NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY

Volume 2: Philippine Water Supply and Sanitation Master Plan

Central Visayas Water Supply and Sanitation Databook and Regional Roadmap

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Acronyms

AIP	Annual Investment Plan
AM	Assistance to Municipalities
ARMM	Autonomous Region in Muslim Mindanao
BOD	Biological Oxygen Demand
BPO	Business Process Outsourcing
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
LCE	Local Chief Executive
LFPR	Labor Force Participation Rate
LWUA	Local Water Utilities Administration
LGU	Local Government Unit
MAM	March, April and May
MCWD	Metropolitan Cebu Water District
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 Program
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
PhP	Philippine peso
MCM	million cubic meters
lpcd	liters per capita per day

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Region VII Central Visayas

Introduction

Central Visayas is located in the central part of the Visayas island group.

It is bounded on the north by the Visayan Sea, on the east by the Camotes Sea, on the south by the Mindanao Sea, and on the west by the province of Negros Occidental.

The region comprises four provinces namely, Bohol, Cebu, Negros Oriental, and Siquijor, and three highly urbanized cities (HUCs) namely, Cebu City, Lapu-Lapu City and Mandaue City. Cebu City, Cebu's capital, is acknowledged as the regional center.

The region is known for its famous landmarks, the Mactan-Cebu International Airport (the second busiest airport in the country) and Bohol's Chocolate Hills, cone-shaped hills declared as the country's third National Geological Monument.

It has excellent tourism potential because of its unspoiled and pristine beaches, beautiful waterfalls, numerous caves, evergreen forests, mountain trails, and historical sites, one of them, the Magellan's Cross in Cebu City.

Land Classification

The region has a total land area of 15,886 square kilometers (km^2) (3,922,200 acres) accounting for 5% of the country's total land area. About 36% is classified as forestland and 64% alienable and disposable land.

Agricultural land covers around 32%.

Economy

The service sector made up the region's share of the gross regional domestic product (GRDP) in 2016 followed by the industry sector, and the agriculture, fishery and forestry sector (see Figure 1).

Its economy grew by 8.8% in the same year but slowed down in 2017 at 5.1% (though it remained the country's fourth region with the largest economy valued at PhP551 billion).

According to the National Economic and Development Authority (NEDA), the regional downshift in 2017 was caused by the 0.9% contraction in the construction sector, with Cebu's market for residential condominiums nearing the ceiling, as evidenced by the slower rate of sales and rising share of property buyers from areas outside of Cebu.

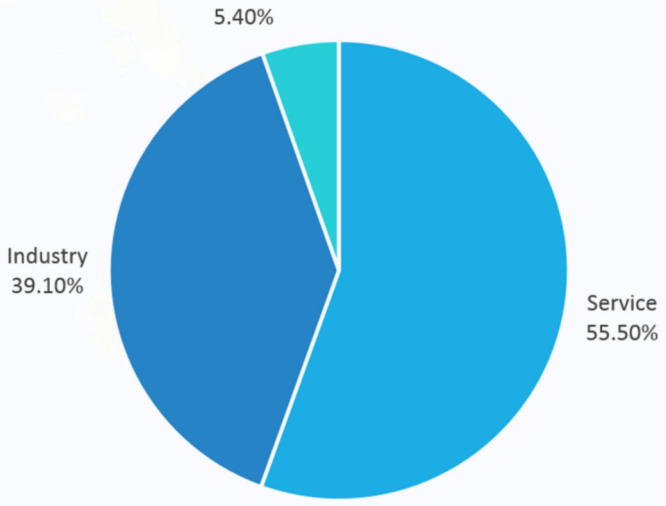

Figure 1: GRDP Contributions per Sector, 2016[1]

Labor and Employment

According to the Philippine Statistics Authority (PSA), as of January 2018, the total labor force participation rate (LFPR) was estimated at 63.1% of the total population of the region, equivalent to nearly 5.28 million Filipinos. This meant a decrease of 0.6% from the October 2017 LFPR.

As of 2016, Negros Oriental had the highest LFPR among the four provinces with 69.4%, though that of the other provinces did not differ significantly.

The employment rate in the region in January 2018 was registered at 94.2%. Among the region's provinces, Negros Oriental had the highest employment rate at 96.6% in 2016.

The unemployment rate was recorded at 5.8% and the underemployment rate at 24.4%. The region's high underemployment rate was largely attributed to the closure of many business establishments reeling from financial losses, lack of raw materials, redundancy of jobs, and reorganization.

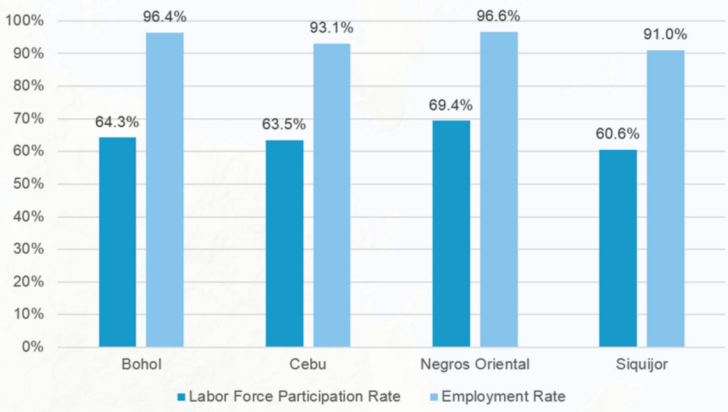

Figure 2: Labor Force Participation and Employment Rates per Province[2]

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

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Legend

Population Density (person/ha)

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- 1.18 - 1.82
- 1.82 - 2.49
- 2.49 - 3.25
- 3.25 - 4.18
- 4.18 - 5.71
- 5.71 - 8.42
- 8.42 - 14.10
- 14.10 - 37.53
- 37.53 - 5974.13

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Madridejos
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Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Consolacion
Cebu City
Toledo City
CEBU
Mandaue City
Lapu-Lapu City
Minglanilla
Talisay City
Cordoba
Pinamungahan
Naga City
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Ronda
Alcantara
Moalboal
Argao
Badian
Dalaguete
Alegria
Alcoy
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Oslob
Samboan
Santander
Pilar
Poro
Tudela
San Francisco
Jetafe
Talibon
Bien Unido
Pres. Carlos P. Ga
Trinidad
Buenavista
Inabanga
Ubay
San Miguel
Danao
Clarin
Tubigon
Sagbayan
Dagohoy
Alicia
Mabini
Calape
BOHOL
Pilar
San Isidro
Catigbian
Carmen
Candijay
Loon
Batuan
Antequera
Balilihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Valencia
Baclayon
Loboc
Dimiao
Garcia Hernandez
Dauis
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Zamboanguita
Enrique Villanueva
Larena
Siquijor
SIQUIJOR
Maria
San Juan
Lazi

Population Density

PSA, 2015 Census

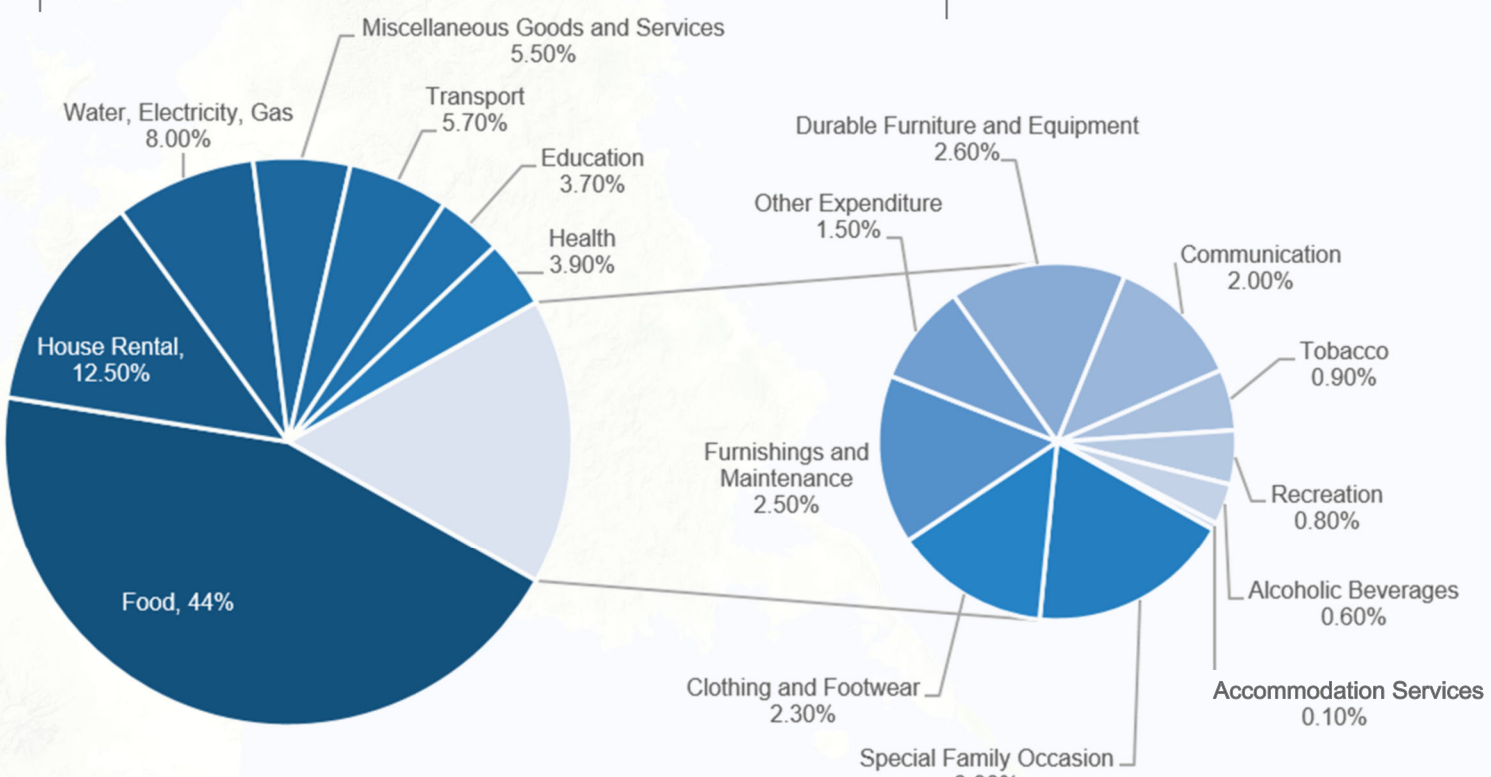

Figure 3: Distribution of Family Expenditure[3]

Family Income and Expenditure

There are about 1,672,000 families in Central Visayas, with an estimated total annual average income of PhP239,000 and a total average expenditure of PhP193,000.

In terms of income class, the total average expenditure of those earning PhP100,000 and above is greater than their average income, while the rest earn incomes greater than their expenditures.

Considering 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. This shows that a family of five has more savings compared to other family sizes.

With respect to the disbursement patterns of families in the region and across income levels, the Family Income and Expenditure Survey (FIES) conducted in 2015 showed that food expenditure accounted for the biggest share among the major expenditure groups at 44.3%. Housing expenses followed at 12.5%, while water, electricity, gas and other fuels expenses accounted for 8.0%. Figure 3 graphs the expenditure distribution indicating that most families spend more for their basic needs.

Demography

As of 2015, Central Visayas' total population stood at 7,396,898, which accounted for 7.3% of the Philippine population. Cebu (excluding Cebu City, Mandaue City and Lapu-Lapu City) and Siquijor had the largest and smallest population, respectively (see Table 1).

The region's population growth from 2010 to 2015 was recorded at 1.53%, lower than the national average of 1.84%.

Its population density in 2015 averaged 470 persons per square kilometer. The map on the left shows that a large percentage of its population is concentrated in the cities as well as along the coastal areas.

The region is predominantly rural — about 56% comprises its rural population. Average household size is estimated at 4.31 persons (see Table 2).

Table 1: Population per Province/HUC, 2015

Region/Province/ City	Population	Land Area (km^2)	Population Density (Persons/ km^2)
Central Visayas	**7,396,898**	**15,885.97**	**470**
Bohol	1,313,560	4,820.95	270
Cebu (excluding Cebu City, Lapu-Lapu City, Mandaue City)	2,938,982	4,943.72	590
Negros Oriental	1,354,995	5,385.53	250
Siquijor	95,984	337.49	280
Cebu City	922,611	315.00	2,900
Lapu-Lapu City	408,112	58.10	7,000
Mandaue City	362,654	25.18	14,400

Table 2: Urban and Rural Population per Province/HUC, 2015[4]

Region/Province/ City	Urban Population	Rural Population	HH Size
Central Visayas	**44%**	**56%**	**4.31**
Bohol	11%	89%	4.54
Cebu (excluding Cebu City, Lapu-Lapu City, Mandaue City)	38%	62%	4.37
Negros Oriental	30%	70%	4.35
Siquijor	5%	95%	4.19
Cebu City	93%	7%	4.05
Lapu-Lapu City	93%	7%	4.05
Mandaue City	93%	7%	4.05

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

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WGS 1984 - UTM Zone 51 N

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

PAGASA, 2015 Data

Climate

Central Visayas has a tropical monsoon climate.

It has three types of climate: Type I, Type III and Type IV. It is comparatively one of the coldest regions in the Philippines with an average daily high temperature of only 32°C. Generally, its climate is partly tropical, hot and humid most of the year. There is less rain from February to May — the amount of precipitation decreases from June to October.

Disaster Risk

Because of the region's geographical location, it is vulnerable to geohazards as evidenced by quite a number of natural disasters 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	flooding, drought, rain-induced landslide, sea level rise, storm surges

Central Visayas, however, is relatively safe from tropical cyclones because the rest of Negros Island (in the west) and Leyte (in the east) serve as its "shield".

Climate Change and Hydrological Hazards

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

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

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

The projected seasonal temperature increase, seasonal rainfall change and frequency of extreme events (temperatures higher than 35°C, days when rainfall is more than 300 mm, and rainy days that outnumber dry days) in Region VII 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
Bohol	26.6	28.0	28.2	27.8	0.9	1.2	1.2	1.0	1.8	2.3	2.3	1.9
Cebu	26.8	28.4	28.2	27.9	0.9	1.2	1.1	1.0	1.9	2.4	2.1	1.9
Negros Oriental	27.0	28.4	28.0	27.8	0.9	1.2	1.0	1.0	1.9	2.3	2.0	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
Bohol	376.1	209.6	412.9	514.5	9.8	-7.1	4.5	6.8	21.2	-11.9	18.9	22.6
Cebu	324.0	228.3	595.1	607.4	17.7	0.8	7.7	7.7	19.6	0.5	18.9	17.8
Negros Oriental	225.8	226.0	639.5	636.9	15.0	-4.9	9.3	4.7	17.4	-6.8	20.7	10.5

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
Bohol	Tagbilaran	260	1710	3413	8176	6836	6473	0	1	6
Cebu	Mactan	25	1488	2463	7112	5720	5693	0	0	1
Negros Oriental	Dumaguete	66	826	1499	8451	6032	5642	0	0	0

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WGS 1984 - UTM Zone 51 N

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CEBU

BOHOL

NEGROS ORIENTAL

SIQUIJOR

Contour Map

NAMRIA

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1000
Madridejos
Bantayan
Daanbantayan
Santa Fe
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Pilar
Danao Lake
Poro
Tudela
San Francisco
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Cebu City
Mandaue City
Lapu-Lapu City
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Pinamungahan
Minglanilla
Cordoba
Naga City
Aloguinsan
San Fernando
Barili
Carcar
Jetafe
Talibon
Bien Unido
Pres. Carlos P.
Buenavista
Trinidad
Inabanga
Ubay
San Miguel
Danao
Alicia
Mabini
Dagohoy
Tubigon
Calape
Sagbayan
Pilar
Candijay
Carmen
Catigbian
Loon
Batuan
Sierra Bullones
Guindulman
Balilihan
Maribojoc
Bilar
Duero
Cortes
Sevilla
Jagna
Corella
Valencia
Garcia Hernandez
Dimiao
Dauis
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Lila
Panglao
Vallehermoso
Canlaon City
Guihulngan City
La Libertad
Dumanjug
Jimalalud
Ronda
Sibonga
Alcantara
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Argao
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Alegria
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Alcoy
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Boljoon
Negros Oriental
Ginatilan
Bayawan City
Tanjay City
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Oslob
Basay
Pamplona
Amlan
Santander
San Jose
Sibulan
Valencia
Santa Catalina
Dumaguete City
Bacong
Larena
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Zamboanguita
San Juan
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Average Rainfall
PAGASA, 2015 Data
Legend
Annual Rainfall 2015

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WGS 1984 - UTM Zone 51 N

60°0.000'S

Legend

Safe Drinking Water (%)

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

20°0.000'N

80°0.000'S

Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
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Enrique Villanueva
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Maria
San Juan
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Jetafe
Talibon
Bien Unido
Pres. Carlos P. Ga
Buenavista
Trinidad
Ubay
Inabanga
San Miguel
Danao
Clarin
Tubigon
Sagbayan
Dagohoy
Alicia
Mabini
Calape
BOHOL
Pilar
San Isidro
Catigbian
Carmen
Candijay
Loon
Batuan
Antequera
Balilihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Valencia
Baclayon
Loboc
Dimiao
Garcia Hernandez
Albuquerque
Dauis
Lila
Loay
Panglao

Access to Safe Water

PSA, 2015 Census

WSS Sector Status

Access to Safe Water

About 85% of Central Visayas' population in 2015 had access to safe water sources in 2015[5].

This translates to around 1,458,700 households. About 48.5% of the population has Level III service connection in their own homes while 14.6% has Level II connections that they share with the community. Access to Level I comprises 22.1%.

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

The region's access to safe water is nearly on a par with national average of about 88%, with only a 3% difference. In terms of access per level of service, Central Visayas' numbers do not differ significantly with the national figures. Level III access, registered at 48.5%, is higher than the national figure of 44.1%.

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

Level of Service	National	Central Visayas
Level III	44.1%	48.5%
Level II	11.2%	14.6%
Level I (Safe Sources)	32.4%	22.1%
Subtotal (Safe Sources)	*87.7%*	*85.2%*
Level 1 (Unsafe Sources)	12.3%	14.8%
Total	100.0%	100.0%

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

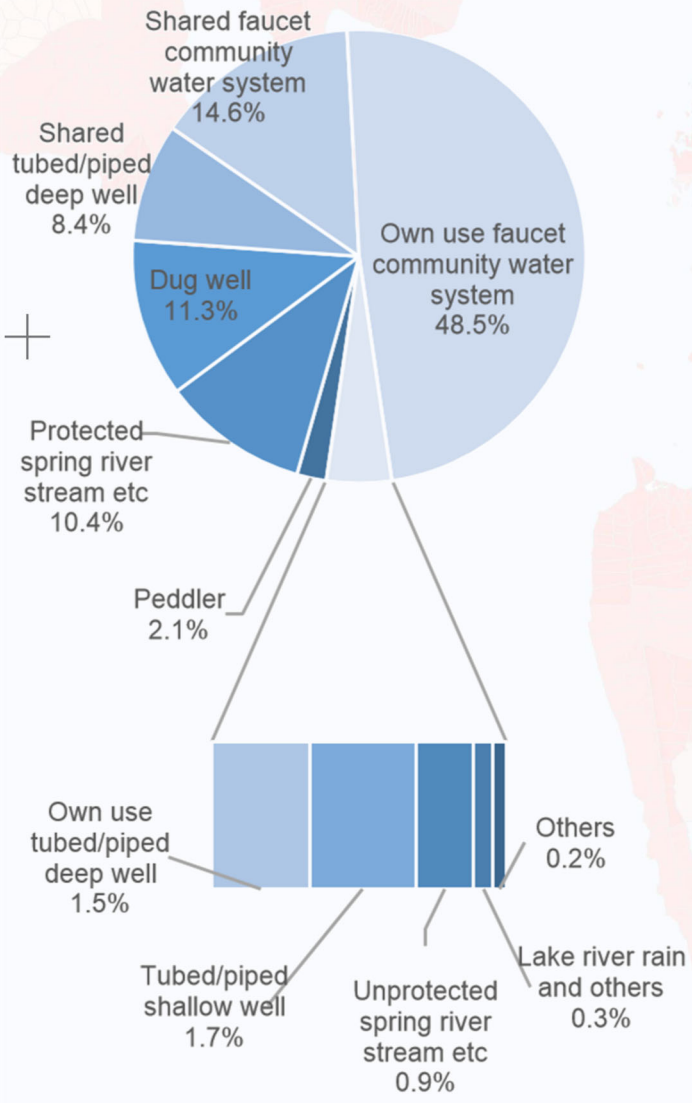

Figure 4: Main Sources of Water Supply, 2015

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

Region/Province/City	Access to Safe Water Supply
Central Visayas	**64.7%**
Bohol	74.6%
Cebu	33.1%
Negros Oriental	90.7%
Siquijor	76.2%
Cebu, Mandaue and Lapu-Lapu Cities	90.5%

Figure 5 shows a map of the extent of access to safe water at the provincial level in 2015.

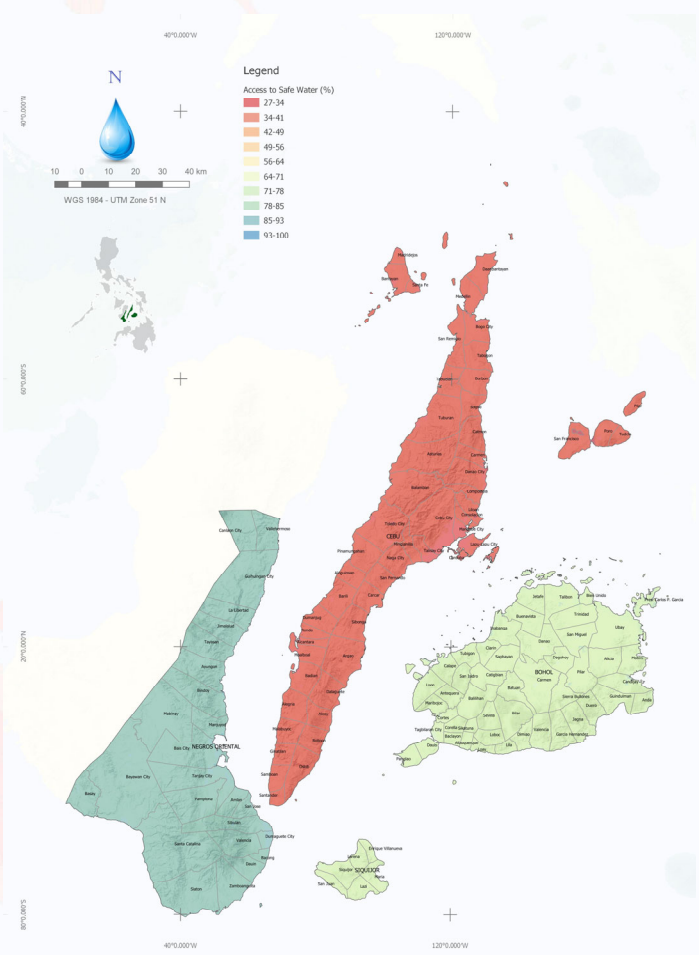

Figure 5: Provincial Access to Safe Water

Drinking Water

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

The 2017 National Demographic and Health Survey (NDHS) survey showed that 96.2% of the population in Central 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, Bohol has the lowest access to safe drinking water at around 84%.

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

[5] *Philippine Statistics Authority, Family Income and Expenditure Survey, 2015*
[6] *Ibid.*
[7] *Based on Central Visayas provinces' firsthand data on access to safe water (as gathered during the regional consultation and planning workshop)*

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10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Consolacion
Cebu City
Toledo City
Cebu
Mandaue City
Minglanilla
Lapu-Lapu City
Pinamungahan
Talisay City
Naga City
Cordoba
Aloguinsan
San Fernando
Barili
Carcar
Dumanjug
Sibonga
Ronda
Alcantara
Moalboal
Argao
Badian
Dalaguete
Alegria
Alcoy
Malabuyoc
Boljoon
Ginatilan
Oslob
Samboan
Santander
Pilar
Danao Lake
Poro
Tudela
San Francisco
Canlaon City
Vallehermoso
Guihulngan City
La Libertad
Jimalalud
Tayasan
Ayungon
Bindoy
Mabinay
Manjuyod
Bais City
Negros Oriental
Bayawan City
Tanjay City
Basay
Pamplona
Amlan
San Jose
Sibulan
Dumaguete City
Valencia
Santa Catalina
Bacong
Dauin
Siaton
Zamboanguita
Enrique Villanueva
Larena
Siquijor
Maria
San Juan
Lazi
Jetafe
Talibon
Bien Unido
Pres. Carlos P. Garcia
Buenavista
Trinidad
Inabanga
Ubay
San Miguel
Danao
Clarin
Tubigon
Sagbayan
Dagohoy
Alicia
Mabini
Calape
Bohol
San Isidro
Catigbian
Pilar
Carmen
Loon
Batuan
Candijay
Antequera
Balilihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Valencia
Baclayon
Loboc
Dimiao
Garcia Hernandez
Albuquerque
Lila
Dauis
Loay
Panglao
Legend
Sanitation Access
16% - 25%
25% - 33%
33% - 41%
41% - 50%
50% - 58%
58% - 67%
67% - 75%
75% - 83%
83% - 92%
92% - 100%

Access to Sanitation

Central Visayas Regional Workshop and Planning Consultation, 2017 Data

Access to Sanitation

Central Visayas' growth as a region is mainly driven by the services and industry sectors in Tagbilaran City, Cebu City, Lapu-Lapu City, Mandaue City, Dumaguete City, and surrounding municipalities. The fast-paced growth of the region has necessarily increased the demand for sanitation services.

About 71.6% of the region's population has access to improved sanitation.

The 2015 FIES has reported that the regional percentage of access to basic and improved sanitation is almost the same as the national percentage (see Table 8).

A cause for concern, however, is the region's open defecation rate, which is twice the national average. It has the fourth highest open defecation rate, next to Eastern Visayas, 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	Central Visayas
Improved Sanitation	73.77%	71.58%
Basic Sanitation	19.96%	19.44%
Unimproved Sanitation	2.04%	0.50%
Open Defecation	4.23%	8.48%
Total	100.0%	100.0%

Siquijor registers the highest access to basic sanitation at 90.01% and represents only 1.3% of the region's total population. Cebu, the province with the highest population base in the region, has the least percentage of households with sanitary toilets at 73.2%, 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/City[9]

Region/Province/ City	HHs with Sanitary Toilets	HHs with Complete Basic Sanitation Facilities
Central Visayas	**66.14%**	**42.55%**
Bohol	88.29%	52.30%
Cebu	73.20%	43.05%
Negros Oriental	*	*
Siquijor	90.01%	35.95%
Cebu City	83.33%	83.33%
Lapu-Lapu City	78.93%	78.93%
Mandaue City	92.85%	*

** No Data*

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

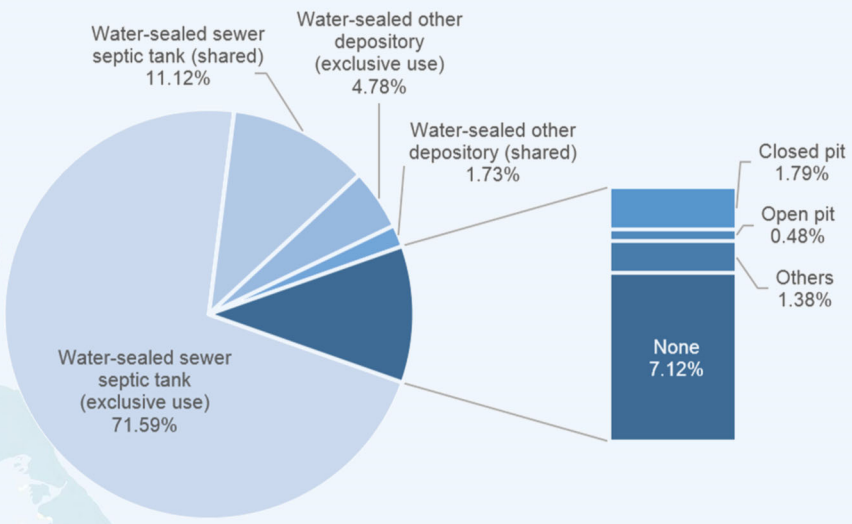


Figure 6: Percentage of Households with Access to Sanitation Facilities

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 Cental 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 septage treatment plants (STPs), i.e., in the municipality of Cordoba and the cities of Dumaguete, Bayawan, Naga and Cebu.

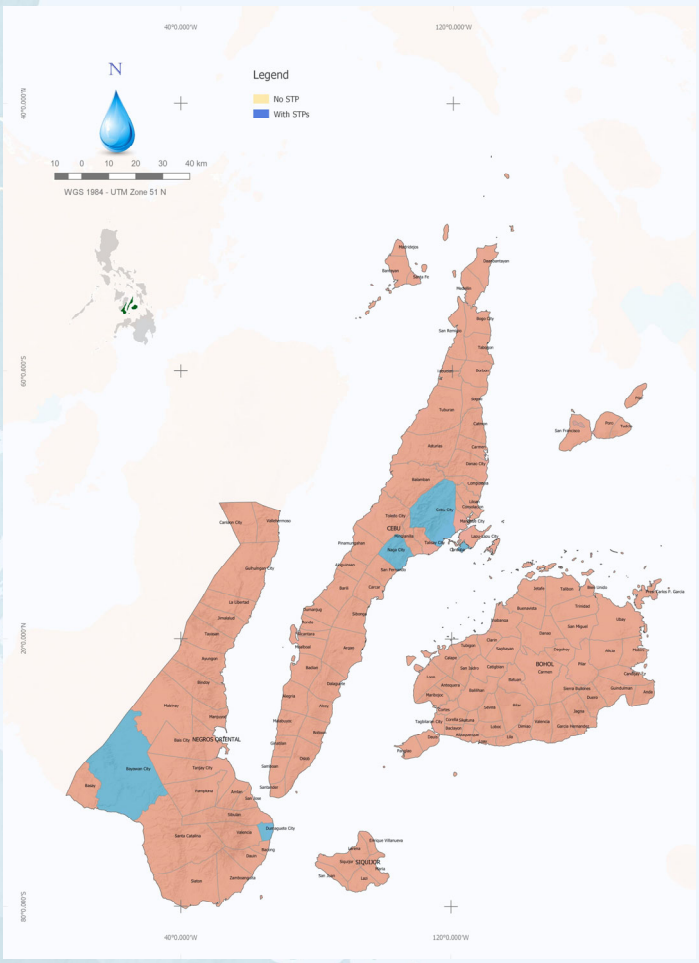


Figure 7: Existing Septage Treatment Plants[10]

[8] Philippine Statistics Authority, Family Income and Expenditure Survey, 2015
[9] Department of Health, FHSIS Annual Report CY 2015 (ro7.doh.gov.ph)
[10] Based on Central Visayas provinces' firsthand data on access to safe water (as gathered during the regional consultation and planning workshop)

40°0.000'W

120°0.000'W

N

40°0.000'N

Legend

Water Bodies

Major River Basin

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Panay River Basin

Jalaur River Basin

60°0.000'S

20°0.000'N

Ilog-Hibangan River Basin

Central Visayas Rivers and Tributaries

DENR, NWRB, NAMRIA

80°0.000'S

40°0.000'W

120°0.000'W

Water Resources

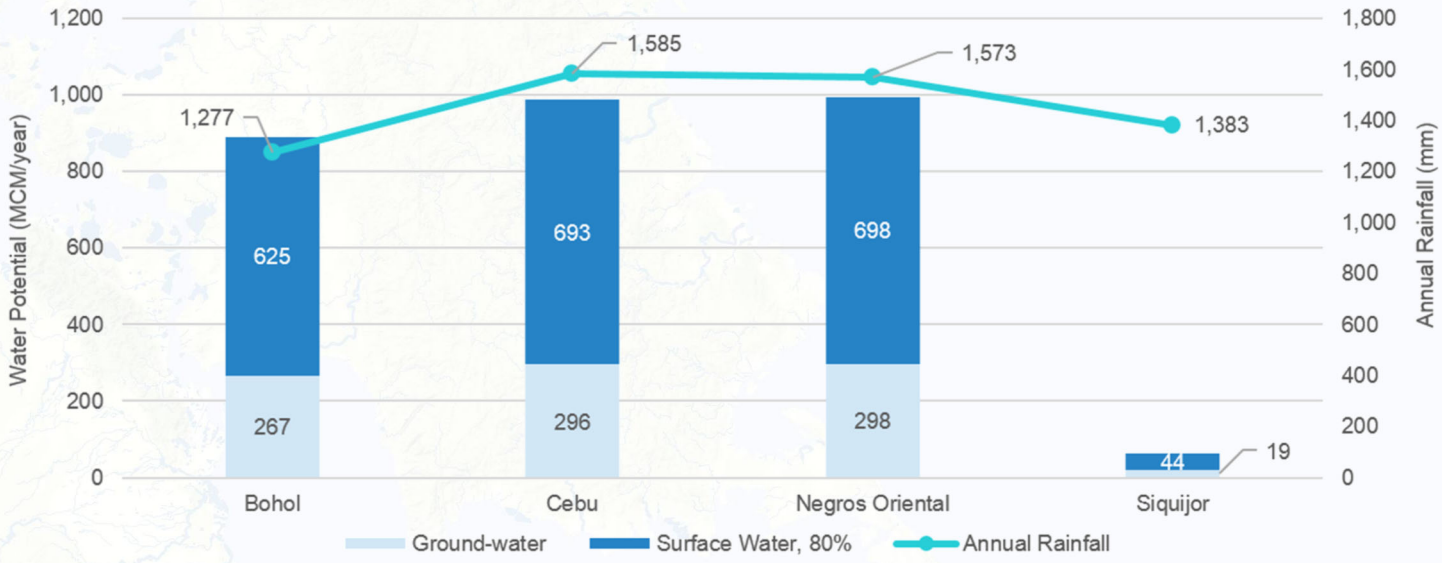


Figure 8: Water Resources Potential and Annual Rainfall[12]

Central Visayas ranks 3rd among all administrative regions with the least water resources potential.

The region's water resources potential totals 2,939 million cubic meters (MCM)/year, accounting for only 2.01% 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 879 MCM/year while surface water is estimated at 2,060 MCM/year. Annual rainfall in the region averages 1,455 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.

Central Visayas straddles only WRR 7.

Surface Water

There are about 34 major rivers in the region that are potential water supply sources. Of these, 13 are found in Negros Oriental, 6 in Bohol, and 15 in Cebu. Most of these rivers are used for irrigation except in Cebu where rivers are used for both irrigation and industrial purposes.

Table 10: Classification of Rivers in Region VII

Province	River	
Bohol	Abatan River	Loboc River
	Inabanga River	Matul-id River
Cebu	Balamban River	Guadalupe River
	Cotcot River	Guindarohan River
	Ginabasan River	Lahug River
	Mananga River	Luyang River
	Sapangdaku River	Bulacao River
	Argao River	Bagatayam River
	Butuanon River	Bojo River
	Danao River	
Negros Oriental	Bayawan River	Tanjay River
	Canaway River	Tyabanan River
	Cawitan River	Banica River
	La Libertad River	Guihulngan River
	Pangatban River	Ocoy River
	Siaton River	Panamangan River
	Sicopong River	

Siquijor has 3 minor rivers, which have not yet been properly evaluated as potential water supply sources. However, some of its rivers and creeks are being used for irrigation. These are Sapang Daku, Gabayan and Tag -ibo Rivers and Capalasan Creek.[11]

The region also has a number of lakes, dams and reservoirs, which are potential sources of water for irrigation, domestic and industrial use.

Ilog-Hilabangan River Basin

The Ilog-Hilabangan River Basin is located in Negros Island covering a portion of both the provinces of Negros Occidental and Negros Oriental. It has a total area of 2,118.17 km^2. Forestland is approximately 46.64% of the total area, concentrated in the headwaters of the basin and along the topographical divide. Alienable and disposable land covers 53.36% of the total area, concentrated in the downstream and middle stream portion of the basin.

The river basin covers the municipalities of Jimamalud, Tayasan, Ayungon, Bindoy and Mabinay, and the cities of Bayawan, Bais and Tanjay in Negros Oriental.

[11] National Nutrition Council—Central Visayas Regional Demography
[12] JICA Master Plan on Water Resources Management in the Philippines, 1998; NWRB; PAGASA Rainfall Data; FAO

40°0.000'W

120°0.000'W

40°0.000'N

60°0.000'S

20°0.000'N

80°0.000'S

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Legend

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

Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Pilar
Poro
Tudela
San Francisco
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Consolacion
Cebu City
Toledo City
Mandaue City
CEBU
Minglanilla
Lapu-Lapu City
Talisay City
Cordoba
Pinamungahan
Naga City
Aloguinsan
San Fernando
Barili
Carcar
Dumanjug
Sibonga
Ronda
Alcantara
Moalboal
Argao
Badian
Dalaguete
Alegria
Alcoy
Malabuyoc
Boljoon
Ginatilan
Samboan
Oslob
Santander
Canlaon City
Vallehermoso
Guihulngan City
La Libertad
Jimalalud
Tayasan
Ayungon
Bindoy
Mabinay
Manjuyod
Bais City
NEGROS ORIENTAL
Bayawan City
Tanjay City
Basay
Pamplona
Amlan
San Jose
Sibulan
Dumaguete City
Valencia
Santa Catalina
Bacong
Dauin
Siaton
Zamboanguita
Enrique Villanueva
Larena
Siquijor
SIQUIJOR
Maria
San Juan
Lazi
Jetafe
Talibon
Bien Unido
Pres. Carlos P. Ga
Buenavista
Trinidad
Inabanga
Ubay
San Miguel
Danao
Clarin
Tubigon
Sagbayan
Dagohoy
Alicia
Mabini
Calape
BOHOL
Pilar
San Isidro
Catigbian
Carmen
Candijay
Loon
Batuan
Antequera
Balilihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Valencia
Baclayon
Loboc
Dimiao
Garcia Hernandez
Albuquerque
Dauis
Lila
Loay
Panglao

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 1,000 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).

Central Visayas has well-distributed groundwater with aquifers ranging from limited to fairly productive. There are also some areas in Cebu where aquifers are extensive and highly productive. The entire province of Siquijor has less productive aquifers.

Water Use

As of 2017, water use in the region based on awarded water permits was estimated at 4,715.5 MCM annually. Of this figure, about 1,854 MCM (or 39.33%) is allocated for power generation and is categorized as nonconsumptive use.

The irrigation sector consumes about 917.2 MCM, the municipal/domestic sector 224.6 MCM, and the industrial sector 1,535.7 MCM (see Figure 9).

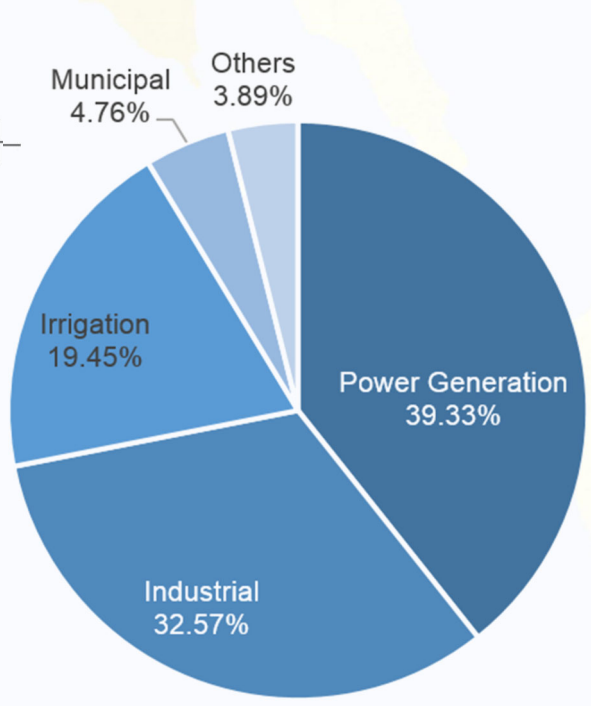


Figure 9: Water Resource Utilization, 2017[13]

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 m^3 per person. When annual water supplies drop below 1,000 m^3 per person, the population faces water scarcity, and below 500 m^3 'absolute scarcity.'" (UN Water, n.d.)[14]

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

Central Visayas has a per capita water availability of around 397 m^3/year, absolute water scarcity in the region.

Table 12: Water Availability per Province

Region/Province	Water Availability (m^3/capita/year) 2015 Population
Bohol	679
Cebu	214
Negros Oriental	735
Siquijor	656
Central Visayas	**397**

Figure 10 presents the computed figures to highlight the provinces' level of water availability, stress, and scarcity.

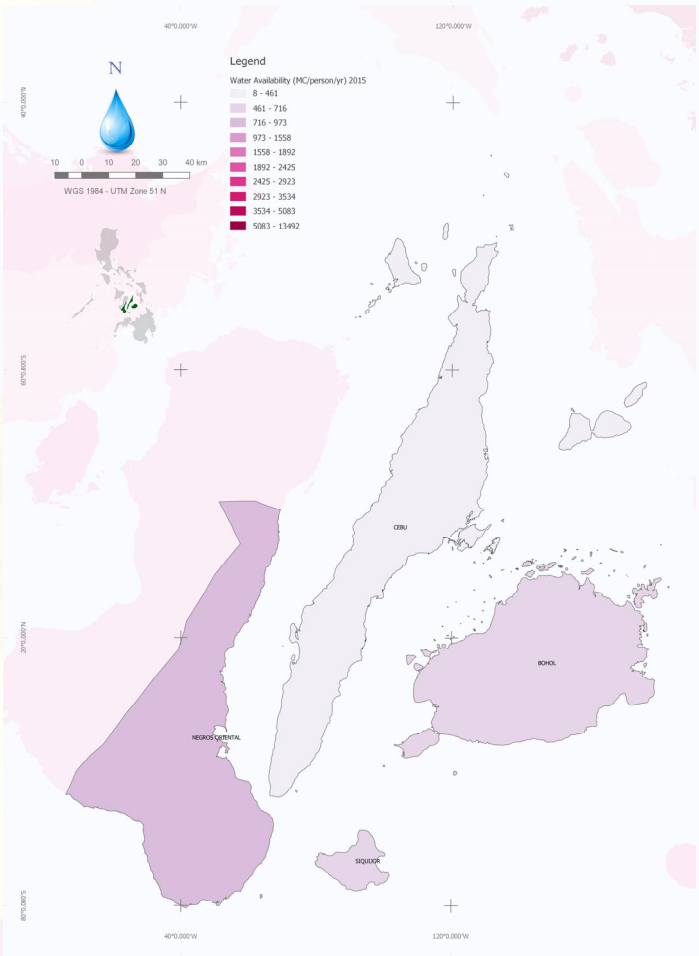


Figure 10: Water Availability Map, 2015

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

Demand

Population Projection

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

Employing PSA's 2010-based population projections which were adjusted to conform with the actual 2015 population, the region's population is projected to reach 10,031,488 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 460 MCM/year, 602 MCM/ year, and 757 MCM/year, respectively.

Water Demand vs. Water Resources Potential

The water demand of the industrial, business and domestic sectors in Central 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 (757 MCM/year) to the water resources potential of the region (2,939 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.

The water scarcity in the region may be attributed to the untallied demand not reflected in the statistics cited earlier. Shortages in the water supply in the upcoming years are foreseen if no water management schemes are developed and enforced to control demand shifts.

Approaches to water resources management may include utilization and proper use of existing water resources to ensure sustainable and adequate water supply for domestic use.

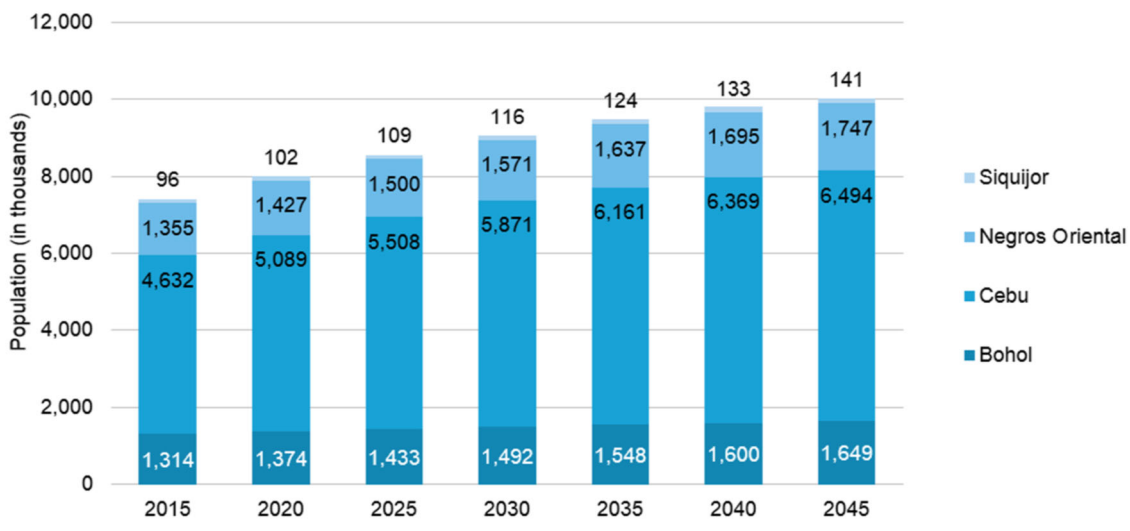


Figure 11: Projected Population

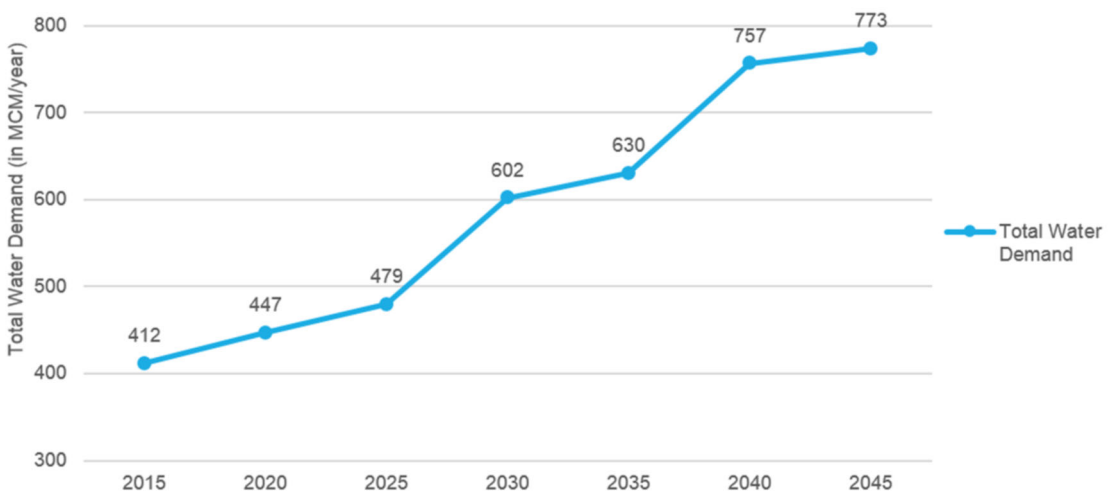
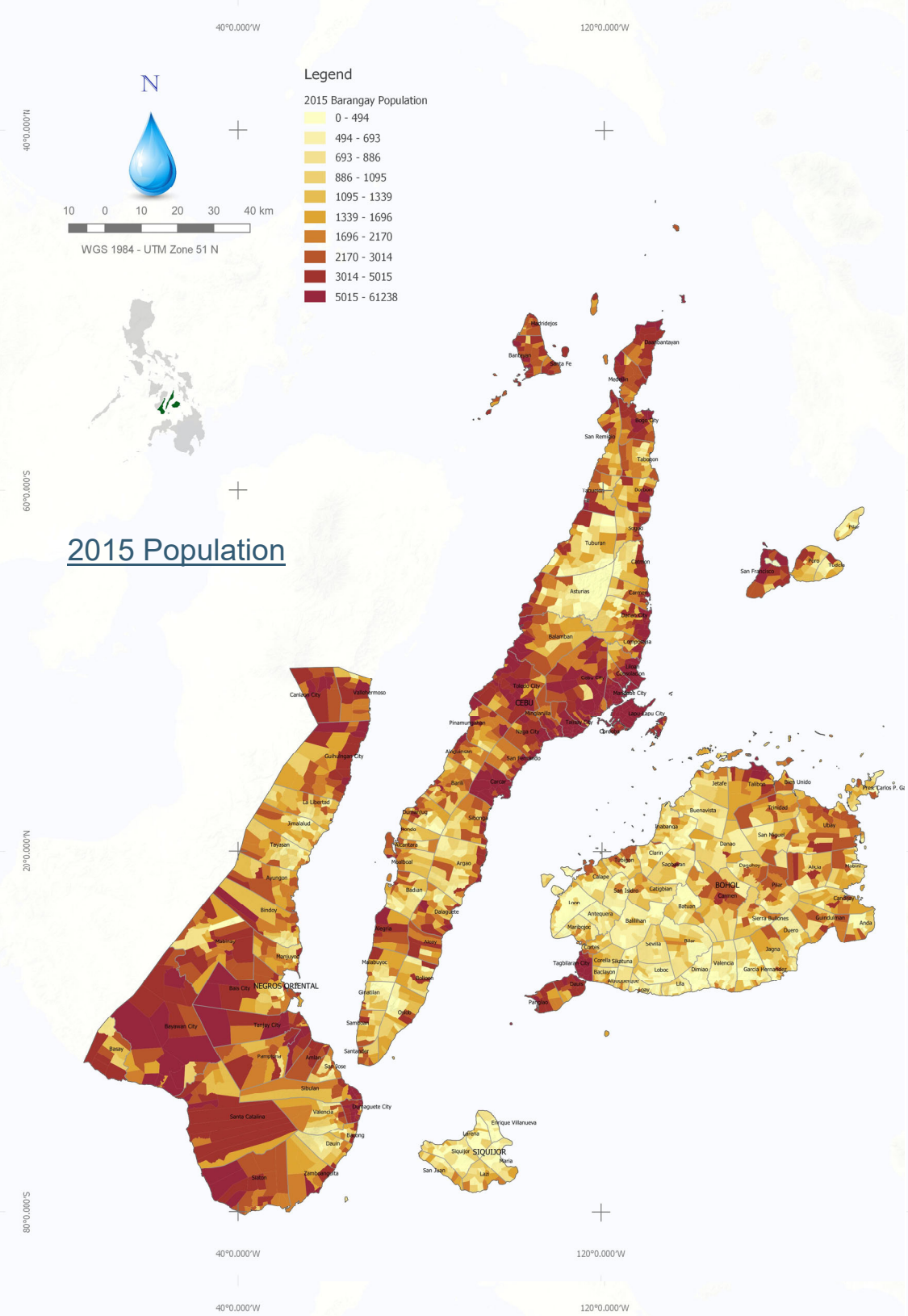
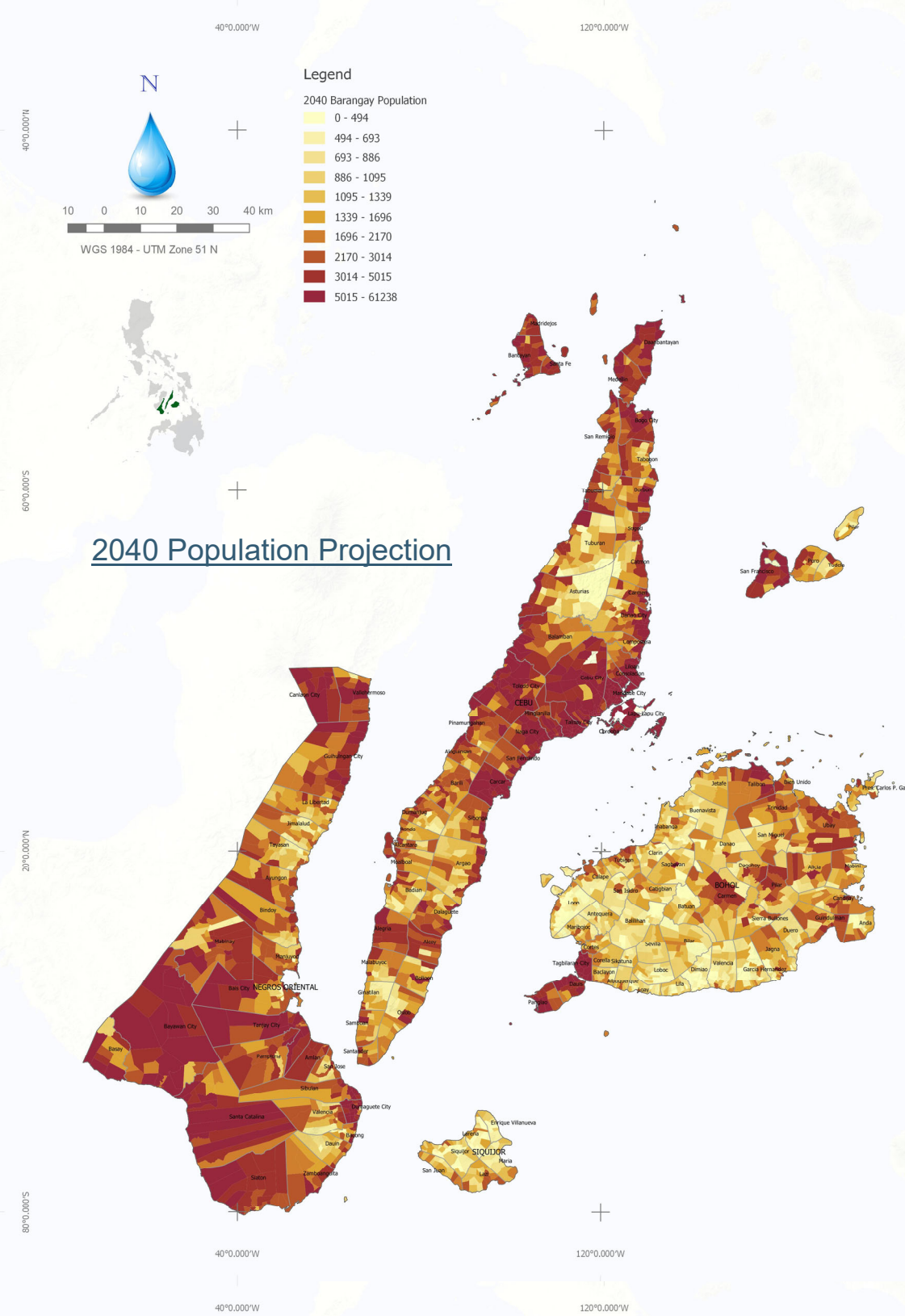


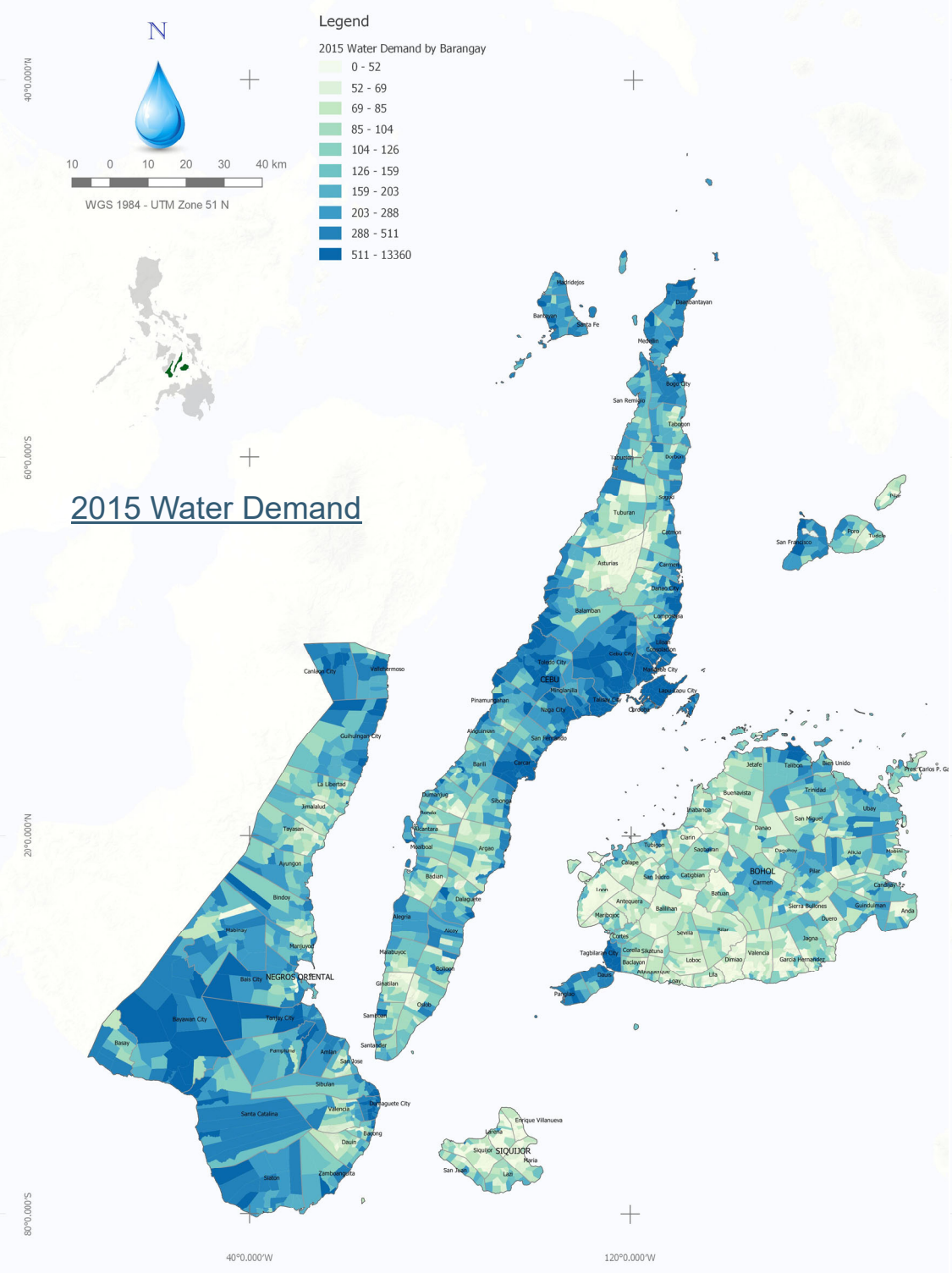
Figure 12: Projected Water Demand



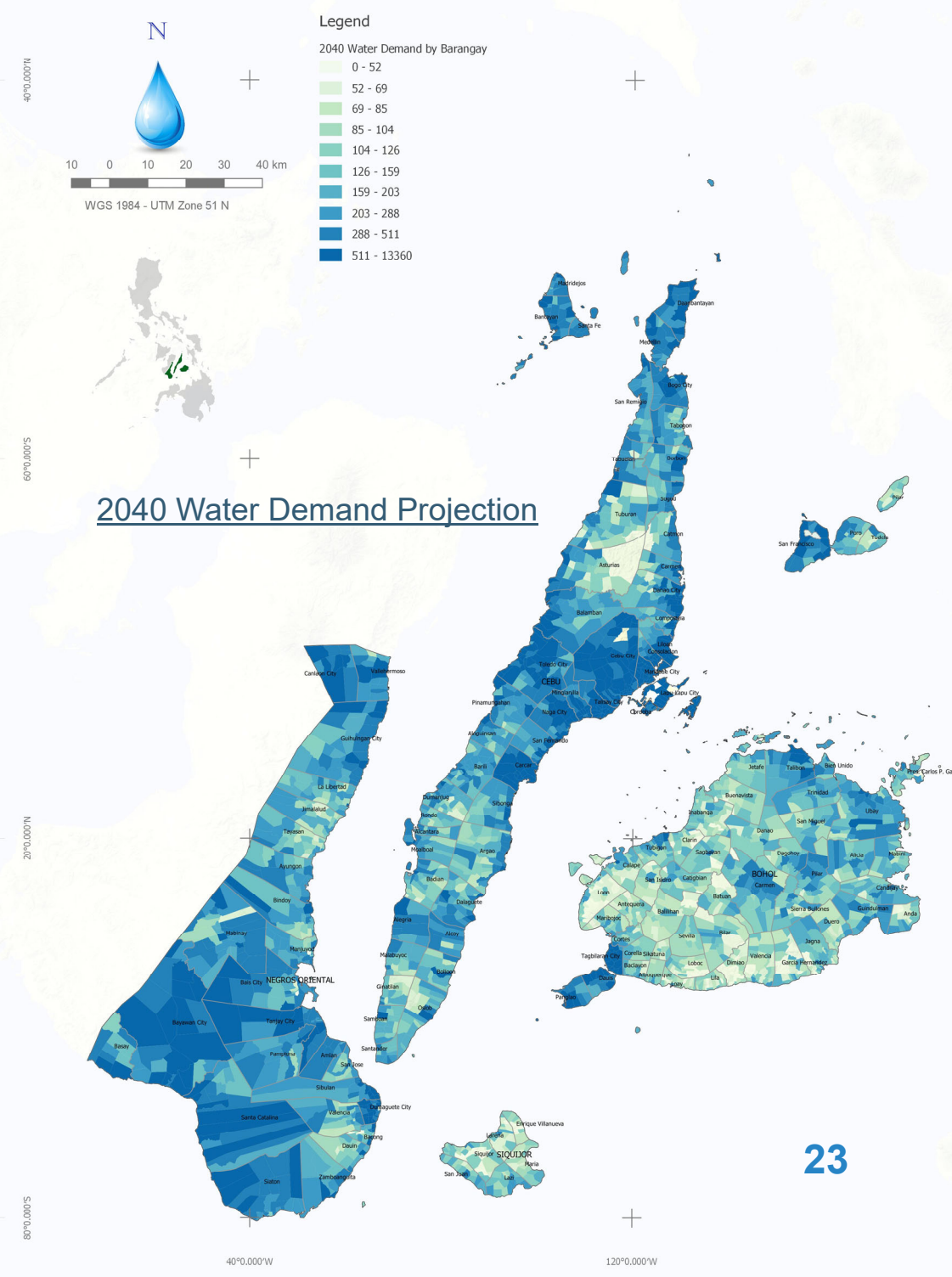
2015 Population



2040 Population Projection



2015 Water Demand



2040 Water Demand Projection

40°0.000'W

120°0.000'W

N

40°0.000'N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

60°0.000'S

20°0.000'N

80°0.000'S

Legend

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

Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Consolacion
Cebu City
Toledo City
Mandaue City
CEBU
Minglanilla
Lapu-Lapu City
Talisay City
Pinamungahan
Naga City
Cordoba
Aloguinsan
San Fernando
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Alegria
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Malabuyoc
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Tudela
San Francisco
Canlaon City
Vallehermoso
Guihulngan City
La Libertad
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Tanjay City
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San Jose
Sibulan
Dumaguete City
Santa Catalina
Valencia
Bacong
Dauin
Siaton
Zamboanguita
Enrique Villanueva
Larena
Siquijor
SIQUIJOR
Maria
San Juan
Lazi
Jetafe
Talibon
Bien Unido
Pres. Carlos P. Ga
Buenavista
Trinidad
Inabanga
Ubay
San Miguel
Danao
Clarin
Tubigon
Sagbayan
Dagohoy
Alicia
Mabini
Calape
San Isidro
Catigbian
BOHOL
Pilar
Carmen
Candijay
Loon
Batuan
Antequera
Balilihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Baclayon
Loboc
Dimiao
Valencia
Garcia Hernandez
Albuquerque
Dauis
Lila
Loay
Panglao

Water Districts And Areas Covered By Level III Service

LWUA, PAWD, NWRB Listahang Tubig, 2017 Data

WSS Infrastructure

Water service providers (WSPs) of various management types serve around 45% of Central Visayas.[15]

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

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

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

Water Supply Service Providers

The percentage of the population having access to or being served by these WSPs is not in accord with the figures in PSA's 2015 FIES mainly because the former came from various sources[16], 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 33 operational WDs serving Central Visayas, 20 were operational and 13 non-functional. These 20 WDs were serving roughly 31% (or 2.31 million of the total population), of which only about 1.89 million or 82% (or about 1.89 million) was served.

Cebu has the highest coverage of 93% while Bohol has the lowest coverage with only 23% of the population covered.

LGU-Led Water Utilities

There are 304 LGU-led water utilities within the region covering 445,850 or 6% of the total population of Central Visayas.

BWSA

There are 646 BWSA utilities within the region being utilized by 45 areas or at about 9% with respect to the total population.

RWSA

There are 70 RWSA utilities within the region being utilized by 25 areas covering 25,065 of the total population.

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	%
Bohol	48	WDs	7	87,270	19,878	23%
		LGU-led	106		94,495	7%
		BWSA	123		69,719	5%
		RWSA	40		25,065	2%
		Private/Others	444		250,622	19%
		Subtotal	**720**	**1,313,560**	**459,779**	**35%**
Cebu	53	WDs	18	1,688,075	1,570,651	93%
		LGU-led	60		256,810	6%
		BWSA	338		77,750	2%
		RWSA	8		12,970	0%
		Private/Others	260		369,866	8%
		Subtotal	**684**	**4,632,359**	**2,288,047**	**49%**
Negros Oriental	25	WDs	7	511,858	285,673	56%
		LGU-led	122		80,420	6%
		BWSA	126		47,495	4%
		RWSA	17		45,430	3%
		Private/Others	230		51,069	4%
		Subtotal	**502**	**1,354,995**		**38%**
Siquijor	6	WDs	1	26,861	14,616	54%
		LGU-led	16		14,125	15%
		BWSA	59		16,745	17%
		RWSA	5		2,679	3%
		Private/Others	47		32,464	34%
		Subtotal	**128**	**95,984**	**80,629**	**84%**
Central Visayas Region	132	WDs	33	2,314,064	1,890,818	82%
		LGU-led	304		445,850	6%
		BWSA	646		211,709	3%
		RWSA	70		86,021	1%
		Private/Others	981		704,021	10%
		Grand Total	**2,034**	**7,396,898**	**3,338,542**	**45%**

[15] Based on registered WSPs in Listahang Tubig (Data as of 2017)
[16] Local Water Utilities Administration (LWUA), PAWD, NWRB Listahang Tubig

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

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Cebu City
Mandaue City
Lapu-Lapu City
Cordoba
Cebu
Pinamungahan
Minglanilla
Naga City
Aloguinsan
San Fernando
Barili
Carcar
Sibonga
Dumanjug
Ronda
Alcantara
Moalboal
Argao
Badian
Dalaguete
Alegria
Alcoy
Malabuyoc
Boljoon
Ginatilan
Samboan
Oslob
Santander
Pilar
Danao Lake
Poro
Tudela
San Francisco
Canlaon City
Vallehermoso
Guihulngan City
La Libertad
Jimalalud
Tayasan
Ayungon
Bindoy
Mabinay
Manjuyod
Negros Oriental
Bayawan City
Tanjay City
Basay
Pamplona
Amlan
San Jose
Sibulan
Santa Catalina
Valencia
Dumaguete City
Bacong
Dauin
Siaton
Zamboanguita
Siquijor
Larena
San Juan
Lazi
Jetafe
Talibon
Ubay
Trinidad
San Miguel
Inabanga
Danao
Tubigon
Calape
Loon
Bohol
Dagohoy
Alicia
Mabini
Pilar
Candijay
San Isidro
Catigbian
Batuan
Sierra Bullones
Guindulman
Mariboojoc
Cortes
Bilar
Duero
Sevilla
Jagna
Corella
Valencia
Garcia Hernandez
Dimiao
Dauis
Loay
Lila
Panglao

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

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.

Central Visayas has the fourth highest open defecation rate among all regions at 8.48%. About 627,000 people, mostly informal settlers along coasts, were reported to be practicing open defecation in 2015. 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 Central Visayas.

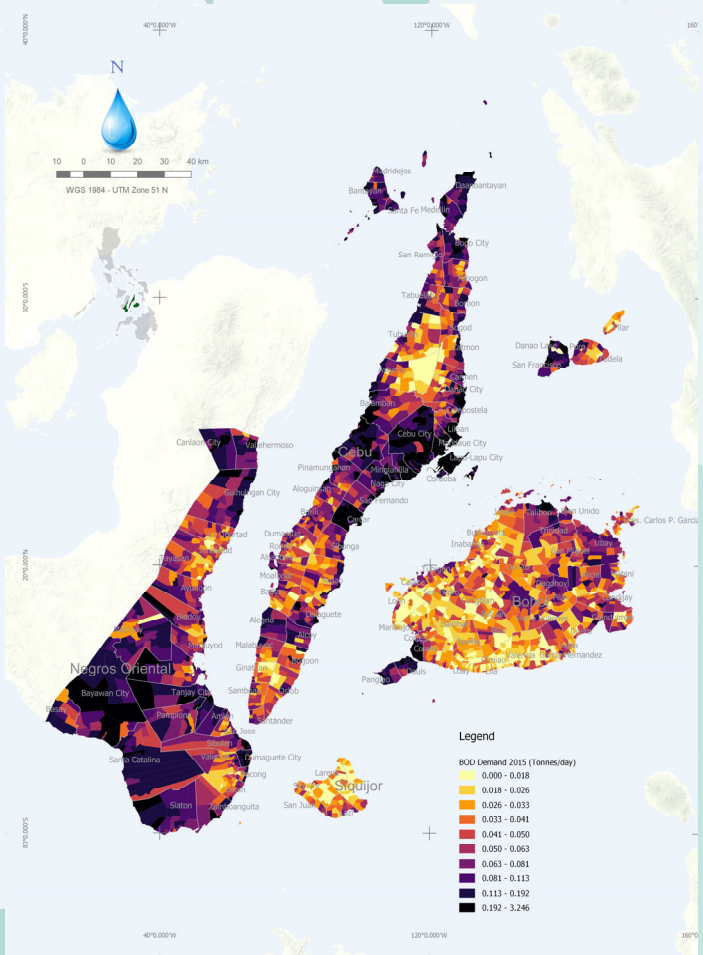


Figure 13: Biological Oxygen Demand, 2015

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[17] per person per day is used.

The wastewater[18] 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.

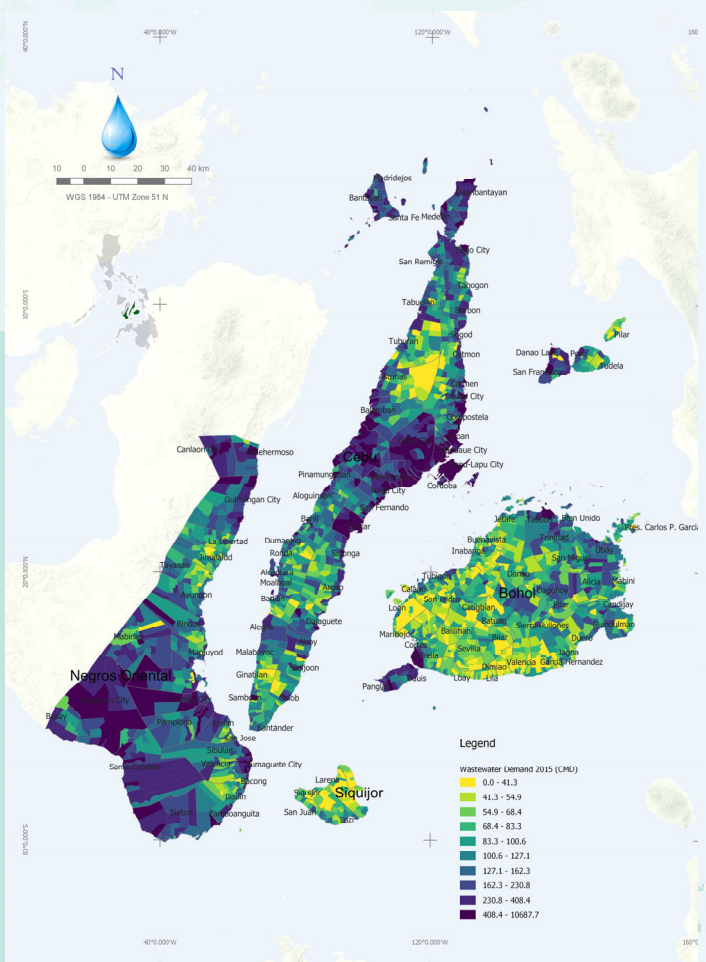
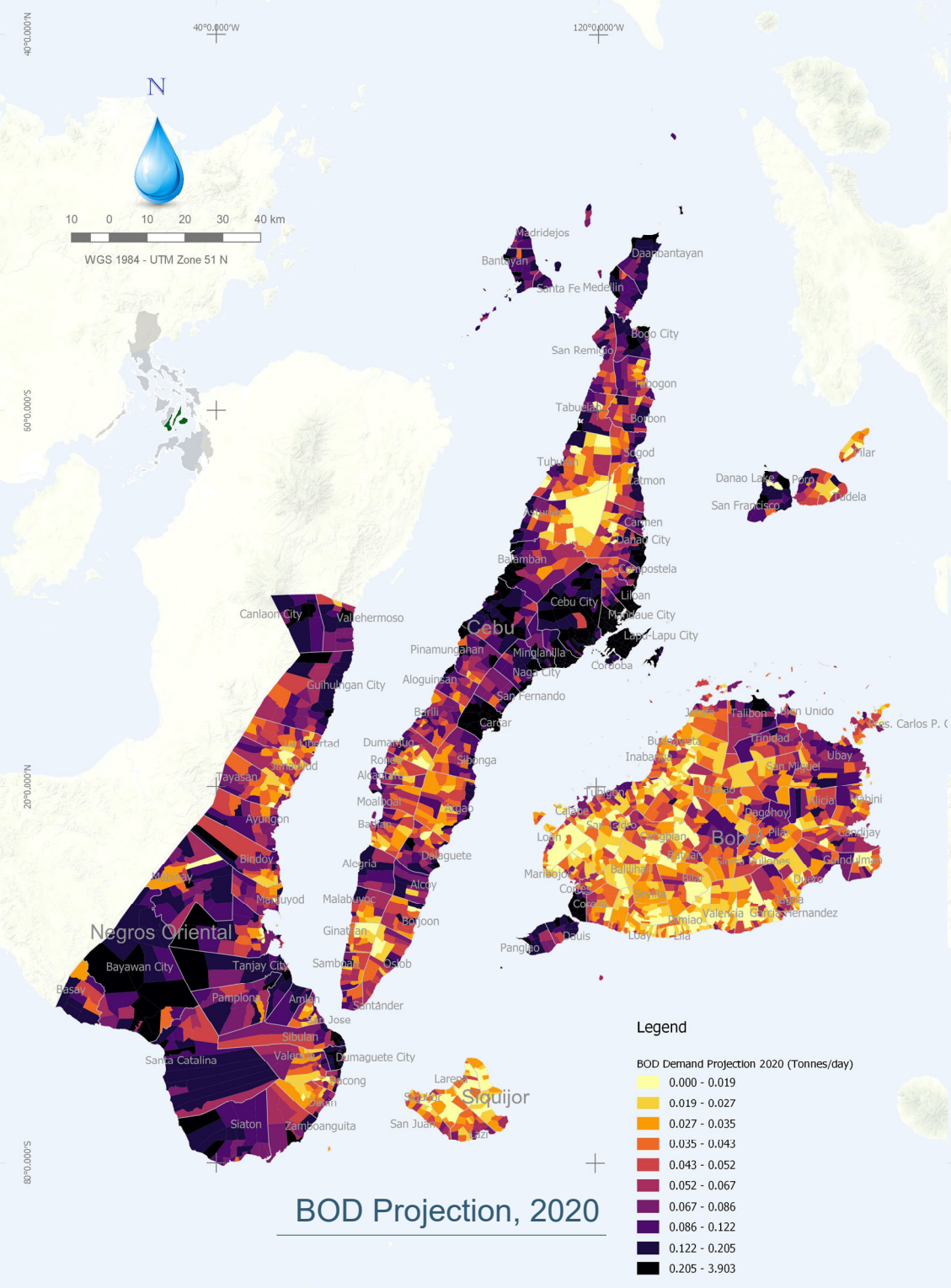
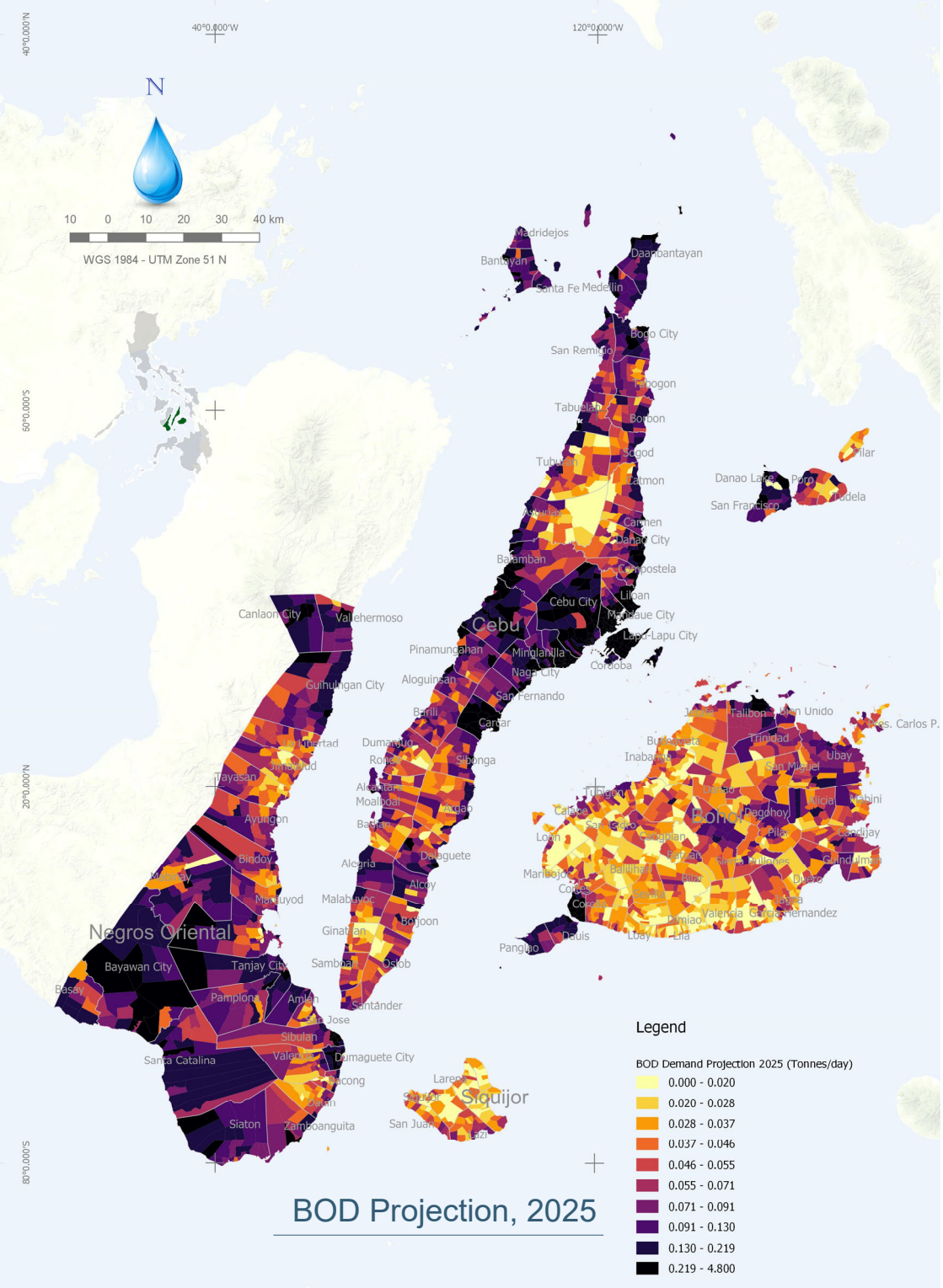
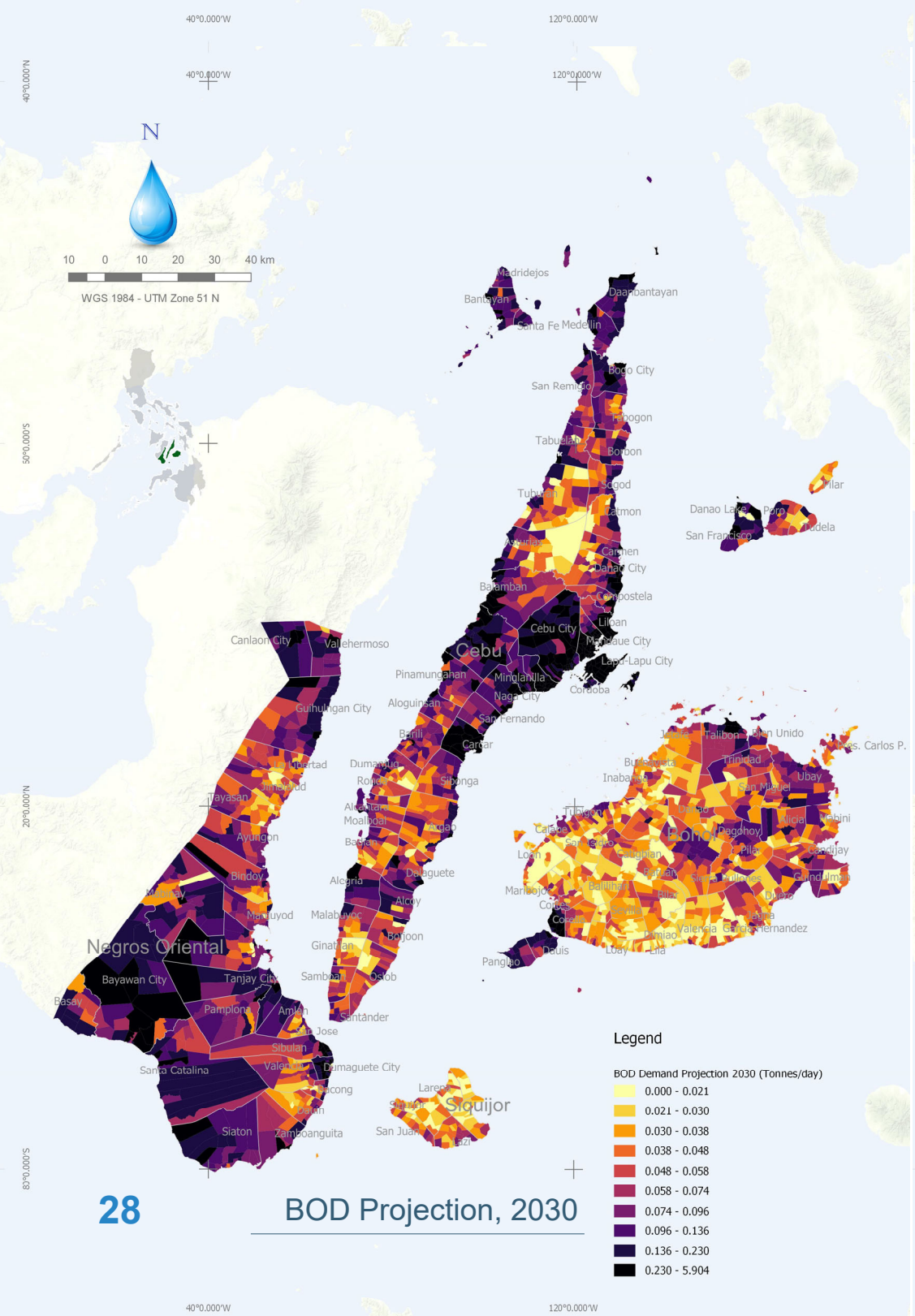


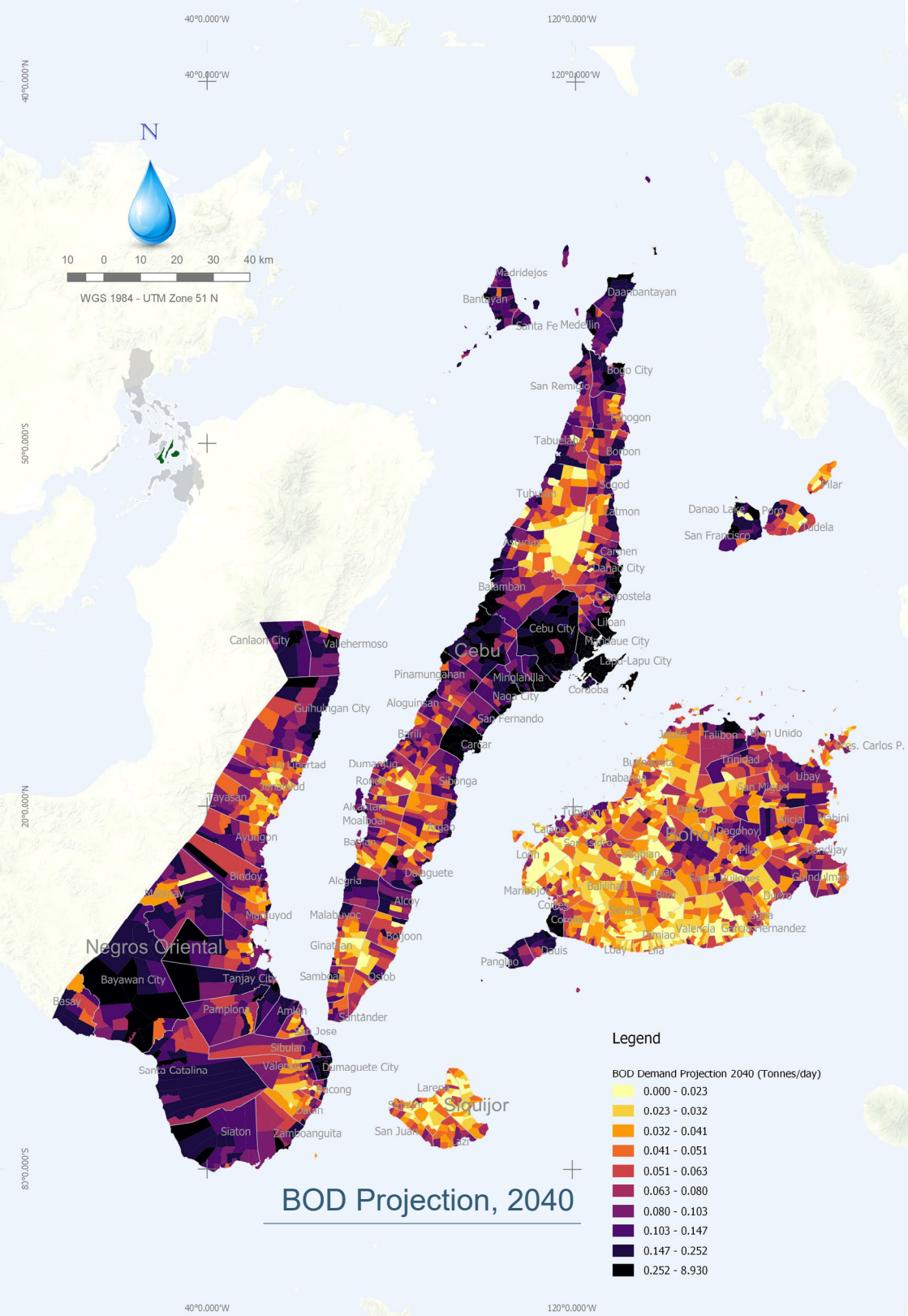
Figure 15: Wastewater Produced, 2015

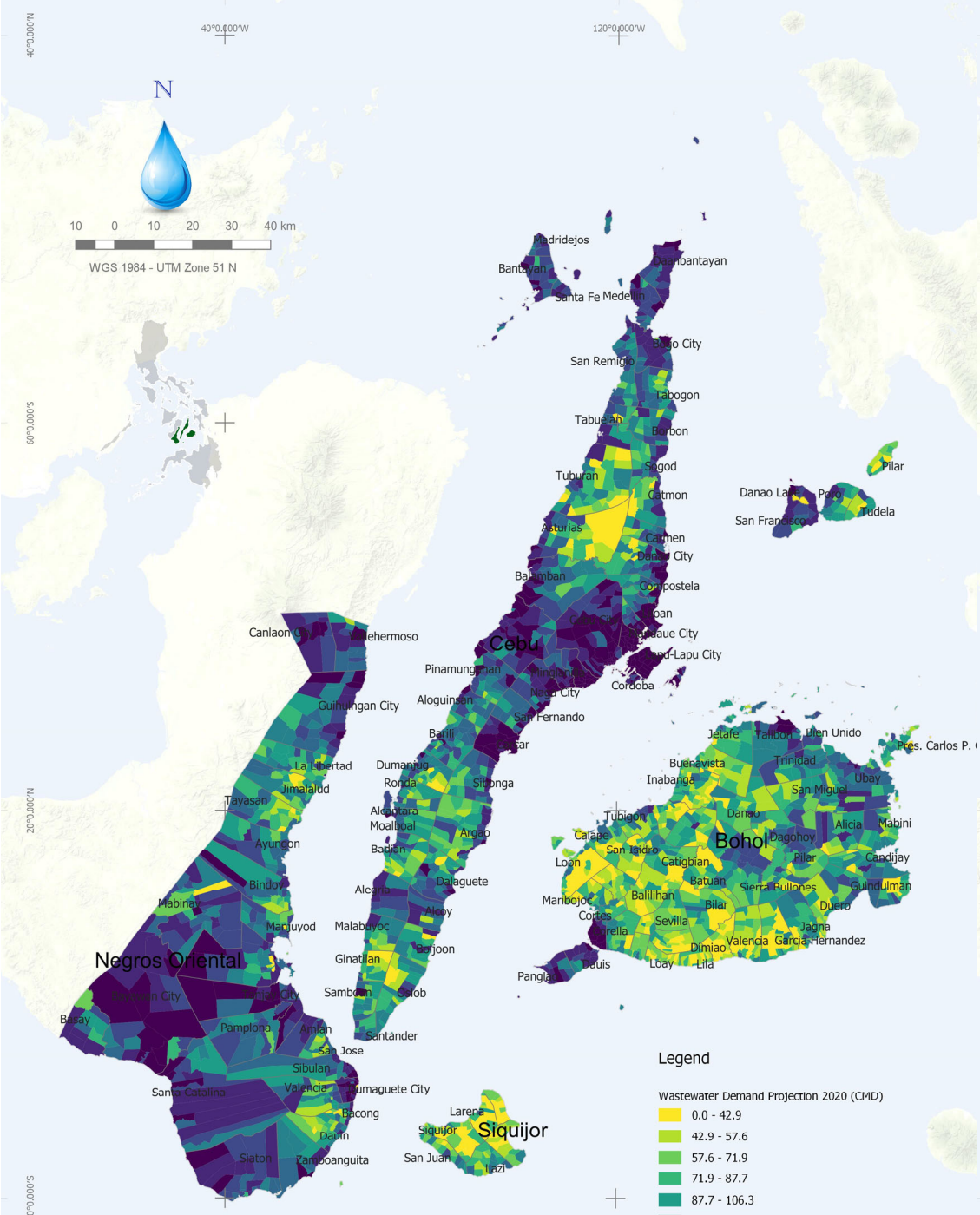
[17] Philippine Environment Monitor (PEM), 2003
[18] Ibid.


N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Legend
BOD Demand Projection 2020 (Tonnes/day)
0.000 - 0.019
0.019 - 0.027
0.027 - 0.035
0.035 - 0.043
0.043 - 0.052
0.052 - 0.067
0.067 - 0.086
0.086 - 0.122
0.122 - 0.205
0.205 - 3.903
BOD Projection, 2020

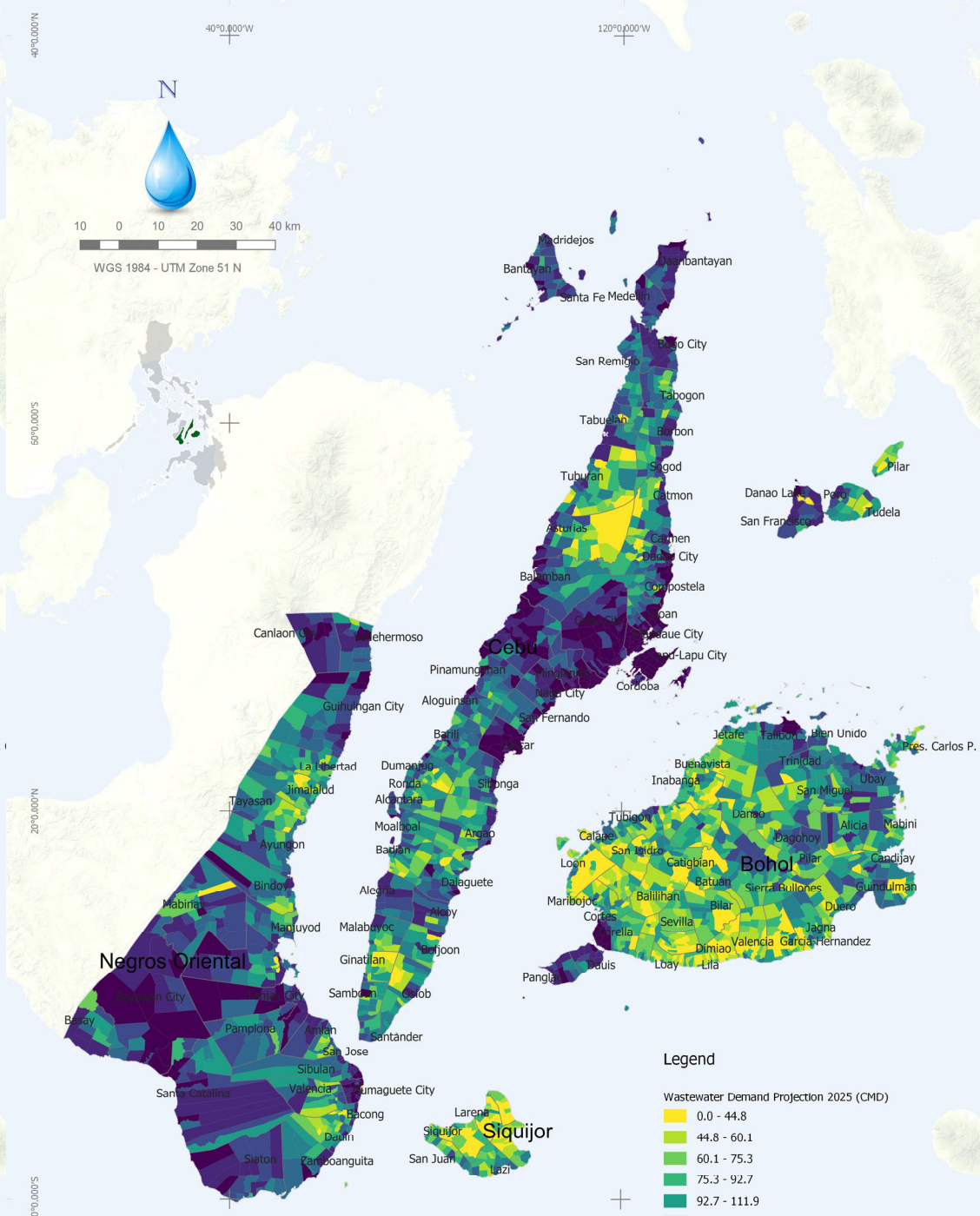

N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Legend
BOD Demand Projection 2025 (Tonnes/day)
0.000 - 0.020
0.020 - 0.028
0.028 - 0.037
0.037 - 0.046
0.046 - 0.055
0.055 - 0.071
0.071 - 0.091
0.091 - 0.130
0.130 - 0.219
0.219 - 4.800
BOD Projection, 2025


N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Legend
BOD Demand Projection 2030 (Tonnes/day)
0.000 - 0.021
0.021 - 0.030
0.030 - 0.038
0.038 - 0.048
0.048 - 0.058
0.058 - 0.074
0.074 - 0.096
0.096 - 0.136
0.136 - 0.230
0.230 - 5.904
BOD Projection, 2030

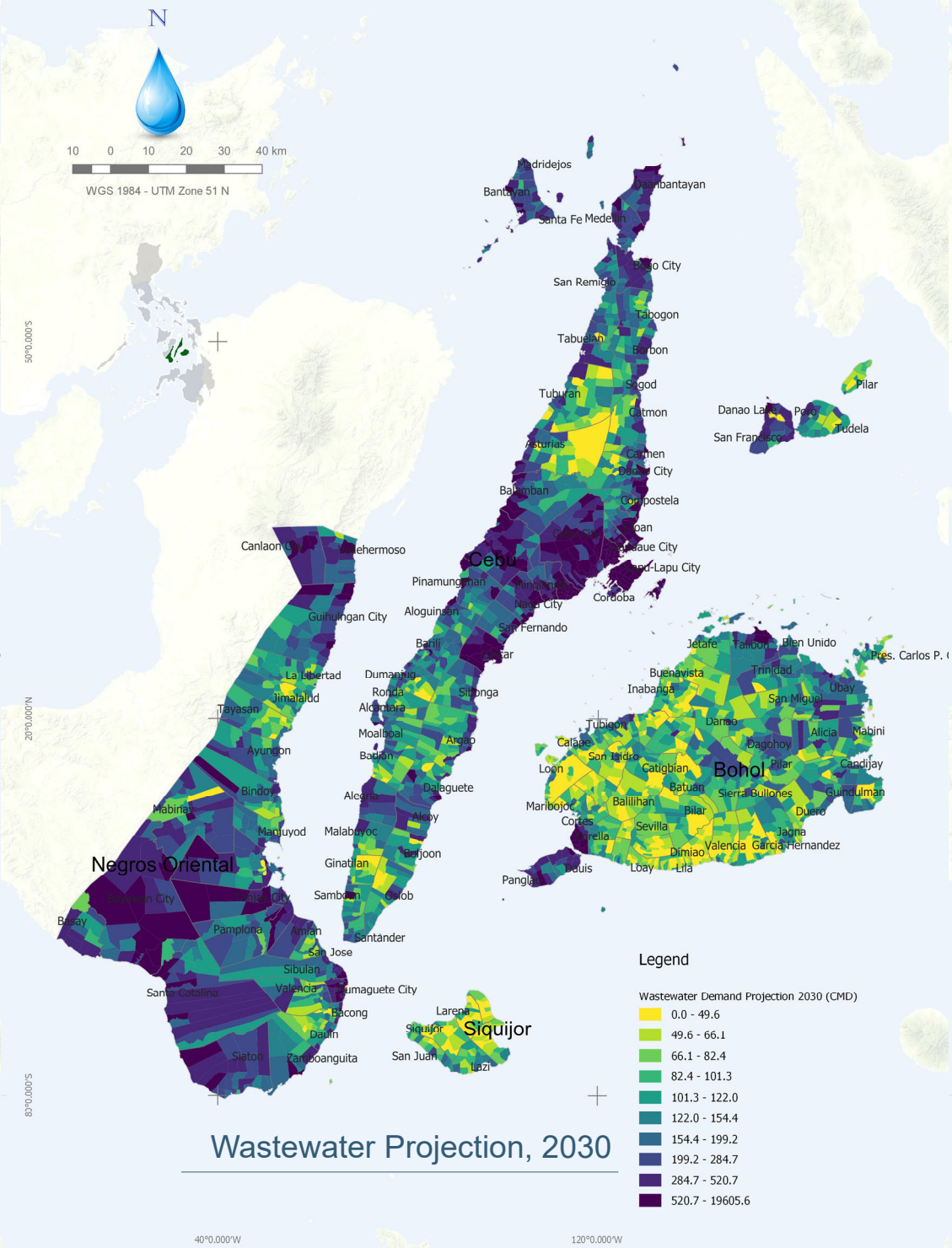

N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Legend
BOD Demand Projection 2040 (Tonnes/day)
0.000 - 0.023
0.023 - 0.032
0.032 - 0.041
0.041 - 0.051
0.051 - 0.063
0.063 - 0.080
0.080 - 0.103
0.103 - 0.147
0.147 - 0.252
0.252 - 8.930
BOD Projection, 2040



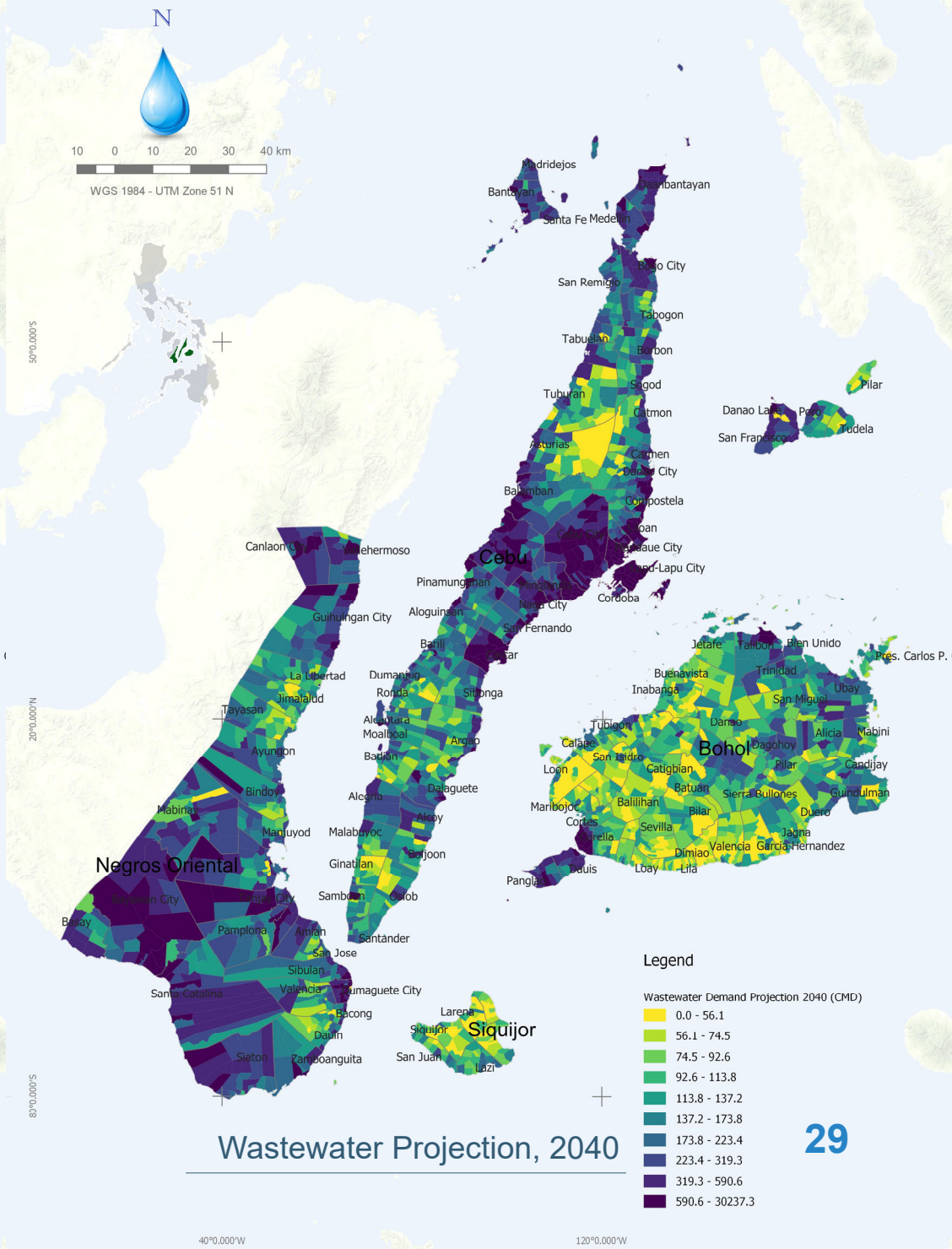
Wastewater Projection, 2020



Wastewater Projection, 2025



Wastewater Projection, 2030



Wastewater Projection, 2040

40°0.000'W

120°0.000'W

40°0.000'N

60°0.000'S

20°0.000'N

80°0.000'S

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Legend

With Water Quality Problem

Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Consolacion
Cebu City
Toledo City
Mandaue City
CEBU
Minglanilla
Lapu-Lapu City
Pinamungahan
Talisay City
Naga City
Cordoba
Aloguinsan
San Fernando
Barili
Carcar
Dumanjug
Sibonga
Ronda
Alcantara
Moalboal
Argao
Badian
Dalaguete
Alegria
Alcoy
Malabuyoc
Boljoon
Ginatilan
Oslob
Samboan
Santander
Canlaon City
Vallehermoso
Guihulngan City
La Libertad
Jimalalud
Tayasan
Ayungon
Bindoy
Mabinay
Manjuyod
Bais City
NEGROS ORIENTAL
Bayawan City
Tanjay City
Basay
Pamplona
Amlan
San Jose
Sibulan
Dumaguete City
Santa Catalina
Valencia
Bacong
Dauin
Siaton
Zamboanguita
Enrique Villanueva
Larena
Siquijor
SIQUIJOR
Maria
San Juan
Lazi
Pilar
Poro
Tudela
San Francisco
Jetafe
Talibon
Bien Unido
Pres. Carlos P. Ga
Buenavista
Trinidad
Inabanga
Ubay
San Miguel
Danao
Clarin
Tubigon
Sagbayan
Dagohoy
Alicia
Mabini
Calape
BOHOL
Pilar
San Isidro
Catigbian
Carmen
Candijay
Loon
Batuan
Antequera
Balilihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Valencia
Baclayon
Loboc
Dimiao
Garcia Hernandez
Albuquerque
Lila
Dauis
Loay
Panglao

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.

In an effort to ensure that good water quality is provided to its users and allay their fears about the safety of drinking tap water, the Metropolitan Cebu Water District (MCWD), a government-owned and controlled corporation, has enforced measures to prevent the contamination of its water sources, one of which is taking samples on a daily basis to check the potability of water.[19] The MCWD meets only 43% of total demand in 8 of the 13 LGUs in Metro Cebu.

Based on the wastewater projection maps, most of the region's cities and growing municipalities have higher demand compared to that in other areas. These areas generate more wastewater and wastes that, if left untreated and unmanaged, would pollute existing and future water sources, and increase the incidence of 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.

Ilog-Hilabangan River

The Ilog-Hilabangan River has been classified by the Department of Environment and Natural Resources (DENR) based on criteria governing its beneficial usage and water quality: Ilog River Upper Reach - Class A, Lower Reach - Class C; Hilabangan River - Upper Reach - Class A, Lower Reach - Class B/C.

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[20].

Based on the Food and Waterborne Diseases Report (January 1 to June 3, 2017) of the DOH, there were 2939 cases of acute bloody diarrhea in the region. A total of 443 cases of typhoid and 37 cases of hepatitis A were also reported. There were also 10 reported cases of cholera and 2 of rotavirus.[21]

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

As of 2017, the Department of the Interior and Local Government (DILG) reported 21 waterless[22] municipalities in the region (see Figure 16).

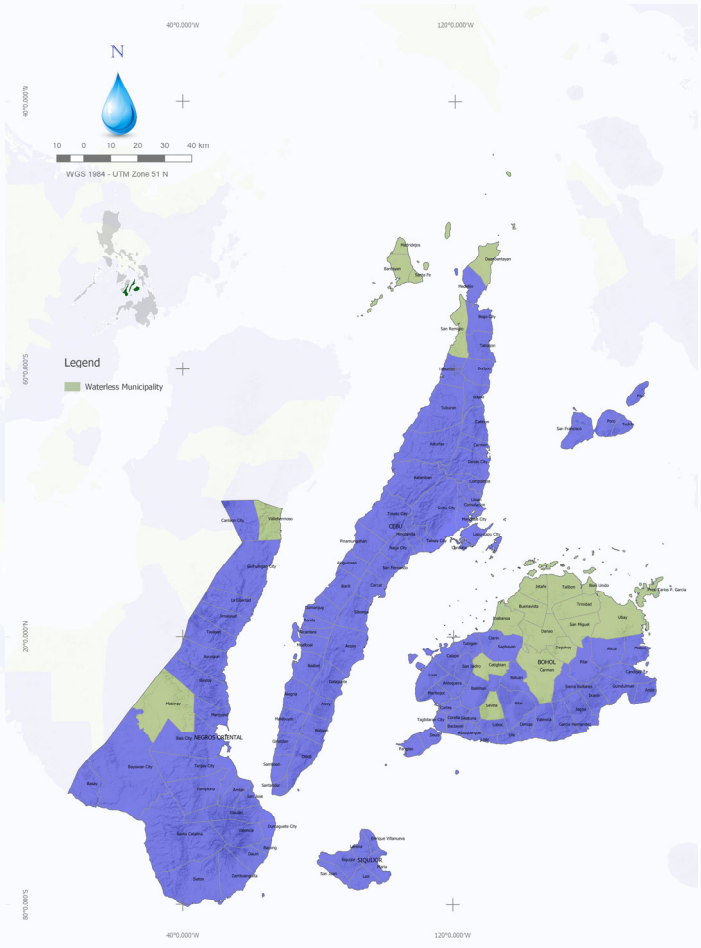


Figure 16: Waterless Municipalities

[19] Philippine Star - The Freeman (Cebu News), February 1, 2018
[20] World Health Organization
[21] Department of Health, Epidemiology Bureau, Food and Waterborne Diseases, 2017
[22] 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 the Central Visayas, areas that require upgraded facilities, improved water supply and sanitation systems as well as regular and extensive monitoring protocols were brainstormed and identified at the regional consultation and planning workshop.

Issues, Constraints and Challenges

The planning workshop participated in by concerned provincial officers from Region VII and representatives from regional line agencies have produced a working document that identified the “hindering” issues, constraints, and challenges being encountered by the WSS sector in three areas of concern: (a) Planning and Development, (b) Service Provision, and (c) Regulation.

Planning and Development

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

The most common hindering factors are: the lack of political will to prioritize water supply and sanitation; questionable priority setting; the lack of initiative to look for potential local resources for water supply development and fund sources; inadequate training with respect to capacity building; inadequate budget to defray expenses for personnel empowerment and institution/ systems upgrade; local and political leaders who act out of self-interest; unavailability of technical expertise; limited competence of policy makers; and poor leadership.

Among the facilitating measures are: continuous capacity building on all levels of management and governance; multi-sectoral collaboration on all aspects of plan conceptualization and development; the intervention of national agencies in imposing relevant policies; establishing linkages with financial and technical institutions; value formation and training programs for political leaders and stakeholders especially in regard to coordination and collaboration; and fund outsourcing through public-private partnerships (PPP).

Service Provision

Resolving the various problems hindering the efficient delivery of water and sanitation service to Region VII consumers was easier said than done. These problems, had been caused by: financial constraints, local leaders’ lack of political will; leaders promoting their personal, selfish agenda; misplaced or misguided priorities given by private stakeholders and caused by a change in local leadership; dysfunctional regulatory mechanisms; the low level of public awareness of the importance of water supply and sanitation; high investment cost; and inadequate resources allocated by LGUs to skills enhancement, technical advancement and competence buildup of personnel and institutions involved in policy formulation, master plan development and project implementation.

Mitigating factors are: the pooling of adequate funds, rollout of information campaigns, prioritization of issues affecting the WSS sector, requesting fund grants from relevant institutions, strict enforcement of policies, strengthening of staff selection guidelines and competence buildup of technical personnel, and continuing staff education and development.

Regulation

One of the main reasons behind the stagnation of the region’s WSS sector was partisan politics rearing its ugly head.

Hindering factors include: politicking; lack of political will among heads of line and attached government agencies, decision and policy makers and stakeholders themselves; lack of sectoral support with respect to strict enforcement of WSS laws; the absence of a single body regulating the WSS sector; and the absence of enabling mechanisms at the national and local levels pushing for the creation of a water supply and sanitation organization.

Facilitating measures include the following: strengthening of political will among leaders and stakeholders through value formation programs, training, seminars and workshops; proper and close coordination and collaboration between water districts and LGUs in project implementation; subsidy from DPWH for sewerage and septage projects of the LGUs; and the involvement of partners from the private sector and the academe

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

Table 14: Hindering and Facilitating Factors

	Hindering Factors	Facilitating Factors
Planning and Development	No priority given to other programs/projects	Participatory consultations on the identification of priority programs/projects/activities
	Lack of initiative re: looking into potential local resources for water supply development and outsourcing of funds	Intervention of national agencies in imposing policies on water supply and sanitation
	Failure to appreciate the importance and impact of water supply and sanitation on the development process	Linking with other agencies for technical and financial assistance
	Lack of training programs and other capacity-building programs	Political and local leaders undergoing value formation
	Failure to include water supply and sanitation initiatives in the Annual Investment Plans (AIPs) and Comprehensive Development Plans (CDPs) of LGUs	Provision of related exposure, training programs, conferences and seminars
	Political issues and differences between executives and legislative bodies	Lobbying for the inclusion of water supply and sanitation initiatives in the AIPs and CDPs of LGUs
	Outdated LGU Revenue Code	Coordination with other nongovernment organizations in community-led activities
	No funds available	Fund outsourcing through public-private partnerships (PPPs)
	LGU staff not being given permanent positions	Applying for/requesting support funds from financing institutions
	Lack of empowerment mechanisms in policies	Prioritization of water supply and sanitation projects
	Lack of expertise in water supply and sanitation planning	Resiliency studies/mechanisms
Service Provision	Conflicting agenda being pushed by different agencies and private stakeholders	Pooling of resources
	Change in leadership affecting priority projects	Strengthening of political will among local leaders
	Lack of skill/knowledge in preparing required documents	Updating of and putting more teeth into laws
	High investment cost of water supply and sanitation facilities	Strict enforcement of policies
	Agencies' lack of thrust to serve/initiate water projects	Provision of training programs and seminars on water supply and sanitation to consumers
	Lack of awareness about the current state and importance of the WSS sector	Upgrading the technical capacity of water providers
	Local chief executives acting out of self-interest	Involvement of partners and the academe
	Selecting and hiring staff employees based on their political affiliations	Creation of a single governing body for the water supply and sanitation sector
		Immediately addressing pressing issues concerning water supply and sanitation
		Hiring qualified and competent people
		Continuing education of sector leaders and stakeholders
		Strengthening of selection guidelines re: the hiring of technical and support staff
		Raising the level of public awareness on water and sanitation through social media
		Applying for/requesting loan grants from funding institutions
Regulation	Lack of enabling mechanisms at the national and LGU levels with which to push for the creation of a water supply and sanitation department/office	Integration of institutional mechanisms on water supply and sanitation
	NWRB's functions highly centralized in Manila	Proper and strict implementation of policies
	Conflicting laws and regulations	Passage of a national law for the creation of a single governing body for water supply and sanitation
	Lack of workable systems and procedures in regulating the sector	Creation of NWRB satellite offices at the provincial level
	Incompetent personnel	Training programs/seminars/workshops on value formation that will benefit local leaders
	Lack of support from responsible agencies	Behavioral counseling
	Conflicts between LGUs and WDs	Capacity building of stakeholders in water supply and sanitation
	Lack of facilities for education	Harmonizing and streamlining of laws and ordinances
		Specification of roles and responsibilities of stakeholders

Regional Vision

“By 2030, every person in Central Visayas has sustainable and equitable access to safe, adequate, and affordable water supply and sanitation services through the active participation of communities in environmentally-sound and technologically innovative water and sanitation management as responsible stewards of a vibrant environment.”

The Central 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 the collective view, 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 water supply and sanitation sector. The diagram on the right shows specific highlights and contrasts, pertaining to areas displaying best practices and those needing improvement.

The figure shows strategic priorities for Central 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: Central 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.

Central Visayas strives to achieve 94.2% access to safe water by 2022 and 100% access by 2030. Universal access by 2040 means more than 2,425,000 HHs will benefit. Improved access to sanitation is set at 85% by 2022 and universal access by 2030.

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

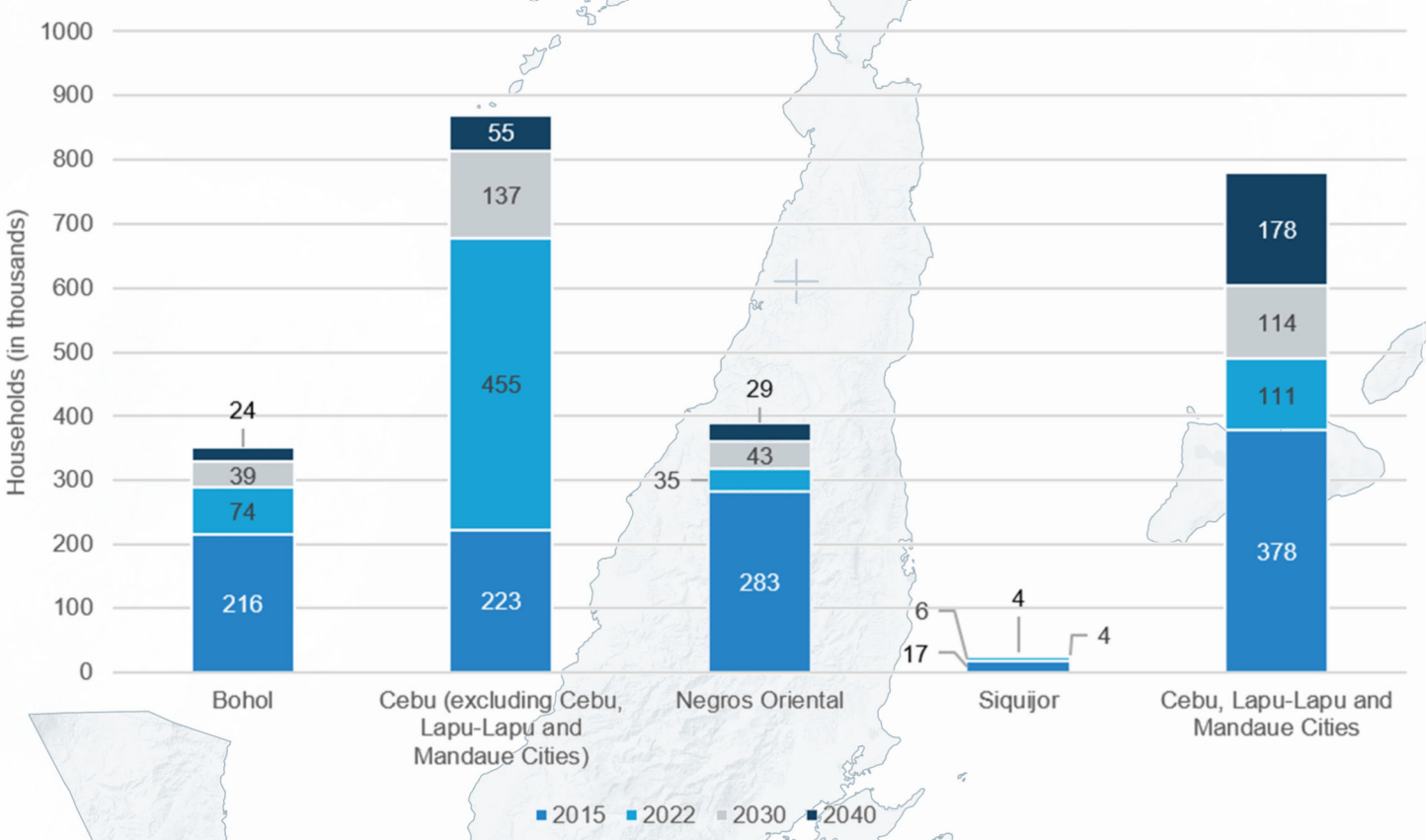


Figure 18: Targeted Households with Access to Safe Water

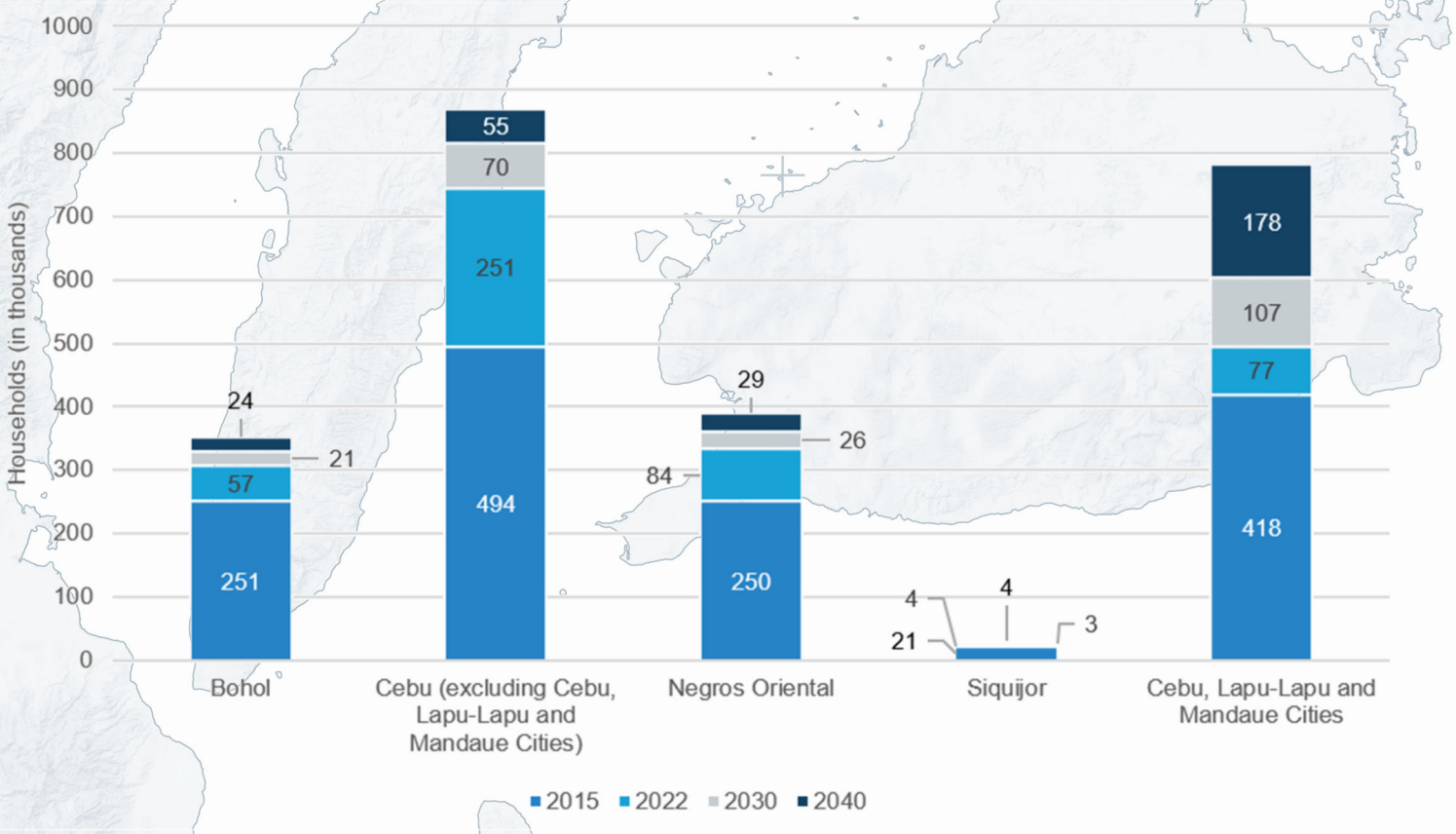


Figure 19: Targeted Households with Access to Sanitation

Water Supply Targets

BOHOL			
Category	**2022**	**2030**	**2040**
Level III	90.0%	100.0%	100.0%
Level II	2.1%	0.0%	0.0%
Level I	2.0%	0.0%	0.0%
Safe Access	94.1%	100.0%	100.0%
No Access	5.9%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

CEBU (EXCLUDING CEBU CITY, MANDAUE CITY and LAPU-LAPU CITY)			
Category	**2022**	**2030**	**2040**
Level III	43.2%	75.9%	100.0%
Level II	20.9%	8.3%	0.0%
Level I	26.9%	15.8%	0.0%
Safe Access	91.0%	100.0%	100.0%
No Access	9.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

NEGROS ORIENTAL			
Category	**2022**	**2030**	**2040**
Level III	48.0%	49.7%	100.0%
Level II	23.8%	25.4%	0.0%
Level I	23.2%	24.9%	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%

SIQUIJOR			
Category	**2022**	**2030**	**2040**
Level III	43.9%	76.8%	100.0%
Level II	51.0%	21.4%	0.0%
Level I	0.0%	1.9%	0.0%
Safe Access	94.9%	100.0%	100.0%
No Access	5.1%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

CEBU CITY, MANDAUE CITY and LAPU-LAPU CITY			
Category	**2022**	**2030**	**2040**
Level III	95.3%	100.0%	100.0%
Level II	2.6%	0.0%	0.0%
Level I	0.9%	0.0%	0.0%
Safe Access	98.7%	100.0%	100.0%
No Access	1.3%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

CENTRAL VISAYAS			
Category	**2022**	**2030**	**2040**
Level III	64.7%	81.7%	100.0%
Level II	14.1%	7.9%	0.0%
Level I	15.3%	10.4%	0.0%
Safe Access	94.2%	100.0%	100.0%
No Access	5.8%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

Sanitation Targets

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

CEBU (EXCLUDING CEBU CITY, MANDAUE CITY and LAPU-LAPU CITY)			
Category	**2022**	**2030**	**2040**
Improved	97.0%	100.0%	100.0%
Basic	3.0%	0.0%	0.0%
Shared/Communal/ Limited	0.0%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

NEGROS ORIENTAL			
Category	**2022**	**2030**	**2040**
Improved	97.0%	100.0%	100.0%
Basic	3.0%	0.0%	0.0%
Shared/Communal/ Limited	0.0%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

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

CEBU CITY, MANDAUE CITY and LAPU-LAPU CITY			
Category	**2022**	**2030**	**2040**
Improved	100.0%	100.0%	100.0%
Basic	0.0%	0.0%	0.0%
Shared/Communal/ Limited	0.0%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

CENTRAL VISAYAS			
Category	**2022**	**2030**	**2040**
Improved	97.7%	100.0%	100.0%
Basic	2.3%	0.0%	0.0%
Shared/Communal/ Limited	0.0%	0.0%	0.0%
Open Defecation	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%

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 VII 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 ▪ Registration, water rights/permits ▪ 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.		

40°0.000'W

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N

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Legend

Approved Projects

Pending Projects

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

60°0.000'S

20°0.000'N

80°0.000'S

Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Consolacion
Cebu City
Toledo City
Mandaue City
CEBU
Minglanilla
Lapu-Lapu City
Talisay City
Cordoba
Pinamungahan
Naga City
Aloguinsan
San Fernando
Barili
Carcar
Dumanjug
Sibonga
Ronda
Alcantara
Moalboal
Argao
Badian
Dalaguete
Alegria
Alcoy
Malabuyoc
Boljoon
Ginatilan
Oslob
Samboan
Santander
Pilar
Poro
Tudela
San Francisco
Canlaon City
Vallehermoso
Guihulngan City
La Libertad
Jimalalud
Tayasan
Ayungon
Bindoy
Mabinay
Manjuyod
Bais City
NEGROS ORIENTAL
Bayawan City
Tanjay City
Basay
Pamplona
Amlan
San Jose
Sibulan
Dumaguete City
Valencia
Santa Catalina
Bacong
Dauin
Siaton
Zamboanguita
Enrique Villanueva
Larena
Siquijor
SIQUIJOR
Maria
San Juan
Lazi
Jetafe
Talibon
Bien Unido
Pres. Carlos P. Ga
Buenavista
Trinidad
Inabanga
Ubay
San Miguel
Danao
Clarin
Tubigon
Sagbayan
Dagohoy
Alicia
Mabini
Calape
BOHOL
Pilar
San Isidro
Catigbian
Carmen
Candijay
Loon
Batuan
Antequera
Balilihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Baclayon
Loboc
Dimiao
Valencia
Garcia Hernandez
Albuquerque
Dauis
Lila
Loay
Panglao

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).

Central Visayas requires capital investments for infrastructure development of about PhP32.01 billion and PhP22.43 billion to achieve 2022 and 2030 targets, respectively. Unit development costs employed to arrive at these sums are estimated at PhP33,300 per HH for Level III, PhP19,600 for Level II, and PhP8,800 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 Central 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 household for Level III, PhP18,700 for Level II, and PhP8,400 for Level I.

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

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

Table 20: Indirect Costs Employed[23]

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	Total Investment Cost (in PhP Million) 2022	Total Investment Cost (in PhP Million) 2030
Bohol	10,301	2,232
Cebu (including Cebu City, Mandaue City and Lapu-Lapu City)	20,442	12,822
Negros Oriental	1,047	1,254
Siquijor	220	431
Total	**32,010**	**16,739**

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 Central 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 two municipalities and two cities in Central Visayas where priority WD projects have been approved and those pending approval for LWUA's financial assistance (FA). The WD of Balamban has secured the agency's FA. The FA requests of the other three WDs, i.e., in Bogo City, Bayawan City, and Siquijor, are pending approval.

[23] *Based on Industry Standards*

40°0.000'W

120°0.000'W

40°0.000'N

60°0.000'S

20°0.000'N

80°0.000'S

Legend

STP CLUSTERING

- R7-CL1
- R7-CL2
- R7-CL3
- R7-CL4
- R7-CL5
- R7-CL6
- R7-CL7
- R7-CL8
- R7-CL9
- R7-CL10
- R7-CL11
- R7-CL12
- R7-CL13
- R7-CL14
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- R7-CL34
- R7-CL35
- R7-CL36
- R7-CL37
- R7-CL38
- R7-IN1
- R7-IN2
- R7-IN3
- R7-IN4
- R7-IN5

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Consolacion
Cebu City
Toledo City
CEBU
Mandaue City
Minglanilla
Lapu-Lapu City
Talisay City
Pinamungahan
Naga City
Cordoba
Aloguinsan
San Fernando
Barili
Carcar
Dumanjug
Sibonga
Ronda
Alcantara
Moalboal
Argao
Badian
Dalaguete
Alegria
Alcoy
Malabuyoc
Boljoon
Ginatilan
Oslob
Samboan
Santander
Pilar
Poro
Tudela
San Francisco
Canlaon City
Vallehermoso
Guihulngan City
La Libertad
Jimalalud
Tayasan
Ayungon
Bindoy
Mabinay
Manjuyod
Bais City
NEGROS ORIENTAL
Bayawan City
Tanjay City
Basay
Pamplona
Amlan
San Jose
Sibulan
Dumaguete City
Valencia
Santa Catalina
Bacong
Dauin
Siaton
Zamboanguita
Enrique Villanueva
Larena
Siquijor
SIQUIJOR
Maria
San Juan
Lazi
Jetafe
Talibon
Bien Unido
Pres. Carlos P. Ga
Buenavista
Trinidad
Inabanga
Ubay
San Miguel
Danao
Clarin
Tubigon
Sagbayan
Dagohoy
Alicia
Mabini
Calape
San Isidro
Catigbian
BOHOL
Pilar
Carmen
Candijay
Loon
Batuan
Antequera
Balilihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Loboc
Dimiao
Valencia
Garcia Hernandez
Baclayon
Albuquerque
Lila
Dauis
Loay
Panglao

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).

Central Visayas will need about PhP22 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 PhP4.1 billion and PhP487 million for 2022 and 2030, respectively, for its septage management program.

Sewerage System Program. Only Cebu City, Lapu-lapu City and Mandaue City will be required to plan and build a sewerage system for their 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, the three cities will require PhP9.6 billion by 2022 and an additional PhP2.08 billion 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 citIES' incremental population from 2015 to 2022 and from 2023 to 2030.

Candidate HUCs in Cebu (e.g., Talisay, Toledo, Naga City, Minglanilla, Liloan, Danao City, and City of Carcar) and Negros Oriental (e.g., Dumaguete City and Bayawan City) may be initially reviewed as the pace of urbanization may set in rapidly in these places followed by the capital towns of the other provinces.

Nonphysical Investments

Central 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
Bohol	4,637	686
Cebu (excluding Cebu, Mandaue and Lapu-lapu Cities)	20,446	2,222
Negros Oriental	2,863	836
Siquijor	245	85
Cebu, Mandaue, Lapu-Lapu Cities	15,100	5,770
Total	**43,290**	**9,599**

Proposed Projects and Programs

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

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

This list of projects does not cover only infrastructure projects, but also nonphysical investment requirements, such as capacity development programs, information dissemination campaigns, and watershed management plans. These projects run the gamut from conception, proposal, pre-feasibility and feasibility study stages, detailed engineering design, to pre-procurement and procurement. Figure 20 shows the distribution of the investment requirement per province and HUC. Based on the proposed projects and programs, the region needs PhP107.33 billion to boost its WSS sector.

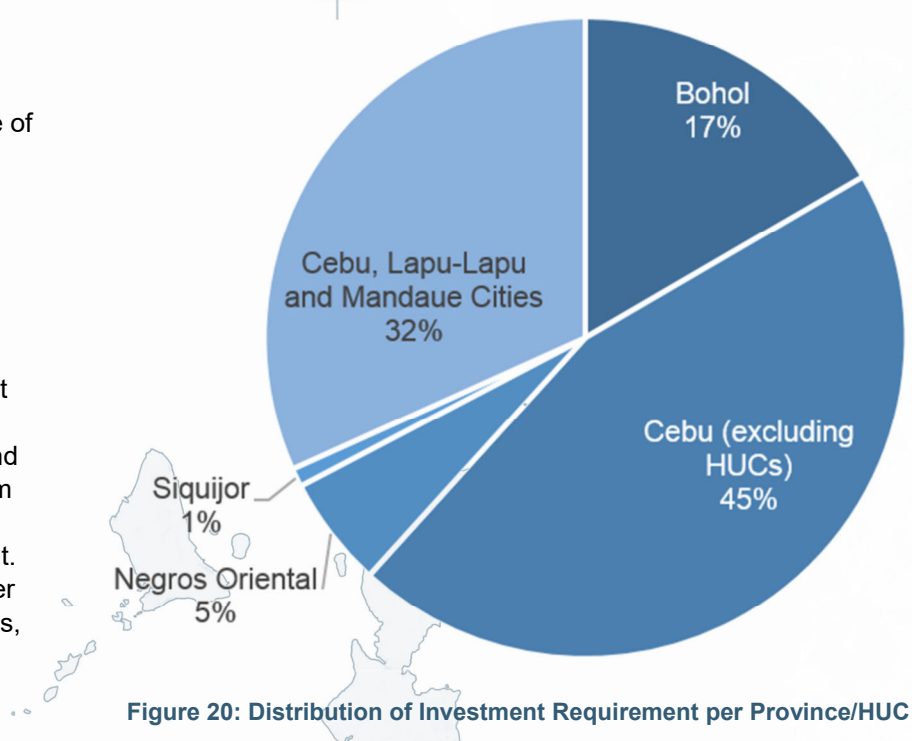

Figure 20: Distribution of Investment Requirement per Province/HUC

Bohol							
	Water Supply	Period	Budget Requirement (PhP Million)	Sanitation	Period	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Bulk water supply to 17 priority areas	Short Term	-				
2	Capacity development re: O&M	Short Term	-				
3	Construction of storehouse for materials, equipment and vehicles	Short Term	-				
4	Development of power source	Short Term	-				
5	Establishment of storage and transmission facilities	Short Term	-				
6	Establishment of water source facilities	Short Term	-				
7	Hiring of Technical and Administrative Personnel	Short Term	-				
8	Installation of pump stations	Short Term	-				
9	Land and right-of-way acquisition	Short Term	-				
10	Memorandum of Agreement between the Provincial and Municipal LGUs	Short Term	-				**70.67**
11	PPP through BOT	Short Term	-				
12	Securing water rights permits	Short Term	-				
13	Improvement of water supply system at Panglao Resettlement Site	Short Term	1.35				
14	Expansion of municipal waterworks at Poblacion Vieja, Batuan, Bohol	Short Term	1.92				
15	Bohol Bulk Water Supply Project covering 18 municipalities	Medium Term	3.20				
16	Rehabilitation of Level III Municipal Water Supply System of the municipality of Cortes	Medium Term	64.20				
		Total	**70.67**				

Cebu							
	Water Supply	Period	Budget Requirement (PhP Million)	Sanitation	Period	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Mananga transmission line	Long Term	450.00	1 Mactan septage management	Medium Term	-	
2	Mactan pipeline improvement	Medium Term	394.00	2 STP (15 clustered and 4 individual LGUs)	Long Term	-	
3	Hydraulic area 3	Long Term	376.00	3 Septage (North Area)	Medium Term	-	
4	Hydraulic Area 1 pipe improvement	Medium Term	281.00	4 Septage (South Area)	Medium Term	-	
5	Mactan Add. pipe improvement	Medium Term	101.00		**Total**	**-**	
6	Alegria Integrated Potable Water Supply Project	Short Term	95.51				
7	Proposed bulk water supply system (Argao, Badian, Tuburan)	Long Term	60.00				
8	Proposed Level III waterworks system	Short Term	52.48				
9	Lusaran Dam	Long Term	3.57				
10	Kotkot Dam	Long Term	1.33				
11	Expansion Level III waterworks system(Phase 1)	Short Term	2.43				**1,821.07**
12	Proposed Level II waterworks system	Short Term	2.66				
13	Proposed Level I-III waterworks system	Short Term	0.48				
14	Proposed Landahan Level I-III waterworks system (Phase 2)	Short Term	0,61				
15	Cebu Desal	Long Term	-				
16	Mactan Big Scale Desal	Long Term	-				
17	Brackish water supply (Mambaling, Subabasbas)	Short Term	-				
18	Mactan Desal Supply	Short Term	-				
19	Bulk water supply (Mananga, Nivel, Talisay, Danao)	Long Term	-				
20	Mananga reservoir	Long Term	-				
		Total	**1,821.07**				

Negros Oriental								
	Water Supply	Period	Budget Requirement (PhP Million)	Water Supply and Sanitation	Period	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Construction & improvement of WWS Level I	Short Term	2.46	1 Orientation on database management	Short Term	10,000,000	
2	Construction & improvement of WWS Level II	Short Term	5.10	2 Monitoring & evaluation of WSS program	Short Term	10,000,000	
3	Construction & improvement of WWS Level III	Short Term	26.75	3 Interagency consultative meeting	Short Term	15,000,000	
4	Construction of additional water source Level I	Long Term	206.86		**Total**	**35.00**	
5	Construction of additional water source Level II	Long Term	206.86				
6	Construction of additional water source Level III	Long Term	413.73				**917.91**
7	Dumaguete City WD Water Supply Project	Long Term	1.15				
8	Creation of a Local Drinking Water Quality Monitoring Committee throughout Negros Oriental	Short Term	10.00				
9	Establishment of water quality laboratory and purchase of equipment (BACTE)	Short Term	10.00				
		Total	**882.91**				

Siquijor							
	Water Supply	Period	Budget Requirement (PhP Million)	Water Supply and Sanitation	Timeline	Budget Requirement (PhP Million)	Total Budget Requirement (PhP Million)
1	Capability building of the proponent group involved in water resource development and management	Short Term	1.20				
2	Water conservation, impounding, collection and storing thru mini dams and other means	Short Term	631.00				
3	Development and distribution: installation and establishment of water connection, facilities and infrastructure	Short Term	370.00				
4	Hydrogeological studies and inventory	Short Term	13.00				
5	Massive IEC campaign re: rehabilitation, protection, conservation and management of water resources and protected areas	Short Term	2.50				**1,050.16**
6	Rehabilitation & protection of water sources, micro-watersheds and non-watershed areas	Short Term	30.00				
7	Siquijor Integrated Water Development Project	Short Term	-				
8	Water system development at Camapalanas, Lazi	Short Term	2.46				
		Total	**1,050.16**				

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120°0.000'W

N

40°0.000'N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Legend

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

60°0.000'S

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80°0.000'S

Madridejos
Bantayan
Santa Fe
Daanbantayan
Medellin
Bogo City
San Remigio
Tabogon
Tabuelan
Borbon
Sogod
Tuburan
Catmon
Pilar
Poro
Tudela
San Francisco
Asturias
Carmen
Danao City
Balamban
Compostela
Liloan
Consolacion
Cebu City
Toledo City
Mandaue City
CEBU
Minglanilla
Lapu-Lapu City
Talisay City
Pinamungahan
Naga City
Cordoba
Aloguinsan
San Fernando
Barili
Carcar
Canlaon City
Vallehermoso
Guihulngan City
La Libertad
Jimalalud
Dumanjug
Ronda
Sibonga
Alcantara
Tayasan
Moalboal
Argao
Ayungon
Badian
Dalaguete
Bindoy
Alegria
Alcoy
Mabinay
Manjuyod
Malabuyoc
Boljoon
Ginatilan
Oslob
Bais City
NEGROS ORIENTAL
Samboan
Bayawan City
Tanjay City
Basay
Pamplona
Amlan
San Jose
Santander
Sibulan
Dumaguete City
Valencia
Santa Catalina
Bacong
Dauin
Siaton
Zamboanguita
Enrique Villanueva
Larena
Siquijor
SIQUIJOR
Maria
San Juan
Lazi
Jetafe
Talibon
Bien Unido
Pres. Carlos P. Ga
Buenavista
Trinidad
Ubay
Inabanga
San Miguel
Danao
Tubigon
Clarin
Sagbayan
Dagohoy
Alicia
Mabini
Calape
BOHOL
Pilar
San Isidro
Catigbian
Carmen
Candijay
Loon
Batuan
Antequera
Baillihan
Sierra Bullones
Guindulman
Anda
Maribojoc
Duero
Cortes
Sevilla
Bilar
Jagna
Tagbilaran City
Corella
Sikatuna
Valencia
Baclayon
Loboc
Dimiao
Garcia Hernandez
Albuquerque
Lila
Dauis
Loay
Panglao

AM, Salintubig Pipeline WSS Projects

DILG-WSSPMO, 2019 List of DILG Projects

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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 Name	Amount (PhP)
Bohol	Anda	Potable Water Supply System	Expansion of Water System	6,107,000
Bohol	Antequera	Potable Water Supply System	Expansion of Water System	6,565,000
Bohol	Baclayon	Potable Water Supply System	Rehabilitation/Improvement of Level II/III Water System	5,025,000
Bohol	Balilihan	Potable Water Supply System	Rehabilitation/Improvement of Level II/III Water System	6,637,000
Bohol	Candijay	Potable Water Supply System	Rehabilitation/Improvement of Level II/III Water System	6,377,000
Bohol	Catigbian	Potable Water Supply System	Expansion of Level II & III Water System	11,426,000
Bohol	Clarin	Potable Water Supply System	Expansion of Level III Water System	2,000,000
Bohol	Loboc	Potable Water Supply System	Expansion of Water System	6,597,000
Bohol	Pres. Carlos P. Garcia	Potable Water Supply System	Expansion of Level II Potable Water System	5,082,000
Bohol	Ubay	Potable Water Supply System	Improvement of Water Supply System	6,125,000
Cebu	Bantayan	Potable Water Supply System	Expansion of Level II & III Water System	12,094,000
Cebu	Boljoon	Potable Water Supply System	Expansion of Water System	6,105,000
Cebu	Consolacion	Potable Water Supply System	New Construction of Level II Potable Water System	2,291,000
Cebu	Cordova	Rainwater Catchment Facility	Provision of Rainwater Catchment Facility	525,000
Cebu	Ginatilan	Potable Water Supply System	Rehabilitation/Improvement of Level II/III Water System	6,096,000
Cebu	Ronda	Potable Water Supply System	Rehabilitation/Improvement of Level II/III Water System	10,878,000
Negros Oriental	Bacong	Potable Water Supply System	Rehabilitation/Improvement of Water System	6,523,000
Negros Oriental	La Libertad	Potable Water Supply System	Construction of Potable Water System	5,398,000
Negros Oriental	Manjuyod	Potable Water Supply System	Expansion of Level II & III Water System	5,475,000
Negros Oriental	San Jose	Potable Water Supply System	Expansion of Level III Water System	3,189,000
Negros Oriental	Siaton	Potable Water Supply System	Rehabilitation/Improvement of Potable Water System	3,000,000
Negros Oriental	Valencia	Potable Water Supply System	Rehabilitation/Improvement of Level III Potable Water System	6,488,000
Negros Oriental	Zamboanguita	Potable Water Supply System	Upgrading of Water System	6,337,000
Siquijor	Enrique Villanueva	Potable Water Supply System	Rehabilitation/Improvement of Level II Potable Water System	2,200,000
Siquijor	Lazi	Potable Water Supply System	Rehabilitation/Improvement of Level II/III Water System	500,000
Siquijor	San Juan	Potable Water Supply System	Expansion of Water System	6,074,000
Siquijor	Siquijor	Potable Water Supply System	New Construction of Level II Potable Water System	1,822,000
			Total	**146,936,000**

SALINTUBIG (2019)				
Province	Municipality	Project Name	Barangays	Amount
Bohol	Anda	Upgrading Of Anda Waterworks System (Salintubig)	Poblacion	16,000,000
Bohol	Antequera	Potable Water Supply	Danao,Santo Rosario and Ubojan	10,000,000
Bohol	Bilar	Upgrading Of Existing Potable Water Sources/Upgrading/Replacement Of Pumps/Replacement Of Existing Pipelines/ Construction Of Spring Box/ Drilling	Cabacnitan, Cansumbol, Bugang Sur	10,000,000
Bohol	Clarin	Upgrading And Rehabilitation Of Danahaw Water System	Danahaw	2,000,000
Bohol	Lila	Potable Water Supply	Calvario	2,500,000
Bohol	Lila	Potable Water Supply	Jambawan	2,500,000
Bohol	Lila	Potable Water Supply	Nagsulay To Banban	5,000,000
Bohol	Sagbayan	Expansion Of Sagbayan Waterworks	San Vicente Norte, Sta. Catalina, Kati-punan, Canmaya Centro	2,000,000
Bohol	Sagbayan	Construction Of Shallow Tube Wells	Kagawasan, Canmaya Diot	800,000
Bohol	Sagbayan	Development Of Kagawasan Spring Into Level III Water Supply	Canmano, Dagnawan, Mantalongon, San Antonio, San Isidro and San Roque	10,000,000
Bohol	Sierra Bullones	Expansion And Completion Of Municipal Waterworks System	Various barangays	13,000,000
Bohol	Pilar	Installation Of Service Pipeline To All Barangays Down To Sitios And Construction Of Additional Reservoir	Bagumbayan, Aurora, Cagasawan, La Suerte and Estaca	10,000,000
Cebu	Asturias	Construction Of Water System At Upper Lunas	Banban	2,000,000
Cebu	Asturias	Construction Of Water System At Sitio Ulayan, Baye	Baye	2,000,000
Cebu	Balamban	Potable Water Supply	Lamesa	2,000,000
Cebu	Badian	Construction Of Level 2 Water System Project At Barangay Tiguib	Tiguib	2,000,000
Cebu	Badian	Construction Of Level 2 Water System Project At Barangay Patong	Patong	2,000,000
Cebu	Dumajug	Potable Water Supply	Matalao	2,000,000
Cebu	San Fernando	Potable Water Supply	Basak	2,000,000
Cebu	San Fernando	Potable Water Supply	Tabionan	2,000,000
Cebu	San Fernando	Potable Water Supply	Tananas	2,000,000
Cebu	San Fernando	Potable Water Supply	Tubod	2,000,000
Negros Oriental	Santa Catalina	Potable Water Supply System, Level II, Barangay Caigangan	Caigangan	2,000,000
Negros Oriental	Siaton	Expansion Of Existing Waterworks System	Mantiquil	2,000,000
Negros Oriental	Siaton	Rehabilitation Of Existing Waterworks System	Si-It	2,000,000
			Total	**109,800,000**

Appendix A: Provincial and HUC Profiles

BOHOL	47 municipalities	Alburquerque, Alicia, Anda, Antequera, Baclayon, Balilihan, Batuan, Bien Unido, Bilar, Buenavista, Calape, Candijay, Carmen, Catigbian, Clarin, Corella, Cortes, Dagohoy, Danao, Dauis, Dimiao, Duero, Garcia Hernandez, Getafe, Guindulman, Inabanga, Jagna, Lila, Loay, Loboc, Loon, Mabini, Maribojoc, Panglao, Pilar, President Carlos P. Garcia, Sagbayan, San Isidro, San Miguel, Sevilla, Sierra Bullones, Sikatuna, Talibon, Trinidad, Tubigon, Ubay, Valencia
	one (1) component city	Tagbilaran City
	1,109 barangays	27 urban, 1,082 rural
Land Area	4,820.95 square kilometers	
Demographics (2015)	Population (2015) – 1,313,560 Population Growth Rate (2000 to 2015) – 0.94 Population Density – 270 per sq. km	
Economy	• Major industries - agriculture, fishery, aquaculture, tourism, livestock and poultry raising, mining • Major products - palm oil, handicraft items • Major crops - rice, corn, coconuts, mangoes, other high-value crops • Bohol is famous for the "Chocolate Hills", many heritage sites, old stone churches, and the tarsier (the world's smallest primate). • One of its main attractions is Panglao Island where the most visited beaches in the province are found. It is also where the Bohol International Airport was opened in November 2018, accommodating about 2 million passengers on its first year.	
Poverty Incidence (2015)	On Families – 21.7 On Population – 26.0	
CEBU	44 municipalities	Alcantara, Alcoy, Alegria, Aloguinsan, Argao, Asturias, Badian, Balamban, Bantayan, Barili, Bogo, Boljoon, Borbon, Carcar, Carmen, Catmon, Compostela, Consolacion, Cordova, Daanbantayan, Dalaguete, Danao, Dumanjug, Ginatilan, Liloan, Madridejos, Malabuyoc, Medellin, Minglanilla, Moalboal, Naga, Oslob, Pilar, Pinamungajan, Poro, Ronda, Samboan, San Fernando, San Francisco, San Remigio, Santa Fe, Santander, Sibonga, Sogod, Tabogon, Tabuelan, Talisay, Toledo, Tuburan, Tudela
	three (2) independent cities	Cebu City, Lapu-Lapu City, Mandaue City
	six (6) component cities	Bogo, Carcar, Danao, Naga, Talisay, Toledo
	1,203 barangays	238 urban, 965 rural
Land Area	4,943.72 square kilometers	
Demographics (2015)	Population (2015) – 2,938,982 Population Growth Rate (2000 to 2015) – 2.04 Population Density – 590 per sq. km	
Economy	• Major industries - agriculture, fishery, tourism • Major products - textiles, footwear, processed foods, vegetable oil, furniture, chemicals • Major crops - rice, corn, mangoes, coconut, bananas, peanuts • It was in Cebu that the first Spanish settlement and Catholic mission in the Phiippines were founded. • Cebu City is one of the country's largest cities; it is served by an international aiport on Mactan Island across its harbor.	
Poverty Incidence (2015)	On Families – 17.9 On Population – 21.4	

NEGROS ORIENTAL	19 municipalities	Amlan, Ayungon, Bacong, Basay, Bindoy, Dauin, Jimalalud, La Libertad, Mabinay, Manjuyod, Pamplona, San Jose, Santa Catalina, Siaton, Sibulan, Tayasan, Valencia, Vallehermoso, Zamboanguita
	six (6) component cities	Bais, Bayawan, Canlaon, Dumaguete, Guihulngan, Tanjay
	557 barangays	84 urban, 473 rural
Land Area	5,385.53 square kilometers	
Demographics (2015)	Population (2015) – 1,354,995 Population Growth Rate (2000 to 2015) – 1.20 Population Density – 250 per sq. km	
Economy	• Major industries - agriculture, fishery, livestock raising, water bottling/warehousing, BPO • Major products - abaca, copra • Major crops - rice, sugarcane, sweet corn, coconuts • Negros Oriental hosts several renewable power plants responding significantly to the electricity needs of the Visayas.	
Poverty Incidence (2015)	On Families – 38.7 On Population – 45.0	

SIQUIJOR	6 municipalities	Enrique Villanueva, Larena, Lazi, Maria, San Juan, Siquijor
	six (6) component cities	Bais, Bayawan, Canlaon, Dumaguete, Guihulngan, Tanjay
	134 barangays	4 urban, 130 rural
Land Area	337.49 square kilometers	
Demographics (2015)	Population (2015) – 95,984 Population Growth Rate (2000 to 2015) – 1.07 Population Density – 280 per sq. km	
Economy	• Major industries - agriculture, tourism, fishery, knitting • Major products - copra, knitting, toys, garments • Major crops - rice, corn, coconuts, cassava, mangoes, jackfruit, rubber • Siquijor is capitalizing on its numerous caves, springs, rivers and mountains to make it one of the country's top travel destinations.	
Poverty Incidence (2015)	On Families – 48.9 On Population – 52.9	

CEBU CITY	Cebu City is a significant center of commerce, trade and education in the Visayas. The country's main domestic shipping port, and is home to about 80% of the country's domestic shipping companies. Cebu city is also the host of the colorful festival of Sinulog. 80 barangays 80 urban
Land Area	315.00 square kilometers
Demographics (2015)	Population (2015) – 922,611 Population Growth Rate (2000 to 2015) – 1.65 Population Density – 2,900 per sq. km
Economy	• The city's proximity to many islands, and beaches has driven its tourism industry. It has become the tourist gateway to Central and Southern Philippines because of its accessible geographic location. • It is the hub of the BPO industry in the south.

LAPU-LAPU CITY	Lapu-Lapu City is linked to Mandaue on mainland Cebu by the Mactan-Mandaue Bridge and Marcelo Fernan Bridge. Mactan-Cebu International Airport, the second busiest airport in the Philippines, is located in Lapu-Lapu City. 30 barangays 30 urban
Land Area	58.10 square kilometers
Demographics (2015)	Population (2015) – 408,112 Population Growth Rate (2000 to 2015) – 4.23 Population Density – 7,000 per sq. km
Economy	• Lapu-lapu City's economy is primarily supported by its growing industrial sector. Its busy port accommodates a variety of fishing and trade sea vessels. • It is noted for its thermal energy plants that supply much of the city's energy needs. • Corn mills and flour mills are found in many parts of the city. • Its lovely beaches and diving spots are some of its top tourist attractions.

MANDAUE CITY	Mandaue City is a vital transport link of the islands of Cebu and Mactan. The city is also known for its bustling manufacturing firms like food and beverage, furniture, metalwork and many others. 27 barangays 27 urban
Land Area	34.87 square kilometers
Demographics (2015)	Population (2015) – 362,654 Population Growth Rate (2000 to 2015) – 2.21 Population Density – 10,000 per sq. km
Economy	• Major industries: food and beverage manufacturing, furniture making, metalcraft, woodwork • It is home to almost 20,000 industrial and commercial businesses and multinational manufacturing companies.


160°0.000′E
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60°0.000′S
20°0.000′N
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160°0.000′E
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