



NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY

Volume 2: Philippine Water Supply and Sanitation Master Plan

Zamboanga Peninsula Water Supply and Sanitation Databook and Regional Roadmap

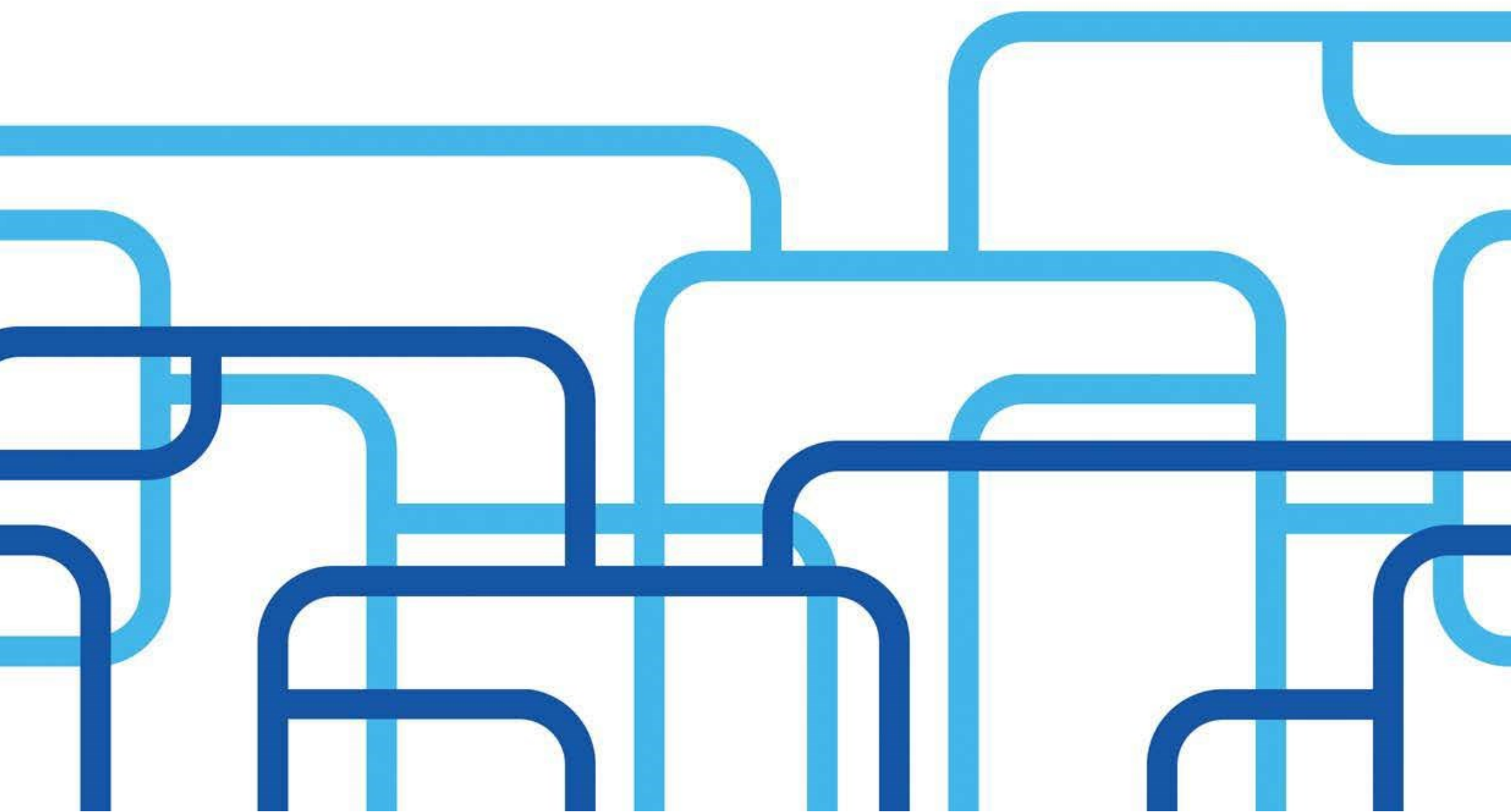


Table of Contents

Introduction	
Land Classification	7
Topography	7
Economy	7
Labor and Employment	7
Family Income and Expenditure	9
Demography	9
Climate	11
Climate Change and Hydrological Hazards	11
Disaster Risks	11
WSS Sector Status	
Access to Safe Water	15
Drinking Water	15
Access to Sanitation	17
Water Resources	
Surface Water	19
Groundwater	21
Water Availability, Water Stress and Water Scarcity	21
Water Use	21
Demand	
Population Projection	22
Water Supply and Demand	22
Water Demand vs. Water Resources Potential	22
WSS Infrastructure	
Water Service Providers	25
<i>Water Districts</i>	25
<i>LGU-Led Water Utilities</i>	25
<i>BWSA</i>	25
<i>RWSA</i>	25
Sanitation	
Open Defecation	27
Wastewater and Domestic Biological Oxygen Demand	27
Water Quality	31
Waterborne diseases	31
WSS Sector Gaps	
Issues, Constraints and Challenges	32
Regional Vision	34
Strategic Framework	34
Access Targets for Water and Sanitation	36
Strategic Interventions	38
<i>Physical Interventions</i>	39
<i>Nonphysical interventions</i>	39
Addressing the Gaps	
Water Supply Investment Requirements	41
<i>Physical Investments</i>	41
<i>Nonphysical Investments</i>	41
Sanitation Investment Requirement	43
<i>Physical Investments</i>	43
<i>Nonphysical Investments</i>	43
Proposed Projects and Programs	45
Identified Priority Projects (2019-2020)	47
Appendix	
Appendix A: Provincial and HUC Profiles	48

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	List of Tables	Page
Table 1	Population per Province/City, 2015	9
Table 2	Urban and Rural Population per Province/City, 2015	9
Table 3	Seasonal Projections Under a Medium-Range Emission Scenario	11
Table 4	Frequency of Extreme Events in 2020 and 2050 Under a Medium-Range Emission Scenario	11
Table 5	National and Regional Access to Water Supply	15
Table 6	Access to Water Supply per Province/City	15
Table 7	National and Regional Access to Sanitation	17
Table 8	Access to Sanitary Facilities per Province	17
Table 9	Rivers in Region IX	19
Table 10	Aquifer Classes Based on MGB Aquifer Types	21
Table 11	Water Availability per Province	21
Table 12	Water Service Providers per Province/City	25
Table 13	Classification of Rivers	31
Table 14	Hindering and Facilitating Factors	33
Table 15	Strategies in Achieving Increased Access to Potable Water	34
Table 16	Proposed Strategic Interventions for Water Supply	38
Table 17	Proposed Strategic Interventions for Sanitation	38
Table 18	Capital Investments Required to Achieve Water Supply Targets	39
Table 19	Institutional and Regulatory Reforms Required to Meet Water Supply and Sanitation Goals	39
Table 20	Indirect Costs Employed	41
Table 21	Total Investment Costs for Water Supply Sector	41
Table 22	Total Investment Costs for Sanitation Sector	43

	List of Figures	Page
Figure 1	GRDP Contributions per Sector, 2016	7
Figure 2	Employment Rates per Province/City	7
Figure 3	Distribution of Expenditure, 2015	9
Figure 4	Main Sources of Water Supply, 2015	15
Figure 5	Provincial Access to Safe Water	15
Figure 6	Percentage of Households with Access to Sanitary Facilities	17
Figure 7	Existing Septage Treatment Plants	17
Figure 8	Water Resources Potential and Annual Rainfall	19
Figure 9	Water Resource Utilization, 2017	21
Figure 10	Water Availability Map, 2015	21
Figure 11	Projected Population	22
Figure 12	Projected Water Demand	22
Figure 13	Biological Oxygen Demand, 2015	27
Figure 14	Categories of Wastewater	27
Figure 15	Wastewater Produced, 2015	27
Figure 16	Waterless Municipalities	31
Figure 17	Zamboanga Peninsula WSS Strategic Framework	35
Figure 18	Targeted Households with Access to Safe Water	36
Figure 19	Targeted Households with Access to Sanitation Facilities	36
Figure 20	Distribution of Investment Requirement per Province/City	45

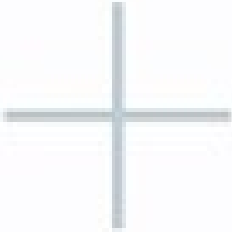
Acronyms

AIP	Annual Investment Plan
AM	Assistance to Municipalities
ARMM	Autonomous Region in Muslim Mindanao
BEC	Behavior Change Communication
BOD	Biological Oxygen Demand
BWSA	Barangay Water and Sanitation Association
CapEx	Capital Expenditure
CBO	Community-Based Organization
CW	Coastal Water
DA	Department of Agriculture
DED	Detailed Engineering Design
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
DJF	December, January and February
DOH	Department of Health
DPWH	Department of Public Works and Highways
DTI	Department of Trade and Industry
EMB	Environmental Management Bureau
FAO	Food and Agriculture Organization
FHSIS	Field Health Service Information System
FIES	Family Income and Expenditure Survey
FA	Financial Assistance
GRDP	Gross Regional Domestic Product
HUC	Highly Urbanized City
JICA	Japan International Cooperation Agency
IEC	Information, Education and Communication
JJA	June, July and August
LDP	Local Development Plan
LFPR	Labor Force Participation Rate
LGU	Local Government Unit
LSSP	Local Sustainable Sanitation Plan
LWUA	Local Water Utilities Administration
M&E	Monitoring and Evaluation
MAM	March, April and May
MDG	Millennium Development Goals
MGB	Mines and Geosciences Bureau
MSME	Micro, Small and Medium Enterprises
NAMRIA	National Mapping and Resource Information Authority
NCR	National Capital Region
NDRRMC	National Disaster Risk Reduction Management Council
NEDA	National Economic and Development Authority
NGO	Nongovernment Office
NRW	Nonrevenue Water
NSSMP	National Septage and Sewerage Master Plan
NWRB	National Water Resources Board
O&M	Operation and Maintenance
OBS	Observed Baseline
OCD	Office of Civil Defense
OD	Open Defecation
OTOP	One Town One Product
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAWD	Philippine Association of Water Districts
PDP	Philippine Development Plan
PEM	Philippine Environment Monitor
PNSDW	Philippine National Standards for Drinking Water
PSA	Philippine Statistics Authority
PSGC	Philippine Standard Geographic Code
PWSSMP	Philippine Water Supply and Sanitation Master Plan

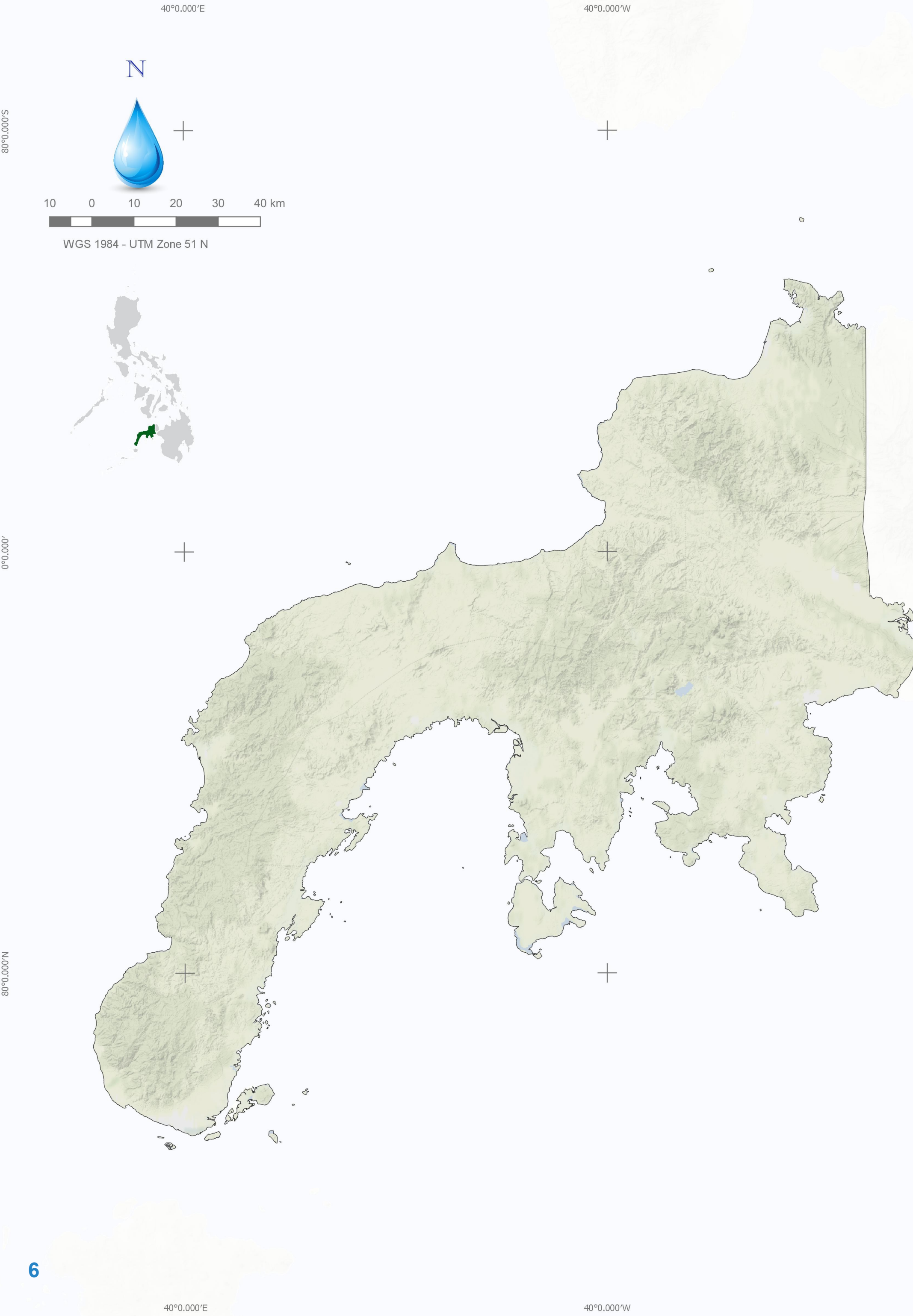
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RBCO	River Basin Control Office
RDC	Regional Development Council
RDP	Regional Development Plan
ROW	Right-of-Way
RWSA	Rural Waterworks and Sanitation Association
SALINTUBIG	Sagana at Ligtas na Tubig
SDG	Sustainable Development Goals
SMERA	Small and Medium Enterprise Roving Academy
SMP	Septage Management Program
SON	September, October and November
STP	Septage Treatment Plant
SSF	Shared Service Facilities
TC	Tropical Cyclone
UN	United Nations
UNICEF	United Nations Children's Fund
uPVC	Unplasticized Polyvinyl Chloride
WASH	Water, Sanitation and Hygiene
WD	Water District
WHO	World Health Organization
WQMA	Water Quality Management Area
WRR	Water Resources Region
WSP	water service provider
WSS	Water Supply and Sanitation
WSSPMO	Water Supply and Sanitation Program Management Office
ZOD	Zero Open Defecation

Units



%	percent
°C	degree Celsius
CY	Calendar Year
km²	square kilometer
km	kilometer
lpcd	liters per capita per day
lps	liters per second
m³	cubic meter
MCM	million cubic meters
mm	millimeter
mg/L	milligrams per liter
PhP	Philippine peso



Region IX

Zamboanga Peninsula

Introduction

10

Zamboanga Peninsula Region

Zamboanga Peninsula, designated as Region IX, is located in western Mindanao.

It extends southwesterly toward the Sulu Archipelago and Borneo.

Its location is associated with whatever is left of Mindanao through an isthmus between Panguil Bay and Pagadian Bay. The limit between the landmass and the territory is formally set apart by the outskirts between Zamboanga del Sur and Lanao del Norte.

Zamboanga Peninsula consists of three provinces namely, Zamboanga del Norte, Zamboanga del Sur, and Zamboanga Sibugay, and five cities: Isabela City, Dapitan City, Dipolog City, Pagadian City, and the highly urbanized city (HUC) of Zamboanga. Pagadian City is acknowledged as the regional center.

The region is endowed with abundant forest resources. Its major products include logs, lumber, plywood, and veneer.

Mineral deposits (metallic and non-metallic) are also abundant. Metallic reserves include gold, silver, copper, chromite, iron, lead, and manganese ore. Non-metallic minerals consist of coal, clay, asbestos, limestone, quartz, silica, phosphate rock, and marble.

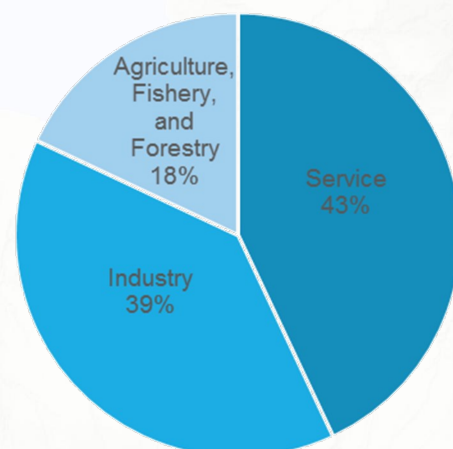


Figure 1: GRDP Contributions per Sector, 2016

The region's economic performance has improved by 4.7%. The agriculture, hunting, forestry, and fishing sector which accounted for 17.9% of the region's total output decreased by 5.0%.

Contributions to the rise in domestic sales include interventions such as assistance from the Department of Trade and Industry (DTI) to micro, small and medium enterprises (MSMEs) assistance through the Small and Medium Enterprise Roving Academy (SMERA) and Shared Service Facilities (SSF).²

Labor and Employment

As of 2018, the current total labor force participation rate (LFPR) was estimated at 59.3% of the total population of the region, equivalent to 1.85 million. This shows a decrease of 0.3% from the 2017 LFPR.³

The employment rate was considerably high at 96.6% in January 2018 (from 96% in 2017). On the other hand, unemployment rate stood at 3.4% in January 2018 (from 4.3% in 2017) while underemployment was estimated at 16.1% in January 2018 (from 9.2% in 2017). The region's annual average employment rate was recorded at 96% in 2017, slightly lower compared to 96.1% in 2016. While the unemployment rate increased from 3.9% in 2016 to 4% in 2017 but the number of unemployed workers decreased from 61,213 to 59,904 workers due to the decline in the number of people who are in the labor force.

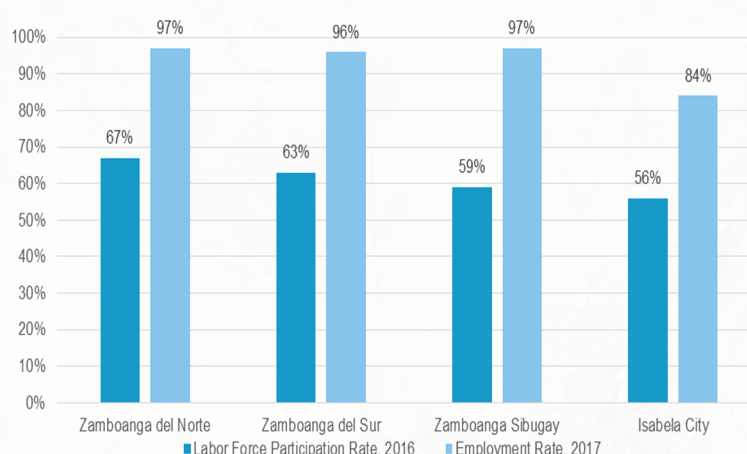


Figure 2: Employment Rates per Province/City

Land Classification

The region has a total land area of 17,046.64 square kilometers (km²) representing around 5.7% of the country's total land area and 17.5% of the island of Mindanao. Of this figure, 54% is forestland and 46% alienable and disposable land. The region also has large tracts of arable land and those for real estate development.

About 86.5% of its land consists of open, cultivated, built-up areas and inland waters; 8.8% consists of forestland and 4.8% bushland.

Economy

The service sector accounts for the lion's share of the Gross Regional Domestic Product (GRDP) followed by the industry sector, and the agriculture, fishery and forestry sector.¹

The region's economy was valued at PhP35.81 billion in 2008, growing at an average of 2.2% for the period 2007-2008. In 2016, it contributed 2.0% to the country's Gross Domestic Product.

¹ Philippine Statistics Authority (PSA), CountryStat Philippines 2016

² National Economic and Development Authority (NEDA) Region IX, 2015 Regional Economic Situationer

³ Philippine Statistics Authority, Labor Force Survey, 2015

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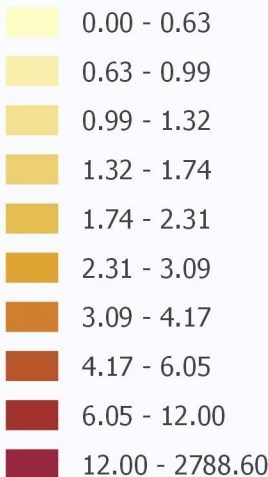
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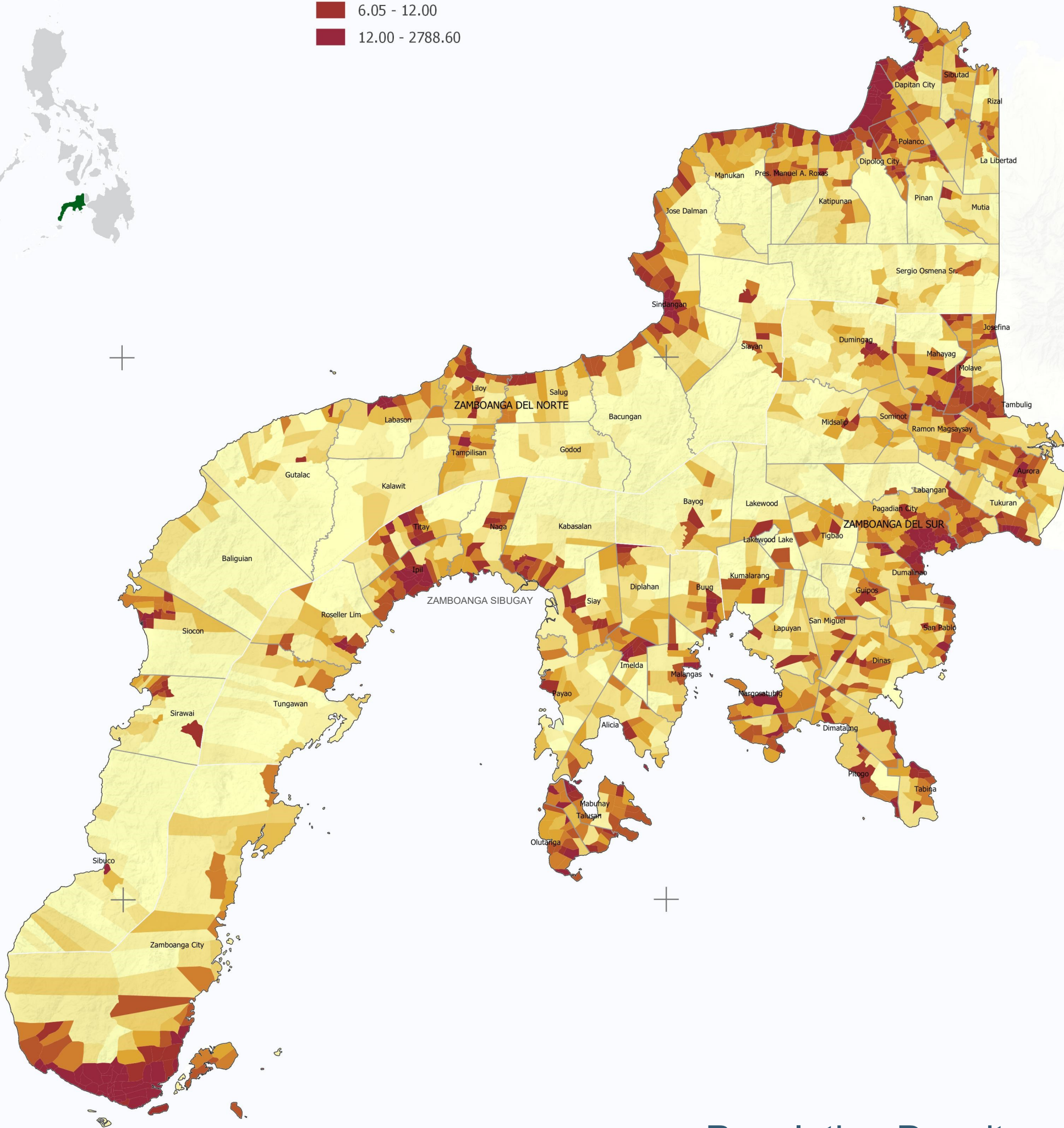
Population Density (person/ha)



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Population Density

PSA, 2015 Census

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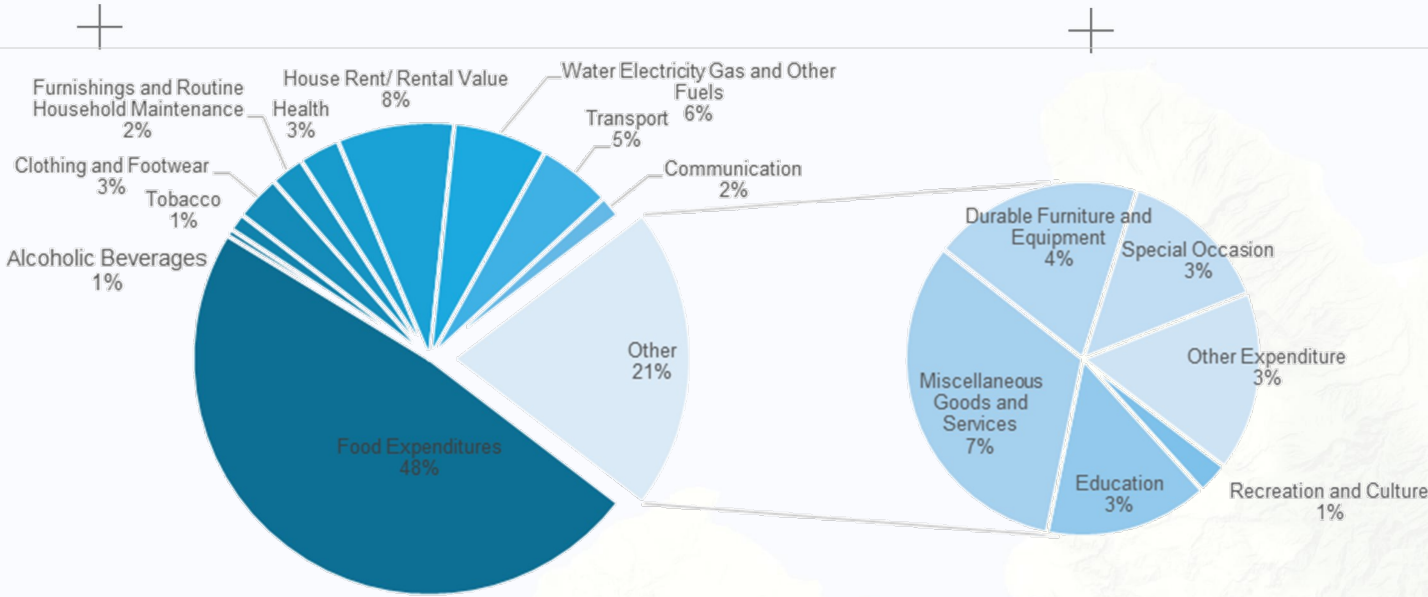


Figure 3: Distribution of Expenditure, 2015

Family Income and Expenditure

There are about 824,000 families in Zamboanga Peninsula, with an estimated total average income of PhP190,000 and a total average expenditure of PhP144,000. All income classes show that average expenditures are lower than the average income.

With family size as an indicator, a family of four has the largest income-expenditure difference, while a single-person household has the least income-expenditure difference — indicating that the former has more savings compared to other family sizes.

With respect to the disbursement patterns of the families in the region and across income levels, the Family Income and Expenditure Survey (FIES) conducted in 2015 revealed that food expenditure registered the highest among the major expenditure groups at 48.2%. House rental/rental expenses followed at 8.0% and expenses for water, electricity, gas and other fuels at 6.4%. Figure 3 graphs the expenditure distribution showing that most families spend more for their basic needs.⁴

Demography

As of 2015, Zamboanga Peninsula had a total population of 3,629,783, which accounted for 3.6% of the country's population. Zamboanga del Norte had the biggest population among the three provinces (1,011,393) comprising 28% of the region's total population, followed closely by Zamboanga del Sur with 1,010,674. Zamboanga Sibugay had the smallest population — 633,000. Zamboanga City had a population of about 862,000.

The population growth rate of the region from 2000 to 2015 was registered at 1.64%, which was lower than the national average of 1.84.

The population density of the region as of 2015 averaged 213 persons per square kilometer. Among all cities and towns, Zamboanga City had the highest density at 609 persons per square kilometer, about three times larger than that of the entire region.

Household size in the region averages 4.54 persons.

The region is predominantly (66%) rural. Even Zamboanga City has an urban population slightly larger than 80% of its total population.

Table 1: Population per Province/City, 2015

Region/Province/City	2015 Population	Land Area (km ²)	Population Density (Persons/km ²)
Zamboanga Peninsula	3,629,783	17,046.64	213
Zamboanga del Norte	1,011,393	7,301.00	139
Zamboanga del Sur (excluding Zamboanga City)	1,010,674	4,499.46	225
Zamboanga City	861,799	1,414.70	609
Zamboanga Sibugay	633,129	3,607.75	175
Isabela City	112,788	223.75	504

Table 2: Urban and Rural Population per Province/City, 2015⁵

Region/Province/City	Urban Population	Rural Population
Zamboanga Peninsula	27%	73%
Zamboanga del Norte	14%	86%
Zamboanga del Sur (excluding Zamboanga City)	19%	81%
Zamboanga City	87%	13%
Zamboanga Sibugay	16%	84%
Isabela City	26%	74%

⁴ Philippine Statistics Authority, Family Income and Expenditure Survey (FIES), 2015

⁵ Philippine Statistics Authority, Philippine Standard Geographic Code, 2015

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- Type I - two pronounced season, dry from November to April and wet during the rest of the year. Maximum rain period is from June to September.
- Type II - no dry season with a very pronounced maximum rain period from December to February. There is not a single dry month. Minimum monthly rainfall occurs during the period from March to May.
- Type III - no very pronounced maximum rain period with a dry season lasting only from one to three months, either during the period from March to May. This type resembles Type I since it has a short dry season.
- Type IV - rainfall is more or less evenly distributed throughout the year. This type resembles Type 2 since it has no dry season.

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Climate Map

PAGASA, 2015 Data

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Climate

Zamboanga Peninsula experiences two types of climate: Type III (in the western part) and Type IV (in the eastern section).

Its climate has no pronounced rainy seasons but has a relatively dry season from December to May. Rainfall distribution is relatively uniform throughout the year. The annual rainfall average is 2,372 mm which very well meets the region's irrigation needs.

Disaster Risks

According to the Office of Civil Defense and National Disaster Risk Reduction Management Council (NDRRMC), no typhoons visited the region from 2015 to 2016.

The most recent natural calamity that struck the region was Typhoon Paolo which dumped heavy rains forcing more than 2,000 families in Zamboanga City to flee their homes in 2017. The Zamboanga City Water District (ZCWD) said one third of the city's more than 862,000 residents also had no water for days when torrential rains triggered an erosion and pushed a boulder into the entrance of the water filter of PrimeWater, a major water supplier.

In 2010, there were 13 disaster incidents affecting 18,000 people. In 2011, 10 disaster incidents affected 66,000 people.

In 2012, there was an increase in the number of disaster incidents, with a total affected population of 91,000. In 2013, the number of disasters decreased but affected 131,000 owing to the intensity thereof. In 2014, there were 10 disasters that struck the region affecting 45,000 people.⁶

Climate Change and Hydrological Hazards

The Philippines is at great risk of climate-related hazards, such as tropical cyclones (TCs), floods, droughts and sea level rise. The effects of observed changes in extreme events and severe climate anomalies include increased occurrence of extreme rains causing: (a) floods and landslides; (b) longer and more intense droughts which cause massive crop failures, water shortages and forest fires; and (c) increased occurrence of TCs.

Global climate models, which were used to run two possible scenarios (A1B and A2), were downscaled to calculate projected Philippine rainfall. Studies show a general increase in rainfall for 2020, 2050 and beyond. The models, however, show higher variability in rainfall with increased peak rainfall during the wet season and longer dry conditions during the dry season. (Rainfall variability means changes in water supply dynamics spatially and year-to-year.)

Water supply is highly vulnerable to changes in river flows and the rate of replenishment of groundwater resources. Lower river flows will result in water shortages. More intense rainfall events may not necessarily mean more groundwater recharge compared to rain that is more evenly spread throughout the year. Lower than average rainfall or longer pronounced dry days may affect soil porosity and vegetation, which could lead to reduced soil infiltration rates. This means less groundwater recharge. Given this scenario, more water stress will likely be experienced by 2020 and 2050.

The projected seasonal temperature increase, seasonal rainfall change and frequency of extreme events (temperatures higher than 35°C, days when rainfall is more than 300 mm, and rainy days that outnumber dry days) in Region IX based on the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) downscaled climate projections are shown in Tables 3 and 4. Four seasons are provided: December, January and February (DJF); March, April and May (MAM); June, July and August (JJA); and September, October and November (SON). The projections were added to the observed values in the past 30-year baseline (1971-2000).

Table 3: Seasonal Projections Under a Medium-Range Emission Scenario

Seasonal Temperature Increase (in °C)	Observed Baseline (1971 - 2000)				Change in 2020 (2006-2035)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Zamboanga del Norte	27	27.9	27.6	27.5	1	1.1	1.1	1	2	2.1	2.2	2
Zamboanga del Sur	26.8	27.6	27.3	27.2	0.9	1.1	1	1	1.9	2.1	2	1.9
Zamboanga Sibugay	27.1	27.9	27.5	27.5	1	1	1	1	2	1.9	1.9	2
Seasonal Rainfall Change (in %)	Observed Baseline (1971 - 2000)				Change in 2020 (2006-2035)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Zamboanga del Norte	324.5	279.7	599.1	718.1	11	3.2	-3.2	13.8	2.6	1.7	-0.7	5.4
Zamboanga del Sur	294.5	298.7	593.8	663.2	11.2	2.2	-0.4	13.8	2.6	0	9.9	7.1
Zamboanga Sibugay	284.1	290.5	597.2	674.1	9.9	6.6	6.5	14.8	4.8	10.3	22	8.9

Table 4: Frequency of Extreme Events in 2020 and 2050 Under a Medium-Range Emission Scenario

Province	Station	No. of Days w/ T _{max} > 35°C			No. of Dry Days			No. of Days w/ Rainfall > 300 mm		
		OBS	2020	2050	OBS	2020	2050	OBS	2020	2050
Zamboanga del Norte	Dipolog	217	2155	4004	7481	5384	5470	0	5	2
Zamboanga del Sur	Zamboanga	54	114	714	8531	7058	6781	0	1	4

⁶ Office of Civil Defense, National Disaster Risk Reduction Management Council (NDRRMC)

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ZAMBOANGA DEL NORTE

ZAMBOANGA DEL SUR

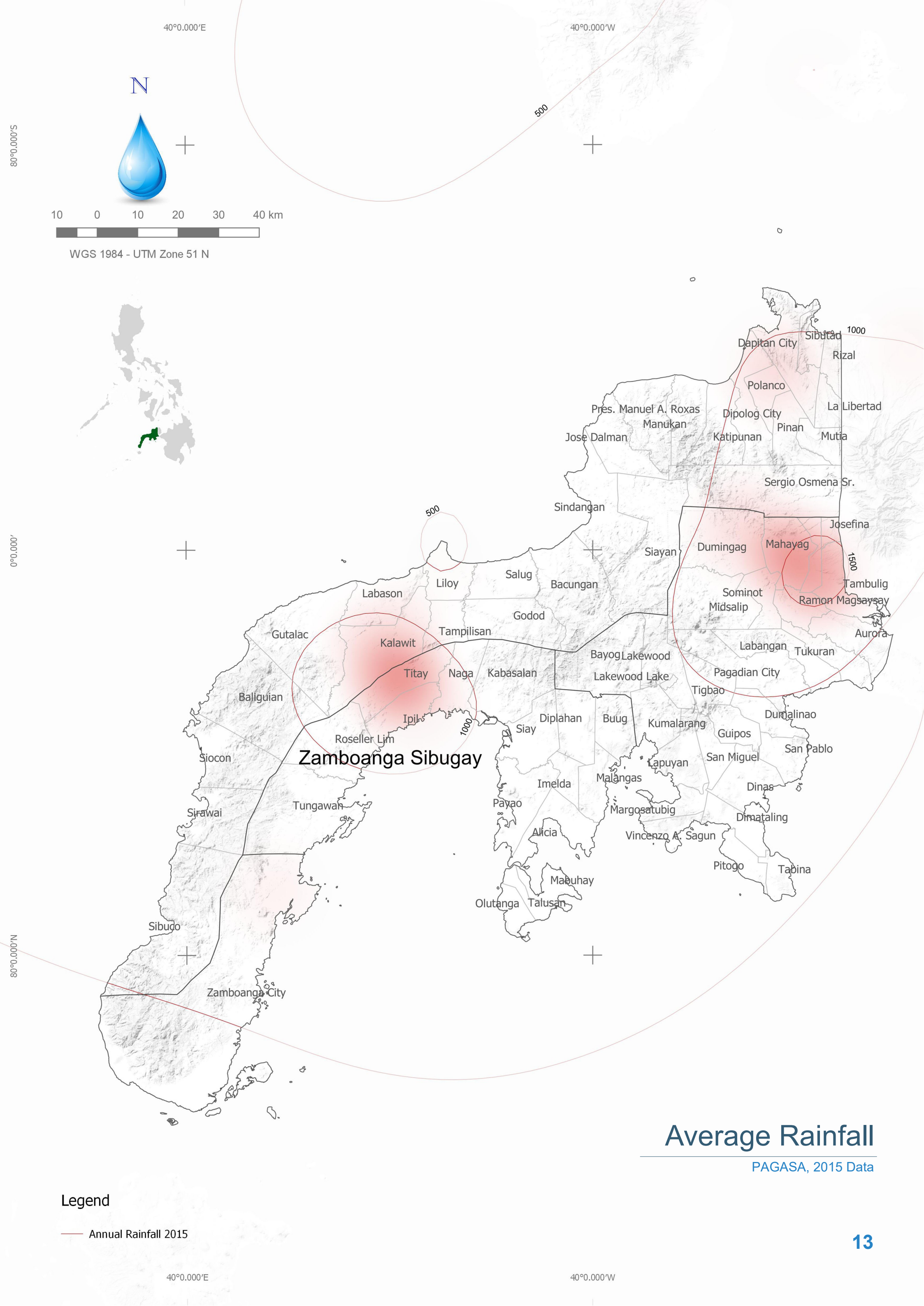
ZAMBOANGA SIBUGAY

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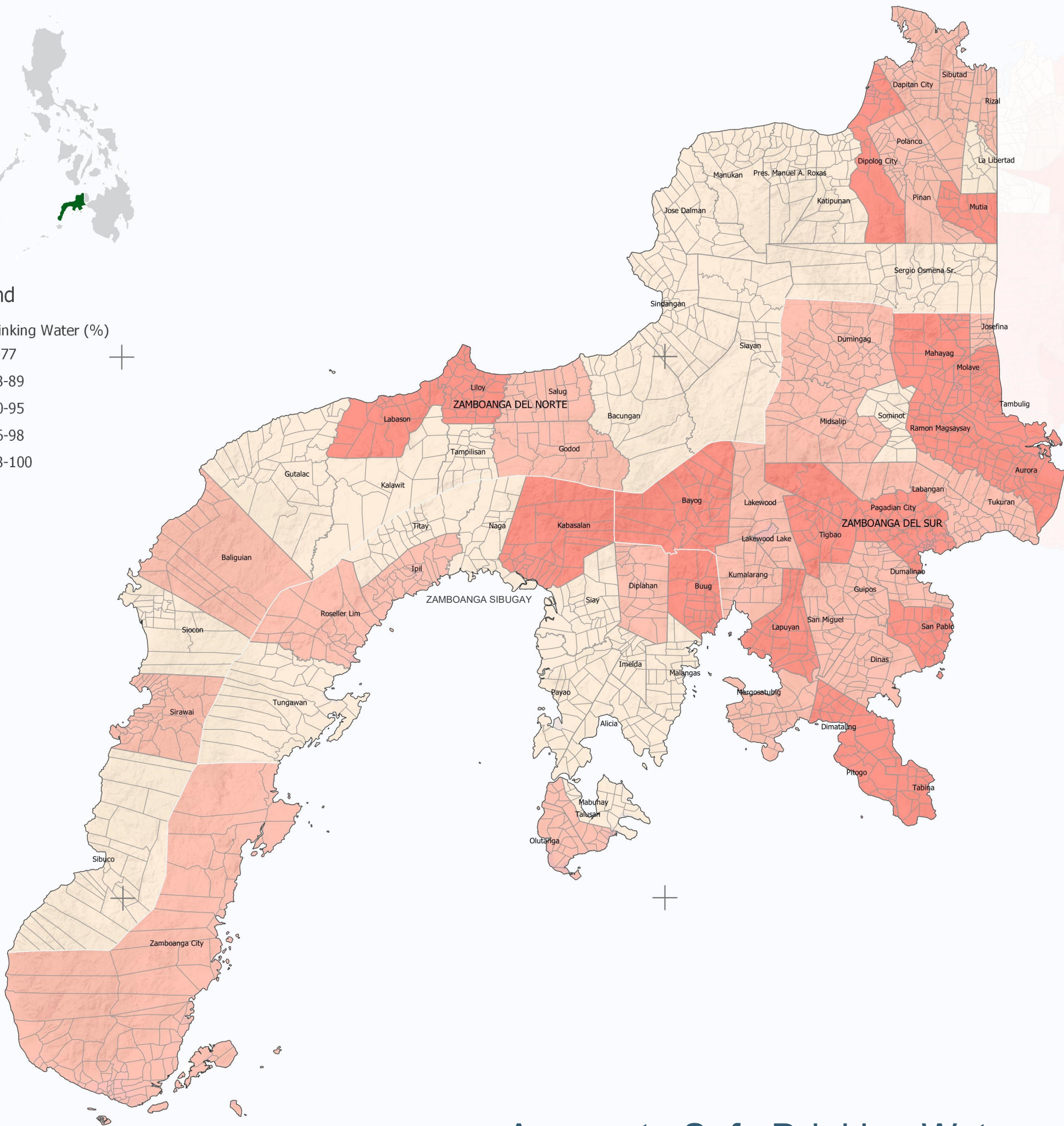
Safe Drinking Water (%)

- 1-77
- 78-89
- 90-95
- 96-98
- 98-100



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Access to Safe Drinking Water

PSA, 2015 Census

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WSS Sector Status

Access to Safe Water

About 77% of Zamboanga Peninsula’s population had access to water sources in 2015.⁷

This translates to around 637,000 households. About 33% of the population has Level III service connection at home while 14% has Level II connection which the households share with the community. Access to Level I comprises 31%.

Safe sources of water under this category include tubed and/or piped deep/shallow wells (which users themselves own or share with the community), and protected springs, rivers, streams, etc.

The region’s access to safe water is below the national average by 10%. In terms of access per level of service, discrepancies range from 2% to 11%.

Table 5: National and Regional Access to Water Supply⁸

Level of Service	National	Region IX
Level III	44.1%	33.2%
Level II	11.2%	13.5%
Level I (Safe Sources)	32.4%	30.58%
Subtotal (Safe Sources)	87.7%	77.3%
Level I (Unsafe Sources)	12.3%	22.7%
Total	100.0%	100.0%

Figure 4 shows the percentage distribution of the region’s various water sources.

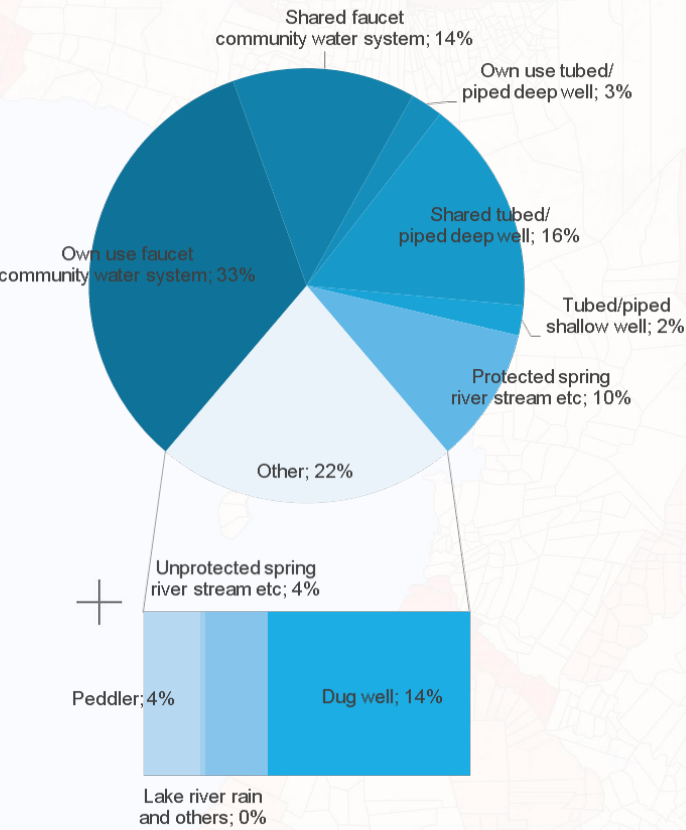


Figure 4: Main Sources of Water Supply, 2015

Table 6 shows safe water access in 2015 at the provincial level.

Table 6: Access to Water Supply per Province/City⁹

Region/Province/City	Access to Safe Water Supply
Region IX	60.4%
Zamboanga del Norte	62.3%
Zamboanga del Sur	69.8%
Zamboanga Sibugay	92.1%
Zamboanga City	92.4%
Isabela City	72.5%

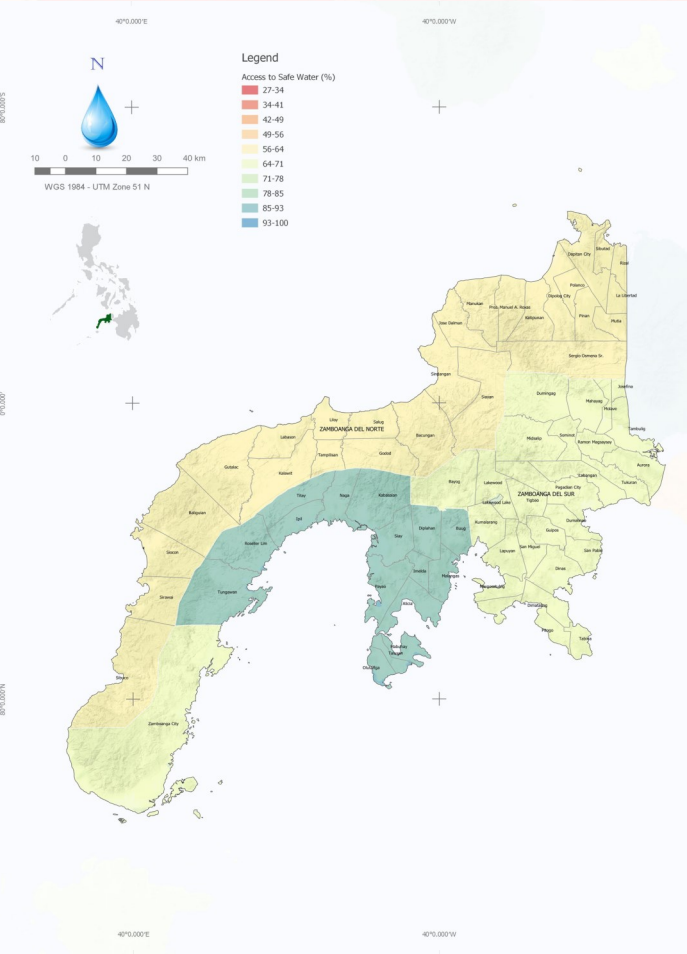


Figure 5: Provincial Access to Safe Water

Drinking Water

The PSA has released data up to the municipal level based on the latest 2015 Census. The classification of sources for drinking water is the same as that for sources of safe water with the addition of bottled water.

As of 2015, 83% of the population drank water from sources considered “improved” and “safe”. Of the region’s total population, 14% drank bottled water — significantly less than the population drinking from their own faucets and shared faucet facilities at 21% and 25%, respectively.

Among the provinces, Zamboanga Sibugay has the lowest access to safe drinking water (around 77%), followed by Zamboanga del Norte at 79%.

The map on the left shows the extent of access to safe drinking water at the municipal level.

⁷ Philippine Statistics Authority, Family Income and Expenditure Survey, 2015

⁸ Ibid.

⁹ Based on Region IX provinces’ firsthand data on access to safe water, as gathered at the regional planning and consultation workshop

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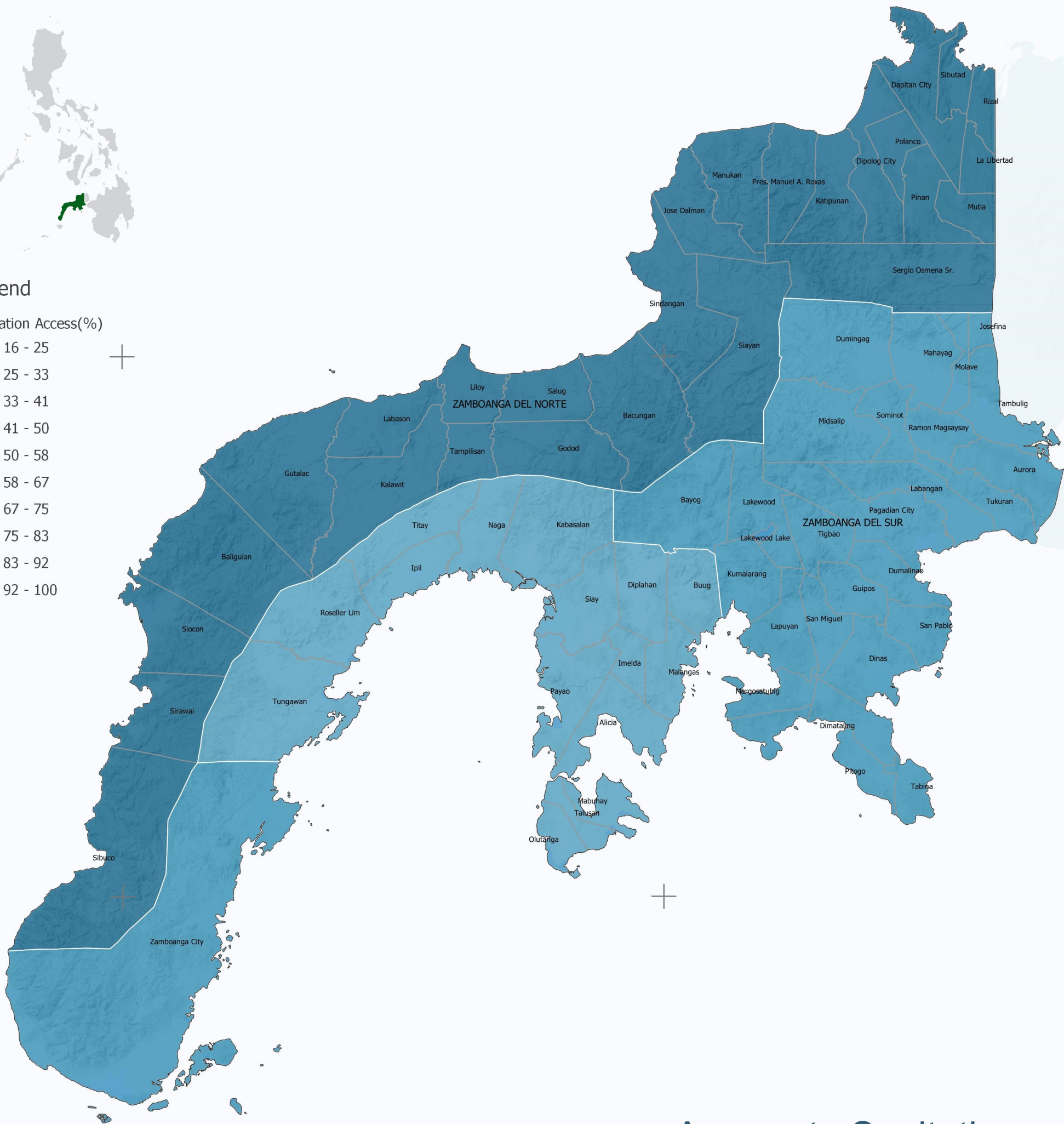
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Legend

Sanitation Access(%)

- 16 - 25
- 25 - 33
- 33 - 41
- 41 - 50
- 50 - 58
- 58 - 67
- 67 - 75
- 75 - 83
- 83 - 92
- 92 - 100



Access to Sanitation

Zamboanga Peninsula Regional Planning and Consultation Workshop, 2017 Data

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Access to Sanitation

The growth of Region IX's economy was principally driven by the accelerated growth in the services sector. This, and the in-migration to Zamboanga City, Pagadian City and Dipolog City as a factor, however (and as a matter of course), has increased the demand sanitation services.

About 71% of the region's population has access to improved sanitation.

The 2015 FIES has reported that the Zamboanga Peninsula posted figures almost on a par with the national average in terms of improved sanitation and slightly higher figures in terms of basic sanitation (see Table 7).

Table 7: National and Regional Access to Sanitation¹⁰

Sanitation Coverage	National	Region IX
Improved Sanitation	73.77%	70.55%
Basic Sanitation	19.96%	20.32%
Unimproved Sanitation	2.04%	5.22%
Open Defecation	4.23%	3.91%
Total	100.0%	100.0%

In terms of access to sanitation facilities, Zamboanga del Sur has the highest access to basic sanitation and represents 27.84% of the regional population. The two provinces with the largest population base, i.e., Zamboanga Del Sur and Zamboanga Del Norte, had the highest percentage of access.

Zamboanga Sibugay, however, had a lot of catching up to do — it registered the lowest percentage of access to basic sanitation (see Table 8).

Table 8: Access to Sanitary Facilities per Province¹¹

Region/Province/City	HHs with Sanitary Toilets	HHs with Complete Basic Sanitation Facilities
Region IX	69.38%	38.15%
Zamboanga del Norte	69.33%	30.70%
Zambonga del Sur	101.66%	45.07%
Zamboanga City	67.90%	49.57%
Zamboanga Sibugay	32.67%	12.02%
Isabela City	44.66%	12.71%

The minor discrepancy between Tables 7 and 8 regarding totals and averages highlights the difficulty of reconciling the definition of sanitation coverage under the Millenium Development Goals (MDG) with a more stratified and specific definition under the Sustainable Development Goals (SDG). Table 7 reflects the specifics per the SDG's definition. Table 8, on the other hand, reflects the rates of access as defined under the MDG, wherein the percentage of households with complete basic sanitation facilities is a subset of those with sanitary toilets.

Categorization of the facilities as per SDG definitions is as follows:

Improved Sanitation	Water-sealed sewer septic tank (exclusive use)
Basic Sanitation	Water-sealed sewer septic tank (shared) Water-sealed other depository (exclusive use) Water-sealed other depository (shared) Closed Pit
Unimproved Sanitation	Open Pit
Open Defecation	Other Means None

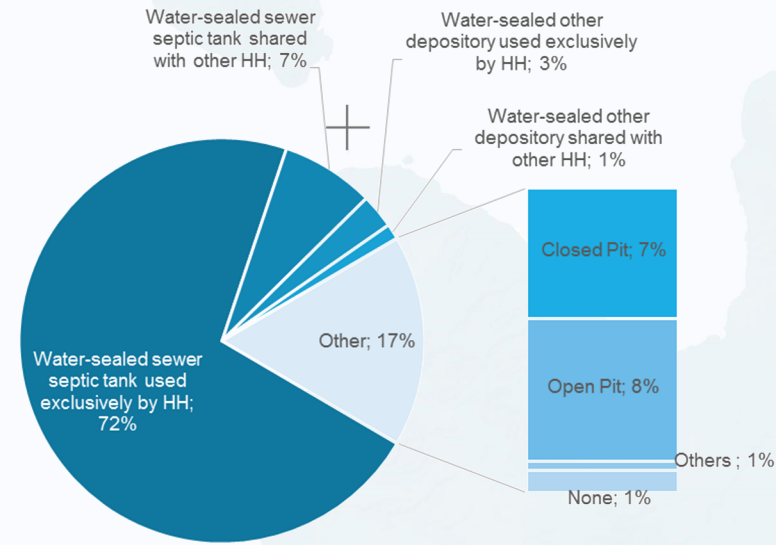


Figure 6: Percentage of Households with Access to Sanitary Facilities

Figure 6 shows the percentage of households per type of sanitation facilities. It represents the initial stages of the sanitation ladder in the region.

While one of the main objectives of the Philippine Development Plan (PDP) is to achieve universal access to sustainable sanitation by 2030, SDG 6.2 highlights the need to broaden the definition of sanitation access, that is, to include safely managed and improved sanitation through the treatment of wastewater or fecal sludge on-site or off-site.

Data on access to sanitation at the provincial level in the Zamboanga Peninsula were gathered during the regional consultation and planning workshop. The map on the left shows the extent of access to sanitation of the provinces in the region.

Figure 7, on the other hand, shows the location of the only septage treatment plant (STP) in the region.

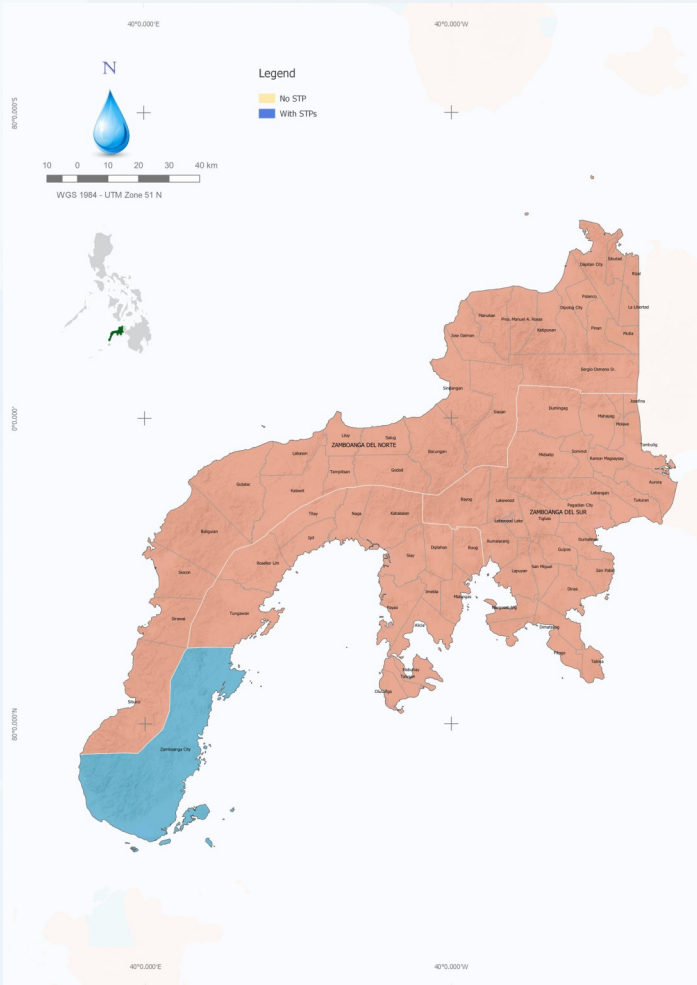


Figure 7: Existing Septage Treatment Plants

¹⁰ Philippine Statistics Authority, Family Income and Expenditure Survey, 2015
¹¹ Department of Health, FHSIS Annual Report CY 2015

40°0.000'E

40°0.000'W

N



80°0.000'S

10 0 10 20 30 40 km



WGS 1984 - UTM Zone 51 N

Legend

Water Bodies

Major River Basin

0°0.000'



80°0.000'N



Zamboanga Peninsula Rivers and Tributaries

DENR, NWRB, NAMRIA

40°0.000'E

40°0.000'W

Water Resources

Zamboanga Peninsula ranks 8th among all administrative regions with the most water resources potential.

The region’s water resources potential is estimated at 8,180 MCM/year, accounting for 5.6% of the country’s total.

The water resources potential of an area is divided into groundwater and surface water. Groundwater in the region is estimated at 671 MCM/year while surface water is estimated at 7,508 MCM/year. Annual rainfall in the region averages 1,732 mm/year.

These figures are based on the estimation of the potential of the country’s water resources regions (WRR) (see National Databook). The WRRs do not necessarily coincide with the boundaries of the administrative regions. These hydrological boundaries are defined by their physiographic features and homogeneity in climate.

Zamboanga Peninsula is included in WRR 9 along with three (3) provinces in ARMM.

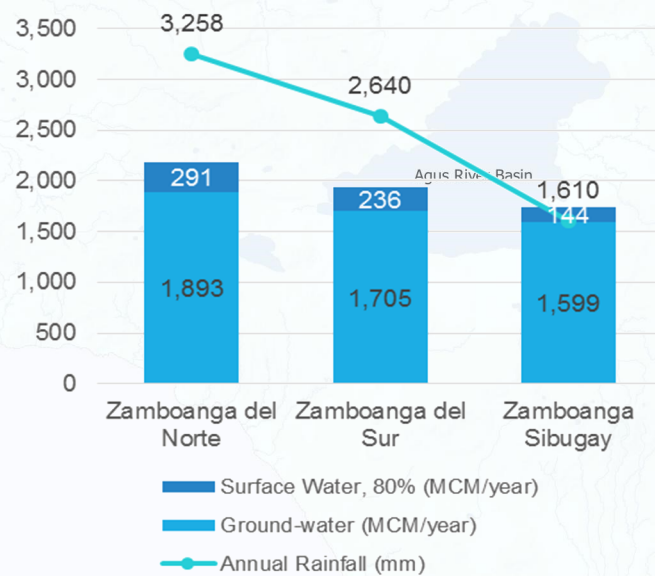


Figure 8: Water Resources Potential and Annual Rainfall¹²

Surface Water

Although the country’s 18 major rive basins do not cover the Zamboanga Peninsula, its three provinces have reached access to certain rivers through which they sustain their water supply.

Table 9 shows some of the major rivers tapped as a surface water sources.

Table 9: Rivers in Region IX

Province/City	Surface Water Source
Zamboanga del Norte	Dicayo River
	Dipolog River
	Ingin River
	Mucas River
	Patawag River
	Polandok River
	Sindangan River
	Siocon River
Zamboanga del Sur	Kumalarang River
	Labangan River
	Sibuguey River
	Tigbao River
Zamboanga Sibugay	Bakalan River
	Kabasalan River
Zamboanga City	Bolong River
	Cabaluay River
	Manicahan River
	Mercedes River
	Patalon River
	Saaz River
	Sinunuc River
	Tumaga River

¹² JICA Master Plan on Water Resources Management in the Philippines, 1998; NWRB; PAGASA Rainfall Data; FAO

40°0.000'E

40°0.000'W

N



10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

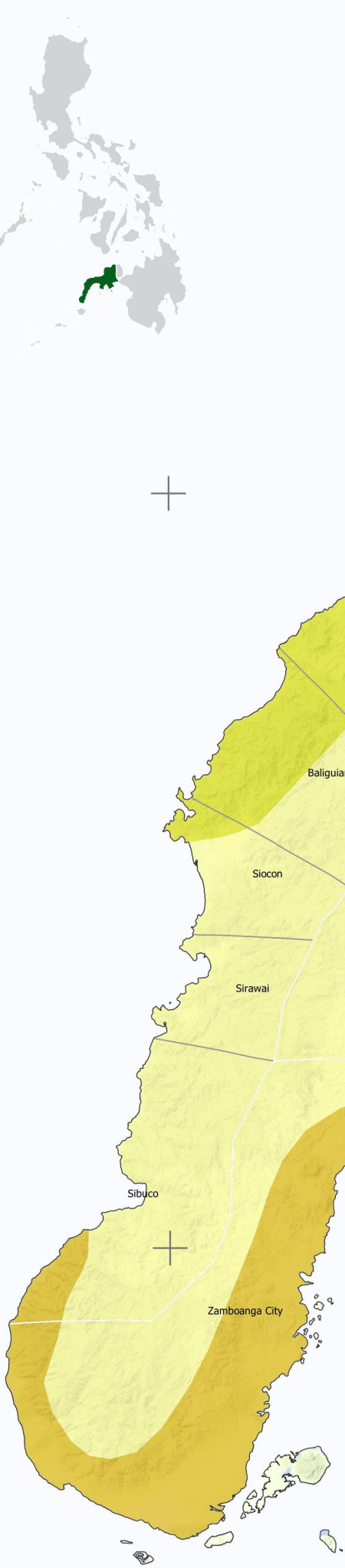
Legend

- Extensive and Highly Productive Aquifers
- Fairly Extensive and Productive Aquifers
- Fairly Extensive and Productive, Aquifers with High Potential Recharge
- Fairly to Less Extensive and Productive Aquifers with Low to Moderate, Potential Recharge
- Local and Less Productive Aquifers
- Rocks with Limited Potential, Low to Moderate Permeability
- Rocks with Limited Potential, Low to Moderated Permeability
- Rocks without Any Known Significant, Groundwater Obtainable through Drilled Wells
- Lake

80°0.000'S

0°0.000'

80°0.000'E



Groundwater Availability

MGB

40°0.000'E

40°0.000'W

Groundwater

Groundwater conditions are controlled by geology, topography, and the structure of the groundwater basin. The structure of the groundwater basin consists of distribution and hydrogeological conditions such as the aquifer structure and aquicludes, the physical characteristics of the formations as per transmissibility and storage coefficient and chemical characteristics of groundwater. These factors need to be defined in relation to the possible development depth and overall development potential.

The extent of groundwater availability in any given area also depends on its surface area and the amount of precipitation it receives. Furthermore, it is tied to groundwater storage based on the type and class of aquifer present in a study area (see Table 10).

Table 10: Aquifer Classes Based on MGB Aquifer Types

Aquifer Class	MGB Aquifer Type	Estimated Yields (Boreholes Unless Stated)
Major Aquifer (Highly permeable)	Intergranular: extensive and highly productive Fractured: fairly extensive and productive (aquifers with high potential recharge)	Mostly 50-100 lps 3-50 lps, spring yields up to 1000 lps
Minor Aquifer (Variably permeable)	Intergranular: fairly extensive and productive Intergranular: local and less productive Fractured: less extensive and productive	About 20 lps Mostly 2-20 lps Well yields up to 3 lps
Non-aquifer (Negligibly permeable)	Rocks with limited groundwater potential Rocks without any significant known groundwater	Yields mostly less than 1 lps Yields mostly less than 1 lps

Only a small portion of each of the region's three provinces yields low to moderate potential recharge. The region's permeability aquifers range from less productive to low. In the southwestern part of the region, groundwater is obtainable through drilled wells.

Water Use

Water use in the region was estimated at 2,076.17 MCM annually based on awarded water permits as of 2017. Of this figure, about 38% (or 787.06 MCM) is allocated for power generation and is categorized under nonconsumptive use. The remaining volume (i.e., 1,289.11 MCM) is allocated for consumptive use (see Figure 9).

The irrigation sector consumes the largest volume of water among all sectors with a 91% allocation. The domestic sector consumes only 3%, while the industrial and fishery sectors account for 1% and 5%, respectively.

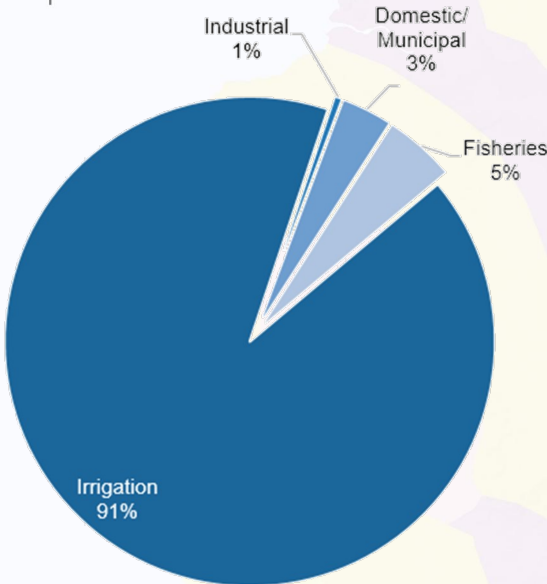


Figure 9: Water Resource Utilization, 2017¹³

Water Availability, Water Stress, and Water Scarcity

Hydrologists typically assess scarcity by looking at the population-water equation. An area is experiencing water stress when annual water supplies drop below 1,700 m³ per person. When annual water supplies drop below 1,000 m³ per person, the population faces water scarcity, and below 500 m³ 'absolute scarcity.'" (UN Water, n.d.)¹⁴

Water availability per capita was computed by comparing the region and provinces' potential against the 2015 population (as shown in Table 11)

Zamboanga Peninsula has a per capita water availability of around 3,000 m³/year.

Table 11: Water Availability per Province

Province	Water Availability (m ³ /capita/year) 2015 Population
Zamboanga del Norte	3,509.83
Zamboanga del Sur	936.80
Zamboanga Sibugay	4,542.38
Zamboanga Peninsula	2,996.34

Figure 10 presents the computed figures to highlight the provinces' level of water availability.

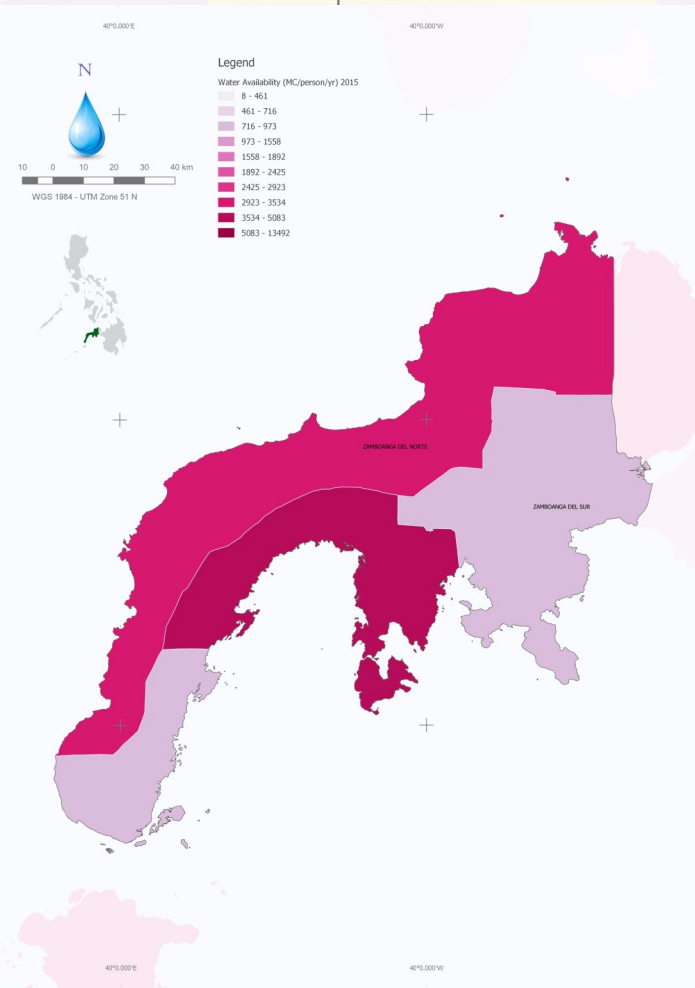


Figure 10: Water Availability Map, 2015

¹³ National Water Resources Board's list of water permit grantees, 2017
¹⁴ Managing Water Report under Uncertainty and Risk, UN World Water Development Report 4 (Volume 1)

Demand

Population Projection

Population projection is important in estimating the future water and sanitation demand of a study area. It is a study of a recorded pattern of past population growth to establish future trends.

Employing PSA's 2010-based population projections which were adjusted to conform with the actual 2015 population, the region's population is projected to reach 5,602,854 million by 2045.

Water Supply and Demand

Water demand projection is fundamental to water supply feasibility studies and preliminary engineering design. It is also an important tool in the preparation of master plans, considering the future needs of a growing population. Water demand projections are developed based on the estimated projected population.

In general, the total water demand is equal to the sum of the domestic, commercial, industrial, institutional, and unaccounted-for water. Computation for water demand at the household level, in particular, is primarily based on the degree of urbanization of a barangay.

In projecting water demand, the units of consumption used are 120 liters per capita per day (lpcd) for urban populations, and 60 lpcd for rural populations. In the NCR and other HUCs, 150 lpcd and 80 lpcd are used for urban and rural populations, respectively.

By 2022, 2030, and 2040, the total water demand of the region would have reached 155.3 MCM/year, 228.0 MCM/year, and 274.4 MCM/year, respectively.

Water Demand vs. Water Resources Potential

The water demand of the industrial, business and domestic sectors in Zamboanga Peninsula is expected to significantly increase in the near future. The efficient use and management of available water resources, therefore, must be ensured to promote universal access to stable and steady water supply.

Comparing the projected water demand (274.4 MCM/year) to the water resources potential of the region (8,180 MCM/year), the availability of water far exceeds the projected water demand of the region up to 2045.

It must be noted, however, that the projected water demand of the region does not include that of its agricultural sector, which consumes the largest volume of water among all industry sectors. What appears to be abundant may be less once the agriculture sector uses its "share". It is estimated that agriculture takes up about 75% to 80% of the total consumptive use of water in the country.

Though there is no foreseeable water shortage in the region in the coming years, it is necessary to efficiently manage and use its water resources to control possible demand shifts.

To fully make use of its groundwater and surface water potential, however, the issue regarding mining activities in the region has to be immediately addressed.

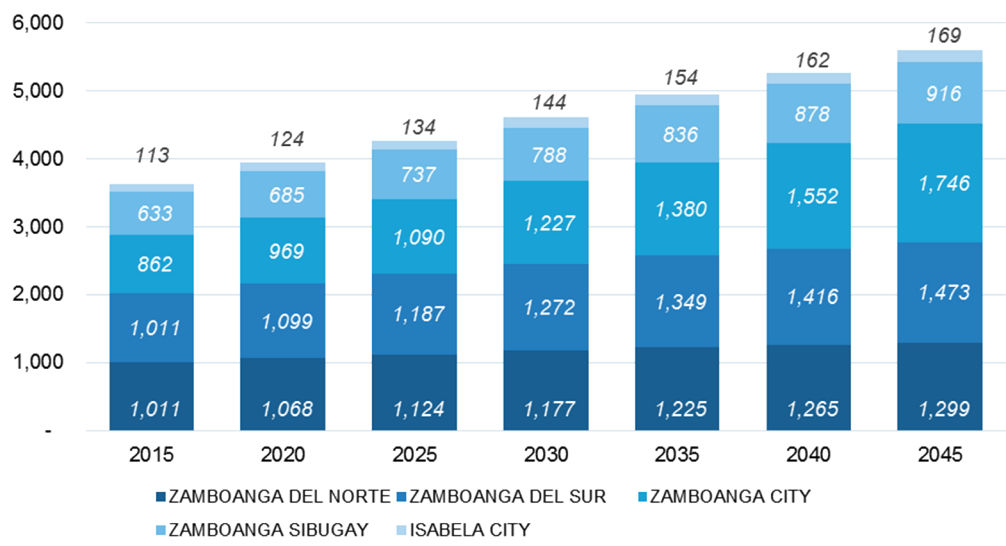


Figure 11: Projected Population

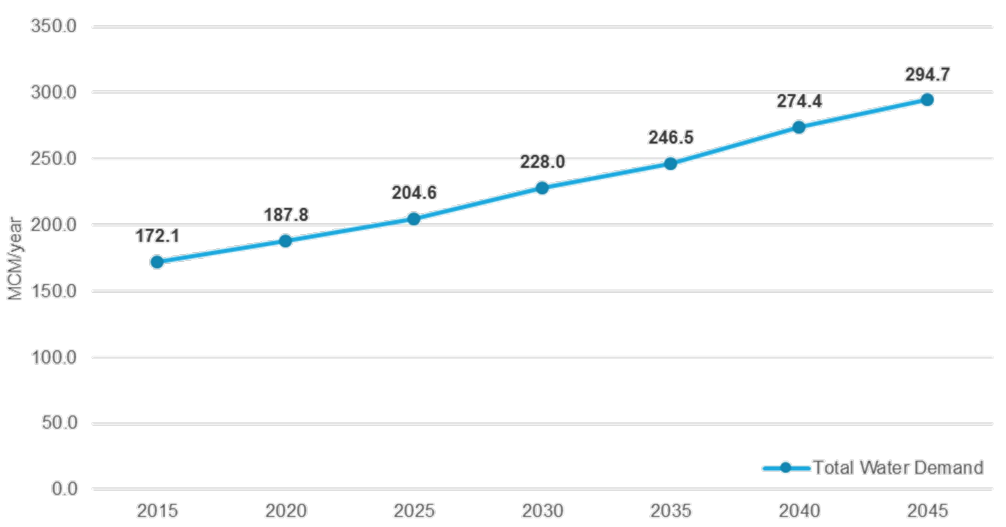
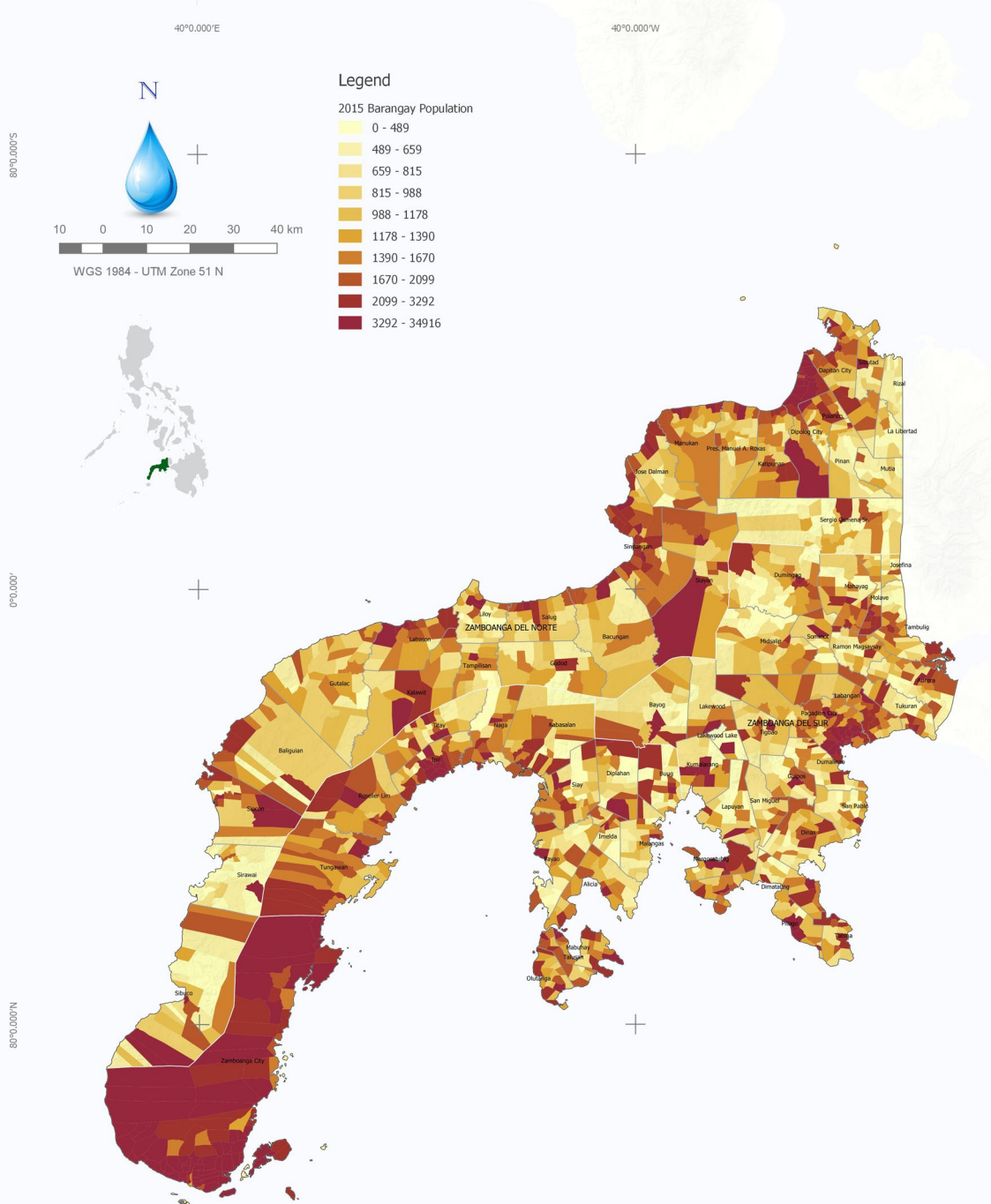
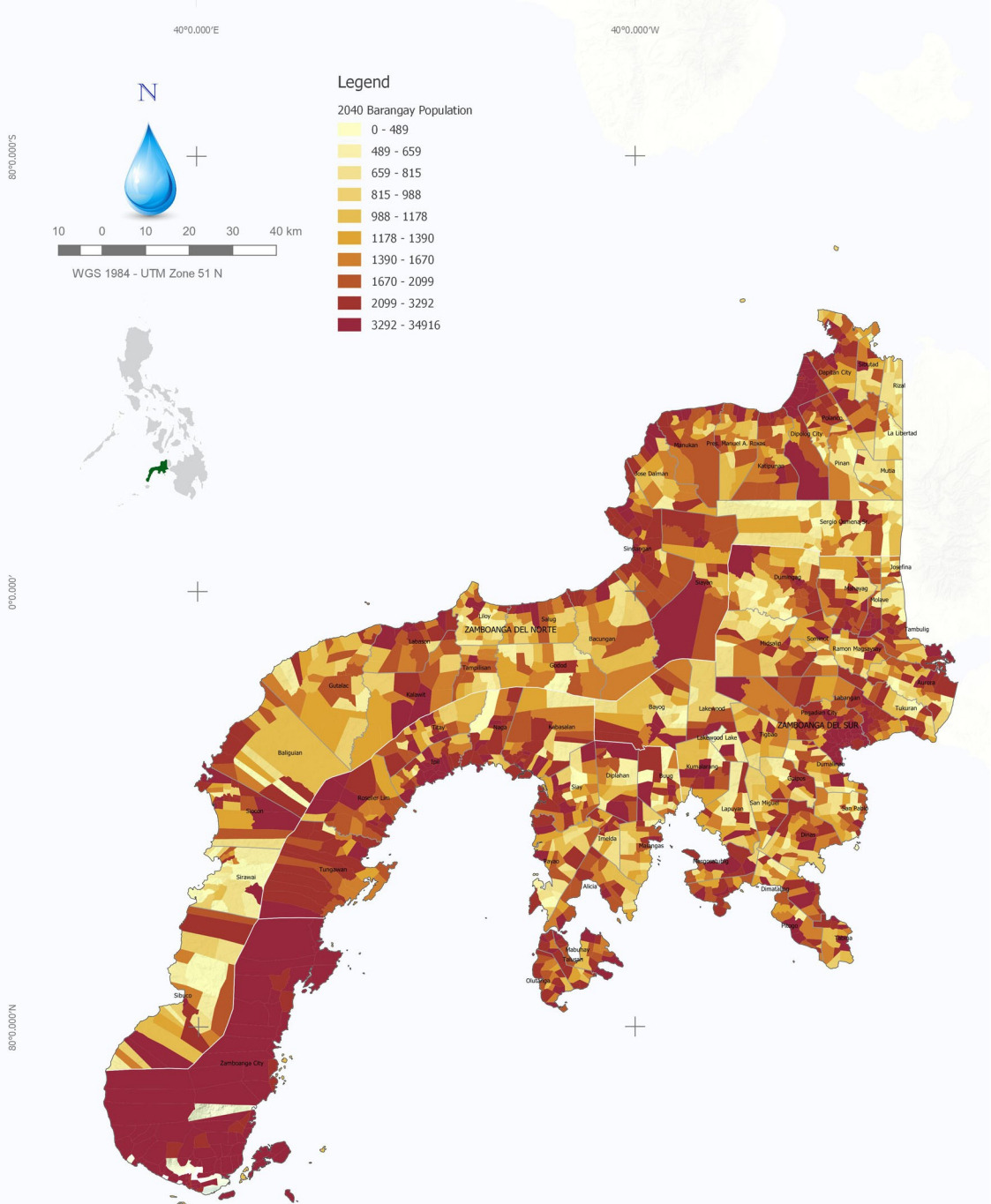


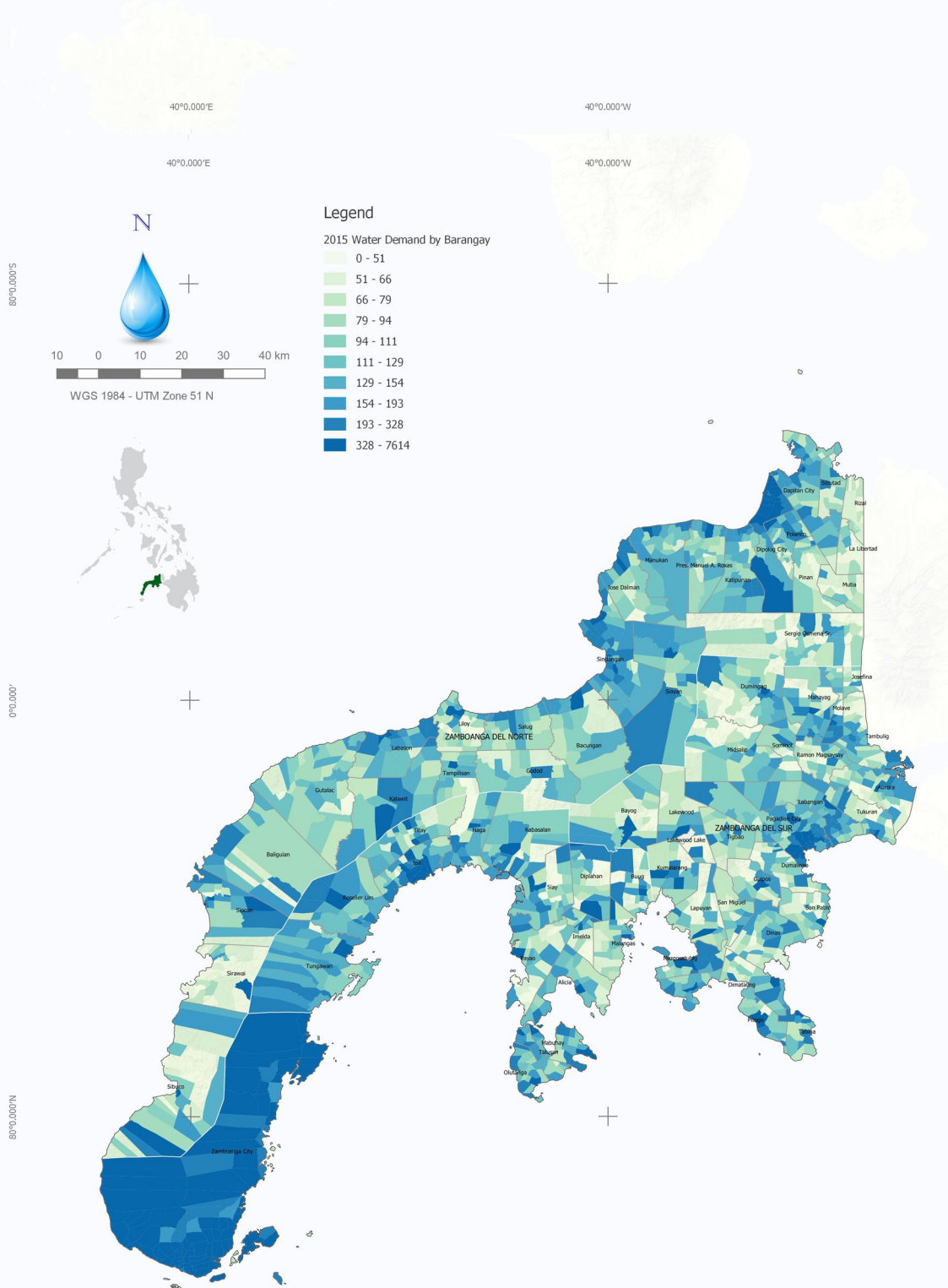
Figure 12: Projected Water Demand



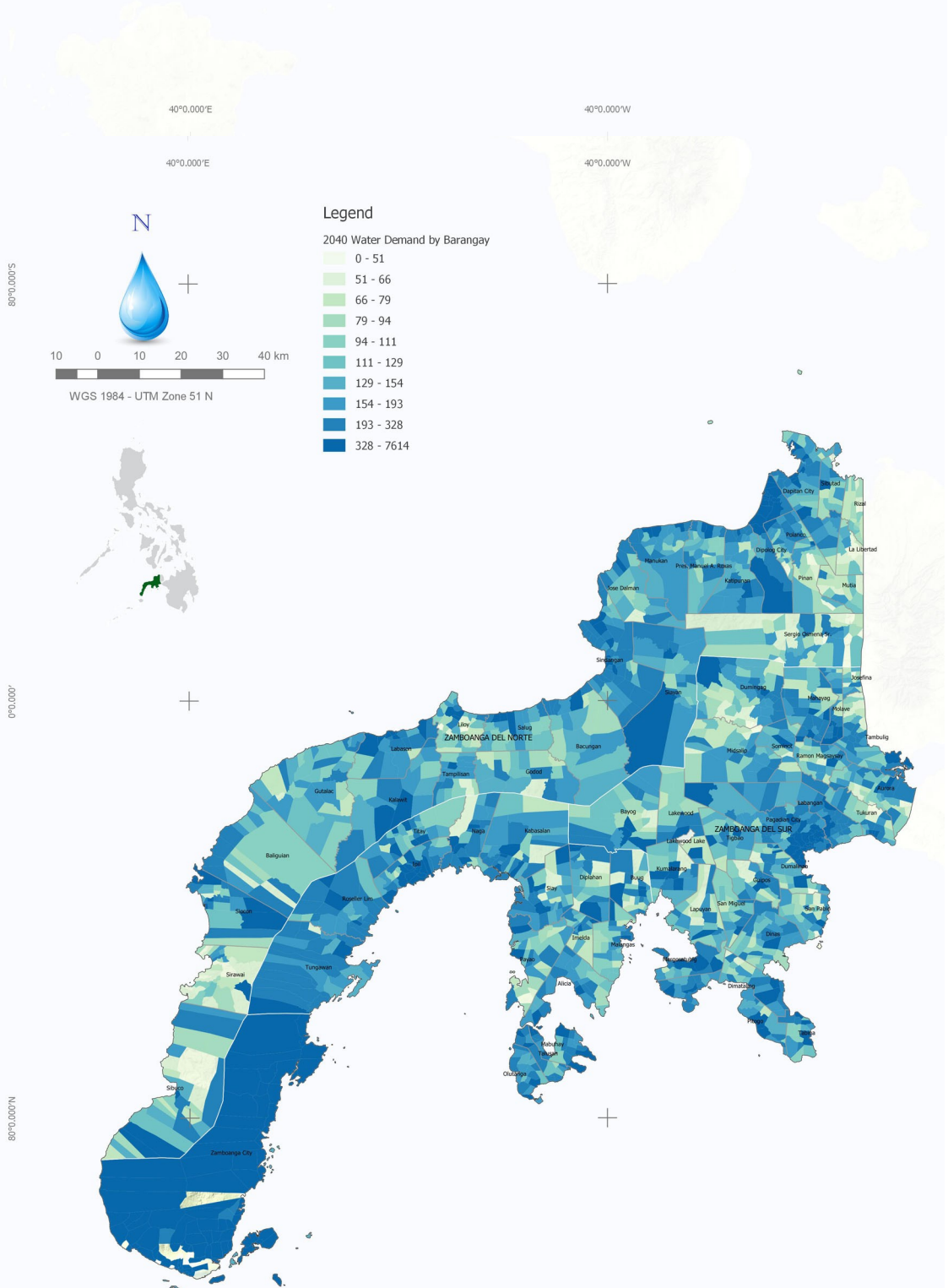
2015 Population



2040 Population Projection



2015 Water Demand



2040 Water Demand Projection

40°0.000'E

40°0.000'W

N



80°0.000'S

10 0 10 20 30 40 km



WGS 1984 - UTM Zone 51 N

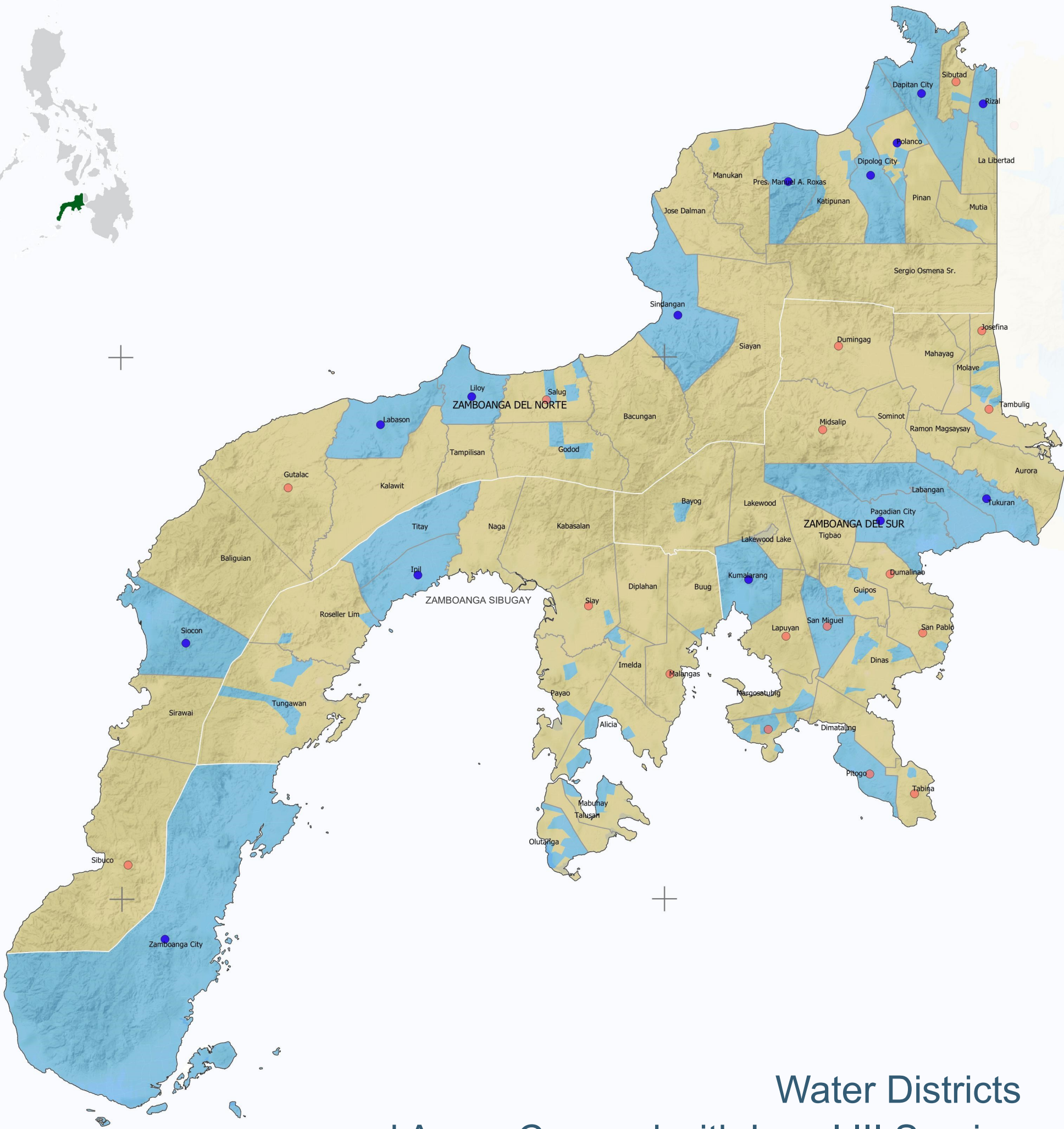
Legend

- Non - Operational WDs
- Operational WDs
- Barangays with Existing Level 3 Water Service

0°0.000'



80°0.000'N



Water Districts and Areas Covered with Level III Service

LWUA, PAWD, NWRB Listahang Tubig, 2017 Data

40°0.000'E

40°0.000'W

WSS Infrastructure

Water service providers (WSPs) of various management types serve around 23% of the Zamboanga Peninsula.¹⁵

These management types depend on the service areas (urban and rural), the number of potential water connections, and the level of service given.

For small urban towns and rural areas, community-based organizations (CBOs) – which include rural waterworks and sanitation associations (RWSA), barangay water and sanitation associations (BWSA), and water cooperatives – operate supply systems offering services at Level II (and in some cases, Level I). As the area grows and becomes more urbanized or more densely populated, water service providers mostly comprise water districts (WDs) and LGU-run utilities providing Level III service.

Areas that do not have access to any formal level of service rely on point sources, such as shallow and deep wells.

Water Supply Service Providers

The percentage of the population having access to or being served by these WSPs is not in accord with the figures in PSA's 2015 FIES mainly because the former came from various sources¹⁶, with the bulk of the data coming from the National Water Resources Board's (NWRB) Listahang Tubig.

Furthermore, it cannot be ascertained that all WSPs in the region have already registered under Listahang Tubig or are continually updating their operations data.

Nevertheless, these data help economic experts and engineers gain insights into the region's situation in relation to its existing water utilities.

Water Districts

As of 2015, there are 35 WD serving the Zamboanga Peninsula. These WDs serve about 1,778,034 users or roughly 21% of the region's total population. Of this figure, 48% or about 851,034 users are covered.

LGU-Led Water Utilities

There are 131 LGU-led water utilities within the region covering 30 areas and serving 152,610 or 3% of the total population of Region IX. Zamboanga del Sur has the most number of LGU-led facilities that cover 92,685 users. Zamboanga del Norte has the lowest coverage serving only 22,825 people.

BWSA

There are 240 BWSA utilities within the region covering 35 areas and serving 70,305 users or about 4.08% of the region's total population. Zamboanga Sibugay has 126 BWSA utilities, the serving the largest number of users estimated at 57,275.

RWSA

There are 55 RWSA utilities in the region used by 11 LGUs covering 43,370 users or roughly 1% of the region's total population. Zamboanga Sibugay has the most number of RWSA utilities serving 28,790 users.

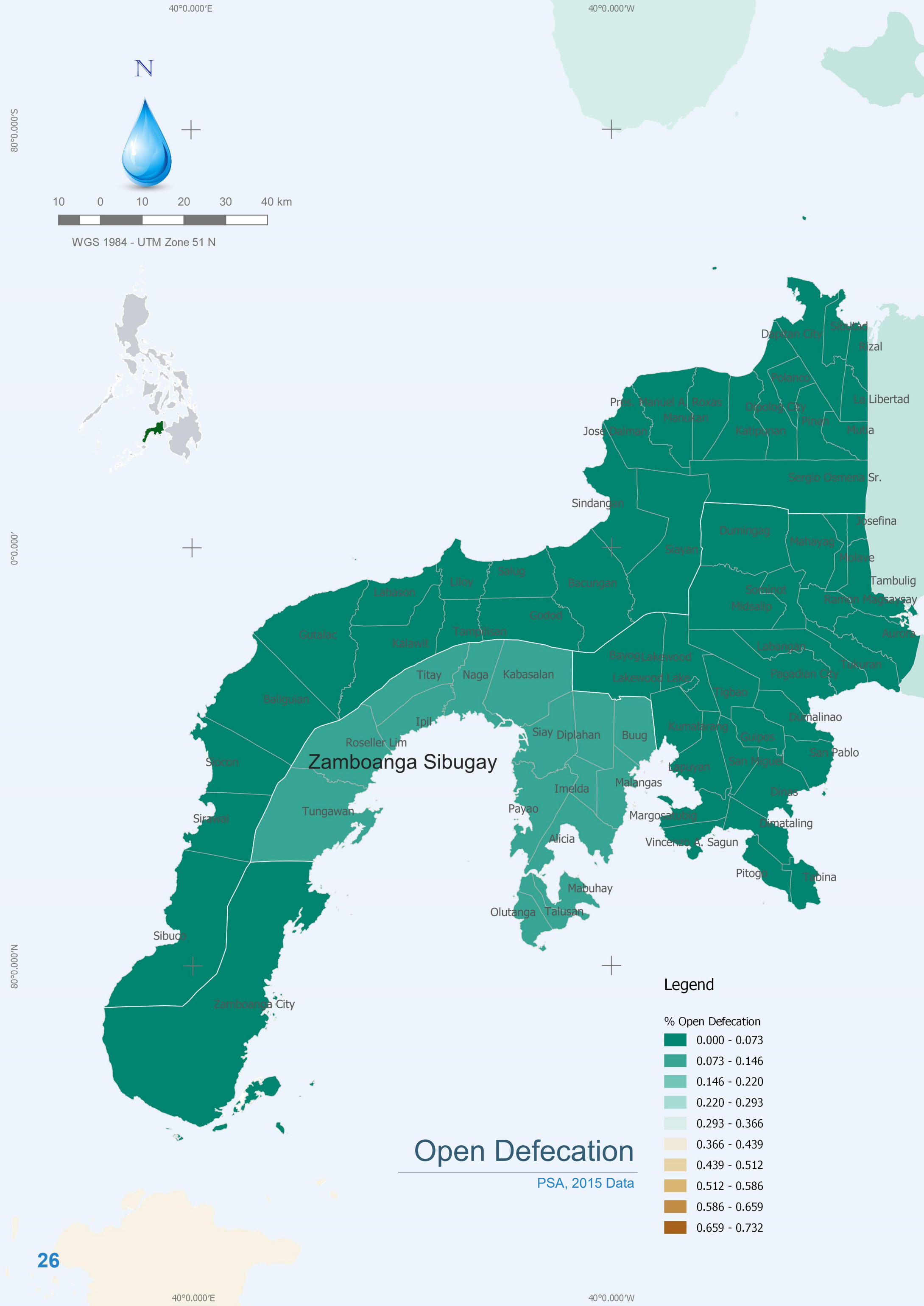
The map on the left shows the location of operational and nonoperational WDs in the region as well as barangays provided with Level III water service by various WSPs (except WDs).

Table 12: Water Service Providers per Province/City

Region/Province/ City	No. of LGUs	Type & No. of WSPs	Service Area	Population Served		
				TOTAL	%	
Zamboanga del Norte	27	WDs	13	533,379	174,396	33%
		LGU-led	25		22,825	2%
		BWSA	104		33,615	3%
		RWSA	3		8,830	1%
		Private/Others	116		24,975	2%
		Subtotal	261	1,544,772	264,641	17%
Zamboanga del Sur	28	WDs	18	1,170,938	661,898	57%
		LGU-led	51		92,685	5%
		BWSA	37		20,130	1%
		RWSA	6		5,010	0%
		Private/Others	42		26,813	1%
		Subtotal	154	3,043,411	806,536	27%%
Zamboanga Sibugay	16	WDs	4	74,656	14,740	20%
		LGU-led	55		37,100	6%
		BWSA	126		57,275	9%
		RWSA	44		28,790	5%
		Private/Others	73		20,880	3%
		Subtotal	304	707,785	158,785	22%
City of Isabela	1	WDs	-	-	-	-
		LGU-led	-		-	-
		BWSA	13		4,130	4%
		RWSA	2		740	1%
		Private/Others	79		20,000	18%
		Subtotal	94	112,788	24,870	22%
Zamboanga Peninsula	72	WDs	35	1,778,973	851,034	48%
		LGU-led	131		152,610	4%
		BWSA	280		115,150	3%
		RWSA	55		43,370	1%
		Private/Others	310		92,668	3%
		Grand Total	811	5,408,756	1,254,832	23%

¹⁵ Data on water districts were based on LWUA and PAWD; data on other WSPs were based on Listahang Tubig (as of 2017)

¹⁶ Local Water Utilities Administration (LWUA), PAWD, NWRB Listahang Tubig



Sanitation

Sanitation is the provision of facilities and services for the safe management and disposal of human waste. Without sanitation, water quality degrades, health is compromised and the environment is adversely affected.

This section discusses the link between growing water demand and its detrimental effects on water quality and public health.

Open Defecation

As defined by the Joint Monitoring Program (JMP) for Water Supply, Sanitation and Hygiene of the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), open defecation is the practice whereby people go out into the fields, bushes, forests, open bodies of water, or other open spaces rather than use the toilet to defecate. This can pollute the environment and cause various health-related problems.

The region has a lower open defecation rate (3.91%) compared to the national average.

The map on the left shows the areas in the region where open defecation is most prevalent.

Industrial and agricultural wastewater generation may be estimated using guidelines provided by the WHO Rapid Assessment of Sources of Air, Water, and Land Pollution. Estimations, however, heavily depend on sectoral data not currently available to the Consulting Team.

Industrial wastewater generated is computed by industry type and depends on the present and future annual volume of production output per type. Agricultural wastewater generation and BOD estimation, on the other hand, are based on the present and future annual number of heads of livestock and poultry produced.

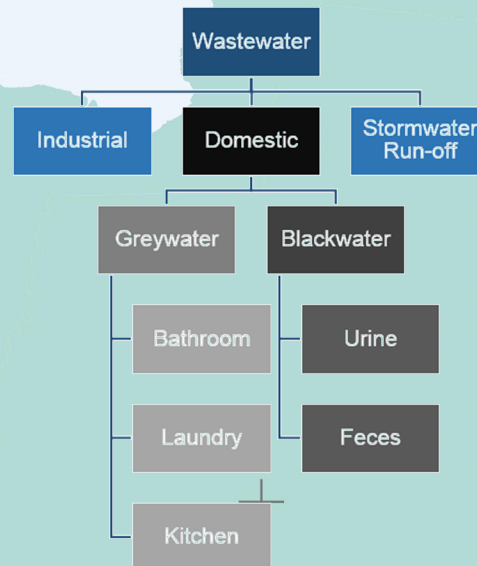


Figure 14: Categories of Wastewater

Wastewater and Domestic Biological Oxygen Demand

A measure of the organic strength of wastes in water is biological oxygen demand (BOD), which is the rate at which organisms use the oxygen in water or wastewater while stabilizing decomposable organic matter under aerobic conditions. The greater the BOD, the greater the degree of organic pollution.

The map below shows the current BOD in Region IX.

In the absence of other data, only domestic BOD can be estimated. A BOD factor of 37 grams per person per day (unit pollution load) is assumed; for highly urbanized areas, 53 grams¹⁷ per person per day is used.

The wastewater¹⁸ produced by each province is directly proportional to its water demand as well as its population. It is assumed that wastewater generated is 80% of the total water demand. The current wastewater in the region is shown in Figure 15.

BOD and wastewater projections until 2040 are shown in the succeeding pages.

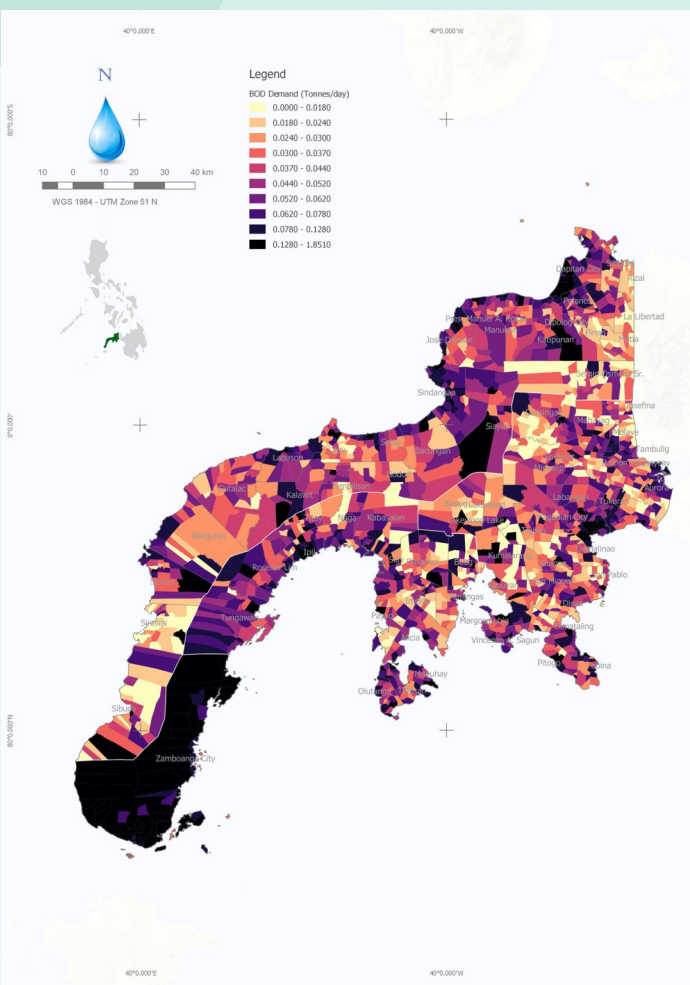


Figure 13: Biological Oxygen Demand, 2015

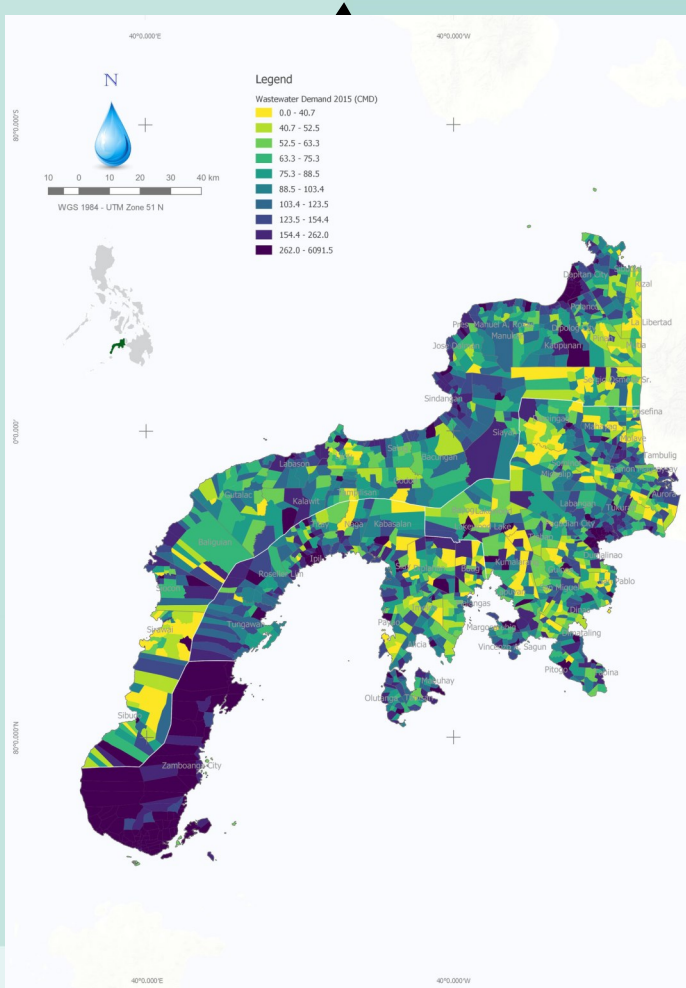
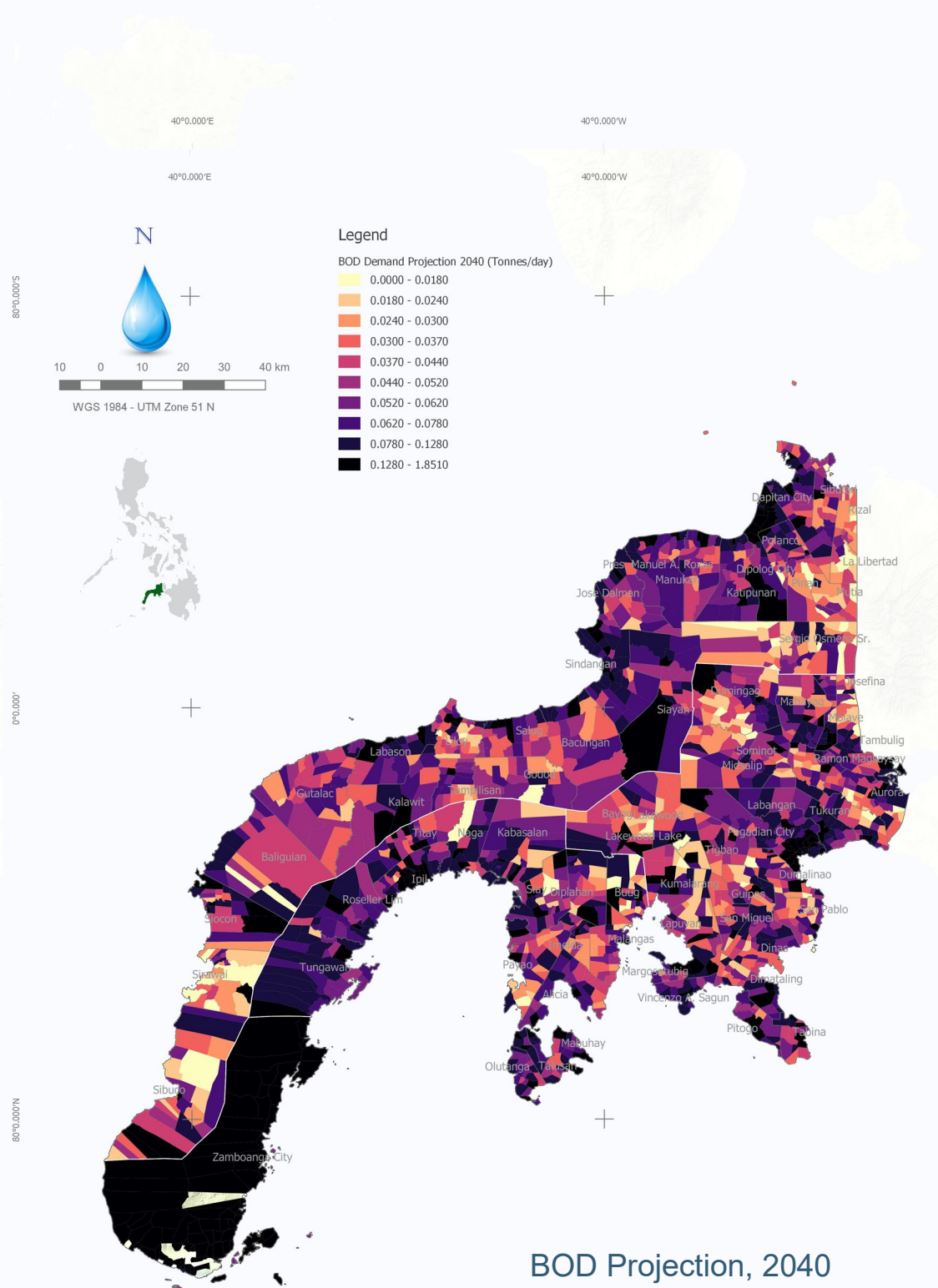
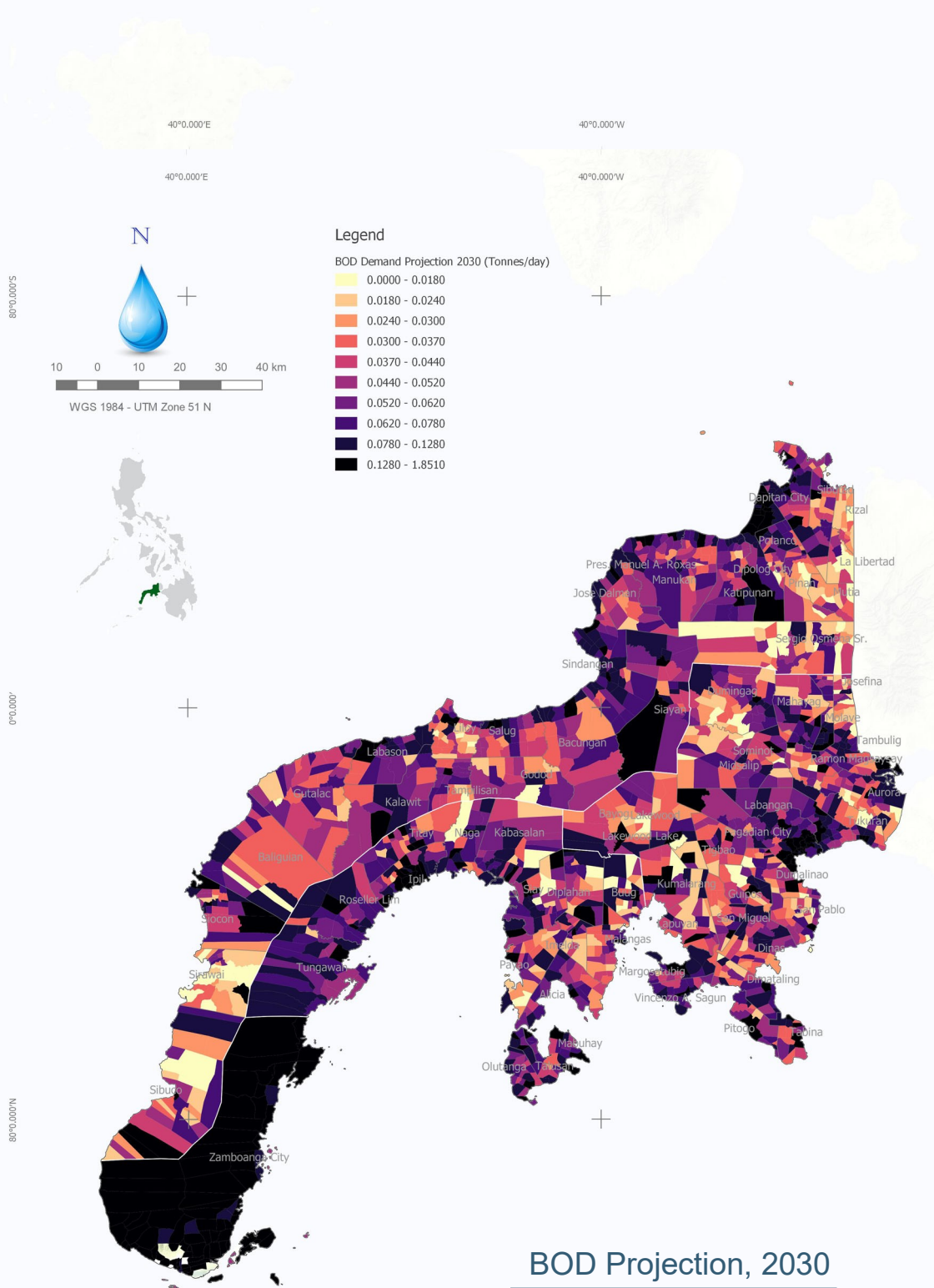
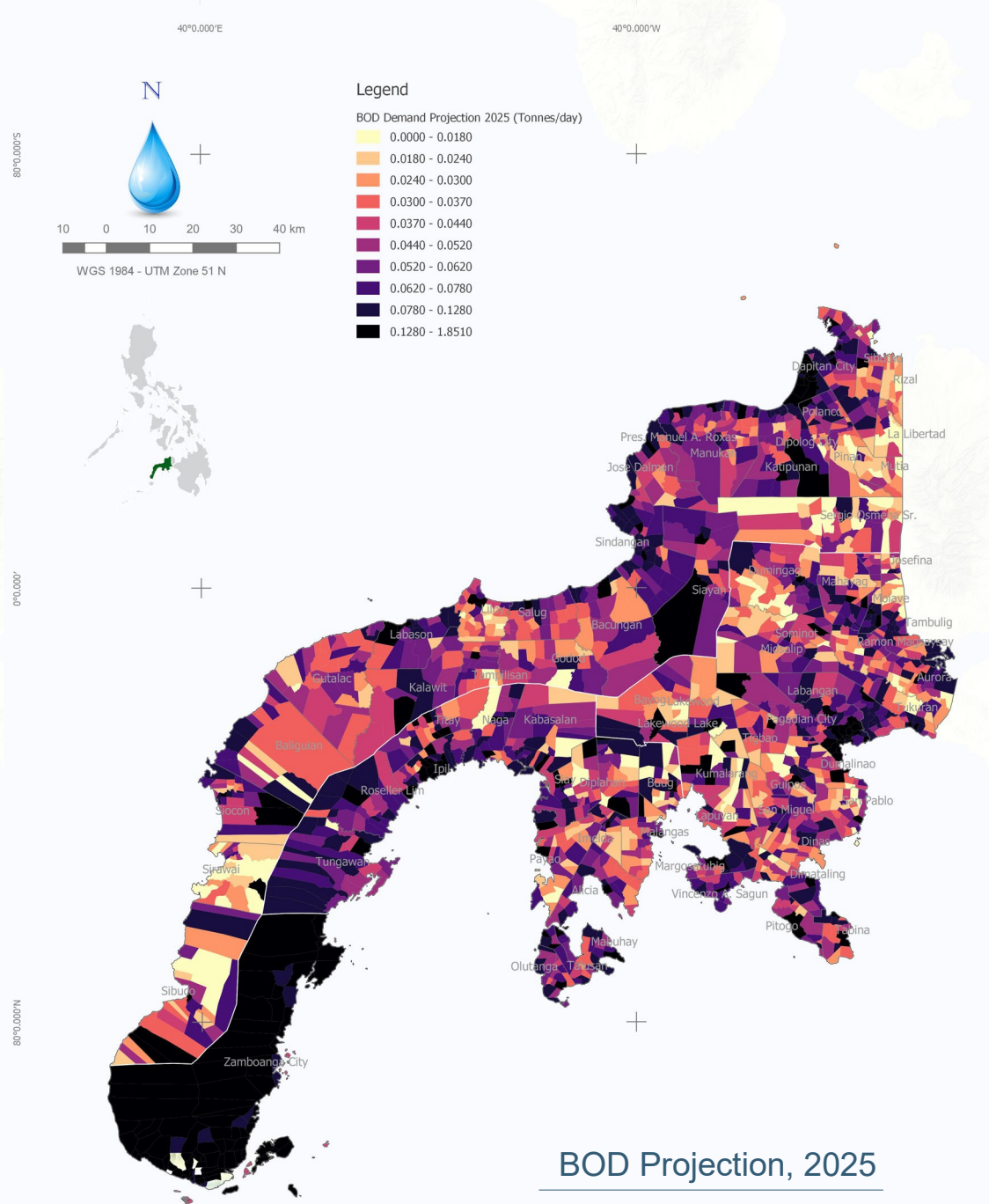
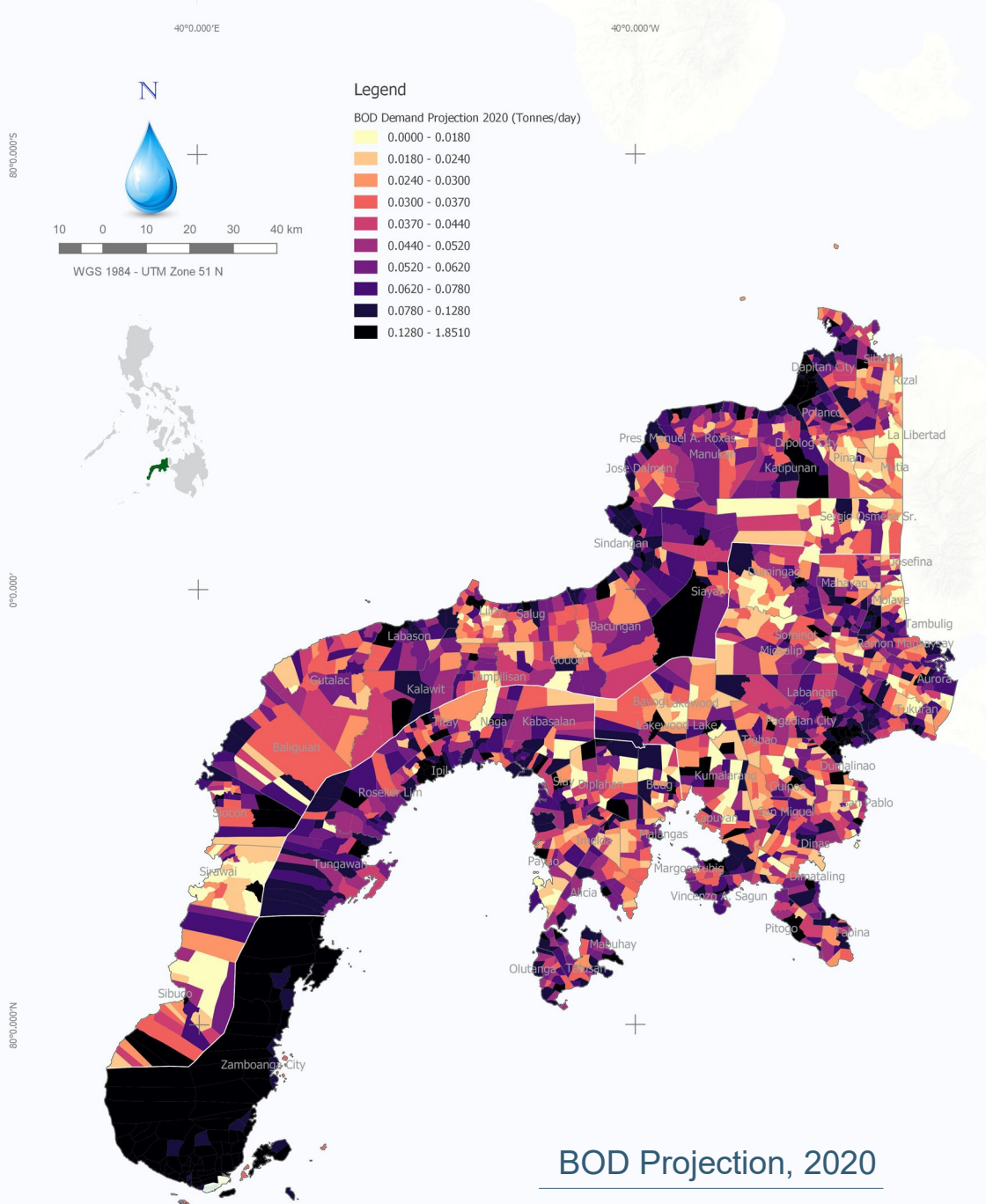
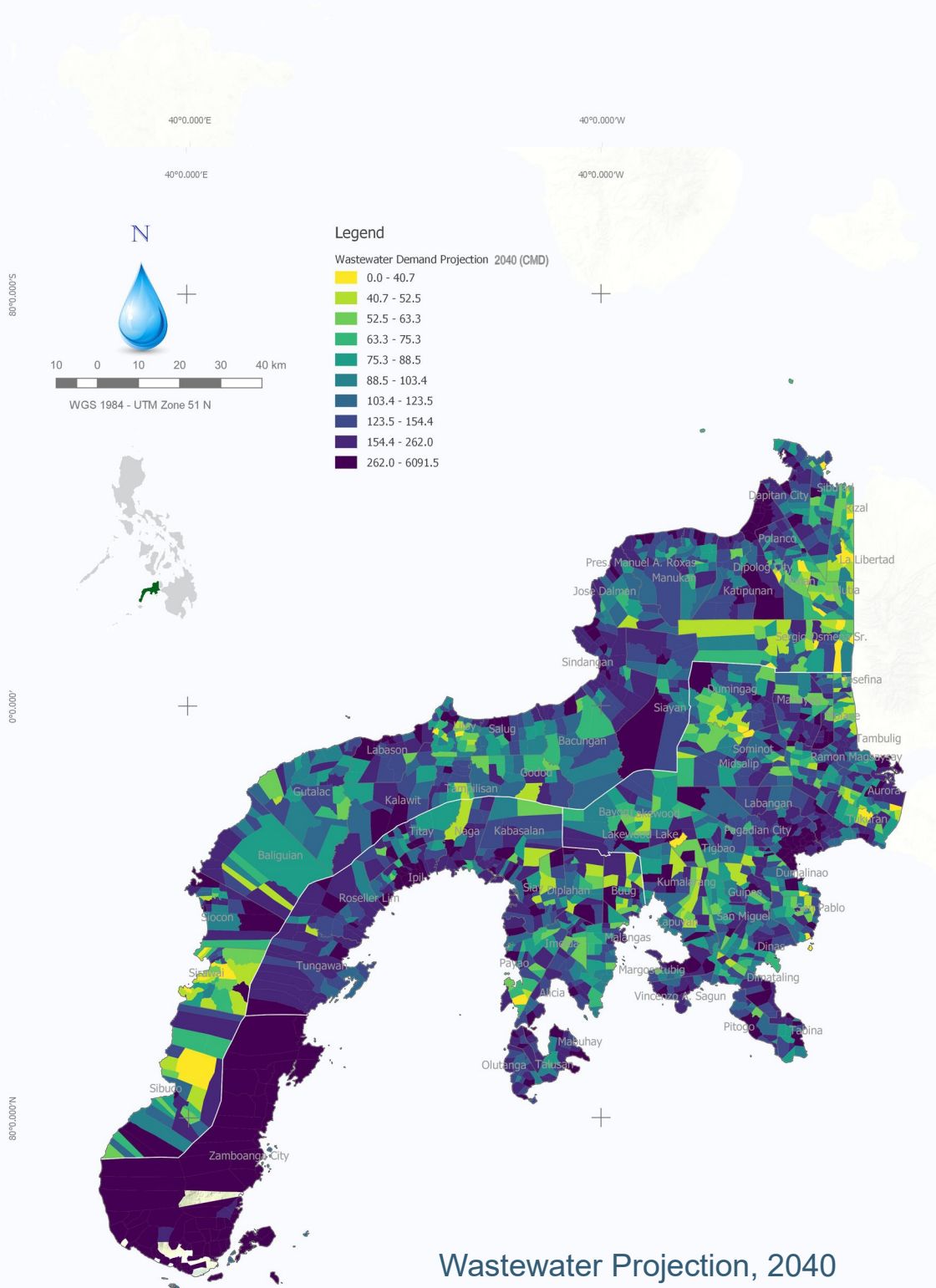
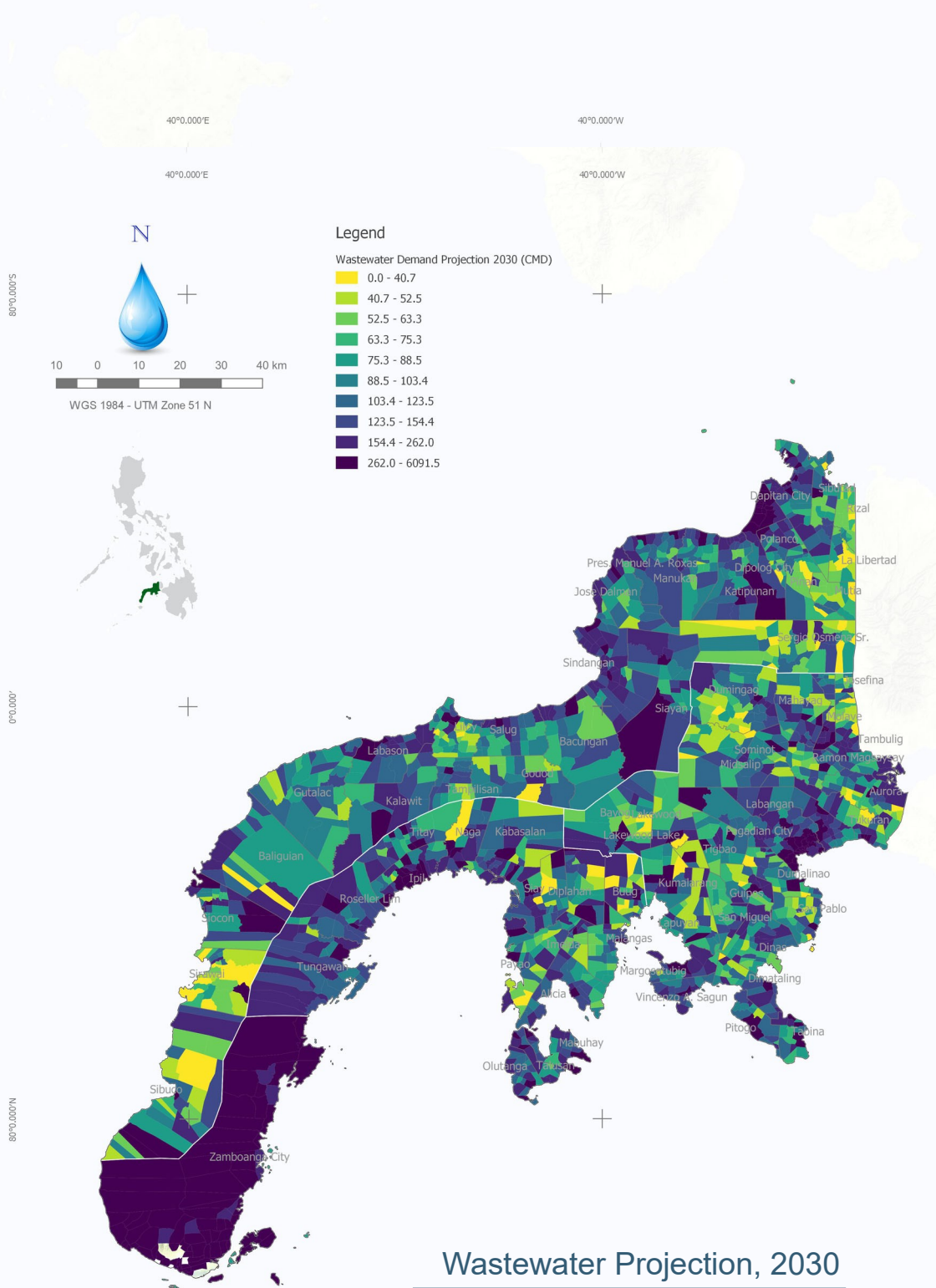
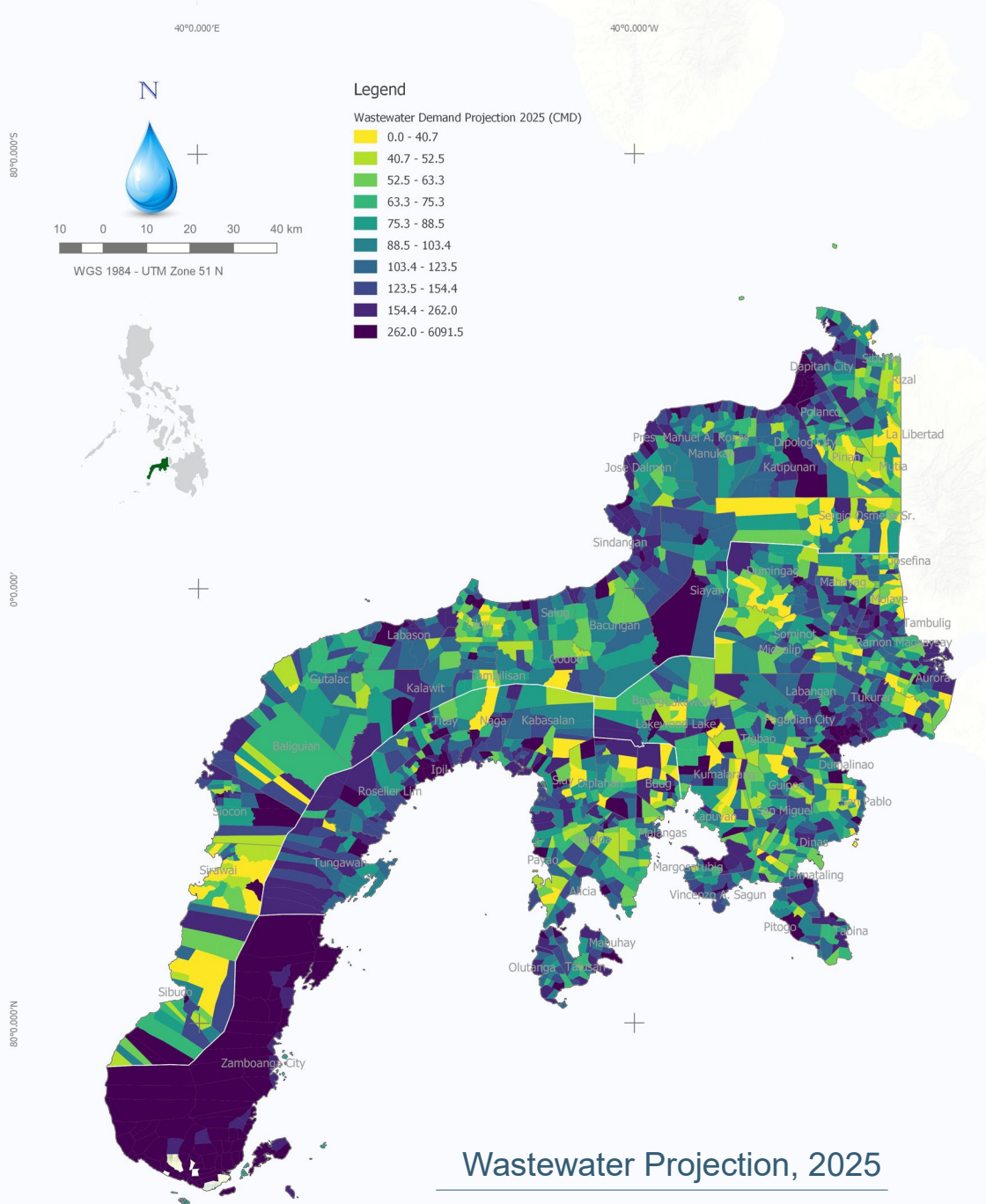
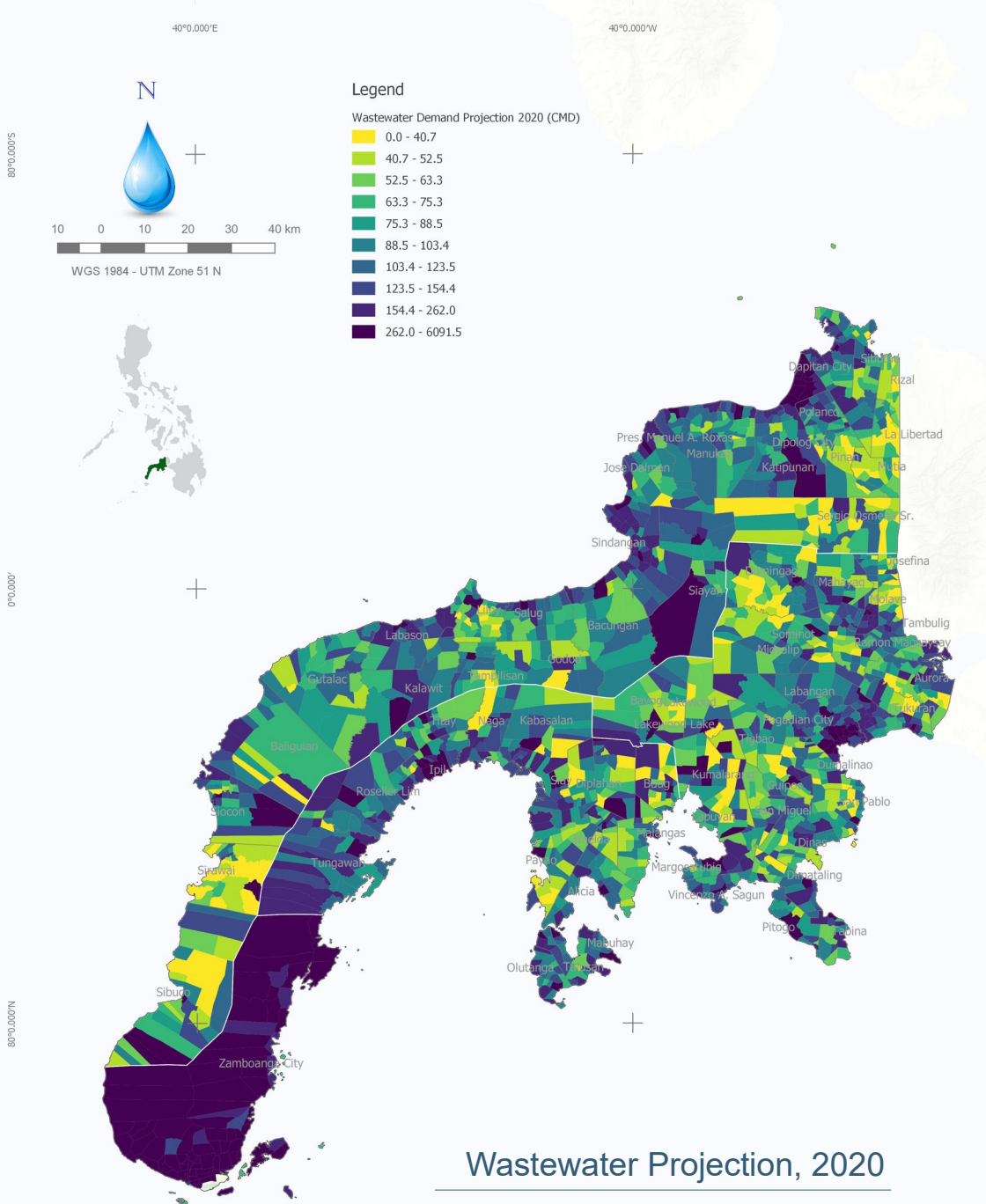


Figure 15: Wastewater Produced, 2015

¹⁷ Philippine Environment Monitor (PEM), 2003

¹⁸ Ibid.





40°0.000'E

40°0.000'W

N



80°0.000'S

10 0 10 20 30 40 km



WGS 1984 - UTM Zone 51 N

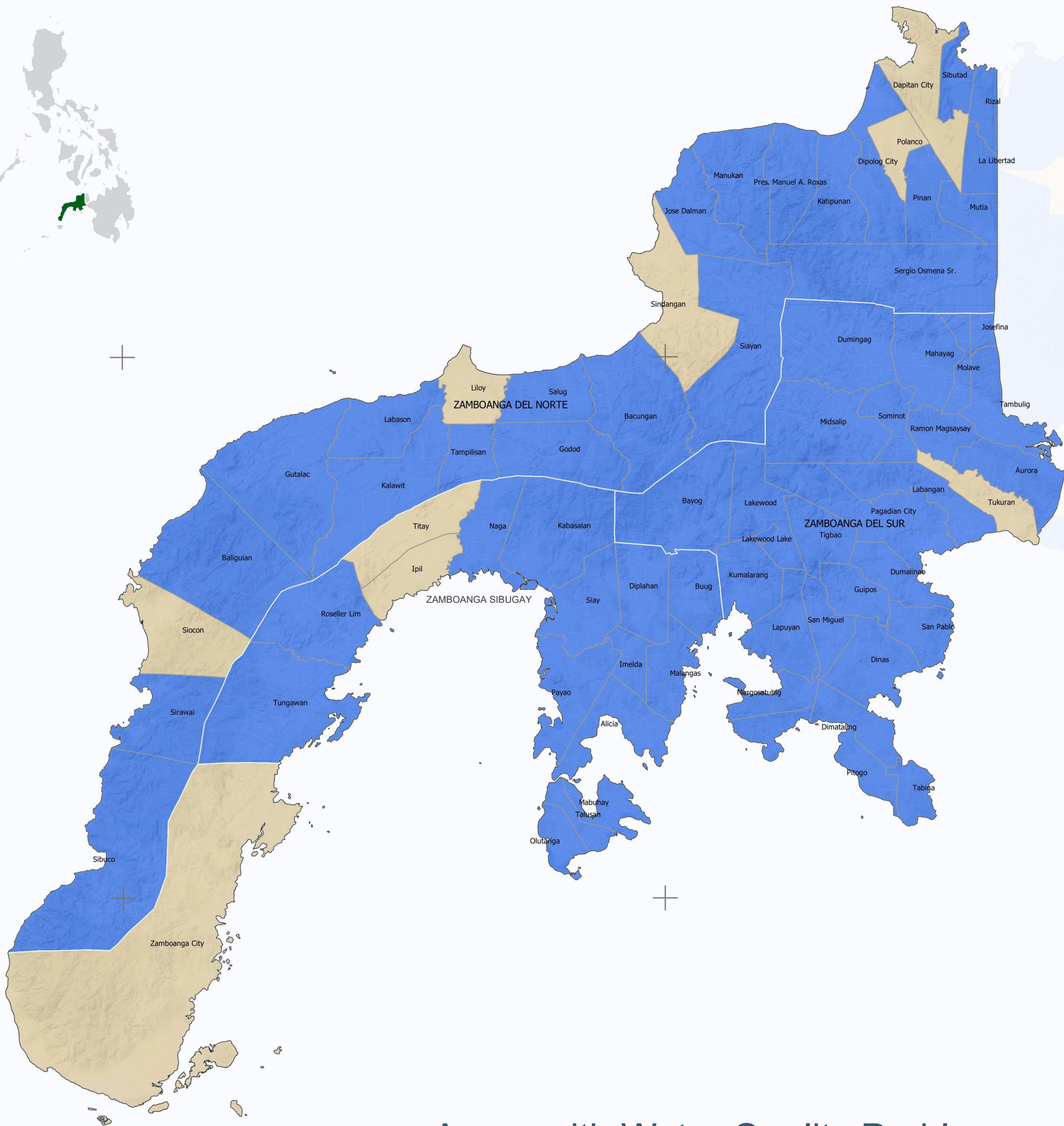
Legend

With Water Quality Problem

0°0.000'



80°0.000'N



Areas with Water Quality Problems

Water Districts' Water Quality Monitoring Data, LWUA, 2015

40°0.000'E

40°0.000'W

Water Quality

Water quality measures how good water is in terms of its beneficial use and environmental value. It is water relative to its use and measured in terms of its physical, chemical, biological and radiological characteristics. It is most frequently used in reference to a set of standards against which compliance can be assessed.

Table 13 shows a list of rivers in the region and their corresponding classification.

Wastewater projection maps (as shown in the preceding pages) indicate that most cities and growing municipalities have higher water demand compared to the other areas in the region. These areas are more exposed to problems related to water quality and health, among them waterborne diseases.

The map on the left shows the areas whose water sources have exhibited signs of poor water quality. The data are based on the water quality reports submitted by WDs to the Local Water Utilities Administration (LWUA). Data on water supply sources that are not covered or owned by WDs are not reflected on this map.

Waterborne Diseases

Waterborne diseases are generally transmitted through water in which pathogenic microorganisms live. These diseases can be spread while bathing, washing, or drinking water, or by eating food exposed to contaminated water²⁰.

The lack of safe drinking water and sanitation facilities that compels grassroots communities to content themselves with poor hygiene contributes significantly to waterborne diseases.

Based on the 2015 Food and Waterborne Diseases report from the Department of Health (DOH), there were 1,089 reported cases of acute bloody diarrhea, 69 schistosomiasis cases and 1,366 typhoid and paratyphoid cases in the Zamboanga Peninsula. This indicates that there are people who still have no safe access to drinking water and sanitation facilities.

As of 2017, the Department of the Interior and Local Government (DILG) reported 22 waterless²¹ municipalities in Zamboanga Peninsula (see Figure 16).

Residents in these areas have limited access to safe (drinking) water, and thus, are forced to resort to unsafe sources of water. Doing so increases their exposure to a host of waterborne diseases.

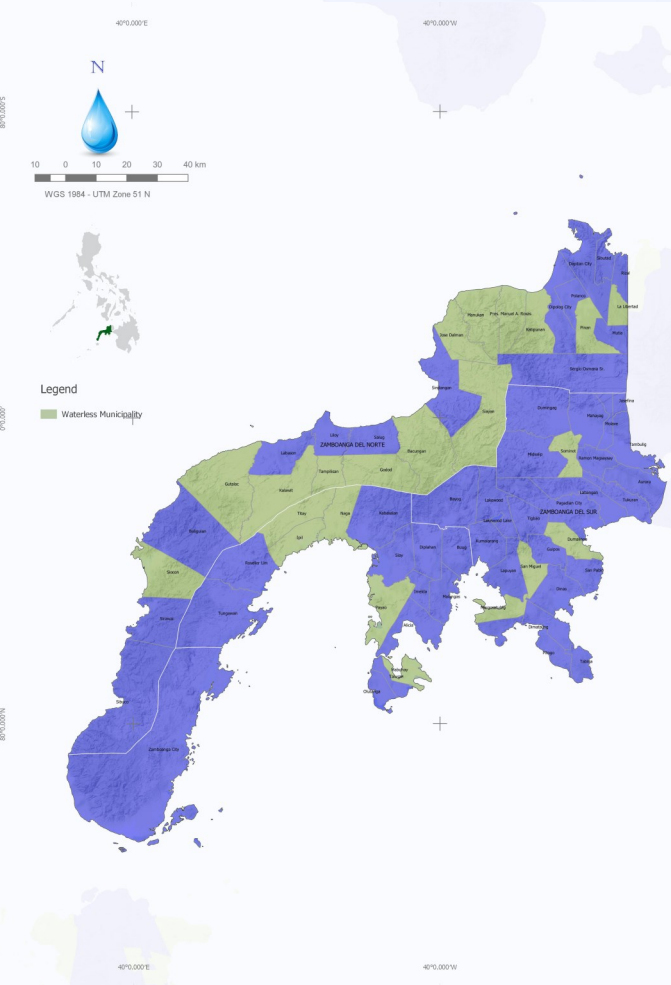


Figure 16: Waterless Municipalities

Table 13: Classification of Rivers¹⁹

Location	River	Classification
Zamboanga City	Ayala	A/B
	Bolong	A/B
	Bolong to Sangali CW	SB/SC
	Cabaluay	B/C
	Cunuan	A/B
	Limpapa	A/B
	Manicahan	B
	Mercedes	B/C
	Patalon	A/B
	Rio Hondo to Sinunuc CW	SB/SC
	Saaz	A/B
	Sinunuc	A/B
	Tumaga*	A/B/C
	Vitali	B
	West Coast CW	SC
Zamboanga del Norte	Dicayo*	A/B
	Dipolog*	B
	Disakan	B
	Dohinob	A
	Ingin*	A
	Kipit	B
	Layawan	A
	Lituban	B
	Lubungan	A
	Mucas*	A
	Panganuran	A/B
	Patawag*	A
	Piao	A/B
	Polandok*	A
	Polo	B/C
	Salug	A
Zamboanga del Sur	Sibalic	A/B
	Sindangan*	B
	Siocon *	A/B
	Talinga	A
	Tolon	B
	Kumalarang *	A/B
	Labangan*	A/B
	Salug Daku	A/B
	Sibuguey*	A/C
	Tigbao*	A/B
Zamboanga Sibugay	Bakalan*	A/B
	Batu	B
	Binuangan	B
	Buayan	B/C
	Catituan	B
	Kabasalan*	A/C
	La Dicha	A/B
	Lambuyogan	B
	Logpond	B
	Lutiman	B
	Sanito*	B
	Sinusayan	B
	Suluan	B
	Tungawan	A/B

*Principal river

¹⁹ Environmental Management Bureau (EMB)
²⁰ World Health Organization
²¹ Municipalities with less than 50% service coverage, National Anti-Poverty Commission, 2010

WSS Sector Gaps

In assessing the current state of the WSS sector in Zamboanga Peninsula, areas that require upgraded facilities, improved water supply and sanitation systems as well as regular and extensive monitoring protocols were brainstormed and identified at the regional consultation and planning workshop.

Issues, Constraints and Challenges

The workshop on WSS in Region IX produced a clear picture of realities on the ground, based on personal experiences, local knowledge and insights shared by key stakeholders and resource persons from the academe, nongovernment organizations (NGOs) and other concerned institutions.

The planning workshop attended by provincial officials in Region IX and representatives of regional line agencies identified certain “hindering and facilitating factors” and classified specific issues, constraints, and challenges confronting the WSS sector in three areas of concern: (a) Planning and Development, (b) Service Provision, and (c) Regulation.

Planning and Development

Planning is commonly defined as “a strategic process to achieve developmental objectives.” In a broad sense, it is a fundamental management undertaking that requires “logical thinking, rational decision-making and total dependence on reliable data and factual information.”

The most common hindering factors were: divisive and contentious water right issues occasioned by unregulated utilization of existing water resources; underdevelopment of available water sources (springs, deep wells, rivers, etc.) in conflict areas, and lack of expertise in water system maintenance and service delivery. The inactive status of the River Basin Management Organization was also considered a hindering factor.

A major handicap in the delivery of efficient sanitation services in the region is the absence of septage treatment plants (STPs). To catalyze the establishment of modular STPs in identified suitable locations, the workshop participants recommended the grant of subsidies by LGUs to water and sanitation service providers.

Service Provision

The prevalence of poor WSS delivery in Region IX were attributed to several hindering factors, specifically: financial constraints; absence of a comprehensive water and sanitation master plan; lack of technical expertise; outmoded, poorly maintained and inefficient water supply facilities; and poor appreciation by the general public of the importance of best sanitation practices.

Practical solutions included: crafting of a viable and sustainable water and sanitation master plan; submission of LGU-initiated loan proposals to LWUA; exploring financial grants from nonprofit organizations; and, upgrading/rehabilitation of existing water supply and sanitation facilities.

Recognizing that the above-cited recommendations would take some time to materialize, immediate implementation by the LGUs of the following doable measures are proposed in the interim: enhancement of in-house technical expertise in partnership with NGOs, academic institutions and relevant government agencies; and multi-sectoral, multi-media coordinated awareness and advocacy campaigns to promote sound sanitation practices.

Along this line, provision of additional funds from the provincial government are recommended to fast-track the existing toilet bowl program in the region.

One notable concern was the region's lack of readiness to adapt to the challenges posed by climate change. Water concessionaires operating in the region are thus requested to invest in technologies and facilities that would make it possible to store water in bulk to be released in times of climate change-induced shortages.

Regulation

The messy state of WSS in Region IX pointed to a “Failure of Regulation” as the cause of major aggravations.

Among the complaints were: unregulated installation of booster pumps; contrasting policies of LGUs on cross-boundary issues; absence of water surveillance programs; zero NWRB presence in the region; and serious deforestation that affects water resource management because of a toothless and ineffectual Chainsaw Act.

Among the solutions proposed were: crafting of enabling ordinances to address the existing deficiencies in water sampling and surveillance; harmonization of policies on cross-boundary issues; establishment of a fully-functioning NWRB office in the region; enhancement of water resources protection and conservation through better forest protection; and, allotment of funds for capacity building in various areas of water supply provision and management.

Table 14 summarizes the hindering and facilitating factors impacting the WSS sector in Region IX.

Table 14: Hindering and Facilitating Factors

	Hindering Factors	Facilitating Factors
Planning and Development	Water	
	Undeveloped available water sources (springs, deep wells, rivers)	Budget allocation by LGUs for maintenance of water systems
	Lack of technical expertise among contractors and local implementers	Sustainable water supply
	Lack of manpower	Systematic identification of water users and sources
	Inactive river basin management organization	LGU-initiated water systems development
	Abandonment of wells owing to the lack or unavailability of spare parts	Enhanced forest management
	Sanitation	
	Sanitation services not prioritized by low-class communities	Implementation of sanitation code
	Lack of city ordinances on sanitation	Requiring LGUs to map out plans for and put up modular sewerage treatment plants
	Poor accessibility to laboratory facilities for water quality monitoring	Building wastewater treatment plants in hospitals
	Improper solid waste management policies and procedures	Government subsidies to water service providers in implementing septage and sewerage systems
Service Provision	Water	
	Climate change	PrimeWater (bulk water in Zamboanga City)
	Absence of systematic procedures governing water demand management	Regular visits and mentoring of facilitators
	Financial constraints	Establishing linkages with national or local donor agencies re: loan grant requests
	Lack of technical expertise	Loan package requests submitted to LWUA
	Poor planning re: existing water supply facilities	Rehabilitation of existing facilities
	Sanitation	
	No dynamic social preparation on sanitation	Counterpart funding for household sanitary toilets from NGOs, LGUs
	Unhygienic cultural practices re: sanitation	LGUs' strict enforcement of ordinances
	Lack of technical skills among LGU personnel	
	Absence of a comprehensive water and sanitation master plan	
	Lack of funds for sanitation facilities	
Regulation	Water	
	Differing policies of LGUs on water resources across boundaries	Adopting the ridge reef approach to water supply
	Toothless regulations on issuance of permits to chainsaw owners	Revisiting and giving teeth to the chainsaw act
	Implementation of the Water Supply Chapter II	Allocation of budget (20% development funds)
	Absence of a water safety plan	Crafting of ordinances establishing water surveillance programs
	Absence of regulations on the installation of booster pumps	
	Sanitation	
	Lack of funds with which to conduct water sampling	Tapping funding sources and exploring collaborative arrangements to put in place an efficient water sampling operation in the region; Multi-sectoral, multi-media coordinated advocacy campaigns to address open defecation issues
	Absence of an NWRB representative in the region	NWRB membership in Regional Development Council sectorial communities

Regional Vision

“Universal Access to Sustainable Water Supply and Sanitation Services in Zamboanga Peninsula by 2030”

The Zamboanga Peninsula WSS vision was crafted by the visioning group with the goal of achieving universal and equitable access to safe and affordable water supply and sanitation by 2030. In essence, it articulated the outcomes and targets the sector wants to achieve without losing sight of the challenges that lie ahead, especially those related to sufficiency, accessibility, affordability, governance and sustainability.

In keeping with this vision, key strategies and corresponding success indicators contributing towards the achievement of the overall sector vision were adopted, and key projects and programs were identified, including WSS targets which will adhere to the national WSS targets that are in accord with the PDP and SDGs.

Strategic Framework

The creation of the strategic framework begins with the determination of the issues, constraints and challenges of the water supply and sanitation sector. The diagram on the right shows specific highlights and contrasts, pertaining to areas displaying best practices and those needing improvement.

The figure shows strategic priorities for Zamboanga Peninsula highlighting the provinces’ individual plans. Priority areas include capacity building, information dissemination, project development and politics. These priorities have been observed to be the major areas of concern in relation to the provincial plans (as discussed in “Issues, Constraints and Challenges”).

Corresponding strategies were formulated to translate the regional vision into specific approaches to get the best results and achieve the region’s WSS targets. These are the region’s general approaches applicable to urban and rural contexts of ensuring access to safe water and sanitation.

A more detailed discussion with respect to achieving increased access to potable water considering the various segments comprising the water utilities (categorized as undeveloped/underdeveloped, developing and developed) is shown in Table 15.

Table 15: Strategies in Achieving Increased Access to Potable Water

Segment	Target	Strategic Statement
Undeveloped/Underdeveloped		
Level I	<ul style="list-style-type: none">Zero waterless barangaysReduction to 5% of unsafe sources of water supply (2022) and universal access to safe water (2030)	<ul style="list-style-type: none">Government investment in the development of water supply systems (WSS) to upgrade unsafe sources to safe sourcesPromoting water harvesting in far-flung areas
Level II	<ul style="list-style-type: none">Upgrade of Level II systems to Level III	<ul style="list-style-type: none">Establishing WDs or LGU-led water utilities that can operate commerciallyUpgrading Level II systems to Level IIICreation of a body that provides technical and financial assistance to barangay water associations and rural water-works to upgrade their level of service
Developing		
Water Districts (Categories C and D)	<ul style="list-style-type: none">Zero nonoperational WDs	<ul style="list-style-type: none">Prioritizing conversion of nonoperational to operational WDsAssisting low performing WDs in rehabilitation and expansion worksProviding a window for low cost funds that can be accessed by low performing WDs to expand coverage
Non-WDs (financially struggling water utilities)	<ul style="list-style-type: none">Organizing water utilities and allowing them to operate commercially100% recovery of O&M cost	<ul style="list-style-type: none">Allowing the commercialization of water utility operations; encouraging LGUs to establish WDs or similar local government corporations or economic enterprises
Developed		
Level III	<ul style="list-style-type: none">100% coverage of franchise areaEnsuring the sustainability of operations of Level III systemsContinuing expansion programs to ensure 100% coverage	<ul style="list-style-type: none">Increasing private sector participationEnsuring a robust regulatory framework to balance the interest of consumers and operators/WSPsEncouraging business establishments and residential communities to embark on rainwater harvesting programs

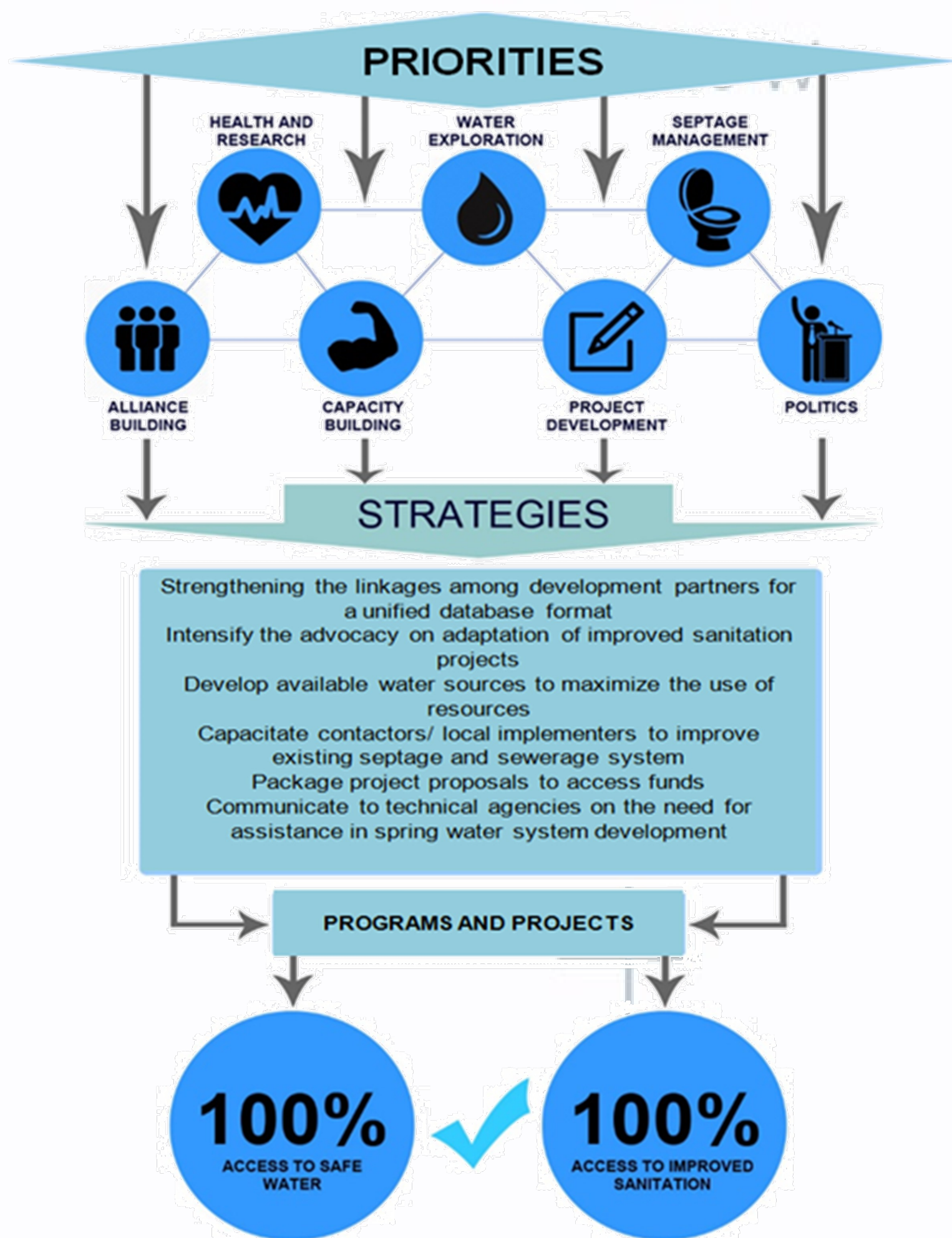


Figure 17: Zamboanga Peninsula WSS Strategic Framework

Access Targets for Water Supply and Sanitation

As experts knowledgeable in and thoroughly familiar with the social and environmental conditions in their respective provinces, the workshop participants were given free rein in setting targets concerning water supply and sanitation access (even as they were guided by the prescribed goals).

Their targets were based on current and baseline data (i.e., population growth rates, water resources availability, topographical and geographical setting, etc.), the status quo (funding constraints, political and cultural challenges, etc.), and the realistic attainability of set targets.

Region IX strives to achieve 94% access to safe water by 2022 and 100% access by 2040. This figure means more than 1,100,000 households will have access to safe water by 2040. Improved access to sanitation for Region IX is set at 84% by 2022 and universal access by 2040.

Figures 18 and 19 graph the WSS targets for 2022 and 2040 in terms of households.

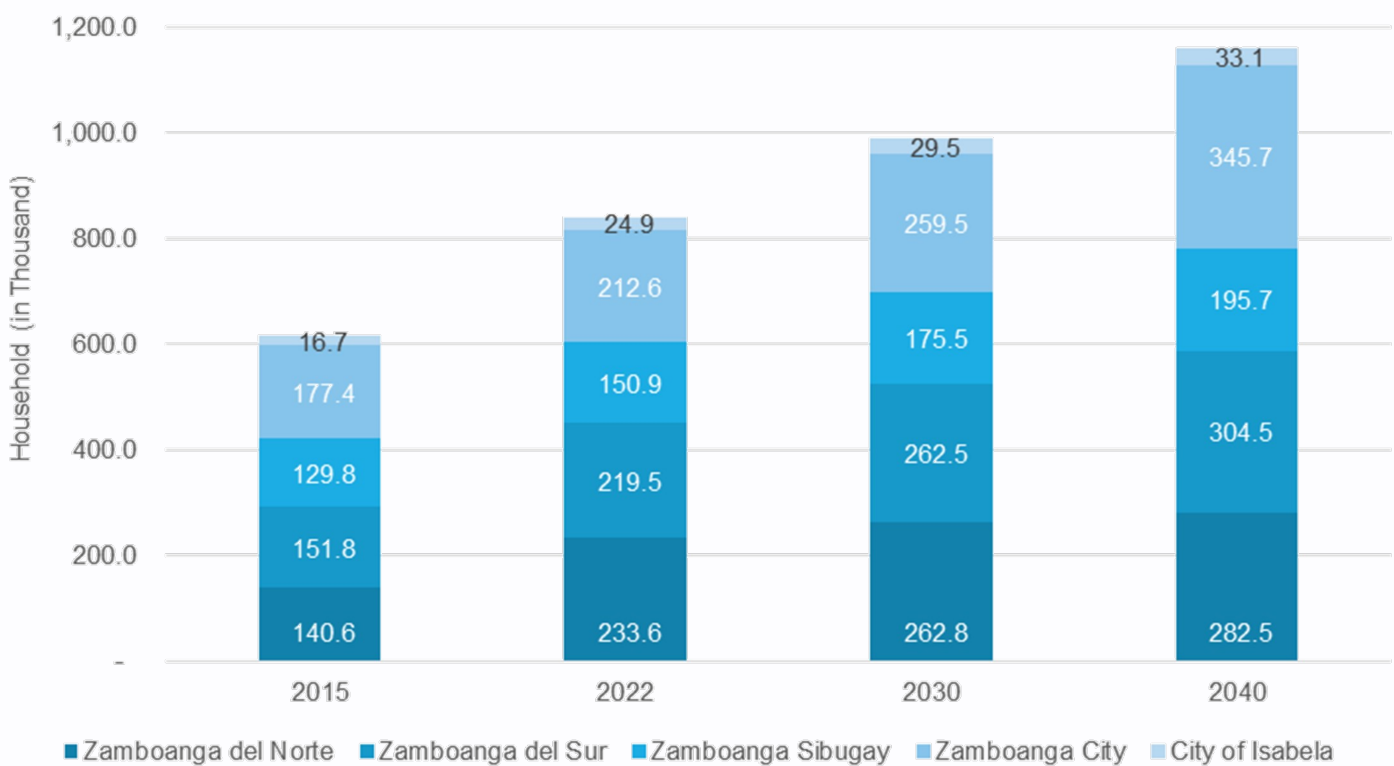


Figure 18: Targeted Households with Access to Safe Water

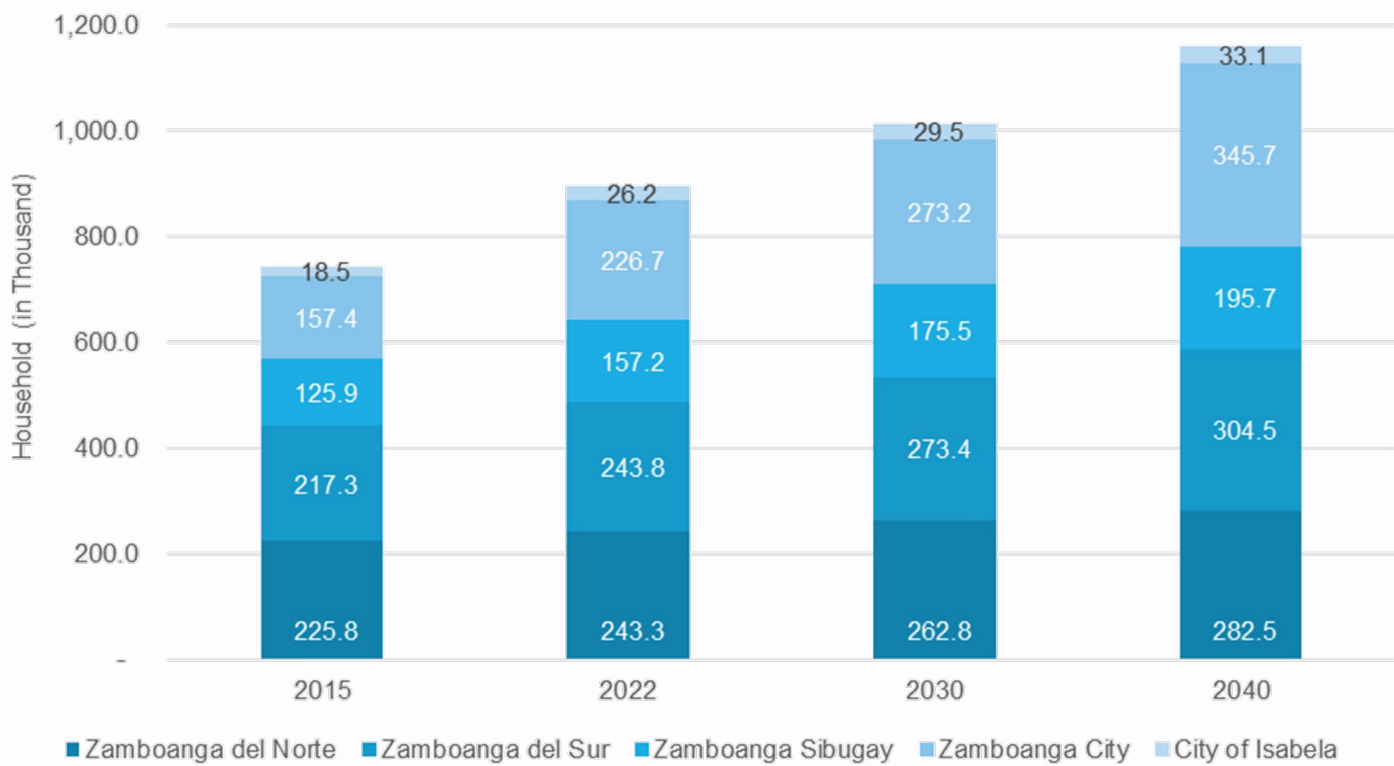


Figure 19: Targeted Households with Access to Sanitation Facilities

Water Supply Targets

ZAMBOANGA DEL NORTE			
	2022	2030	2040
With Access	96.0%	100.0%	100.0%
Level III	18.0%	65.0%	100.0%
Level II	37.0%	25.0%	0.0%
Level I	41.0%	10.0%	0.0%
No Access*	4.0%	0.0%	0.0%

ZAMBOANGA DEL SUR			
	2022	2030	2040
With Access	90.0%	96.0%	100.0%
Level III	40.0%	44.0%	100.0%
Level II	30.0%	32.0%	0.0%
Level I	20.0%	20.0%	0.0%
No Access*	10.0%	4.0%	0.0%

ZAMBOANGA SIBUGAY			
	2022	2030	2040
With Access	96.0%	100.0%	100.0%
Level III	29.0%	38.0%	100.0%
Level II	43.0%	44.0%	0.0%
Level I	24.0%	18.0%	0.0%
No Access*	4.0%	0.0%	0.0%

ZAMBOANGA CITY			
	2022	2030	2040
With Access	93.8%	95.0%	100.0%
Level III	74.0%	75.0%	100.0%
Level II	11.0%	11.0%	0.0%
Level I	8.8%	9.0%	0.0%
No Access*	6.2%	5.0%	0.0%

CITY OF ISABELA			
	2022	2030	2040
With Access	95.0%	100.0%	100.0%
Level III	75.0%	85.0%	100.0%
Level II	15.0%	10.0%	0.0%
Level I	5.0%	5.0%	0.0%
No Access*	5.0%	0.0%	0.0%

ZAMBOANGA PENINSULA			
	2022	2030	2040
With Access	93.7%	97.6%	100.0%
Level III	41.8%	57.9%	100.0%
Level II	28.9%	26.0%	0.0%
Level I	23.0%	13.7%	0.0%
No Access*	6.3%	2.4%	0.0%

Sanitation Targets

ZAMBOANGA DEL NORTE			
	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	3.0%	0.0%	0.0%
Shared/Communal/Limited	0.0%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

ZAMBOANGA DEL SUR			
	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	2.0%	0.0%	0.0%
Shared/Communal/Limited	1.0%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

ZAMBOANGA SIBUGAY			
	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	0.0%	0.0%	0.0%
Shared/Communal/Limited	0.0%	0.0%	0.0%
Open Defecation	3.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

ZAMBOANGA CITY			
	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	0.6%	0.0%	0.0%
Shared/Communal/Limited	0.8%	0.0%	0.0%
Open Defecation	1.6%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

CITY OF ISABELA			
	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	0.0%	0.0%	0.0%
Shared/Communal/Limited	0.0%	0.0%	0.0%
Open Defecation	3.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

ZAMBOANGA PENINSULA			
	2022	2030	2040
Improved	83.7%	100.0%	100.0%
Basic	10.3%	0.0%	0.0%
Shared/Communal/Limited	6.0%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

Strategic Interventions

After the regional planning and consultation workshop, a working document detailing specific strategic interventions to improve water supply and sanitation access in Region IX was formulated. The participants deliberated on these proposed interventions to make

them adaptable to actual local conditions. (These are discussed more thoroughly in the National Master Plan and may be adopted accordingly at the local level.)

Tables 16 and 17 show the specific strategic interventions for water supply and sanitation, respectively.

Table 16: Proposed Strategic Interventions for Water Supply

Access to Safe Water	Planning and Development	Service Provision	Regulation	Promotion
95% Access to Safe Water in 2022 Universal Access in 2030	<ul style="list-style-type: none"> Planning, program or project design Establishing labs and water quality testing centers Lobbying for the Regional WSS Masterplan 	<ul style="list-style-type: none"> M&E expansion Rehabilitation/Non-revenue water (NRW) reduction maintained at 20% of total production Integration/Amalgamation Automation Residuals management Mitigation Water potability maintained at all times Providing 24/7 water supply service Achieving 100% coverage Residuals management 	<ul style="list-style-type: none"> Water resources protection Arbitration Environmental and social safeguards Compliance with PNSDW 2017 Close monitoring of Joint Agreement Compliance training from DOH Resource studies 	<ul style="list-style-type: none"> Willingness to connect and pay Demand creation

Table 17: Proposed Strategic Interventions for Sanitation

Access to Improved Sanitation	Planning & Development <i>Planning Program or Project Design Institution Building Training Financing Climate/Disaster Resiliency Policy</i>	Service Provision <i>Operations M&E Expansion Amalgamation Automation</i>	Regulation <i>Tariff/Pricing Resource Arbitration Registration, Permits, Rights</i>	Promotions <i>Social Preparation Advocacy Demand Creation Behavior Change</i>
High Access Areas with 60% to 100% Improved Sanitation Coverage	<ul style="list-style-type: none"> Local Sustainable Sanitation Plan (LSSP) should be incorporated into the WSS Sector Plan, local development plan (LDP), annual investment program (AIP), and local health plan. A sewerage system program should be developed to provide service in the urban core coordinating with those in charge of the septage management program; project urban sprawl A National Sewerage and Septage Management Program (NSSMP) subsidy grant for sewerage and septage management programs (SMP) should be in place. Capacity development in regard to sewerage systems should be planned and integrated with other infrastructure. A sanitation ordinance covering sewerage system and septage management services should be passed, possibly integrating it into the environment code and Water Quality Management Areas (WQMA) action plan. 	<ul style="list-style-type: none"> Sanitation programs should focus on implementing sewerage systems and completing septage management programs. Expansion of urbanized and urbanizing barangays should be pursued. M&E system should conform to PSA/ Census (covered by sewerage system, households desludged, and on-site systems). 	<ul style="list-style-type: none"> Tariff should be computed using full cost recovery with infusion of capex subsidy for sewerage projects. LGU implementers have undergone compliance training given by DOH and Department of Environment and Natural Resources (DENR) (particularly in sewerage systems), and the Dept. of Agriculture (DA) with respect to regulations/guidelines governing disposal of by-products. Penalties should be strictly imposed on those not complying with certain requirements, including LGUs/WDs by filing cases with the environmental ombudsman. 	<ul style="list-style-type: none"> Promotions should focus on enjoining the public to connect to the sewerage system when made available stressing the importance of compliance and the benefits therefrom. Promotional efforts regarding water demand management should be supported to minimize wastage and unnecessary use of water. Building buy-in for paying for sanitation services should be promoted.

Physical Interventions

To meet the targets for access and coverage as well as the normative content of water (service standards), capital investments are necessary. The details of these investments in 2022 and 2030 are listed in Table 18.

Table 18: Capital Investments Required to Meet Water Supply Targets

Service Level	2022	2030
Level III	<ul style="list-style-type: none"> Water source assessment and development Construction of water treatment facilities Distribution network expansion Provision of service connections NRW reduction program Watershed and water resources protection, management and development Development of a Water Safety Program Adoption of a rainwater harvesting program Establishment of adequately equipped laboratory testing centers in strategic areas to serve all service levels clientele 	<ul style="list-style-type: none"> Water source assessment and development Construction of water treatment facilities Distribution network expansion Provision of service connections NRW reduction program Watershed and water resources protection, management and development Development of a Water Safety Program Adoption of a rain water harvesting program Automation of operations and major services
Level II	<ul style="list-style-type: none"> Rehabilitation of existing water supply system to upgrade it to Level III 	<ul style="list-style-type: none"> Rehabilitation of water supply system to upgrade it to Level III
Level I	<ul style="list-style-type: none"> Upgrading to “safe level” those water sources found “unsafe” 	<ul style="list-style-type: none"> Adoption of a rain water harvesting program in areas not reached by Levels II and III services

Capital investments for the sanitation targets will include basic sanitation programs, septage management programs, and sewerage management programs.

Targets for 2022 will mainly focus on basic sanitation. The septage and sewerage management programs are to be undertaken to achieve 2030 targets, although these programs may be implemented as early as 2022.

Nonphysical Interventions

To support the CapEx programs and ensure the efficient operation of the newly constructed facilities, institutional and regulatory reforms are to be undertaken (as shown in Table 19).

Table 19: Institutional and Regulatory Reforms Required to Achieve Water Supply and Sanitation Goals

Items	Undeveloped/Underdeveloped	Developing	Developed
Water Service Provision	<ul style="list-style-type: none"> LGUs will organize/establish water utilities as commercial enterprises in their jurisdictions or form a WD. LGUs will create offices to handle Level II and Level I services. 	<ul style="list-style-type: none"> WDs and LGU-run utilities will be motivated to improve their performance by offering them incentives/rewards. 	<ul style="list-style-type: none"> A system for independent evaluation and due diligence regarding public-private partnership projects will be set up.
Planning and Development	<ul style="list-style-type: none"> An agency will be created to spearhead efforts to improve the WSS sector at the provincial level. The provincial office shall coordinate development plans for water and sanitation of all municipalities in each province, pursue efforts (in coordination with the DENR) in watershed rehabilitation, and provide training programs to LGUs in water supply development and management. 		
Regulation	<ul style="list-style-type: none"> Service standards for water supply and sanitation will be defined. An independent group will be formed to monitor the performance of water and sanitation service providers, other than the WDs, within each province. WDs will continue to be regulated by the LWUA. The monitoring group could later be made part of a regulatory body. 		

40°0.000'E

40°0.000'W

N



80°0.000'S

10 0 10 20 30 40 km



WGS 1984 - UTM Zone 51 N

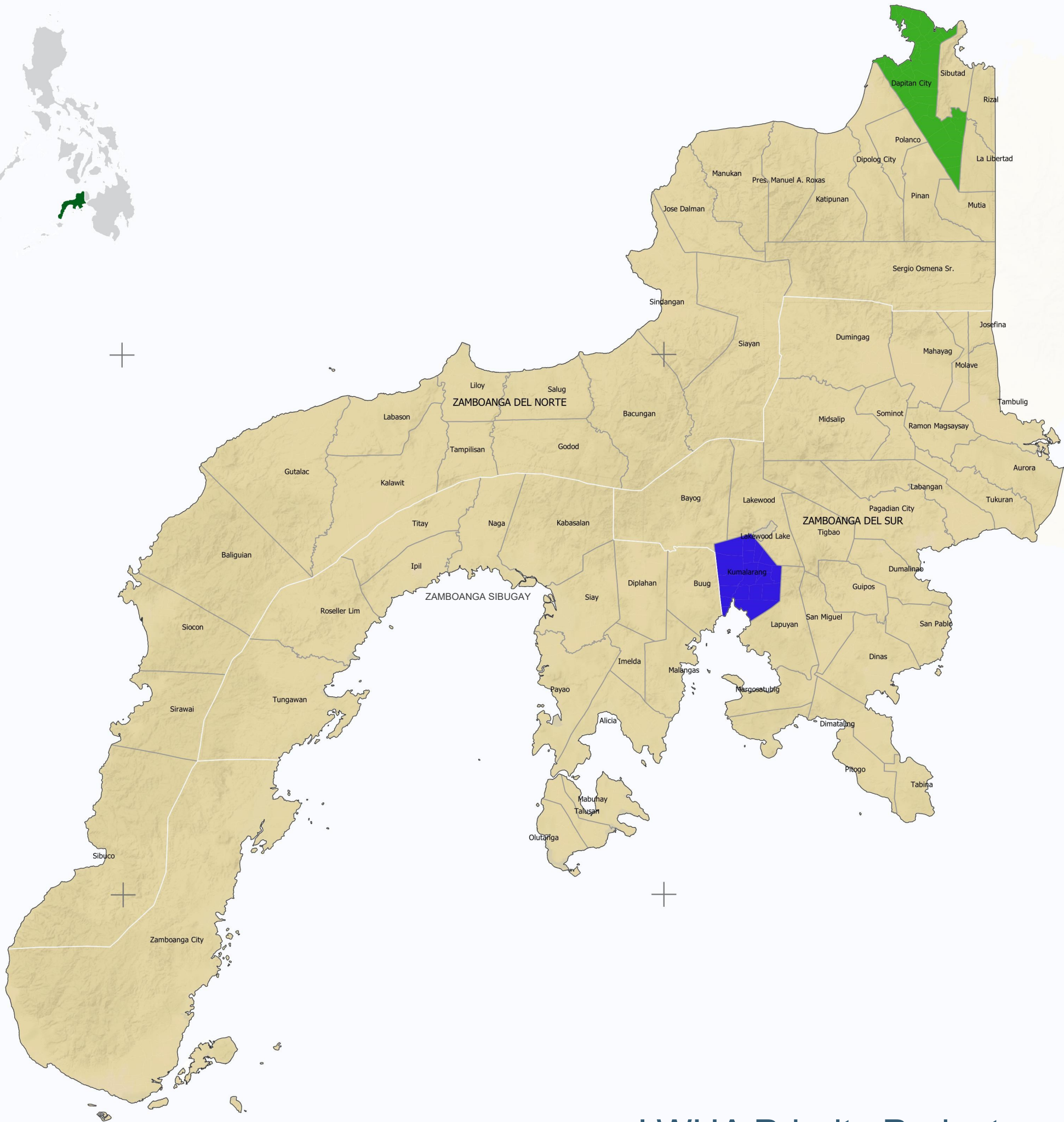
Legend

- Approved Projects
- Pending Projects

0°0.000'



80°0.000'N



LWUA Priority Projects

LWUA, 2015 Data

40°0.000'E

40°0.000'W

Addressing the Gaps

Water Supply Investment Requirements

Physical Investments

To address WSS infrastructure gaps and fulfill specific targets and commitments for 2022 and 2030, the cost of infrastructure investments was derived based on anticipated demand. Such demand was based on projected population, economic growth, as well as factored-in investments to ensure the continuous delivery of WSS services provided by existing systems. The computation included the anticipated need to upgrade existing service levels (i.e., from Level II to Level III, Level I to Level II or Level III).

Zamboanga Peninsula requires total investments for infrastructure development of about PhP7.11 billion and PhP10.46 billion to achieve the 2022 and 2030 targets, respectively. Unit development costs employed to arrive at these sums are estimated at PhP34,500 per HH for Level III, PhP20,200 for Level II, and PhP9,100 for Level I.

These rates are direct costs and cover water source development, water treatment facilities, storage requirements, transmission and distribution lines, and pumping requirements, and provision of service connections.

Furthermore, these unit costs (determined to suit local conditions in Zamboanga Peninsula) were derived by applying regional cost factors (with respect to labor, material, and equipment costs) to the computed development base costs for NCR. NCR values are pegged at PhP31,800 per household for Level III, PhP18,700 for Level II, and PhP8,400 for Level I.

The cost deviations (from the NCR base rates) were taken into account considering the region's distinct geographical, economical, and accessibility characteristics, and labor, material, and equipment costs, which are bound to affect the implementation costs of any project. The regionalization of costs ensures that computed regional investment requirements for the Master Plan and the Regional Roadmaps are as realistic as possible befitting each locale.

Aside from the direct costs, indirect costs were considered in estimating the total investment requirements. These items include project preparation activities (which may affect budget considerations) before actual construction work begins. Items considered and percentage values used in relation to the total direct costs computed are shown in Table 20.

Total expenses for establishing water quality testing laboratories have also been taken into account. It is assumed that one laboratory per province will be constructed.

Table 21 shows a summary of the total investment requirements of the region. (The detailed methodology of how the regional costs for Zamboanga Peninsula were derived is referenced in Annex D of the main volume of the Philippine WSS Master Plan.)

Nonphysical Investments

Institutional and regulatory reforms have to be pursued to complement infrastructure development and ensure that water supply systems constructed will operate efficiently. Costs of reform implementation have not been estimated at the regional level and are projected to be not substantial compared to the infrastructure investments.

LGUs, WDs, and other stakeholders are obligated to influence decision makers to pursue relevant reforms in the water sector. These reforms serve as non-infrastructure investments and typically include organization/institutional development, regulatory strengthening, capacity building, and project management.

Proposed interventions include the following:

- The model of existing water utilities should be identified in areas where there are no water districts. The establishment of WDs should be proposed in municipalities with a population of at least 20,000, subject to an agreement with the local chief executives. If LGUs are not amenable to forming a WD, water utilities that can operate commercially (e.g., a similar local government water corporation or economic enterprise) should be set up.
- Priority should be given to operationalizing nonfunctional WDs, particularly those in municipalities categorized as 3rd class and higher.
- The target expansion of service coverage shall be conducted at the municipal level. Municipalities with lower than 50% coverage will be given priority in the investment program.

The map on the left shows the two Zamboanga Peninsula LGUs where priority WD projects have been approved and those pending approval for LWUA's financial assistance (FA). The WD of Kumalarang has secured LWUA's FA. The FA request of the WD in Dapitan City is pending approval.

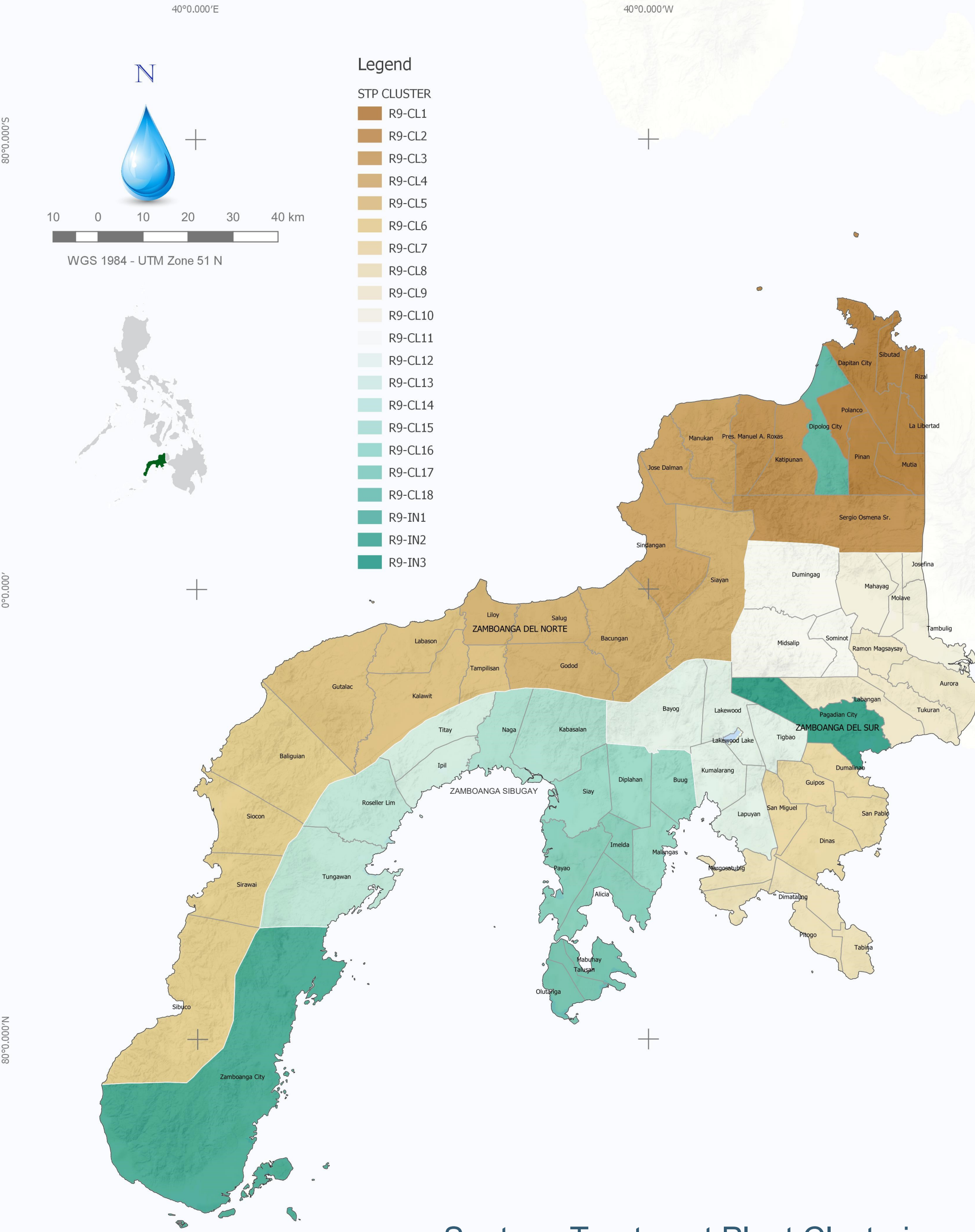
Table 20: Indirect Costs Employed²²

Water Supply		
Contingency	10.0%	Percentage of Total Direct Cost
Feasibility Study	3.0%	Percentage of Total Direct Cost
Detailed Engineering Design	6.0%	Percentage of Total Direct Cost
Construction Supervision	5.0%	Percentage of Total Direct Cost
ROW/Land Acquisition	3.0%	Percentage of Total Direct Cost
Organizational Cost/Permits	2.0%	Percentage of Total Direct Cost
Capacity Development	33,350	1 Staff Employee per 100 HH (LWUA)

Table 21: Total Investment Costs for Water Supply Sector

Province/City	Total Investment Cost (in PhP Million)	Total Investment Cost (in PhP Million)
	2022	2030
Zamboanga del Norte	2,372.00	5,694.43
Zamboanga del Sur	2,107.34	1,465.00
Zamboanga City	1,425.49	1,853.10
Zamboanga Sibugay	775.28	1,195.92
Isabela City	431.03	246.11
Total	7,111.14	10,454.55

²² Based on Industry Standards



Septage Treatment Plant Clustering

Sanitation Investment Requirements

Physical Investments

Basic Sanitation Program. The DOH plans to prescribe a national basic sanitation program for the entire country – looking into a combination of microfinance and behavior change communication. A Department Administrative Order on standard septic tank use and design will also be released by the DOH soon after planned consultation activities have been rolled out in the country’s three major island groups (Luzon, Visayas and Mindanao).

Zamboanga Peninsula will need about PhP1.4 billion for basic sanitation from 2016 to 2022 to reach a target of 84%.

This was derived by multiplying the unserved population by the unit development costs with regard to establishing specific on-site sanitation facilities. (An annex to this report and the National Master Plan explains the unit costs and derived costs for specific sanitation interventions.)

Septage Management Program. A clustering approach will be recommended to reduce capital costs and attain economies of scale. The proposed clustering per province is shown on the map on the left.

The region will need about PhP2.0 billion and PhP260 million for 2022 and 2030, respectively, for its septage management program.

Sewerage System Program. Only Zamboanga City will be required to plan and implement a sewerage system for its urban core. However, rapidly urbanizing cities (i.e., candidate HUCs) should also consider planning for sewerage services in the interim.

The indicative cost for sewerage was computed based on the 50% coverage of the HUCs’ urban population only. The unit cost was derived per the procedure applied to septage management, wherein the unit cost was based on the National Septage and Sewerage Master Plan (NSSMP) estimations and later adjusted considering other factors.

For sewerage services, Zamboanga City will require PhP5.3 billion by 2022 and an additional PhP1.1 billion by 2030. In 2015, Zamboanga City showed an urban ratio of 87%. The computational template provided for a 25% coverage of sewerage services by 2022 and an additional 25% coverage by 2030. This includes the city’s incremental population from 2015 to 2022 and from 2023 to 2030.

Candidate HUCs may be closely examined initially (e.g., Dipolog City in Zamboanga del Norte, Pagadian City in Zamboanga del Sur and Ipil in Zamboanga Sibugay) as urbanization may set in more rapidly in these places than in other towns.

Nonphysical Investments

Zamboanga Peninsula, like other regions in the country, will require substantial assistance from the national government, or where technical and financial assistance can be funneled. This will include an inventory or survey and assessment of existing sanitation facilities, capacity development for implementing local agencies (local health office, environment and natural resources office, office of the building official, and general services office), institutional, policy and regulatory environment development (which would require the involvement of capacitance support offices like the budget and treasurer’s office, bids and awards committee, commission on audit office, engineering office, office of legal services/affairs, barangay affairs office, office of the local chief executive, and the local legislative council).

Other nonstructural interventions that may require a budget include developing a monitoring and evaluation (M&E) system to monitor progress, support planning, and guide development training programs, promotional campaigns and other legislative advocacies, and initiate hygiene promotion programs.

Table 22: Total Investment Costs for Sanitation Sector

Province/City	Total Investment Cost (in PhP Million) 2022	Total Investment Cost (in PhP Million) 2030
Zamboanga del Norte	2,113.46	653.92
Zamboanga del Sur	4,035.16	1,031.00
Zamboanga City	9,057.54	2,650.14
Zamboanga Sibugay	4,517.44	615.63
Isabela City	322.93	122.07
Total	20,046.52	5,072.76

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Proposed Projects and Programs

A list of projects and investment programs has been developed during the regional planning workshop to assess the current state of the WSS sector and propose projects to increase access to and upgrade water supply and sanitation facilities at the provincial or regional level.

The DILG, DENR River Basin Control Office (RBCO) and LWUA have proposed projects in the WSS sector in addition to those discussed and agreed on at the regional workshop.

This list of projects does not cover only infrastructure projects, but also nonphysical investment requirements, such as capacity development programs, information dissemination campaigns, and watershed management plans. These projects run the gamut from conception, proposal, pre-feasibility and feasibility study stages, detailed engineering design, to pre-procurement and procurement. Figure 20 shows the distribution of the investment requirement per province and HUC. Based on the proposed projects and programs, the region needs Php23.3 billion to boost its WSS sector.

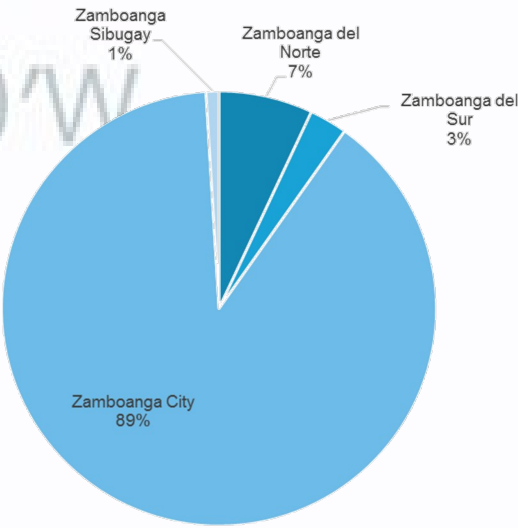


Figure 20: Distribution of Investment Requirement per Province/City

Zamboanga del Norte												
Water Supply			Period	Budget Requirement (in PhP Million)	Sanitation			Period	Budget Requirement (in PhP Million)	Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)	
1	Water Supply System Upgrading		Medium Term	1,063.07	1	Procurement of Desludging/Vacuum Trucks and Semi-Mechanized Equipment		Medium Term	566.97	1,630.04	243,327	
TOTAL				1,063.07	TOTAL				566.97			
Zamboanga del Sur												
Water Supply			Period	Budget Requirement (in PhP Million)	Water Supply and Sanitation			Period	Budget Requirement (in PhP Million)	Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)	
1	Construction/Development of Various Water Systems		Medium Term	500.00	1	Installation of Transmission Line, 200mm.dia. uPVC pipe from Barangay Danlugan to Pagadian City		Short Term	77.46	655.84	243,842	
TOTAL				500.00	2	Rehabilitation of Pipelines 450mm dia. pipes along National Highway (from Tiguma to Cor. Sabellano St. - Both Sides)		Short Term	78.37			
					TOTAL				155.84			
Zamboanga City												
Water Supply			Timeline	Budget Requirement (in PhP Million)	Sanitation			Period	Budget Requirement (in PhP Million)	Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)	
1	Bulk Water Distribution Line		Long Term	850.00	1	Computer Software System for Data Analysis		Short Term	-	20,801.90	226,687	
2	Cahumban Water System		Short Term	76.40	2	Material Recovery Facility for Every Barangay		Short Term	-			
3	Feederline/Water Services Expansion		Short Term	264.00	3	Sanitary Landfill Facility		Short Term	-			
4	Impounding Facilities		Long Term	19,000.00	4	Sewerage Treatment Plant		Medium Term	339.00			
5	Mainline Replacement Project		Long Term	105.00	5	WinS (WaSH in Schools)		Long Term	-			
6	NRW Reduction Program		Medium Term	16.00	6	Zero Open Defecation		Long Term	-			
7	Rancho Frio and Bunguiao Water System		Medium Term	121.00	TOTAL				339.00			
8	Water Demand Management		Long Term	-								
9	Zamboanga City WD Impounding Dam		Short Term	30.50								
TOTAL				20,462.90								
Zamboanga Sibugay												
Water Supply			Period	Budget Requirement (in PhP Million)	Sanitation			Period	Budget Requirement (in PhP Million)	Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)	
1	Construction of Various Water Supply Systems in the Municipalities of Ipil and Titay		Medium Term	156.00	1	Provision of 4,000 pcs Porcelain Toilet Bowls (Seat Type)		Short Term	2.00	223.70	156,745	
2	Construction of Water Supply System Level II in 16 Municipalities		Medium Term	62.20	TOTAL				2.00			
3	Rehabilitation of Water Supply System Level II in 16 Municipalities		Medium Term	3.50								
TOTAL				221.70								

Identified Priority Projects (2019-2020)



The table below show the priority projects identified by LWUA and DILG for 2019-2020. The map on the left shows the various barangays and municipalities to be covered by DILG's Assistance to Municipalities (AM) and Salintubig Projects in 2019.

Assistance To Municipalities (2019)			
Province	Municipality	Project	Amount (in PhP Million)
Zamboanga del Norte	Baliguian	Rehabilitation/Improvement Of Level II Potable Water System	3.00
Zamboanga del Norte	Jose Dalman	Expansion Of Level II Water System	4.51
Zamboanga del Norte	Piñan	Improvement Of Water System	1.71
Zamboanga del Norte	Sibutad	Expansion Of Level III Water System In Poblacion	3.14
Zamboanga del Norte	Sibutad	Improvement Of Water System	3.00
Zamboanga del Sur	Aurora	Rehabilitation /Improvement Of Level II Potable Water System	1.82
Zamboanga del Sur	Dinas	Provision Of Rainwater Catchment Facility	1.33
Zamboanga del Sur	Dumingag	Construction Of Potable Water Supply System In Barangay Bucayan	0.85
Zamboanga del Sur	Dumingag	Rehabilitation/Improvement Of Level III Water System In Barangay Bagong Kauswagan	3.53
Zamboanga del Sur	Josefina	Construction Of Sanitary Toilets With Hygiene Facilities For Public Places	2.21
Zamboanga del Sur	Mahayag	Rehabilitation/Improvement Of Level II Potable Water Supply System	2.42
Zamboanga del Sur	Molave	Expansion Of Level III Water System	7.34
Zamboanga del Sur	Ramon Magsaysay	Expansion Of Level III Water System In Katipunan	3.00
Zamboanga del Sur	Ramon Magsaysay	Expansion Of Level III Water System In San Fernando	1.70
Zamboanga del Sur	Ramon Magsaysay	Rehabilitation/Improvement Of Level III Water System	1.50
Zamboanga Sibugay	Imelda	Rehabilitation/Improvement Of Level II Potable Water Supply System In Barangay Mali-Little Baguio	1.00
Zamboanga Sibugay	Imelda	Rehabilitation/Improvement Of Level II Potable Water Supply System In Barangay Balugo	5.00
Zamboanga Sibugay	Malangas	Expansion Of Level III Water System	9.98
Total			34.85


SALINTUBIG (2019)			
Province	Municipality	Project	Amount (in PhP Million)
Zamboanga del Norte	Labason	Construction Of Potable Water System In 17 Barangays	15.00
Zamboanga del Norte	Sindangan	Expansion Of Distribution Of Water District Main Line	4.00
Zamboanga Sibugay	Alicia	Construction Of Water System: Brgys. Alegria, Bella, La Paz, Litayon, Sta. Maria, Tampalan, Lutiman	7.00
Zamboanga Sibugay	Imelda	Improvement/Rehabilitation Of Pws Level II In Brgy. Gandiangan, Dumpoc, Lower Baluran, Baluyan, Lumbog, San Jose (Purok Orchids)	12.00
Zamboanga Sibugay	Titay	Rehabilitation Of Barangay Camanga Potable Water System Level II	6.00
Zamboanga del Sur	Aurora	Potable Water Supply (Mahayahay)	2.00
Zamboanga del Sur	Dimataling	Construction/Installation Of Water System Level III (San Roque)	2.00
Zamboanga del Sur	Dimataling	Construction/Installation Of Water System Level III (Sumbato)	2.00
Zamboanga del Sur	Dimataling	Construction/Installation Of Water System Level III (Tinguangan)	2.00
Zamboanga del Sur	San Pablo	Potable Water Supply (Bag-Ong Misamis)	2.00
Zamboanga del Sur	San Pablo	Potable Water Supply (Mabuhay)	2.00
Zamboanga del Sur	San Pablo	Potable Water Supply (Songgoy)	2.00
Zamboanga del Sur	San Pablo	Potable Water Supply (Tubo-Pait)	2.00
Zamboanga del Sur	Tambulig	Improvement Of Municipal Water System (Lower Liasan)	2.00
Zamboanga del Sur	Tambulig	Improvement Of Municipal Water System (Pelocoban)	2.00
Zamboanga del Sur	Tambulig	Improvement Of Municipal Water System (Upper Liasan)	2.00
Total			66.00


LWUA (2017-2018)			
Province	City/Municipality	Project Status	Amount (in PhP Million)
Zamboanga del Norte	Dapitan City (WD)	Expansion/Improvement - Awaiting assessment report from WDDD	30.00
Zamboanga del Sur	Kumalarang	Expansion/Improvement - Approved April 17, 2018	2.00
Total			32.00


Annex A: Provincial and HUC Profiles

 ZAMBOANGA DEL NORTE	25 municipalities	Baliguin, Godod, Gutalac, Jose Dalaman, Kalawit, Katipunan, La Libertad, Labason, Leon B. Postigo, Liloy, Manukan, Mutia, Piñan, Polanco, President Manuel A. Roxas, Rizal, Salug, Sergio Osmeña Sr., Siayan, Sibuco, Sibutad, Sindangan, Siocon, Sirawai, Tampilisan
	two (2) component cities	Dapitan City, Dipolog City
	691 barangays	20 urban, 671 rural
Land Area	7,301.00 square kilometers	
Demographics (2015)	Population (2015) - 1,011,393 Population Growth Rate (2000 to 2015) – 1.36 Population Density – 139 per sq. km	
Economy	<ul style="list-style-type: none"> Major industries - agriculture, fishery, mining Major products - rubber, minerals such as gold, chromate, manganese, asbestos and silica Major crops - rice, coconut, corn, banana, cassava, vegetables Zamboanga Peninsula is the third highest in fish production among all regions in the country. 	
Poverty Incidence (2015)	On Families – 41.1 % On Population – 51.6 %	
 ZAMBOANGA DEL SUR	26 municipalities	Aurora, Bayog, Dimataling, Dinas, Dumalinao, Dumingag, Guipos, Josefina, Kumalarang, Labangan, Lakewood, Lapuyan, Mahayag, Margosatubig, Midsalip, Molave, Pitogo, Ramon Magsaysay, San Miguel, San Pablo, Sominot, Tabina, Tambulig, Tigbao, Tukuran, Vincenzo A. Sagun
	one (1) component city	Pagadian City
	one (1) independent city	Zamboanga City
	681 barangays (excluding Zamboanga City)	26 urban, 655 rural
Land Area	4,499.46 square kilometers	
Demographics (2015)	Population (2015) – 1,010,674 Population Growth Rate (2000 to 2015) – 1.25 Population Density – 225 per sq. km	
Economy	<ul style="list-style-type: none"> Major industries - agriculture, fishery, mining, livestock, houseware production Major products – housewares made from indigenous materials such as rattan, <i>buri</i>, bamboo and paper Major crops - palay, corn, coconut, rubber, banana 	
Poverty Incidence (2015)	On Families – 18.6 % On Population – 24.8%	

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 ZAMBOANGA SIBUGAY	16 municipalities	Alicia, Buug, Diplahan, Imelda, Ipil, Kabasalan, Mabuhay, Malangas, Naga, Olutanga, Payao, Roseller Lim, Siay, Talusan, Titay, Tungawan
	389 barangays	18 urban, 371 rural
Land Area	3,607.75 square kilometers	
Demographics (2015)	Population (2015) – 633,129 Population Growth Rate (2010 to 2015) – 1.60 Population Density – 175 per sq. km	
Economy	<ul style="list-style-type: none"> Major Industries - agriculture, fishery, milling, livestock, furniture making Major products - rubber, processed food, furniture made from wood and rattan, dried fish and squid, garments, wax, lime Major crops - abaca, coffee, cacao, rice, corn, coconut, fruits, vegetables 	
Poverty Incidence (2015)	On Families – 24.1 % On Population – 31.7%	

 ZAMBOANGA CITY	Zamboanga City is an independent, chartered city and was designated highly urbanized on November 22, 1983.	
	98 barangays	58 urban, 40 rural
Land Area	1,414.70 square kilometers	
Demographics (2015)	Population (2015) – 861,799 Population Growth Rate (2010 to 2015) – 2.38 Population Density – 609 per sq. km	
Economy	<ul style="list-style-type: none"> Major industries - fishery, manufacturing Major products – canned products especially sardines Zamboanga City is dubbed as the Sardines Capital of the Philippines, for 9 out of 12 sardines companies in the country are produced here. Sardine fishing and processing account for about 70% of the city's economy. 	

 City of Isabela	Isabela City is located on the northern shore of Basilan Island, along the Basilan Strait across from Zamboanga City to the north. Administratively, it is under the jurisdiction of the province of Basilan; however, regional services are provided by the Zamboanga Peninsula regional government.	
	45 Barangays	8 urban, 37 rural
Land Area	223.73 square kilometers	
Demographics (2015)	Population (2015) – 112,788 Population Growth Rate (2000 to 2015) – 2.89 Population Density – 504 per sq. km	
Economy	<ul style="list-style-type: none"> Major industries - agriculture, trading, fishery Major products - crumb rubber, furniture made of bamboo, marine products Major crops - coconut, copra, rice, corn, fruits such as <i>lanzones</i>, durian, <i>mangosteen</i> and <i>marang</i> 	



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