NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY

Volume 2: Philippine Water Supply and Sanitation Master Plan

Eastern Visayas Water Supply and Sanitation Regional Databook and Roadmap

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Acronyms

AIP	Annual Investment Plan
AM	Assistance to Municipalities
ARMM	Autonomous Region in Muslim Mindanao
BOD	Biological Oxygen Demand
BWSA	Barangay Water and Sanitation Association
CBO	Community-Based Organization
CDP	Comprehensive Development Plan
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
DJF	December, January and February
DOH	Department of Health
FA	Financial Assistance
FHSIS	Field Health Services Information System
FIES	Family Income and Expenditure Survey
GRDP	Gross Regional Domestic Product
HH	Household
HUC	Highly Urbanized City
JJA	June, July and August
JMP	Joint Monitoring Program
KRA	Key Result Area
LFPR	Labor Force Participation Rate
LWUA	Local Water Utilities Administration
LGU	Local Government Unit
MAM	March, April and May
MDG	Millennium Development Goals
M&E	Monitoring and Evaluation
NCR	National Capital Region
NDHS	National Demographic and Health Survey
NEDA	National Economic and Development Authority
NGO	Nongovernment Organization
NRW	Nonrevenue water
NSSMP	National Sewerage and Septage Management System
NWRB	National Water Resources Board
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PDP	Philippine Development Plan
PNSDW	Philippine National Standards for Drinking Water
PPP	Public-Private Partnership
PSA	Philippine Statistics Authority
PWSSMP	Philippine Water Supply and Sanitation Master Plan
RBCO	River Basin Control Office
RDC	Regional Development Council
RPME	Regional Project Monitoring Evaluation System
RWSA	Rural Waterworks and Sanitation Association
SDG	Sustainable Development Goals
SON	September, October and November
STP	Septage Treatment Plant
TC	Tropical Cyclone
UN	United Nations
UNICEF	United Nations Children's Fund
WD	Water District
WHO	World Health Organization
WRR	Water Resources Region
WSP	Water Service Provider
WSS	Water Supply and Sanitation
ZOD	Zero Open Defecation

Units

%	percent
°C	degree Celsius
ha	hectare
m	meter
m^2	square meter
m^3	cubic meter
mm	millimeter
km^2	square kilometer
lpcd	liters per capita per day
MCM	million cubic meters
PhP	Philippine peso

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Region VIII
Eastern Visayas

9

Eastern Visayas Region

Introduction

Eastern Visayas is located in the east central section of Visayas.

It is bounded on the east and north by the Philippine Sea, on the west by the Camotes and Visayan Sea, and on the south by the Bohol Sea (also called Mindanao Sea) which is located between Visayas and Mindanao.

The region is composed of six provinces namely, Biliran, Leyte, Northern Samar, Samar, Eastern Samar, Southern Leyte. It has one independent city (Ormoc City) and one highly urbanized city (HUC), i.e., Tacloban City in Leyte. The latter is acknowledged as the regional center.

The region is known for the San Juanico Bridge dubbed as the "Most Beautifully Designed and Longest Bridge in the Philippines". Built from 1969 to 1973, it connects the island provinces of Leyte and Samar.

Eastern Visayas is abundant in natural resources and mineral deposits, and has large tracts of potential arable land. Palay, sugarcane, and coconuts are among its main crops.

It has excellent tourism potential because of its unspoiled and pristine white sand beaches, ancient and historical landmarks, numerous caves, and evergreen forests.

Land Classification

The region has a total land area of 23,251.10 square kilometers (km^2) (5,328,300 acres) accounting for 7.8% of the country's total land area. About 52% of the region's land area is classified as forestland and 48% alienable and disposable land.

Agricultural land covers around 45%, forestland 28% and, grassland 25%.

Economy

The industry sector accounts for the biggest share in the region's Gross Regional Domestic Product (GRDP), followed by the service sector, and the agriculture, fishery and forestry sector (see Figure 1).

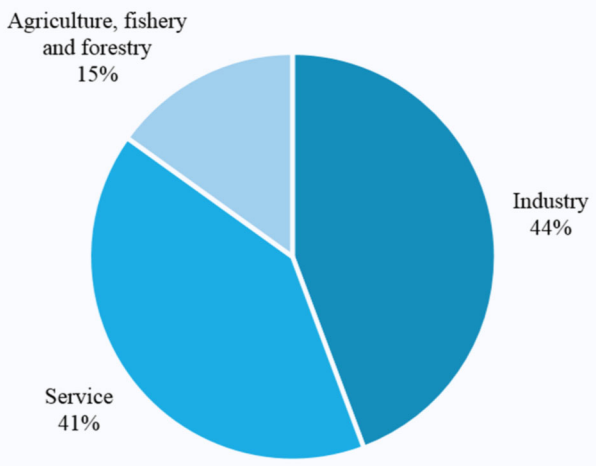

Figure 1: GRDP Contributions per Sector, 2016[1]

Its economy suffered a slump in 2016 recording only a 1.8% growth in 2017 from the previous year's figure of 12.8%. This business slowdown was caused mainly by rehabilitation projects after the region was pummeled by super typhoon "Yolanda" in 2013.

According to the National Economic and Development Authority (NEDA), these rehabilitation projects have been obstructing the flow of investments in the region. Investment figures in the region fell to PhP534 million in 2017 from PhP807 million in 2016.

Labor and Employment

As of January 2018, the total labor force participation rate (LFPR) was estimated at 61.6% of the total population of the region, equivalent to nearly 1.9 million. This shows an increase of 4.8% from the LFPR in October 2017.

Among the region's provinces, Eastern Samar recorded the highest LFPR with 67.3%.[2]

The employment rate in the region was considerably high at 96.3% in 2016 (from the previous year's 93.6%).

In 2017, the region's unemployment rate was registered at 3.7% while underemployment stood at 19.4% (from 15.5% in 2016). These were attributed to financial losses suffered by many business establishments which eventually closed down, lack of raw materials, and redundancy of jobs.

Among the region's provinces, Southern Leyte has the highest employment rate at 96.4%.

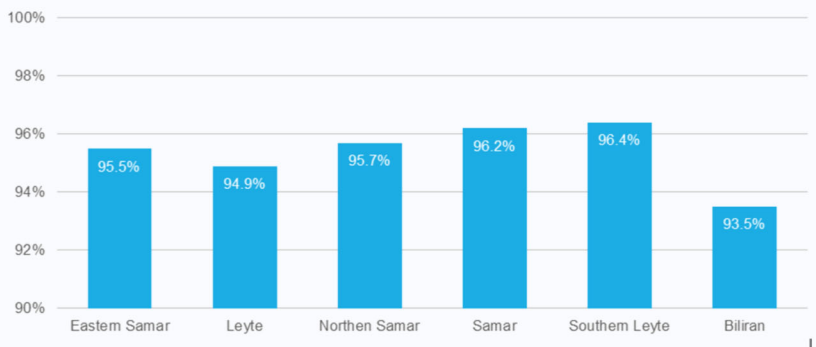

Figure 2: Employment Rates per Province

[1] *Philippine Statistics Authority, CountryStat Philippines, 2016*
[2] *Philippine Statistics Authority, Labor Force Survey, 2017 and 2018*

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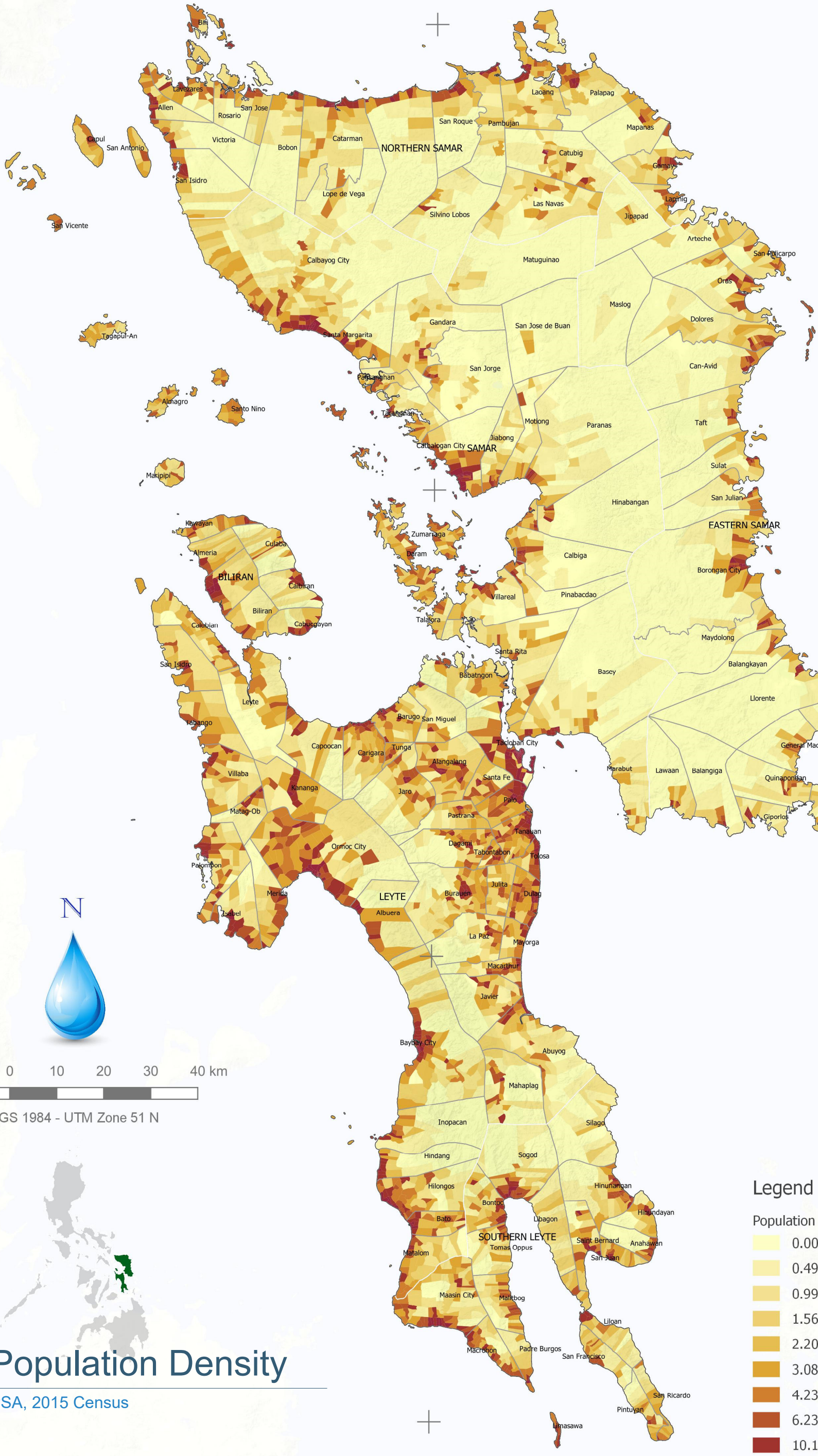
Population Density

PSA, 2015 Census



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Legend

Population Density (person/ha)

- 0.00 - 0.49
- 0.49 - 0.99
- 0.99 - 1.56
- 1.56 - 2.20
- 2.20 - 3.08
- 3.08 - 4.23
- 4.23 - 6.23
- 6.23 - 10.10
- 10.10 - 25.53
- 25.53 - 6795.89

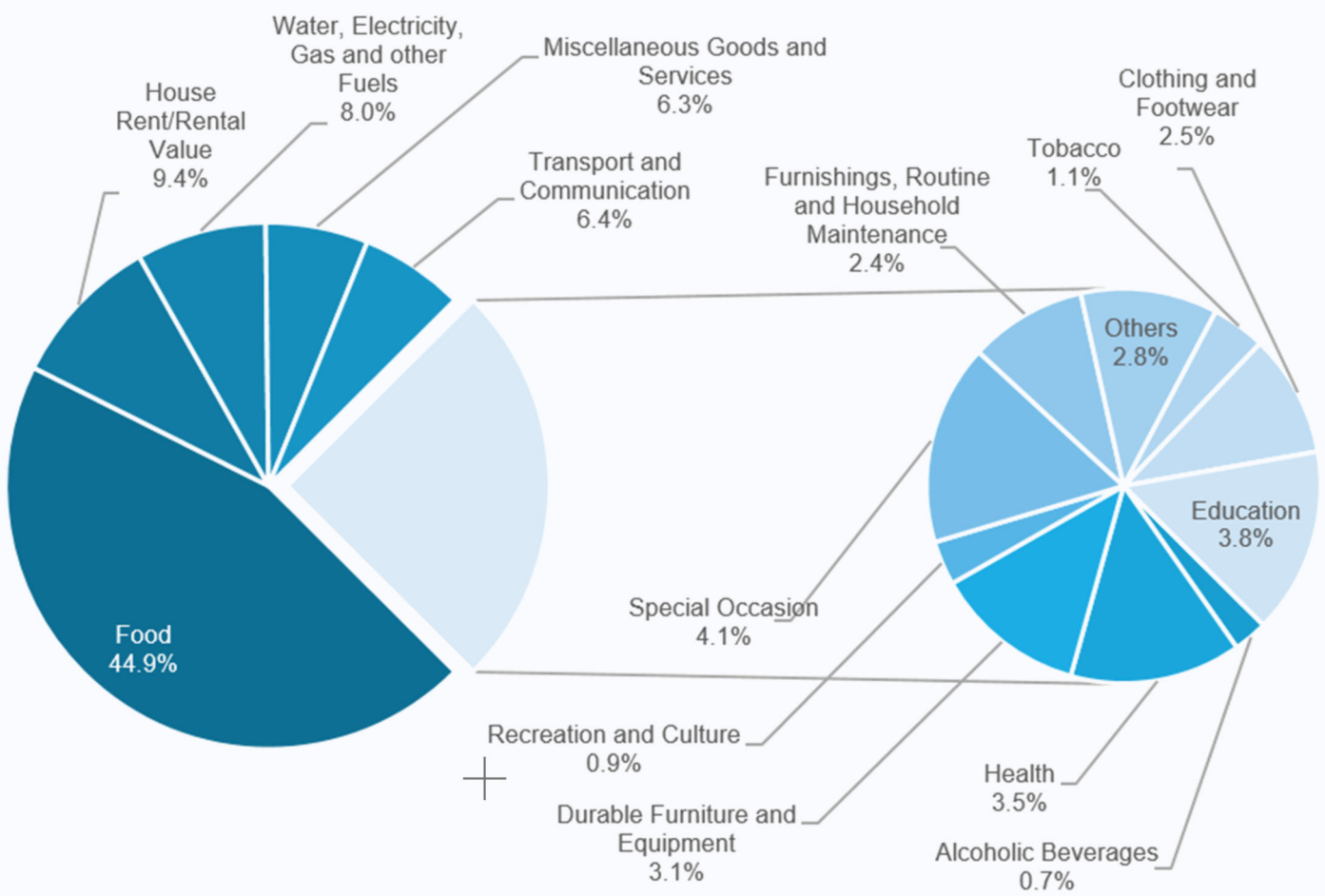

Figure 3: Distribution of Family Expenditure[3]

Family Income and Expenditure

There are about 976,000 families in Eastern Visayas, with an estimated total annual average income of PhP197,000 and a total average expenditure of PhP156,000.

In terms of income class, the total average expenditure for the PhP40,000-59,999 category is greater than its average income, while the rest have incomes greater than their expenditures. Considering the family size as an indicator, a family of five 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 44.9%. Housing expenses followed at 9.4%, while expenses for water, electricity, gas and other fuels were estimated at 8.0%. Figure 3 graphs the expenditure distribution showing that most families spend more for their basic needs.

Demography

As of 2015, Eastern Visayas had a total population of 4,440,150, which accounted for 4.4% of the country's population. Leyte (excluding Tacloban City) had the largest population among the six provinces, while Biliran had the smallest population. The population growth of the region from 2010 to 2015 stood at 1.52%, lower than the national average of 1.84%.

The population density of Eastern Visayas in 2015 averaged 190 persons per square kilometer. A large percentage of its population is concentrated in the cities as well as along the coastal areas (as shown on the map on the left).

The region is predominantly (91%) rural. Household size averages 4.5 persons (see Table 2).

Table 1: Population per Province/HUC, 2015

Region/Province/ City	Population	Land Area (km^2)	Population Density (person/km^2)
Eastern Visayas	**4,440,150**	**23,251.10**	**190**
Biliran	171,612	536.01	320
Leyte (excluding Tacloban City)	467,160	6,313.33	270
Northern Samar	632,379	3,692.93	170
Samar	780,481	6,048.03	130
Eastern Samar	467,160	4,660.47	100
Southern Leyte	421,750	1,798.61	230
Tacloban City	242,089	201.72	1,200

Table 2: Urban and Rural Population per Province/HUC[4]

Region/Province/ City	Urban Population	Rural Population	HH Size
Eastern Visayas	**9%**	**91%**	**4.49**
Biliran	5%	95%	4.43
Leyte (excluding Tacloban City)	10%	90%	4.23
Northern Samar	4%	96%	4.99
Samar	10%	90%	4.71
Eastern Samar	1%	99%	4.38
Southern Leyte	3%	97%	4.53
Tacloban City	33%	67%	4.76

[3] Philippine Statistics Authority, Family Income and Expenditure Survey, 2015
[4] Philippine Statistics Authority, Philippine Standard Geographic Code, 2015

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Climate

PAGASA, 2015 Data

10

Legend

- 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.

Climate

Eastern Visayas has two types of climate: Type II and Type IV.

Samar Island and the eastern part of Leyte have a Type II climate with no dry season; maximum rainfall occurs from November to January.

The western half of Leyte Island and some portions of Samar Island has a Type IV climate which has an even distribution of rainfall throughout the year and a short dry season from February to May.

Disaster Risk

The region's geographical location makes it vulnerable to geohazards as evidenced by several disasters that struck the region resulting in loss of life and damage to properties.

The Rapid Geohazards Assessment identifies the most common geohazards in the region (see Table 3).

Table 3: Geological and Climatological Hazards

Category	Specific Hazards
Geological	earthquake, liquefaction, earthquake-induced landslide and tsunami, volcanic eruption, coastal erosion, subsidence
Climatological	tropical cyclones (TCs), flooding, drought, rain-induced landslide, sea level rise, storm surges

The most destructive calamity that struck the region was super typhoon "Yolanda" which snuffed out thousands of lives (estimated at more than 10,000) and damaging property throughout most parts of Leyte in November 2013.

Climate Change and Hydrological Hazards

The Philippines is at great risk of climate-related hazards, such as 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 VIII based on the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) downscaled climate projections are shown in Tables 4 and 5. 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 4: 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
Eastern Samar	26.1	27.7	28.3	27.7	0.8	1.1	1.1	1.0	1.7	2.1	2.2	1.8
Leyte	26.4	27.8	28.0	27.7	0.9	1.2	1.1	1.0	1.8	2.3	2.2	1.9
Northern Samar	26.0	27.5	28.3	27.5	0.9	1.2	1.0	0.9	1.8	2.4	2.0	1.7
Samar	26.3	27.9	28.4	27.8	0.9	1.2	1.0	1.0	1.8	2.4	2.1	1.8
Southern Leyte	26.4	27.7	27.8	27.5	0.9	1.1	1.2	1.0	1.7	2.1	2.3	1.9
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
Eastern Samar	987.0	464.1	559.8	871.4	3.1	-11.3	2.2	8.1	1.7	-26.8	2.2	15.8
Leyte	689.5	342.0	568.7	785.5	3.0	-8.9	9.5	7.4	9.4	-18.9	19.6	19.5
Northern Samar	1128.9	462.2	566.8	981.4	0.8	-9.6	15.1	6.5	-10.7	-20.2	22.1	18.7
Samar	889.5	437.0	599.8	879.4	-8.3	-16.0	11.7	5.0	-11.1	-23.0	20.8	21.1
Southern Leyte	818.6	362.2	510.6	695.6	9.7	-5.0	5.7	7.2	17.1	-16.0	13.0	17.9

Table 5: Frequency of Extreme Events 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
Eastern Samar	Guiuan	67	20	186	5,847	5,342	5,287	0	4	13
Leyte	Tacloban	52	1,398	2,495	6,874	5,199	5,475	0	7	11
Northern Samar	Catarman	360	411	1,627	6,378	7,288	6,816	1	42	47
Samar	Catbalogan	455	1,908	3,388	6,900	4,551	4,896	0	7	8
Southern Leyte	Maasin	130	195	764	7,201	8,144	7,786	0	19	33

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NORTHERN SAMAR
SAMAR
EASTERN SAMAR
BILIRAN
LEYTE
SOUTHERN LEYTE

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Contour Map

NAMRIA

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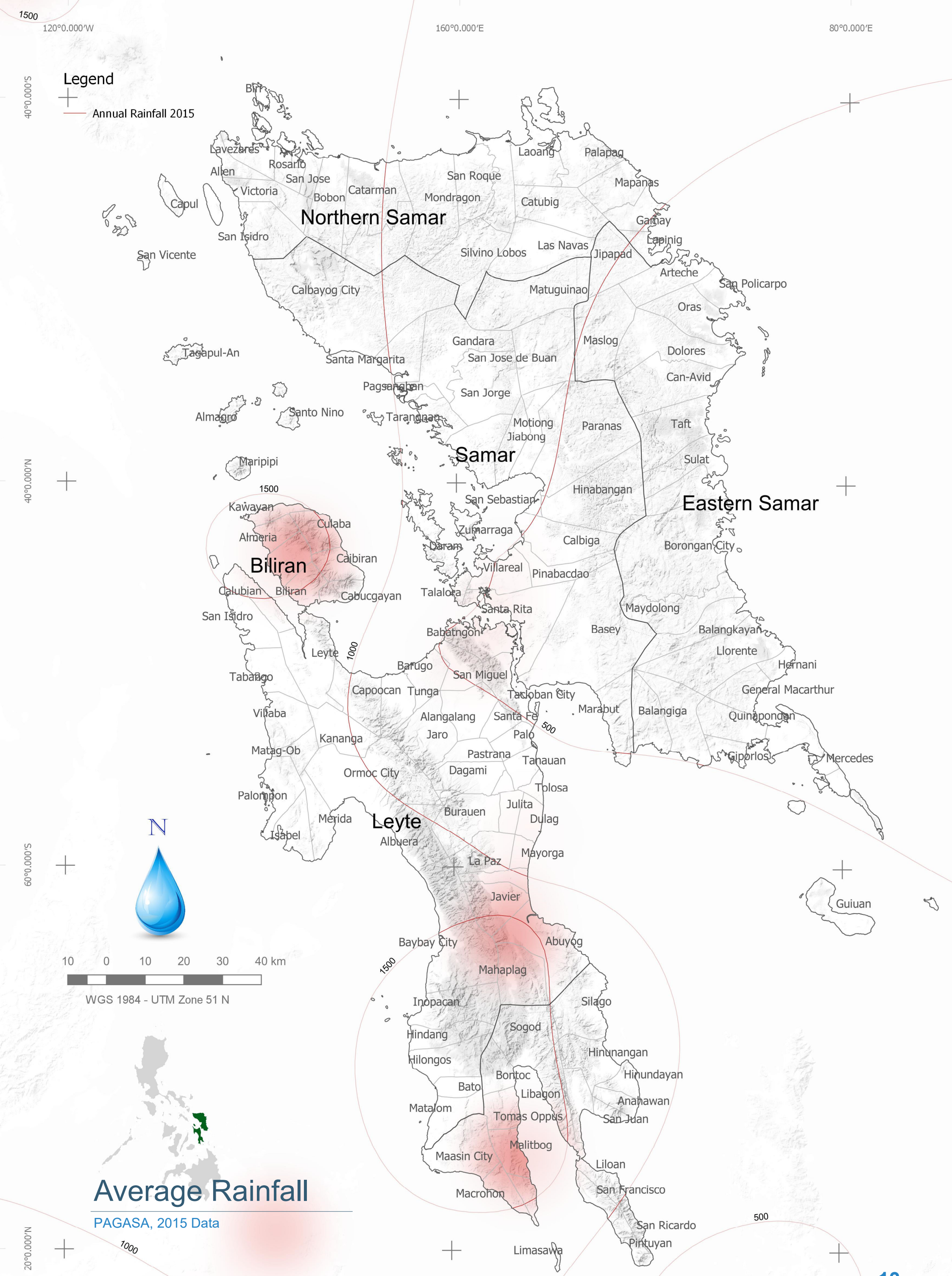
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Annual Rainfall 2015
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Eastern Samar
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Leyte
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Lavezares
Rosario
Allen
San Jose
Victoria
Bobon
Catarman
Capul
San Isidro
San Vicente
San Roque
Mondragon
Laoang
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Mapanas
Gamay
Lapinig
Las Navas
Silvino Lobos
Jipapad
Arteche
San Policarpo
Oras
Calbayog City
Matuguinao
Maslog
Dolores
Can-Avid
Gandara
San Jose de Buan
Tagapul-An
Santa Margarita
Pagsanghan
San Jorge
Santo Nino
Almagro
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Borongan City
Talalora
Santa Rita
Maydolong
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Balangkayan
Llorente
Hernani
General Macarthur
Quinapondan
Balangiga
Marabut
Giporlos
Mercedes
Tacloban City
Barugo
San Miguel
Tabango
Capoocan
Tunga
Villaba
Alangalang
Santa Fe
Jaro
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Kananga
Matag-Ob
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Tanauan
Ormoc City
Dagami
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Palompon
Julita
Merida
Burauen
Dulag
Isabel
Albuera
Mayorga
La Paz
Javier
Guiuan
Baybay City
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Average Rainfall
PAGASA, 2015 Data

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Victoria
Bobon
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NORTHERN SAMAR
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Laoang
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Mapanas
Catubig
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Lapinig
Las Navas
Jipapad
Arteche
San Policarpo
Oras
Maslog
Dolores
Can-Avid
Taft
Sulat
San Julian
Hinabangan
EASTERN SAMAR
Borongan City
Calbiga
Zumarraga
Daram
Villareal
Pinabacdao
Talalora
Maydolong
Balangkayan
Llorente
Hernani
General Macarthur
Quinapondan
Salcedo
Giporlos
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Palapag
Mapanas
Catubig
Gamay
Lapinig
Las Navas
Jipapad
Arteche
San Policarpo
Oras
Maslog
Dolores
Can-Avid
Taft
Sulat
San Julian
Hinabangan
Matuguinao
San Jose de Buan
Gandara
Santa Margarita
Pagsanghan
San Jorge
Tarangnan
Catbalogan City
Motiong
Jiabong
Paranas
Calbiga
Zumarraga
Daram
Villareal
Pinabacdao
Talalora
Maydolong
Balangkayan
Llorente
Hernani
General Macarthur
Quinapondan
Salcedo
Giporlos
Mercedes
Guiuan
Marabut
Lawaan
Balangiga
Tacloban City
Santa Fe
Palo
Tanauan
Tolosa
Julita
Dulag
Burauen
Mayorga
La Paz
Macarthur
Javier
Abuyog
Baybay City
Mahaplag
Inopacan
Hindang
Hilongos
Bato
Matalom
Maasin City
Malitbog
Liloan
Padre Burgos
San Francisco
San Ricardo
Pintuyan
Limasawa
Silago
Sogod
Hinunangan
Hinundayan
Libagon
Saint Bernard
Anahawan
San Juan
Bontoc
Tomas Oppus
SOUTHERN LEYTE
Basey
Santa Rita
Babatngon
Barugo
San Miguel
Tunga
Carigara
Capoocan
Alangalang
Jaro
Pastrana
Dagami
Tabontabon
Ormoc City
LEYTE
Albuera
Burauen
Julita
Dulag
Merida
Isabel
Palompon
Leyte
Tabango
Villaba
Kananga
Matag-Ob
Calubian
San Isidro
Kawayan
Culaba
Almeria
BILIRAN
Caibiran
Biliran
Cabucgayan
Naval
Maripipi
Almagro
Santo Nino
Tagapul-An
San Vicente

Legend

Safe Drinking Water (%)

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

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Access to Safe Drinking Water

PSA, 2015 Census

WSS Sector Status

Access to Safe Water

Approximately 90% of Eastern Visayas' population had access to safe water sources in 2015.[5]

This translates to around 878,000 households (HHs). About 36.69% of the population has Level III service home connection while 30.14% has Level II connections which the households share with the community. Access to Level I comprises 23.14%.

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 on a par with the national average of about 88%, with only a 2% discrepancy. In terms of access per level of service, Eastern Visayas' numbers do not differ significantly from the national figures. Level III access which was registered at 36.7% is way below the national figure (44.1%).

Table 6: National and Regional Access to Water Supply[6]

Level of Service	National	Eastern Visayas
Level III	44.1%	36.7%
Level II	11.2%	30.1%
Level I (Safe Sources)	32.4%	23.2%
Subtotal (Safe Sources)	*87.7%*	*89.97%*
Level I (Unsafe Sources)	12.3%	10.3%
Total	100.0%	100.0%

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

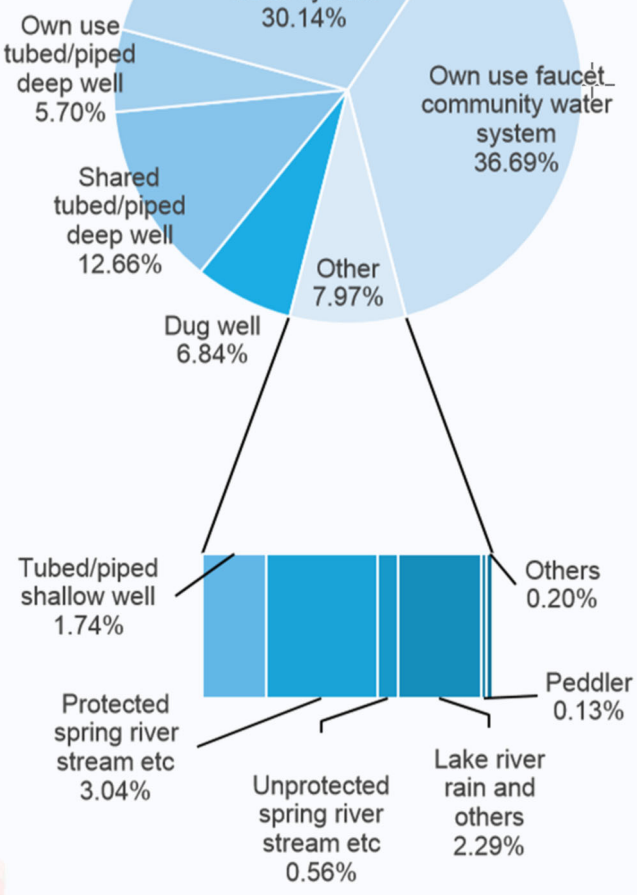

Figure 4: Main Sources of Water Supply

Table 7 shows safe water access in 2015 at the provincial level.

Table 7: Access to Water Supply per Province/HUC[7]

Region/Province/City	Access to Safe Water Supply
Eastern Visayas	**81.7%**
Biliran	100.0%
Eastern Samar	86.0%
Leyte	73.2%
Northern Samar	72.0%
Samar	86.3%
Southern Leyte	100.0%
Tacloban City	100.0%

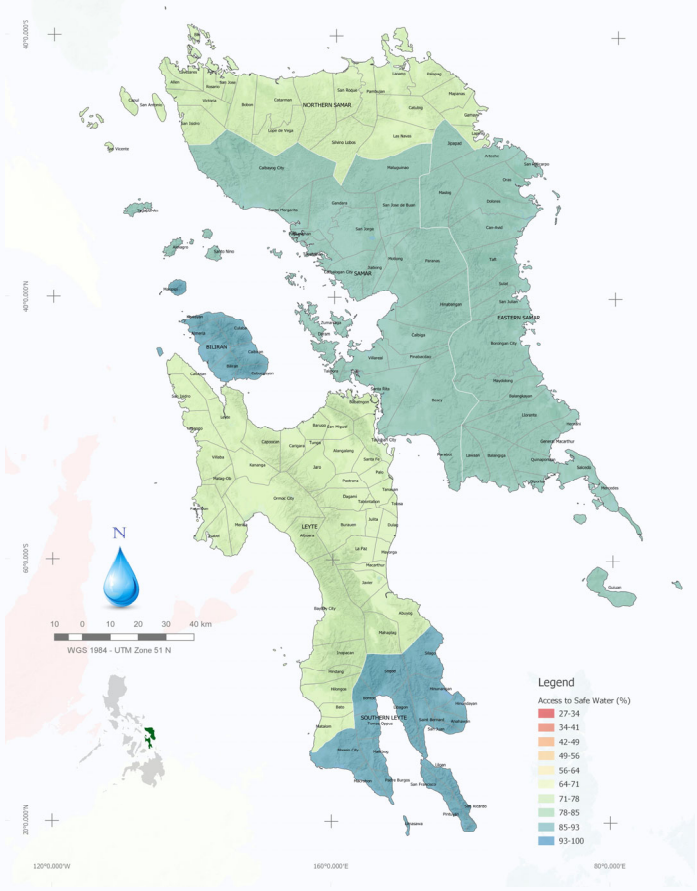

Figure 5: Access to Safe Water

Drinking Water

In terms of access to safe drinking water, the Philippine Statistics Authority (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.

96.2% of the population in Eastern Visayas got its drinking water from improved and safe water sources. Of the region's total population, approximately 41.94% drank bottled water.

Among the provinces, Northern Samar has lower access to safe drinking water at around 85%.

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

[5] Philippines Statistics Authority, Family Income and Expenditure Survey, 2015
[6] Ibid.
[7] Based on Eastern Visayas provinces' firsthand data on access to safe water as gathered at the regional planning and consultation workshop

120°0.000'W
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80°0.000'E
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Biri
Lavezares
Allen
Rosario
San Jose
Victoria
Bobon
Catarman
Mondragon
Northern Samar
San Roque
Pambujan
Laoang
Palapag
Mapanas
Catubig
Gamay
Lapinig
Capul
San Antonio
San Isidro
Lope de Vega
Silvino Lobos
Las Navas
Jipapad
Arteche
San Policarpo
Oras
Maslog
Dolores
San Vicente
Calbayog City
Matuguinao
Tagapul-An
Santa Margarita
Gandara
San Jose de Buan
San Jorge
Can-Avid
Pagsanghan
Almagro
Santo Nino
Tarangnan
Motiong
Paranas
Taft
Jiabong
Catbalogan City
Samar
Sulat
Maripipi
Hinabangan
San Julian
San Sebastian
Eastern Samar
Kawayan
Culaba
Almeria
Zumarraga
Daram
Calbiga
Biliran
Naval
Caibiran
Biliran
Cabucgayan
Borongan City
Villareal
Pinabacdao
Talalora
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Maydolong
Santa Rita
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Balangkayan
Babatngon
Leyte
Llorente
Hernani
Barugo
San Miguel
Tabango
Capoocan
Carigara
Tunga
Tacloban City
General Macarthur
Alangalang
Marabut
Lawaan
Balangiga
Quinapondan
Salcedo
Villaba
Santa Fe
Kananga
Jaro
Palo
Matag-Ob
Pastrana
Giporlos
Mercedes
Tanauan
Dagami
Ormoc City
Tabontabon
Tolosa
Palompon
Julita
Merida
Burauen
Dulag
Leyte
Albuera
Isabel
La Paz
Mayorga
Macarthur
Javier
Guiuan
Baybay City
Abuyog
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Hinunangan
Bontoc
Hinundayan
Bato
Libagon
Saint Bernard
Anahawan
Southern Leyte
Matalom
San Juan
Maasin City
Malitbog
Liloan
Macrohon
Padre Burgos
San Francisco
San Ricardo
Pintuyan
Limasawa

Legend

Sanitation Access (%)

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

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Access to Sanitation

Eastern Visayas Regional Planning and Consultation Workshop, 2017 Data

Access to Sanitation

The growth of Eastern Visayas' economy was principally driven by the accelerated growth in the services sector. This, in turn as a matter of course, increased the demand for sanitation services.

Approximately 73% of the region's population has access to improved sanitation.

The 2015 FIES has reported that Region VIII was not far behind the national average with regard to improved sanitation but trailed behind it with respect to basic sanitation (see Table 8).

What is alarming is that the region's open defecation rate is more than twice the national average. It has the third highest open defecation rate among the regions (next to the Bicol Region and ARMM). (The open defecation rate is a proxy indicator for the lack of access to toilet facilities.)

Table 8: National and Regional Access to Sanitation[8]

Sanitation Coverage	National	Eastern Visayas
Improved Sanitation	73.77%	73.40%
Basic Sanitation	19.96%	14.77%
Unimproved Sanitation	2.04%	1.56%
Open Defecation	4.23%	10.27%
Total	100.00%	100.00%

Southern Leyte registers the highest access to basic sanitation at 91.4% representing only 9.5% of the region's total population. Leyte, the province with the highest population base in the region, ranks second in the percentage of households with sanitary toilets (87.22%), according to the 2015 Annual Report of the Field Health Services Information System (FHSIS) of the Department of Health (DOH).

Table 9: Access to Sanitation Facilities per Province/HUC[9]

Region/Province/ City	HHs with Sanitary Toilets	HHs with Complete Basic Sanitation Facilities
Eastern Visayas	**75.95%**	**59.26%**
Biliran	78.73%	46.40%
Eastern Samar	79.49%	64.25%
Leyte	87.22%	83.16%
Northern Samar	61.72%	55.34%
Southern Leyte	91.40%	44.42%
Samar	57.59%	10.65%
Tacloban City	76.33%	76.33%

The minor discrepancy between Tables 8 and 9 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 8 reflects the specifics per the SDG's definition. Table 9, 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

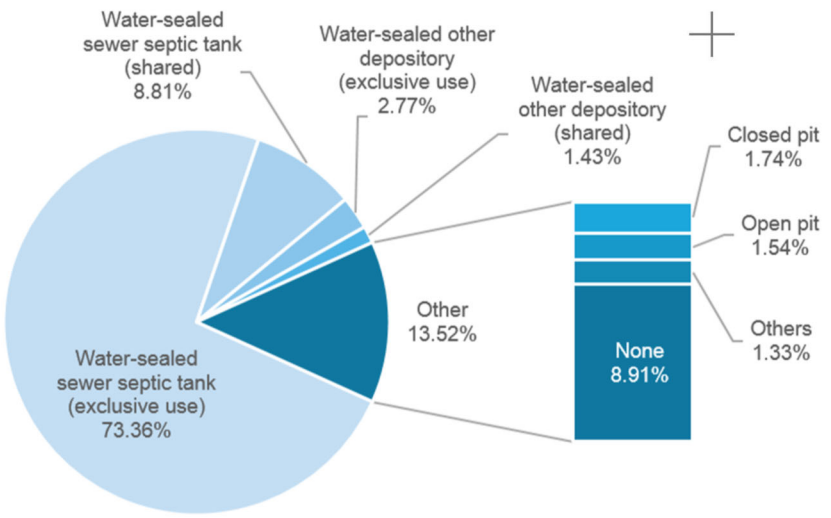

Figure 6: Percentage of Households with Access to Sanitation Facilities

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 Eastern Visayas 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 locations of the two septage treatment plants (STPs) in the region — in Tacloban City and Ormoc City.

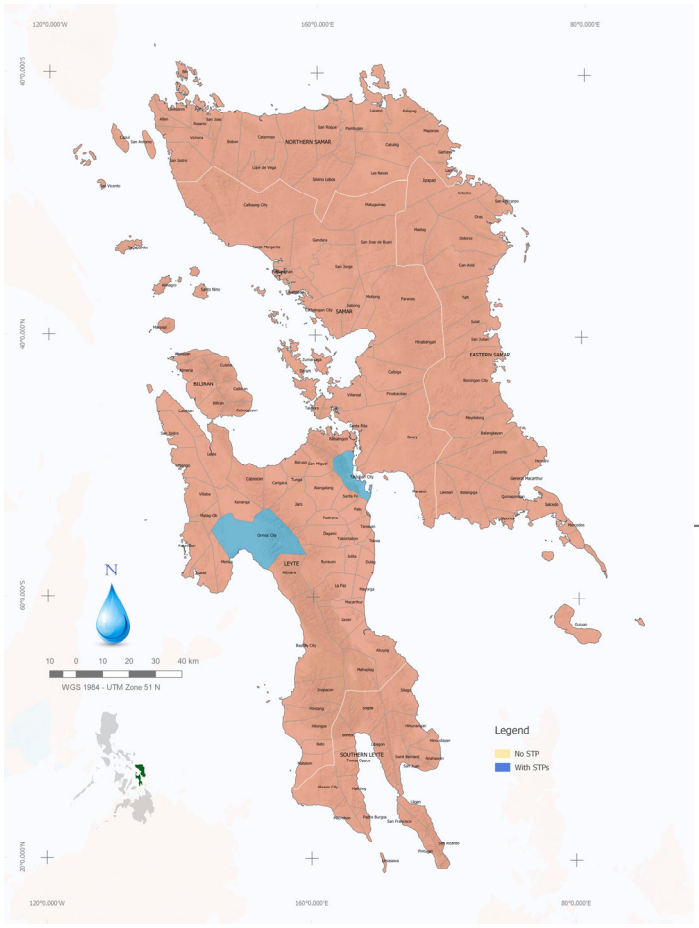

Figure 7: Existing Septage Treatment Plants[10]

[8] *Philippine Statistics Authority, Family Income and Expenditure Survey, 2015*
[9] *Department of Health, FHSIS Annual Report CY 2015 (ro8.doh.gov.ph)*
[10] *Based on Eastern Visayas provinces' firsthand data on access to safe water as gathered at the regional planning and consultation workshop*

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10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Legend

Water Bodies

Major River Basin

Eastern Visayas Rivers and Tributaries

DENR, NWRB, NAMRIA

Water Resources

Eastern Visayas ranks 5th among all the administrative regions with the most water resources potential.

The region's water resources potential is estimated at 11,907 million cubic meters (MCM)/year, accounting for 8.16% 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 2,557 MCM/year while surface water is estimated at 9,350 MCM/year. Annual rainfall in the region averages 2,782 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.

Eastern Visayas straddles only WRR 8.

Surface Water

Eastern Visayas has abundant surface water. The Department of Environment and Natural Resources (DENR) has identified 52 rivers , 8 marine water bodies, and 1 lake in the region.

Lake Danao in Ormoc City, Leyte covers 148 hectares with an average depth of 80 m. Surface elevation is 650 m.

Table 10: Rivers in Region VIII

Province	River	
Biliran	Cabibihan River	Mapula River
	Caibiran River	
Eastern Samar	Balangiga River	Taft River
	Borongan River	Ulot River
	Dolores River	Sulat River
	Oras River	Suribao River
	Llorente River	Danao River
Leyte	Binahaan River	Embarkadero River
	Cadac-an River	Malbasag River
	Daguitan Marabong River	Natubgan River
	Pagsangahan River	Pagbanganan River
	Dupon River	Ponso River
	Anilao River	Salog River
	Bangquerohan River	Sibugay River
	Bao River	Tigbao River
	Bacan River	Tugbong River
	Bangon River	Ugayon River
	Carigara River	
Northern Samar	Catarman River	
	Mawo River	
Samar	Basey River	Salug River
	Calbiga River	Silaga River
	Gamay River	Calbayog River
	Gandara River	Jibatang River
Southern Leyte	Pandan River	Hitunlob River
	Amparo River	Lawigan River
	Canturing River	Magcasa River
	Das-ay River	Mahalo River

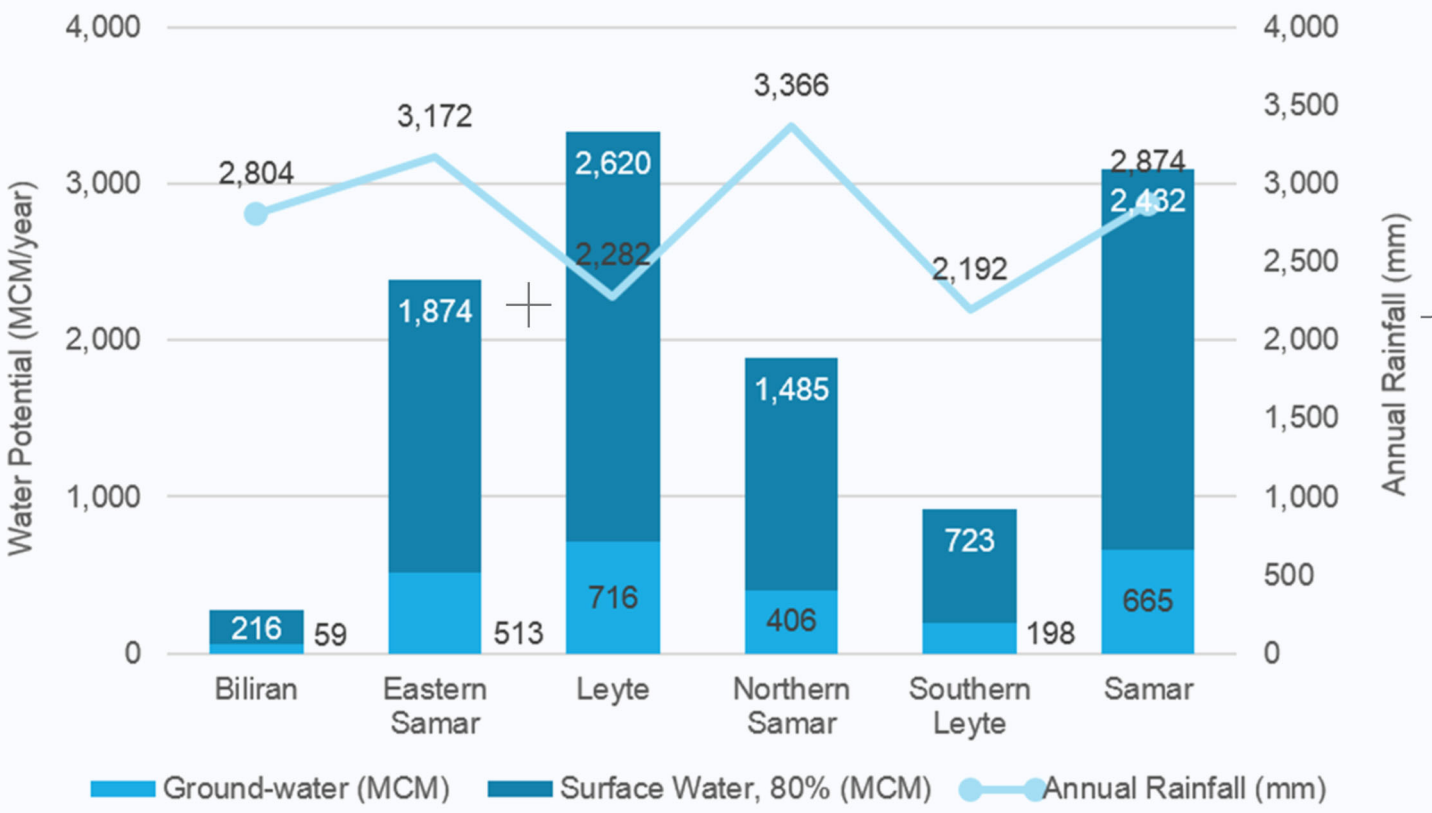

Figure 8: Water Resources Potential and Annual Rainfall[11]

[11] *JICA Master Plan on Water Resources Management in the Philippines, 1998; NWRB; PAGASA Rainfall Data; FAO*

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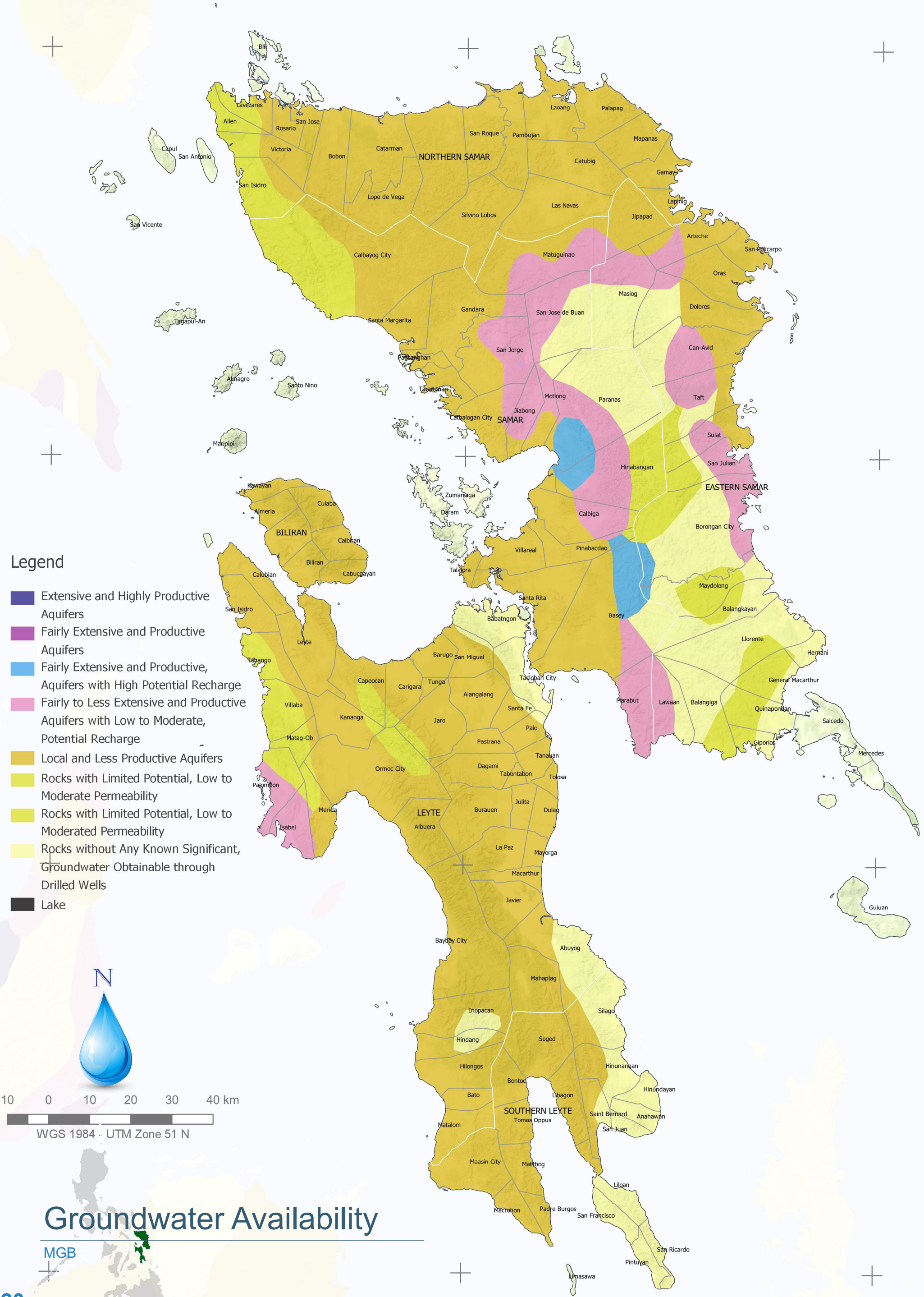


Legend

- 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

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Groundwater Availability

MGB

Table 11: 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

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 11).

Eastern Visayas is predominantly underlain by the minor aquifer class (specifically the local and less productive kind). The southern part of Samar Island, on the other hand, along with the region's smaller islands are underlain by non-aquifer areas that have limited groundwater potential.

Water Use

Water use in the region was estimated at 2,968 MCM annually based on awarded water permits as of 2017. Of this figure, about 2,537 MCM (or 85.5%) was allocated for irrigation and categorized as consumptive use. The municipal/domestic sector consumed about 103.61 MCM and the industrial sector 209.79 MCM. Of the estimated 114 MCM reserved for nonconsumptive use, 108.42 MCM was consumed by the power sector (see Figure 9).

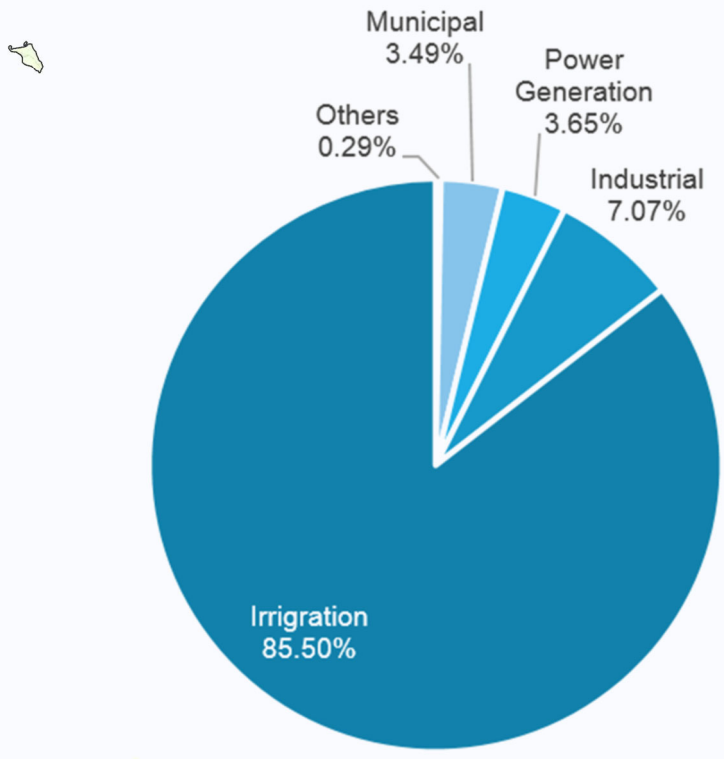


Figure 9: Water Resource Utilization (NWRB)[12]

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.)[13]

Water availability per capita was computed by comparing the region and provinces' potential against the 2015 population (as shown in Table 12).

Table 12: Water Availability per Province

Region/Province	Water Availability (m^3/capita/yr), 2015
Biliran	1,597
Eastern Samar	5,110
Leyte	4,703
Northern Samar	2,990
Samar	3,968
Southern Leyte	2,184
Eastern Visayas	**2,682**

Eastern Visayas has a per capita water availability of around 2,682 m^3/year.

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

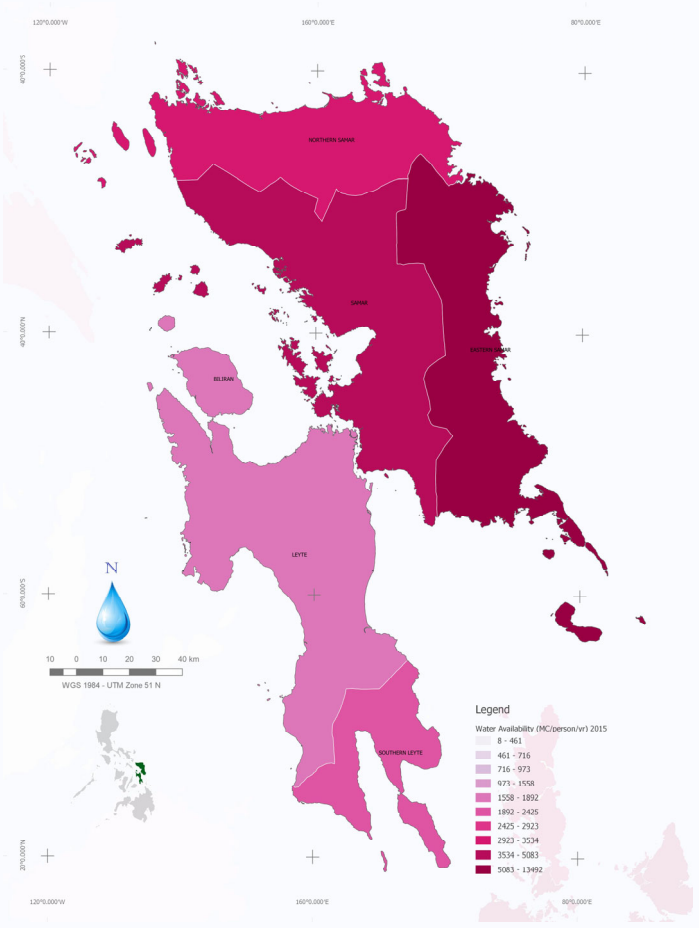


Figure 10: Water Availability Map, 2015

[12] National Water Resources Board's list of water permit grantees, 2017
[13] 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 6,516,196 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 186 MCM/year, 216 MCM/year, and 252 MCM/year, respectively.

Water Demand vs. Water Resources Potential

The water demand of the industrial, business and domestic sectors in Eastern Visayas 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 (252 MCM/year) to the water resources potential of the region (11,907 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.

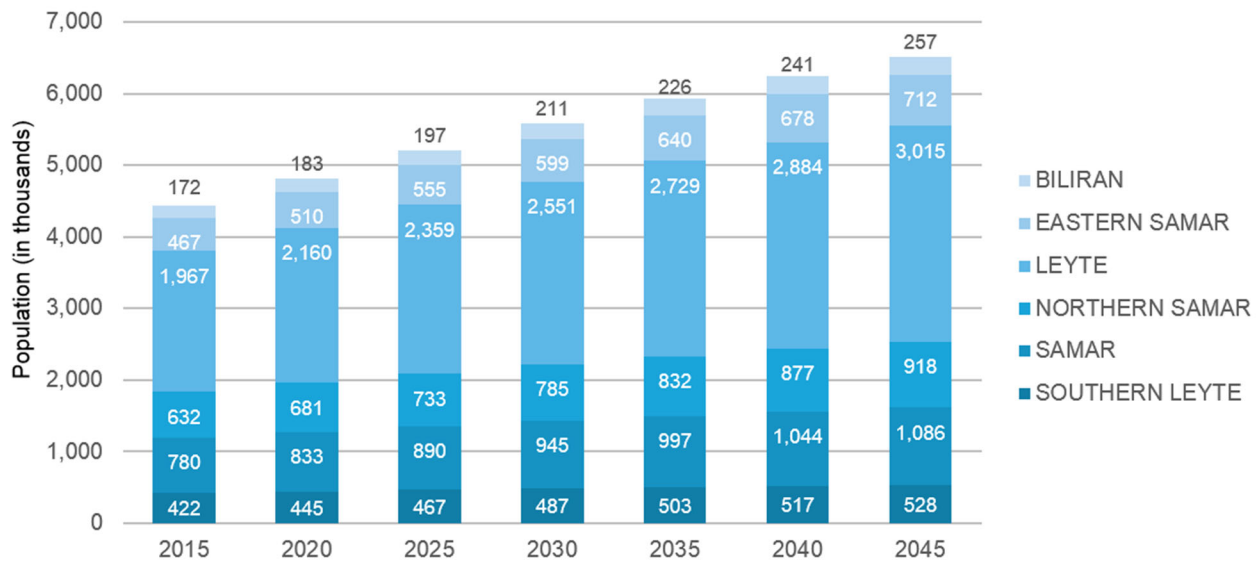


Figure 11: Projected Population

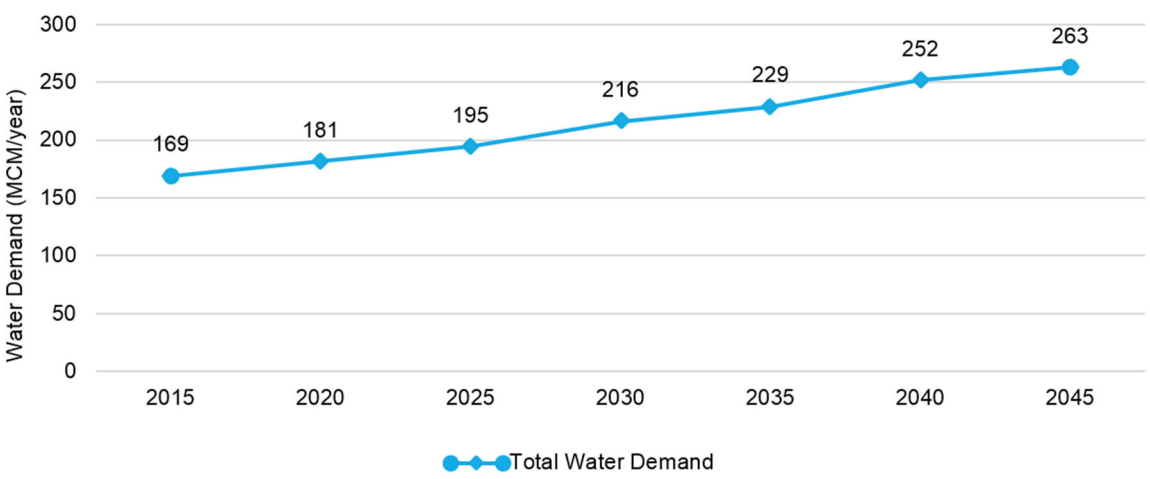
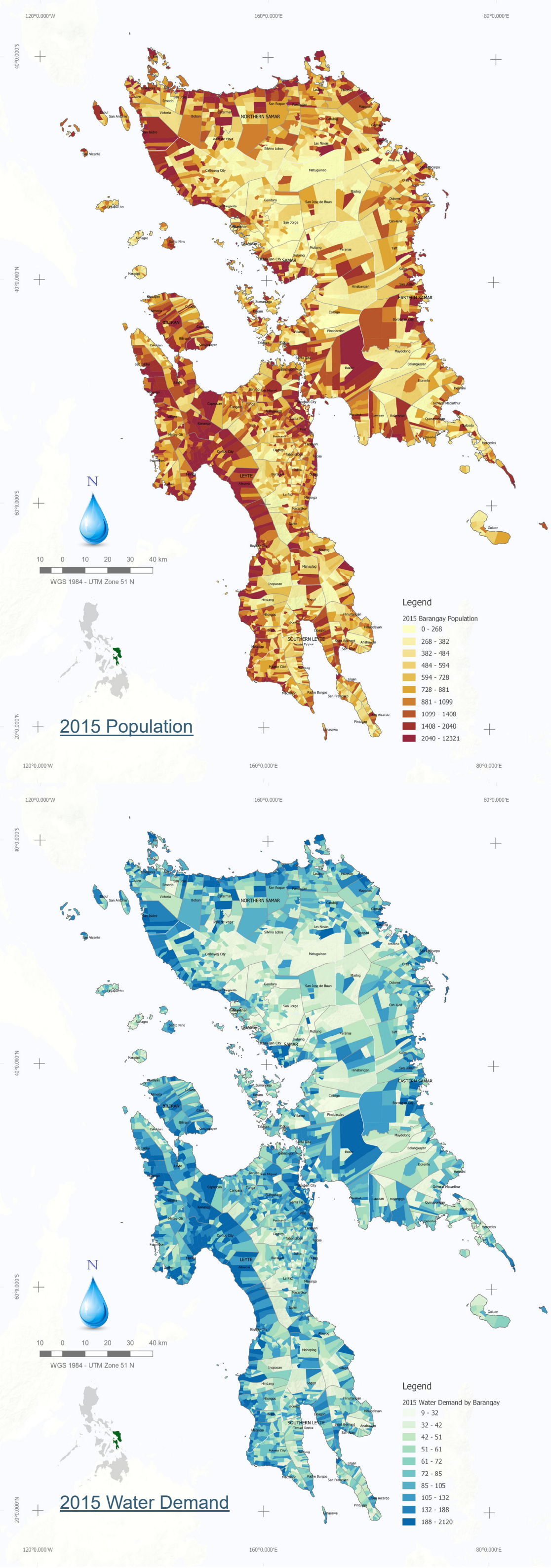
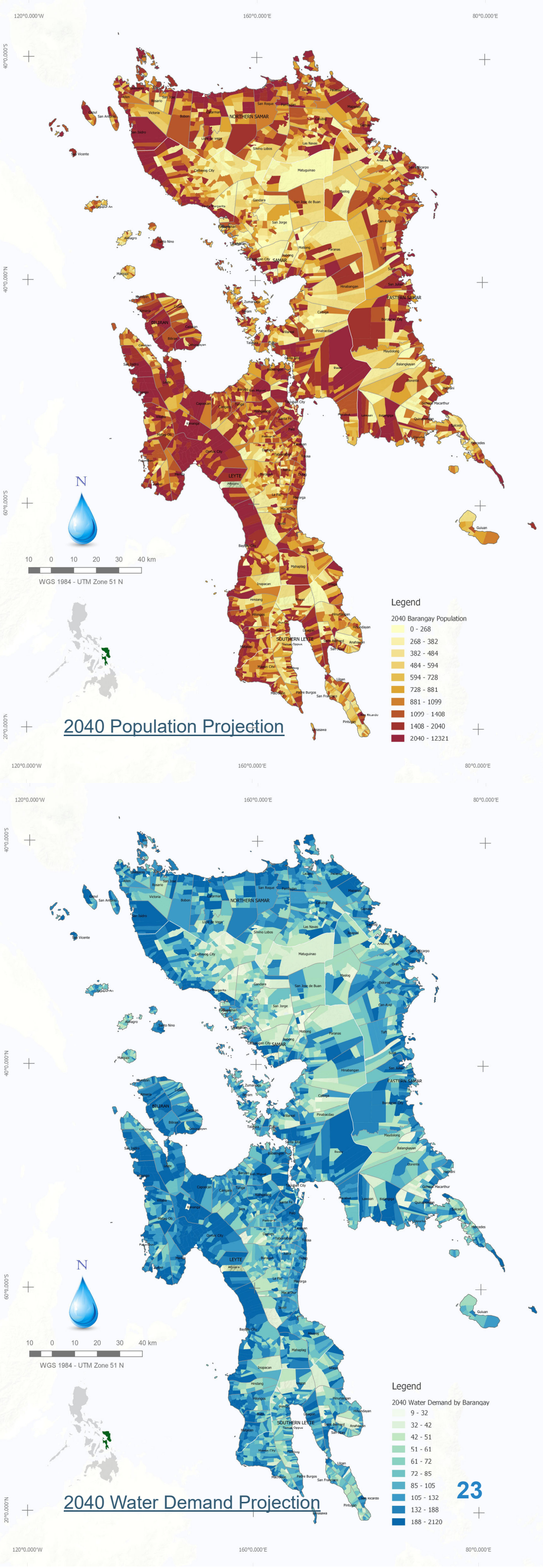


Figure 12: Projected Water Demand



2015 Population



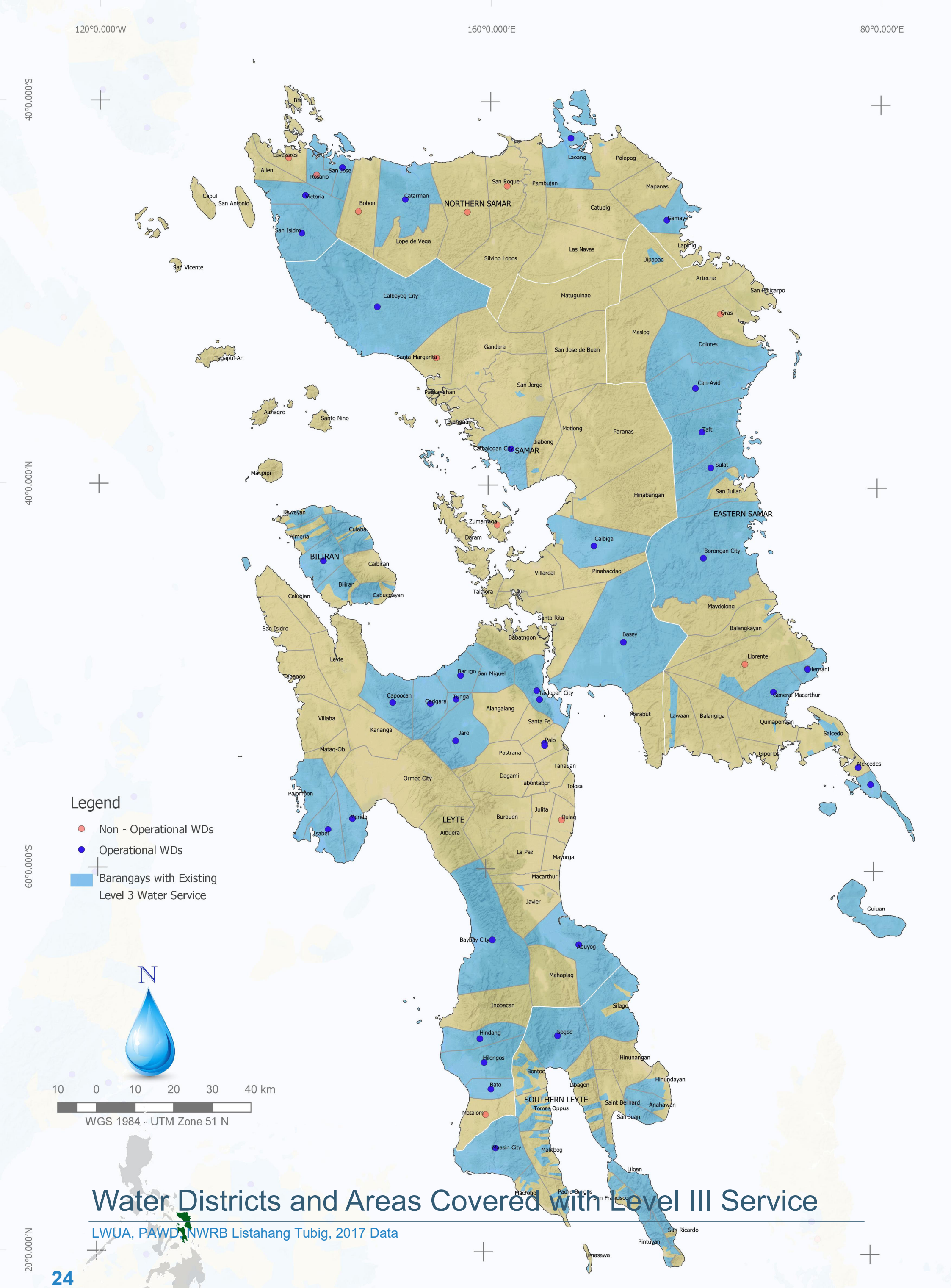
2040 Population Projection

2015 Water Demand

2040 Water Demand Projection

Water Districts and Areas Covered with Level III Service

LWUA, PAWD, NWRB Listahang Tubig, 2017 Data



WSS Infrastructure

Water service providers (WSPs) of various management types serve around 49% of Eastern Visayas.[14]

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 sources[15], 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, of the 63 WDs serving Eastern Visayas, 27 were operational and 36 nonfunctional.

These WDs serve about 1.5 million users or roughly 35% of the region's total population. Of the 1.5 million people served, only 49% of them (or less than a million) are covered.

Leyte has the highest coverage at 71.2% while Northern Samar has the lowest coverage at 11.18% of the population.

LGU-Led Water Utilities

There are 553 LGU led-water utilities within the region covering 74 areas and serving 549,518 users or 12.4% of the total population of Eastern Visayas.

BWSA

There are 771 BWSA utilities within the region covering 61 areas and serving roughly 13% of the total population.

RWSA

There are 103 RWSA utilities covering 20 areas and serving 71,815 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 13: Water Service Providers per Province

Region/Province	No. of LGUs	Type & No. of WSPs		Service Area	Population Served	
					Total	%
Biliran	8	WDs	1	32,118	32,118	100.00%
		LGU-led	65		86,945	50.66%
		BWSA	22		22,683	13.22%
		RWSA	14		7,672	4.47%
		Private/Others	13		4,344	2.53%
		Subtotal	**115**	**171,612**	**153,762**	**90%**
Southern Leyte	19	WDs	3	130,546	56,113	42.98%
		LGU-led	131		113,575	26.93%
		BWSA	66		35,165	8.34%
		RWSA	31		18,829	4.46%
		Private/Others	43		21,358	5.06%
		Subtotal	**274**	**421,750**	**245,040**	**58%**
Eastern Samar	23	WDs	15	179,703	39,815	22.16%
		LGU-led	178		137,010	29.33%
		BWSA	29		23,670	5.07%
		RWSA	16		8,185	1.75%
		Private/Others	75		50,305	10.77%
		Subtotal	**313**	**467,160**	**258,985**	**55%**
Northern Samar	24	WDs	14	214,424	23,977	11.18%
		LGU-led	79		70,135	11.09%
		BWSA	213		214,697	33.95%
		RWSA	21		19,814	3.13%
		Private/Others	179		111,038	17.56%
		Subtotal	**506**	**632,379**	**439,661**	**70%**
Samar	26	WDs	16	366,192	161,639	44.14%
		LGU-led	30		46,184	5.92%
		BWSA	434		260,092	33.32%
		RWSA	21		17,315	2.22%
		Private/Others	28		25,230	3.23%
		Subtotal	**529**	**780,481**	**510,460**	**65%**
Leyte	43	WDs	14	645,845	459,855	71.20%
		LGU-led	70		95,669	4.86%
		BWSA	7		2,331	0.12%
		RWSA	0		0	0.00%
		Private/Others	67		19,932	1.01%
		Subtotal	**158**	**1,966,768**	**577,787**	**29%**
Eastern Visayas	143	WDs	63	1,568,828	773,517	49.31%
		LGU-led	553		549,518	12.38%
		BWSA	771		558,638	12.58%
		RWSA	103		71,815	1.62%
		Private/Others	405		232,207	5.23%
		Grand Total	**1,895**	**4,440,150**	**2,185,695**	**49%**

[14] Data on water districts were based on LWUA and PAWD reports; other WSP data were based on Listahang Tubig (data as of 2017)
[15] Local Water Utilities Administration (LWUA), PAWD, NWRB Listahang Tubig

120°0.000'W
160°0.000'E
80°0.000'E
40°0.000'S
60°0.000'S
20°0.000'N

Biri
Lavezares
Rosario
Allen
San Jose
Capul
Victoria
Bobon
Catarman
San Roque
Mondragon
Laoang
Palapag
Mapanas
Catubig
Gamay
Lapinig
Northern Samar
San Isidro
San Vicente
Silvino Lobos
Las Navas
Jipapad
Arteche
San Policarpo
Oras
Maslog
Dolores
Can-Avid
Taft
Sulat
Eastern Samar
Hinabangan
San Sebastian
Zumarraga
Calbiga
Borongan City
Daram
Pinabacdao
Villareal
Talalora
Santa Rita
Maydolong
Basey
Balangkayan
Llorente
Hernani
General Macarthur
Quinapondan
Giporlos
Mercedes
Balangiga
Marabut
Tacloban City
Guiuan
Calbayog City
Matuguinao
Gandara
San Jose de Buan
Tagapul-An
Santa Margarita
Pagsanghan
San Jorge
Almagro
Santo Nino
Tarangnan
Motiong
Jiabong
Paranas
Samar
Maripipi
Kawayan
Culaba
Almeria
Caibiran
Biliran
Calubian
Biliran
Cabucgayan
San Isidro
Babatngon
Leyte
Barugo
San Miguel
Tabango
Capoocan
Carigara
Villaba
Alangalang
Santa Fe
Jaro
Palo
Kananga
Matag-Ob
Pastrana
Tanauan
Ormoc City
Dagami
Tolosa
Palompon
Merida
Burauen
Julita
Dulag
Leyte
Isabel
Albuera
La Paz
Mayorga
Macarthur
Javier
Baybay City
Abuyog
Mahaplag
Inopacan
Silago
Sogod
Hindang
Hilongos
Hinunangan
Hinundayan
Bontoc
Bato
Libagon
Anahawan
Matalom
Tomas Oppus
San Juan
Malitbog
Maasin City
Liloan
Macrohon
San Francisco
San Ricardo
Pintuyan
Limasawa

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Legend

% Open Defecation

- 0.000 - 0.073
- 0.073 - 0.146
- 0.146 - 0.220
- 0.220 - 0.293
- 0.293 - 0.366
- 0.366 - 0.439
- 0.439 - 0.512
- 0.512 - 0.586
- 0.586 - 0.659
- 0.659 - 0.732

Open Defecation

PSA, 2015 Data

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.

Eastern Visayas has the third highest open defecation rate among all regions at 10.27%. As of 2015, about 456,000 people, mostly informal settlers along coasts, were reported practicing open defecation. These waterless areas do not have access to sanitation facilities.

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

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 Eastern Visayas.

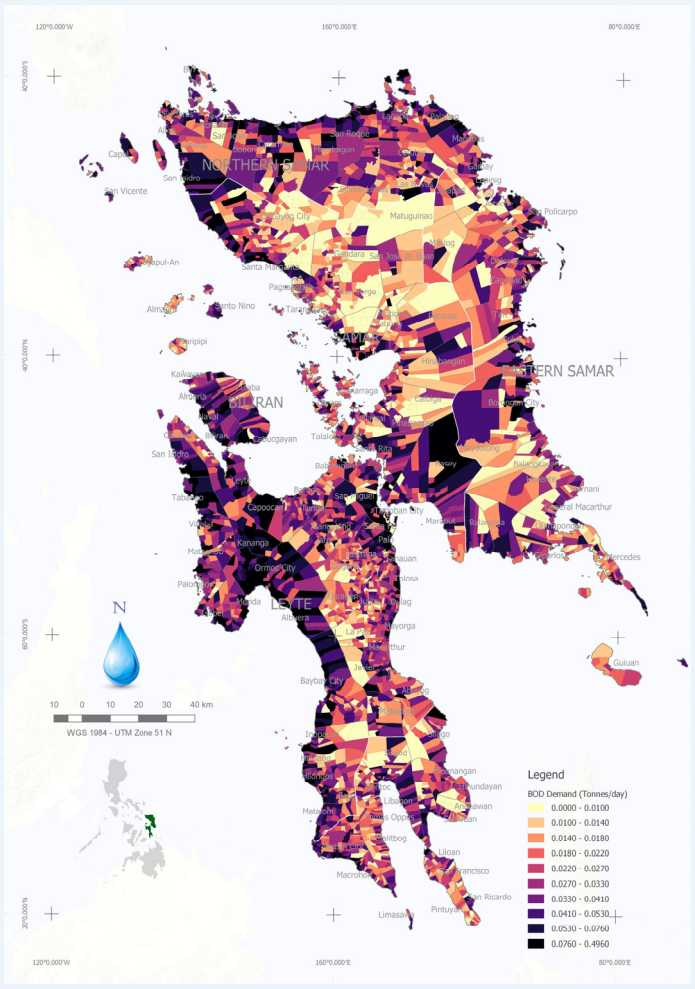


Figure 13: Biological Oxygen Demand, 2015

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.

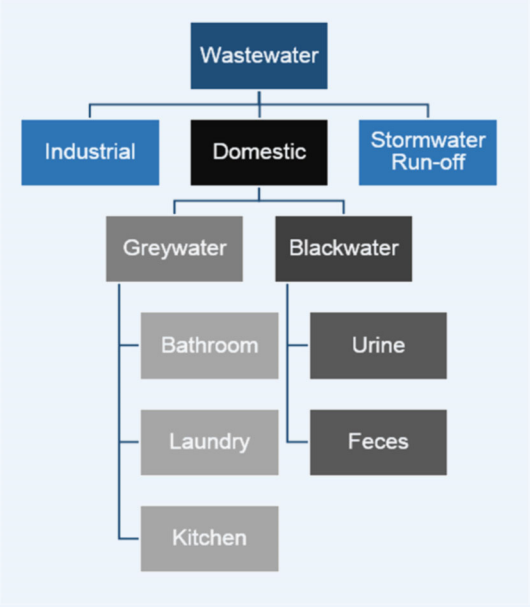


Figure 14: Categories of Wastewater

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 grams[16] per person per day is used.

The wastewater[17] 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.

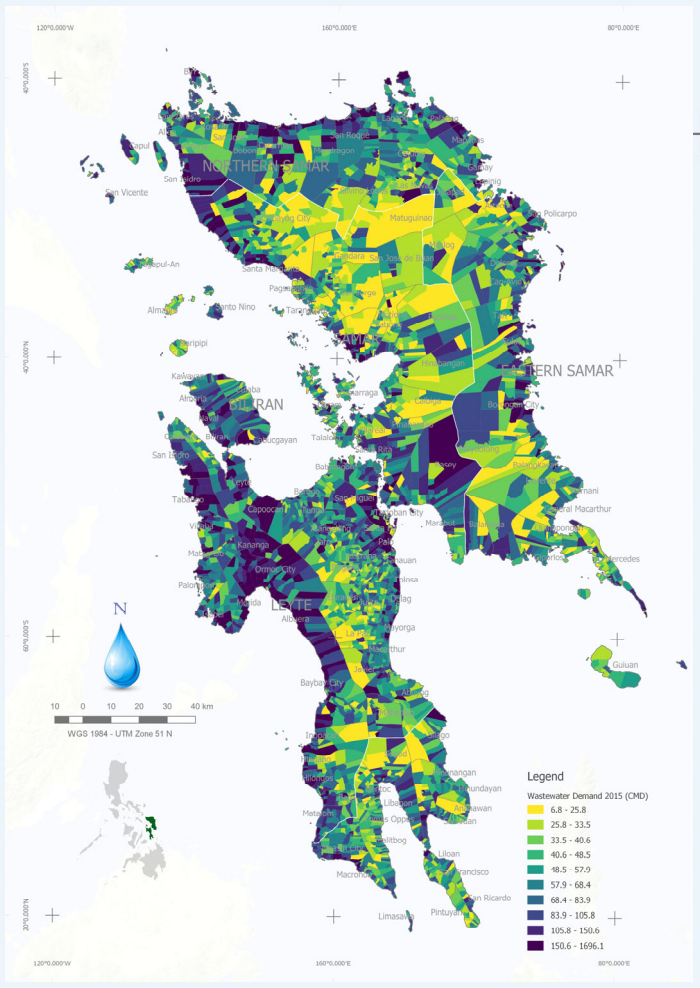


Figure 15: Wastewater Produced, 2015

[16] *Philippine Environment Monitor (PEM), 2003*
[17] *Ibid.*

120°0.000'W 160°0.000'E 80°0.000'E

40°0.000'N 60°0.000'S 20°0.000'N

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

BOD Projection, 2020

Legend

BOD Demand Projection 2020 (Tonnes/day)

- 0.0000 - 0.0100
- 0.0100 - 0.0140
- 0.0140 - 0.0180
- 0.0180 - 0.0220
- 0.0220 - 0.0270
- 0.0270 - 0.0330
- 0.0330 - 0.0410
- 0.0410 - 0.0530
- 0.0530 - 0.0760
- 0.0760 - 0.4960

BOD Projection, 2025

Legend

BOD Demand Projection 2025 (Tonnes/day)

- 0.0000 - 0.0100
- 0.0100 - 0.0140
- 0.0140 - 0.0180
- 0.0180 - 0.0220
- 0.0220 - 0.0270
- 0.0270 - 0.0330
- 0.0330 - 0.0410
- 0.0410 - 0.0530
- 0.0530 - 0.0760
- 0.0760 - 0.4960

BOD Projection, 2030

Legend

BOD Demand Projection 2030 (Tonnes/day)

- 0.0000 - 0.0100
- 0.0100 - 0.0140
- 0.0140 - 0.0180
- 0.0180 - 0.0220
- 0.0220 - 0.0270
- 0.0270 - 0.0330
- 0.0330 - 0.0410
- 0.0410 - 0.0530
- 0.0530 - 0.0760
- 0.0760 - 0.4960

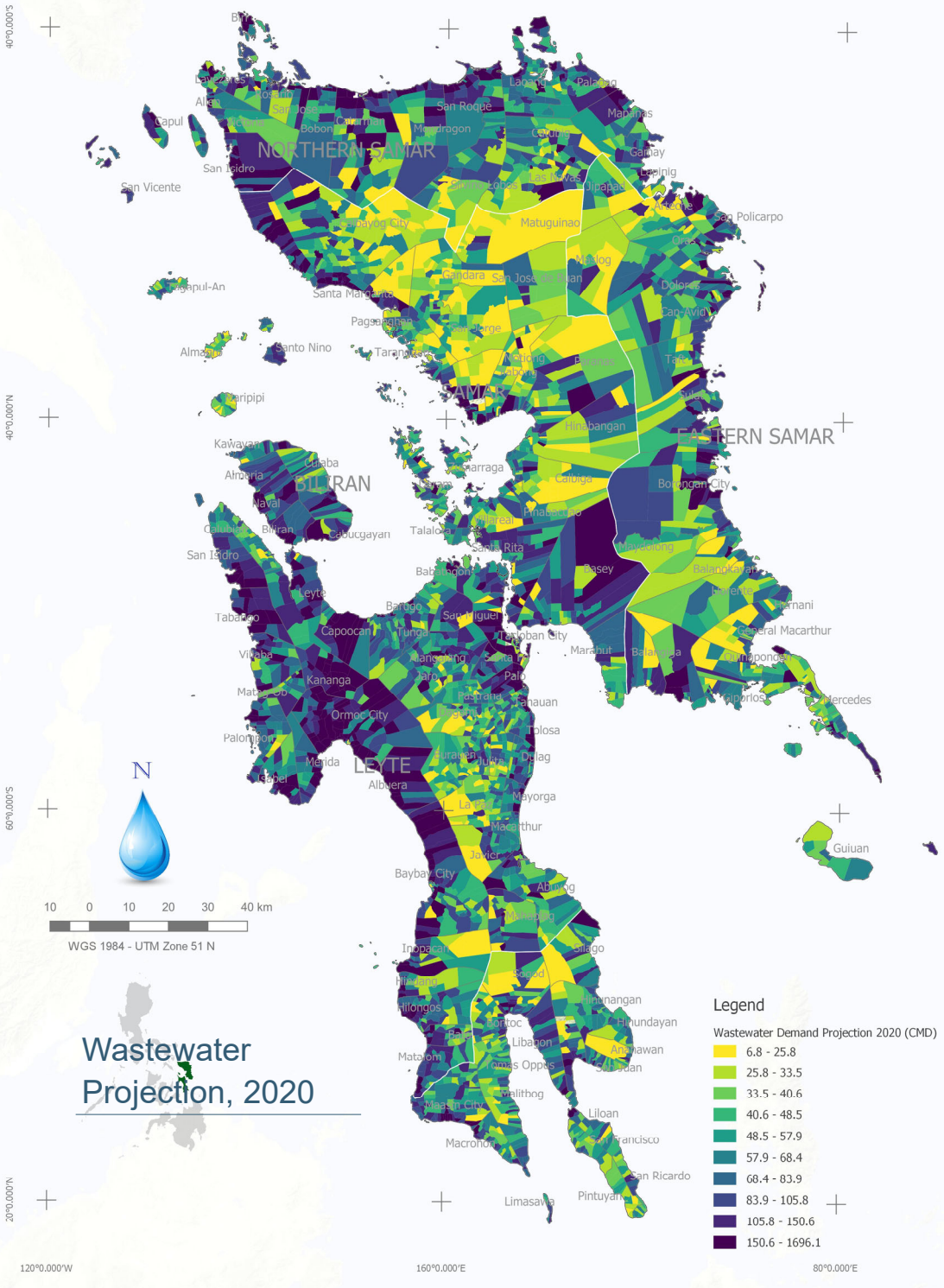
BOD Projection, 2040

Legend

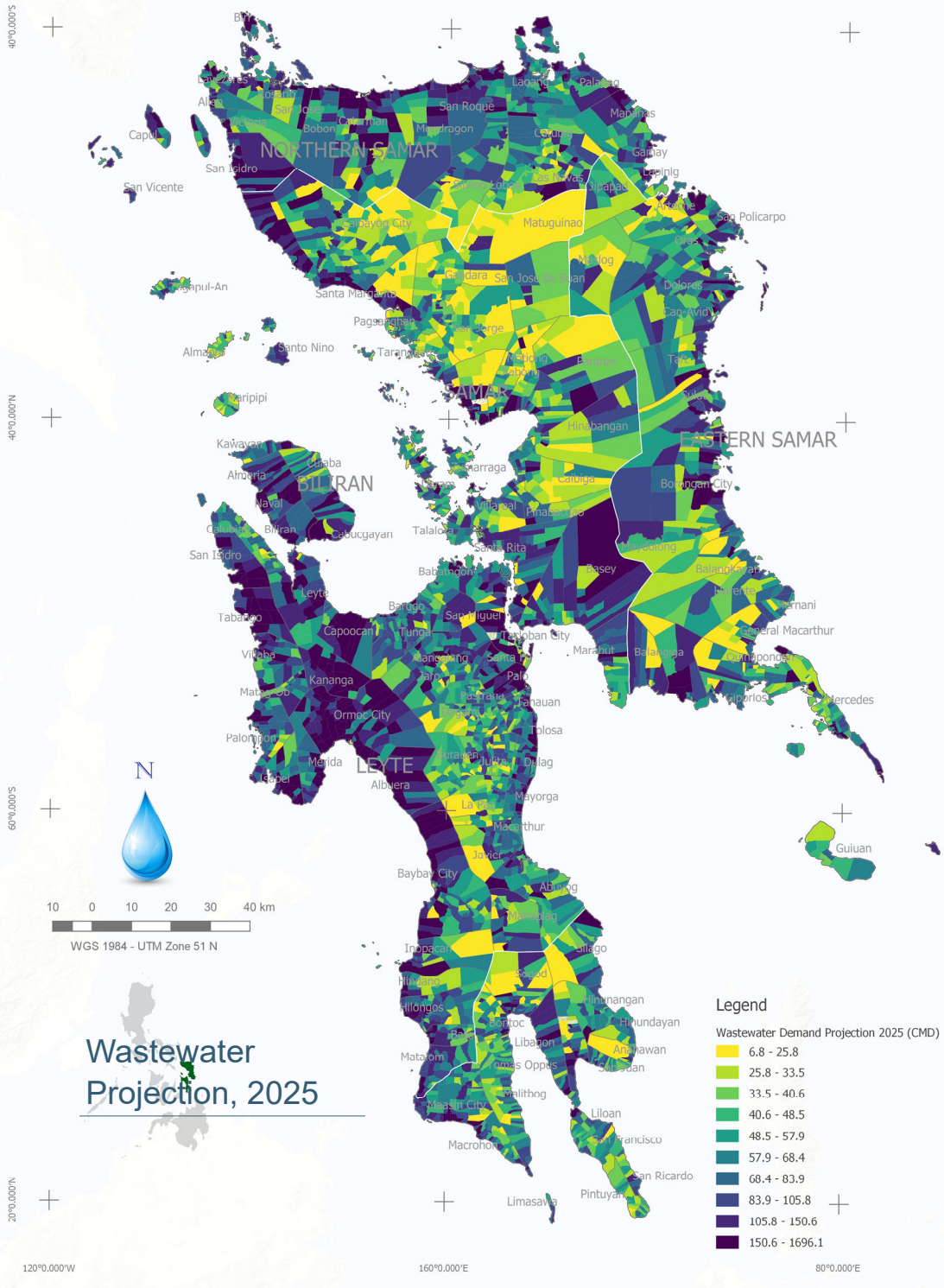
BOD Demand Projection 2040 (Tonnes/day)

- 0.0000 - 0.0100
- 0.0100 - 0.0140
- 0.0140 - 0.0180
- 0.0180 - 0.0220
- 0.0220 - 0.0270
- 0.0270 - 0.0330
- 0.0330 - 0.0410
- 0.0410 - 0.0530
- 0.0530 - 0.0760
- 0.0760 - 0.4960

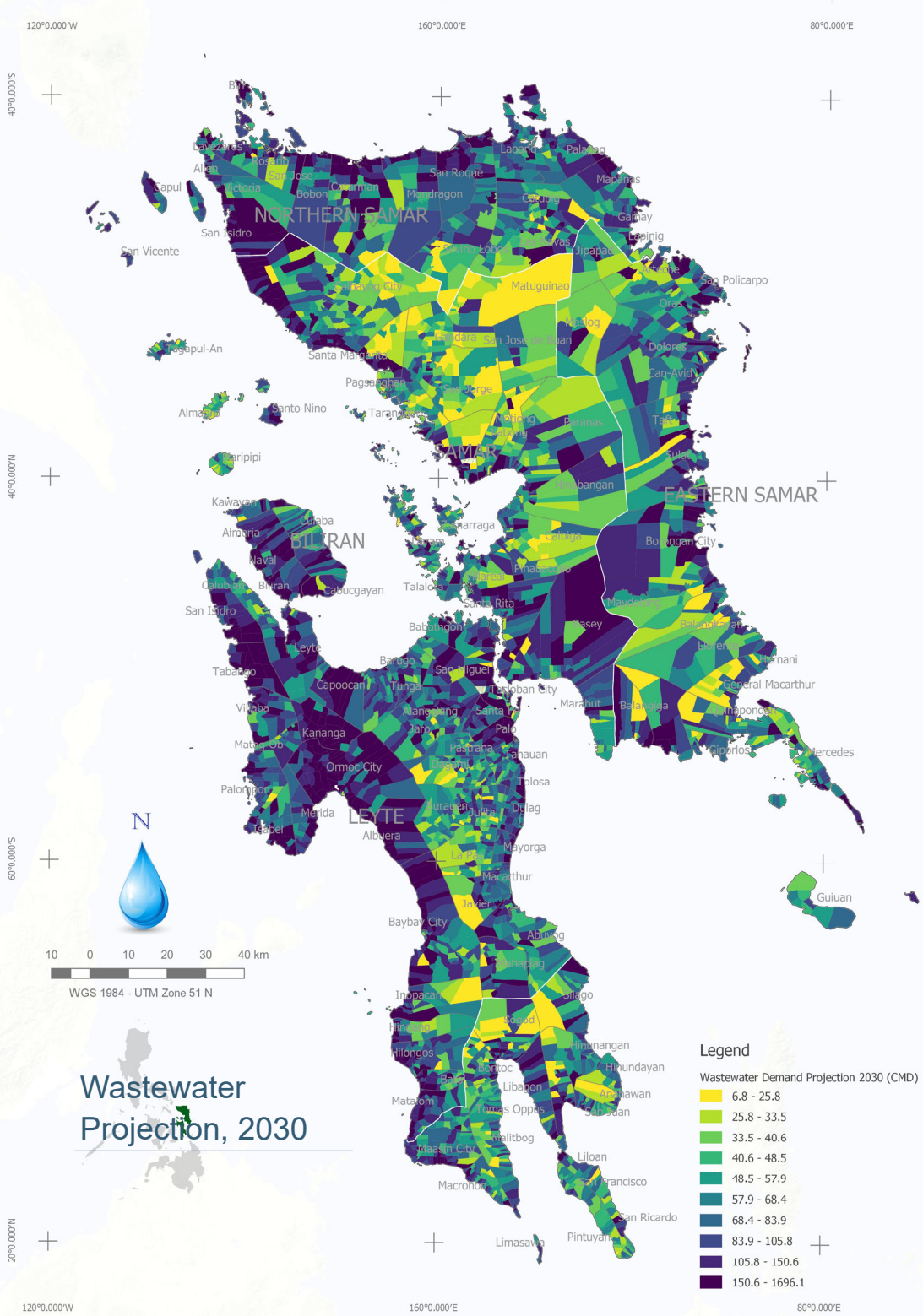
Wastewater Projection, 2020



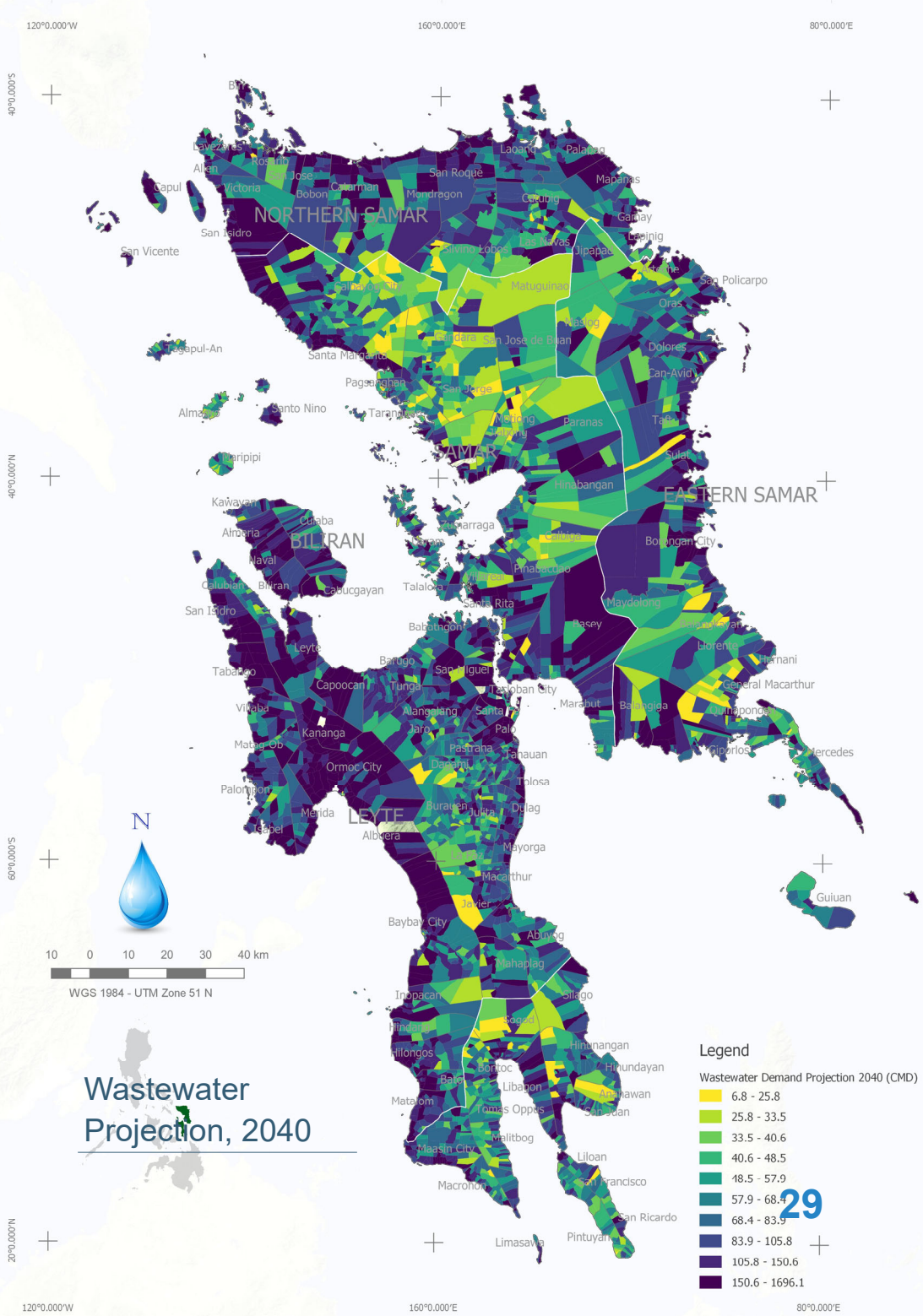
Wastewater Projection, 2025



Wastewater Projection, 2030



Wastewater Projection, 2040



120°0.000'W
160°0.000'E
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Biri
Lavezares
Allen
San Jose
Rosario
Capul
San Antonio
Victoria
Bobon
Catarman
NORTHERN SAMAR
San Roque
Pambujan
Laoang
Palapag
Mapanas
Catubig
Gamay
Lapinig
San Isidro
Lope de Vega
Silvino Lobos
Las Navas
Jipapad
Arteche
San Policarpo
San Vicente
Calbayog City
Matuguinao
Oras
Maslog
Dolores
Togapul-An
Gandara
San Jose de Buan
Santa Margarita
San Jorge
Can-Avid
Pagsanghan
Almagro
Santo Nino
Tarangnan
Motiong
Paranas
Taft
Jiabong
Catbalogan City
SAMAR
Maripipi
Sulat
Hinabangan
San Julian
EASTERN SAMAR
Kawayan
Culaba
Almeria
Zumarraga
Daram
Calbiga
Borongan City
BILIRAN
Caibiran
Biliran
Villareal
Pinabacdao
Cabucgayan
Talalora
Calubian
Maydolong
Santa Rita
San Isidro
Basey
Balangkayan
Babatngon
Leyte
Llorente
Hernani
Tabango
Barugo
San Miguel
Capoocan
Carigara
Tunga
Tacloban City
General Macarthur
Alangalang
Villaba
Santa Fe
Marabut
Lawaan
Balangiga
Quinapondan
Salcedo
Kananga
Jaro
Palo
Matag-Ob
Pastrana
Giporlos
Mercedes
Tanauan
Ormoc City
Dagami
Tabontabon
Tolosa
Palompon
Julita
Merida
Burauen
Dulag
LEYTE
Albuera
Isabel
La Paz
Mayorga
Macarthur
Javier
Guiuan
Baybay City
Abuyog
Mahaplag
Inopacan
Silago
Hindang
Sogod
Hilongos
Hinunangan
Bontoc
Hinundayan
Bato
Libagon
SOUTHERN LEYTE
Saint Bernard
Anahawan
Tomas Oppus
Matalom
San Juan
Maasin City
Malitbog
Liloan
Macrohon
Padre Burgos
San Francisco
San Ricardo
Pintuyan
Limasawa

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Legend

With Water Quality Problem

Areas with Water Quality Problems

Water Districts' Water Quality Monitoring Data, LWUA, 2015

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.

Super typhoon Yolanda severely battered Eastern Visayas in 2013 causing extensive damage to economic, social and water supply infrastructure. The WHO, in cooperation with the DOH, reported (in a descriptive study on an assessment of the quality of drinking water supply systems in areas affected by the typhoon) that the majority of the residents in the region were at risk of waterborne diseases after water quality tests were performed in various locations.

The rapid assessment found that nearly half of the water samples collected were positive for *E. coli* (44%). Leyte had the highest proportion of positive samples. It was also found that 74% did not comply with the minimum residual chlorine level of 0.3 mg/L. Eastern Samar registered the highest proportion of residual chlorine level that was not in compliance with the required standards.

Another testing was done ten months after — it found that 65% of the samples collected in Eastern Visayas were positive for *E. coli*. The same survey revealed 93% had residual chlorine below the minimum required level. Fecal contamination was also found, as indicated by the presence of *E. coli*, which affected 70%, 67%, and 57% of source, storage and distribution components, respectively.

The poor quality of drinking water has been attributed to the damage typhoon Yolanda has wreaked on the region's sanitation facilities. The massive destruction scattered human waste and infected wastewater which reached drinking water sources. Furthermore, it was either that LGUs had been unable to allocate budgets for and prioritize water chlorination or that chlorinator systems were destroyed by the typhoon.[18]

It is not to be presumed, however, that the unrepaired damage to water supply facilities caused by the typhoon was solely responsible for the poor water quality as historical water quality data were not available.

Two other factors that contribute to the degradation of water sources and resources are open defecation and untreated domestic wastewater.

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 water[19].

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

In the Samar provinces, the low percentage of improved sanitation access indicates a very high risk of contracting waterborne diseases, especially in rural villages where toilets and latrines are rare.

Open defecation, one of the primary causes of waterborne diseases, is likewise practiced in many parts of Region VIII.

Based on the Food and Waterborne Diseases report (from January 1 to June 3, 2017) of the DOH, there were 279 cases of acute bloody diarrhea in the region. A total of 144 cases of typhoid and 3 cases of hepatitis A were also reported. There were no reported cases, however, of cholera and rotavirus.[20]

As of 2017, the Department of the Interior and Local Government (DILG) reported 15 waterless[21] municipalities in Eastern Visayas (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.

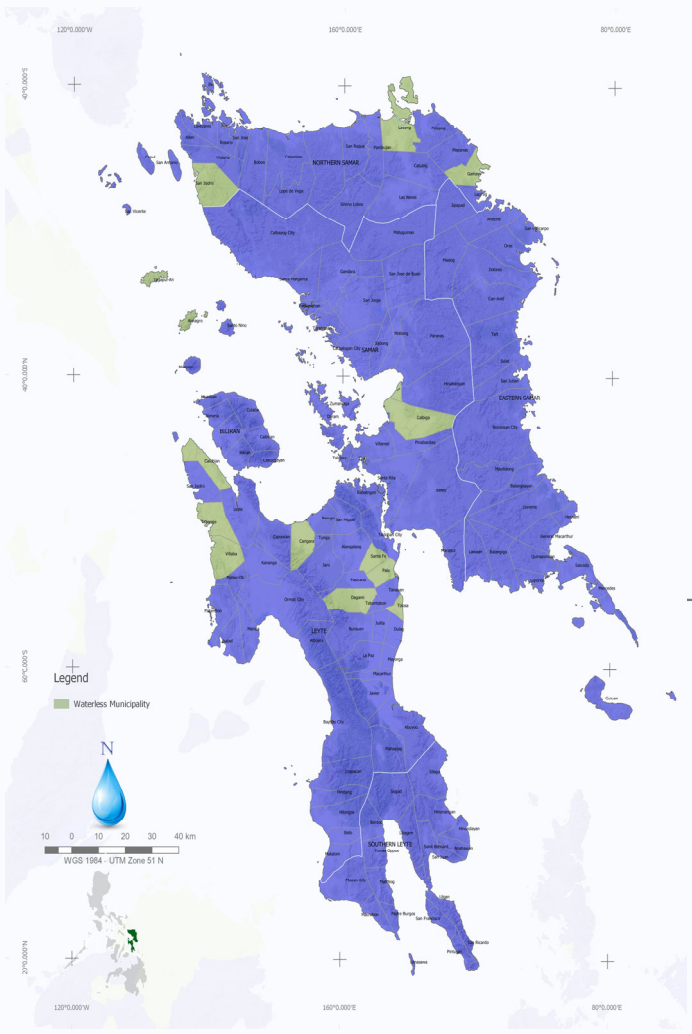

Figure 16: Waterless Municipalities

[18] *An assessment of drinking-water quality post -Haiyan, Western Pacific Surveillance and Response journal, 2015*
[19] *World Health Organization*
[20] *Department of Health, Epidemiology Bureau, Food and Waterborne Diseases, 2017*
[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 Eastern Visayas, areas that require upgraded facilities, improved WSS 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 VIII 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 focused discussions resulted in the identification of weaknesses, inadequacies and other complications that have hindered the growth and development of the WSS sector in Region VIII. More importantly, the exchange of ideas also led to the adoption of specific recommendations on how to put an end to the sector's stagnation and facilitate the creation of momentum toward its accelerated development.

Planning and Development

The most common hindering factors were: the lack of political will among local and national leaders to prioritize water supply and sanitation; questionable priority setting; unavailability of technical expertise that leads to low levels of participation in the planning process; the absence of a single governing and regulatory body that will oversee water supply and sanitation programs; overlapping mandates of several water agencies; lack of funds; data inconsistencies; negative public perceptions; and natural calamities that come in increasing frequency.

Among the facilitating measures proposed are: establishing linkages with financial and technical institutions and international NGOs regarding financial assistance and technology transfer with respect to statistical analysis; commissioning resiliency studies; establishment of third-party laboratories; and behavior change communication interventions to enable the public to adopt and sustain positive behaviors.

Service Provision

Politicking had hindered the efficient delivery of water and sanitation service in Region VIII. In a collective view, among the other hindering factors include: the lack of political will among decision and policy makers, and the users themselves; and gaps with respect to agency collaboration, capacity building, and financing.

Facilitating measures agreed include: strengthening of political will among local leaders; proper and close coordination and collaboration between water districts and LGUs in project implementation; subsidy provided by DPWH to sewerage and septage projects of LGUs; value formation training programs and seminars involving water service providers and customers; and the involvement of partners from the private sector and the academe.

Regulation

One of the main reasons behind the stagnation of the region's WSS sector was the lack of integrated institutional mechanisms.

Gaps are present in financing, government inefficiency in policy implementation and enforcement owing to partisan politics, the overlapping functions of agencies and institutions in regard to WSS projects and programs.

Among the facilitating measures are: the strict implementation of ordinances and enforcement of local and national policies concerning the WSS sector anchored on multi-sectoral collaboration; and intervention of national agencies in imposing relevant policies on health, water safety and sanitation.

Table 14 summarizes the hindering and facilitating factors impacting the WSS sector in Eastern Visayas.

Table 14: Hindering and Facilitating Factors

	Hindering Factors	Facilitating Factors
Planning and Development	Low-level participation/involvement of technical experts in planning activities and lack of awareness of stakeholders re: WSS sector	Designation of temporary personnel
	Low prioritization given by local and political leaders to WSS	Financial assistance from international NGOs
	Absence of permanent/regular RSIs in municipalities	Setting up third-party laboratories
	Poor regulation and implementation of present programs	Availability of technology to facilitate statistical analysis of data
	Absence of a single body regulating the sector	Positive behavioral change intervention among decision makers and target publics
	Overlapping mandates of water agencies	Resiliency studies/mechanisms
	Lack of funds	
	Absence of septage treatment facilitates and unavailability of water testing facilities	
	Data inconsistencies	
	Human habitation in watershed areas or near water sources	
	Negative public perceptions re sanitation	
	Natural calamities	
	Delays in rolling out information, education and communication (IEC) campaigns	
Service Provision	Interference from petty politicians	Subsidy from DPWH of 40% of the total project cost of sewerage and septage projects of LGUs, WO and PSP
	Climate change	Proper and close coordination between WDs and LGUs in implementing WSS projects
	Inaccurate water pricing of LGU-managed water service providers	Strengthening of political will
	Very low water rates of Ormoc Water System	Proper construction of water treatment facilities and adhering to best practices
	Outdated water meters	Protection of water resources and watersheds
	Lack of septage facilities	Encouraging consumers to attend seminars on the importance of water and sanitation (to influence them into adopting positive behaviors)
	Defective sewerage systems	Building the technical capacity of water providers
	Agencies' lack of initiative to plan and implement water projects	Reforestation
	Budget constraints re: sanitation	Accurate reading of water meters
	Lack of timely ordinances related to sanitation	Increasing the water rates of Ormoc Water System to encourage users to conserve water
	Non-segregation of household waste in municipal/provincial socialized housing	Involvement of partners from the private sector and the academe
	Absence of any regulation requiring LGUs to enforce proper waste disposal and/or set up a treatment facility	DPWH's proper maintenance of drainage systems
	Lack of collaboration among water agencies re: creation of a single regulatory body	
	Lack of political will among decision and policy makers and the consuming public	
	Capacity gaps (lack of awareness and sense of urgency to implement priority projects)	
	Financing gaps	
Regulation	Lack of integrated institutional mechanisms re: water and sanitation	Subsidy from DPWH of 40% of the total project cost of sewerage and septage projects of LGUs, WO and PSP
	Lack of political will to implement policies	Implementation of programs on health, water safety, and sanitation by other government agencies
	Absence of water safety plans among LGU-led utilities	
	Low cost of water in water districts	
	Lack of policy enforcement	
	Petty/dirty politicians	
	Financing gaps	
	Collaboration gaps (overlapping functions between agencies and institutions)	

Regional Vision

“Full Access to Sustainable Safe Water in Eastern Visayas”

The Eastern Visayas Region WSS vision was developed by the visioning group with the objective of enabling the entire region to achieve universal access to safe and sustainable water by 2030.

In essence, safe water encompasses sanitation, rationalizing the necessity of improved water and sanitation projects that will sustain adequate water supply, ensure its good quality and affordability, and upgrade sanitation infrastructure.

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 WSS 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 Eastern Visayas 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	▪ Zero waterless barangays ▪ Reduction to 5% of unsafe sources of water supply (2022) and universal access to safe water (2030)	▪ Government investment in the development of water supply systems (WSS) to upgrade unsafe sources to safe sources ▪ Promoting water harvesting in far-flung areas
Level II	▪ Upgrade of Level II systems to Level III	▪ Establishing WDs or LGU-led water utilities that can operate commercially ▪ Upgrading Level II systems to Level III ▪ Creation of a body that provides technical and financial assistance to barangay water associations and rural waterworks to upgrade their level of service
Developing		
Water Districts (Categories C and D)	▪ Zero nonoperational WDs	▪ Prioritizing conversion of nonoperational to operational WDs ▪ Assisting low performing WDs in rehabilitation and expansion works ▪ Providing a window for low cost funds that can be accessed by low performing WDs to expand coverage
Non-WDs (financially struggling water utilities)	▪ Organizing water utilities and allowing them to operate commercially ▪ 100% recovery of O&M cost	▪ Allowing the commercialization of water utility operations; encouraging LGUs to establish WDs or similar local government corporations or economic enterprises
Developed		
Level III	▪ 100% coverage of franchise area ▪ Ensuring the sustainability of operations of Level III systems ▪ Continuing expansion programs to ensure 100% coverage	▪ Increasing private sector participation ▪ Ensuring a robust regulatory framework to balance the interest of consumers and operators/WSPs ▪ Encouraging business establishments and residential communities to embark on rainwater harvesting programs

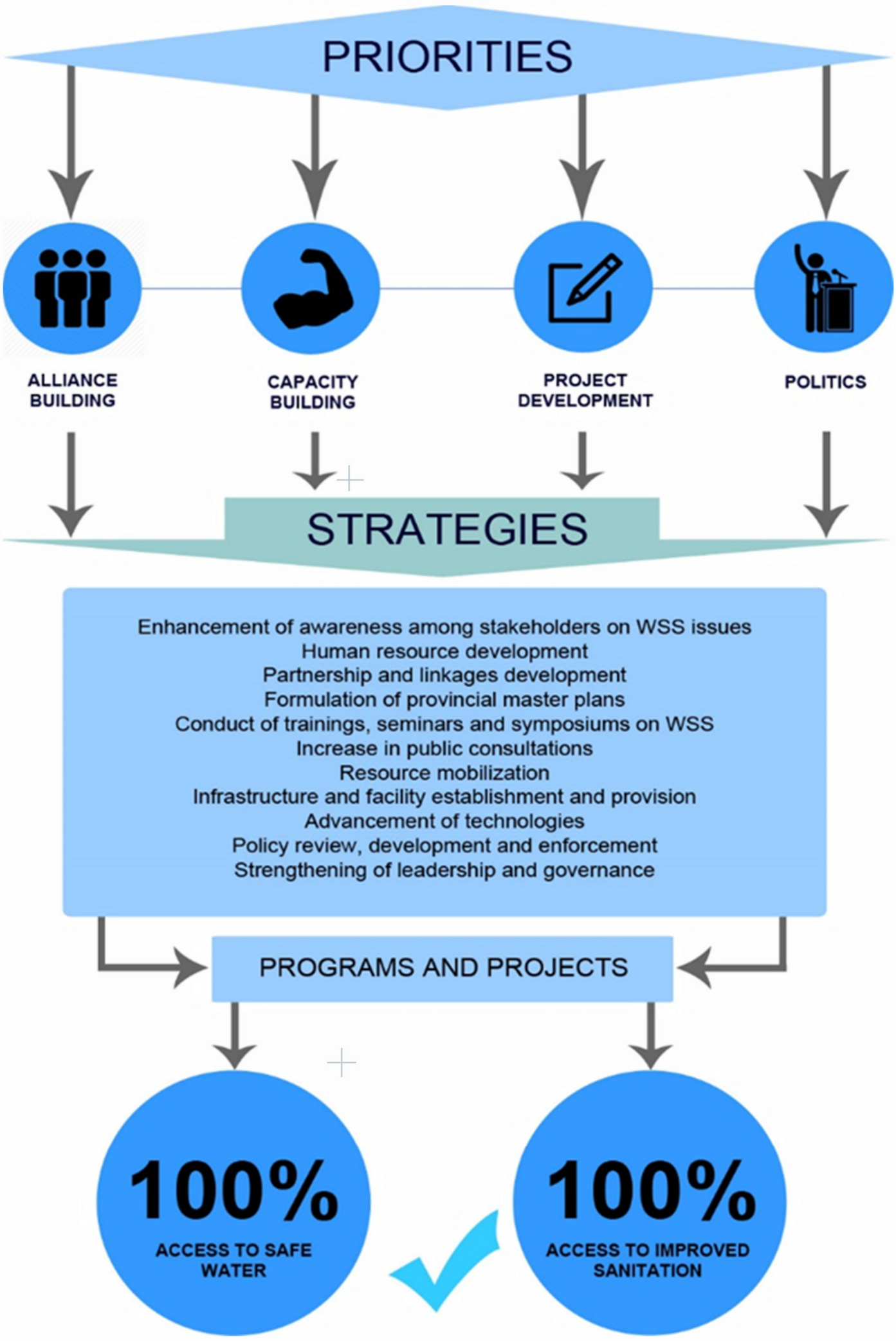

Figure 17: Eastern VIsayas WSS Strategic Framework

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.

Eastern Visayas strives to achieve 94.4% access to safe water by 2022 and 100% access by 2030. Universal access by 2030 means more than 1,386,000 HHs will benefit. Improved access to sanitation is set at 73.4% by 2022 and universal access by 2030.

Figures 18 and 19 graph the WSS targets for 2022 and 2030 in terms of additional households.

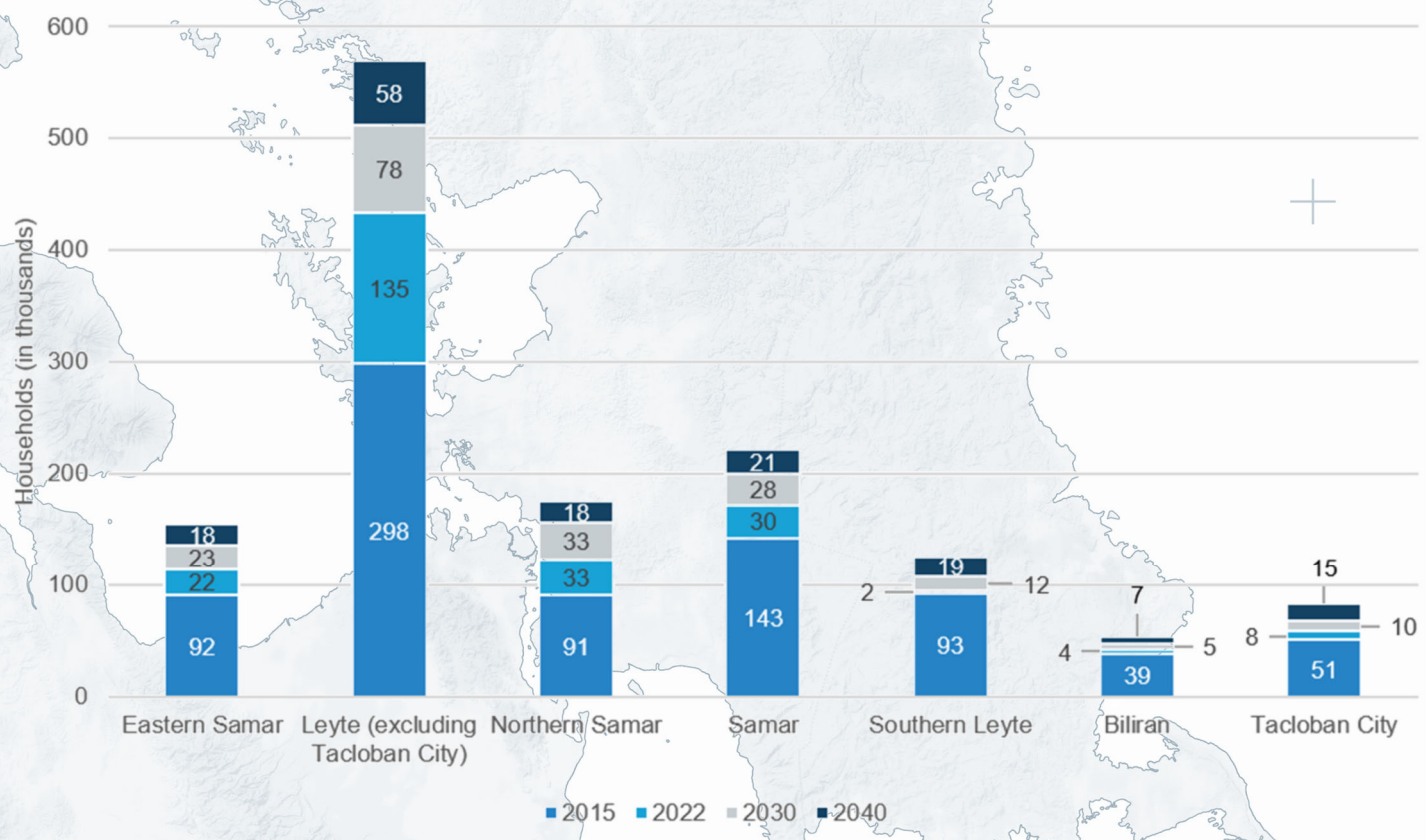

Figure 18: Targeted Households with Access to Safe Water

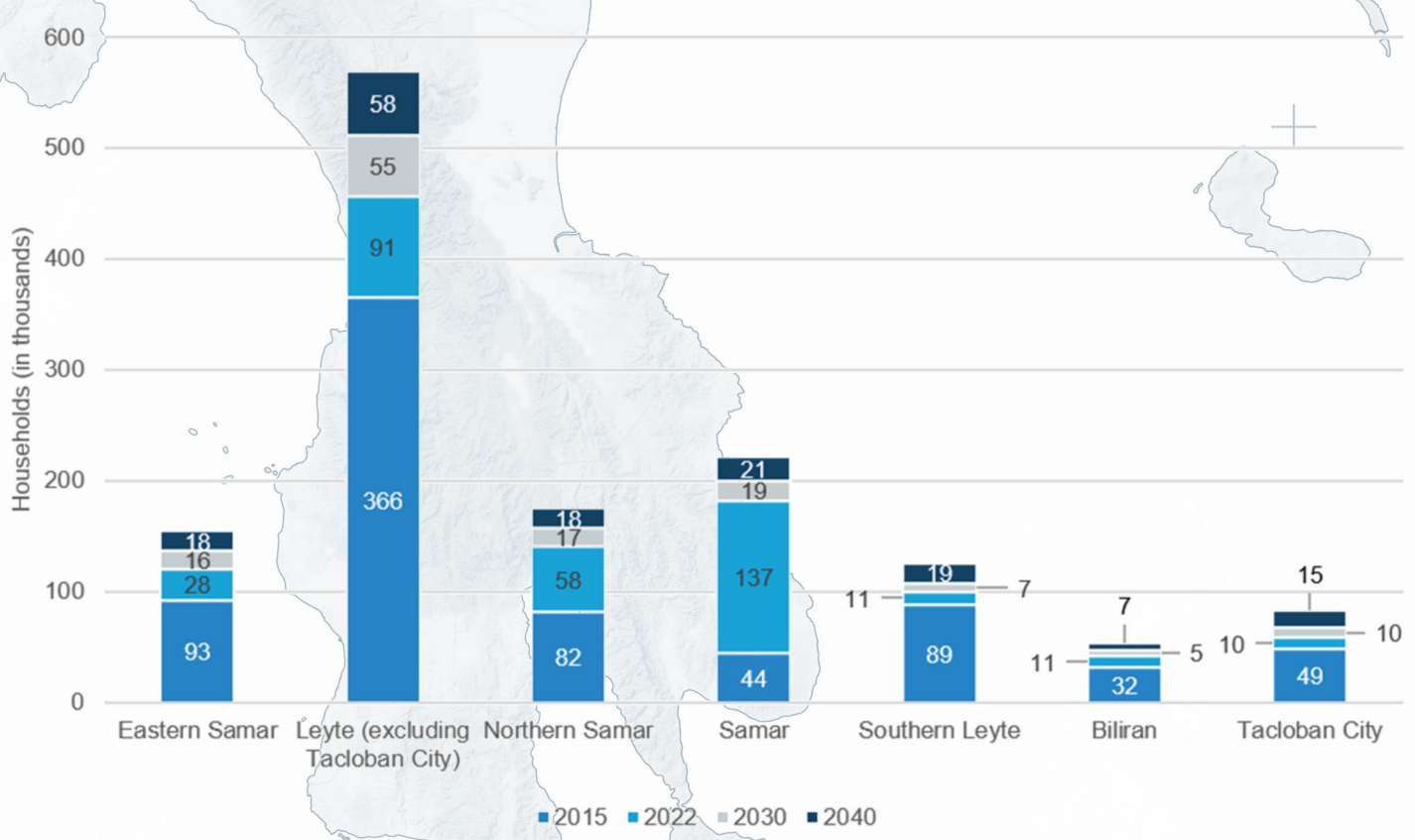

Figure 19: Targeted Households with Access to Sanitation

Water Supply Targets

EASTERN SAMAR			
Category	2022	2030	2040
Level III	17.2%	19.0%	100.0%
Level II	47.4%	51.0%	0.0%
Level I	30.0%	30.0%	0.0%
Safe Access	94.6%	100.0%	100.0%
No Access	5.4%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

LEYTE (EXCLUDING TACLOBAN CITY)			
Category	2022	2030	2040
Level III	45.0%	60.0%	100.0%
Level II	35.0%	40.0%	0.0%
Level I	15.0%	0.0%	0.0%
Safe Access	95.0%	100.0%	100.0%
No Access	5.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

NORTHERN SAMAR			
Category	2022	2030	2040
Level III	28.0%	45.0%	100.0%
Level II	50.0%	53.0%	0.0%
Level I	10.0%	2.0%	0.0%
Safe Access	88.0%	100.0%	100.0%
No Access	12.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

SAMAR			
Category	2022	2030	2040
Level III	43.0%	75.0%	100.0%
Level II	30.0%	15.0%	0.0%
Level I	22.0%	10.0%	0.0%
Safe Access	95.0%	100.0%	100.0%
No Access	5.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

SOUTHERN LEYTE			
Category	2022	2030	2040
Level III	60.0%	70.0%	100.0%
Level II	30.0%	30.0%	0.0%
Level I	5.0%	0.0%	0.0%
Safe Access	95.0%	100.0%	100.0%
No Access	5.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

BILIRAN			
Category	2022	2030	2040
Level III	75.0%	100.0%	100.0%
Level II	23.0%	0.0%	0.0%
Level I	2.0%	0.0%	0.0%
Safe Access	100.0%	100.0%	100.0%
No Access	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

TACLOBAN CITY			
Category	2022	2030	2040
Level III	45.0%	100.0%	100.0%
Level II	30.0%	0.0%	0.0%
Level I	25.0%	0.0%	0.0%
Safe Access	100.0%	100.0%	100.0%
No Access	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

EASTERN VISAYAS			
Category	2022	2030	2040
Level III	41.8%	60.8%	100.0%
Level II	36.4%	34.0%	0.0%
Level I	16.3%	5.3%	0.0%
Safe Access	94.4%	100.0%	100.0%
No Access	5.6%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

Sanitation Targets

EASTERN SAMAR			
Category	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	0.0%	0.0%	0.0%
Shared/Communal/ Limited	1.0%	0.0%	0.0%
Open Defecation	2.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

LEYTE (EXCLUDING TACLOBAN CITY)			
Category	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	1.0%	0.0%	0.0%
Shared/Communal/ Limited	0.0%	0.0%	0.0%
Open Defecation	2.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

NORTHERN SAMAR			
Category	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	1.0%	0.0%	0.0%
Shared/Communal/ Limited	2.0%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

SAMAR			
Category	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%

SOUTHERN LEYTE			
Category	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	2.5%	0.0%	0.0%
Shared/Communal/ Limited	0.5%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

BILIRAN			
Category	2022	2030	2040
Improved	97.0%	100.0%	100.0%
Basic	2.0%	0.0%	0.0%
Shared/Communal/ Limited	0.0%	0.0%	0.0%
Open Defecation	1.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

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

EASTERN VISAYAS			
Category	2022	2030	2040
Improved	69.7%	100.0%	100.0%
Basic	8.3%	0.0%	0.0%
Shared/Communal/ Limited	22.0%	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 VIII 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	▪ Planning, program or project design ▪ Establishing labs and water quality testing centers ▪ Lobbying for the Regional WSS Masterplan	▪ 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	▪ Water resources protection ▪ Arbitration ▪ Environmental and social safeguards ▪ Compliance with PNSDW 2017 ▪ Close monitoring of Joint Agreement ▪ Compliance training from DOH ▪ Resource studies	▪ Willingness to connect and pay ▪ Demand creation

Table 17: Proposed Strategic Interventions for Sanitation

Access to Improved Sanitation	Planning & Development *Planning* *Program or Project Design* *Institution Building* *Training* *Financing* *Climate/Disaster Resiliency* *Policy*	Service Provision *Operations* *M&E* *Expansion* *Amalgamation* *Automation*	Regulation *Tariff/Pricing* *Resource* *Arbitration* *Registration, Permits, Rights*	Promotions *Social Preparation* *Advocacy* *Demand Creation* *Behavior Change*
High Access Areas with 60% to 100% Improved Sanitation Coverage	▪ 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.	▪ 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).	▪ 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 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.	▪ 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	▪ 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	▪ 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	▪ Rehabilitation of existing water supply system to upgrade it to Level III	▪ Rehabilitation of water supply system to upgrade it to Level III
Level I	▪ Upgrading to “safe level” those water sources found “unsafe”	▪ 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	▪ 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.	▪ WDs and LGU-run utilities will be motivated to improve their performance by offering them incentives/rewards.	▪ A system for independent evaluation and due diligence regarding public-private partnership projects will be set up.
Planning and Development	▪ 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	▪ 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.		

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160°0.000'E
80°0.000'E
40°0.000'S
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Biri
Lavezares
Allen
San Jose
Rosario
Victoria
Capul
San Antonio
San Isidro
San Vicente
Bobon
Catarman
NORTHERN SAMAR
San Roque
Pambujan
Laoang
Palapag
Mapanas
Catubig
Gamay
Lapinig
Las Navas
Jipapad
Arteche
San Policarpo
Oras
Maslog
Dolores
Can-Avid
Taft
Lope de Vega
Silvino Lobos
Calbayog City
Matuguinao
Tagapul-An
Santa Margarita
Gandara
San Jose de Buan
San Jorge
Pagsanghan
Almagro
Santo Nino
Tarangnan
Motiong
Paranas
Jiabong
Catbalogan City
SAMAR
Maripipi
Kawayan
Culaba
Almeria
BILIRAN
Caibiran
Biliran
Cabucgayan
Calubian
San Isidro
Leyte
Tabango
Barugo
San Miguel
Capoocan
Carigara
Tunga
Alangalang
Villaba
Kananga
Jaro
Santa Fe
Palo
Matag-Ob
Pastrana
Tanauan
Ormoc City
Dagami
Tabontabon
Tolosa
Palompon
Merida
Isabel
LEYTE
Albuera
Burauen
Julita
Dulag
La Paz
Mayorga
Macarthur
Javier
Baybay City
Abuyog
Mahaplag
Inopacan
Silago
Hindang
Sogod
Hilongos
Hinunangan
Bontoc
Hinundayan
Bato
Libagon
SOUTHERN LEYTE
Tomas Oppus
Saint Bernard
Anahawan
San Juan
Matalom
Maasin City
Malitbog
Liloan
Macrohon
Padre Burgos
San Francisco
San Ricardo
Pintuyan
Limasawa
Hinabangan
San Julian
EASTERN SAMAR
Zumarraga
Daram
Calbiga
Borongan City
Villareal
Pinabacdao
Talalora
Maydolong
Santa Rita
Balangkayan
Babatngon
Basey
Llorente
Hernani
Tacloban City
General Macarthur
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Quinapondan
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Mercedes
Guiuan

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WGS 1984 - UTM Zone 51 N

Legend

- Approved Projects
- Pending Projects

LWUA Priority Projects

LWUA, 2018 Data

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).

Eastern Visayas requires capital investments for infrastructure development of about PhP10.75 billion and PhP14.08 billion to achieve 2022 and 2030 targets, respectively. Unit development costs employed to arrive at these sums are estimated at PhP33,100 per HH for Level III, PhP19,500 for Level II, and PhP8,700 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 Eastern Visayas) 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 HH 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 Eastern Visayas 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 four Eastern Visayas municipalities where priority WD projects have been approved and those pending approval for LWUA's financial assistance (FA). The WD of Naval has secured LWUA's FA. The FA requests of the other three WDs, i.e., in Carigara, Jaro, and San Juan WDs, are pending approval.

Table 20: Indirect Costs Employed[22]

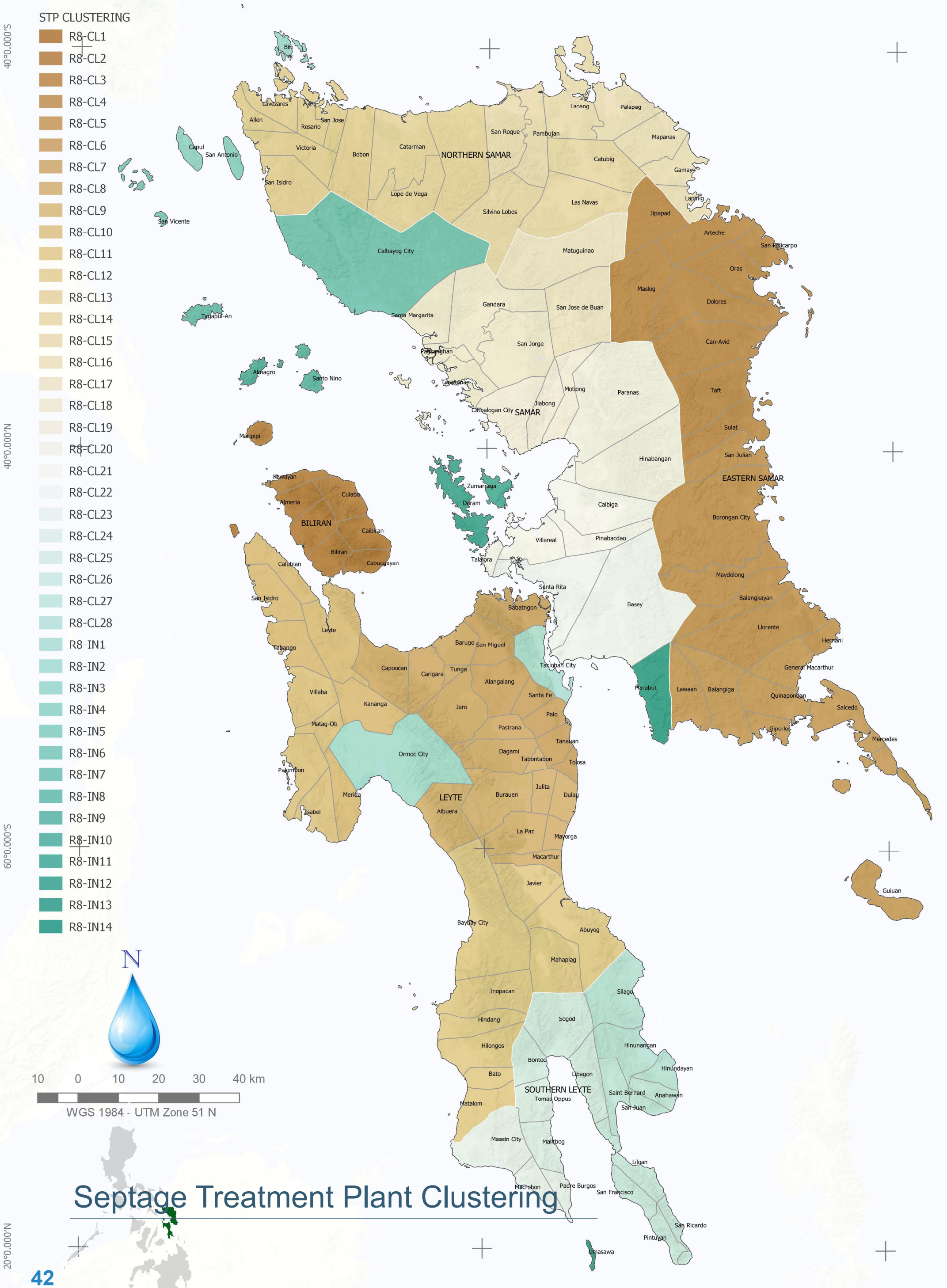
Water Supply		
Contingency	10.0%	Percentage of Total Direct Cost
Feasibility Study	3.0%	Percentage of Total Direct Cost
Detailed Engineering Design	6.0%	Percentage of Total Direct Cost
Construction Supervision	5.0%	Percentage of Total Direct Cost
ROW/Land Acquisition	3.0%	Percentage of Total Direct Cost
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) 2022	Total Investment Cost (in PhP Million) 2030
Eastern Samar	504	598
Leyte	5,716	5,498
Northern Samar	1,602	1,677
Samar	1,393	3,113
Southern Leyte	470	705
Biliran	467	675
Tacloban City	598	1,817
Total	**10,751**	**14,084**

[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).

Eastern Visayas will need about PhP17.8 billion for basic sanitation from 2016 to 2022 to reach a target of 97%.

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 PhP2.48 billion and PhP275 million for 2022 and 2030, respectively, for its septage management program.

Sewerage System Program. Only Tacloban 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, Tacloban City will require PhP493 million by 2022 and an additional PhP84 million by 2030. 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 in Leyte (e.g., Ormoc City and Baybay City) may be closely examined initially as urbanization may set in more rapidly in these places than in other capital cities or towns such as Maasin City in Southern Leyte, Catarman in Northern Samar, and the cities of Catbalogan and Calbayog in Western Samar.

Nonphysical Investments

Eastern Visayas, 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
Eastern Samar	3,293	510
Leyte	6,821	1,675
Northern Samar	3,856	589
Samar	5,054	637
Southern Leyte	2,768	236
Biliran	1,171	161
Tacloban City	1,294	426
Total	**24,257**	**4,233**

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, prefeasibility 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 PhP53.38 billion to boost its WSS sector.

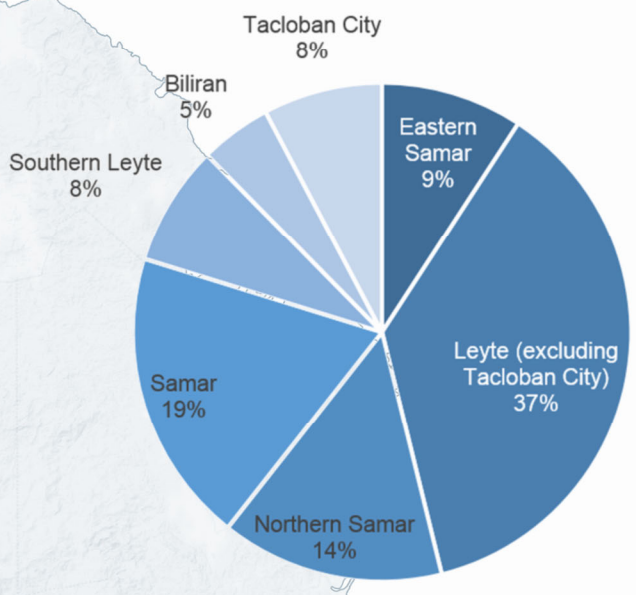


Figure 20: Distribution of Investment Requirement per Province/HUC

Eastern Samar

	Water Supply	Period	Budget Requirement (PhP Million)		Sanitation	Period	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Construction of Level II Water System	Short Term	1.88	1	Septage Management	Long Term	30.00	
2	Potable Water System Program, Level II	Short Term	30.00		**Total**		**30.00**	
3	Potable Water System Project Level II (Brgy. Maputi, Brgy. San Roque, Brgy. Taytay)	Short Term	2.25					
4	Rehabilitation of Gen. Mac. Water District Deep Well, Level II	Short Term	1.25					
5	Provision of Water System, livelihood activities and power supply to housing resettlements	Short Term	1.25					**72.00**
6	Rehabilitation of Water Pipelines of Level III Giporlos Water Supply System from Source to Poblacion area	Short Term	0.88					
7	Water System improvement: Barangay Bagua-Level III WSS; Brgy. Tagpuro Level III WSS, Casuguran Level II WSS	Medium Term	0.88					
8	Construction of small water impounding project at Barangay Paco	Short Term	200					
9	Implementation of the Water Safety Plan	Long Term	1.63					
	Total		**42.00**					

Leyte

	Water Supply	Period	Budget Requirement (PhP Million)		Sanitation	Period	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Design and Build of Ormoc Waterworks System 30 MLD Water Treatment Plant	Medium Term	1.98	1	Construction of Septage Treatment Facilities	Medium Term	1.00	
2	Leyte Metro WD - Tacloban	Medium Term	4.40		**Total**		1.00	
3	On-going upgrading and improvement of Ahag Water Treatment Facility (Surface Water)	Short Term	40.00					**47.38**
	Total		**46.38**					

Northern Samar

	Water Supply	Period	Budget Requirement (PhP Million)		Sanitation	Period	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Construction of additional two (2) Water Districts	Medium Term	200.00	1	Construction of Septage, Sewerage, and Landfill Facilities	Medium Term	7.00	
2	Construction of Level II and Level III Facilities	Medium Term	5.00		**Total**		**7.00**	
3	Provincial WATSAN Plan Formulation	Short Term	20.00					**233.00**
4	Research and Development on New WATSAN Projects	Short Term	1.00					
	Total		**226.00**					

Samar							
	Water Supply	Period	Budget Requirement (PhP Million)	Sanitation	Period	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Calbayog Water Supply Project	Short Term	270.00				
2	Construction of Level I to Level II Water Facilities	Medium Term	77.40				
3	Development of Water Sources, and Sanitation/Distribution System (Motiong, Pinabacdao, Villareal)	Medium Term	45.00				
4	Development of Water Sources, and Sanitation/Distribution System (Zumarraga, Zumarraga Island, Samar)	Medium Term	16.00				**817.80**
5	Rehabilitation of 494 Level II Water Facilities	Medium Term	49.40				
6	Rehabilitation of Level I Water Facilities	Short Term	360.00				
	Total		**817.80**				

Southern Leyte							
	Water Supply	Period	Budget Requirement (PhP Million)	Sanitation	Period	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Expansion of Water Supply Service Area	Medium Term	1,000.00	1 Waste Treatment Plant Installation at 6 clusters in the Province-wide of Southern Leyte	Long Term	300.00	
	Total		**1,000.00**	**Total**		**300.00**	
	Water Supply and Sanitation	Period	Budget Requirement (PhP Million)				**1,301.00**
1	Creation of Provincial WSS Plan	Short Term	1.00				
	Total		**1.00**				

120°0.000'W
160°0.000'E
80°0.000'E
40°0.000'S
40°0.000'N
60°0.000'S
20°0.000'N

AM, Salintubig Pipeline WSS Projects

DILG-WSSPMO, 2019 List of DILG Projects

Legend

- Barangays with Assistance
- Municipality with Assistance
- Priority Projects (Barangay Level)
- Priority Projects (Municipal Level)

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

NORTHERN SAMAR
SAMAR
EASTERN SAMAR
BILIRAN
LEYTE
SOUTHERN LEYTE

Bin
Lavezares
Allen
San Jose
Rosario
Victoria
Capul
San Antonio
San Isidro
Bobon
Catarman
San Roque
Pambujan
Laoang
Palapag
Mapanas
Catubig
Gamay
Lapinig
Las Navas
Jipapad
Arteche
San Policarpo
Oras
Maslog
Dolores
Can-Avid
Lope de Vega
Silvino Lobos
San Vicente
Calbayog City
Matuguinao
Tagapul-An
Santa Margarita
Gandara
San Jose de Buan
San Jorge
Pagsanghan
Almagro
Santo Nino
Tarangnan
Motiong
Paranas
Taft
Jiabong
Catbalogan City
Sulat
Hinabangan
San Julian
Maripipi
Kawayan
Culaba
Almeria
Caibiran
Biliran
Cabucgayan
Calubian
Zumarraga
Daram
Calbiga
Borongan City
Villareal
Pinabacdao
Talalora
Maydolong
Santa Rita
Basey
Balangkayan
Llorente
Hernani
General Macarthur
Babatngon
San Miguel
Barugo
Leyte
Tabango
Capoocan
Carigara
Tunga
Alangalang
Tacloban City
Marabut
Lawaan
Balangiga
Quinapondan
Salcedo
Giporlos
Mercedes
Villaba
Kananga
Jaro
Santa Fe
Palo
Matag-Ob
Pastrana
Tanauan
Dagami
Tabontabon
Tolosa
Ormoc City
Palompon
Julita
Merida
Burauen
Dulag
Isabel
Albuera
La Paz
Mayorga
Macarthur
Javier
Guiuan
Baybay City
Abuyog
Mahaplag
Inopacan
Silago
Hindang
Sogod
Hilongos
Hinunangan
Bontoc
Hinundayan
Bato
Libagon
Saint Bernard
Anahawan
Tomas Oppus
San Juan
Matalom
Maasin City
Malitbog
Liloan
Macrohon
Padre Burgos
San Francisco
San Ricardo
Pintuyan
Limasawa

Identified Priority Projects

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				
Province	Municipality	Project Type	Project Title	Amount
Biliran	Maripipi	Potable Water Supply System	Expansion of Level III Potable Water System	5,164,000
Biliran	Naval	Potable Water Supply System	Construction of Water Supply System	6,899,000
Eastern Samar	Dolores	Potable Water Supply System	Rehabilitation/Improvement of Level II Water Supply System	1,000,000
Leyte	Albuera	Potable Water Supply System	Improvement of Level III Water Supply System	6,726,000
Leyte	Babatngon	Potable Water Supply System	New Construction of Level II Potable Water System	5,174,000
Leyte	Bato	Potable Water Supply System	Construction of Water Supply System	11,251,000
Leyte	Capoocan	Potable Water Supply System	Rehabilitation/Improvement of Level III Potable Water System	5,294,000
Leyte	Hilongos	Potable Water Supply System	Rehabilitation/Improvement of Level III Potable Water System in Barangay Marangog	2,000,000
Leyte	Hilongos	Potable Water Supply System	Rehabilitation/Improvement of Level III Potable Water System in Barangay Tabunok	1,912,000
Leyte	Hilongos	Potable Water Supply System	Rehabilitation/Improvement of Level III Potable Water System in Barangay Bung-aw	2,000,000
Leyte	Leyte	Potable Water Supply System	Expansion of Water Supply System	5,440,000
Leyte	MacArthur	Potable Water Supply System	Rehabilitation/Improvement of Level III Potable Water System	8,000,000
Leyte	San Isidro	Rainwater Catchment Facility	Provision of Rainwater Catchment Facility	943,000
Leyte	San Miguel	Potable Water Supply System	Rehabilitation/Improvement of Level II Water Supply System	5,000,000
Leyte	Tanauan	Potable Water Supply System	Expansion of Potable Water System	5,906,000
Leyte	Villaba	Potable Water Supply System	Rehabilitation/Improvement of Level II Water System in Barangay Buga-buga	1,300,000
Leyte	Villaba	Potable Water Supply System	Rehabilitation/Improvement of Level II Water System in Barangay Jalas	2,400,000
Leyte	Villaba	Potable Water Supply System	Rehabilitation/Improvement of Level II Water System in Barangay Tinghub (Sitio Kanquipot)	2,934,000
Northern Samar	San Jose	Potable Water Supply System	Rehabilitation/Improvement of Level II Water System	5,000,000
Samar	Almagro	Potable Water Supply System	Rehabilitation/Improvement of Level II Water System in Marasbaras, San Isidro	3,000,000
Samar	Almagro	Potable Water Supply System	New Construction of Level II Potable Water Supply System in Talahid, Tonga-tonga	2,936,000
Samar	Calbiga	Potable Water Supply System	Expansion of Level II Water System	6,387,000
Samar	Sta. Margarita	Potable Water Supply System	Expansion of Level III Water System	6,698,000
Samar	Sta. Rita	Potable Water Supply System	New Construction of Level II Potable Water Supply System in Barangay Guinbalot-an	2,000,000
Samar	Sta. Rita	Potable Water Supply System	New Construction of Level II Potable Water Supply System in Barangay San Pedro	2,500,000
Samar	Sta. Rita	Potable Water Supply System	Rehabilitation/Improvement of Level II Water System in Barangay Santa Elena	1,610,000
Southern Leyte	Malitbog	Potable Water Supply System	Expansion of Level III Water System	9,449,000
Southern Leyte	Padre Burgos	Potable Water Supply System	Rehabilitation/Improvement of Level _?_Water Supply System	3,455,000
			Total	**122,378,000**

SALINTUBIG (2019)				
Province	Municipality	Project	Barangay	Amount
Leyte	Albuera	Improvement of Water Supply System	Talisayan	2,000,000
Leyte	Barugo	Potable Water Supply	Balire	2,500,000
Leyte	Barugo	Potable Water Supply	Hiagsam	2,500,000
Leyte	Burauen	Improvement of Level II Water System	Takin and Anonang	12,000,000
Leyte	Matalom	Construction of Level II Water System	Pres. Garcia, Caningag, Kahagnaan, Tag-Os and Sta. Fe	9,000,000
Leyte	Villaba	Expansion of Waterworks System Project	Buga-Buga, Cahigan, Jalas, Tinghub and Catagbacan	12,000,000
Northern Samar	Catubig	Construction/Upgrading of Water Supply System to Level III	Inoburan	2,500,000
Northern Samar	Gamay	Potable Water Supply Level II and III	Dao	2,000,000
Northern Samar	Gamay	Potable Water Supply Level II and III	Gamay Occidental I (Pob.)	2,000,000
Northern Samar	Silvino Lobos	Upgrading/Maintenance of Waterworks System in Identified Barangays with Climate Lens. Repair of Water Storage Tank, Pipes, Tank, Pipes, Fittings, Couplings, Valves, Transmission and Distribution Pipelines, Tapstands, etc.	Gusaran	2,000,000
Samar	Basey	Potable Water Supply	Mongabong	2,000,000
Samar	Basey	Potable Water Supply	Mabini	2,000,000
Samar	Matuguinao	Potable Water Supply	Libertad	2,000,000
Samar	Matuguinao	Potable Water Supply	Ligaya	2,000,000
Samar	Matuguinao	Potable Water Supply	Mahayag	2,000,000
Samar	Matuguinao	Potable Water Supply	Salvacion	2,000,000
Samar	Motiong	Improvement/Renovation of Level II Water Supply System and Construction of New Water Reservoir	Beri	2,000,000
Samar	Motiong	Construction of Level III Water Supply System with 500-Cubic Meter Capacity Concrete Reservoir	Caluyahan	2,000,000
Samar	Pinabacdao	Potable Water Supply	Parasanon	2,000,000
Samar	San Jorge	Potable Water Supply	Canyaki	2,000,000
Samar	San Jorge	Potable Water Supply	Guadalupe	2,000,000
Samar	San Jorge	Potable Water Supply	Libertad	2,000,000
Samar	San Jorge	Potable Water Supply	Mobo-Ob	2,000,000
Samar	San Jorge	Potable Water Supply	Puhugan	2,000,000
Samar	San Jose de Buan	Potable Water Supply	Gusa	2,000,000
Samar	San Jose de Buan	Potable Water Supply	Hagbay	2,000,000
Samar	San Jose de Buan	Potable Water Supply	Hibaca-An	2,000,000
Samar	Santa Margarita	Potable Water Supply	Campeig	2,500,000
Samar	Santa Margarita	Potable Water Supply	Matayonas	2,500,000
Samar	Santa Rita	Construction of Level II Water Supply System	Guinbalot-An	2,000,000
Samar	Santa Rita	Construction of Level II Water Supply System	San Eduardo	2,000,000
			Total	**91,500,000**

Appendix A: Provincial and HUC Profiles

BILIRAN	8 municipalities	Almeria, Biliran, Cabucgayan, Caibiran, Culaba, Kawayan, Maripipi, and Naval
	132 barangays	2 urban, 130 rural
Land Area	536.01 square kilometers	
Demographics (2015)	Population (2015) – 171,612 Population Growth Rate (2000 to 2015) – 1.33 Population Density – 320 per sq. km	
Economy	• Major industries - agriculture, fishery, livestock and poultry raising • Major crops - rice, coconuts, corn, camote, cassava, gabi, bananas, mangoes, jackfruit, vegetables • About 30,628 hectares are planted to various agricultural crops.	
Poverty Incidence (2015)	On Families – 15.2% On Population – 21.3%	
LEYTE	40 municipalities	Abuyog, Alangalang, Albuera, Babatngon, Barugo, Bato, Burauen, Calubian, Capoocan, Carigara, Dagami, Dulag Hilongos, Hindang, Inopacan, Isabel, Jaro, Javier, Julita, Kananga, La Paz, Leyte, MacArthur, Mahaplag, Matag-ob, Matalom, Mayorga, Merida, Palo, Palompon, Pastrana, San Isidro, San Miguel, Santa Fe, Tabango, Tabontabon, Tanauan, Tolosa, Tunga, and Villaba
	two (2) independent cities	Ormoc City, Tacloban City
	one (1) component city	Baybay City
	1,503 barangays (excluding Tacloban City)	52 urban, 1,451 rural
Land Area	6,313.33 square kilometers	
Demographics (2015)	Population (2015) – 1,724,679 Population Growth Rate (2000 to 2015) – 1.31 Population Density – 270 per sq. km	
Economy	• Major industries - agriculture, fishery, handicraft, livestock and poultry raising • Major crops - palay, corn, fruits • About 278,115 hectares are planted to various crops and vegetables.	
Poverty Incidence (2015)	On Families – 39.1% On Population – 31.0%	

EASTERN SAMAR	22 municipalities	Arteche, Balangiga, Balangkayan, Can-avid, Dolores, General MacArthur, Giporlos, Guiuan, Hernani, Jipapad, Lawaan, Llorente, Maslog, Maydolong, Mercedes, Oras, Quinapondan, Salcedo, San Julian, San Policarpo, Sulat, and Taft
	one (1) component city	Borongan City
	597 barangays	3 urban, 594 rural
Land Area	4,660.47 square kilometers	
Demographics (2015)	Population (2015) – 467,160 Population Growth Rate (2000 to 2015) – 1.44 Population Density – 100 per sq. km	
Economy	• Major industries - agriculture, fishery, livestock and poultry raising • Major crops - palay, corn, coconuts, bananas, pineapples • Eastern Samar has about 101,255 hectares of agricultural land. • Poultry production was at an all-time high in 2018 – it registered an increase of 5.93% from the previous year's figure.	
Poverty Incidence (2015)	On Families – 40.1% On Population – 46.3%	

NORTHERN SAMAR	24 municipalities	Allen, Biri, Bobon, Capul, Catarman, Catubig, Gamay, Laoang, Lapinig, Las Navas, Lavezares, Lope de Vega, Mapanas, Mondragon, Palapag, Pambujan, Rosario, San Antonio, San Isidro, San Jose, San Roque, San Vicente, Silvino Lobos, and Victoria
	569 barangays	7 urban, 562 rural
Land Area	3,692.93 square kilometers	
Demographics (2015)	Population (2015) – 632,379 Population Growth Rate (2000 to 2015) – 1.54 Population Density – 170 per sq. km	
Economy	• Major industries - agriculture, fishery, handicraft, livestock and poultry raising, oil manufacturing • Major crops - rice, bananas, coconuts, root crops, fruits, vegetables • Northern Samar's agricultural land covers around 179,503 hectares.	
Poverty Incidence (2015)	On Families – 52.4% On Population – 56.2%	

Appendix A: Provincial and HUC Profiles

SAMAR	24 municipalities	Almagro, Basey, Calbiga, Daram, Gandara, Hinabangan, Jiabong, Marabut, Matuguinao, Motiong, Pagsanghan, Paranas, Pinabacdao, San Jorge, San Jose de Buan, San Sebastian, Santa Margarita, Santa Rita, Santo Niño, Tagapul-an, Talalora, Tarangnan, Villareal, and Zumarraga
	two (2) component cities	Catbalogan City, Calbayog City
	951 barangays	18 urban, 933 rural
Land Area	6,048.03 square kilometers	
Demographics (2015)	Population (2015) – 780,481 Population Growth Rate (2000 to 2015) – 1.30 Population Density – 130 per sq. km	
Economy	• Major industries - agriculture, fishery, livestock and poultry raising • Major crops - rice, bananas, corn, coconuts, cassava, legumes, sugarcane, sweet potato, vegetables • There are about 101,954 hectares of farmland planted to various crops.	
Poverty Incidence (2015)	On Families – 41.8% On Population – 46.9%	
SOUTHERN LEYTE	18 municipalities	Anahawan, Bontoc, Hinunangan, Hinundayan, Libagon, Liloan, Limasawa, Macrohon, Malitbog, Padre Burgos, Pintuyan, Saint Bernard, San Francisco, San Juan, San Ricardo, Silago, Sogod, and Tomas Oppus
	one (1) component city	Maasin City
	500 barangays	5 urban, 495 rural
Land Area	1,798.61 square kilometers	
Demographics (2015)	Population (2015) – 421,750 Population Growth Rate (2000 to 2015) – 1.04 Population Density – 230 per sq. km	
Economy	• Major industries - agriculture, livestock and poultry raising • Major crops - palay, corn, coconuts, bananas, root crops, fruits, vegetables • There are about 62,220 hectares of agricultural land in Southern Leyte.	
Poverty Incidence (2015)	On Families – 30.4% On Population – 38.0%	

TACLOBAN CITY	Tacloban City is the regional center of Eastern Visayas. 138 barangays 138 urban
Land Area	201.72 square kilometers
Demographics (2015)	Population (2015) – 242,089 Population Growth Rate (2000 to 2015) – 2.01 Population Density – 1,200 per sq. km
Economy	• Tourism experienced a resurgence as a PhP4.05 billion industry in 2015. The 2.16 kilometer San Juanico Bridge is a pride of the city for it is the longest in the Philippines and its picturesque view serves as an attraction to local and foreign tourists. • There are 2,586.53 hectares being utilized for agriculture. Existing major agricultural crops include corn, coconut, vegetables, etc. Annual production amounted to 9,264.77 metric tons with a value of PhP235.32 million. Livestock and poultry farms also produced 817,796 kilograms per year with revenues reaching more than PhP91.1 million. Fishing and aquaculture yielded 1,317.11 metric tons of marine products valued at PhP128.87 million.

NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY

12 St. Josemaria Escriva Drive, Ortigas Center, Pasig City
Trunkline: (+632) 86310945 to 56
Email: info@neda.gov.ph

www.neda.gov.ph
NEDAhq