temporarily following the Mindanao Spatial Strategy/Development Framework Plan 2015-2045. The finalization of the urban function shall be undertaken through the updating of the BARMM Regional Physical Framework Plan as well as the Comprehensive Land Use Plans of the said municipalities.

3.1.1 Regional Setting by the Key Framework Plans

(1) Mindanao Spatial Strategy/Development Framework (MSS/DF) 2015-2045

- Development Vision and Socio-economic Framework: Mindanao is envisioned to be “A peaceful, safe, resilient, and socially-inclusive Mindanao of diverse cultures harmoniously enjoying a *sustainable and competitive agri-industrial and resource-based economy*”. The planning target for key macroeconomic indicators by 2045 is indicated in Table 3.1-3.

Table 3.1-3 Mindanao Socio-economic Framework in the MSS/DF 2015-2045

Indicators		Development Framework by Target Year		
		2030	2040	2045
Population Framework	Population	4,394,221	5,104,710	5,501,260
	Annual Average Growth Rate	1.51% (2020-2030)	1.51% (2030-2040)	1.51% (2040-2045)
	Share of BARMM in Mindanao	13.6%	13.1%	12.8%
Economic Framework	GRDP	n.a	n.a	n.a
	Employment	n.a	n.a	n.a
BARMM / Cotabato City Development Position		n.a	n.a	n.a

Source: Mindanao Socio-economic Framework in the MSS/DF 2015-2045

Spatial Strategy, Policies, and Programs: Consistent with the NPPF, the three NSS interrelated strategies were applied to the MSS/DF. The strategy on concentration aims to enhance the ability of settlements to absorb growth and provide opportunities to improve the existing urban environment. This resulted in the hierarchy of settlements with a) one Metropolitan region (Metro Davao) serving as the economic and administrative core of Mindanao; b) eleven (11) Regional Centers (including Metro Cotabato) as regional market and service center to several provinces, not to be confused with the existing regional administrative center; c) 26 Sub-regional centers which are relatively large settlements that form the market catchments of regional centers, including surrounding municipalities of Cotabato City (e.g. Parang in Maguindanao); d) 67 Provincial centers composed of settlements that are typically a major city or municipality of a province, with a similar role as a regional center but in a limited scale; and e) Local center as a settlement that forms the base of the hierarchy and generally caters to one or two local government units. All other cities or municipalities that are not included in the higher levels are considered as local centers.

The NSS states that the strategy on connectivity aims to increase transportation and communication linkages with settlements and key production areas. However, the MSS/DF focused on enhancing connectivity through inter-modal transport by air, sea, and land through inter-Mindanao and international access and linkages. Intermodal, integrated, and efficient infrastructure support systems to and from settlements zones, production areas, and domestic and foreign marketing centers shall be provided. The development programs and projects are proposed in the plan by three strategies with policy options as summarized in Table 3.1-4.

Table 3.1-4 Policy Option and Priority Programs, Activities and Projects Proposed in the MSS/DF 2015-2045

Strategy	MSS / DF 2015 - 2045	
	Key Policy Option	Key Priority Programs, Activities, Projects
Concentration (Regional Agglomeration)	<ul style="list-style-type: none"> • Promote redevelopment of build-up areas and infill-development • Strategic densification of priority areas • Public transport-oriented development • Protect environmentally sensitive areas, agricultural lands, and open spaces • Key development zones (KDZ) for economic development 	<ul style="list-style-type: none"> • Development of KDZ (agri-fishery and marine, tourism circuit, industrial & economic zone, power, mineral) • Built-up areas improvement for basic services • The effective transportation system in growth centers
Connectivity	<ul style="list-style-type: none"> • Development of Mindanao Railway (long-term) • Resilient and green infrastructure development including redundant access to settlement and production areas 	<ul style="list-style-type: none"> • Widening/Improvement/rehabilitation of arterial and secondary national roads and bridges • Establishment of railways and mass rapid transportation system • Modernization/upgrading of airports and seaports to meet international standards • Establishment/enhancement of air and sea routes with other growth centers in the country, the ASEAN region and the rest of the world
Vulnerability Reduction	<ul style="list-style-type: none"> • Reduce disaster risks by appropriate management (e.g. open space system, stormwater system, mitigation measures for hazard-prone areas) • Establish evacuation centers and redundant access network 	<ul style="list-style-type: none"> • 10% of settlements in hazardous areas shall be relocated to safer areas during the first 10 years • 30% within the 2nd 10 years and 50% within the 3rd ten years of MSS/DF implementation • Integrated management of eight River Basins in Mindanao

Source: Mindanao Socio-economic Framework in the MSS/DF 2015-2045

- Relevant Development Plans in conjunction with Greater Cotabato and Cotabato City:
The MSS/DF proposed development directions and programs for the relevant areas concerning the Greater Cotabato area and Cotabato City as presented in Table 3.1-5.

Table 3.1-5 Relevant Development Plans concerning Greater Cotabato and Cotabato City Proposed in the MSS/DF 2015-2045

Strategy	MSS / DF 2015 - 2045	
	Key Strategy and Policy Option	Key Priority Programs, Activities, Projects
Concentration (Regional Agglomeration)	<ul style="list-style-type: none"> • Cotabato City as urban centers of Region 12 and ARMM for institutional, financial, and commercial and services • <i>Sub-regional Center:</i> Parang Municipality as a host of ARMM for investment, trade and commercial activities with Polloc Free-port and SEZ • <i>Provincial Center:</i> Sultan Kudarat as the provincial of Maguindanao Province (Shariff Aguak at present 2020) 	<ul style="list-style-type: none"> • Modernization of Cotabato Regional Medical Center • Energy: Power project in Sultan Kudarat, Dentre Thermal Plant in Cotabato City • Halal industry development project in ARMM • Padang-Padang Adventure Park (Parang)
Connectivity	<ul style="list-style-type: none"> • Intra-Mindanao Linkages by; • Land transport (Cotabato City-Parang-Pagadian Road) • Sea transport (cargo handling service, RORO, rapid ferry, etc) • Air transport (upgrading in compliance with ICAO requirements) • Mindanao Railway (long-term) 	<ul style="list-style-type: none"> • Awang Airport expansion, Bangsamoro International Airport Project (F/S) • Timako Port construction (Cotabato City), Cotabato City East Diversion Road, others

Strategy	MSS / DF 2015 - 2045	
	Key Strategy and Policy Option	Key Priority Programs, Activities, Projects
Vulnerability Reduction	<ul style="list-style-type: none"> • Open space system guidelines • Protect environmental sensitive areas • Promote pollution reduction and prevention • Relocate hazard-exposed settlements to safe areas 	<ul style="list-style-type: none"> • Flood control projects (Ala River in Sultan Kudarat, Ambal-Simuay River in Cotabato, Rio Grande de Mindanao River)

Source: Mindanao Socio-economic Framework in the MSS/DF 2015-2045

(2) ARMM Regional Development Plan (ARMM-RDP) 2017-2022

- Development Vision and Socio-economic Framework: The plan sets out the development vision for ARMM as “by 2040, the peoples in the Bangsamoro are self- governing with a predominantly *middle-class society* living in safe communities, having a dynamic economy including a *Halal ecosystem*, enjoying inclusive peace and diverse cultures, who shall enhance sustainable development ensuring that responsibilities and benefits are shared by all.”. he targets for key indicators by 2022 as indicated in the plan are shown in Table 3.1-6.

Table 3.1-6 Socio-economic Target Indicators of the ARMM-RDP 2017-2022

Indicators		Development Framework by Target Year		
		2016	2022	
Population Framework	Population	n.a	n.a	
	Annual Average Growth Rate	n.a	n.a	
	Share of BARMM in Mindanao	n.a	n.a	
Economic Framework	GRDP (low target growth rate %)	Primary (AHFF)	0.98	2.44
		Secondary (Industry)	8.68	25.34
		Tertiary (Service)	4.10	6.68
	Total	2.53	5.25	
	Labor Force	53 %	65 %	
Poverty Incidence	ARMM	48.2%*	33.2%	
	Maguindanao Province	48.8%*	33.8%	
Cotabato City Development Position		n.a	n.a	

Note: Figures indicate the actual value in 2015

AHFF: Agriculture, Hunting, Forestry and Fishery

Source: ARMM Regional Development Plan 2017-2022 (2017)

- ARMM Development Goals and Inter-mediate Outcomes: The ARMM RDP 2017-2022 is consistent with the Philippines Development Plan (PDP) 2017-2022. It supports the framework on Enhancing the Social Fabric, Inequality Reducing Transformation, Increasing Growth Potential, and Enabling and Supportive Economic Environment. Supporting the framework are foundations for sustainable development towards the achievement of four cross-cutting intermediate outcomes as shown in Table 3.1-7.

Table 3.1-7 Intermediate Outcomes Proposed in ARMM-RDP 2017-2022

Framework	ARMM-RDP 2017 – 2022	
	Development Goals	Intermediate Outcomes
Enhancing the social fabric	<ul style="list-style-type: none"> Open, transparent, accountable and inclusive governance practiced and sustained 	<ul style="list-style-type: none"> Functional LGUs Continuing improvement of ARG in service delivery People’s participation in governance strengthened Revenue generation and financial management in ARMM improved
Reducing inequality	<ul style="list-style-type: none"> Access of ARMM communities to basic services for human capital development 	<ul style="list-style-type: none"> Cultural diversity in ARMM is protected, conserved and developed as part of human capital Access to and quality delivery of health and nutrition for all improved Lifelong learning opportunities for all improved Income-earning ability increased Vulnerability of individuals and families reduced
Increasing potential growth	<ul style="list-style-type: none"> Environment for more secured communities in ARMM improved and sustained 	<ul style="list-style-type: none"> More effective access to justice and conflict resolution, management and prevention in ARMM communities Improved promotion and protection of human rights in ARMM
Enabling and supportive economic environment	<ul style="list-style-type: none"> Investment, employment, and income in ARMM increased 	<ul style="list-style-type: none"> Increased economic opportunities in agriculture, fishery, and forestry in ARMM Increased economic opportunities in the industry and service sector in ARMM Technology and innovations harnessed to increase economic opportunities Foundation of a conducive environment for the efficiency of market competition
Foundations for sustainable development	<ul style="list-style-type: none"> Infrastructure development for socio-economic growth in the region ARMM accelerated 	<ul style="list-style-type: none"> Attaining just and lasting peace Ensuring security, public order, and safety Accelerating infrastructure development Ensuring ecological integrity, clean and healthy environment

Source: ARMM Regional Development Plan 2017-2022

- **Spatial Strategy:** The ARMM-RDP 2017-2022 spatial strategy was developed following the core strategies of NSS. The hierarchy of settlements resulted from the concentration (regional agglomeration) of the population giving way to the functional roles of LGUs as shown in Table 3.1-8. The regional center is Metro Jolo in Sulu Province, the sub-regional centers are the municipalities of Parang, Sultan Mastura, Sultan Kudarat and Upi in Maguindanao province, and the provincial center is Lamitan in Basilan Province (although the present seat of Provincial Government is in Isabela City which is not part of BARMM, planning to transfer the seat to Lamitan City by early 2021).

The integration of the region is realized with the connectivity that identifies specific routes and linkages through various modes of transportation (air, sea, land) to enhance access and to connect production, tourism, and service centers. Connectivity could also be improved with modern telecommunications. The region’s growth shall be sustained by mainstreaming vulnerability reduction at all stages of development processes. Disaster risk management is directed at eleven (11) areas including four (4) resources that require strict protection and conservation.

Table 3.1-8 Policy Option and Priority Programs, Activities and Projects Proposed in ARMM-RDP 2017-2022

Strategy	ARMM-RDP 2017 – 2022
	Key Spatial Strategy
Concentration (Regional Agglomeration)	<ul style="list-style-type: none"> • <i>Regional Center</i>: Metro Jolo as the regional center of ARMM for institutional, financial, medical, universities with seaport/airport • <i>Sub-regional Center</i>: Parang Municipality with Sultan Mastura, Sultan Kudarat, Datu Odin Sinsuat and Upi municipalities • <i>Provincial Center</i>: Lamitan for Basilan Province
Connectivity	<ul style="list-style-type: none"> • Airports upgrading and new route development for Tawi-Tawi and Awang • Seaports upgrading (Polloc, Jolo, Bongao, Lamitan, Malabang) for internal link improvement in ARMM • Tourism link development for potential ecotourism areas
Vulnerability Reduction	<ul style="list-style-type: none"> • Disaster risk management in focused 11 areas including 4 areas concerning Greater Cotabato by Dimapatoy watershed 8,765 ha, Ligawasan marsh (36,600 ha), Malitubog and Maritagao watersheds)

Source: ARMM Regional Development Plan 2017-2022

(3) Maguindanao Physical and Development Framework Plan (M-PDFP) 2014-2023

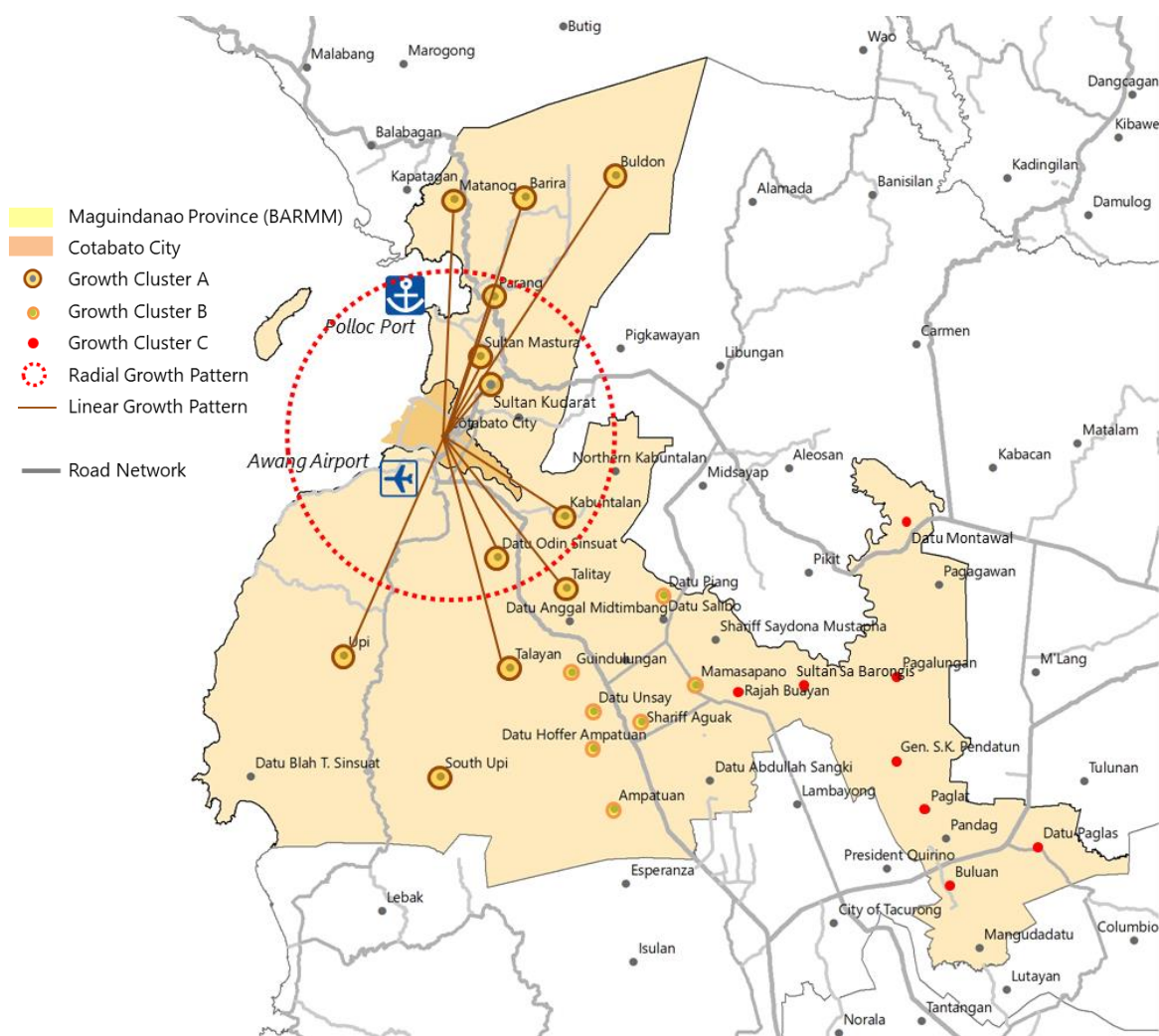
- Vision: The plan sets out the development vision for the province as “A developed, economically productive and stable Maguindanao, where educated and healthy men and women of different people harmoniously co-exist in a culture of peace, safe environment and habitation, anchored by committed leadership that upholds the principle of participatory governance and people empowerment.” The plan does not have plan targets for socio-economic indicators by 2023.
- Physical Framework: The plan adopts a combination of the “growth cluster” and “linear-radial development pattern” as its spatial strategy. The province is grouped into three clusters that shall serve as the commercial-industry-transshipment point, gateway of nearby growth centers, and production center. The linear-radial development links the growth cluster with Cotabato City and influences other municipalities. This spatial strategy is described in Table 3.1-9 and Figure 3.1-1.

Table 3.1-9 Physical Framework and Urban Centers of M-PDFP 2014-2023

Strategy		M-PDFP 2014 - 2023	
		Concept	Municipalities
Growth Cluster	Growth Cluster A	<ul style="list-style-type: none"> • to play the role of commercial-industrial-transshipment point of the whole province • to hasten the growth of processing or manufacturing industries, commerce, and trade 	<ul style="list-style-type: none"> • Matanog, Barira, Buldon • Parang, Sultan Mastura, Sultan Kudarat, Datu Odin Sinsuat, Kabuntalan, Upi, South Upi • Talayan, Talitay
	Growth Cluster B	<ul style="list-style-type: none"> • To serve as the gateway of the province to the growth centers of nearby cities of General Santos and Tacurong • To complement the production of agriculture-based crops, livestock, and poultry products. 	<ul style="list-style-type: none"> • Datu Piang, Guindulungan • Datu Unsay, Shariff Aguak, Datu Saudi Ampatuan, Ampatuan, Mamasapano
	Growth Cluster C	<ul style="list-style-type: none"> • To boost agricultural production especially in fisheries and crops 	<ul style="list-style-type: none"> • Datu Montawal • Rajah Buayan, • Sultan sa Barongis, Pagalungan • SK Pendatun, Paglat, Buluan, Datu Paglas

Strategy	M-PDFP 2014 - 2023	
	Concept	Municipalities
Linear Development	<ul style="list-style-type: none"> To link between Cotabato City and the surrounding municipalities in the Growth Cluster A. 	<ul style="list-style-type: none"> Municipalities of Growth Cluster A
Radial Development	<ul style="list-style-type: none"> To spread and affect adjacent municipalities 	<ul style="list-style-type: none"> Parang, Sultan Mastura, Sultan Kudarat, Datu Odin Sinsuat, Upi

Source: Maguindanao Physical and Development Framework Plan 2014-2023



Source: JICA Study Team based on the Maguindanao Physical and Development Framework Plan 2014-2023

Figure 3.1-1 Physical Framework and Urban Centers of M-PDFP 2014-2023

(4) Region XII (Soccsksargen) Regional Development Plan (R12-RDP) 2017-2022

The Region XII as the adjacent region of BARMM (ex-ARMM) region with close relationship of Cotabato City historically to this region, where an apart of Pigkawayan Municipality in this region is covered by the Greater Cotabato area. Cotabato City was involved as one of six cities (Cotabato, General Santos, Kidapawan, Koronadal, and Tacurong) in the regional development plan.

- Development Vision and Socio-economic Framework (R12-RDP 2017-2022): The plan sets out the long-term vision for Region XII by 2040, as “Good Governance, Convergence, Sustainable Development, Gender and Development, Population and Development, Volunteerism, and Resiliency” to become a prosperous, predominantly middle-class society where no one is poor. The targets for key indicators by 2022 as indicated in the plan are shown in Table 3.1-10.

Table 3.1-10 Socio-Economic Target Indicators of the R12-RDP 2017-2022

Indicators		Development Framework by Target Year		
		2016	2022	
Population Framework	Population	n.a	n.a	
	Annual Average Growth Rate	n.a	n.a	
	Share of BARMM in Mindanao	n.a	n.a	
Economic Framework	GRDP (low target growth rate %)	Primary (AFF)	1.0	4.5
		Secondary (Industry)	7.0	10.0
		Tertiary (Service)	7.0	10.0
		Total	5.4	8.9
Cotabato City Development Position		n.a	n.a	

AHFF: Agriculture, Forestry and Fishery

Source: Region XII (Soccsksargen) Regional Development Plan 2017-2022 (2017)

- Development Strategies: The overall six strategic frameworks of the plan consist of 1) enhancing the social fabric, 2) inequality, reducing transformation, 3) increasing growth potential, 4) enabling and supporting economic environment, and 5) laying the foundations for sustainable development with development strategies as shown in Table 3.1-11.

Table 3.1-11 Strategic Frameworks and Strategies Proposed in R12-RDP 2017-2022

Strategic Frameworks	Development Strategies
Enhancing the social fabric	<ul style="list-style-type: none"> • Ensuring People-Centered, Clean, and Efficient Governance • Pursuing Swift and Fair Administration of Justice • Promoting Philippine Culture and Values
Inequality-reducing transformation	<ul style="list-style-type: none"> • Expanding Economic Opportunities in Agriculture, Forestry and Fishery • Expanding Economic Opportunities in Industry and Service Through Trabaho at Negosyo • Accelerating Human Capital Development • Reducing Vulnerabilities of Individuals and Families • Building Safe and Secure Communities
Increasing growth potential	<ul style="list-style-type: none"> • Reaching for the Demographic Dividend • Vigorously Advancing Science, Technology, and Innovation
Enabling and supportive economic	<ul style="list-style-type: none"> • Ensuring Sound Macroeconomic Policy • Levelling the Playing Field through a Regional Competition Policy
Foundations for sustainable development	<ul style="list-style-type: none"> • Attaining Just and Lasting Peace • Ensuring Security, Public Order and Safety • Accelerated Infrastructure Development • Ensuring Ecological Integrity, Clean and Healthy Environment

Source: Region XII (Soccsksargen) Regional Development Plan 2017-2022 (2017)

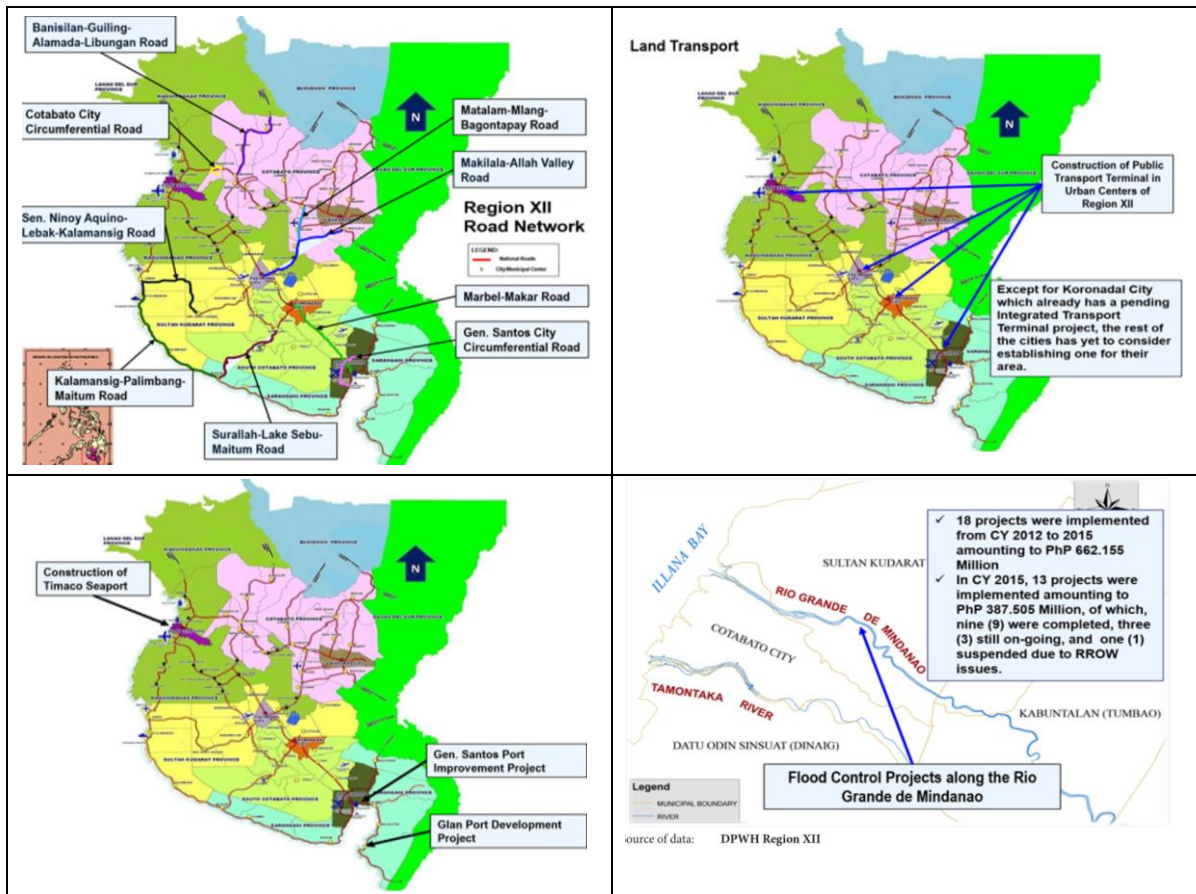
Regarding to economic development in agriculture and industrial sectors as the framework by inequality-reducing transformation in the region, the following priority strategies were proposed as shown in Table 3.1-12.

To support a higher growth trajectory and improve the quality of life in both urban and rural communities, infrastructure development was set as the top priorities of the region over the medium term. Spending on infrastructure was proposed and “Golden Age of Infrastructure” for a solid foundation for reaching the country’s Long-Term Vision 2040. The following figures show key proposed programs and projects.

Table 3.1-12 Priority Strategies Proposed in Economic Development of R12-RDP 2017-2022

Economic Development	Priority Strategies
Agriculture, Forestry and Fishery	<ul style="list-style-type: none"> • Improve Rice Productivity (quality, hybrid rice, organic rice, lower-cost, drought / flood resistance rice development) • Improve Corn Productivity (access to production areas, post-harvest support, marketing and price control, pest and disease monitoring) • HVCC Productivity improvement (seeds/planting material, small scale irrigation, processing equipment and facilities) • Livestock improvement (poultry production center, forage and pasture, animal health program, meat processing, regional broiler and swine information center, multiplier farmer) • Fishery improvement (high-quality and value-add products for aquaculture) • Land management improvement (Web-based Legal Case Monitoring System)
Industry and Service	<ul style="list-style-type: none"> • Cacao as one of the priority industry clusters and introduction of the shrimp industry. • Establishment of good and resource-based processing in order to transform from traditional agriculture to more modern agribusiness. • Establishment of organic certifying body in the region • Regulation of small-scale mining by professionalizing operations and allowing small-scale miners access to technology and credit in the future.
Accelerating Human Capital Development	<ul style="list-style-type: none"> • Conducting studies on matching education sector outputs with the manpower requirements of Region XII’s agri-industrial economy. • Reviewing and developing curricula that are more relevant and responsive to the manpower needs of industries in the region. • Strengthening academe-industry linkages and collaboration among education agencies. • Establishing provincial training centers to cater to young boys and girls dropping out from school. • Expanding community-based training programs for women, PWDs, senior citizens and returning migrants. • Integrating entrepreneurship training to institution-based, enterprise-based and community-based programs

Source: Region XII (Soccksargen) Regional Development Plan 2017-2022 (2017)



Source: Region XII (Soccsksargen) Regional Development Plan 2017-2022 (2017)

Figure 3.1-2 Key Infrastructure Developments Proposed in R12-RDP 2017-2022

- Spatial Development Strategy: To realize its vision as an agri-industrial hub and ecotourism center in southern Philippines, the regional spatial strategy in the plan was formulated to encourage the establishment of ecozones supporting the region’s industry clusters. Specifically, the spatial strategy focuses on Tri-Corridor Development by main and potential corridors involving the establishment of small- to medium-scale processing centers, agriculture and commercial hubs, ecotourism spokes, centers for social opportunities, housing, connected by infrastructure support facilities, and made resilient by mainstreaming disaster risk reduction and climate change adaptation at all stages of the planning process.

Table 3.1-13 Proposed Tri-Corridor Development of the Regional Spatial Strategy in R12-RDP 2017-2022

Tri-Corridors Development	R12-RDP 2017 – 2022
	Key Spatial Strategy
The Cotabato City-Kidapawan City (CK) Agri-Industrial and Eco-tourism Corridor	<ul style="list-style-type: none"> • The major industries to be promoted in this corridor are agri-industrial and eco-tourism development • Cotabato City as the primary urban center in this corridor serving as the institutional, financial, and service center • The corridor could promote processing plants for oil palm, rubber, sugar cane and fresh-water fish productions.
The Isulan-General Santos (IGS) Agri-Industrial and Eco-tourism Corridor	<ul style="list-style-type: none"> • General Santos City to be the primary growth node in this corridor with the cities of Koronadal, Isulan and Tacurong as intermediate urban centers, while Koronadal City to be the regional administrative center of Region XII. • The major industries to be promoted in this corridor by high value commercial crops, corn and other agri-based products, fishery-based products, and information communication technology (ICT). • Trade linkage in this corridor to be promoted by trades of goods and services between General Santos City and Davao City
The Lebak-Maasim-Alabel-Glan (LMAG) Coastal Development Zone	<ul style="list-style-type: none"> • The primary growth nodes are Lebak, Kalamansig, Alabel and Glan with Kiamba and Maasim as the intermediate urban centers. Maitum shall be an ecotourism destination. • The major industries to be promoted along this corridor are marine fishing, coconut, cement, marble, coffee, and nature, dive, sun, and beach tourism

Source: Region XII (Soccsksargen) Regional Development Plan 2017-2022 (2017)

(5) 1st Bangsamoro Development Plan 2020-2022

The 1st Bangsamoro Development Plan 2020-2022 (BDP 2020-2022) was formulated recently by the Bangsamoro government through six Planning Committees and the Bangsamoro Planning and Development Authority (BPDA) in 2020 as one of the latest regional development plans approved by the Philippines government in relation to the Greater Cotabato area. The plan illustrates 12-point priority agenda as priority focuses for the Bangsamoro Autonomous Region by three years program.

- BARMM Vision and Socio-economic Framework (BDP 2020-2022): The plan sets out the long-term vision for BARMM as “It is a region where people are united, enlightened, self-governing, peaceful, just, morally upright, and progressive” to enable Bangsamoro people to be empowered, educated resilient and dynamic and feel secured, comfortable, and benefitting from a just, morally upright, and progressive governance. The macro-economic targets by key indicators by 2022 as indicated in the plan are shown in Table 3.1-14.

Table 3.1-14 Socio-economic Target Indicators of the BDP 2020-2022

Indicators		Development Framework by Target Year 2022
Population Framework	Population	n.a
	Annual Average Growth Rate	4.2 %
Economic Framework	GRDP (growth rate)	7.0~7.5 %
	Labor Force Participation Rate	50 %
	Unemployment Rate	3 %
	Poverty incidence	49.6 %

Source: 1st Bangsamoro Development Plan 2020-2022

- Development Goals and Development Strategy focused: Overall development goal of the Bangsamoro government was stated in the plan as “to uplift of the lives of the Bangsamoro and establishment of the foundation of self-governance through moral governance” and eight development goals as the priority interventions for the period 2020 to 2022 were set as shown in Table 3.1-15. In consideration with spatial development for the Greater Cotabato area, the development strategy for the Goal 7 (infrastructure development) is highlighted.

Table 3.1-15 Regional Spatial Strategy of the BDP 2020-2022 in conjunction with Greater Cotabato Area

Overall Goal	Eight Development Goals	Development Strategy for Goal 7
Uplift of the lives of the Bangsamoro and Establishment of the Foundation of Self-governance through Moral Governance	Goal1: Establish the foundation for an inclusive, transparent, accountable, and efficient governance	1. Improve the public access to activities, goods, and services of the government
	Goal2: Uphold peace, public order, safety, and security, and protect, promote, and fulfill human rights	2. Protect and enhance the communities and the environment through flood control and mitigation measures
	Goal3: Creating a favorable enabling environment for inclusive and sustainable economic development	3. Improve the access to functional, responsive, sustainable, strategic, and calamity-resilient infrastructure and utilities
	Goal4: Promote Bangsamoro identity, cultures, and diversity	4. Encourage public-private partnerships for the financing, construction, operation and maintenance, rehabilitation of major infrastructure (transportation, telecommunication, power, and water)
	Goal5: Ensure <u>access</u> to and delivery of quality services for human capital development	5. Appropriate capacity building of workforce
	Goal6: Harness technology and innovation to increase socio-economic opportunities and government services	6. Foster transparency and accountability in infrastructure development
	Goal7: Increase strategic and climate resilient infrastructure to support sustainable socio-economic development in the Bangsamoro region	7. Identify proposed project for the installation of strategic infrastructures
	Goal8: Improve ecological integrity and resilience of communities	

Source: 1st Bangsamoro Development Plan 2020-2022

- Regional Spatial Development Strategy: To establish the foundations for the implementation of BARMM vision in line with the National Spatial Strategy (NSS), three regional spatial strategies of “Regional Agglomeration”, “Connectivity” and “Vulnerability Reduction” were set out in the plan. Urban growth centers or hierarchical settlement in the region are one of the significant elements for the regional spatial development of BARMM. Two regional centers by Metro Cotabato and Metro Jolo and Metro Marawi as the regional sub-center were proposed in BARMM. Table 3.1-16 shows the selected proposed directions by the three regional spatial strategies in relation to relevant urban centers for the Greater Cotabato area.

Table 3.1-16 Regional Spatial Strategy of the BDP 2020-2022 in conjunction with Greater Cotabato Area

Local Government (City and Municipality)	Regional Spatial Strategy in conjunction with Greater Cotabato Area		
	Regional Agglomeration	Connectivity	Vulnerability Reduction
Cotabato City	<ul style="list-style-type: none"> • Institutional, financial, and service center for the mainland of Bangsamoro • Center for public health with Cotabato Regional and Medical Center (CRMC) 	<u>Road Connectivity</u> <ul style="list-style-type: none"> • Maguindanao-Sultan Kudarat-Cotabato Province-Davao City 	Necessary disaster risk area Management by type of risks
Parang Municipality (M)	<ul style="list-style-type: none"> • Polloc free port and Agro-industrial Economic Zone • Trade center for hinterland aquaculture and agriculture products • Destination of marine and eco-tourism 	<ul style="list-style-type: none"> • Maguindanao mainland corridor (Polloc Port-Cotabato City-Kabuntalan-Datu Piang-Buluan) <u>Air Connectivity</u>	<u>Flood risk</u> Cotabato City, Sultan Kudarat, Datu Odin Sinsuat <u>Tsunami/Storm Surge risk</u>
Sultan Mastura (M)	<ul style="list-style-type: none"> • Ago-industrial center for processing agricultural products 	<ul style="list-style-type: none"> • Direct international flight to Malaysia from Cotabato City 	Parang, Datu Odin Sinsuat
Sultan Kudarat Municipality	<ul style="list-style-type: none"> • Industrial center for food products (Lamsan Trading, Aboitiz Company, etc.) • Construction material products 	<ul style="list-style-type: none"> • Islands flight of BARMM from Cotabato City <u>Sea Connectivity</u>	<u>Landslide /Erosion risk</u> Parang, Upi
Datu Odin Sinsuat (M)	<ul style="list-style-type: none"> • Urban service provider with Awang Airport, Mindanao State University, and other services. 	<ul style="list-style-type: none"> • BIMP-EAGA (ASEAN) connection from Polloc Port 	In association with natural area protection
Upi Municipality	<ul style="list-style-type: none"> • Center for organic rice and corn production • Center for indigenous tribe culture 	<ul style="list-style-type: none"> • Bangsamoro Nautical Highway from Polloc Port 	<ul style="list-style-type: none"> • Ligawasan marsh protection

Source: 1st Bangsamoro Development Plan 2020-2022

(6) BIMP-EAGA Vision 2025

The Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA) Vision 2025 (BEV 2025) was formulated to ensure that member countries are attuned to regional and global development trends, opportunities and challenges that would influence the future of economic cooperation. BIMP-EAGA covers the entire sultanate of Brunei Darussalam; the provinces of Kalimantan, Sulawesi, Maluku, and Papua in Indonesia; the states of Sabah and Sarawak and the federal territory of Labuan in Malaysia; and the entire island of Mindanao and the island province of Palawan in the Philippines.



Source: BIMP-EAGA Vision 2025

Figure 3.1-3 Coverage of BIMP-EAGA with Mindanao

- Vision: The BEV 2025 Vision is “Resilient, Inclusive, Sustainable and Economically competitive (R.I.S.E.)”. It intends to foster inclusivity by narrowing development gaps within each country, and between the subregion and ASEAN. All BIMP-EAGA initiatives will consider environmental impacts and seek the sustainable management of natural resources.
- Strategic Pillars for Economic Corridors Programs and Projects: Economic Corridors aim to provide a spatial concept by the connectivity approaches to facilitate cross-border movement of the factors of production that stimulate trade, investment, tourism, and other economic activities. Economic corridors enhance BIMP-EAGA’s competitiveness by linking production with supply chains and providing opportunities for small-medium enterprises. The strategic pillars were formulated as sector strategies as presented in Table 3.1-17 in consideration of the relevant areas for Greater Cotabato and Cotabato City.

Table 3.1-17 Strategic Pillars for Economic Corridors Programs and Projects in BIMP-EAGA Vision 2025

Strategic Pillar	MSS / DF 2015 - 2045	
	Sector Strategy	Programs and/or Programs
Connective Pillar	<ul style="list-style-type: none"> • Interconnected, Seamless and Safe Multimodal Transport 	<ul style="list-style-type: none"> • Increase multimodal transport connectivity for the priority economic corridors of West Borneo Economic Corridor and Greater Sulu-Sulawesi Corridor including Zamboanga peninsula–Sabah (including Basilan, Sulu, and Tawi-Tawi in the Philippines)
		<ul style="list-style-type: none"> • Improving transport facilitation (protocol, agreement, and MOU)
		<ul style="list-style-type: none"> • Improve Infrastructure and facilities through Priority Airports, Seaports and Roads designation (4 Philippines /11 airports, 4 Philippines / 8 seaports including Polloc Port, Davao-Gen, Santos, and other Mindanao roads, and others)
		<ul style="list-style-type: none"> • Prioritizing programs for CIQS as well as the trade and investment, tourism and agribusiness sectors
	<ul style="list-style-type: none"> • Viable Cross-border Trading and Conducive Investment Environment 	<ul style="list-style-type: none"> • Streaming rules, regulations and facilitation of cross-border trade environment and organizing joint public-private sector and investment
		<ul style="list-style-type: none"> • Power and energy infrastructure through renewable energy development by technical cooperation
		<ul style="list-style-type: none"> • ICT Sector strategy by E-Commerce at Sub-regional Area, human resource development for ICT
		<ul style="list-style-type: none"> • Agri-business Sector improvement through sub-regional supply/value chains for five priority commodities: shrimp, rice, coconut, cattle, and seaweed
Food Basket Pillar	<ul style="list-style-type: none"> • Competitive and Climate Resilient Agro-Industry and Fishery 	<ul style="list-style-type: none"> • Long-term Food Security in the sub-regions
		<ul style="list-style-type: none"> • High-quality agro-based and fisheries products for exports including Halal industry
		<ul style="list-style-type: none"> • Sustainable livelihoods for fish folk and farmers within the subregions
Tourism Pillar	<ul style="list-style-type: none"> • Sustainable and Inclusive Tourism Destination in Asia and the Pacific 	<ul style="list-style-type: none"> • Establishing Ecotourism Destinations through the improvement of access, connectivity, infrastructure, site development, tourism circuit, and communities
Environment Pillar	<ul style="list-style-type: none"> • Sustainable Management Approaches in the BIMP-EAGA Ecosystem 	<ul style="list-style-type: none"> • Climate change adaptation and mitigation through activities by farming, fishing, ecotourism in rural communities
		<ul style="list-style-type: none"> • Promotion of clean and green technologies through Green Cities Initiative (proposed partnership program)
Socio-cultural and Education Pillar	<ul style="list-style-type: none"> • People to People Connectivity and Cultural Exchange 	<ul style="list-style-type: none"> • Promote, preserve, and sustain BIMP-EAGA culture and heritage through social-cultural events and human resource developments.

Source: BIMP-EAGA Vision 2025

3.2 Greater Cotabato and Its Status

3.2.1 Definition of Greater Cotabato

Apart from administrative areas and their terminologies of the Philippines government, Greater Cotabato is defined as a wider urban area agglomeration consisting of a densely populated urban center and its less-populated surrounding urban areas, linking closely socio-economic activities and utility services sometimes to each urban area, where frequent trips are generated among urban areas for commuting to work or go to schools, or for shopping and other purposes.

Greater Cotabato could organize its entity including satellite urban areas in municipalities and barangays, where socio-economic relationships among relevant municipalities could be enhanced to formulate competitive and attractive urban areas contributing to relevant regions (Maguindanao Province, BARMM).

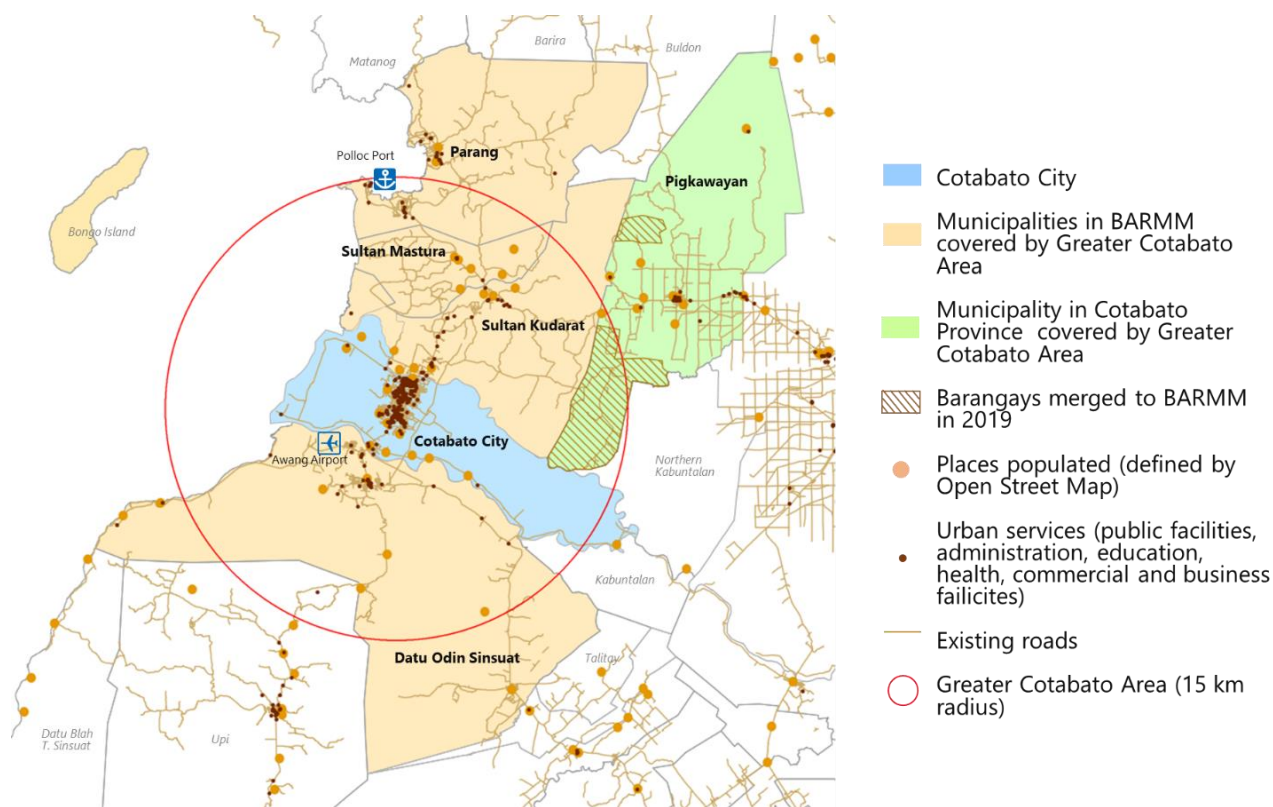
3.2.2 Defining the Study Area for Greater Cotabato

The study area for Greater Cotabato covers a considerable area of influence by the current developments taking place in Cotabato City. Part of the area is the adjacent and nearby municipalities that engaged in different socio-economic and other transactions in Cotabato City. Although right now we have no available data and statistics to provide us the extent and specific description of these transactions. Figure 3.2-1 shows the area of the Greater Cotabato (in red circle).

- Key urban areas with socio-economic relationship: The population in Cotabato City and the adjacent and nearby municipalities are the primary beneficiaries of the urban services and amenities being offered in the city. The municipality of Parang, Maguindanao which is used to be tagged as the “sub-regional Center” of the former ARMM, is not wholly part of the Greater Cotabato, though some of its barangays, particularly those near the Polloc Port are considered part of the planning area.

Many municipalities are observed by such socio-economic relationships (e.g. business services-banking, trading, tertiary educational service, health and medical services and regional administrative services) between Cotabato City and surrounding municipalities such as Parang, Sultan Mastura, Sultan Kudarat, Datu Odin Sinsuat, and others.

- Key infrastructure hub: Infrastructure facilities that serve inter-intra linkages and provide essential support to the regional center, such as the Awang Airport (Class 1/Principal Airport) located in Datu Odin Sinsuat, Maguindanao and Polloc Port (Base Port) in Parang, Maguindanao are covered in the Greater Cotabato area.
- Potential satellite urban areas: An urban or a metropolitan city is normally considered a core area that is influencing adjacent and nearby towns to become satellites of development. A part or full part of five municipalities of Parang, Sultan Masutura, Sultan Kudarat, Datu Odin Sinsuat and Pigkawayan are gradually attaining a certain level of urban facilities and services offered in their areas of responsibility. These municipalities are considered as potential satellite towns within the Greater Cotabato area.



Source: JICA Study Team based on the open-source data

Figure 3.2-1 Study Area for Greater Cotabato

3.2.3 Development Conditions for Greater Cotabato

- Cotabato City, as host to the administrative center of BARMM and the former regional seat of Region XII until 2004, has played a key role in leading socio-economic development among its influenced municipalities not only in the Greater Cotabato area but also in Maguindanao and Lanao del Sur provinces, both of BARMM; and other municipalities of North Cotabato and Sultan Kudarat both of Region XII.
- The area of the Greater Cotabato including Cotabato City covers around 706 km², where the population in the area is estimated at around 559,284 persons based on the 2015 Population Census. Cotabato City shares more than half (53.5%) of the population of the Greater Cotabato area, while the Greater Cotabato population accounts for 38% of the total population of Maguindanao Province including Cotabato City.
- Within the Greater Cotabato, the second-largest share of population by the municipality is Sultan Kudarat with 91,709 accounts for 16.3% of the total for Greater Cotabato, followed by Datu Odin Sinsuat municipality with 73,080 and accounts for 12.2% share.
- In terms of development trend based on population annual average growth rate (AAGR) (2010-2015), the group with higher population growth rates includes Parang (5.2%), Sultan Kudarat (4.1%) and Datu Odin Sinsuat (5.4%), although each AAGR is computed using the total municipal population in 2010 and 2015.

Table 3.2-1 Urban Centers concerning Greater Cotabato Area

City and Municipality	Current Status of LGUs within Greater Cotabato Area				Gross Density (person/ha) of Municipality
	Class	Urban Centers	Population within the Area	AAGR (2010-2015)	
Cotabato City	ICC	RC/ PUC	299,438	2.0%	170.1
Parang*	M	RSC	57,848	5.2%	6.2
Sultan Mastura	M	LC	22,261	0.5%	4.0
Sultan Kudarat	M	LC	91,709	4.1%	5.2
Datu Odin Sinsuat	M	LC	73,080	5.4%	2.9
Pigkawayan	M	LC	14,948	2.2%	2.7
Total	--	--	559,284	--	7.9*
			Amount	GC Share	
Maguindanao Province including Cotabato City		Population	1,473,371	37.9%	
		Area (km2)	4,871.6	14.5%	
Bangsamoro Autonomous Muslim Mindanao (BARMM)		Population	3,781,387	14.7%	
		Area (km2)	12,711.8	5.5%	

Note1: GC = Greater Cotabato

Note2: Urban Center Hierarchy is based on the National Spatial Strategy and Other Plans (RC: Regional Center, PUC: Primary Urban Center, SRC; Sub-regional Center)

Note3: M: Municipalities, ICC: Independent Component City

Note4: Only barangay's population covered by the Greater Cotabato area in each municipality is indicated.

Note5: AAGRs (Annual Average Growth Ratios) are based on the municipality level.

Note6: 7.9 p/km2 indicates the gross-density for Greater Cotabato area, other municipalities indicate the population density by the administrative area.

Source: 2015 Census of Population / PSA

3.3 Development Plans for Cotabato City

Development plans for Cotabato City had been formulated and published in various sectors including integrated development plans of CDP (Comprehensive Development Plan), CLUP (Comprehensive Land Use Plan), and other sector plans. The CLUP and other sector-specific plans are described in detail in the later relevant chapters or sections.

3.3.1 Overview of Development Plans for Cotabato City

- Within the past eight years, several development plans for socio-economic or physical development for Cotabato City were published. Table 3.3-1 shows the list of key development plans or programs for Cotabato City. Although this JICA Study has collected some of these relevant plans as a reference, however, these may not cover all sector plans. There are other sector-specific development plans such as road and transportation, educational sector, health sector which need to be incorporated into the new land use plan.
- It should be noted that the Cotabato City CLUP is currently under the process of updating. The result of this Study on Data Collection Survey on Urban Infrastructure Development in Greater Cotabato City is expected to be incorporated in the new CLUP.

Table 3.3-1 Development Plans for Cotabato City

Name of the Plan	Abbreviation	Year	OIC
1, Comprehensive Development Plan (CDP) 2016-2022	CDP	201?	CPDO
2, Comprehensive Land Use Plan (CLUP) 2011-2020	CLUP	2012	CPDO
3, Local Disaster Risk Reduction and Management Plan 2016-2022	LDRRMP	2016	CDRRMO
4. Local Shelter Plan 2012-2020	LSP	2018	CPDO
5, Local Climate Change Action Plan 2017-2022	LCCAP	2016	CPDO
6. Feasibility Study on Septage Management Program	FS/SMP	2019	BDA
7. Ecological Solid Water Management Plan 2018-2027	ESWMP	2017	CENRO
8. Local Development Investment Program 2017-2022	LDIP	2017	DOTC-CCAAP
9. Infrastructure Program	IP	2018	CDEO

Note: OIC: Office in Charge, CPDO: City Planning & Development Office, CDRRMO: Csdads, CDEO: Cotabato City District Engineering Office/DPWH

Source: Each relevant report

3.3.2 Comprehensive Development Plan (CDP) 2017-2022

- Socio-economic Framework: The plan sets out the socio-economic development framework in a six-year time horizon for Cotabato City in which the future population in 2022 was projected to reach 340,669 with 1.86 % annual average growth rate (2016-2022). While the labor force of which people are of the productive years (15-64 years old) to work potentially was projected to be 213,271 by 2022.

Table 3.3-2 Socio-economic Target Indicators of the CDP 2017-2022

Indicators		Development Framework by Target Year		
		2015	2022	
Population Framework	Population	299,438	340,669	
	Annual Average Growth Rate (AAGR)	1.96 %*1	1.86 %*2	
	Average persons per family	5.0	5.0	
Economic Framework	GRDP (low target growth rate %)	Primary (AHFF)	n.a	n.a
		Secondary (Industry)	n.a	n.a
		Tertiary (Service)	n.a	n.a
		Total	n.a	n.a
	Labor Force Participation Rate	96.4 %	96.4 %	
Poverty Incidence		n.a	n.a	

Note: AAGR *1 = 2010~2015, *2 = 2016~2022

Source: Cotabato City Comprehensive Development Plan 2017-2022

- Programs, Projects, and Activities: Based on the vision of the Comprehensive Development Plan, programs, projects, and activities by sectors were set. Table 3.3-3 presents these key programs, projects, and activities taking into account the spatial/physical concerns.

Table 3.3-3 Programs, Projects, and Activities concerning Spatial/Physical Development in the CDP 2017-2022

Sector	Sub-Sector	Key Programs and Projects concerning Spatial Development
Social Sector	Health	<ul style="list-style-type: none"> Health information system improvement (baseline data, IT equipment between center to local health centers)
	Education	<ul style="list-style-type: none"> School building program (new school development and stock improvement)
	Social-welfare	<ul style="list-style-type: none"> Daycare center improvement, Construction of community-based facilities (children, youth, woman, emergency shelter, drug rehabilitation, etc)
	Housing	<ul style="list-style-type: none"> Social housing program and joint venture shelter program
	Security services	<ul style="list-style-type: none"> New city jail, upgrade fire-fighting facilities
	Sports recreation	<ul style="list-style-type: none"> Construction of city sports arena,
Economic Sector	Agriculture	<ul style="list-style-type: none"> Farm access roads development, techno-demo farm establishment
	Livestock and poultry	<ul style="list-style-type: none"> Construction of Halal Poultry Dressing Plant
	Fishery	<ul style="list-style-type: none"> Aquaculture development (Tamontaka3/4/5, Kalanganan BGYs)
	Forestry	<ul style="list-style-type: none"> Tree-planting, mangrove planting
	Industry	<ul style="list-style-type: none"> Establishment of Special Economic Zone at Tamontaka Mother and Kalangana 2
	Commercial& business	<ul style="list-style-type: none"> Establishment of Timako port
	Tourism	<ul style="list-style-type: none"> Development of Timako hill eco-trail, City museum, Souvenir Center Designate the heritage zone
Infrastructure Sector	Road & Transport	<ul style="list-style-type: none"> Farm access roads Providing alternative transport mode (e.g. pedestrian or bicycle network, riverine network and terminal, integrated public transport terminal) Creation of a new city airport and a new seaport
	Flood Control and Drainage System	<ul style="list-style-type: none"> Organizations for the regular dredging operation of Rio Grande de Mindanao Construction of flood control and drainage system
	Domestic Water System	<ul style="list-style-type: none"> Water supply expansion to less piped water households Exploring alternative water supply system
	Domestic Power Supply	<ul style="list-style-type: none"> Creation and installation of alternative transmission routes to mitigate rotational power interruptions
	Communication Facilities	<ul style="list-style-type: none"> Additional line installation to increase access of households to Internet service connection
	Social Facilities and Supports	<ul style="list-style-type: none"> New school building with land acquisition Expansion of Cemetery Improvement of informal settlement
	Economic Support	<ul style="list-style-type: none"> Market facilities construction
Environment Sector	Solid Waste Management	--
	Environmental-friendly energy-saving building	<ul style="list-style-type: none"> Minimizing the negative environmental impact of new building construction
	Eco-system	<ul style="list-style-type: none"> Establishing freshwater and coastal ecosystem through protection Eco-park development
	Natural hazard risk reduction	<ul style="list-style-type: none"> Resilient community against flooding, earthquake, drought, fire River dike roads along Rio Grande de Mindanao River
Institutional Sector	Institutional arrangement	<ul style="list-style-type: none"> Enhancement of ARTA compliance and rules through capacity buildings
		<ul style="list-style-type: none"> Establishment of multi-purpose planning & productivity enhancement center
		<ul style="list-style-type: none"> Implementation of CLUP and Zoning Ordinance

Source: Cotabato City Comprehensive Development Plan 2017-2022

3.3.3 Disaster Risk Reduction and Climate Change Adaptation Plan

- Local Disaster Risk Reduction and Management Plan (LDRRMP) 2016-2022: Cotabato City has suffered frequently from various types of natural hazards. Flooding is the primary hazard always experienced by the city. This hazard tends to increase its frequency and magnitude over time due to climate change as provided in the Local Climate Change Action Plan (LCCAP) 2017-2022. The LDRRMP sets out the vision of “a safer, well-prepared, and disaster-resilient multi-cultural Cotabato City, towards inclusive and sustainable development” and action plans by four thematic areas of 1) disaster prevention and mitigation; 2) disaster preparedness; 3) disaster response; and 4) disaster rehabilitation and recovery. Table 3.3-4 summarizes the key objectives of LDRRMP.

Table 3.3-4 Key Objectives by Thematic Areas in the LDRRMP 2016-2022

Thematic Area	Key Objectives
Disaster prevention and mitigation	<ul style="list-style-type: none"> To construct and maintain structural mitigation measures by adequate funding To strengthen the partnership between the farmers and the city agriculture office to facilitate assistance from District of Agriculture To update current city ordinances recognizing the impacts of disaster and climate change To conduct risk/vulnerability assessments in all barangays with multi-sectoral participation To ensure delivery of basic services and sustained provision of health and education services to the victims/survivors on time To strengthen police/Bureau Fire Protection, community relations and force multipliers in the barangays To monitor and surveil risk factors (water lily, tracking of the flood, damage assessment)
Disaster Preparedness	<ul style="list-style-type: none"> To institutionalize DRRM efforts at the barangay and city level To strengthen preparedness efforts for effective response both at the city and barangay levels To increase public awareness campaigns on the city’s exposure to multi-hazard phenomena To ensure and enhance coordination, collaboration, and complementation between the city and barangay LGUs, local and national partners for delivery of activities in all four DRRM thematic areas, in all-hazards present in the city
Disaster Response	<ul style="list-style-type: none"> To ensure systematic relief distribution through data management and validation To intensify the security through Ronda and patrolling before, during and after the disaster To ensure the provision of water, sanitation, and hygiene during the emergency To ensure safety and well-being of the IDPs (people, livelihood and properties) though accommodating the special needs of the vulnerable sectors, capacitating Camp Managers and establish and improve the facilities To ensure systematic and proper management of the dead and missing persons
Disaster Rehabilitation and Recovery	<ul style="list-style-type: none"> To reinforce and expand existing agricultural, aquaculture and environmental rehabilitation programs To ensure collaboration and coordination between neighboring LGUs and partners (incl. national government agencies) for recovery and rehabilitation programs To ensure adequate supply and strengthen the resiliency of critical infrastructure, utilities and equipage to aid in faster recovery and rehabilitation efforts

Source: Local Disaster Risk Reduction Management Plan 2017-2022

- Local Shelter Plan 2012-2020: The plan approved in 2018 aims primarily to improve the quality of life of constituents by establishing environmental-friendly, decent, and affordable housing and resettlement communities backed with all the necessary infrastructure support facilities and livelihood components. The target beneficiaries are the informal settlers covering around 14,010 families in 37 barangays of Cotabato City. Most of them live mainly in the surroundings of river

banks, waterways, road right-of-way, open spaces, government-owned properties, and private lands without the expressed consent from legitimate owners. The nine-year implementation of the program would involve housing development proposed in 267 hectares of land with 25,961 housing units, as shown in Table 3.3-5.

Table 3.3-5 Housing Program for Vulnerable Communities in LSP 2012-2020

Type of Housing Program	Land Requirement (ha)	Housing Unit
Resettlement program	78.9	--
Housing program	188.1	--
(Social Housing)	(119.4)	--
Total	267.0	25,961

Source: Local Shelter Plan 20

3.3.4 Local Development Investment Plan 2017-2022

The Local Development Investment Program (LDIP) aims to implement the Comprehensive Development Plan (CDP) by translating the CDP into programs and projects. The programs and projects would be prioritized by the LGU for funding under its annual investment program through its local available budget and special fund generation schemes and the national government agencies or Non-Government Organizations and other donor and funding institutions. The LDIP serves as the link between the CLUP/CDP and the local budget, national budget, and other fund sources.

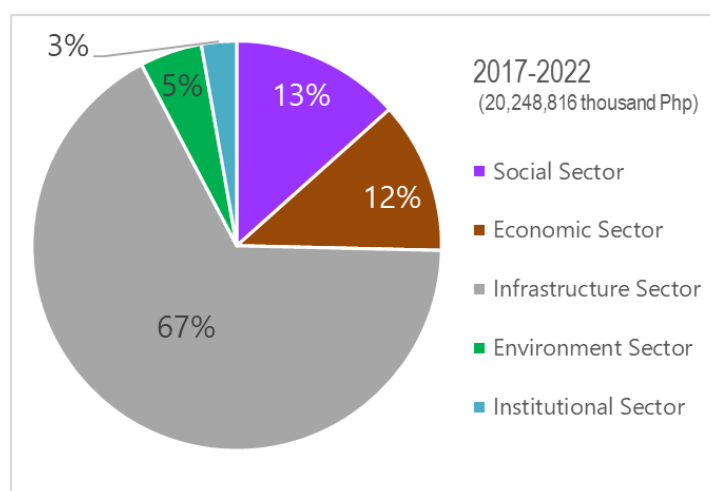
- Type of Projects/Programs/Activities: Projects, programs, and activities for implementation of relevant plans are categorized into four types of Form A, Form B, Form C, and Form D depending on funding sources and requirements for implementation as shown below Table 3.3-6.

Table 3.3-6 Types of Programs/Projects/Activities in LDIP 2017-2022

Type of Programs/Projects/Activities	Source Founded	Conditions / Requirements
FORM A:	Community Development Fund (CDF)	<ul style="list-style-type: none"> • 20 % sourced from CDF utilizing it for LGU's priority development projects based on approved local development plans and annual investment plan (AIP) • Not less than 20 % of Annual Internal Revenue Allotment for development projects
FORM B	General Fund	<ul style="list-style-type: none"> • Gender and Development (GAD) programs, projects and activities (PPAs-senior citizens) • Community-based Human Immunodeficiency (virus, HIV/AIDS) • Programs of the Local Councils for the Protection of Children (LCPC) • Programs for public social workers
FORM C:	National Government Agencies	---
FORM D:	Other Sources	<ul style="list-style-type: none"> • Non-Government Organizations, Foreign Investors and Donor Agencies

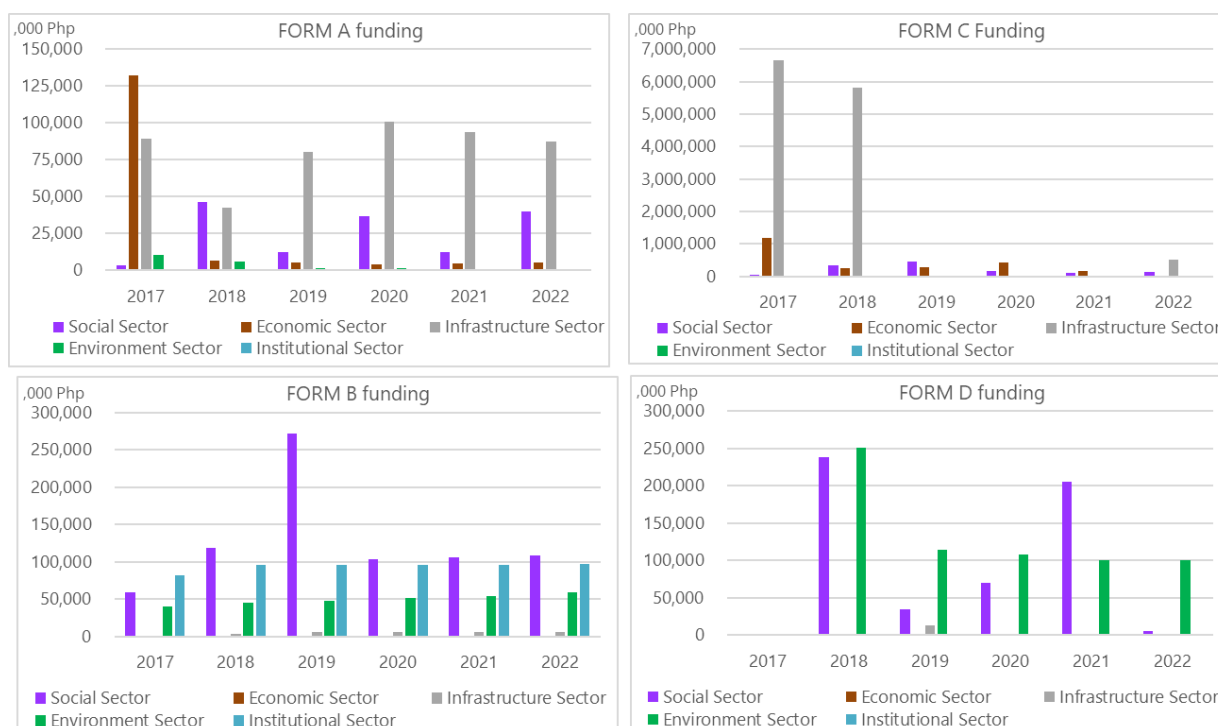
Source: Local Development Investment Plan 2017-2022

- **Funding Budget of the Plan:** The investment program 2017-2022 allocated a total amount of 20,248,816 thousand Philippines Peso (around 402 million US\$) for six years (2017- 2022). Looking into the distribution of the investment by sector, the infrastructure sector occupies the majority by 67% share out of the total investment because of inclusion of the proposed new airport in Cotabato City including costs for land acquisition, survey, and engineering studies, followed by the social sector (13%) and the economic sector (12%) as shown in Figure 3.3-1. Figure 3.3-2 indicates the breakdown of the total investment and distribution by type of funding by year, from 2017 to 2022.



Source: JICA Study Team based on the LDIP 2017-2022

Figure 3.3-1 Total Investment Amount by Sector of LDIP 2017-2022



Source: JICA Study Team based on the LDIP 2017-2022

Figure 3.3-2 Funding Investment by Types of Funding by Year by Sector in LDIP 2017-2022

3.4 Socio-economic Development Status and Spatial Implications

3.4.1 Current Economic Status in Greater Cotabato City

(1) Role of Cotabato City in the Region

a) Historical Evolution of the Roles of Cotabato City

Cotabato City has always played and will continue to play an important role in Mindanao due to its central location and good quality of infrastructure and services compared with the neighboring towns. Historically, the City was the administrative capital of the Cotabato Province (more popularly, Empire Province of Cotabato) which was created in 1914 along with Davao, Lanao, Zamboanga, Sulu, and Bukidnon in Mindanao. It was one of the largest provinces of the Philippines with 22,968 sq. km or about 8% of the country's land area or 24% of the Mindanao's. It was composed of areas known now as:

Cotabato Province, Maguindanao Province, Sultan Kudarat Province, and South Cotabato Province. Figure 3.4-1 shows the vast territory of the



Source: Prepared by the Study Team based on the "Cotabato: Geography and Ethnohistory. The Tuna Country At The Southern Edge Of Mindanao: General Santos City, 1939-2000"

Figure 3.4-1 Map of the Empire Province of Cotabato (1914 – 1967) where Cotabato City Serves as Administrative Capital

Empire Province of Cotabato. Most of the old province's territory now form Region 12 while portions of Maguindanao and 63 barangays of Cotabato Province are part of the BARMM.

With its central location and relatively superior infrastructure, utilities, and social services (hospitals, schools, and the like), Cotabato City caters to the needs of local governments, business entities, private organizations, and residents within the radius of two to three-hour travel time.

Figure 3.4-1 shows the rise and decline of the major roles of Cotabato City from 1914 to the present. Consistent though is the economic and political importance of the City, albeit in seemingly declining level especially in the 21st Century.

Table 3.4-1 Summary of the Roles of Cotabato City through the Years

Period	Province/Region	Cotabato City's Role
1914 to 1973	Empire Province of Cotabato (Maguindanao, Cotabato, Sultan Kudarat, South Cotabato, and Sarangani)	<ul style="list-style-type: none"> • Political center until 1967 • Socio-Economic center from 1914 to 1967
1975 to 1989	Region 12 (Central Mindanao) (Lanao del Norte, Lanao del Sur, Maguindanao, Sultan Kudarat, Cotabato)	<ul style="list-style-type: none"> • Political center for the whole Region • Socio-Economic center for most of Maguindanao, Sultan Kudarat, and Cotabato Province
1989 to 2019	Region 12 (re-structured due to creation of ARMM) (Cotabato, Sultan Kudarat, South Cotabato, and Sarangani)	<ul style="list-style-type: none"> • Political Center of Region 12 (up to 2001 when Koronadal City became the regional center) • Temporary Political Center of ARMM
February 2019 to Present	BARMM and Region 12 BARMM (Maguindanao, Lanao del Sur, Basilan, Sulu, Tawi-Tawi, and 63 barangays of Cotabato Province)	<ul style="list-style-type: none"> • Cotabato City hosting the administrative center of the BARMM

Source: JICA Study Team

b) Decline of the Economic Importance of Cotabato City

The decline in the socio-economic role that Cotabato City plays to the different cities and municipalities located in the neighboring provinces was due to the following reasons.

- **First, political and administrative arrangements.** The separation of South Cotabato from the Empire Province in 1967 allowed the latter to pursue its own development and reduce its need to have business and other forms of transaction with Cotabato City. The inclusion of South Cotabato in Region 11 (Southern Mindanao Region) strengthened its economic ties with the Davao provinces.

Lanao del Norte subsequently became part of Region 10 as the plebiscite for the creation of the Autonomous Region in Muslim Mindanao (ARMM) led to the realignment of the administrative regions of Mindanao. Thus, Lanao del Norte and Iligan City gravitated more towards Cagayan de Oro City.

- **Second, impact of deteriorating peace and order.** Peace and order situation also affected the economic relations of Cotabato City with the different provinces around it. Sea travel from Cotabato to Zamboanga and Cebu, as well as, land travel to other regions were severely affected. Frequent conflicts and acts of banditry in the areas between Cotabato City and Sultan Kudarat province, between Cotabato City and North Cotabato province forced large portions of those provinces to shift their trade relations and patronage of business services towards Gen. Santos City and Davao City.
- **Third, evolution of other urban centers.** The rapid improvement in the infrastructure, economic activities, and social facilities in other urban centers acted as a magnet for most of the municipalities served by Cotabato City. In the north, municipalities of Cotabato Province beyond Pikit shifted their socio-economic ties more towards the capital town of Kidapawan

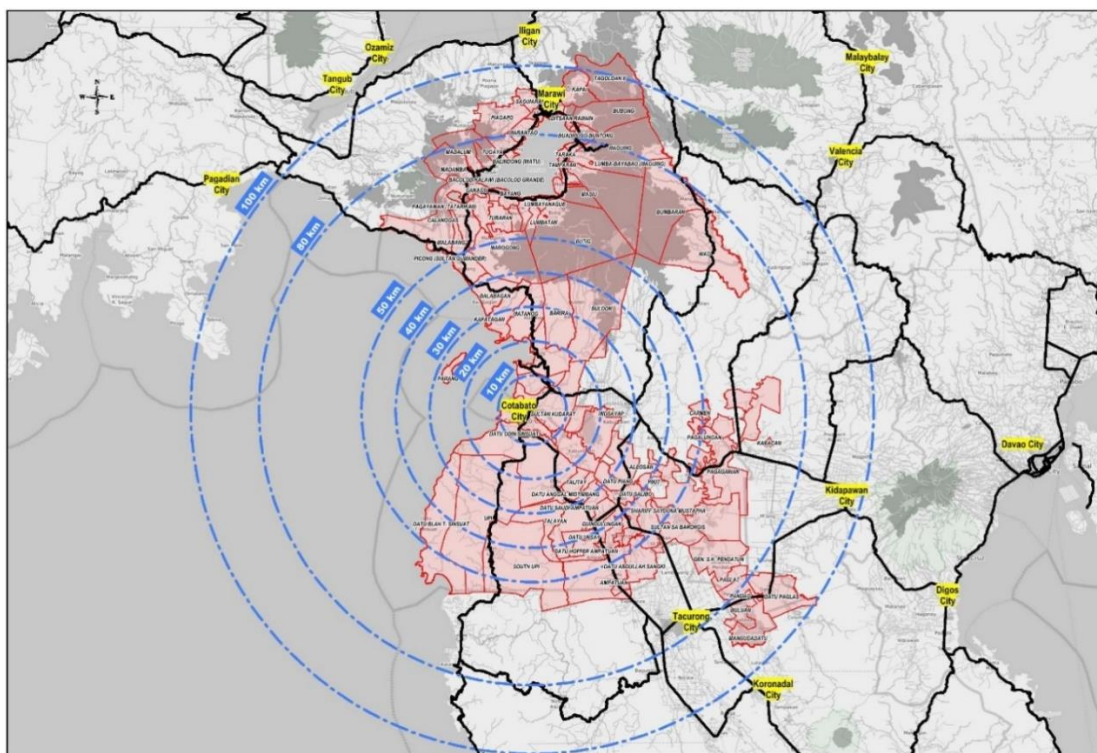
(which later became a city) or further to Davao City. Even portions of Maguindanao eventually gravitated towards Sultan Kudarat, South Cotabato, and Davao City.

c) Remaining Economic Influence Areas of Cotabato City

About twenty-six (26) municipalities with a total population of about 1.06 Million (about 1.3 Million including population of Cotabato City) belonging to Sultan Kudarat Province and Cotabato Province (both of Region 12) and Maguindanao and Lanao Sur (of BARMM) still have strong trade, commercial, financial, and other economic relations with Cotabato City. The current significant socioeconomic influence of the City is roughly within the 40 km to 60 km. radius as illustrated in Figure 3.4-2. Cities and municipalities beyond this radius are mostly likely availing the services of rival urban centers such as Iligan City, Kidapawan City, Tacurong City and Koronadal City.

Some municipalities of Maguindanao are nearer to urban centers providing the same, if not superior, services and amenities compared to Cotabato City, thus, they tend transact more with these localities. Towards the South, the municipalities of Datu Abdullah Sangki, Rajah Buayan, Buluan, among others would rather relate with Isulan, Tacurong City, Koronadal City, Kidapawan City, and Gen. Santos City.

Towards the northern direction, Maguindanao towns like Datu Montawal and Pagalungan find it more convenient to trade or avail of the services of Kabacan, Kidapawan City, and even further to Davao City.



Note: Yellow color=major urban areas; strong socio-economic influence of Cotabato City is within the 40 km to 60 km radius

Source: Prepared by the JICA Study Team

Figure 3.4-2 Economic Influence of Cotabato City

Table 3.4-2 Present Economic Influence Areas of Cotabato City

Geographic Areas			Services Provided by Cotabato City	Strength of relationship
Region	Province	Municipality		
BARMM	Maguindanao (route to Zamboanga and Lanao)	Sultan Kudarat, Sultan Mastura, Parang, Barira, Matanog, Buldon, (in route to Zamboanga)	<ul style="list-style-type: none"> • Government services • Finance/Banking Services • Education; • Commerce, trade and recreation • Medical service and health care 	Very High
BARMM	Maguindanao (east of the City)	Kabuntalan, and Northern Kabuntalan	<ul style="list-style-type: none"> • Government services • Finance/Banking Services • Education; • Commerce, trade and recreation • Medical service and health care 	Very High
BARMM	Maguindanao (along route to South Cotabato)	DOS, DBS, Talayan, DAS, Mamasapano, Talitay, Talayan, Datu Unsay, Datu Piang, Datu Saudi Ampatuan, Datu Hoffer Ampatuan	<ul style="list-style-type: none"> • Government services • Finance/Banking Services • Education; • Commerce, trade and recreation • Medical service and health care 	Very High
BARMM	Lanao del Sur	Balabagan, Kapatagan	<ul style="list-style-type: none"> • Government services • Finance/Banking Services • Education; • Commerce, trade and recreation • Medical service and health care 	High
Region 12	North Cotabato	Pigcawayan, Libungan, Midsayap, Alamada	<ul style="list-style-type: none"> • Finance/Banking Services • Education; • Commerce, trade and recreation • Medical service and health care 	Medium to Low
Region 12	Sultan Kudarat	Lebak, Kalamansig	<ul style="list-style-type: none"> • Government services • Finance/Banking Services • Education; • Commerce, trade and recreation • Medical service and health care 	High

Source: JICA Study Team

(2) Current Status of Industry, Business, and Investments in Cotabato City

a) Economic Ambition and Direction of the City

In the Comprehensive Land Use Plan being prepared by the City Government, the new vision statement for Cotabato City reads: A smart city with God-fearing and enlightened diverse people living in a peaceful, secure, resilient community with progressive economy and good governance.

The 2004 – 2020 Regional Physical Framework Plan of Region 12 says that the City will continue as an “institutional, financial, and service center” not only to Region 12 but also to the Autonomous Region in Muslim Mindanao (ARMM). From that statement, it appears that the City Government intends to pursue an economic development that is anchored on the Tertiary Sector (Service Industry).

b) Contribution of Economic Sectors to the City’s Economy

Despite a seemingly ever-changing political landscape, Cotabato City remained dynamic and influential, particularly in the economic sphere. The Service sector has been the constant driver of the local economy as there are few enterprises related to Agriculture and Industry helping provide income and employment.

Table 3.4-3 shows the major sectors of the economy: Agriculture, Industry, and Services and the magnitude of their contribution to the aggregate value of the national and regional economic accounts of the administrative groupings that Cotabato City relate with.

For Region 12, the order of the importance of the sectors is the same as the National picture but Industry does not lag too far from the leading Services Sector. However, the BARMM is a different story with Agriculture being the largest contributor to its overall economic performance, followed by Services, and small Industry sector.

Table 3.4-3 Major Economic Sectors and their Contribution to GDP and GRDP (2018)

Major Economic Sector	Share Contribution to National or Regional Economy		
	Philippines	Region 12	BARMM
Agriculture, Fishery, and Forestry	8.1%	22.0 %	55.6 %
Industry	34.1%	37.2 %	5.9 %
Services	57.8%	40.8 %	38.5%

Source: Basic Data from Philippine Statistics Authority, 2018

There is no disaggregated data to determine the contribution of Cotabato City to the GRDP of Region 12. However, if the indicator is the data of the Business Licensing and Permit Services of formally registered business entities, the Tertiary Sector (Services) is the main driver of the city’s economy. Registered business firms belonging to the Services sector make up over 97 % of existing enterprises (2,647 out of 2,722).

Industry sector is small with only 74 firms (2.72%) of the total formally registered firms under this classification. There is only one Agricultural firm registered though there are other enterprises engaged in agriculture, forestry, or fishery but they could be organized as cooperatives or owned by sole proprietors that do not conduct business in the formal sector but rather in the so-called “underground economy.”

Table 3.4-4 Number of Registered Business Firms, By Sector (2016)

Economic Sector	No. of Registered Firms	Percent to Total
Primary Sector (Agriculture, Forestry, and Fishery)	1	0.04 %
Secondary (Industry)	74	2.72 %
Tertiary (Services)	2,647	97.24 %
Total	2,722	100.00 %

Source: Data from Cotabato City Business Licensing and Permit Services, 2016

c) Major Business Firms in the City, by Industry Classification

The Primary and Secondary economic sectors have very minimal contribution to the City’s economy; the 2016 registry of the City’s Business Licensing Office listed only 1 agriculture and fishery production firm and 74 firms falling under 2016the industry sector.

The sparse number of firms related to agriculture and fishery formally registered as business entities is due to the very small-scale of their operation and the producers are mostly individuals living in the outer portions.

Firms in the industry sector are dominated by those in Construction or Electricity Distribution. Manufacturers are mostly home-based enterprises engaged in the production of processed food and items that are just sold informally and not marketed to large retail stores or outside the city.

Table 3.4-5 Registered Business Firms in Cotabato City (Agriculture and Industry), 2016

Sector	Sub-Sector	No. of Significant Registered Firms	Remarks
Agriculture	Agriculture	None formally registered	Marginal farming activities: rice, coconut, corn, vegetables
	Fishery	1 firm	One cooperative regularly produces crabs and milkfish and does some processing
Industry	Construction	45 firms	Category range from D (16 firms to the highest classification AAA (2 firms))
	Manufacturing	No firm doing significant commercial operation in the city	Manufacturing firms like Lamsan are in Sultan Kudarat town
	Electricity	1	Cotabato Light and Power co. is a distributor of electricity
	Gas	No gas producers just distributors of LPG and other petroleum products There are 4 major distributors of LPG products and 17 gasoline stations	Major firms represented include: Shell, Petron, Caltex, and local firms

Source: Compiled by the JICA Study Team based on the data from Cotabato City Business Licensing and Permit Services, CLUP 2011-2020, CDP 2011-2020

Table 3.4-6 shows the components of the Service Sector that are strongest: Wholesale and Retail Trade, Education, Health Care, Food, and Transportation. Sub-sectors that need to improve include: Information and Communication, Accommodation (and other tourism-oriented services such as Arts, Recreation, and Entertainment), and Real Estate.

Table 3.4-6 Registered Business Firms in Cotabato City (Services)

Sector	Sub-Sector	No. of Known Registered Firms	Remarks
Services	Wholesale and Retail Trade, Repair of Motor Vehicle and Related Activities	Nationally known Puregold, Save More, and Robinsons' grocery stores operate in the city	Large local wholesaler and retailers are South Seas Complex and Superama (with 5 stores) co-exist with nationally known stores
	Transport and Storage	Cebu Pacific and Philippines Airlines cater to the city; Bus and commuter vans to Davao City and General Santos; commuter vans to Marawi and Pagadian cities	Airport located in municipality of DOS, about 10 kilometers from the city
	Accommodation and Food Services	City has about 10 hotels and inns with 20 room or more capacity; Higher occupancy rate than neighboring cities Major firms Jollibee, Chowking, Red Ribbon, MangInasal, Greenwich, McDonalds, have at least store in the city,	No hotel with at least three-star accreditation level Numerous locally owned food and beverage establishments
	Information and Communication	Globe, PLDT, and Sun Cellular provide cellular phone and internet services in the city	PLDT also offers fixed line services
	Financial and Insurance	17 Commercial Banks; 4 insurance companies with offices plus smaller agencies or agents	1 Bangko Sentral ng Pilipinas (Central Bank) Office
	Real Estate	There are just four known large real estate lessors; most other real estate lessors rent out apartments, commercial, and office spaces	H and M Uy family (has 4 large commercial building; CitiMall, Alnor Mall Complex; Manuel Tan family
	Professional, Scientific, and Technical Services	There are law firms, accounting and bookkeeping, architecture, and engineering firms catering to clients within and from outside the city	
	Education	There are 42 firms operating private schools and vocational education institutions	There are 25 primary schools, 11 secondary schools, 17 tertiary schools, and 5 vocational schools
	Human Health and Social Work	There are four (4) private hospitals and 24 laboratories and clinics offering a wide range of services	Some residents still prefer Davao or Manila for medical services
	Arts, Entertainment, and Recreation	Four cinemas, 2 at the Mall of Alnor and 2 at Citimall	

Source: Compiled by the JICA Study Team based on the data from CLUP 2011-2020, CDP 2011-2020

Some data on Business Name Registration (BNR) were also obtained from the Department of Trade and Industry (DTI) Cotabato Office for the years 2016 and 2018. Although the data show an impressive increase in the number of firms registered between the base year of 2016 to the more recent 2018, it needs reviewing as some of the establishments registered with the said Office are not located in the City but in different towns of Maguindanao and Sultan Kudarat provinces. That should be taken out in later analysis to determine which ones are operating in Cotabato City.

Table 3.4-7 Business Name Registration in Cotabato City, 2016 and 2018

Classification	Year of Registration		Change (2016 to 2018)	
	2016	2018	In Number	In Percent
Agriculture, Forestry, and Mining	3	21	18	600 %
1.Import	0	4	4	0
2.Export	0	2	2	0
Industry	93	84	(9)	
1. Manufacturing	34	55	21	61.76 %
2. Mining and Quarrying	1	2	1	100%
3. Construction	38	19	(19)	(50%)
4. Electricity, Gas, Steam, and Airconditioning Supply; and	10	7	(3)	(30%)
5. Water Supply, Sewerage, Water Management, and Remediation Activities	10	1	(9)	(90%)
Services	562	1,434	872	155.16 %
1. Wholesale and Retail Trade	220	770	550	250.00%
2. Repair of Motor Vehicle and Motorcycle	10	20	10	100.00%
3. Transportation and Storage	31	42	11	35.48%
4. Accommodation and Food Service Activities	100	204	104	104.00%
5. Information and Communication				
6. Financial and Insurance Activities	17	18	1	5.88%
7. Real Estate Activities	23	23	0	
8. Professional, Scientific, and Technical Services	21	17	(4)	
9. Administrative and Support Activities	16	21	5	31.25 %
10. Public Administration and Defense, Compulsory Social Security	0	4	4	
11. Education	2	9	7	350.00%
12. Human Health and Social Work Activities	37	33	4	(10.81%)
13. Arts, Entertainment, and Recreation	19	80	61	321.05 %
14. Other Service Activities	22	188	155	469.70%
15. Activities of Private Households as Employers and Undifferentiated Goods and Services and Producing Activities of Households for Own Use	4	0	(4)	
Total	658	1,545	887	134.80%

Source: JICA Study Team, Basic Data from DTI Cotabato City Office

Cotabato City still serves much of the banking needs of surrounding municipalities as these do not even have government-owned banks in their jurisdiction. The opening of more department stores, malls, and other business establishments in the last 5 to 7 years prompted the entry of East-West Bank (EWB), Asia United Bank (AUB), and additional branch for Banco de Oro (BDO).

Table 3.4-8 Commercial Banks Operating in Cotabato City

Name of Bank	Ownership	No. of Branches	Remarks
Banco de Oro	Private	3	CitiMall branch opened in 2017
Bank of the Philippines Islands	Private	1	
China Bank	Private	1	
Philippine National Bank	Private	3	
East-West Bank	Private	1	Opened in 2019
Security Bank	Private	1	
Metropolitan Bank and Trust Corporation	Private	2	
United Coconut Planters Bank	Private	1	
Asian United Bank	Private	1	Opened in 2019
Development Bank of the Philippines (DBP)	Government	1	
Land Bank of the Philippines	Government	2	With one small branch at City Hall
Al-Amanah Islamic Bank	Government	1	Owned by DBP
BangkoSentral ng Pilipinas (Central Bank)	Government	1	
Total (Excludes BSP and LBP City Hall branch)		17	

Source: Compiled by the JICA Study Team based on the data from the CDP 2011-2020

With a more stable peace and order situation, the City experienced a surge in investment for the last five to seven years. Table 3.4-9 shows the notable companies that were established in Cotabato City during the said period:

Table 3.4-9 Major Establishments in the City (Established 2010 to Current Year)

Sub-Sector	Firms	Ownership (Local or External)	Year Started Operation in the City	
			Last 6 to 10 years	Last 5 years
Wholesale and Retail	Robinson Department Store, Robinson's Grocery, Robinsons Appliance (all 3 at Alnor Mall)	Robinsons Retail Holdings (Manila)		2018 to 2019
	Citi Mall (includes Watson's, Savemore Grocery, and other retail establishments); 2 cinemas	Double Dragon Corporation (Manila)		October 2016
	Centro Department Store	National chain of stores	2015	
	Alnor Mall Complex	Local	2015	
	Daiso Store (in Alnor Complex)	National chain of stores		2019
	Puregold Grocery – 2	National chain of stores		
Accommodation	EM Manor Hotel	Local		2016
	Alnor Hotel	Local	2014	
	Paragon Hotel	Local		2019
	Primera Hotel	Local		2019
Food Service	Infinitea Beverage (4 full-sized stores and 1 food-card outlet)	Manila-based franchisor		2016 onward
	Out of Nowhere	Franchise		2018
	Penong's Chicken House	Franchise		2020
	Jollibee Food – 3	Franchise	ORC branch	2016 to 2018 - 2
Financial Services	China Bank (CBC), East-West Bank (EWB), Security Bank (SEB), Banco de Oro (BDO) - 2	Branches of manila-based Banks	EWB, CBC, BDO	SECB (2018), BDO (2017)
Human Health	United Doctors Hospital	Local		2018

Source: JICA Study Team

(3) Assessment of Economic Potentials of Cotabato City

Most of the major economic activities of Cotabato City-based enterprises remain viable, especially those in the Services sector. The City should continue to promote the Agriculture and Industry related businesses, though currently weak, to hasten growth and ensure diversity to its economic base.

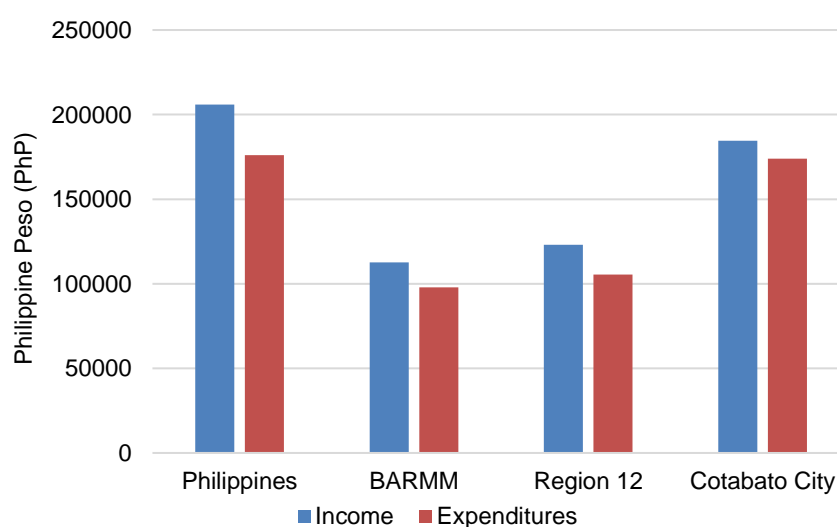
The family income and expenditure characteristics of the residents of Cotabato City is a positive indicator of the locality’s potential for establishment and absorbing new investments.

As shown in Table 3.4-10, residents of the City spend more than 96% of their income in the year 2012 compared to around 86% for BARMM and Region 12. This provides impetus to future growth as the City’s average family income is almost at par with the regional average and higher than BARMM by more than 25%. There are newer Family Income and Expenditure Surveys (FIES) but the 2012 edition is the latest with disaggregated data for Cotabato City.

Table 3.4-10 Average Family Income and Expenditure (2012)

Area	Average Family Income and Expenditure (Year 2009)			Expenditure as Percent of Income
	Income	Expenditure	Saving	
Philippines	235,000	193,000	42,000	82.12 %
BARMM	130,000	114,000	16,000	87.69 %
Region 12	163,000	140,000	23,000	85.89 %
Cotabato Province	149,739	126,934	22,805	84.77 %
South Cotabato	202,393	167,132	35,261	82.58 %
Sultan Kudarat	126,806	99,139	27,667	78.18 %
Sarangani	137,077	118,620	18,457	86.53 %
Cotabato City	163,579	157,346	6,233	96.19 %

Source: Prepared by the JICA Study Team (Based on Regional Socio-Economic Trends of the PSA Region 12)



Source: Prepared by the JICA Study Team (Based on 2009 FIES of the Philippine Statistical Agency)

Figure 3.4-3 Comparative Family Income and Expenditure (2009)

a) Sector Situation and Future Outlook

Table 3.4-11 analyzes each of the major sectors of the economy to determine which ones to support and their degree of feasibility. The potential anchors of the city’s future economic development could be broadly categorized into:

- Those that will continue to prosper and attract further investments without significant intervention
- Those with potential significant benefits but require policies, plans, and action by the City Government and other sectors.

The business categories that will fall in the first category are: Whole and Retail Trade and related activities, Education, Construction, and Accommodation and Food Service.

Businesses with good upside but requires significant intervention to be expanded or realized are: Agriculture and Fishery; Manufacturing; Electricity, Gas, Steam and related activities; Transportation and Storage; Information and Communication; and Real Estate Activities.

Table 3.4-11 Current and Future Outlook of Economic Sector and Sub-Sectors of the City (Agriculture and Industry)

Industry Classification	Status and Outlook		Remarks
	Current	Potential	
Agriculture, Fishery, and Forestry	Limited agriculture and fishery production	Modernized aquaculture production (crabs, milkfish); Organic vegetable	Market linkages need to be made; transport and logistics improved
Mining and Quarrying	None within the City	No potential	
Manufacturing	Limited to mostly food processing by Micro-Enterprises	Agriculture-based processing and manufacture with raw materials from neighboring provinces	The Metro Cotabato Regional Agri-Industrial Center (MCRAIC), a proposed 129-hectare industrial estate to host agri-based locators may be established; alternately, an Economic Zone may be registered with Philippine Economic Zone Authority for this purpose
Electricity, Gas, Steam, etc.	Power and gas are sourced from outside; CLPC has limited capacity to produce electricity	Potential for waste-to-energy project	A foreign or local energy company need to be tapped to realize a power project
Water Supply, Sewerage, Waste Management	MCWD distributes water to the City and part of DOS and Sultan Kudarat municipalities	Demand for water is increasing but need to find new water sources; Possible recycling and related businesses	
Construction	There are City-based construction and construction-related firms	Good potential for this industry if development in the City and BARMM accelerates	Training institutions related to the construction industry are needed

Source: JICA Study Team

Table 3.4-12 Current and Future Outlook of Economic Sector and Sub-Sectors of the City (Services)

Industry Classification	Status and Outlook		Remarks
	Current	Potential	
Wholesale and Retail Trade, Repair of Motor Vehicle, etc.	City has large number of wholesale and retail establishments	This sector will continue to grow, if not serve as the flagship of Cotabato City's economy	KCC, a South Cotabato Mall operator has commence construction of a large mall in a 12 hectare property
Transport and Storage	The city is the starting point of buses traveling to Davao City (North) and Gen. Santos City (South); there are also van terminals to Zamboanga City and Iligan City; Seaport and Airport is just outside the City; Warehouse are present in the city and neighboring Sultan Kudarat municipality	Transport services could be improved with central terminal/s; New City Seaport, if completed would improve access to bulk cargo; An improved or new airport could accommodate night flights and more destinations	Possible new airport in the City or in Sultan Mastura municipality (as identified in the Bangsamoro Development Plan-2)
Accommodation and Food Service	As administrative center of BARMM through the years, Cotabato City has a robust accommodation and food service industry	This sector can also be a flagship industry as supply of hotels/inns is lower than demand; food sub-sector is expected to continue to thrive	Prices of hotels, apartments, and other places of accommodation has risen, reflecting high demands
Information and Communication	Globe Telecom and PLDT have offices in the City, latter offering both fixed and wireless internet and phone services;	BPOs can be established in the City with improved telecommunication facilities	Large number of City natives work in call center or BPOs in Davao, Manila, Cebu, etc.
Financial and Insurance	City has most number of banks in south Central Mindanao, catering to Maguindanao, Lanao del Sur, Cotabato, and Sultan Kudarat provinces; large number of pawnshops and money transfer firms	Opportunity for Islamic banking and for other financial intermediaries that could cater to micro and smaller enterprises	Demand for micro-credit is high
Real Estate Activities	Current activities are limited to leasing of residential apartments, store spaces, and office spaces	There is a dearth of spaces for all types of uses. Low to medium rise apartments or condominiums looks feasible due to growing population and limited supply of land (leading to high cost)	Bringing in large real estate developers would help; Having local partners would be critical to ensure "safety of outside investors"
Professional, Scientific, and Technical	Limited professional service-providers; could be due to low demand, forces local professionals to work in other regions	Growing need for professional service providers with the establishment of the BARMM and increasing business activities	More professional consultants (business and other specialization), architects, and other technical professionals are needed
Education	City is an education hub with large number of private sectarian and non-sectarian schools	Potential for medicine and medical-related (medical technology, pharmacy) and other technical (architecture, urban planning, economic development planning) courses	Local schools could increase their course offerings or national private schools may open their own campus in the city
Human Health and Social Work	The presence of the CRMC, private hospitals, and diagnostic clinics and laboratories attract patients from its neighboring towns	There is clear demand for more modern hospitals and diagnostic centers especially for city residents who often travel to Davao City or Manila for checkups and major operations	Investor could be local doctors or large companies engaged in hospital business
Arts, Entertainment, and Recreation	Business firms under this category is still limited to 4 movie houses, and a few playhouses for kids, a badminton court	With the growing population of the city, there is a high potential for businesses belonging to this category	There is a need for venues for concerts and similar activities; also bowling lanes, etc.

Source: JICA Study Team

b) Prerequisites to Realization of Priority Economic Sectors

Aside from the improvement of basic infrastructure such as roads and bridges, as well as, the preparation of a good land use plan, there are other matters that must be addressed to make possible the further expansion and modernization of the city’s economy.

- First, for manufacturing and other industrial activities to be realized in the near future, the Metro Cotabato Regional Agri-Industrial Center (MCRAIC) along the Tamontaka-Bubong Road should be promoted to potential industrial estate developers and operators.
- Second, the City should establish an office that shall be responsible for identifying potential investment projects, prepare investment profiles, promote projects to local and outside investors, and assist those that have expressed intention to invest in Cotabato City.

(4) Implication of Land Use Planning in View of Rapid Development

a) Concentration of Economic and Other Activities

The traditional Central Business District (CBD) of Cotabato City straddles the areas of barangays Poblacion 5 and Poblacion 6, the location of many Regional Offices of national line agencies of Region 12 when Cotabato City was still its regional center (Table 3.4-13).

Table 3.4-13 Business Establishments and Institutions in the Central Business District

Barangay	Largest Business Establishments	Other Notable Institutions
Poblacion 5	South Seas Mall, Puregold Grocery, Jollibee Magallanes, Commercial Banks (at least 7), Hotels and Inns (El Manuel Hotel, Novotel, City Plaza Inn) Hardwares (Citi Hardware, LCT, City Hardware, Metropolitan Hardware)	City Legislative Building, BIR Office, Social Security System, 3 Land Transport Terminals (1 bus, 2 commuter vans), Churches
Poblacion 6	Franchised food stores (McDonald’s, Jollibee, Red Ribbon), Restaurants and Bakeshops (Mardoney’s, Mami King, Sahara, Oriental, KC Bakeshop, D’Max Bakeshop, Snow Queen), Commercial Banks (at least 5)	City Plaza, Old City Hall, BSP (Central Bank), CCCPES (primary school with over 5,000 pupils), Old Market, City Puericulture Hospital

Note: Refer to Figure 3.4-4 for map

Source: JICA Study Team

Until the middle 1990s, nighttime business activities in the CBD extend up to around midnight but peace and order issues forced people to avoid the downtown area beyond 7:00 in the evening. As security issues affected the city’s CBD, residents perceived that portions of the city along the national highway are relatively safer. In the last 10 to 15 years, more business establishments located themselves along Sinsuat Avenue, particularly Rosary Heights (RH) barangays: RH Mother, RH5, RH 6, RH7, RH 9, and RH 10.

More recently, business establishments also sprouted along TV Juliano Avenue straddling the expanse of Barangays Rosary Heights 12 and Rosary Heights 13. Notable new establishments along that strip include Paragon Hotel, Café Mindanao, Out of Nowhere Restaurant.

Table 3.4-14 Business Establishments and Institutions Outside the Central Business District

Barangay	Largest Business Establishments	Other Notable Institutions
Rosary Heights 7	Citimall, Banks (2), Mercury Drugstore,	GSIS, MCWD, BARMM Compound
Rosary Heights 9	Alnor Mall Complex (with mall, offices, movie houses, and hotel), EM Manor Complex (Hotel, Convention Center, Gasoline Station, and assorted stores), Greenwich Food	Notre Dame Hospital, Private market along Gov. Gutierrez Avenue, Land Transport Terminals (2)
Rosary Heights 10	Department Stores and Groceries (Superama, Purefold, Fiesta Mall) Jollibee Highway, Local Restaurants and Beverage stores (AlingPrecy, MangGorio, Aling Isang, Avenue Grill, Rebecca's, Lash Hermanas)	New City Hall, Cotabato Regional and Medical Center, Archbishop of Cotabato's Palace, Hysky Bus Terminal

Note: Refer to Figure 3.4-4 for map

Source: JICA Study Team

The City's superior infrastructure, utilities, and other services act as a magnet for people and organizations needing to do business transactions, deal with government agencies, avail of important services (medical, professional, among others), or simply enjoy amenities. Some people who work in the city, such as officials and employees of the former ARMM but coming from other provinces, usually end up permanently residing in Cotabato.

Over the years, the volume of traffic generated by more people travelling from outside the city and the increase in vehicles owned by local residents has outpaced the construction of new roads or the expansion of existing ones. This resulted in heavy traffic, increasing travel time within the city and strain the capacity of institutions and agencies to provide services such as electricity, water, waste collection, public safety, among others. The drivers of increase activities in the city can be summarized into three:

- Business-related activities of people and organizations;
- Transactions with government institutions like the BARMM (and its agencies) and agencies of the national government such the Philippine Statistics Office, Government Service Insurance System, Social Security System, and Home Mutual Development Fund; and People availing of non-business facilities such as the Cotabato Regional Medical Center and public schools found in the city.

b) Defining the Role and Directions of the City

The creation of the BARMM as a successor to the ARMM poses several impacts on the City, as it is right in the center of Maguindanao Province of the BARMM. If the city becomes the permanent location of the BARMM's parliament and executive offices, it will experience increase in new residents and visitors transacting with BARMM agencies and other offices. Increased consumption of goods and services by the BARMM agencies and employees in Cotabato City would lead to more movement of people and vehicles.

The City Government and the major stakeholders (particularly the business sector) could pursue the development of its agriculture and fishery resources, establish manufacturing and other industrial activities, or just be content to concentrate on the Tertiary Sector (Services).

c) Major Considerations for Land Use Planning

Assuming that the priority economic development directions that the city will be playing over the next 20 years and beyond had been settled, the Land Use Plan should be prioritizing the following, among others:

- Allocation of land for various uses such as Industry and Commerce, Residential, Institutional, Institutional, and Preservation areas.
- Decide whether certain facilities (land transport terminal, public market) shall be established on a single site or divided into two or more locations. The vulnerability of the city to natural and man-made calamities, in addition to traffic issues, should be given consideration. The COVID-19 pandemic also highlighted the danger of single location.
- Address the decades long problem of insufficient residential units with solutions that not only considers affordability but also conserving the scarce supply of land in the city, as well as, taking residences further away from rivers and other waterways (currently, households had been obstructing passage and polluting these bodies of water)

3.4.2 Current Status of Urban Services in Greater Cotabato City

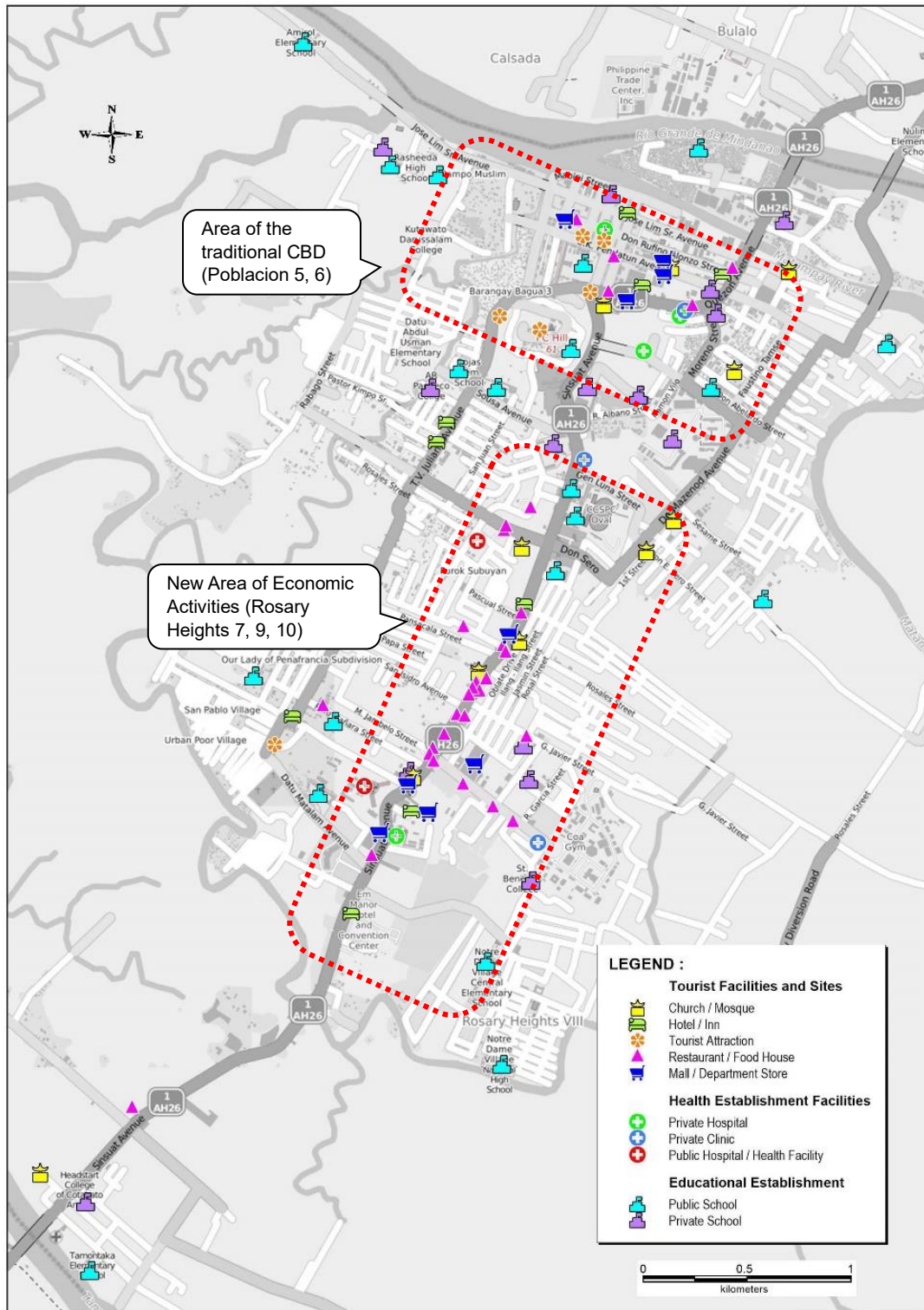
(1) Introduction

Since its time as a mere municipality of the Empire Province of Cotabato, Cotabato City built and maintained its superiority in level of urban services. At least within a 40km or so, Cotabato City reigns supreme with its wide range and quality of urban services.

Cotabato City however is physically challenged to develop its agriculture and industry sectors. The City is a delta created by the actions of two large rivers, Rio Grande de Mindanao and Tamontaka River and it is crisscrossed by rivers and creeks with a relatively small land area of 176 square kilometers. With such limitations, the city is challenged to develop into a recognized agricultural or industrial hub but its central location, made it the area of choice for the dispensation of government services and development of urban services.

(2) Urban Services

Urban services (Educational, Health, Tourism, and other sectors) in Cotabato City are exclusively provided by the public sector, others purely by the private sector, and some provided by both. Figure 3.4-4 shows the location of major urban services and attractions. As seen in the figure below, concentration of the services is located at the traditional CBD and along the Sinsuat Avenue which is emerging as the new area of economic activities.



Source: JICA Study Team (Basic Data from DOT Region 12, PSA 12)

Figure 3.4-4 Major Urban Institutions and Attractions in Cotabato City

a) Educational Services

Education is one of the important services provided by Cotabato City, having some of the oldest and largest schools in the BARMM and Region 12. Ownership of educational institutions in the city is both public and private with the latter dominated by sectarian organizations.



**Figure 3.4-5
Photo of a Public School in Cotabato City**

At the heart of the City is the Cotabato City Central Elementary School (formerly, Cotabato City Central Pilot Elementary School), said to be largest public elementary school in Region 12, in terms of student population, exceeding 7,000 pupils.

The present Cotabato City National High School was founded in 1924 as the Cotabato National High School and was originally located at the current campus of the Cotabato City Central Elementary School. It transferred later to an eight-hectare property along Sinsuat Avenue donated by the Sero family.

Educational Institutions in the City

There is a total of 99 schools for all levels of education in Cotabato City, fifty-five (55) of which are privately-owned and operated while the balance of 44 are public schools.

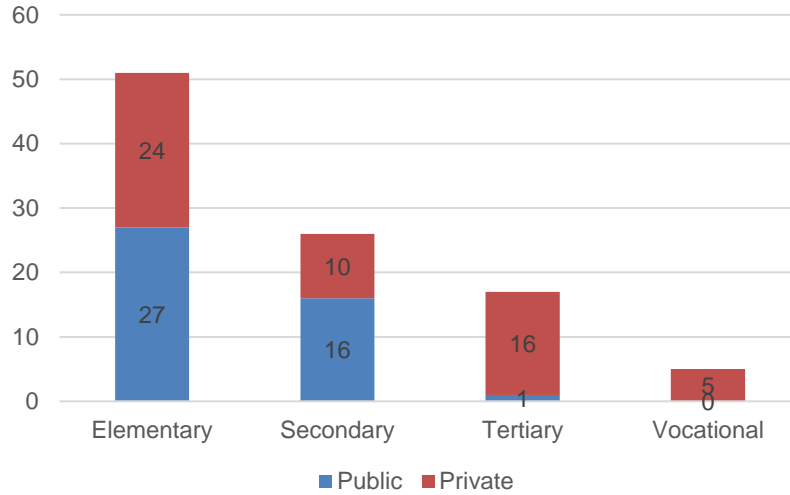
Most of the public schools are either elementary (27) or secondary (16), and the only tertiary school is the Cotabato State Polytechnical College (CSPC) proposed as Cotabato State University. The latter offers a wide spectrum of courses, including Education, Agriculture, and Business Administration in six undergraduate colleges. The CSPC also offers graduate studies leading to masters and doctorate degrees. There was an attempt to convert the school to a university, but such has not yet been achieved as of this year.

Table 3.4-15 Public and Private Schools in Cotabato City

School by Level	Total	Public Schools		Private Schools	
		Number	% to Total	Number	% to Total
Elementary/Primary	51	27	52.94 %	24	47.06 %
Secondary/High School	26	16	61.39 %	10	38.46 %
Tertiary	17	1	5.88 %	16	94.12 %
Vocational	5	0	0.00 %	5	100.00 %
Total	99	44	44.44 %	55	55.56

Source: JICA Study Team (based on data from the Department of Education, PSA Region 12, actual inventory)

Figure 3.4-6 below shows the mix of public and private schools at various levels. Public schools are more numerous at the elementary (primary) and secondary levels compared to private schools. However, at the tertiary level and in vocational schools, the participation of private institutions is clearly significant.



Source: JICA Study Team (Basic Data from City's Comprehensive Development Plan, DepEd 12, PSA 12)

Figure 3.4-6 Mix of Educational Institutions (Public and Private)

Most of the private educational institutions in Cotabato City are elementary or primary schools, representing (43.10%) of total school levels. There are 41 physical locations for these schools as there are institutions that have both primary and secondary schools or even complete school levels: primary, secondary, and tertiary.

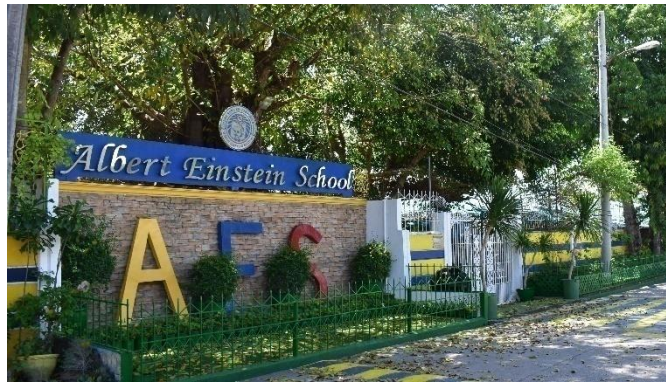


Figure 3.4-7 Gate of Albert Einstein School

There are five (5) privately-owned schools with both elementary and secondary levels. The Cotabato City Institute (CCI) and the Albert Einstein School are the leading institutions in this category. CCI was founded in September 1924 and owned and operated by leading members of the Chinese business community in the City. Though much younger (founded in 1982 as the Child Development Center), Albert Einstein School had arguably become one of the better, if not the best, elementary and secondary schools in the City as its students have a high passing average in entrance examinations for the best universities in the country (University of the Philippines – Diliman, Ateneo de Manila University, among others).

Four (4) educational institutions based in Cotabato City are complete in all levels (primary to tertiary), two of which are sectarian and the other two are non-sectarian.

The leading and only university, in Cotabato City is Notre Dame University (NDU) which was founded in 1948 as Notre Dame College and gained university status in 1960. At its peak in the late 1980s, the University had around



Source: Notre Dame University Website

Figure 3.4-8 Photo of College of Health Sciences, Notre Dame University

7,000 college students some coming as far as Gen. Santos City (South Cotabato), Kalamansig (Sultan Kudarat Province), Kidapawan City (Cotabato Province). It, however, started losing students due to the: establishments of colleges offering new courses and/or charging lower schools fees; rise of new schools or upgrading of existing schools in other cities and towns of Region 12; perceived deterioration in the peace and order condition in Cotabato City; and the transfer of thousands of government employees when the seat of the region was transferred to Koronadal City.

Among the leading tertiary schools are the Notre Dame RVM College of Cotabato (NDRVMCC), Systems Technology Institute (STI), AMA Computer College (AMACC), Coland Systems Technology Institute (CSTI), St. Benedict College, and AR Pacheco College.

The STI, AMACC, and Coland Systems Technology Institute all specialize in computer-related courses but in the last five years or so diversified their course offerings to include bachelor's degrees in Hotel and Restaurant Management and Social Work. These schools, along with other colleges, also ventured into offering Junior and Senior High School levels to be in step with the roll out of the K plus 12 Program of the Department of Education, as well as, to ensure that they have "feeder schools" for their regular programs and short-courses.

Along with Notre Dame University, the three institutions: St. Benedict College, AR Pacheco College, and NDRVMCC all have integrated educational levels, that is, they have complete primary, secondary, and tertiary schools. Notre Dame University offers masters and doctorate courses with St. Benedict College the other private school offering graduate studies.

Enrollment in Schools of Cotabato City

In a span of almost a decade there was a generally upward trend in the number of children involved in the Pre-School, Elementary, and Secondary levels in Cotabato City.

The surge in the number of enrollees in Pre-School classes had been attributed to the adoption of the K plus 12 Program of the Department of Education where additional years of schools were added to the traditional 10 years of primary and secondary schooling previously practiced in the

Philippines. The K plus 12 also made Pre-School mandatory, thus, resulting to a significant rise in the number of enrollees. However, the number of enrollees in elementary schools mysteriously fell between the same period. The number of children who enrolled in school year 2017-2018 was less than 2,202 compared to about ten years earlier.

For secondary enrollment, a 12.5% rise in the number of children enrolling in secondary level was recorded between the two school years under comparison.

Table 3.4-16 Comparison of Number of Enrollees, Pre-School to Secondary Levels

Area and Level	School Years		Increase (Decrease)	Percentage Change
	2008 -2009	2017-2018		
Cotabato City				
Pre-School	1,017	4,956	3,939	387.31 %
Elementary	30,520	28,318	(2,202)	(7.21 %)
Secondary	13,371	15,043	1,672	12.50%

Source: JICA Study Team (basic data from the DepEd Region 12 and PSA 12)

b) Health Services

Health and health-related services is well established in Cotabato City. It may even have a bigger market compared to the educational services as people from four provinces, Maguindanao and Lanao del Sur (of the BARMM) and Cotabato Province and Sultan Kudarat (of the Region 12).

Public Health Services

The wide reach of the health services of Cotabato City is attributable to the presence of the Cotabato Regional and Medical Center (CRMC). The hospital was established in 1916 as a 16-bed capacity health facility called the Cotabato Hospital in a private residence of the then Municipality of Cotabato. The hospital was transferred to the lower part of PC Hill and its bed capacity grew to 75, 100, and to 150. The Second World War caused its closure as the city was heavily bombed and most of the buildings burned.

It resumed operation after the War and in 1973, the Secretary of Health issued Department Order 60-B increasing the bed capacity of the hospital to 200 and made an accredited Tertiary Teaching and Training Center. The hospital transferred to its current site, a 10-hectare property along Sinsuat Avenue. Under Republic Act No. 8316, the hospital was renamed the Cotabato Regional and Medical Center and allocated a 400-bed capacity.

Lately, through the PhP 14 Million funding from the BARMM, the hospital gets accreditation as Covid-19 testing laboratory.

Private Hospitals and Health Services

There are four (4) private hospitals providing service to residents of the city and to those coming from neighboring municipalities of the four provinces previously mentioned.

Two (2) hospitals are owned and managed by private corporations while the other two (2) are owned by charitable institutions. The United Doctors Hospital is the newest of the private hospitals in the City, opening to the public in 2018.



Figure 3.4-9 Photo of United Doctors Hospital

As shown in Table 3.4-17, the four private hospitals have a combined bed capacity of around 200. Thus, with the 400-bed capacity of the CRMC, Cotabato City can cater to the confinement of almost 600 patients.

In reality, the CRMC has more admissions than its designated bed capacity leading to overcrowding of the rooms in the hospital and strain on its doctors and medical staff.

Table 3.4-17 Bed Capacity of Hospitals in Cotabato City

Name of Hospital	Nature of Organization and Ownership	Bed Capacity	General Location
Notre Dame Hospital and School of Midwifery	Owned by the Order of the Dominican Sisters (Catholic Religious Organization)	100 Beds	Sinsuat Avenue, almost fronting the CRMC
Cotabato Puericulture Center and General Hospital	Owned by a Private Non-Stock Corporation (Foundation)	30 Beds	Don Rufino Alonzo Street, fronting the City Plaza
Cotabato Medical Specialist	Private corporation led by a family of doctors	30 Beds	Quezon Avenue
United Doctors Hospital	Private	24 Beds	Notre dame Avenue
Cotabato Regional and Medical Center	Public Hospital (under the Department of Health, National Office)	400 Beds	Sinsuat Avenue
Total Bed Capacity		584 Beds	

Source: JICA Study Team (basic data from the CRMC website, City's CDP, and the private hospitals)

Outside Cotabato City, going to the south direction, the nearest hospitals are the Dinaig District Hospital at the adjacent Datu Odin Sinsuat municipality and about 60 kilometers from the city is the Maguindanao Provincial Hospital at Sharif Aguak municipality.

On the north, going to the direction of Davao City, there are private hospitals in the municipality of Midsayap, about 55 kilometers away. In the same direction, but nearer to the city is the Cotabato Sanitarium Hospital with a 45 to 50 bed capacity, a hospital under the jurisdiction of the national Department of Health. The hospital expects to be upgraded to a 200-bed capacity hospital. A 100-

patient capacity Isolation Building was very recently donated to the Cotabato Sanitarium Hospital by the Ministry of Health – BARMM.

c) **Tourism and Travel-Related Services**

Tourist Attractions of Cotabato City

Cotabato City has a mix of natural and historical attractions for both local and foreign tourists. Figure 3.4-10 and Table 3.4-18 shows some of the places that could be of most interest to foreign and domestic tourists, particularly those interest in history, religion, and culture. The City also holds festivals, such as the Sharif Kabunsuan Festival, Chinese New Year, and the various religions festivities of Muslims and Christians.



Source: Prepared by the JICA Study Team

Figure 3.4-10 Tourist Attraction Map of Cotabato City

Table 3.4-18 Major Tourist Attractions in Cotabato City

Tourist Attraction	Significance	Location	Current Status
PC Hill	The hill is the highest point in the City; said to be significant to the Sultanate; Location of the capitol of the Empire Province of Cotabato; Headquarters of the CEMCOM till the 1980s	Near the Central Business District; offers a 360 degrees view of the City	Recently, houses on the eastern side were painted in different colors; Viewing deck's on the Hill proposed but not yet realized
Kutawato Caves	Said to lead to caves near the Tamontaka area	Underneath PC Hill	Not much effort to explore the caves and ready them for tourists
Takumi Butai	A shrine in honor of the former Japanese military commander in the Cotabato City area	Sebastian Compound, Rosary Heights 10	Maintained by a local family
Timako Hill	The other promontory in the City other than PC Hill; supposed to be a protected area	Barangay Kalangangan 2, western part of the City and beside the sea	No clear program on how to cater to tourists; threat of more intrusions with the opening of roads
Tamontaka Church	One of the oldest Catholic churches in Mindanao; site of one of the first Christian settlements	Barangay Tamontaka Mother	Damaged during the 1976 earthquake but repaired
Grand Mosque	Largest mosque in the Philippines; Donated by the Sultan of Brunei	Barangay Kalangangan 2	May benefit from periodic upkeep of the structure
BARMM Government Center	Built as the office complex of the Regional Commission /Lupong Tagapagpaganap ng Pook Region 12; became the center of Region 12, ARMM, and now the BARMM	Governor Gutierrez Avenue, Barangay Rosary Heights 7	This is probably the only government center where all major agencies hold office
Old City Hall	The seat of office of the mayors of Cotabato from its creation as a municipality and eventually a city in 1959; new City Hall was built around 2005 and the old city hall was vacated	Central Business District	The structure is now converted to a museum and other uses
Provincial Capitol at PC Hill	The building used to the office of Governor of the Empire Province of Cotabato	PC Hill	The building was recently repaired by the National Historical Institute

Source: JICA Study Team (using the City's Comprehensive Development as a reference)

Tourist Arrivals

The Department of Tourism Region 12 records data on tourists arriving in various parts of the Region. By looking at the table below, the following were observed:

- Share of Cotabato City to the total tourist arrivals in Region 12 is less than 10%. General Santos is the leading destination with about 32% in 2017.
- Growth of the tourist arrivals to Cotabato City however is very strong with an AAGR of 47.65% from 2013 (62,521) to 2017 (296,874).
- Number of overnight foreign tourist arrivals for Cotabato City is equally strong. This is most likely due to personnel of different international development organizations like JICA, World Bank, UN among others. The 2017 siege of Marawi City however affected this figure which dropped from 24,908 in 2016 to just 778 in 2017.

Table 3.4-19 Tourist Arrivals, Region 12 and Cotabato City (2013-2017)

Area and Types of Tourists	Tourists Arrivals, 2013 to 2017				
	2013	2014	2015	2016	2017
Region 12	817,308	2,576,405	3,151,574	3,764,664	4,945,028
Overnight	345,328	717,596	939,367	1,035,357	1,261,063
<i>Domestic</i>	333,307	692,982	904,641	988,485	1,241,262
<i>Foreign</i>	12,021	24,614	34,726	46,872	19,801
Day Tourists	471,980	1,858,809	2,212,207	2,729,345	3,683,965
<i>Domestic</i>	469,626	1,851,562	2,193,607	2,712,345	2,668,211
<i>Foreign</i>	2,354	7,247	18,600	16,962	15,754
Share of Cotabato City					
Cotabato City	7.6%	2.3%	6.4%	9.2%	6.0%
Overnight	18.1%	8.3%	8.2%	14.2%	8.3%
<i>Domestic</i>	17.3%	8.1%	8.0%	12.4%	8.3%
<i>Foreign</i>	41.3%	0.0%	14.3%	53.1%	3.9%
Day Tourists	N/A	N/A	5.7%	7.3%	5.2%
<i>Domestic</i>	N/A	N/A	5.7%	7.3%	7.2%
<i>Foreign</i>	N/A	N/A	6.1%	8.9%	6.9%

Source: JICA Study Team (using basic data from the DOT 12 and PSA 12)

Hotels and Other Accommodation

Despite the sharply increasing number of tourists visiting the City for overnight stays, particularly tourists that are foreigners, the number of hotels (and their available rooms) accredited with the Department of Tourism is disappointingly low.



Source: Paragon Hotel Facebook Account

Figure 3.4-11 Photo of Paragon Hotel

As shown in Table 3.4-20, the number of hotels in Cotabato City tripled between 2008 to 2017, the same rate as the regional total. However, the base figure (one hotel only) is very low. In contrast, the number of DOT-accredited hotels in Gen. Santos City more than doubled while the growth in Koronadal City was seven-fold.

The number of rooms (983) of accredited hotels in Gen. Santos City in 2017 is 54.3% of the Regional total while that of Koronadal City (496) is equal to 27.4%. The total available rooms in the three accredited hotels of Cotabato City (182) is just 10% of the regional total.

In recent years, several new hotels (such as the Paragon Hotel and Restaurant, Primera Hotel, and EM Manor), had been constructed in the City as higher influx of visitors was anticipated.

Table 3.4-20 Number of Accredited Hotels and Hotel Rooms (2013-2017)

Area and Types of Tourists	Tourists Arrivals, 2013 to 2017				
	2008	2011	2013	2015	2017
Region 12					
<i>Hotels</i>	14	11	24	35	39
<i>Rooms</i>	448	390	1,055	1,273	1,811
Cotabato City					
<i>Hotels</i>	1	1	-	-	3
<i>Rooms</i>	11	11	-	-	182
Gen. Santos City					
<i>Hotels</i>	8	4	14	22	21
<i>Rooms</i>	348	254	701	969	983
Koronadal City					
<i>Hotels</i>	2	3	5	7	14
<i>Rooms</i>	50	86	174	194	496

Source: JICA Study Team (basic data from DOT 12 and PSA 12)

However, there are still no hotel that would qualify for at least a three-star rating had been established in the City and most appears not very keen at getting accreditation from the Department of Tourism. This is probably due to less stiff competition compared to other cities in the Region.

Table 3.4-21 Hotel Occupancy Rate in Cotabato City and Other Cities of Region 12 (2014-2017)

Area	Occupancy Rate (%), CY 2014 to 2017				Average Occupancy Rate (%)
	2014	2015	2016	2017	
Region 12	38.00	40.98	41.29	35.57	38.96
Cotabato City	51.07	63.97	66.25	52.66	58.49
Kidapawan City	No Data	48.00	57.65	73.05	59.57
Koronadal City	30.45	38.92	43.00	46/39	39.69
Gem. Santos City	35.46	40.08	40.24	42.69	39.62
Tacurong City	34.61	25.66	28.92	33.22	30.60

Source: JICA Study Team (Basic Data from Department of Tourism 12, PSA)

Restaurants and Food Establishments

One of the strong urban service provided by Cotabato City are the restaurants and other food-serving establishments. Unlike the other cities where local grown restaurants and food places were driven to closure by the arrival of franchises and famous restaurant chains, the local dining establishments of Cotabato City continue to thrive.

Many restaurants such as Cotabato Oriental Restaurant, Mardoneys, Smileys Food Place, Mang Gorio, among others started operating in the 1970s or 1980s and still maintain their loyal customers. There are also bread and pastry shops, such as Tam's Bakery, D'Max Bakeshop, and Connie's Bakeshop that date back to the 1960s or the 1970s that are still existing if not have established branches within and even outside Cotabato City.

The entry of franchised food outlets started in the late 1990s when the families owning Southseas Complex, a department store business that started in the 1970s successfully applied for the Jollibee franchise and opened their first store (along with a Greenwich outlet) right across the City plaza.

Convention Halls and Events Place

Anticipating the establishment of a bigger government structure in the form of the BARMM as replacement for the then Autonomous Region in Muslim Mindanao (ARMM), a number of mall and hotel operators constructed convention halls and venues for social events like weddings.



Figure 3.4-12 Photo of Alnor Convention Center

The traditional venue for large events were the South Seas Mall and the Alnor Complex Halls. Newer halls

were constructed in the EM Manor complex, the City Mall, and the new Alnor Convention Halls.

d) Sports and Recreational Services

There is a dearth of good sports and related facilities in Cotabato City. This prevents the City from serving as venue for national sports activities such as basketball and volleyball games.

Most of the sports venues in the City are found in school premises with the larger private schools having the bigger and better kept facilities such as Notre Dame University, Notre Dame RVM – College or Cotabato, Notre Dame of Cotabato, and the Cotabato City Institute. Indoor games such as basketball, volleyball, badminton, and tennis can be played in most of these schools' covered courts.

One of the better badminton facilities was the Sideout Badminton courts along Sinsuat Avenue in Barangay Rosary Height 7 but due to the onslaught of the COVID-19, the facility was closed for over two months and its management has decided to permanently close the establishment.

There are no Olympic-size swimming pools in the city. There are at least four establishments with swimming pools but their pools are small in size and just used mostly for parties or by children.

The Alnor Complex has two cinemas with capacity of around 600 persons each. Two years ago, the City Mall, a subsidiary of Double Dragon Corporation based in Manila, also opened small two cinemas with about 120 seats each.

(3) Assessment of Urban Services Growth Potentials of Cotabato City

The biggest chunk of economic and other activities that are sources of income by Cotabato City-based enterprises and provider of employment to residents are in the Services sector. The family income and expenditure characteristics of the residents of Cotabato City, that is, higher income

and propensity to spend compared to most of Region 12 and BARMM indicate continued support for consumption of urban services in the future.

Even with the ill-effects of the COVID-19 the impact on the urban services described herewith may not be as grave as in the neighboring towns and cities perhaps except for tourist-oriented services. A significant portion of the employed persons in the city are working for national line agencies and local government units (including the BARMM) and their income is not reduced during this period of health crisis.

Table 3.4-22 Comparative Average Family Income and Expenditure (2012)

Area	Average Family Income and Expenditure (2009) 2012			Expenditure as Percent of Income
	Income (PhP)	Expenditure (PhP)	Saving (PhP)	
Philippines				
BARMM	130,000	114,000	16,000	87.69
Region 12	163,000	140,000	23,000	85.89
Cotabato City	163,579	157,346	6,233	96.19

Source: Family Income and Expenditure Surveys, Philippine Statistics Authority

Table 3.4-23 analyzes each of the sectors providing urban services and their degree of viability for future development or enhancement. The business categories that will fall in the first category are: Whole and Retail Trade and related activities, Education, Construction, and Accommodation and Food Service.

Table 3.4-23 Current and Future Outlook of Urban Services of the City

Urban Services	Status and Outlook		Remarks
	Current	Potential	
Health	The current combined bed capacity of the CRMC and private hospitals appear insufficient in catering to the needs of residents and people from nearby towns; Many residents still go to Davao or Manila for checkups and operation	There seems to be great need for more modern hospitals and related facilities that can cater to the needs for diagnosis and treatment of serious diseases such as cancer, leukemia, and the like	Investor could be local doctors or large companies engaged in hospital business
Tourism	There is an apparent lack of hotels and similar accommodation for tourists	High potential for better hotels especially those that could cater to foreign tourists	Developers should consider the current health crisis in planning
Sports and Recreational Facilities	There is a dearth in sports and other recreational facilities in the city that would support the demand of a rapidly urbanizing community	Sports (such as bowling centers, badminton, courts, etc.), recreational facilities, and venues for social activities (like concerts) can be promoted for private investors to undertake	The establishment of facilities that require large investments should be demand-driven, otherwise, it will just be a wasteful use of money
Education	There is a good number of schools but course offerings are still limited	There is room for expansion of the course offerings of current schools or opening of new institutions	School owners and future investors should consider the demand of the BARMM and potential industries for workers

Source: JICA Study Team (using information on the assessment of potentials from the City Development Plan)

CHAPTER 4

CLUP REVIEW AND DEMAND-SUPPLY ANALYSIS FOR COTABATO CITY

4.1 Reviews on the Comprehensive Land Use Plan (CLUP) 2011-2020

4.1.1 Current Status of the CLUP 2011-2020 of Cotabato City

(1) CLUP 2011-2020

The comprehensive land use plan 2011-2020 for Cotabato City and Zoning Ordinance was approved through Resolution No. 4674 and No. 3786 in 2010 by the government (HLURB).

(2) Addendum of the CLUP

After the CLUP 2011-2020 approval, some parts were amended focusing on Climate Change Adaptation and Disaster Risk Reduction in line with the new guidelines for CLUP formulation. The HLURB Board finally approved the CLUP 2011-2020 with an addendum through Resolution No. 886 in 2012. The followings were the salient provisions (not in the spatial plan) as an addendum.

- The establishment of City Disaster Risk Reduction Management Council (CDRRMC) together with Barangay DRRMC and other necessary organizations
- Prevention and mitigation programs to achieve resilient systems in infrastructure and community in association with preparedness and disaster response programs
- Sector climate change adaptation program in agriculture and health and capacity development

(3) New CLUP Status

- The new CLUP 2020 - 2028 (9 years) is under preparation/updating supervised by the Department of Human Settlements and Urban Development (DHSUD).
- The Comprehensive Development Plan (CDP) 2017-2022 (six years) of Cotabato City is still in effect. Its time frame coincides with the Philippine Development Plan 2017-2022 of the present administration.
- The original target completion date of the new CLUP as mentioned to the new target of May 2021 (extended deadline of DILG) due to the onset of COVID-19.

4.1.2 Identified Planning Issues and Measures in the CLUP 2011-2020

(1) Identified Issues in the CLUP 2011-2020

- **Dominant uninhabitable lands:** Environmental vulnerability of Cotabato City is one of the essential constraints to develop urban settlement areas in an appropriate way because significantly large land areas (82.9%) are identified as natural hazard risk areas (flood, inundation, earthquake, liquefaction, and landslide) in the city.

- **Limited land with weak land management:** The city administration faces critical land management issues due to competition among several essential land use demands (CBD development, agricultural land, residential areas, industrial land) within limited available lands.
- **Insufficient urban services:** Several fundamental urban services in sectors of education and health care are insufficient in terms of physical facilities and human resources to efficiently and effectively serve the constituents. Much affected are informal settlers with poor environment surroundings within the hazard risk areas. Their living condition should be improved or they must be resettled in a more comfortable place.
- **Weakness in economic development:** Substantial land areas in the city are vulnerable to different environmental hazards. This situation brings constraints to carry out effective economic development. However, in marshy and waterlogged areas, the possibility of utilizing these for rice production, aquaculture, and tourism activities may be given due consideration.
- **Weak urban infrastructure:** The living environment in the city is confronted with unsuitable conditions due to a lack of basic infrastructure services (e.g. drainage system, electricity, water supply) especially in informal settlements. The insufficiency of the road network is generating traffic congestion, particularly in the CBD area. This concern is further aggravated by poor traffic management in the city.

(2) Opportunities and Measures Proposed in the CLUP 2011-2020

The CLUP 2011-2020 has identified development opportunities toward future potential development taking into account the desirable functional roles of the city being located at the center of the region. The details are shown in Table 4.1-1.

- **Strategic location:** Cotabato City is located at the central position of urban and economic services for Region XII and BARMM, particularly in the provision of related urban services in the area of public governance, finance, and others. The city also acts as a transportation node with economic corridors, a typhoon-free area, and functions as a central service node for the surrounding agricultural production areas, financial services, commerce, trade and industry, and institutional services.
- **Potential natural resources for economic development:** Rich coastal area with potential for aquaculture development and rice production in low lying areas will give high opportunities to promote agriculture development in the city. Tourism activities could also be promoted utilizing water-based tourism resources.
- **Measures identified to address issues on land condition:** To address the weakness of the land condition, lack of urban service capacities, insufficient infrastructure, and lack of opportunities for economic development, the land use plan ventured on the strategy of expanding the residential and commercial business areas utilizing agriculture lands. While structural measures shall be employed in the prevention of flood hazards together with programs for solid waste management and other necessary related activities.

Table 4.1-1 Identified Issues, Opportunities and Counter Measures Proposed in the CLUP 2020

Development Issues identified by CLUP 2020		Opportunities	Counter Measures by the CLUP 2020
1. Natural Environment Conservation (area: 3.1%)	1.1 Conservation of coastal areas with mangrove (area: 2.3%) and coastal and marine ecosystem for aquaculture and natural hazard resilience	Rich coastal areas with potential aquamarine production, wooden industries, and tourism development	In Land Use Policy: <ul style="list-style-type: none"> Coastal areas should be protected
	1.2 Conservation of forest land (area: 0.8% especially slope areas)		
2. Dominant Uninhabitable Area or Hazard Risk Areas (area: 82.9%)	2.1 Dominant flood hazard risk areas (low lying area: 54.7%)		In Land Use Policy: <ul style="list-style-type: none"> Discouraging housing development in the hazard risk area Preventing loss and property in low lying barangays (e.g. cleaning/dredging waterways) Anti-flood elevated building in a prone area
	2.2 Poor subsoil areas by marshland, fishponds (area: 28.2%)		
	2.3 Geohazard risks (liquefaction, fault) in CBD area requiring anti-earthquake measures		
3. Constraints in Land Management and Land Use Policy	3.1 CARPable Land (irrevocable agricultural land to urban use, area 0.7%)	Strategic location: <ul style="list-style-type: none"> Central service position in Region 12 and BARMM (administrations, financial other urban service function) Transportation node with economic corridors Typhoon free area Central service node for surrounding agriculture productive areas, financial service, trade, commercial business, industry, and institution 	Key Land Use Strategy/Plan: <ul style="list-style-type: none"> Residential: existing infilling and densification and new settlement utilizing agriculture/mangrove areas, and resettlement for coastal and riverside area Commercial-business: expanding areas for SME along a trunk roadside and a new center Industry: RAIC development Agriculture: expansion and cultivation Public facilities: multi-use/high-dense
	3.2 Weak control measures to prevent urban sprawl to hazard risk areas		
	3.3 No expandable lands and spaces in CBD where parking space and park are insufficient		
	3.4 Vulnerable informal settlements in hazard risk areas and resettlement to be required		
	3.5 Constraints on competitive land resource among high-demand land use for residential and agriculture development		
4. Insufficient and Weak Urban Services and Administration	4.1 Lack of disposal site and insufficient implementation for waste management against increased waste	Inter-LGU-alliance <ul style="list-style-type: none"> Metro Kutawato Development Alliance (MKDA) by cluster local development 	Priority Programs: <ul style="list-style-type: none"> The school building and improvement Establishment of health care facilities
	4.2 Poor living environment of informal settlements without adequate utilities in association with risks of natural hazards		
	4.3 Lack of remedy care (e.g. obstetrics, day-care center) and facilities rather than preventive medical care and services		
	4.4 Insufficiency of primary and high-school education service (public school, equipment, human resources)		

Development Issues identified by CLUP 2020		Opportunities	Counter Measures by the CLUP 2020
5. Weakness in Economic Development	5.1 Low agricultural productivity due to poor soil fertility (only for paddy in low lying areas) and few access roads	Agriculture development: <ul style="list-style-type: none"> • A large extent of low lying lands for agricultural development • Aquaculture potential in marshy land Tourism development <ul style="list-style-type: none"> • Waterfront tourism • Timako hill development 	In Land Use Policy: <ul style="list-style-type: none"> • Discouraging housing development in the hazard risk area • Preventing loss and property in low lying barangays (e.g. cleaning/dredging waterways) • Anti-flood elevated building in a prone area
	5.2 Lack of industrial development lands due to undeveloped investment opportunities without attractive infrastructure and its finance for MCRAIC (Metro Cotabato Regional Agro-industrial Center)		
	5.3 Lack of tourism products due to unutilized resources and less tourism infrastructure (e.g. accommodation)		
6. Weak Urban Infrastructure and Services	6.1 Traffic congestion due to insufficient road and transportation facilities and inappropriate traffic management		Priority Programs: <ul style="list-style-type: none"> • Seek possible sanitary landfill areas for waste disposal and sewerage facilities • Flood control and drainage • Road network expansion • Power supply expansion
	6.2 Insufficient urban infrastructure (e.g. drainage, electricity, water supply) due to less financial source to improve		

Source: CLUP 2011-2020/Cotabato City 2012

4.1.3 CLUP 2011-2020 and Further Considerations

(1) Spatial and Quantitative Targetsof theLand Use Plan

Based on the land use policies and strategies addressing development issues of Cotabato City, the proposed land use was formulated taking into account the strategy of strengthening the urban functions through the expansion of land allocated for commercial and business, industries, and uses for public facilities. While the residential land use shall also be expanded to address the future demand of population by 2020¹ together with decreasing population density (residential use only² : 365 p/ha in 2010 to 306 p/ha in 2020).

- The land area by land use classes for urbanization such as residential, commercial & business, industry, and public facilities was expanded, while some of the agricultural use lands (1,768 ha) were converted into urban land uses.
- Among the highest target increases in urban land use is industrial use encompassing 140 hectares which include the Metro Cotabato Regional Agro-Industrial Center (MCRAIC) area. The figure rose by 18.6 times the existing industrial use area, followed by commercial and business use (227 ha) with a 3.5 times increase.

¹CLUP 2020 indicates future population in 2020 by the projection of future population up to 2030 (CPDO)

² As CLUP 2020 does not indicate the amount of population by land use classification, it cannot be validated by referable data for possibility of population in the land uses of commercial and business, agriculture, industry classes.

- Residential land use has the biggest area among urban land uses. The area is targeted to become 1.76 times from the 2010 total area of 796 hectares. This represents a target increase of 607 hectares by 2020.

Table 4.1-2 Key Land Use Changes from Existing Land Use 2010 in the CLUP 2020

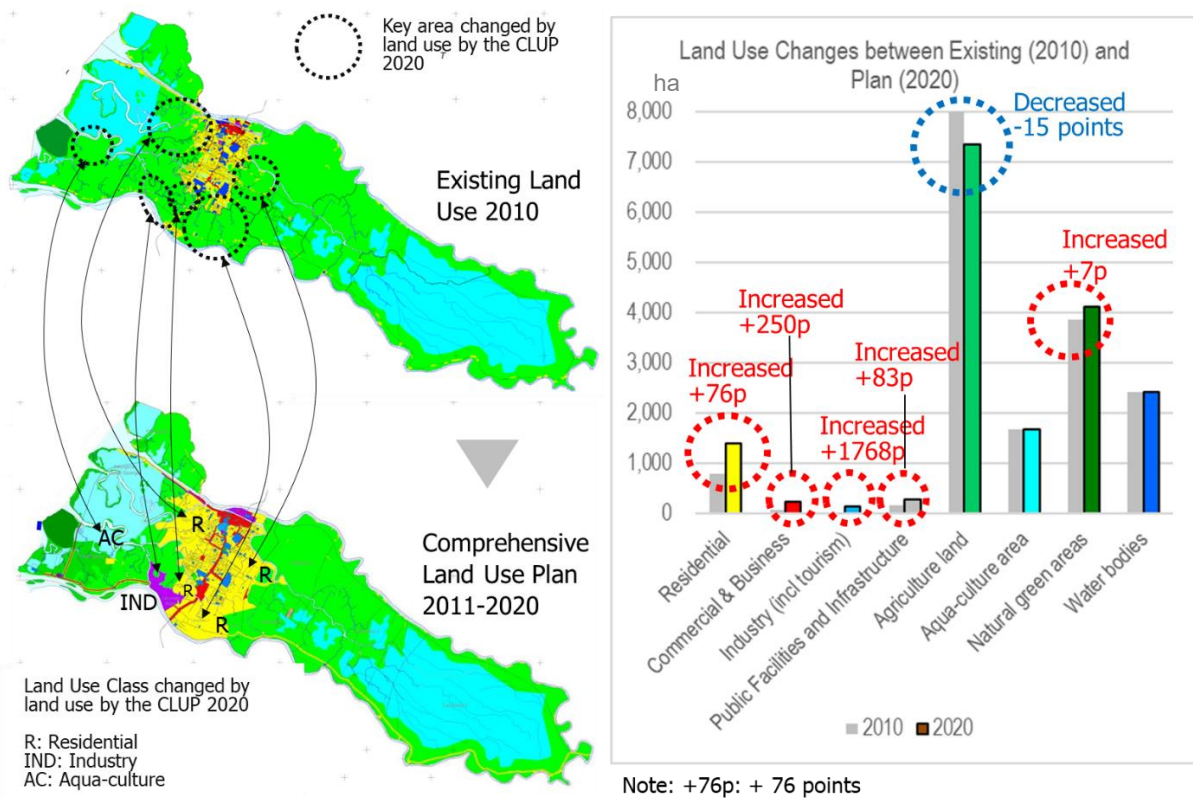
Category	2010	2020	Increased
Residential (ha)	796.15	1403.36	607.21
Other uses with settlements (ha)* ¹	n.a	n.a	n.a
Population (persons)	291,255	429,888* ²	138,633
Density* ³ (persons / ha)	365.8	306.3	--

Note1: As CLUP 2020 does not indicate the amount of population by land use classification, it cannot be validated by referable data for the possibility of the population in the land uses of commercial and business, agriculture, industry classes as “Mixed Use”.

Note2: CLUP 2020 indicates the population projection up to 2020 by CPDO.

Note3: Density is estimated by the population only within land use of residential use.

Source: *Comprehensive Land Use Plan of Cotabato City (2011-2020)*



Source: *JICA Study Team edited based on the CLUP 2011-2020*

Figure 4.1-1 Land Use Changes from Existing Land Use 2010 in the CLUP 2020

(2) Current Development Programs to be Incorporated into the New CLUP

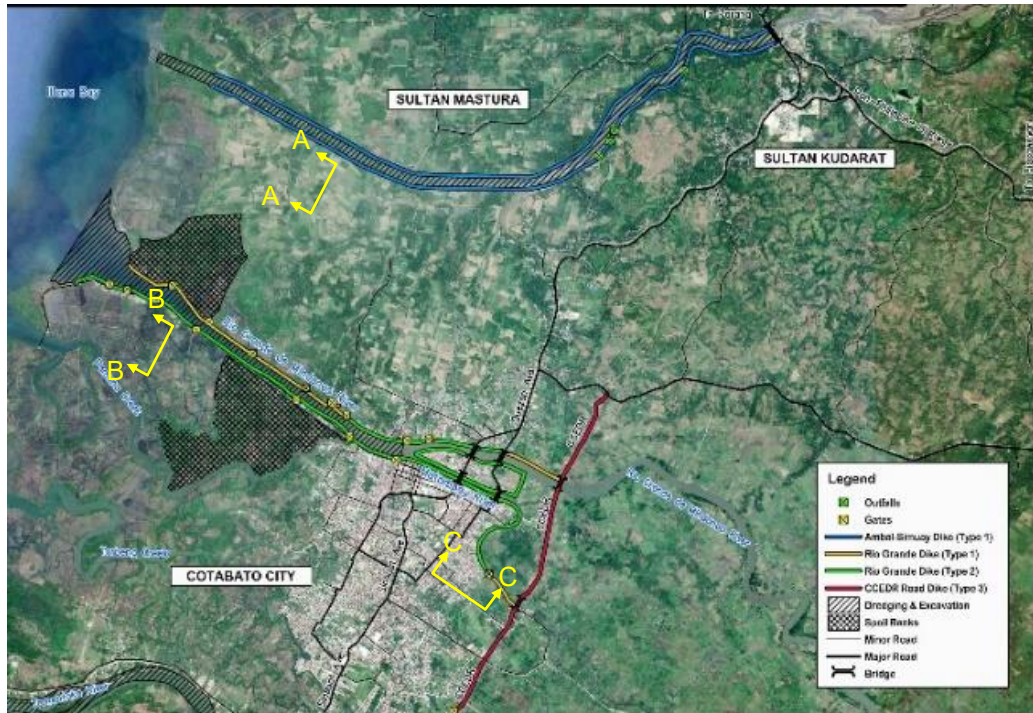
- Ambal-Simuyay River and Rio Grande de Mindanao Flood Control projects:** In 2019, the Ambal-Simuyay River and Rio Grande de Mindanao Flood Control Projects were approved by the NEDA Board as among the flagship infrastructure projects in Mindanao. The brief presentation material of the feasibility study indicates that the proposed projects will have the following scope of works: 1) construction of river dikes for Ambal-Simuyay River and Rio Grande de Mindanao, at the upper part of the city; and 2) river dike road construction utilizing the Cotabato City East Diversion Road.

The project composes of key several project packages including design-build works, civil works for two rivers' management by dredging and excavation, construction of dikes and dike-roads, land acquisition and resettlement program including relocation site development and other administrative and management services. The total project cost was estimated at PhP 39.2 Billion for six years of project period implementation. The following Table 4.1-3 illustrates the brief description of the project and Figure 4.1-2 shows the location of the project and Figure 4.1-3 shows typical cross-sections of the planned dike-road.

Table 4.1-3 Components of Ambal-Simuay River and Rio Grande de Mindanao River Flood Control Project

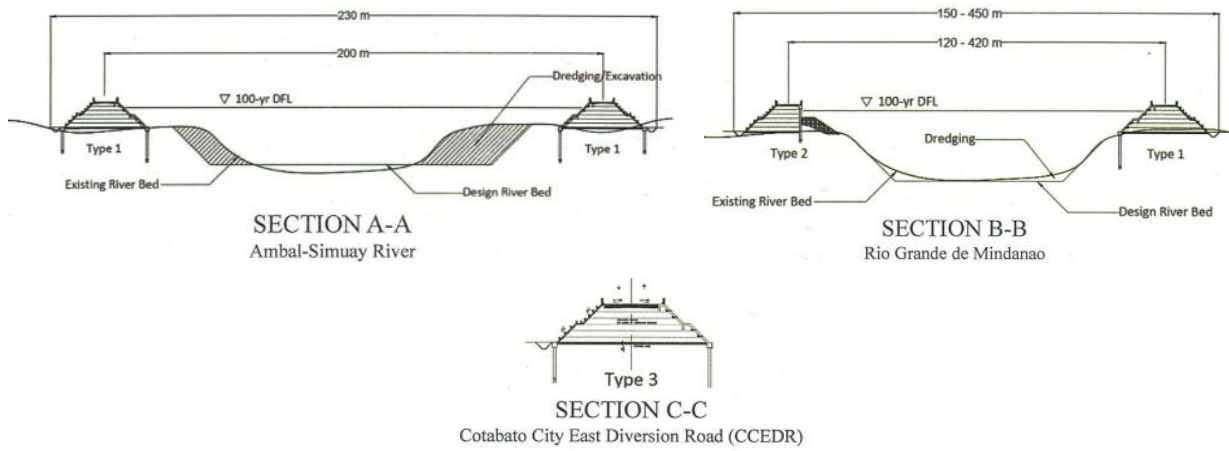
Category	Description	Reference
Finance / Project Cost	Loan Project/ 39.22 Billion Php	China Export-Import Bank Loan. (Included by local portion: 7.05 billion Php) DPWH as a Counter Agency is currently facilitating the procurement for the Consultancy Services for the Procurement preparation of land Acquisition Plan and Resettlement Action Plan.
Project Term	6 Years (2020-2025)	The project contract would have been signed-in July 2020 with a Chinese Contractor, according to the annual procurement plan of DPWH.
Contract Package	Package 1	Design-build, dredging, and excavation in two rivers, relocation site dev.
	Package 2	Construction of dike-roads, Sluice gates, relocation site development
	Others	Management service, land acquisition, and resettlement, others

Source: Presentation slides for the Project and the website of DPWH



Source: Presentation slides of the projects / DPWH

Figure 4.1-2 Location of Flood Control Project Components



Source: Presentation slides of the projects / DPWH

Figure 4.1-3 Proposed Typical Cross Sections of Dike Roads

The projects will eventually provide flood protection and agricultural development in relevant areas. Further, the projects will be able to convert the present uninhabitable land area (flood-prone, marshy) into an inhabitable area. This must also be accounted for as part of the benefits resulting from the implementation of these projects.

- **New Airport Proposals:** There are several discussions on the development of the future new airport to replace the existing Awang Airport which is confronted with some technical constraints on air safety navigation, hence its upgrading may no longer be feasible. Three alternative suitable sites for the new airport development had been identified. These location options are as follows: 1) Cotabato City, this was proposed by the City Government of Cotabato and a Pre-Feasibility Study has been completed; 2) Sultan Mastura municipality in Maguindanao, which is about 15 km. from Cotabato City and 11 km. from Polloc Port; and, 3) Malabang municipality in Lanao del Sur, this is midway between Cotabato City and Marawi City, the site is the old airport owned by CAAP. However, the proposal for the development of a new airport may still take substantial time before it is approved and implemented, thus, this may not be discussed comprehensively in this project. But it is acknowledged that wherever the location of the new airport, it would have a great impact on the future development of Cotabato City.
- **Mindanao Railway System (RSM)with Cotabato City in the network:** The government has launched the promotion of the Mindanao railway project along the route Tagum-Davao-Digos as the initial phase of a long-term railway network on the island. Cotabato City as part of the railway network should consider in its future land use its new role as one main station of the network after 2040. The city will assume a new urban function not only as a potential part of the route but also as a station-front urban center development.
- **Social Housing Demand in the approved Local Shelter Plan:** The Local Shelter Plan which was approved through Sangguniang Panglunsod Resolution No.6416, series of 2018, contains a proposal for social housing programs that shall accommodate 6,124 households without decent residential houses, including 2,511 households staying in hazard risk areas. Further, the program shall also benefit 3,613 households whose dwelling units are the potential to be affected by different infrastructure projects implemented by the government. Accordingly, the shelter plan was formulated in the early 2010s based on old statistical data, and the target land area requirement for the social housing program was estimated at 119 hectares. Nevertheless, this information and data on social housing requirements for residential land use should be incorporated in the updating of the new CLUP.
- **A suitable location for Sanitary Landfill Facilities (SLF):**The Waste Analysis and Characterization Study (WACS) conducted in 2017, proposed the identification of a suitable location for the new sanitary landfill facility (SLF) within the city. The estimated required area for this new SLF was based on the existing SLF capacity. The new CLUP to be updated should consider this SLF requirement taking into account that the new and appropriate location should be free from any environmental and social constraints.

(3) “Smart City Concept” to be Incorporated into the New CLUP Planning

- **New Vision of Cotabato City:** The new vision for the city has been formulated recently as “A smart city with God-fearing and enlightened diverse people living in a peaceful, secure, resilient community with the progressive economy and good governance” emphasized by the beginning term of “smart city.”
- **Smart city solution to be incorporated into CLUP planning:** A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life. It also focuses on the efficiency of urban operation and services, and competitiveness in the socio-economic sector, while ensuring that it meets the needs of present and future generations concerning economic, social, and environmental aspects. The urban development issues of Cotabato City can be addressed through the “smart city” strategy focusing on ICT-oriented management measures to accelerate urban improvement. Table 4.1-4 illustrates examples of smart strategies to cope with the urban development issues of the City.

Table 4.1-4 Example: Potential Smart City Solutions to the Urban Development Issues on Cotabato City

Sector Problems	Urban Development Issues	Potential Smart City Solution
Vulnerable Environment by Natural hazard	• Risk-sensitive urban planning and land use control	Smart natural hazard monitoring system (ICT)
	• Preventing and mitigating natural disasters	Limited applicability
	• Establishing a quick response to natural disasters	Applying non-structural measures with ICT supports (e.g. early warning system)
Weak and Insufficient Transportation System	• Mitigating traffic congestion	Smart mobility management system by ICT
	• Managing traffic efficiently	
	• Establishing a sustainable public transportation system	Smart operation system (ICT ticketing, traffic control, etc)
Weak and Insufficient Infrastructure	• Strengthening effective waste management system	Smart monitoring and operation by ICT
	• Improving urban drainage	Limited applicability
	• Improving viable utilities supply system (sewer, water supply, etc)	Smart operation system (ICT monitoring, charging, etc)
Insufficient Urban Services	• Providing sufficient primary and high school education services	Limited applicability except for ICT education
	• Improving the poor living environment and vulnerable informal settlement	Limited applicability
	• Improving insufficient health services	Smart monitoring and data management by ICT
	• Improving security/safety against street crimes	Smart surveillance system by ICT
Weak Economic Development	• Improving agriculture infrastructure and productivity (access road, etc) against a weak cultivation environment	Smart monitoring and marketing system for productivity improvement by ICT
	• Insufficient industrial sector development without a competitive productive environment	

Source: JICA Study Team

4.2 Land Supply and Demand for Cotabato City

4.2.1 Inhabitable Land Analysis (Supply Side)

Natural hazards that frequently occurred in the city and its surrounding areas have become essential constraints on existing living and working environment and toward future socio-economic development for Cotabato City. Environmental vulnerability analysis aims to identify inhabitable lands where living and working activities are secured against natural hazards.

(1) Methodology

Cotabato City has various types of natural hazards to threaten living and working environment in the city such as flood, storm surge, tsunami, earthquake in association with liquefaction and landslide. The following methodology within limited conditions for the analysis is taken.

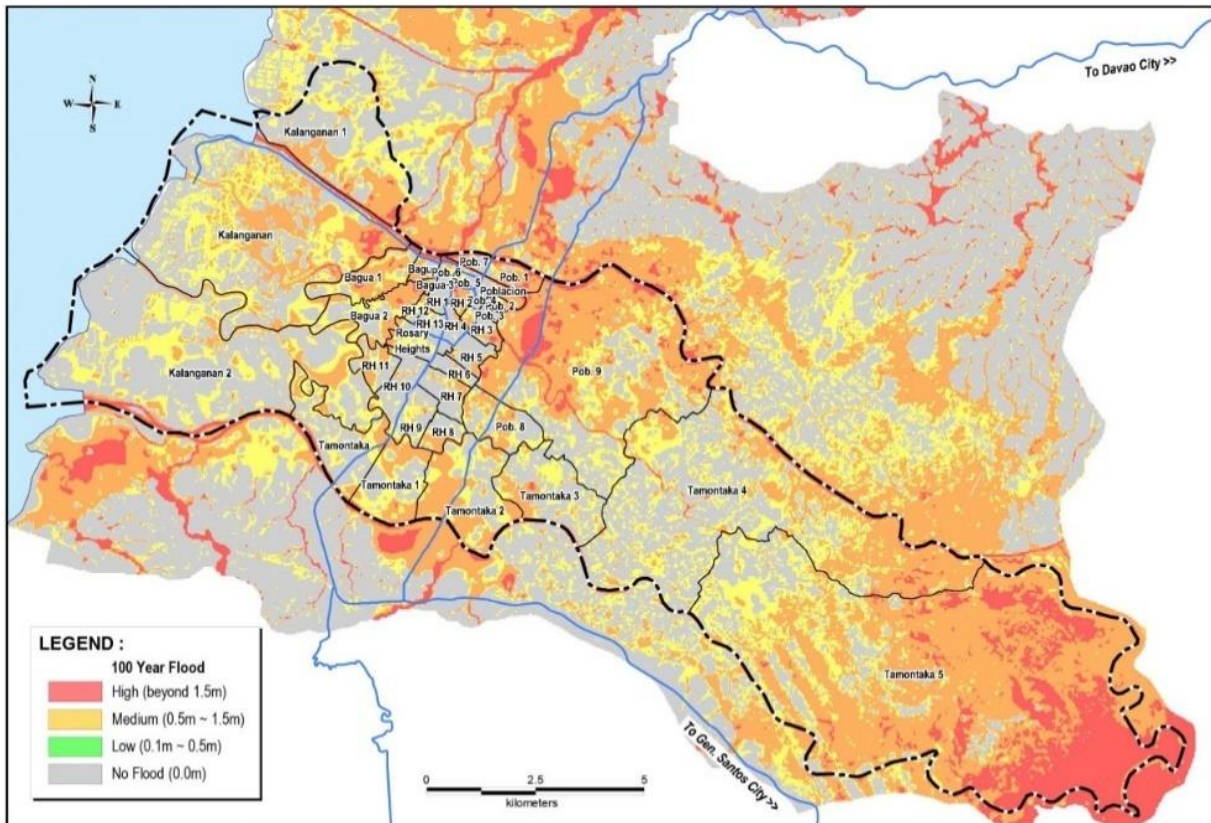
- **Flood risk factor identifying inhabitable lands:** The flood factor is one of the most essential negative factors to identify uninhabitable lands to be excluded. The flood hazard geo-data of LiDAR Portal (National Engineering Center of the University of the Philippines) for Archiving and Distribution (100 years flood probability) covering the city and surrounding areas publicized on the website as the available data is utilized. The criteria for inhabitable lands apply to the land with flood risk by the flood water depth under 0.5 m.

Table 4.2-1 Type and Criteria utilizing Flood Risk Data

Segment	Depth of Flood / Inundation	Criteria for Inhabitable Land
SEG – 1	0 m	Applicable
SEG-2	0.1 - 0.5 m	Applicable with condition (bycounter measures)
SEG-3	0.6 - 1.5 m	Not applicable by life-threatening and considerable physical damages as uninhabitable land
SEG-4	Over 1.5 m	

Source: JICA Study Team based on Flood hazard geo-data (2017) distributed by LiDAR Portal for Archiving and Distribution

- **Conditions for inhabitable lands:** Inhabitable lands could apply to land use types not only for settlement (residential, commercial, industry, institutions, etc) as low-risk areas against river flood or stormwater inundation but also favorable other uses of land use comparatively by agriculture land with less negative impacts in terms of economical damage on agricultural products under condition of a well-organized drainage system to shorten the time by submergence for agricultural products
- **Another consideration for inhabitable land:** According to the Ambal-Simuay River and Rio Grande de Mindanao Flood Control Projects by the Philippines government financed by the Chinese government, the construction of river dikes for Ambal-Simuay River and Rio Grande de Mindanao River including river dike roads is expected to give positive impacts greatly on the secured urban areas as inhabitable lands in Cotabato City and its surroundings. Therefore this project should be considered as one of the factors to improve land conditions to analyze potentials for inhabitable land in the city.



Source: Flood hazard geo-data(2017) distributed by LiDAR Portal for Archiving and Distribution

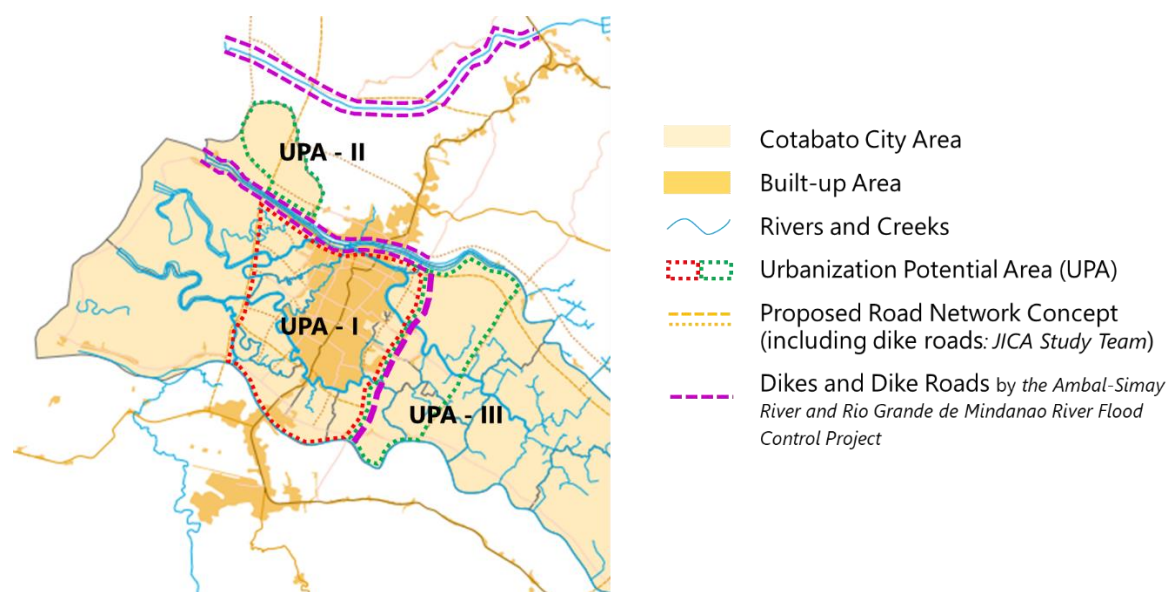
Figure 4.2-1 Flood Risk Hazard Map (100 years probability)

- Assessment by options including dike road concept:** The inhabitable lands are assessed by three options in cases of 1) **Case-1** without dikes and dike roads, 2) **Case-2** with dikes and dike roads for the Urbanization Potential Area I (UPA-I) involving the existing urban area and surroundings enclosed by the dike road projects on the Cotabato East Diversion Road and a proposed dike road (JICA Study Team) as one of the west diversion roads, and 3) **Case-3** adding other UPAs (UPA-II and UPA-III) with dikes and dike roads for the area of PUA's, where these two areas could be candidates for future expansion beyond 2040 unless UPA-I has enough land supply capacity against future population increase upto 2040. The following Table 4.2-2 and Figure 4.2-2 illustrating the status of Urbanization Potential Areas (I, II, III) with proposed road network (JICA Study Team) are conditions of land demand and supply analysis for inhabitable land.

Table 4.2-2 Three Urbanization Potential Areas (PUAs) as Supply-side Condition

Candidate of Urban Area	Inhabitable Land (ha)	Existing Land Use	Status and Potentials
UPA-I	1,692	<ul style="list-style-type: none"> The existing key urban area including the city center 	<ul style="list-style-type: none"> The highest urbanization potential area because of proximity to existing urban areas The western side of the area is characterized as low-lying lands with high dense rivers and creeks
	2,565	<ul style="list-style-type: none"> Agricultural land and vacant lands 	
UPA-II	310	<ul style="list-style-type: none"> Agricultural land with dispersed settlements Some fishery ponds 	<ul style="list-style-type: none"> Second potential for urbanization with the advantage of the flood control project in Ambal-Simuyay River and Rio Grande de Mindanao River Comparative fewer rivers and creeks
	425		
UPA-III	648	<ul style="list-style-type: none"> Agricultural land with dispersed settlements Waste disposal site Vacant lands 	<ul style="list-style-type: none"> The third potential for urbanization, if a dyke and dike roads are provided with advantage proximity to an urban area (PUA-II)
	1,349		
Total	2,649	Inhabitable land excludes rivers and creeks, and land without severe flood (water depth over 0.5 m)	
	4,338	Inhabitable land excludes rivers and creeks and flood risk-free by dikes and dike roads	

Source: JICA Study Team



Source: JICA Study Team

Figure 4.2-2 Urbanization Potential Areas (UPA) in Consideration with Dikes and Dike Roads Concept including the Flood Control Project for Inhabitable Land Analysis Assessment

(2) Land Supply Capacity by Three Cases with UPAs and Their Dike Conditions

- Case-1 without dikes and dike roads for any place in the city indicates 6,814 ha as inhabitable land as a whole, where UPA-I shares predominantly 64% in PUA's (25% in total inhabitable lands).
- Case-2 with dikes and dike roads for UPA-I as the primary urban area including the existing city center indicates 7,687 ha as inhabitable land as a whole, where all uninhabitable land in UPA-I is normalized without flood risks by additional lands (873 ha) for UPA-I on Case-1 land capacity.

- Case-3 with dikes and dike roads for all UPAs as the maximum land supply capacity unless flood control projects with dikes and dike roads have any constraints such as engineering rationale for river flow system, financial capability, and other implementation measures. And this Case -3 may be considered as a reserved area for long-term beyond 2040.

Table 4.2-3 Land Supply Capacity by Three Cases with UPAs and their Dike Conditions

Type of Barangay	Settlement Area	Administrative Area (ha) (A)	Rivers & Creek (ha) (B)	Potential Development Area (ha) (C) (C= A-B)	Uninhabitable Flood Risk Area (ha) (D)	Inhabitable Land (ha) (E) (E=C-D)	Share (E)
Case-1 without dikes and dike roads	UPA-I	2,887	323	2,565	873	1,692	24.8%
	UPA-II	515	90	425	115	310	4.5%
	UPA-III	1,584	235	1,349	701	648	9.5%
	Others	12,613	1,766	10,847	6,682	4,165	61.1%
	Total	17,599	2,414	15,185	8,371	6,814	100.0%
Case-2 with dikes and dike roads for UPA-I	UPA-I	2,887	323	2,565	0	2,565	33.4%
	UPA-II	515	90	425	115	310	4.0%
	UPA-III	1,584	235	1,349	701	648	8.4%
	Others	12,613	1,766	10,847	6,682	4,165	54.2%
	Total	17,599	2,414	15,185	7,498	7,687	100.0%
Case-3 with dikes and dike roads for all UPAs	UPA-I	2,887	323	2,565	0	2,565	30.2%
	UPA-II	515	90	425	0	425	5.0%
	UPA-III	1,584	235	1,349	0	1,349	15.9%
	Others	12,613	1,766	10,847	6,682	4,165	49.0%
	Total	17,599	2,414	15,185	6,682	8,503	100.0%

Note: UPA = Urbanization Potential Area

Source: JICA Study Team based on the data of flood hazard geo-data (2017) of LiDAR Portal

4.2.2 Land Demand Analysis

(1) Methodology

- **Condition of the preliminary future population:** The preliminary future population is set out by two possible cases of lower growth case (Annual Average Growth Ratio: AAGR 1.86% as the current policy of Cotabato City) and higher growth case (2.93% as potential growth) with mid-term target 2028 and 2040 as a long-term frame. Two cases apply to the land demand estimation based on a density set taking account of the existing density of the city referring to the Philippines standards or norms. Regarding the distribution of the total population framework into barangays, it is also set by temporal figures for distribution taking account of existing distribution by Barangays (2015). The final densities will be set by the land use plan in the next stage.
- **Density standards:** Population density is one of the fundamental factors to examine and set out a future population in consideration with an appropriate living environment and sustainable settlement formulation. Although no close-fitting standards are defining gradual density (low-mid-high) in urban planning of the Philippines, several standards for housing projects of authorities of the government can be referred to, of which the standards, in general, indicate very high-density standards in comparison with the developed countries.

- **Compatible density standards:** The most familiar density term in general planning is used by “gross density” as people per area (a square kilometer or hectare) estimated by a total population and an administrative area. However, “semi-gross density” as a compatible term with the density standards in the Philippines is required for this examination, of which density is estimated by narrowing down to urban areas excluding conditional areas such as water bodies, natural environment as unsuitable lands for settlement. Semi-gross density is applied only to this examination to identify issues of land supply capacities.
- **UPA-I treated as a critical area for estimation:** UPA-I with existing urban settlement including candidate areas for future expansion will be the key supply-side areas addressing future population demands. This analysis considers critically the land supply capacity in consideration with a smaller amount of areas, of which land areas are estimated by GIS rather than the official land areas at the barangay level. Although it is observed that there are gaps between the official administrative areas and GIS estimations (15,086 ha), the total administrative area (17,599 ha) is managed by controlled total focusing on rural area barangays or large barangays.

Table 4.2-4 Referable Standards by Authorities in the Philippines for Semi-gross Population Density

Semi-gross (A)		Net-density (C)		Semi-gross (B)			Typical Newtown Density (Japan)	
Density Type for Social Housing (IRR-RB220)		CLUP Residential Density (example)		NHA Site Planning Guide Max Pop (NHA-MC-2015)			Pop Density / ha	
Lot-unit / ha	Max Pop	Type	Pop/ha	Housing	Lot /ha	Max Pop	Semi	Net
a < 150	Under 660	Low	Under 150	1 story	150	660	Large	Large
151 < a < 160	704	Medium	151 - 250	2 story	192	845	300	650
151 < a < 175	770	High	Over 250	3 story	252	1,109	Small	Small
151 < a < 200	880			4 story	336	1,478	60	250
151 < a < 225	990			5 story	420	1,848		
225 < a	Over 990							

Note: Number of persons is assumed by an average household (4.4 persons as Philippines average) per a lot/unit.

Source: Each regulative document (A, B, C) by the authorities of A: Housing and Land Use Regulation Board (HLURB) (Implementing Rules and Regulations for BP 220, C: National Housing Authority (NHA-MC-2015-0015 Guidelines for Site Selection, Site Suitability and Site Planning of NHA Housing Development Projects) and only reference by because of just samples in the document of HLURB CLUP Guidebook Volume 2. Densities in Japan based on URA data

(2) Existing Density Condition

- Existing semi-gross densities by settlement areas of UPA-I, UPA-II, UPA-III, and others in urban and rural barangays are identified by the population in 2015 of the census of population (PSA) and built-up area by the geo-data (open-source map) updated by the satellite imagery of 2015 data (google earth).
- The average density of the whole built-up areas is 314 people per hectare (p/ha), while UPAs indicates the highest average density (775 p/ha, UPA-III in urban barangay) and the lowest (104 p/ha by Others in rural barangays). The maximum density is shown by 931 p/ha in UPA-III in rural barangay while the minimum density is 64 p/ha in Others in rural barangay and the median value of density is indicated by 244 p/ha in urban barangays and 250 p/ha as a whole.

Table 4.2-5 Existing Population Density by Built-up Areas (2015)

Type of Barangay	Settlement Area	Administration Area (ha)	Existing Built-up Area (ha)	Existing Population 2015	Existing Semi-gross Density Indices (Barangay Base) (person/ha)			
					Average	Maximum	Median	Minimum
Urban Barangay	UPA-I	2,738	1,152	263,391	287	739	239	91
	UPA-II	515	7	3,789	--	559	--	559
	UPA-III	1,072	21	3,690	245	316	--	174
	Others	4,913	79	16,736	293	559	238	135
	sub-total	9,237	1,259	287,606	292	739	244	91
Rural Barangay	UPA-I	149	3	1,769	--	619	--	619
	UPA-II	0	0	0	--	--	--	--
	UPA-III	512	7	5,145	775	931	--	619
	Others	7,701	44	4,918	104	145	--	64
	sub-total	8,363	54	11,832	475	931	619	64
Total	UPA-I	2,887	1,155	265,160	297	739	244	91
	UPA-II	515	7	3,789	--	559	--	559
	UPA-III	1,584	28	8,835	510	931	467	174
	Others	12,613	123	21,654	241	559	145	64
	Total	17,599	1,313	299,438	314	931	250	64

Note: UPA = Urbanization Potential Area

Source: JICA Study Team based on open-source geo-data updated by Google Earth and 2015 Census of Population (PSA)

(3) Preliminary Population Growth by Two Growth Cases (AAGR: 1.86% and 2.93%)

- Based on the two growth cases by Annual Average Growth Ratio (AAGR 1.86% and 2.93%, the preliminary population growth for the target year 2028 and long-term population 2040 are set out by the settlement areas as shown in Table 4.2-6.
- The majority of the population (over 80%) is distributed into the area of UPA-I in every phase from 2015 to 2040 followed by the existing distribution trend.
- The future population by AAGR 1.86% is estimated as 380,500 in 2028 and 474,700 in 2040, while AAGR 2.39% gives 435,700 in 2028 and 615,900 in 2040.

Table 4.2-6 Preliminary Population by Two Growth Cases (AAGR: 1.86% and 2.93%) in 2028 and 2040

Type of Barangay	Settlement Area	Population in 2015		Population in 2028		Population in 2040	
		Population	Share	Population	Share	Population	Share
AAGR (1.86%)	UPA-I	265,160	88.6%	336,943	88.6%	420,359	88.6%
	UPA-II	3,789	1.3%	4,815	1.3%	6,007	1.3%
	UPA-III	8,835	3.0%	11,226	3.0%	14,006	3.0%
	Others	21,654	7.2%	27,516	7.2%	34,328	7.2%
	sub-total	299,438	100.0%	380,500	100.0%	474,700	100.0%
AAGR (2.93%)	UPA-I	265,160	88.6%	385,824	88.6%	545,396	88.6%
	UPA-II	3,789	1.3%	5,513	1.3%	7,794	1.3%
	UPA-III	8,835	3.0%	12,855	3.0%	18,172	3.0%
	Others	21,654	7.2%	31,508	7.2%	44,539	7.2%
	sub-total	299,438	100.0%	435,700	100.0%	615,900	100.0%

Note: UPA = Urbanization Potential Area

Source: JICA Study Team

4.2.3 Demand and Supply Assessment

This assessment aims at examining conditions of future land demand and land capacity (supply) by the inhabitable lands to validate the further population framework. Therefore, the purpose of this examination is not to validate population distributions into areas of the city. The examination proceeds under the following including several hypothetical conditions

(1) Assessment of Demand and Supply Gaps in Each Case (Case-1, Case-2, and Case-3)

- In Case-1 without dikes and dike roads based on both demands for future population growth (AAGR: 1.86% and 2.93%), the land supply is apparently insufficient in 2040 as a whole capacity, although the land demand by both population growth cases (380,500 by 1.86% and 435,700 by 2.93%) in 2028 could be secured by the total land supply. As a result, the total land capacity of UPAs and Other areas without dikes would not be capable to absorb the total future population demand of 2040 even if the lower growth (1.86%) case as shown in Table 4.2-7. Otherwise high-density settlement (e.g. over 340 p/ha as average) is required for UPAs to accommodate the future population as this assumption applies the density by 240 p/ha to land supply condition.
- Case-2 with dikes and dike roads for PUA-I could solve the insufficient land capacity against the future population demand both in 2028 and 2040 as a whole capacity as shown in Table 4.2-7 (AAGR-1.86%) and Table 4.2-8 (AAGR-2.93%).

Table 4.2-7 Demand and Supply Assessment in All Cases by AAGR 1.86%

Options by Case	Settlement Area	Inhabitable Land (ha) (A)	Urban Land Use Occupancy (%)	Urban Land Use Area (ha)	Population Capacity by Applied Average Density (240p/ha)	A balance between Preliminary Population Growth (1.86%)	
						2028	2040
Case-1 without dikes and dike roads	UPA-I	1,692	100.0%	1,692	406,042	69,100	-14,317
	UPA-II	310	2.0%	6	1,487	-3,327	-4,519
	UPA-III	648	4.3%	28	6,723	-4,503	-7,282
	Others	4,165	3.2%	134	32,197	4,681	-2,131
	sub-total	6,814	27.3%	1,860	446,450	65,950	-28,250
Case-2 with dikes and dike roads for UPA-I	UPA-I	2,565	100.0%	2,565	615,499	278,556	195,139
	UPA-II	310	2.0%	6	1,487	-3,327	-4,519
	UPA-III	648	4.3%	28	6,723	-4,503	-7,282
	Others	4,165	3.2%	134	32,197	4,681	-2,131
	sub-total	7,687	35.6%	2,733	655,906	275,406	181,206
Case-3 with dikes and dike roads for all UPAs	UPA-I	2,565	100.0%	2,565	359,041	22,098	-61,319
	UPA-II	425	50.0%	212	29,719	24,904	23,712
	UPA-III	1,349	50.0%	674	94,413	83,186	80,407
	Others	4,165	3.2%	134	18,782	-8,734	-15,547
	Total	8,503	42.2%	3,585	501,954	121,454	27,254

Note: UPA = Urbanization Potential Area

Source: JICA Study Team

Table 4.2-8 Demand and Supply Assessment in All Cases by AAGR 2.93%

Options by Case	Inhabitable Land (ha) (A)	Urban Land Use Occupancy (%)	Urban Land Use Area (ha)	Population Capacity by Applied Average Density (240p/ha)	A balance between Preliminary Population Growth (1.86%)	
					2028	2040
Case-1 without dikes and dike roads	6,814	27.3%	1,860	446,450	10,750	-169,450
Case-2 with dikes and dike roads for UPA-I	7,687	35.6%	2,733	655,906	220,206	40,006
Case-3 with dikes and dike roads for all UPAs	8,503	42.2%	3,585	645,369	209,669	29,469

Note: UPA = Urbanization Potential Area

Source: JICA Study Team

(2) Implication of Assessment

- The assessment results by these examinations imply that only PUA-1 in Case 2 could accommodate the population demand (both growth 1.86% and 2.93%) by the certain level of population density (240 p/ha) in 2028 and 2040, where flood control project with dikes and are inevitable to secure a safe settlement from flood risks. However, issues of appropriate population distribution and density formulation would remain to be resolved, especially in rural barangays settlement where there are flood risks without dikes and dike roads.
- In every case (1.2. and 3), imbalance distribution between surplus (sufficient capacity) and deficit (oversupply capacity) in each settlement becomes evident due to simple population projection following the current distribution pattern. Coping with these inappropriate distributions, higher density to absorb more population in each settlement would be required, as the settlement distributions in rural barangays are necessary to formulate appropriate scale with flood risks, agriculture development, and environmental conservation.
- Therefore, the distribution of the preliminary population growth with appropriate density for settlements, and relevant land uses of residential, agricultural land, and the natural environmental area should be scrutinized in the further detailed land use planning for the city.

(3) Development Considerations with Dikes and Dike Roads Network for PUA and SUA

- **Inhabitable Land with Condition of Acceptable Water Depth (0.5m):** The water depth of inundation or flood by past flood events indicates its importance as a direct indicator for the degree of flood risks in general. The water depth of 0.5 m has been observed as a turning point toward difficult conditions of evacuation easiness, considerable building damage, and less asset damage. On the other hand, the countermeasures to eliminate flood and inundation conditions would require huge investment costs. Complete relocation of settlements located in a frequently flooded is also a difficult option. Therefore, inundation or flood water depth by 0.5 m is a criterion for the maximum allowable depth taking into account inhabitable lands under the condition that mitigation measures for flood and inundation are made.

- **Necessary Drainage System Improvement for Flood Mitigation in UPAs:** As the lands in UPAs are a pre-condition of Case-2 and 3 with dikes and dike roads, safe land from flood risks should be secured by certain measures including reclamation or drainage system improvement or provision of retention areas for river water, as the inhabitable areas include acceptable inundation areas (0.1 m to 0.5 m potential flood depth) and difficult areas with considerable flood water depth over 0.5 m. Table 4.2-9 suggests requirement areas for improvement by appropriate measures.

Table 4.2-9 Area to be Improved Coping with Acceptable Inundation Areas in Habitable Area in PUA and SUA

Type of Barangay	Settlement Area	Total Developable Land (ha) (A)	0.0 m depth Area Secured from Flood Risk	Area to be Improved		Share of Areas by Water Depth to be Improved		
				0.1-0.5m	Over 0.5m	0.0m	0.1-0.5m	Over 0.5m
Urban Barangay	UPA-I	2,445	544	1,087	814	22%	44%	33%
	UPA-II	425	106	204	115	25%	48%	27%
	UPA-III	985	205	225	556	21%	23%	56%
	sub-total	3,854	855	1,515	1,485	22%	39%	39%
Rural Barangay	UPA-I	120	31	30	59	26%	25%	49%
	UPA-II	0	0	0	0	0	0	0
	UPA-III	364	97	122	145	27%	33%	40%
	sub-total	483	128	152	204	26%	31%	42%
Total	UPA-I	2,565	575	1,117	873	22%	44%	34%
	UPA-II	425	106	204	115	25%	48%	27%
	UPA-III	1,349	301	346	701	22%	26%	52%
	Total	4,338	983	1,667	1,689	23%	38%	39%

Note: UPA = Urbanization Potential Area

Source: JICA Study Team

- **Mitigation measures against flood risks for settlements outside of dike roads:** Unless settlements outside of the dike road for UPAs are relocated into inhabitable areas without flood risks, the settlements would face particular concern for the flood. Some measures by both of structure and non-structure such as building design control by compulsory multi-story building, evacuation training and measures and early warning for flood, etc.

CHAPTER 5

PRESENT CONDITION OF VARIOUS URBAN INFRASTRUCTURE

5.1 Transport Infrastructure and Services

5.1.1 Road Network

The total length of the road network of the city is about 217 km in 2016 of which 12% is classified as national road hence under the administration of the DPWH (Table 5.1-1). The remaining road is classified under city road and barangay road and therefore under the administration of the City Government of Cotabato. Comparing the length of road in 2009 and 2016 revealed that in the span of seven (7) years, the city road network grew by 27 km. or an average of 3.9 km./year.

Table 5.1-1 Road Classification, Type, and Length (2016)

Pavement type	Length (km)			Total Length per Type
	National Road	City Road	Barangay Road	
Concrete	17.29	119.51	8.76	145.56
Gravel	-	37.90	24.45	62.35
Asphalt	8.66	0.00	0.00	8.66
Total Length (km)	25.95	157.41	33.20	216.57

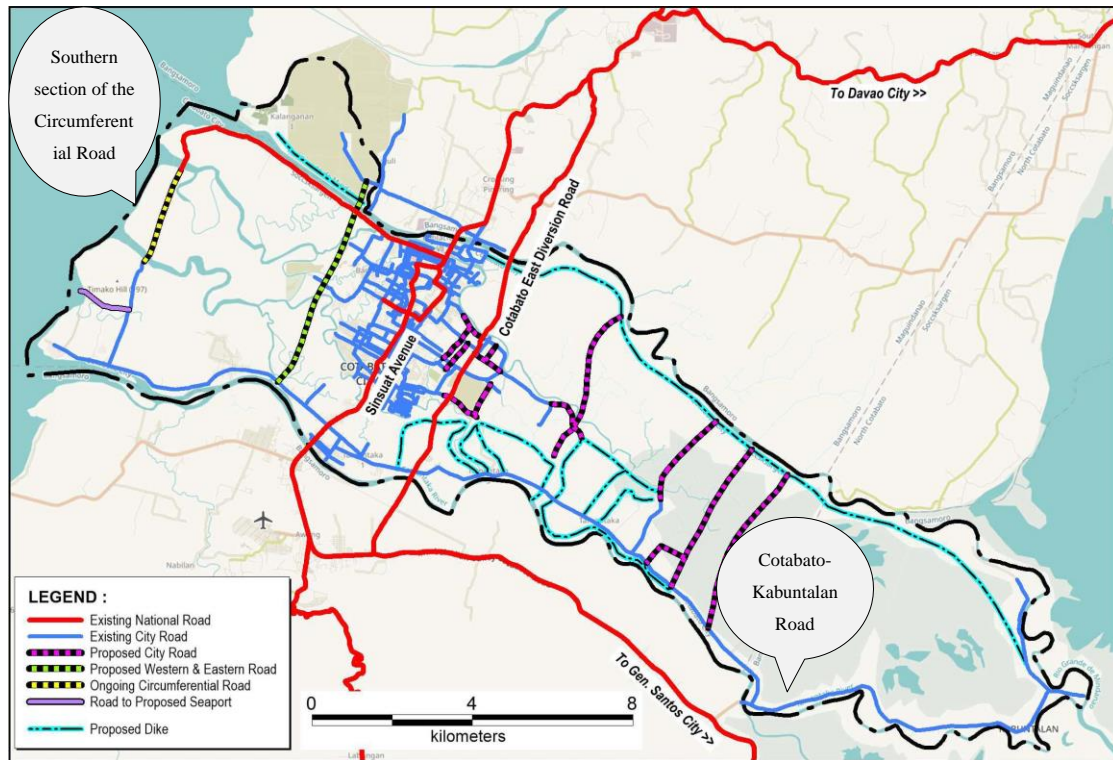
Source: Comprehensive Land Use Plan of Cotabato City (2011-2020)

Originally, the road network is concentrated at the old historic core of the city where the City Plaza and the old City Hall are located (Figure 5.1-2). From these two old facilities, three parallel roads (Jose Lim Sr. St., Don Rufino Alonzo St., and S.K. Pendatun St.) run west to east until these roads meet another historic facility, the Mega Market (formerly Super Market). The shift of the city development to the south along Sinsuat Avenue in the last 10 years or so intensified development of new roads in this area. However, the lack of road network masterplan is evident by the lack of shape of the network and absence of visible functional road hierarchy (e.g. local road, collector/distributor road, arterial road) resulting to a road network with limited function to distribute vehicular traffic. Hence, the Sinsuat Avenue, a national road, continues to serve as the main corridor for north-south traffic due to the lack of parallel arterial roads (high capacity road) running north to south.

Once completed, the on-going Cotabato City East Diversion Road (CCEDR) has potential to absorb some of the traffic volumes from the Sinsuat Avenue, provided that connector roads between these two parallel arterial roads are developed. Although all the bridges of CCEDR have already been constructed, the access road is still gravel-surfaced, hence only limited traffic is currently observed. Completion of this new arterial road will have significant impact on the spatial development of the city. This means that the land area of the city within the influence of the CCEDR which was previously inaccessible will experience rapid development due to this new accessibility provided by the said arterial road. Newly constructed houses along the alignment of CCEDR have been observed at this early.

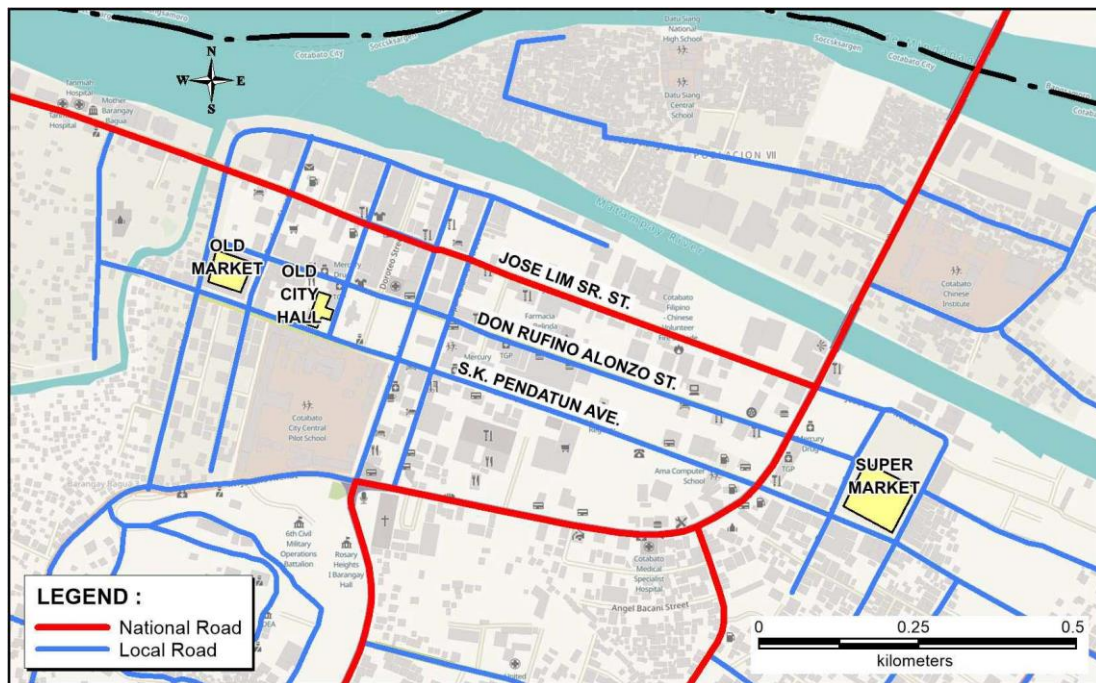
Similarly, there are also two other newly completed roads with significant implication on the spatial development of the city. These roads are (i) the Cotabato-Kabuntalan Road and (ii) the southern section of the Western Circumferential Road. The former penetrates the depth of Liguasan Marsh on the eastern side of the city and the latter runs until the western coast of the city. The construction work is on-going to complete the western circumferential road by linking it to the existing road on the norther part of the city. Both roads are now attracting development as shown by newly constructed houses, schools, mosques and other buildings. Despite the above notable progress on the road sector, it is evident that the eastern side of Cotabato city (and Greater Cotabato to large extend) still needs more new roads to reduce the large area without road access (Figure 5.1-3).

Outside of Cotabato City, there are two notable large areas without the supply of roads: (a) eastern side of Cotabato City leading to the eleven (11) barangays which newly joined the BARMM during the February 2019 plebiscite and (b) the coastal side between the city and Polloc Port. Both these wide areas need development of new roads for various reasons. On one hand, construction of new roads on the eastern part of Cotabato City will trigger agricultural development as well as remove the missing infrastructure facility that hamper the communities to access various services in Cotabato City. As seen in Figure 5.1-3, the communities on the upper stream of Rio Grande de Mindanao River lacked road access hence relying to the less-reliable mode of transport (water transport). On the other hand, construction of new roads at the coastal areas of Cotabato City leading to Polloc Port is needed to strengthen the link between the primary port and the city. Similarly, the said vast area between Polloc Port and Cotabato City is a productive land which produces aquaculture from its farming water (fishponds) and rice/palay from its vast rice paddy.



Source: Prepared by the JICA Study Team based on the CLUP, 2011-2020

Figure 5.1-1 Road Network of Cotabato City



Source: Prepared by the JICA Study Team

Figure 5.1-2 Road Network of the “Old Historic Core” of Cotabato City

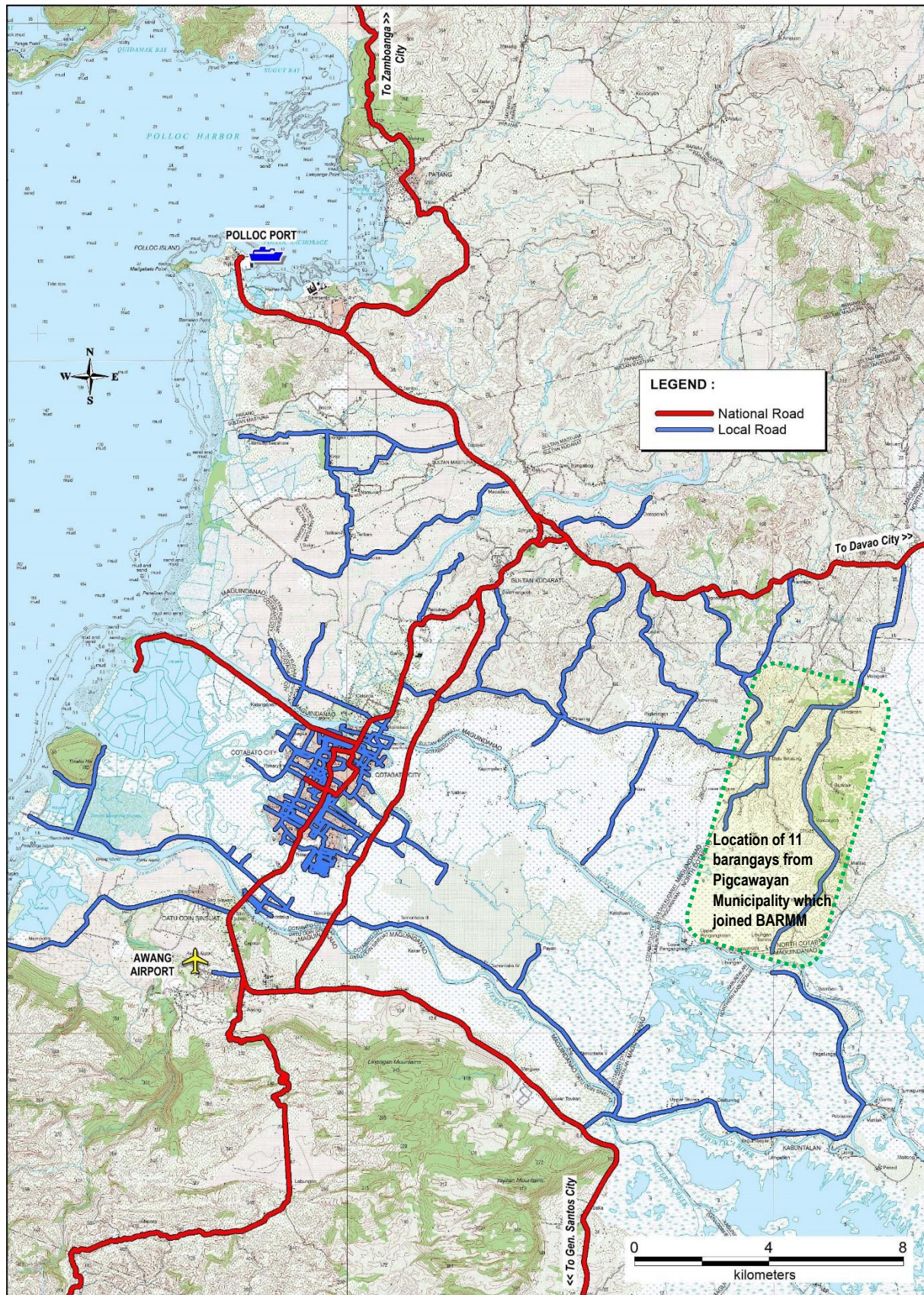


Figure 5.1-3 Current Road Network of Greater Cotabato

5.1.2 Road and Drainage Condition

(1) Road Condition

Evaluation Criteria

The DPWH-National has established a system of rating road surface condition of the national road (although not included national road inside BARMM) through Visual Road Condition Assessment (RoCond). This is a very detailed assessment of road condition (e.g. size of pothole and length of pavement crack is measured) involving several teams covering the entire national road network. To have data consistency, each DPWH Regional Office (RO) and District Engineering Office (DEO) have dedicated a RoCond surveyor team who underwent training. RoCond data gathered are transmitted to DPWH-Planning Service in DPWH Central Office in Manila. Processed data are then transmitted back to RO for checking/validation and this process continues until the data is deemed credible. The processed data is the basis for programming and scheduling of road rehabilitation. As seen in the above, the process involved for the DPWH RoCond is difficult to be adopted for this study.

Instead, a simplified evaluation method for road surface condition (Table 5.1-2) which was used in another JICA-assisted project (2018 Preparatory Survey for Urgent rehabilitation of Damaged Trans-central Roads by the Conflict in Marawi City) was adopted. This evaluation criteria which was arrived upon discussion with the DPWH at that time was then discussed with the TWG members of the City Government of Cotabato. Upon their agreement, the simplified evaluation method is then adopted and used by the surveyors to classify road condition either in good, fair, bad, very bad condition.

Table 5.1-2 Road Condition Evaluation Criteria

Road Condition	Photo Index	Descriptions
Good		No visible longitudinal or transverse cracks; concrete surface is still intact; no course aggregates are popping out; at least with a two-lane carriageway.
Fair		Appearance of occasional transverse cracks but no noticeable depression along these cracks; presence of few and small potholes from popped-out course aggregates; concrete surface is still generally intact; at least with a two-lane carriageway.
Bad		With longitudinal cracks; presence of numerous potholes caused by popped-out course aggregates; concrete surface starts to peel-off and gradually exposing course aggregates.
Very Bad		Presence of numerous longitudinal and transverse cracks; with noticeable depression along these cracks and/or between lane joints; with substantial presence of potholes; concrete surface has significantly peeled-off, thus, exposing course aggregates.

Source: Urgent Rehabilitation of Damaged Trans-central Roads by the Conflict in Marawi City, DPWH-JICA, 2017

Result of the Road Condition Survey

A road surface condition survey was conducted in June 2020 covering the 101.13 km backbone network of Cotabato City and the national roads connecting the city to the neighboring municipalities. Results of the survey are summarized in the table below and depicted in the two succeeding figures. The findings of the survey are as follows:

- 5.8% (5.9 km) of the surveyed road network is in very bad condition and 15.3% (15.5 km) in bad condition which means immediate intervention is needed.
- 12.3% (12.2) of the surveyed roads have a gravel/earth surface of which 8.1 km is classified as national road. The involved national road is section of the East Diversion Road.

Table 5.1-3 Result of Road Surface Condition Survey

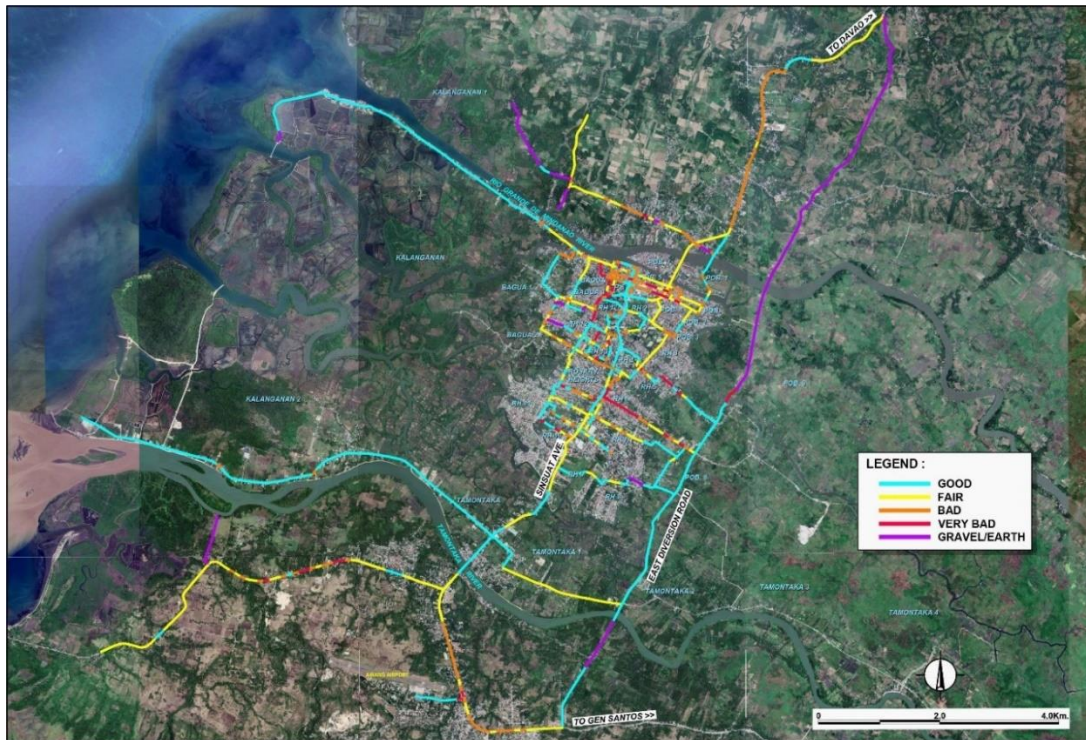
Road Classification	Sub-Total (km)	Road Condition (Concrete)				Gravel
		Good	Fair	Bad	Very Bad	
National Road	40.7	15.7	10.8	5.6	0.4	8.1
Cotabato City (City Road)	45.9	21.4	11.2	7.8	4.8	1
Sultan Kudarat (Local Road)	6.1	0.2	2.4	1.2	0.1	2.3
Datu Odin Sinsuat (Local Road)	8.4	1.3	4.7	0.9	0.6	0.9
Total	101.1	38.7	29.1	15.5	5.9	12.3
	Percentage	38.2%	28.8%	15.3%	5.8%	12.2%

Source: JICA Study Team



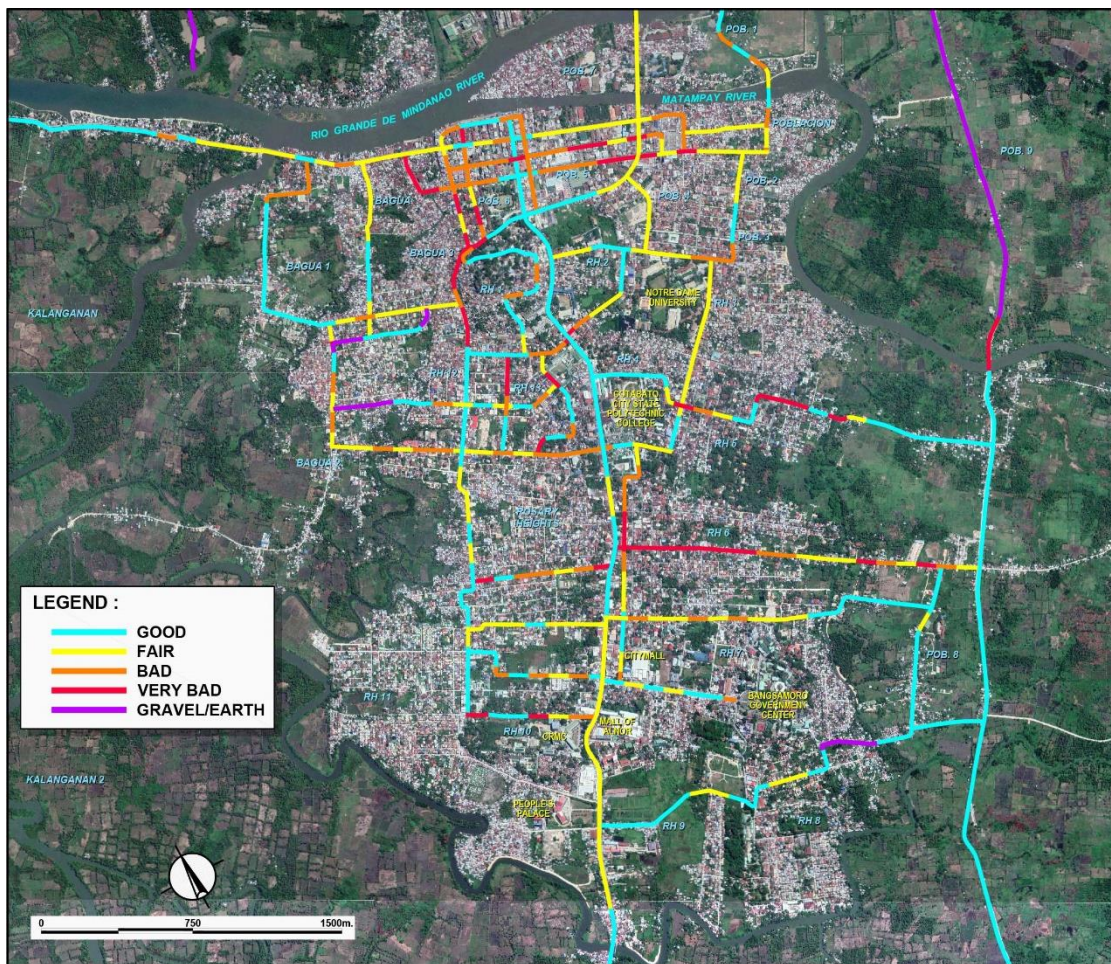
Top left: Don Rufino Alonso St. (Magallanes St.); top right: Oblate Drive St.;
Bottom left: RL Sebastian St.; Bottom right: Pansacala St.

Figure 5.1-4 Example of Roads in Very Bad Condition in Cotabato City



Source: JICA Study Team; Note: Very bad section of East Diverion Road means road surface is still gravel

Figure 5.1-5 Road Surface Condition of Greater Cotabato’s Road Network



Source: JICA Study Team; Note: Very bad section of East Diverion Road means road surface is still gravel

Figure 5.1-6 Road Surface Condition of Cotabato City’s Road Network

(2) Drainage Condition

The condition of the drainage along the 101.13 km of road was also surveyed. Result of the survey reveals that 44% (44.5 km) of the road network lacked drainage system. And of the 56.64km existing drainage, 7.6 km are not functioning (water is not flowing) as illustrated in the figure below. Most of these drainages with stagnant water are located in the following roads:

- Salipada K. Pendatun St. on the side of the supermarket (Barangay Poblacion Mother)
- Don Rufino Alonso St. (Magallanes St.) and Jose Lim Sr. St. in Barangay Poblacion 5
- Bonifacio St., Salipada K. Pendatun St., Sinsuat Avenue and other roads in the proximity of the Old Market (Barangay Poblacion 6)
- Other roads with non-functional drainage includes: Datu Mampen Road, Sousa Avenue, Don Teodoro V. Juliano Avenue, Pastor Kimpo Sr. St. (Barangay Bagua 2 side), Kalanganan Mother Barangay Road and other roads as depicted in Figure 5.1-7.



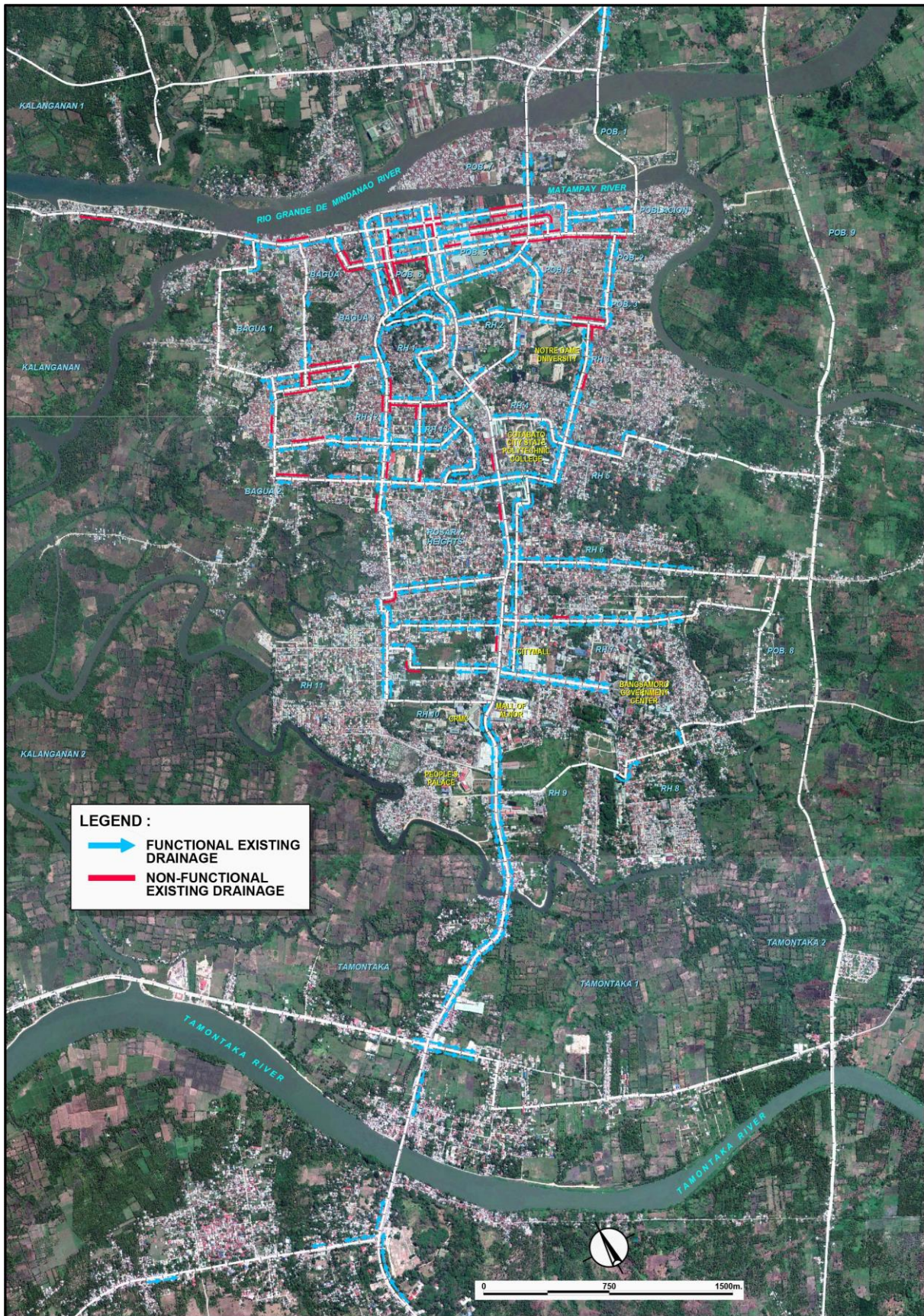
Top photos (Manday – S.K. Pendatun St.); Bottom photos (Roales Street - Soledad Sousa)

Figure 5.1-7 Photos of Non-functional drainage in Cotabato City

Sheet No. of the: 1/3 R32		Road No./ID: ROAD NO. 32					
Inspection Date: 07.05.2020		CITY/MUNICIPALITY: COTABATO CITY					
Inspected by:		PROVINCE NAME: COTABATO CITY					
Checked by:		District Engineering Office: <input type="checkbox"/> National Road <input type="checkbox"/> Provincial Road <input type="checkbox"/> City Road <input type="checkbox"/> Other, specify					
ROAD NAME: MANDAY-SK PENDATUN AVENUE		Baranggay Name					
PROVINCE NAME: COTABATO CITY		MOTHER BARANGGAY BAGUJA					
District Engineering Office:		BARANGGAY POBLACION 6					
Land Use							
Side Ditch (type)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
With or without	C (FILLED) WW/ SOIL	C	C	C	C	C	C
Size (m)	N=9.00m/Y=9.100m(NF) 1.00W/0.80H	Y=2120m/N=78.80m 1.00W/0.80H	Y=89.10m/N=10.90m 0.95W/0.80H	Y=24.90m/N=75.10m 1.00W/0.80H 1.20W/0.80H	Y=88.10m/N=75.10m 1.00W/0.80H 1.20W/0.80H	Y=91.50m/N=8.50m 1.10W/0.70H	Y=86.10m/N=8.9.00m 0.50W/0.07H 0.90W/0.15H
Water flow direction	↓	↓	↓	↓	↓	↓	↓
Discharge location	STAGNANT	STAGNANT	STAGNANT	STAGNANT	STAGNANT	STAGNANT	STAGNANT
Shoulder width, type	0+100	0+200	0+300	0+400	0+500	0+600	0+700
Pavement	0+000	0+200	0+300	0+400	0+500	0+600	0+700
Width Type	RCBC	RCBC	RCBC	RCBC	RCBC	RCBC	RCBC
Defects	↑	↑	↑	↑	↑	↑	↑
Shoulder width, type							
Side Ditch (type)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
With or without	C (FILLED) WW/ SOIL	C	C	C	C	C	C
Size (m)	Y (NF) 1.00W/0.80H	Y 0.90W/0.80H	Y 1.00W/0.80H	Y 1.00W/0.80H	Y 1.00W/0.70H	Y 1.10W/0.70H	Y 1.10W/0.80H
Water flow direction	↓	↓	↓	↓	↓	↓	↓
Discharge location	TO RIVER	TO RIVER	TO RIVER	TO RIVER	TO RIVER	TO RIVER	TO RIVER

NOTE: Station (0+12.80 to 0+24.90) - No Left Ditch/Drainage Station (0+49.30 to 0+48.40) - No Right Ditch/Drainage
 Station (0+64.30 to 0+66.20) - No Left Ditch/Drainage Station (0+66.30 to 0+67.20) - No Right Ditch/Drainage
 Station (0+76.00 to 0+719.90) - No Left Ditch/Drainage Station (0+76.00 to 0+87.20) - No Right Ditch/Drainage

Figure 5.1-8 Example of Details of Drainage Condition Survey Result

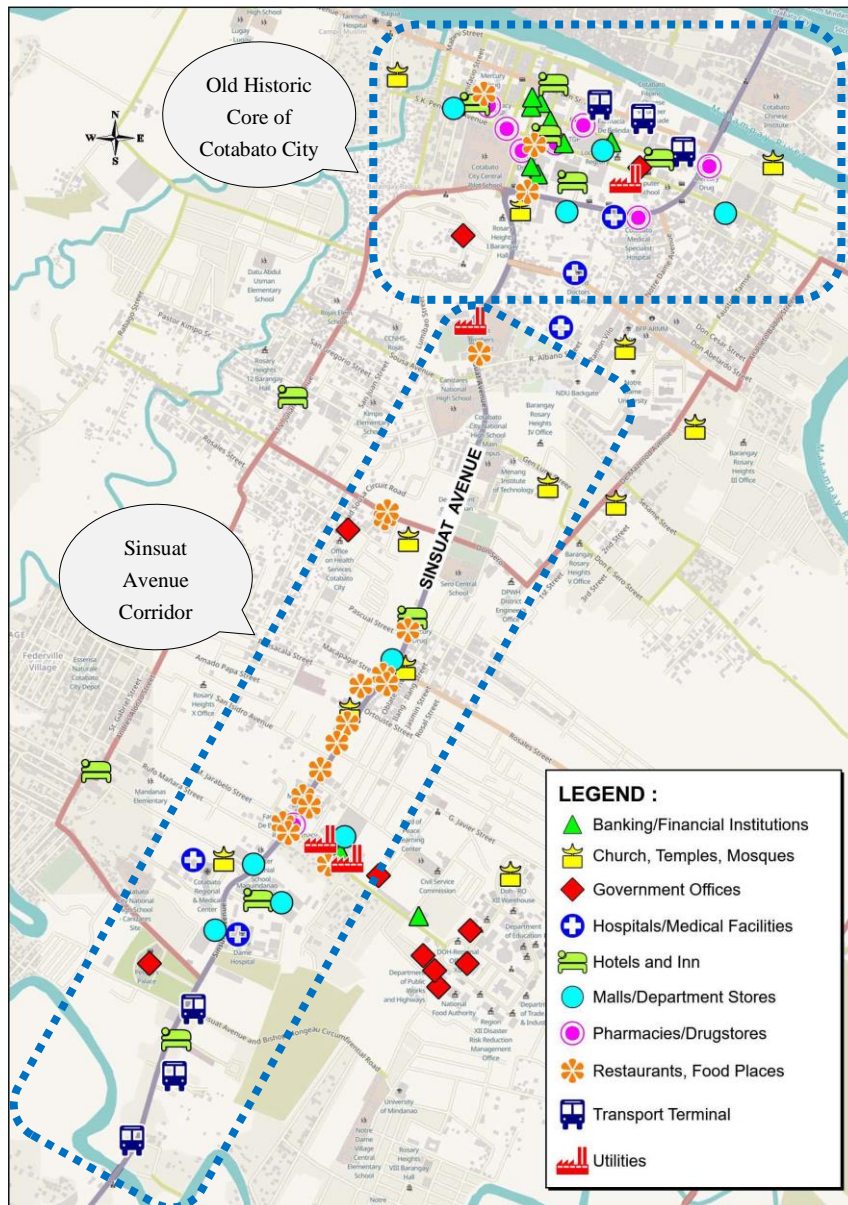


Source: JICA Study Team

Figure 5.1-9 Drainage Condition of Cotabato City's Road Network

5.1.3 Location of Major Traffic Attractors/Generators (Facilities)

In Cotabato City, the following facilities are observed to attract and generate huge traffic which creates serious congestion: schools, government offices, shopping malls, public transport terminals, restaurants/shops among others. By plotting the said facilities in the map (Figure 5.1-10), it was observed that most of them are concentrated in two areas: (i) at the old historic core of the city and (ii) at along the Sinsuat Avenue. Both areas are experiencing serious traffic congestion especially during morning and afternoon rush hours.



Source: Prepared by the JICA Study Team

Figure 5.1-10 Location of Major Traffic Attractors/Generators

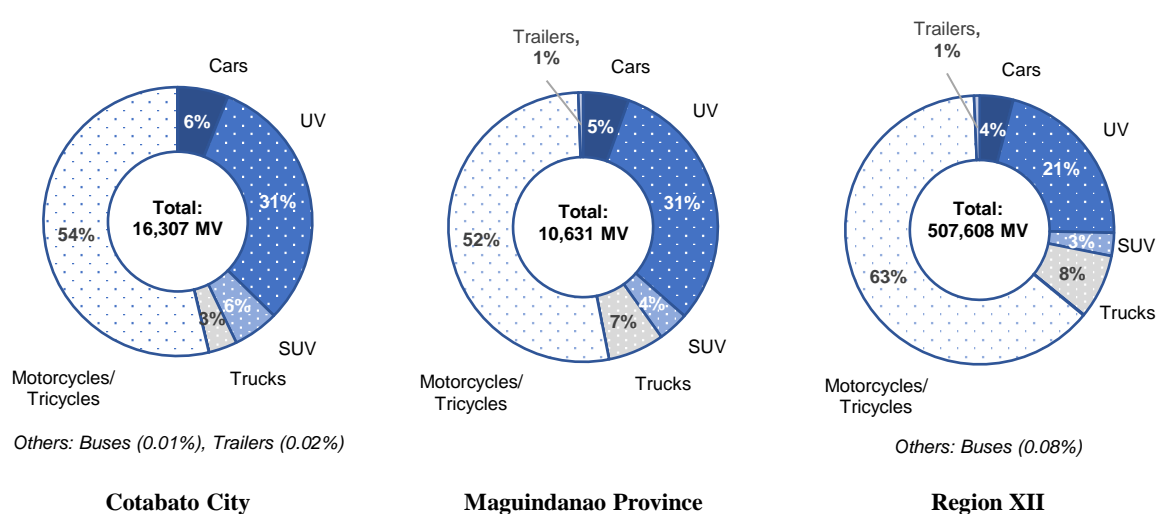
5.1.4 Public Transport Services and Routes

(1) Registered Motor Vehicles

The number of registered motor vehicles in Cotabato City reached 16,307 in 2019, according to the records of the Land Transportation Office (LTO). This comprised 3.2% of the total number of

vehicles in Region XII. Vehicle registration in Cotabato City nearly doubled since 2009 (8,743 vehicles) and grew at an average annual rate of 6.4% (2009-2019). Growth is primarily driven by the significant increase in the number of motorcycles and tricycles at around 10% per annum. In 2019, motorcycles and tricycles comprised the largest share at 54%, followed by utility vehicles (31%), and cars (6%).

Maguindanao, whose district office is located at the municipal hall of Parang, recorded a total of 10,631 motor vehicles in 2019. Similarly, more than half (52%) of the registered vehicles in Maguindanao in 2019 were motorcycles and tricycles. Vehicle registration increased at a rapid annual rate of 17.9% (2009-2019) and represented a fivefold increase from the recorded figure in 2009 (2,053 vehicles).



Source: Land Transportation Office

Figure 5.1-11 Percent composition of motor vehicles in Cotabato City, Maguindanao, and Region XII, by type (2019)

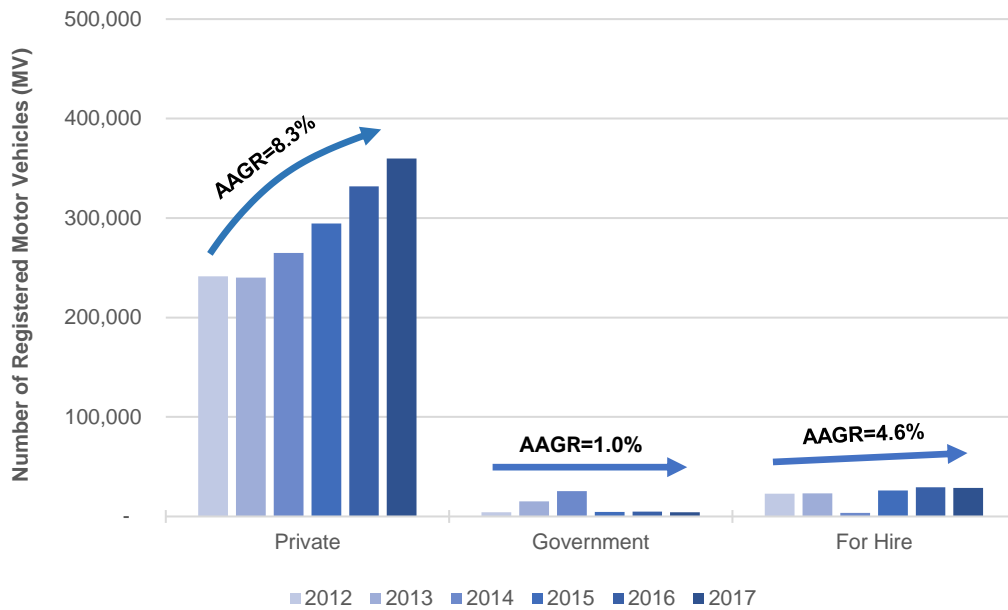
Table 5.1-4 Number of registered motor vehicles in Cotabato City, Maguindanao, and Region XII, by type (2019)

Type of Motor Vehicle	Number of Registered Motor Vehicles			Average Annual Growth Rate (2009-2019)		
	Cotabato City	Maguindanao	Region XII	Cotabato City	Maguindanao	Region XII
Cars	989	584	20,447	(1.7%)	20.7%	7.5%
Utility Vehicles (UV)	5,099	3,291	108,195	5.0%	17.5%	10.2%
Sport Utility Vehicles (SUV)	897	393	14,073	7.8%	25.7%	13.4%
Trucks	561	719	39,406	1.1%	10.8%	8.6%
Buses	2	-	394	0.0%	0.0%	(0.5%)
Motorcycles/Tricycles	8,756	5,583	321,654	9.6%	18.8%	9.0%
Trailers	3	61	3,439	(5.0%)	19.8%	6.6%
Total	16,307	10,631	507,608	6.4%	17.9%	9.2%

Source: Land Transportation Office

The LTO regional office, in adherence to the Land Transportation and Traffic Code, further classifies vehicles as: ‘private’, ‘government’, and ‘for hire’. Public Utility Vehicles, such as jeepneys and tricycles are classified under ‘for hire’.

Private vehicles comprised 92% of all registered vehicles in Region XII in 2017. In general, private vehicles recorded faster growth rates compared to public or ‘for hire’ vehicles, as shown in Figure 5.1-12 below.



Source: Land Transportation Office

Figure 5.1-12 Number of registered motor vehicles in Region XII, by classification (2012-2017)

(2) Public Transport Services within the City

For over 40 years, the backbone of public transportation in Cotabato City has always been the jeepneys which are classified as Public Utility Vehicles (PUV) and tricycles. According to the Business and Licensing Department of the City Government of Cotabato, there are currently 1,325 PUVs and 571 tricycles operating in Cotabato City.

While the long stretch of Sinsuat Avenue is primary served by jeepneys, the old historic core of the city is served by tricycles. In recent years however and due to expansion of the city, new demand for public transportation services has emerged. This newly created demand is filled by various informal transportation modes such as trisikad (pedicabs), habal-habal (single motorcycle-for-hire), and payong-payong (single motorcycle with detachable side car and umbrella as roofing). A few years back, taxi service was introduced in the city by one company but its number of taxi units in operation remains limited.



Town-ace is gradually outnumbering Jeepneys



Taxi services provided by Al Nor Group



Tricycle



Payong-payong

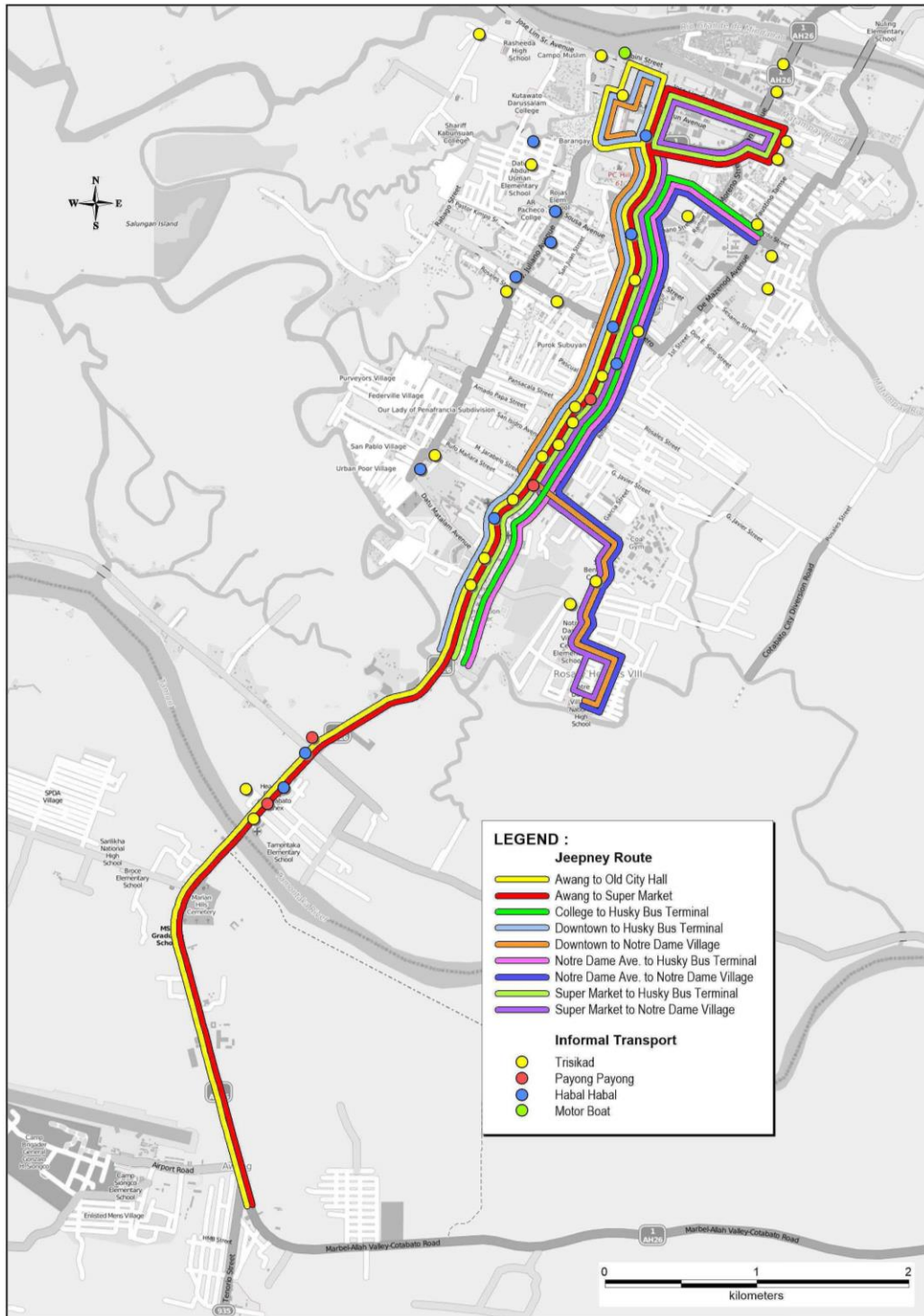


Trisikad (bicycle with side car to carry passengers)



Habal-habal (single motorcycle used for public transport)

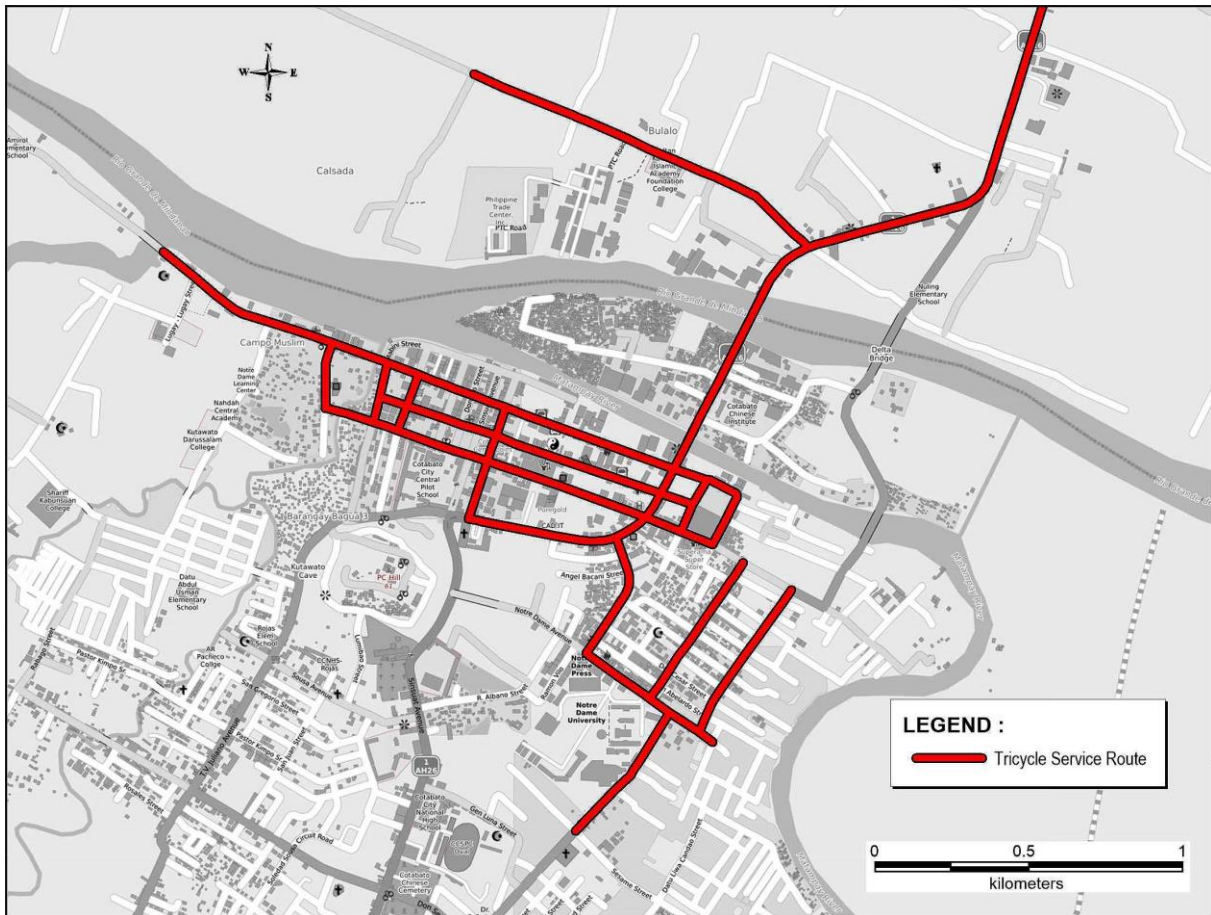
Figure 5.1-13 Photos of Public Transport Modes in Cotabato City



Note: About 1,325 PUVs serving this network

Source: Prepared by the JICA Study Team

Figure 5.1-14 Jeepney Routes and Terminal Locations of Informal Transport



Note: About 571 tricycles serving this network
 Source: Prepared by the JICA Study Team

Figure 5.1-15 Tricycle Services Routes concentrated at the Old Historic Core

(3) Public Transport Services from Cotabato City to other Cities and Municipalities

In general, barangays closer to Cotabato City but under the jurisdiction of the neighboring towns are served by tricycles. As the distance from Cotabato City increases, the transport mode shifted to faster type of vehicles with high capacity such as jeepneys, vans and other public utility vehicles. Commuters moving from Cotabato City to other major cities in Mindanao like Davao City, General Santos City and major cities between them are served by large buses and vans. The exception is Zamboanga City and Pagadian City where only vans operate. The poor road alignment is not suitable for large buses. Similarly, other destinations where road condition is poor is served by single motorcycle locally known as “habal-habal” such as commuters to Matuber, Pinansaran and Nalkan in the municipality of Datu Blah Sinsuat. The two tables (Table 5.1-5 and Table 5.1-6) below present the details of various routes and the type of transport mode servicing them.

Table 5.1-5 Inter-city Public Transport (From Cotabato City to Northern Towns)

Terminal name/location in Cotabato City	Destination	Route name	Transport Mode
1. Super Market	Brg. Gang, Sultan Kudarat Municipality	Super-Gang	Tricycle
2. Super Market	Simuay, Sultan Kudarat Municipality	Cotabato-Simuay	Jeepney
3. Mindanao Star terminal	Davao City	Cotabato-Davao (usually with stops at Midsayap, Kabacan, Kidapawan, and Digos City)	Bus
4. A2Z or Kutoco terminals at Jose Lim Street	Marawi City	Cotabato-Marawi	Van and other PUVs
5. A2Z or Kutoco terminals at Jose Lim Street	Pagadian City	Cotabato-Pagadian	Van
6. A2Z or Kutoco terminal at Jose Lim Street	Balabagan, Lanao Del Sur	Cotabato-Balabagan	Van
7. A2Z or Kutoco terminal at Jose Lim Street	Malabang, Lanao Del Sur	Cotabato-Malabang	Van
8. A2Z or Kutoco terminal at Jose Lim Street	Parang, Maguindanao	Cotabato-Parang	Van and Jeepney
9. A2Z or Kutoco terminal at Jose Lim Street	Zamboanga City	Cotabato-Zamboanga	Van
10. A2Z or Kutoco terminal at Jose Lim Street	Iligan City	Cotabato-Iligan	Van
11. A2Z or Kutoco terminal at Jose Lim Street	Midsayap North Cotabato	Cotabato-Midsayap	Van
12. A2Z or Kutoco terminal at Jose Lim Street	Kidapawan City	Cotabato-Kidapawan	Van
13. A2Z or Kutoco terminal at Jose Lim Street	Kabacan North Cotabato	Cotabato-Kabacan	Van
14. A2Z or Kutoco terminal at Jose Lim Street	Davao City	Cotabato-Davao	Van

Table 5.1-6 Inter-city Public Transport (From Cotabato City to Southern Towns)

Terminal name/location in Cotabato City	Destination	Route name	Transport Mode
1. Across Husky terminal	Koronadal City	Cotabato-Koronadal	Van
2. Husky terminal	Gen. Santos City	Cotabato-Gen. Santos	Bus
3. Crossing Awang	Upi	Cotabato-Crossing Awang; Crossing Awang - Upi	Jeepney/van
4. Sema Terminal	Lebak/Kalamansig municipalities of Sultan Kudarat Province	Cotabato – Lebak/Kalamansig	Van (but from Lebak to Kalamansig, mode is motorcycle and Jeepney)
5. Crossing Broce/SPDA	Crossing SPDA to Tapian, Matuber, Pemasaran, Nalkan	Cotabato-Datu Blah Sinsuat	Motorcycle/ Tricycle
6. Alnor Terminal	Lebak	Cotabato-Lebak	Van
7. Alnor Terminal and Unregistered Terminal in Front of Husky Bus Terminal	Koronadal - Gen. Santos City	Cotabato- Gen. Santos	Van
8. Co Toing Bon in front of Lamsan Trading Corp. at Sinsuat Ave. (Not Registered Public Terminal)	Datu Odin Sinsuat (also known by its old name Dalican and Dinaig)	Cotabato-Datu Odin Sinsuat	Jeepney (Townace) /Van

Terminal name/location in Cotabato City	Destination	Route name	Transport Mode
9. Co Teiong Bon front of Lamsan Trading Corp. at Sinsuat Ave. (Not Registered Public Terminal); Alnor Terminal	Isulan, Sultan Kudarat	Cotabato-Isulan	Jeepney (Townace) / Van
10. Co Teiong Bon front of Lamsan Trading Corp. at Sinsuat Ave. (Not Registered Public Terminal) Alnor Terminal	Tacurong, Sultan Kudarat	Cotabato-Tacurong	Jeepney (Townace)/ Van
11. Co Teiong Bon front of Lamsan Trading Corp. at Sinsuat Ave. (Not Registered Public Terminal)	Maganoy (now known as Sharriff Aguak)	Cotabato-Maganoy (Shariff Aguak)	Jeepney (Townace) /Van
12. Co Teiong Bon front of Lamsan Trading Corp. at Sinsuat Ave. (Not Registered Public Terminal)	Datu Piang, Maguindanao (Dulawan)	Cotabato-Datu Piang (Dulawan)	Jeepney (Townace)/Van



Husky Bus Terminal (Cotabato City – General Santos City)



A2Z Van Terminal (Cotabato City – Davao City)

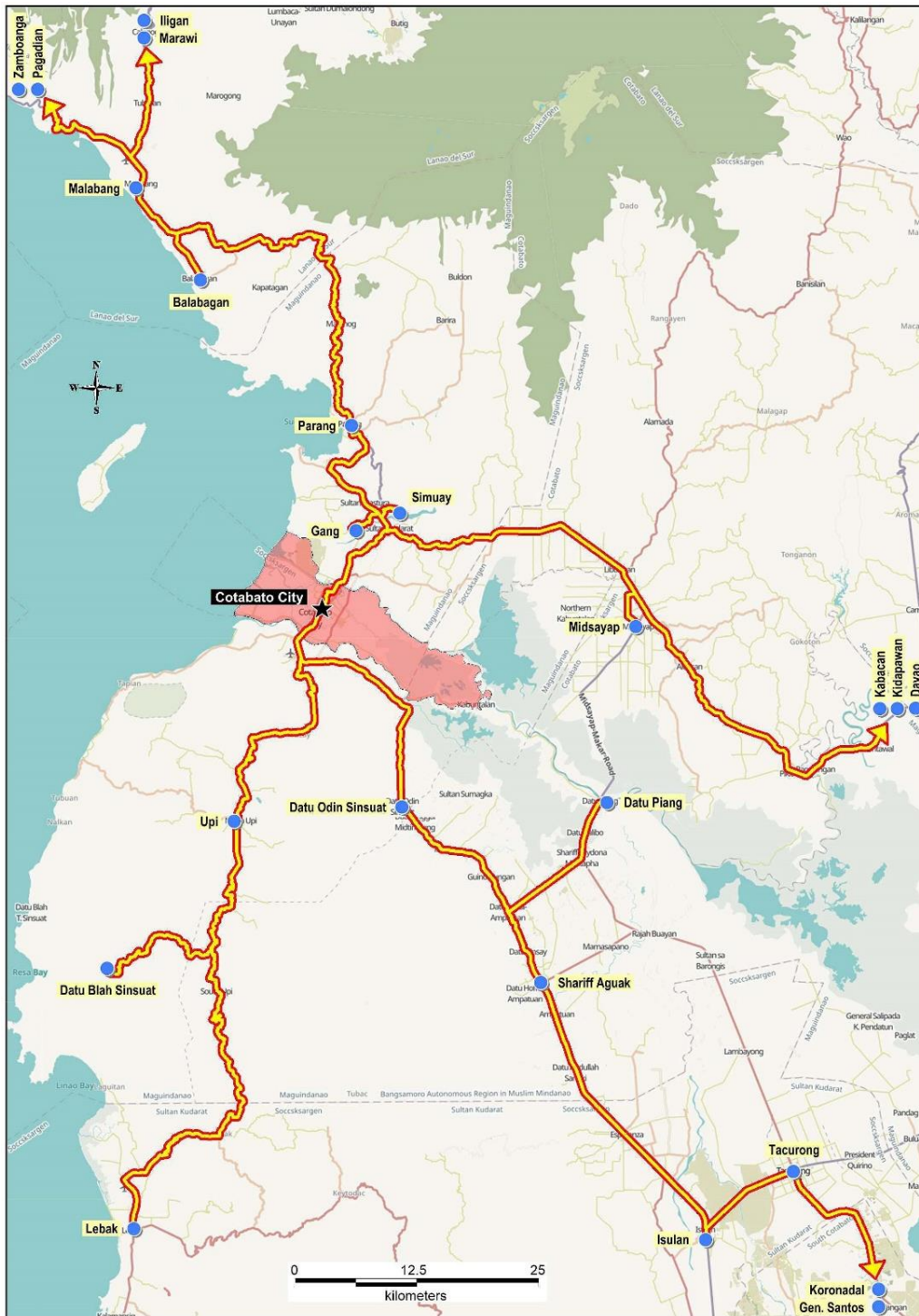


Al Nor Terminal (Cotabato-,Lebak-Kalamasig)



A2Z Terminal (Cotabato City – Marawi City)

Figure 5.1-16 Photos of Various Public Transport Terminals (Inter-city Routes)



Source: Prepared by the JICA Study Team

Figure 5.1-17 Inter-city Public Transport Routes between Cotabato City and Other Towns

(4) Number of Service Operators

The table below shows the number of vehicles utilizing each public transport terminals. In total, there are 425 public utility vehicles (PUV) with franchise from the LTRFB serving the inter-city routes. As seen in Figure 5.1-4 and Figure 5.1-5, basically, the public transportations follow four (4) major routes originating from Cotabato City. In terms of distribution, the following were observed:

- Cotabato City – Marawi/Pagadian/Zamboanga Route (42% of the 425 PUVs are plying this route)
- Cotabato City – Davao City Route (this route has the highest number of PUVs with 43%)
- Cotabato City – Gen. Santos City Route (13% or 57 PUVS are serving this route)
- Cotabato City – Lebak Corridor (the remaining 2% or equivalent to 9 PUVs)

From the above, it can be deduced that Cotabato City-Davao City route appears to be the most active route. These can be due to two reasons: (i) population of cities and municipalities along this route is high compared with the other routes and (ii) Davao City has a stronger pull due to availability of many services which people from Cotabato City are trying to avail. The surprise here is the high number of vehicles plying the Cotabato City- Marawi/Pagadian/ Zamboanga route over the Cotabato City – Gen. Santos City route. In the past, the impression is the stronger connection between Cotabato City and Gen. Santos City over the Marawi/ Pagadian/ Zamboanga City route.

Table 5.1-7 Number of Inter-city Public Transport Operators

Terminal Name	Route	No. of Vehicle	Estimated Trips/day	
			Departure	Arrival
A to Z Transport Terminal	Parang	30	28	25
	Midsayap	40	10	10
	Kabacan			
	Kidapawan			
	Davao	40	12	12
Kutoco Transport Terminal	Midsayap	50	22	22
	Kabacan		5	10
	Kidapawan		5	10
	Davao		5	10
Mindanao Star Transport Terminal	Midsayap	52	50	50
	Kabacan			
	Kidapawan			
	Davao			
COLIDO Transport Terminal	Balabagan	17	11	15
	Malabang	25	20	22
	Zamboanga	15	4	7
	Marawi	30	25	22
	Iligan	20	3	5
	Pagadian	40	10	15
Husky Transport Terminal	Shariff Aguak	39	23	23
	Tacurong			
	Koronadal			
	General Santos			
Al Nor Terminal (Resurrection Transport Terminal)	Dalican (DOS)	7	7	7
	Tacurong	8	8	8
	General Santos	3	2	2
	Lebak & Kalamansig	5	3	3
Sema Transport Terminal (Fronting City Hall)	Lebak	4	4	3
	Kalamansig			

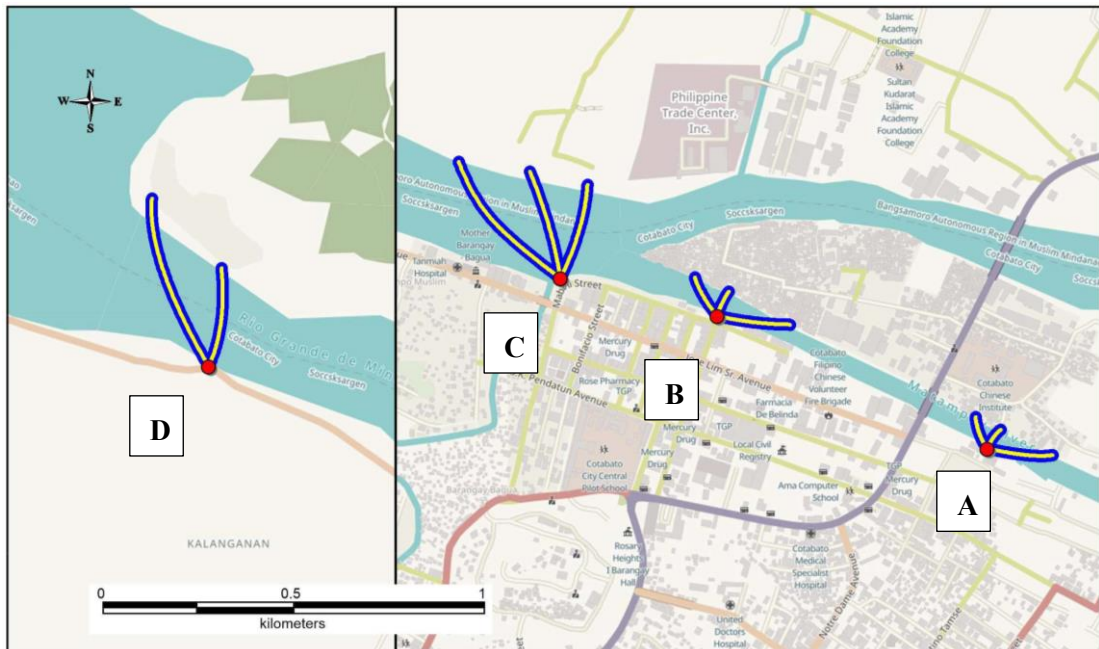
Source: Business and Licensing Department of the City Hall, City Government of Cotabato

(5) Water Transport

Cotabato City is bounded by two large rivers – Rio Grande de Mindanao on the north and Tamontaka river on the south – and fronting the Illana Bay on the west, hence it is natural that water transport has had played a key role in people’s mobility and cargo movement. Water transport in the city can be classified into two: intra-city water transport (city routes) and inter-city water transport (between cities).

Intra-city routes (Cotabato City Routes)

Intra-city water transport is servicing the communities living along the riverbanks of Matampay river and Rio Grande de Mindanao. These houses are built within the river channel hence road access is not available. There are at least four landing boats as indicated in Figure 5.1-18. Close to 200 boats are serving these terminals of which Terminal B (Yusingko-Tukananes) has the highest number of operating boats at 120 units.



Source: Prepared by the JICA Study Team

Figure 5.1-18 City Routes of Water Transport



Manual boat (A)



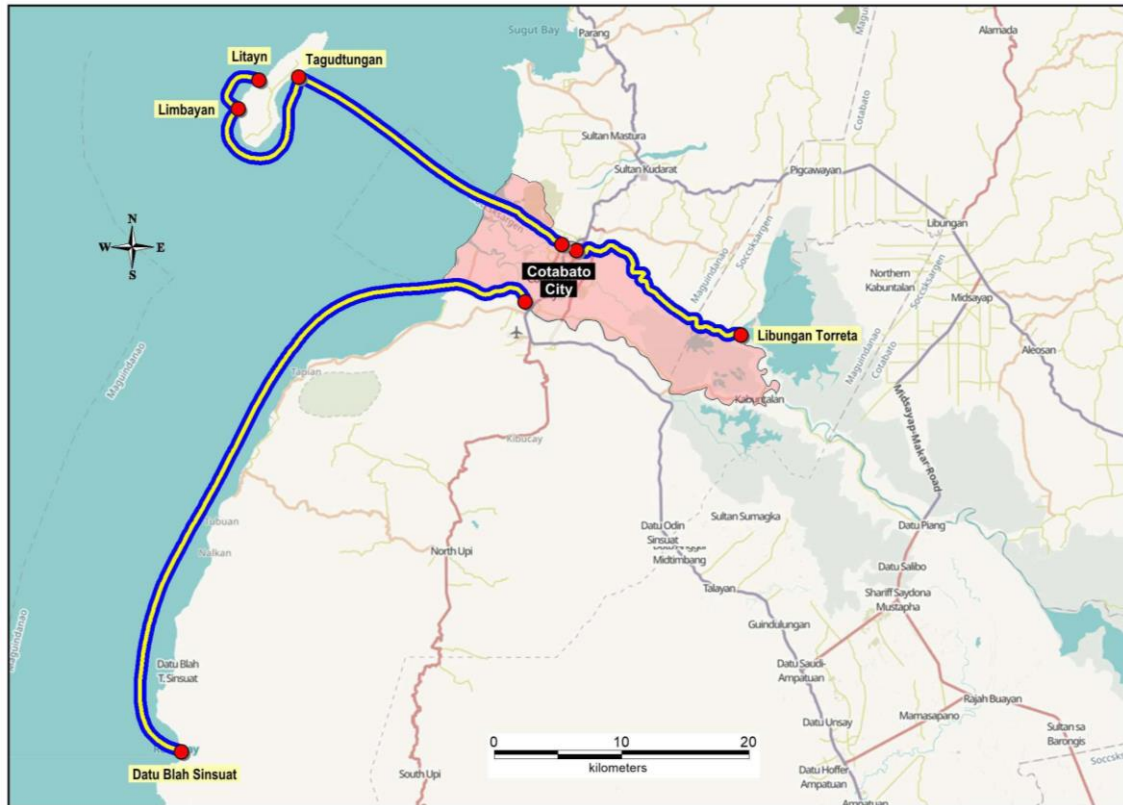
Manual boat (C)

Figure 5.1-19 Photos of Water Transport for City Routes

Inter-city routes (Cotabato City to neighboring towns)

Inter-city water transport on the other hand is traditionally the main transport mode between Cotabato City and its neighboring towns. Rio Grande de Mindanao and Tamontaka rivers serve as main transport corridors between Cotabato City and the communities inside the Liguasan Marsh. Similarly, Illana Bay connects the city to the towns along the coast as far as Zamboanga City, Pagadian City, Balabagan, Lebak and Kalamansig. Expansion of the road network however diminished the regional role of water transport. For instance, currently there are only two (2) remaining active routes through the Illana Bay which are the Cotabato City-Bongo island route and Cotabato City- Datu Blah Sinsuat route. And once the JICA-assisted road project (Tapián – Lebak Coastal Road) is completed, the latter route will surely cease to exist as well. The water transport route to Liguasan Marsh however continued to thrive and this is largely due to the absence of road network which could penetrate the depth of the marsh (Figure 5.1-20).

Per data from the Business and Licensing Department of the City Government of Cotabato, in terms of number of boats in a route, the Cotabato City- Libungan Torreta route has the highest number of registered boats (250 boats). It is estimated however, that only less than 100 boats operate daily serving about 500 passengers visiting Cotabato City. The way this route is operated is unique. For example, there are nine landing stations in between. And each landing station is maintaining a number of boats as follows: to Bolibod (25 boats), to Ungap (25 boats), to Pusao (30 boats), to Raguisi (27 boats), to Pinaring (30 boats), to Maidapa (20 boats), to Kapimpilan (25 boats), to Migkibo (25 boats), to Bagoinged (23 boats) and to Libungan Torreta (20 boats). The total number of boats operating in these ten (10) routes is 120 boats. The other two routes (i. Cotabato City-Tagudtungan, Bongo Island and ii. Cotabato City- Datu Blah Sinsuat) have a smaller number of boats operating which is just about three (3) to five (5) boats at most.



Source: Prepared by the JICA Study Team

Figure 5.1-20 Inter-city Routes of Water Transport



Figure 5.1-21 Photos of Water Transport for Inter-city Routes (Motorized Boats for Libungan Torreta/Liguasan Marsh- about 120 boats are operating this route)



Figure 5.1-22 Photo of the Terminal Building of Water Transport for Inter-city Routes

5.1.5 Road Traffic Management and Enforcement

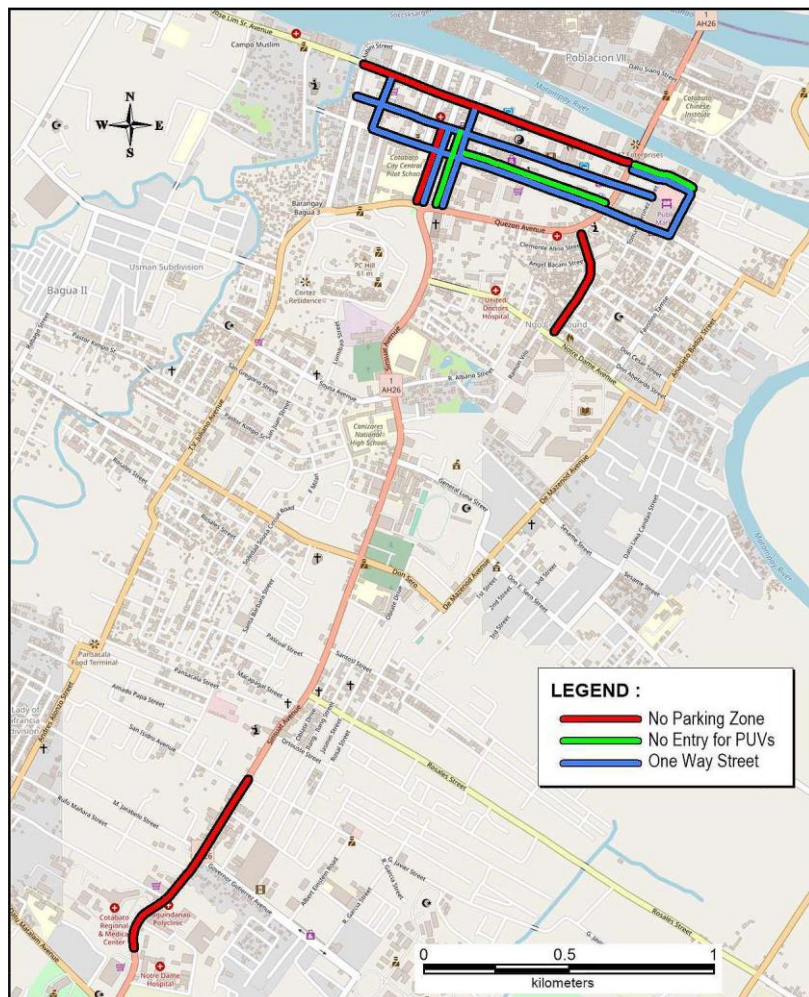
Traffic enforcers may come from Traffic Management Unit (TMU) of Cotabato City, Land Transportation Office (LTO), Land Transportation Franchising and Regulatory Board (LTFRB) and the Philippine National Police (PNP). They have the authority to apprehend and to issue citation tickets to erring drivers subject to their vested authority. For example, ordinances passed by the City Council such as violation of one-way traffic and parking control may enforce by the TMU. Operating a PUV in a particular route without franchise issued by LTFRB to the owner will lead to a penalty from the LTFRB. Driving a vehicle without valid registration or the driver has no valid driver's license will lead as well for penalty from the LTO. Traffic accident on the other hand will involve the police.

Traffic light to control flow of traffic is not yet installed on the streets of Cotabato City. Hence, the city government employs some of the basic tools in traffic management such as access and parking control.

These basic traffic management tools applied by the city is briefly discussed below:

- One-way traffic – Don Rufino Alonzo St. is a major street located at the old historic core where one-way traffic scheme is applied. Most of the roads in the old historic core of the city such as Makakua St., Bonifacio St. among others are designated by the City Government of Cotabato as one-way traffic.
- Parking Control - the whole stretch of Sinsuat Avenue which is a national road has been declared prohibited area for vehicle parking beginning March 2020.

- Traffic Police - during rush hours in the morning, noon and afternoon, traffic police are visible directing traffic flow and assisting school children crossing the roads at different strategic locations.
- Traffic Management Unit (TMU) – the City Government of Cotabato established as well the TMU to aid traffic flow in some of the most congested sections of the road network and to enforce vehicle parking control.
- Designation of terminals for informal transport modes – in collaboration with the Barangay officials, shoulders of some local roads are designated as terminal to avoid encroaching the road’s carriageway.



Source: Prepared by the JICA Study Team based on the Revised Traffic Code of Cotabato City (2016)

Figure 5.1-23 Traffic Regulated Streets in Cotabato City

5.1.6 Traffic Volume

A 12-hour traffic count survey was carried out, from 6 AM to 6 PM, at each of the forty (40) stations across the Greater Cotabato Area. The survey was done manually, with surveyors positioned at the side of the road while recording the number of vehicles, per direction, per vehicle type (12 types of vehicles based on DPWH classification). The locations of the traffic count survey stations are shown in Figure 5.1-24 and Figure 5.1-25.

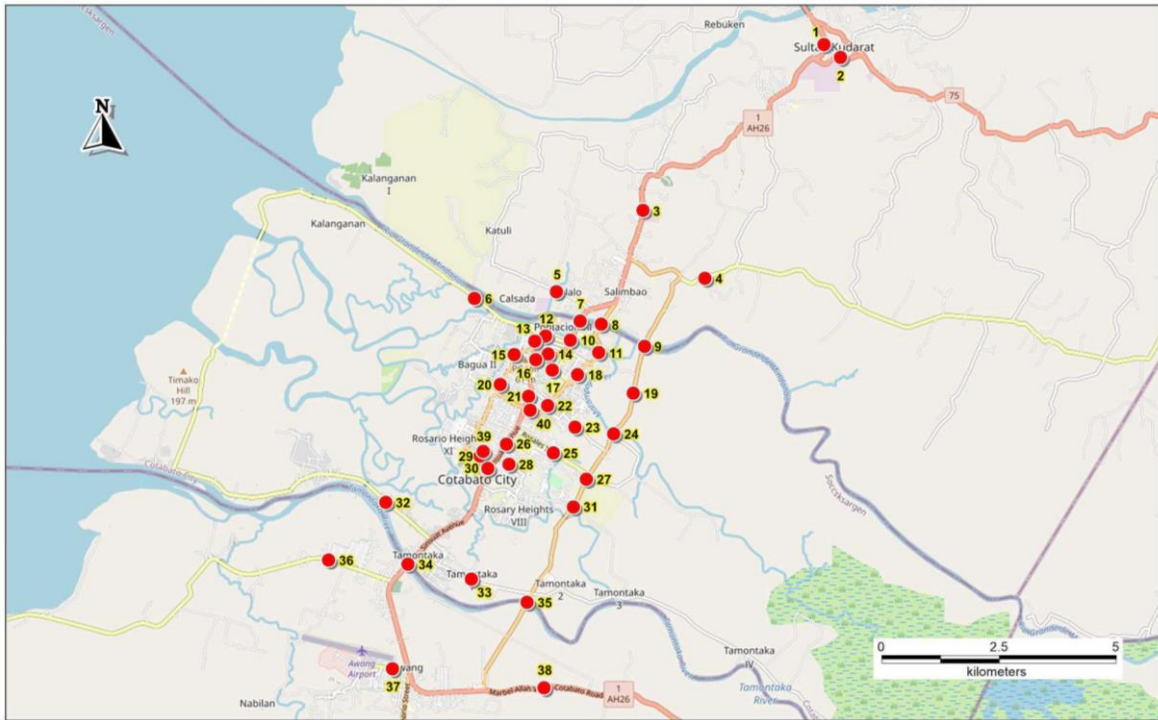


Figure 5.1-24 Location of Traffic Count Stations (Cotabato City and Surrounding Areas)

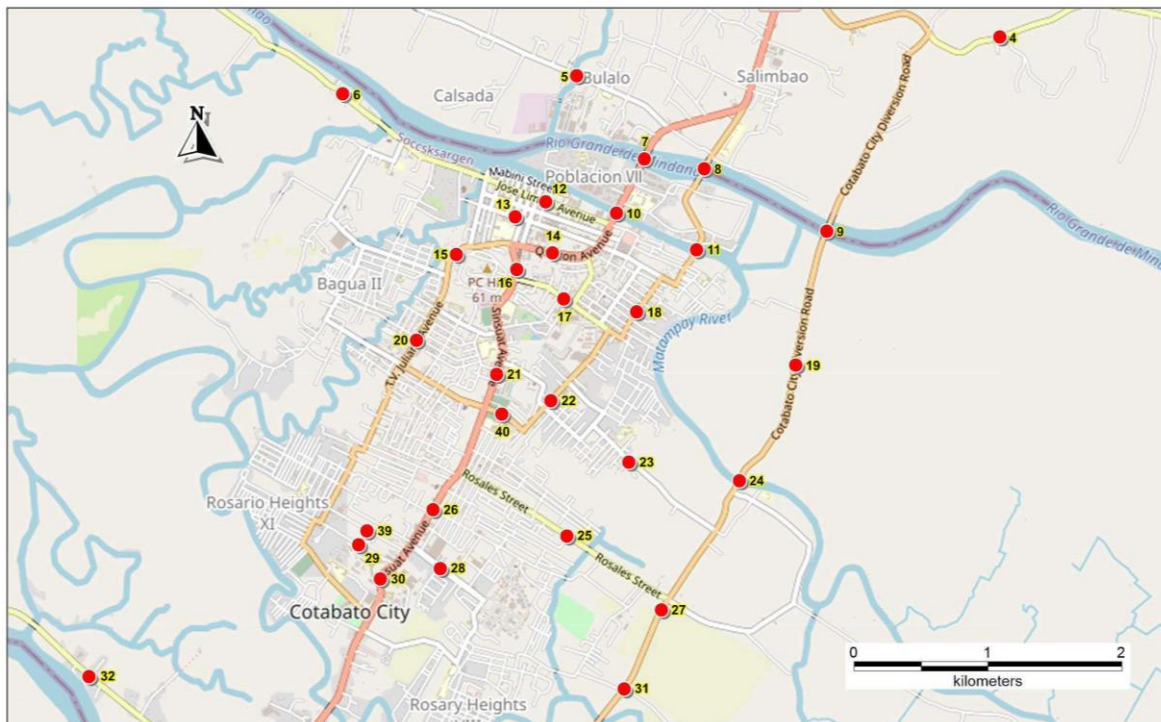


Figure 5.1-25 Location of Traffic Count Stations (within Cotabato City)

The results of the 12-hr. traffic count survey are visualized in Figure 5.1-26 and Figure 5.1-27. Further analysis of the survey results is available in Annex A: Transportation Surveys.

The following are the key observations:

Traffic Volume

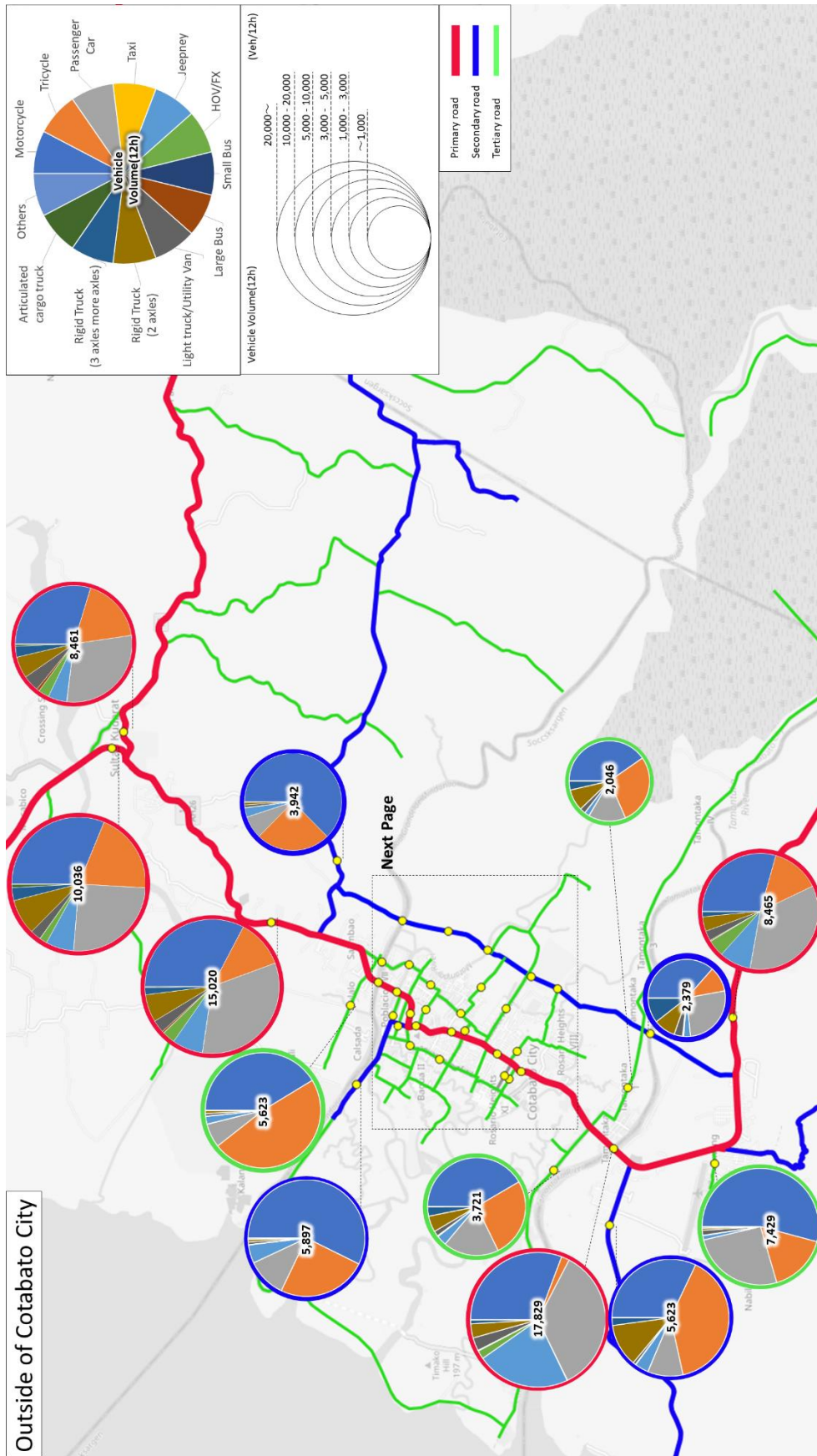
- The trend followed the hierarchy of Philippine national roads, where greater traffic volume was generally observed along primary roads (Sinsuat Ave., Quezon Ave., and adjacent corridors) over secondary and tertiary roads.
- Traffic count along the Pan-Philippine Highway suggested that traffic volume gradually decreases outwards from Cotabato City to surrounding municipalities.
- Within Cotabato City, traffic was heavily concentrated along the Sinsuat Ave. corridor and Old Historic Core, where major facilities are located (as previously discussed). In particular, there was significant traffic volume within the vicinity of Gov. Gutierrez Ave., mainly due to the presence of major shopping malls (CityMall and Robinson's) and other commercial establishments and institutions.

Modal Share

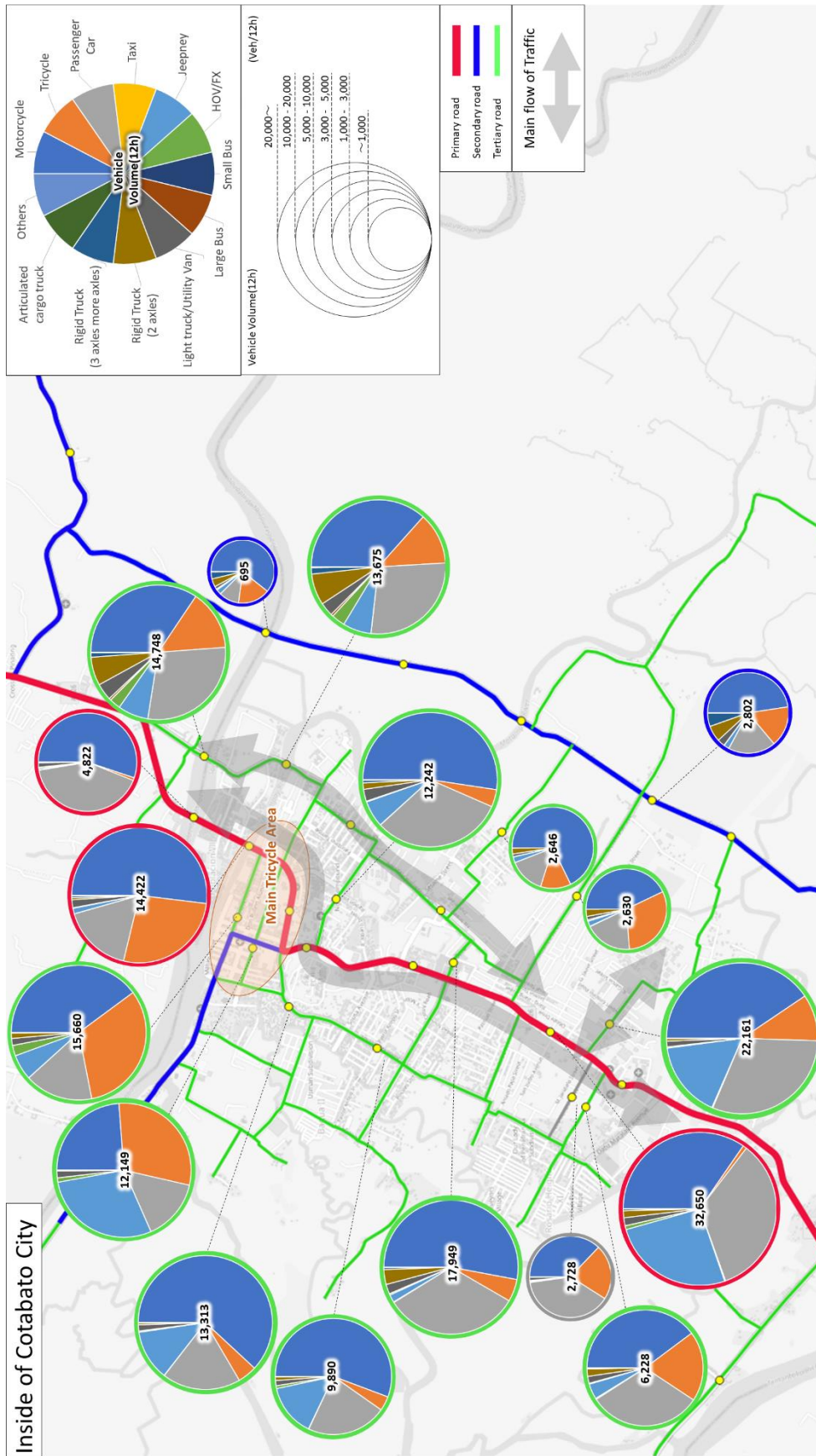
- Motorcycles and tricycles comprised majority of the traffic count in most stations. This is consistent with the vehicle registration records of LTO, as previously discussed. In several road sections along the Old Historic Core, which is considered as the main tricycle area (highlighted in Figure 5.1-27) of the city, the share of motorcycles and tricycles reached up to 75%.
- There was a significant number of tricycles observed to be plying primary roads outside of Cotabato City. This suggests that the national guidelines which prohibit the operations of tricycles along national highways, are not properly implemented.

Peak Hour

- In most road sections, the peak hour ranged from 7:00 to 9:00 AM (AM peak) and 4:00 to 6:00 PM (PM peak). In certain sections within the urban areas, the AM peak extended to 10:00 AM, and/or a noon peak (usually from 11:00 AM to 1:00 PM) developed.



Source: Traffic count survey conducted by the JICA Study Team
Figure 5.1-26 Traffic Volume along Road Sections outside Cotabato City



Source: Traffic count survey conducted by the JICA Study Team

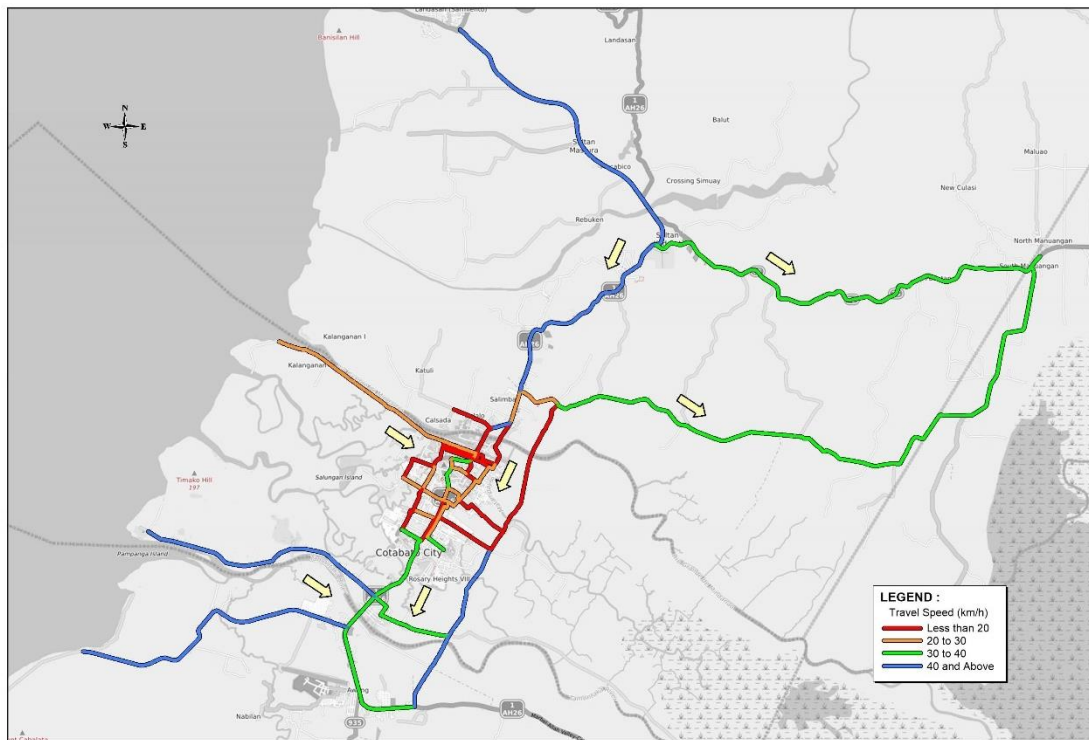
Figure 5.1-27 Traffic Volume along Road Sections within Cotabato City

5.1.7 Travel Speed

A travel speed survey was conducted in selected main corridors in the Greater Cotabato Area to analyze the effect of traffic congestion on vehicle speed. The survey was done by accomplishing a round trip on 20 identified routes in the morning, noon, and afternoon peak hours. Travel data was continuously recorded using a GPS device.

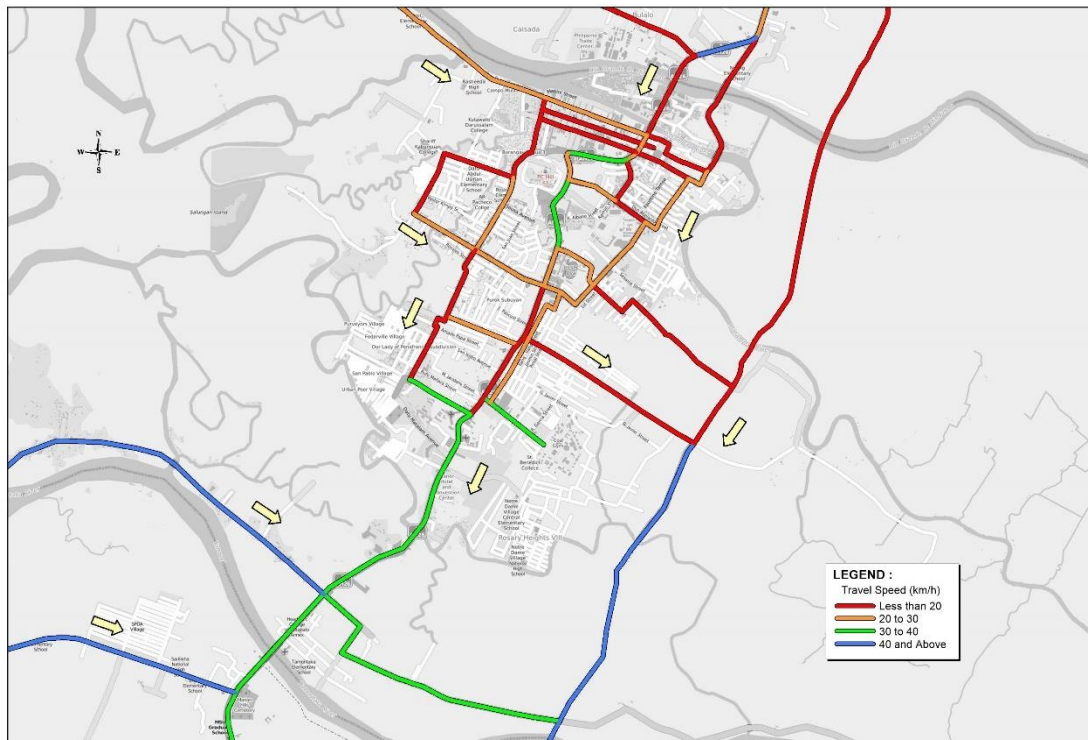
The results of the travel speed survey during the morning peak are shown in Figure 5.1-28 and Figure 5.1-29. Figure 5.1-30 and Figure 5.1-31 show the results during the afternoon peak. Further information on the findings of the survey are shown in Annex A: Transportation Surveys.

In general, the travel speed in road sections outside of Cotabato City was mostly 40 km./h. or above. Travel speed decreases significantly (usually less than 20 km./h.) as the vehicle went closer to the urban area.



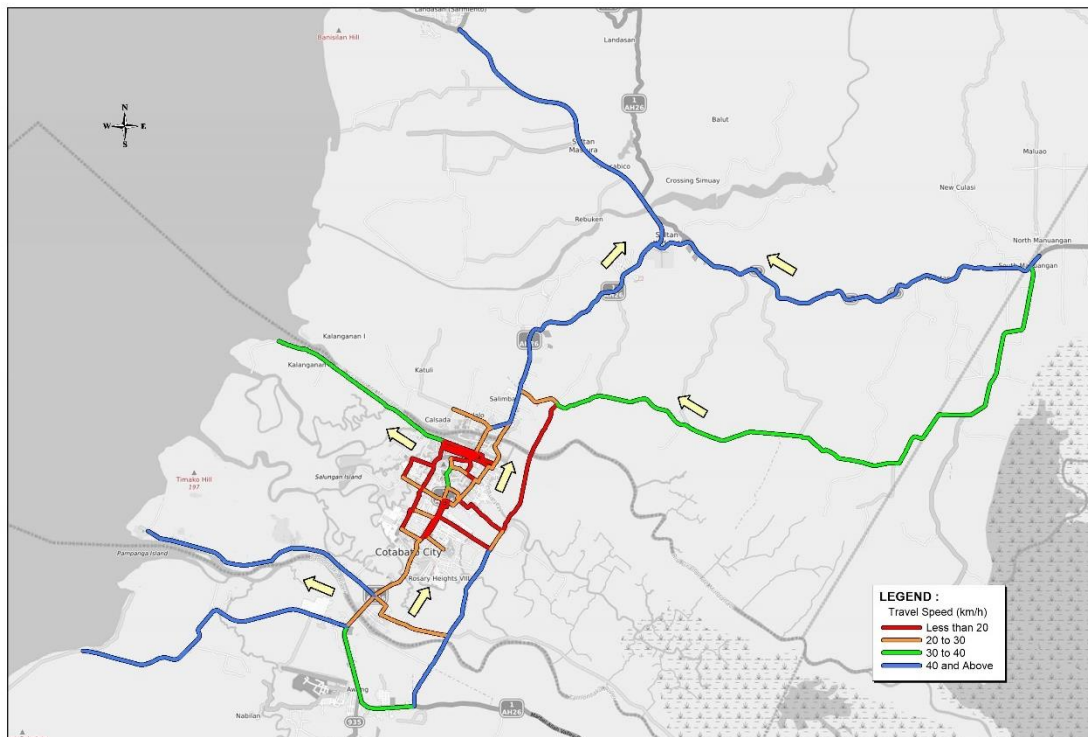
Source: Travel speed survey conducted by the JICA Study Team

Figure 5.1-28 Travel Speed Map at AM Peak Hour (Cotabato City and Surrounding Areas)



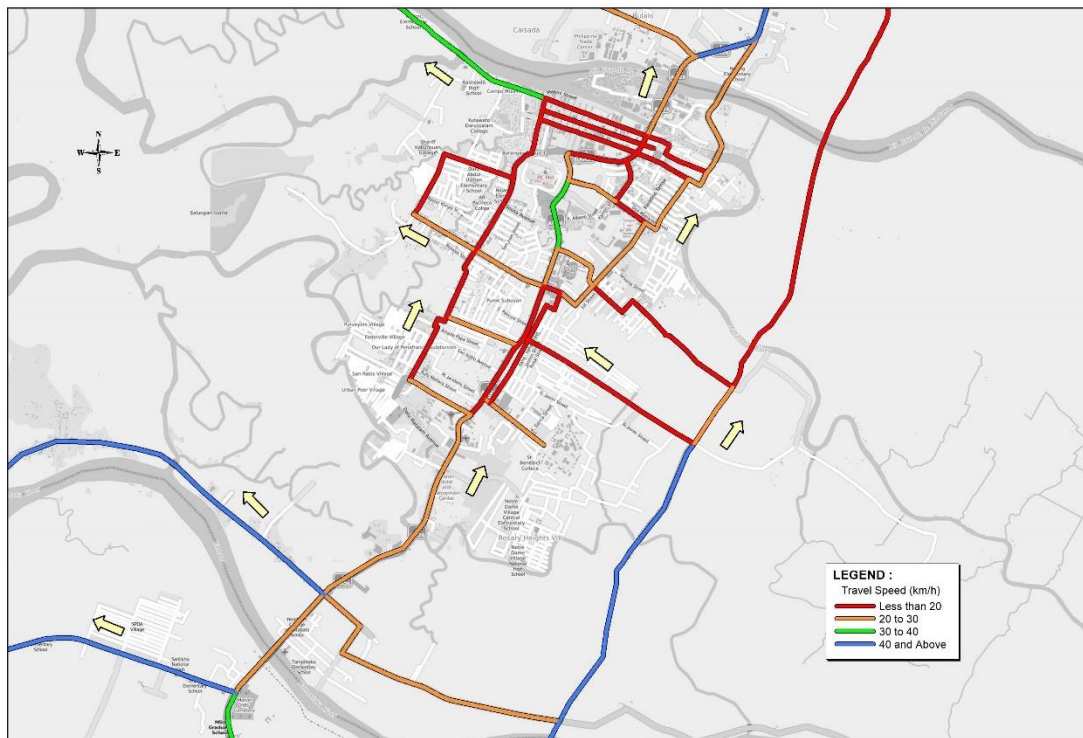
Source: Travel speed survey conducted by the JICA Study Team

Figure 5.1-29 Travel Speed Map at AM Peak Hour (Within Cotabato City)



Source: Travel speed survey conducted by the JICA Study Team

Figure 5.1-30 Travel Speed Map at PM Peak Hour (Cotabato City and Surrounding Areas)



Source: Travel speed survey conducted by the JICA Study Team

Figure 5.1-31 Travel Speed Map at PM Peak Hour (Within Cotabato City)

5.1.8 Level of Service

The Level of Service (LOS) is an indicator used by planners and engineers to assess the quality of operations of roads. The LOS describes the interaction between the traffic volume (V) and road capacity (C), often represented by the ratio, V/C . A higher V/C ratio (LOS F) suggests higher delays and lower operating speeds for vehicles. In contrast, a lower V/C ratio (LOS A) represents better performance of the road section.

According to the AASHTO¹ Green Book, the appropriate level of service for urban and suburban roads ranges from LOS C to LOS D. Beyond these values, cities are expected to begin the planning process for mitigation through infrastructural (e.g., widening of existing roads or construction of new roads) and/or operational (e.g., enforcement of traffic laws) improvements.

The hourly LOS (Table 5.1-8) along major thoroughfares in Cotabato City revealed that roads are often characterized by poor performance (declining vehicle speed due to the increasing traffic flow). Along Sinsuat Ave. (Figure 5.1-32), the city's primary arterial road, an LOS of 'F' (breakdown or forced flow, stop and go) is observed to extend even outside of the presumed peak hours. This indicates that Sinsuat Ave. is carrying vehicular volume beyond its capacity throughout a vast majority of the day. Along adjacent local roads, the LOS typically ranges from 'D' to 'F' during the morning and afternoon peak hours.

¹ American Association of State Highway and Transportation Officials

Table 5.1-8 Hourly LOS along Major Roads in Cotabato City

No.	Road name	Road classification	Road type	Carriageway width (m)	Total hourly capacity (PCU)	LOS											
						6AM-7AM	7AM-8AM	8AM-9AM	9AM-10AM	10AM-11AM	11AM-12NN	12NN-1PM	1PM-2PM	2PM-3PM	3PM-4PM	4PM-5PM	5PM-6PM
National Highway (Sinsuat Ave.)																	
16	Sinsuat Avenue	Primary Road	Highway	6.72	2400	C	E	F	F	F	F	E	F	F	F	F	F
21	Sinsuat Avenue	Primary Road	Highway	11.9	2400	C	D	F	E	F	F	E	F	F	E	E	E
26	Sinsuat Avenue	Primary Road	Highway	6.8	2400	C	F	F	F	F	F	D	F	F	F	F	F
30	Along Sinsuat Ave., in front of Cotabato Regional Medical Center	Primary Road	Highway	12.8	2400	C	D	E	F	D	E	D	E	E	E	E	E
14	Along Quezon Avenue in Between ND Avenue and Sinsuat Ave.	Primary Road	Highway	6.74	2400	B	C	C	D	C	C	C	D	D	C	C	B
Alternate Road to the National Highway																	
8	Delta Bridge	Secondary/Tertiary Road	Urban Street	7.5	1800	C	D	D	C	D	D	D	C	C	D	E	F
11	Matampay Bridge 2	Secondary/Tertiary Road	Urban Street	6.3	1600	C	D	D	C	D	D	E	D	D	D	E	E
18	Along Anaclero Badoy Street	Secondary/Tertiary Road	Urban Street	6.85	1800	C	D	E	D	D	E	C	D	C	D	D	E
22	Along De Mazenod Ave. Corner Pinsin Sero Street	Secondary/Tertiary Road	Urban Street	6.6	1800	B	C	C	C	C	C	C	C	C	C	C	D
40	Don Ramon Rabago Street	Secondary/Tertiary Road	Urban Street	6.8	1800	B	C	D	C	C	C	C	C	C	C	C	D
Local Roads																	
13	SK Pendatun Avenue	Secondary/Tertiary Road	Urban Street	11.49	1800	B	C	E	E	F	F	D	E	E	E	D	A
15	TV Juliano Avenue	Secondary/Tertiary Road	Urban Street	6.14	1600	B	B	B	C	C	C	B	C	C	C	C	C
20	Along TV Juliano Avenue Corner Pastor Kimpo St. Street	Secondary/Tertiary Road	Urban Street	6.7	1800	A	B	B	B	B	B	B	B	B	B	B	B

LEGEND

V/C Ratio		LOS	
From	To		
0	0.2	A	Free flow traffic
0.2	0.5	B	Free flow traffic
0.5	0.7	C	Moderate traffic
0.7	0.85	D	Moderate/heavy traffic
0.85	1	E	Heavy traffic
1		F	Forced flow, stop and go

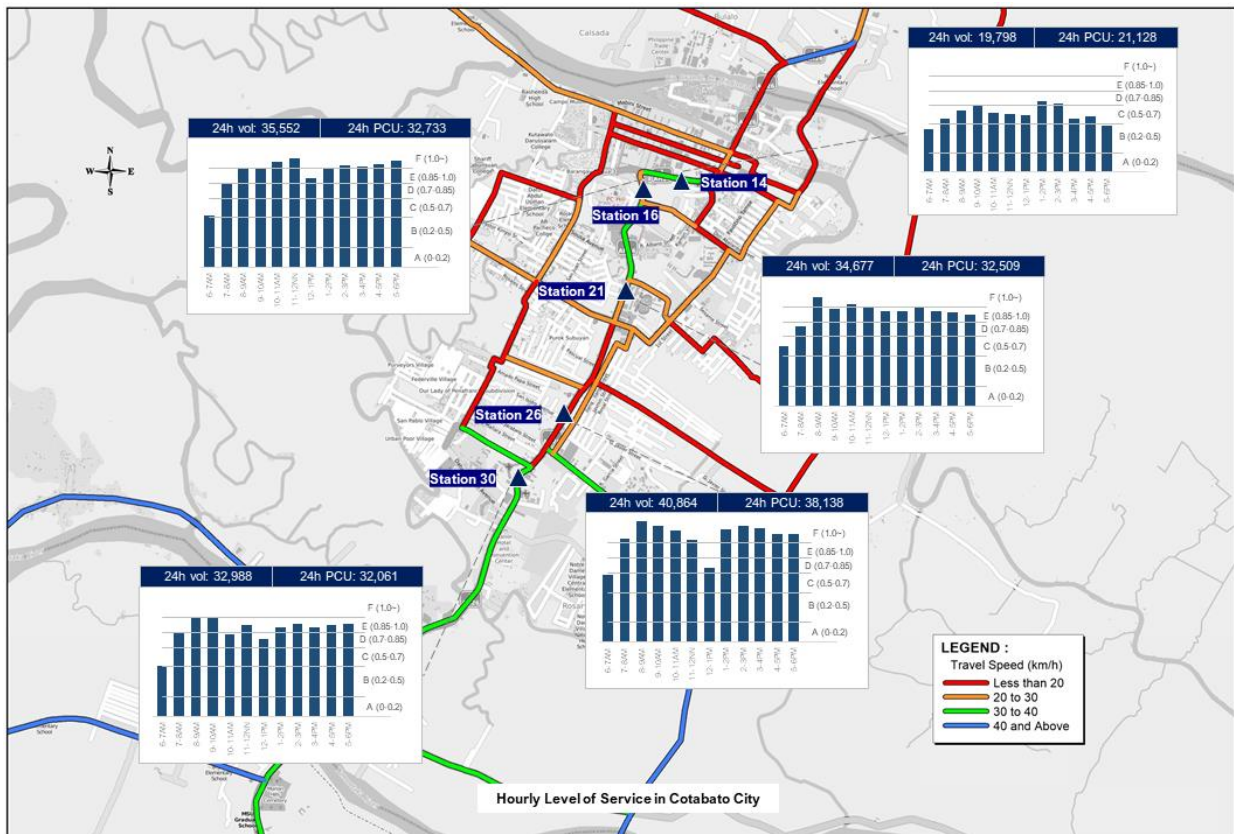


Figure 5.1-32 Hourly Level of Service along Sinsuat Ave.

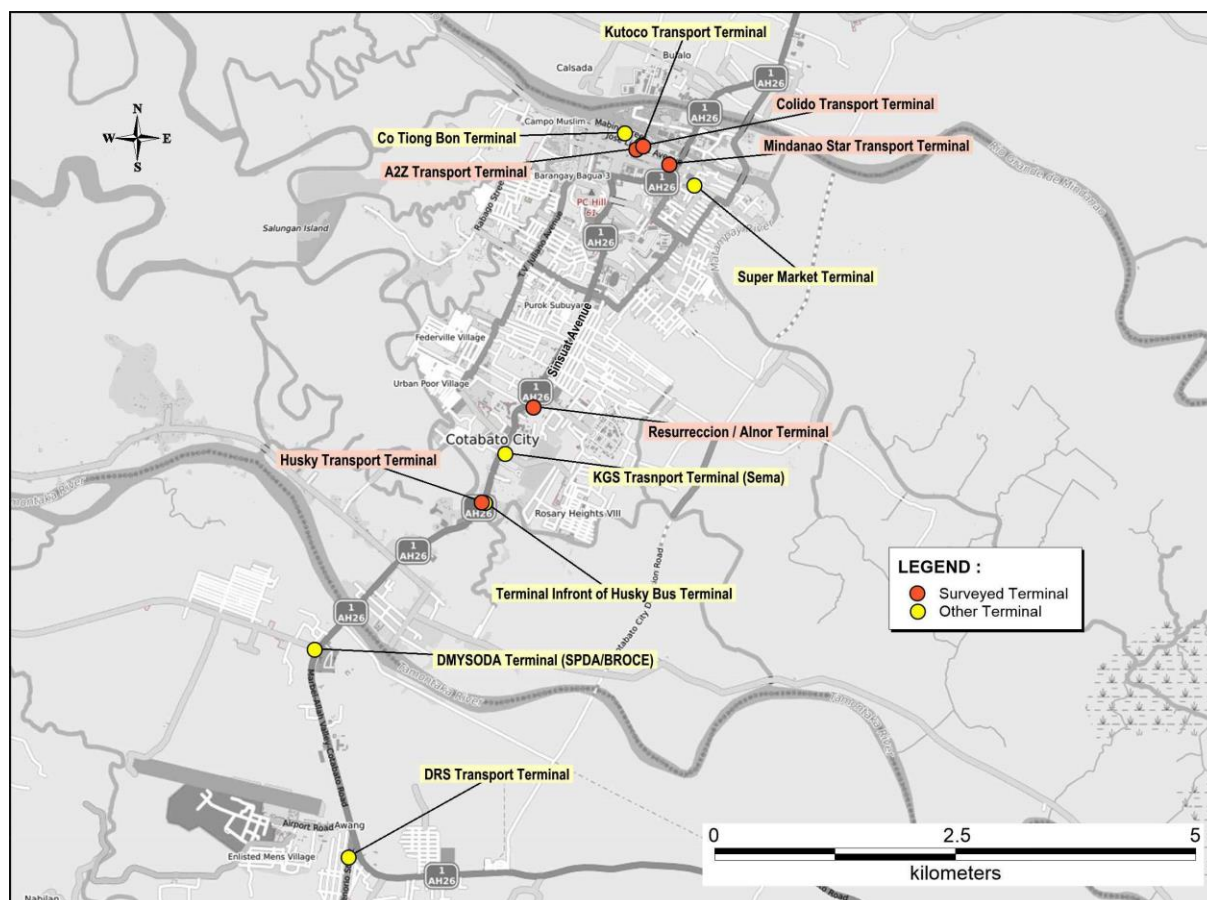
5.1.9 Public Transport Terminals

A public transport survey was conducted to gather information from different stakeholders (e.g., passengers, drivers, operators) on the existing conditions of terminal facilities and operations. The components of the public transport survey are discussed in Table 5.1-9.

Five public transport terminals serving inter-city routes (in and out of Cotabato City) were surveyed – two of which are bus terminals, while the other three cater to vans. All surveyed terminals are situated adjacent to major thoroughfares such as Sinsuat Ave. and Jose Lim Sr. St. (Figure 5.1-33).

Table 5.1-9 Components of the Public Transport Terminal Survey

No.	Component	Methodology	Survey items
1	Passenger Interview	Manual filling out of questionnaire by passengers at the terminal	<ul style="list-style-type: none"> • Origin and destination • Trip route • Mode of transport to/from the terminal • Trip purpose • Terminal satisfaction
2	Driver Interview	Manual filling out of questionnaire by drivers at the terminal	<ul style="list-style-type: none"> • Vehicle information (type of vehicle, passenger capacity) • Average daily number of passengers • Trip route and direction • Trip frequency • Terminal satisfaction
3	Terminal Manager Interview	Interview with terminal manager, accompanied with data gathering to prepare layout of terminal, identify routes, volume of passengers, etc.	<ul style="list-style-type: none"> • List of operational routes • Average daily number of passengers • Terminal capacity • Conditions of facilities • Future plans
4	Vehicle Count	Manual counting of vehicles entering and exiting the terminal over a 12-hr. period (6:00 AM to 6:00 PM, weekday).	<ul style="list-style-type: none"> • Number of vehicles entering/exiting the terminal, per mode of transport



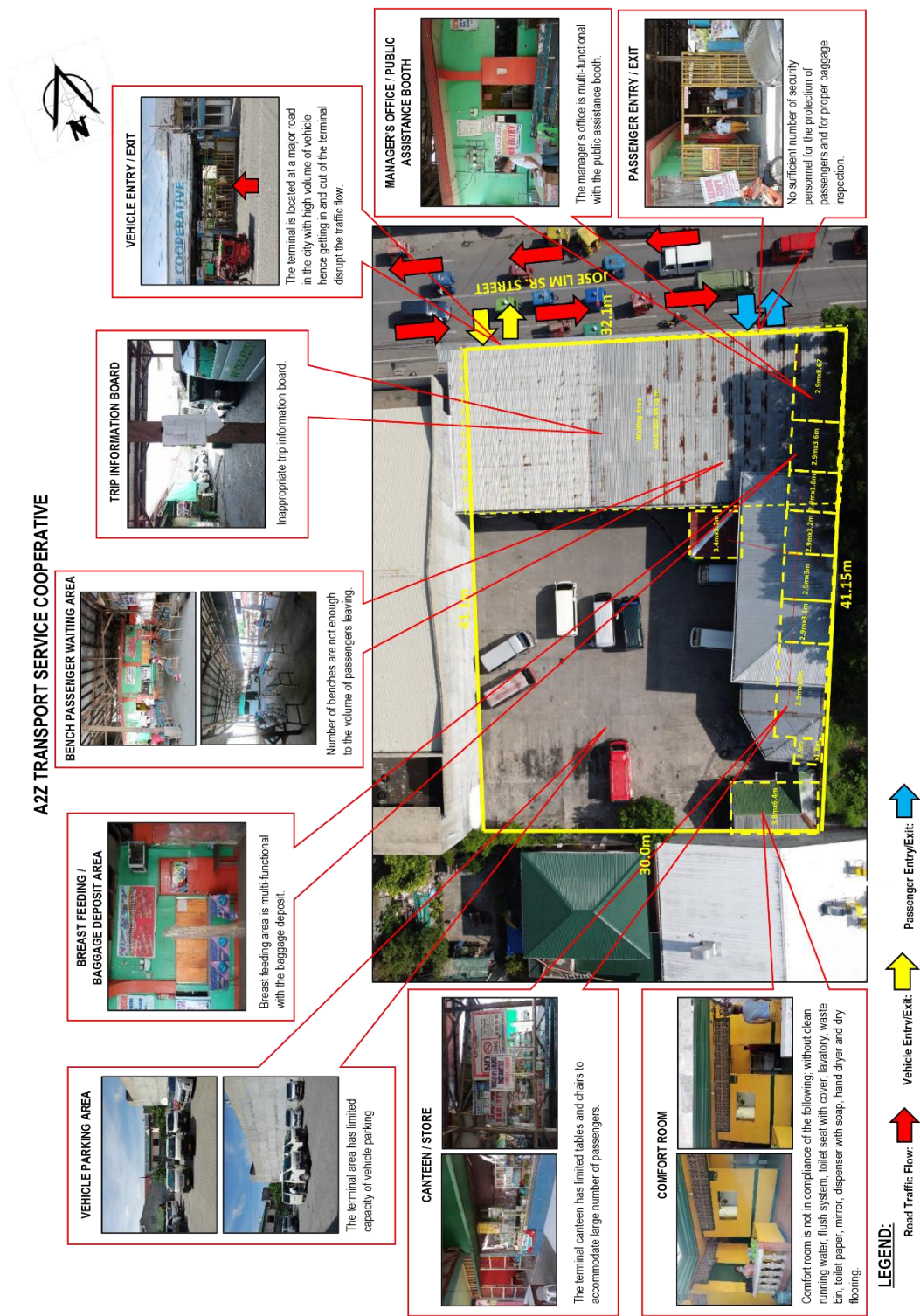
Source: JICA Study Team

Figure 5.1-33 Location of Surveyed Public Transport Terminals in Cotabato City

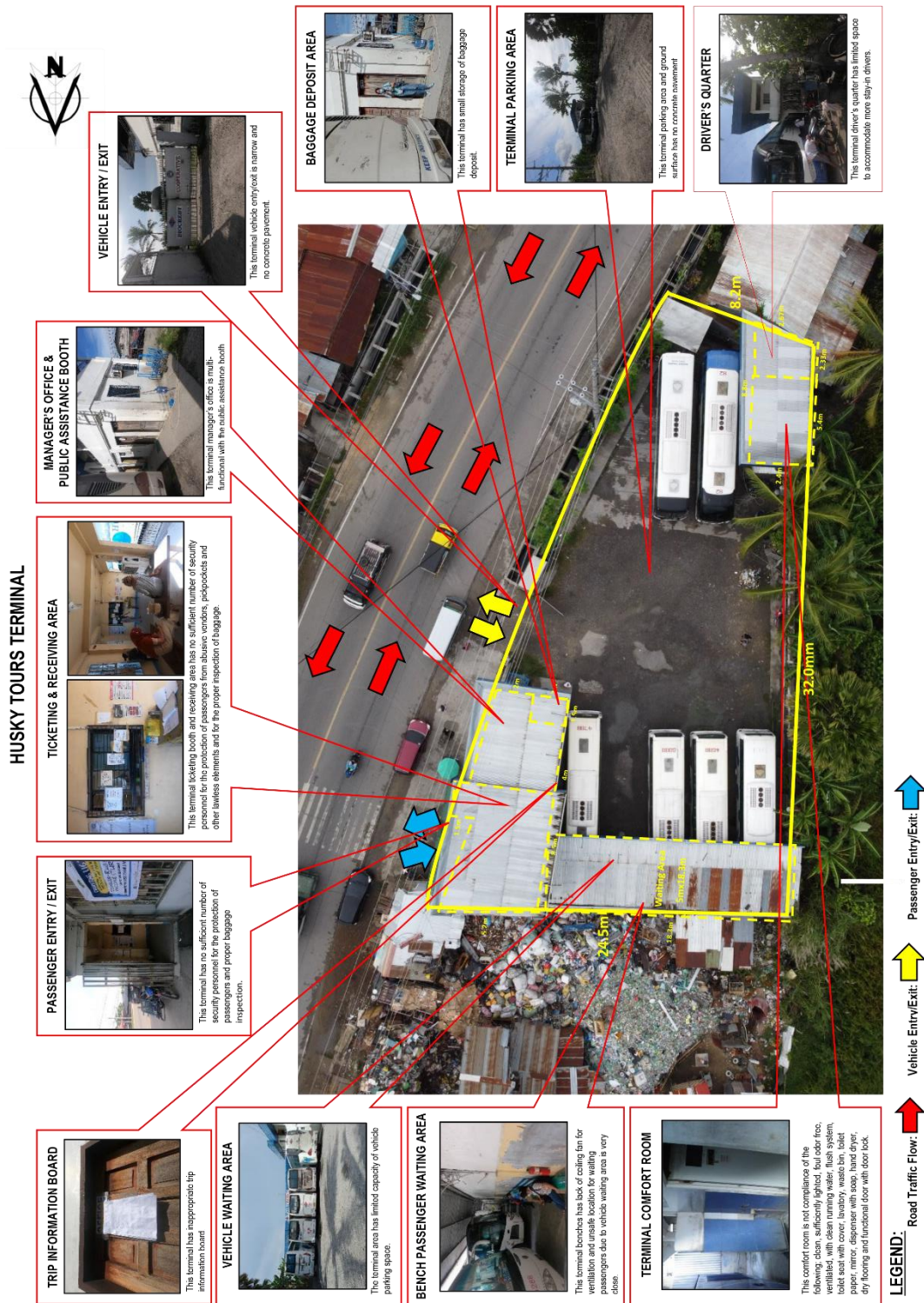
The profile of the public transport terminals, as derived from the conducted survey, is shown in Table 5.1-10. Examples of the physical evaluation of terminal facilities are shown in Figure 5.1-34 (van terminal) and Figure 5.1-35 (bus terminal). Further information is available in Annex A: Transportation Surveys.

In addition, the following have been identified as areas for improvement among all surveyed terminals, according to passengers and drivers:

- Overall cleanliness and improvement of toilet facilities
- Enhancement of security and installation of closed-circuit television (CCTV) cameras
- Improvement of waiting area (provision of more chairs and electric fans)
- Provision of a prayer room
- Establishment of free wi-fi connection



Source: Public transport terminal survey conducted by the JICA Study Team
Figure 5.1-34 Physical Evaluation of Facilities at AZZ Transport Service Cooperative



Source: Public transport terminal survey conducted by the JICA Study Team
Figure 5.1-35 Physical Evaluation of Facilities at Husky Tours Terminal

Table 5.1-10 Profile of Surveyed Public Transport Terminals

No.	Name of terminal	Location	Capacity and type of vehicle	Routes	Ave. daily number of passengers	
					Normal	Pandemic
1	A2Z Transport Service Cooperative	Jose Lim Sr. St., Cotabato City	50 vans	Cotabato-Davao	224	0
				Cotabato-Kidapawan	126	18
				Cotabato-Parang	810	270
2	Bangsamoro Terminal and Transport Services Cooperation	Sinsuat Ave., Cotabato City	17 vans	Cotabato-Tacurong	112	36
				Cotabato-Lebak-Kalamansig	-	0
3	Cotabato Line Drivers and Operators (Colido) Terminal	Jose Lim Sr. St., Cotabato City	50 vans	Cotabato-Marawi-Iligan	49	15
				Cotabato-Malabang	72	18
				Cotabato-Pagadian	90	27
				Cotabato-Balabagan	108	27
4	Husky Tours (Biocrest Multi-Purpose Transport)	Sinsuat Ave., Cotabato City	12 large bus	Cotabato-Gen. Santos City	1,035	0
				Cotabato-Tacurong	1,035	136
5	Mindanao Star Bus Transport Inc.	Jose Lim Sr. St., Cotabato City	22 large bus	Cotabato-Davao	2,968	0
				Cotabato-Kidapawan-Kinuskusan	2,968	828

Source: Public transport terminal survey of the JICA Study Team

5.1.10 Offices/Agencies Involved in Transport Development

In general, transport infrastructure development and operation are under the two national government agencies: the DPWH and DOTr. However, when the scale of project is limited and catering local demand, such project may be under the jurisdiction of the City Government of Cotabato. While these two layers of authority is generally applicable in Cotabato City, transport infrastructure outside Cotabato City such as those in neighboring towns under BARMM might be under three layers of authority: national government agencies, BARMM regional government and respective LGUs.

The DOTr is the main national agency to govern all transport modes, land, sea and air transports. Its two (2) attached agencies, Land Transportation Office (LTO) and Land Transportation Franchising and Regulatory Board (LTFRB), are the two primary transport regulatory offices for land-based transportation systems. LTO is basically involved in vehicle registration and issuance of driver's license. The LTFRB concerns with the approval of franchising – both of new transport routes and the public transport vehicles intended to serve particular routes.

Table 5.1-11 Roles and Functional Responsibilities of Transport Infrastructure Development in Cotabato City and surrounding areas

Sector	Sub-sector	Planning	Construction	Regulation	Fare Marketing	Operation & Maintenance
1. Road Network	National road	DPWH	DPWH	DPWH	N/A	DPWH
	Provincial road	Provincial LGU	Provincial LGU	Provincial LGU	N/A	Provincial LGU
	City/Municipal road	City/Mun LGU	City/Mun LGU	City/Mun LGU	N/A	City/Mun LGU
	Barangay road	City/Mun LGU	City/Mun LGU	City/Mun LGU	N/A	City/Mun LGU
2. Public transport	Inter-city bus services	LGU	N/A	LTFRB	LTFRB	LGU
	Inter-city PUV	LGU	N/A	LTFRB	LTFRB	LGU
	Intra-city PUV	LGU	N/A	LTFRB	LTFRB	LGU
	Informal transport	LGU	N/A	LGU	LGU	LGU
3. Traffic Management	Traffic regulation	LGU	N/A	LGU	N/A	LGU
	Traffic signal	N/A	N/A	N/A	N/A	N/A
	Public parking	LGU	LGU	LGU	N/A	LGU
4. Others	Vehicle registration	LTO 12	N/A	LTO 12	N/A	N/A
	Driving license	LTO 12	N/A	LTO 12	N/A	N/A
	Franchising	LGU	N/A	LTFRB	LTFRB	N/A

Source: JICA Study Team

During the ARMM period, LTO and LTFRB in the ARMM, both having their offices inside the ARMM complex in Cotabato City were under the operation control of Region 12 offices. However, under the new BARMM regional government, the Ministry of Transport and Communication (MOTC-BARMM) made a serious effort to have the two agencies' assets and operation turn over to BARMM. This effort yields positive result and in September 2019, DOTr Secretary Arthur Tugade attended the ceremonial turnover of LTFRB in Cotabato City. Discussion between the MOTC-BARMM and LTO 12 is on-going as well for gradual turnover of operation of LTO inside the BARMM compound.

The DPWH on the other hand is the construction arm of the national government and involves in the construction of roads, bridges, toll roads among others. National roads inside Cotabato City and BARMM are under the operation and maintenance of the DPWH through its regional offices (Region 9, 10 and 12). Table 5.1-11 below shows the roles and functional responsibilities among agencies involved in development of transport infrastructure and its operation.

5.1.11 Future Plans

There are two major future projects related to transport sector highlighted in the Cotabato City CLUP 2011 – 2020 (Figure 5.1-1). These are: (i) establishment of Public Integrated Terminal at barangay Rosary Heights 8 (RH 8) close to CCEDR and (ii) strengthening of the road network by construction of:

- Additional City Roads (23.17 km.)
- Western & Eastern Road (5.51 km.)
- Completion of the Western Circumferential Road (2.48 km.)

5.1.12 Summary of Issues

The following may summarize the issues confronting the transport sector of the city:

Road transport

- **Road network** - The road network expansion is not coping up with the growth of the city leading to some settlements without road or if there is, very narrow road and in poor quality (i.e. poor road surface, narrow, no road ROW for further expansion). For example, the road network grew by just 27 km. from 2009 to present and most of the new roads were constructed by the DPWH. Similarly, in general, the road network is not yet fully developed hence the poor traffic circulation and presence of missing links.
- **Wide area without road in Greater Cotabato** – there are two wide areas without road development (eastern side of Cotabato City and coastal side of Cotabato City going to Polloc Port). Construction of new roads is necessary to realize their economic potential and to provide access roads to the isolated communities (currently just relying on water transport).
- **Road surface condition** – of the 101.13km surveyed roads, 17% are in very bad condition, 15% in bad condition, 29% in fair condition and only 39% in good condition. This indicates that at least 32% (bad + very bad condition) of the road needs rehabilitation.
- **Roadside drainage** – Of the 64.22 km surveyed drainage along the 101.13 km road, 12% of the drainage or 7.58 km are non-functional. The water is either stagnant or the drainage is blocked by debris.
- **Road right-of-way** – securing 15 m road ROW for city road as stated in the 2015 DPWH Design Manual is difficult. However, it is possible to most of the city roads to secure 10m road ROW. Of the 101.13 km surveyed roads, only 15 km road has less 10 m ROW. Based on experience with other cities in the Philippines like Marawi City, it is possible to secure the 6.10 carriageway and the 3 m road shoulder within the 10m road ROW.
- **Traffic congestion** – Traffic congestion is becoming serious in the city where travel speed is less than 20 km/hr in most of the major roads such as sections of Sinsuat Avenue, Notre Dame Avenue, Don Rufino Alonzo St., S.K. Pendatun St., Mabini St., Don Teodoro V. Juliano St. among others. In a small to medium city, the travel speed should be above 20 km/hr and close to 30 km/hr.

Public transport terminal (Road)

- **Terminal conditions** – Physical evaluation of facilities indicate that most public transport terminals in Cotabato City are in poor condition. Among the common problems include: lack of chairs, poor ventilation, insufficient security measures, inappropriate trip information board, and unsanitary restrooms.
- **Effects of pandemic** – Inter-city public transport have been heavily impacted by quarantine guidelines in several cities/municipalities in Mindanao. Most routes were limited to catering significantly less daily passengers (following social distancing and

travel protocols), while the following routes temporarily ceased operations: Cotabato-Davao (bus and van), Cotabato-Gen. Santos City (bus), and Cotabato-Lebak-Kalamansig (van). In addition, there were reported instances when health protocols were not properly enforced in terminals.

Water transport

- **Terminal condition** – field survey reveals that almost all river terminals in Cotabato City are in poor condition

5.2 Airport

5.2.1 Overview

The existing Cotabato (Awang) Airport is the most accessible airport for passengers and cargoes inbound and outbound from Cotabato City, Maguindanao and Sultan Kudarat Provinces and parts of Lanao del Sur and Cotabato Provinces.

According to the Civil Aviation Authority of the Philippines (CAAP), the Awang Airport belongs to a Class I Principal classification. As such, the facility only serves domestic destinations and capable of serving jet aircrafts with a capacity of at least 100 seats.

The Awang Airport is located in the municipality of Datu Odin Sinsuat (DOS), Maguindanao. It is about nine kilometers away from center of Cotabato City. The airport has been in this location for almost six decades already since when the old airport which was located in the vicinity of the present BARMM Complex along the Governor Gutierrez Avenue was closed to air traffic in 1960s.

The Awang Airport started its operations in early 1970s and through time, many of its facilities had already deteriorated. Thus, in 1998, the DOTC had included Awang Airport to be part of the Third Airport Development Project (TADP) funded by the loan of the Government of the Philippines from the Asian Development Bank (ADB). The project aimed to rehabilitate the facilities of six existing airports in Southern Philippines.

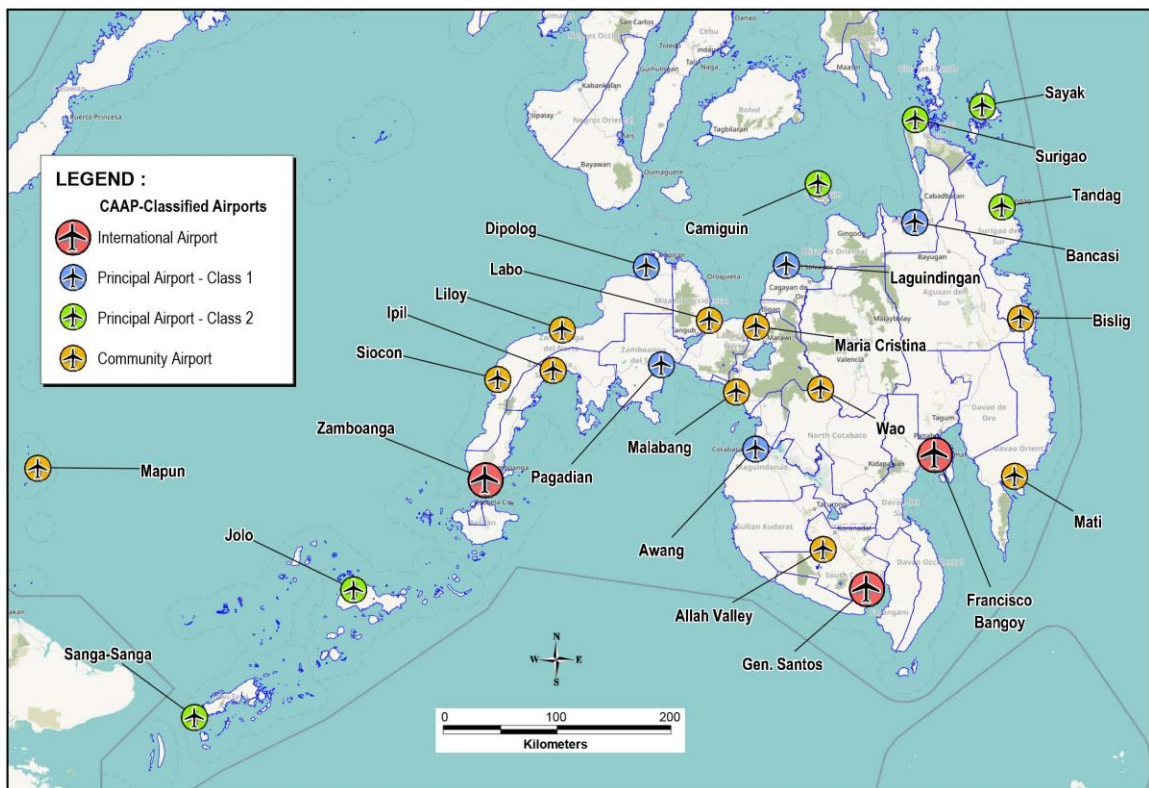
Unfortunately, the loan effectivity had closed in 2005 without having implemented any improvement for the Awang Airport due to incurred significant delays in preliminary work requisites. Hence, since then, the condition of the airport facilities continued to deteriorate. Many instances when the airport runway had the presence of peeled off pebbles on its surface that become potential risk to aircrafts during landing and take-off.

At present, the apron area of the airport can only accommodate at the maximum about four aircrafts of the size of Boeing A-320 type at one given time. The present location of the airport had raised in the past some safety concerns on air navigation. The airport is surrounded by high grounds, with Mt. Cabalalaan as highest point and the Linangan Mountains are the most pronounced. The range of the 650-meter high Mt. Cabalalaan is situated some three to four kilometers southwest from the airport and within the inner horizontal and conical surface and is expected to cause visual limitations for circling operations of aircrafts. The same is true with the

Linangan Mountains with a maximum elevation of 360 meters which are at a distance of some five kilometers southeast from the airport and just south of the eastern approach zone.

Further, its runway is 1,913 meters long and 45 meters wide, which does not meet the international standard as set by the International Civil Aviation Organization (ICAO). The passenger terminal building has limited space for pre-departure area that can only accommodate a maximum of 300 passengers at a time. Hence, the area always becomes crowded when departing passengers of two aircrafts which have little time gap between take-offs simultaneously stay here before boarding. Moreover, the arrival area which could only accommodate one baggage carousel is always crowded every time a commercial aircraft arrives.

In view of the foregoing, Awang Airport still operates below the international standard for airports.



Source: Prepared by the JICA Study Team based on CAAP data

Figure 5.2-1 Location of Awang Airport in relation to other Airports in Mindanao

5.2.2 Description of Existing Airport Facilities

(1) Runway

The runway lies along the west to east direction from the Illana Bay going perpendicular towards the Cotabato City-Datu Odin Sinsuat National Highway. Its western end has a designation number 10; while the eastern end has designation number 28. The runway has a total length of about 1,913 meters, but its effective length between its threshold markings are only about 1,888.5 meters. The only available distance beyond the threshold marking at runway end no. 10 is only 17.5 meters, while, at runway end no. 28 is only 7.0 meters. This does not conform to ICAO standard which

requires at least 60 meters strip beyond runway ends. The entire runway length has a width of 45 meters.

The runway pavement is composed of 250 mm portland cement concrete pavement (PCCP) with 50 mm asphalt overlay. The overlay of asphalt is not being done for the whole stretch on a regular basis, instead, it is done by section depending on the severity of the damage. Hence, some sections would still be in good condition, while in other sections the overlay starts to peel-off.

Beyond runway end no. 10 (western end) is a very deep ravine, while at runway end no. 28 (eastern end) is a low ground and approaching perpendicularly the Cotabato City- Datu Odin Sinsuat National Highway. The runway is equipped with functional Airfield Ground Lighting fixtures.



Figure 5.2-2 Runway End No. 10 (western end) of Awang Airport



Figure 5.2-3 Middle section of the Runway of Awang Airport

(2) Taxiways and Apron

Two short taxiways (18 meters x 83 meters) asphalt pavement provide access for aircrafts from the runway to the apron and vice-versa. The taxiways are generally in fair condition, though there are few spots with uneven surface.



Figure 5.2-4 Taxiway of Awang Airport

Apron is the space where aircrafts are temporarily parked to perform passenger and cargo boarding and disembarking, refueling, and other activities prior to take-off. The apron of the Awang Airport has a measurement of 256 meters by 100 meters or an area of 2.56 hectares. It is paved with concrete and is in fair condition. It has four bays which can accommodate four aircrafts of A-320 type with 180- seat capacity. A four-bay hangar located at the western side of the apron is reserved for Philippine Air Force (PAF) aircrafts.



Figure 5.2-5 Apron of Awang Airport

(3) Passenger Terminal Building

The existing passenger terminal building was constructed in late 1980s. It is a one-storey structure made of concrete with galvanized iron roof. It measures approximately 72 meters long by 16 meters wide. The terminal building currently accommodates the following facilities: pre-departure area with a capacity of more or less 300 passengers; arrival area with a baggage carousel; check-in counters; ticketing offices (PAL and Cebu Pacific Airlines); security check and

x-ray area before check-in; and, security check and x-ray at entrance of pre-departure area. The building is still in fair condition, but it has limited spaces that cause crowding, particularly at the check-in counters and pre-departure area whenever two aircrafts have little time gap between their take-offs.



Figure 5.2-6 Passenger Terminal Building of Awang Airport

(4) Cargo Building

A newly constructed cargo building located beside the passenger terminal building has been in use since 2018. It is a concrete structure with galvanized iron roof. It has an approximate floor area of 243 square meters. Beforehand, the processing area for inbound and outbound cargoes was within the passenger terminal building. The building was funded under the 2015 DOTC Budget.



Figure 5.2-7 Cargo Building of Awang Airport

(5) Non-Passenger Waiting Area

A single-storey waiting area for non-passengers sending-off or welcoming home their relatives and friends was built in CY 2008 through the initiative of former Congressman Didagen Dilangalen. The structure is made of concrete, steel trusses, galvanized iron (long span) and concrete floor with tiles. The floor area is approximately 300 square meters with available chairs and comfort rooms. The structure is still in good condition.



Figure 5.2-8 Non-Passenger Waiting Area of Awang Airport

(6) Administration and Operations Building

The administration office of the CAAP is located beside the crash fire facility covered garage. It is a one-storey concrete structure with galvanized iron sheets roof. It has an approximate floor area of 304 square meters. It houses the airport manager's office and the different administrative and operation units of the CAAP. The building is in good shape.



Figure 5.2-9 CAAP Administration and Operations Building

(7) Aircraft Rescue and Firefighting Facilities

The airport has three functional fire trucks stationed in a covered garage. The facility is also equipped with appropriate accessories in the performance of its duties as fire fighters and rescuers. The fire trucks draw water from a deep well through an elevated water tank situated just adjacent to the covered garage.



Figure 5.2-10 Aircraft Rescue and Firefighting Facilities

(8) Air Traffic Control Tower and Air Navigation Equipment

The air traffic control tower is a five-story concrete structure having an approximate dimension of 5 meters by 5 meters. The Visual Control Room is located on the 5th floor of the tower. It is responsible for the Airport's Aerodrome Traffic Zone. The equipment communication room is located on the 4th floor of the building. The communication equipment are all in good condition and are just appropriate for the operation of the airport with the types of aircrafts it is servicing now. The control tower has just undergone rehabilitation/repainting in 2016. However, both runway thresholds are not visible from the control tower due to the obstacles by the military facilities (6th ID Philippine Army Camp at western end and the Philippine Air Force Camp at eastern end).



Figure 5.2-11 Air Traffic Control Tower at Awang Airport

(9) Vehicle Parking Area

The vehicle parking area is located in front of the Passenger Terminal Building fronting the entrance gate of the camp of the 6th Infantry Division of the Philippine Army. It consists of two sections separated by a concrete island. At the rear portion of the parking area are commercial tenements owned by private individuals, although located within the airport's property line. Owing to limited capacity of the parking area, it always becomes crowded during the arrival time of pilgrims from Saudi Arabia.



Figure 5.2-12 Vehicle Parking Area of Awang Airport

(10) Access Road from the Cotabato City-Datu Odin Sinsuat National Highway

The only access to the Awang Airport from Cotabato City and other parts of Maguindanao is through the Cotabato City-Datu Odin Sinsuat National Highway Junction towards the 6th Infantry Division of the Philippine Army Camp. From the junction, a two-lane concrete-paved road approximately 700 meters long connects to the airport entrance. The access road is provided with two military checkpoints because this access road also leads to the Philippine Air Force camp and the 6th ID Philippine Army Camp.



Figure 5.2-13 Access Road with Checkpoint from Awang Airport to National Highway

5.2.3 Service Routes

As of February 2020, only the Philippine Airlines (PAL) and the Cebu Pacific Air (CebuPac) are using the Awang Airport for their commercial flights.

Table 5.2-1 Flight Schedules and Airlines Operating at Awang Airport

Airline Company	Route	Day	Time
Philippine Airlines (PAL)	Manila-Cotabato	Daily	Arrival: 10:45 AM
	Cotabato-Manila	Daily	Departure: 12:05 PM
Cebu Pacific Air (CebuPac)	Manila-Cotabato	Daily	Arrival: 12:40 PM
	Cotabato-Manila	Daily	Departure: 1:10 PM

Source: Official homepage of the respective airlines

5.2.4 Air Traffic Statistics

The general picture of the air traffic movements from 2008-2018 at the Awang Airport has increased steadily.

Table 5.2-2 Aircraft, Passenger and Cargo Movement at Awang Airport (2008-2018)

Year	Aircraft	Passenger	Cargo (kilogram)
2008	1,606	104,535	632,921
2009	4,076	199,133	1,111,080
2010	2,976	219,104	1,544,601
2011	3,044	192,017	1,522,823
2012	3,174	246,209	1,747,866
2013	3,408	239,265	1,579,142
2014	2,354	232,742	2,148,789
2015	2,228	241,642	2,178,707
2016	2,270	258,529	2,061,267
2017	2,656	289,229	1,934,413
2018	2,889	298,345	3,036,681

Source: CAAP Website

5.2.5 Organization and Budget of Offices/Agencies Involved in Airport Development

DOTr

The Department of Transportation (DOTr) is the executive department of the Philippine Government responsible for the construction, maintenance and expansion of viable, efficient and dependable transportation systems as effective instruments for national recovery and economic progress.

CAAP

The Civil Aviation Authority of the Philippines (CAAP) is responsible for implementing policies on civil aviation. It also investigates aviation accidents through its Aircraft Accident Investigation and Inquiry Board (AAIIB). CAAP is an independent regulatory body attached to DOTr.

5.2.6 Summary of Issues at Awang Airport

- 1) **Aerodrome Obstruction.** The airport has some obstacles to safe navigation. It is surrounded by high grounds, such as, Mt. Cabalaan and the Linangan Mountain Range. These clearly present serious amounts of obstacles that would cause limitations for visual circling operations and endanger aircrafts operation.
- 2) **Runway Limitations.** The runway length is short from the international standard as set by ICAO. Hence, larger aircrafts that could fly direct to ASEAN and other foreign countries could not be served by the Awang Airport. Extending the runway to sufficient length may pose technical difficulties owing to a deep ravine at one end and a national highway obstruction at the other end.
- 3) **Non-Visible Runway Ends.** Both runway thresholds are not visible from the control tower due to the obstacles by the military facilities (6th ID Philippine Army Camp at western end runway 10; and Philippine Air Force Camp at eastern end runway 28). This is in violation of safety requirements for air navigation.
- 4) **Other Substandard Facilities.** The Passenger Terminal Building has limited space, thus, overcrowding at the pre-departure area and check-in counters is a regular experience of departing passengers. Similarly, the arrival area with one- unit baggage carousel has limited space, hence, arriving passengers feel uncomfortable in retrieving their baggage. The vehicle parking area could only accommodate few numbers of vehicles because of space limitation.

The total land area of the airport is only about 36.1 hectares. It is substantially small compared to other airports. The General Santos City Airport, for instance, has an approximate area of 650 hectares.

- 5) **Congestion along the Access Road.** The access road going to the airport is also the access road leading to the entrance and exit of the 6th Infantry Division Philippine Army Camp and the

Philippine Air Force Camp for Central Mindanao. Whenever there is an urgent military troop movement, traffic congestion along this road is inevitable.

5.2.7 Current Development Initiatives

(1) Initiatives of the Local Government Units

Due to the issues discussed above, there are efforts by both the City Government of Cotabato and BARMM Regional Government to build a new airport situated in a better location. Currently, there are three (3) sites being considered as shown in Table 5.2-3 and in the succeeding map (Figure 5.2-14).

Table 5.2-3 Characteristics of the three (3) candidate sites

Candidate Location	Distance from Cotabato City	Current land use
1. Site 1 (Barangays Tamontaka 3, 4, 5 in Cotabato City)	Inside Cotabato City (11 km east from city core)	Marshy land, non-agricultural area
2. Site 2 (Barangay Tambu in Sultan Mastura Municipality)	About 18 km away from Cotabato City	Productive rice paddy
3. Site 3 (Improvement of the old Malabang Airport)	About 80 km away from Cotabato City and 74 km away from Marawi City	Abandoned old airport with land area of 16 hectares owned by the CAAP

Site 1- located in Barangays Tamontaka 3, 4, 5 in Cotabato City

A 3,000 hectare of mostly marshy land (non- agricultural area) on the eastern side of the city in Barangays Tamontaka 3, 4, 5 is eyed by the city government as candidate site. A massive earthwork is necessary since the identified new airport location is a marshland. Accordingly, a Pre-Feasibility Study was undertaken by a local consultant. The preliminary with estimated indicative cost of the project was placed at PhP 4.8 Billion.

Site 2- located in Barangay Tambu, Sultan Mastura Municipality

The Bangsamoro Development Plan-2 proposed a rice field which is located in the flat land without any hills and mountains in the municipality of Sultan Kudarat near the Polloc Port as potential candidate site for the new airport. The site is about 18 kilometers away from Cotabato City and 9 kilometers close to Polloc Port.

Site 3- located in Malabang Municipality

Initial discussion with the BARMM's Ministry of Transportation and Communication (MOTC-BARMM) indicates that they are also considering the old Malabang Airport in the province of Lanao del Sur. This airport is classified as community airport or a minor commercial airport by the CAAP. Presently, no airlines are serving this airport and the runway is utilized for drying corns and coconuts. It has an area of 16.05 hectares which is already owned by CAAP. The said location is about 80 kilometers away from Cotabato City and about 74 kilometers away from Marawi City. It appears that one of the considerations is to make the airport development as trigger to accelerate development of the surrounding municipalities.

(2) Initiatives of the National Government

Interviews with the officials of the DOTr and CAAP in Manila were made on 30 September 2020 to understand if the plan by the LGUs have already reached to both national line agencies for possible inclusion in their plan. The following were the findings:

- There are currently no development plans in the pipeline for the establishment of a new airport within the vicinity of Cotabato City. The current focus of the DOTr is the development of the Central Mindanao Airport in Mlang Municipality [interview from DOTr, Air Transport Planning Division].
- Current development plans for the existing Awang Airport in Cotabato City includes: a) Upgrading/expansion of the existing Passenger Terminal Building (PhP 41.1 M), b) Asphalt overlay of airport runway (PhP 340 M), c) Shoulder grade correction (PhP 161 M), d) Airfield lighting system [interview from CAAD Head Office, Aerodrome Development and Management Service].

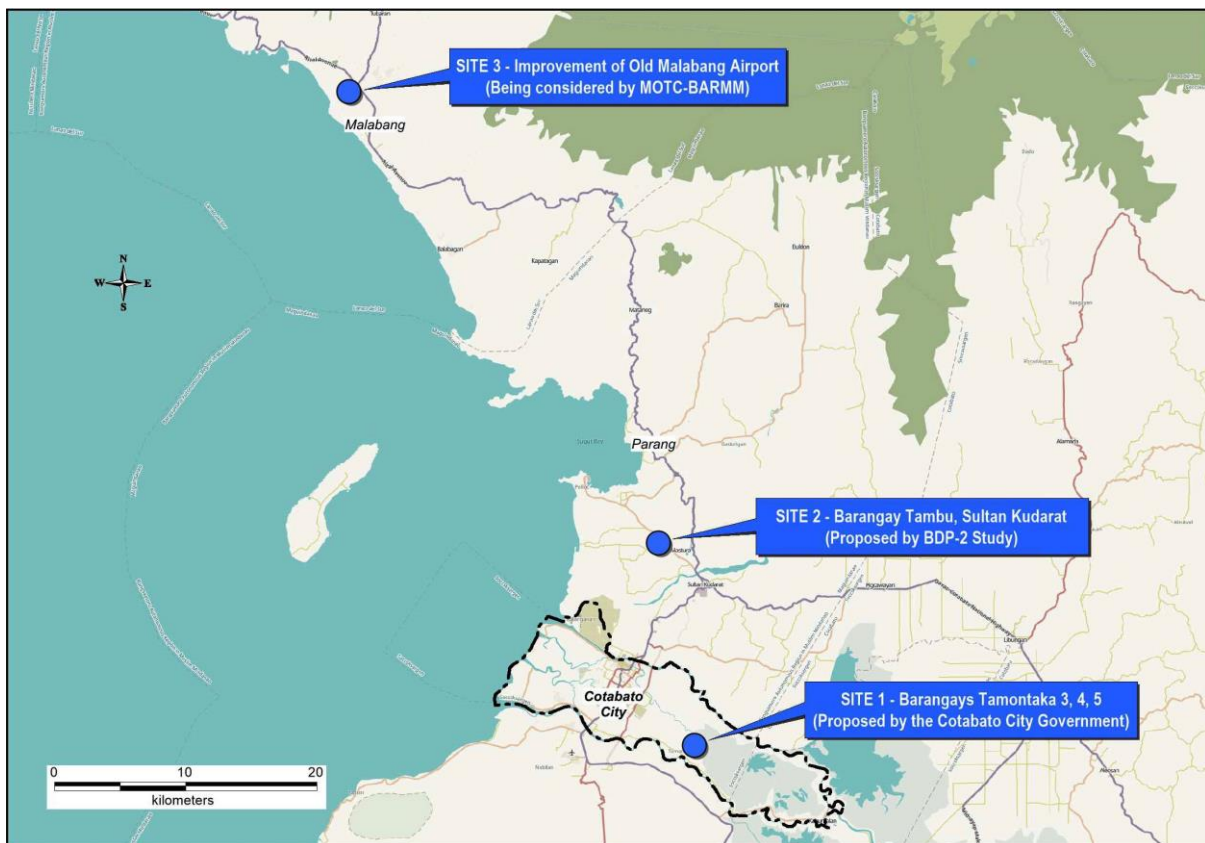
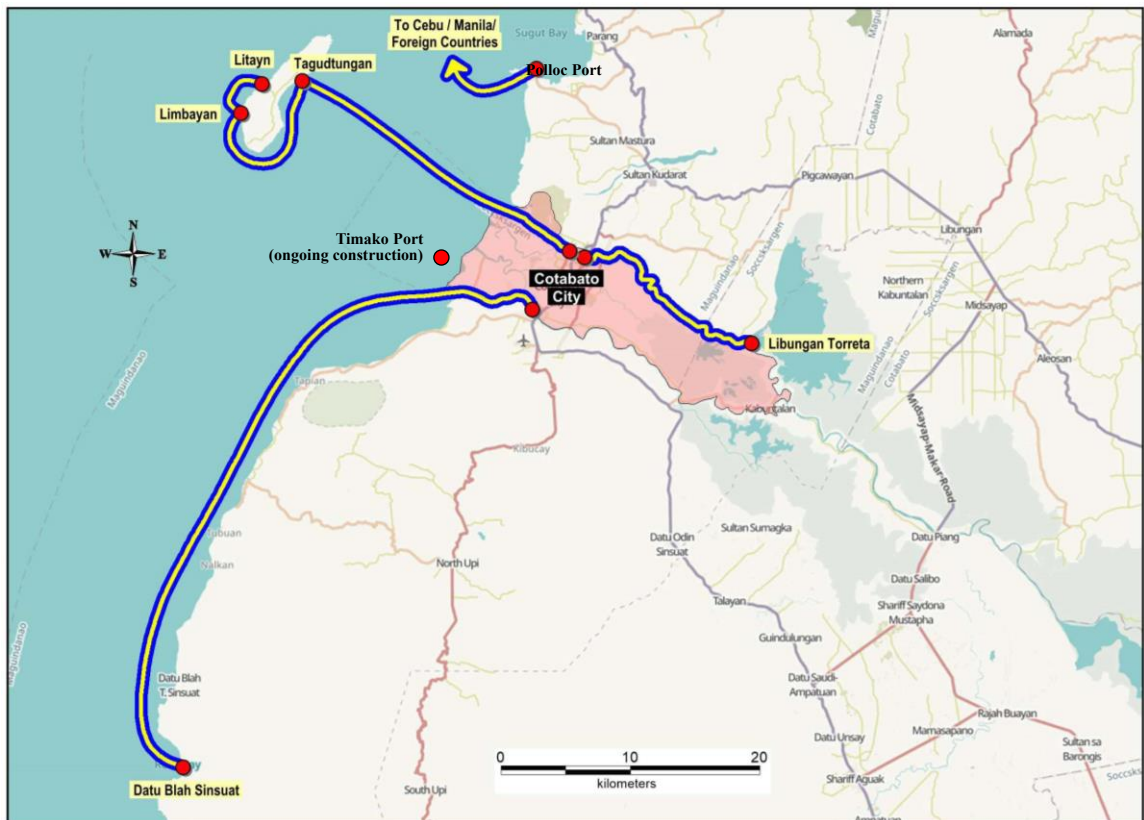


Figure 5.2-14 Location of Candidate Sites for a New Cotabato Airport

5.3 Port

5.3.1 Overview

The geography of Cotabato City highlights the importance of water transport as an essential means of moving passengers and cargoes. Bounded by two large rivers (Rio Grande de Mindanao and Tamontaka River) and fronting the Illana Bay, Cotabato City's early settlements relied on water transport. Recognizing this strategic location of the city (i.e. with river access to the fertile land at the upper stream of both rivers (Liguasan Marsh) and sea access to aquamarine products and fish from Illana Bay), the Philippine Ports Authority (PPA) constructed the Cotabato River Port (CRP) at the mouth of Rio Grande de Mindanao. However, the port has been heavily silted and in the late 1970s, the idea to construct a new port outside the river mouth was conceived. That new port was Polloc Port located in the municipality of Parang Maguindanao.



Source: Prepared by the JICA Study Team

Figure 5.3-1 Active Ports in Cotabato City and surrounding areas

Regional (Cotabato-Zamboanga-Cebu/Ilo-ilo-Manila) and international traffic were readily absorbed by the Polloc Port upon its operation in the early 1980s, while the old port (CRP) continued to host medium-size ships serving intra-Mindanao traffic (Cotabato-Balabagan route, Cotabato-Pagadian route, Cotabato-Zamboanga route, Cotabato-Kalamansig route). Traffic to Liguasan Marsh meanwhile continued to this day and are handled by small river ports located close to the CRP. The demand for intra-Mindanao ship routes in the early 1990s had been affected by the opening of the Cotabato City - Zamboanga City road which passes through the municipality

Balabagan and Pagadian City. Since then, the operation of these ship routes turned out to be financially unsustainable and eventually terminated.

Currently, Cotabato City and its surrounding towns are served by the following ports: Polloc Port and a number of river ports as shown in Figure 5.3-1. In addition, through the efforts of the City Government of Cotabato and the PPA, the construction of a new port situated along the coast of Timako Hill in Cotabato City is now underway.

5.3.2 Institutional Framework

There are four (4) government bodies assigned to supervise port operations in the study area depending on the characteristics of the port. These four government bodies are: the Philippine Ports Authority (PPA), Regional Economic Zone Authority (REZA), Regional Port Management Authority (RPMA), and Local Government Units (LGUs).

- Polloc Port is under the jurisdiction of REZA
- Timako Port (construction is on-going) will most likely be managed under PPA if Cotabato City remains to be part of Region 12. If the city becomes part of BARMM, the port might be under the supervision of RPMA
- Old Cotabato River Port is under the jurisdiction of PPA
- Small river ports are under the jurisdiction of the respective LGUs

5.3.3 Polloc Port

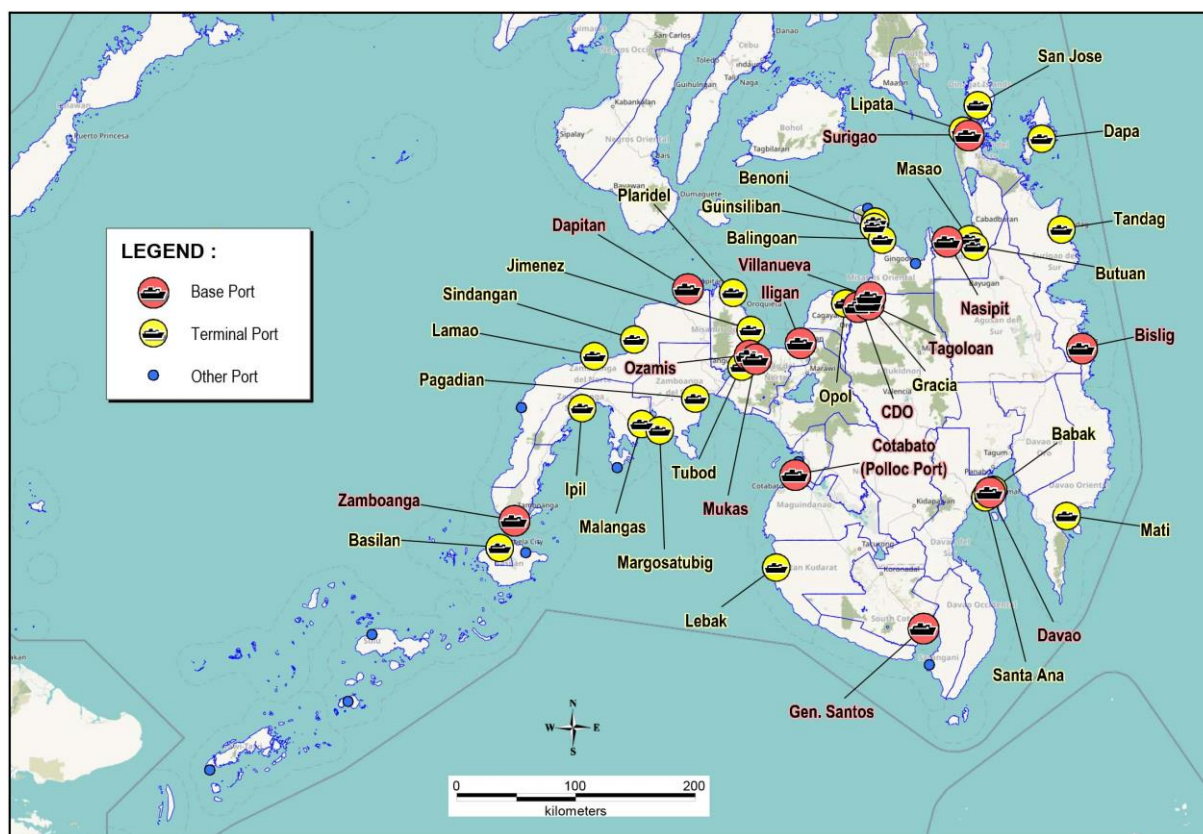
(1) Background

The construction of Polloc Port started in 1977 through a fund from ADB by a Korean company named “Nam Kwang Construction Company, Ltd.” Port operation was initially handled by the Philippine Ports Authority (PPA) beginning in March 1980 until 1987; and transferred to Department of Transportation and Communications - ARMM (DOTC-ARMM) during the creation of the said autonomous region. The administration of the facility was again transferred in 2010, upon the establishment of the Regional Economic Zone Authority (REZA). Up to this time, the REZA oversees the essential operations within the port.

Due to its strategic location, much of the economic activities that take place in Central Mindanao and BARMM rely heavily on Polloc Port. The port is situated in Parang, Maguindanao about 24 km. north of Cotabato City. Due to its central location, its hinterland service areas extend to provinces outside BARMM, particularly portions of North Cotabato and Sultan Kudarat.

Polloc Port has a strategic importance to Central Mindanao for being the only deep seaport with a water depth of 10.5 meters and wharf length of 400 meters. It has the capacity to accommodate as much as two 15,000 DWT foreign container vessels or two 15,000 DWT bulk vessels at the same time. The port is designated as a free port and has the following facilities: transit sheds, passenger terminal building, container yard and wide open area within the port compound. The

harbor is characterized by calm water throughout the year sheltered by the presence of Bongo Island, which blocks southwest induced waves.



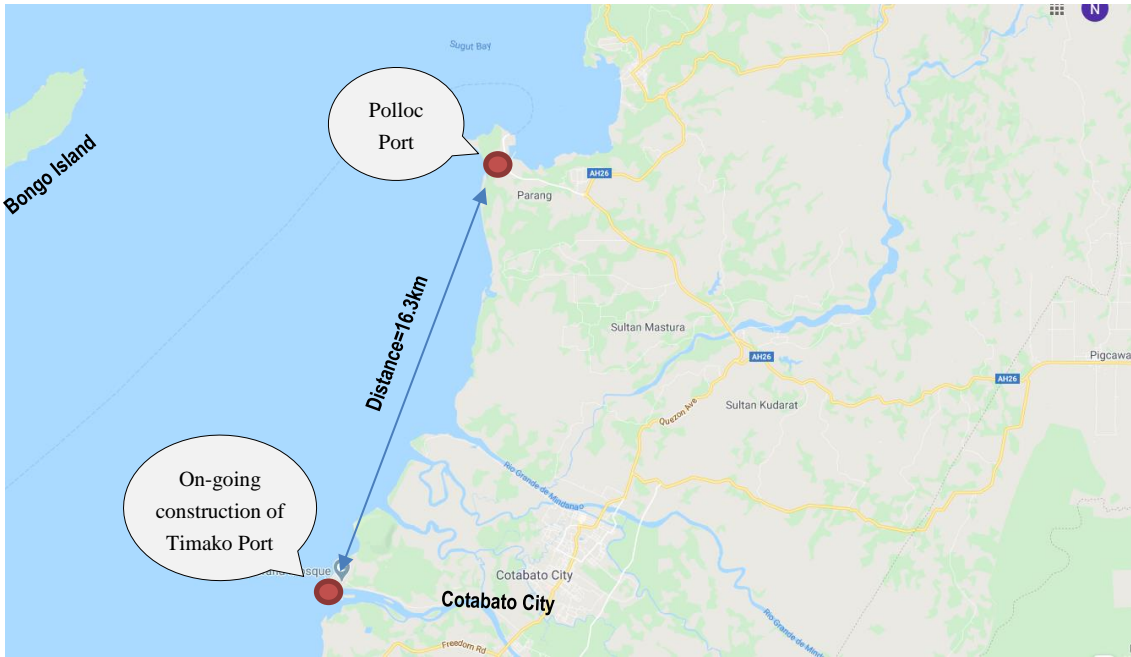
Source: Prepared by the JICA Study Team based on PPA data

Figure 5.3-2 Location Map of Polloc Port in Relation to Other Major Ports in Mindanao

Table 5.3-1 General Characteristics of Polloc Port

Description	Reinforced concrete general-purpose marginal wharf with two lighter docks on both sides
Location	Lat. 07' 21' 22" Long 124' 113'E of Polloc harbor
Port Limits	Entrance to Bay
Navigational approach	Mariga Bato Point
Entrance channel	Parang Channel
Turning basin	Polloc Anchorage
Types of cargoes handled	Conventional and containerized cargo
Area	119 hectares
Maximum number of vessels	4 vessels for Main Wharf and Lighter Dock
Pilotage	Compulsory pilotage for all vessels 25 GRT and above

Source: Polloc Freeport and Ecozone (PFEZ)



Source: JICA Study Team

Figure 5.3-3 Location Map of Polloc Port in Relation to Cotabato City and Timako Port



Source: Prepared by the JICA Study Team based on Aerial Photo of Polloc Port Administration

Figure 5.3-4 Aerial view of Polloc Port

Table 5.3-2 Technical Description of the Port Area and Support Facilities

Total Berth Length	
Marginal wharf	400 linear meters
Lighter dock	67 linear meters
Draft Limitation	
Main wharf	Depth: 10.5 m.
Lighter dock	Depth: 3.0 m.
Anchorage	No draft limitation
Total Back-up Area	
Open storage	42,940 sq. m.
Area for private warehousing	75,645 sq. m.
Parking area	23,364 sq. m.
Buildings	
Transit Shed 1	5,980 sq. m.
Transit Shed 2	5,980 sq. m.
Barter Trade Building	700 sq. m.
Passenger Terminal Building	600 passenger capacity
Port Police Building	700 sq. m.
Powerhouse	750 sq. m.
Weighbridge	60 tons capacity
Engineering/Navigational Aid	
Beacon light	1

Source: Polloc Freeport and Ecozone (PFEZ)

(2) Natural and Physical Advantage of Polloc Port

Polloc Port is situated in an ideal location where a cove can offer shelter to the ships and Bongo island can protect the facility from big violent waves. It is perhaps one of the best ports in the Philippines with respect to the following natural and physical conditions.

Table 5.3-3 Natural and Physical Environment Advantage of the Port

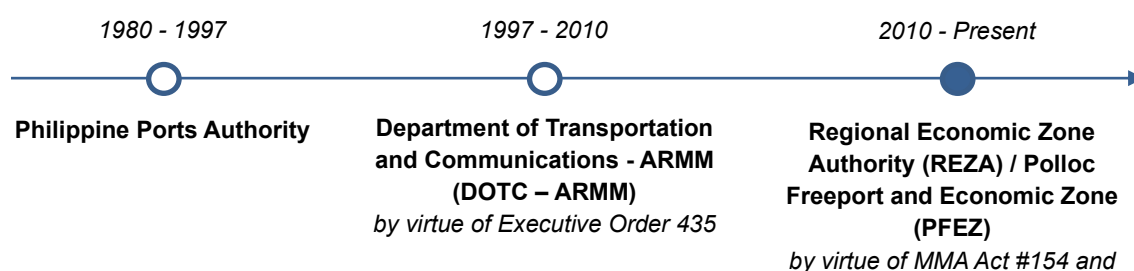
Parameters	Details
a. Wind	<ul style="list-style-type: none"> According to the wind rose analysis for the south of Cotabato taken from the daily data for the period 1971–2000, 43.5% of the time the wind directions are from the south with 43.4% ranging in 1–4 meters per second (mps), 0.1% in the range of 5–8 mps, and 0.0% greater than 8 mps. The prevailing wind direction throughout the year is south followed by north direction with wind speed 99.2% ranging in 1–4 mps.
b. Wave	<ul style="list-style-type: none"> No wave behavior data from direct measurement are available in the south of Cotabato, but according to interviews with concerned port authorities, no significant wave has occurred to prevent the port operation throughout the year. It should be considered that the port and marine structure be given adequate protection from destructive waves related to cyclonic activities. Polloc port is protected topographically from the southwest monsoon wave and sheltered from the west wave by the Bongo Island in front of the port.
c. Current	<ul style="list-style-type: none"> Current outside of the Moro Gulf is 0.01–0.02 knot based on the PAGASA data. Tidal current in front of the Polloc harbor is north to south during flood tide and south to north during ebb tide based on the Chart. It is expected that velocity in front of the Polloc harbor is small considering from the topographic point of view.

Parameters	Details
d. Water depth of the approach to the port	<ul style="list-style-type: none"> Water depth around the Polloc port is suitable for ship anchorage and maneuvering for docking to the berth. Water depth can reach 4,000 m at 80 km to the southwest from the Polloc port, and 400 m within 7 km near the port and the depth of the Polloc harbor in front of berth is 40 m.
e. Siltation issues	<ul style="list-style-type: none"> There is no siltation problem as no large river flows around the port and no littoral drift from outside of the Polloc harbor.
f. Accessibility to the port	<ul style="list-style-type: none"> Polloc port is accessible by land from Cotabato City through a 24-km modern 2-lane concrete paved road.
g. Accessibility to major cities in Mindanao	<ul style="list-style-type: none"> Polloc port has established good road connection with other major cities in Mindanao (Marawi City, Iligan City, Pagadian City to the north, Kidapawan City, Digos City, Davao City to the east, and Tacurong City, Koronadal City and General Santos City to the south).
h. Central location in view of Mindanao and BIMP-EAGA	<ul style="list-style-type: none"> Polloc port is centrally located in Mindanao with hinterland area of Maguindanao, portions of North Cotabato (including productive plain of Liguasan Marsh), Sultan Kudarat, and Lanao del Sur. The port is facing the Celebes Sea which is directly connected to the old trading routes of Malaysia (Sabah), Brunei, and Indonesia (Sulawesi).

Source: Modified from the JICA's *Bangsamoro Development Plan-2 (2016)*

(3) Operation and Management of Polloc Port

Polloc Port commenced full operations in 1980 under the management of the Philippine Ports Authority (PPA). By virtue of Executive Order No. 435 in 1997, the management was transferred to then-DOTC-ARMM. In March 2010, Polloc Port was converted into a freeport, following the passage of Mindanao Muslim Authority (MMA) Act No. 154, Proclamation No. 1. The port is currently managed by the Polloc Freeport and Ecozone (PFEZ), with a declared annual budget of PhP 12.9 million (2019). The PFEZ undertakes the development and essential operations of the port facilities. Figure 5.3-5 shows the chronology of the management of Polloc Port.



Source: *Polloc Freeport and Ecozone (PFEZ)*

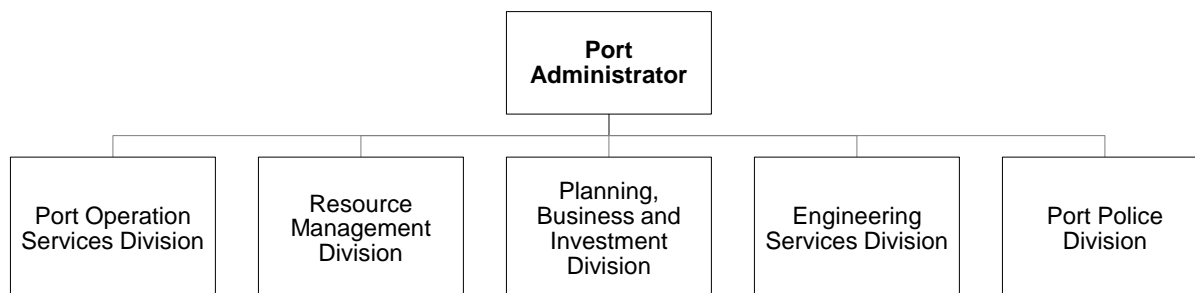
Figure 5.3-5 Chronology of the Management of Polloc Port

Figure 5.3-6 shows the satellite view of the 119-hectare lot covered by Polloc Freeport and Ecozone. Figure 5.3-7 shows the organization of the PFEZ.



Source: Polloc Freeport and Ecozone, presentation material by the Polloc Port Administrator

Figure 5.3-6 Area of Polloc Freeport and Economic Zone



Source: Polloc Freeport and Ecozone (PFEZ)

Figure 5.3-7 Organizational Structure of the PFEZ

The Bangsamoro Terminal Services, Inc. (BTSI), formerly known as PTC Mindanao Services, Inc., is the exclusive private entity, contracted to manage and operate the cargo handling operations in Polloc Port. The BTSI is responsible for providing cargo handling equipment and manpower, and shall undertake the following services:

- Loading and unloading of cargoes to and from the vessel
- Loading and unloading of cargoes to and from the shipper’s or consignee’s truck
- Transport of cargoes between the apron and yard
- Re-stowing of cargoes within the yard
- Stacking of cargoes at the yard and stowing of cargoes inside the vessels

Table 5.3-4 shows the summary of key stakeholders involved in Polloc Port.

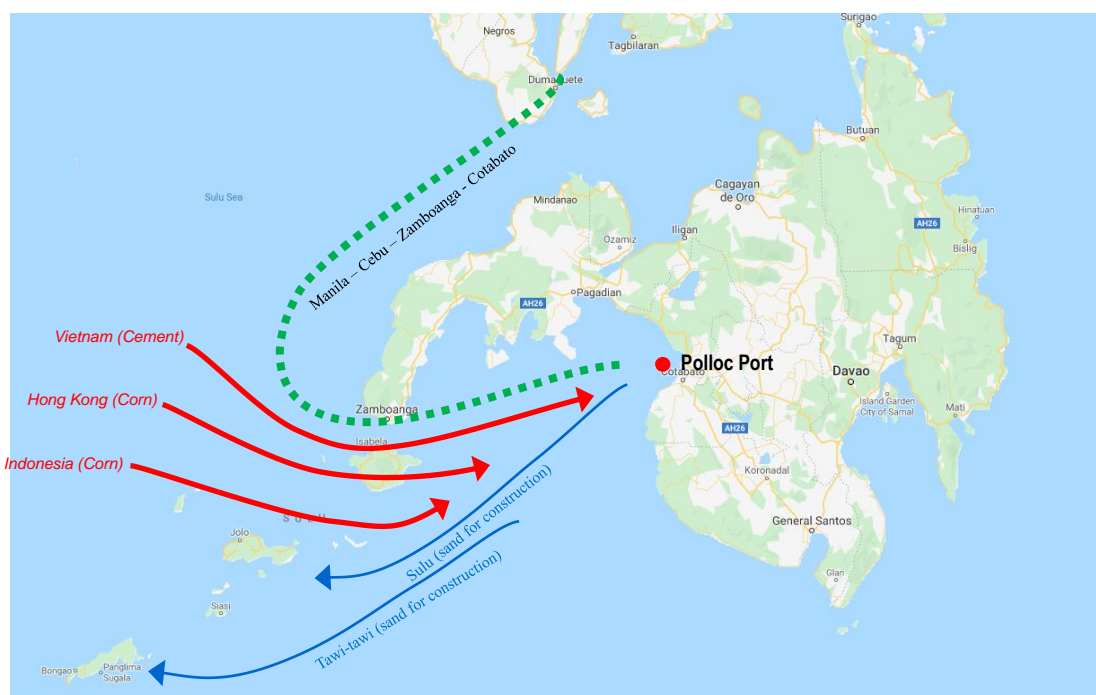
Table 5.3-4 Key Stakeholders Involved in the Operations of Polloc Port

a. Shipping Line Companies	Philippine Span Asia Carrier Corporation Lorenzo Shipping Corporation
b. Harbor Pilotage Services	United Harbor Pilot Association of the Philippines (UHPAP)
c. Cargo Handling Operator	Bangsamoro Terminal Services, Inc. (BTSI)
d. Trucking Hauling Services	Bangsamoro Terminal Services, Inc. (BTSI) Sunrise Marketing Maxie Boy Trucking Jades Cargo MKN Forwarder Cotabato Excel Hardware Datz Hauling Services Fast Cargo Logistic Corp. Merchantile Lueia Arise Marketing Southern Mountain Transport Logistic Corporation
e. Shippers	Lamsan Trading Inc. Philippine Trade Center Inc. Minrico Lumber Ent. Co. Inc. R&T Marketing Cotabato City Sunrise Marketing Inc. Cotabato Union Hardware Co. Inc. LCT Hardware Co. New City Hardware Co. Pacific Enterprises Sugni Super Store Isulan ECT
f. Port Users	LAMSAN Incorporated HUAMING Shipping Corp. (MCM) FMCM Cotabato Corp. (MCM) JAMEN Enterprises (MCM) LTI Enterprises (MCM) HALONG Phil. (MCM) A.F. UMEREZ Enterprises (MCM) JMI Sand and Gravel Supply Usop Aron Sand and Gravel STN2 Corp. WFP United Nation World Food Programme PUTRI MEGA Constructions and Supply
g. Locator	Power Up Ventures (Petroleum depot)
h. Watering Services	Polloc Freeport Water Reservoir
i. Relevant National Government Agencies in its operation	Bureau of Customs (BOC) Bureau of Immigration (BI) DOH (Quarantine Services) Philippine Coast Guard (PCG) Philippine Maritime Police (PMP) 1st Marine Brigade - Philippine Marine Corps

Source: Polloc Freeport and Ecozone (PFEZ)

(4) Current Sea Routes Served by Polloc Port

Currently, the port has established maritime links with Manila (via Cebu or Zamboanga) and foreign countries such as Indonesia, Vietnam, and Hong Kong as presented in Figure 5.3-8. The port has also established inland freight corridors to/from areas in Mainland Mindanao such as Lanao del Sur, Sultan Kudarat, and North Cotabato as part of its economical hinterland area. The list of foreign vessels which visited the port from 2018 to the early part of 2020 is available in Table 5.3-5.



Source: Prepared by the JICA Study Team based on the data from Polloc Freeport and Ecozone (PFEZ)

Figure 5.3-8 Current Sea Routes of Polloc Port

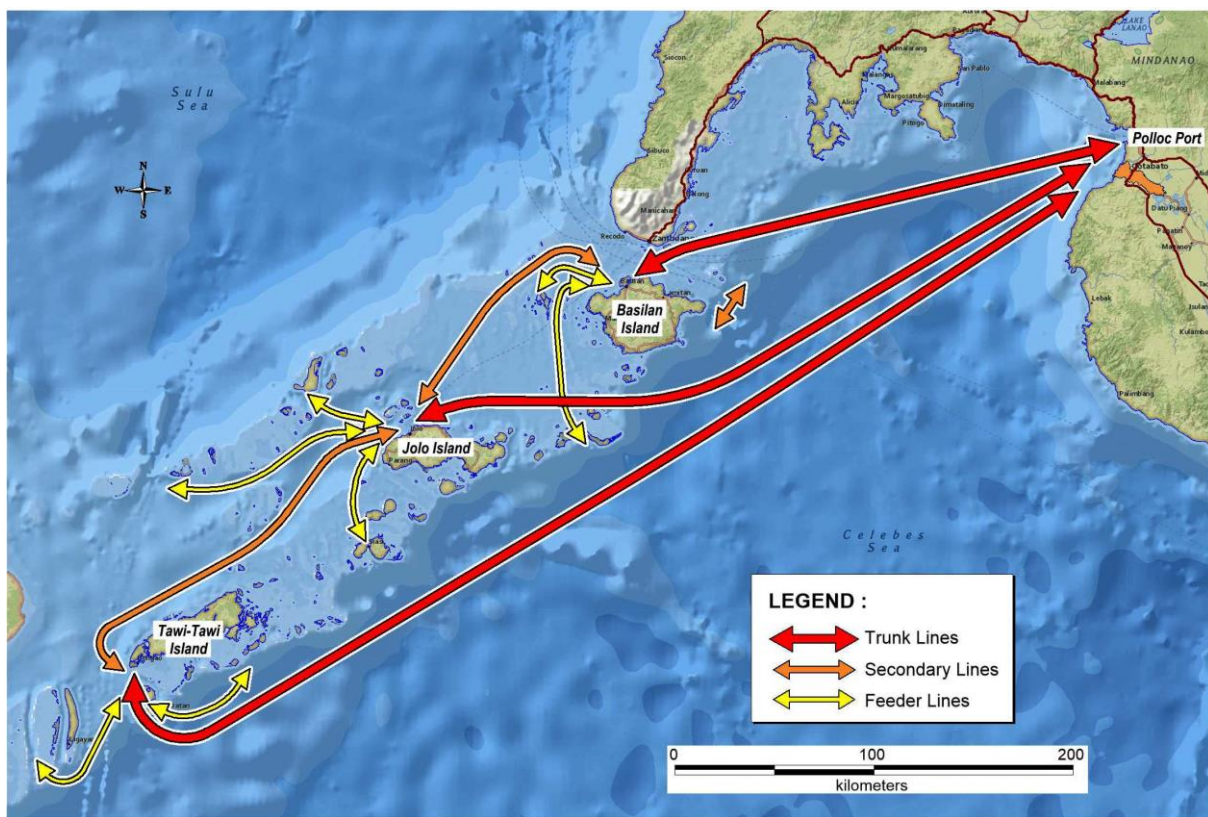
Table 5.3-5 Foreign Vessel Arrivals at Polloc Port (2018-2020)

Date of arrival	Name of ship	Country of origin	Type of commodity	Volume
Jan. 28, 2018	MV VINASHIP	Vietnam	Cement	12,333.35 MT
Mar. 31, 2018	MV MERIT	Vietnam	Portland Cement	17,000 MT
Apr. 1, 2018	MV TAY SON 2	Hong Kong	Corn	12,500 MT
May 3, 2018	MV TAY SON 2	Indonesia	Corn	12,700 MT
May 26, 2018	MV SEA DRAGON	Indonesia	Corn	6,600 MT
Jun. 2, 2018	MV MBC ROSE	Indonesia	Corn	12,350 MT
Jun. 15, 2018	MV GUO SHUN	Vietnam	Cement	12,500 MT
Jun. 28, 2018	MV GOLDEN OCEAN V	Vietnam	Cement	12,500 MT
Sep. 3, 2018	MV DORIS	Vietnam	Halong Cement	20,999 MT
Dec. 16, 2018	MV SHENG LE A	Vietnam	Cement	17,000 MT
Jan. 29, 2019	MV BMC CATHERINE	Vietnam	Cement	22,500 MT
Apr. 4, 2019	MV BMC CALYPSO	Vietnam	Cement	22,500 MT
Jun. 13, 2019	MV HO BAO	Vietnam	Cement	22,500 MT
Jul. 7, 2019	MV GREAT WENSHAN	Vietnam	Cement	25,150 MT
Feb. 20, 2020	MV PHOUNG DONG	Vietnam	Cement	21,100 MT
Mar. 20, 2020	MV TAY SON 1	Vietnam	Cement	6,000 MT

Source: Polloc Freeport and Ecozone (PFEZ)

Within the BARMM, it is envisioned that in the future, Polloc Port will establish a shipping line to serve the island provinces of Basilan, Sulu, and Tawi-tawi. These islands under the jurisdiction of BARMM are known to be rich in agricultural resources and fisheries. With plans to develop special economic zones (SEZ) in each of these islands, an agri-industrial corridor could potentially be established within the region.

The port has recently been declared by BARMM as a halal hub and could serve as a future gateway for the export of Mindanao-produced halal food products to the Middle East and Singapore. There were also plans to develop Bongao port in Tawi-tawi, which is expected to expand trade routes within member states of the Brunei – Indonesia – Malaysia – Philippines East ASEAN Growth Area (BIMP – EAGA).

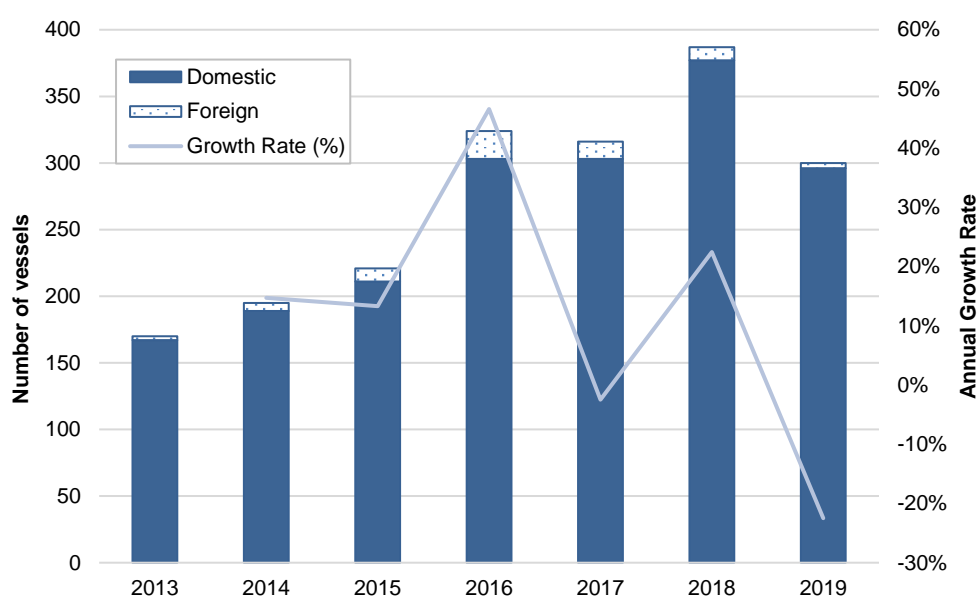


Source: *Bangsamoro Development Plan – 2 (2016)*

Figure 5.3-9 Envisioned Future Sea Routes within BARMM

(5) Number of Ship Calls and Freight Volume

Polloc Port caters to both containerized and non-containerized cargoes, with no record of passenger traffic since 2012. The PFEZ recorded 300 ship calls in 2019, translating into an annual average increase of 9% since 2014. In 2017, the arrival of foreign vessels had been temporarily restricted, following the implementation of Martial Law in Mindanao. There was a total of 16 foreign vessel arrivals (see Table 5.3-5) from January 2018 to March 2020, most of which carried imported corn and cement from Indonesia and Vietnam, respectively. The corn are imported by Lamsan Inc., a corn starch factory located in the municipality of Sultan Kudarat, Maguindanao due to the insufficiency in the supply of yellow corn in Mindanao and the rest of the country. The shortage of corn supply is partly due to the expansion of milling capacity of the said company from 500 tons/day to 1,000 tons/day.



Source: Polloc Freeport and Ecozone (PFEZ)

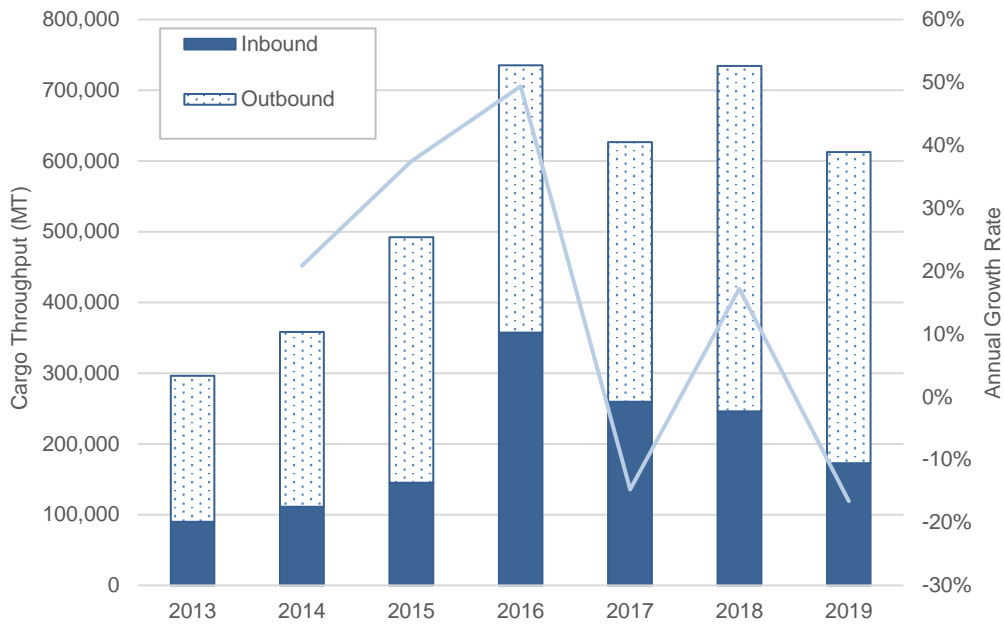
Figure 5.3-10 Number of Vessels Per Year Handled by the Port (2013-2019)

The total cargo throughput recorded in 2019 was 612,468 MT, down by 17% from the previous year. Despite of this, the volume of cargo handled still increased by an average annual rate of 11.3% over a five-year period (2014 to 2019). Outbound commodities consistently outnumbered incoming cargoes since 2013. In 2019, outbound cargoes accounted for 72% of the total volume handled by the port. The list of major inbound and outbound commodities is shown in Table 5.3-6 .

Table 5.3-6 Top Inbound and Outbound Commodities Passing Through Polloc Port

Top Inbound Commodities	Top Outbound Commodities
Cement	River sand
Rolling cargoes	Cement
Coco dust	Plywood
Non-prime commodities	Rolling cargoes
Containerized cargoes	Containerized cargoes

Source: Polloc Freeport and Ecozone (PFEZ)



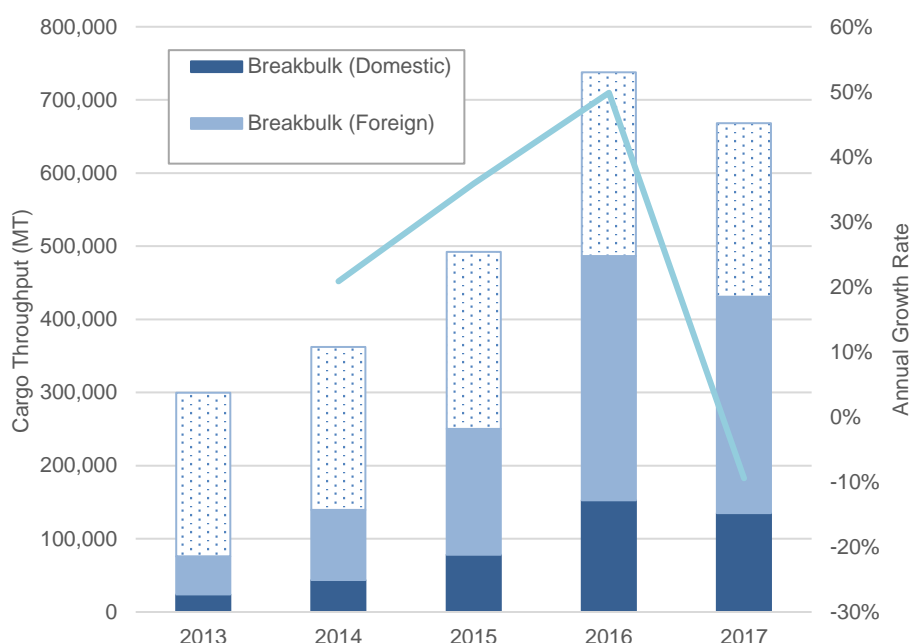
Note: Arrival of foreign cargoes decreased in 2017, following the implementation of Martial Law in Mindanao
Source: Regional Economic Zone Authority (REZA)

Figure 5.3-11 Annual Cargo Throughput of Polloc Port, Per Flow of Cargo (2013-2019)

Figure 5.3-12 shows the historical freight volume handled by the port, categorized per type of cargo. In 2017, breakbulk cargoes accounted for 65% of the total cargo throughput. Incoming foreign commodities comprised 69% of the breakbulk volume (431,157 MT). The volume of breakbulk cargoes was observed to be growing at a rapid rate of 54% per annum (2013 to 2017).

In contrast, the volume of containerized cargoes grew at a slow and steady annual rate of 1.4% from 2013 to 2017. On average, 600 to 650 containers are shipped out domestically every month via Polloc Port².

² Technical Feasibility Study and Master Planning for the Upgrading of Polloc Port (October 2018)



Note: Arrival of foreign cargoes decreased in 2017, following the implementation of Martial Law in Mindanao

Source: Polloc Freeport and Ecozone (PFEZ)

Figure 5.3-12 Annual Cargo Throughput of Polloc Port, Per Type of Cargo (2013-2017)

(6) Revenue

Polloc Port collects charges from every entering vessel to cover the cost of port infrastructure. The port usage fees, as indicated in Table 5.3-7, are imposed on vessels for the use of berthing facilities and are set based on the gross registered tonnage (GRT) of the vessel and the corresponding period that it needs to stay at the port.

Table 5.3-7 Port Usage Fees Imposed on Vessels by Polloc Port

Foreign Vessel Rate	
Port Dues	GRT x USD 0.081 (per ship call)
Dockage at Berth	GRT x USD 0.039 (per day)
Dockage at Anchorage	GRT x USD 0.020 (per day)
Domestic Vessel Rate	
Port Dues	GRT x PhP 0.80 (per day)
Dockage at Anchorage	GRT x PhP 0.40 (per day)

Source: Polloc Freeport and Ecozone (PFEZ)

In addition, fees are also imposed on cargo owners for the use of the back-up area of the port, including portion of the apron, storage facilities, and access roads within the yard. The wharfage fees, as shown in Table 5.3-8, vary depending on the volume and type of cargo.

In 2019, the PFEZ reported a collected income of PhP 21.8 million (excluding income generated by the Bureau of Customs). This translates to an average annual growth rate of 14.29% over the past five-year period (2014 – 2019).

Table 5.3-8 Wharfage fees collected by Polloc Port (PhP)

Foreign Wharfage Due	
Non-containerized cargoes – Imported	
Per Metric Ton	36.65
Per Revenue Ton	30.55
Non-containerized cargoes – Exported	
Per Metric Ton	18.35
Per Revenue Ton	15.25
Containerized cargoes – Imported	
20 ft container	519.35
35 ft container	656.85
40 ft container	779.05
45 ft container	916.50
Containerized cargoes – Exported	
20 ft container	259.70
35 ft container	329.00
40 ft container	391.00
45 ft container	458.25
Domestic Wharfage Due	
Non-containerized cargoes	
Per Metric Ton	9.00
Per Revenue Ton	7.00
Containerized cargoes	
10 ft container	63.00
20 ft container	126.00
40 ft container	252.00

Source: Polloc Freeport and Ecozone (PFEZ)

Table 5.3-9 Income collected by Polloc Port (2013-2019)

Type of income	Amount ('000 PhP)						
	2013	2014	2015	2016	2017	2018	2019
Collected income	9,401	11,192	12,592	27,945	26,631	27,668	21,825
Income generated by the BOC	75	19,221	91,052	134,849	36,959	102,185	30,397

Source: Polloc Freeport and Ecozone (PFEZ)

(7) Port Utilization

Berth occupancy is a useful parameter to determine the utilization of port facilities. It is expressed in terms of the ratio between the actual meter-hours spent by vessels at the berth, and the maximum available meter-hours per year. The berth occupancy rate (BOR) is computed through the following equation:

$$\text{BOR} = \frac{\text{actual service time}}{\text{maximum berth time}} = \frac{\text{ship calls} * \text{ave. service time} * \text{ave. length of vessels} * \text{spacing factor}}{\text{effective total berth length} * 8,760 \text{ hours per year}}$$

Table 5.3-10 Berth Occupancy Rates of Polloc Port in 2013 and 2017

	2013	2017
Berth occupancy rate (%)	43.51	57.76
Actual service time (m-hr.)	15,246	15,179
Maximum berth time (m-hr.)	35,040	26,280

Source: Technical Feasibility Study and Master Planning for the Upgrading of Polloc Port (Oct. 2018)

A high berth occupancy rate suggests that more vessels make use of the port’s facilities, but this may result into excessive queuing and reduced quality of service rendered. On the other hand, a very low occupancy rate of berths is not acceptable to port operators as it will lead to the under-utilization of port facilities. Therefore, a tradeoff would be necessary to balance the interests of both port operators and shipping line owners. The United Nations Conference on Trade and Development (UNCTAD) has released a list of suggested optimal berth occupancy rates (Table 5.3-11) based on the number of available berths at the port.

Table 5.3-11 Recommended Berth Occupancy Ratios

Number of available berths	1	2	3	4	5	6	7	8	> 9
Recommended Berth Occupancy Rate (%)	45%	50%	55%	60%	63%	65%	67%	69%	70%

Source: United Nations Conference on Trade and Development (UNCTAD)

The number of available berths at Polloc Port was computed using historical data provided by the PFEZ. The current berth length is 400 meters and has not been extended since the port was completed in 1980. On the other hand, the average length of vessels catered by the port has increased from 90 meters in 2013 to 120 meters in 2017. Using this information, the increased length of ships resulted in a lower effective number of berths (i.e. maximum number of vessels that the berth can accommodate at the same time) from four (4) in 2013 to three (3) in 2017.

The computed berth occupancy rate of Polloc Port in 2013 was 43.51%, while the allowable standard for ports with four available berths is 60%. This suggests that the port has been underutilized when it reopened.

In 2017, the occupancy rate increased at 57.76%, which is beyond the optimal value recommended by UNCTAD for ports with three available berths (55%). This indicates that congestion is starting to build up at Polloc Port. With cargo throughput projected to further increase based on current trend, the level of service is expected to drop unless expansion of berthing facilities takes place.

(8) Future Development Plans (Short-term Plan and Long-term Plan)

In 2018, a feasibility study entitled “Technical Feasibility Study and Master Planning for the Upgrading of Polloc Port” was undertaken by a local consultant through the efforts of the DPWH-ARMM. Basically, the study covered short-term and long-term plans. To execute the identified projects in both plans, about PhP 2.21 Billion would be needed to cover construction costs and indirect costs (Detailed engineering cost, Tender assistance cost, Project administration cost, etc.). Accordingly, the number of ship calls in Polloc Port is projected to increase to 380 ships per year by 2028, handling a total annual cargo volume of 1.3 million MT. By 2043, these figures are expected to further increase to 1,152 vessels per year, carrying an annual cargo volume of 3.4 million MT.

In anticipation of the future short-term (2028) demand, an extension of the berthing facilities by around 200 linear meters was proposed. This would allow the port to accommodate 4 general cargo ships and 1 container vessel at the same time. In addition, the existing wharf will have to be rehabilitated to facilitate more efficient berthing and cargo handling. The components of the proposed project development include the following:

- *Expansion of existing wharf* – this involves the construction of additional berthing facilities by 200 meters (35 meters of apron) to accommodate projected volume by 2028
- *Rehabilitation and upgrading of existing wharf* – this requires reconstruction of fender beams, rehabilitation of concrete piles and replacement of worn out bollards
- *Dredging and reclamation works* – dredging along the harbor basin will be carried out to a depth of about 11 meters, allowing the port to accommodate foreign cargo and container vessels of about 20,000 to 25,000 DWT.
- *Bulk terminals* – bulk terminals of about two (2.0) hectares each shall support the import and export of bulk commodities, such as fuel and other oil products, corn, cement, and sand (commonly exported to BARMM island provinces).
- *Rockworks* – rockworks shall be undertaken to provide the reclaimed land protection and stability from strong waves.
- *Gated complex* – two gates with two lanes (width: 3.25 m.) each have been proposed to facilitate easier flow of trucks in and out of the port.

The summary of the required port facilities and project cost are shown in Table 5.3-12 and Table 5.3-13, respectively. The site development plans for the short and long-term are shown in Figure 5.3-13 and Figure 5.3-14, respectively.

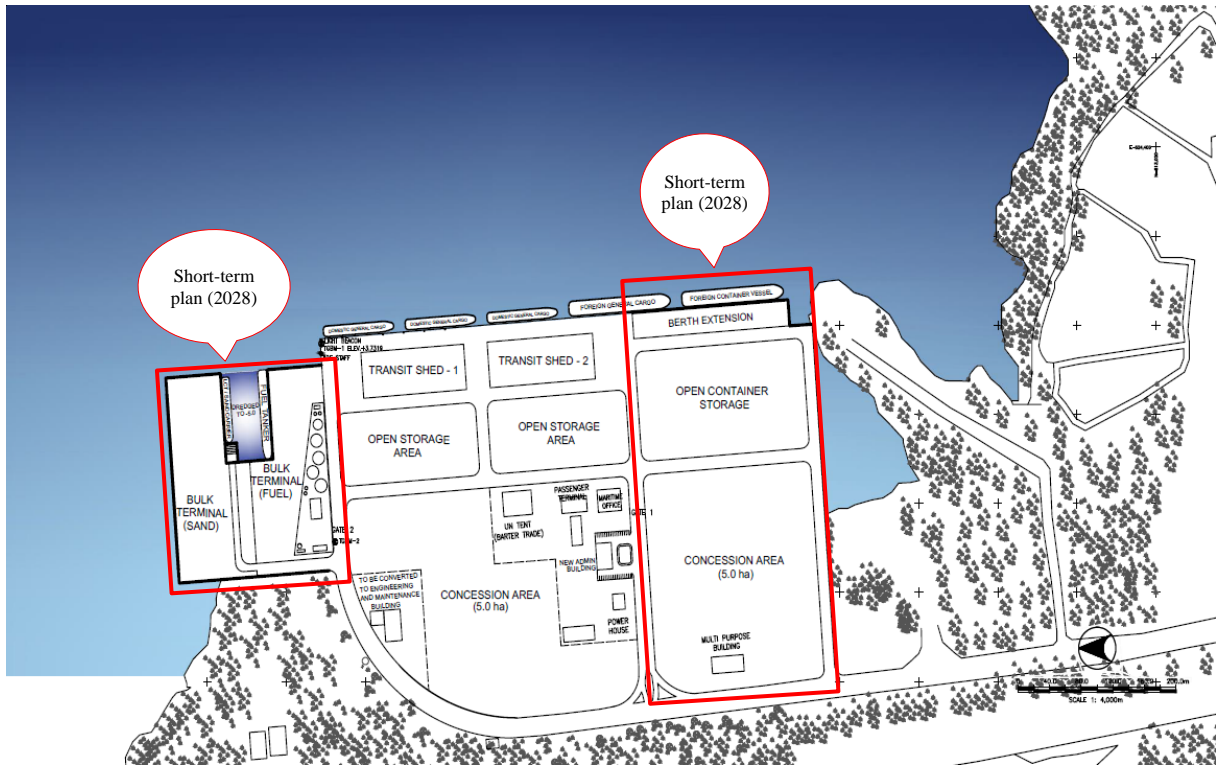
Table 5.3-12 Summary of Required Port Facilities (Both Short-term and Long-term Plans)

Facilities	Scale of port development	
	Short-term plan (design year: 2028)	Long-term plan (design year: 2043)
Berth length (meters)		
a. Container berth	88.00	110.00
b. General cargo berth	486.00	780.00
c. Total	574.00	890.00
d. Current facilities	400.00	400.00
e. Required facilities	174.00	490.00
Container yard (TEU slots)		
a. Domestic containers	100.00	140.00
b. Foreign containers	42.00	671.00
c. Total	142.00	811.00
Closed storage (sq. m.)		
a. Domestic cargo	2,200.00	4,400.00
b. Foreign cargo	7,300.00	6,500.00
c. Total	9,500.00	10,900.00
d. Current facilities	13,000.00	13,000.00
e. Required facilities	-	-
Open storage (sq. m.)		
a. Domestic cargo	2,000.00	5,300.00
b. Foreign cargo	6,630.00	7,940.00
c. Total	8,630.00	13,260.00
d. Current facilities	15,000.00	15,000.00
e. Required facilities	-	-
Gated complex		
a. Number of gates	2	2
b. Number of lanes	4	5

Source: Technical Feasibility Study and Master Planning for the Upgrading of Polloc Port (Oct. 2018)

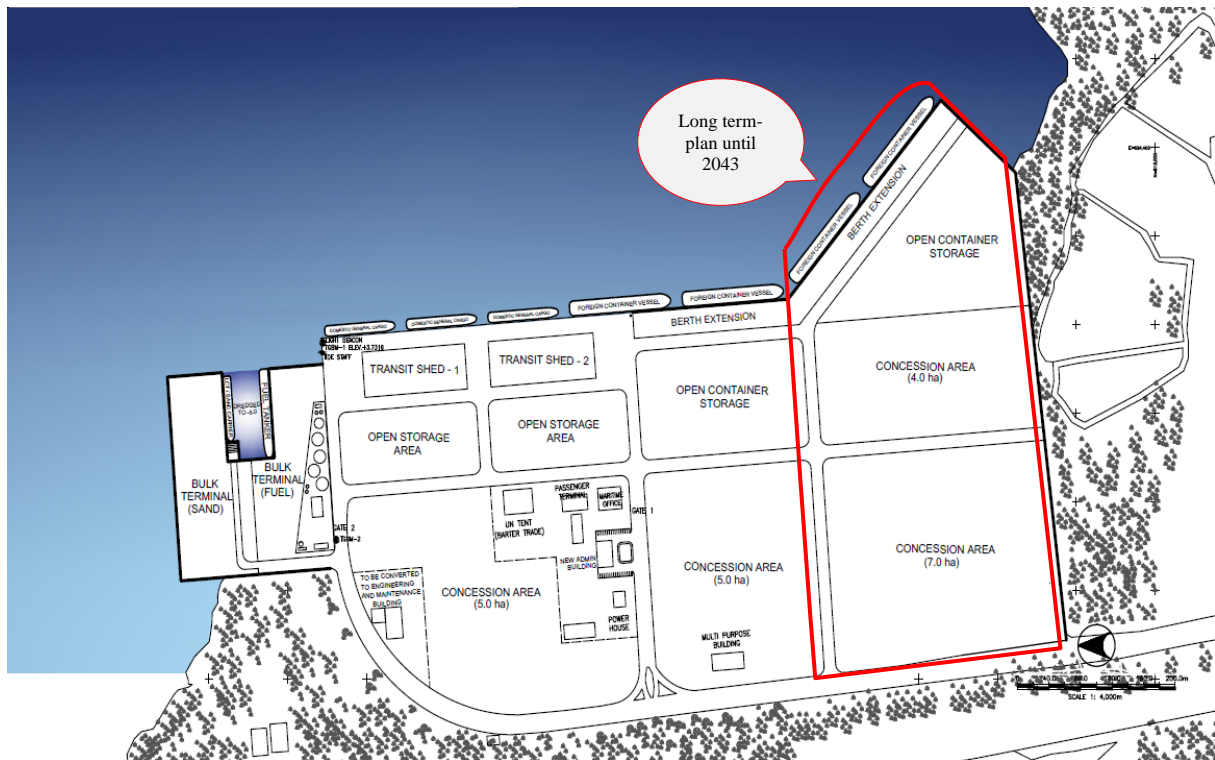
Table 5.3-13 Summary of Preliminary Project Cost (Both Short-term and Long-term Plans)

Item of work		Amount (PhP)
I. Preparatory works		19,746,776.00
Item 1	Mobilization/Demobilization	8,450,000.00
Item 2	Temporary works	9,946,776.00
Item 3	Site survey	1,350,000.00
II. Basic port facilities		1,886,894,736.00
Item 1	Foreign container berth expansion	829,862,900.00
Item 2	Rehabilitation/upgrading of existing wharves	153,500,000.00
Item 3	Bulk vessel berth	206,277,336.00
Item 4	Dredging works	198,750,000.00
Item 5	Reclamation works	175,000,000.00
Item 6	Rockworks	323,504,500.00
III. Civil works		152,862,025.18
Item 1	Pavement and landscaping	92,781,250.00
Item 2	Drainage and sewerage system	22,588,464.46
Item 3	Water supply (fresh/sea water)	37,492,310.72
IV. Building works		52,671,147.80
Item 1	Administration office building	47,983,372.00
Item 2	Guard house	1,837,775.80
Item 3	Gates	2,850,000.00
V. Port lighting/telecommunication works		65,000,000.00
Item 1	Port lighting/telecommunication	65,000,000.00
VI. Detailed Engineering Design		34,500,000.00
Item 1	Detailed Engineering Design (inc. site investigation works)	34,500,000.00
Total		2,211,674,684.98



Source: Technical Feasibility Study and Master Planning for the Upgrading of Polloc Port (Oct. 2018)

Figure 5.3-13 Short-term Development Plan for Polloc Port (2028)



Source: Technical Feasibility Study and Master Planning for the Upgrading of Polloc Port (Oct. 2018)

Figure 5.3-14 Long-term Development Plan for Polloc Port (2043)

(9) Urgent Plan for Polloc Port

A meeting with the current Port Administrator revealed that aside from the projects included in the 2018 masterplan, additional projects have been identified to urgently address the increasing freight volume handled by the port and the subsequent increasing demand for warehousing.

- Construction of 1-unit industrial warehouse at least 5,520 sq.m (L = 120 m, W = 46 m) Cost: PhP 120M
- Installation of new complete electronics weighbridge station with a capacity of 70 tons Cost: PhP 3M

5.3.4 Timako Port (Construction is On-going)

Overview

The construction of the Timako Port was identified by the City Government of Cotabato as its priority infrastructure project. The project is also contained in the SOCCSKSARGEN or Region XII 2017 – 2022 Regional Development. The seaport facility which is ongoing construction is situated along the coastline of Timako Hill facing the Illana Bay. The port, once completed, will provide a passenger terminal and international cargo handling and storage facilities.

About PhP 90 Million from the Philippine Ports Authority (PPA) corporate funds was made available for the implementation of Timako Port Development Project Phase 1. However, Phase 1 only covers the construction of rock causeway and a Roll On – Roll Off (RoRo) ramp and the funding for the construction of other facilities is yet to be secured.

Short-term and Long-term development plan

The site development plans for the short and long-term are shown in Figure 5.3-15 and Figure 5.3-16, respectively.

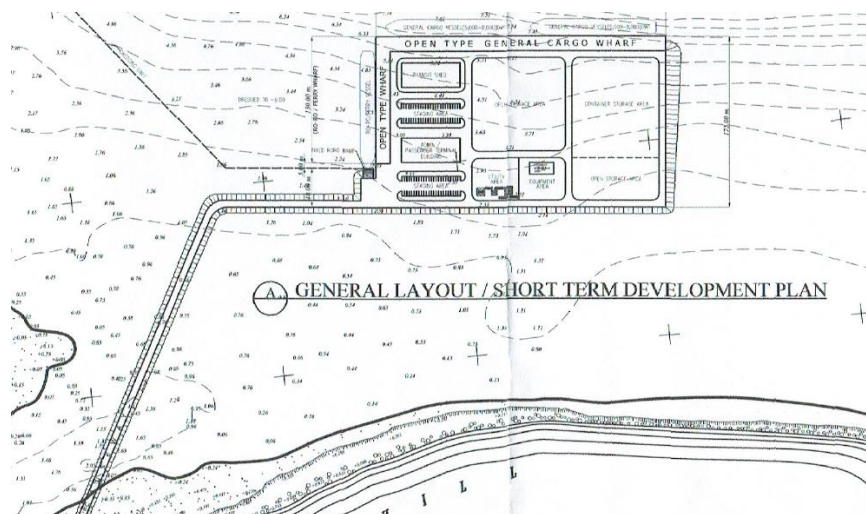


Figure 5.3-15 Short-term Development Plan for Timako Port

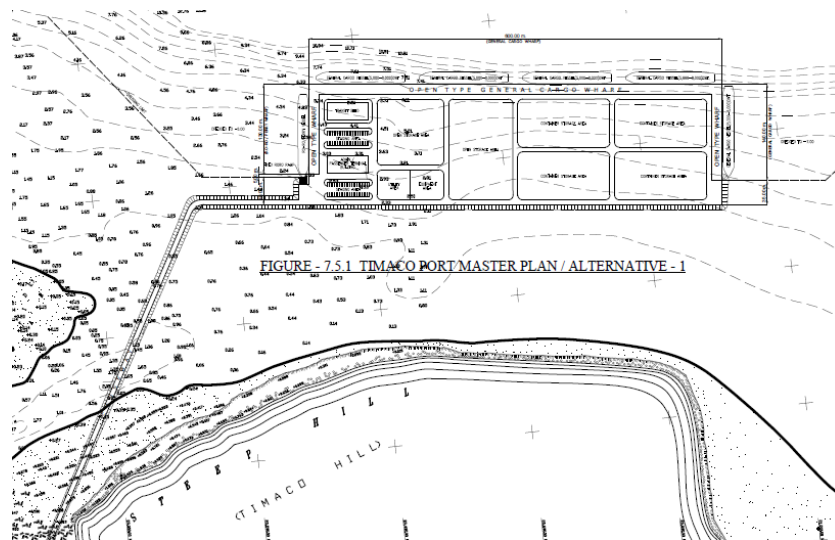


Figure 5.3-16 Long-term Development Plan for Timako Port (2036)

Progress of the Project

Staff of the JICA Study Team visited the project site on 3 June 2020, in coordination with the City Government of Cotabato to understand the present condition of the project. It was learned from the Resident Engineer of Victoriano C. Lim Construction, an Ozamis City-based firm undertaking the project, that the Phase 1 of the project involves the construction of about 300 meters rock causeway which started in 2007. The Resident Engineer estimated that Phase 1 of the project is about 80% complete and is expected to be finished by September 2020. The access road leading to the port was constructed by the DPWH-12.

Proposal for China Assistance to complete the project

There is no additional fund committed by the PPA for the construction of the other remaining components, such as the terminal buildings (both for cargo and passenger), administrative building, main wharf and its auxiliary facilities (e.g. fenders, transit shed, warehouse and other facilities). For this reason, the City Government of Cotabato has solicited the assistance of the Government of China for the completion of the project. Accordingly, a Shenzhen-based construction company has expressed interest to undertake the project under a Public-Private Partnership (PPP) scheme with the Cotabato City Government.

Issues

The following issues relevant to the project have been identified:

- **Budget** – only Phase 1 has budget allocation from the PPA, hence it is difficult to predict the target date of completion and start of operation of the port.
- **Delay of the project** – revision of plan was made due to land title issues which delayed the project implementation. Similarly, due to this revision, the starting point of causeway is offset by 40 meters north away from the access road constructed by the DPWH-12.

- **Clarity of detailed plan and funding from the company in China** – although it was initially reported that a Shenzhen – based company has expressed an interest to undertake the project under a PPP scheme, a detailed work plan, which could provide a definite scope and timeline of the project, has not yet been prepared.
- **Relationship with Polloc Port** – the distance between the two (2) ports is just about 16.3 kilometers, hence the two facilities will have overlapping hinterland area. The role of each port must be clearly defined to ensure synchronized operations and avoid unwanted competition.



Port Causeway/Trestle leading to the main wharf (29.6m)



Port Causeway/Trestle



Revetment of Causeway



Backfilling of Causeway (On-going)



Port surroundings during low tide



Condition of the of the access road (40m offset)

Figure 5.3-17 Current Condition of Timako Port (Phase 1)

5.3.5 Major Issues in Port Development

Major issues that have to be addressed concerning port development in Cotabato City and surrounding areas are discussed below.

- 1) Securing Fund to Complete the Timako Port Project** – As previously mentioned, the committed fund of PHP 90 Million is just for Phase 1, which only covers the construction of rock causeway (296 m) and a Roll On – Roll Off (RoRo) ramp. Securing additional fund for the construction of additional facilities to complete the project would be necessary.
- 2) Defining the Role Sharing between Polloc Port and Timako Port** – As mentioned earlier, it is important to initiate discussion among related government agencies regarding the role sharing between the two ports, with the goal of synchronizing operations. A possible demarcation may involve one port handling international freight (if there is sufficient volume) and the other port handling regional and national freight. Another way of defining the roles of the two ports is by dedicating one port for containerized cargoes, and the other for bulk cargoes. These possible demarcations would highly depend on the volume and type of cargoes imported to/exported from the hinterland area.
- 3) Continued Revitalization of Polloc Port** – Over the years, the level of port operation has shrunk. This resulted to shippers in Bangsamoro patronizing other ports in Mindanao, particularly the Sasa port of Davao, Macabalan port of Cagayan de Oro and Makar wharf of General Santos. A revitalized port will position the facility to capture back this port traffic including the shipping of agricultural exports (e.g. banana, mango, palm oil products, industrial cassava, rubber, corn, etc.) from BARMM.
- 4) Urgent Repair of Steel Pipes Supporting the Concrete Deck** - The BDP-2 undertook a comprehensive examination of the condition of port structure. In general, the main berth structure is in fine condition despite more than three decades of service, with the exception of some minor damage/deterioration. However, the upper portions of the steel pipes supporting the concrete deck have corroded. In addition, some portions of the concrete cover have been peeled off, with the exposed re-bars showing signs of corrossions as well. To this day, these have not been repaired. It would be important to repair the pile head immediately to protect the re-bars from further corrosion.
- 5) Encroachment inside the Polloc Freeport Ecozone:** Polloc port has a plan to further expand the facility in 2028 (short-term plan) and 2043 (long-term plan). The area dedicated for expansion will affect the informal settlers. According to the 2018 FS, about 30 to 40 households will be affected. Accordingly, REZA has secured a relocation site in coordination with the Parang Municipality LGU.
- 6) Attracting More Locators in the PFEZ:** In 2010, through a law called the ARMM Special Economic Zone Act of 2003, Polloc port was declared a free port/zone, making it a non-Customs territory. Investors are granted tax exemptions, as well as duty free importations. Due to various factors including peace and order, only one (1) locator - Power Up Ventures (Petroleum) currently

operates within the free zone. Vigorous promotion of the free zone would be needed to attract more locators and eventually utilize the remaining available space within the 119-hectare lot of the PFEZ.

- 7) **Piracy at Sulu and Celebes Sea:** International trade within the region has been greatly affected by security issues in the Sulu and Celebes Sea (Anuar, et. al, 2018)³. In 2017, a Vietnamese cargo ship was hijacked AT 20 nautical miles north of Tawi-Tawi, while on its way to deliver 4,500 MT of cement to Polloc Port. Successive incidences of piracy by the Abu Sayyaf Group (ASG) have caused several international shipping companies to temporarily halt operations.

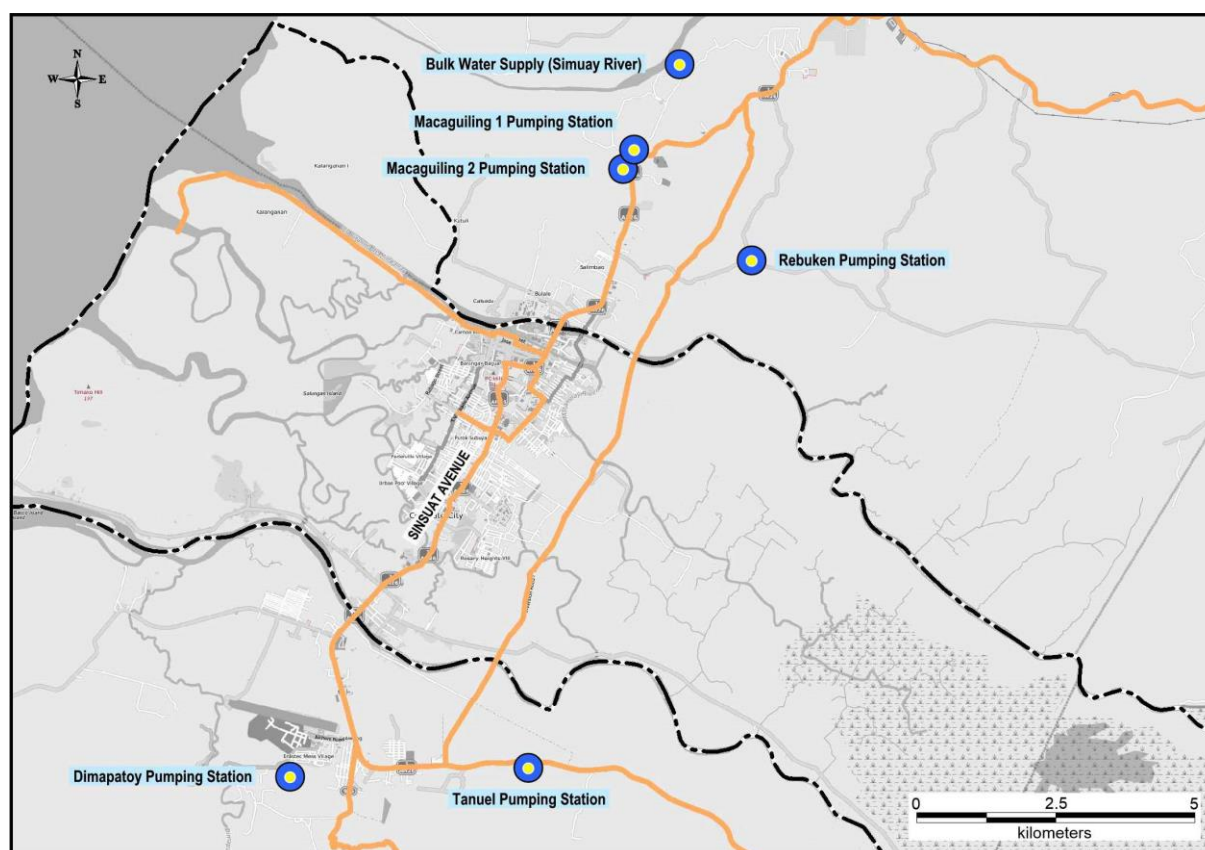
5.4 Water Supply

5.4.1 Existing Facilities and Service Area

(1) Source of Water Supply

Potable water in Cotabato City is provided by the Metro Cotabato Water District (MCWD), a Government Owned and Control Corporation (GOCC). The five (5) pumping stations and treatment plants which produce about 13.3 million cubic meters of water (excluding production by bulk water supplier) are located in the nearby municipalities of Datu Odin Sinsuat (DOS) and Sultan Kudarat both in the province of Maguindanao (Figure 5.4-1). Over 80% of the water supply come from Tanuel Pumping Station and Dimapatoy Pumping Station both located in DOS, Maguindanao. Production output in 2018 is larger by 3.01 million cubic meters compared to 2016 output. This is primarily due to improved production at Dimapatoy Pumping Station and the additional support of bulk water supplier (Table 5.4-1) which produced about 1.5 million cubic metesr of water.

³ Tawau-Polloc Port Cross Border Special Economic Zone as a Development Path for Bangsamoro Autonomous Region (February 2018)



Source: Prepared by the JICA Study Team based on 2018 Annual Report, Metro Cotabato Water District

Figure 5.4-1 Location map showing source of water by MCWD

Table 5.4-1 Sources of Water and their Production Volume

Water Sources	Source of water	Location	Production (cu. m.)	
			2016	2018
1. Tanuel Pumping Station	Spring	DOS Municipality	5,702,550	5,765,981
2. Rebuken Pumping Station	Deep well	Sultan Kudarat Municipality	886,948	798,965
3. Macaguling Pumping Station 1	Deep well	Sultan Kudarat Municipality	583,463	472,126
4. Macaguling Pumping Station 2	Deep well	Sultan Kudarat Municipality	235,745	187,691
5. Dimapatoy Pumping Station	Surface	Sultan Kudarat Municipality	4,288,406	5,975,846
6. Bulk Water Supply (Mactan Rock-TGV Corporation)	Surface	Sultan Kudarat Municipality	-	1,506,584
Total			11,697,112	14,707,193

Source: 2016 and 2018 Annual Report, Metro Cotabato Water District

(2) Water Supply Users

Over 80% of the water supplied by the MCWD is consumed by the residents of Cotabato City which is about 8.5 million cubic meters in 2018. This volume of water consumption is higher by 1.25 million cubic meters compared to the consumption in 2016 which might be attributed to the increase of water connection by 3,259 in the same period.

Share of commercial uses (both Pure Commercial and Semi Commercial) on the other hand is about 12% and the trend is rising (11.7% in 2016 and 12.5% in 2018). The city is experiencing rapid growth in trade and commerce which is one of the primary drivers of economy. In the last

five years, two shopping malls (Al Nor Mall and Citi Mall) and a number of hotels commenced their operation. Construction of another large shopping mall is on-going, hence the demand for water supply will continue to increase. Similarly, since Cotabato City is serving as the seat of the BARMM Regional Government, water consumption from government offices is also significant which is between 8% to 9%. The remaining share of less than 1% is consumed by industry sector (Table 5.4-2).

Table 5.4-2 Annual Water Consumption (cu. m.)

Consumer	2016 (a)		2018 (b)		Difference (b-a)
	Consumption (cu.m.)	Share (%)	Consumption (cu.m.)	Share (%)	
1. Residential	7,260,187	83.3%	8,512,498	82.0%	1,252,311
2. Government	411,817	4.7%	561,453	5.4%	149,636
3. Pure Commercial	710,779	8.2%	919,850	8.9%	209,071
4. Industry	24,072	0.3%	13,903	0.1%	(10,169)
5. Semi Commercial	308,321	3.5%	379,052	3.6%	70,731
Total	8,715,176	100.0%	10,386,756	100.0%	1,671,580

Source: 2016 and 2018 Annual Report, Metro Cotabato Water District

(3) Service Coverage

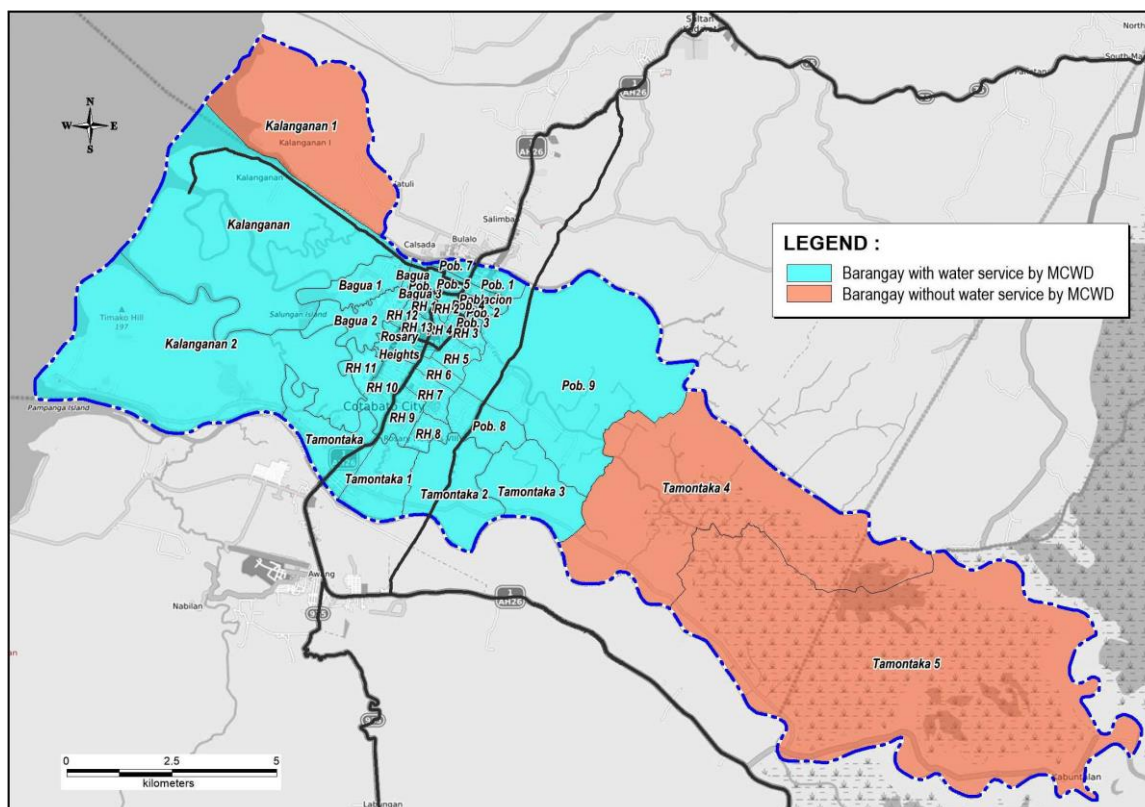
In general, there is more demand than available supply of water in Cotabato City as illustrated by water rationing in the franchise area of MCWD and limited service area.

- In 2015, Cotabato City had 57,944 households while the service connection of MCWD was only 29,960 which represents 51.7% of the household number. This number means that about 27,984 households have to avail water supply through other means.
- Three barangays: Kalanganan 1, Tamontaka 4, and Tamontaka 5 are out of the franchise area of MCWD (Figure 5.4-2).
- In terms of growth in the number of water concessionaires, from 2014 to 2018, the MCWD had provided additional new service connection of over 1,000 per year.

Table 5.4-3 Number of Service Connection (2009-2018)

Item	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
No. of service connection	24,142	25,094	26,061	26,862	27,774	28,854	29,960	31,517	33,069	34,776
Growth Rate (%)	4.2%	3.9%	3.9%	3.1%	3.4%	3.9%	3.8%	5.2%	4.9%	5.2%

Source: 2018 Annual Report, Metro Cotabato Water District



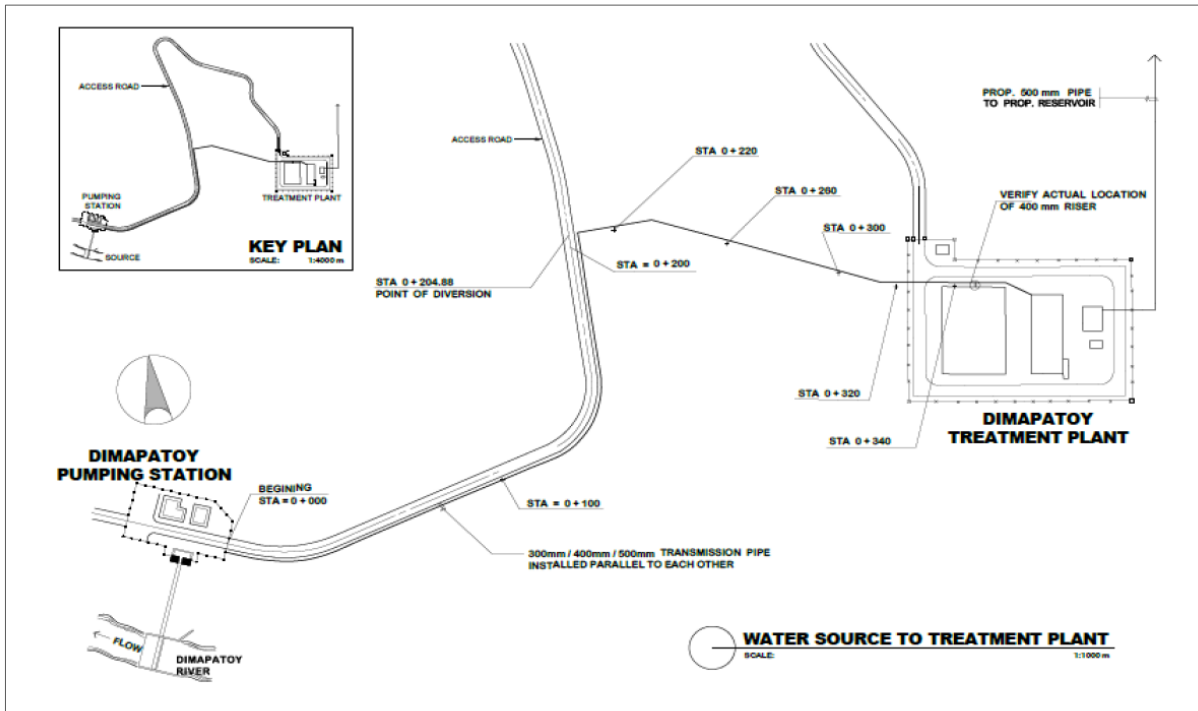
Source: Prepared by the JICA Study Team based on 2018 Annual Report, Metro Cotabato Water District

Figure 5.4-2 MCWD Service Area

(4) Existing Facilities

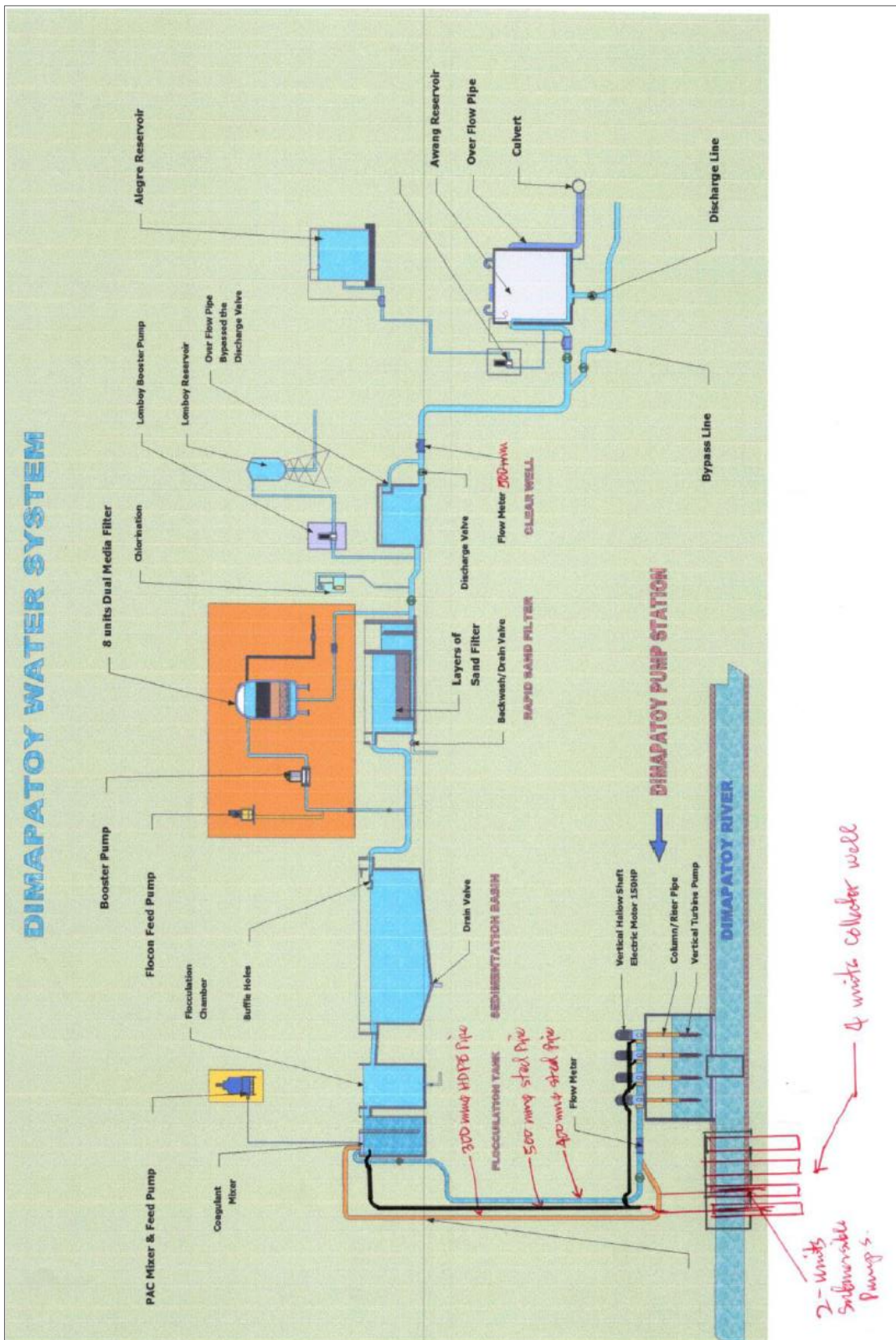
The facility of MCWD at Dimapatoy produces the largest volume of water which was about 6.0 million cubic meters in 2018. Its main water source is the Dimapatoy River located in Datu Odin Sinsuat (DOS) Municipality, about nine (9) kilometers south of Cotabato City. The facility is experiencing several issues which affect its ability to produce maximum water output. For instance, both sides of the river in the immediate vicinity of the facility are exposed to erosion. Although at the downstream, riverbank protection work for about 14 – km.stretch is now ongoing. However due to limited budget of MCWD, the proposed construction of protection wall at the upstream section has not yet been started. Another issue confronting the facility is some of its pipes, particularly at the pumping stations are already very old (over 30 years) hence replacement is necessary to address water leakage.

Moreover, recurring power supply shortage in Cotabato City and surrounding municipalities affect water production, Hence MCWD is planning to install a solar panel which could generate about 2000 kw of electricity they can use to augment the power supply for water production. An additional modular water treatment plant with a capacity between 5,000 to 8,000 cubic meters/day is being considered as well by MCWD to boost its water production. Schematic diagram of the water system and photographs showing its present condition is illustrated in the succeeding figures.



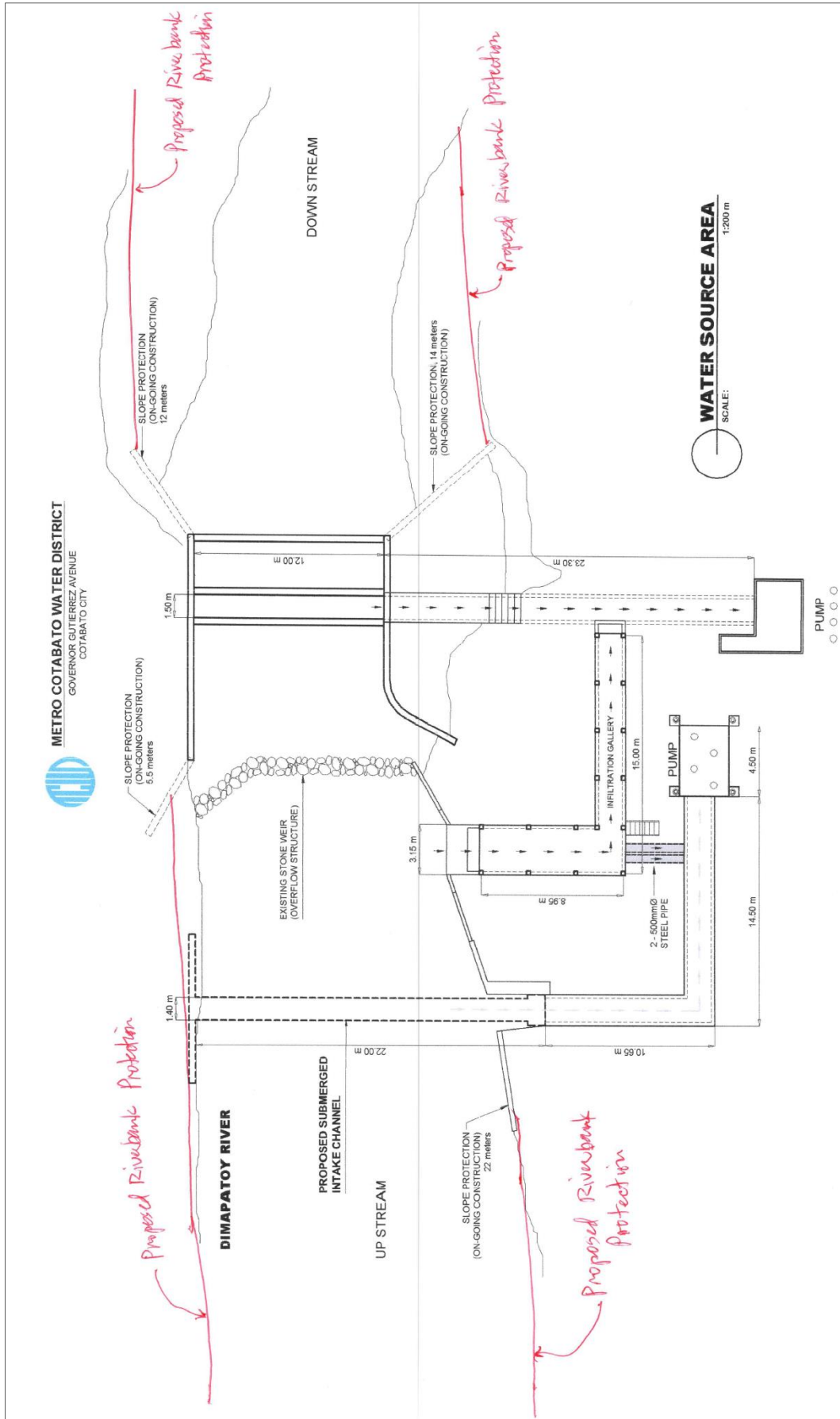
Source: Metro Cotabato Water District

Figure 5.4-3 Vicinity Map of Water Source to Treatment Plant in Dimapatoy, Awang, DOS

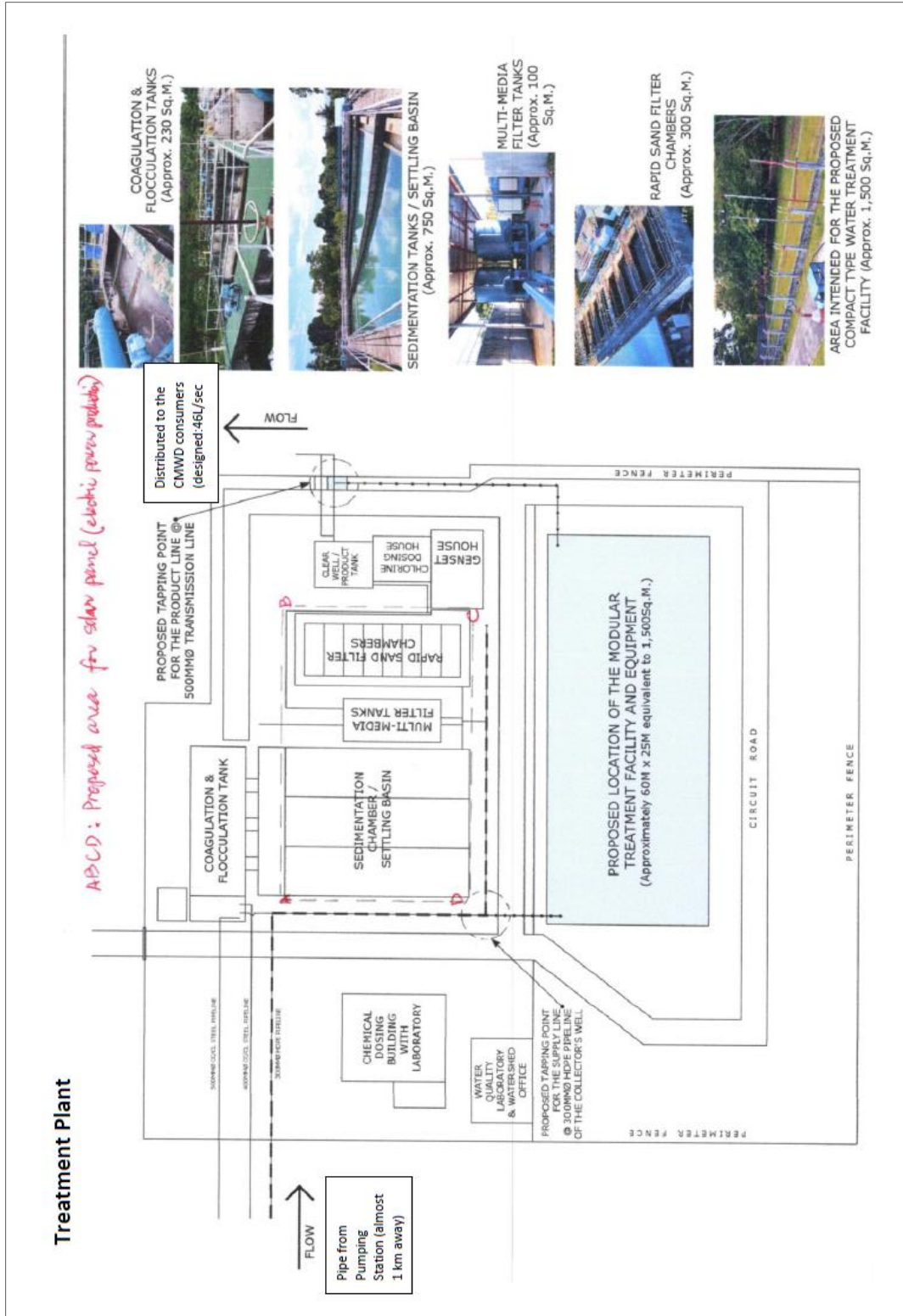


Source: Metro Cotabato Water District

Figure 5.4-4 Schematic Diagram of Dimapatoy Water System



Source: Metro Cotabato Water District
Figure 5.4-5 Location of the Proposed Riverbank Protection of Dimapatoy River



Source: Metro Cotabato Water District

Figure 5.4-6 Schematic Diagram of the Treatment Plan in Dimapatoy

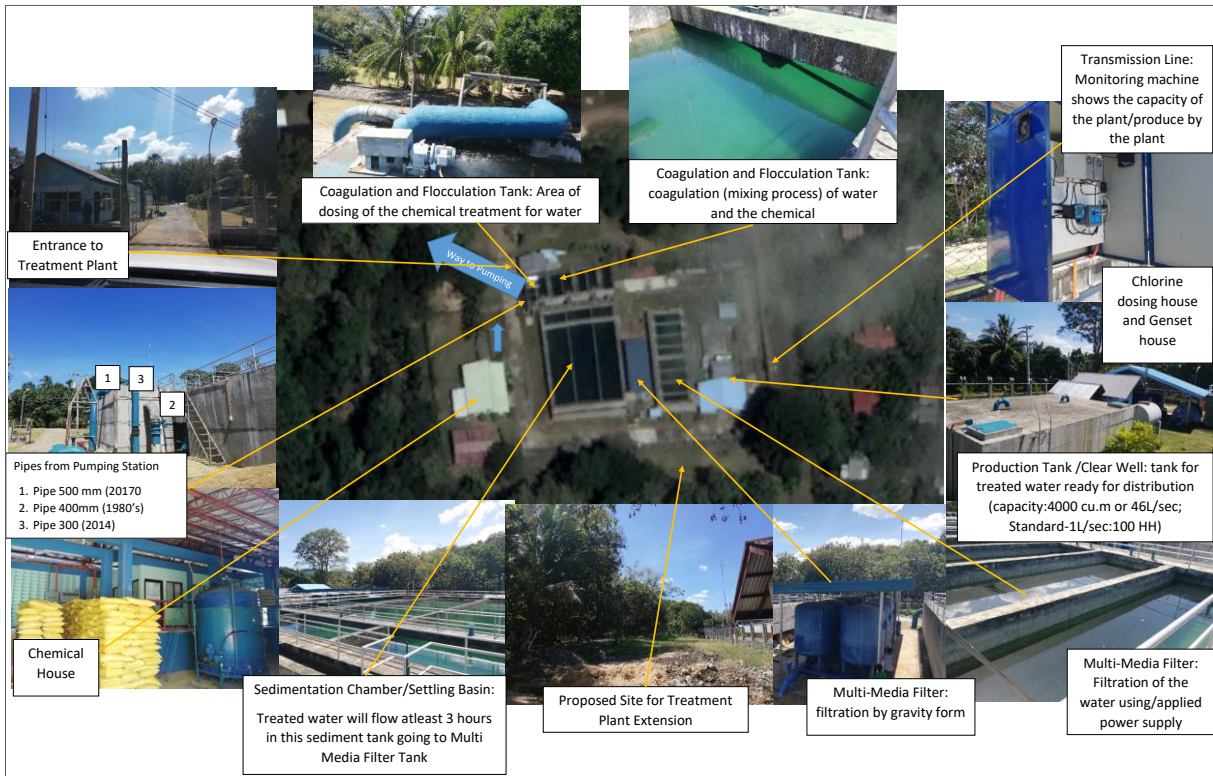


Figure 5.4-7 Photos of the Treatment Plan in Dimapatoy



Figure 5.4-8 Photos of Pumping Station in Dimapatoy

5.4.2 Organization and Budget of Offices/Agencies Involved in Water Supply

(1) Brief History of Metro Cotabato Water District

According to the official website of MCWD, the original water system of Cotabato City was constructed in 1939 and was operated and managed by the Provincial Government of Cotabato. At that time, Dimapatoy River was the sole water supply source and water was transmitted to the population by way of a gravity feed system.

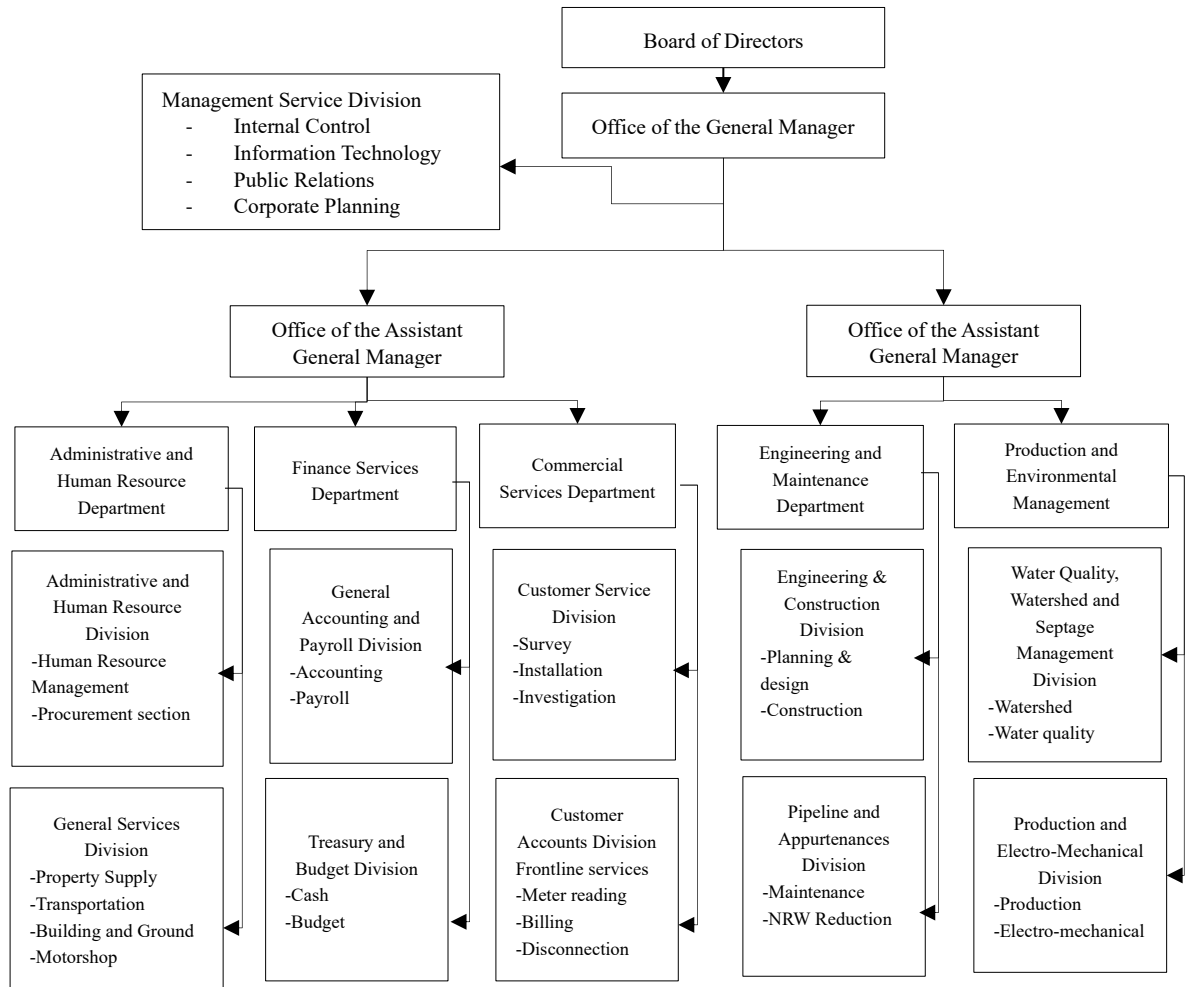
In 1976, the City Government of Cotabato passed a resolution creating the Cotabato City Water District (CCWD). The ownership and the management of the water utility was all transferred to CCWD by virtue of Sangguniang Panlungsod Resolution No 035, dated March 9, 1976. This was later renamed as Metro Cotabato Water District (MCWD), pursuant to CCWD Board Resolution No. 030B-03, dated August 8, 2003, and in accordance with Local Water Utilities Administration (LWUA) Board of Trustees Resolution No. 186, series of 1997.

The MCWD derived its legal mandate to serve the populace from Presidential Decree No. 198, otherwise known as the Provincial Water Resources Act of 1973. The District was formed on October 12, 1976. On November 5, 1976, the LWUA issued the Certificate of Conformance No. 30 to the MCWD. Aside from Cotabato city, MCWD also supplies water to some barangays of the municipalities of Sultan Kudarat and Datu Odin Sinsuat, both of Maguindanao, Province.

(2) MCWD Organization

The organization chart of MCWD is depicted in Figure 5.4-9. In 2006, the agency had a total of 166 employees. This number increased to 189 in 2018. Since break down of 2018 data is not available, breakdown of 2016 is as follows:

- Office of the General Manager (10)
- Administrative Services Department (34)
- Finance Department (16)
- Commercial Services Department (34)
- Engineering & Operations Department (72)
- Total (166)



Source: Official website of Metro Cotabato Water District

Figure 5.4-9 Organization Structure of MCWD

(3) Budgetary Framework

In general, there was a gradual increase of the MCWD’s annual budget from 2014 to 2018 as indicated in Table 5.4-4. But perhaps the most interesting number is the increase of Capital Outlay which represents dedicated fund to implement projects. Below are some of the observations derived from the budget data:

- In the last five (5) years (2014-2018), it was observed that the total budget increased by 7.98% annually.
- In the same time span, Capital Outlay had an annual average increase of 15.97%. However, there was a sharp decrease from 2017 to 2018 by PhP 10.16 Million. Around 5% to 11% of the budget was dedicated to project under the Capital Outlay.

Table 5.4-4 Summary of Annual Budget in Million PhP (2014-2018)

Particulars		2014	2015	2016	2017	2018
Office of the Board of Directors		4.56	5.16	5.67	6.91	6.63
Office of the General Manager		5.18	9.99	9.54	13.65	15.14
Finance Services Department		5.82	5.62	6.47	9.57	9.85
Commerce Services Department		12.41	12.71	17.53	21.17	22.41
Administrative Services Department		43.91	35.95	33.02	51.83	49.57
Engineering/ Operation Department		59.41	69.84	70.90	67.10	78.24
Debt Service		26.46	26.68	26.89	26.95	27.05
Reserves		0.30	0.30	0.30	0.30	0.30
Materials for New Water Connections/ Installations		1.80	3.87	4.50	4.50	4.00
Capital Outlay (Budget for project)	Real value	9.13	18.64	23.48	26.66	16.50
	% to Total	5.4%	9.9%	11.8%	11.7%	7.2%
Total		168.97	188.77	198.29	228.65	229.68

Source: 2018 Annual Report, Metro Cotabato Water District

(4) Gross Revenue

The gross revenue of MCWD which comes mostly from the sales of water in 2016 was about PhP 223 Million. This revenue rose to almost PhP 280 Million in 2018 which represents about PhP 46 Million increase compared to 2016. Operation expense (budgetary outlay) in 2016 and 2018 were both larger than the gross revenue in the same years, hence there were budget deficits incurred. The positive thing to note however, was the substantial reduction of deficit from about PhP 158 Million in 2016 down to merely PhP 4.36 Million in 2018.

Table 5.4-5 Budgetary Outlay and Gross Revenue (PhP)

Items	Year	
	2016	2018
I. Total Budgetary Outlay		
a. Operating Outlay (Original Budget)	147,648,866.40	185,928,822.70
b. Capital Outlay (Original Budget)	23,480,080.00	16,499,000.00
c. Special Budgets, if any (additional budget)- Contingency	193,375,451.64	54,400,939.33
d. Debt Service	26,885,819.65	27,045,412.73
e. Reserves	300,000.00	300,000.00
Total	391,690,217.69	284,174,174.76
II. Gross Revenue		
a. Collection for Water Sales	223,239,384.32	268,498,147.95
b. Other Revenues	10,304,474.96	11,315,552.66
Total	233,543,859.28	279,813,700.61
Deficit (II-I)	-158,146,358.41	-4,360,474.15

Source: 2016 and 2018 Annual Report, Metro Cotabato Water District

(5) Priority Projects

Most of the projects identified by the MCWD respond to the existing problems of their facility in Dimapatoy as shown in Table 5.4-6 below.

Table 5.4-6 Priority Projects of MCWD

Project Name	Cost (PhP M)
1. Replacement of Dilapidated Pipes (30-40 years old)	200.00
2. Modular Water Treatment Plant (with capacity of 5,000-8,000 cu.m. a day)	300.00
3. Solar Panel for Electric Power Production (with accessories 2,000KW)	50.00
4. Riverbank Protection for Dimapatoy River (50 meters)	50.60
Total	600.00

Source: Metro Cotabato Water District; Note: Costs were updated by the JICA Study Team

5.4.3 Summary of Issues on Water Supply in Cotabato City

As mentioned above, the MCWD could only supply about 52% of the households in Cotabato City in 2015. This leaves about 27,984 households without the supply of water and have to find other means to acquire potable water. In the coming years, demand of water supply will only increase in view of rapid growth of population and continuing expansion of economic activities, such as on-going construction of shopping malls and hotels.

The following are the summary of identified issues affecting the supply of potable water:

- Lack of financial capital to procure necessary projects and programmes;
- Dilapidated pipes/old pipes (30-35 years old) both at the plants and distribution sites;
- Scaling which reduces diameter of pipes by 25% (from 16 inches to 12 inches) which occurs to even new pipes;
- Erosion of Dimapatoy river which is the primary source of water, hence riverbank protection is urgently needed;
- Recurring power supply shortage in Cotabato City and surrounding municipalities affect water production.

5.4.4 Current Condition of Water Supply in Surrounding Municipalities

(1) Overview

The five surrounding municipalities of Cotabato City have abundant natural resources such as rivers, lakes, creeks, springs, underground water, and other bodies of water. If managed properly, these can more than enough sustain the needs of the residents. However, with the fast-growing increase in population, agricultural use and potable water withdrawals, there is an unprecedented pressure on the water resources of these municipalities. In addition, the sources of water supply had undergone depletion due to water pollution, siltation of bodies of waters, deforestation, and climate change.

Table 5.4-7 Levels of Water Supply Service

Level		Description
Level 1	Point source	A protected well or a developed spring with an outlet but without a distribution system. This is generally adaptable for rural areas where houses are thinly scattered serving an average of 15 households with people having to fetch water from up to 250 m.
Level 2	Communal faucet system or stand post	A piped system with communal or public faucets usually serving 4-6 households within 25 meters distance
Level 3	Waterworks system	A fully reticulated system with individual house connections based on a daily water demand of more than 100 liters per person

Source: National Economic and Development Authority (NEDA)

As shown in Table 5.4-8, majority of the households still lack access to improved water supply services. On average, about 75.6% still sourced their potable water supply from level 1 system (surface waters, shallow dug wells, and deep wells), while others bought from peddlers or water hauling trucks at a higher cost.

On the other hand, around 12.1% of the households source their potable water from level 2 systems, while only about 12.5% of households have access to clean water through a level 3 water system. However, some households with access to improved water supply systems still suffer low water quality and scarcity due to decades of poor management and inadequate financing by responsible units.

Table 5.4-8 Water Supply Level System in the Five Surrounding Municipalities

Municipality	Total # of Households	Water Supply Level system					
		Level 1		Level 2		Level 3	
		# of HH	% to Total	# of HH	% to Total	# of HH	% to Total
Datu Odin Sinsuat	16,880	11,452	17.22	1,950	2.93	3,478	5.22
Sultan Kudarat	15,331	8,331	12.52	4,100	6.16	2,900	4.36
Sultan Mastura	3,837	3,166	4.76	450	0.68	221	0.33
Parang	15,261	14,170	21.30	457	0.69	755	1.14
Pigcawayan	15,201	13,164	19.79	1,070	1.61	967	1.45
Total	66,510	50,283	75.60	8,027	12.07	8,321	12.50

(2) Water Supply in Datu Odin Sinsuat

Current water supply situation

Datu Odin Sinsuat has numerous water resources that can be tapped for potable supply such as the Dimapatoy Watershed, which can sufficiently satisfy the demand for the entire municipality. However, despite the municipality's abundance of water resources, many households still suffer from water scarcity as they cannot afford to install deep wells, particularly those located in the remote hilly areas where a shallow dug well is not feasible. Although there are number of available springs in those areas, these are usually located away from the residents' houses. Fetching water from such far sources will cause additional burden to household members and may even result to unsanitary practices.

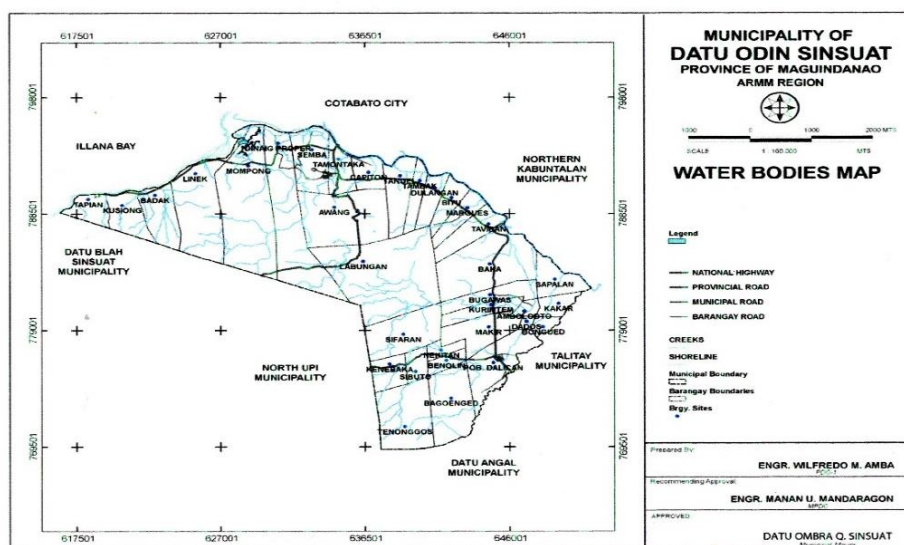
Existing surface water resources in Datu Odin Sinsuat

The municipality has bodies of water that are suitable and sufficient for the domestic and agricultural needs of the residents. Table 5.4-9 shows the distinct water resources in the municipality, along with the respective primary uses and current condition.

Table 5.4-9 Existing Water Resources in Datu Odin Sinsuat

Name	Location	Primary Uses	Current Condition/ Issues
1. Tamontaka River	Barangay Tamontaka	Water Transportation	Contaminated by chemicals used for agriculture & households waste
2. Taviran River	Barangay Taviran	Water Transportation	Contaminated by chemicals used for agriculture & households waste
3. Dimapatoy River	Barangay Awang	Potable Water Supply	Have risk of contamination since it is used for bathing and washing clothes
4. Mado Hot Spring	Barangay Awang	Potable Water Supply	Reserved underground water
4. Makir-Dalican-Bongued Creek	Barangay Makir, Dalican & Bongued	Irrigation Water	Contaminated by chemicals used for agriculture & households waste
5. Sifaran Creek	Barangay Sifaran	Irrigation Water	Contaminated by chemicals used for agriculture
6. Sifaran Falls	Barangay Sifaran	Irrigation Water	Contaminated by chemicals used for agriculture
7. Benolen Creek	Barangay Benolen	Irrigation Water	Contaminated by chemicals used for agriculture
8. Benolen Hot Spring	Barangay Benolen	Medicinal Bathing	--
9. Blue Lagoon	Barangay Margues & Bitu	Drinking water/ Bathing and washing clothes	Ideal for drinking but has high risk of contamination for it is also used for other domestic purposes
10. Tanuel Spring	Barangay Tanuel	Potable Water Supply	safe for drinking
11. Badak Spring	Barangay Badak	Potable Water Supply	Still safe for drinking
12. Linek Spring	Barangay Linek	Potable Water Supply	Still safe for drinking
13. Inland Freshwater	Barangay Tamontaka, Capiton, Tambak, Tanuel, Bitu & Baka	Fresh Water Aqua Resources	Contaminated with chemicals used for aquaculture and agriculture
14. Aquamarine	Barangay Tapian, Kusiong, Linek, Badak	Marine Life Resources	At risk of pollution due to the presence of beach resorts along the seashores

Source: Comprehensive Land Use Plan (CLUP)



Source: Comprehensive Land Use Plan (CLUP)

Figure 5.4-10 Map of Water Bodies in Datu Odin Sinsuat

Levels of water supply service in Datu Odin Sinsuat

Level 1 water system

The level 1 water system of Datu Odin Sinsuat is primarily sourced from shallow wells/hand pumps, open dug wells, and springs. As shown in Table 5.4-10 below, around two-thirds of the total households in Datu Odin Sinsuat source their water from a level 1 water system. As of 2015, approximately 8,590 households (75% of HHs using level 1 system) draw their supply from shallow wells.

Table 5.4-10 Summary of Level 1 Water System in Datu Odin Sinsuat (2015)

Barangays	Total # of the Municipal Households (a)	HHs Using Level 1 water System (b)	Percentage To a	Shallow Well		Open dug Well		Springs/Improved Spring	
				HHs Served	% to b	HHs Served	% to b	HHs Served	% to b
All 34 barangays	16,880	11,452	67.8	8,590	75	2,690	23.5	172	1.5

Source: Comprehensive Land Use Plan (CLUP)

Level 2 water system

13 out of 34 barangays in Datu Odin Sinsuat are served by a level 2 water system. However, only a portion of the households in these barangays can gain access to the available water system, as every pump could only serve a maximum of 150 households. According to Table 5.4-11, level 2 water supply systems accounted for 11.6% of the total municipal households.

Table 5.4-11 Summary of Level 2 Water System in Datu Odin Sinsuat

Water Facility/ Source	Number of Pumps	Number of Communal Faucets	Barangays Served	Total Number of HHs	Number of HHs Served	Percentage to total HHs
Powered-generated water pumps stored in reservoir / underground water	13	130	Dalican, Dulangan, Kakar, Pinguaman, Bugawas, Labungan, Awang, Linek, Niketan, Makir, Margues, Tambak, Badak	16,880	1,950	11.55

Source: Comprehensive Land Use Plan (CLUP)/MPDC

Level 3 water system

The municipality has two functioning water pumping stations – the Dimapatoy and Taniel Pumping Stations, located in Brgy. Awang and Brgy. Taniel, respectively. However, only a sizeable portion of the production output is accessed by the residents as bulk of the output is supplied to Cotabato City. Table 5.4-12 shows that only four barangays (20.6% of total municipal households) in Datu Odin Sinsuat have access to a level 3 water system.

Table 5.4-12 Summary of Level 3 Water System in Datu Odin Sinsuat

Name of Water Facility	Location	Barangays Served in the Municipality	# of Households Served in that particular Barangay
1. Dimapatoy Pumping Station	Barangay Awang	Awang, Semba	2,775
2. Tanuel Pumping Station	Barangay Tanuel	Tanuel, Capiton	703
Total			3,478

Source: Comprehensive Land Use Plan (CLUP)

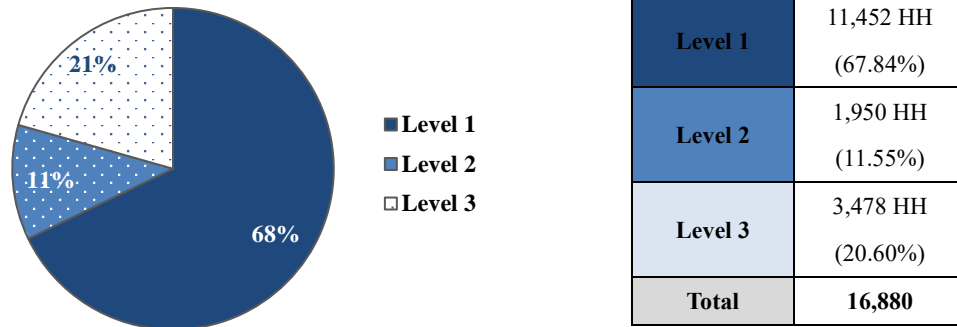
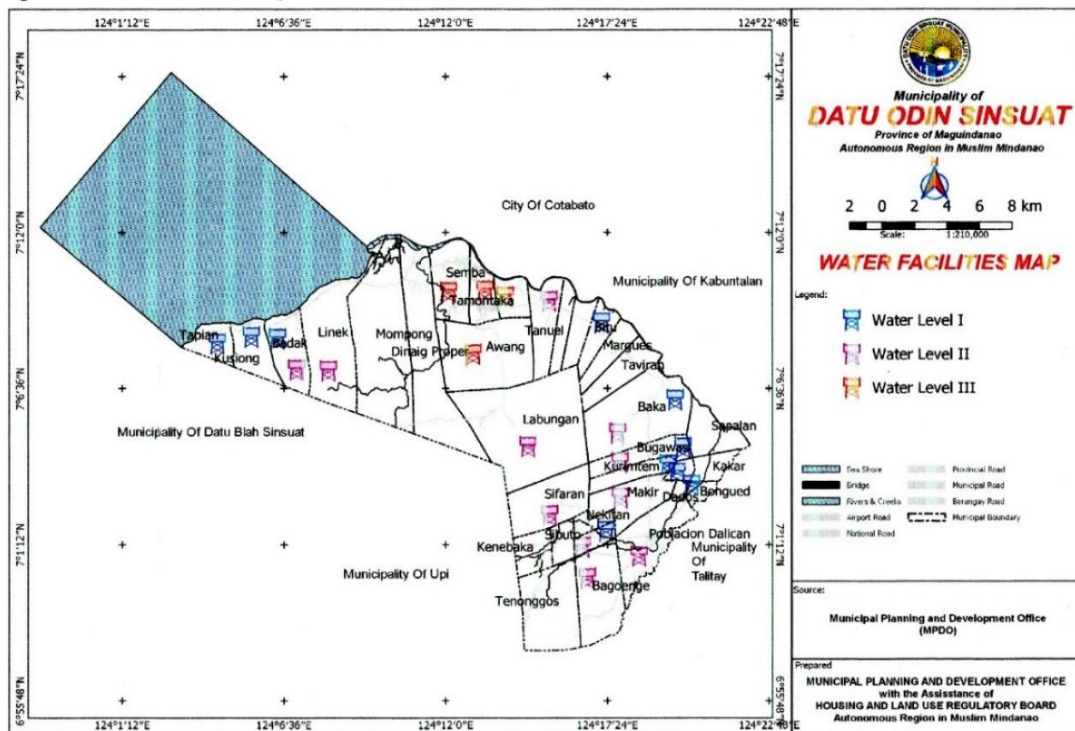


Figure 5.4-11 Summary of Water Supply Service in Datu Odin Sinsuat



Source: Comprehensive Land Use Plan (CLUP)

Figure 5.4-12 Map of Water Facilities in Datu Odin Sinsuat

(3) Water Supply in Sultan Kudarat Municipality

Current water supply situation

The municipality of Sultan Kudarat has good quality of surface and underground water. However, the local households are more dependent on the latter for the source of their potable water. Majority of the households draw underground water through shallow and open dug wells, and hand pumps.

Existing surface water resources in Sultan Kudarat Municipality

As reflected in Table 5.4-13, Sultan Kudarat municipality has 3 major rivers, 16 creeks, 9 lakes and a vast area of fresh inland water suitable for irrigation and aquaculture purposes. As such, the underground water of the municipality is reserved for domestic purposes only, thus, making potable water supply more sustainable.

Table 5.4-13 Existing Water Resources in Sultan Kudarat Municipality

Type	No.	Names	Primary Uses
Rivers	3	Simuay River, Maguindanao River, Matampay river	Irrigation and Transportation
Lakes	9	Lake Malinao, Darapanan, Mala, Tipague, Matengen, Olas, Panambakan and Tuminggay	Irrigation and Fishing ground
Creeks	16	Rebuken Creek and 15 others	Irrigation and fishing ground
Inland Freshwater	Present in 12 barangays	Katamlangan, Kakar, Katidtuan, Kapimpilan, Maidapa, Raguisi, Bulibod, Ungap, Kabuntalan, Bulalo, Katuli and Inawan	Fresh Water Aqua Resources
Aquamarine	Accessed in 7 barangays	Nekitan, Crossing Simuay, Dalumangcob, Rebuken, Macaguiling, Senditan and Sambulawan	Marine Aqua Resources

Source: Comprehensive Land Use Plan (CLUP)

Levels of water supply service in Sultan Kudarat municipality

Level 1 water system

Table 5.4-14 shows that more than half of total households in Sultan Kudarat municipality draw their water from level 1 water systems (shallow wells and improved springs).

Table 5.4-14 Summary of Level 1 Water Supply System in Sultan Kudarat Municipality (2015)

Barangay	Total # of HHs (a)	Total # of HH Served by Level 1 (b)	% to Total	Shallow Well			Improved Spring			Total HHs
				# of units	HH Served		# of units	HH Served		
					#	% to b		#	% to b	
All 39 barangays	15,331	8,331	58.63	398	7,791	55.11	15	540	3.52	8,989

Source: Comprehensive Land Use Plan (CLUP)

Level 2 water system

As shown in Table 5.4-15 below, 4,100 households or 26.7% of the total municipal households are served by level 2 water systems. These are usually in the form of deep wells and pump-driven underground water distributed to households through communal faucets or tap stands.

Table 5.4-15 Summary of Level 2 Water Supply System in Sultan Kudarat Municipality

Water Facility/ Source	Number of Units	Number of Communal faucets/ tap stand	Barangays Served	Number of Households Served	% to Total
Deep Well / Pump	10	10 (communal faucets)	Alamada, Narra, Ibotigen, Raguisi, Ungap, Crossing Simuay, Pinarang, Banatin, Pigkalagan, Panatan	500	3.26
Pump Driven Underground Water with Water Tanks/Reservoir	8	240 (tapstand)	Alamada, Ibotigen, Narra, Raguisi, Ungap, Crossing Simuay, Pinarang, Pigkalagan	3,600	23.48
Total	18	250		4,100	26.74

Source: Comprehensive Land Use Plan (CLUP)

Level 3 water system

The Metro Cotabato Water District (MCWD) tapped the municipal underground water resources and had constructed pumping stations at Barangay Rebuken and Makaguiling. The Rebuken Pumping station produces a volume of 2,700 cu.m. daily but a large volume of the output is supplied to Cotabato City. Out of the 39 barangays of Sultan Kudarat, only 25.6% or 10 barangays are served with an average daily consumption of 2,326.88 cu.m.

As shown in Table 5.4-16, there were 2,511 local connections in the municipality in 2012. This figure has increased to 2,900 (15.5% increase) in 2017. The table also shows that 2,900 households (19% of the total households) are being served by MCWD.

Table 5.4-16 Summary of Level 3 Water Supply System in Sultan Kudarat Municipality

Name of Water Facility	Source	Area Served	Producti on Output (cu.m.)	# of Households Served in Sultan Kudarat		Percenta ge of Increase	Percenta ge of Served HH to Total	
			2019	2012	2017		2017	
Rebuken Pumping Station at Brgy. Rebuken	Rebuken Deep Well	Cot. City and 10 brgys of Sultan Kudarat	745,755	2,511	2,900	15.48%	18.92	
Makaguiling 1 Pumping Station 1 at Brgy. Makaguilng	Makaguili ng 1 Deep Well	Cot. City	406,034	--	--	--	--	
Makaguiling 1 Pumping Station 2* at Brgy. Makaguilng	Makaguili ng 1 Deep Well	• <i>Deactivated effective September 6, 2019 due to very low yield</i>						
Bulk Water Supplier (Mactan Rock/TGV Builder Corp)	Simuay River	Cot. City	1,708,96 5	--	--	--	--	

Source: Comprehensive Land Use Plan (CLUP)/MPDC

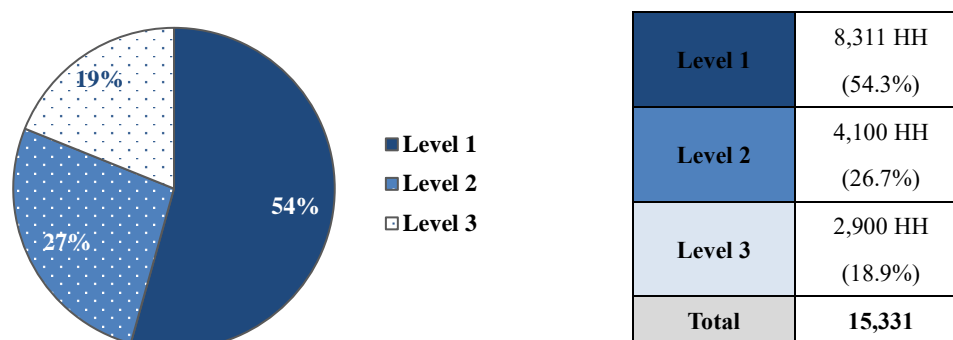


Figure 5.4-13 Summary of Water Supply Service in Sultan Kudarat Municipality (2015)

(4) Water Supply in Sultan Mastura

Current water supply situation

The municipality of Sultan Mastura has abundant water resources suitable for both domestic and agricultural purposes. The water table of the municipality has very low depth, hence most of the households draw their potable water from shallow wells. The municipality also has ample reserve of underground water, so construction of deep wells or reservoir for level 2 waterworks is very feasible. However, despite such numerous water resources, majority of the households still draw their potable water from level 1 water system source.

Out of the 13 barangays in Sultan Mastura, 11 have access to level 2 water systems while 2 barangays have access to level 3 water systems. However, only a portion of the households in those barangays are served.

Existing surface water resources in Sultan Mastura

Table 5.4-17 shows the existing water resources in Sultan Masutra. At present, only Simuay Seashore is being tapped for potable water supply, but the municipality has an abundant reserve of underground water suitable for drinking.

Table 5.4-17 Existing Water Resources in Sultan Mastura

Name	Location	Primary Uses
1. Simuay River	Barangay Simuay	Potable & Irrigation Water Supply
2. Balut River	Barangay Balut	Irrigation Water Supply
3. Balut Lake	Barangay Balut	Irrigation Water & Aquaculture
4. Inland Fresh water	Barangay Guiday T. Biruar, Tambo & Balut	Irrigation Water & Aquaculture
4. Inland Brackish Water	Barangay Simuay Seashore & Boliok	Aquaculture
5. Aquamarine	Barangay Simuay Seashore & Boliok	Marine life resources

Source: Comprehensive Land Use Plan (CLUP)/MPDC

Levels of water supply service in Sultan Mastura

Level 1 water system

The water table depth of the municipality is very low, so local households using level 1 systems usually draw their potable water supply from shallow wells. Table 5.4-18 shows that approximately two-thirds of the total municipal households rely on level 1 systems.

Table 5.4-18 Summary of Level 1 Water Supply System in Sultan Mastura (2019)

Barangay	Total # of HHs	Shallow Well			Deep Well		
		Number	HH Served		Number	HH Served	
			#	%		#	%
All 13 barangays	3,837	1,059	3,166	65.26	--	--	--

Source: Comprehensive Land Use Plan (CLUP)/MPDC

Level 2 water system

The level 2 water system in the municipality is primarily drawn from underground water through pump-driver water tanks or reservoir. Table 5.4-19 shows that all 13 barangays have access to level 2 water systems, however, only 450 households (11.7% of the total municipal households) are served.

Table 5.4-19 Summary of Level 2 Water Supply System in Sultan Mastura (2019)

Water Facility/ Source	Number of Pumps	Number of Communal Faucets	Barangays Served	Number of Households Served
Water Tanks (reservoir) / Underground	13	30	All 13 barangays	450

Source: MPDC

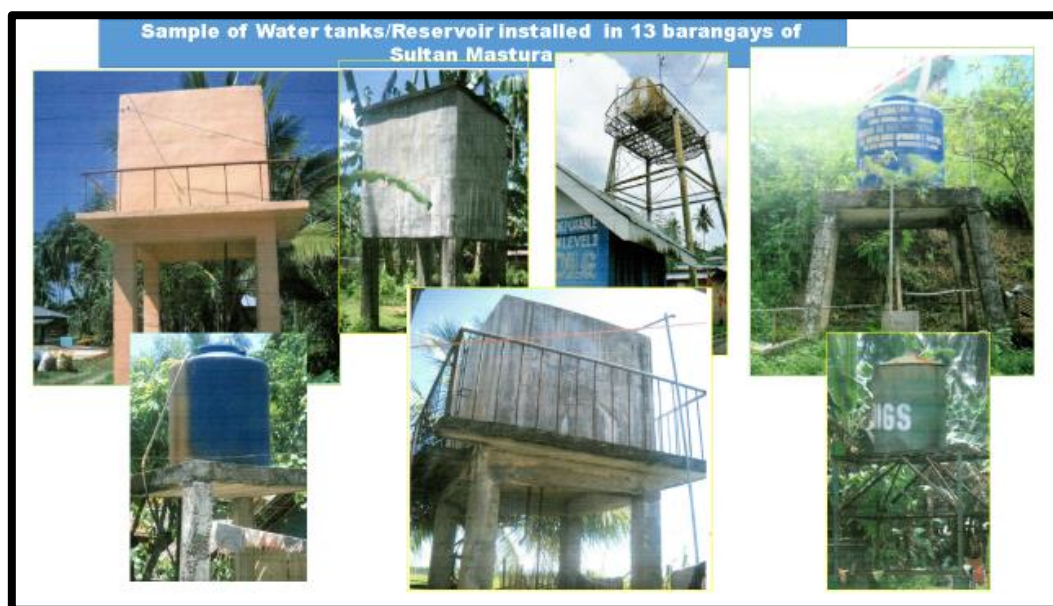


Figure 5.4-14 Photos of the Level 2 Water Supply System in Sultan Mastura

Level 3 water system

The level 3 water system, located at Barangay Tapayan, mostly supplies households along the national highway. As indicated in Table 5.4-20 below, only 4 barangays (221 households) source their water through a level 3 water supply system.

Table 5.4-20 Summary of Level 3 Water Supply System in Sultan Mastura (2019)

Water Facility/ Source	Location	Barangays Served in the Municipality	Number of Households Served
Level III Water System Project / Underground	Barangay Tapayan	Tapayan, Balut, Tambo, Tuka	221

Source: MPDC

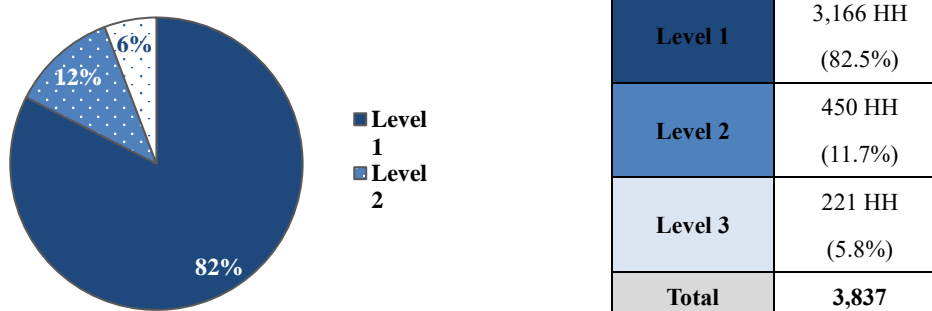


Figure 5.4-15 Summary of Water Supply Service in Sultan Mastura (2019)

(5) Water Supply in Parang

Current water supply situation

Parang is home to numerous bodies of water suitable for both agricultural and domestic purposes. Aside from its two major rivers (Nituan and Libuan), the municipality has a lake (Balut Lake), which comprises a vast area of wetlands. In addition, free flowing springs offering clear water are abundant. Such water resources are more than enough to cover the needs of the population, however, access to supply is limited due to the lack of necessary and appropriate facilities.

Existing surface water resources in Parang

Table 5.4-21 below summarizes the existing water resources in Parang, which includes rivers, lakes, springs, inland water, and aquamarine.

Table 5.4-21 Water Resources by Type and Primary Uses in Parang

Type / Name	Location	Primary Uses
1. Nituan River	Barangay Nituan	Irrigation Water Supply
2. Libuan River	Barangay Guiday T. Biruar	Irrigation Water Supply
3. Balut Lake	Barangay Guiday T. Biruar	Irrigation Water & Aquaculture
4. Springs	Barangay Guiday T. Biruar, Macasandag, Sarmiento	Potable water
5. Inland Brackish Water	Barangay Polloc, Magsaysay, Sarmiento	Aquaculture
6. Aquamarine	Barangay Bongo Island, Magsaysay	Marine life resources

Source: Comprehensive Land Use Plan (CLUP), MPDC

Levels of water supply service in Parang

Level 1 water system

The main sources of level 1 water system in Parang include shallow well, deep well, spring, rainwater and commercial. Commercial sources refer to water bought from water peddlers or water refilling stations. Table 5.4-22 shows that households served by level 1 water systems comprised an overwhelming majority (92.8%) of the total municipal households.

Table 5.4-22 Summary of Level 1 Water Supply System in Parang

Barangays	Total # of HHs	Total # of HHs Availing Level 1	% to total	Shallow Well		Deep Well		Spring		Rainwater		Commercial	
				HHs Served	%	HHs Served	%	HHs Served	%	HHs Served	%	HHs Served	%
All 25 barangays	15,262	14,170	92.84	7,265	51.27	2,415	17.04	2,915	20.57	203	1.43	1,197	8.45

Source: Comprehensive Land Use Plan (CLUP), MPDC

Level 2 water system

Table 5.4-23 shows that there are currently three (3) level 2 sources of water in Parang – Barangay Making, Magsaysay, and Nituan. These water facilities have an average production output of 10 cubic meters daily and served 457 households (3% of total municipal households).

Table 5.4-23 Summary of Level 2 Water Supply System in Parang

Type of Facility	Location	Barangays Served in the Municipality	# of Households Served	% to Total Households
Level 2 Water System	Brgy. Making, Magsaysay, Marigalupa, Nituan	Brgy. Making, Magsaysay, Guiday T. Biruar, Nituan	457	3.0

Source: Comprehensive Land Use Plan (CLUP), MPDC

Level 3 water system

At present, Parang has two level 3 waterworks system located in Barangay Sarmiento and Macasandag. These facilities serve only a total of 755 households, or around 5% of the total municipal households.

The water system in Brgy. Sarmiento is sourced from a deep well pump device, serving 555 households. In addition, the Macasandag water system is sourced from a spring and serves 200 households from four barangays located along the national highway.

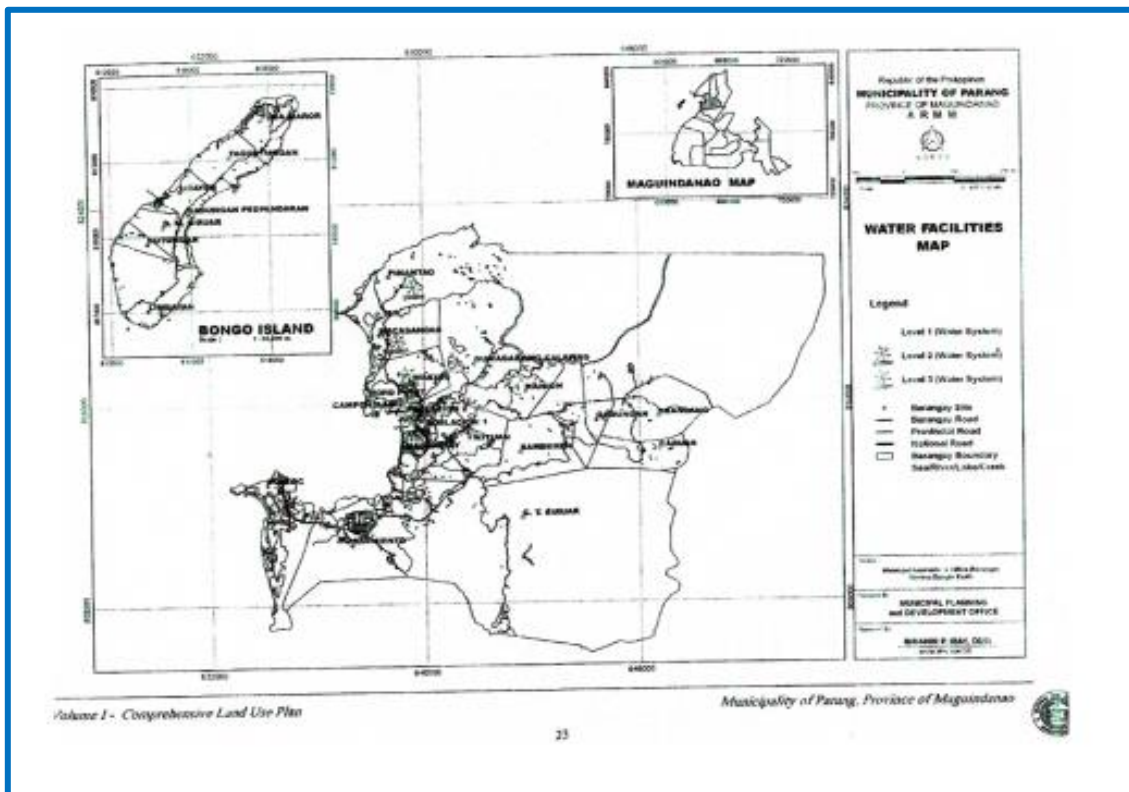
Table 5.4-24 Summary of Level 3 Water Supply System in Parang

Name of Water Facility	Location	Production Output	Barangays Served in the Municipality	# of Households Served	% to Total Households
Macasandag Level 3 Water System	Linindingan Creek, Brgy. Macasandag	--	Making, Poblacion I & 2, Magsaysay, Campo Islam	200	1.31
Sarmiento Level 3 Water System	Sarmiento	10 cu.m./day	Sarmiento	1,718	11.26
Total				755	4.95

Source: Comprehensive Land Use Plan (CLUP), MPDC



Figure 5.4-16 Photos of the Level 3 Water Supply System in Parang



Source: Comprehensive Land Use Plan (CLUP), MPDC

Figure 5.4-17 Map of Water Facilities in Parang

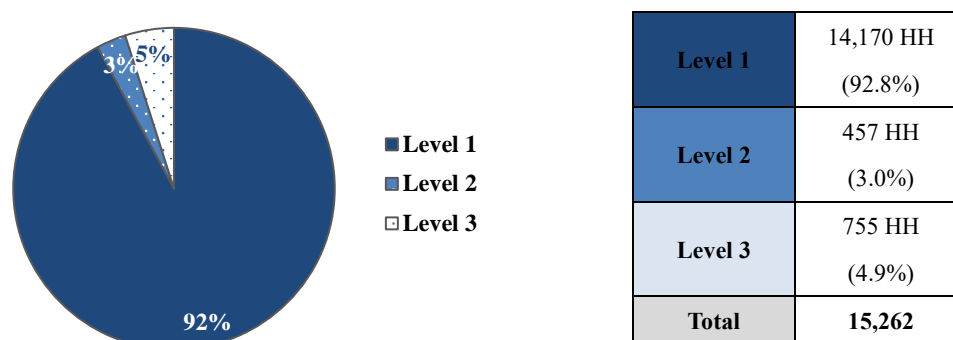


Figure 5.4-18 Summary of Water Supply Service in Parang (2019)

(6) Water Supply in Pigcawayan

Current water supply situation

Pigcawayan is very rich in water resources and almost every household in the barangay has its own water source. Majority of households source their water from level 1 water supply. Over the years, more water supply systems had been developed, but majority of the households are still dependent on unprotected water sources.

Level 2 water system is widely used in barangays with tap stands, which are put up in key areas where a significant number of houses are concentrated. In addition, a level 3 water system had been established in bigger and more widely populated barangays.

Currently, Pigcawayan has only one water district, which serves four barangays (Poblacion 1, 2, 3, and Bulucaon) including the Public Market. Another level 3 water system had been established in seven other barangays: Barangay Presbitero, Balogo, Bulucaon, Mibpapan 2, South Manuangan, New Igbaras and Banucagon.

Existing surface water resources in Pigcawayan

Table 5.4-25 summarizes the existing water resources in Pigcawayan.

Table 5.4-25 Existing water resources in Pigcawayan

Surface Water	Location/Covered/ Traversed Areas	Primary Use
Kimarayag River	Cabpangi, Kimarayag, Capayuran, Balogo	Irrigation
Libungan River	Matilac, Simsiman, Datu Mantil, Libungan Torreta, Lower Pangankalan, Buricain, Upper Pangankalan, Lower Baguer	For irrigation/ agriculture/livestock watering
Payong-Payong Creek	Payong-Payong, Midpapan 2, Buluan, Poblacion 2	Irrigation
Malu-ao Creek	New Igbaras, New Panay, Malu-ao, North Manuangan	Irrigation
Manuangan Creek	North Manuangan, South Manuangan	Irrigation
Anick Creek	Renibon, Anick, Midpapan 1, Balogo, Tigbawan	Irrigation
Springs	Balacayon, Banucagon, Buluan, Kimarayag, Maluao, Mibpapan 1, New Igbaras, Renibon, North Manuangan, Payong-Payyong, South Manuangan, Tigbawan	Potable water

Source: Comprehensive Land Use Plan (CLUP)

Levels of water supply service in Pigcawayan

Level 1 water system

Households in Pigcawayan are predominantly served by level 1 water systems, as shown in Table 5.4-26. Shallow wells or hand pumps are used in 72.5% of the total municipal households. These systems are often characterized by easy installation and low maintenance.

Table 5.4-26 Summary of Level 1 Water Supply System in Pigcawayan

Barangay	Total HHs	Shallow Well/ Hand Pumps			Open Dug Wells			Undeveloped Spring			Water Peddlers		
		No.	HH Pop. Served	% Served	No.	HH Pop. Served	% Served	No.	HH Pop. Served	% Served	No.	HH Pop. Served	% Served
A. Urban													
1 Poblacion 1	496	115	210	1.38		-	-	-	-	-		25	5.04
2 Poblacion 2	618	140	438	2.88		-	-	-	-	-		30	4.85
3 Poblacion 3	734	84	494	3.25		-	-	-	-	-		28	3.81
B. Rural													
1 Anick	257	21	237	1.56	15	20	7.78	-	-	-			
2 Balacayon	242	6	82	0.54		-	-	1	10	4.13			
3 Balogo	577	129	508	3.34		-	-	-	-	-		38	5.58
4 Banucagon	320	24	210	1.38		-	-	1	5	1.56			
5 Buluan	262	35	260	1.71		-	-	1	2	0.076			
6 Bulucaon	670	99	456	2.99		-	-	-	-	-		30	4.48
7 Buricain	462	10	362	2.38	5	100	21.6	-	-	-			
8 Cabpangi	337	13	285	1.87	32	52	15.43	-	-	-			
9 Capayuran	665	164	635	4.17		-	-	-	-	-		30	4.51
10 Central Panatan	241	20	241	1.59		-	-	-	-	-			
11 Datu Binasing	327	10	129	0.85	40	48	14.68	-	-	-			
12 Datu Mantil	242	3	84	0.55	75	158	65.29	-	-	-			
13 Kadingilan	304	10	222	1.46	52	82	26.97	-	-	-			
14 Kimarayag	576	55	402	2.64	3	5	.0087	5	169	29.30			
15 Libungan Toreta	499	150	334	2.2	40	60	12.02	-	-	-			
16 Lower Baguer	218	5	119	0.78	55	99	45.4	-	-	-			
17 Lower Pangankalan	253	3	205	1.35	34	48	18.97	-	-	-			
18 Malagakit	136	7	81	0.53	5	55	3.67	-	-	-			
19 Maluao	353	36	331	2.18	10	14	1.70	1	8	1.70			
20 Matilac	360	10	260	1.71	65	100	13.89	-	-	-			
21 Midpapan 1	463	51	454	2.99	3	5	1.08	1	2	0.043		2	0.043
22 Midpapan 2	344	45	47	0.31	3	5	1.45	-	-	-		2	0.058
23 Molok	140	-	-	-	95	140	100	-	-	-			
24 New Culasi	202	22	197	1.3	4	5	0.024	-	-	-			
25 New Igaras	195	9	107	0.7	4	5	2.56	5	63	32.30			
26 New Panay	259	15	189	1.24	35	50	19.31	-	-	-			
27 North Manuangan	562	65	527	3.47	30	35	6.23	-	-	-			
28 Patot	439	2	63	0.41	55	86	19.59	5	80	18.22			
29 Payong-Payong	251	45	203	1.33	10	15	5.98	5	33	13.15			
30 Presbitero	303	20	170	1.12		-	-	-	-	-		15	4.95
31 Renibon	260	10	56	0.37		-	-	112	204	40.0			
32 Simsiman	495	12	395	2.6	20	100	5.05	-	-	-			
33 South Manuangan	523	48	393	2.58		-	-	1	10	1.91		10	1.91
34 Tigbawan	239	38	189	1.24	25	30	12.55	2	20	8.37			
35 Tubon	539	71	504	3.31	20	25	4.64	-	-	-		10	1.85
36 Upper Baguer	608	95	578	3.8	5	10	1.65	-	-	-		20	3.29
37 Upper Pangankalan	230	-	-	-	70	230	100	-	-	-			
	15,201		11,021	72.50		1,399	9.20		504	3.32		240	1.58

Source: Comprehensive Land Use Plan (CLUP)

Level 2 water system

As shown in Table 5.4-27, level 2 water systems are put up in seven barangays in Pigcawayan. Level 2 water systems serve 1,070 households or 7% of the total municipal households.

Table 5.4-27 Summary of Level 2 Water Supply System in Pigcawayan

Location of Water Sources	Number of Pumps/ Type of Project	Number of Communal Faucets	Barangays Served	No. of HH Population Served	% to total HHs
Bulucaon	1 - Pump Driven Level 2 Water System	11 tap stands	Within the barangay	165	1.09
Patot	Spring Development with intake box (by gravity)	14 tap stands	Within the barangay	210	1.38
Midpapan 2	Spring Development with intake box (by gravity)	13 tap stands	Within the barangay	195	1.28
New Panay	Spring Development with intake box (by gravity)	1 tap stand	Within the barangay	20	0.13
Banucagon	1 - Pump Driven Level 2 Water System	5 tap stands	Within the barangay	75	0.49
Balacayon	1 - Pump Driven Level 2 Water System	10 tap stands	Within the barangay	150	0.99
Datu Binasing	1 - Pump Driven Level 2 Water System	10 tap stands	Within the barangay	150	0.99
Libungan Torreta	1 - Pump Driven Level 2 Water System	7 tap stands	Within the barangay	105	0.69
Total				1,070	7.04

Source: Comprehensive Land Use Plan (CLUP)/MPDC

In addition, the Pigcawayan LGU is undertaking the development of level 2 water system projects in eleven (11) barangays. The projects were funded from the 20% annual development fund (CY 2019 and 2020) of the municipality. Upon completion, the projects are expected to serve 150 households in every barangay (total of 1,650 households).

Table 5.4-28 On-going Level 2 water System Projects in Pigcawayan (2020)

Type of Project	Recipient Barangay	Target Households Served	Percentage to Total
Pump Driven Elevated Tank / Reservoir	Brgy Lower Panangkalan, Upper Panganagkalan, Kadingilan, Datu Mantil, Benasing, Bulakayon, Buricain, Simsiman, Banucagon, Patot, Cabpangi	1,650	7.25

Source: MPDC



Figure 5.4-19 Photos of the On-going Level 2 Water Projects in Pigcawayan

Level 3 water system

The level 3 water supply system is not solely provided by the Pigcawayan Water District. An alternative source is provided by pump-driven elevated tanks or reservoirs established through the initiatives of local officials in seven (7) barangays of the municipality. Table 5.4-29 shows that a total of 1,046 households (6.9% of total municipal households) have access to level 3 water systems.

Table 5.4-29 Summary of Level 3 Water Supply System in Pigcawayan (2015)

Name of Water Facility	No.	Location	Monthly Consumption Cu.m./mo.	Barangays Served in the Municipality	# of Households Served	% to Total Households
Pigcawayan Water District	1		1,082.40	Poblacion 1,2 & 3	623	4.10
Sub-Total					623	4.10
Elevated Concrete Water Tank/Reservoir	2	Brgy. Presbitero	1,416	Brgy. Presbitero	118	0.078
Elevated Steel Water Tank/Reservoir	1	Brgy. Balogo	372	Brgy. Balogo	31	0.020
Elevated Concrete Water Tank/Reservoir	2	Brgy. Bulucaon	209	Brgy. Bulucaon	19	0.012
Elevated Concrete Water Tank/Reservoir	1	Brgy. Mibpapan 2	950	Brgy. Mibpapan 2	95	0.062
Elevated Concrete Water Tank/Reservoir		Brgy. South Manuangan	1,100	Brgy. South Manuangan	110	0.072
Elevated Steel Water Tank/Reservoir	1	Brgy. New Igbaras	200	Brgy. New Igbaras	20	0.013
Elevated Steel Water Tank/Reservoir	1	Brgy. Banucagon	300	Brgy. Banucagon	30	0.10
Sub-Total					423	2.78
Total					1,046	6.88

Source: Comprehensive Land Use Plan (CLUP)/MPDC

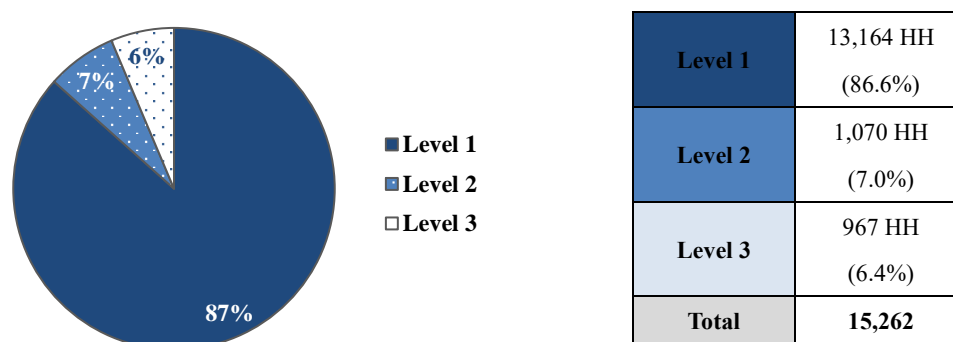


Figure 5.4-20 Summary of Water Supply Service in Pigcawayan

(7) Summary of Issues on the Water Supply of the Surrounding Municipalities

The major issues and plans on the water supply system of the five surrounding municipalities are discussed in Table 5.4-30.

Table 5.4-30 Summary of Issues on Water Supply in the Surrounding Municipalities

Issues	Plans
Inadequate funds to improve water systems particularly in the remote barangays	LGUs will seek assistance from other line agencies or foreign funding agencies
Non-prioritization of water supply systems by some LGUs	LGUs will allocate budget for water system projects from the 20% annual development plans
No collection of tariffs for the sustainability of facilities	LGUs will organize and strengthen BAWASA or Water Concessioner's Cooperatives to facilitate collection of tariffs
Poor management of existing water supply systems	LGUs will enjoin concerned barangay officials to assign personnel that will oversee proper management of project including water supply systems
Environment and climate change impact resulting to disappearance of forests in the barangays that may result to depletion of water resources	Reforestation program will be included in the Annual Investment Plan of LGUs

5.5 Sewage

5.5.1 Sanitary Condition in Cotabato City

(1) Overview

At present, Cotabato City does not have yet a sewerage system for domestic wastewater disposal. Therefore, the sewage collection system of the households in the city may be classified into three types, such as: a) households with toilets and onsite septic tanks; b) households with toilets that empty into pits (antipolo); c) no toilets and practice open defecation.

According to 2013 health statistics of the Office on Health Services, 40,839 households or 70.8% of the total number of households (57,678) in the city have sanitary toilet facilities.

In a study conducted in 2007 by the Notre Dame University- University Research Center (NDU-URC) entitled "Water Analysis of Cotabato City Rivers and its Implication to Human and Aquatic Life" showed from its statistical sampling that only nineteen percent (19%) of households living along the riverbanks of Rio Grande, Tamontaka, Esteros and Matampay have water-sealed toilets; and twenty-three percent (23%) dispose their human wastes in an open pit. Therefore, most of these households defecate along the riverbank or directly in the river.

Most septic tanks built before year 2000 were inadequately sized, improperly designed and have open bottoms at leaching chambers that allows contamination of the ground water. Others have only single compartment. Many septic tanks are located underneath homes or are otherwise difficult to access. Addressing the dysfunctions of the existing septic tanks is not a common practice among households in the city. Hence, many septic tanks in Cotabato City is substandard and do not conform to the provisions of the National Building Code.

Poorly treated and pathogen-laden effluent from these septic tanks either seeps through the groundwater directly (for those houses located where there are no proper drainage) or goes to the city drainage system which empties to the rivers without undergoing treatment.

Further, most septic tanks in the city are infrequently or never been desludged. Desludging is only done when the septic tank becomes non-functional because it is already full to its capacity. There are desludging companies operating in Cotabato City, however, whether they follow the strict guidelines and protocols on waste disposal still remains a question.

Moreover, about seventy percent (70%) of the land area of the city is below sea level. As such, during heavy downpour some areas near rivers and creeks become flooded and backflow of river water to septic tanks always happens. This phenomenon further contaminates the surface water.

In the same water analysis study of the NDU-URC, it was found that the water samples drawn from the Rio Grande, Tamontaka, Esteros and Matampay rivers were highly contaminated with fecal coliform bacteria, specifically, E coli considered the best indicator of fecal water contamination associated with human or animal wastes.

The 2013 statistics on morbidity reported by the Office on Health Services showed that diarrhea was the number one cause of illness of Cotabato City residents. Many households still source their domestic water from shallow wells and open dug wells. While, private water delivery companies augmenting the water requirements of some commercial and residential users draw their supply from their respective deep wells. There could be a probability that groundwater in some areas may have been contaminated by sewage leakage and effluent coming from septic tanks.

Table 5.5-1 Statistics on Morbidity (2013)

	Morbidity	Male	Female	Total
1	Age/lbm (diarrhea)	1,702	1,408	3,110
2	Pneumonia	1,457	1,082	2,539
3	HPN	916	1,168	2,084
4	Disorder of the skin	1,043	917	1,960
5	UTI	171	264	435
6	PTB	276	158	434
7	D.M.	112	156	268
8	Heart disease	97	161	258
9	Gastritis	93	142	235
10	Asthma	89	109	198

Source: Feasibility Study, Cotabato City Septage Management Program, 2019

(2) Mode of Septage and Domestic Wastewater Disposal

The desludging of septage from households septic tanks in Cotabato City is being performed by three private desludging companies based and having operations within the city. One company is using a tanker truck while, the two others are using drums as depository receptacles onboard

smaller trucks. They perform the services in an on-call basis from customers and they charge service fees according to the volume of the desludged materials.

There were occasions in the past when the City Government of Cotabato, through the City Environment and Natural Resources Office (CENRO) had apprehended workers of these companies caught disposing the collected septage either direct to existing city drainage/canal or into the Esteros River without properly treating or disinfecting the waste. However, no new reported illegal waste disposal was reported in the past several months. These companies claim that they are disposing the collected septage in vacant lots away from residential houses outside Cotabato City.

Households which cannot afford the services of these companies resort to hiring individuals to do the desludging manually and disposing the waste on any vacant lots or direct to a nearby creek without the benefit of undergoing appropriate treatment or disinfection.

There is no other means of septage disposal being practiced in the city at present except as discussed above, i.e., desludging by private companies and manually by hired individuals. Even the septic tank effluents and other household domestic wastewater leading to city drainage system within the central business district (CBD) are disposed towards Rio Grande River without undergoing any type of treatment.

5.5.2 Related Laws and Regulations

The Philippine Clean Water Act of 2004, or Republic Act no. 9275 aims to protect the country's water bodies from pollution from land-based sources and address the need for improvement management of domestic wastewater.

The Code on Sanitation of the Philippines provides that septic tanks must be water tight, inspected once a year, cleaned when the sludge has reduced the liquid capacity by fifty percent (50%), and the sludge must be treated and disposed of properly.

Many studies point to the fact that domestic wastewater is the principal cause of organic pollution of our water bodies. In view hereof, the national government established the National Sewerage and Septage Management Program (NSSMP). It is part of the National Sustainable Sanitation Plan.

NSSMP aims to enable LGUs to plan for sewerage and septage treatment through a process similar to what they usually use for planning other infrastructure projects. And to enhance the ability of local implementers to build and operate wastewater treatment systems for urban centers and promote the behavior change and supporting environment needed for systems to be effective and sustainable.

The NSSMP set a target that by year 2020, all local government units have developed Septage Management Systems, and the seventeen (17) highly urbanized Cities (HUCs) have developed sewerage systems.

The Department of the Interior and Local Government (DILG) Memorandum Circular No. 2019-62, entitled “Policy and Guidelines on Sewage Treatment and Septage Management System” was issued on April 22, 2019. The Circular reiterates the roles of LGUs and advocates for the delivery of basic services relative to the implementation of sewage treatment and septage management system within their respective territorial jurisdiction.

5.5.3 Current Development Initiatives in Cotabato City

The continuing rapid growth of the city paved the way for the rise of necessary economic infrastructure facilities, such as, hotels, restaurants, cinemas, and other business establishments which would all contribute to the increasing demand for a good sewage management. Aware of this scenario, the City Government of Cotabato with support from the United States Agency for International Development (USAID) began in 2016 the planning for the establishment of a septage management system as a concrete response to address the concern on sanitation, particularly, sewage disposal.

The Metro Cotabato Water District (MCWD) which has also the mandate over the collection, treatment and disposal of sewage as provided under PD 198 or the Provincial Water Utilities Act participated in the undertaking as an active partner of the City Government of Cotabato.

The USAID provided the technical assistance component for the proposed septage management system project for the city. A series of trainings were conducted for the technical personnel from the city government and the MCWD which led in the formulation of the Feasibility Study for the Septage Management Program for Cotabato City. The feasibility study was finalized in February 2019 and was submitted to NSSMP-DPWH for fund assistance of the fifty percent (50%) of the Ninety Three Million Five Hundred Thousand Pesos (P93.5M) total cost of the project. While, the remaining fifty percent (50%) shall be equally shared by the City Government and the MCWD.

(1) The Proposed Cotabato City Septage Management Program

The Septage Management Program (SMP) is a joint venture project of the City Government of Cotabato and the MCWD. The concept of the project is to desludge septic tanks and transport the collected septage to the fully mechanized treatment facility for treatment before disposal of the bio-solids and effluents.

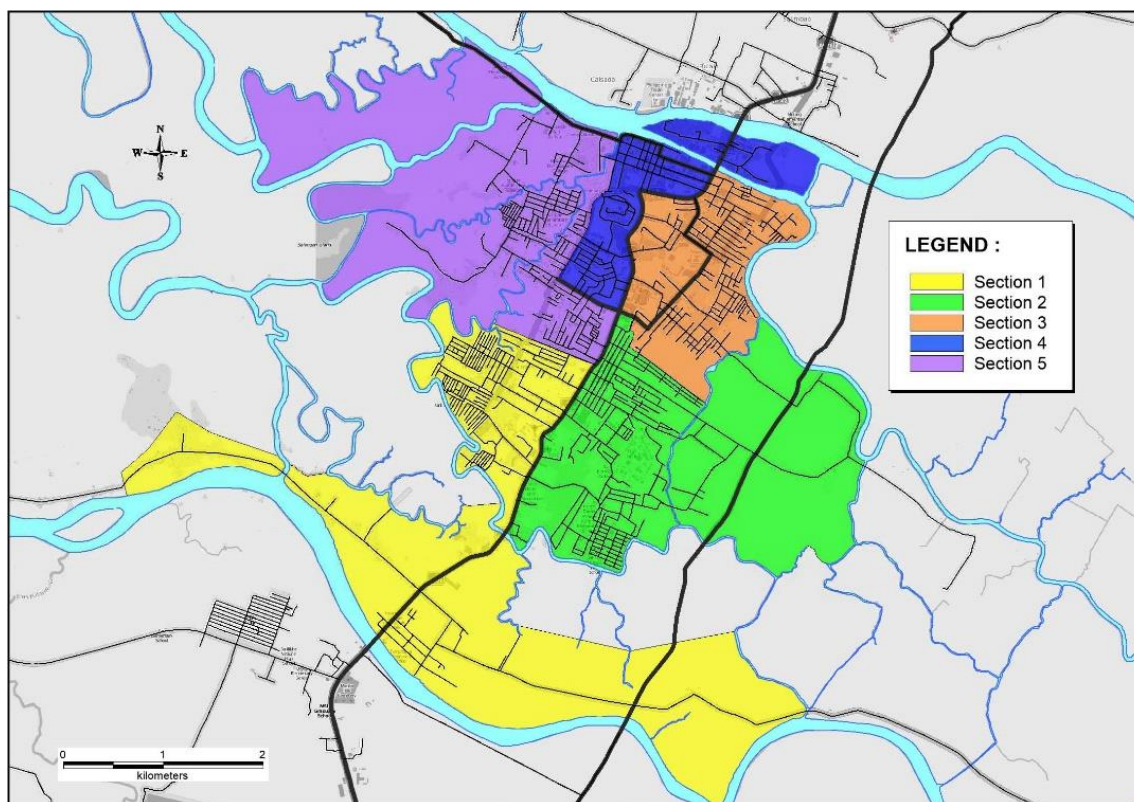
The project shall be operated by the MCWD under its Engineering Department. While, the City LGU through the City Engineering Office (CEO) shall undertake the construction of the treatment facility through qualified selected private contractors. The regular frequency of septic tank desludging is once every five years and corresponding wastewater management fees shall be collected monthly combined with the water bill of every household consumer.

The city service area is divided into five sections. Each section corresponds to the year of servicing (years 1 to 5). The same schedule will be followed in the next five-year cycle to ensure that all septic tanks are regularly desludged every five years as required by the Department of Health.

Table 5.5-2 Projected Number of Household Clients

Section	Covered Barangays	2015	2020	2025	2030	2035
Section 1	Kalanganan 2, Mother Brgy. Tamontaka, Tamontaka 1, Tamontaka 2, Tamontaka 3, Rosary Heights 10, Rosary Heights 11	3,994	4,630	5,368	6,223	7,214
Section 2	Rosary Heights 8, Rosary Heights 9, Rosary Heights 6, Rosary Heights 7, Poblacion 8, Poblacion 9	4,390	5,089	5,900	6,839	7,928
Section 3	Rosary Heights 4, Rosary Heights 5, Rosary Heights 2, Rosary Heights 3, Mother Barangay Poblacion, Poblacion 2, Poblacion 3, Poblacion 4	5,448	6,316	7,322	8,488	9,840
Section 4	Mother Barangay Rosary Heights, Rosary Heights 1, Rosary Heights 13, Poblacion 1, Poblacion 7, Poblacion 5, Poblacion 6	4,989	5,784	6,705	7,773	9,011
Section 5	Rosary Heights 12, Bagua 3, Mother Barangay Bagua, Bagua 2, Lugay-Lugay (Bagua 1), Mother Barangay Kalanganan	4,355	5,048	5,852	6,784	7,865
Total		23,176	26,867	31,147	36,107	41,858

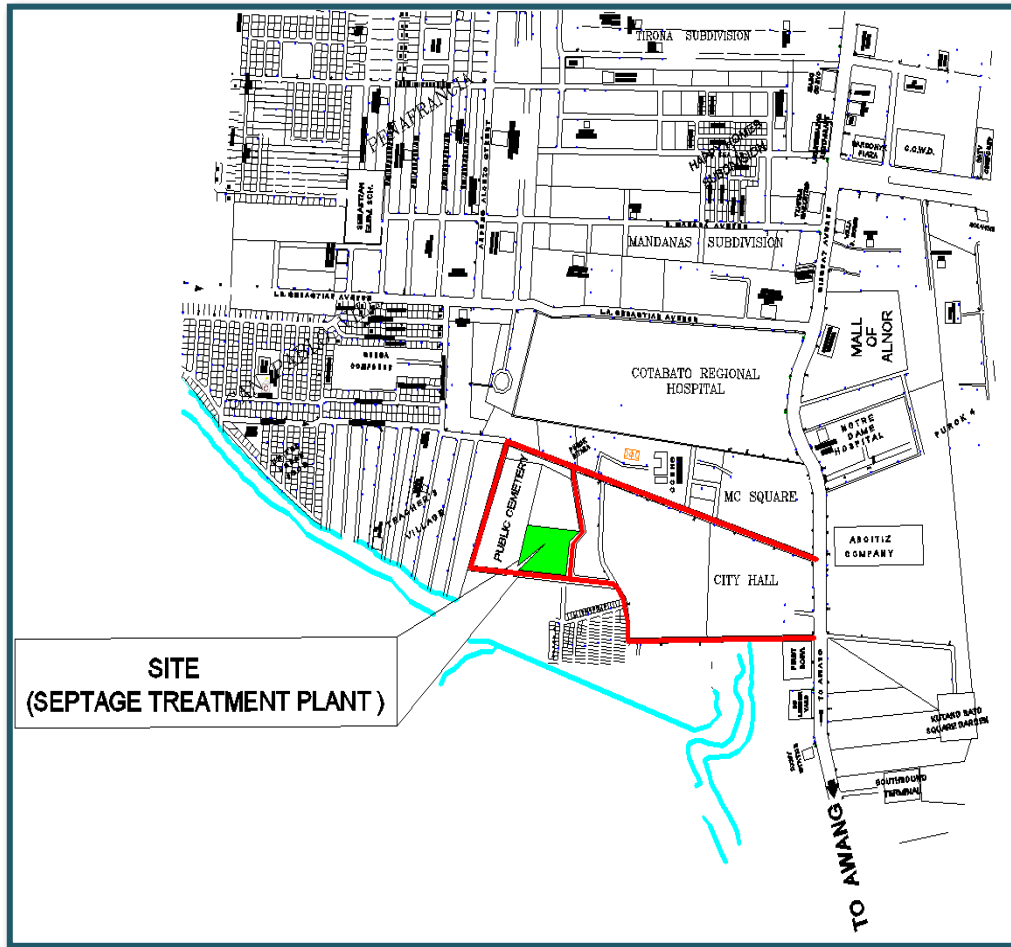
Source: Feasibility Study, Cotabato City Septage Management Program, 2019



Source: Feasibility Study, Cotabato City Septage Management Program, 2019

Figure 5.5-1 Sectional Map of Coverage Area

The proposed septage treatment plant will be located at the old Malagapas dumpsite in Barangay Rosary Heights 10. The Barangay Officials issued a resolution to show their support for the establishment of the treatment plant. The site is within the 34-hectare city government property where the New City Hall and the Mega Square Commercial Complex are situated. The treatment plant site will occupy an area of about 3,000 square meters at the rear portion of the City Hall and adjacent to the Malagapas Cemetery. The treatment plant applied fully-mechanized system to avoid odor problem. It is also very near the Esteros River where the effluent after treatment will be discharged.



Source: Feasibility Study, Cotabato City Septage Management Program, 2019

Figure 5.5-2 Proposed Site of the Septage Treatment Plant

(2) Status of the Proposed Cotabato City Septage Management Program

The estimated total project cost of the Proposed Cotabato City Septage Management Program is Ninety-Three Million Five Hundred Thousand Pesos (P93.5M).

The feasibility study together with other requirements were already submitted to the NSSMP-DPWH in 2019 for the approval of the fifty percent (50%) subsidy to the project. The City Government of Cotabato made a follow-through with NSSMP-DPWH in February 2020 and accordingly, that office is expected to approve soon the release of its cost subsidy.

In the case of the twenty-five percent (25%) counterpart from the City LGU, the amount is already available. This was sourced-out though a loan from the Land Bank of the Philippines.

While, the other twenty-five percent (25%) counterpart from the MCWD, as of April 2020, that office is still finding ways to raise the amount. Given the COVID 19 pandemic, the water bill collection beginning March 2020 is expected to significantly go down from the normal rate before.

Table 5.5-3 Summary of Capital Costs (in million Pesos, 2018 prices)

Cost Items	Amount (M PhP)
Total Cost of Treatment Facility	72.36
Land development	5.82
Soil Exploration	0.35
Civil Works	13.82
Electrical System (Lines and Transformers)	4.13
Buildings	43.24
Office Equipment	0.91
Laboratory Equipment	4.00
Maintenance Equipment	0.09
Vehicles (Desludging Trucks)	18.08
Construction Contingencies	3.06
Total Capital Costs	93.50

Source: Feasibility Study, Cotabato City Septage Management Program, 2019

Table 5.5-4 Financing Plan

Source	Percentage	Amount (M PhP)
NSSMP-DPWH	50%	46.750
City Government of Cotabato (CGC)	25%	23.375
MCWD	25%	23.375
Total	100%	93.500

Source: Feasibility Study, Cotabato City Septage Management Program, 2019

(3) Organization and Budget of Office Involved in the Operation of the Septage Management Program

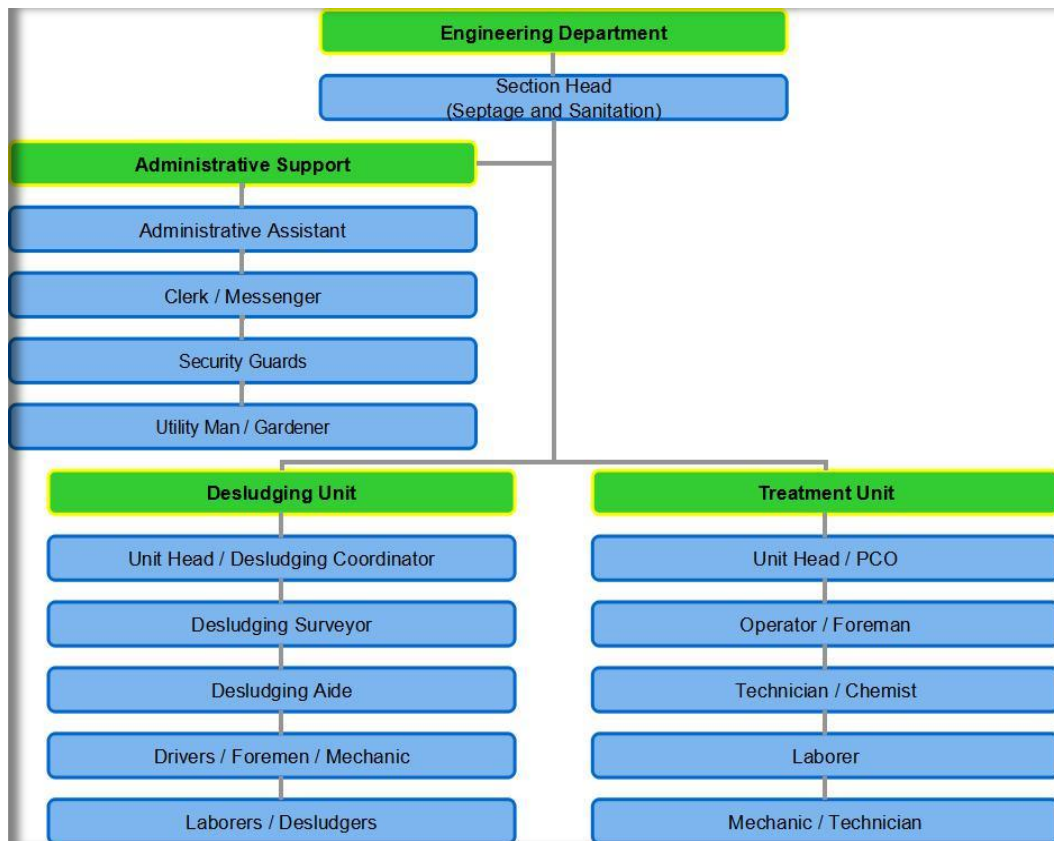
The proposed Cotabato City Septage Management Program shall be operated and managed by the MCWD through a Septage and Sanitation Section to be created under its Engineering Department. A Section Head shall be designated by the MCWD to supervise the operations. He/she will be supported by technical and administrative personnel in the operations of the project. The salary of the section head shall come from the MCWD. All the support staff shall be hired by the project and their salaries shall be drawn from the wastewater management service fee collection.

The administrative support will have the following staff members: one Administrative Assistant; one clerk/messenger; four security guards; and, one utility man/gardener.

The technical support will have two technical units, i.e., the Desludging Unit and the Treatment Unit.

The Desludging Unit will be in-charge of the collection and transport of septage/sludge from septic tanks to treatment plant. This unit is composed of the following: one Unit Head/Desludging Coordinator; one Desludging Surveyor; one Desludging Aide; two Drivers/Foreman/Mechanic; and, two Laborers/Desludgers.

The Treatment Unit will be in-charge of the treatment of septage delivered to the treatment plant. This unit is composed of the following: one Unit Head/Pollution Control Officer; one Operator/Foreman; one Technician/Chemist; one Mechanic/Technician; and, one Laborer.



Source: Feasibility Study, Cotabato City Septage Management Program, 2019

Figure 5.5-3 Septage Management Project Operations Organizational Chart

In the first year of operation, the Personal Services expenses is estimated to be about P3.673M. This includes salaries and wages of the staff and other statutory obligations. It is also estimated that there will be salary increase of ten percent (10%) every five years.

While, the Maintenance and other Operating Expenses (MOOE) for the first year of operation is estimated at P4.07M. An average annual increase of four percent (4%) is assumed in its MOOE.

5.5.4 Current Condition of Sanitation in Surrounding Municipalities

Sanitation research in five municipalities surrounding Cotabato City (Datu Odin Sinsuat, Sultan Kudarat, Sultan Mastura, Parang, Plgawayan) shows that many households do not have access to adequate sanitation facilities. Access to sanitary sanitation facilities in these municipalities ranges from 26% to 90%. Sultan Kudarat municipality has the highest percentage (74%) of

households with unsanitary sanitation, while Parang has the lowest percentage (10%) of households with unsanitary facilities.

Table 5.5-5 Summary of Sanitation in the Surrounding Municipalities

Name of municipality	Total number of households	Unsanitary facilities		Sanitary facilities	
		# of households	%	# of households	%
Datu Odin Sinsuat	16,880	5698	33.75	11,182	66.24
Sultan Kudarat	15331	11,345	74	3,986	26
Sultan Mastura	3,837	576	15	3,261	85
Parang	15,262	1,526	10	13,736	90
Pigcawayan	15,201	2,687	17.68	12,514	82.32

Source: MPDC, CLUP

To inspire and persuade LGUs to observe proper sanitation, the Department of Health (DOH) launched a National Program which gives incentives to LGUs with zero open defecation cases. However, in these municipalities, progress has been very slow. Sanitation practices and hygiene behavior of many households pollute the environment and threaten the health of many residents.

In these municipalities, households predominantly use septic tanks. However, septic tanks pose several challenges that may lead to the pollution of surface and groundwater. First, most septic tanks have open bottoms, which may lead to septage polluting both surface and groundwater. Second, most septic tanks are rarely or never emptied. It is quite common for households to fix PVC outlet pipes to the septic tanks to allow septage to flow from the septic tanks into surrounding areas, rivers, creeks, and drainage channels.

Desludging of septic tanks is rarely or never done by households. In anticipation of reaching the full capacity of septic tanks, most households install PVC pipes on a hole made in the septic tanks to make extra liquid outflow allowing foul smell to circulate in the surroundings and pollute air in the environment.

5.5.5 Summary of Issues on Sanitation

- 1) **Substandard design and construction of many septic tanks.** A significant number of septic tanks were designed and constructed with open bottoms at leaching chambers, hence, water seeps underneath and possibly contaminate the aquifer. A big challenge therefore is how to enjoin the owners of these septic tanks to undertake the necessary repair of the facility since this will entail cost from their end.
- 2) **Effluent from septic tanks go to underground water or to city drainage system without proper treatment.** The overflow wastewater (effluent) from septic tanks either flow freely to the groundwater in areas without drainage system or flow into accessible city drainage system and discharges into a river/creek without undergoing treatment or disinfection.

Domestic wastewater from the central business district (CBD) flows towards existing city drainage and exits to the Rio Grande River without undergoing any type of treatment. The city drainage system within the central business district (CBD) is quite adequate to accommodate

storm water under normal weather condition. These undergo regular maintenance and cleaning works. The effluent wastewater from the septic tanks and non-fecal wastewater of residential houses and commercial establishments within the CBD also flow through to this city drainage system (along the SK Pendatun St., Don Rufino Alonzo Ave., Jose Lim Sr. St., and Rajah Tabunaway Blvd.) and flow along the “open creek” crossing the streets of SK Pendatun, Don Rufino Alonzo, Jose Lim Sr., and Rajah Tabunaway before exiting to Rio Grande River near the City River Wharf.

However, the combined storm water and domestic wastewater from residential houses and commercial establishments flow into the Rio Grande River without undergoing any type of treatment, hence, polluting the river.

- 3) Lack of awareness for the importance of sanitation in the five surrounding municipalities.** Due to the lack of awareness for the dangers brought by poor sanitation, the households also lack appreciation for sanitation and hygiene. As a result, many households are still discharging their sewers into rivers, creeks, and other bodies of water including oceans. Although those issues are somehow addressed in some parts of Cotabato City, these were observed to be more serious in the surrounding municipalities.
- 4) Lack of Septage Management Program in Five Surrounding Municipalities.** LGUs seem not so concerned on the dangers posed by such kind of practices, so they do not make efforts to improve. Instead, their priorities are more centered on road construction. The less prioritization for sewage disposal is evident in the LGUs’ Comprehensive Development Plans (CDPs), wherein proper sewage disposal projects remains yet-unrealized plans.

5.6 Solid Waste Management

5.6.1 Solid Waste Management condition in Cotabato City

(1) Overview

With over 70% of the city’s total land area below sea level, improper waste disposal could potentially escalate the recurring threat of flooding. Based on the results of the Waste Analysis and Characterization Study (WACS) in 2017, the city generates approximately 109 tons of wastes daily. By 2027, this figure is projected to increase at 167 tons per day. Currently, a one-hectare lot being used as a temporary Residual Containment Area (RCA) serves as the sole facility for waste disposal. The geographical constraints within the city poses a challenge in finding a suitable location for a Sanitary Landfill (SLF).

By virtue of City Ordinance No. 4417, the City Environment and Natural Resources Office (CENRO) was created in 2016 to address this upsurge in waste generation. The CENRO is tasked to spearhead the LGU’s initiative on solid waste management (SWM) programs. The CENRO coordinates with other local government offices and stakeholders to properly implement the

Ecological Solid Waste Management Plan (ESWMP) towards the realization of a “clean, healthy, environment-friendly, and economically stable Cotabato City by 2027.”

(2) Waste Generation

The results of the 2017 WACS revealed that Cotabato City generated a daily average of 108.61 tons of wastes. This translates to an average waste generation per capita of 0.35 kg per day.

As shown in Table 5.6-1 below, households contributed to the highest percentage of wastes generated at 53.72%, followed by food establishments (11.26%), and public markets (9.94%).

Table 5.6-1 Waste generation per sector (2017)

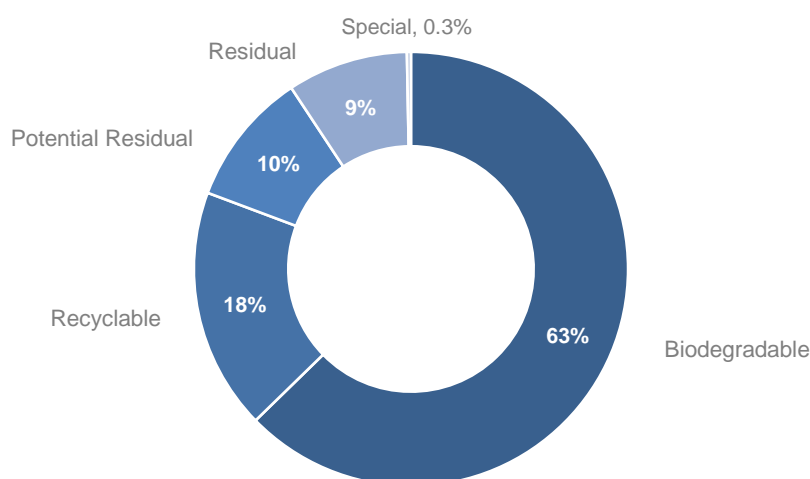
Sector	Volume of waste generated		
	Kg/day	Ton/year	%
Residential	58,345	21,296	53.72%
Commercial			
Food establishments	12,230	4,464	11.26%
General stores	8,189.21	2,989	7.54%
Other services	5,604.29	2,046	5.16%
Institutions			
School, offices and churches	8,602	3,140	7.92%
Public markets	10,796	3,940	9.94%
Hospitals	369	135	0.34%
Industrial	4,475	1,633	4.12%
Total	108,610	39,643	100.00%

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

(3) Waste Composition

Figure 5.6-1 shows the composition of wastes within Cotabato City. Biodegradable and recyclable wastes comprise 63% and 18% of total waste generation respectively. Among the 37 barangays, three urban barangays – Bagua 2 (7.16%), Poblacion Mother (7.03%) and Bagua Mother (6.68%) contributed to the highest amount of biodegradable and recyclable wastes disposed.

Table 5.6-2 shows the composition of disposed waste per sector. The difference between the total of disposed waste (85 tons), and the computed daily generated waste (108.6 tons) translate into an overall collection efficiency of 78.4%.



Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

Figure 5.6-1 Waste Composition within Cotabato City (2017)

Table 5.6-2 Summary of the Amount and Composition of Disposed Waste per Sector

Sector	Composition of wastes generated								Total
	Biodegradable		Recyclable		Residual		Special wastes		
	kg/day	%	kg/day	%	kg/day	%	kg/day	%	
Residential	21,634	40.5%	7,875	51.4%	9,108	56.3%	193	75.6%	38,810
Food establishments	10,782	20.2%	510	3.3%	1,100	6.8%	2	1.0%	12,395
General stores	1,496	2.8%	3,555	23.2%	1,690	10.5%	1	0.6%	6,742
Recreational centers	299	0.6%	21	0.1%	53	0.3%	1	0.3%	375
Public markets	9,288	17.4%	108	0.7%	951	5.9%	13	4.9%	10,359
Industries	1,930	3.6%	628	4.1%	429	2.7%	1	0.3%	2,988
Institutions	5,786	10.8%	1,022	6.7%	1,609	10.0%	10	3.9%	8,428
Service centers	2,028	3.8%	1,526	10.0%	1,147	7.1%	32	12.4%	4,733
Health-related sources	132	0.2%	77	0.5%	87	0.5%	2	1.0%	298
Total collection area	53,375	100.0%	15,323	100.0%	16,174	100.0%	255	100.0%	85,128
% to Total	62.7%		18.0%		19.0%		0.3%		100%

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

(4) Waste Collection and Transportation

The barangay governments, through their own solid waste management committees, are primarily responsible for waste collection. According to the ESWMP of Cotabato City, each barangay is mandated to establish their own collection system.

In 2017, the scope of the waste collection area included 29 out of the 37 (78%) barangays. Waste collection was conducted twice a day – with a morning shift from 4 AM to 10 AM and an evening shift from 9 PM to 3 AM. All wastes collected from these areas were transported directly to the RCA in Biniruan.

For the other eight (8) barangays outside the collection area, waste collections have been limited to set schedules. The collection schedule per barangay is shown in Table 5.6-3.

Table 5.6-3 Collection Schedule per Barangay in Cotabato City (2017)

No.	Collection area (barangays)	Time	Frequency	Types of wastes
1	Rosary Heights Mother	9 PM to 3 AM	Daily	Bio and non-biodegradable
2	Rosary Heights 1	4 AM to 10 AM	Mon/Thurs	Bio and non-biodegradable
3	Rosary Heights 2	4 AM to 10 AM	Daily	Bio and non-biodegradable
4	Rosary Heights 3	9 PM to 3 AM	Daily	Bio and non-biodegradable
5	Rosary Heights 4	9 PM to 3 AM	Daily	Bio and non-biodegradable
6	Rosary Heights 5	9 PM to 3 AM	Daily	Bio and non-biodegradable
7	Rosary Heights 6	4 AM to 10 AM	Daily	Bio and non-biodegradable
8	Rosary Heights 7	4 AM to 10 AM	Daily	Bio and non-biodegradable
9	Rosary Heights 8	9 PM to 3 AM	Daily	Bio and non-biodegradable
10	Rosary Heights 9	9 PM to 3 AM	Daily	Bio and non-biodegradable
11	Rosary Heights 10	9 PM to 3 AM	Daily	Bio and non-biodegradable
12	Rosary Heights 11	9 PM to 3 AM	Daily	Bio and non-biodegradable
13	Rosary Heights 12	4 AM to 10 AM	Daily	Bio and non-biodegradable
14	Rosary Heights 13	4 AM to 10 AM	Daily	Bio and non-biodegradable
15	Bagua Mother	4 AM to 10 AM	Daily	Bio and non-biodegradable
16	Bagua 1	4 AM to 10 AM	Daily	Bio and non-biodegradable
17	Bagua 2	4 AM to 10 AM	Daily	Bio and non-biodegradable
18	Bagua 3	4 AM to 10 AM	Daily	Bio and non-biodegradable
19	Poblacion Mother	4 AM to 10 AM	Daily	Bio and non-biodegradable
20	Poblacion 1	1 PM to 5 PM	Tue/Thurs	Bio and non-biodegradable
21	Poblacion 2	9 PM to 3 AM	Daily	Bio and non-biodegradable
22	Poblacion 3	9 PM to 3 AM	Daily	Bio and non-biodegradable
23	Poblacion 4	9 PM to 3 AM	Daily	Bio and non-biodegradable
24	Poblacion 5	9 PM to 3 AM	Daily	Bio and non-biodegradable
25	Poblacion 6	9 PM to 3 AM	Daily	Bio and non-biodegradable
26	Poblacion 7	9 PM to 3 AM	Mon/Wed/Fri	Bio and non-biodegradable
27	Tamontaka Mother	4 AM to 10 AM	Daily	Bio and non-biodegradable
28	Tamontaka 1	4 AM to 10 AM	Daily	Bio and non-biodegradable
29	<i>Kalanganan Mother</i>	1 PM to 5 PM	Per request	Residual and special wastes
30	<i>Kalanganan 1</i>	1 PM to 5 PM	Per request	Residual and special wastes
31	<i>Kalanganan 2</i>	1 PM to 5 PM	Per request	Residual and special wastes
32	<i>Poblacion 8</i>	1 PM to 5 PM	Per request	Residual and special wastes
33	<i>Poblacion 9</i>	1 PM to 5 PM	Per request	Residual and special wastes
34	<i>Tamontaka 2</i>	1 PM to 5 PM	Per request	Residual and special wastes
35	<i>Tamontaka 3</i>	1 PM to 5 PM	Per request	Residual and special wastes
36	<i>Tamontaka 4</i>	1 PM to 5 PM	Per request	Residual and special wastes
37	<i>Tamontaka 5</i>	1 PM to 5 PM	Per request	Residual and special wastes

Source: Cotabato City CENRO

All barangays not covered by the waste collection system are located outside the central area of Cotabato City. Barangay Kalanganan 1 and 2 are located along the coast, while Barangay Tamontaka 2, 3, 4 and 5 are situated in the southern portion along the banks of the Tamontaka River.

Table 5.6-4 Collection Schedule for Institutions and Business Establishments in Cotabato City (2017)

Collection area	Frequency	Types of wastes
Institutions		
Hospitals	Daily	Biodegradable and residual
Public markets	Daily	Bio and non-biodegradable
Public plazas	Daily	Bio and non-biodegradable
Academe	Daily	Bio and non-biodegradable
City hall	Daily	Bio and non-biodegradable
City jail	Daily	Bio and non-biodegradable
Other National Government Agencies (NGA)	Daily	Bio and non-biodegradable
Business Establishments		
Overland terminals	Daily	Bio and non-biodegradable
Business district	Daily	Bio and non-biodegradable

Source: Cotabato City CENRO

Table 5.6-5 lists down the equipment used for the collection and transport of wastes. As of 2017, the city owned 7 garbage trucks and 7 compaction vehicles. The CENRO is in-charge of assigning and maintaining all equipment used in waste collection activities.

Table 5.6-5 List of Equipment Used for Collection and Transport of Wastes (2017)

Heavy equipment	Quantity	Status	Capacity/specifications
Dump trucks	2	Serviceable	6-wheeler/7 cubic meters
	1	Serviceable	10-wheeler/15 cubic meters
	3	New	6-wheeler/7 cubic meters
	1	New	10-wheeler/15 cubic meters
Compactor trucks	2	Serviceable	6-wheeler/10 cubic meters
	1	Serviceable	6-wheeler/7 cubic meters
	4	New	6-wheeler/8 cubic meters

Source: Cotabato City CENRO

Starting 2018, the CENRO commenced the strict implementation of the “No segregation, no collection” policy. The goal of the EWSMP is to further improve upon the results of the WACS in 2017, where only 60% of the collected wastes were segregated.

(5) Waste Processing and Recycling

Waste processing is conducted to recover usable materials from solid wastes. As of 2017, there were no processing facilities in the Biniruan RCA. Waste processing was only conducted periodically in MRFs located within the barangays and at the city MRF at the Cotabato City Hall compound. The facilities related to waste processing and recycling are listed in Table 5.6-6.



MRF in Rosary Heights 8



MRF in Rosary Heights 7



MRF in Poblacion 4



MRF in Poblacion 5



MRF in Rosary Heights 6



MRF in Rosary Heights 10

Figure 5.6-2 Photos of the Materials Recovery Facility (MRF)

Table 5.6-6 List of Facilities for Waste Processing (2017)

Facility	Location	Capacity	Source of materials	Type/s of materials accepted	Brief description
City Materials Recovery Facility (MRF) Building	People's Palace Grounds, Cotabato City	6 cu.m. per day	Public markets	Agricultural by-products and biodegradable materials	<ul style="list-style-type: none"> • It is partly used as containment area for residuals and non-toxic special wastes • It produces charcoal briquettes from corn cobs, coconut husks, etc.
MRF at barangays	Different barangays	variable	Households	Residual & recyclables	<ul style="list-style-type: none"> • These serve as garbage collection points
MRF at schools	Different schools	variable	Classrooms and canteens	Residual & recyclables	<ul style="list-style-type: none"> • These serve as garbage collection points • These serve as trading area for recyclable waste materials

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

Waste pickers, whose main source of livelihood depend on recyclable materials, are tolerated within the vicinity of the RCA facility. In addition, there are also itinerant buyers who roam around the communities to buy recyclables from residents. With the aid of collection carts, tricycles or pedicabs, the itinerant buyers then sell the recyclables to the junkshops. The cost of recyclable materials as of 2017 are listed in Table 5.6-7.

Table 5.6-7 Price of Recyclable Materials (2017)

HM Junkshop (Highway)		Malagapas	
Item	Price (PhP)	Item	Price (PhP)
Plastic bottle	3.00 per kg	Plastic bottle (small)	3.00 per kg
Tin cans (milk, sardines)	2.00 per kg	Plastic bottle (2-5 L capacity)	10.00 per kg
Hard coated plastic	8.00 per kg	Hard coated plastic	10.00 per kg
Scrap metal (solid)	5.00 per kg	Liquor bottle (flat)	0.50 per pc
		Liquor bottle (long neck)	0.75 per pc
		Scrap metal (solid)	5.00 per kg
		Scrap metal (light)	3.00 per kg

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

Junkshops are beneficial in the city's goal of diverting recyclable waste materials from the solid waste stream. As of 2017, there were eight (8) junkshops operating in Cotabato City (see Table 5.6-8). The volume of recyclables collectively bought by these junkshops range from 3,000 to 5,000 kg. per day. Examples of products generated from recyclable wastes include bottle grits (from broken bottles), charcoal briquettes (from coconut husks), and ornamental containers (from thinner and paint containers).

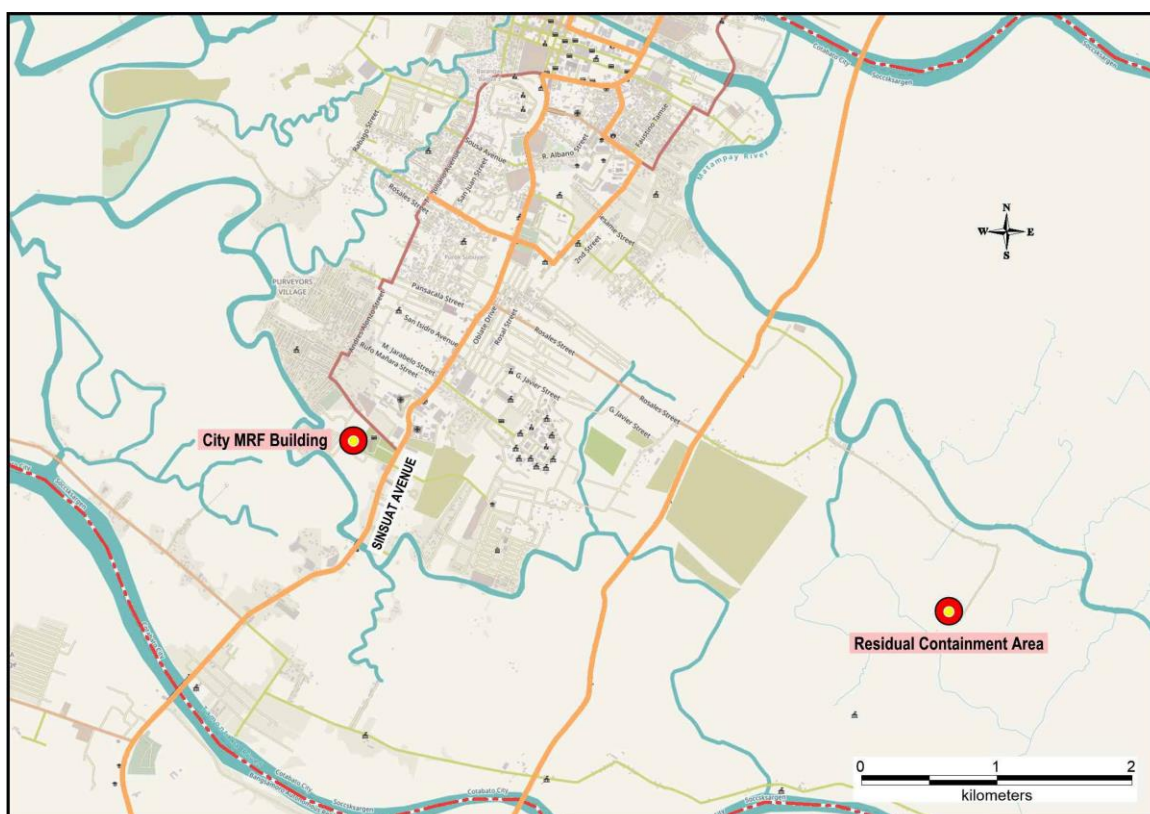
Table 5.6-8 List of Junk Shops in Cotabato City (2017)

Junkshop operator	Location	Types of recyclables traded
Lim Junkshop	Sinsuat Avenue	Plastic, iron, tin, aluminum, scrap metal
Nuharris Junkshop	Sinsuat Avenue	Plastic, iron, tin, aluminum, scrap metal
Dennis Junkshop	De Mazenod	Plastic, iron, copper, tin, brass
Sammy Junkshop	Esteros	Plastic, iron, copper, tin, brass, canisters
Harris Junkshop	Rosary Heights 10, Malagapas	Plastic, iron, bottles, tins, GI sheets, aluminum
Ferdinand Siang	San Pablo	Plastic, iron, bottles, tin, paper, cartons, GI sheets
DR Junkshop	Malagapas	Plastic, iron, tin, aluminum, soft drink cans
DR Junkshop	Sinsuat Avenue	Iron, tin, aluminum, scrap metal, battery

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

(6) Final Disposal

The only facility for final disposal, as of 2019, was the Biniruan RCA. It is a one-hectare lot located 13 kilometers from the Central Business District. The specifications of the RCA are shown in Table 5.6-9.



Source: JICA Study Team

Figure 5.6-3 Location of Existing Major SWM Facilities

Table 5.6-9 Description of the Biniruan RCA Facility

Location	Biniruan, Barangay Poblacion 9
Ownership	City Government of Cotabato (CGC)
Capacity	15,857 tons/year
Area	1.0 ha
Source of wastes	Waste collection area (29 barangays)
Types of wastes accepted	Mixed wastes
Brief description of operations	<ul style="list-style-type: none"> • Mixed wastes are directly dumped and filled in at the RCA • Recyclables are gathered by waste pickers to support their livelihood • Wastes being dumped are treated with Effective Microorganisms (EM) solutions (decomposer, deodorizer, and disinfectant)

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City



Figure 5.6-4 Photos of the RCA in Biniruan

The residual waste generation per capita of 0.07 kg/day indicates that the design lifespan of the RCA is approximately three (3) years. It must be noted that burning of wastes is not allowed within the vicinity of the dumpsite, according to the Clean Air Act of 1999 (RA 8749). Therefore, it is imperative for the City Government of Cotabato to explore other alternative solutions for waste disposal, particularly the construction of a sanitary landfill.

Table 5.6-10 List of Heavy Equipment for the Operations and Maintenance of Disposal Facility (2017)

Heavy equipment	Quantity	Status	Capacity/specifications
FUSO water truck	1	serviceable	6-wheeler/6,000 liters
Backhoe loader	2	serviceable	1.5 cubic meter bucket
Bulldozer	1	serviceable	D6
	1	new	D7
Wheel loader	1	new	3 cubic meter bucket

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

5.6.2 Institutional Framework

(1) Related Agencies

Prior to the establishment of the CENRO, the DTI) was formally created on September 22, 2002 through Executive Order No. 17. The CSWMB is mandated to lead the preparation of the ESWMP, in pursuant to the RA 9003 (Ecological SWM Act). It is composed of representatives from the local government offices, key government agencies (e.g. DTI, DepEd, DILG), religious sector, as well as members of the academe and the private sector.

In addition, Barangay Solid Waste Management Committees were established to serve as the policy-making body and enforcer of SWM initiatives at the barangay level. DENR-EMB assists and serves as the lead agency at the regional level.

Table 5.6-11 Roles and Responsibilities of Agencies on SWM

Agencies/Organizations	Roles in Solid Waste Management
Office of the Local Chief Executive	<ul style="list-style-type: none"> • Oversees the implementation of SWM programs and projects
City Environment and Natural Resources Office (CENRO)	<ul style="list-style-type: none"> • Leads the department in the implementation of the City ESWM Plan • Serves as secretariat to the City SWM board • Provides technical assistance to barangays in the implementation of SWM • Conducts Information, Education and Communication (IEC) on SWM system such as waste segregation, reduction and diversion and recycling • Enforces SWM laws, rules, and regulations • Coordinates with partner agencies in relation to SWM concerns • Monitors the compliance of waste generators on SWM systems
Office of the Vice Mayor and Sangguniang Panlungsod	<ul style="list-style-type: none"> • Provides legislative support in strengthening SWM policy on proper waste disposal • Monitors the infrastructure component of the SWM projects
Ecological Solid Waste Management Board	<ul style="list-style-type: none"> • Prepares the Ecological Solid Waste Management Plan • Oversees the implementation of the ESWM Plan • Monitors and evaluates the SWM program and projects
City Engineer's Office (CEO)	<ul style="list-style-type: none"> • Aids on the engineering aspects of SWM and related construction in the controlled dumpsite
City Health Office	<ul style="list-style-type: none"> • Coordinates the implementation of the health and sanitation code • Spearheads the advocacy in the maintenance of sanitation in all households, commercial and industrial establishments
City Treasurer's Office	<ul style="list-style-type: none"> • Assists the CENRO in the collection of environmental and garbage collection fees, including fines and penalties
City Planning and Development Office (CPDO)	<ul style="list-style-type: none"> • Supports the preparation of the solid waste management plan
City Local Government Operations Office (City LGOO)	<ul style="list-style-type: none"> • Collects and submits SWM reports to the national office • Monitors the implementation of RA 9003 at the city level
Philippine National Police (PNP)	<ul style="list-style-type: none"> • Assists in the implementation of SWM ordinances and policies and supports SWM enforcement team in the issuance of citation tickets to violators
Solid Waste Enforcement Team (Sanitary Officers)	<ul style="list-style-type: none"> • Assists the CENRO in the enforcement of SWM related policies
Barangay SWM Committees	<ul style="list-style-type: none"> • Serves as the SWM policy-making body at the barangay level • Coordinates with the CENRO on SWM implementation at the barangay level
Academe	<ul style="list-style-type: none"> • Assists in the IEC campaign on SWM • Extends knowledge on SWM to parents and students
Association of Barangay Captains	<ul style="list-style-type: none"> • Assists in the strengthening of the BSWMC • Serves as change agents in the implementation of SWM system in the barangays
Civil Society (K of C, CWL, Rotary, etc.)	<ul style="list-style-type: none"> • Participates in the coastal clean-up, and clean and green programs • Assists in encouraging households to practice backyard composting and gardening
Non-Government Organizations	<ul style="list-style-type: none"> • Assists the CENRO in IEC activities
Department of Environment and Natural Resources – Environmental Management Bureau (DENR-EMB)	<ul style="list-style-type: none"> • Conducts periodic monitoring on the operation of the Disposal Facility

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

(2) Budget

The City Government of Cotabato collects garbage fees based on the local tax code. These are annually collected from establishments to support the funds needed for waste collection and disposal management. Fees range from around PhP 25 (small business with areas less than 10 sq. m.) to PhP 130 (establishments with areas greater than 200 sq. m.). The list of monthly fees collected from different types of establishments is shown in Table 5.6-12. The local tax code includes a provision to gradually increase the garbage fees every year.

Table 5.6-12 Monthly Fees Collected per Type of Establishment

Type of establishment	Monthly fee (PhP)	
	2018	Proposal for 2020
A. Manufacturing companies		
With an area of 200 sqm. and above	279.00	288.00
With an area of 100 to 200 sqm.	211.00	217.00
With an area of 100 sqm. and below	140.00	144.00
B. Wholesale/Retail Trade		
Supermarkets and groceries with an aggregate area of:		
With an area of 400 sqm. and above	279.00	288.00
With an area of 200 to 400 sqm.	140.00	144.00
With an area of 200 sqm. and below	86.00	89.00
Malls	322.00	333.00
Sari-sari stores		
Located along the main roads	86.00	89.00
Located along secondary and minor roads	56.00	58.00
Bakeries		
With 3 or more ovens	140.00	144.00
With 2 ovens or less	112.00	115.00
With one oven	84.00	86.00
Department Stores		
With an area of 400 sqm. and above	279.00	288.00
With an area of 200 to 400 sqm.	140.00	144.00
With an area of 100 to 200 sqm.	112.00	115.00
With an area of 100 sqm. and below	84.00	86.00
Hardware, lumber, gravel, and sand		
With an area of 200 sqm. and above	211.00	217.00
With an area of 100 to 200 sqm.	140.00	144.00
With an area of 100 sqm. and below	84.00	86.00
Electronics supply	84.00	86.00
Drugstore		
With an area of 300 sqm. and above	140.00	144.00
With an area of 100 to 300 sqm.	112.00	115.00
With an area of 100 sqm. and below	84.00	86.00
Gasoline stations		
With an area of 400 sqm. and above	140.00	144.00
With an area of 200 to 400 sqm.	112.00	115.00
With an area of 200 sqm. and below	84.00	86.00
Public market stallholders	84.00	86.00

Type of establishment	Monthly fee (PhP)	
	2018	Proposal for 2020
C. Services		
Restaurants and panciterias		
With an area of 300 sqm. and above	279.00	288.00
With an area of 150 to 300 sqm.	211.00	217.00
With an area of 150 sqm. and below	140.00	144.00
Cafeterias and canteens	90.00	93.00
Hotels, motels, and inns		
With an area of 400 sqm. and above	211.00	217.00
With an area of 300 to 400 sqm.	140.00	144.00
With an area of 300 sqm. and below	84.00	86.00
Dormitories, and other lodging houses		
With an area of 400 sqm. and above	140.00	144.00
With an area of 300 to 400 sqm.	112.00	115.00
With an area of 300 sqm. and below	84.00	86.00
Universities, colleges, and other educational institutions		
With an area of 1,000 sqm. and above	279.00	288.00
With an area of 400 to 1,000 sqm.	140.00	144.00
With an area of 300 to 400 sqm.	112.00	115.00
With an area of 300 sqm. and below	84.00	86.00
Hospitals and clinics		
With a bed capacity of 15 or more	279.00	288.00
With a bed capacity of less than 15	140.00	144.00
D. Banking and Finance		
Banks	84.00	86.00
Pawnshops	84.00	86.00

Source: Cotabato City CENRO

Table 5.6-13 Budget and Revenues Collected from Garbage Fees

Year	Budget allocated for SWM operations	Annual revenues
2013	19,304,450	2,076,981
2014	24,436,579	2,076,981
2015	24,888,689	2,063,268
2016	20,170,128	2,660,747
2017	20,538,245	3,026,235

Source: 10-year Ecological Solid Waste Management Plan (2010-2019) of Cotabato City

5.6.3 Related Laws / Regulations and Policy

(1) National Laws and Regulations

Republic Act 9003, or the Ecological Solid Waste Management Act of 2000 is the principal law of the Philippines regarding solid waste management. RA 9003 facilitates the creation of institutional and policy framework pertaining to SWM, and mandates LGUs for the enforcement of the provisions within their respective jurisdictions.

Table 5.6-14 National Laws and Regulations Related to SWM

Title	Year	Major components
Republic Act 9003 “Ecological Solid Waste Management Act of 2000”	January 2001	<ul style="list-style-type: none"> • Principal law of solid waste management in the Philippines • Supported the nationwide ban on the use of incinerators for waste treatment • Mandated the establishment of Materials Recovery Facilities (MRF) in every barangay
Republic Act No.8749 “Act providing for a Comprehensive Air Pollution Control Policy and for Other Purposes”	June 1999	<ul style="list-style-type: none"> • Prohibited the use of incinerators for waste treatment
Republic Act No. 6969 “Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990”	September 1990	<ul style="list-style-type: none"> • Provided the baseline principles on hazardous waste management
Presidential Decree No. 1152 “Philippine Environment Code”	June 1977	<ul style="list-style-type: none"> • Provided the principles of the whole environmental management, including waste management • Identified the baseline methods of solid and liquid waste disposal
Presidential Decree No. 856 “Code on Sanitation of the Philippines”	December 1975	<ul style="list-style-type: none"> • Provided the principle of public sanitation • Prescribed sanitation requirements for the disposal system of cities and municipalities

Source: various laws compiled by the JICA Study Team

(2) Municipal Regulations

The City of Cotabato has passed several ordinances and resolutions to comply with RA 9003 and its Implementing Rules and Regulations (IRR), as shown in Table 5.6-15.

Table 5.6-15 Enacted City Ordinances and Resolutions Related to SWM

Ordinance No.	Year	Title	Major components
Resolution No. 6039	Series of 2016	Resolution Creating the City Environment and Natural Resources Office (CENRO) in the City of Cotabato	<ul style="list-style-type: none"> • Approval of the resolution creating the CENRO in Cotabato City
Ordinance No. 4417	Series of 2016	Ordinance Establishing the City Environment and Natural Resources Office (CENRO) in the City of Cotabato and Providing Funds Therefore.	<ul style="list-style-type: none"> • Establishment of the CENRO • Transfer of personnel and funds from the Office on General Services (OGS) to CENRO
Ordinance No. 4203	Series of 2013	An Ordinance Strictly Prohibiting the Use, Selling, and Distribution of Non-Biodegradable Plastic as Secondary Packaging Material and Non-Biodegradable Styrofoam as Food and Beverage Containers, and Prescribing Penalties Thereof	<ul style="list-style-type: none"> • Prohibited use of non-biodegradable plastics as secondary packaging materials • Prohibited use of Styrofoam as food and beverage containers • Provision of penalties for such offenses
Ordinance No. 2360	Series of 2003	A Comprehensive and Integrated Solid Waste Management Code of Cotabato City	<ul style="list-style-type: none"> • Established the baseline principles for SWM in Cotabato City • Mandated collection of monthly fees from establishments to support SWM activities • Identified prohibited acts and defined their corresponding fines and penalties • Promoted the establishment of key SWM organizations such as the City Solid Waste Management Office

Source: Sangguniang Panlungsod ng Cotabato City (2016)

(3) Ecological Solid Waste Management Plan (ESWMP)

In accordance with RA 9003, all LGUs in the Philippines are mandated to craft a 10-year solid waste management plan consistent with the national SWM framework. Cotabato City proposed to allocate Php 574,385,000 for the implementation of the ESWMP (excluding expenditures for the sanitary landfill) throughout the 10-year period (2010 – 2019). The five basic management objectives indicated in the plan are as follows:

- Segregation/diversion of wastes generated at source
- Enhancement of recycling processes based on established technologies
- Reduction of the volume of solid waste to extend serviceability of the disposal facility
- Improved collection efficiency from all sources of solid wastes
- Establishment of a safe and environmentally acceptable way of disposing wastes

In addition, the CENRO aims to reduce waste by 60% at the first year of implementation (2018), and eventually by 90% by the end of 2027. The following are the specific targets by the end of 2020:

- Fully operational central Materials Recovery Facility (MRF) with segregation and composting area
- Functional MRF in all barangays, with material recovery efficiency of 100%
- Construction of a category-2 sanitary landfill
- Full closure of the Biniruan Residual Containment Facility

5.6.4 Current Condition of SWM in Surrounding Municipalities

(1) Overview

Solid waste management is one of the most challenging tasks in the five municipalities surrounding Cotabato City (Datu Odin Sinsuat, Sultan Kudarat, Sultan Mastura, Parang, and Pigcawayan). Population and economic growth lead to an increase in garbage volume which is difficult for the LGUs to solve, because it does not correspond to an increase in the IRA received.

The current practice of SWM in the five surrounding municipalities is almost common - from the households to the dumpsites. The difference is on the volume of waste collected and the manner of segregation which depends on the cooperation of every household, and from the motivation they get from their political leaders. Ideally, every barangay has a Materials Recovery Facility (MRF) where segregation, recycling and proper decomposition is done. Other waste materials, which can neither be recycled or decomposed, are collected and brought to designated landfills or dumpsites by the LGU using their respective waste hauling truck.

LGUs usually cannot accommodate the bulk of solid wastes generated in every barangay, hence programs and capacity building on the recycling of waste materials is being implemented in every

barangay. Residents, particularly women, were trained to make crafts out of empty plastic bottles, food wrappers and other junks. However, such activities were not usually sustained due to the lack of market for finished products.

Other residents directly sell their waste materials to junk shops but at a very low price, hence most residents resort to burning their garbage or burying it in the ground. Such practices are both detrimental to health and environment, however, weighing the pros and cons between (a) burning or burying and (b) allowing the garbage to scatter around for rats and other pests to feast on – the former could be realized as the better choice for most households.

Three municipalities (Parang, Sultan Kudarat and Pigcawayan) have an identified sanitary landfill, while Sultan Mastura and Datu Odin Sinsuat are yet to identify theirs. LGUs of the latter municipalities are aware of the ever-increasing volume of garbage, which is related to the increase of population. Hence, these LGUs are also planning to acquire lands to establish proper sanitary landfills. However, the plan is slow paced due to the other priorities of the LGUs.

Likewise, all households are enjoined to segregate their biodegradable wastes from the non-biodegradable. However, implementation of the order is left to the discrimination and political will of the barangay leaders. As usual, this type of directive is not usually given much importance.

(2) SWM in Datu Odin Sinsuat

Waste generation in Datu Odin Sinsuat

Solid waste generation comes from residential, commercial, and industrial zones and hospitals. Table 5.6-16 shows the volume of waste generated per day from Barangay Dalican and Awang. The information below does not include those generated from the other barangays.

Table 5.6-16 Type and Volume of Solid Waste Generated in Datu Odin Sinsuat

Compostable	Recyclable	Others
6,801 kg/day	22,035 kg/day	734 kg/day

Source: Comprehensive Land Use Plan (CLUP)

Waste collection in Datu Odin Sinsuat

Collection of solid wastes is done three (3) times a week every Wednesday, Friday and Sunday. For every collection schedule, two dump trucks and one old model tractor owned by the LGU are used to collect and dump waste materials. Drivers and waste collectors are being paid by the local government units with counterpart from the BLGUs.

Out of the 39 barangays of Datu Odin Sinsuat, only the wastes of Barangay Dalican and Awang, which serves as the economic center of the municipality, are collected regularly. The collected waste usually come from the public markets, restaurants, and other establishments, and from households along key streets or designated areas in the said barangays.

Waste processing and recycling in Datu Odin Sinsuat

Due to the absence of a dumpsite and proper waste disposal management, the collected waste is not given proper treatment/disposal management such as the establishment of an MRF in every barangay. In addition, the segregation of waste materials is not given much importance due to the absence of a sanitary landfill.

The LGU has a central composting facility (CCF) which can process about 23,925 kg of biodegradable waste per month.

Waste disposal in Datu Odin Sinsuat

Datu Odin Sinsuat has no specific sanitary landfill yet. The LGU has been searching over the past couple of years, but it is very hard to find one because every location they identified has been met with strong opposition from residents. The LGU is allocating an annual budget for garbage collection and continually looking for at least 5.5 hectares suitable to establish a municipal sanitary landfill.

Respective BLGUs were tasked to collect waste three times a week but due to the lack of dumpsite and waste disposal management system, waste collected were not properly segregated and disposed of, hence many households employ traditional disposal methods like burning, burying and composting.

(3) SWM in Sultan Kudarat Municipality

Waste generation and collection in Sultan Kudarat

Solid waste from the key areas of the municipality like the market, municipal hall and households along the highways are collected twice a week by a dump truck owned by the LGU. The drivers and waste collectors are paid by the LGU. Waste generation of the municipality amounts to 10,166,324 kg/year.

Waste processing and recycling in Sultan Kudarat

The municipality established an MRF, situated in front of the municipal's designated dumpsite and proposed landfill at Barangay Ladia with a cost of around Four Million (PhP 4,000,000.00) pesos with technical assistance from Eco-Gov. However, as the pictures below reveal, it is not yet fully utilized for its intended purpose. There is an indication that the LGU is not yet technically equipped to operate it.



Figure 5.6-5 MRF in Sultan Kudarat Municipality

Waste disposal in Sultan Kudarat

The municipality has already identified a 9-hectare landfill at Barangay Ladia up to its boundary with Barangay Damaniog. The landfill is expected to accommodate about 2,169,919 kg/year (21,700 tons/year) which is more than enough to accommodate the solid waste generation of 10,166,324 kg/year. However, the landfill is not yet fully utilized, maybe due to lack of political will by leaders to implement proper disposal of solid waste.

At the back of the MRF is the municipal dumpsite where residual garbage is being thrown. The location of both facilities is covered by the 9-hectare proposed sanitary landfill.

Presently, only a portion of garbage generated, mostly from the municipal market is being dumped on that facility. While the collection process is not yet properly established, a number of households in different barangays exercise traditional disposal of garbage – the burning and burying method. Other households were observed to exercise indiscriminate throwing of garbage on their surroundings including bodies of waters.

(4) SWM in Sultan Mastura

Waste generation and collection in Sultan Mastura

For the meantime, the LGU collects wastes from key point areas such as the market, municipal hall, and households along the national highway.

Table 5.6-17 Type and Volume of Waste Generated in Sultan Mastura

Compostable	Recyclable	Others/ Residual	Special
1,766.41 kg/day	170.30 kg/day	274.25 kg/day	15.14 kg/day

Source: MPDC

Waste processing and recycling in Sultan Mastura

Sultan Mastura had allocated 1 Million pesos for the establishment of MRFs in the 11 barangays except for the barangays of Tapayan and Tambo, where garbage collection is shouldered by the LGU (started and completed in 2018). These facilities lessen the problems on waste disposal in the barangays. Those barangays with MRFs are obliged to manage collection, segregation and dumping of their respective wastes. Waste in every MRF should be segregated and residuals should be disposed every two days to the dumpsite currently located in Barangay Macabiso.

Sultan Mastura has a plan to purchase a Multi-Purpose Shredder Machine worth 3 Million pesos, but it may take some time due to the lack of funds.



Figure 5.6-6 MRF in Sultan Mastura

Waste disposal in Sultan Mastura

Sultan Mastura has no designated landfill and households exercise their own discretion on the disposal of their respective garbage. The LGU has a plan to establish its own sanitary landfill and is currently searching for an appropriate location. However, this plan is hampered by the lack of budget.

Several households disposed their solid wastes through dumping in pits, burying, and burning. For some who have some knowledge on proper waste disposal, they practice waste segregation.

Biodegradable waste particularly kitchen wastes are buried or dumped in pit and allowed to decompose until it is fit to use as organic fertilizer. For the non-biodegradable waste, majority of the households employ burning method. However, there were still incidents when residents along the rivers, creeks, or seashore practice indiscriminate waste disposal by dumping directly in the waters, which is critical for the environment.

(5) SWM in Parang

Waste generation and collection in Parang

Currently, the LGU is in-charge of managing solid waste collection, but is limited to the wastes generated from the market and key establishments located in Poblacion (including those from the municipal hall, line agencies, and households along the roadsides). A dump truck is used in the

collection process. The LGU plans to acquire additional dump trucks and manpower to further enhance garbage collection activities.

Waste processing and recycling in Parang

Each barangay has its own MRF and is obliged to manage the waste collection and dumping. Segregation of waste materials is done at the MRF site before dumping it at the dumpsite. All non-recyclables are burned while biodegradables are dumped in a composting area. Recyclables are usually taken by local trash men who collect and sell to junk traders.

Waste disposal in Parang

Parang has rented a one-hectare land which temporarily served as the municipal dumpsite at Sitio Marigalupa, Brgy. Guiday T. Biruar. The rent agreement will expire at the end of 2020 (December 31, 2020) and the closure plan was already approved by DENR. Fortunately, the LGU had acquired a four- hectare land at Barangay Gadungan which will serve as the permanent sanitary landfill of the municipality. The landfill is already developed and ready for operation by CY 2021 and onwards.



Figure 5.6-7 Newly-developed Sanitary Landfill at Brgy. Gadungan, Parang

(6) SWM in Pigcawayan

Waste generation and collection in Pigcawayan

At present, there are two (2) Garbage Collector Trucks collecting the waste based on the daily waste collection schedule. Out of the 40 barangays, only 10 are covered by the LGU's collection system, which includes Poblacion 1, Poblacion 2, Poblacion 3, Bulucaon, North Manuangan, Tubon, Capayuran, Balogo, Presbitero and Upper Baguer. Bulk of the collected garbage came from the Public Market located at Poblacion 1. On average, the garbage collection is 5.82 tons per day. The other 30 barangays have their own collection system imposed by their own local authorities.

Table 5.6-18 Type and Volume of Wastes Generated in Pigcawayan

SECTOR	Amount of wastes			
	Kgs/day	Kgs/year	Tons/year	%
RESIDENTIAL	15,008.33	5,478,040.45	5,478.04	72.00%
COMMERCIAL				
FOOD SHOPS	375.21	136,951.65	136.95	1.80%
GENERAL STORES	958.86	349,983.90	349.98	4.60%
INSTITUTIONS				
SCHOOL, OFFICES	2,251.25	821,706.25	821.71	10.80%
CHURCH	250.14	91,301.10	91.30	1.20%
PUBLIC MARKETS	1,550.86	566,063.90	566.06	7.44%
HOSPITAL	116.73	42,606.45	42.61	0.56%
INDUSTRIAL	-	-	-	-
TOTAL	20,844.90	7,608,388.50	7,608.39	100%

Source: MPDC

Table 5.6-19 Waste Composition per Type of Waste in Pigcawayan

TYPE OF WASTE	Total Weight generated	% COMPOSITE
Biodegradable		60.7%
Garden and Yard waste	1,045.35 kg/day	
Food waste	271.4 kg/day	
Wood	880.9 kg/day	
Other types available	802.7 kg/day	
Subtotal	3.0 tons/day	
Recyclable		21.1%
PET	63.0 kg	
Other types of recyclable plastics	162.4 kg/day	
Metals (can be further broken down)	361.8 kg/day	
Paper and cardboard	75.6kg/day	
Glass	364.8 kg /day	
Rubber	153.6 kg/day	
Other types available	23.8 kg/day	
Subtotal	1,205 tons/day	
Residuals		17.3%
Textile	371.28kg/day	
Diapers, sanitary napkins & tissues	642.94 kg/day	
Leather	306.612 kg/day	
Other types available	306.612 kg/day	
Subtotal	1.57 tons/day	
Special		0.36%
Busted bulbs, tubes, and lamps	4.68 kg/day	
Containers of paints, thinners	8.02 kg/day	
Household batteries	5.28 kg/day	
Lead and batteries		
Spray chemicals	2.5kg/day	
Consumer electronics	23.16 kg/day	
Health care wastes	3.44 kg/day	
Other types available	2.0kg/day	
Subtotal	49.08 kg/day	
TOTAL	5.82 tons/day	100%

Source: MPDC

Waste processing and recycling in Pigcawayan

At present, only 3 barangays have established a Material Recovery Facility - Brgy. New Panay, Poblacion 2, and Central Panatan.

Waste disposal in Pigcawayan

Pigcawayan has a sanitary landfill located at Sitio Midtawa, Brgy. Malagakit. However, proper segregation from the source is not fully implemented. Residual waste materials are placed at the Residual Containment Area (RCA), also located inside the sanitary landfill.

Usually, barangays outside the coverage of the waste collection system, practice the traditional way of disposing garbage (e.g. composting, recycling, burning, and burying).

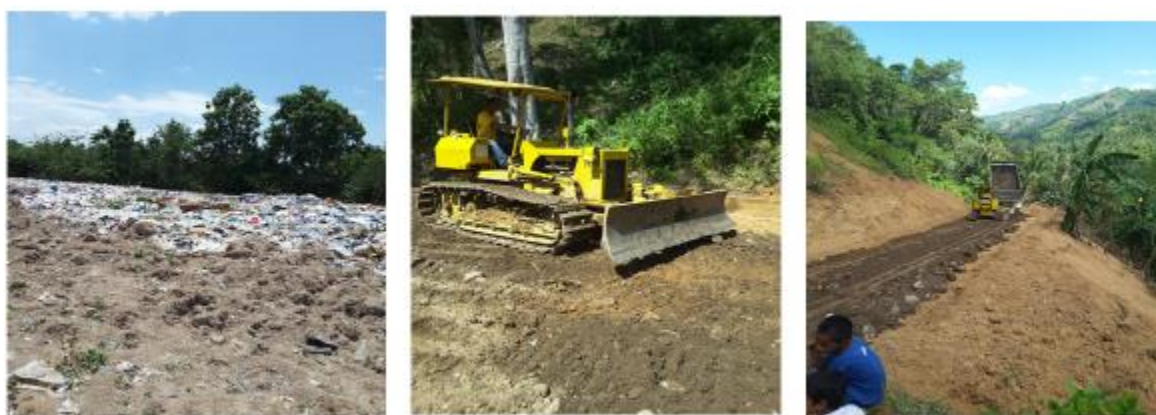


Figure 5.6-8 Sanitary Landfill in Pigcawayan

5.6.5 Summary of Issues on Solid Waste Management

In general, Cotabato City and surrounding municipalities currently face the following issues:

- 1) Lack of sanitary landfill and Materials Recovery Facilities (MRF):** The need for a sanitary landfill has been highlighted, with the current RCA and/or dumping site overfilled and nearing its design lifespan. Initial investigations have shown that there is no environmentally suitable space to construct a new landfill. In addition, the cities fail to comply with Section 32 of the RA 9003, which mandates the establishment of an MRF in every barangay.

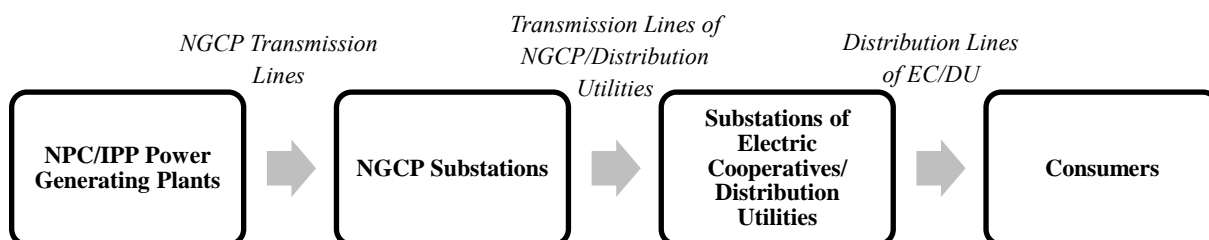
- 2) Ineffective public awareness campaigns and lack of discipline:** The preliminary implementation of the “No Segregation, No Collection” policy was not well recognized by the residents. The collected garbage remained haphazardly managed and mixed up during loading and transportation to the disposal facility. In most rural areas, traditional practices such as burning of wastes and throwing garbage into bodies of water were still widely adopted.

- 3) **Limited collection area:** Not all barangays in Cotabato City and 5 surrounding municipalities are covered by the regular waste collection service. The collection area is limited to set schedules and were often left to dispose their household wastes based on their own traditional understanding.
- 4) **Increasing volume of garbage due to increasing population and commercial activities:** Increasing population levels and rapid urbanization have greatly accelerated the generation of solid wastes within the cities. Similarly, increased volume of wastes means that it would be more difficult for the local government to provide adequate waste collection services and treatment facilities.

5.7 Power Sector

5.7.1 Overview of the Mindanao Power Sector

The power sector in the country is composed of three major components: a) generation, b) transmission, and c) distribution. Over the past years, the generation of power falls under the responsibility of the government through the National Power Corporation (NPC), but is now mostly undertaken by Independent Power Producers (IPPs) from the private sector. On the other hand, transmission of power from different generating plants to the substations is handled by the National Grid Corporation of the Philippines (NGCP), a private service provider. Finally, the distribution of power from the substations to the different types of consumers (i.e. industrial, commercial, residential, others) is being performed by the Electric Cooperatives (EC) and Private Distribution Utilities (DU).



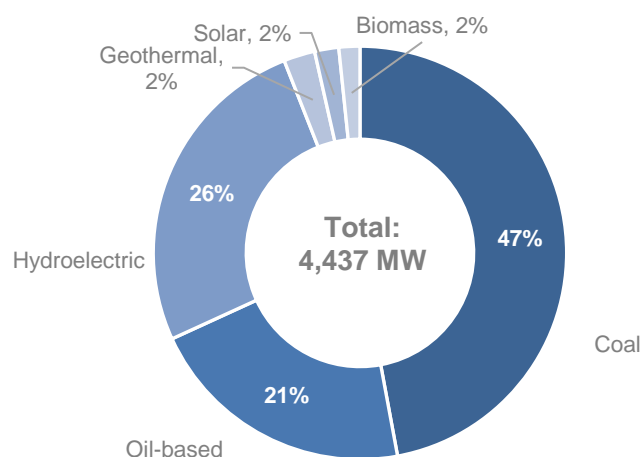
Source: *Comprehensive Capacity Development Project for Bangsamoro Region (2016)*

Figure 5.7-1 General Flow of Power in Mindanao

(1) Generation

As of December 2019, the Mindanao Grid has a total installed capacity of 4,436.7 MW of power, with a dependable power output of 3,832 MW. This represented a 16% increase from the 3,815 MW installed capacity in 2018.

Electricity in Mindanao is generated from both conventional sources such as coal and oil-based plants, and renewable sources such as hydroelectric, geothermal, and solar plants. Figure 5.7-2 shows that more than two-thirds of electricity was sourced from conventional coal (47%) and oil-based (21%) plants, while hydroelectric power contributed to 26% of the total generation. Table 5.7-1 lists down the operating power plants in Mindanao.



Source: Department of Energy

Figure 5.7-2 Mindanao Gross Power Generation Mix (2019)

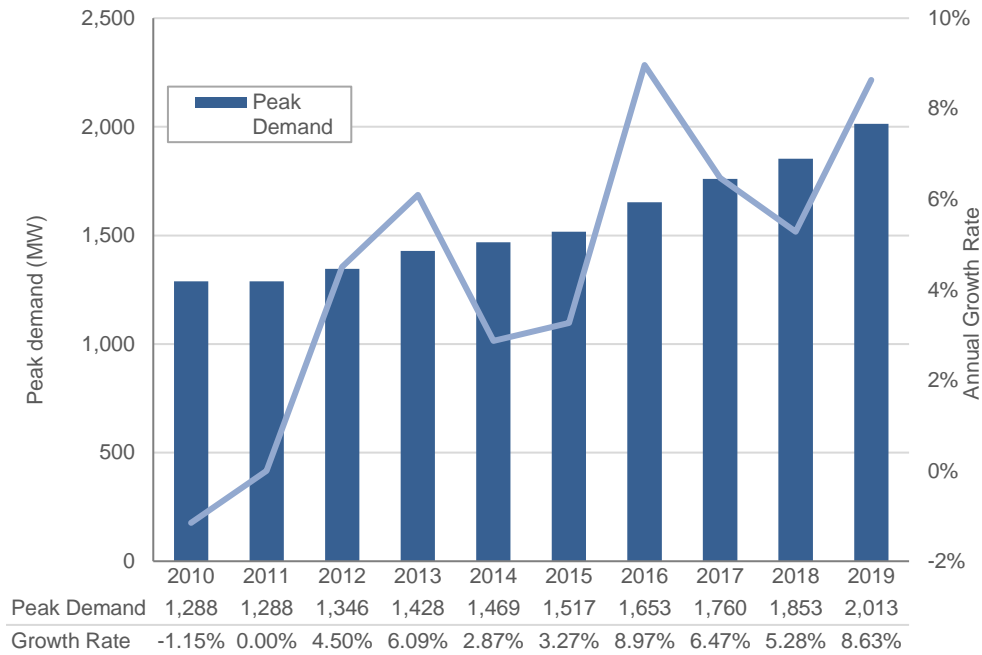
Table 5.7-1 Operating Power Plants in Mindanao (2019)

Sources	No. of units	Installed Capacity (MW)	Dependable Capacity (MW)	Location (number of units)
Grid-connected				
Coal	12	1,687.0	1,514.0	PHIVIDEC (5), Lanao del Norte (3), Davao del Sur (2), Davao Occidental (2)
Oil-based (Diesel)	38	486.1	450.0	Sarangani, Agusan Norte, Davao del Norte, Iligan City, Zamboanga City
Geothermal	2	108.5	103.3	Kidapawan, North Cotabato
Hydroelectric (large)	9	1,056.1	901.3	Agus 1,2,4,5,6,7 & Pulangi 4 in Maramag; 2 in Manolo Fortich, Bukidnon
Hydroelectric (small)	1	8.1	8.0	Sta. Cruz, Davao del Sur (1)
Solar	2	39.1	31.3	Digos City (1), Kibawe, Bukidnon (1)
Embedded				
Coal	5	402.0	360.0	Misamis Oriental, Sarangani
Oil-based (Diesel)	80	379.9	269.7	COLIGHT included (6 units plants)
Hydroelectric (large)	2	42.5	42.5	Sta. Cruz, Davao del Sur (2)
Hydroelectric (small)	4	30.4	29.6	Davao del Sur (1), Bukidnon (1), Misamis Oriental (1), Agusan del Norte (1)
Mini Hydroelectric	7	9.1	9.1	Mintal, Davao City (5), Bukidnon (1), Compostela Valley (1)
Biomass	19	72.8	25.0	Lamsan, Sultan Kudarat (1), Buluan, Maguindanao (4), South Cotabato (10), Bukidnon (4)
Solar	4	44.7	35.8	General Santos City (1), Cagayan de Oro (1), South Cotabato (1), Misamis Oriental (1)
TOTAL On-Grid		4,366.3	3,779.6	
Off Grid				
Oil-based (Diesel)	25	69.7	51.8	Small Power Utility Group (SPUG) mostly operating in island areas
Small Hydro	1	0.67	0.60	Basilan (1)
TOTAL Off-Grid		70.4	52.4	
OVERALL Total		4,436.7	3,832.0	

Source: Department of Energy

(2) Peak Demand

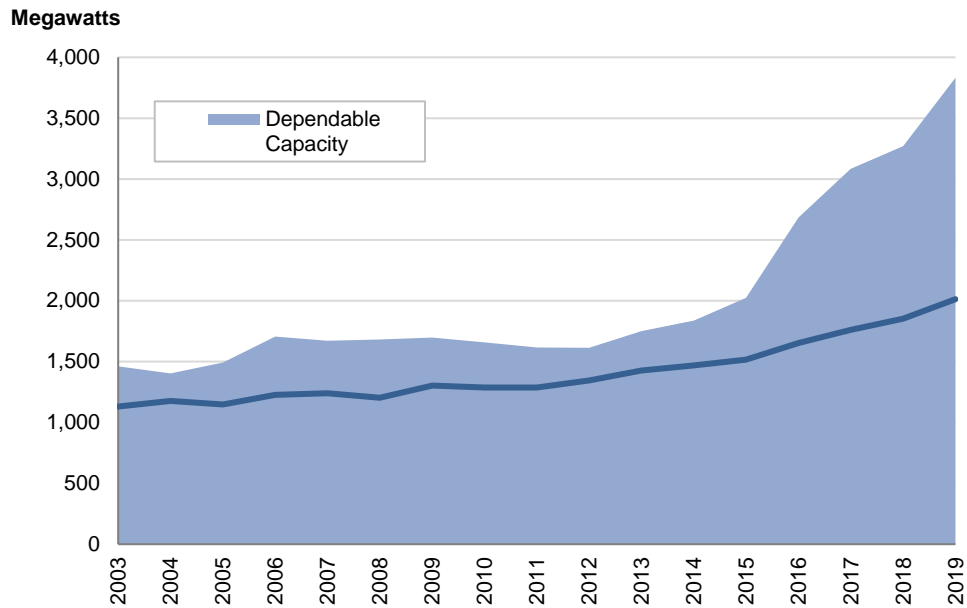
The Mindanao grid reached its peak demand of 2,013 MW in 2019, which represented an 8.6% increase from the previous year. The demand has since grew at a fast rate since 2015, mainly due to the increased and more stable power supply. In 2016, more than 800 MW additional generation capacity was added to the grid, which resulted in a record high 9% annual growth in the peak demand. As shown in Figure 5.7-3, Mindanao still holds a high reserve margin, showing its readiness to undertake major infrastructure projects, in line with the “Build, Build, Build” Program of the government.



Source: Department of Energy

Figure 5.7-3 Mindanao Peak Demand (2010-2019)

Drop in the demand was observed in the years 2008 and 2010. In 2008, the demand from manufacturing industries significantly decreased due to the effects of the global financial crisis. On the other hand, the suppressed hydropower generation (about half of Mindanao’s installed capacity) caused by the El Nino phenomenon impeded demand growth in 2010.



Source: Department of Energy

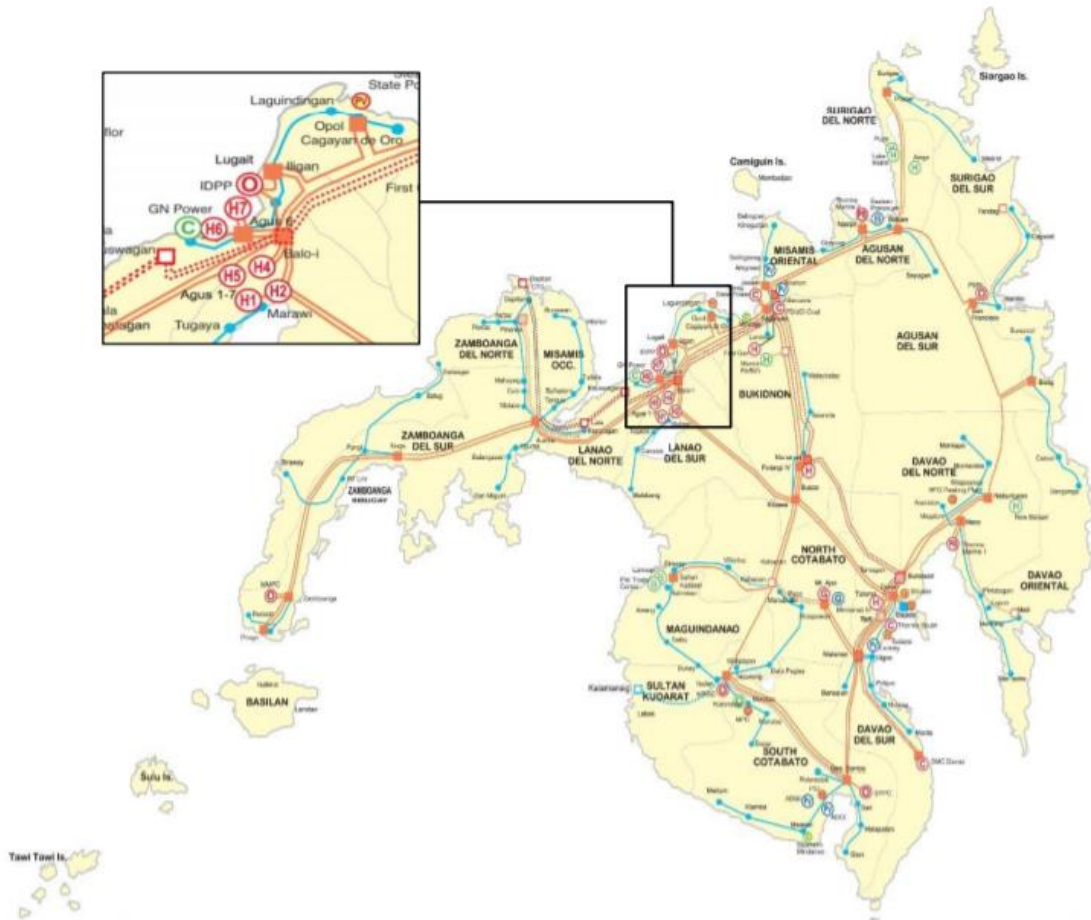
Figure 5.7-4 Supply and Demand Margins in Mindanao (2003-2019)

(3) Transmission

The transmission system in Mindanao, consisting mainly of “On-grid” and “Off-grid” systems, is operated at the voltage class of 138kV and 69kV. The transmission system, including the substations is operated and maintained by the private company, NGCP, based on the Philippine Grid Code. The National Transmission Corporation (TransCo) supervises and manages the transmission and substation assets operated by the NGCP.

The Mindanao transmission system, as shown in Figure 5.7-5, is composed of six districts:

- District 1: North Western Mindanao Area (NWMA) covers Zamboanga area and Misamis Occidental
- District 2: Lanao Area (LA) includes Lanao del Norte and Lanao del Sur
- District 3: North Central Mindanao Area (NCMA) includes the provinces of Bukidnon and Misamis Oriental
- District 4: North Eastern Mindanao Area (NEMA) is comprised of Agusan and Surigao provinces
- District 5: South Eastern Mindanao Area (SEMA) is the Davao Region
- District 6: South Western Mindanao Area (SWMA) consists of South Cotabato, Cotabato, Sultan Kudarat, Sarangani and Gen. Santos (SOCCSKSARGEN) and Maguindanao.

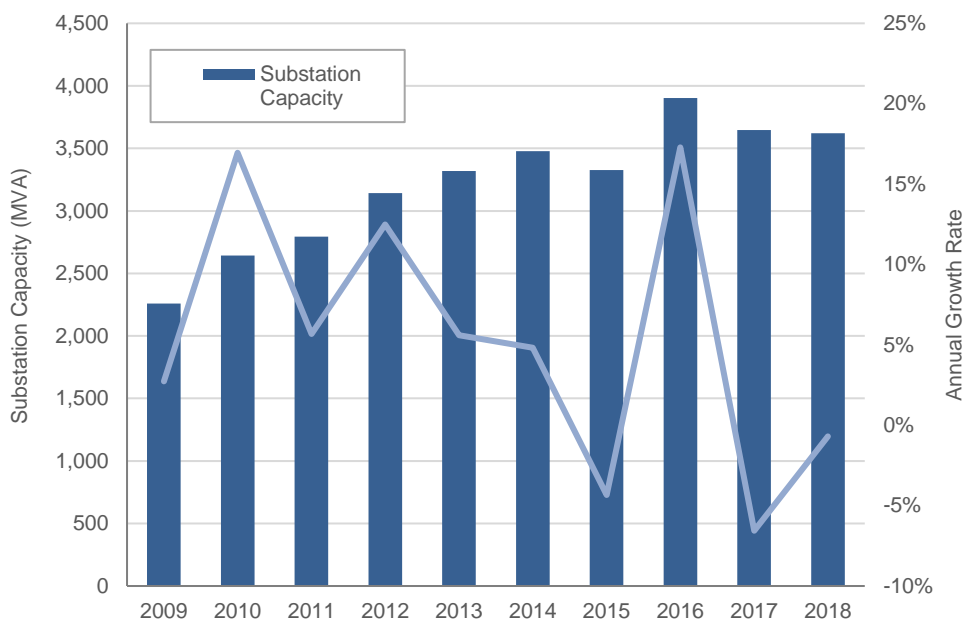


Source: National Grid Corporation of the Philippines, Transmission Development Plan (2016-2040)

Figure 5.7-5 Mindanao Transmission Network

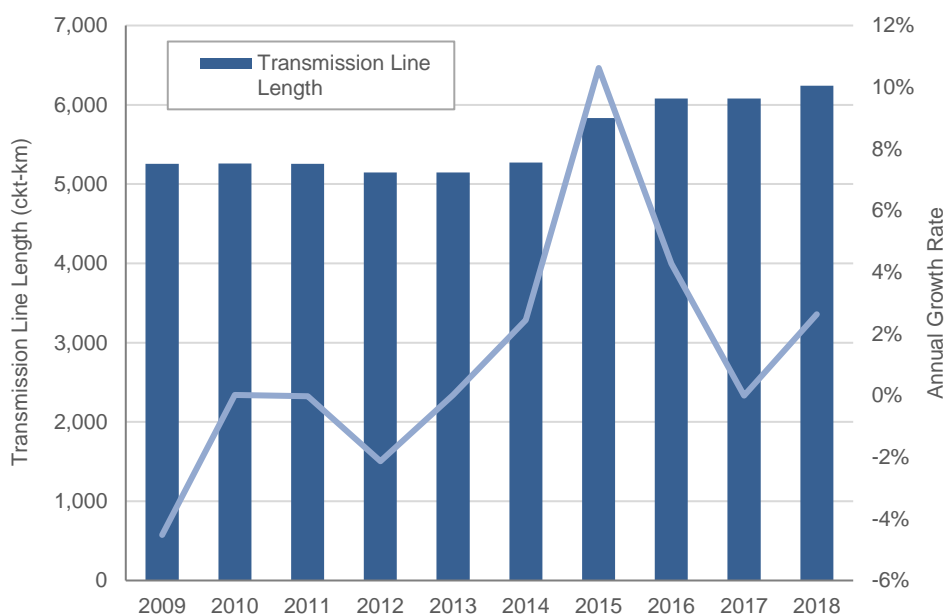
Power in the Mindanao grid is largely transmitted from north to south. Most of the power plants with large capacity such as the Agus hydro power plants are situated in the northern part of Mindanao, while the highest consuming regions (e.g. Davao Region) are situated in the southern portion. In Cotabato City, power flows from Kibawe Substation in Bukidnon to Nuling Substation (32.2 MW) in Maguindanao and Tacurong Substation (66.6 MW) in the province of Sultan Kudarat.

Figure 5.7-6 and Figure 5.7-7 show the historical summary of transmission facilities managed by the NGCP. As of June 2018, a total of 3,621 MVA substation capacities and 6,241 circuit-km. of transmission lines are accounted in the assets of the Mindanao Grid. The decrease in substation capacities in recent years is attributed to the implementation of NGCP’s transformer replacement program.



Source: National Grid Corporation of the Philippines, Transmission Development Plan (2016-2040)

Figure 5.7-6 Mindanao Grid Substation Capacity (2009-2018)



Source: National Grid Corporation of the Philippines, Transmission Development Plan (2016-2040)

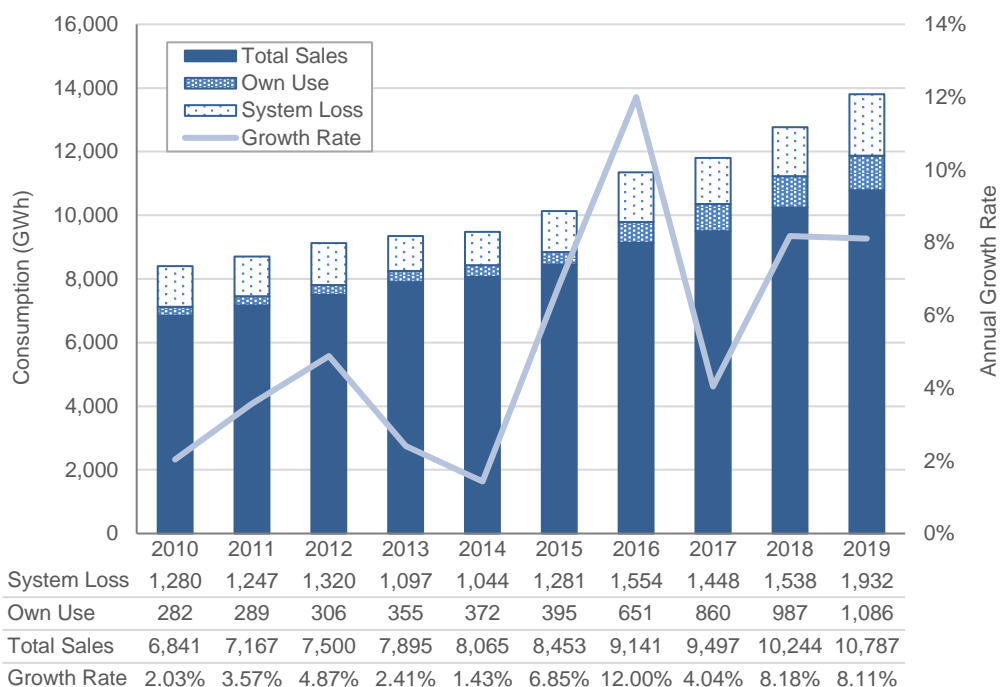
Figure 5.7-7 Mindanao Grid Transmission Line Length (2009-2018)

(4) Distribution and Consumption

As of 2018, power distribution in Mindanao was administered by 37 distribution utilities (DU) – 33 Electric Cooperatives (EC) and 4 Private Investor Owned Utilities (PIOUs)/Local Government Unit Owned Utilities (LGUOU). Cotabato Light and Power Company, Inc. (CLPC) is one of the

four PIOU in Mindanao. CLPC distributes electricity to Cotabato City and other areas in Maguindanao.

Figure 5.7-8 shows the breakdown of the electricity consumption in Mindanao over the past decade (2010-2019). The Mindanao grid recorded 13,805 GWh of electricity sales and consumption, which comprised 13% of the total Philippine consumption in 2019. Electricity demand in Mindanao more than tripled from 1990 to 2019. The sustained accelerated growth in the island group resulted to an 8.1% annual increase in total consumption for both 2018 and 2019.



Note: Own Use includes power used by Distribution Utilities and power plants stations. System Loss includes Distribution Utilities losses and transmission losses (substation used, transformation and other unaccounted losses).

Source: Department of Energy

Figure 5.7-8 Annual Total Electricity Consumption (2010-2019)

Table 5.7-2 shows the electricity consumption profile, per region from 1990 to 2017. Davao Region (Region XI) remained the largest electricity consumer among all six regions, although its share declined from 41% in 1990 to 33% in 2017. This was followed by Northern Mindanao (Region X) at 25% and SOCCSKSARGEN (Region XII) at 18%. Northern Mindanao and ARMM were among the fastest growing regional economies with annual average consumption growth of 8.3% and 7.6%, respectively from 2010 to 2017.

Table 5.7-2 Total Electricity Consumption, Per Region (1990-2017)

Region	Electricity Consumption (GWh)				Percent Share (2017)	Growth Rate (%)		
	1990	2000	2010	2017		1990-2000	2000-2010	2010-2017
Region IX	326	549	802	1,042	11%	5.4	3.9	3.8
Region X	590	989	1,440	2,412	25%	5.3	3.8	7.6
Region XI	1,245	1,910	2,564	3,165	33%	4.4	3.0	3.1
Region XII	529	864	1,220	1,673	18%	5.0	3.5	4.6
CARAGA	274	438	613	851	9%	4.8	3.4	4.8
ARMM	67	136	203	354	4%	7.3	4.1	8.3
Total	3,031	4,886	6,842	9,497	100%	4.9	3.4	4.8

Source: Department of Energy, Mindanao Energy Plan (2018-2040)

In 2017, the industrial and residential sectors consumed the most electricity across Mindanao at 42% and 37% share, respectively. Similarly, the two sectors recorded the fastest growth rate in terms of sectoral electricity consumption from 2010 to 2017. The residential sector posted the largest growth at 5.4% per year, as increasing urbanization and rising per capita income allowed households to purchase more electrical appliances. The industry sector observed a 5.2% annual growth over the seven-year period (2010-2017), which reflected the development of energy intensive industries. The power consumption profile of Mindanao, per sector is shown in Table 5.7-3 below.

Table 5.7-3 Total electricity consumption, per sector (1990-2017)

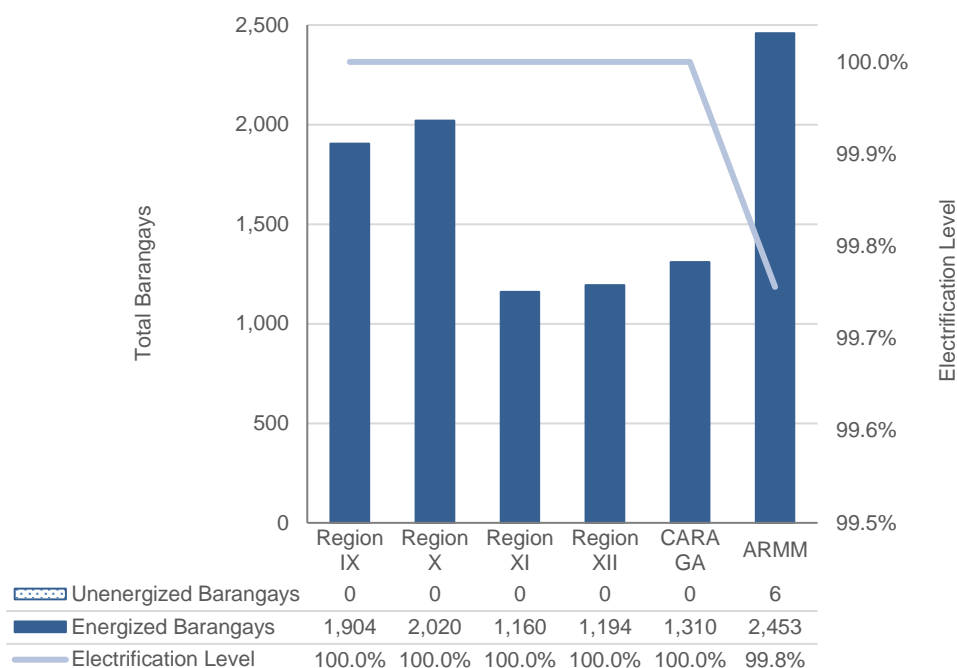
Sector	Electricity Consumption (GWh)				Percent Share (2017)	Growth Rate (%)		
	1990	2000	2010	2017		1990-2000	2000-2010	2010-2017
Industrial	1,726	2,290	2,776	3,955	42%	2.9	1.9	5.2
Commercial	350	709	1,265	1,525	16%	7.3	6.0	2.7
Residential	720	1,654	2,445	3,541	37%	8.7	4.0	5.4
Agricultural	235	233	356	476	5%	(0.1)	4.3	4.2
Total	3,031	4,886	6,842	9,497	100%	4.9	3.4	4.8

Source: Department of Energy, Mindanao Energy Plan (2018-2040)

(5) Electrification

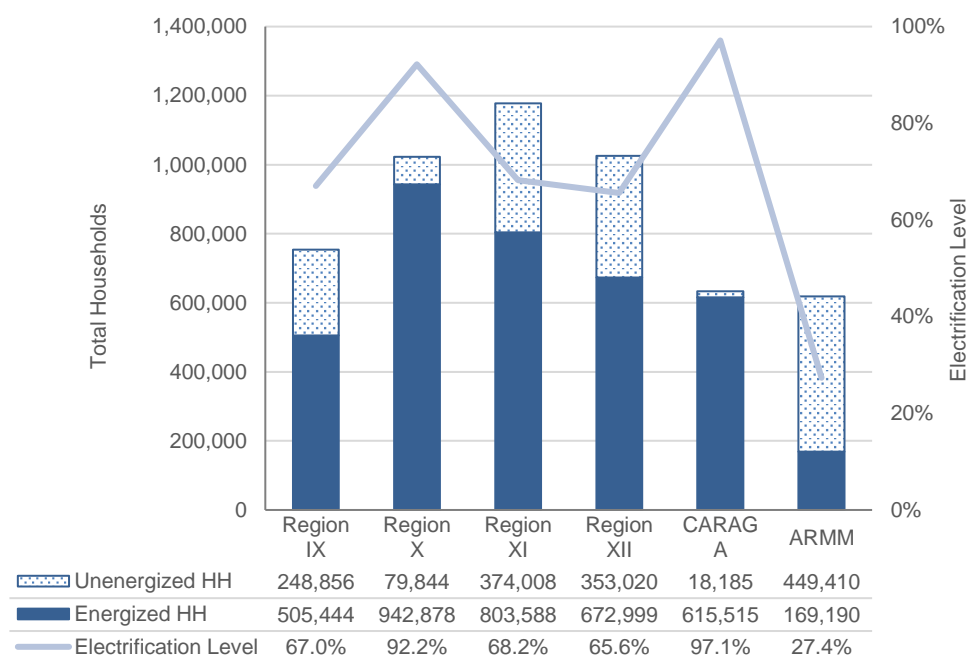
The electrification road map aims to attain 100 percent household electrification by 2022. As of December 2017, Mindanao's barangay electrification stood at 99.9 percent, with 10,041 out of the 10,047 total potential barangays already having access to electricity. The six remaining unenergized barangays were mostly located in Maguindanao (ARMM).

Meanwhile, the Mindanao household electrification rate was recorded at 70.8 percent as of 2017. CARAGA and Northern Mindanao (Region X) recorded the highest electrification rates at 97% and 92%, respectively. ARMM had the lowest household electrification rate at 27%.



Source: Department of Energy, Mindanao Energy Plan (2018-2040)

Figure 5.7-9 Barangay Electrification in Mindanao (2017)



Source: Department of Energy, Mindanao Energy Plan (2018-2040)

Figure 5.7-10 Household Electrification in Mindanao (2017)

5.7.2 Power and Electrification Situation in Cotabato City and Nearby Municipalities

The Cotabato Light and Power Company (CLPC), a subsidiary of Aboitiz Power Company, is the power distributor for Cotabato City and portions of the adjoining towns of Sultan Kudarat and Datu Odin Sinsuat, both under the province of Maguindanao. The original 50-year franchise of CLPC to operate as a power distribution utility expired in June 1989 but it was renewed in 1990 and its current franchise is valid until 2039.

The electric utility's main source of power comes from the National Power Corporation (NPC)/Power Sector Assets and Liabilities Management (PSALM) delivered through the transmission operator, the National Grid Corporation of the Philippines (NGCP).

As of June 2018, Cotabato Light is serving 41,110 customers through its three distribution substations (one in CLPC Compound, one at the back of Las Hermanas Restaurant, and one in Sultan Kudarat municipality, going to Delta Bridge) and feeder lines.

CLPC provides electricity to all 37 barangays of Cotabato City; 16 of 34 barangays of Datu Odin Sinsuat (47%); and 10 of the 39 barangays of Sultan Kudarat (26%). The number of barangays served by the company in Cotabato City remained unchanged, while its coverage in Datu Odin Sinsuat rose from 13 in 2013 to 16 in 2014 until 2017. On the other hand, the number of barangays served in Sultan Kudarat dropped from 19 in 2015 to 10 barangays. This was due to the alleged transfer of some barangay electric connections to the Maguindanao Electric Cooperative (MAGELCO) system and other barangays to the Lamsan Industrial Complex. Lamsan was able to put up a bagasse-fired cogeneration plant (biomass type) with an installed capacity of 15 MW.

Table 5.7-4 Number of Barangays Served by CLPC (2013-2017)

Local Government Unit	Number of Barangays Served					% to Total Barangays (2017)
	2013	2014	2015	2016	2017	
Cotabato City	37	37	37	37	37	100 %
Sultan Kudarat (Maguindanao)	19	19	19	10	10	26 %
Datu Odin Sinsuat (Maguindanao)	13	16	16	16	16	47 %
Total	69	72	72	63	63	-

Source: Philippine Statistics Authority, *Regional Social and Economic Trends (2018)*

Table 5.7-5 shows the number of consumers served by CLPC, classified per sector. The total number of consumers grew by 17% from 2013 to 2017. Meanwhile, the number of public buildings catered by the company decreased due to the transfer of some public offices from Cotabato City to the new regional center in Koronadal, South Cotabato.

Table 5.7-5 Number of Consumers Served by CLPC, per sector (2013-2017)

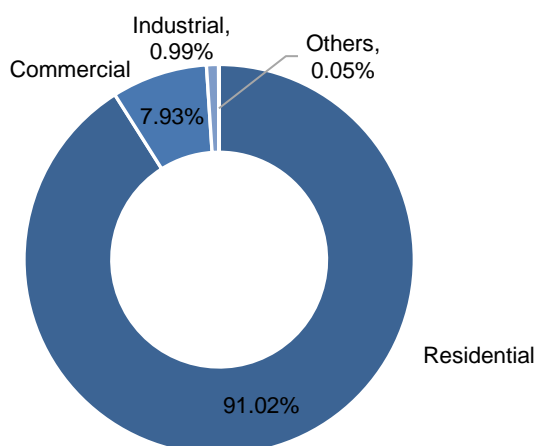
Sector	Number of Consumers Served					% Change (2013-2017)
	2013	2014	2015	2016	2017	
Residential	31,930	32,945	34,286	35,473	37,420	17.2%
Commercial	2,836	2,972	3,034	3,037	3,261	15.0%
Industrial	347	357	376	393	409	17.9%
Others*	24	23	21	21	20	(16.7%)
Total	35,137	36,297	37,697	38,924	41,110	17.0%

*Others include streetlights, public buildings, public parks, etc.

Source: Philippine Statistics Authority, *Regional Social and Economic Trends (2018)*

As shown in Figure 5.7-11 below, residential consumers comprised 91% of all CLPC accounts in 2017. The number of consumers from the commercial and industrial sectors made up 8% and

1% of all accounts, respectively. The list of major electricity consuming establishments is shown in Table 5.7-6.



Source: Philippine Statistics Authority, Regional Social and Economic Trends (2018)

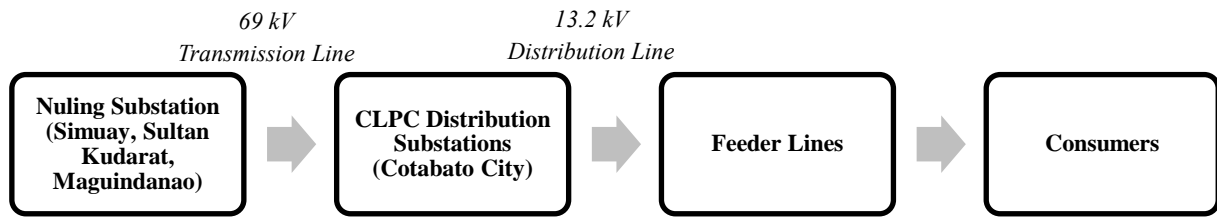
Figure 5.7-11 Breakdown of CLPC Customers, Per Sector (2017)

Table 5.7-6 List of Major Electricity Consumers

Type of Establishment	Name of Establishment	Location
Malls	Alnor Commercial Complex	Sinsuat Ave., Cotabato City
	South Seas Mall	Don Rufino Alonzo St.
	Superama Mall	Sinsuat Ave., Cotabato City
Hotels	Alnor Hotel	Sinsuat Ave., Cotabato City
	EM Manor Hotel	Sinsuat Ave., Cotabato City
	Primera Hotel	L.R. Sebastian St., Cotabato City
Schools	Notre Dame University	Notre Dame Ave., Cotabato City
	Cotabato City State Polytechnic College	Sinsuat Ave., Cotabato City
	RVM College	Sinsuat Ave., Cotabato City
Hospitals	Cotabato Regional & Medical Center	Sinsuat Ave., Cotabato City
	Notre Dame Hospital	Sinsuat Ave., Cotabato City
Public Institutions	Cotabato City Hall	Cotabato City
	BARMM Complex	Gov. Gutierrez Ave., Cotabato City
	Mega Market	Supermarket site, Cotabato City
	City Central Arcade	Bonifacio, Don Rufino St., Cotabato City

Source: JICA Study Team

Under normal condition, power is supplied from the Mindanao Grid by the NGCP through its Nuling Sub-Station in the municipality of Sultan Kudarat, Maguindanao to the CLPC Distribution Substations. CLPC, through its 13.2 kV distribution lines and feeder lines distributes electricity to its consumers.

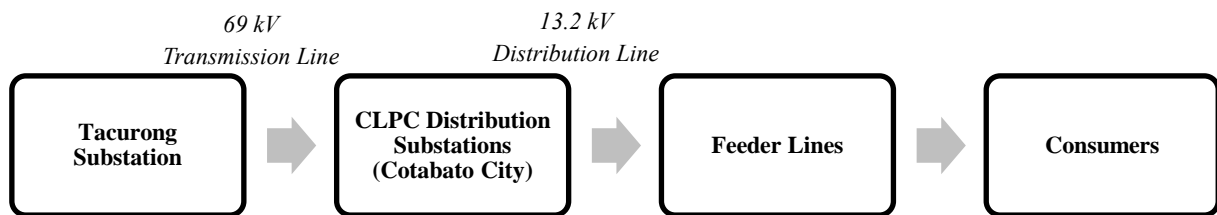


Source: Comprehensive Capacity Development Project for Bangsamoro Region (2016)

Figure 5.7-12 Flow of Power to Cotabato City Under Normal Condition

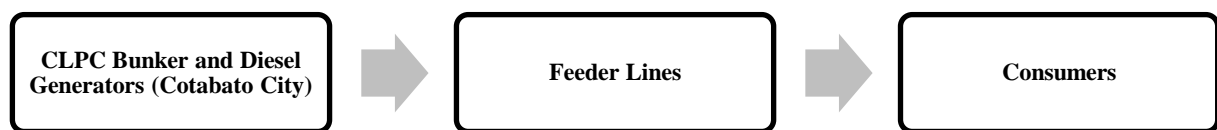
In case of a significant interruption occurring at the Nuling substation, or through the transmission lines between Kibawe and Nuling substations (e.g. technical problems, man-made destruction of steel towers, etc.), power can be restored by shifting the power source from Nuling to the Tacurong substation (Figure 5.7-13).

If the power interruption is considered minor and can be remedied in a matter of hours, CLPC can temporarily utilize the standby six units of bunker and diesel-fed generators (Figure 5.7-14). These generators can produce 7.5 MW power to sustain the supply of electricity.



Source: Comprehensive Capacity Development Project for Bangsamoro Region (2016)

Figure 5.7-13 Flow of Power to Consumers in Case of Major Interruption



Source: Comprehensive Capacity Development Project for Bangsamoro Region (2016)

Figure 5.7-14 Flow of Power to Consumers in Case of Minor Interruption

Currently, there is no company in Cotabato City or in any nearby town that generates electricity primarily for the consumption of the general public and business sector. However, two (2) corn starch manufacturing plants have established their own power plants – the Lamsan Industrial Complex and the Philippine Trade Industry, both operating in Sultan Kudarat, Maguindanao. These two companies were former customers of CLPC before they built their own power plants.



Source: Comprehensive Capacity Development Project for Bangsamoro Region (2016)

Figure 5.7-15 Transmission and Distribution Lines in Cotabato City

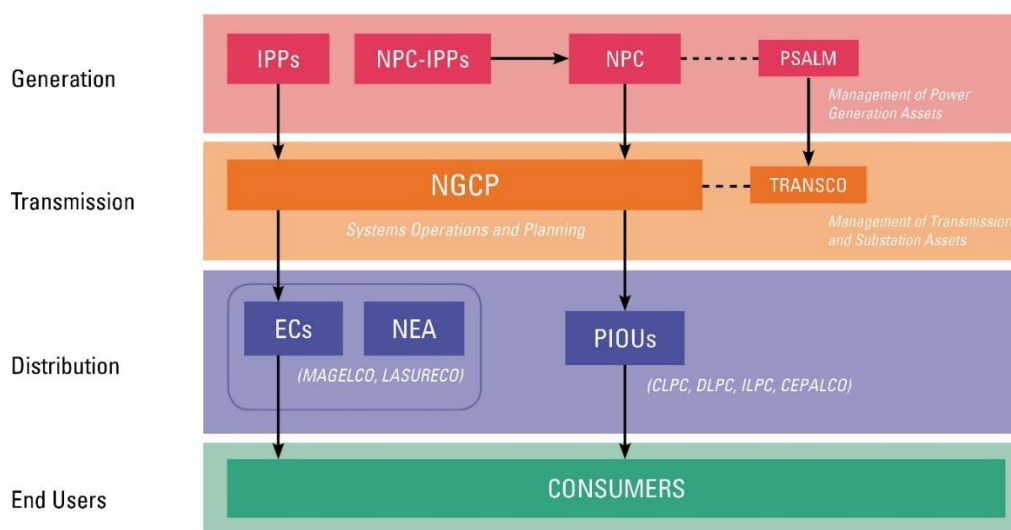
5.7.3 Institutional Framework

(1) General Structure of the Power Sector in Mindanao

The generation of power in Mindanao comes from both state-owned and private-owned Independent Power Producers (IPPs). The National Power Corporation (NPC) holds office just outside Iligan City and operates the six Agus River Hydroelectric Plants and the Pulangi River Hydroelectric Plant.

The larger private sector power plants in Mindanao include the Geothermal Plant of the Energy Development Corporation (EDC) at Mt. Apo, Kidapawan, North Cotabato and the various coal-fired plants of Aboitiz Power in Northern Mindanao, Davao City, and Sarangani.

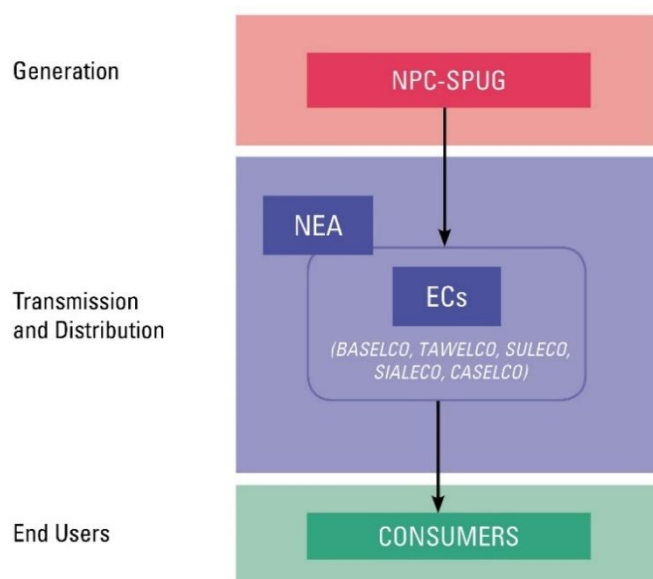
The transmission of power is owned and managed by the National Grid Corporation of the Philippines (NGCP), a consortium of local investors and a China-based company. The National Transmission Corporation (TransCo) is a government-owned and controlled corporation that exercises regulatory powers over the NGCP. The general structure of the systems connected to the Mindanao Grid is shown in Figure 5.7-16.



Source: Comprehensive Capacity Development Project for Bangsamoro Region (2016)

Figure 5.7-16 Structure of the Power Business Sector for on-Grid Systems in Mindnao

Certain areas in Mindanao, such as islands or remote areas where the private sector hesitate to invest, do not have access to the Mindanao Grid. For situations like these, the transmission system for on-grid power systems (Figure 5.7-16) does not apply. Instead, the National Power Corporation, through its Small Power Utilities Group (NPC-SPUG) provides electricity in off-grid areas. The transmission and distribution of electricity to the consumers is handled by the electric cooperatives. The flow diagram of power for off-grid systems is shown in Figure 5.7-17 below.



Source: Comprehensive Capacity Development Project for Bangsamoro Region (2016)

Figure 5.7-17 Structure of the Power Business Sector for Off-grid Systems in Mindanao

(2) Governing Law and Regulation

In 2001, Republic Act No. 9136 or the “Electric Power Industry Reform Act (EPIRA) of 2001” was enacted. This provides a framework for the restructuring of the electric power industry, including the privatization of the assets of the National Power Corporation (NPC), the transition to the desired competitive structure, and the definition of the responsibilities of the Electric Power Industry Participants and government authorities, including but not limited to: NPC, NEA, ERC and PSALM.

(3) Involved Agencies⁴

DOE

The Department of Energy (DOE) is the central government administrative authority in charge of formulating basic policies and energy programs related to the development and utilization of energy resources.

NPC

The National Power Corporation (NPC), established in 1936, used to own the majority of power plants and transmission lines and was the principal power provider in the Philippines. After independent power producers (IPPs) were approved to enter the power market in 1993, the financial status of NPC was severely affected. Furthermore, a drop in the value of the peso caused by the 1997-1998 Asian Financial Crisis confounded its management condition and the financial deficit of the government, consequently, was viewed with suspicion.

In response to this situation, the Philippine Government enacted the EPIRA to restructure the power sector. Since the EPIRA enforcement, the assets owned by the NPC have been sold and privatized. As of January 2015, the supply from the power plants – Power Barge (PB) 104, and Agus-Pulangi Complex, both operated by the NPC accounted for 41% (828 MW) of the total power output (1,794 MW) generated by all power plants connected to the Mindanao grid. According to 24th Electric Power Industry Reform Act Implementation Status Report, periodically issued by ERC, the ownership of the Agus-Pulangi Hydropower Complex shall be subject to consultation with Congress and it shall be discussed whether the water resource tapped from Lanao Lake should be attributed to the Bangsamoro autonomous government equity or the Philippine Government.

NPC-SPUG

The National Power Corporation-Small Power Utilities Group (NPC-SPUG) is an organization established within the NPC. The unit is responsible for supplying power to island provinces such as Basilan, Sulu, and Tawi-Tawi, and missionary areas (remote areas) without connection to the grid. NPC-SPUG oversees the maintenance and operation of small-scale generators and administers the power development plan in the missionary areas. The power generated by NPC-

⁴ Comprehensive Capacity Development Project for the Bangsamoro Region (2016)

SPUG is supplied to distribution utilities (e.g. electric cooperatives), which then distribute to different electricity consumers.

PSALM

The Power Sector Assets and Liabilities Management Corporation (PSALM) was established based on the EPIRA to facilitate the sale of available assets owned by NPC for the repayment of its debt. Two power plants in Mindanao – the Power Barge 104 (PB104) and the Agus-Pulangi Hydro Complex, are owned by PSALM.

TransCo

The National Transmission Corporation (TransCo) was initially established as the transmission department of the NPC. Following the enactment of the EPIRA, the office was spun off from NPC and re-established as TransCo, which owns the assets of the transmission facilities of the NPC. TransCo is responsible for managing and supervising the transmission business operated by NGCP.

NGCP

The National Grid Corporation of the Philippines (NGCP) is a private company that maintains, operates, plans, and constructs 138kV and 69kV power transmission network in the Philippines. NGCP took over the system operation business of TransCo that spun off from the transmission department of NPC through bidding. The corporation was established based on the joint financing of two domestic companies in the Philippines (Monte Oro Grid Resources Corp. and Calaca High Power Corp. Intl.) and the State Grid Corporation of China (SGCC) in 2008. Each domestic company maintains a 30% share of investment, while the SGCC's investment to the NGCP is at 40% share.

NEA

The National Electrification Administration (NEA) was established in 1969 to promote regional electrification as a national policy. The agency manages and supervises electric cooperatives (ECs) in the Philippines and is responsible for providing financial support for regional electrification. The NEA has set the goal of achieving the electrification of all regions by the end of 2020.

ECs

Electric cooperatives (ECs) are non-profit public organizations which distribute power to consumers. Currently, at least 33 ECs exist all throughout Mindanao. ECs provide power to their customers through their owned distribution network and are responsible for the planning, construction, and maintenance of all distribution lines.

In the first quarter of 2014, the performance assessment targeting for ECs was conducted by the NEA. Cooperatives were classified into *Green*, *Yellow (b-1)*, *Yellow (b-2)* and *Red* based on their operation and financial status. Most of ECs in ARMM are categorized into the group Red, which indicated that performance improvement within the region is highly recommended.

PIOUs/LGUOUS

In addition to ECs, there are private investor-owned utilities (PIOUs) and local government unit-owned utilities (LGUOUS) operating within the Philippines. In Mindanao, Iligan Light and Power Company (ILPC), and Cagayan Electric Power and Light Company (CEPALCO) are doing their business as PIOUs. In addition, there are also two major private distribution utilities (DUs) – Davao Light and Power Company (DLPC) and Cotabato Light and Power Company (CLPC), both owned by the Aboitiz Group. CLPC supplies power for Cotabato City and some barangays in the municipalities of Sultan Kudarat and Datu Odin Sinsuat, both under the province of Maguindanao.

ERC

The Energy Regulatory Commission (ERC) was established on the basis of the EPIRA. The ERC has the authority to regulate and supervise the generation, transmission, and distribution business fields. In addition, ERC is responsible for streamlining regulatory rules of the power supply and accelerating the competition in the power market.

5.7.4 Major issues in Power Sector Development

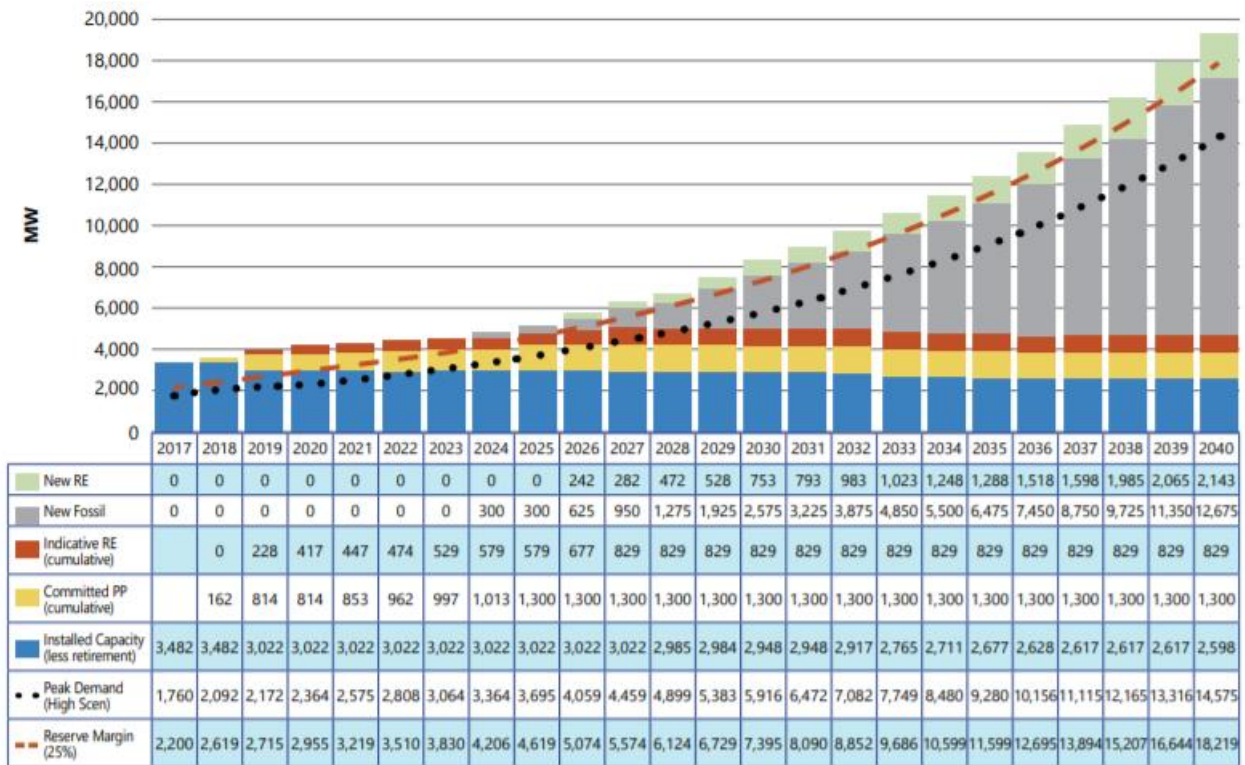
(1) Generation and Demand

As of December 2019, the power generating plants connected to the Mindanao Grid combined for a total dependable capacity of 3,832 MW. The DOE projects the peak demand in Mindanao to increase to 3,695 MW by 2025, under the reference high scenario (i.e. the current development strategies and trend will continue at a fast rate)⁵. With this, the required power generation capacity by 2025, including the 25% reserve margin is 4,619 MW. By 2040, the estimated peak demand would increase to 14,575 MW.

The current committed power plants in Mindanao could still accommodate the major island's grid demand (including reserve capacity) until 2023, based on the forecast of DOE (Figure 5.7-18). However, it must be noted that despite the improved supply and demand situation, Mindanao still heavily relies on hydroelectric power, which is dependent on water availability. Hydropower comprised only 27% of the total generation in 2019, but there still exists the risk of seasonal power shortages during El Niño⁶. Therefore, additional power generating plants must be commissioned between 2020 and 2025 to meet the expected demand growth.

⁵ Department of Energy, Mindanao Energy Plan (2018-2040)

⁶ Asian Development Bank, Philippines: Energy Sector Assessment, Strategy, and Road Map (October 2018)

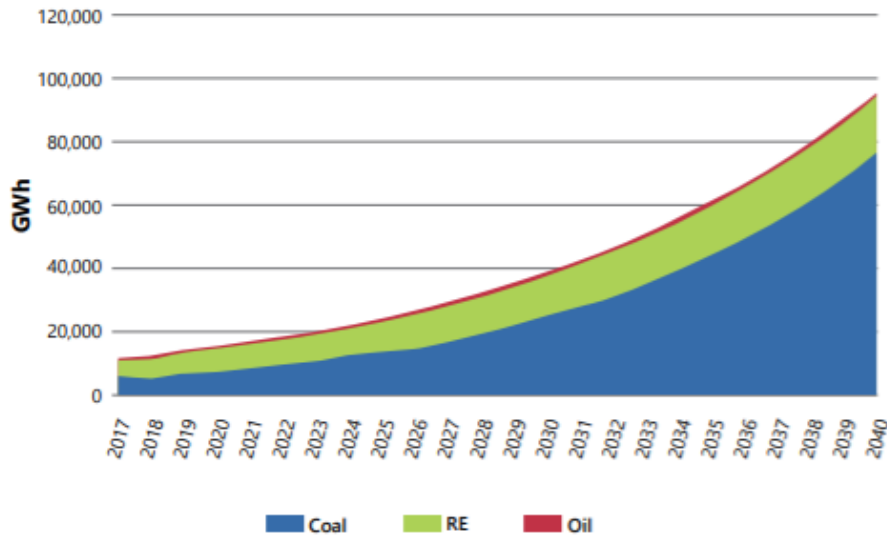


Source: Department of Energy, Mindanao Energy Plan (2018-2040)

Figure 5.7-18 Mindanao Supply and Demand Outlook Under the Reference High Scenario (2017-2040)

(2) Climate Change

The Philippines, together with over 130 other countries, has ratified the Paris Agreement with the goal of curbing climate change and reducing emissions by 70% by 2030. However, the current trend suggests that the country would find it difficult to comply, especially with its high reliance on non-renewable energy (fossil fuels) to support its major infrastructure projects. Coal, despite its high carbon footprint, is regarded as one of the cheapest and most stable sources of energy. The DOE forecasts that coal will dominate the power generation mix in Mindanao at 80% (76,814 GWh) share in 2040, from only 53% (6,271 GWh) in 2017. The share of renewable energy is projected to significantly drop, due to the expected entry of more coal-based plants in the Mindanao grid starting 2024.



Source: Department of Energy, Mindanao Energy Plan (2018-2040)

Figure 5.7-19 Power Generation Projection Under the Reference High Scenario (2017-2040)

(3) Transmission Lines

Power is regularly supplied from the Mindanao Grid to Cotabato City through the Nuling Substation (Sultan Kudarat, Maguindanao), which acquires power from the Kibawe Substation (Bukidnon). Occasionally, the power supply in Cotabato City is interrupted when the 138 kV transmission lines between Kibawe and Nuling substations encountered technical faults, incurred man-made damage, or underwent preventive maintenance.

In such instances, the Tacurong substation in the province of Sultan Kudarat can temporarily supply electricity via the 69 kV transmission lines between Tacurong and Nuling substations, with limited capacity. Consequently, some electricity consumers in Cotabato City have experienced frequent low voltage due to the relatively long transmission lines under this set-up.

For this reason, the Cotabato City Government through its Comprehensive Development Plan (2017-2022) proposed for the establishment of a new 138 kV transmission line between the Tacurong and Nuling substations along a shorter route. The new transmission line aims to improve the system reliability of the supply of power to the Nuling substation and eventually to consumers within the Greater Cotabato Area.

(4) Household Electrification

As of 2017, a total of 37,420 households were serviced by the CLPC. This represented a 52.1% electrification rate for the estimated 71,802 households within the franchise area of CLPC. While in the ARMM (now BARMM), of the total 618,600 households, 169,190 of which or a mere 27.4% were provided with electricity. The substantial percentage of households without electricity within the region is indicative of the lack of financial capacity of the population to avail the power supply service. The Bangsamoro region recorded a 53.7% poverty incidence rate, which is

significantly above the national average of 21.6%. This trend has increased in recent years, without the availability of a more economical alternative energy source.

The low electrification rate in the Bangsamoro is currently being addressed through ongoing international development programs. For instance, the World Bank Group has launched the Access to Sustainable Energy Project (ASEP) to support rural electrification with emphasis on providing 30,500 solar home systems to remote and “last-mile” communities (including the Bangsamoro region) by 2021.

In the case of Maguindanao province, as of November 2018, of the total potential 154,500 households, 51,528 of which or merely 33.35% were provided with electricity per NEA data on Status of Energization. The government’s target of 100% household electrification by 2022 remains a big challenge to the power sector.

5.7.5 Current Condition of Power Supply in the Surrounding Municipalities

(1) Overview

The four (4) surrounding municipalities covered by Maguindanao Province (Datu Odin Sinsuat, Sultan Kudarat, Sultan Mastura, and Parang) are being served by the Maguindanao Electric Cooperative (MAGELCO) and Cotabato Light and Power Company (CLPC). In general, there is an observed scarcity of power supply particularly in areas served by MAGELCO. There had been erratic power supply for the past decades due to many problems besetting the electric company, which resulted to daily scheduled brownouts. Solar powers have been the most common alternative for electricity; hence it became a part of almost every household in Maguindanao Province.

On the other hand, households served by CLPC have relatively more stable electricity since the company has its own stand-by electric generator to operate in case of emergency failure of power.

The municipality of Pigkawayan is being served by COTELCO-PPALMA (Cotabato Electric Cooperative/ Pikit-Pigkawayan, Alamada, Libungan, Midsayap & Aleosan) and households, likewise, experienced frequent brownouts due to erratic power supply from the main source.

CLPC, MAGELCO, and COTELCO-PPALMA all source their electricity from the NGCP Nuling substation.

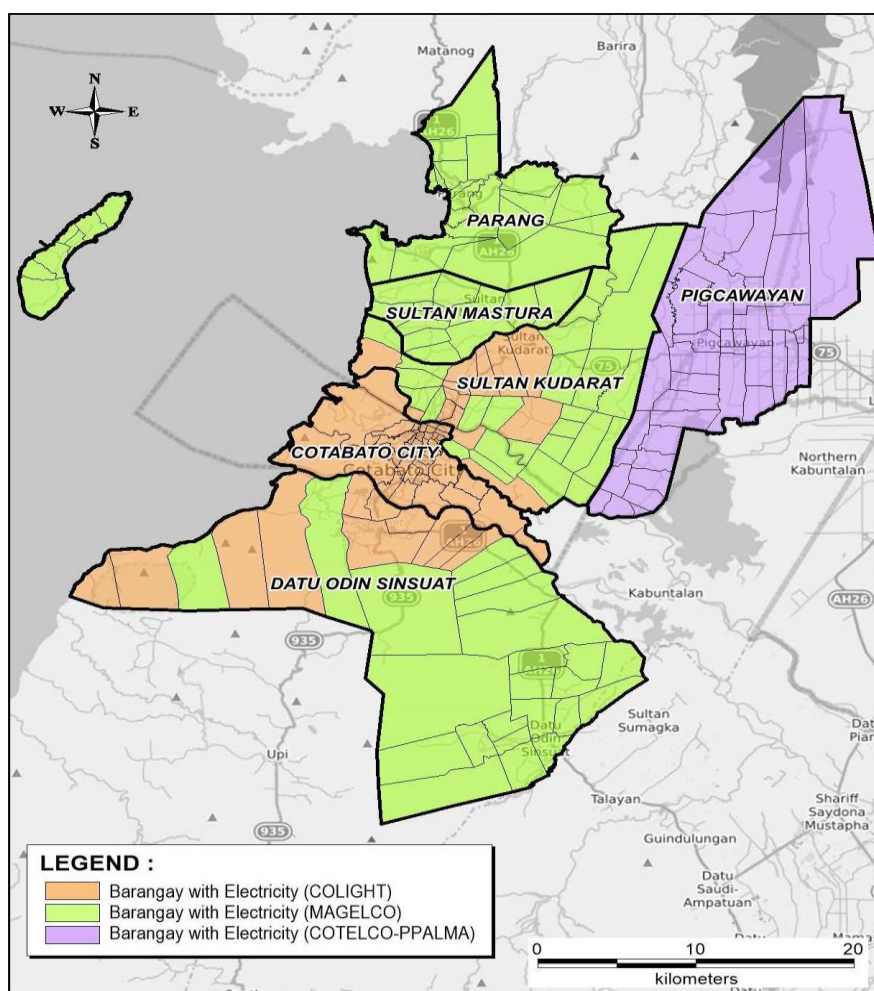
In total, 58,172 households (87.5%) have access to electricity across the five surrounding municipalities. The remaining 8,339 (12.5%) households do not have access to power supply.

Table 5.7-7 Energization Profile of Households in the Surrounding Municipalities

Municipality	Sources of Power	Number of Households Served		Total # of HHs	% to Total	
		Energized	Un-energized		(a)	(b)
		(a)	(b)			
1. Datu Odin Sinsuat	MAGELCO/ CLPC	13,504	3,376	16,880	80	20
2. Sultan Kudarat	MAGELCO/ CLPC	13,798	1,533	15,331	90	10
3. Sultan Mastura	MAGELCO	3,453	384	3,837	90	10
4. Parang	MAGELCO	13,736	1,526	15,262	90	10
5. Pigcawayan	COTELCO- PPALMA	13,681	1,520	15,201	90	10
TOTAL		58,172	8,339	66,511	87.5	12.5

Source: Power distribution companies

Figure 5.7-20 shows the distribution of barangays in the Greater Cotabato Area, based on the power distribution utility.



Source: JICA Study Team, arranged from data provided by the three power distribution companies

Figure 5.7-20 Franchise Area of the Three Power Distribution Companies

Updates on the 142M Grant Assistance of JICA to MAGELCO:

To date, MAGELCO is yet to reply to a Letter of Inquiry sent by the JICA Study Team based in Cotabato City regarding the status of the grant assistance. However, an unofficial source disclosed that MAGELCO had acquired the following equipment and materials out of the fund: 2 Bucket Trucks, 2 Boom Trucks, Concrete/Steel Poles, Distribution Wires, and Distribution Transformers.

(2) Power Supply in Datu Odin Sinsuat

Table 5.7-8 shows that all barangays in Datu Odin Sinsuat have access to electricity and are served either by MAGELCO or CLPC. However, several households still do not have access to power supply. This is primarily due to the remoteness of the communities, or the lack of resources to pay for electric connections and monthly bills.

Table 5.7-8 Power Supply Service Providers in Datu Odin Sinsuat

Barangay	Distribution Utility	Barangay	Distribution Utility
1. Ambolodto	MAGELCO	18. Kurintem	MAGELCO
2. Awang	CLPC	19. Kusiong	CLPC
3. Badak	MAGELCO	20. Labungan	MAGELCO
4. Bagoenged	MAGELCO	21. Linek	COLIGHT
5. Baka	MAGELCO	22. Makir	MAGELCO
6. Benolen	MAGELCO	23. Margues	MAGELCO
7. Bito	MAGELCO	24. Mompong	CLPC
8. Bongued	MAGELCO	25. Nekitan	MAGELCO
9. Bugawas	MAGELCO	26. Semba	CLPC
10. Kapiton	CLPC	27. Sebuto	MAGELCO
11. Dados	MAGELCO	28. Sifaren	MAGELCO
12. Dalican Poblacion	MAGELCO	29. Tambak	CLPC
13. Datu Mustapha B. Ala	MAGELCO	30. Tamontaka	CLPC
14. Dinaig Proper	MAGELCO	31. Tanuel	CLPC
15. Dulangan	CLPC	32. Tampilan	CLPC
16. Kakar	MAGELCO	33. Taviran	MAGELCO
17. Kenebeka	MAGELCO	34. Tenonggos	MAGELCO

Table 5.7-9 below shows that 80% of households in Datu Odin Sinsuat are energized, while the remaining 20% still have no access to electricity. In addition, there have been observed instances when households not directly linked to the power supplier, connect informally through their neighbors at agreed upon payment terms.

Table 5.7-9 Households With and Without Power Supply in Datu Odin Sinsuat (2016)

Description	Number of Households		Percentage	
	Rural / Urban		Rural / Urban	
Served	13,504		80%	
Unserved	3,376		20%	
Total	16,880		100%	

Source: MPDC

(3) Power Supply in Sultan Kudarat Municipality

The municipality of Sultan Kudarat is being served by two electric companies – CLPC and MAGELCO, which energize 12 and 28 barangays, respectively. Table 5.7-10 below shows the respective barangays served by the two power distributors.

Table 5.7-10 Power Supply Service Providers in Sultan Kudarat

Barangay	Distribution Utility	Barangay	Distribution Utility
1. Alamada	MAGELCO	21. Limbo	CLPC
2. Banatin	MAGELCO	22. Maidapa	MAGELCO
3. Banubo	MAGELCO	23. Makaguiling	CLPC
4. Bulalo	CLPC	24. Matengen	MAGELCO
5. Bulibod	CLPC	25. Mulaog	MAGELCO
6. Calsada	MAGELCO	26. Nalinan	MAGELCO
7. Crossing Simuay	CLPC	27. Nara	MAGELCO
8. Dalumangcob (Pob.)	CLPC	28. Nekitan	MAGELCO
9. Damaniog	MAGELCO	29. Olas	MAGELCO
10. Darapanan	MAGELCO	30. Panatan	MAGELCO
11. Gang	CLPC	31. Pigcalagan	MAGELCO
12. Inawan	CLPC	32. Pigkelegan (Ibotegen)	MAGELCO
13. Kabuntalan	MAGELCO	33. Pinaring	CLPC
14. Kabuntalan	MAGELCO	34. Pingping	MAGELCO
15. Kakar	MAGELCO	35. Raguisi	MAGELCO
16. Kapimpilan	MAGELCO	36. Rebuken	CLPC
17. Katamlangan (Matampay)	MAGELCO	37. Salimbao	CLPC
18. Katidtuan	MAGELCO	38. Sambolawan	MAGELCO
19. Katuli	CLPC	39. Senditan	MAGELCO
20. Ladia	MAGELCO	40. Ungap	MAGELCO

Source: MPDC

Table 5.7-11 shows that approximately 90% of households in Sultan Kudarat municipality have access to electricity. There was also an observed decrease in households served due to the non-payment of electrical bills.

Table 5.7-11 Households with and Without Power Supply in Sultan Kudarat

Description	Number of Households	Percentage
	Rural / Urban	Rural / Urban
Served	13,798	90%
Unserved	1,533	10%
Total	15,331	100%

Source: MPDC

(4) Power Supply in Sultan Mastura

All barangays in Sultan Mastura are serviced by MAGELCO. Table 5.7-12 shows that out of the 3,837 total households in Sultan Mastura, 90% have access to electricity. Among the issues faced

within the municipality include: (1) households with delinquency in electricity charges, and (2) illegal connections associated with electricity theft.

Table 5.7-12 Households with and Without Power Supply in Sultan Mastura

Description	Number of Households		Percentage	
	Rural / Urban		Rural / Urban	
Served	3,453		90%	
Unserved	384		10%	
Total	3,837		100%	

Source: MPDC

(5) Power Supply in Parang

Out of the twenty-five (25) barangays in Parang, only 18 have access to electricity provided by MAGELCO. The other seven (7) barangays in Bongo Island have no electricity due to the island's relative distance from the mainland. Majority of the households in Bongo Island utilize solar panels to power their lights and small appliances, while the others who could not afford use gas lamps instead. There were a few households who own a generator, but these are seldomly used (i.e. for special occasions only) due to the high cost of fuel.

On the other hand, households in the mainland experienced long and frequent scheduled and non-scheduled brownouts. Hence, low wattage solar panels and gas lamps became common to households in the entire municipality.

Table 5.7-13 Households with and Without Power Supply in Parang

Description	Number of Households		Percentage	
	Rural / Urban		Rural / Urban	
Served	13,736		90%	
Unserved	1,526		10%	
Total	15,262		100%	

Source: MPDC

(6) Power Supply in Pigcawayan

All 40 barangays in Pigcawayan are energized by COTELCO-PPALMA, however, there are still areas which remain unserved due to low population density (i.e. the number of households do not meet the minimum requirements set by the electrical company). Aware of the crucial role of electricity in economic development and improvement of living conditions of residents, the LGU, together with officials of affected barangays, are currently negotiating with COTELCO-PPALMA to reconsider the electrification in the aforementioned areas.

On the other hand, frequent power interruption is still experienced by consumers due to the erratic supply from the main power source, which is NAPOCOR.

Table 5.7-14 shows that households in urban areas in Pigcawayan are 100% energized. In contrast, only 90% of households in rural areas across the municipality have access to electricity.

Table 5.7-14 Households with and Without Power Supply in Pigcawayan

Description	Number of Households		Total number of HHs	Percentage	
	Urban	Rural		Urban (%)	Rural (%)
Served	2,017	11,664	13,681	100	90
Unserved	--	1,520	1,520	-	10
Total	2,017	13,184	15,201	100	100

Source: MPDC

5.8 Disaster Risk Reduction

5.8.1 History of Major Disasters in Cotabato City

The Local Disaster Risk Reduction and Management Plan (LDRRMP) of Cotabato City (2016-2022) documented the disasters experienced by the city over the years. By looking at the said LDRRMP and other studies, the three disasters which have devastating impact on the city are flood, earthquake and tsunami. Similarly, photos of the major disasters are presented in the succeeding figures (Figure 5.8-1 and Figure 5.8-2).

Table 5.8-1 Historical Major Disaster Events in Cotabato City

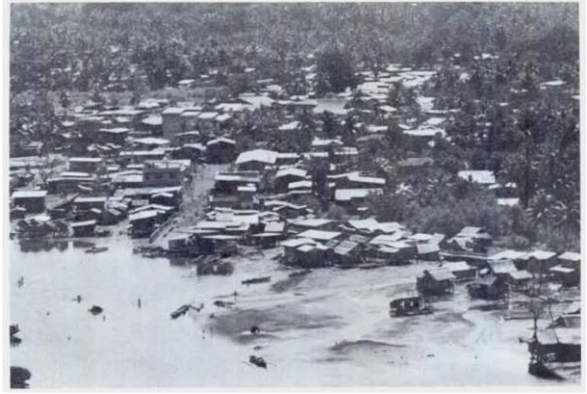
Year	Type of Disaster	Damage
1918	Earthquake/ Tsunami	Magnitude 8.0 earthquake. Shortly after earthquake, a tsunami, estimated at 24 ft high, invaded coast in an extension of about 150 km from near Port Lebak to Glan, drowning and carrying away many persons and animals.
1976	Earthquake/ Tsunami	Magnitude 8.1 earthquake struck and produced 5-meter high tsunami which killed 4,791 people and caused 2,288 the missing, 9,928 injured. About ninety percent (90%) of casualties were caused by the tsunami, which is said that most destructive tsunami event in the Philippines which affected the coastal towns of Southern Mindanao.
2008	Flood	Typhoon Frank submerged more or less 80% of Cotabato City and caused 3 casualties and 100,000 people and about 3,100 houses affected (equal to about 40% of the total population), which led to the declaration of state of calamity.
2009	Flood	Typhoon Jolina caused 150,000 people and about 400 houses affected by the induced flood.
2011	Flood	Heavy rainfall caused flood which affected about 110,000 people and about 4,000 houses.

Source: prepared by JICA Study Team based on Cotabato City LDRRMP (2016-2022), PHIVOLCS website, the PWRI report⁷

⁷ The factor analysis on water-related disasters in the Philippines, the Public Work Research Institute (PWRI) of Japan, 2007



Damage Houses at Seashore of Cotabato City



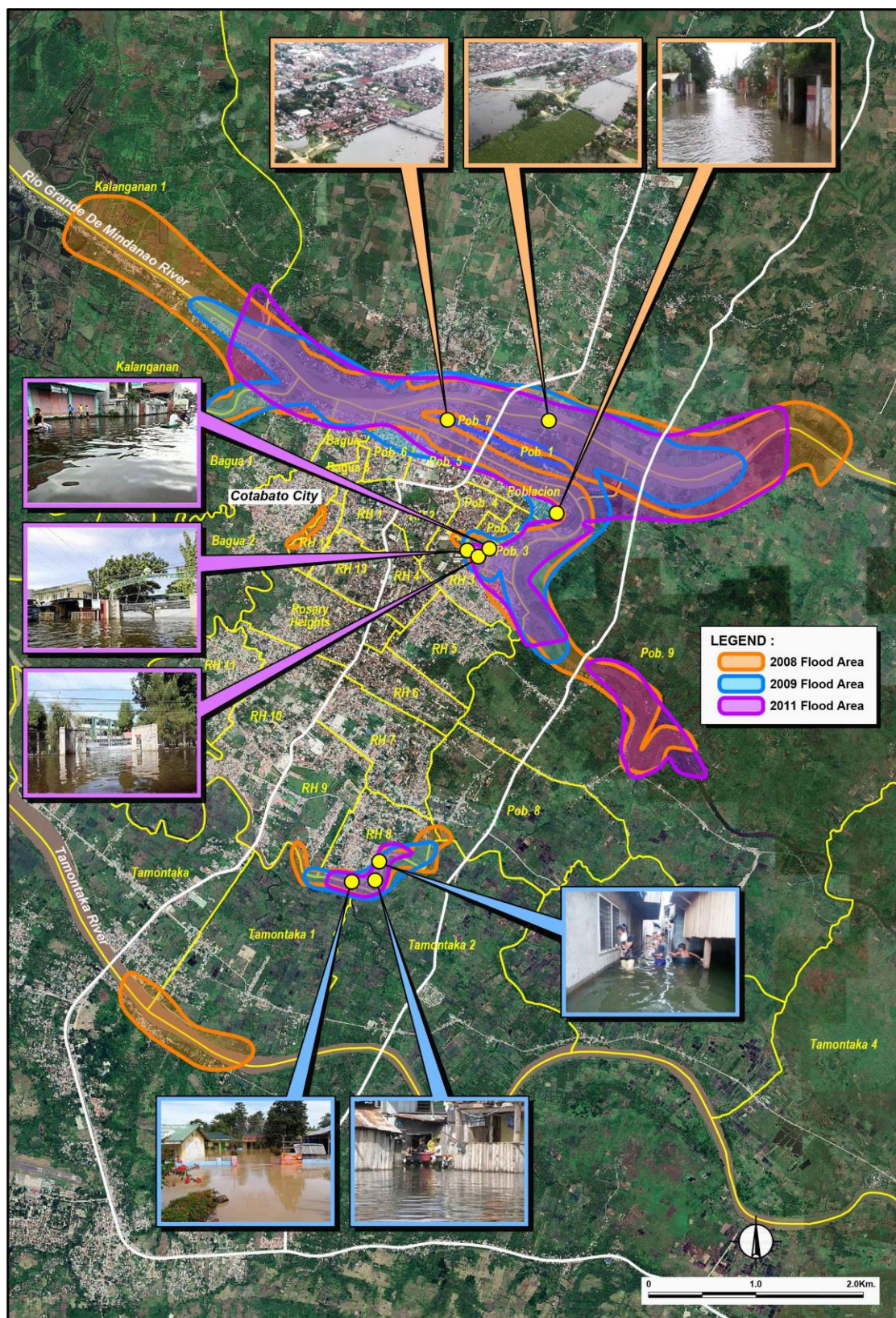
Damage houses at Seashore of Malabang Municipality



Building of Philippine Harvardian College in Cotabato City

Source: Reconnaissance Report of 1976 Mindanao Earthquake, National Science Foundation, August 1976

Figure 5.8-1 Damage of the 1976 Earthquake and Tsunami in Cotabato City



Note: Map is representative of the actual inundated area but not indicative of the actual flood line which varies regularly.

Source: Prepared by the JICA Study Team based on various documents including the Local Disaster Risk Reduction Management (LDRRMP) Plan of Cotabato City (2016-2022)

Figure 5.8-2 Flood level of the Recent Three Major Floods in Cotabato City

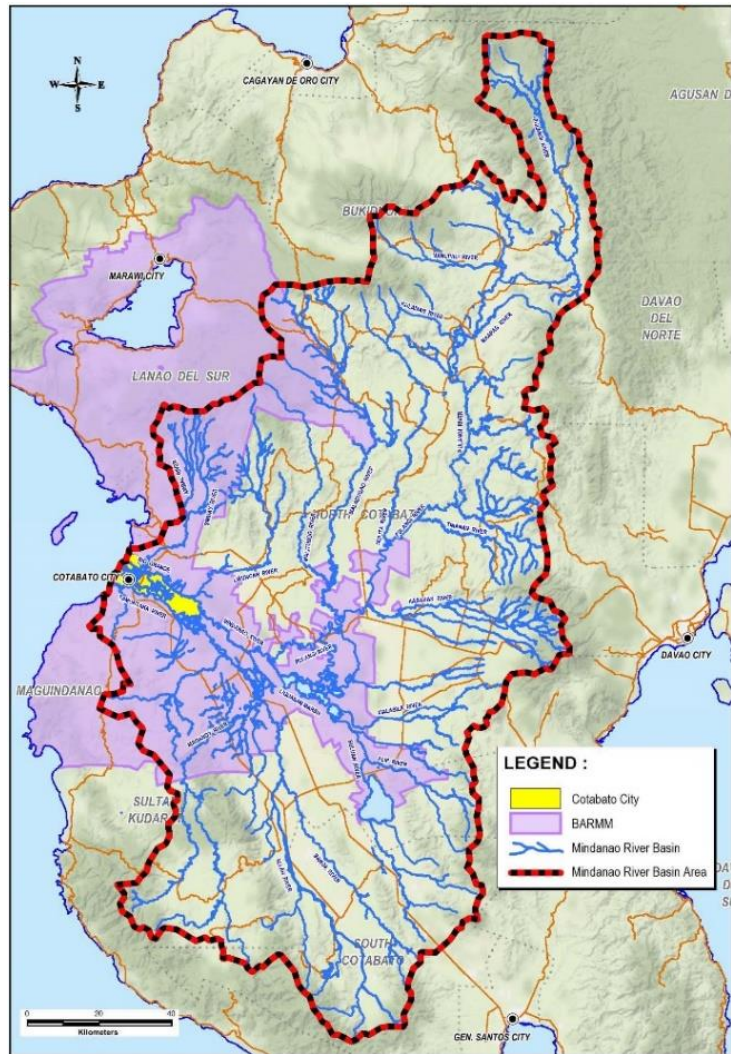
5.8.2 Natural Condition of Cotabato City and History of Disasters

(1) Location and Topography of Cotabato City

Cotabato City is located at the outlet of the Mindanao River and stands on alluvial lowland between Liguan Marsh and Illana Bay.

The location and the physical characteristics of Cotabato City have exposed the city vulnerable to various types of natural disaster. Being located at the discharge point of the Mindanao River Basin (MRB) entails susceptibility to flooding every time heavy rain occurs within the MRB. The MRB has an area of over 20,000 sq. km. and roughly equivalent to 25% of the land area of Mindanao.

Similarly, the city is founded on a delta formed by Rio Grande de Mindanao and Tamontaka river, hence its elevation is low. With Liguan Marsh on the east and Illana Bay on the west, both sides of the city are exposed to natural disaster – floods from Liguan Marsh and tsunami/storm surge from Illana Bay (Figure 5.8-4). About 62% (10,900 has.) of the eastern side is exposed to high risk of flood and about 13% (2,233 has.) of the western side is subject to high risk of tsunami/storm surge, which means that about 75% of the land area of the city is vulnerable to water-related disasters. Table 5.8-2 summarizes the land characteristics of the city and explained as well other factors which contribute to occurrence of natural disaster.



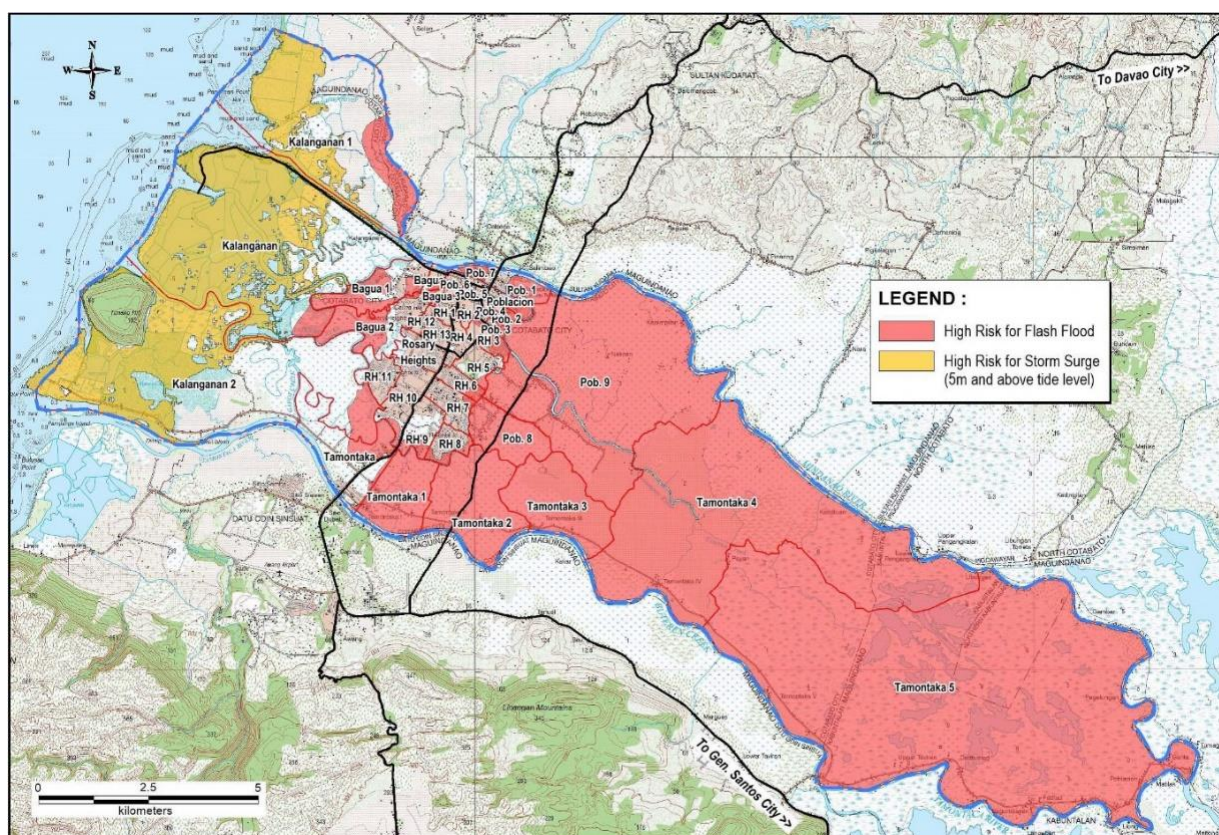
Source: DENR-RBCO (River Basin Control Office)

Figure 5.8-3 Mindanao River Basin Map Showing the Location of Cotabato City at the Discharge Point

Table 5.8-2 Contributory Elements to Natural Disaster in Cotabato City

Item	Details
i. Low elevation of the city's land	<ul style="list-style-type: none"> Per data from CLUP 2011-2020, about 60% of the city's total land area is considered below sea level. To be specific, the land area of the city has the following elevation: 76% has an elevation of less than 1m, 16% between 1m to 5m and only 8% has an elevation of above 5 m Due to this low elevation, the area facing the coast is susceptible to tsunami, storm surge and sea level rise due to climate change. For example, a storm tide of at least 5m produced by storm surge and astronomical tide will place in high risk the following barangays: 51% of Mother Kalanganan, 33% of Kalanganan 1, 34% of Kalanganan 2, and 2% of Bagua 1.
ii. Location of Cotabato city in relation to Mindanao River Basin	<ul style="list-style-type: none"> The city is located at the discharge point of Mindanao River Basin (MRB). The basin covers an area about ¼ of the land area of Mindanao. Heavy rainfalls inside the MRB floods the city. Flooding is projected to be exacerbated by climate change impact.
iii. Poor flow capacity of the two rivers	<ul style="list-style-type: none"> Poor flow capacities of shallow, gentle and meandering river channels of Rio Grande de Mindanao and Tamontaka River and their tributaries are among the causes of flooding in Cotabato City.
iv. Heavy erosion and siltation at two rivers downstream	<ul style="list-style-type: none"> Erosion is likely to occur within the river channels of MRB due to steep slope, lack of vegetation and poorly consolidated or compacted sediments. Upstream eroded sediment is transported to downstream and makes the river bed shallow.
v. Changing river course of Simuay River	<ul style="list-style-type: none"> The Simuay River has changed its river course overtime and the latest of it involves a new path going south and merged with Rio Grande de Mindanao during flood. The combined volume of the two rivers at the downstream section of latter creates an amount of water which is beyond the flow capacity of Rio Grande de Mindanao. Similarly, this course change creates not only flood but brings siltation of sediments in the river channel of Rio Grande de Mindanao.

Source: JICA Study Team



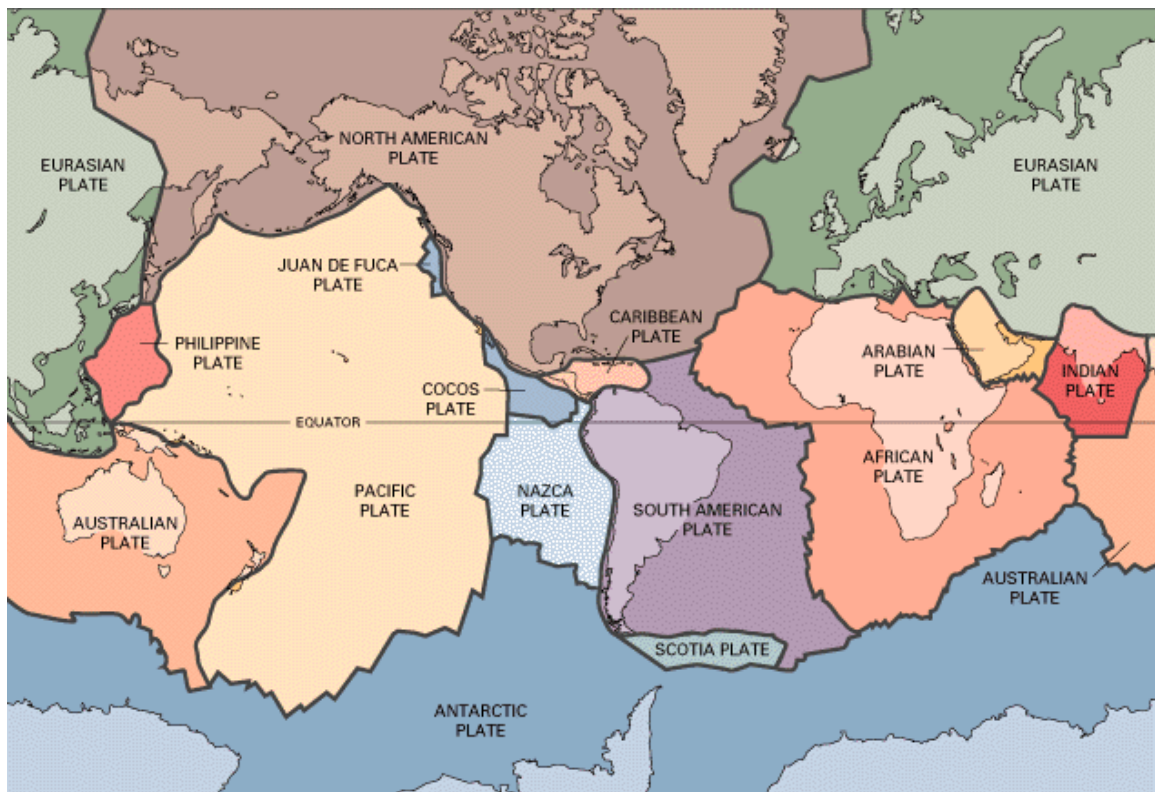
Source: High Risk for Flash Flood from Cotabato City CLUP 2011-2020; High Risk for Storm Surge from DOST-Project NOAA

Figure 5.8-4 Flash Flood Map and Storm Surge Map of Cotabato City

(2) Location of Cotabato City in Relation to Tectonic Plates

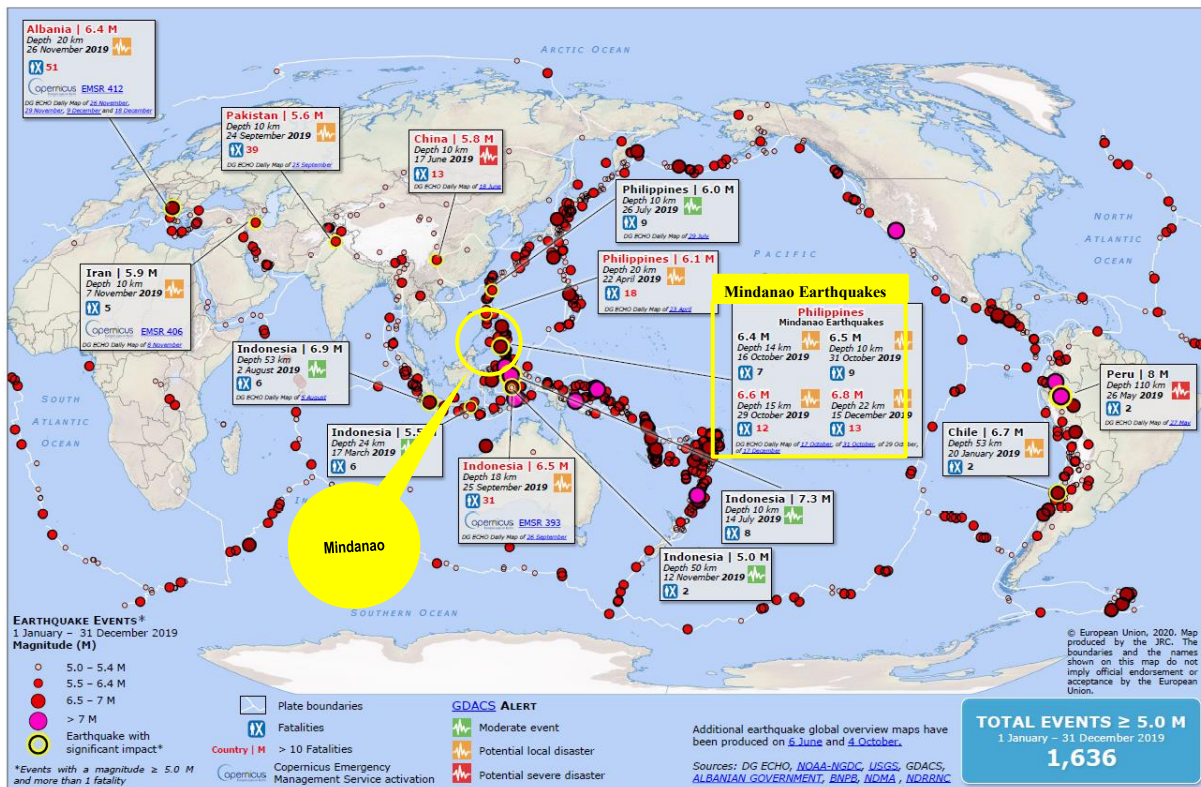
Earthquakes are mainly caused either by volcanic activities, or movements of the Earth's tectonic plates. Situated along the Pacific Ring of Fire, the Philippines experiences high earthquake activity and is surrounded by three active tectonic plates: the Philippine Sea Plate in the east, the Eurasian Plate in the west, and the Indo-Australian Plate in the south.

Most earthquakes occur along existing fault lines, which are formed by the movement of plates. Mindanao is among the seismically active regions in the Philippines due to the presence of several active faults such as the Makilala-Malungon fault, M'lang fault, North Columbio fault, South Columbio fault, and the Cotabato-Sindangan fault. In 2019, a sequence of strong earthquakes, as listed in Table 5.8-3, occurred successively within the vicinity of Tulunan, Cotabato. Intensity IV (moderately strong) was recorded in Cotabato City, following the Magnitude 6.3 earthquake on October 16, 2019.



Source: United States Geological Survey (USGS)

Figure 5.8-5 Philippine Plate in Relation to Other Major Tectonic Plates of the World



Source: Earthquakes Global Overview 2019, Emergency Response Coordination Center, EU

Figure 5.8-6 Major Earthquake Events in Mindanao and the World (2019)

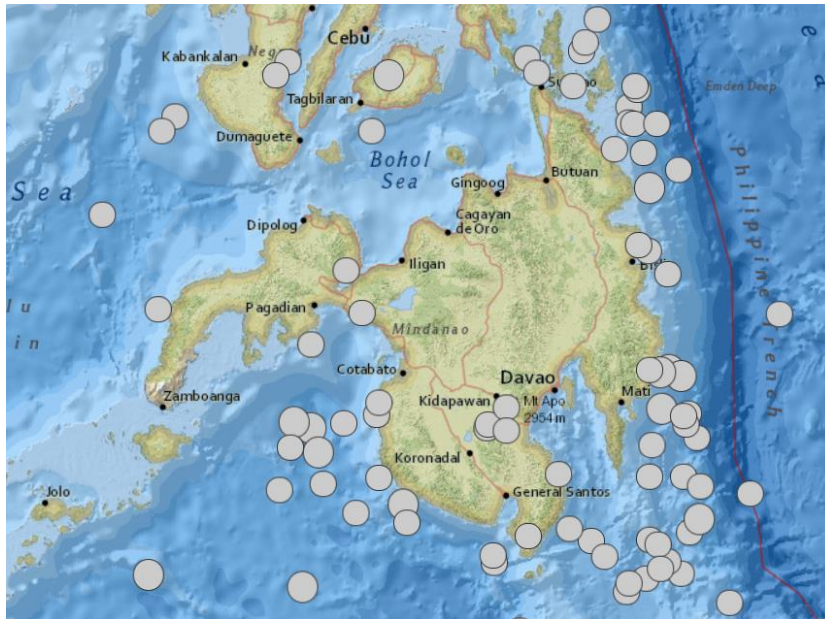
Table 5.8-3 Major Earthquakes in Mindanao (2019)

Date	Magnitude	Depth of focus	Location
July 9, 2019	5.6	10.0 km.	16 km. southwest of Makilala, North Cotabato
Oct. 16, 2019	6.3	8.0 km.	22 km. southeast of Tulunan, North Cotabato
Oct. 29, 2019	6.6	7.0 km.	25 km. southeast of Tulunan, North Cotabato
Oct. 31, 2019	6.5	6.0 km.	28 km. southeast of Tulunan, North Cotabato
Dec. 15, 2019	6.9	3.0 km.	9 km. northwest of Matanao, Davao del Sur

Source: Philippine Institute of Volcanology and Seismology (PHIVOLCS)

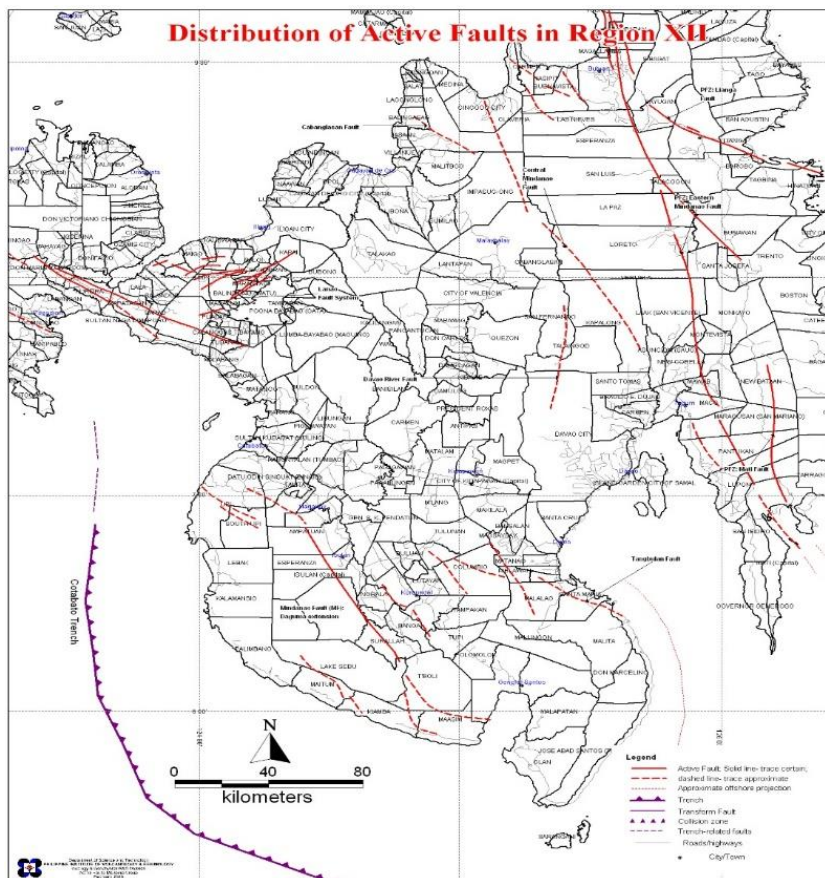
In addition, the location of Cotabato City, as a coastal community makes it vulnerable to earthquake-generated tsunamis. As seen in Figure 5.8-7, there were several recorded earthquakes on the sea floor within the vicinity of the city. Large earthquakes on the sea floor will cause tsunamis. This was what happened in 1976 where Magnitude 8.1 earthquake struck the sea floor of Moro Gulf which triggered a devastating tsunami. The event is considered as the most devastating tsunami occurrence in the Philippines⁸, recording intensities of up to Intensity VII in Cotabato City.

⁸ M.L.P. Bautista, et. al. (2012). Philippine Tsunamis and Seiches (1589-2012)



Source: United States Geological Survey (USGS)

Figure 5.8-7 Epicenters of Major Earthquakes Within the Vicinity of Mindanao Since 1990



Source: PHIVOLCS

Figure 5.8-8 Location of Cotabato Trench and Active Faults

(3) Climate and Hydrology

The climate in the Mindanao River Basin is classified in two types, Type III and Type IV, based on Modified Coronas Classification. As shown in Figure 5.8-9, the Type III is dominant in the river basin which is characterized as unclear seasonal weather changes with relatively wet from May to October and dry during the rest of the year.

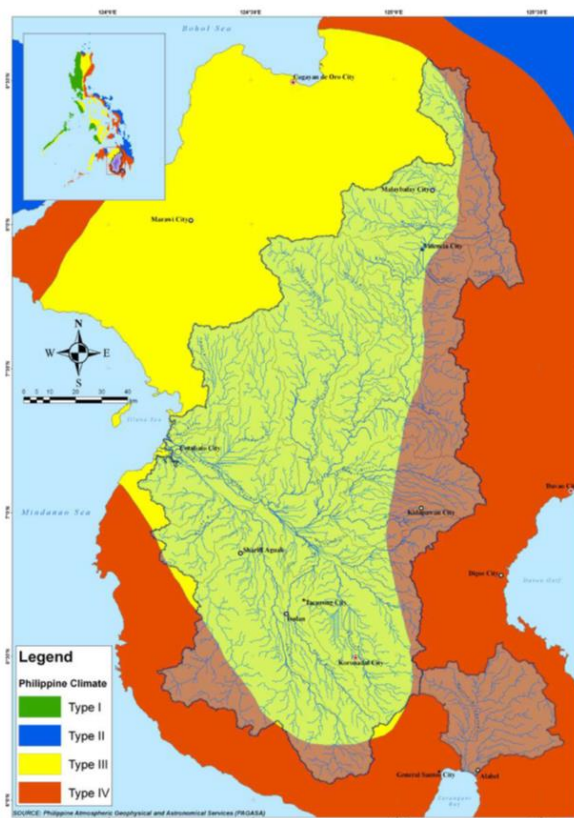


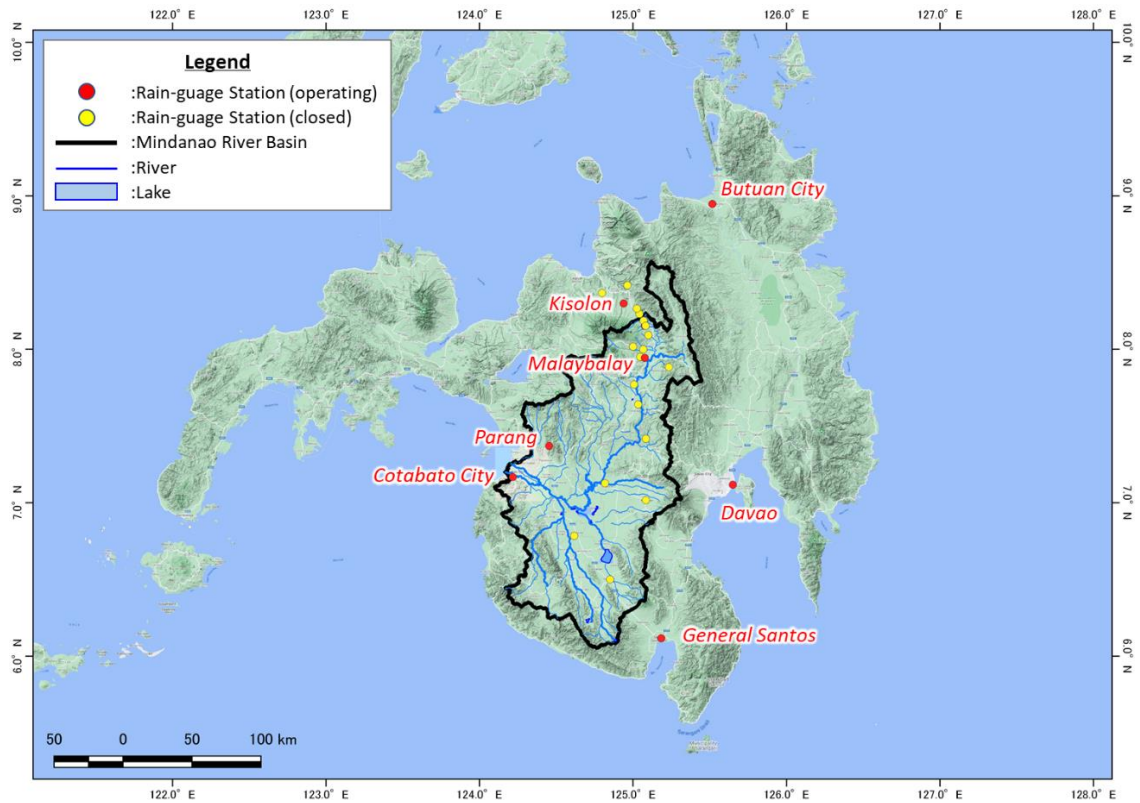
Table. Climate Classification based on the Modified Coronas Classification

Type	Description
Type I	Two pronounced seasons: dry from November to April and wet during the rest of the year.
Type II	No dry season with a very pronounced maximum rainfall from November to January.
Type III	Seasons not very pronounced, relatively dry from November to April and wet during the rest of the year.
Type IV	Rainfall more or less evenly distributed throughout the year.

Source: Mindanao River Basin Integrated Management and Development Master Plan (2012)

Figure 5.8-9 Climate Map of the Mindanao River Basin

Annual average rainfall in the Mindanao River Basin approximately ranges from 2,000 to 3,000 mm. According to the Mindanao River Basin Integrated Management and Development Master Plan (MRBIMDMP) in 2012, there are more than 20 rainfall stations in the Mindanao River Basin. However, most of them have been closed, and only the 3 rainfall stations (Cotabato City, Parang, Malaybalay) are available. Location of the rainfall stations is presented in Figure 5.8-10 and their observed mean annual rainfalls are listed in Table 5.8-4.



Source: prepared by JICA Study Team based on the MRBIMDMP (2012) (Table 5.8-4)

Figure 5.8-10 Location of Rainfall Stations in the Mindanao River Basin and its Vicinity

Table 5.8-4 Mean Annual Rainfall of the Rainfall Stations in the Mindanao River Basin

STATION		Coordinates		Type	Years of Record	Status	Mean Annual Rainfall, mm
NO.	Location	Latitude	Longitude				
074	Kahaponan, Valencia, Bukidnon	7°57'00"	125°02'48"	AGR	1976 -84	Closed	3,321
076	CMU, Musuan, Bukidnon	7°56'36"	125°04'36"	AGR	From 1978	Operating	
081	USM, Kabakan, North Cotabato	7°07'36"	124°49'00"	AGR	1969 -94	Closed	1,768
746	Cotabato City, Maguindanao	7°10'00"	124°13'00"	SYN	From 1961	Operating	2,232
751	Malaybalay, Bukidnon	8°09'12"	125°04'36"	SYN	From 1951	Operating	2,586
752	Butuan City, Agusan del Norte	8°56'48"	125°31'00"	SYN	From 1981	Operating	2,041
851	General Santos, South Cotabato	6°07'00"	125°11'00"	SYN	From 1961	Operating	924
1003	Dalwangan, Malaybalay, Bukidnon	8°13'48"	125°02'30"	OR	1961 -73	Closed	2,661
1004	Damilag, Manolo Fortich, Bukidnon	8°22'00"	124°47'54"	OR	1966 -84	Closed	2,395
1005	Impalutao, Impasugong, Bukidnon	8°15'54"	125°01'30"	OR	1956 -78	Closed	2,581
1007	Kalasangay, Malaybalay, Bukidnon	8°11'12"	125°04'06"	CR	1973 -80	Closed	2,772
1008	Kisolon, Sumilao, Bukidnon	8°17'54"	124°56'18"	CR	From 1980	Operating	2,255
1009	Linabo, Malaybalay, Bukidnon	8°05'30"	125°06'00"	VVS	1973 -81	Closed	2,421
1010	Mailag, Valencia, Bukidnon	8°00'00"	125°04'00"	OR	1974 -82	Closed	2,165
1012	Panadtalan, Maramag, Bukidnon	7°46'12"	125°00'24"	OR	1968 -77	Closed	2,554
1013	Miaray, Dangcagan, Bukidnon	7°38'24"	125°02'00"	OR	1973 -80	Closed	2,775
1014	Phillips, Manolo Fortich, Bukidnon	8°25'00"	124°57'48"	OR	1956 -81	Closed	2,455
1015	Quezon, Bukidnon	7°25'00"	125°05'00"	CR	1973 -80	Closed	2,691
1024	Zamboanguita, Malaybalay, Bukidnon	8°09'12"	125°04'54"	OR	1957 -65	Closed	2,087
1204	Parang, Maguindanao	7°22'12"	124°27'12"	OR	From 1972	Operating	3,069
1205	Carmen, Tacurong, Sultan Kudarat	6°47'00"	124°37'00"	OR	1970 -99	Closed	803
L02	Kaato-an, Lantapan, Bukidnon	8°01'	125°00'	CR	1977 -80		2,365
L10	San Fernando, Bukidnon	7°53'	125°14'	CR	1976 -80		2,338
L28	Kidapawan, North Cotabato	7°01'	125°05'	OR	1969 -94		2,918
L31	Koronadal, South Cotabato	6°30'	124°51'	OR	1972 -78		4,310

*[Station Types] SYN: Synoptic Station, AGR: Agrometeorological Station, OC: Official Climatological Station, CC: Cooperative Climatological Station, OR: Official Rain Station, CR: Cooperative Rain Station

Source: *Mindanao River Basin Integrated Management and Development Master Plan (2012)*

Mean annual flood discharge in the Mindanao River downstream approximately ranges from 1,000 to 1,500 m³/s. According to the Mindanao River Basin Integrated Management and Development Master Plan (MRBIMDMP) in 2012, there are totally 25 stream-gauge stations in the Mindanao River Basin as listed in Table 5.8-5. The MRBIMDMP notes that plotted stage-discharge curves (rating curves) appear to be biased towards matching the available measured discharges in low flow, which means that peak discharge tends to be underestimated.

Location of the stream-gauge stations in the Mindanao River Basin is presented in Figure 5.8-11. The station of XII-07 is located slightly downstream of the confluence of the Mindanao River and the Alah River. At the station, the mean annual flow is about 650 m³/s, and the mean annual flood discharge is about 1,200 m³/s. On the other hand, the station of XII-29 is located on the Plangi River upstream. At the station, the mean annual flow is about 170 m³/s, and the mean annual flood discharge is about 1,150 m³/s. Comparing the above two stations (XII-07 and XII-29), these drainage areas are about 18,000 km² and 3,000 km² (the ratio is 6 to 1), and these mean annual

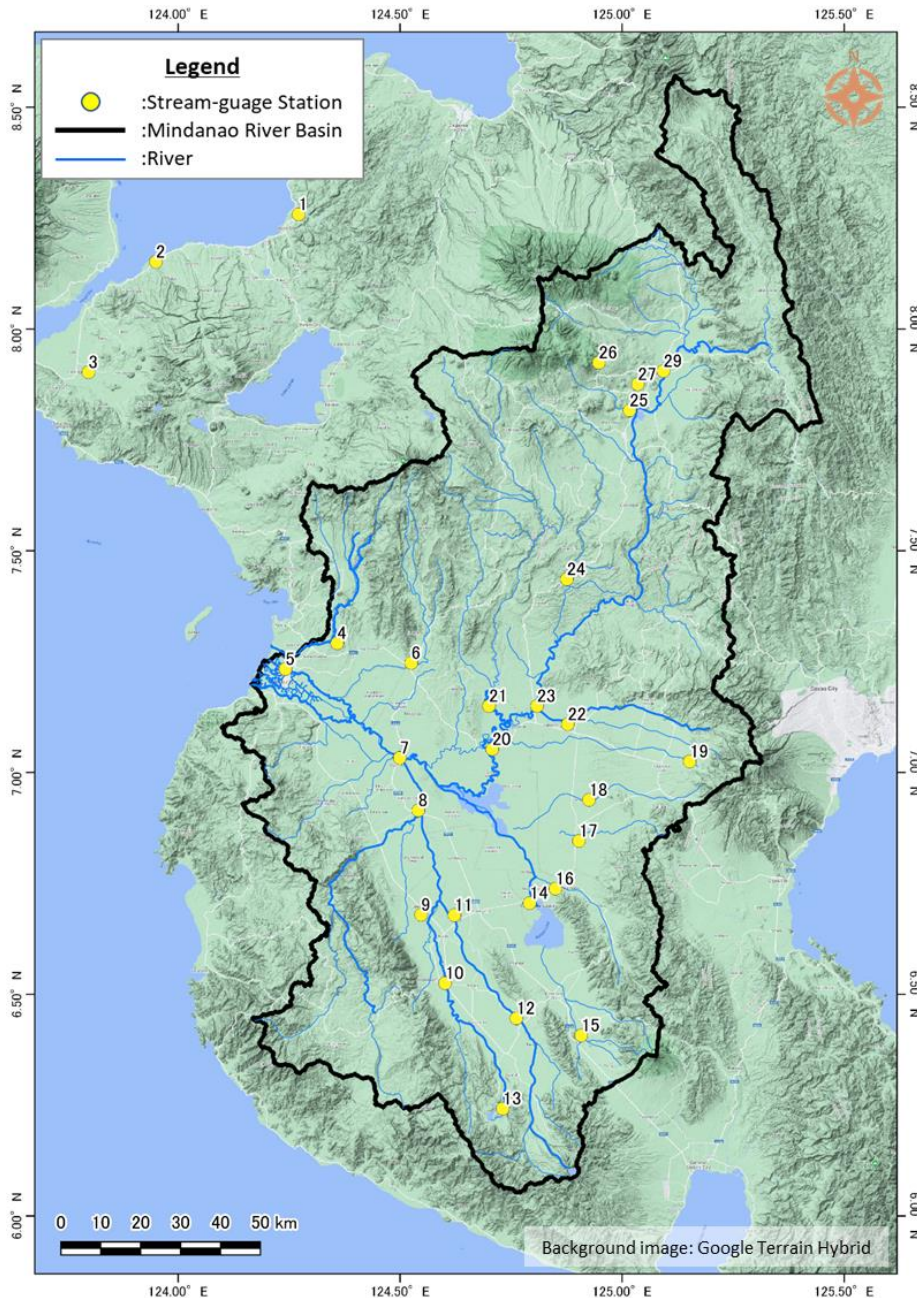
flood discharge are 1,200 m³/s and 1,150 m³/s (almost same). It indicates large retarding effect by the marshes in the Mindanao River downstream.

Table 5.8-5 Stream-gauge Stations in the Mindanao River Basin and Its Vicinity

Station		Coordinates		Drainage Area (km ²)	Years of Record	Mean Annual Flow (m ³ /s)	Mean Annual Flood (m ³ /s)
ID	River	Latitude	Longitude				
XII-01	Mandulog	8° 15'32"	124° 16'16"	576	15	45.37	202.57
XII-02	Maigo	8° 09'07"	123° 57'00"	74	13	5	103.17
XII-03	Maranding	7° 54'10"	123° 47'53"	345	19	24.4	133.45
XII-04	Simuay	7° 17'30"	124° 21'30"	664	2	62.16	442.25
XII-05	Mindanao	7° 14'00"	124° 14'30"	19,406	10		Gauge Height
XII-06	Libungan	7° 14'50"	124° 31'30"	534	24	19.37	545.34
XII-07	Mindanao	7° 01'59"	124° 29'57"	17,744	10	654.2	1,183.30
XII-08	Dansalan	6° 54'53"	124° 32'27"	3,749	10	95.36	434.24
XII-09	ALA-09	6° 40'45"	124° 32'50"	1,496	18	62.28	225.47
XII-10	ALA-10	6° 31'30"	124° 36'05"	936	25	47.41	137.07
XII-11	Kapingkong	6° 40'42"	124° 37'20"	559	9	19.9	53.59
XII-12	Banga	6° 26'45"	124° 45'43"	331	18	9.32	43.63
XII-13	Lonon	6° 14'31"	124° 43'52"	79	12	4.51	9.12
XII-14	Buluan	6° 42'20"	124° 47'30"	720	4	25.1	55.36
XII-15	Marbel	6° 24'26"	124° 54'28"	290	28	6.06	42.06
XII-16	Alip	6° 44'17"	124° 50'59"	380	17	17.09	242.63
XII-17	Malasila	6° 50'45"	124° 54'10"	145	21	8.52	84.61
XII-18	M'lang	6° 56'18"	124° 55'31"	159	22	7.45	99.79
XII-19	Saguing	7° 01'30"	125° 09'08"	9	15	0.74	45.99
XII-20	Rio Grande de Mindanao	7° 03'09"	124° 42'27"	12,999	26	423.31	931.5
XII-21	Maridagao	7° 09'00"	124° 42'00"	1,333		96.91	491.78
XII-22	Kabakan	7° 06'32"	124° 52'39"	698	16	41.12	425.12
XII-23	PULANGI-23	7° 09'00"	124° 48'30"	6,572	15	267.18	1,058.60
XII-24	Muleta	7° 26'10"	124° 52'32"	1,001	16	30.29	125
XII-25	Kulaman	7° 49'00"	125° 01'00"	144	6	Limited Data	55.42
XII-26	Sagomata	7° 55'28"	124° 56'50"	10	7	Limited Data	0.77
XII-27	Taganibong 1	7° 52'33"	125° 02'07"	27	3	Limited Data	0.48
XII-29	PULANGI-29	7° 54'20"	125° 05'35"	2,730	12	168.1	1,150.60

*The 3 stations whose ID are XII-01,02,03 are out of the Mindanao River Basin

Source: prepared by JICA Study Team based on the MRBIMDMP (2012)



*The numerical superscripts of the stream-gauge stations indicate the station ID shown in the table above
 Source: prepared by JICA Study Team based on the MRBIMDMP (2012)

Figure 5.8-11 Location of Streamflow Stations in the Mindanao River Basin and its Vicinity

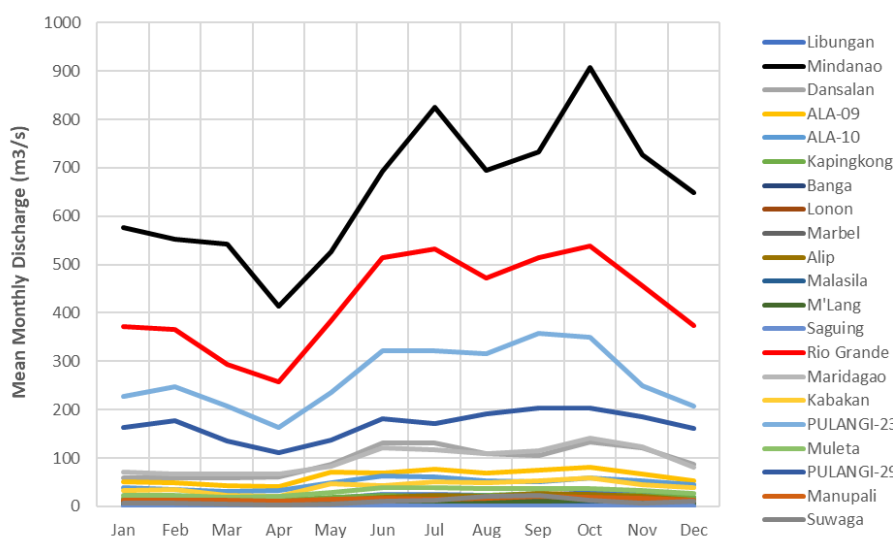
Mean monthly discharges at the 21 stream-gauge stations are also described in the MRBIMDMP (2012) as shown in Table 5.8-6, and the table is visualized in Figure 5.8-12. The mean monthly discharges at the Mindanao River downstream ranges from 400 m³/s in April to 900 m³/s in October.

Table 5.8-6 Mean Monthly Streamflow of the Mindanao River

River	Mean Monthly Discharge, m ³ /s											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Libungan	11.88	11.19	8.74	9.70	17.37	24.86	23.75	22.99	23.64	29.06	29.67	19.09
Mindanao	576.36	552.03	543.20	412.97	525.86	693.23	824.36	693.96	733.58	906.66	727.91	648.18
Dansalan	58.55	59.00	58.76	61.72	86.80	130.70	130.54	108.12	105.45	133.73	121.44	87.22
ALA-09	49.87	49.63	43.65	41.67	70.50	69.65	76.86	68.72	74.62	80.12	67.75	53.21
ALA-10	37.76	34.80	30.52	32.08	48.57	62.23	61.76	52.39	51.21	57.80	53.17	45.67
Kapingkong	17.48	15.22	15.68	13.25	18.72	22.43	21.15	23.51	26.13	23.05	22.47	19.39
Banga	8.15	7.64	6.22	6.55	9.20	9.31	11.27	11.62	11.47	11.14	9.98	9.13
Lonon	4.52	4.48	3.84	3.98	4.98	5.40	4.95	4.56	4.67	4.67	4.14	3.93
Marbel	5.20	4.82	3.91	4.22	6.44	6.38	5.97	6.30	8.48	6.99	7.06	6.90
Alip	9.80	10.69	14.38	10.18	10.16	18.09	23.65	21.29	26.86	25.67	21.34	12.63
Malasila	6.05	5.67	5.15	5.85	8.12	9.63	10.24	11.13	11.11	10.86	9.31	8.90
M'Lang	4.28	4.16	3.74	4.00	7.83	8.91	9.03	9.33	11.33	11.80	8.90	5.86
Saguing	0.75	0.61	0.55	0.53	0.79	0.78	0.96	0.82	0.88	0.82	0.78	0.61
Rio Grande	372.18	365.13	292.98	258.32	383.69	514.38	532.13	472.67	515.01	538.57	456.40	374.71
Maridagao	70.50	67.37	67.63	66.87	83.35	121.94	116.06	108.68	115.83	140.43	122.55	80.40
Kabakan	32.09	34.17	23.23	20.28	46.52	42.14	49.87	49.58	52.72	57.81	45.61	38.66
PULANGI-23	227.69	247.69	207.76	164.07	236.34	321.17	321.40	316.20	357.57	349.37	249.09	206.87
Muleta	22.93	23.21	19.35	21.57	28.38	39.38	39.18	36.72	35.89	37.52	32.80	26.15
PULANGI-29	162.22	176.51	134.86	110.60	137.74	182.08	171.69	190.62	204.24	202.81	184.60	160.27
Manupali	12.56	12.96	11.67	10.18	13.85	16.36	15.40	16.11	19.85	19.52	16.50	13.09
Suwaga	5.70	6.41	3.74	2.03	4.08	10.79	13.48	19.67	21.96	13.36	6.03	10.78

*The river names are probably in consistency with Table 5.8-5.

Source: Mindanao River Basin Integrated Management and Development Master Plan (2012)



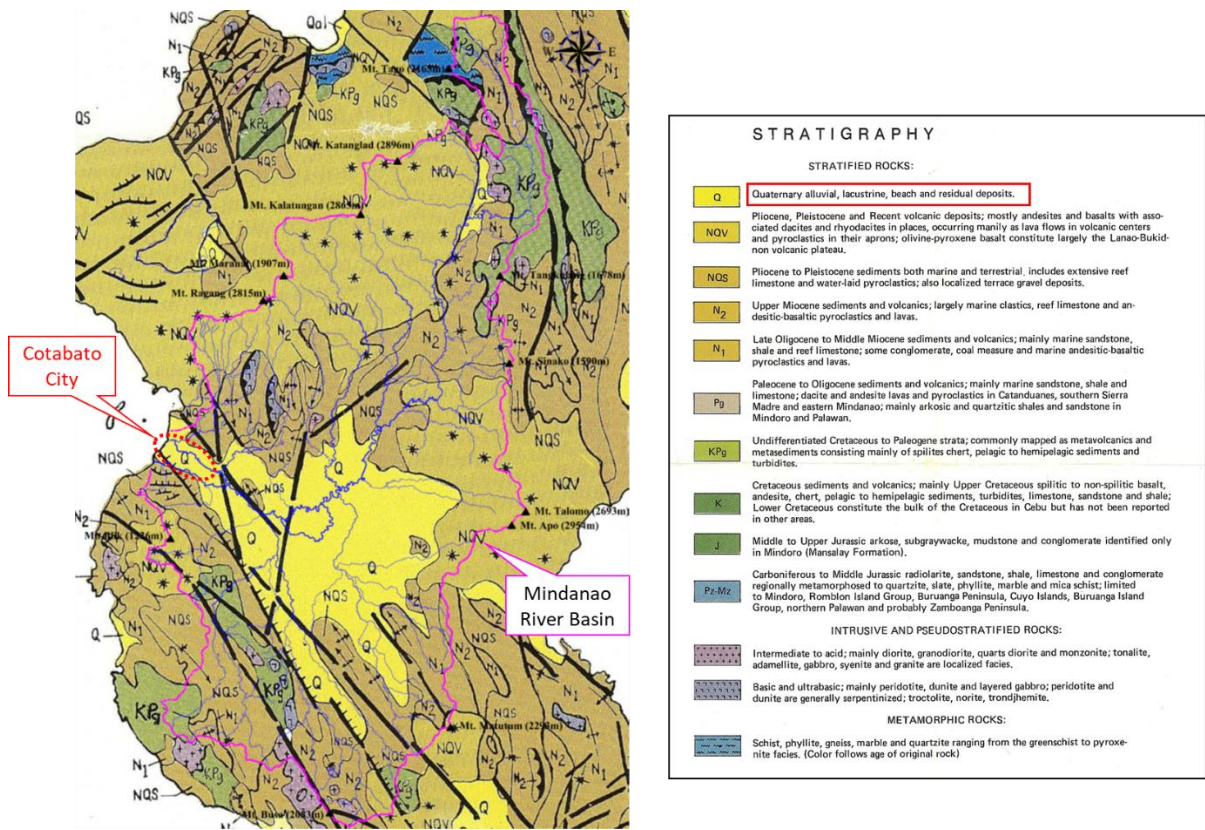
Source: prepared by JICA Study Team based on the MRBIMDMP (2012)

Figure 5.8-12 Mean Monthly Streamflow of the Mindanao River

(4) Geology

The boundary of Mindanao River Basin is surrounded by number of volcanic mountains whose altitude over 2,000 meters. Thus, the Mindanao River Basin is covered by volcanic deposits. Figure 5.8-13 shows a geological map of the Mindanao River Basin. The two type of geological conditions are dominant in the area, namely ‘NQV’ and ‘Q’. ‘NQV’ means lava such as andesite, basalt, quartz andesite, or pyroclastic flow deposits containing these lavas. ‘Q’ means quaternary alluvial, lacustrine, beach and residual deposits. Cotabato City locates on this area. There are also

mixed structure of sedimentary rocks (limestone, sandstone) and igneous rocks indicated by 'NQS', 'N1', and 'N2', and metavolcanics or metasediments indicated by 'KPg'.



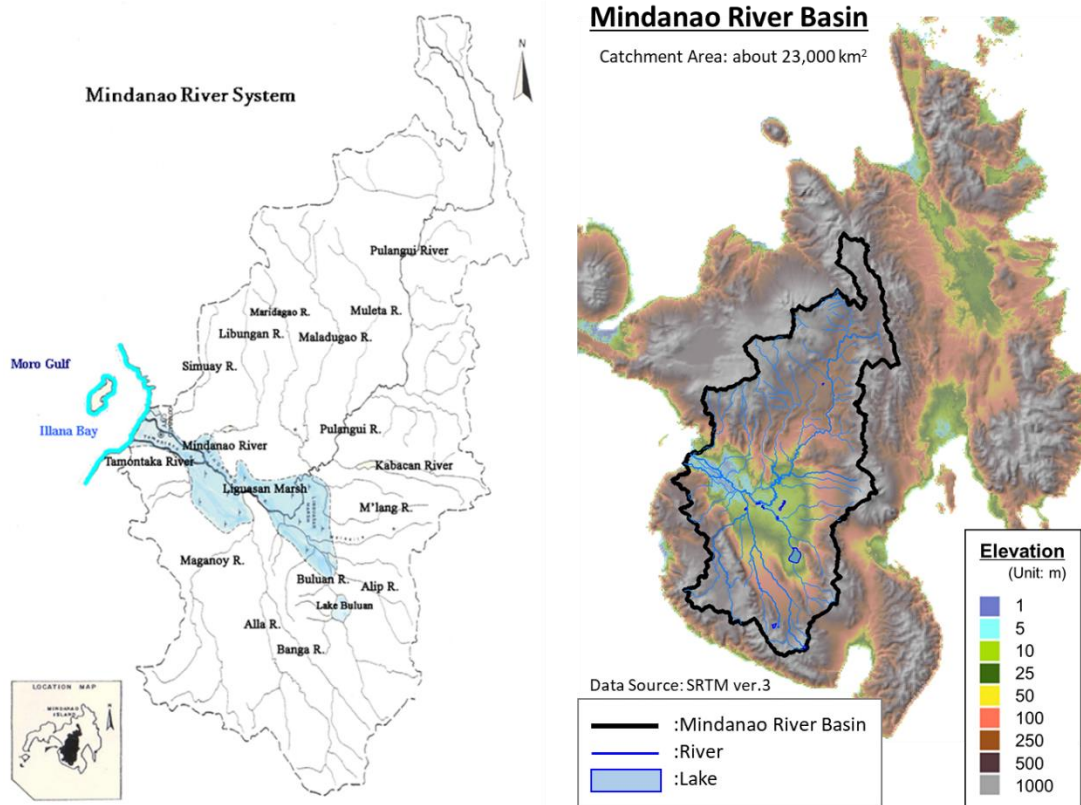
Source: Geological Map of the Philippines, Bureau of Mines and Geo-Sciences

Figure 5.8-13 Geological Map of the Mindanao River Basin

(5) River System

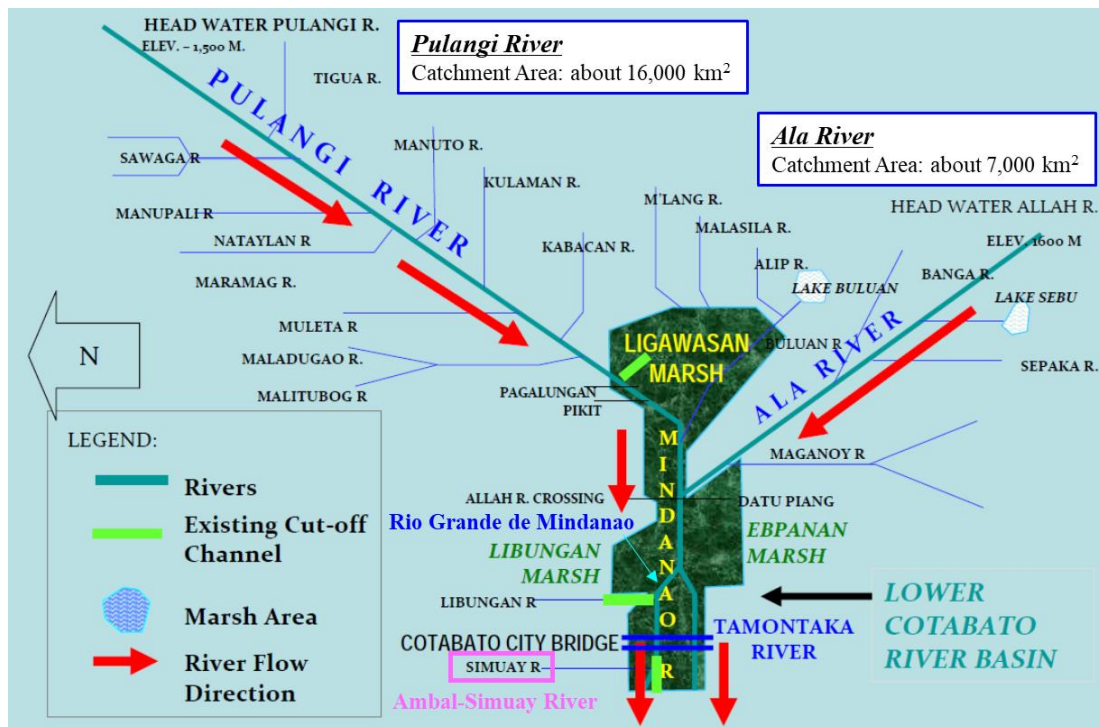
The river basin is largely divided into two major tributary basins, the Pulangi and Ala River Basins. The Pulangi River Basin, with head water from Bukidnon, drains an area of 16,320 km² and comprises of twelve minor basins, the biggest of which are the watersheds of Maridagao, Buluan, Marupali, and Muleta. The Ala River Basin, traversing the Ala Valley in the south, drains an area of 6,849 km², and comprises of two minor basins, Banga and Maganoy. The Mindanao (Rio Grande de Mindanao) and Tamontaka Rivers in the lower part of the river basin, all flows towards the Illana Bay.

The Mindanao River can be classified into two sections: the upstream with steep river-bed slope and the downstream with very gentle river-bed slope. In addition, the Mindanao River develops vast wetlands in the downstream due to its topographical condition as presented in Figure 5.8-14. Since the natural wetlands have large retarding effects in flooding, management of the wetlands takes a significantly important role in flood control of the Mindanao River.



Source: Left: Proposed Flood Mitigation Scheme of Mindanao River Basin (DPWH, 2015), Right: JICA Study Team

Figure 5.8-14 The Mindanao River System and its topography



Source: partially revised by JICA Study Team based on "A Brief on PTF-Mindanao River Basin Rehabilitation and Development (Feb 2010)"

Figure 5.8-15 The Schematic Mindanao River System

5.8.3 National Government's Plans and Programs to Address Disasters in the City

(1) Mindanao River Basin Integrated Management and Development Master Plan

After the big flood in June 2008, the Presidential Task Force (PTF) on Mindanao River Basin Rehabilitation and Development was created by the three Executive Orders (EO); the EO # 743 Creating a Task Force on Cotabato Flood Control (July 24, 2008); EO # 753 Creating a Presidential Task Force for the Mindanao River Basin Rehabilitation (September 29, 2008); and EO # 753-A Amending EO No. 753, series of 2008, which created the Presidential Task Force on Mindanao River Basin Rehabilitation and Development (January 5, 2009).

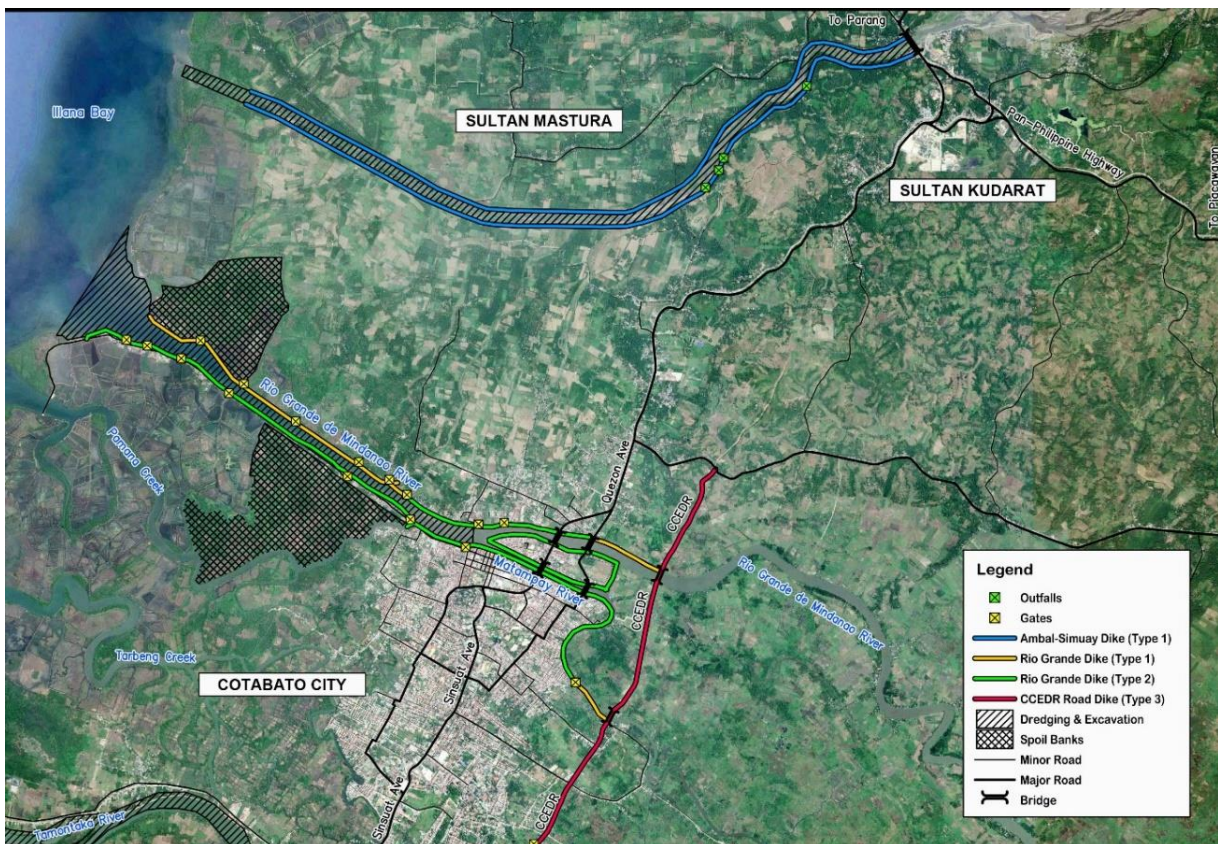
Subsequently, the PTF formulated the Mindanao River Basin Integrated Management and Development Master Plan (MRBIMDMP) in 2012. The MRBIMDMP focuses on two inter-related broad areas of concerns: the problem on the increase in the frequency and magnitude of flooding particularly within the lower floodplain; and the problem on how best to rehabilitate and develop the rivers within the basin. The plan included: (i) conducting a detailed hydrology and basin simulation study as bases for the preparation of water resources development and flood hazard management plan of the Mindanao River Basin, (ii) identifying development issues and concerns affecting the Mindanao River Basin and recommend appropriate development policies, strategies and program/project interventions, (iii) conducting feasibility studies for priority and high impact projects identified, (iv) recommending an appropriate institutional arrangement for coordinated basin-wide resource management and other development programs, and (v) improving linkages and institutional capability of concerned stakeholders in plan preparation process and other related activities.

(2) National Government's Initiative

The National Government through the DPWH prepared a plan entitled "Mindanao River Basin (Ambal - Simuay River and Rio Grande de Mindanao River) Flood Control and Riverbank Protection Project" to address the recurrence of flooding in Cotabato City and neighboring municipalities, particularly Sultan Kudarat. DPWH secured NEDA Board's approval of the said project in April 2018 and ROW acquisition is said to be on-going (Figure 5.8-16 and Table 5.8-7). In essence, the plan involves the following:

- Construction of road dike (6 m. high) in Ambal-Simuay River to re-channel the flow of the river straight to Illana Bay thus cutting its path towards Rio Grande de Mindanao river. Dredging is to be executed as well to improve the flow capacity of the river.
- Construction of flood wall (5 m. high) on both sides of Rio Grande de Mindanao beginning from the upper stream bridge of the Cotabato City East Diversion Road (CCEDR) until to the mouth of the river at Illana Bay. Various gates will be installed to control the flow of water coming from small tributaries of Rio Grande de Mindanao river. The about 6-km downstream section of the river will be dredged as well to improve the river flow.

- Raising the embankment of CCEDR to about 5 m. high to block flood water coming from Liguasan Marsh during heavy rains. Various gates will be installed to control water flow coming from small creeks crossing the CCEDR.



Source: Joint DPWH and DOTr Presentation entitled “Strengthening Economic Resilience and Spurring Infrastructure Development for Inclusive Growth, 20 March 2019; available at <https://iro.ph/index.php> (Investment Relation Office of the Government of the Republic of the Philippines)

Figure 5.8-16 DPWH’s Flood Control Plan for Cotabato City and Sultan Kudarat Municipality

Table 5.8-7 Details of the Ambal – Simuay River and Rio Grande de Mindanao Flood Control & Riverbank Protection Project

Item	Details
1. Project Description	This project is intended to eradicate the contribution of huge volume of water overflowing from Ambal-Simuay river that would mitigate flooding in Cotabato City and adjacent provinces covering Mindanao River Basin
2. Project Impact	<ul style="list-style-type: none"> • It will mitigate frequent flooding in the flood-vulnerable areas along Mindanao River Basin (MRB) specifically the Provinces of Maguindanao, Cotabato and parts of Sultan Kudarat and Cotabato City • It will prevent harmful degradation of riverbed and will enhance the ecological condition of MRB • It will enhance economic activities of about 4 to 9 million people living within the geographic coverage of MRB.
3. Project Scope	Ambal-Simuay Dike (L=23.2 km) Rio Grande Dike (L=7.9 km) Rio Grande Floodwall (L=17.1km) Dredging, Ambal - Simuay (L=11.2km) Dredging, Rio Grande (L=6.1km)
4. Project Status	<ul style="list-style-type: none"> • Approved by NEDA Board on 25 April 2018. • DPWH will start ROW activities by 2019 and will end by 2020. • Project Management Services (Local Consultant) to be procured in 2019. • TOR for Const. Supervision & Tender Assistance Services is on final review by BOD. • Meeting of DPWH and Regional Assembly (ARMM) regarding seeking Resolution of support for the Project on 12 Sept 2018. • Pre-public consultation meeting between DPWH, ESSD & LGUs of Cotabato City on 13 Sept 2018.
5. Indicative Cost	Ambal-Simuay = PhP 13.684 Billion Rio-Grande = PhP 25.512 Billion Total = PhP 39.196 Billion

Source: DPWH presentation during the DPWH Forum held at DPWH Central Office on Dec 17, 2018

(3) Monitoring and Early Warning System

As described in the subsection 5.8.2(3) , there are certain number of rain-gauge stations and stream-gauge stations in the Mindanao River Basin, however, their measurements have lots of missing and some of the stations are already closed. Meanwhile, The Advanced Science and Technology Institute (ASTI) of the Department of Science and Technology (DOST) enhances deployment of weather sensors over the country and created the Philsensor website as presented in Figure 5.8-17.

Early warning system is also developing in the country. The Deployment of Early Warning System (DEWS) in Disaster-prone Areas is a collaborative work among several Department of Science and Technology (DOST) agencies namely the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), Advanced Science and Technology Institute (ASTI), and the DOST-Regional Offices (ROs). According to the DOST website, the DEWS project aims to install a granular system of hydrometeorological devices (hydromet) and warning stations in selected hazard areas in the country in order to collect weather risk data to be used in aiding real time disaster mitigation efforts. Figure 5.8-18 shows the vicinity of Cotabato City in the DEWS Project website. There are several warning stations along the Mindanao River downstream, which will give early warning for flooding from the Mindanao River.

Map View

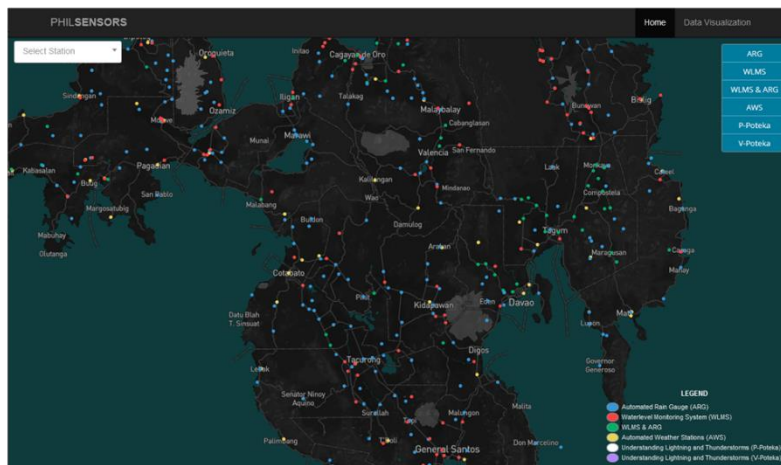
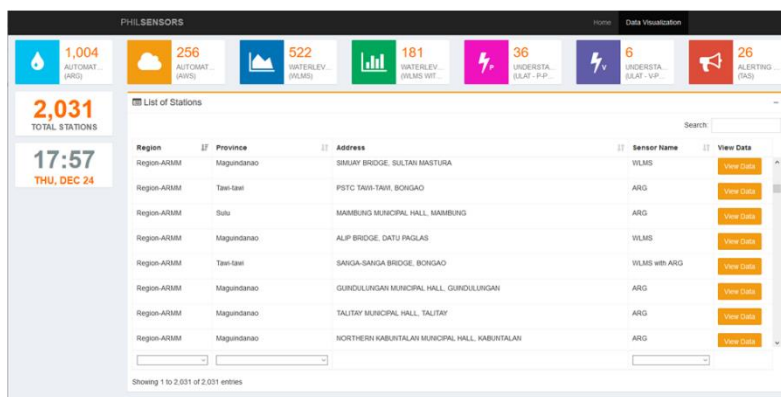
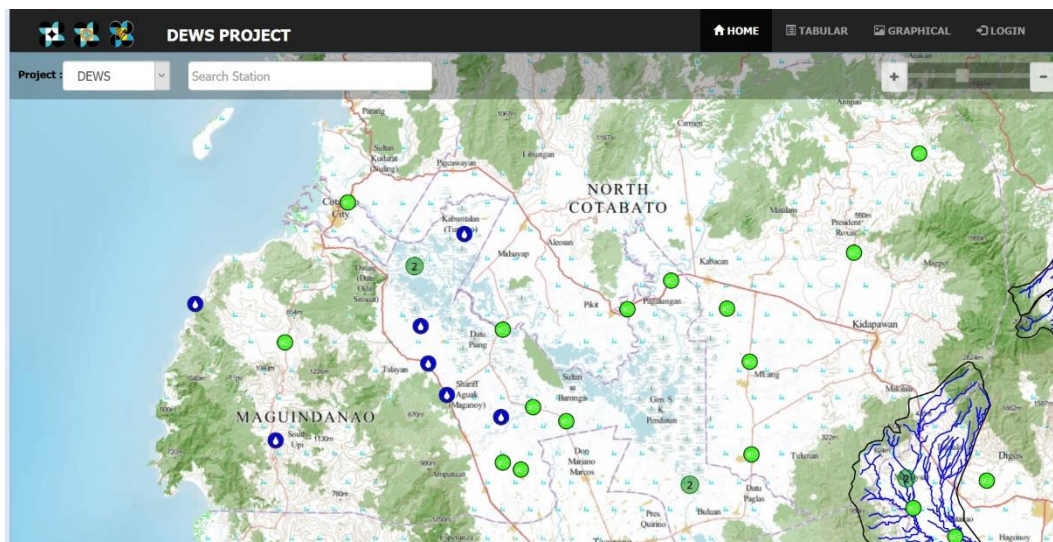


Table View



Source: Philsensor website (<http://philsensors.asti.dost.gov.ph/index.php?r=site%2Findex>)

Figure 5.8-17 Telemetry Hydrometeorological Data on the Philsensor Website



*Green points indicate warning stations.

Source: DEWS Project website (<http://dews.asti.dost.gov.ph/>)

Figure 5.8-18 Early Warning System and Hydromet Data on the DEWS Project Website

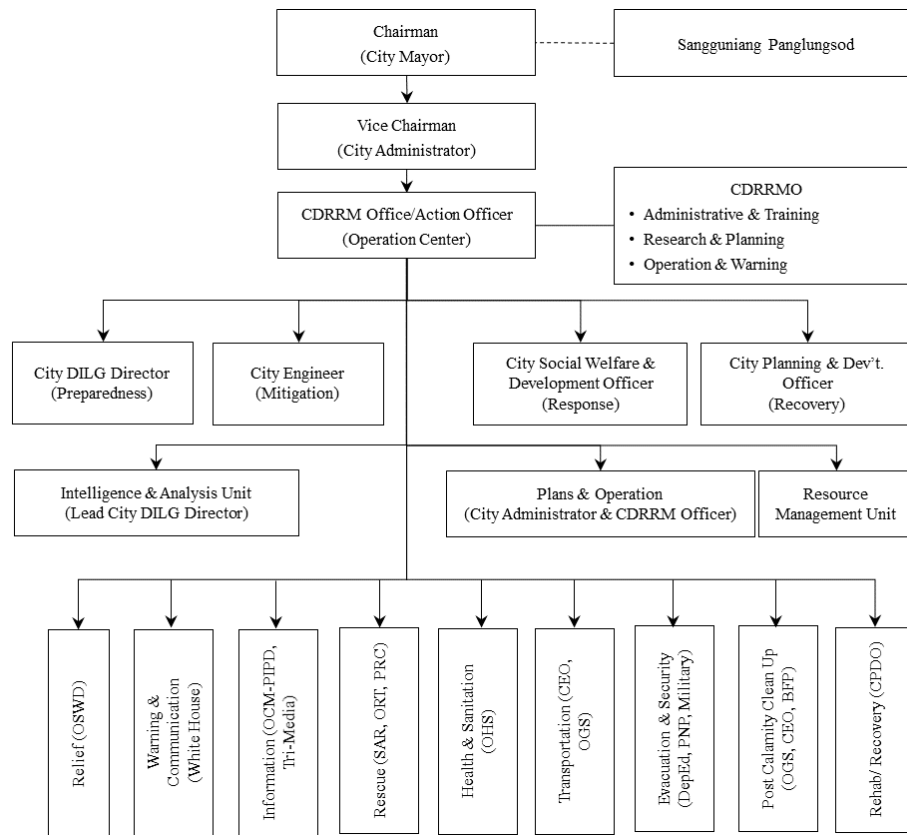
5.8.4 Local Government’s Plans and Programs to Address Disasters in the City

(1) Disaster Risk Reduction Management (DRRM) Plan

The main vehicle of the City Government of Cotabato in preparing its residents and protecting its assets and properties from both man-made and natural disasters is the 2016-2022 “Local Disaster Risk Reduction Management (LDRRMP) Plan”. The CLUP 2011-2020 was amended specifically to integrate two new components: (i) Climate Change Adaptation and Mitigation Measures, and (ii) Disaster Risk Reduction Management. The DRRM has four phases: 1) prevention and mitigation; 2) preparedness; 3) response and 4) recovery and rehabilitation.

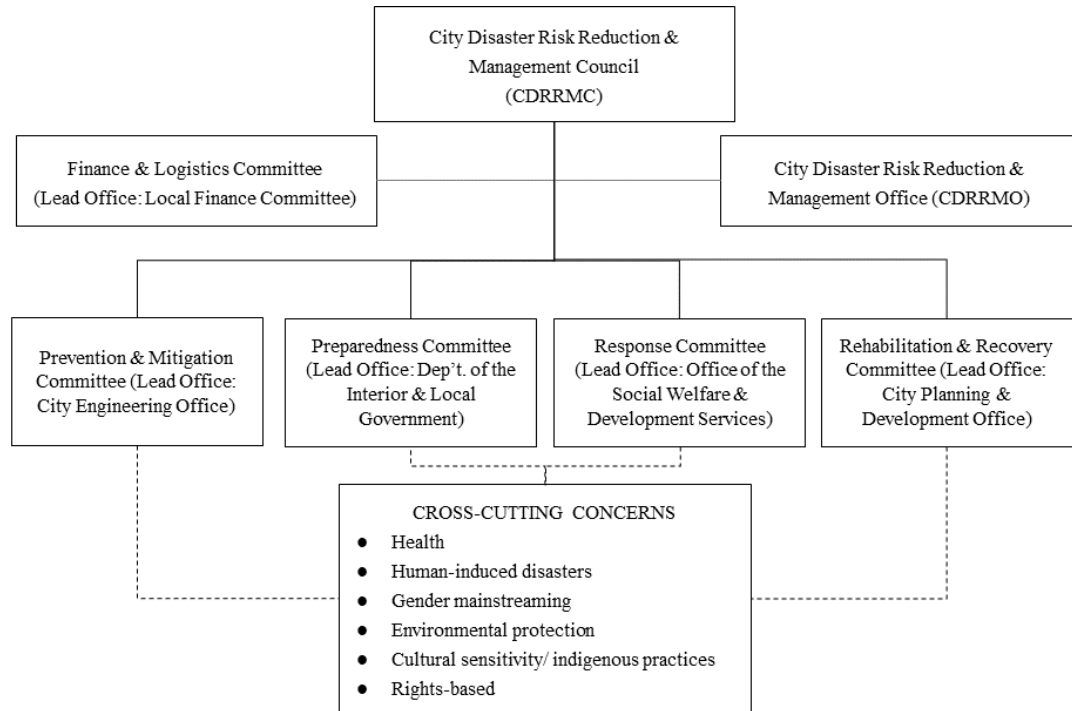
(i) Composition of Local DRRM of Cotabato City

The City DRRM Council has the Mayor as its Chairman and the City Administrator as Vice Chairman as illustrated in Figure 5.8-19. The Operation Center is manned by an Action Officer. The four phases of DRRM are distribute to the following offices: City DILG for Preparedness; City Engineering Office for Mitigation; City Social Welfare and Development Office for Response; and City Planning and Development Office for Recovery. As seen in the functional chart in Figure 5.8-20, the City DRMM covers not only natural disaster but other cross-cutting issues such as health, human-induced disasters, gender mainstreaming, environmental protection, cultural sensitivity/indigenous practices and even rights-based activities.



Source: Local Disaster Risk Reduction Management Plan (LDRRMP) of Cotabato City (2016-2022)

Figure 5.8-19 Composition of Cotabato City DRRM Council



Source: Local Disaster Risk Reduction Management (LDRRMP) Plan of Cotabato City (2016-2022)

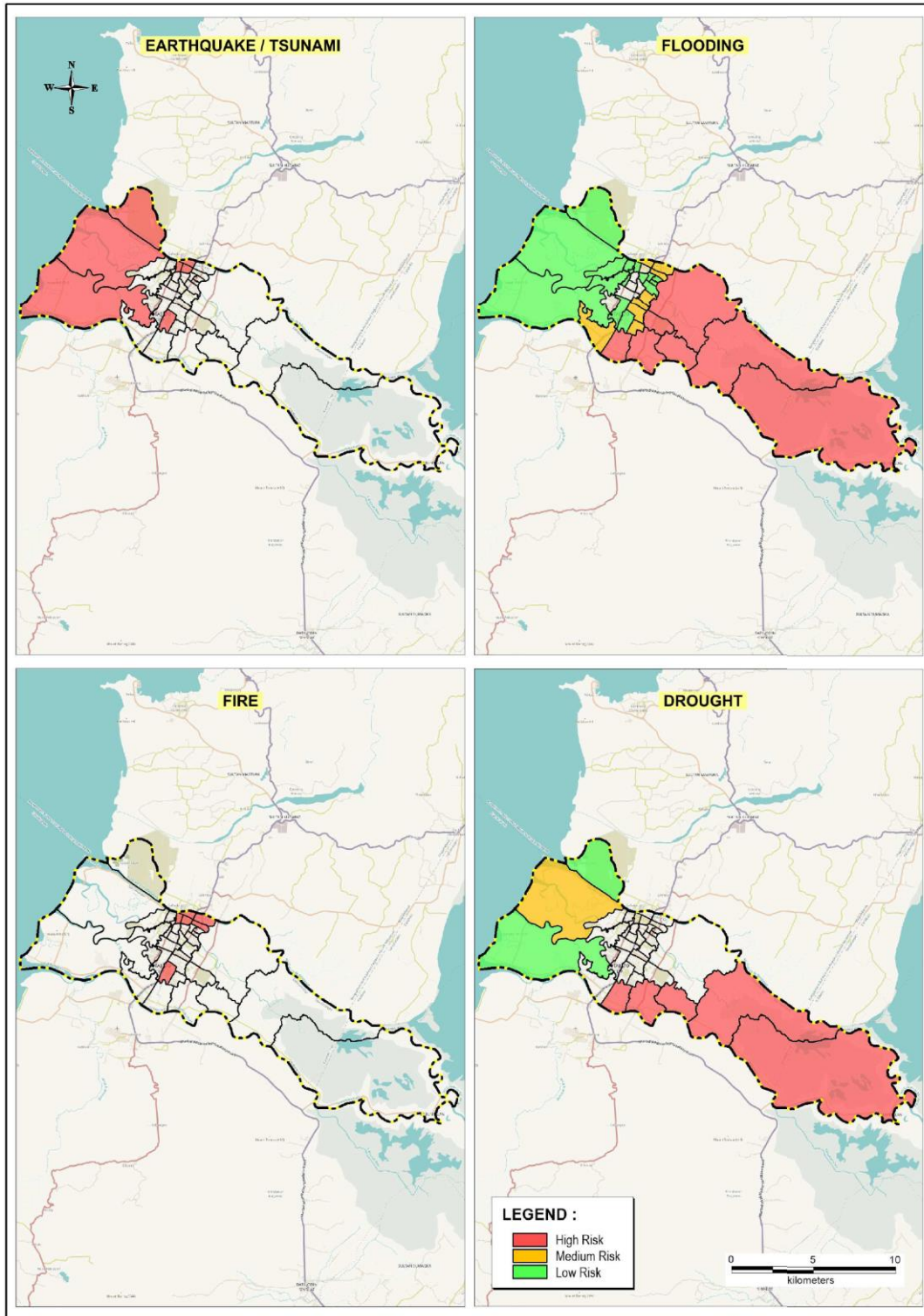
Figure 5.8-20 Functional Chart of Cotabato City DRRM Council

(ii) Identified Priority Hazards to Address

Spearheaded by the Technical Working Group of Cotabato City Disaster Risk Reduction Management Council (CDRRMC) and using Participatory Vulnerable Analysis (PVA) at barangay level, both natural and human-induced hazards were identified for all the barangays of the city. The risk profile assessment of the 37 barangays then served as the basis for formulation of the City Disaster Risk Reduction Management Plan. The identified top four (4) priority hazards that have to be addressed because of its likely to occur soonest and magnitude of damage is huge are the following: 1) Earthquake, 2) Flood, 3) Fire, and 4) Drought as illustrated in Figure 5.8-21. In the previous CDRMMC, the identified top hazards to be addressed were armed conflict, floods and earthquake. Although floods and earthquake remain a concern, armed conflict has been eliminated in the 2016-2020 CDRRMC which could be largely due to the peace agreement entered between the government and the MILF. Table 5.8-8 provides brief assessment of the four (4) top priority hazards to be addressed as well as the most likely exposed barangays. Aside from the above-mentioned hazards, the following were included as well:

- Geographically Isolated and Disadvantaged Areas (GIDA) - Eight (8) barangays are identified with difficulty in accessing the core of the city where various services are available. These barangays are: Tamontaka 2, 3, 4, 5; Poblacion 8, 9; and Kalanganan 1, 2

- Armed conflict and terrorism – this involves political families, areas with family feud (rido), areas with rebel groups in conflict with military, and urban areas with high population density including public places.
- Biological/Outbreaks – this likely may happen in the urbanized barangays especially those with informal settlers living in a very high-density area.



Source: Prepared by the JICA Study Team based on the data of Local Disaster Risk Reduction Management Plan (LDRMP) of Cotabato City (2016-2022)

Figure 5.8-21 Exposed Barangays Based on The Type of Hazard

Table 5.8-8 Exposed Barangays to Four Identified Hazards

Ranking of Hazard	Assessment	Exposed Barangays
1 st : Earthquake (including Tsunami)	<ul style="list-style-type: none"> • Cotabato City lies in proximity to the Cotabato Trench and Mindanao fault (Daguma extension). • The 1976 magnitude 8.1 earthquake. 4,791 dead, 2,288 missing, 9,928 injured • According to surveys during the event per PHIVOLCS, the tsunami was responsible for 85% of deaths, 95% of those missing and 65% of injuries. • Old houses and buildings made up of light materials are susceptible to earthquake. Built-up area is high risk for earthquake and coastal barangays are vulnerable to tsunami. 	<p><i>High Risk:</i> Tsunami (Kalanganan Mother, Kalangan 1, 2) Earthquake hazard (Built up area at the core of the city)</p>
2 nd : Flood	<ul style="list-style-type: none"> • 32 of 37 barangays are exposed to flooding even without typhoon especially those in low lying areas and near the river banks 	<p><i>High Risk:</i> Poblacion 8, 9, Tamontaka 1, 2, 3, 4 and 5 <i>Medium Risk:</i> Poblacion Mother, Poblacion 1, 7, Rosary Heights 5, 6, 7, 8, Tamontaka Mother <i>Low Risk:</i> Poblacion 2, 3, 4, 6, Bagua Mother, 1, 2, 3, Rosary Heights 2, 3, 9, 10, 12, Kalanganan Mother, 1, 2</p>
3 rd : Fire	<ul style="list-style-type: none"> • Fire incidents have been identified to be more frequent at the hearth of the city and may trigger by natural disaster or small carelessness. • Congested settlements (especially informal settlers), narrow streets, and illegal electrical connection were identified as related vulnerabilities that could worsen the effect of fire incidents. 	<p><i>High Risk</i> Poblacion Mother, 1, 5, 6, 7, Rosary Heights 9, 11 <i>Note from JICA Study Team</i> Bagua Mother and Bagua 3 are both very high density barangays as well hence vulnerable to fire incident</p>
4 th : Drought	<ul style="list-style-type: none"> • El Nino phenomenon of 2015-2016 has affected the agriculture and fisheries (aquaculture) sector of the city. 	<p><i>High Risk:</i> Tamontaka 1, 2, 3, 4, 5 <i>Medium Risk:</i> Kalanganan Mother <i>Low Risk</i> Kalanganan 1, 2</p>

* Note: Some low risk barangays, especially those located along the river, are also exposed to partial flooding caused by the sudden rise of water level.

Source: Prepared by the JICA Study Team based on the data of Local Disaster Risk Reduction Management Plan (LDRRMP) of Cotabato City (2016-2022)

(iii) Programs, Projects, Activities to Address the Identified Hazards

The Vision of the Local DRRM Plan (2016-2022) is “a safer, well-prepared, and disaster resilient multi-cultural Cotabato City, towards inclusive and sustainable development”, hence programs, projects and activities will be directed towards the achievement of this goal. Accordingly, the following are priority programs and projects of the City.

- Establishment of City and Barangay DRMMC;
- Establishment and Organization of a Mass Casualty Management System composed of Disaster Response Unit and Pre-Hospital Unit;

- Establishment of Incident Command Post and linking it to the Philippine National Police, Bureau of Fire Protection, Armed Forces of the Philippines, Philippine Red Cross, Traffic Management Unit, Cotabato Light and Power Company, among others.

Similarly, the four (4) phases of DRRM were defined as follows:

- *Disaster Prevention and Mitigation* - Avoid hazards and mitigate their potential impacts by reducing vulnerabilities and exposure.
- *Disaster Preparedness* – Capacities of the barangay and the community in the city to anticipate, cope with and recover from negative impacts of disaster developed.
- *Disaster Response* – Save lives, properties and ensure well-being of affected communities during emergencies and disasters.
- *Disaster Rehabilitation and Recover* – To restore and improve facilities and livelihood of affected communities and reduce disaster impacts; and strengthen organizational capacities (for recovery and rehabilitation) in the city.

Table 5.8-9 Summary of Identified Projects, Program and Activities

DRRM Phase	Projects, Program and Activities
Prevention and Mitigation	<ul style="list-style-type: none"> • Mainstreaming and Integrating Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) in the sectoral local development plans, policies, plans and budget; • Increased Disaster Resiliency of Infrastructure System; • Conduct community- based and scientific Disaster Risk Reduction/Climate Change Adaptation Assessment, Mapping, Analysis and Monitoring; • Risk Transfer Mechanism.
Preparedness	<ul style="list-style-type: none"> • Conduct Community Awareness and Understanding of Risk Factors; • Conduct Contingency Planning at the local level (to include Incident Command System, Early Warning System, Pre-Emptive Evaluation, stockpiling and equipping) • Conduct Local drills and simulation exercises; • Conduct local disaster response planning.
Response	<ul style="list-style-type: none"> • Conduct Damage and needs assessment • Conduct Relief Operations • Search, Rescue, Retrieval • Conduct Dissemination/Information sharing of disaster-related information • Water Sanitation and Health • Development/Provision of Permanent Evacuations Centers (Covered-court Type) • Provision of Psycho-Social Support; • Early Recovery Mechanism; • Establishment of Management of Dead and Missing Persons Desk; • Evacuation Management; • Social Protection Intervention; • Civil and Uniformed Services Coordination.
Recovery and Rehabilitation	<ul style="list-style-type: none"> • Conduct of Post-Disaster Needs Assessment (PDNA) by PDNA Team and affected barangays; • Livelihood Recovery Program (reinforce and expand existing agricultural (fishery), and environmental rehabilitation program; • Collaboration and Coordination with neighboring LGUs and partners (including national government agencies) for recovery and rehabilitation; • Infrastructure Recovery Program (restoration of utilities and rehabilitation of evacuation centers/ IDP sites).

Source: Prepared by the JICA Study Team based on the data of Local Disaster Risk Reduction Management Plan (LDRRMP) of Cotabato City (2016-2022)

(iv) Estimated Required Budget

The indicative cost of the identified projects in the LDRRMCP is about PhP 1.15 Billion rolled into six years. About 93% goes to Prevention and Mitigation and the rest are distributed to other phases of DRMM. The detailed indicative costs are presented in the Table 5.8-10.

Table 5.8-10 Indicative Cost of Identified Projects, Program and Activities

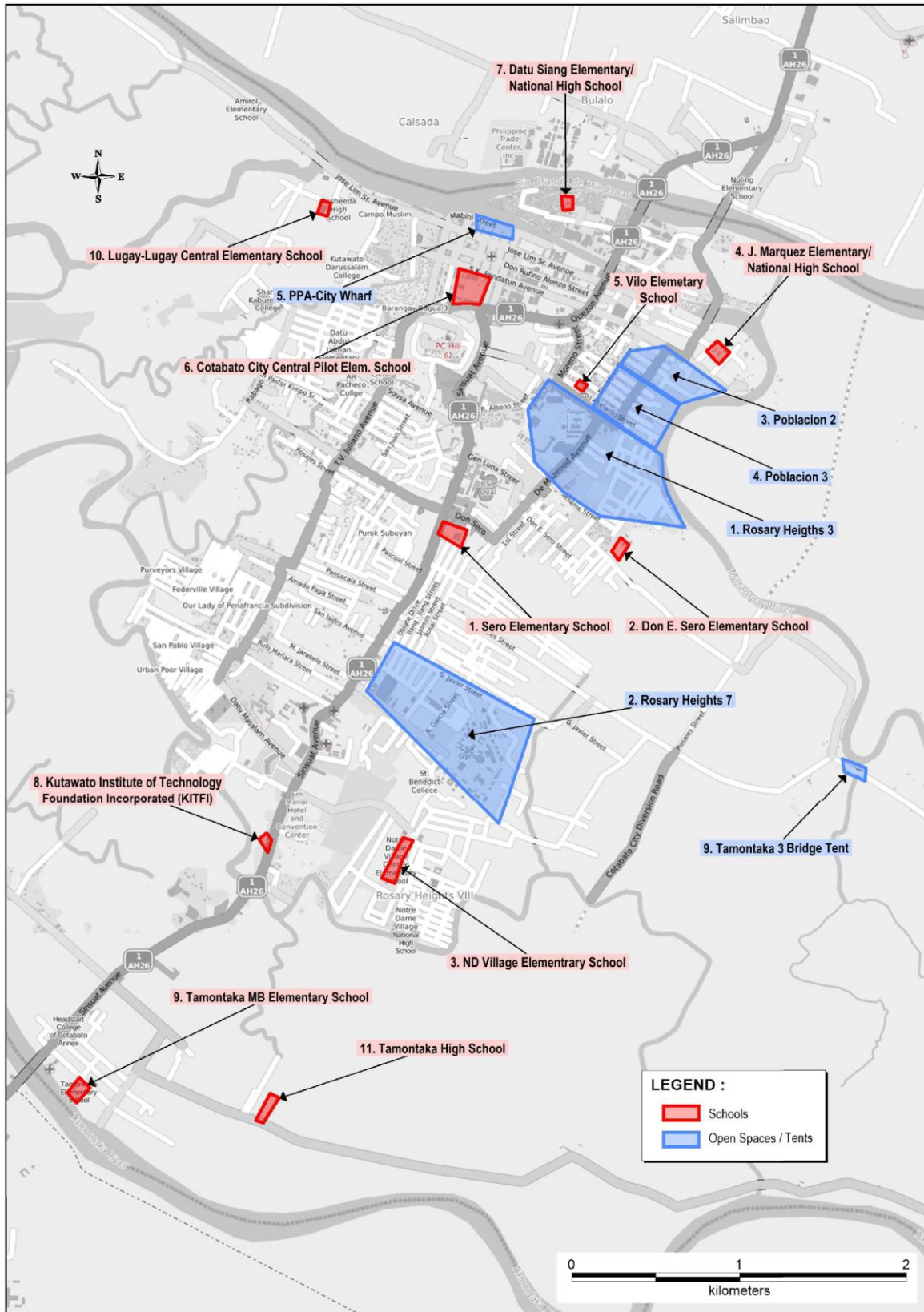
DRRM Phase	Project Type	Estimate Cost
Prevention and Mitigation	Transport Infrastructure	P46,000,000
	Traffic Management System	P4,500,000
	Water Supply Infrastructure	P155,000,000
	Flood control / management of waterways	P800,520,000
	Evacuation sites	P2,000,000
	Resettlement (of at-risk population in high risk areas) program: Development of Resettlement Area	P24,600,000
	City Green Building Code	P200,000
	Barangay-level Capacity Building	P28,950,000
Preparedness	Capacity-building for post disaster recovery	P9,340,000
	Contingency Planning Program	P6,970,000
	Equipment for Effective Response	P6,060,000
	Stockpiling	P5,005,000
	Capacity Building Program for Climate Change Adaptation and Mitigation	P1,080,000
	Capacity Building Program for DRRM (for Prevention and Mitigation)	P720,000
	Capacity Building Program for Response Skills	P14,400,000
	Information, Education, Communication Campaign Program	P1,290,000
	Partnerships between city, barangays, and local partners	P11,400,000
	Partnerships between city, neighboring LGUs	P600,000
Response	Regular House-to-house profiling and updating per barangay	P72,000
	Identification of the pickup points and distribution centers (for prepositioning of stocks)	P600,000
	Devising a clustering approach in barangays for easier information dissemination and feedback system	P200,000
	Devise and update communication protocol in each barangay and in city- level	P480,000
	Devise a duty detail on patrolling or ronda	P10,000/day
	Activation of ICS	P1,000,000
	Procurement of Equipment and Training of proper use of communication equipment	P6,000,000
	Procurement and installment of WASH Facilities in IDP sites	P6,000,000
	Trainings and orientation on Psychosocial support for IDPs	P6,000,000
	Coordination meeting with lead and partner agencies for management of the dead and the missing	P600,000
Recovery and Rehabilitation	Conduct of post-disaster needs assessment (PDNA) by city PDNA Team and barangays affected	P100,000
	Livelihood Recovery Program (Dike Repair)	P100,000
	Livelihood Recovery Program (Fry Dispersal)	P5,000/ affected hectare
	Livelihood Recovery Program (Livestock Dispersal)	P200,000
	Livelihood Recovery Program (Seeds Dispersal: rice, corn, farm vegetables)	P660,000

DRRM Phase	Project Type	Estimate Cost
Recovery and Rehabilitation	Livelihood Recovery Program (Mangrove Rehabilitation)	P715,000
	Livelihood Recovery Program (Provision of Alternative Livelihood)	P1,750,000
	Partnership for Recovery and Rehabilitation (With external partners and stakeholders)	P300,000
	Partnership for Recovery and Rehabilitation (With internal partners and stakeholders)	P50,000
	Infrastructure Recovery Program (Restoration of Utilities)	P500,000
	Infrastructure Recovery Program (Rehabilitation of Evacuation Centers/ IDP sites)	P1,000,000

Source: Prepared by the JICA Study Team based on the data of Local Disaster Risk Reduction Management Plan (LDRRMP) of Cotabato City (2016-2022)

(v) Evacuation Facility

The City Government of Cotabato has identified eleven (11) schools and nine (9) open spaces and tents for the total of twenty (20) evacuation sites as illustrated in Figure 5.8-22.



Source: Prepared by the JICA Study Team based on the Addendum to the Cotabato City's CLUP 2011-2020

Figure 5.8-22 Location of Evacuation Facility and Sites During Disaster

(2) Local Climate Change 6-Year Action Plan (2016-2020)

(i) Overview

As mentioned earlier, the Cotabato City's CLUP were amended to integrate the Local Climate Change Action Plan (LCCAP) in line with National Framework Strategy on Climate Change 2010-2020. The effort by the national government aims to build a roadmap that will serve as the basis for a national program on climate change and establish an agenda upon which the Philippines would pursue a dynamic process of determining actions through the National Climate Change Action Plan process. Basically, it tasked the LGUs to be "the frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas". Cotabato City's LCCAP adopted a vision as follows: "A peaceful, secure, and highly developed multi-cultural climate risk resilient city with thriving and productive ecosystems".

(ii) Identified Projects

The LCCAP outlines the specific programs and strategies for the city's adaptation and mitigation for 2017 to 2022 and provides key actions that enhances adaptive capacity and resilience of communities and natural ecosystems of climate change, adopts the total economic valuation of natural resources while ensuring biodiversity conservation. Projects and programs under the LCCAP were classified into two: Adaptation Pillar and Mitigation Pillar as presented in the succeeding tables (Table 5.8-11 and Table 5.8-12). Similarly, the following projects are currently on-going:

- Dredging of the Rio Grande de Mindanao;
- De-clogging of flood control and drainage facilities;
- Clearing of small waterways;
- De-clogging the portion of Rio Grande de Mindanao.

Table 5.8-11 Plans and Programs for Adaptation Pillar

Key Areas	Projects, Program and Activities	Location
1. Integrated Eco-System Based Management (Climate-Responsive Agriculture)	1.1 Construction/Road Opening of Farm-to Market Road cum Road Dike Along the Periphery of Rio Grande de Mindanao	Barangay Poblacion 9 to Tamontaka 4 and 5
	1.2 Rehabilitation & Upgrading of the Pagalamatan-Taviran Farm-to-Market Road cum Road Dike	Barangay Tamontaka 1 to Tamontaka 5
2. River Basin Management	2.1 Dredging of Rio Grande de Mindanao	Barangay Kalanganan Mother to Tamontaka 5
	2.2 Dredging of Tamontaka River	Barangay Tamontaka V to Kalanganan II
	2.3 River Bank Protection and Rehabilitation	Rio Grande De Mindanao & Tamontaka River
3. Coastal and Marine Ecosystem Management	3.1 Preservation and Rehabilitation of Mangrove Forest Cover	Barangay Kalanganan Mother, Barangays Kalanganan 1 and 2
	3.2 Establishment of Material Recovery Facility	All 37 Barangays
	3.3 Adapt a River Program	Tarbung River
	3.4 Protection and conservation of Sea Grass Areas	Kalanganan II
4. Eco-Tourism	4.1 Preservation of Timako Hill's Forest Cover	Barangay Kalanganan 2
5. Disaster Risk Reduction	5.1 Formulation of Disaster Preparedness and Response Plan (with accompanying Manual of Operations)	City-wide
	5.1 Formulation of Cotabato City Master Drainage Plan	City-wide

Source: Local Climate Change 6-Year Action Plan (2016-2020)

Table 5.8-12 Plans and Programs for Mitigation Pillar

Key Areas	Projects, Program and Activities	Location
1. Sustainable Infrastructure	1.1 Establishment of Flood-Free Relocation/Resettlement Areas for the Vulnerable Sectors	Six (6) barangays to be identified
	1.2 Establishment of Risk-Free Evacuation Centers	Five (5) strategic barangays to be identified that are proximate to low-lying and flood-prone barangays
2. Renewable Energy	2.1 Installation of Solar-Energy Powered Lighting Facilities	Barangay Rosary Heights 10 (City Hall Premises) and in other barangays to be identified
3. Environmentally Sustainable Transport	3.1 Operation of Electric Motor-Driven Utility Vehicles for Short Distance Shuttling of Government Employees	Barangay Rosary Heights 10 (City Hall), Rosary Heights 7
	3.2 Establishment of Dendro Fuel processing Plant	Tamontaka V
	3.3 Establishment of Monitoring Post, water level sensor	Rio Grande De Mindanao & Tamontaka River
	3.4 Installation of rainfall gauge meter at City Hall Compound	Rosary Heights 10
4. Water Governance and Management	4.1 Preservation/Conservation of Dimapatoy Watershed (In Collaborative Capacity)	Datu Odin Sinsuat Municipality
5. Waste Management	5.1 Clearing of Small Waterways	Vilo & Kibatang Creeks, Bagua, Manday & Lugay-lugay Rivers
	5.2 Establishment of Cotabato City Central Composting Facility	Barangay Rosary Heights 10

Source: Local Climate Change 6-Year Action Plan (2016-2020)

CHAPTER 6 PLANNING PROCEDURE AND BUDGETING

6.1 Position of CLUP and CDP in the overall Planning System

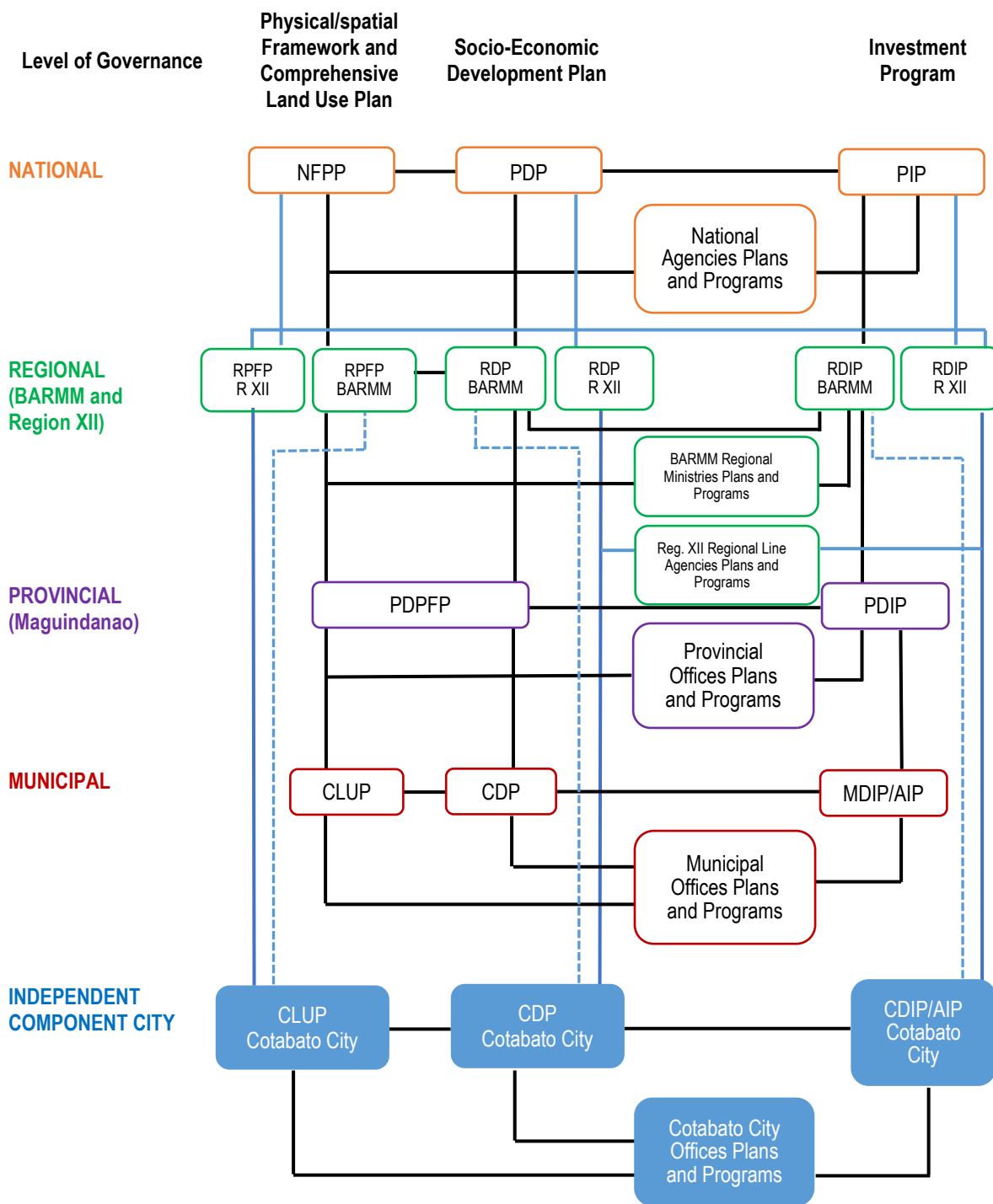
The planning system in the Philippines consists of physical/spatial planning and socioeconomic development planning. The physical or spatial planning is concern on the management of the country's land and other physical resources. It provides spatial directions and development guidelines on the four major land use policy areas, to wit: production land use, protection land use, settlements development, and infrastructure development.

While the socioeconomic development planning outlines the present administration's policies and programs during the President's term of office. It encompasses the following sectors: Social Services, Economic, Infrastructure and Utilities, Environmental, and Institutional. Its main concern is to promote the general welfare of the constituents. The socioeconomic development plan normally has a six-year time frame and its policies are directly linked and aligned to the physical/spatial plan which has a longer planning horizon of thirty to fifty years. In this way, all plans and programs prepared by national and local government agencies should be seen as contributing and supportive of the physical/spatial development objectives and goals of the physical frameworks and comprehensive land use plans.

The integration and harmonization of the physical/spatial framework plans at all levels (national, regional, provincial, city and municipal) shall be iterative to ensure the combined bottom-up and top-down approach. The same approach is pursued in the formulation of socioeconomic development plans at all levels of governance.

The investment programs contain the lists of priority programs and projects for different development sectors with indicative cost rolled out consistent with the time horizon of the socioeconomic development plans (PDP, RDP, PDPFP, CDP). Description of each plan is indicated in Table 6.1-1 and relevant laws and regulations are presented in Table 6.1-2.

As seen in Figure 6.1-1, the various development plans of Cotabato City are anchored to Regional Development Plans of Region XII. A broken line linked them to the BARMM's RDP which might be the likely structure if Cotabato City is indeed integrated in the Bangsamoro Region.



Notes:

NFPP – National Framework for Physical Planning
 PDP – Philippine Development Plan
 PIP – Philippine Investment Program
 RDP – Regional Development Plan
 PDIP – Provincial Development Investment Program
 MDIP – Municipal Development Investment Program
 AIP – Annual Investment Program

RPPF – Regional Physical Framework Plan
 PDPFP – Provincial Development and Physical Framework Plan
 CLUP – Comprehensive Land Use Plan
 RDIP – Regional Development Investment Program
 CDP – Comprehensive Development Plan
 CDIP – City Development Investment Program

Source: Modified by the JICA Study Team from HLURB CLUP Guidebook: A Guide to CLUP Preparation

Figure 6.1-1 Hierarchy and Linkage of Plans

Table 6.1-1 Description of Physical/Spatial Plans and Socioeconomic Plans at Different Hierarchy of Governance

Plan	Description/Explanation
National Framework for Physical Planning (NFPP), (2001-2030)	The NFPP lays out policies and initiatives related to the distribution, utilization, management, and development of land and material resources of the Philippines. The ultimate purpose of the plan is to raise land productivity, protect and ensure the sustainability of resources, facilitate the coherent development of housing, and build an infrastructure that helps promote or assist in development. The current NFPP has a time frame of 2001-2030.
Philippine Development Plan (PDP), (2017-2022)	The PDP time frame corresponds to the term of office of the President of the country. The current PDP has a time frame of six years (2017-2022). The plan outlines the policies the present administration wishes to institute during his term. It lays out major policy initiatives, socioeconomic strategies, and major national programs. The PDP 2017-2022 shall aspire to contribute to the attainment of a “Matatag, Maginhawa at Panatag na Buhay” by laying down a solid foundation for more inclusive growth, high trust society and a globally competitive knowledge economy. This shall be done by focusing on three pillars of: “Malasakit” (enhancing the social fabric), “Pagbabago” (reducing inequality), and “Kaunlaran” (increasing potential growth of economy); supported by strong foundation in national security, infrastructure development, socioeconomic resiliency, and ecological integrity.
Regional Physical Framework Plan (RFPF), Region XII, (2004-2030)	The RFPF covers the physical development of the region’s territory, and consistent with the NFPP. It integrates the physical framework plans of the provinces, highly urbanized cities and independent component cities within the region. Region XII’s RFPF 2004-2030 espouses sustainable agri-industrial development strategy with focus on tri-corridor development approach (Cotabato City-Midsayap-Kidapawan Corridor; Isulan-General Santos Corridor; Lebak-Maasim-Alabel-Glan Corridor).
Regional Development Plan (RDP), Region XII, (2017-2022)	Region XII’s RDP 2017-2022 espouses twin goals of inclusive growth and poverty eradication. Policies and programs are geared towards the following: accelerate infrastructure development and improve inter and intraregional connectivity with BARMM, Regions X and XI; address health and human development sector challenges; ensure good governance, fair administration of justice, lasting peace and security; expansion of economic opportunities in the agriculture, industry and services; strict implementation of E- NIPAS Act and other environment protection/ preservation related policies.
Provincial Development and Physical Framework Plan (PDPFP), 2014-2023	The PDPFP is a combined physical/spatial framework and socioeconomic development plan. It determines the physical development of the provincial territory, consolidates the comprehensive land use plans of the component cities and municipalities. It reflects the indicative land use management and physical development direction of the province consistent with the RFPF. It also contains the sectoral socioeconomic development plan of the province taking into account the Comprehensive Development Plans (CDPs) of its component cities and municipalities.
Comprehensive Land Use Plan (CLUP), 2011-2020	The CLUP determines the specific uses of land and other physical and natural resources within the territorial jurisdiction of the city or municipality. It delineates actual boundaries of barangays on the ground and embodies the desired land use patterns and provides appropriate policies for each land use category (Production, Protection, Settlement, Infrastructure). CLUP is the main document necessary for legislating Zoning Ordinance for the city or municipality. Usually, CLUP has a maximum time frame of nine years. In the case of Cotabato City, the current CLUP has a time frame of 2011-2020, and therefore is now due for updating.
Comprehensive Development Plan (CDP), (2016-2020)	The CDP is a plan which promotes the socioeconomic welfare of the city or municipality’s inhabitants. It covers all the development sectors, such as, social services, infrastructure and utilities, economic, environmental, and institutional. The CDP consolidates the programs and projects necessary to carry out the objectives of the different development sectors. Normally, CDP has a time frame of six years. CDP should be linked, harmonized and supportive of the Comprehensive Land Use Plan (CLUP).
Investment Program (PIP, RDIP, PDIP, MDIP, CDIP)	The Investment Program contains the list of programs and projects with indicative cost rolled out on an annual basis. These programs and projects are deemed necessary to operationalize the strategies enunciated in the socioeconomic development plans (PDP, RDP, PDPFP, MDP, CDP) and realize the plan objectives.
Annual Investment Program (AIP)	AIP is the annual slice of the investment program. It is the main reference document in the preparation of annual budget of the city and municipality.

Source: Compiled by the JICA Study Team

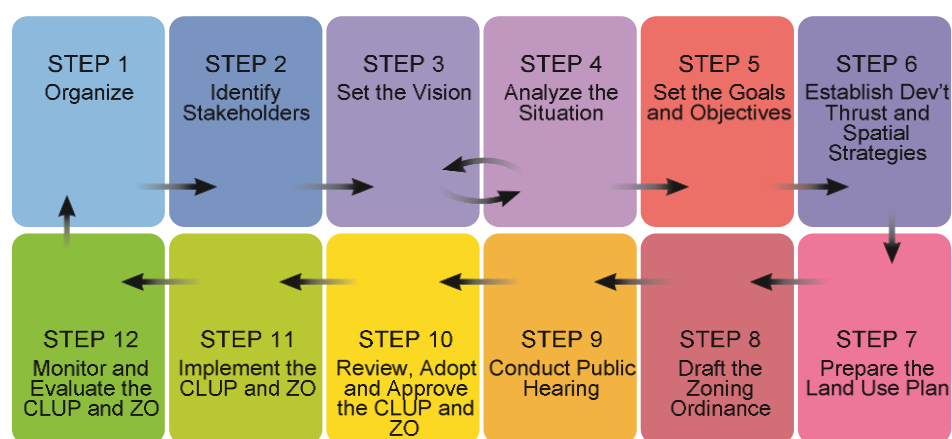
Table 6.1-2 Related Laws and Regulations on the Planning System in the Philippines

Laws and Regulations	Description/Explanation
Republic Act 7160 or Local Government Code of 1991	Provides the Mandate of LGUs on Local Planning, Legislation, Implementation, Including Budgeting and Monitoring
Executive Order No. 27	Directing all Government Agencies and Instrumentalities, Including Local Government Units to Implement the Philippine Development Plan for the period 2017-2022. Issued on June 01, 2017 by President Rodrigo R. Duterte
Executive Order No. 72	Providing for the Preparation and Implementation of the Comprehensive Land Use Plans of Local Government Units Pursuant to the Local Government Code of 1991 and other Pertinent Laws. Issued on March 25, 1993 by President Fidel V. Ramos
DILG-HLURB Joint Memorandum Circular No. 001, series of 2009	Guidelines on the Harmonization of Comprehensive Land Use Plan and Comprehensive Development Plan Preparation. Issued on October 19, 2009
DILG Memorandum Circular No. 2008- 156	Guide to Comprehensive Development Plan Preparation for Local Government Units. Issued on October 22, 2008 by DILG Secretary Ronaldo Puno
DILG Memorandum Circular No. 2012- 93	Reiterating Memorandum Circular No. 2008- 156. Issued on May 21, 2012 by DILG Secretary Jesse M. Robredo
Republic Act No. 7279 or Urban and Housing Development Act of 1992	An Act to Provide for a Comprehensive and Continuing Urban Development and Housing Program, Establishing the Mechanism for its Implementation, and for other Purposes
HLURB Resolution No. 906, series of 2013	Establishing the Time Frame for Comprehensive Land Use Plans and Zoning Ordinance, and the Period for their Review, Updating, and Amendment. Passed on September 25, 2013
HLURB Resolution No. 908, series of 2013	Approving the 2013 Enhanced Comprehensive Land Use Plan Guidebook Vol. 1. Passed on October 30, 2013
HLURB Resolution No. 918, series of 2014	Approving the Enhanced CLUP Guidebook Vol. 2, Sectoral Studies and Tools for Analysis. Passed on July 24, 2014
HLURB Resolution No. 919, series of 2014	Approving the Enhanced CLUP Guidebook Vol. 3, The Integrated Model Zoning Ordinance. Passed on July 24, 2014
HLURB Resolution No. 915, series of 2014	Approving the Supplemental Guidelines for Mainstreaming Climate Change Adaptation and Disaster Risk Reduction in the CLUP. Passed on February 24, 2014

Source: Compiled by the JICA Study Team

6.2 Preparation Process of Cotabato City’s CLUP

The current HLURB-approved Comprehensive Land Use Plan (CLUP) of Cotabato City has a time horizon of 2011-2020, hence, it is now due for updating. As provided under the 2013 CLUP Guidebook, the City Government of Cotabato shall follow the 12-step process which provides the general procedures from which the planning team can proceed with the CLUP and Zoning Ordinance preparation for the next CLUP plan period.

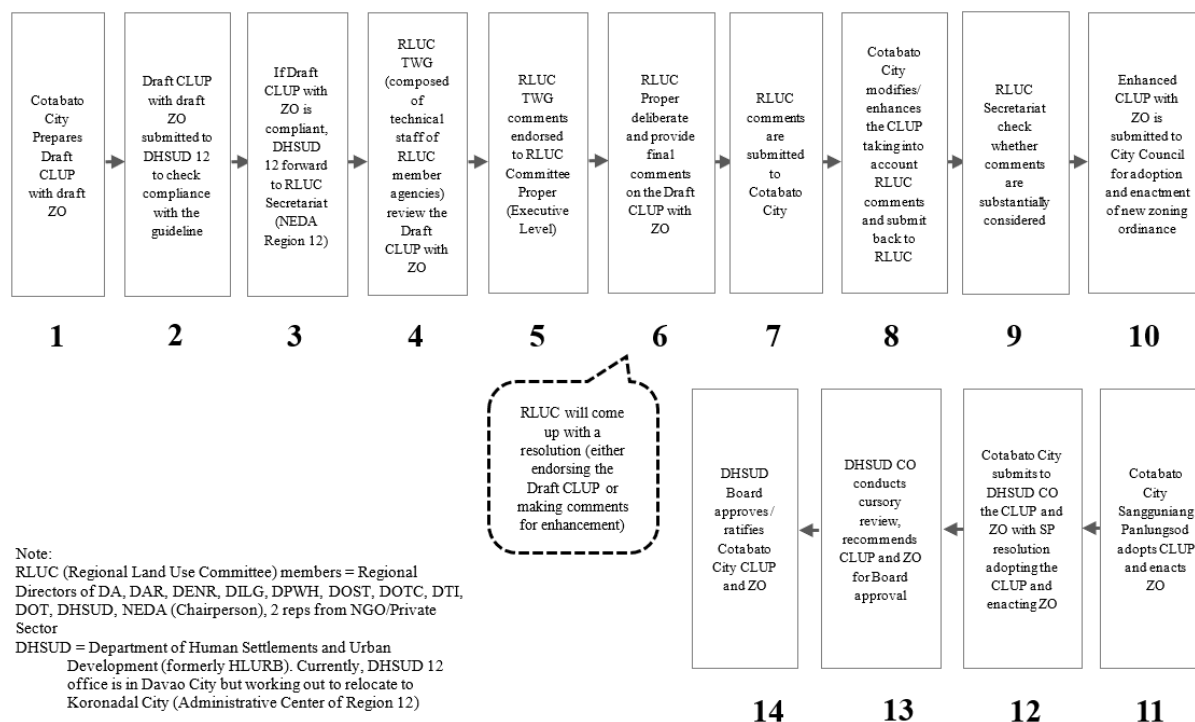


Source: HLURB CLUP Guidebook: A Guide to CLUP Preparation

Figure 6.2-1 Twelve-Step Process, General Procedures for CLUP Preparation

Figure 6.2-2 presents the process by which the prepared draft Cotabato City CLUP with Zoning Ordinance shall undergo review by DHSUD and RLUC (Regional Land Use Committee) until approval by the DHSUD Board. This provides some details of Step 10 (Review, Adopt and Approve the CLUP and ZO) of the Twelve-step process under Figure 6.2-1.

The usual members of RLUC are the Regional Directors of DA, DAR, DENR, DILG, DPWH, DOST, DOTC, DTI, DOT, DHSUD, NEDA (Chairperson), and two (2) representatives from NGO/private sector. The list of parameters for the Draft review of each government agency are itemized in Table 6.2-1.



Source: JICA Study Team

Figure 6.2-2 Details of the Review, Adoption and Approval of the CLUP and ZO under Step 10

Table 6.2-1 Parameters for the Review of the Cotabato City CLUP by the Member-agencies of the RLUC and Other Agencies That may be Requested

Agency	Roles and Responsibilities
Dept. of Interior and Local Government (DILG)	1) Checks the institutional capacity of Cotabato City LGU to implement the CLUP and enforce the Zoning Ordinance (ZO); 2) Ascertain the complementation and harmony of CLUP and ZO with other local codes, such as Revenue Code, Environment Code, Investment and Administrative Code; 3) Checks if the proposed implementing and monitoring schemes are consistent with the Local Government Code; 4) Evaluates the CLUP vis-à-vis approved agency (DILG) related policies/plans/programs.
Dept. of Human Settlements and Urban Development (DHSUD)	1) Checks whether the Cotabato City LGU clearly identified its functional role and whether the proposed land use plan and development strategies are consistent with its vision; 2) Evaluates if the CLUP is in harmony with the land use plans of adjacent municipalities and takes into account existing and potential conflicting land uses, and shared climate and disaster risks, with other municipalities; 3) Evaluates the CLUP if it is in accordance with the development policies of the Region;

Agency	Roles and Responsibilities
	<ol style="list-style-type: none"> 4) Evaluates if the land/space requirements for basic services and facilities are identified, quantified and properly delineated; 5) Evaluates if the locations of different land uses are suitable, properly allocated and delineated, such as forest and coastal/marine ecosystems, including required easements along inland water, coastal and marine bodies, and buffer areas to reduce land use conflicts and risks; 6) Evaluates if proposed socio-cultural and other infrastructure support facilities are adequate and supportive of the city's functional role and development thrust; 7) Checks if sites for socialized housing are identified and properly delineated pursuant to RA 7279 (Urban Development and Housing Act of 1992); 8) Checks if the locality has other programs and projects to address the squatting problems; 9) Checks consistency with and compliance to MC 54 (Reclassification of Agricultural Lands to Non-agricultural Uses); 10) Checks whether the land use plan is translated into the requisite Zoning Ordinance with clear zone boundaries; 11) Checks integration/mainstreaming of climate change and disaster risk reduction management, biodiversity, heritage conservation, ancestral domain and green growth in the CLUP and ZO; 12) Evaluates the CLUP vis-à-vis approved agency (DHSUD) related policies/plans/programs.
National Economic and Development Authority (NEDA)	<ol style="list-style-type: none"> 1) Checks if the CLUP and ZO is consistent with RFPF and other national/regional policies set by NLUC/ RLUC; 2) Checks if the CLUP and ZO is in harmony with the land use plans of adjacent municipalities; 3) Evaluates the CLUP vis-à-vis approved agency (NEDA) related policies/plans/programs.
Dept. of Agriculture (DA)	<ol style="list-style-type: none"> 1) Checks if irrigated and irrigable lands are identified, quantified and delineated per RA 8435 (AFMA); 2) Determines if areas identified for urban expansion are outside the identified Network of Protected Areas for Agricultural and Agro-industrial Development (NPAAAD) and Strategic Agriculture and Fisheries Development Zones (SAFDZ) 3) Checks consistency with and compliance to MC 54 (Reclassification of Agricultural Lands to Non-agricultural Uses); 4) Determines if high/medium-risk agricultural and fishery/marine areas are delineated and if appropriate, conflict and gender-sensitive policy options to address climate change and disaster impacts are established; 5) Checks compliance to Fisheries Code (RA 8550), DAOs and other relevant laws; 6) Evaluates CLUP vis-à-vis approved policies, plans, programs of the DA and its instrumentalities.
Dept. of Environment and Natural Resources (DENR)	<ol style="list-style-type: none"> 1) Checks whether present and proposed residential/settlement sites are free from legal (e.g. tenure) and environmental constraints; 2) Checks whether there are inconsistencies between areas proposed for protection and areas for production (e.g. mining leases/permits within protection zones); 3) Checks if there are sites identified for disposal and projects for management of solid and other hazardous wastes within the city; 4) Checks the consistency of the City Solid Waste Management Plan with the CLUP; 5) Checks if the plan promotes the enhancement of environmental quality through local initiatives to control water, air and land pollution; 6) Checks if there are plans for sustainable development and management of natural resources within the city; 7) Ensures that the identified areas for urban use are not within the coverage of DENR's Environmentally Critical Areas, if applicable; 8) Checks/evaluates the proposed solid waste management program if this conforms with the provisions of Ecological Solid Waste Management Act (RA 9003); 9) Ensures the protection of watershed and national parks; 10) If there are forestlands, checks if forest land use is integrated into the CLUP; 11) If applicable, ensures that areas with slope 18% and above are not designated for urban use. Delineate which is for the forest and which is Alienable and Disposable (A&D); 12) Checks if there are endangered flora and fauna in the area and if there are corresponding programs/projects for the protection or conservation of such areas; 13) Checks if the land use plan and zoning ordinance direct development away from medium-and high-risk areas;

Agency	Roles and Responsibilities
	<p>14) Checks if city waters, foreshore and coastal areas are delineated, mapped and reflected in the CLUP and ZO;</p> <p>15) Evaluates the CLUP vis-à-vis approved agency (DENR) related policies/plans/programs.</p>
Dept. of Agrarian Reform (DAR)	<p>1) Checks/evaluates if there are agricultural lands within the coverage of CARP that were reclassified;</p> <p>2) Evaluates the CLUP vis-à-vis approved agency (DAR) related policies/plans/programs.</p>
Dept. of Trade and Industry (DTI)	<p>1) Checks if Special Economic Zones identified in the PEZA are delineated in the plan;</p> <p>2) Evaluates if the proposed industrial sites are suitable for industrial development, such as not within prime agricultural area, Environmentally Critical Areas, Key Biodiversity Areas and Critical Habitats, etc.;</p> <p>3) Checks if proposed industrial sites are not located in high-risk areas for climate and disaster risk. For medium-risk areas, checks if appropriate mitigation and/or adaptation measures shall be provided for industries to be located in the area;</p> <p>4) Checks if the Small and Medium Enterprises Development plan, Investment Priority Program sites are identified, quantified and delineated in the CLUP;</p> <p>5) Checks if the requisite utilities and facilities are adequate and are climate and disaster-resilient;</p> <p>6) Evaluates the CLUP vis-à-vis approved agency (DTI) related policies/plans/programs.</p>
Dept. of Public Works and Highways (DPWH)	<p>1) Checks/evaluates if the proposed road network and other infrastructure facilities and utilities are adequate to support the various land uses;</p> <p>2) Evaluates if the CLUP is consistent and in synch with the DPWH plans and programs for implementation within the planning period;</p> <p>3) Determines if appropriate mitigation and adaptation measures for climate change and disaster risks are identified;</p> <p>4) Checks if the proposed Traffic Management Program (TMP) has linkage with the TMPs of adjacent municipalities;</p> <p>5) Evaluates the CLUP vis-à-vis approved agency (DPWH) related policies/plans/programs.</p>
Dept. of Tourism (DOT)	<p>1) Checks if potential tourism sites are identified and considered in the plan;</p> <p>2) Checks if the sites identified for local tourism development is supportive of the Regional Tourism Master Plan;</p> <p>3) Determines if there are adequate utilities/facilities to support tourism activities;</p> <p>4) Determines if tourism facilities are resilient to climate change and disaster risks;</p> <p>5) Evaluates the CLUP vis-à-vis approved agency (DOT) related policies/plans/programs.</p>
DOST- Phil. Institute for Volcanology and Seismology (DOST-PHIVOLCS)	<p>1) Checks if the land use plan and zoning ordinance reflect information on earthquakes, faults, volcanic danger zones, and areas at high risk to lahar and earthquake-induced hazards, e.g. landslide, tsunami, etc., including their implications to land use planning;</p> <p>2) Evaluates the CLUP vis-à-vis approved agency (DOST-PHIVOLCS) related policies/plans/programs.</p>
DOST- Phil. Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA)	<p>1) Checks if the land use plan and zoning ordinance reflect climate information on areas prone to storm surge, severe wind, flood, and tropical cyclones, including their implications to land use planning;</p> <p>2) Checks if the CLUP provides for early warning systems;</p> <p>3) Evaluates the CLUP vis-à-vis approved agency (DOST-PAGASA) related policies/plans/programs.</p>
Dept. of Science and Technology (DOST)	<p>1) If applicable, furnishes Cotabato City LGU a list of projects/studies/researches useful for land use within the city that are programmed for implementation by DOST but not identified in the plan;</p> <p>2) Checks or recommends whether there are available technologies for the development of low-cost housing materials in the locality;</p> <p>3) Checks or recommends the suitability of technology identified in the proposed projects;</p> <p>4) Checks whether there are indigenous technologies worthy of development which can be adopted, innovated or improved;</p> <p>5) Evaluates the CLUP vis-à-vis approved agency (DOST) related policies/plans/programs.</p>

Agency	Roles and Responsibilities
National Commission on Indigenous Peoples (NCIP)	<ol style="list-style-type: none"> 1) Checks if there are ancestral domain areas in Cotabato City and if the following are integrated in the CLUP and ZO, among others: <ul style="list-style-type: none"> • Inventory of resources within the ancestral domain • Assessment of the condition of resource assets within the ancestral domain • Endemic flora and fauna, critical habitats and biodiversity conservation areas • Traditional or indigenous uses of these resources and its community map • Agreed proposed land uses and zoning of the ancestral domain 2) Evaluates the CLUP vis-à-vis approved agency (NCIP) related policies/plans/programs.
Dept. of Transportation (DOTr) and Dept. of Information and Communication Technology (DICT)	<ol style="list-style-type: none"> 1) Checks if the proposed transportation and communication facilities and utilities are adequate to support the various land uses; 2) Evaluates if the CLUP is consistent and in synch with DOTr and DICT plans and programs for implementation within the planning period; 3) Determines if appropriate mitigation and adaptation measures for climate change and disaster risks are identified; 4) Checks if the proposed Traffic Management Program (TMP) has linkage with the TMPs of adjacent municipalities; 5) Evaluates the CLUP vis-à-vis approved DOTr and DICT related policies/plans/programs.
Mines and Geo-sciences Bureau (MGB)	<ol style="list-style-type: none"> 1) Checks if the land use plan and zoning ordinance reflect information on areas at high risk to geological hazards, including their implications to land use planning; 2) Evaluates the CLUP vis-à-vis approved agency (MGB) related policies/plans/programs.
National Commission for Culture and the Arts (NCCA); National Historical Commission of the Philippines (NHCP); National Museum (NM)	<ol style="list-style-type: none"> 1) If there are heritage areas/sites, checks if these are integrated in the CLUP and zoning ordinance in accordance with RA 1006 otherwise known as the National Cultural Heritage Act of 2009 and its IRR; and the guidelines and standards applied to sites declared by the NHCP or the NM as Historic Centers or Heritage Zones; 2) Evaluates the CLUP vis-à-vis approved agencies (NCCA, NHCP, NM) related policies/plans/programs.
Non-Government Organization (NGO)	<ol style="list-style-type: none"> 1) Checks whether the plan provides access to socio-economic opportunities of the under-privileged and other basic sectors, especially persons at high/medium-risk to impacts of disasters and climate change; 2) Evaluates if the CLUP development strategies, programs and projects promote the interests of the basic sectors; 3) Evaluates the CLUP vis-à-vis laws and regulations affecting human rights, gender, and other sectoral concerns.

Source: HLURB CLUP Guidebook: A Guide to CLUP Preparation

6.3 Current Status of Cotabato City’s Comprehensive Land Use Plan (CLUP)

6.3.1 CLUP 2020-2028 for Updating

The current Cotabato City CLUP has a time horizon of 2011-2020, therefore, this has to be updated for a new planning period. Hence, the Cotabato City Government has started to formulate the CLUP 2020-2028 following the HLURB now Department of Human Settlements and Urban Development (DHSUD) CLUP Guidebook: A Guide to CLUP Preparation.

6.3.2 Current Status of CLUP 2020-2028 Preparation

During the 1st On-line seminar/workshop held last July 17, 2020, the CPDO personnel of the City Government of Cotabato City shared with the JICA Study Team the status of preparation of the 2020-2028 CLUP. Basically, the City Government of Cotabato intends to submit to DHSUB the new CLUP by December 2020.

On July 7, 2021, the CPDO further updated the JICA Study Team on the progress of CLUP and CDP preparation. They explained that they have prioritized the preparation of the CDP though they are also working on the CLUP.

With such developments, the City Government of Cotabato now targets to complete and submit to DHSUB the new CLUP by December 2021.

Table 6.3-1 below summarized the steps and their status.

Table 6.3-1 Current Status of CLUP 2020-2028 Preparation

Step	Activities	Status
Step 1: Organize	Organize the Planning Team	Organized through EO 277 issued in 2019 by the LCE
	Inventory of reference materials (CLUP 2011-2020, CDP, ELA, DRRM, SWM and other sectoral plans)	Done
	Inventory of maps	Done
	Coordinate with HHSUD for assistance	Done
Step 2: Identify Stakeholders	Identify participants who can play active role in the planning process (members of the planning team). These are: City Mayor/Administrator’s Office; Sangguniang Panlungsod; CPDO sector heads; CENRO; CDRRMO; City Agri. Office; CEO; CSWDO; City Assessor’s Office	Done
Step 3: Setting the Vision	Formulate the Vision and adopt this by the City Development Council (CDC)	Done. The Vision: “A smart city with God-fearing, enlightened diverse people living in a peaceful, secure and resilient community with progressive economy and excellent governance”. was adopted by the City Development Council
	Formulate the Vision-Reality Gap (module 1)	Done
	Formulate Scalogram (module 1)	Done
	Prepare Hazard inventory matrix (module 1)	Done

Step	Activities	Status
Step 4: Analyze the Situation	Collect data on current situation using DHSUD module 2 template and module 4 template for CDRA.	Done except for a few agencies
	Prepare Shape file maps on hazards (module 2)	Done
	Prepare Shape file maps on Existing Land Use (module 3)	Done
	Prepare Shape file on Road Network	Done
Step 5: Setting the Goals and Objectives	Prepare Goals and Objectives	Collated for the Draft CLUP Package 1
Step 6: Development Thrust and Spatial Strategies	Prepare Goal Achievement Matrix (GAM) on Development Thrust and GAM on Preferred Spatial Strategy under DHSUD module 4a.	Completed the GAM. The Development Thrust is biased on Commercialization. While, the Preferred Spatial Strategy is combination of Circumferential + Central and Nodal. And, an Initial Structural Map has been prepared. (Revised Spatial Strategy to Concentric Form where identified expansion will be confined to the hazard-protected zone as proposed in the JICA study-Greater Cotabato)
Step 7: Prepare the Land Use Plan	Undertake module 5, Land Use Plan Preparation through a workshop consolidating all outputs from modules 1-4.	Not done yet. No invitation yet from DHSUD XII on module 5
Step 8: Preparing the Zoning Ordinance	Prepare the proposed Zoning Ordinance.	Drafted the proposed Zoning Ordinance under module 4b. This will still undergo validation/improvement. Can be finalized after the CLUP has been submitted for consultation and completion under step 4.
Step 9: Conduct of Public Hearing	Conduct Public Hearing on the Land Use Plan and Zoning Ordinance	Not yet conducted.
Step 10: Review, Adopt and Approve the CLUP and Zoning Ordinance	Review, Adopt and Approve the CLUP 2020-2028 and Zoning Ordinance by DHSUD, RLUC and DHSUD Board	Not yet conducted.
Step 11: Implement the CLUP and Zoning Ordinance	Implement the CLUP 2020-2028 and the Zoning Ordinance.	Not yet conducted.
Step 12: Monitor and Evaluate the CLUP 2020-2028 and the Zoning Ordinance	Prepare Monitoring and Evaluation system/tools to be utilized in the regular monitoring and evaluation on the implementation of the CLUP 2020-2028 and the Zoning Ordinance.	Under DHSUD module 4b, the planning team has come up with a draft monitoring and evaluation system with MRE composition, thematic areas and focal persons/offices and report card performance indicator. This is still for validation.

Source: Presentation material of the CPDO Cotabato City Government

6.4 Budgetary Framework of Cotabato City

6.4.1 Sources of Revenues

The three sources of revenues of Cotabato City come from the following: a) Internal Revenue Allotment (IRA) is the LGU share of revenue from the national government and it is based upon the LGU land area and population; b) Real Property Tax; and c) Other sources, such as, local taxes, permits, fees, licenses.

In 2016, about 82% of the total income of Cotabato City was sourced from the Internal Revenue Allotment (IRA) from the national government. The remainder was shared by Real Property Tax (RPT) collection at 1%, and income from other sources (e.g., local taxes, permits, fees, licenses, etc.) at around 17% share. Table 6.4-1 shows the breakdown of sources of city revenue.

In general, the following were observed: IRA increased by an average of 5.99% per annum from 2010 to 2016; RPT by 3.74% per annum, and other sources by 9.89% per annum.

Table 6.4-1 Cotabato City Sources of Revenues, 2010-2016

Year	Internal Revenue Allotment		Real Property Tax		Other Sources (Taxes, Permits, Fees, Licenses, etc.)		TOTAL	
	PhP	Percent	PhP	Percent	PhP	Percent	PhP	Percent
2010	447,736,471	84.9%	5,747,514	1.1%	73,975,152	14.0%	527,459,137	100.0%
2011	480,670,041	72.6%	12,434,674	1.9%	169,017,496	25.5%	662,122,211	100.0%
2012	421,722,061	80.9%	9,083,563	1.7%	90,512,637	17.4%	521,318,262	100.0%
2013	451,253,503	72.7%	7,479,200	1.2%	161,977,391	26.1%	620,710,094	100.0%
2014	507,422,593	83.4%	7,863,092	1.3%	93,091,961	15.3%	608,377,646	100.0%
2015	580,134,119	65.1%	10,772,723	1.2%	300,166,311	33.7%	891,073,153	100.0%
2016	634,792,081	82.2%	7,165,253	0.9%	130,260,392	16.9%	772,217,726	100.0%

Source: Cotabato City CDP 2017-2022

6.4.2 Income Versus Expenditure

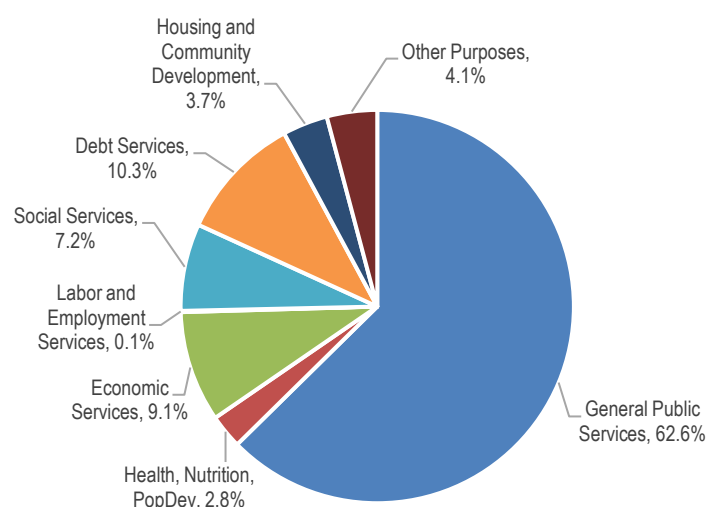
From 2010-2016, the annual expenditure of Cotabato City was observed to be lower than the annual income, hence, there was accrued budget surplus every year within the seven-year period under review. The largest budget surplus was recorded at around PhP 248 Million in 2015 (Table 6.4-2).

The bulk of the expenditure went to General Public Services which consist of salaries of LGU officials and employees, and maintenance and other operating expenses (MOOE), with a share of over 60% from the total expenditures (Figure 6.4-1). Another mandatory obligation incurred was the Debt Service for existing loans entered by the LGU with funding institutions, with a share of 10.30% from the total expenditures. The remaining expenditure were shared by different sectors (Health, Nutrition, Population Development; Economic Services; Labor and Employment Services; Social Services; Housing and Community Development; and Other Purposes).

Table 6.4-2 Cotabato City Income, Expenditures, and Surplus, 2010-2016

Year	Income (PhP)	Expenditures (PhP)	Surplus/ (Deficit) PhP
2010	527,459,137	482,238,885	45,220,252
2011	662,122,211	514,070,031	148,052,181
2012	521,318,262	508,807,574	12,510,687
2013	620,710,094	549,586,799	71,123,295
2014	608,377,646	544,095,694	64,281,953
2015	891,073,153	643,076,892	247,996,262
2016	772,217,726	745,619,052	26,598,673
Total	4,603,278,229	3,987,494,926	615,783,303

Source: Cotabato City CDP 2017-2022



Source: Cotabato City CDP 2017-2022

Figure 6.4-1 Distribution of Expenditures, 2016

6.4.3 Infrastructure Budget

From period of 2012-2016, the infrastructure allocation of PhP 78.7 Million was about 2.69% of the total expenditures of PhP 2.9 Billion of the City during the five-year duration. The yearly shares of infrastructure budget in 2012-2016 vis-à-vis the total expenditures of the City is presented in Table 6.4-3. The highest recorded share of budget for infrastructure was at 4.6% in 2014. The lowest share was observed at around 1.33% in 2012.

Table 6.4-3 Infrastructure Allocation vis-a-vis Total Expenditures, 2012-2016

Year	Total Expenditures (PhP)	Infra Allocation (PhP)	Infrastructure Share (%)
2012	477,662,141	6,329,987	1.33
2013	495,151,560	11,678,013	2.36
2014	584,968,756	26,920,568	4.60
2015	639,742,581	13,561,199	2.12
2016	724,518,116	20,176,086	2.78
2012-2016	2,922,043,154	78,665,853	2.69

Source: Cotabato City LGU

For the period 2012-2019, Cotabato City had provided a total of PhP 123.3 Million allocation for the implementation of various infrastructure projects in the city. Among project categories, Road Development/Maintenance got the biggest share at 63.40% of the total infrastructure budget for 2012-2019, then followed by Parks and Cemetery Improvement at 13.88% as shown in Table 6.4-4. Yearly disaggregate data is not yet available as of the moment. But assuming the allocation was equally distributed in the seven (7) years span, the average budget allocation for infrastructure is about PhP 17.62 Million per year.

The above amount of budget per year is rather limited to develop the infrastructure requirements of the city. For example, constructing a kilometer of road is more than PhP 30 Million which is way above the PhP 17.62 Million. Finding other sources of fund therefore is critical to address the infrastructure gap of the city.

Table 6.4-4 Distribution of Infrastructure Allocation by Project Category, 2012-2019

Project Category	2012-2019 Allocation (PhP)	% Share	Yearly allocation (assuming equal distribution per year)
Road Development/Maintenance	78,179,498	63.40%	11,168,500
Parks and Cemetery Improvement	17,120,000	13.88%	2,445,714
Market/Slaughterhouse	7,050,000	5.72%	1,007,143
Resettlement Sites Development	6,054,086	4.91%	864,869
Waste Management/Dumpsite Development	4,850,000	3.94%	692,857
Flood Control and Drainage	3,956,070	3.21%	565,153
Social Buildings/ Water Project	2,900,000	2.35%	414,286
Health Facilities	2,529,987	2.05%	361,427
Bridge Repair	670,568	0.54%	95,795
Total (2012-2019)	123,310,209	100%	17,615,744

Source: Cotabato City LGU

6.5 DPWH Budget allocation for Cotabato City

The national government through the Department of Public Works and Highways (DPWH) regularly allocates annual budgets for infrastructure projects in Cotabato City. These yearly infrastructure budgets are sourced out from the General Appropriations Act (GAA) enacted by the Philippine Congress and approved by the President. This GAA reflects the budgets of government agencies for their operation and program, project, activities implementation for each year. The DPWH annual allocation for the implementation of different infrastructure projects in Cotabato City are managed by the DPWH Cotabato City District Engineering Office and the regional office of DPWH XII (for project above PhP 100 Million cost).

From 2015 to 2020, a total of PhP 5.6 Billion budget was allocated by DPWH to different infrastructure projects in Cotabato City. These projects include the following categories: roads, bridges, riverbank protection, multi-purpose facilities, office buildings, school buildings, drainage

structures, and water supply systems. A closer look at Table 6.5-1 reveals that there's seems to be lack of trend say there is an increase of certain amount per year.

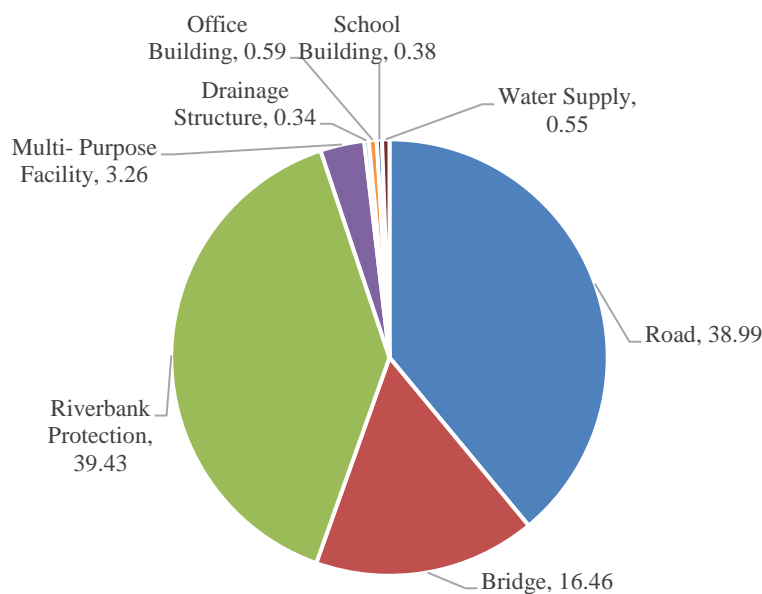
Table 6.5-1 DPWH Total Annual Budget for Infrastructure Projects in Cotabato City, 2015-2020

Year	Budget Allocation (PhP thousand)	% Share
2015	717,930	12.85
2016	1,169,630	20.93
2017	79,500	6.79
2018	1,910,816	34.20
2019	748,888	13.40
2020	660,746	11.83
Total	5,587,510	100.00

Source: DPWH Cotabato City District Engineering Office

Among the different project categories, the riverbank protection work with a total budget of PhP 2.2 Billion got the biggest share of 39.43%, closely followed by road projects with a 38.99% share from the total budget of DPWH in the six-year period. Figure 6.5-1 present the DPWH total allocation for each project category.

Annual budget allocation for each project category from 2015 to 2020 shows that the road projects and riverbank protection works rank first or second to get the highest budget share yearly. Table 6.5-2 presents the DPWH annual budget by project category from 2015 to 2020.



Source: DPWH Cotabato City District Engineering Office

Figure 6.5-1 DPWH Total Budget by Project Category in Cotabato City, 2015-2020

Table 6.5-2 DPWH Annual Budget by Project Category, Cotabato City, 2015-2020 (PhP ‘000)

Project Category	2015	2016	2017	2018	2019	2020
Road	329,410	652,630	103,500	714,816	124,594	253,822
Bridge	173,520	211,000	50,000	330,000	95,650	59,529
Riverbank Protection	150,000	250,000	200,000	820,000	483,144	300,000
Multi- Purpose Facility	65,000	35,000	18,000	15,000	38,500	10,500
Drainage Structure	0	0	8,000	0	7,000	4,000
Office Building	0	0	0	0	0	32,895
School Building	0	21,000	0	0	0	0
Water Supply	0	0	0	31,000	0	0
Total	719,945	1,171,646	381,517	1,912,834	750,907	662,766

Source: DPWH Cotabato City District Engineering Office

6.6 Budgetary Framework of BARMM

CY 2018 DPWH-ARMM Infrastructure Budget

As provided in the Fiscal Year (FY) 2018 General Appropriations Act (GAA) of the Department of Budget and Management (DBM), the budget dedicated for the infrastructure development in the ARMM in year 2018 was primarily lodged with the Department of Public Works and Highways (DPWH)- ARMM. During the year, a total of Ten Billion Eight Hundred Thirty One Million and Six Hundred Sixty Five Thousand Pesos (P10,831,665,000) was allocated to the agency under its capital outlay fund for the implementation of a total of 493 infrastructure projects of different categories across the five provinces of the ARMM.

This total budget is composed of allocation for 485 various specific projects listed under the DPWH-ARMM amounting to P10,213,565,000; plus the allocation of P560,000,000 for eight road projects under the special program “Payapa at Masaganang Pamayanan (PAMANA)” for conflict-affected areas in Maguindanao and Lanao del Sur provinces as identified by the Office of the Presidential Adviser on the Peace Processes (OPAPP); and a lumpsum allocation of P58,000,000 for the construction, maintenance, repair and rehabilitation of infrastructure facilities.

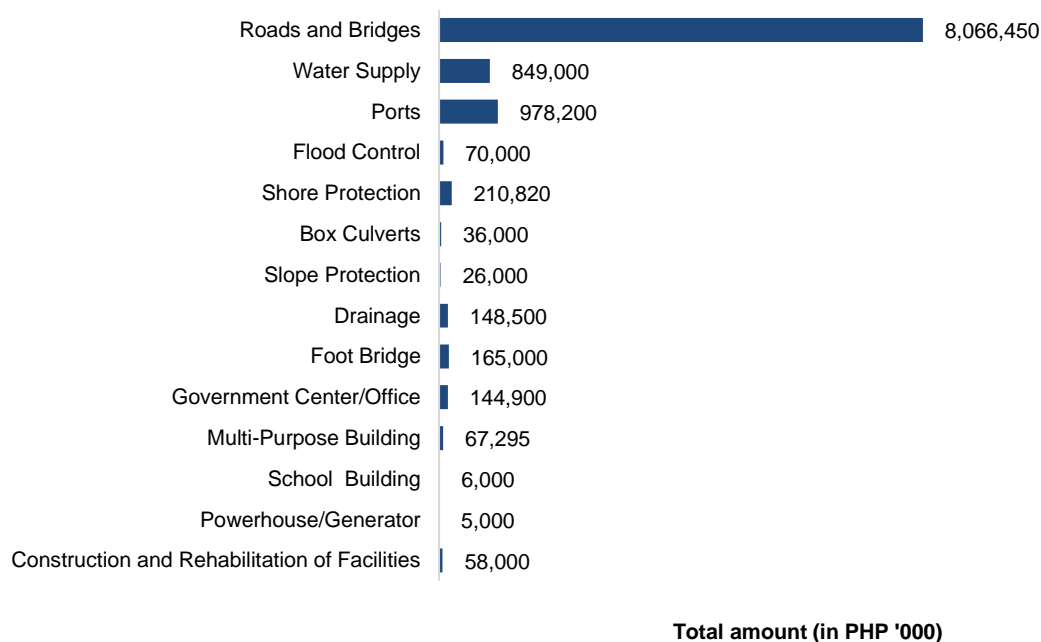
Among project categories, the Construction/Concreting of Roads and Bridges got the largest allocation of P8,066,450,000 representing a share of 74.47 per cent to the total budget for infrastructure. This is followed by Port and Water Supply with P978,200,000 and P849,500,000 allocations, respectively. The port got a share of 9.03 per cent; while, the water supply was shared with 7.84 per cent.

Across provinces, Maguindanao allocation reached P2,754,832,000; followed by Lanao del Sur with P2,662,849,000; next was Sulu with P2,143,864,000; Basilan got P2,000,000,000; and Tawi Tawi had P1,212,120,000. Please see Figure 6.6-2 for percentage share of budget allocations among provinces.

Table 6.6-1 CY 2018 DPWH-ARMM Infrastructure Budget for ARMM (PhP '000)

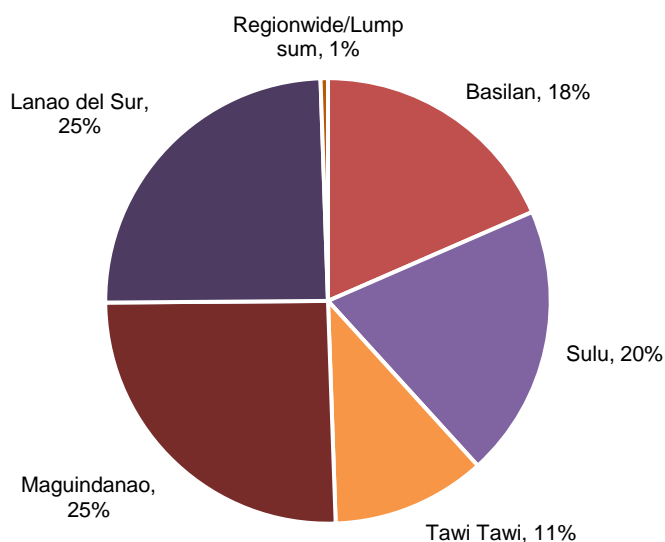
Project Category	Basilan		Sulu		Tawi-Tawi		Maguindanao		Lanao del Sur		Regionwide (Lumpsum)	Total	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	Amount	No.	Amount
Roads and Bridges	40	1,501,600	39	1,255,364	31	678,100	79	2,521,832	69	2,109,554	-	258	8,066,450
Water Supply	11	65,000	38	343,000	21	125,000	3	10,500	14	306,000	-	87	849,500
Ports	13	220,000	14	390,000	9	233,200	2	120,000	3	15,000	-	41	978,200
Flood Control	1	20,000	0	-		-		-	5	50,000	-	6	70,000
Shore Protection	3	15,000	5	55,000	10	50,820	1	50,000	2	40,000	-	21	210,820
Box Culverts	11	28,000	2	6,000		-		-	1	2,000	-	14	36,000
Slope Protection	2	6,000	1	20,000		-		-		-	-	3	26,000
Drainage	8	44,500	1	8,000	3	20,000		-	5	76,000	-	17	148,500
Foot Bridge	3	30,000	3	30,000	17	105,000		-		-	-	23	165,000
Government Center/Office	2	69,900	1	30,000		-	1	30,000	1	15,000	-	5	144,900
Multi-Purpose Building		-	1	2,000		-	4	22,500	8	42,795	-	13	67,295
School Building		-	3	4,500		-		-	1	1,500	-	4	6,000
Powerhouse/Generator		-		-		-		-	1	5,000	-	1	5,000
Construction, Maintenance, Repair and Rehabilitation of Infrastructure Facilities (No specific list of projects and location)		-		-		-		-		-	58,000		58,000
Total	94	2,000,000	108	2,143,864	91	1,212,120	90	2,754,832	110	2,662,849	58,000	493	10,831,665

Source: FY 2018 General Appropriations Act



Source: FY 2018 General Appropriations Act

Figure 6.6-1 CY 2018 DPWH-ARMM Infrastructure Budget for ARMM by Project Category (PhP '000)



Source: FY 2018 General Appropriations Act

Figure 6.6-2 CY 2018 DPWH-ARMM Infrastructure Budget for ARMM By Province/Region (PhP '000)

CY 2019 DPWH-ARMM Infrastructure Budget

The CY 2019 Infrastructure Budget allocated to DPWH-ARMM to implement various infrastructure projects in the five provinces of ARMM amounted to a total of Ten Billion One Hundred Forty-Eight Million and Three Hundred Sixteen Thousand Pesos (P10,148,316,000). Comparing this 2019 figure with that of 2018 budget of the agency for the implementation of different infrastructure projects, the 2019 budget for capital outlay is lesser by P683,349,000. One cause of the reduction was due to no amount was allocated for the special program “PAMANA” for the identified conflict-affected areas in Mindanao.

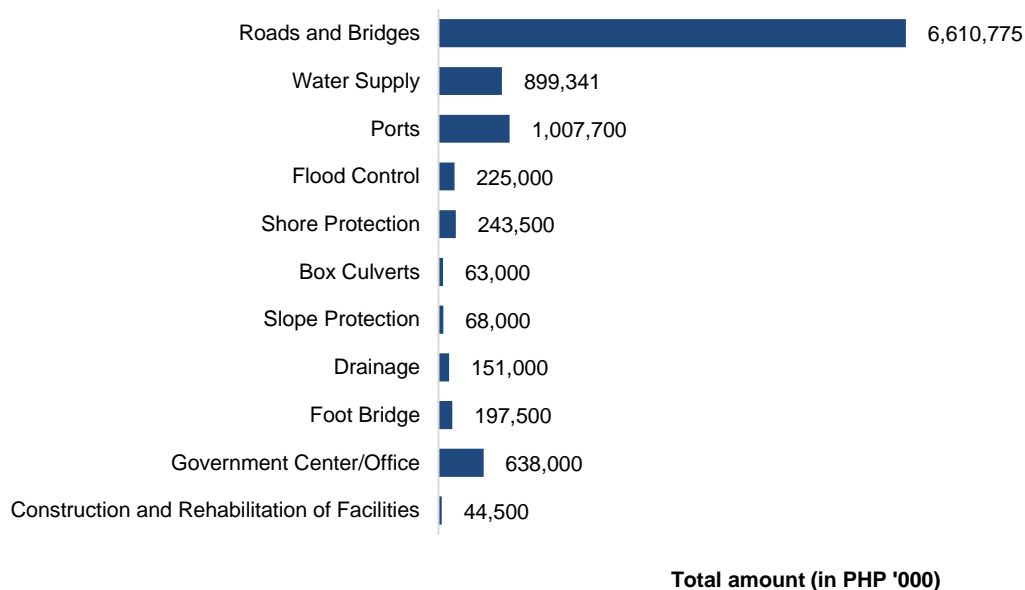
The construction/concreting of roads and bridges again got the lion’s share from the total infrastructure budget during the year. An amount of P6,610,775,000 or 65.14 per cent of the total budget was earmarked under this category. The second highest allocation went again to port construction with a funding support of a little over one billion (P1,007,700,000) sharing 9.92 per cent; and the third rank went again to water supply at P899,341,000 or 8.86 per cent of the total budget.

The provincial breakdown of the 2019 infrastructure budget followed similar trend of distribution in 2018 with Maguindanao getting the highest share with P2,442,552,000; followed by Lanao del Sur with a fund support of P2,287,000,000; third rank went again to Sulu with P2,162,264,000; while, Basilan and Tawi-Tawi ranked fourth and fifth getting P2,000,000,000 and P1,212,000,000, respectively. For percentage distribution of the provincial breakdown of the budget, please refer to Figure 6.6-4.

Table 6.6-2 CY 2019 DPWH-ARMM Infrastructure Budget for ARMM (PhP '000)

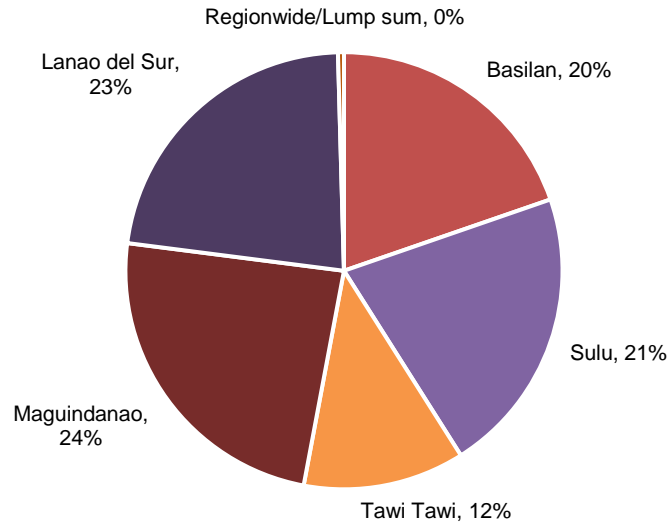
Project Category	Basilan		Sulu		Tawi-Tawi		Maguindanao		Lanao del Sur		Regionwide (Lumpsum)	Total	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount		No.	Amount
Roads and Bridges	49	887,034	60	1,497,264	29	638,000	91	1,846,177	94	1,742,300	-	323	6,610,775
Water Supply	71	196,466	61	141,000	25	52,500	61	179,375	56	330,000	-	274	899,341
Ports	25	274,000	14	345,000	7	246,000	4	80,000	8	62,700	-	58	1,007,700
Flood Control	3	10,000	-	-	-	-	3	130,000	6	85,000	-	12	225,000
Shore Protection	7	28,000	6	145,000	4	20,500	1	50,000	-	-	-	18	243,500
Box Culverts	17	42,000	7	14,000	-	-	-	-	1	7,000	-	25	63,000
Slope Protection	-	-	1	10,000	4	-	3	33,000	1	25,000	-	5	68,000
Drainage	2	15,000	-	-	26	30,000	3	71,000	4	35,000	-	13	151,000
Foot Bridge	6	37,500	2	10,000	2	150,000	-	-	-	-	-	34	197,500
Government Center/Office	11	510,000	-	-	-	75,000	2	53,000	-	-	-	15	638,000
Construction, Maintenance, Repair and Rehabilitation of Infrastructure Facilities (No specific list of projects and location)	-	-	-	-	-	-	-	-	-	-	44,500	-	44,500
Total	191	2,000,000	151	2,162,264	97	1,212,000	168	2,442,552	170	2,287,000	44,500	777	10,148,316

Source: FY 2019 General Appropriations Act



Source: FY 2019 General Appropriations Act

Figure 6.6-3 CY 2019 DPWH-ARMM Infrastructure Budget for ARMM by Project Category (PhP'000)



Source: FY 2019 General Appropriations Act

Figure 6.6-4 CY 2019 DPWH-ARMM Infrastructure Budget for ARMM by Province/Region (PhP'000)

FY 2020 General Appropriations Act (GAA) Budget Allocations for BARMM

The FY 2020 GAA published by the Department of Budget and Management (DBM) provides that the newly constituted BARMM Government shall have the following budgets for its operations from January-December 2020:

- a) Annual Block Grant : P 63,634,076,000
- b) Special Development Fund: P 5,000,000,000
- c) Share in Taxes: P 2,000,000,000

Total : Seventy Billion Six Hundred Thirty-Four Million Seventy-Six Thousand Pesos
(P 70,634,076,000)

FY 2020 Bangsamoro Appropriations Act

The newly constituted BARMM Government through the Bangsamoro Transition Authority (BTA) Parliament has enacted the FY 2020 Bangsamoro Appropriations Act, “An Act appropriating funds for the operation of the Bangsamoro Government from January 1 to December 31, 2020, and for other purposes”.

The total budget allocated under this FY 2020 Bangsamoro Appropriations Act amounted to Sixty-Five Billion Nine Hundred Sixteen Million Four Hundred Sixty-Seven Thousand and Six Hundred Eighty-Seven Pesos (P 65,916,467,687). The funds were programmed for the operation of different ministries and offices under the BARMM Government for CY 2020.

From the foregoing, it showed that the total amount of budget contained in the FY 2020 Bangsamoro Appropriation Act is P4,717,608,313 lower than the total budget allocated by the National Government through the FY 2020 GAA.

CY 2020 Ministry of Public Works (MPW) Infrastructure Budget for BARMM

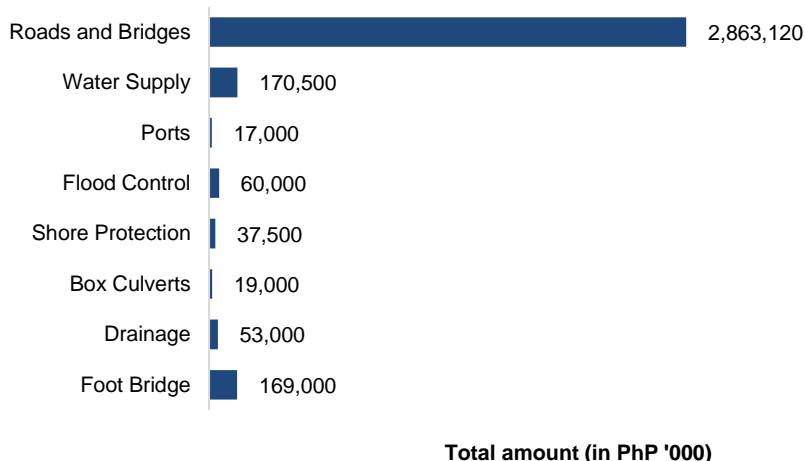
From the total budget appropriated for BARMM operation under the FY 2020 Bangsamoro Appropriations Act, an amount of Three Billion Three Hundred Eighty-Nine Million One Hundred Twenty Thousand Pesos (P 3,389,120,000) was earmarked for capital outlay fund for the implementation of various infrastructure facilities (Road network and other Public Infrastructure Facilities) across six provinces (to include Cotabato Province’ 63 barangays) that compose BARMM. This allocation was lodged with the MPW of the BARMM.

The largest chunk of the infrastructure budget was allocated for the construction of roads and bridges with P2,863,120,000 fund support or 84.48 per cent share from the total amount. This was followed by water supply and concrete foot bridge which got P170,500,000 (5.03%) and P169,000,000 (4.98%), respectively. Please refer to Table 6.6-3 for the budget allocation of different project categories across provinces.

Table 6.6-3 CY 2020 MPW Infrastructure Budget for BARMM (PhP '000)

Project Category	Basilan		Sulu		Tawi-Tawi		Maguindanao		Lanao del Sur		Cotabato Province (63 Barangays)		Total	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Roads and Bridges	10	185,000	22	386,500	7	116,500	37	705,120	29	462,000	63	1,008,000	168	2,863,120
Water Supply	5	25,000	10	42,500	5	34,000	2	10,000	10	59,000		-	32	170,500
Ports	-	-	2	12,000	1	5,000	-	-	-	-		-	3	17,000
Flood Control	-	-	-	-	-	-	3	20,000	3	40,000		-	6	60,000
Shore Protection	2	10,000	1	7,500	-	-	-	-	2	20,000		-	5	37,500
Box Culverts	5	19,000	-	-	-	-	-	-	-	-		-	5	19,000
Drainage	3	13,000	1	30,000	-	-	-	-	1	10,000		-	5	53,000
Foot Bridge	3	8,000	2	10,000	12	151,000	-	-	-	-		-	17	169,000
Total	28	260,000	38	488,500	25	306,500	42	735,120	45	591,000	63	1,008,000	241	3,389,120

Source: FY 2020 Bangsamoro Appropriations Act

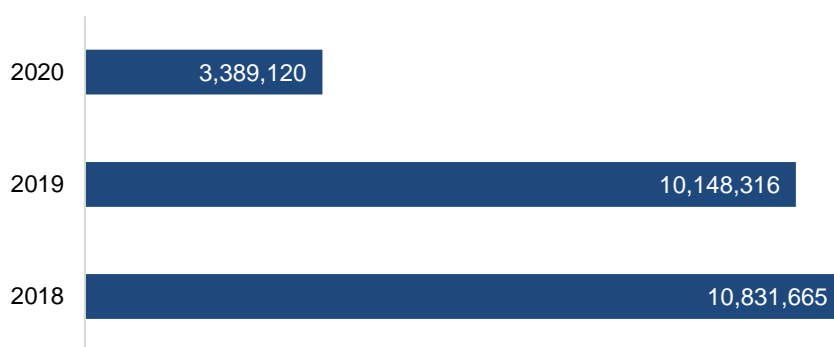


Source: FY 2020 Bangsamoro Appropriations Act

Figure 6.6-5 CY 2020 MPW Infrastructure Budget for BARMM by Project Category (PhP '000)

Compared with the past years, the 2020 MPW infrastructure budget for BARMM is only about 31.29% and 33.40% of the 2018 and 2019 DPWH-ARMM infrastructure budgets, respectively. Please refer to Figure 6.6-6 showing the comparison of infrastructure budget allocations in CY 2018-2020.

However, under the FY 2020 Bangsamoro Appropriations Act, a lumpsum amount of P13,201,891,779 is allocated to Contingent Fund which can be utilized to fund other programs and projects that the Bangsamoro Government may deem necessary and important, and these include among others, infrastructure projects in addition to the list of projects already contained in the MPW infrastructure budget.



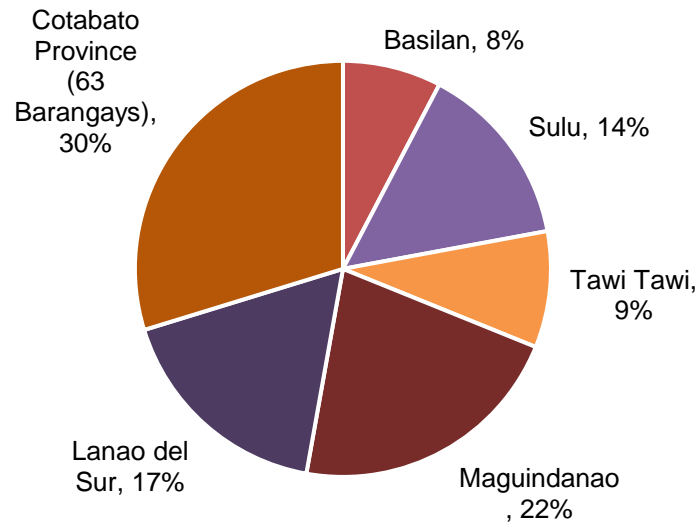
Source: FY 2018 GAA, FY 2019 GAA, FY 2020 Bangsamoro Appropriations Act

Figure 6.6-6 CY 2018-2020 Infrastructure Budget for ARMM/BARMM (PhP'000)

Among the six provinces which compose the BARMM, the Cotabato Province' 63 barangays got the largest share from the 2020 MPW infrastructure budget at P1,008,000,000; followed by Maguindanao with P735,120,000; ranked third is Lanao del Sur with P591,000,000; fourth is Sulu

with an allocation of P488,500,000; and Tawi-Tawi and Basilan got P306,500,000 and P260,000,000, respectively. Please see Figure 6.6-7 for the budget share of each province.

Cotabato City on the other hand continued to be recipient of the 2020 DPWH (National) infrastructure program through the DPWH Regional Office No. XII and these infrastructure projects are implemented by the DPWH Cotabato City District Engineering Office.



Source: FY 2020 Bangsamoro Appropriations Act

Figure 6.6-7 CY 2020 MPW Infrastructure Budget for BARMM By Province (PhP '000)

FY 2021 Bangsamoro Expenditure Program (BEP)

The BARMM Government has prepared its Fiscal Year (FY) 2021 Bangsamoro Expenditure Program (BEP) which contains the details of the BARMM’s proposed programs and projects for implementation in CY 2021. The FY 2021 BEP shall serve as the primary official reference document in the formulation of the BARMM’s FY 2021 Bangsamoro Appropriations Act to be enacted by the Bangsamoro Transition Authority (BTA) Parliament.

The FY 2021 BEP has allocated a total of Seventy-Five Billion Six Hundred Twenty-Eight Million Six Hundred Eighty-One Thousand Seven Hundred Forty-Eight Pesos (P75,628,681,748) for the operations of the different ministries and offices of the autonomous region from January 1-December 31, 2021. The proposed allocation will come from the following sources: Annual Block Grant, Special Development Fund and Shares from the National and Local Taxes.

Proposed CY 2021 MPW Infrastructure Budget for BARMM

Under the FY 2021 BEP, the Ministry of Public Works (MPW) has allocated P15,004,987,000 as proposed infrastructure budget for the implementation of different projects across the six provinces of BARMM, to include the 63 barangays of Cotabato Province. Please refer to Table 6.6-4.

The budget for roads and bridges was shared largest at 81.04% from the total amount; while, flood control and water supply got 4.89% and 3.54% shares, respectively. Please see Figure 6.6-8 for the budget allocation per project category.

Across provinces, Maguindanao ranked first with the largest budget of P 4,334,610,000 (29%); second is Lanao del Sur with P 3,805,717,000 (25%); third is Sulu with P 2,673,100,000 (18%); Tawi-Tawi got P 1,522,000,000 (10%); followed by the Cotabato Province' 63 barangays with P 1,480,160,000 (10%); and Basilan with P1,189,400,000 (8%). Please refer to Figure 6.6-9 for the distribution of budget across provinces.

Table 6.6-4 CY 2021 MPWH Infrastructure Budget for BARMM as Contained in the Bangsamoro Expenditure Program (BEP) FY 2021 (PhP '000)

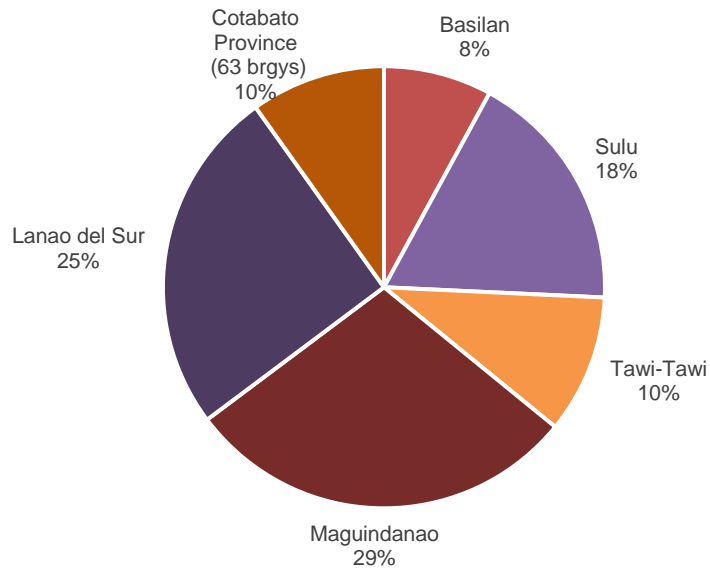
Project Category	Basilan		Sulu		Tawi-Tawi		Maguindanao		Lanao del Sur		Cotabato Province (63 Barangays)		Total	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Roads and Bridges	33	911,400	86	2,135,000	33	1,014,000	150	3,648,110	141	2,985,617	66	1,473,160	509	12,167,287
Water Supply	11	33,000	20	158,000	14	107,000	9	63,500	26	170,100	-	-	80	531,600
Ports	6	30,000	11	160,000	7	210,000	1	20,000	8	63,000	-	-	33	483,000
Flood Control	-	-	1	5,000	-	-	11	385,000	17	344,000	-	-	29	734,000
Shore Protection	27	137,000	3	90,000	10	50,000	-	-	4	40,000	-	-	44	317,000
Box Culverts	6	18,000	-	-	-	-	-	-	-	-	-	-	6	18,000
Drainage	2	10,000	7	53,000	1	10,000	2	30,000	4	33,000	-	-	16	136,000
Foot Bridge	10	50,000	11	72,100	20	131,000	2	80,000	-	-	-	-	43	333,100
Slope Protection	-	-	-	-	-	-	4	108,000	7	140,000	1	7,000	12	255,000
Government Office	-	-	-	-	-	-	-	-	1	30,000	-	-	1	30,000
Total	95	1,189,400	139	2,673,100	85	1,522,000	179	4,334,610	208	3,805,717	67	1,480,160	773	15,004,987

Source: FY 2021 Bangsamoro Expenditure Program (BEP)



Source: FY 2021 Bangsamoro Expenditure Program (BEP)

Figure 6.6-8 CY 2021 MPWH Infrastructure Budget for BARMM, By Project Category



Source: FY 2021 Bangsamoro Expenditure Program (BEP)

Figure 6.6-9 CY 2021 MPWH Infrastructure Budget for BARMM, By Province (PhP '000)

CHAPTER 7 GROWTH DIRECTION AND SCENARIOS FOR GREATER COTABATO AND CITY

7.1 Growth Direction for Greater Cotabato and City

7.1.1 Spatial Development Opportunities and Challenges

(1) Opportunities and Challenges for the Greater Cotabato Area

Based on the several higher regional development frameworks with three key strategies, spatial development opportunities in the Greater Cotabato area are presented in Table 7.1-1 in association with challenges to utilize and maximize them.

Table 7.1-1 Opportunities and Challenges for Spatial Development for Greater Cotabato

Upper Spatial Strategies	Current Status toward Future Spatial Development for Cotabato City	
	Opportunities	Challenges
Concentration/ Agglomeration	<ul style="list-style-type: none"> • Two key leading urban centers combining Cotabato City and Parang drive regional socio-economic activities • Major crossroads on economic development corridor in BARMM and its surroundings for strategic socio-economic growth • Various municipalities cluster with each potential human resource and hinterland production areas and proximity effects to each other 	<p>Coping with harmonized and integrated development among municipalities in Greater Cotabato area with appropriate role and functions to be enhanced as one regional center</p>
		<p>Improving insufficient urban infrastructure service and urban public services (schools, health services, etc) to cope with an expected level of development and population increase</p>
		<p>Enhancing basic administrative and management capacity for weak development control and management especially for small municipalities</p>
Connectivity	<ul style="list-style-type: none"> • Strong linear linkage on the South-Central Mindanao Development Corridor with expected internal and external opportunities for socio-economic development • External gateways of the region by the Awang airport and Polloc freeport to neighboring regions for trade and tourism development • Islamic society linkage for the domestic and international potential market (e.g., Halal products) • Inter-LGU-alliance for urban services cooperation to supplement each other 	<p>Strengthening regional infrastructure network to support socio-economic developments of Greater Cotabato area (roads, logistic, regional public transport, communication, etc)</p>
		<p>Improving insufficient intra-access and services network between economic production areas and urban centers</p>
		<p>Formulating attractive tourism circuits and promotion to Greater Cotabato area destination</p>
		<p>Promoting cooperation for inter-municipality urban service to supplement weak urban services and effective supports and resource utilization of each municipality</p>
Vulnerability Reduction	<ul style="list-style-type: none"> • Redundant regional spatial structure with potential site and areas in municipalities with green and open spaces avoiding chaotic regional damages from regional-wide disaster risks • Sharing and managing natural environment and resources as common assets among municipalities in Greater Cotabato 	<p>Formulating regional disaster risk management through cooperative mechanism against potential natural disaster risks among municipalities</p>
		<p>Formulating resilient region through a redundant regional road network</p>
		<p>Building environment protection alliance for the regional wide natural environment among by urbanization against climate resilience</p>

Source: JICA Study Team

(2) Opportunities and Challenges for Cotabato City

Toward the future development of Cotabato City, opportunities and challenges for spatial development for the city are explained in Table 7.1-2, taking account of the roles and functions in

line with the higher spatial development strategies to be pursued effectively, which would facilitate a desirable development direction.

Table 7.1-2 Opportunities and Challenges for Spatial Development for Cotabato City

Upper Spatial Strategies	Current Status toward Future Spatial Development for Cotabato City	
	Opportunities	Challenges
Vulnerability Reduction	<ul style="list-style-type: none"> • Untapped lowland areas as green and water resources for agriculture, aquaculture, eco-tourism, and environment protection • Inevitable roles and function of green and open spaces for retarding, retention, and infiltration for the water drainage system 	Overcoming flood and storm surge prone areas as majority lowlands with increasingly with climate change circumstances
		Improving vulnerable urban structure including an informal settlement with flood risks toward resilient city formulation
		Coping with green areas depletion by urbanization against climate resilience
		Achieving a certain level of density to address future population increase without high-rise building development due to
Concentration	<ul style="list-style-type: none"> • Accumulation of commercial, business, and financial services supporting regional socio-economic activities • Accumulation of regional administrative facilities and institutions encouraging effective other business service generation • Potential human resource and basis by education and knowledge facilities accumulation 	Coping with available land scarcity for increased urban function demand for primary urban center
		Improving insufficient utility service and urban public services (schools, health services, etc)
		Enhancing management capacity for weak development control and management
		Improving traffic management and roads against traffic congestion and delayed road and transportation network to achieve sustainable transportation system
Connectivity	<ul style="list-style-type: none"> • Major crossroads of economic development corridors in BARMM and surroundings for strategic socio-economic development • Proximity to key logistics hub of the Awang Airport and Polloc Seaport for export and import • Islamic society linkage for the domestic and international potential market (e.g. Halal products) 	Improving insufficient access and services to economic production areas
		Formulating competitive tourism products and promotion to a domestic and international market
		Improving and enhancing business and production linkage to promote agro-industrial development

Source: JICA Study Team

7.1.2 Directing Spatial Development Greater Cotabato and City

(1) Regional Spatial Development Context for Greater Cotabato

Cotabato City shall serve as the institutional, financial, and commercial and services center of BARMM. It is also expected to influence the development of BARMM given its role as a regional center. It is thus important that Cotabato City establish efficient linkages with the more progressive economies of Davao, Northern Mindanao, and SOCSKSARGEN. This is also in line with the development plans of Mindanao (MSS/DF), BARMM, and Maguindanao Province and following the National Spatial Strategy (NSS) core strategies on concentration (regional agglomeration), connectivity, and vulnerability reduction. Also, Cotabato City as the regional center shall play a proactive role as it benefits from the outcomes of cooperation development stipulated in the BIMP-EAGA Vision 2025.

Having established the functional role of the Greater Cotabato Area with Cotabato City as spelled out in the various hierarchy of plans, the following key spatial development strategies shall be implemented following the interrelated strategies of concentration (regional agglomeration), connectivity, and vulnerability reduction.

1) Concentration (Regional Agglomeration) Strategy:

Concentration involves planning and managing increases in densities in settlements. It aims to improve access to greater opportunities arising from more economic activities, services, and amenities associated with urbanization; and reduce intrusion in environmentally critical areas.

Urban Centers: Following the Department of the Interior and Local Government (DILG) Guide to CDP Formulation, Cotabato City classified 33 out of its 37 barangays as Urban with a total population of 287,606 in 2015. Based on its CLUP, the city follows a spatial strategy that directs development away from the urban core (or city center) towards identified urban growth areas having their specialization. The urban center shall provide the facilities and services to the growth areas and serve as the external linkage to other adjoining municipalities, connected by road systems which are potential development corridors. According to the latest Bangsamoro Development Plan 2020-2022, Metro Cotabato almost like the Greater Cotabato area is designated as the agglomerated urban center consisting of Cotabato City and the other five municipalities of Parang, Sultan Mastura, Sultan Kudarat, Datu Odin Sinsuat, and Upi in Maguindanao Province. Cotabato City as a center for administrative and financial services shall be the primary urban center in Metro Cotabato. The said municipalities of Maguindanao are expected to play specific roles in promoting economic development in the corridor with Parang as a trade center along with Polloc Free Port and Special Economic Zone, Sultan Mastura and Sultan Kudarat as agri-industrial centers, Datu Odin Sinsuat as one subcenter with the airport and a university (MSU), and Upi for the agricultural production area.

Agri-industrial hub and ecotourism center: The local economy of Cotabato City is service-oriented dominated by trade, finance, transportation, and other services. While the sector posted the least share, the city has the potential for agri-industry development that could focus on Halal-related production to target the Islamic market. Cotabato City is rich in historical tourism but it is not a tourist-oriented locality. Several tourist attractions are worth seeing if only to learn something about the history of the city and the culture of its people. It is also endowed with natural and manmade physical attributes that are conducive to recreation, leisure, and other wholesome activities. Parang, Maguindanao, as one of Mindanao's sub-regional centers (MSS/DF), is host to the Polloc Free Port which was declared as Free Port and Special Economic Zone by the ARMM Government in March 2010. Parang, Maguindanao plays an important role in investment, trading, and commerce in the BARMM areas.

2) Connectivity Strategy:

South-Central Mindanao Development Corridor: The South-Central Mindanao Development Corridor, as one of the corridor development programs for Mindanao, is expected to play a key

role in encouraging the economic development of the South-Central Mindanao region composed of Region XII (all LGUs), Davao del Sur province (Region XI) and Maguindanao Province (BARMM). National Route No.75 is focused as the main corridor linking Cotabato City through Sultan Kudarat with Davao City as Metropolitan Center of Mindanao. The Bangsamoro Development Corridor refers to the southern part route which is No.1 (AH26) from Cotabato City to Davao City via General Santos City.

Mindanao Logistics Infrastructure Network (MLIN): The Mindanao Logistics Infrastructure Network (MLIN) is an initiative project to reduce logistics costs in Mindanao by improving linkage roads to key ports and production areas in Northern Mindanao, Davao, SOCCSKSARGEN, and Caraga regions. This project is nearly under the final stage to complete the relevant projects.

Mindanao Railway Project: The Mindanao Railway Project envisioned to link the major cities in Mindanao as a circumferential network is expected to improve physical connectivity within Mindanao. It shall serve as an alternative mode of the transportation system in Mindanao, reduce travel time, and increase opportunities for economic activities in Mindanao. The route is expected to go through Cotabato City and other towns in Maguindanao Province as a long-term program aside from the priority project in the Davao area.

New Airport Schemes: Regarding Section 5.2.7, three options were initially presented as potential sites for new airport development that would replace the existing Awang Airport due to technical constraints for expanding its capacity. The alternatives for a suitable location for the new airport development have been identified in the following areas: Cotabato City, Sultan Mastura Municipality in Maguindanao, or Malabang Municipality in Lanao del Sur.

3) Vulnerability Reduction Strategy:

Mindanao River Basin Flood Control Project: Based on the Integrated River Basin Master Plan for the Mindanao River Basin, several flood control projects had been prepared and supported by technical studies. The Ambal-Simuay River and Rio Grande de Mindanao Flood Control Project would play considerable roles in mitigating flood risks in Cotabato City and its surrounding areas at the mouth of Rio Grande de Mindanao River.

(2) Economic Development Direction for Greater Cotabato and City

Cotabato City is predominantly urban and is positioned as the service center and captive market of surrounding municipalities in the Greater Cotabato area. It is an institutional center serving as the administrative center for BARMM and an educational center with the presence of several colleges and a university. It is a financial center with a total of 17 banks of various classification including a Central Bank; and other investment and lending institutions. It remains a hub for commerce and trade, supported by economic enterprises like the mega-market, central city arcade, and slaughterhouse for both Halal and non-Halal products. Tourism services are improving with plans to prepare a 5-year City Tourism Development Plan that will feature regularly celebrated

religious and socio-cultural festivals and the operation of Visitor's Information Center at the old City Hall. Transportation and telecommunications amenities enhance the conveyance of people and communication in and out of the area. From the foregoing, Cotabato City has played a key role in providing major services (e.g. banking, tertiary education, retail and wholesale business) to surrounding municipalities in the Greater Cotabato area (see Section 5.1.C). These municipalities in Maguindanao Province played as leading producers of various agricultural commodities (e.g coconut, banana, palay, corn, livestock, poultry, fishery).

On the other hand, the city has several issues concerning economic development identified in Section 5.3 such as low production of primary sector industry (agriculture and fishery), limited secondary sector industry (food processing by SMEs), insufficient transport and infrastructure services against demands (e.g. power supply, water supply, logistic services) and insufficient tertiary sector industry (e.g. lack of efficient logistic function, insufficient tourism infrastructure against demand). From the gap analysis within Cotabato City and surrounding municipalities in the Greater Cotabato area, the following directions for economic development for Greater Cotabato and City are illustrated.

- **Key economic sectors to be enhanced:** Three vital fields in Greater Cotabato area, namely 1) agribusiness and agri-industry including aquaculture; 2) regional and international trade and distribution services; and 3) urban service industry; would contribute to strengthening the economic development for Greater Cotabato taking into account the advantages of the economic development corridors in association with transportation nodes of Polloc Seaport (and Timako Port once completed) and Awang Airport, and each economic competence of the city and municipalities. Also, tourism and recreational development is a promising sector which is one of the effective industry sectors not requiring large investments.
- **Enhancement of economic development cluster formulation for Greater Cotabato:** An economic cluster development can be influenced by the geographic concentration of horizontally and vertically connected establishments and institutions in each municipality and the city by fields, along with the irrelated government, academic and private sector stakeholders. The economic development cluster in Greater Cotabato aims at the concentration of economic activities around agriculture/aquaculture process or product and related products for which Cotabato City could contribute to the processing and distribution, rapid transmission of ideas and resources from a variety of sources boosting productivity and innovation including access to ICT, research and development (R&D), skilled workers, quality certification services to surrounding production areas. In terms of spatial strategy, the economic development clusters will be elements along the regional trunk roads with two transportation nodes of Polloc Seaport (and Timako Port once completed) and Awang Airport to embody the economic corridor development in Greater Cotabato.
- **Governmental support for economic development:** Governmental support to enhance economic development for Greater Cotabato is an essential element for improving and upgrading the investment environment including competitive infrastructure services and human resource

development, where further foreign direct investment (FDI) or domestic direct investment (DDI) would be attracted. Government support for nurturing Small and Medium Enterprises (SMEs) and micro-business is expected to be fostered through financial assistance, capacity empowerment for business management, market promotion, and technical innovation. Meanwhile, the primary industry (agriculture and fishery) needs to capacitate the farmers and fisherfolks on appropriate technology in farming, aquaculture and marine production with the provision of infrastructure support, cold chain/storage facility, farm mechanization, and technical assistance at each level of the production value chain.

(3) Greater Cotabato Spatial Development Direction

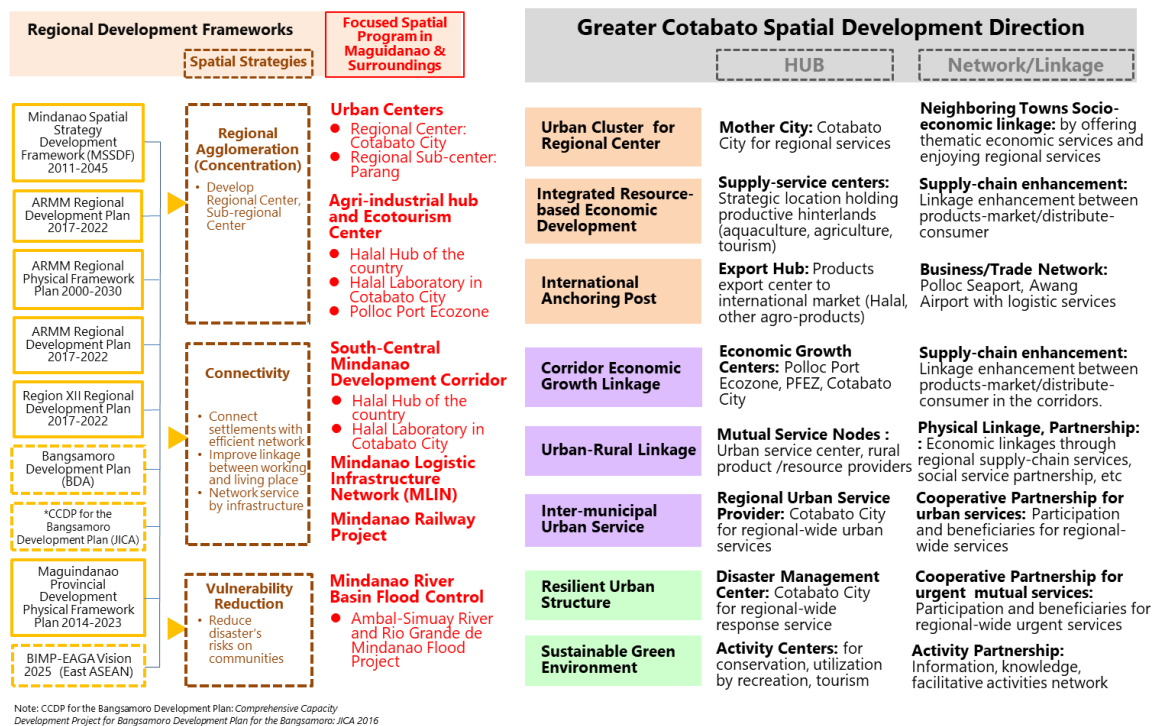
Although Cotabato City has played a key role in harnessing and promoting the regional socio-economic development, urban development in the surrounding towns of Cotabato City had slightly increased by current economic development demands. It is envisioned that the accumulation of economic activities at the regional center will be expanded gradually toward neighboring areas, which in turn could result in the expansion of urban areas of municipalities, and such expansion could be increased further in the future.

In this context, Cotabato City and surrounding urban areas could be organized as the Greater Cotabato in an integrated manner. The spatial development direction for the Greater Cotabato area can be illustrated in this view. According to the context of the regional spatial development strategies for relevant areas including the Greater Cotabato area, the directions of the spatial development of Greater Cotabato can be drafted as follows, taking account of spatial development elements of “Hub” and “Network/Linkage” and “Cluster” to be organized and formulated. The following and Figure 7.1-1 illustrate the overall spatial development directions in line with higher development frameworks.

- **Urban cluster for the regional center (Concentration):** The Greater Cotabato could be organized through urban clusters among relevant municipalities utilizing each characteristic and future potentials as development drivers in combination with surrounding production areas (e.g. agriculture production area, aquaculture area).
- **Integrated resource-based economic development (Concentration):** Maguindanao Province embracing the Greater Cotabato area as the central area of the province has competitive regional resources and is mainly utilized for agriculture and aquaculture development. The greater Cotabato could serve as the driver for economic development in combination with strengthening the center and its linkages.
- **International anchoring post (Connectivity):** The Greater Cotabato involves two important international transportation nodes through the Polloc seaport (and Timako Port once completed) and Awang airport linking with neighboring countries of ASEAN. This strategic position gives opportunities for promoting economic development through international trade (export and import).
- **Economic growth corridor linkage (Connectivity):** The South-Central Mindanao Development Corridor (SCMDC) and Bangsamoro Development Corridor (BDC) are expected to be the trigger

for promotion of the regional socio-economic development of Maguindanao Province including the Greater Cotabato area and BARMM overall. Strong measures to promote this corridor development is expected to be introduced.

- **Urban-rural linkage (Connectivity):** For the regional development, the socio-economic linkage between the urban area and rural area has become one of the considerable elements from both views of positive aspects (e.g. complementary relationship) and negative aspect (one-way migration to the urban area). Taking account of this linkage, the urban-rural network should be enhanced complementarily in the Greater Cotabato area.
- **Inter-municipal urban service (Connectivity):** Municipalities within a region have sometimes or periodically cooperative relationships such as wider urban services (e.g. waste management, water supply), especially on emergency occasions for disaster management. In this context, the municipalities could be organized to cooperate for common urban services as mutual beneficiaries.
- **Resilient urban structure (Vulnerability Reduction):** Although a single municipality should establish its prevention and mitigation measures against natural hazard risks (per RA 10121 series of 2010), the Greater Cotabato as a wider domain should also establish an effective resilient structure with cooperative mechanisms among municipalities.
- **Sustainable green environment (Vulnerability Reduction):** Lowland as natural wetlands with large rivers and mangrove forests with biodiversity are the potential natural environment of the Greater Cotabato area. This natural or green environment including aquaculture and agriculture areas could be utilized judiciously and sustainably.



Source: JICA Study Team, Relevant Development Plans in conjunction with Mindanao, BARMM, Maguindanao Province

**Figure 7.1-1 Overall Direction for Spatial Development Direction of Greater Cotabato Area
Spatial development direction of Cotabato City**

1) Role and Function in Greater Cotabato Spatial Development Direction

To advance the spatial development direction for Greater Cotabato, Cotabato City is expected to play a pivotal role in triggering a chain reaction of the development in the Greater Cotabato area. Based on the direction of spatial development for the Greater Cotabato area, roles and functions for Cotabato City are illustrated in Table 7.1-3.

Table 7.1-3 Roles and Functions of Cotabato City in Greater Cotabato Spatial Development Direction

Spatial Development Direction for Greater Cotabato Area	Roles of Cotabato City in the Spatial Development Direction	Spatial Function	
		Hub	Network/Linkage
1. Urban cluster for the regional center	<ul style="list-style-type: none"> Major cluster for commercial business and financial Center of network of services, knowledge resources 	●	--
2. Integrated resource-based economic development	<ul style="list-style-type: none"> Center for network of agro-industrial technology, research development, and services 	○	○
3. International anchoring post	<ul style="list-style-type: none"> Center for Halal business and industries Communication and exchange network center 	●	○
4. Economic growth corridor linkage	<ul style="list-style-type: none"> Center for various service providers in the corridor development for Greater Cotabato 	●	--
5. Urban-rural linkage	<ul style="list-style-type: none"> Center for socio-economic development as various service provider for Greater Cotabato 	○	--
6. Inter-municipal urban service	<ul style="list-style-type: none"> Utility service provider for neighboring municipalities 	○	--
7. Resilient urban structure	<ul style="list-style-type: none"> Center for disaster risk management 	●	●
8. Sustainable green environment	<ul style="list-style-type: none"> The activity center for environment protection and eco-tourism (information, accommodation) 	●	○

Note: ● = leading function, ○ = supplemental or supportive, -- = equivalent status to other municipalities

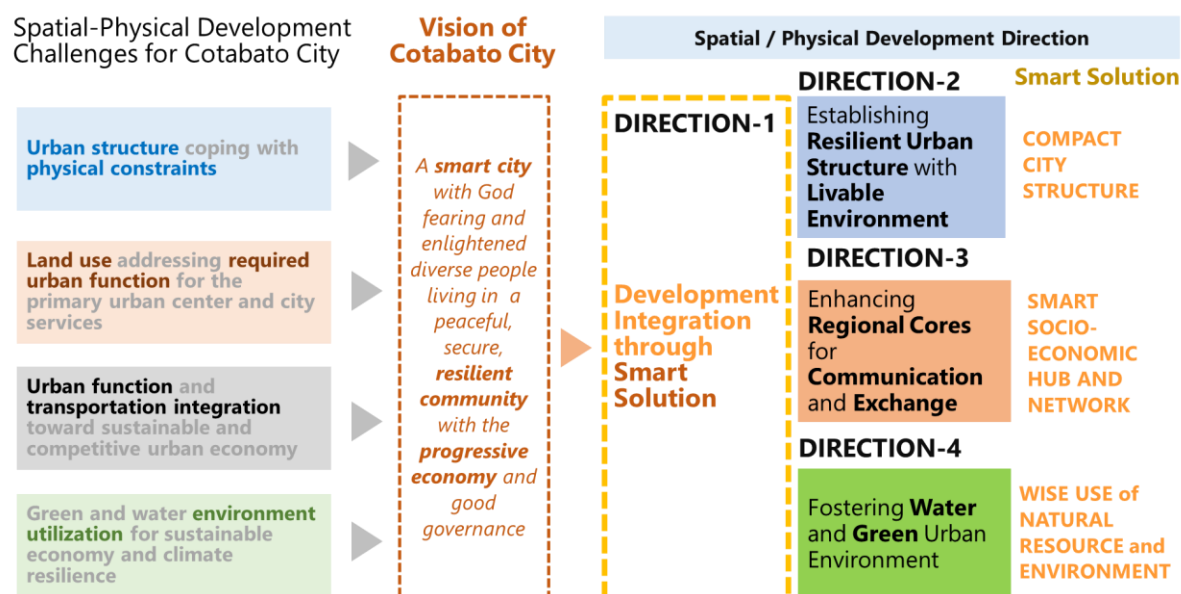
Source: JICA Study Team

2) Spatial Development Directions to Embody the Vision of Cotabato City

Looking into the city level of development, Cotabato City intends to become a “smart city”. Several strategies are spelled out to address the spatial development challenges and to embody the vision through the formulation and integration of the smart solution in various sectors for strategic implementation. The strategies are as follows.

- **Direction 1: Development integration through the smart solution:** The vision of Cotabato City to be a “smart city” could be achieved through increased communication linkages among settlements and key production areas (put up ICT infrastructure and improve digital connectivity) and rational use of natural environment and resources supported by ICT.
- **Direction 2: Establishing a resilient urban structure with a livable environment:** Cotabato City should establish a resilient urban structure to prevent and mitigate natural hazard risks and improve public safety and living environment to have a secure community life.
- **Direction 3: Enhancing regional cores to promote communication and exchange:** The city shall serve as the ICT hub for improved connectivity among human resources, production goods, market centers, the public transportation system (bus and mini-bus system), and information exchange to increase access to economic opportunities and a wider range of services.

- **Direction 4: Fostering water and the green urban environment:** Water and green areas characterize the natural environment of the city. Mangrove strips shall be grown along riverbanks and a marine fish sanctuary established. As the city is prone to flooding given its physical configuration, the stormwater drainage system should be managed sufficiently.



Source: JICA Study Team

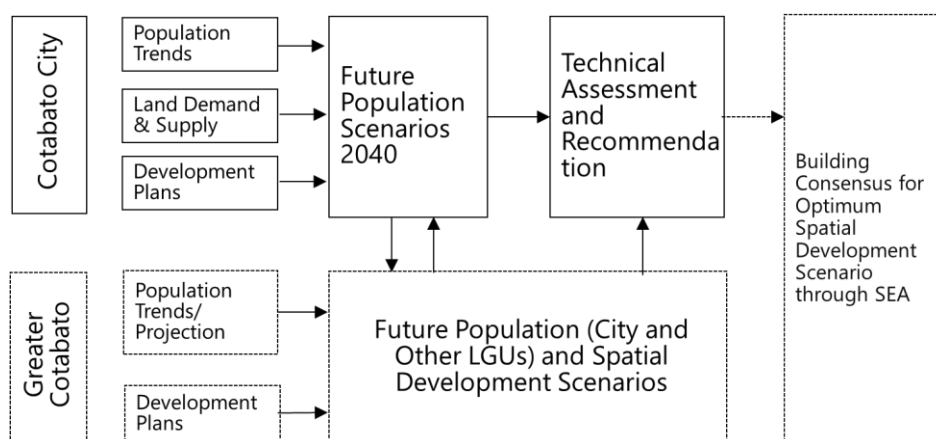
Figure 7.1-2 Spatial Development Directions for Cotabato City

7.2 Alternative Growth Scenarios for Greater Cotabato and Cotabato City

7.2.1 Approach and Assumptions for Growth Scenarios

(1) Approach to Formulating Spatial Development Scenario

- **Purpose:** Spatial development scenario for Greater Cotabato and Cotabato City aims to identify the most appropriate spatial development direction through formulating plausible variables of spatial structure for Greater Cotabato and Cotabato City. One of the important processes in scenario planning is to organize stakeholder’s involvement to verify the spatial development scenarios through the Strategic Environment Assessment.
- **Target year on 2040:** The development scenario is examined by conceptual spatial structures with urban functions and networks toward the long-term target 2040 including the mid-term target 2028 for the population framework for the Greater Cotabato area and Cotabato City.
- **The planning process for spatial development scenario:** Alternative spatial development scenarios are formulated by interactive examination process of alternative directions between Cotabato City and Greater Cotabato area, taking account of the significant role of Cotabato City in the Greater Cotabato area in terms of the scale of population and urban functions. Therefore, the status of the future development scenario of Cotabato City could be a determinant factor to formulate the spatial development scenario of the Greater Cotabato area.



Source: JICA Study Team

Figure 7.2-1 Planning Process of Alternative Spatial Development Scenarios and Assessment for Greater Cotabato and City

(2) Assumption of Development Scenario

- Higher development frameworks, plans, projects, and programs by the government are incorporated into the development alternative as preconditions for scenario planning, especially for potential improvement of Cotabato City with vulnerable conditions physically by the Ambal-Simuay River and Rio Grande de Mindanao Flood Control Project /ASRGMR-FCP, etc.
- Although the formulation of the socio-economic development framework for the Greater Cotabato area and Cotabato City is described in detail in Chapter 8, this spatial development scenario treats population frameworks in advance as the basis of the spatial framework with several assumptions for setting them, as described in Chapter 9.

7.2.2 Spatial Development Scenarios of Greater Cotabato and Cotabato City

(1) Formulation of Alternative Spatial Development Scenarios

Alternatives for Cotabato City spatial development are examined and formulated as the first step in developing three population growth options (low, medium, high growth). Cotabato City would play a determinant role in directing future growth of the Greater Cotabato area whether the city would grow by a predominant status in terms of volume of population and economic development in the Greater Cotabato area or medium or small level of growth. On the contrary, the rest of the population of other municipalities in the Greater Cotabato is set varying in inverse proportion to Cotabato City, as the population framework of the Greater Cotabato area is fixed as the target population framework. In this premise, three alternative spatial development scenarios are set as shown in Table 7.2-1.

Table 7.2-1 Three Alternative Scenarios for Spatial Development for Greater Cotabato and City

Spatial Development Scenario	For Cotabato City		For Greater Cotabato Area	Population Growth excluding the City
		Population Growth		
SCENARIO 1	Strict Urban Growth Control	Low	Multi-Polar Urban Centers	High
SCENARIO 2	Intermediate Growth	Medium	Single-polar with Peripheral Barangays	Medium
SCENARIO 3	Accelerating Growth	High	Single-polar by Cotabato Urban Center	Low

Source: JICA Study Team

(2) Population Growth for Alternative Spatial Development Scenarios

The future population growth options of Cotabato City in the target years of 2028 and 2040 are set as the first step assuming low growth ratio (1.86% Annual Average Growth Rate: AAGR), medium growth case (2.93%), and high growth (3.63%) through validating the land supply capacity of the city. The population framework for the Greater Cotabato area is set based on the population framework (1,287,100 population) setting at the level of BARMM and Maguindanao province. Based on the future population growth options of the city and the framework of the Greater Cotabato area, the population for other municipalities is set as the remaining population within a total population of the Greater Cotabato area.

Table 7.2-2 Three Alternative Scenarios for Spatial Development for Greater Cotabato and City

	Greater Cotabato Area	2028	2040	share	AAGR 2015-2040
SCENARIO 1	Cotabato City	380,500	474,700	37%	1.86%
	Other Municipalities	589,000	812,400	63%	3.17%
	Total	969,500	1,287,100	100%	--
SCENARIO 2	Cotabato City	435,700	615,900	48%	2.93%
	Other Municipalities	533,800	671,200	52%	2.38%
	Total	969,500	1,287,100	100%	--
SCENARIO 3	Cotabato City	505,000	818,000	64%	3.63%
	Other Municipalities	464,000	469,100	36%	1.62%
	Total	969,500	1,287,100	100%	--

Source: JICA Study Team

(3) Alternatives for Greater Cotabato Spatial Development Scenario in 2040

Based on the development scenarios in association with their population growth targets, three alternative spatial development scenarios for the Greater Cotabato are illustrated by conceptual spatial structural diagrams with each opportunity and threat shown in the following Table 7.2-3 in detail with descriptions about opportunities and threats on each alternative.

- **Scenario 1: Multi-polar Urban Centers** (with strict urban growth control for Cotabato City): This alternative scenario aims to formulate balanced and collaborative socio-economic development in the Greater Cotabato area by the multi-polar urban center concept, where every local government will maximize existing and future economic development potential for aquaculture, agriculture and nature tourism, other potential industries and business having the geographical advantage, and basic urban services taking account of mutual-sustained public service in a mutually complementary form in the Greater Cotabato area.
- **Scenario 3: Single-polar by Cotabato Urban Center** (with accelerating growth for Cotabato City): Scenario 3 as the opposite side of Scenario 1 aims at formulating predominantly an urban center in the Greater Cotabato area similarly followed by the current regional structure, where many public and economic services excluding primary economic production (agriculture and aquaculture) will be concentrated and enhanced in Cotabato City.
- **Scenario 2: Single-polar with Peripheral Barangays** (with intermediate growth for Cotabato City): This alternative scenario will take an intermediate position between Scenario-1 and Scenario-3, aims to utilize effectively the current urban functions and roles with a decent scale of socio-economic development involving neighboring barangays where interactive socio-economic activities (e.g., work place-living place, public urban services) between the city and neighboring barangays could be promoted positively.

Table 7.2-3 Alternative Spatial Development Scenarios for Greater Cotabato 2040

Opportunities		Threats	Conceptual Diagram of Spatial Structure 2040
Scenario 1: Multi-polar Urban Centers (with strict urban growth control for Cotabato City)			
Cotabato City	<ul style="list-style-type: none"> Flexible land management keeping sufficient space for expansion Minimize disaster risk by less exposure (settlement) in lowland flood risks Sustainable urban service without excessive burden 	<ul style="list-style-type: none"> Weakening competitiveness of economic development by possible competitors of other LGUs Draining labor resource to other working places in other LGUs 	
Greater-Cotabato Area	<ul style="list-style-type: none"> Sustain mutual socio-economic development for LGUs maximizing own potential resources and characters, and in a mutually complementary form for public services Convenient basic urban service within each LGU 	<ul style="list-style-type: none"> Possible insufficiency of urban services and management capability in small LGU unless government supports and provides assistance Potential negative socio-economic impacts by urbanization and large investments unless managed appropriately 	
Scenario 2: Single-polar with Peripheral Barangays (with intermediate growth for Cotabato City)			
Cotabato City	<ul style="list-style-type: none"> Possible enhancement of business opportunities for adjacent barangays Utilizing lands for settlement by adjacent barangays for flexible land growth management Possible scenario followed by current relation and status in a natural manner 	<ul style="list-style-type: none"> Possible further concentration to City by an increase of economic activities, urban service convenience, and job opportunities Possible urban service defrayment by adjacent barangays of other municipalities Possible constraints of administrative services and policies by different administration 	
Greater-Cotabato Area	<ul style="list-style-type: none"> Optimize socio-economic service investment in a decent scale of development for each LGU Less environmental deterioration, self-sustained socio-economic development for each LGU 	<ul style="list-style-type: none"> Possible uncontrollable urban sprawl expansion in adjacent barangays unless administrative capacity is enhanced in each LGU Weakening urban service capability of adjacent barangays of Cotabato City 	
Scenario 3: Single-polar by Cotabato Urban Center (with accelerating growth for Cotabato City)			
Cotabato City	<ul style="list-style-type: none"> Strong competitive economic development having the advantageous service accumulation of the city Enhancement of representative status and function of Regional Center Generating mutual effects to attract more investment 	<ul style="list-style-type: none"> Deterioration of living environment quality by potential hazards, inadequate urban service Generating considerable traffic congestion and associated negative impacts on socio-economic activities and urban environment 	
Greater-Cotabato Area	<ul style="list-style-type: none"> Minimize socio-economic service investment in other LGUs because of the main service provided by the city Less environmental deterioration in surrounding municipalities by small urbanization 	<ul style="list-style-type: none"> Unbalanced administrative services and financial capacity by maintaining smaller LGU comparatively and large LGU of Cotabato City Insufficient urban service and amenity in surrounding LGUs Less infrastructure investment for living place in each LGU 	

Source: JICA Study Team

7.2.3 Assessment of Growth Scenarios and Preferred Development for the Greater Cotabato Area

(1) Assessment of Three Alternative Growth Scenarios and Evaluation

The three alternative spatial development scenarios (2040) for the Greater Cotabato area are assessed qualitatively but with some quantitative values by several criteria, taking account of the principles for appropriate urban structure and urban functions based on the spatial development directions afore-mentioned. The assessment result with an optimum scheme and the assessment process will be validated through the Strategic Environmental Assessment (SEA) involving relevant stakeholders with their opinions and suggestions to be reflected in the schemes.

1) Assessment Criteria

Assessment criteria to evaluate the three alternative growth scenarios of the Greater Cotabato area are set out in consideration with the following categories of criteria. As there may be two different views from Cotabato City or Greater Cotabato area by the different perspectives, this assessment focuses on the review of common merits for municipalities mainly in the Greater Cotabato area to find an optimum development direction in terms of the integrated development of the Greater Cotabato area, while the spatial development direction of Cotabato City is assessed separately from the city view mentioned in the later section. Finally, two assessments of the Greater Cotabato area and Cotabato City will be combined and evaluated.

- **Consistency with the policies and higher framework and plans:** in terms of the frameworks, spatial structure, in higher development plans are the framework of assessment criteria.
- **Compatibility with the development directions:** based on the three spatial strategies (urban agglomeration/concentration, connectivity, vulnerability reduction by relevant higher development plans).
- **Sustainability in urban mobility and economic development:** addressing global development issues (e.g., Sustainable Development Goals, Climate Change Adaptation).
- **Adaptability to the livable living environment:** in terms of appropriate urban services and quality of life.
- **Propriety of conceivable public management and investment:** taking account of the assumed magnitude of development and management capacity of the public sector to achieve each scenario.

2) Measure for the Assessment and Result

Assessment criteria assess three alternative growth scenarios through qualitative measure with a scoring indicator (five degrees 1 to 5) by positive value (max. 5 points). Every criterion is given by score through qualitative assessment and they are aggregated as total scores. Consequently, the alternative scenario with the highest score is considered as the most favorable scenario for the spatial development direction of the Greater Cotabato area. Table 7.2-4 shows the score sheet by each criterion and aggregated scores by each alternative spatial development scenario.

Table 7.2-4 Assessment of Three Alternative Scenarios by Assessment Criteria

Category of Criteria		Assessment Criteria		Alt-1:	Alt-2:	Alt-3:
Consistency with the higher spatial framework and plans	Regional Physical Frameworks and Plans	Latest BARM Regional Development Plan 2020-2022		5	3	2
		Regional physical framework plans and other RDPs		3	3	2
Compatibility to Development Direction (in line with higher frameworks)	Urban Agglomeration/ Concentration	Land Capacity / Land Requirement	Space flexibility to address variable urban function in each LGU	5	3	4
			Sufficient lands without vulnerable physical conditions (except Cotabato City)	3	4	5
			Less burden of a land requirement for public service demand in each LGU	2	3	4
		Sustainable and Competitive Economic Development	Efficient formulation of economic cluster development	5	3	2
			Attractive commercial and business area accumulation	3	4	5
			Contribution to job creation and convenient access to industrial areas in each LGU	5	3	2
	Connectivity	Sustainable Urban Mobility	Contribution to efficient intra-commuting transport formulation in each LGU	5	3	2
			Contribution to efficient access to economic activity areas in each LGU	5	3	2
			Contribution to the promotion of inter-LGU road network and public transportation system	5	3	2
		Efficient Infrastructure Service	Contribution to the formulation of cooperative or common utility service system	3	5	2
	Contribution to the betterment of the utility system within each LGU		5	3	2	
	Vulnerability Reduction	Preventive structure against hazards risks	Regional resiliency against water hazards by a degree of exposure (settlement)	5	3	2
			Contribution to regional resiliency by balanced structure (green and settlement)	5	3	2
		Flexibility and Redundancy of urban structure	Advantage in enabling flexible disaster risk management by regional response	4	4	3
			Contribution to formulation of redundant regional road network	5	4	3
		Climate Change Adaptation	Contribution to sufficient green space for biodiversity and retention area in each LGU	5	3	4
			Contribution to climate change adaptation by agriculture and aquaculture areas	5	3	4
	Adaptability to Livable Community Environment	Attractive living environment	Advantage in effective accessibility to urban services in each LGU	5	4	3
Advantage in creating recreational open spaces and proximity to settlement in each LGU			5	4	3	
Quality of the living environment		Advantageous structure in mitigating transportation pollution as a whole	4	3	2	
		Advantage in protecting natural and historical spaces in each LGU	4	3	3	
Propriety of conceivable public management and investment	Ease of urban growth control	Manageability to control urban sprawl and development in each LGU	5	4	3	
		Manageability to cope with increased urban service in each LGU	5	4	2	
	Propriety of Investment	Degree of contribution to lean public investment in each LGU	3	4	5	
Total score				114	89	75

Note: Alt1: Scenario 1: Multi-polar Urban Centers, Alt-2: Single-polar with Peripheral Barangays, Alt-3: Single-polar by Cotabato Urban Center
Source: JICA Study Team

3) Aggregated Assessment and Evaluation of Growth Scenarios for the Greater Cotabato area

- Scenario-1 is evaluated as the most favorable spatial development structure for the Greater Cotabato area with the highest score on the overall assessment in all criteria as compared with other scenarios followed by Scenario-2 and Scenario-3 having the lowest score.
- Although there are difficulties in assessing qualitatively without certain quantitative measures and different quality of criterion among categories, the multi-polar urban center development in Scenario-1 is considered to address the contemporary issues globally taking into account

sustainability, climate change adaptation, decentralization of local governance, and equitable development opportunity among municipalities in the Greater Cotabato area.

- On the other hand, even if another alternative scenario is selected, every scenario requires well-organized development management with prudent growth control measures and promotion of private investment and inevitable infrastructure services. Specifically, Scenario-1 will require strong growth control and management to prevent urban sprawl and sufficient support and assistance by the central government on other municipalities particularly the underdeveloped municipalities to meet future desirable development status toward 2040.

7.2.4 Possible Spatial development Direction of Cotabato City

(1) Cotabato City Spatial Development Alternatives in Combination with Alternative Growth Scenarios of Greater Cotabato

As mentioned in 7.2-1 (1) Formulation of alternative spatial development scenarios, the alternative spatial development scenarios are formulated in combination with both growth options between Cotabato City and the Greater Cotabato area. Based on this scenario formulation, the alternative spatial development directions of Cotabato City are formulated as favorable combinations with each alternative scenario of the Greater Cotabato area as shown below and in Table 7.2-5. However, it should be noted that the alternative spatial development within Cotabato City will not impose a limited spatial direction toward 2040 in terms of potential development space for the future reserved area under specific conditions if development constraints (e.g., technical, and environmental constraints, policies and finance) are resolved.

Table 7.2-5 Three Alternative Scenarios for Spatial Development for Greater Cotabato and City

Cotabato City		Greater Cotabato Area	
Direction-1	Focused Urban Growth	SCENARIO 1	Multi-Polar Urban Centers
Direction-2	Dual Urban Growth	SCENARIO 2	Single-polar with Peripheral Barangays
Direction-3	Accelerating Growth	SCENARIO 3	Single-polar by Cotabato Urban Center

Source: JICA Study Team

- **Direction 1: Focused urban growth** (under Multi-polar Urban Centers scenario): This alternative direction aims to limit to urban development area in Cotabato City by current urban area and some expansion maximizing existing urban assets and stocks, where urban settlement will be secured by dikes and dike roads against flood risks by the flood control project¹. This direction is expected to embody the concept of “Compact City” to achieve sustainable urban development by the most decent development scale in association with the lowest population growth case.
- **Direction 2: Dual urban center** (with a Single-polar with Peripheral Barangays scenario): This direction considers peripheral barangays in adjacent other municipalities (Sultan Kudarat and Datu Odin Sinsuat) with socio-economic ties under the urban center of Cotabato City followed

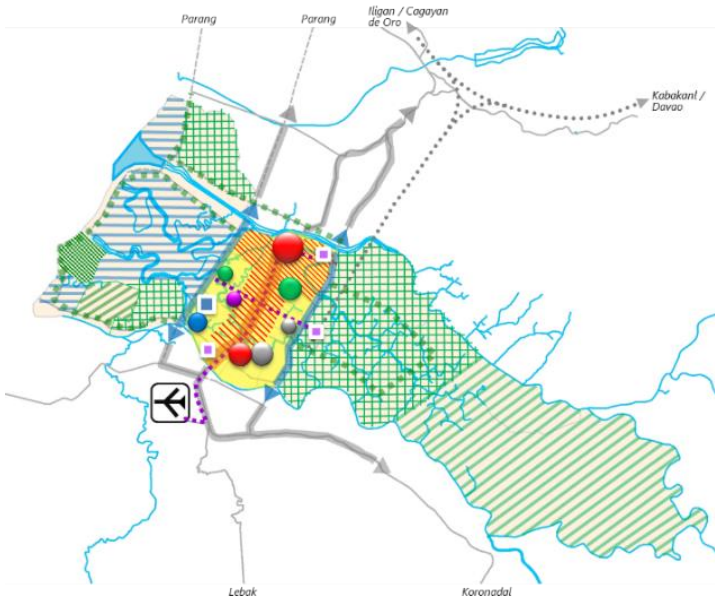
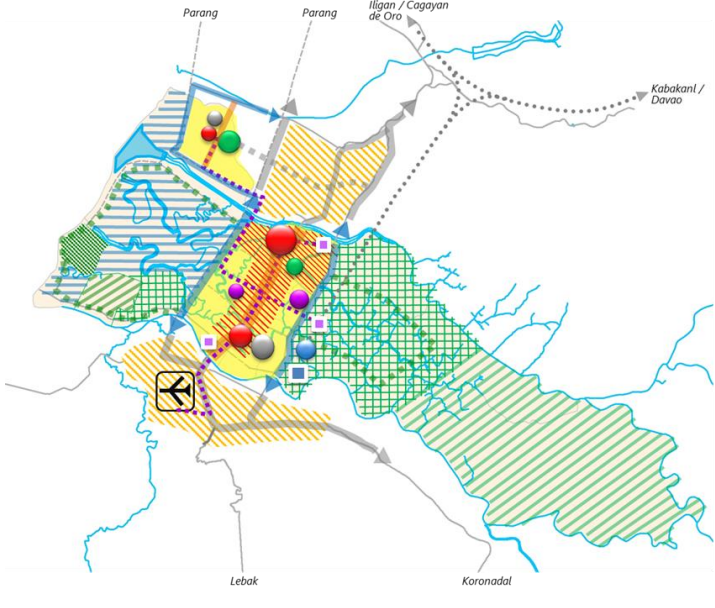
¹Ambal-Simuay River and Rio Grande de Mindanao River Flood Control Project / DPWH

by the current circumstance, where peripheral barangays could contribute to settlement provision as commuting areas while urban services could be provided by the city. The spatial development considers another urban development area in the city's jurisdiction beyond Rio Grande de Mindanao River with harmonized development by common utility provision (e.g., water supply, solid waste management) with other adjacent barangays in other municipalities of Sultan Kudarat. It should be noted that this urban development expansion is considered as one of the beneficial areas by the flood project.

- **Direction 3: Omnidirectional urban growth** (with Single-polar by Cotabato Urban Center scenario): This spatial development direction aims to accommodate the large land demand in the case of the largest future population growth, taking account of maximization of inhabitable lands secured by necessary dikes and dike roads in combination with one urban expansion area beyond Rio Grande de Mindanao river and another urban expansion area beyond the Eastern Diversion road, where there have been developed by some new urban settlements and the waste disposal area. Therefore, this expansion requiring another dike and dike road is necessary to consider the technical possibility in terms of flood and financial viability of double investments in dikes, although this expansion could be a further possibility of urbanization beyond 2040 unless future population becomes the decent scale of growth in future.

Based on the three development directions above mentioned, three alternative spatial development schemes for Cotabato City are illustrated by conceptual spatial structural diagrams with development characteristics shown in the following and Table 7.2-6 in detail with descriptions on each development direction.

Table 7.2-6 Spatial Development Directions for Cotabato City (1)

Spatial Development Alternative	Characteristics of Alternative Scheme
<p>Direction-1: Focused Urban Growth with Scenario-1: Multi-polar Urban Centers for Greater Cotabato Area</p> 	<ul style="list-style-type: none"> This scheme limits the urban area to the area within the current urban area and its adjacent areas, where all developments are required to formulate the most compact development by efficient land use for settlement and commercial-business among the alternatives. Outside areas dedicated to economic development areas for agriculture, aquaculture, and natural environmental conservation areas, where service road needs to be installed. <div style="margin-top: 10px;"> <p>Settlement</p> <ul style="list-style-type: none"> Residential Use Zone Mixed Use Zone <p>Urban Service Hub</p> <ul style="list-style-type: none"> CBD Core CBD-Sub-center Corridor Commercial & Business Government/Institution Hub Health & Medical Hub Knowledge Hub <p>Economic Development</p> <ul style="list-style-type: none"> Agroindustry Service Aquaculture Development Industry Hub Development <p>Network and Node</p> <ul style="list-style-type: none"> Primary Road with Dike Public Transportation Passenger Node Logistic Node Industry Service Access Circumferential Railway <p>Nature Conservation</p> <ul style="list-style-type: none"> Wetland Conservation Forest Protection </div>
<p>Direction-2: Dual Urban Growth with Scenario-2: Single-polar Peripheral Barangays scenario for Greater Cotabato Area</p> 	<ul style="list-style-type: none"> This scheme involves the potential urban development area across the Rio Grande de Mindanao river to be added to the urban area of Direction-1, where a flexible expansion of an urban function in the long-term future. The industrial area can be formulated close to dike roads with preventive measures from flood risk. Transportation nodes (intercity bus terminals, logistics centers) are located close to gate areas from outside of the city as common measures among three alternatives. <div style="margin-top: 10px;"> <p>Settlement</p> <ul style="list-style-type: none"> Residential Use Zone Mixed Use Zone <p>Urban Service Hub</p> <ul style="list-style-type: none"> CBD Core CBD-Sub-center Corridor Commercial & Business Government/Institution Hub Health & Medical Hub Knowledge Hub <p>Economic Development</p> <ul style="list-style-type: none"> Agroindustry Service Aquaculture Development Industry Hub Development <p>Network and Node</p> <ul style="list-style-type: none"> Primary Road with Dike Public Transportation Passenger Node Logistic Node Industry Service Access Circumferential Railway <p>Nature Conservation</p> <ul style="list-style-type: none"> Wetland Conservation Forest Protection </div>

Source: JICA Study Team

Table 7.2-7 Spatial Development Directions for Cotabato City (2)

Spatial Development Alternative	Characteristics of Alternative Scheme
<p>Direction-3: Omnidirectional Urban Growth with Scenario-3: Single-polar by Cotabato City</p>	<ul style="list-style-type: none"> • This scheme aims to maximize the urban area of all possible inhabitable areas secured by dikes and dike roads, where all developments enable to formulate the largest development to enhance urban functions as single polar development in Greater Cotabato area. • Outside areas dedicated to economic development areas for agriculture, aquaculture, and natural environmental conservation areas as the smallest area among Directions.

Source: JICA Study Team

(2) Assessment of Three Alternative Directions and Overall Evaluation

The three spatial development alternative directions (schemes) for Cotabato City are assessed similarly to Greater Cotabato with certain development criteria, taking account of the principles for land use and urban function based on the spatial development directions afore-mentioned. The results of the assessment are combined with assessments for the alternative spatial development scenarios for the Greater Cotabato area as overall assessment and evaluation.

1) Assessment Criteria

Assessment criteria for three alternative directions are set out in consideration of compatibility to the principles of land use and urban function in line with the development strategies. The categories of criteria are composed of:

- **Compatibility** to development direction which is mentioned in the previous section.
- **Consistency with the policies and higher framework and plans:** including the vision and programs (relevant regional plans, CDP 2017-2022, CLUP 2011-2020 and other sector plans) reflected as one of the city's political outputs.
- **Advantage or strength in formulating resilient urban structure:** against natural hazard risks.
- **Sustainability in urban mobility and the natural environment:** taking account of economic development and current global environmental issues.
- **Adaptability to the livable living environment:** in terms of appropriate urban services and quality of life.

- **Propriety of conceivable public management and investments:** for developments in the case of each alternative direction

2) Measure for the Assessment and Result

The same measure for the alternative scenarios of the Greater Cotabato area is applied to this assessment. Table 7.2-8 shows the score sheet by each criterion and aggregated scores by each alternative spatial development scenario.

Table 7.2-8 Overall Evaluation of Three Alternatives by Assessment Criteria

Category of Criteria		Assessment Criteria	Dir-1:	Dir-2:	Dir-3:
Compatibility to Development Direction	Compact city structure	Advantage in enabling efficient urban form to minimize spatial development	5	3	2
	Smart hub and intra-network formulation	Advantage in enabling infrastructure and transport to make efficient connectivity by hub and intra-network	3	4	4
Consistency with the policies and higher framework and plans	Three Spatial Strategies by Regional Development Plans	Contributing to 1) Urban Agglomeration	3	4	5
		Contributing to 2) Connectivity	3	4	3
		Contributing to 3) Vulnerability Reduction	5	4	2
	Cotabato City Development Policy	City Vision (Smart City with peace, secure, resilient community, progressive economy, and good governance)	4	3	2
Consistency with development framework (future population) proposed by the city		5	3	2	
An advantage in formulating Resilient Urban Structure	Preventive structure against hazards risks	Water hazard resiliency (flood, tsunami, storm surge)	5	4	3
		Other hazards (earthquake, ground subsidence)	3	3	3
	Flexibility and Redundancy of urban structure	Advantage in enabling flexible disaster response	4	4	3
		Land capacity to absorb future population demand	3	4	5
		Space flexibility to address variable urban function	3	4	5
		Space capacity to create sufficient green and open space	5	4	3
Sustainability in urban mobility and natural environment	Sustainable Urban Mobility	Handle ability for environmental-friendly mobility	5	4	3
		Compact access to urban facilities	5	3	2
	Adaptability to Global Climate Resilience	Adequacy of green space including agriculture for biodiversity and local climate conditions	5	4	2
		Advantage in formulating green infrastructure	5	4	3
	Economic development sustainability	Environmental-friendly industrial area including access	3	3	3
		Degree of contribution to the generation of job opportunities and business development	3	4	5
Adaptability to a livable environment	Attractive living environment formulation	An advantage in effective accessibility to urban services and utility services	5	4	3
		Advantage in creating green and open spaces	3	3	2
	Quality of environment	Advantageous structure in mitigating urban pollution	4	3	2
		Advantage in protecting natural and historical spaces	3	3	2
Propriety of conceivable public management and investments	Easiness urban growth control	Manageability to control urban sprawl and development	5	4	3
		Manageability to cope with increased urban service	5	4	2
	Propriety of Investment	Degree of contribution to lean public investment	4	3	2
		Total score	106	94	76

Note: Dir: Direction

Source: JICA Study Team

3) Aggregated Assessment and Evaluation of Growth Scenarios for Cotabato City

- Direction-1 was evaluated and obtained the highest score aggregated by all scores to all criteria as the most favorable spatial development direction of Cotabato City over other directions followed by Direction-2 and Direction-3 with the lowest score.
- One of the important factors for the assessment is the current policy of the city consistent with the population framework issued currently by the lower population growth target in line with the Comprehensive Development Plan, which may not require a larger land area for urban settlement fitting with Direction-1.
- This assessment and evaluation of three alternative directions are based on hypothetical conditions, such as the railway project as uncertain factors. Therefore, Direction-2 and Direction-3 may have rooms to cope with an unexpected change of future population and demand toward 2040 or beyond 2040. From this consideration, the urban area proposed in Direction-2 and Direction-3 would enable Cotabato City to treat the land supply as a future reserved area for future expansion beyond 2040.

7.2.5 Overall Evaluation of Favorable Spatial Development Direction for Greater Cotabato Area and Cotabato City

Based on the aggregated scores of the two assessment of alternative scenarios for the Greater Cotabato area (focused municipalities) and alternative direction for Cotabato City, the overall assessment scores are generated. Based on the results, Scenario 1 as Multi-polar Urban Center for Greater Cotabato area in combination with Direction 1 as Focused Urban Growth for Cotabato City is found to be the most favorable development direction toward 2040.

Table 7.2-9 Overall Assessment of Three Alternative Scenarios for Spatial Development for Greater Cotabato and City

Cotabato City		Aggregated Score	Greater Cotabato Area		Aggregated Score	Overall Score
Direction-1	Focused Urban Growth	106	SCENARIO 1	Multi-Polar Urban Centers	114	220
Direction-2	Dual Urban Growth	94	SCENARIO 2	Single-polar with Peripheral Barangays	84	178
Direction-3	Accelerating Growth	76	SCENARIO 3	Single-polar by Cotabato City Urban Center	79	155

Source: JICA Study Team

7.3 Strategic Environmental Assessment

7.3.1 Framework of a Strategic Environmental Assessment

(1) Scope

The general purpose of a Strategic Environmental Assessment (SEA) is “to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programs to promote sustainable development”².

The implementation of the SEA in the Project allows the BTA, city government, and the public to consider and integrate environmental considerations as well as social and economic aspects in the early stages of master planning for the Project. The SEA can complement the Environmental Impact Assessment (EIA) and the Environmental Management Plan (EMP) at a future project formation stage, and avoid, reduce, or minimize environmental impacts. The combination of the SEA, EIA, and EMP also makes it possible to reduce social, economic, and environmental costs and the time it may take to complete the Project significantly.

(2) Project and the SEA

The JICA Guidelines for Environmental and Social Considerations (2010) require the implementation of an SEA for a master plan study, and the Project conducts the SEA accordingly.

The Project consists of three phases: (1) Urban Infrastructure Development in Greater Cotabato City, (2) sector-wise plan studies, and (3) action plan studies on priority projects. The studies are a preliminary study to consider future project implementation.

The SEA is implemented as part of the Master Plan Study, and the data collected for the SEA are used for environmental and social considerations in sector-wise plan studies and the action plans.

(3) Objectives and Benefits of the SEA

The objectives of the SEA are as follows:

- Help the BTA promote sustainable development of the Greater Cotabato City;
- Avoid, mitigate, and minimize negative environmental impacts and cumulative environmental impacts, and enhance positive impacts; and
- Strengthen and support the implementation of environmental and social considerations at the planning stage.

The following are the SEA’s benefits.

- Making the formulation process more effective through better decision-making for evaluating the master plan;
- Providing the BTA and other stakeholders with an opportunity to exercise and experience a SEA process and understand its effectiveness in decision-making; and

² Guidelines for Strategic Environmental Assessment of Spatial Plans: Municipal Spatial Planning Support Programme in Kosovo (United Nations Human Settlements Programme, 2014)

- Enhancing the capacity of the BTA, city government, and other related agencies for undertaking environmental and social considerations and the SEA.

(4) Study Area

The study area of the SEA is the same as the target area of the Project, namely Greater Cotabato City.

(5) Organization for the Implementation of the SEA

The SEA is conducted by the City Environment and Natural Resources Office of Cotabato City and the JICA Study Team.

(6) Procedures

The SEA of the Project is conducted according to the following procedures:

- a. Clarification of the purpose of the SEA;
- b. Collection of baseline data such as general information on the country, Cotabato City, surrounding municipalities, the natural environment (e.g., protected areas), and the social environment;
- c. Scoping using the JICA scoping table. After the scoping, additional baseline data collection is conducted if necessary;
- d. Assessment and mitigation measures; and
- e. A stakeholder analysis is conducted, and appropriate stakeholders are selected for the Project. And then, Stakeholders Meetings (SHMs) are conducted. SHMs are held twice. Table 7.3-1 shows the tentative schedule and main issues of the SHMs.
- f. Discussions on alternative scenarios
- g. Discussions on a monitoring system

Table 7.3-1 Tentative Schedule and Main Issues to Discuss at the SHMs

Timing of Implementation	Contents
1 st SHM	Explanation of the following issues and Q&A <ul style="list-style-type: none"> • Outline of the Project • Outline of the Urban Spatial Plan for Greater Cotabato City • Outline of the SEA
2 nd SHM	Explanation of the following issues and Q&A <ul style="list-style-type: none"> • Outline of the Urban Spatial Plan for Greater Cotabato City • Alternative scenarios of the Urban Spatial Plan for Greater Cotabato City • Outline of the Cotabato Metropolitan Area Urban Development Plan • Outlines of other plans

Source: JICA Study Team

7.3.2 Relevant Legislation on SEA and Environmental Impact Assessment

(1) Policies on environmental and social considerations

The following two Presidential Decrees (PD) are important for environmental and social considerations in the Philippines.

PD 1151 of 1977, known as the “Environmental Policy,” describes the policy as follows: (a) to create, develop, maintain, and improve conditions under which man and nature can thrive in productive and enjoyable harmony with each other; (b) to fulfill the social, economic, and other requirements of present and future generations of Filipino; and (c) to ensure the attainment of an environmental quality that is conducive to a life of dignity and well-being.

PD 1152 of 1977, known as the “Philippine Environmental Code,” has the following aims: (a) to achieve and maintain such levels of air quality as to protect public health; (b) to prevent to the greatest extent practicable, injury and/or damage to plant and animal life and property; and (c) to promote the social and economic development of the country.

(2) Legislation on SEA

The Philippines has no law on SEA. Bills of the new Environmental Assessment System (EAS), which include the SEA for policies, plans, and programs, and EIA for projects, have been submitted to the House of Representatives but have not been enacted.

(3) Legislation on Environmental Impact Assessment

PD 1151 defines the framework of the Environmental Impact Assessment (EIA) as the Environmental Impact Statement (EIS). PD 1586 of 1978 stipulates the Philippine Environmental Impact Statement System (PEISS) and defines Environmentally Critical Projects (ECPs) and Environmentally Critical Areas (ECAs). According to the PEISS, all ECPs and projects in ECAs are required to submit an Environmental Compliance Certificate (ECC). Proclamation 2146 of 1981 identifies ECPs and ECAs. The National Environmental Protection Council Office Circular 1983-3 shows the detailed categorization of ECPs and ECAs³. Table 7.3-2 gives a summary of the list.

³ Environmental Impact Assessment Guidebook for Japanese Business Development in the Philippines (Institutes for Global Environmental Strategies, 2019, in Japanese)

Table 7.3-2 List of ECPs and ECAs

A. List of ECPs	
- As declared by Proclamation No. 2146 (1981)	
1	Heavy industries – non-ferrous metal industries, iron and steel mills, petroleum and petro-chemical industries including oil and gas, smelting plants
2	Resource extractive industries – major mining and quarrying projects, forestry projects (logging, major wood processing projects, introduction of fauna (exotic animals) in public and private forests, forest occupancy, extraction of mangrove products, grazing), fishery projects (dikes for/ and fishpond development projects)
3	Infrastructure projects – major dams, major power plants (fossil-fueled, nuclear fueled, hydroelectric or geothermal), major reclamation projects, major roads and bridges
- As declared by Proclamation No. 803 (1996)	
4	All golf course projects
B. List of ECA Categories - As declared by Proclamation No. 2146 (1981)	
1	All areas declared by law as national parks, watershed reserves, wildlife preserves, sanctuaries
2	Areas set aside as aesthetic potential tourist spots
3	Areas which constitute the habitat of any endangered or threatened species of Philippine wildlife (flora and fauna)
4	Areas of unique historic, archaeological, or scientific interests
5	Areas which are traditionally occupied by cultural communities or tribes
6	Areas frequently visited and/or hard-hit by natural calamities (geologic hazards, floods, typhoons, volcanic activity, etc.)
7	Areas with critical slopes
8	Areas classified as prime agricultural lands
9	Recharged areas of aquifers
10	Water bodies characterized by one or any combination of the following conditions: tapped for domestic purposes; within the controlled and/or protected areas declared by appropriate authorities; which support wildlife and fishery activities
11	Mangrove areas characterized by one or any combination of the following conditions: with primary pristine and dense young growth; adjoining mouth of major river systems; near or adjacent to traditional productive fry or fishing grounds; areas which act as natural buffers against shore erosion, strong winds and storm floods; areas on which people are dependent for their livelihood
12	Coral reefs characterized by one or any combination of the following conditions: with 50% and above live coralline cover; spawning and nursery grounds for fish; act as natural breakwater of coastlines

Source: Revised Procedural Manual for DAO 2003-30 (2007)

The Revised Procedural Manual for the Department of Environment and Natural Resources (DENR) Administrative Order No. 30 series of 2003 (DAO 2003-30) (2007) defines categories from the following two perspectives: (1) a project could have large negative environmental impacts, and (2) a project site has environmental resources that are susceptible or vulnerable to the induced impacts of the Project⁴. Table 7.3-3 shows the PEISS category types and locations of the project.

⁴ Environmental Impact Assessment Guidebook for Japanese Business Development in the Philippines (Institutes for Global Environmental Strategies, 2019, in Japanese)

Table 7.3-3 PEISS Category Type and Location of the Project

Category	Type and location of the project
Category A: Environmentally Critical Projects	Projects or undertakings which are classified as ECPs under Presidential Proclamation No. 2146 (1981) Proclamation No. 803 (1996) and any other projects that may later be declared as such by the President of the Philippines. Proponents of these projects implemented from 1982 onwards are required to secure an ECC.
Category B: Non-Environmentally Critical Projects (NECP) but Located in ECA	Projects or undertakings which are not classified as ECP under Category A but which are likewise deemed to significantly affect the quality of the environment by virtue of being located in ECA as declared under Proclamation 2146 and according to the parameters set forth in the succeeding sections. Proponents of these projects implemented from 1982 onwards are required to secure an ECC.
Category C: Environmental Enhancement or Direct Mitigation Project	Projects or undertakings not falling under Category A or B which are intended to directly enhance the quality of the environment or directly address existing environmental problem.
Category D: Non-Covered Project	Projects or undertakings that are deemed unlikely to cause significant adverse impact on the quality of the environment according to the parameters set forth in the Screening Guidelines. These projects are not covered by the Philippine EIS system and are not required to secure an ECC. However, such non-coverage will not be construed as an exemption from compliance with other environmental laws and government permitting requirement.

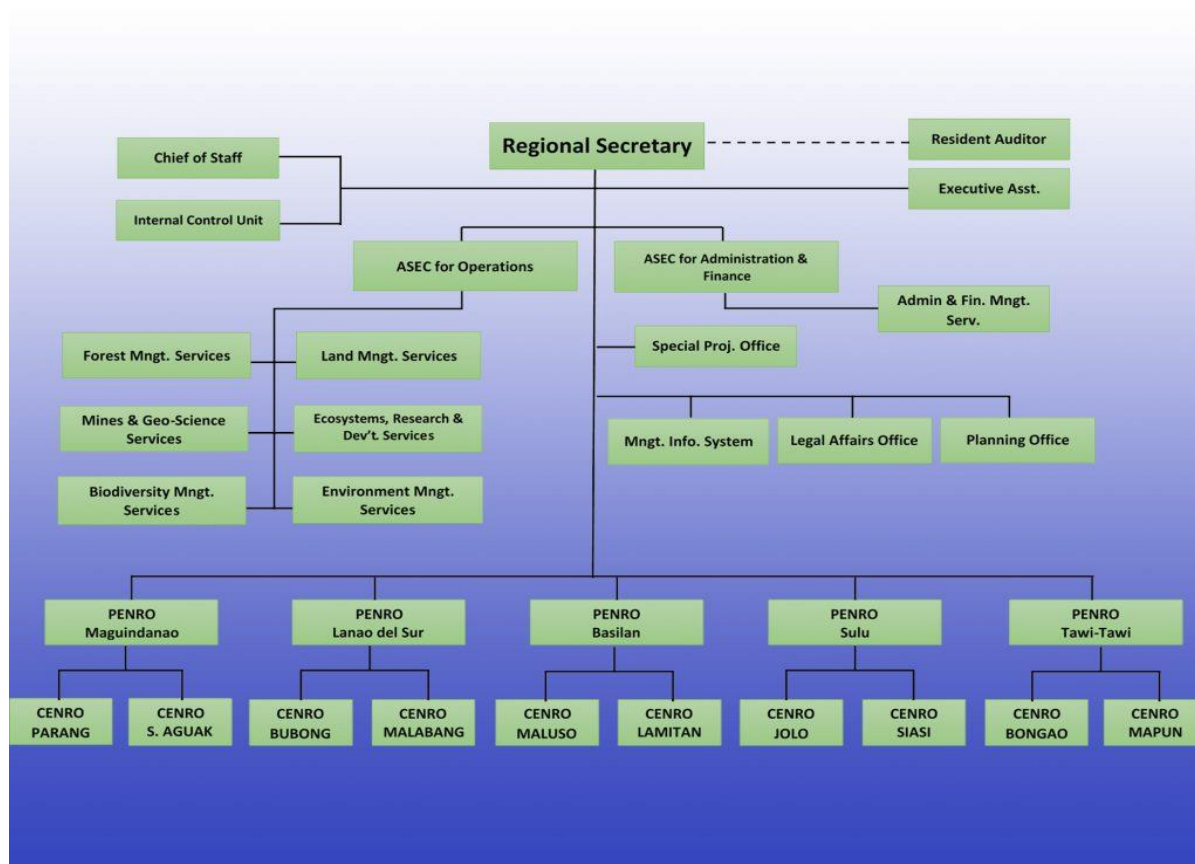
Source: Revised Guidelines for Coverage Screening and Standardized Requirements: Memorandum Circular No.2014-05

(4) Responsible Authority for PEISS

PD 1151 first defines the National Environmental Protection Council under the Ministry of Human Settlements as the competent authority. Administrative Order 42 of 2002 stipulates the DENR and its Environmental Management Bureau (EMB) as the endorsing official and approving authority.

In BARMM, the Ministry of Environment, Natural Resources and Energy (MENRE) is in charge of the tasks of the DENR. The mandate of the MENRE is stated as follows: “The BARMM-MENRE shall be the primary agency responsible for the exploration, utilization, management, conservation, protection, and sustainable development of the region’s environment, natural resources, and potential energy sources”⁵. Figure 7.3-1 shows the organizational structure of the MENRE.

⁵ Ministry of Environment, Natural Resources and Energy: <https://menre.bangsamoro.gov.ph/>



Source: Ministry of Environment, Natural Resources and Energy: <https://menre.bangsamoro.gov.ph/>

Figure 7.3-1 Organizational Structure of MENRE

(5) Procedures of PEISS

Projects normally require the following documents depending on project type, location, and magnitude of potential impacts.

- EIS
- Programmatic Environmental Impact Statement (PEIS)
- Environmental Performance Report and Management Plan (EPRMP)
- Programmatic Environmental Performance Report and Management Plan (PEPRMP)
- Initial Environmental Examination Checklist Report (IEEC)
- Project Description Report (PDR)

All documents should be prepared by the project proponent before they are submitted to the EMB Central Office or EIA Division of the respective EMB Regional Offices. The outcome of the EIA process within the PEISS is the issuance of decision documents. Decision documents may either be an ECC, Certificate of Non-Coverage (CNC), or a Letter of Denial⁶. Table 7.3-4 summarizes the categories, required report types, decision documents, and deciding authorities.

⁶ Environmental Impact Assessment: Malolos-Clark Railway Project (ADB, 2019)

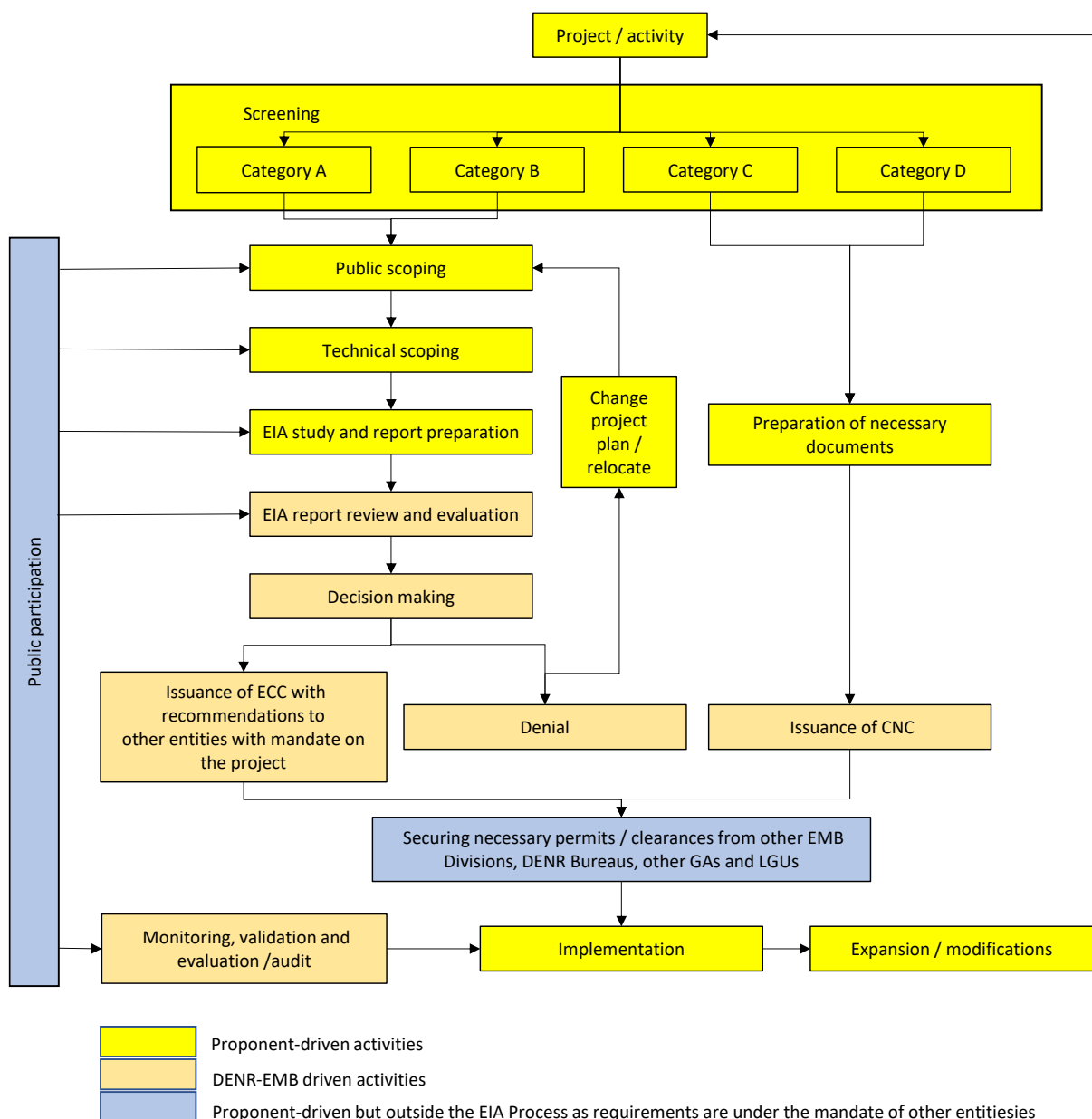
Table 7.3-4 Project Categories, Report Types, Decision Documents, and Deciding Authorities

Category		Project	Documents required for ECC/CNC application	Decision document	Deciding authority
Category A: Environmentally Critical Projects	A-1: New	Co-located	PEIS	ECC	EMB Central Office
		Single	EIS		
	A-2: Existing and to be expanded, modified and/or rehabilitated A-3: Operating without ECC	Co-located	PEPRMP in case programmatic monitoring data are available.		
		Single	EPRMP in case monitoring data are available. EIS if no monitoring data are available.		
Category B: Non- Environmentally Critical Projects (NECP) but Located in ECA	B-1: New	Co-located	PEIS	ECC	EMB regional office in the region where the project is located.
		Single	EIS, IEEC		
	B-2: Existing and to be expanded, modified and/or rehabilitated B-3: Operating without ECC	Co-located	PEPRMP		
		Single	EPRMP, EPRMP Checklist		
Category C: Environmental Enhancement or Direct Mitigation Project		Co-located/ single	PDR (Part I and II)	CNC	EMB regional office in the region where the project is located.
Category D: Non-Covered Project			PDR (Part 1 only)	CNC	EMB regional office in the region where the project is located.

Source: Revised Guidelines for Coverage Screening and Standardized Requirements: Memorandum Circular No.2014-05

The details of the procedures are shown in the Revised Procedural Manual for DAO 2003-30 (2007). Among those procedures, the relevant items related to screening and public participation have been replaced by the Revised Guidelines for Coverage Screening and Standardized Requirements Memorandum Circular No. 2014-05 and the Guidelines on Public Participation under the PEISS DAO 2017-15. The procedures consist of the following: (1) screening; (2) public scoping; (3) technical scoping; (4) EIA study and report preparation; (5) EIA report review and evaluation; (6) decision-making; and (7) a monitoring, validation, and evaluation/audit.⁷ Figure 7.3-2 shows the procedures.

⁷ Environmental Impact Assessment Guidebook for Japanese Business Development in the Philippines (Institutes for Global Environmental Strategies, 2019, in Japanese)



Source: Revised Procedural Manual for DAO 2003-30 (2007), and Environmental Impact Assessment Guidebook for Japanese Business Development in the Philippines (Institutes for Global Environmental Strategies, 2019, in Japanese)

Figure 7.3-2 Procedures of PEISS

7.3.3 Legislation on Land Acquisition

The Constitution of the Republic of the Philippines declares that the protection of property is a policy of the State and essential for Filipino citizens to enjoy the benefits of democracy (Article II, Section 5). The first provision of the Bill of Rights of the Constitution prohibits depriving any person of his property without due process (Article III, Section 1). Further, the same Article declares that property cannot be confiscated or expropriated without just compensation (Article III, Section 9).

The Local Government Code of 1991 (RA 7160) declares that the power of local government units (LGUs) or sub-national administrative entities to expropriate (eminent domain) can only be

applied for “public use or purpose or for the benefit of the poor and the landless” and always with just compensation being paid to the affected property owner (Section 19).

A World Bank report⁸ points out that “private property is a fundamental right of citizens, and it follows that the involuntary taking or loss of property by State fiat is an exception rather than the rule. Expropriation is a last resort to be used after all other means of acquiring the land have been exhausted.” The Right-of-Way Act of 2015 (RA 10752) facilitates the acquisition of right-of-way sites or locations for national government infrastructure projects. Table 7.3-5 summarizes the main contents of the Act. The Implementing Rules and Regulations describe the details for the implementation of the Act.

Table 7.3-5 Main Contents of the Right-of-Way Act of 2015 (RA 10752)

Section No.	Contents (abstract)
1	Short Title
2	Declaration of Policy
3	National Government Projects (<i>definition of the term</i>)
4	Modes of Acquiring Real Property. – The government may acquire real property needed as a right-of-way site or location for any national government infrastructure project through donation, negotiated sale, expropriation, or any other mode of acquisition as provided by law.
5	Rules on Negotiated Sale. – The implementing agency may offer to acquire, through negotiating the sale, the right-of-way site or location for a national government infrastructure project, under the following rules. (a) The implementing agency shall offer to the property owner concerned, as compensation price, the sum of: (1) The current market value of the land, (2) The replacement cost of structures and improvements therein; and (3) The current market value of crops and trees therein. (<i>the rest of the rules are described hereafter</i>)
6	Guidelines for Expropriation Proceedings. – Whenever it is necessary to acquire real property for the right-of-way site or location for any national government infrastructure through expropriation, the appropriate implementing agency, through the Office of the Solicitor General, the Office of the Government Corporate Counsel or their deputize government or private legal counsel, shall immediately initiate the expropriation proceedings before the proper court under the following guidelines. (<i>the guidelines are described hereafter</i>)
7	Standards for the Assessment of the Value of the Property Subject to Negotiated Sale
8	Ecological and Environmental Concerns
9	Relocation of Informal Settlers. – The government, through the Housing and Urban Development Coordinating Council (HUDGC) and the National Housing Authority (NHA), in coordination with the LGUs and implementing agencies concerned, shall establish and develop resettlement sites for informal settlers.
10	Appropriations for Acquisition of Right-Of-Way Site or Location for National Government Infrastructure Projects in Advance of Project Implementation
11	Regulation of Developments Within Declared Right-of-Way
12	Sanctions
13	Implementing Rules and Regulations (IRR)
14	Transitory Clause

⁸ PHILIPPINES Involuntary Resettlement: Policy and Institutional Frameworks, Practices, and Challenges (World Bank, 2008)

Section No.	Contents (abstract)
15	Separability Clause
16	Repealing Clause: Republic Act No. 8974 is hereby repealed and all other laws, decrees, orders, rules and regulations or parts thereof inconsistent with this Act are hereby repealed or amended accordingly.
17	Effectivity

Note: The contents are summarized by the JICA Study Team.

The Urban Development and Housing Act of 1992 (RA 7279) stipulates that it is the policy of the State, in coordination with the private sector, to uplift the conditions of the underprivileged and homeless citizens in urban areas and resettlement areas by making available decent affordable housing, with basic services, and employment opportunities.

The Alternative Dispute Resolution Act of 2004 (RA 9285) promotes alternative mechanisms to resolve disputes outside of judicial litigation. However, it does not stipulate the grievance redress mechanism. No Philippine laws stipulate grievance redress mechanisms⁹.

7.3.4 Responsible Authorities for the Environmental and Social Considerations and Land Acquisition in the Study Area

Table 7.3-6 summarizes the responsible authorities for environmental and social considerations and land acquisition in the Study Area.

Table 7.3-6 Responsible Authorities for the Environmental and Social Considerations and Land Acquisition

Administration unit	Environmental and social considerations	Land acquisition (and land transfers)
	Name of department	Name of department and/or officer
Central government	-	Ministry of Public Works
BTA/BARMM	MENRE	MENRE Land Management Services
Cotabato City	City Environment and Natural Resources Office	City Assessor
Datu Odin Sinsuat	Municipal Environment and Natural Resources Officer (MENRO)	Municipal Assessor Municipal Engineer
Sultan Kudarat	MENRO	Municipal Assessor
Sultan Mastura	MENRO	Municipal Assessor Municipal Engineer
Parang	MENRO	Municipal Assessor Municipal Engineer
Pigcawayan	MENRO	Municipal Assessor Municipal Engineer

Source: JICA Study Team

⁹ Combined Resettlement and Indigenous Peoples Planning Framework: Proposed Multitranchise Financing Facility Philippines: Malolos-Clark Railway Project (Prepared by Department of Transportation for the Asian Development Bank, Draft, 2018)

7.3.5 Legislation and Authorities Related to the Conservation of Biodiversity

The Philippines started to formulate its National Biodiversity Strategy and Action Plan (NBSAP) in 1994. As a result of discussions with stakeholders, the first NBSAP was developed and published in 1997¹⁰. The Philippine Biodiversity Strategy and Action Plan (PBSAP) 2015–2028, the latest version that was published in 2016, stipulates the direction and implementation process of the conservation of biological diversity in the Philippines. The PBSAP is the country’s roadmap to conserve its biodiversity and achieve its vision— “By 2028, biodiversity is restored and rehabilitated, valued, effectively managed, secured, maintaining ecosystem services to sustain healthy, resilient Filipino communities and delivering benefits to all.”

One of the main tools of biodiversity conservation activities is the National Integrated Protected Areas System (NIPAS) Act of 1992 (Republic Act RA 7586). Based on the Act, the country has 561 protected areas¹¹, and the government and conservation NGOs have identified key biodiversity areas.

The Wildlife Resources Conservation and Protection Act of 2001 (RA 9147) has the following objectives: (a) to conserve and protect wildlife species and their habitats to promote ecological balance and enhance biological diversity; (b) to regulate the collection and trade of wildlife; (c) to pursue, with due regard to the national interest, the Philippine commitment to international conventions and the protection of wildlife and their habitats; and (d) to initiate or support scientific studies on the conservation of biological diversity.

The Philippines is a member of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (known as the Ramsar Convention) and the Convention Concerning the Protection of the World Cultural and Natural Heritage. The country has seven Ramsar sites¹² and three World Natural Heritage sites¹³.

The Biodiversity Management Bureau of the Department of Environment and Natural Resources (DENR) is the competent authority. It is responsible for mandates such as establishing and managing protected areas, conserving wildlife, promoting and institutionalizing ecotourism, managing coastal biodiversity and wetlands ecosystems, and conducting information and education on biodiversity and nature conservation¹⁴.

Regarding local governments and the conservation of biodiversity, a Comprehensive Land Use Plan (CLUP) is one of the two key documents. The other is the Comprehensive Development Plan (CDP) that LGUs are mandated to prepare under Republic Act No. 7160 (Local Government Code). The CLUP serves as the primary basis for the current and future use of land resources for food production, human settlements, and industrial expansion. In 2013, a Framework and Methods for Mainstreaming Biodiversity in the CLUPs of Local Governments was developed as a

¹⁰ Convention on Biological Diversity: <https://www.cbd.int/countries/profile/?country=ph#measures>

¹¹ United Nations Environment World Conservation Monitoring Centre: <https://www.protectedplanet.net/country/PH>

¹² Ramsar Bureau: <https://www.ramsar.org/sites/default/files/documents/library/sitelist.pdf>

¹³ UNESCO World Heritage Centre: <https://whc.unesco.org/en/statesparties/ph>

¹⁴ Biodiversity Management Bureau: <https://www.bmb.gov.ph/index.php>

supplemental guide on how to mainstream biodiversity conservation in spatial and land use planning. Some LGUs have already approved CLUPs while others are in the process of drafting and submitting their CLUPs. However, consultations nationwide have revealed challenges to integrating biodiversity conservation and sustainable use into the CLUPs of LGUs. Many LGUs lack knowledge of biodiversity and access to updated information and maps. The lack of funds, manpower, expertise, and capacity at the local level also makes it difficult for LGUs to prepare their CLUPs or incorporate biodiversity in their CLUPs¹⁵.

7.3.6 Legislation and Authorities Related to the Protection of Cultural Properties

The National Cultural Heritage Act of 2009 (RA 10066) identifies cultural preservation as a strategy for maintaining Filipino identity and has the following three objectives: (a) to protect, preserve, conserve, and promote the nation’s cultural heritage, its property and histories, and the ethnicity of local communities; (b) to establish and strengthen cultural institutions; and (c) to protect cultural workers and ensure their professional development and well-being.

All cultural properties are registered in the Philippines Registry of Cultural Property. The Act specifies structures that are more than 50 years old as important cultural properties.

The National Commission for Culture and the Arts (NCCA) is the main implementing agency, and six other affiliated cultural agencies such as the National Historical Commission of the Philippines assist the NCCA to achieve the objectives of the Act.

The Philippines is a member of the Convention Concerning the Protection of the World Cultural and Natural Heritage. The country has three World Cultural Heritage sites and three World Natural Heritage sites. In addition, it has 19 sites on the Tentative List to consider nominating for World Cultural and Natural Heritage¹⁶.

7.3.7 Legislation and Authorities Related to Socially Vulnerable People and Ethnic Minorities

(1) Constitution

The Constitution (1987) states in Section I of Article III of the Bill of Rights, “No person shall be deprived of life, liberty, or property without the due process of law, nor shall any person be denied the equal protection of the laws.” Section I of Article XIII Social Justice and Human Rights adds, “The Congress shall give highest priority to the enactment of measures that protect and enhance the right of all the people to human dignity, reduce social, economic, and political inequalities, and remove cultural inequities by equitably diffusing wealth and political power for the common good. To this end, the State shall regulate the acquisition, ownership, use, and disposition of property and its increments.”

¹⁵ 6th National Report for the Convention of Biological Diversity (Philippines)

¹⁶ UNESCO World Heritage Centre: <https://whc.unesco.org/en/statesparties/ph>

(2) Authorities on Human Rights

The Commission on Human Rights is an independent government agency. It has the mandate vested by the 1987 Philippine Constitution and the Paris Principles¹⁷ to promote and protect the full range of human rights including civil and political rights, and economic, social, and cultural rights. It has the responsibility to report and monitor human rights situations and violations regularly, and recommend steps to advance the realization of human rights and dignity of all¹⁸.

The Presidential Human Rights Committee serves as a multi-agency coordinating body on human rights. The committee's responsibilities include compiling the government's submission for the UN Universal Periodic Review¹⁹.

The Regional Human Rights Commission of BARMM is mandated to perform the functions of the Commission on Human Rights of the central government within the autonomous region. It is a statutory agency created under Section 16 of RA 9054 (2001) and operationalized by the ARMM Human Rights Commission Charter of 2012 (Muslim Mindanao Act 288)²⁰.

(3) Social Welfare

The Social Welfare Act of 1968 (Republic Act 5416) states that it is the responsibility of the Government to provide a comprehensive program of social welfare services designed to ameliorate the living conditions of distressed Filipinos, particularly those who are handicapped because of poverty, youth, physical and mental disability, illness, and old age, or who are victims of natural calamities, and provide assistance to members of the cultural minorities to facilitate their integration into the body politic.

The Department of Social Welfare and Development (DSWD) has a mandate to eliminate poverty, and implements various measures to improve the living environment and quality of life of the country's poorest people. LGUs are the project proponents on the ground owing to decentralization since 1992. Through 16 regional offices, the DSWD conducts program formulation and pilot businesses, and provides LGUs with guidance, supervision, and support. The Department of Education and Department of Health also implements policies for poverty reduction²¹.

(4) Women

The Philippines has introduced laws to protect the rights of women and has been working on gender issues²². Laws such as the Magna Carta of Women (RA 9710, 2009), Anti-Sexual Harassment Act of 1995 (RA 7877), Anti-Rape Law of 1997 (RA 8353), and Anti-Violence

¹⁷ United Nations Human Rights Office of the High Commissioner:

<https://www.ohchr.org/EN/ProfessionalInterest/Pages/StatusOfNationalInstitutions.aspx>

¹⁸ NHRI Report for the List of Issues to be adopted at the 9th Pre-Sessional Working Group Convention on the Rights of Persons with Disabilities (12 Mar 2018 - 16 Mar 2018) (Commission on Human Rights, 2018)

¹⁹ Philippines 2019 Human Rights Report (United States Department of State, Bureau of Democracy, Human Rights and Labor)

²⁰ Regional Human Rights Commission: <http://rhrc.armm.gov.ph/about/regional-human-rights-commission-rhrc>

²¹ Status of countries 2018 (Ministry of Health, Labour and Welfare of Japan, in Japanese)

²² Gender and disabled people in the Philippines (MORI Soya, 2015, in Japanese)

Against Women and Their Children Act of 2004 (RA 9262) have been enacted to achieve these goals.

The Philippine Commission on Women is the main institute to promote and protect women, and has the following mandates: (1) to institute the gender responsiveness of national development plans and coordinate the preparation, assessment, and updating of the National Plan for Women, ensure its implementation, and monitor the performance of government agencies in the implementation of the Plan at all levels; (2) to undertake continuing advocacy to promote the economic, social, and political empowerment of women and to provide technical assistance in the setting-up and strengthening of mechanisms on gender mainstreaming; and (3) to ensure that the gains achieved by Filipino women from Philippine culture and tradition will be preserved and enhanced in the process of modernization²³.

(5) Children

There are various Acts on the protection of children's rights: Child and Youth Welfare Code (PD 603, 1974), Juvenile Justice and Welfare Act of 2006 (RA 9344), and Anti-Child Pornography Act of 2009 (RA 9775). However, comprehensive legislation like a Magna Carta of Children has not been enacted²⁴.

The Council for the Welfare of Children is the focal inter-agency body for children of the Philippine Government. It is mandated to coordinate the implementation and enforcement of all laws, and to formulate, monitor, and evaluate policies, programs, and measures for children²⁵.

(6) Disabled People

Various Acts have been passed for the protection of the rights of people with disabilities: Magna Carta for Disabled Persons (RA 7277, 1992), Accessibility Law (Batas Pambansa 344), and White Cane Act (RA 6759, 1989).

The National Council on Disabled Affairs is the national government agency mandated to formulate policies and coordinate the activities of all agencies, whether public or private, concerning issues and concerns pertaining to disability²⁶.

(7) Indigenous Peoples

The Indigenous Peoples' Rights Act of 1997 (RA 8371) declares that the State shall recognize and promote all the rights of Indigenous Cultural Communities/Indigenous Peoples.

Under the Act, indigenous peoples are given legal grounds to have traditional rights on lands inherited from their ancestors. The traditional rights are granted by the Certificate of Ancestral Domain Title (CADT) and allows indigenous peoples to manage and utilize natural resources in

²³ Philippine Commission on Women: <https://www.pcw.gov.ph/>

²⁴ Situation Analysis of Children in the Philippines (UNICEF, 2018)

²⁵ Council for the Welfare of Children: <https://www.cwc.gov.ph/>

²⁶ National Council on Disabled Affairs: <https://www.ncda.gov.ph/>

areas covered by the Ancestral Domains Sustainable Development and Protection Plan (ADSDPP)²⁷.

The National Commission on Indigenous Peoples is the agency designated to protect and promote the interest and well-being of Indigenous Cultural Communities/Indigenous Peoples with due regard to their beliefs, customs, traditions, and institutions²⁸.

7.3.8 Legislation and Authorities Related to Waste Management

The Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (RA 6969) regulates, restricts, or prohibits the importation, manufacture, processing, sale, distribution, use, and disposal of chemical substances and mixtures that present unreasonable risk and/or injury to health or the environment. It also prohibits the entry, even in transit, of hazardous and nuclear wastes and their disposal into the Philippine territorial limits for whatever purpose. It further provides for the advancement and facilitation of research and studies on toxic chemicals.

The Ecological Solid Waste Management Act of 2000 (RA 9003) has been implemented under the policy to adopt a systematic, comprehensive, and ecologically sound solid waste management program. In partnership with stakeholders, the law aims to adopt a systematic, comprehensive, and ecologically sound solid waste management program that ensures the protection of public health and the environment. The law ensures proper segregation, collection, storage, treatment, and disposal of solid waste through the formulation and adaptation of the best eco-waste products²⁹.

The EMB of the DENR is in charge of waste management. It has a Hazardous Waste Management Section (Environmental Quality Division) and a Solid Waste Management Division. The National Solid Waste Management Commission is a multi-agency established under RA 9003 and the EMB provides secretariat support.

7.3.9 Legislation and Authorities Related to Labor Conditions

The Labor Code of 1974 (PD 442) states the basic policy as “the State shall afford protection to labor, promote full employment, ensure equal work opportunities regardless of sex, race or creed, and regulate the relations between workers and employers. The State shall assure the rights of workers to self-organization, collective bargaining, security of tenure, and just and humane working conditions.” Under Chapter I: Employment of Women” of “Title III: Working Conditions for Special Groups of Employees,” various conditions for women are stipulated. In “Chapter II: Employment of Minors” under the same title, the minimum employable age is defined as fifteen (15) years of age.

RA 6685 stipulates the following conditions as contractor requirements, “All private contractors, including subcontractors, to whom awards are made for the undertaking of national and local

²⁷ Poverty Profile: the Philippines (JICA, 2012, in Japanese)

²⁸<https://www.dbm.gov.ph/index.php/performance-management/agency-profile/14-performance-management/950-national-commission-on-indigenous-peoples-ncip#mandate>

²⁹ Environmental Management Bureau: <https://emb.gov.ph/>

public works projects funded by either the National Government or any local government unit, including foreign-assisted projects, must hire at least fifty percent (50%) of the unskilled and thirty percent (30%) of the skilled labor requirements from the unemployed bona fide and actual residents in the province, city, and municipality.”

The Anti-Age Discrimination sections of the Employment Act of 2015 (RA 10911) prohibits discrimination against any individual in employment on account of age.

The Department of Labor and Employment is the competent authority.

7.3.10 Legislation and Authorities Related to Climate Change

The Climate Change Act of 2009 (RA 9729) mainstreams climate change into government policy formulations. It is responsible for the establishment of the framework strategy and program on climate change, and a multi-agency, the Climate Change Commission. The National Framework Strategy on Climate Change 2010–2022 and the Philippine Strategy on Climate Change Adaptation were prepared in 2010. In 2011, the National Climate Change Action Plan 2011–2028 was prepared and outlines the priority areas for adaptation and mitigation. The Action Plan identifies the following priority areas: food security, water sufficiency, ecosystem and environmental stability, human security, climate-smart industries and services, sustainable energy, knowledge and capacity development, cross-cutting actions, means of implementation, and monitoring and evaluation.

The Intended Nationally Determined Contributions (2015) under the Paris Agreement states, “the Philippines intends to undertake GHG (CO₂e) emissions reduction of about 70% by 2030 relative to its BAU³⁰ scenario of 2000–2030. A reduction of CO₂e³¹ emissions will come from the energy, transport, waste, forestry, and industry sectors.”

The National Strategy to Reduce Short-Lived Climate Pollutants from Municipal Solid Waste Sector in the Philippines was prepared in 2019 to focus national attention on short-lived climate pollutants (SLCPs) and recommend mitigation measures. According to the strategy, the two main SLCPs from the municipal solid waste sector are methane (CH₄) and black carbon (BC).

The Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121) strengthens the Philippine disaster risk reduction and management system. Disasters in the Act include the impact of climate change.

The Climate Change Commission is an inter-agency body of the Philippine Government for climate change issues. In the Climate Change Division, the EMB serves as the focal point of DENR on climate change and is responsible for climate change adaptation and mitigation.

³⁰ BAU: business as usual

³¹ CO₂e = CO₂ equivalent

7.3.11 Environmental Standards

(1) Air quality Standards

The Philippine Clean Air Act of 1999 stipulates the following: (1) national ambient air quality guidelines for criteria pollutants, (2) national ambient air quality standards for source-specific air pollutants from industrial sources/operations, (3) emission standards for stationary sources of air pollution, and (4) emission limits for motor vehicles.

(2) Water Quality Standards

The Water Quality Guidelines and General Effluent Standards of 2016, based on the Philippine Clean Water Act of 2004, stipulates water quality standards for freshwater, marine waters (including brackish waters), and ground waters, and effluent standards of all points of sources regardless of volume that discharge to a receiving body of water or land.

(3) Standards for Noise

The National Pollution Control Commission Memorandum Circular No. 002, Series of 1980³², specifies the noise standards as shown in Table 7.3-7.

Table 7.3-7 Environmental Quality Standards for Noise in General Areas

Category of area	Maximum allowable noise (dBA) by time period		
	Daytime	Morning and evening	Nighttime
AA	50	45	40
A	55	50	45
B	65	60	55
C	70	65	60
D	75	70	65

Note:

1. Category of area

Class AA – a section of contiguous area that requires quietness, such as areas within 100 m from school sites, nursery schools, hospitals and special homes for the aged.

Class A – a section or contiguous area that is primarily used for residential purposes.

Class B – a section or contiguous area that is primarily a commercial area.

Class C – a section primarily zoned or used as light industrial area.

Class D – a section that is primarily reserved, zoned or used as a heavy industrial area

2. For areas directly facing a public transportation route or an urban traffic artery, an additional correction factor equivalent to the following shall apply:

1) Areas directly fronting or facing a four-lane road: + 5 dBA

2) Areas directly fronting or facing a four-lane or wider road: + 10 dBA

³² There is a discrepancy in the definitions of the “category of area” between National Pollution Control Commission 1978 and 1980 (the definitions of Class B are different). The definition of Class B in 1978 is commonly used.

7.3.12 International Treaties Related to Environmental and Social Considerations

Table 7.3-8 shows the international treaties related to environmental and social considerations and the membership statuses of the Philippines.

Table 7.3-8 International Treaties Related to Environmental and Social Considerations and Their Membership Statuses in the Philippines

No.	Name	Year of ratification/ taking effect	Source (website of each convention)
1	Convention on Wetlands of International Importance especially as Waterfowl Habitat	1994	https://www.ramsar.org/wetland/philippines
2	Convention Concerning the Protection of the World Cultural and Natural Heritage	1985	https://whc.unesco.org/en/statesparties/ph
3	Convention on International Trade in Endangered Species of Wild Fauna and Flora	1981	https://www.cites.org/eng/disc/parties/chronolo.php
4	Convention on Biological Diversity	1993	https://www.cbd.int/information/parties.shtml
5	Convention on the Conservation of Migratory Species of Wild Animals	1994	https://www.cms.int/en/parties-range-states
6	United Nations Framework Convention on Climate Change	1994	*1
	Paris Agreement	2017	https://unfccc.int/node/61143
7	Convention on the Elimination of All Forms of Discrimination against Women	1981	https://indicators.ohchr.org/
8	Convention on Rights of the Child	1990	https://indicators.ohchr.org/
9	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	1993	*2

*1: https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=TREATY&msgid=XXVII-7&chapter=27&Temp=msgid3&clang=_en

*2: <http://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/4499/Default.aspx>

7.3.13 Scoping

Based on the current natural and social environments of the city and its surrounding areas (refer to “Chapter 2: Overview of the Study Area”), a scoping exercise was conducted for the Urban Spatial Plan for Greater Cotabato City. The scoping items in the table are from JICA’s guidance³³.

The scoping considered the following (Table 7.3-9 summarizes the general environmental items and activities affecting the environment):

- Expected negative impacts induced by the population increase;
- Expected negative impacts induced by general infrastructure developments (including the operation of infrastructures); and
- General negative impacts induced by construction work are not included, such as air pollution caused by heavy construction machines/vehicles and general construction wastes because these impacts are assessed at the EIA/IEE level of each project. However, involuntary resettlement caused by construction works such as road development was considered.

³³ Report Writing Procedure for Category B Projects under Environmental and Social Considerations Guidelines (JICA, April 2017, in Japanese)

Table 7.3-9 Environmental Items and Activities Affecting the Environment

Environmental item	Activities affecting the environment
Pollution	Traffic flow and vehicles Factories by new developments Domestic and service sectors Generation of wastes (including sewage)
Natural environment	Land conversion, inefficient management of utilization of natural resources such as overexploitation, pollution
Social environment	Involuntary resettlement by infrastructure developments Division of communities and areas by infrastructure developments Flow of new settlers from outside of the area
Others such as issues on climate change	Traffic flow and vehicles

Source: JICA Study Team

The results are shown in Table 7.3-9. The legends in the table are as follows.

A+/-: Significant positive/negative impact is expected. B+/-: Positive/negative impact is expected to some extent. C: Extent of positive/negative impact is unknown. Further examination is needed, and the impact could be clarified as studies progress. D: No impact is expected.

Table 7.3-10 Scoping for the Urban Spatial Plan for Greater Cotabato City

Category	No.	Environmental item	Evaluation	Explanation (expected impacts)
Pollution control	1	Air quality	B-	<ul style="list-style-type: none"> ➤ Air pollution by increased traffic flow and vehicles ➤ Air pollution by increased and/ or expanded factories
	2	Water quality	B-	<ul style="list-style-type: none"> ➤ Wastewater from factories and service sector (e.g., restaurants and hotels) ➤ Wastewater from houses ➤ Waste dumping site leachate
	3	Wastes	B-	<ul style="list-style-type: none"> ➤ Wastes from factories and service sector (e.g., restaurants and hotels) ➤ Wastes from houses ➤ Medical wastes from medical institutions such as hospitals and clinics
	4	Soil contamination	B-	<ul style="list-style-type: none"> ➤ Soil contamination by factories ➤ Soil contamination by waste dumping site leachate
	5	Noise and vibration	B-	<ul style="list-style-type: none"> ➤ Noise and vibration from factories ➤ Noise and vibration from vehicles ➤ Noise from airplanes depending on the municipality
	6	Subsidence	C	Details of the situation are not known.
	7	Odor	B-	<ul style="list-style-type: none"> ➤ Odor from rivers/ wetlands contaminated by wastewater and/or wastes ➤ Odor from waste dumping sites
	8	Sediment	B-	Impacts by river dredging
Natural environment	9	Protected areas	D	No protected area exists in the vicinity of the area (source: Department of Environment and Natural Resources, Philippines). There are no Ramsar Sites (source: Ramsar Bureau) and no World Natural Heritage Sites (source: UNESCO World Heritage Centre) in the vicinity of the area.
	10	Ecosystem	B-	In the vicinity of the area, there are important ecosystems, namely the Liguasan Marsh, Pulangi River and Timako Hill. Negative impacts on these ecosystems are expected to some extent by land conversion, inefficient management of utilization of natural resources such as overexploitation, and pollution.
	11	Hydrology	B-	Impacts by river dredging and dike development
	12	Topography and geology	C	Details of the situation are not known. Depending on the municipality, soil erosion may occur.
Social environment	13	Involuntary resettlement	A-	<ul style="list-style-type: none"> ➤ Developments may cause involuntary resettlements. ➤ For the prevention of natural disasters (i.e., tsunami and seawater surge), it may be necessary to relocate residents along new dikes and dike/ roads.
	14	Poor people/ vulnerable people	A-	<ul style="list-style-type: none"> ➤ Land acquisition and involuntary resettlement may impact poor/ vulnerable people. ➤ There may be impacts of the physical division of areas and/or the division of the communities due to roads and other developments.
	15	Indigenous or ethnic minority	C	Detailed information is needed to assess the situation.
	16	Local economies, such as employment, livelihood	A+	The volume of the local economy increases by development activities.
	17	Land use and utilization of local resources	B-	An increase of population may cause inefficient management of land use and utilization of local resources.
	18	Water usage	B-	An increase of population causes insufficient amount of clean water supply.

Category	No.	Environmental item	Evaluation	Explanation (expected impacts)
	19	Existing social infrastructures and services	B-	There may be not enough social infrastructures such as schools and hospitals because of the increase of population.
	20	Social institutions such as social infrastructure and local decision-making institutions	B-	There may be not enough administrative staff or offices to cope with the increased population and activities.
	21	Misdistribution of benefits and damages	B-	There is a possibility that existing cultural and social conflicts between existing and new communities may become even more acute over new socio-economic benefits.
	22	Local conflicts of interest	B-	<ul style="list-style-type: none"> ➤ There may be land disputes among families and ethnic groups, and areas where unreturned internal displaced persons exist. ➤ There is a possibility that existing cultural and social conflicts between existing and new communities may become even more acute over new socio-economic benefits.
	23	Cultural heritages	C	<ul style="list-style-type: none"> ➤ According to the UNESCO World Heritage Centre, there are no World Cultural Heritage Sites in the vicinity of the area. ➤ Details of the local cultural heritages are not known. ➤ There are many religious institutions such as mosques, but details of the situation are not known.
	24	Landscape (including visual impacts)	B-	For preventing natural disasters, dikes and dike/ roads are proposed. These new infrastructures give some impacts on the landscape.
	25	Gender	C	Details of the situation are not known but it is necessary to consider impacts on women, female-headed households, and disabled women.
	26	Children's rights	C	Details of the situation are not known.
	27	Infectious diseases such as HIV/AIDS	B-	The increase flow of people may cause an increase of cases of infectious diseases.
	28	Labor conditions	C	Details of the situation are not known.
Others	29	Accident	B-	An increase of traffic is expected and it is necessary to prevent traffic accidents as much as possible.
	30	Trans-boundary impacts / global warming	B-	Some negative impacts on climate change are expected due to an increase of traffic and economic activities.

Source: JICA Study Team

From the results of the scoping, the items assessed by the SEA were selected and are shown in Table 7.3-11. The items for which situations are not clear at this point require further investigation in each project (i.e., by EIA). These items are also shown in the table.

The items of “9 Protected areas” and “16 Local economies such as employment, livelihood” were not assessed in the SEA of the Project (shaded cells in the table), but should be considered at the EIA stage to re-examine the situations and assessed.

Table 7.3-11 Items Considered at SEA and EIA Stages

No.	Item	SEA (in the Project)	Project level assessment (in the next stage after the Project)
1	Air quality	✓	✓
2	Water quality	✓	✓
3	Wastes	✓	✓
4	Soil contamination	✓	✓
5	Noise and vibration	✓	✓
7	Odor	✓	✓
8	Sediment	✓	✓
9	Protected areas	Excluded from the SEA (refer to the scoping table)	✓
10	Ecosystem	✓	✓
11	Hydrology	✓	✓
12	Topography and geology	✓	✓
13	Involuntary resettlement	✓	✓
14	Poor people /vulnerable groups	✓	✓
15	Indigenous or ethnic minority	✓	✓
16	Local economies, such as employment, livelihood	Excluded from the SEA (refer to the scoping table)	✓
17	Land use and utilization of local resources	✓	✓
18	Water usage	✓	✓
19	Existing social infrastructures and services	✓	✓
20	Social institutions such as social infrastructure and local decision-making institutions	✓	✓
21	Misdistribution of benefits and damages	✓	✓
22	Local conflicts of interest	✓	✓
23	Cultural heritages	✓	✓
24	Landscape (including visual impacts)	✓	✓
25	Gender	✓	✓
26	Children’s rights	✓	✓
27	Infectious diseases such as HIV/AIDS	✓	✓
28	Labor conditions	✓	✓
29	Accidents	✓	✓
30	Trans-boundary impacts / global warming	✓	✓

Source: JICA Study Team

7.3.14 Additional Information Collection

To fill the gap between general information and local information in the Study Area (i.e., Greater Cotabato City), interview surveys among barangay captains and other local administrators were conducted. The results are described in “24.1 Peace Building.”

7.3.15 Stakeholders Meetings

(1) Stakeholders Analysis

Important stakeholders were identified regarding SEA implementation in the following categories.

- Line state government agencies
- Academic experts at universities and others
- NGOs and civil society organizations (CSOs)

Local stakeholders such as local people are not included in the stakeholder analysis. This is because of restrictions due to the COVID-19 pandemic. All barangay captains were interviewed to obtain their comments and local information. NGOs with knowledge of social relations are expected to represent the comments and opinions of the general public.

The SEA team formulated a preliminary list of stakeholders, distributed and confirmed it within Cotabato City, and then finalized the list.

(2) First SHM

On November 25, 2020, the first SHM was held in Cotabato City with 104 participants including those via Zoom on the Internet. The objectives of the first SHM were as follows: (1) explain the outlines of the Project, the Urban Spatial Plan for the Greater Cotabato City, and the SEA; (2) answer questions on the above; and (3) collect comments from the participants on the Urban Spatial Plan for Greater Cotabato City.

Appendix 7.3-1 shows the program of the SHM, Appendix 7.3-2 shows the lists of participants, and Appendix 7.3-3 shows the presentation materials.

Prevention measures were taken against COVID-19 during the SHM, such as masks, face shields, and sterilization by alcohol. The City Administrator reminded everyone to ensure protection and observe social distancing.

In the morning, after explaining the outline of the Project, the Present Condition of Various Infrastructures, Urban Spatial Development Plan, and SEA methodology were presented. A question-and-answer session (Q&A session) was held, and questions and comments from the participants were collected. In the afternoon, a group discussion session was held to collect opinions on the three scenarios of the Urban Spatial Development Plan. Table 7.3-12 shows the questions and answers in the Q&A session.

During the afternoon session, the participants were divided into the following three groups: (1) Transport, (2) Urban Utilities, and (3) Urban Environment. They discussed the advantages and disadvantages of each scenario. Table 7.3-13 shows a summary of the advantages and disadvantages of the three scenarios.

Table 7.3-12 Questions / comments and Answers on the Project

No.	Question/Comment	Answer/Comment
1	Atty. Anwar MALANG (Business sector rep): Can we make a mixed scenario to get the best out of the three (3) scenarios presented for the advantage of Greater Cotabato City? If we have a more ideal scenario, the city can pass the necessary ordinances that support the agreed development scenario. For example, we can have an ordinance that would adopt a looping traffic route system.	Mr. Danilo C. BUENBRAZO (City Govt.): The scenarios are not yet cast in stone, precisely the point of the consultation. The workshop this afternoon will provide the participants with the opportunity to convey to the JICA Study Team the advantages and disadvantages that are associated with each scenario. There will still be a subsequent section of the Stakeholders Meeting that would allow different sectors to express their views and suggestions.
2	Mr. Perfecto MARQUEZ (Regional Governor of PCCI Central Mindanao): The plan should consider and include utilizing and taking advantage of our rivers in the future as a means for transportation and tourism development. It should consider having water taxis, water jeepneys, and other forms of transportation using the rivers and creeks. With these, it will increase attraction for marketing the city as a tourism destination, given Cotabato City's riverine characteristic.	D. BUENBRAZO: Thanked Mr. Marquez for his valuable observation and creative suggestions. Those may be considered by the JICA Study Team in the preparation of the Master Plan.
3	Atty. Anwar MALANG: Is it possible for the Cotabato Regional and Medical Center (CRMC) to limit the area that could avail of its services?	Dr. Helen YAMBAO (Head of CRMC): The CRMC is an apex hospital with a multispecialty center that caters to both Region 12 and BARMM. It is not just a Level 1 or Level 2 type of hospital that caters to ordinary cases. The CRMC has a number of improvements that are planned or currently being undertaken to improve its services. It can cater to patients that need heart surgery, dialysis, and other sub-specialties. The CRMC will be the referral center for both Region 12 and BARMM. One of the major development plans for CRMC is to enable it to deal with infectious diseases, a sort of a mini-RITM (Research Institute for Tropical Medicine). Thus, the CRMC expect a surge in the demand for its multi-specialty services with people coming into Cotabato City. I hope that will be considered during the workshop this afternoon.
4	Ms. Eva TAN (Editor-in-Chief of Mindanao Cross, local newspaper): I can recall that about 30 years ago, a similar Master Plan was made but never implemented, it also proposed a multi-polar approach where the plan is to also expand the City to Tamontaka and nearby areas. There was also a group from the Asian Development Bank for a sewerage project that considered the Dapdap Area (one of the lowest points of the City) as the area as the receptacle for water. But now the Dapdap area has been land-filled which makes it no longer feasible for the area as the final destination for a sewerage project.	Mr. BUENBRAZO: Unlike the previous Master Plans that were mostly local initiatives, the current plan was proposed by the City Government, endorsed by Regional Development Council (RDC) 12, approved by the NEDA Board, and was endorsed to JICA. This will now be part of the Philippine Development Plan. Thus, it is expected to have funding commitment or allocation. But we also must give due recognition that the older master plans and the Metro Cotabato Regional Agri-Industrial Center (MRCRAIC) plan brought into reality projects such as the highway going to the Timako Hill area and the current construction of the Cotabato Seaport. Engr. RENDON (City Govt): We acknowledge that there were indeed prior master plans and nodes of development, similar to Scenario No. 1 such as Tamontaka area were already there. Following these master plans, the City Government prepared a land-use plan that considered the previous findings/recommendations on nodes of development. Engr. SAAVEDRA (City Govt): There were a lot of developments in the City's Business District (very near to Dapdap) that made the idea of having it as a catchment for waters in the City not feasible. But we would like to assure you that the City Government is exploring projects for sewerage, septage, and solid waste management that were proposed and in

No.	Question/Comment	Answer/Comment
		various phases of negotiation with funders or service providers. The City Government through the TWG for the Master Plan project is in frequent discussions and consultations with the JICA Study Team regarding these proposed projects.
5	Regional Director Paterno Reynato PADUA (LTFRB Region 12): We should consider the New Normal situation (presence of COVID-19) and other factors in planning for Greater Cotabato City.	<p>Mr. BUENBRAZO: The scenarios are just broad strokes, no specific plan yet. He reiterated the difference between each scenario. He said that, hopefully, on the second consultation there would be more clarity with the possible priority projects and stakeholders can comment on the specifics of the proposed projects.</p> <p>Dr. JUANDAY (City Govt): The Stakeholders Meeting is a very good exercise for getting the ideas of the different sectors. At this point, we cannot really say what the final spatial development strategy would exactly look like. As was mentioned by several participants, it may be possible still to have a mix of the features of the 3 different scenarios to come up with the best scenario for Greater Cotabato City.</p> <p>The City Government, through the Steering Committee (SC) and the Technical Working Group (TWG), had been in frequent discussions and consultations with the JICA Study Team on these development scenarios to really try to come up with the best. But for now, the scenarios are still being studied and no specific one had been decided upon.</p> <p>During the discussion of these 3 scenarios with the Department Heads of Cotabato City, most chose Scenario 1 except for one person who advocated for Scenario No. 3, saying that the City should first concentrate on developing within its territory and do what is practicable. That shows the diversity of thinking and possibilities that are available for the spatial development for the Greater Cotabato City.</p>
6	Sister Theresa Rose SALAZAR (Notre Dame Reconciliation Center): This is in response to the statements of the comments on “5” above. I am very pleased to hear that much work had been done on the Project. Is it possible, that other than the TWG, to include participants from other institutions, Non-Government Organizations, and such other organizations that are directly involved in the grassroots so that we can come up with a very comprehensive plan?	Mr. BUENBRAZO: The City Government and the JICA Study Team are keen on having broader participation. This Stakeholder Meeting is one such venue. COVID-19 is keeping us from moving around and visiting places such as Koronadal City where Region 12 offices are located but we are still trying our best to get the opinion of different sectors through different means, including this meeting.

Source: JICA Study Team

Table 7.3-13 Summary of Advantages and Disadvantages of Three Scenarios

Group	Scenario	Advantages	Disadvantages
Urban Transport	Scenario 1: Multi-polar Urban Centers	<ul style="list-style-type: none"> ➤ Wide scope of City ➤ Minimize disaster risk ➤ Spur economic growth in nearby LGUs ➤ Reduces road congestion ➤ Empowered road network ➤ Increase transport infra for roads and bridges ➤ Create more spaces for the development of the transport sector (establishment of terminals) ➤ Reduces household expenses on transportation ➤ Opportunity on neighboring municipalities ➤ Modernization of Terminal Facilities ➤ Greater coverage of development 	<ul style="list-style-type: none"> ➤ Less revenue for the city ➤ Higher exposure to infections/viruses ➤ Two areas to be developed. Does not have convincing development to initiate the migration. How will you convince the LGUs to be compliant? ➤ Additional travel expenses for Cotabato residents ➤ Time-consuming
	Scenario 2: Single-polar with peripheral barangays	<ul style="list-style-type: none"> ➤ Manageable traffic ➤ With road expansion business expansion to nearby barangays ➤ Improve farm to market roads (goods and services) ➤ Opportunity for development of other LGUs ➤ Establishment of businesses along new roads ➤ Opening of new roads ➤ Greater area for economic and social development 	<ul style="list-style-type: none"> ➤ Capability of barangays ➤ Distribution of development funds (Less Impact) ➤ Convincing LGU to be compliant ➤ No effect on traffic ➤ Influx of traders and buyers
	Scenario 3: Single-polar by Cotabato Urban Center	<ul style="list-style-type: none"> ➤ Generated more revenues ➤ Business expansion and business diversification ➤ Center of trading ➤ Focused utilization of development fund ➤ Easy to develop a system with Infrastructure already in place ➤ Route Rationalization can be easily planned ➤ No political complication ➤ Concentrated income for LGU ➤ More job opportunities ➤ Vibrant economic activities 	<ul style="list-style-type: none"> ➤ Heavy traffic ➤ Traffic congestion ➤ Heavy traffic & traffic incidents ➤ Public safety ➤ Implementation of health safety protocols ➤ Increase of population ➤ High public safety risks ➤ Less attractive to investors ➤ High level of pollution
Urban Utilities	Scenario 1: Multi-polar Urban Centers	<ul style="list-style-type: none"> ➤ Can pay easily for water bills or any utilities, outside the Cotabato premises ➤ Data Connections will improve ➤ Areas with poor signals outside Cotabato will have new and improved facilities ➤ Data congestion will be lessened ➤ Less traffic ➤ Expansion of area 	<ul style="list-style-type: none"> ➤ Possible, some small business establishment may lessen their “kita” or income ➤ Protocols to be followed strictly ➤ Time to come-up with MOA’s from LGU’s, agencies, business groups ➤ Takes time to have logistics such as bridges, roads, etc. ➤ More garbage or waste ➤ Data expansions outside Cotabato will take time (years)

Group	Scenario	Advantages	Disadvantages
		<ul style="list-style-type: none"> ➤ More jobs or employment ➤ More business. ➤ Access to different specialized activities like malls, schooling, hospitalization for basic needs. ➤ Employment will grow in the neighboring towns and municipalities ➤ People employed will spend the money in the city ➤ Accessibility to services such as banks, hospitals, etc. ➤ Economic activities, more growth 	<ul style="list-style-type: none"> ➤ Numbers of clients be entertained or given attention
	Scenario 2: Single-polar with peripheral barangays	<ul style="list-style-type: none"> ➤ Expansions and developments will be done in a small period of time ➤ Easy to manage ➤ Shorter time of travel ➤ Investments for community/barangay folks will inspire them to work better – so increase revenues ➤ Expertise can be easily tap ➤ It will enable local businesses to expand to nearby towns ➤ Growth to adjacent areas economically ➤ Accessibility to progress and services ➤ Growth outside of the city boundary will spread population outside of Cotabato City 	<ul style="list-style-type: none"> ➤ Take years to realize if support is limited to extend support to the barangays ➤ Improvements on signal or data speed will be limited ➤ Data congestion will rise or increase ➤ Can cause heavy traffic, in terms of paying bills ➤ Traffic will still be a problem unless diversion roads will be improved ➤ People will still transact in the city ➤ Takes time to get MOA's with the officials regarding road projects, bridges (rights of way)
	Scenario 3: Single-polar by Cotabato Urban Center	<ul style="list-style-type: none"> ➤ A large investment will flow in the city that will result in employment, increase revenue ➤ The growing city makes everyone happy, basic needs should be secured (water, light, power, food, health, etc.) ➤ Employment opportunities, more work ➤ One-stop shop ➤ Culture awareness/ knowledge ➤ Increasing growth of economics to Cotabato City ➤ More infrastructures will be built ➤ Increase in income, increase in population ➤ It will accelerate growth since it will be the center of business 	<ul style="list-style-type: none"> ➤ Traffic ➤ Increase in population ➤ Increase in waste ➤ Shortage of water supply ➤ Congestion, like paying bills, and other utilities ➤ Slow data connection would still be a problem ➤ No expansions, no improvements ➤ Add to congestion – overpopulation ➤ Large investments mean to cope in a shortage of demand for power, water, traffic, and pollution
Urban Environment	Scenario 1: Multi-polar Urban Centers	<ul style="list-style-type: none"> ➤ Less pollution ➤ Decongest Population ➤ Dispersed population means dispersed waste (the solid waste in the city will be reduced) ➤ Waste and other environmental challenges may become a common concern for part/member and Greater Cotabato area 	<ul style="list-style-type: none"> ➤ Clash of different perspectives on how to solve or introduce solutions to environmental problem ➤ Difficulty in controlling wastewater/sewage ➤ Difficulty in controlling solid waste ➤ More expensive

Group	Scenario	Advantages	Disadvantages
		<ul style="list-style-type: none"> ➤ Involvement of local officials in solving environmental problems may be engaged as part of the Greater Cotabato area ➤ Focused environmental program implementation ➤ Uniformity of policies among LGU'S such as environmental matter/concerns ➤ Shared responsibility among LGU's such as environmental issues ➤ Economic advantage: less mouth to feed ➤ More space to develop and put together climate change 	
	Scenario 2: Single-polar with peripheral barangays	<ul style="list-style-type: none"> ➤ Serve as a stepping stone for some barangays to start their development ➤ Urbanization and commercial of poor and underdeveloped barangay ➤ People can become hopeful 	<ul style="list-style-type: none"> ➤ The city may not support Mun. LGU AND ONLY barangays are involved ➤ Competition for funds will encourage ribbon development ➤ Can encourage laziness ➤ Loneliness (fewer social activities) ➤ Peripheral barangays may depend on the city for their solid waste and other environmental concerns
	Scenario 3: Single-polar by Cotabato Urban Center	<ul style="list-style-type: none"> ➤ Maximize utilization of the land space ➤ Availability of all services that will increase the revenue of the city ➤ Enhanced partnership ➤ Full control over environmental challenges/issue ➤ Controlled waste disposal ➤ Allows growth of a central business district 	<ul style="list-style-type: none"> ➤ Lesser area for food production ➤ Occurrence of more health problems (high-risk health pollution) ➤ Exploration of protected areas ➤ Imperialism in Cotabato City ➤ Population increase as environmental issue such as SWM ➤ Sole problem solver of environmental issue ➤ Higher carbon footprints ➤ Cotabato City will sink faster ➤ Increase number of informal settlers ➤ Traffic congestion ➤ Less impact

Source: JICA Study Team



Explaining about the objective of the SHM

The Japanese side participated through Zoom

Presentation of Various Infrastructure in Greater Cotabato

Group discussion (Urban Environmental Group)

Group discussion (Transport Group)

Group discussion (Urban Utilities Group)

Figure 7.3-3 Photographs of the first SHM

(3) 2nd SHM

On March 30, 2021, the second SHM was held in Cotabato City with 76 participants including those via Zoom on the Internet. The objectives of the second SHM were as follows: (1) explain the outlines of the Project, the Urban Plan, Land Use Plan for the Cotabato City (including the result of the SEA); (2) explain the outlines of the Sector Plans; and (3) collect comments from the participants on the plans.

Appendix 7.3-4 shows the program of the SHM, Appendix 7.3-5 shows the lists of participants, and Appendix 7.3-6 shows the presentation materials.

Prevention measures were taken against COVID-19 during the SHM, the same as the first SHM.

In the morning, after explaining the outline of the Project, the followings were presented: the result of the SEA, brief comments on the selected scenario by the three groups (Table 7.3-14), the Urban Plan and the Land Use Plan for the Cotabato City, and the Transport Development, Airport Development, and Port Development Plans. In the afternoon, the Water Supply Development, Sewage Development, Solid Waste Development, Disaster Risk Reduction, and Power Supply Development Plans, and Overall Development Programs were presented. Q&A sessions were held, and questions and comments from the participants were collected for each plan and programs (Table 7.3-15).

Table 7.3-14 Brief Comments on the Selected Scenario by the Three Groups

Group	Comment
Transport Group Mr. Rommel Pausal, City Assessor	We are happy that two of the three projects were subjected to three feasibility studies are the opening of large routes that will add to the routes of the city and municipalities. So, there are also several proposals made by the transport group, we also considered the improvement of the transport system of the Cotabato City. That means, JICA Study Team considered our proposals for the improvement of the transport network in the City. So, we, on behalf of the Transport Group, are thankful for the JICA Study Team for considering our proposals and comments of the urban transport group mainly for the improvement of the existing transport system of the city.
Urban Utilities Group Engr. Oscar Rendon, Asst. CPDC	We are happy to hear that JICA Study Team appreciated the team which is the urban utilities group. Based on the interim report presented to this steering committee and technical working group because of time that there are needs to improve the greater Cotabato City, if I'm not mistaken there is a proposed pre-FS for the water system. In the succeeding presentation as mentioned by the JICA Study Team, it would help the development of Greater Cotabato City.
Environmental Group Engr. Crisanto Saavedra, CENRO	Our group, the Environmental Group, is thankful to hear that the analysis made by the Environmental Group in the first SHM helped JICA Study Team's work on the special environment strategy. We hope to hear more from the other presentations specifically in the proposed projects in our environmental concerns such as waste management and the challenges of the climate change that we mentioned in our group during the first SHM were considered.

Source: JICA Study Team

Table 7.3-15 Questions and Answers on the Plans and Programs

No.	Question/Comment/Suggestion	Answer/Response by the JICA Study Team
1	Mr. Pete Marquez (Governor of PCCI for Cotabato City and Maguindanao) – Urban Utility Group: It was said that there is no law governing SEA in the Philippines which could be a hindrance to the implementation of the projects under the Master Plan, In the absence of such SEA law, would this not affect the plans and their implementation?	At the moment there is no SEA Law in the Philippines, but since this Study is funded by JICA we need to follow the requirements set by the JICA in 2010. Other donors also require the conduct of SEA. Doing the SEA allows us to identify possible environmental impacts much earlier and comply with donor requirements.
2	Rommel Pausal – City Assessor: In the absence of a SEA law in the Philippines, what is the best option to comply with the requirements of JICA and other donors, as well as ensure environmental protection for Greater Cotabato City?	That is a particularly important question. SEA is like an early-stage instrument to consider matters like policies, plans, and programs. There are good Philippine laws on EIA. Without SEA, it is sometimes very difficult to identify negative impacts that could confront you later at the project stage, more difficult to deal with. Thus, better to do SEA first to look at the entire life of the project and use this SEA idea or findings to conduct EIA. This is how we ensure addressing environmental considerations for the project.
3	Nash Maulana – (Writer for the Manila Standard and Mindanao Cross): The Cotabato City port at Timako is near a coral reef, in an open sea, and it is also vulnerable to tsunami. How does the Master Plan address these concerns?	The City Port is a project of the Philippine Ports Authority and they have conducted the Feasibility Study. At the moment, we have yet to conduct a detailed EIA for the Cotabato Port at Timako, but it will be covered by the SEA. With the SEA, we think of environmental considerations such as the ecosystem, among others, Detailed study of possible environmental impacts on specific projects is done through the EIA.
4	Roy Fiesta - Environment Group: City Agriculture Office Head. On the proposed land use, the agricultural sector is one of the most affected sectors, did the Study consider ways to avoid/lessen the conversion of agricultural lands?	Cotabato City Government should promote land policies to protect agricultural lands. This is kind of difficult since there is a need to balance the requirement of land to support the development and then the intent to protect agricultural land. Additional input: Engr. Rendon: The expansion plans of the City had already been discussed when we are preparing the CLUP. Most of the developments are to be located inside the resettlement area that will be protected from tsunami and agricultural lands and fisheries are outside that area, thus, fewer numbers of people engaged in agriculture will get affected.
5	Suggestion/Recommendation: Pete Marquez – Utility Group: Cotabato City is known to be a city of rivers and creeks; we could include these water resources in the planning for transport and tourism.	Response to Pete Marquez: Adela Fiesta (CPDO): The utilization of water bodies had already been considered. There are specific projects for tourism development, but we are yet still searching for a safer place where it could be placed.
6	Edwin Fernandez- Utility Group: On the Institutional framework, it appears that the private sector is not included in the structure, are we not considering (People’s Organization) PO’s and (Non-Government Organization) NGO’s in the planning and implementation of the components of the Master Plan.	For the Master Plan, the formal consultation with the NGOs and business sector is through the SHMs (they are invited in the 1st SHM and this 2nd SHM). Similarly, we are engaging them with individual meetings through our Liaison Office in Cotabato City.
7	Suggestion: Adela Fiesta: Traffic congestion is mainly caused by wrong parking, houses along the roads, wrong placement of loading/unloading in some schools; We need to put an emphasis on policies to address these obstructions. Suggestion: Badrudin Ali: On the approval of the implementation for the opening of traffic routes in Cotabato City. I noticed the traffic congestion in Cotabato City, particularly along Sinsuat Avenue. I suggest that the City Government implement the approved traffic routes to lessen vehicles passing through Sinsuat Avenue.	Good idea. Noted.

No.	Question/Comment/Suggestion	Answer/Response by the JICA Study Team
8	Suggestion: Edwin Fernandez: Could you consider putting a skyway along Sinsuat Avenue?	It may be too early for such an idea. The first step is to form/complete the backbone of the network to divert some traffic away from Sinsuat Avenue. Skyway/flyovers can be in the 2nd phase after completion of the network if there is still traffic congestion.
9	Nash Maulana: Is there a demarcation study to consider the separation of routes for Cotabato Port and Polloc Port? Or how it can potentially connect? Polloc, Cotabato, Zamboanga, Manila.	We have not gone to that extent yet. Initially, Cotabato port is for the Cotabato area while Polloc is a regional port – to serve a larger area.
10	Suggestion: Pete Marquez to LGU: Parking in Cotabato City is restrictive, this affects the business sector and buyers now prefer other areas like Midsayap. Parking areas need to be established, as business parking structures.	It is a difficult balancing act to cater to the interest of the business sector and the transport sector – the solution could be promoting a parking business. The City Government and the private sectors can work together to identify lands that are not yet utilized by owners and temporarily developed as paid parking. This idea is proposed as a project in the Master Plan.
11	Asst. GM Villarma, Water District: About the West Diversion Road, will it bypass the City and therefore will help to address the traffic congestion?	Yes, the route will cross along the Tamontaka river and it will connect the City to Datu Odin Sinsuat town, through the Southern Philippines Development Authority (SPDA) village and a bridge over the Rio Grande will link the City to Sultan Mastura town (and will connect to the National Road).
12	Engr. Crisanto Saavedra: There is a need to update the data on the plan. Data on solid waste, the daily collection seems to be incomplete – we have these data now. We now have the Materials Recovery Facilities (MRFs) in all barangays – though some need to be completed. We also have a strategy to turn solid waste into fertilizers, this is under negotiation with a proponent. In addition, the presentation slides show a proposal for a sanitary landfill, what is the proposal of the JICA Study Team, to place it outside or inside Cotabato City considering it is below sea level?	Please send us the data and we will update the report. Not yet sure where it is the best area to place the sanitary landfill, information on Disaster Risk could help. We believe the SLF will be in the surrounding towns, but we still need to do some investigation to validate this option/idea.
13	Comment: Engr. Crisanto Saavedra: On the septic tanks – We can mandate the construction of proper septic tanks when firms or households apply for business permits or construction permits.	This is noted.
14	Suggestion: Badrudin Ali: on the water system, members of the Integrated Transport Group of Cotabato City Urban settlers in Kalanganan 2 applied for the water connection and it was expensive. Perhaps, MCWD can improve its distribution system in the area to lessen the cost of the water connection to Bubong area residents.	Noted with his suggestion. The JICA Study Team would like to study this in Pre-F/S.
15	Mr. Ismael Tolentino: What will be the part of the BARMM in implementing all of these programs/projects?	The aspects of the final implementation have not yet been finalized. This is a matter that can be addressed later by the Philippine government or those with authority on the subject.
16	Nash Maulana: on the proposal to use Solar panels to augment the supply of electricity, there is a need to consider the possibility of having power surges due to lightning that can strike the system, Control system, service the current technology. Technology has evolved – a recent device has a KW meter. Did the JICA Study Team already consider this possible problem?	Solar panels can be damaged by lightning. It really depends on the areas that have thunder and lightning. If the area does not have that much weather disturbance, then the use of solar panels is desirable.
17	Architect Rebecca Hagad: Did this Study for improving Cotabato City's power sector consider renewable energy; solar, wind, or hydro?	The Study is focusing on improving the supply and distribution of power in Greater Cotabato. Solar energy which is renewable energy is identified as a potential project in the plan.

Source: JICA Study Team



Figure 7.3-4 Photographs of the second SHM

7.3.16 Evaluation of Development Scenarios and the Selection of the Optimum Scenario

The three development scenarios have been assessed based on the selected environmental items shown in Table 7.3-16. Table 7.3-16 summarizes the results of the evaluation. Each item was assessed qualitatively by the scores -2, -1, and 0. The explanation of each score is as follows: -2: significant negative impact is expected; -1: negative impact is expected to some extent; and 0: extent of negative impact is unknown. The last line of the table shows the total of the scores for each scenario.

Table 7.3-16 Comparative Evaluation of Scenarios of the Urban Spatial Plan for Greater Cotabato City

Category	No.	Environmental item	Evaluation			Explanation
			Scenario 1 Multi-polar Urban Centers	Scenario 2 Single-polar with peripheral barangays	Scenario 3 Single-polar by Cotabato Urban Center	
Pollution control	1	Air quality	-1	-1	-2	Scenario 3 expects more traffic flow and vehicles in Cotabato City, and congested roads may accelerate the situation.
	2	Water quality	-1	-1	-2	Scenario 3 expects more wastewater from Cotabato City.
	3	Wastes	-1	-1	-2	Scenario 3 expects more wastewater from Cotabato City.
	4	Soil contamination	-1	-1	-1	In every scenario, soil contamination is expected to some extent.
	5	Noise and vibration	-1	-1	-2	Scenario 3 expects more noise and vibration especially in Cotabato City. Regarding the noise from airplanes, it depends on the location of airport (there is a plan to construct a new airport).
	6	Subsidence	0	0	0	Detailed impacts are not known. If a lot of groundwater is extracted for water supply and/ or factories and other facilities, subsidence may occur.
	7	Odor	-1	-1	-2	Scenario 3 expects more odor from waste water and/or wastes.
	8	Sediment	-1	-1	-1	In every scenario, some impacts are expected because of river dredging.
Natural environment	10	Ecosystem	-1	-1	-2	In Scenarios 1 and 2, some impacts are expected. In Scenario 3, a large concentration of population and invasion into the ecosystems causes impacts on them.
	11	Hydrology	-1	-1	-1	Some impacts by river dredging are expected.
	12	Topography and geology	0	0	0	Details of impacts are not known. According to the interview survey, soil erosion and degradation are observed in Sultan Kudarat. In some municipalities, considerations have to be paid on their topography and geology.
Social environment	13	Involuntary resettlement	-2	-2	-2	In every scenario, involuntary resettlement is expected because of infrastructure development. According to the interview survey, a land dispute is not regarded as a big issue, but the issue of squatters is regarded as a problem in Cotabato City.
	14	Poor people/ vulnerable people	-2	-2	-2	Land acquisition and involuntary resettlement are expected to give impact on poor/ vulnerable people. According to the interview survey, there are many squatters in Cotabato City. They are likely impacted by the involuntary resettlement exercises.
	15	Indigenous or ethnic minority	-2	-2	-2	It is closely associated with "14 Poor people/vulnerable people." According to the interview survey, there are many indigenous people in Cotabato City and

Category	No.	Environmental item	Evaluation			Explanation
			Scenario 1 Multi-polar Urban Centers	Scenario 2 Single-polar with peripheral barangays	Scenario 3 Single-polar by Cotabato Urban Center	
						the municipalities. Many of them are squatters and poor. They are likely to receive impacts induced by the involuntary resettlement exercises.
	17	Land use and utilization of local resources	-1	-1	-2	It is difficult to meet the demand because of the increase of population. In Scenario 3, this situation is more serious.
	18	Water usage	-1	-1	-2	It is likely that the capacity of the water supply may not be able to meet the demand for clean water. In Scenario 3, this situation may be more serious.
	19	Existing social infrastructures and services	-1	-1	-1	Social infrastructures such as schools and hospitals cannot meet the demand.
	20	Social institutions such as social infrastructure and local decision-making institutions	-1	-1	-1	There may be not enough administrative staff or offices due to the increase of population.
	21	Misdistribution of benefits and damages	-1	-1	-1	According to the interview survey, there are not many big conflicts in Cotabato City and the municipalities. Although “Rido” is mentioned in one barangay in Cotabato City, it seems that it is not a serious problem. In every scenario, there are some misdistribution of benefits and damages caused by developments. It is necessary to consider the impacts and to take appropriate actions.
	22	Local conflicts of interest	-1	-1	-1	According to the interview survey, there are not many big conflicts in Cotabato City and the municipalities. Although “Rido” is mentioned in one barangay in Cotabato City, it seems that it is not a serious problem. In every scenario, there are some misdistribution of benefits and damages caused by developments. It is necessary to consider the impacts and to take appropriate actions.
	23	Cultural heritages	-1	-1	-1	City Tourism Officer has identified the cultural heritages in Cotabato City. According to the interview survey, there are many religious institutions (i.e., mosques, churches and cemeteries), and small cultural heritages. Some impacts on them are expected in every scenario.

Category	No.	Environmental item	Evaluation			Explanation
			Scenario 1 Multi-polar Urban Centers	Scenario 2 Single-polar with peripheral barangays	Scenario 3 Single-polar by Cotabato Urban Center	
	24	Landscape (including visual impacts)	-1	-1	-1	For the preventing of natural disasters, dikes and dike/ roads are proposed. These new infrastructures give some impacts on the landscape.
	25	Gender	0	0	0	Details of impacts are not known.
	26	Children's rights	-1	-1	-1	According to the interview survey, in a barangay, Cotabato City, some children are doing the begging. Some impacts on children are expected. Refer to "14 Poor people / vulnerable people".
	27	Infectious diseases such as HIV/AIDS	-1	-1	-2	Although details of impacts are not known, a new flow of people may cause spread of infectious diseases. Water borne infectious diseases may also spread because of lack of clean water. In Scenario 3, the situation may become more serious because the expected population density is high.
	28	Labor conditions	0	0	0	Details of impacts are not known.
Others	29	Accident	-1	-1	-2	Number of cases of accidents is expected to increase due to an increase of traffic. In Scenarion3, the situation is more serious.
	30	Trans-boundary impacts / global warming	-1	-1	-2	Some negative impacts on climate change are expected due to an increase of traffic and factories/ other institutions. In Scenario 3, the situation is more serious.
Total score			-27	-27	-38	

Source: JICA Study Team

7.3.17 Comparison of the Three Scenarios and Selection of the Optimum Scenario

The three development scenarios are compared based on the results of the assessment in Chapter 7.2.2 (Table 7.2-1) and Table 7.3-16. The results are shown in Table 7.3-17. The first scenario, “Scenario 1: Multi-polar Urban Centers,” was selected as the optimum scenario.

Table 7.3-17 Comparison of the Three Scenarios

Category of Criteria		Scenario 1	Scenario 2	Scenario 3	
Consistency with the Upper Spatial Framework and Plans		8	6	4	
Compatibility to Development Direction (in line with upper frameworks)	Urban Agglomeration (Concentration)	Land Capacity / Land Requirement	10	10	13
		Sustainable and Competitive Economic Development	13	10	9
	Connectivity	Sustainable Urban Mobility	15	9	6
		Efficient Infrastructure Service	8	8	4
	Vulnerability Reduction	Preventive Structure Against Hazards Risks	10	6	4
		Flexibility and Redundancy of Urban Structure	9	8	6
		Climate Change Adaptation	10	6	8
	Adaptability to Livable Living Environment		Attractive Living Environment	10	8
Quality of the Living Environment			8	6	5
Propriety of Conceivable Public Management and Investment		Easiness of Urban Growth Control	10	8	5
		Propriety of Investment	3	4	5
Subtotal		114	89	75	
Environmental Aspects (refer to Table 7.3-14)		-27	-27	-38	
Total		87	62	37	

Note: Technical and economic assessment is a summary of Table 7.2-1. For details, please refer to Table 7.2-1.
Source: JICA Study Team

7.3.18 Mitigation Measures and Monitoring System

(1) Summary of the Mitigation Measures

The mitigation measures for the optimum scenario are summarized in Table 7.3-18 for each item listed in the SEA. For details of the items, please refer to Table 7.3-11.

Table 7.3-18 Mitigation Measures for the Optimum Scenario

No.	SEA target item	Mitigation measure
	General	At a project level, the PEISS is adequately implemented. It is highly recommended to conduct environmental awareness campaigns to enhance the awareness of residents regarding keeping attractive living conditions and a good natural environment.
1	Air quality	Regarding traffic flow, new plans are proposed to improve the road conditions to efficiently meet demand in “Chapter 11 Transport Development Plan.” Every project needs to consider how to comply with air quality standards.
2	Water quality	Regarding wastewater, new plans are proposed in “Chapter 15 Sewage Development Plan.”
3	Wastes	“Chapter 16 Solid Waste Management” describes new plans to deal with solid wastes. Environmental awareness campaigns are effective in encouraging residents to reduce and segregate wastes.
4	Soil contamination	In every project, how to prevent soil contamination must be considered.
5	Noise and vibration	Regarding traffic flow, new plans are proposed to improve road conditions to efficiently meet the demand in “Chapter 11 Transport Development Plan.” Regarding noise from airplanes, refer to “Chapter 12 Airport Development Plan.” Every project needs to consider how to comply with noise standards.
7	Odor	Regarding odor, the “Sewage Development Plan” and “Solid Waste Management” help to reduce the odor problem.
8	Sediment	Dredging exercises should be conducted in a sustainable manner, for which the plan needs to be formulated according to plans described in “Chapter 18 Disaster Prevention Plan.”
10	Ecosystem	It is necessary to conduct a comprehensive survey on the ecosystem and formulate a plan. Some areas may be utilized for both the conservation of nature and fishery, which requires a plan to keep sustainability.
11	Hydrology	It is necessary to study existing plans such as the “Climate-Responsive Integrated Master Plan for Mindanao River Basin” (College of Forestry and Natural Resources at the University of the Philippines Los Baños and the DENR) to understand the watershed and river. In some municipalities, it is necessary to study their watersheds to obtain sufficient water supply from streams/ rivers.
12	Topography and geology	Some municipalities have hilly areas, which requires careful selection of development sites to prevent soil erosion.
13	Involuntary resettlement	Every project is required to formulate a plan to avoid involuntary resettlement as much as possible under PEISS. If inevitable, a Land Acquisition and Resettlement Action Plan (LARAP) (refer to the LARAP of the Ambal-Simuay River and Rio Grande De Mindanao Flood Control Projects) must be formulated in close collaboration with residents and officials.
14	Poor people/ vulnerable people	It is necessary to formulate community development programs to cope with poverty. Refer to “24.1 Peace Building.”
15	Indigenous or ethnic minority	The issue of indigenous people in the area is closely related to the issue of poverty. It also requires community development programs. Refer to “24.1 Peace Building.”
17	Land use and utilization of local resources	Refer to “Chapter 10 Land Use Plan 2028 for Greater Cotabato.”

No.	SEA target item	Mitigation measure
18	Water usage	Refer to “Chapter 14 Water Supply Development Plan.”
19	Existing social infrastructures and services	Regarding infrastructure development, refer to each sectoral development plan. Regarding educational and medical institutions, it is necessary to formulate a separate plan.
20	Social institutions such as social infrastructure and local decision-making institutions	Upgrading the capacity of administrators of the city and municipalities is required, as well as barangay officials.
21	Misdistribution of benefits and damages	Refer to “24.1 Peace Building.”
22	Local conflicts of interest	Refer to “24.1 Peace Building.”
23	Cultural heritages	Additional to the cultural heritages identified by Cotabato City, there are many religious institutions and some cultural heritages in the area. They need to be adequately identified and inventoried, which gives good information for PEISS implementation.
24	Landscape (including visual impacts)	Projects are implemented under PEISS.
25	Gender	It is necessary to consider impacts on women, female-headed households, and people with disabilities. Therefore, it is required to formulate a comprehensive plan for gender issues. Refer to laws such as the Magna Carta of Women, Anti-Sexual Harassment Act of 1995, Anti-Rape Law of 1997, and Anti-Violence Against Women and Their Children Act of 2004. In each project, considerations on the subject are given under PEISS.
26	Children’s rights	The issue is closely related to the one of poverty and IP. Refer to “24.1 Peace Building.”
27	Infectious diseases such as HIV/AIDS	It is necessary to introduce daily activities to prevent infectious diseases based on lessons learned from COVID-19. To prevent water-borne infectious diseases, a sufficient water supply system is necessary. Refer to “Chapter 14 Water Supply Development Plan.”
28	Labor conditions	All employers are required to comply with laws such as the Labor Code of 1974, RA 6685, and Anti-Age Discrimination in Employment Act of 2015.
29	Accidents	Accidents are carefully prevented in every project. Awareness campaigns are effective in preventing accidents.
30	Trans-boundary impacts/global warming	Refer to laws such as the Climate Change Act of 2009, National Strategy to Reduce Short-Lived Climate Pollutants from Municipal Solid Waste Sector in the Philippines, and Philippine Disaster Risk Reduction and Management Act of 2010.

Source: JICA Study Team

(2) Monitoring

Table 7.3-19 summarizes the points to monitor for each item listed in the SEA. For details of the items, please refer to Table 7.3-11.

Table 7.3-19 Points to Monitor

No.	SEA target item	Point to monitor
1	Air quality	The result of PEISS of each project is monitored. It is required to comply with air quality standards, water quality standards, and noise standards.
2	Water quality	
3	Wastes	
4	Soil contamination	
5	Noise and vibration	
7	Odor	
8	Sediment	The result of PEISS of each project is monitored.
10	Ecosystem	
11	Hydrology	
12	Topography and geology	
13	Involuntary resettlement	The result of a LARAP of each project is monitored.
14	Poor people / vulnerable people	Refer to “24.1 Peace Building”.
15	Indigenous or ethnic minority	
17	Land use and utilization of local resources	Refer to “Chapter 10 Land Use Plan 2028 for Greater Cotabato”.
18	Water usage	The result of PEISS of each project is monitored.
19	Existing social infrastructures and services	Status of existing social infrastructures and services are monitored. The number of administrators and educational institutions can be monitored.
20	Social institutions such as social infrastructure and local decision-making institutions	
21	Misdistribution of benefits and damages	Refer to “24.1 Peace Building”.
22	Local conflicts of interest	
23	Cultural heritages	The result of PEISS of each project is monitored.
24	Landscape (including visual impacts)	
25	Gender	
26	Children’s rights	
27	Infectious diseases such as HIV/AIDS	Status of infectious diseases is monitored. The number of patients can be monitored using the statics on them.
28	Labor conditions	The result of PEISS of each project is monitored.
29	Accidents	
30	Trans-boundary impacts / global warming	

Source: JICA Study Team

CHAPTER 8

VISION AND DEVELOPMENT FRAMEWORK FOR GREATER COTABATO AND CITY

8.1 Vision and Goals

8.1.1 Vision for Greater Cotabato and City

The 1st Bangsamoro Development Plan (2020-2022) prepared by the BARMM Government contains the development direction wished to achieve by the Regional Government. Hence for the Greater Cotabato's vision, the said vision will be adopted.

BARMM Vision

“The Bangsamoro that is unified, enlightened, self-governing, peaceful, just, morally upright and progressive.”

BARMM Mission

“Guided by moral governance and in pursuit of genuine and meaningful autonomy, the Bangsamoro Government ensures the necessary conditions for enduring peace and sustained socio-economic development suitable to the system of life, needs, and aspirations of its people by providing services to communities, ensuring multi-stakeholder participation, and facilitating appropriate partnerships.”

BARMM Overall Goal

“Upliftment of the lives of the Bangsamoro and establishment of the foundations of self-governance through moral governance.”

Similarly, the City Government of Cotabato held several stakeholder consultations as part of their series of activities toward the preparation of the new CLUP. Through this process, the vision and mission of the City were formulated which expressed the City's development direction.

Cotabato City Vision

“A smart city with God-fearing, enlightened diverse people living in a peaceful, secure and resilient community with progressive economic and excellent governance.”

Cotabato City Mission

“To mobilize a united and disciplined community to practice utmost vigilance in protecting humanity in a safe environment, sound technology and systematic government towards a progressive development and economic activities”

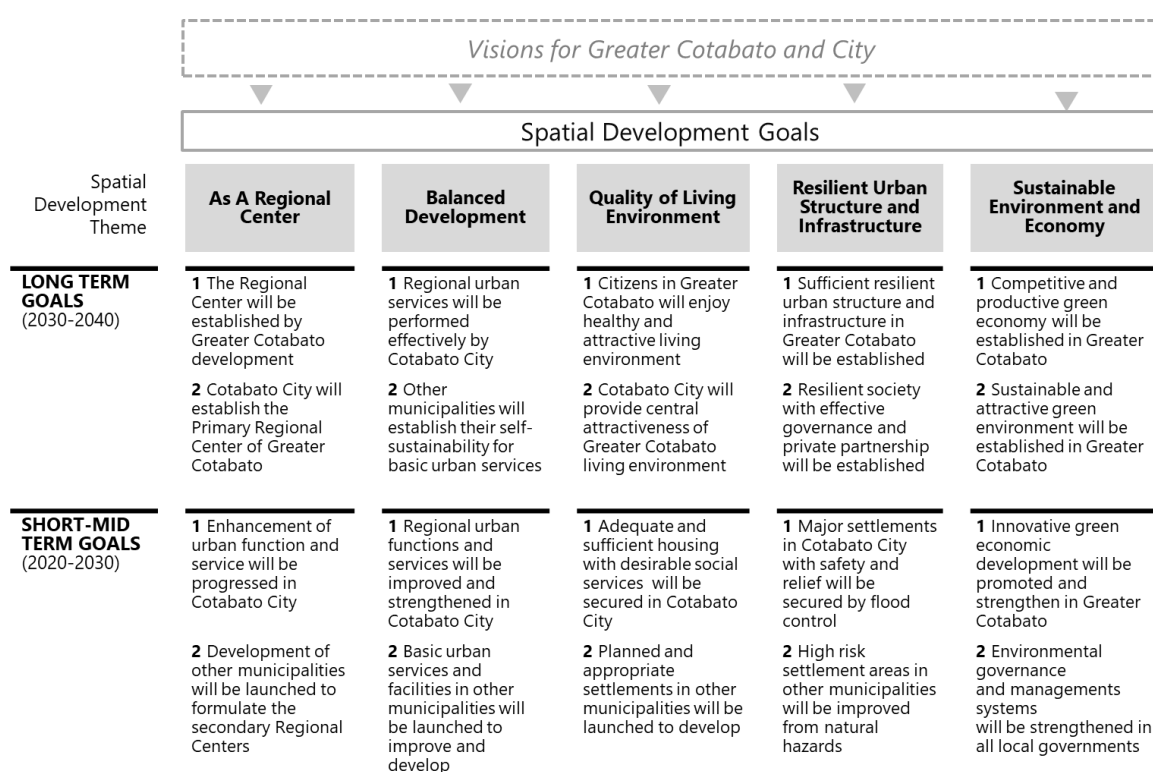
Aside from what was highlighted by the two visions, it is important to add that the development plan of the study area should have a strong component against the possible onslaught of natural

disasters which frequently hit the study area. Hence infrastructure against natural disaster will become major component of the plan to secure life and properties in Greater Cotabato. Therefore, development vision should include the following:

- The Study area shall be well-planned against natural calamities.
- Infrastructure should be strong enough against natural calamities and at the same time, DRRM (Disaster Risk Reduction and Management) is further strengthened.

8.1.2 Spatial Development Goals for Greater Cotabato and City

To achieve the vision for the Greater Cotabato area, the following spatial development goals as common benchmarks in different key sectors shall be pursued vigorously by relevant stakeholders. These spatial development goals focus on five development themes, to wit: 1) regional center; 2) balanced development; 3) quality of the living environment; 4) resilient urban structure and infrastructure; and 5) sustainable environment and economy. These themes are organized by detailed goals from the short, midterm to long-term goals. Figure 8.1-1 illustrates an overall picture of the spatial development goals for Greater Cotabato and City.



Source: JICA Study Team

Figure 8.1-1 Step-wise Spatial Development Goals for Visions of Greater Cotabato and City

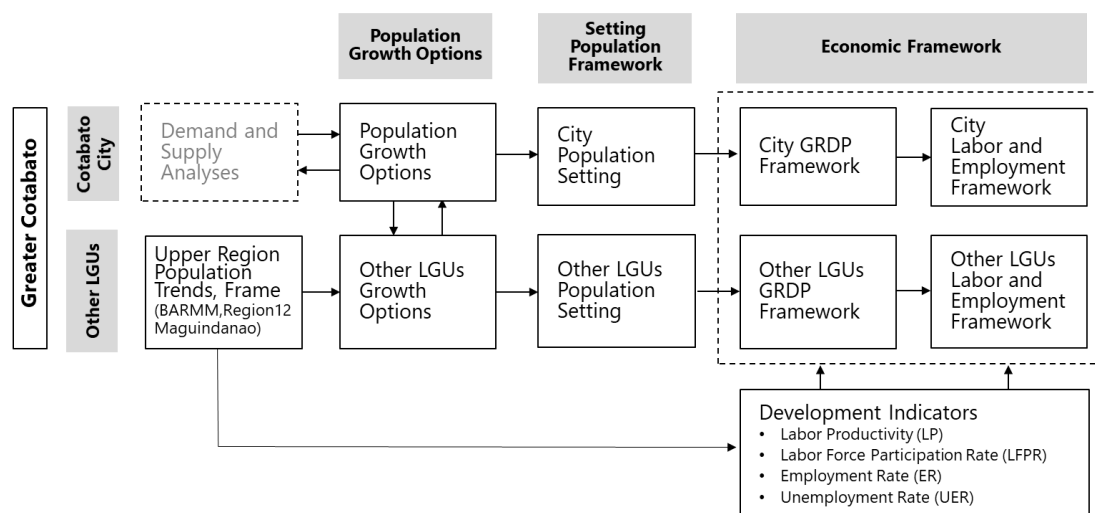
8.2 Socio-economic Development Framework for Greater Cotabato and City

8.2.1 Rationale and Assumptions for Socio-economic Development Framework

(1) Introduction

The socio-economic framework for Greater Cotabato covers the planning period up to 2028 for both Cotabato City and the municipalities of Greater Cotabato area consistent with the plan period of the Comprehensive Land Use Plan 2020-2028 (CLUP 2020-2028) of Cotabato City which is currently being updated, and 2040 as long-term plan target.

The key determinant is the future population of Cotabato City as the primary regional center of Greater Cotabato. The framework depends highly on the city's growth that affects the carrying capacity of Cotabato City to sustain its population without degrading its resources. This was examined by the demand and supply analysis in the previous section. Other factors are recent socio-economic indicators that are available only at the regional level of BARMM like GRDP. A more important economic indicator such as the Provincial income accounts, however, is not yet available for Maguindanao Province. Figure 8.2-1 illustrates the general planning process to set the socio-economic development framework.



Source: JICA Study Team

Figure 8.2-1 Flowchart for Setting Socio-economic Development Framework of Greater Cotabato and City

(2) Assumptions for Socio-economic Development in Greater Cotabato and City

Following past trends of economic development in relevant regions of BARMM including Maguindanao Province covering Greater Cotabato area and Region XII SOCCSKSARGEN (previously included Cotabato City), the future development direction of Greater Cotabato could be sustained within the current trend and pursue higher development especially in the long-term view. The case of Region XII showing steady development with constant growth to date could be a model for the development being pursued by Maguindanao. The economy of SOCCSKSARGEN grew by 8.3 percent in 2017, while that of ARMM recorded a 7.5 percent growth in 2017. From the foregoing, the following assumptions shall be the basis of the development framework.

- Long-term population framework: The regional population projection¹ by the Philippine Statistics Authority (PSA) can be adopted as a higher level long-term framework for Greater Cotabato where the future population in ARMM (currently BARMM) was estimated only until 2045. The annual average growth rate of 2.14 % from 2015 to 2040 population projection is adopted for the estimation.
- Maguindanao population growth with Cotabato City: In the past, the Province of Maguindanao showed stable growth both in terms of the population and the economy. The population of Maguindanao including Greater Cotabato (with Cotabato City and Pigkawayan) covered 37% of the BARMM total and has increased constantly its share (33% in 2000 to 37% in 2015). This increasing trend of the Maguindanao population could be maintained toward the future as one of the core areas in BARMM. The population share (43%) of the Greater Cotabato area out of Maguindanao total maintaining the same value in the past 15 years could also be sustained.
- The secured inhabitable area in Cotabato City: Based on the demand and supply analysis, it is the assumption that the population demand even in a high-growth scenario for Cotabato City is achievable to provide the inhabitable land secured by the flood project². This could be realized by providing additional dike road development and necessary mitigation measures (e.g. drainage system) for minor inundation and appropriate densification of settlement.
- Referable regional economic growth tendency both for Greater Cotabato and the City: Key economic indicators based on the past development trend that are available only at the regional level are applied to the statistical data at the local level. This is due to the lack of primary baseline data, such as domestic products, employment, and unemployment, etc., in the local government units. Economic development indicators of BARMM including Maguindanao and Region XII are referred to as the estimated economic indicators for Greater Cotabato and Cotabato City.
- Referable targets by regional economic development plans: The numerical targets (e.g. GRDP or employment) in the majority of relevant higher development plans (ARMM, BARMM, Region XII, and Maguindanao Province) with the Greater Cotabato area only indicated short-term targets (e.g. 2017-2022). Therefore, the short-term targets are referable indicators when the estimation of the development frameworks could be reflected not only in early-stage development target but in consideration of the current economic slowdown due to the pandemic described in detail below.
- Target development in the labor productivity of other municipalities in Greater Cotabato: The productivity in ARMM/BARMM reached PhP52,978 in 2017, lower than Region XII (including Cotabato City) at PhP125,121 in the same period. With the likely increase in economic activities in the Greater Cotabato area, the value of labor productivity for other municipalities is also expected to increase. The targets are set to reach half of the value of productivity of Cotabato City in 2028 and 80% in 2040.
- Consideration of impacts of the COVID19 pandemic: Taking account of the effects of the COVID 19 pandemic in the target area of Greater Cotabato, the lockdown imposed in many areas to

¹ The regional population projection for BARMM is based on the Projected Regional Population, by Age Group, Sex, and by Five-Calendar Year Interval, Philippines: 2010-2045 (Medium Assumption) /Philippine Statistics Authority (PSA)

² Ambal-Simuyay River and Rio Grande de Mindanao River Flood Control Projects

prevent the spread of the disease will slow down economic development in the short-term. The closure of establishments has resulted in the displacement of workers wherein the unemployment rate was reported to have increased by 10% in the middle of 2020.

8.2.2 Population and Socio-economic Development Framework

(1) Growth Scenarios and Preferred Future Population Framework for Cotabato City

1) Population growth scenarios for Cotabato City

The population framework of Cotabato City accounts for the capacity of inhabitable land for which the demand and supply analysis was examined. It is assumed to absorb future population increase with the provision of flood control projects and dike roads, especially on the western side, and successful population density control.

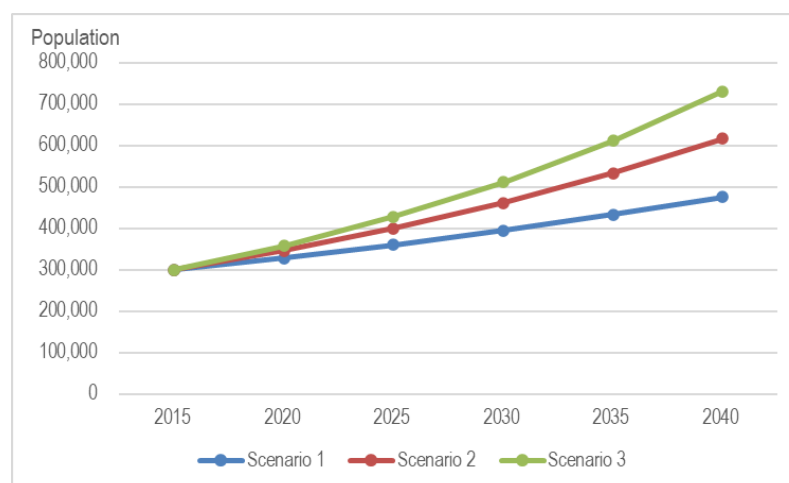
In line with three spatial development scenarios for the Greater Cotabato area examined in Chapter 7, three population growth scenarios of Cotabato City were set on the two target years of 2028 and 2040 as shown in Table 8.2-1 and Table 8.2-3.

Scenario 1 assumes 380,500 people in 2028 and 474,700 in 2040 by the lowest population growth (Annual Average Population Growth Ratio-AAGR: 1.86% tracing the past five years of growth). Scenario 3 at the opposite end of Scenario 1 estimates 476,100 people in 2028 and 730,300 with the highest growth case (3.64% in the past 20 years AAGR). Scenario 2 expects a moderate and medium growth between two scenarios 1 and 3 assuming AAGR as 2.93%.

Table 8.2-1 Three Population Growth Scenarios of Cotabato City in Greater Cotabato Area

Development Scenario	2015 Census	2020	2028	2040	Share in GCA		AAGR 2015-2040
					2028	2040	
Scenario 1	299,438	328,400	380,500	474,700	37.6%	36.9%	1.86%
Scenario 2	299,438	345,900	435,700	615,900	46.3%	47.9%	2.93%
Scenario 3	299,438	357,900	476,100	730,300	53.0%	56.7%	3.63%

Note: GCA – Greater Cotabato Area
Source: JICA Study Team



Source: JICA Study Team

Figure 8.2-2 Population Growth Scenarios of Cotabato City 2015 – 2040

2) Preferred population framework for Cotabato City

The future population of Scenario 1 is presumed as one of the most compact developments with a decent investment scale of infrastructure development for the city, except the national flood control project with region-wide investment currently underway. Despite the fluctuating population growth in the past 20 years due to difficult social circumstances, the recent growth could be maintained, if the urban growth management by the city is under control. Meanwhile, the neighboring municipalities would grow up to a certain scale of urbanization enabling self-sustained development as the multi-polar development for the Greater Cotabato area. As a result, in consultation with the Cotabato City Government, Scenario 1 is adopted with a decent population growth rate (1.86%) of Cotabato City in line with the framework of the Comprehensive Land Use Plan 2020-2028 of Cotabato City and the Comprehensive Development Plan 2017-2022.

(2) Growth Scenarios and Preferred Future Population Framework for Greater Cotabato

1) Other municipalities in Greater Cotabato

Based on the long-term population projections for BARMM by the Philippine Statistics Authority, the JICA Study Team roughly estimated the population of Maguindanao Province and Greater Cotabato including Cotabato City and Pigkawayan Municipality. The estimated population of Greater Cotabato between 2015 and 2040 is shown in Table 8.2-2.

Table 8.2-2 Estimated Population Framework: Greater Cotabato Area and Relevant Upper Regions (BARMM and Maguindanao Province including the City and Pigkawayan)

	2015 Census	2020	2028	AAGR 2015-2028	Share	2040	AAGR 2015-2040	Share
BARMM* incl. Cotabato City and Pigkawayan	4,147,621	4,695,319	5,629,225	2.38%	100.0%	7,044,880	2.14%*	100.0%
Maguindanao incl. Cotabato City and Pigkawayan	1,540,167	1,787,022	2,228,575	2.88%	39.6%	2,958,850	2.65%	42.0%
Greater Cotabato	672,100	777,400	969,500	2.86%	17.2%	1,287,100	2.63%	18.3%

Source: The regional population projection for BARMM is based on the Projected Regional Population, by Age Group, Sex, and by Five-Calendar Year Interval, Philippines: 2010-2045 (Medium Assumption) /Philippine Statistics Authority (PSA) edited by JICA Study Team

Given the three population growth scenarios of Cotabato City and the estimated population of Greater Cotabato, the population of other municipalities of Greater Cotabato is presented in Table 8.2-3. Scenario 1 assumes the highest population growth of other municipalities of Greater Cotabato including Datu Odin Sinsuat, Parang, Sultan Kudarat, Sultan Mastura, and Pigkawayan. Scenario 2 and Scenario 3 expect moderate and low growth compared to Scenario 1.

Table 8.2-3 Three Population Growth Scenarios of Other Municipalities including Pkgawayan in Greater Cotabato Area

	2015 Census	2020	2028	AAGR 2015-2028	Share in GCA	2040	AAGR 2015-2040	Share in GCA
Scenario 1	372,662	449,000	589,000	3.58%	60.8%	812,400	3.17%	63.1%
Scenario 2	372,662	431,500	533,800	2.80%	55.1%	671,200	2.38%	52.1%
Scenario 3	372,662	411,300	493,400	2.18%	50.9%	556,800	1.62%	43.3%

Note: GCA – Greater Cotabato Area
Source: JICA Study Team

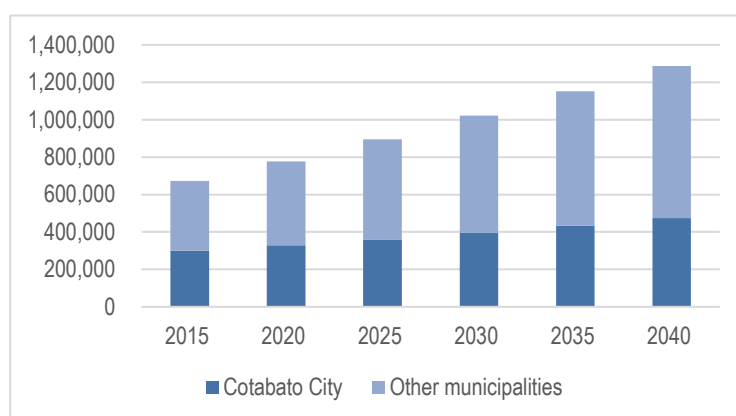
2) Preferred population framework for Greater Cotabato and City

Following the preferred population framework of Cotabato City (Scenario 1) and three growth scenarios of other municipalities in the Greater Cotabato area, Scenario 1 for other municipalities is adopted. The population framework of the Greater Cotabato area and City-based on Scenario 1 assumes growth-controlled Cotabato City with multi-polar urban centers within Greater Cotabato as shown in Table 8.2-4.

Table 8.2-4 Population Frameworks in Greater Cotabato Area

	2015 Census	2020	2028	AAGR 2015-2028	Share	2040	AAGR 2015-2040	Share
Cotabato City	299,438	328,400	380,500	1.86%	39.2%	474,700	1.86%	36.9%
Other municipalities	372,662	449,000	589,000	3.58%	60.8%	812,400	3.17%	63.1%
Greater Cotabato	672,100	777,400	969,500	2.86%	100.0%	1,287,100	2.63%	100.0%

Source: JICA Study Team



Source: JICA Study Team

Figure 8.2-3 Population Growth of Greater Cotabato (Cotabato City and Other Municipalities) 2015 – 2040

(3) Economic Development Framework for Greater Cotabato and City

1) GRDP and labor/employment for Cotabato City

Referring to the past trend of Region XII, relevant economic indicators for Cotabato City such as labor productivity, labor participation rate are set to estimate GRDP and employment, especially the target set by an unemployment rate of 3% by 2040 as shown in Table 8.2-5.

Table 8.2-5 Target Indicators for Labor and Employment of Cotabato City

Key Indicator	2015*	2020	2028	2040
Population	299,438	328,400	380,600	474,700
Population 15 age and over (A)	194,473	213,300	247,200	308,300
GRDP (million peso-constant) (B)	13,530	16,400	26,770	50,220
Employment (C)	115,690	118,360	147,330	183,930
Unemployment (D)	4,217	13,100	4,900	5,700
Labor Force (E)	119,907	131,460	152,230	189,630
Labor Force Participation Rate (E/A)	61.7%	61.6%	61.6%	61.5%
Employment Rate (C/E)	96.5%	90.0%	96.8%	97.0%
Unemployment Rate (D/E)	3.5%	10.0%	3.2%	3.0%
Labor Productivity (PhP/emp/year) (B/C)	116,950	138,560	181,700	273,040

Note: Figures in 2015 for the labor and employment are estimated by indicators of Region XII except the data of population in 2015 by Population and Housing Census 2015 / PSA.
Source: JICA Study Team

Sectoral shares of GRDP is referred to the ratio of gainful workers and its past growth rate of each sector in Cotabato City as shown in Table 8.2-6. The industry sector mainly by agro-industries and the service sector would grow faster while the agriculture sector (material products) would grow slower due to comparative lower productivity than other sectors in the local economy and employment would decrease presumably by the modernization of products.

Table 8.2-6 Estimated GRDP by Sector in 2028 and 2040 for Cotabato City

Total and Sector GRDP	2015*	2020	2028	2040	Share in Total		AAGR 2015- 2040
					2028	2040	
GRDP (million PhP-constant)	13,530	16,400	26,770	50,220	100.0%	100.0%	5.4%
Agricultural, Forestry and Fishery Sector	1,020	1,100	1,240	1,470	4.6%	2.9%	1.5%
Industrial Sector	8,770	10,020	16,460	28,340	61.5%	56.4%	4.8%
Service Sector	3,760	5,280	9,070	20,410	33.9%	40.6%	7.0%

Note: Figures in 2015 for the labor and employment are estimated by indicators of Region XII.
Source: JICA Study Team

Table 8.2-7 Estimated Employment by Sector in 2028 and 2040 for Cotabato City

Total and Sector Employment	2015*	2020	2028	2040	Share in Total		AAGR 2015-2040
					2028	2040	
Employment	115,690	118,370	147,330	183,930	100.0%	100.0%	1.9%
Agricultural, Forestry and Fishery Sector	24,087	22,560	21,390	17,930	14.5%	9.7%	-1.2%
Industrial Sector	34,017	34,630	48,730	56,560	33.1%	30.8%	2.1%
Service Sector	57,586	61,180	79,960	109,460	54.3%	59.5%	2.6%

Note: Figures in 2015 for the GRDP, labor, and employment are estimated by indicators of Region XII.
Source: JICA Study Team

2) GRDP and employment for other municipalities in Greater Cotabato

The labor and employment indicators and GRDP of the other municipalities of Greater Cotabato for 2015-2040 were estimated based on the past labor productivity of ARMM, future working population, and the unemployment rate target of 3% by 2040 as shown in Table 8.2-8.

Table 8.2-8 Target Indicators for Labor and Employment of Other Municipalities in Greater Cotabato Area

Key Indicator	2015	2020	2028	2040
Total population of municipalities	372,662	449,000	589,000	812,400
Population 15 age and over (A)	236,327	284,740	373,520	515,200
GRDP (million peso-constant) (B)	4,984	7,870	19,070	59,360
Employment (C)	124,040	139,410	196,660	271,840
Unemployment (D)	4,521	15,490	6,550	8,430
Labor Force (E)	128,562	154,900	203,200	280,270
Labor Force Participation Rate (E/A)	54.4%	54.4%	54.4%	54.4%
Employment Rate (C/E)	96.5%	90.0%	96.8%	97.0%
Unemployment Rate (D/E)	3.5%	10.0%	3.2%	3.0%
Labor Productivity (PhP/emp/year) (B/C)	40,177	56,370	96,880	218,300

Note: Figures in 2015 for the labor and employment are estimated by indicators of Region XII except the data of population in 2015 by Population and Housing Census 2015 / PSA.

Source: JICA Study Team

Industry share of GRDP reflects the ratio of gainful workers and past growth rate of each industry in the municipalities as shown in Table 8.2-9. The industry sector and the service sector would grow faster while the agriculture sector would grow slower to reduce its share in the local economy.

Table 8.2-9 Estimated GRDP by Sector in 2028 and 2040 for Other Municipalities in Greater Cotabato Area

Total and Sector GRDP	2015*	2020	2028	2040	Share in Total		AAGR 2015-2040
					2028	2040	
GRDP (million PhP-constant)	4,984	7,870	19,070	59,360	100.0%	100.0%	10.4%
Agricultural, Forestry and Fishery Sector	1,473	2,000	3,750	7,500	19.7%	12.9%	6.8%
Industrial Sector	1,491	2,520	6,700	23,190	35.1%	39.1%	11.6%
Service Sector	2,019	3,350	8,620	28,490	45.2%	48.0%	11.2%

Note: Figures in 2015 for the labor and employment are estimated by indicators of BARMM (ARMM).

Source: JICA Study Team

Table 8.2-10 shows the estimated labor force in agriculture, industry, and service sectors in the other municipalities of the Greater Cotabato area for 2015-2040. This projection is based on the estimated GRDP, labor productivity, growth rates of each sector, and the target unemployment rates in the past years.

Employment of the service sector is expected to steadily increase and it shall account for close to half of the total employed labor force by 2040. On the other hand, the agriculture sector would show a downward trend by 2040 sharing only around 20% in the total number of employment.

Table 8.2-10 Estimated projection for Other Municipalities of Greater Cotabato Area

Total and Sector Employment	2015*	2020	2028	2040	Share in Total		AAGR 2015-2040
					2028	2040	
Employment	124,040	139,420	196,660	271,860	100.0%	100.0%	3.2%
Agricultural, Forestry and Fishery Sector	52,941	52,260	58,510	54,510	29.8%	20.1%	0.1%
Industrial Sector	24,929	31,530	52,490	88,640	26.7%	32.6%	5.2%
Service Sector	46,171	55,630	85,660	128,710	43.6%	47.3%	4.2%

Note: Figures in 2015 for the GRDP, labor, and employment are estimated by indicators of Region XII.

Source: JICA Study Team

3) GRDP and employment for Greater Cotabato and City

The estimated GRDP and employment values for the whole Greater Cotabato area are the aggregated GRDPs and employment estimates for Cotabato City and the other municipalities comprising the area. The GRDP estimates of these municipalities were derived using a set of target indicators as mentioned in the previous section. The labor productivity of these municipalities is expected to grow significantly along with the notable economic development expected to happen in the area. Table 8.2-11 indicates that the GRDP share of these municipalities from the total GRDP of the Greater Cotabato area has increased by 9.2 points from the share of 32.4% in 2028 to the share of 41.6% in 2040. In employment, the combined share of these municipalities has also increased by about 3.1 points from 54.1% in 2028 to 57.2% in 2040.

Table 8.2-11 GRDP for Other Municipalities of Greater Cotabato Area in 2028 and 2040

Category	Area	2015	2020	2028	2040	Share	
						2028	2040
GRDP	Cotabato City	13,530	16,400	26,770	50,220	67.6%	58.4%
	Other Municipalities	4,984	7,870	19,070	59,360	32.4%	41.6%
	Total	18,514	24,270	45,840	109,580	100.0%	100.0%
Employment	Cotabato City	115,690	118,360	147,330	183,930	45.9%	42.8%
	Other Municipalities	124,040	139,420	196,660	271,860	54.1%	57.2%
	Total	239,730	257,780	343,990	455,790	100.0%	100.0%

Note: Figures in 2015 for the GRDP, labor, and employment are estimated by indicators of Region XII.

Source: JICA Study Team