NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY

Volume 2: Philippine Water Supply and Sanitation Master Plan

SOCCSKSARGEN 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
BDP	Business Development Plan
BMRB	Buayan-Malungon River Basin
BOD	Biological Oxygen Demand
BWSA	Barangay Water and Sanitation Association
CARP	Comprehensive Agrarian Reform Program
CapEx	Capital Expenditure
CBO	Community-Based Organization
CHO	City Health Office
CLTS	Community-Led Total Sanitation
CLUP	Comprehensive Land Use Plan
CMO	Chief Management Officer
COD	Chemical Oxygen Demand
CPDO	City Planning Development Office
DA	Department of Agriculture
DAO	Department Administrative Order
DED	Detailed Engineering Design
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
DJF	December, January and February
DOH	Department of Health
DPWH	Department of Public Works and Highways
DTI	Department of Trade and Industry
EMB	Environmental Management Bureau
FAO	Food and Agriculture Organization
FHSIS	Field Health Service Information System
FIES	Family Income and Expenditure Survey
FS	Feasibility Study
GRDP	Gross Regional Domestic Product
GSCWD	General Santos City Water District
HH	Household
HUC	Highly Urbanized City
IEC	Information, Education and Communication
JICA	Japan International Cooperation Agency
JJA	June, July and August
KanCRN	Kansan Collaborative Research Network
LDP	Local Development Plan
LCE	Local Chief Executive
LED	Local Economic Development
LFPR	Labor Force Participation Rate
LGU	Local Government Unit
LSSP	Local Sustainable Sanitation Plan
LWUA	Local Water Utilities Administration
M&E	Monitoring and Evaluation
MAM	March, April and May
MDG	Millenium Development Goals
MGB	Mines and Geosciences Bureau
MRB	Mindanao River Basin
MOA	Memorandum of Agreement
MSME	Micro, Small and Medium Enterprises
MW4SP	Municipal Water Supply, Sewerage and Sanitation Sector Plan
NAMRIA	National Mapping and Resource Information Authority
NAPC	National Anti-Poverty Commission
NC	National Certificate
NCR	National Capital Region
NDRRMC	National Disaster Risk Reduction and Management Council
NEDA	National Economic and Development Authority
NGO	Nongovernment Organization
NRW	Nonrevenue Water
NSSMP	National Septage and Sewerage Master Plan
NWRB	National Water Resources Board

O&M	Operation and Management
OBS	Observed Baseline
OCD	Office of Civil Defense
OD	Open Defecation
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAWD	Philippine Association of Water Districts
PDP	Philippine Development Plan
PDIP	Provincial Development Investment Program
PEM	Philippine Environment Monitor
PMS	Pre-Membership Seminar
POW	Program of Work
PNSDW	Philippine National Standards for Drinking Water
PSA	Philippine Statistics Authority
PSGC	Philippine Standard Geographic Code
PWSSMP	Philippine Water Supply and Sanitation Master Plan
RBCO	River Basin Control Office
RDP	Regional Development Plan
ROW	Right-of-Way
RWSA	Rural Waterworks and Sanitation Association
SALINTUBIG	Sagana at Ligtas na Tubig
SDG	Sustainable Development Goals
SMERA	Small and Medium Enterprise Roving Academy
SMP	Septage Management Program
SOCCSKSARGEN	South Cotabato, Cotabato, Sultan Kudarat, Sarangani and General Santos
SON	September, October and November
STP	Septage Treatment Plant
STS	Science Technology and Society
SSF	Shared Service Facilities
SURGE	Strengthening Urban Resilience for Growth with Equity
SWMB	Solid Waste Management Board
TC	Tropical Cyclone
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
TESDA	Technical Education and Skills Development Authority
TOR	Terms of Reference
TSS	Total Suspended Solids
TWG	Technical Working Group
UN	United Nations
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene
WD	Water District
WHO	World Health Organization
WMO	World Meteorological Organization
WQMA	Water Quality Management Area
WRR	Water Resources Region
WSP	Water Service Provider
WSS	Water Supply and Sanitation
WSSPMO	Water Supply and Sanitation Program Management Office
ZOD	Zero Open Defecation

Units

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

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Region XII
SOCCSKSARGEN

13

Introduction

SOCCSKSARGEN is located in Central Mindanao.

It is bounded on the north by Northern Mindanao, on the east by Davao Region, and on the southwest by the Celebes Sea. It is surrounded by the bays of Sarangani, Illana and Paguil, and the Moro Gulf.

SOCCSKSARGEN (designated as Region XII) is the acronym for the region's four provinces and one highly urbanized city (HUC), namely: South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos City. Formerly known as Central Mindanao, it used to include the provinces of Lanao del Norte, Lanao del Sur, Cotabato, Sultan Kudarat, and Maguindanao.

Endowed with rich natural resources, the region is Mindanao's major supplier of hydroelectric power.

General Santos City (or "GenSan"), located in the southern part of South Cotabato, is known as "the tuna capital of the Philippines" because it holds the record for the country's largest total daily tuna volume (caught from the Sarangani Bay).

Land Classification

The region has a total land area of 22,513.30 square kilometers (km^2) representing around 23% of the island of Mindanao and 7.5% of the country's total land area. Of this figure, 53% is forestland and 47% is alienable and disposable land.

Economy

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

In 2009, SOCCSKSARGEN's GRDP ranked third among the Mindanao regions in terms of contribution. Regional investments posted fluctuating trends at PhP8.62 billion in 2013. Investments took a steep decline at PhP4.492 billion in 2014 but recovered posting investments valued at PhP7.650 billion in 2015.[2]

Contributions to the rise in domestic sales include interventions such as Micro, Small and Medium Enterprises (MSMEs) assistance from the Department of Trade and Industry (DTI) through programs such as the Small and Medium Enterprise Roving Academy (SMERA) Negosyo Centers, the Comprehensive Agrarian Reform Program (CARP) and Shared Service Facilities (SSF).

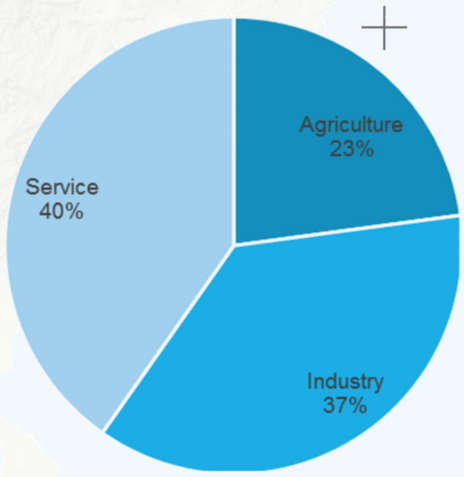

Figure 1: GRDP Contributions per Sector, 2016

Labor and Employment

As of 2017, the current total labor force participation rate (LFPR) of SOCCSKSARGEN was estimated at 63.8% of its total population (or about 3.12 million). This shows a decrease of 0.8% from the 2016 LFPR.[3]

The employment rate was considerably high at 96.6%. The unemployment rate, however, was recorded at 3.4% while underemployment 14.6%.

The region's high underemployment rate, registered at 3.4%, was higher than that in 2016. This was largely attributed to seasonal job opportunities and mismatch of occupations and skills.

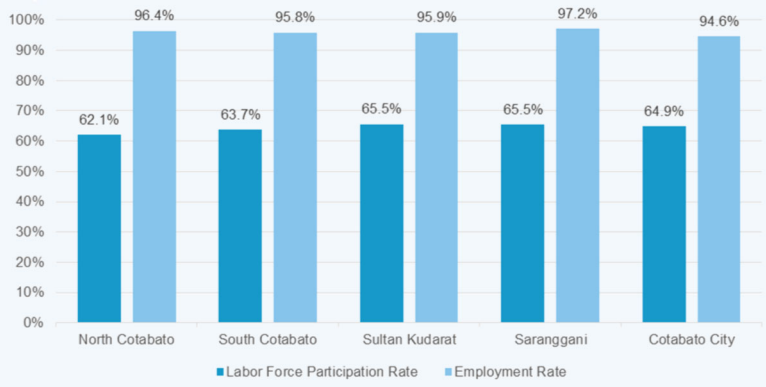

Figure 2: Labor Distribution per Province/City

[1] Philippine Statistics Authority (PSA), CountryStat Philippines 2016
[2] National Economic and Development Authority, Region XII, SOCCSKSARGEN Regional Development Plan 2017-2022
[3] Philippine Statistics Authority, Labor Force Survey, 2015

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Legend

Population Density (person/ha)

- 0.00 - 0.63
- 0.63 - 1.07
- 1.07 - 1.49
- 1.49 - 2.14
- 2.14 - 2.95
- 2.95 - 3.78
- 3.78 - 4.87
- 4.87 - 6.79
- 6.79 - 10.98
- 10.98 - 781.30

Alamada
Banisilan
President Roxas
Arakan
Libungan
Carmen
Pigkawayan
Antipas
NORTH COTABATO
Aleosan
Matalam
Midsayap
Magpet
Kabacan
Pikit
Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
Buluan Lake
Columbio
Isulan
Lutayan
Tantangan
SULTAN KUDARAT
Norala
Kalamansig
Bagumbayan
Koronadal City
Tampakan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Palimbang
SOUTH COTABATO
Malungon
Polomolok
Lake Sebu
Alabel
Maitum
T'Boli
General Santos City
SARANGANI
Kiamba
Malapatan
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Glan

Population Density

PSA, 2015 Census

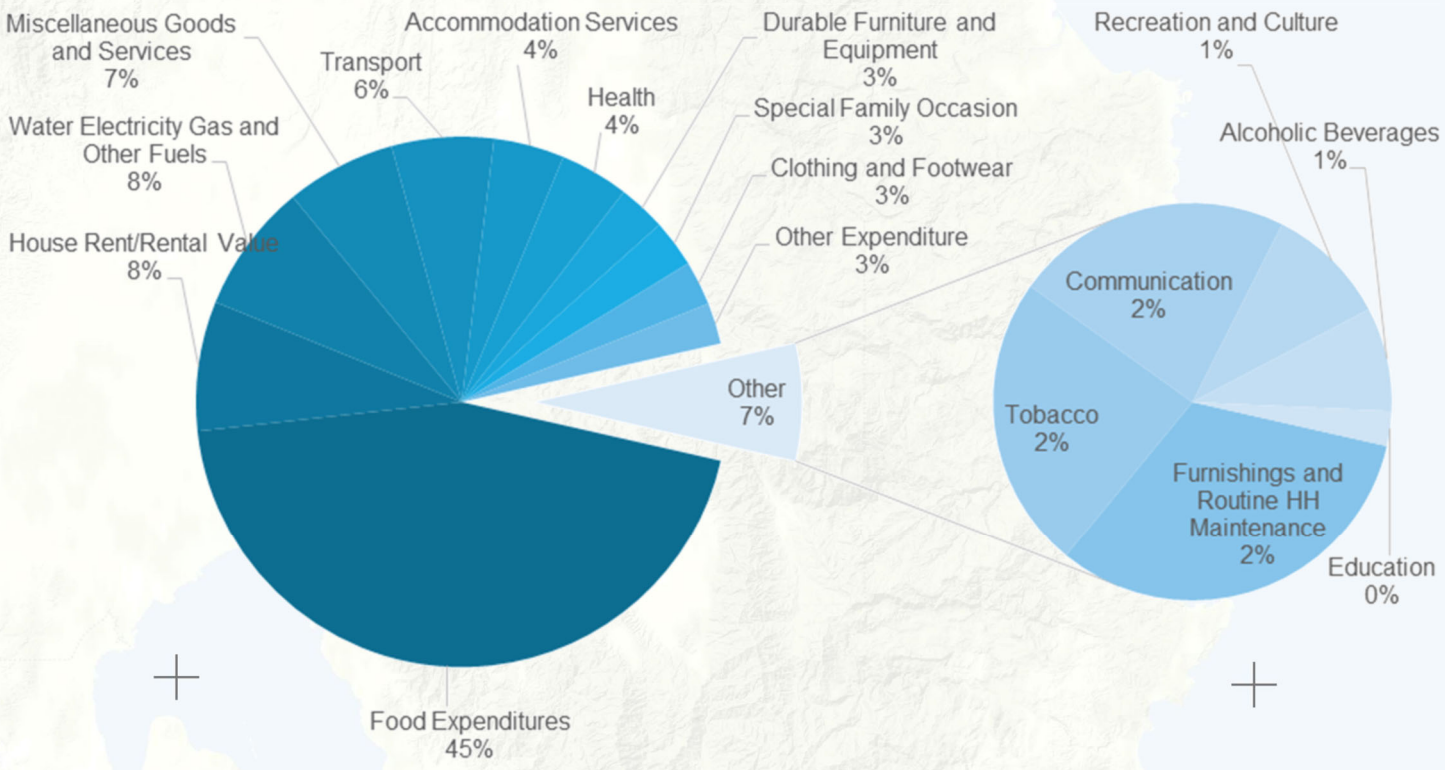

Figure 3: Distribution of Expenditure, 2015

Family Income and Expenditure

There are about 1,055,000 families in SOCCSKSARGEN with a total average annual family income of about PhP188,000, and a total annual average expenditure of PhP162,000. The figure is PhP79,000 lower than the average annual family income of PhP267,000 at the national level.[4]

Out of 100 families, 37 were identified as living below the poverty threshold in 2015. The province of Sarangani had the highest poverty incidence at 47.3%, followed by Sultan Kudarat at 39.2%, and Cotabato at 34.5%.

With respect to the disbursement patterns of the families in the region and across income levels, the Family Income and Expenditure Survey (FIES) conducted in 2015 revealed that food expenditure registered the highest among the major expenditure groups at 45%. Bothe housing expenses and expenses for water, electricity, gas and other fuels followed at 8%. Figure 3 graphs the expenditure distribution showing that most families spend more for their basic needs.

Demography

SOCCSKSARGEN had a total population of 4.55 million (equivalent to about 1 million households) as of 2015, which accounted for 4.5% of the country's total population. It registered an average annual population growth rate of 1.94% from 2010-2015.

In 2015, the population density of the region averaged 202 persons/km^2. Among local government units (LGUs), General Santos City had the highest density at 1,206 persons/km^2, about six times larger than that of the region.

The region is predominantly (54%) rural; the average percentage of the rural population was recorded at 54%. Household (HH) size averages 4.32 persons.

Table 1: Population per Province/City, 2015

Region/Province/City	2015 Population	Land Area (km^2)	Population Density (Persons/km^2)
SOCCSKSARGEN	**4,545,276**	**22,513.30**	**202**
Cotabato (North Cotabato)	1,379,747	9,008.90	153
South Cotabato (excluding General Santos City)	915,289	3,935.95	233
General Santos City	594,446	492.86	1,206
Sultan Kudarat	812,095	5,298.34	153
Sarangani	544,261	3,601.25	151
Cotabato City	299,438	176.00	1,701

Table 2: Urban and Rural Population per Province/City, 2015[5]

Region/Province/City	Urban Population	Rural Population
SOCCSKSARGEN	**46%**	**54%**
Cotabato (North Cotabato)	23%	77%
South Cotabato (excluding General Santos City)	49%	51%
General Santos City	97%	3%
Sultan Kudarat	34%	66%
Sarangani	37%	63%
Cotabato City	87%	13%

[4] Philippine Statistics Authority, Family Income and Expenditure Survey (FIES), 2015
[5] Philippine Statistics Authority, Philippine Standard Geographic Code, 2015

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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

According to the Philippine climate system established by the Modified Coronas Classification, SOCCSKSARGEN has two types of climate — Type IV and Type III.

Most parts of the region has a Type IV climate in which rainfall is more or less distributed throughout the year. The other parts have a Type III climate in which seasons are not very pronounced, relatively dry from November to April, and wet the rest of the year.[6]

Disaster Risk[7]

SOCCSKSARGEN is prone to different types of disasters, specifically those that are climatological and geological in nature.

Table 3: Climatological and Geological Hazards

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

SOCCSKSARGEN is typically a typhoon-free region. In recent years, however, flash floods, tornadoes, earthquakes, and the El Niño and La Niña phenomena have affected a large part of its population.

Deforestation has likewise worsened perennial problems such as flooding in settlements and agricultural areas. In recent years, siltation has taken place in major rivers (such as Ala, Mindanao, and Tamontaka) and the Liguasan marsh (which acts as a natural flood buffer against floods caused by torrential rains and typhoons).

Climate Change and Hydrological Hazards

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

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

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

The projected seasonal temperature increase, seasonal rainfall change and frequency of extreme events (temperatures higher than 35°C, days when rainfall is more than 300 mm, and rainy days that outnumber dry days) in Region XII 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 Increases (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
Cotabato (North Cotabato)	26.8	27.9	27	27.1	1	1.3	1.2	1.1	2.1	2.5	2.4	2.1
Sarangani	27.7	28.4	27.3	27.6	0.9	1.2	1.1	1	1.9	2.4	2.2	2
South Cotabato	27.7	28.5	27.4	27.7	1	1.2	1.1	1.1	2	2.3	2.2	2.1
Sultan Kudarat	27.8	28.6	27.6	27.8	1	1.2	1.1	1	2	2.2	2.2	2
Seasonal Rainfall Change (in %)	Observed Baseline (1971 - 2000)				Change in 2020 (2006-2035)				Change in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Cotabato (North Cotabato)	235.4	353.2	572.5	486	14.8	-5.9	-6.1	1.6	8.1	-4.5	-8.7	-4.2
Sarangani	212.3	212.6	333.6	302.5	10.1	-12.1	-9.3	-1.7	15.6	-17.6	-10.4	-5.3
South Cotabato	183.3	234.1	402.8	351.7	10.1	-8.7	-12.1	-6.8	8.6	-10.8	-18	-14.4
Sultan Kudarat	189.3	311	513.1	448.7	6.1	-2.3	-9.2	2.9	7.5	-4.2	-13.6	1.3

Table 5: Frequency of Extreme Events in 2020 and 2050 Under a Medium-Range Emission Scenario

Province	Station	No. of Days w/ T_{max} > 35°C			No. of Dry Days			No. of Days w/ Rainfall > 300mm		
		OBS	2020	2050	OBS	2020	2050	OBS	2020	2050
South Cotabato	General Santos	1397	3748	6430	8704	7526	8052	0	0	1

[6] *Concepcion RN. 2004. Gateway to land and water information: Philippine National Report*

[7] *Office of Civil Defense, National Disaster Risk Reduction Management Council (NDRRMC)*

120°0.000'W

160°0.000'E

N

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WGS 1984 - UTM Zone 51 N

NORTH COTABATO

SULTAN KUDARAT

SOUTH COTABATO

SARANGANI

Contour Map

NAMRIA

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120°0.000'W

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WGS 1984 - UTM Zone 51 N

1500

1000

1000

500

1000

Alamada
Banisilan
President Roxas
Arakan
Carmen
Libungan
Pigkawayan
Antipas
North Cotabato
Midsayap
Aleosan
Kabacan
Pikit
Magpet
Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Buluan Lake
Columbio
Lebak
Isulan
Sultan Kudarat
Tantangan
Lutayan
Norala
Kalamansig
Bagumbayan
Koronadal City
Tampakan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Malungon
Palimbang
South Cotabato
Polomolok
Lake Sebu
Alabel
Maitum
T'Boli
General Santos City
Sarangani
Kiamba
Maasim
Glan

Legend

Annual Rainfall 2015

Average Rainfall

PAGASA, 2015 Data

120°0.000'W

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120°0.000'W

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N

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WGS 1984 - UTM Zone 51 N

80°0.000'N

20°0.000'S

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Legend

Safe Drinking Water (%)

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

Alamada
Banisilan
President Roxas
Arakan
Libungan
Carmen
Pigkawayan
Antipas
NORTH COTABATO
Aleosan
Matalam
Midsayap
Magpet
Kabacan
Kidapawan City
Pikit
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
Buluan Lake
Columbio
Isulan
Lutayan
Tantangan
SULTAN KUDARAT
Norala
Kalamansig
Koronadal City
Tampakan
Bagumbayan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Malungon
Palimbang
SOUTH COTABATO
Polomolok
Lake Sebu
Alabel
T'Boli
General Santos City
Maitum
SARANGANI
Malapatan
Kiamba
Maasim
Glan

Access to Safe Drinking Water

PSA, 2015 Census

WSS Sector Status

Access to Safe Water

Approximately 87% of SOCCSKSARGEN's population had access to safe water sources in 2015.[8]

This figure translates to around 920,000 HHs. About 29% of the population has Level III service connection at home while 12% has Level II service which the households share with the community. Access to Level I service comprises 46%.

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

The region's access to safe water is on a par with the national average of about 88%, with a discrepancy of only 0.5%.

In terms of access per level of service, Level III access is significantly below the national average while Level II and Level I access is higher.[10]

Table 6: National and Regional Access to Water Supply[9]

Level of Service	National	Region XII
Level III	44.1%	29.3%
Level II	11.2%	12.4%
Level I (Safe Sources)	32.4%	45.5%
Subtotal (Safe Sources)	*87.7%*	*87.2%*
Level I (Unsafe Sources)	12.3%	12.8%
Total	100.0%	100.0%

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

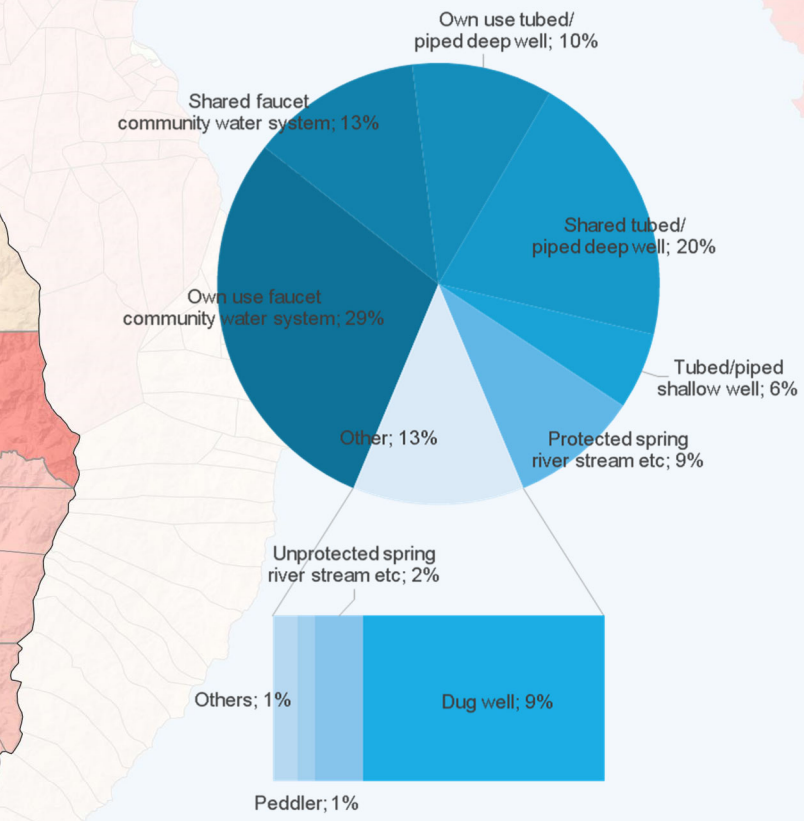

Figure 4: Main Sources of Water Supply, 2015

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

Table 7: Access to Water Supply per Province/City[10]

Region/Province/City	Access to Safe Water Supply
SOCCSKSARGEN	**91.0%**
Cotabato (North Cotabao)	95.1%
Sarangani	100.0%
South Cotabato	94.5%
Sultan Kudarat	75.7%
General Santos City	89.1%
Cotabato City	91.1%

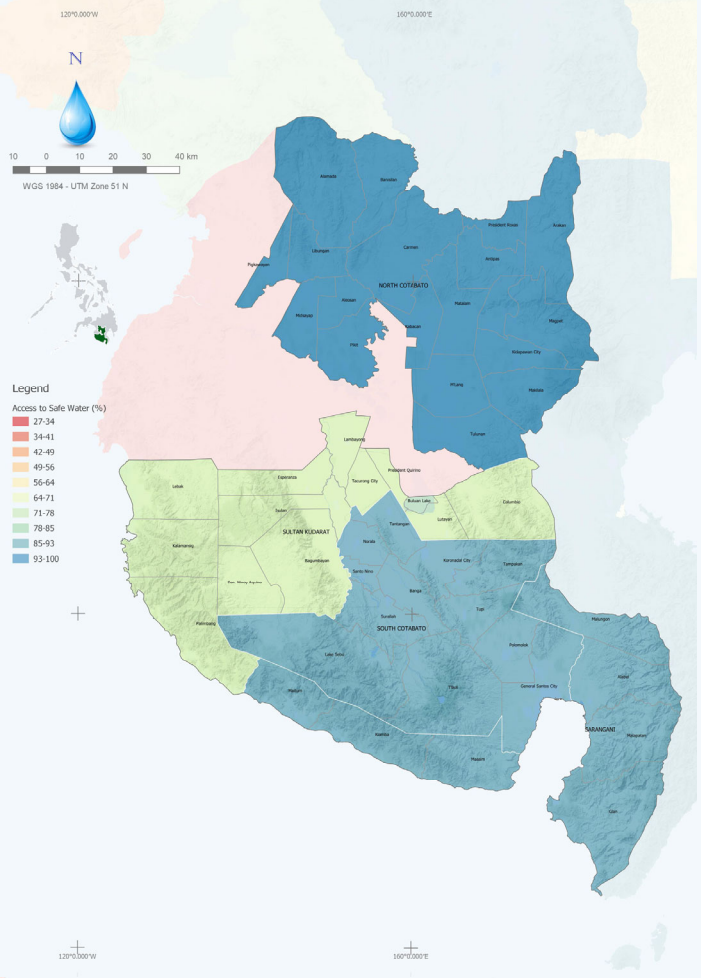

Figure 5: Provincial Access to Safe Water

Drinking Water

In terms of access to safe drinking water, the Philippine Statistics Authority (PSA) has released data up to the municipal level based on the latest 2015 Census. The classification of sources for drinking water is the same as that for sources of safe water with the addition of bottled water.

As of 2015, 88% of the region drank water from sources considered "improved" and "safe". Of the region's total population, 9% drank bottled water.

Among the provinces, Sarangani had the lowest access to safe drinking water at 84%. South Cotabato, excluding General Santos City, had access to safe drinking water at around 94%.

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

[8] Philippine Statistics Authority, Family Income and Expenditure Survey (FIES), 2015
[9] Ibid.
[10] Based on Region XII provinces' first hand data on access to safe water, as gathered during the regional planning and consultation workshop

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WGS 1984 - UTM Zone 51 N

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Legend

Sanitation Access (%)

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

Alamada
Banisilan
President Roxas
Arakan
Libungan
Carmen
Antipas
Pigkawayan
NORTH COTAB
NORTH COTABATO
Aleosan
Matalam
Midsayap
Magpet
Kabacan
Pikit
Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
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Columbio
Isulan
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Kalamansig
Koronadal City
Tampakan
Bagumbayan
Santo Nino
Sen. Ninoy Aquino
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Access to Sanitation

SOCCSKSARGEN Regional Planning and Consultation Workshop, 2017 Data

Access to Sanitation

Though in-migration to capital cities like General Santos City has slowed down development in some adjacent provinces like Cotabato, Sultan Kudarat, and Sarangani, the overall growth of the region has, as a matter of course, contributed to the increase in demand for sanitation services.

Approximately 41% of the region's population has access to improved sanitation.

The 2015 FIES has reported that SOCCSKSARGEN posted a figure more than half of the national average in terms of coverage for improved sanitation and more than twice the national average for basic sanitation.

The open defecation rate of the region is also on a par with the national average. (The open defecation rate is a proxy indicator for the lack of access to toilet facilities.)

Table 8: National and Regional Access to Sanitation[11]

Sanitation Coverage	National	Region XII
Improved Sanitation	73.77%	40.92%
Basic Sanitation	19.96%	48.39%
Unimproved Sanitation	2.04%	6.14%
Open Defecation	4.23%	4.55%
Total	100.0%	100.0%

South Cotabato registered the highest access to basic sanitation at 90.98% but represented only 20.14% of the regional population. The two provinces with the highest population base in the region, North Cotabato and Sultan Kudarat, comprise the lowest and third lowest access at 82.21% and 71.76%, respectively, according to the 2015 Annual Report of the Field Health Services Information System (FHSIS) of the Department of Health (DOH).

Table 9: Access to Sanitary Facilities per Province/City[12]

Region/Province/City	HHs with Sanitary Toilets	HHs with Complete Basic Sanitation Facilities
SOCCSKSARGEN	**81.41**	**63.45**
Cotabato (North Cotabato)	82.21	56.96
Sarangani	72.03	54.39
South Cotabato	90.98	61.49
Sultan Kudarat	71.76	63.82
General Santos City	90.00	80.00
Cotabato City	75.70	75.70

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

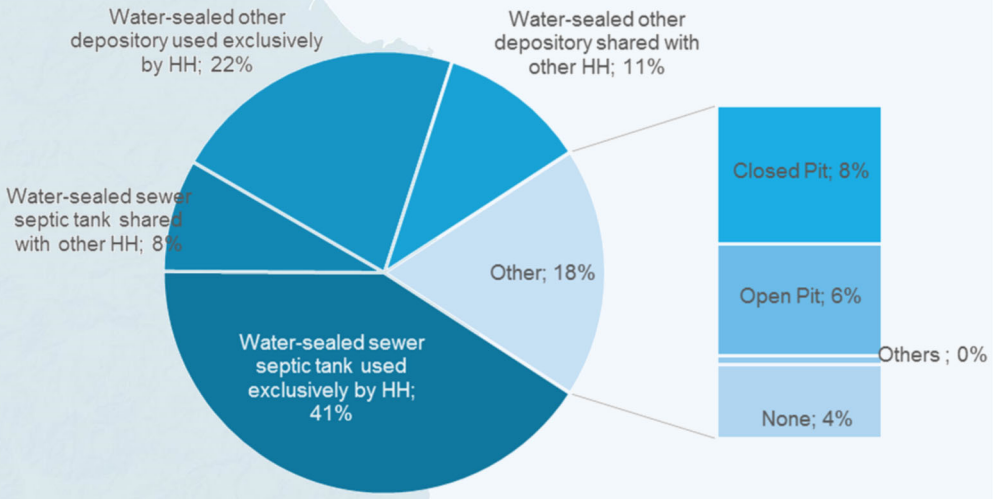


Figure 6: Percentage of HHs with Access to Sanitary Facilities

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

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

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

Figure 7, on the other hand, shows the locations of the septage treatment plants (STPs) in the region.

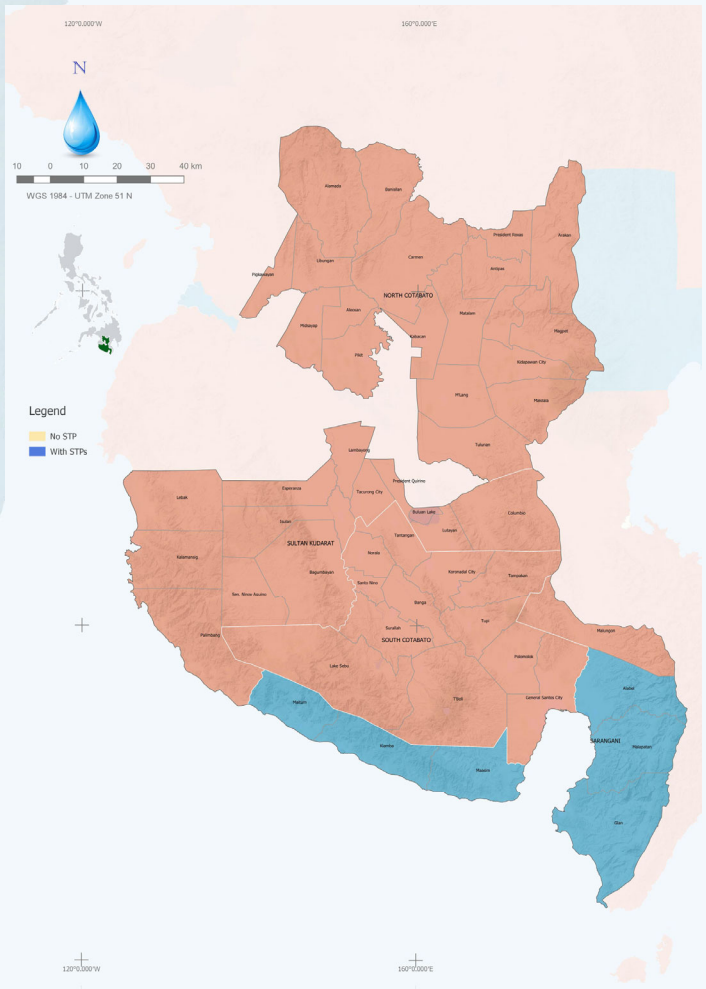


Figure 7: Existing Septage Treatment Plants[13]

[11] Philippine Statistics Authority, Family Income and Expenditure Survey, 2015
[12] Department of Health, FHSIS Annual Report CY 2015
[13] Based on Region XII provinces' first hand data on access to sanitation, as gathered during the regional planning and consultation workshop

120°0.000'W

160°0.000'E

80°0.000'N

20°0.000'S

60°0.000'N

Cagayan de Oro River Basin

Agus River Basin

Davao River Basi

Mindanao River Basin

Buayan-Malungan Rive

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

Legend

Water Bodies

Major River Basin

SOCCSKSARGEN Rivers and Tributaries

DENR, NWRB, NAMRIA

18

Water Resources

SOCCSKSARGEN ranks 7th among all administrative regions with the most water resources potential.

Its water resources potential totals 9,344 million cubic meters (MCM)/year, taking up 6.4% of the country's total.

The water resources potential of an area is based on its groundwater and surface water. Groundwater in the region is estimated at 803 MCM per year while surface water is estimated at 8,541 MCM/year. Annual rainfall in the region averages 1,788 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. SOCCSKSARGEN is included in WRR 12 along with one province from Region X and two provinces from the Autonomous Region of Muslim Mindanao (ARMM).

Surface Water

SOCCSKSARGEN has two major river basins, namely: the Mindanao River Basin (MRB) and the Buayan-Malungon River Basin (BMRB) (the second largest).

It has been recommended that to protect the areas within the river basins, the management and rehabilitation of watersheds and wetland are in order. A flood and disaster risk management plan should likewise be enforced.

Mindanao River Basin

The MRB has a total area of 20,859.41 km^2, making it the second largest river basin next to Cagayan River Basin. It covers a total of nine provinces including North and South Cotabato, and Sultan Kudarat which serves as its water outlet.

North Cotabato has the largest area coverage — about 29.34% of the basin's total area. It has groundwater potential of 4,956 MCM/yr.

Major rivers within the basin include the Ala River, traversing the Ala Valley in the south, the Pulangi River with headwater from Bukidnon, the Ambal-Simuay River System originating from Lanao del Sur, and the Mindanao and Tamontaka Rivers in the Lower Cotabato River Basin. Of these rivers, the Kulama River falls under Class A, the M-lang and Ala Rivers under Class C, and Pulangui and Libungan under Class D (DAO 34 s. 1990).

Buayan-Malungon River Basin

The BMRB is situated in central and southern Mindanao, covering two regions — Region XI (Davao Region) and Region XII. It lies within the northern portion of Sarangani towards its boundary in South Cotabato. It traverses three provinces of Mindanao, namely: Davao del Sur, Sarangani, and South Cotabato. It has an area of approximately 1,505.1 km^2.

This river basin is considered an allied subbasin of the MRB. It is bounded on the east by Mt. Matutum in Malungon, and drains into the Sarangani Bay.

The Buayan River and Malungon River are its main tributaries. Several rivers particularly within General Santos City, South Cotabato, and Alabel, Sarangani also serve as tributaries that discharge into the Sarangani Bay (DENR Region XII 2007).

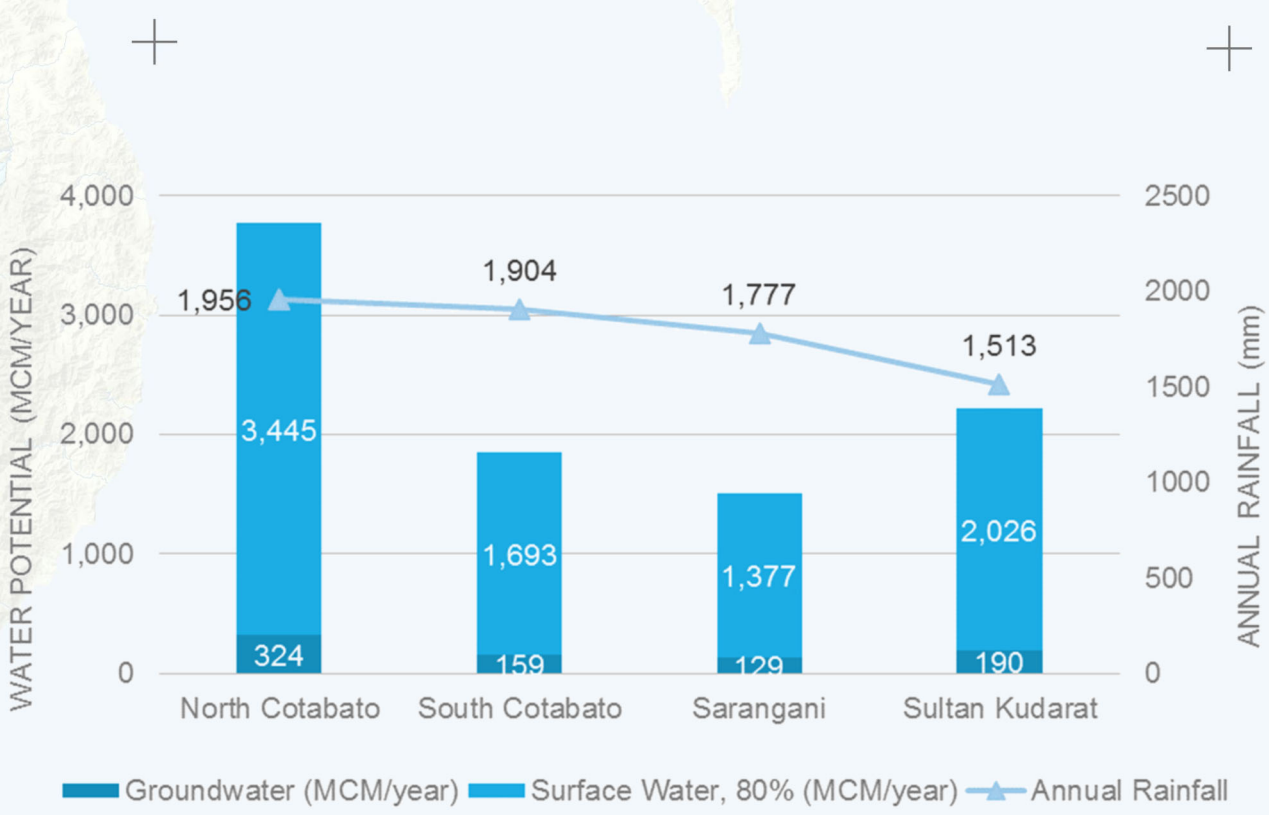


Figure 8: Water Resources Potential and Annual Rainfall[14]

[14] *JICA Master Plan on Water Resources Management in the Philippines, 1998; NWRB; PAGASA rainfall data; FAO*

120°0.000'W

160°0.000'E

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

80°0.000'N

20°0.000'S

Alamada
Banisilan
President Roxas
Arakan
Carmen
Libungan
Antipas
Pigkawayan
NORTH COTABATO
Aleosan
Matalam
Midsayap
Magpet
Kabacan
Pikit
Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
Buluan Lake
Columbio
Isulan
Lutayan
Tantangan
SULTAN KUDARAT
Norala
Kalamansig
Koronadal City
Tampakan
Bagumbayan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Malungon
Palimbang
SOUTH COTABATO
Polomolok
Lake Sebu
Alabel
T'Boli
General Santos City
Maitum
SARANGANI
Malapatan
Kiamba
Maasim
Glan

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

Groundwater Availability

MGB

60°0.000'N

120°0.000'W

160°0.000'E

Table 10: Aquifer Classes Based on MGB Aquifer Types

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

Groundwater

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

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

Major aquifers can be found throughout the region. Non-aquifers cover only small parts of the region in comparison to the other administrative regions. SOCCSKSARGEN's aquifers have extensive to moderate permeability.

Water Use

Water use in the region based on awarded water permits was estimated at 6,253.08 MCM annually as of 2017. About 11% (687.26 MCM) is allocated for power generation and categorized under nonconsumptive use. The remaining volume (5,565.82 MCM) is allocated for consumptive use (see Figure 9).

The irrigation sector consumes the largest volume of water among all sectors with a 97.7% allocation. The domestic sector consumes only 1.2% and the industrial sector 0.4%.

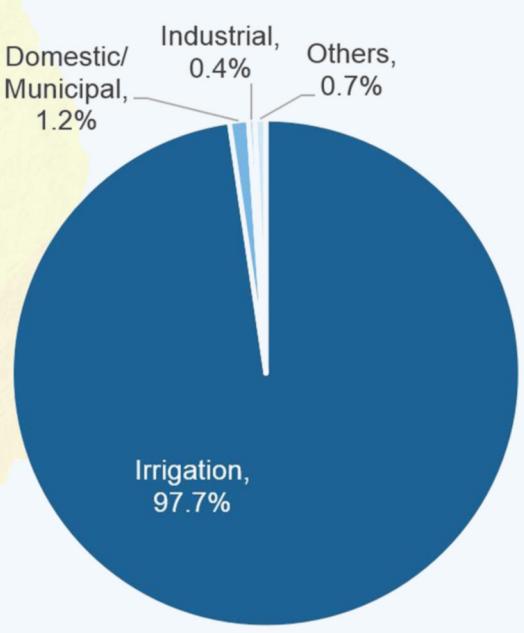


Figure 9: Water Use, 2017[15]

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.)[16]

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

Table 11: Water Availability per Province

Region/Province	Water Availability (m^3/capita/year) 2015 Population
Cotabato (North Cotabato)	2,731.25
Sarangani	2,767.80
South Cotabato	1,227.09
Sultan Kudarat	2,729.12
SOCCSKSARGEN	**2,363.81**

The region's per capita water availability was below said threshold at around 2,400 m^3/year.

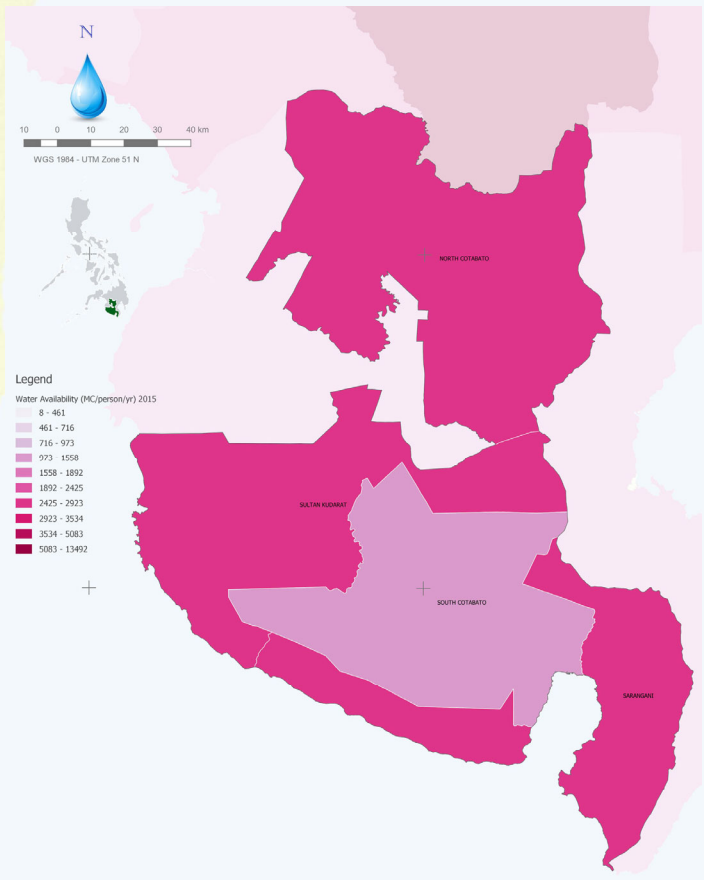


Figure 10: Water Availability Map, 2015

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

Demand

Population Projection

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

Employing PSA's 2010-based population projections which were adjusted to conform with the actual 2015 population, the region's population is projected to reach 6,881,708 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 257 MCM/year, 309 MCM/year, and 380 MCM/year, respectively.

Water Demand vs. Water Resources Potential

The water demand of the industrial, business and domestic sectors in SOCCSKSARGEN 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 (380 MCM/year) to the water resources potential of the region (9,344 MCM/year), the availability of water far exceeds the projected water demand of the region up to 2045.

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

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

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

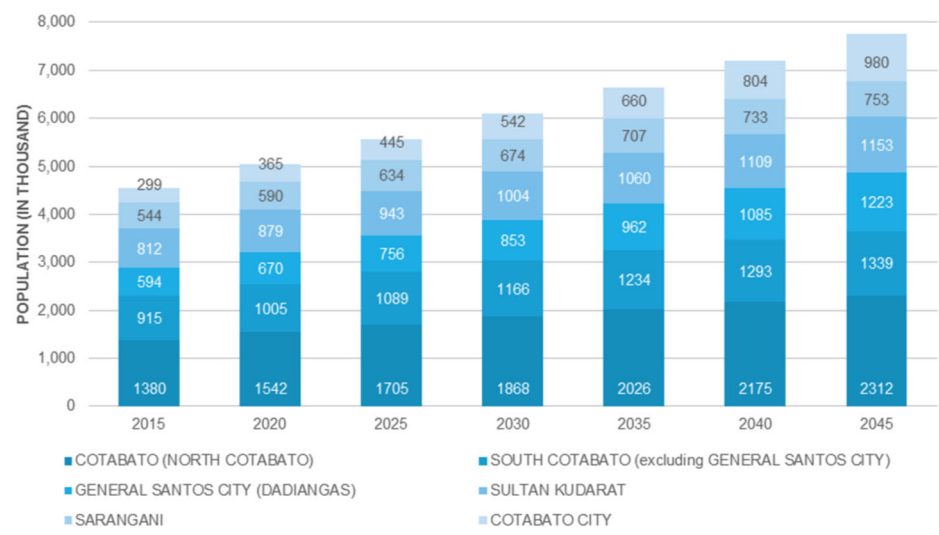


Figure 11: Projected Population

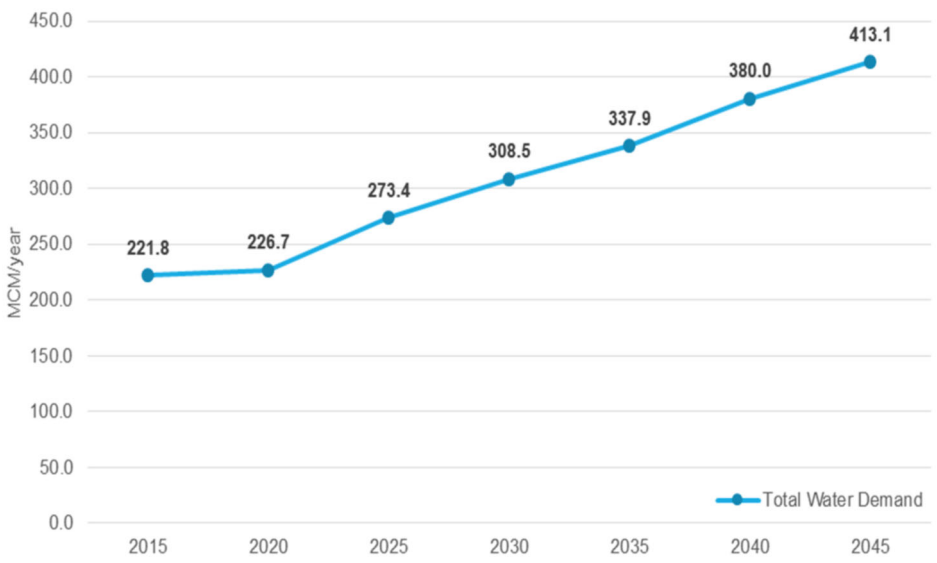
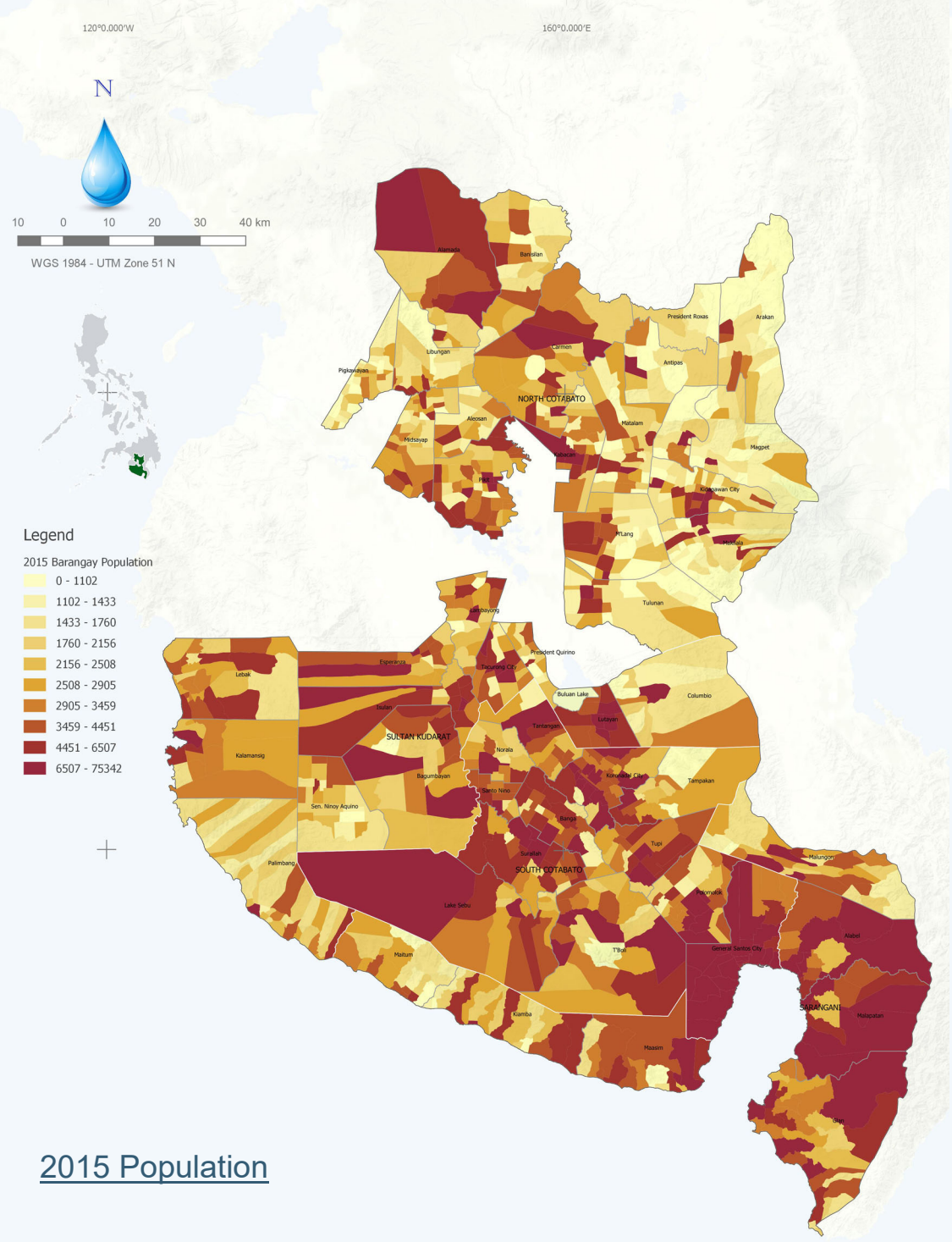
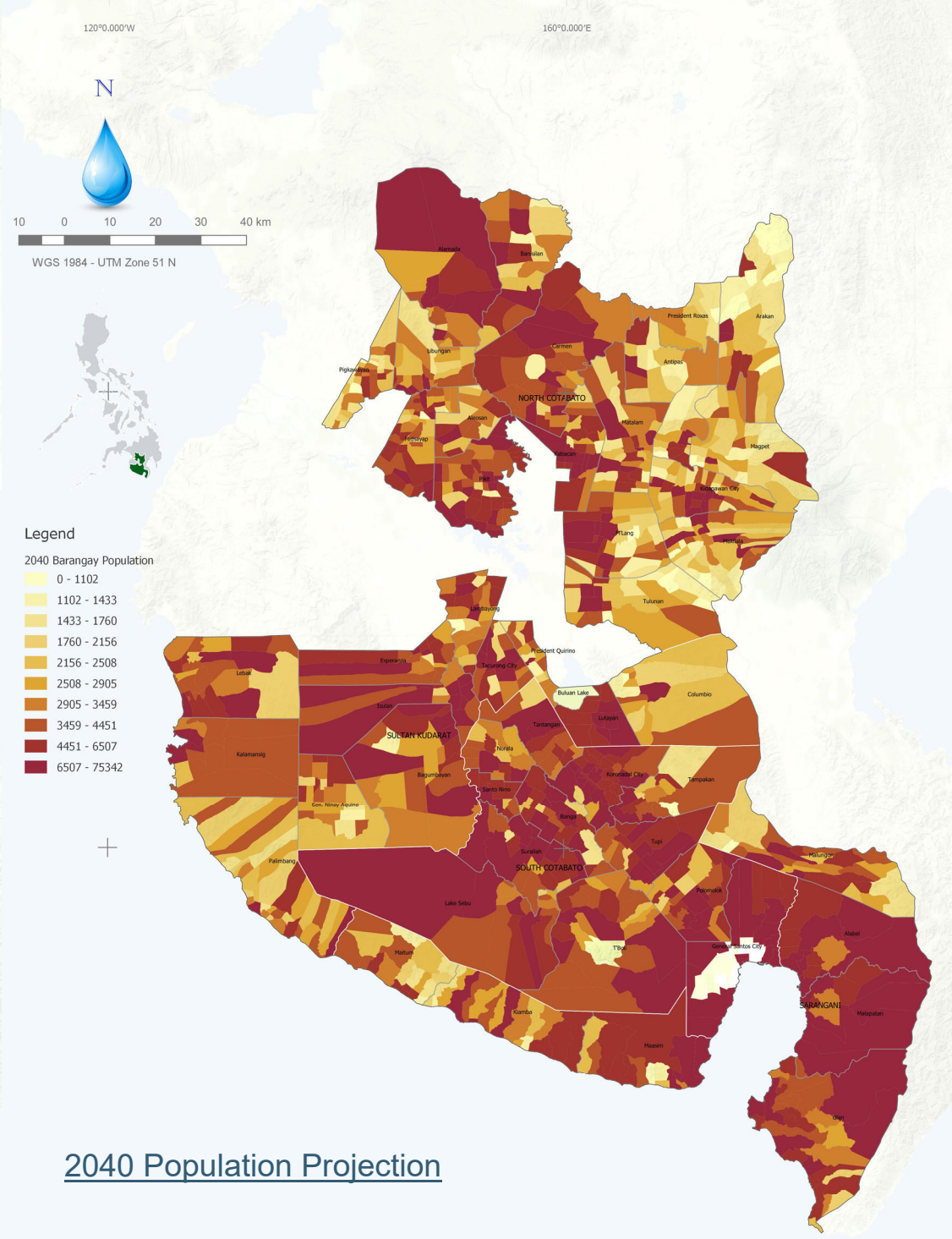


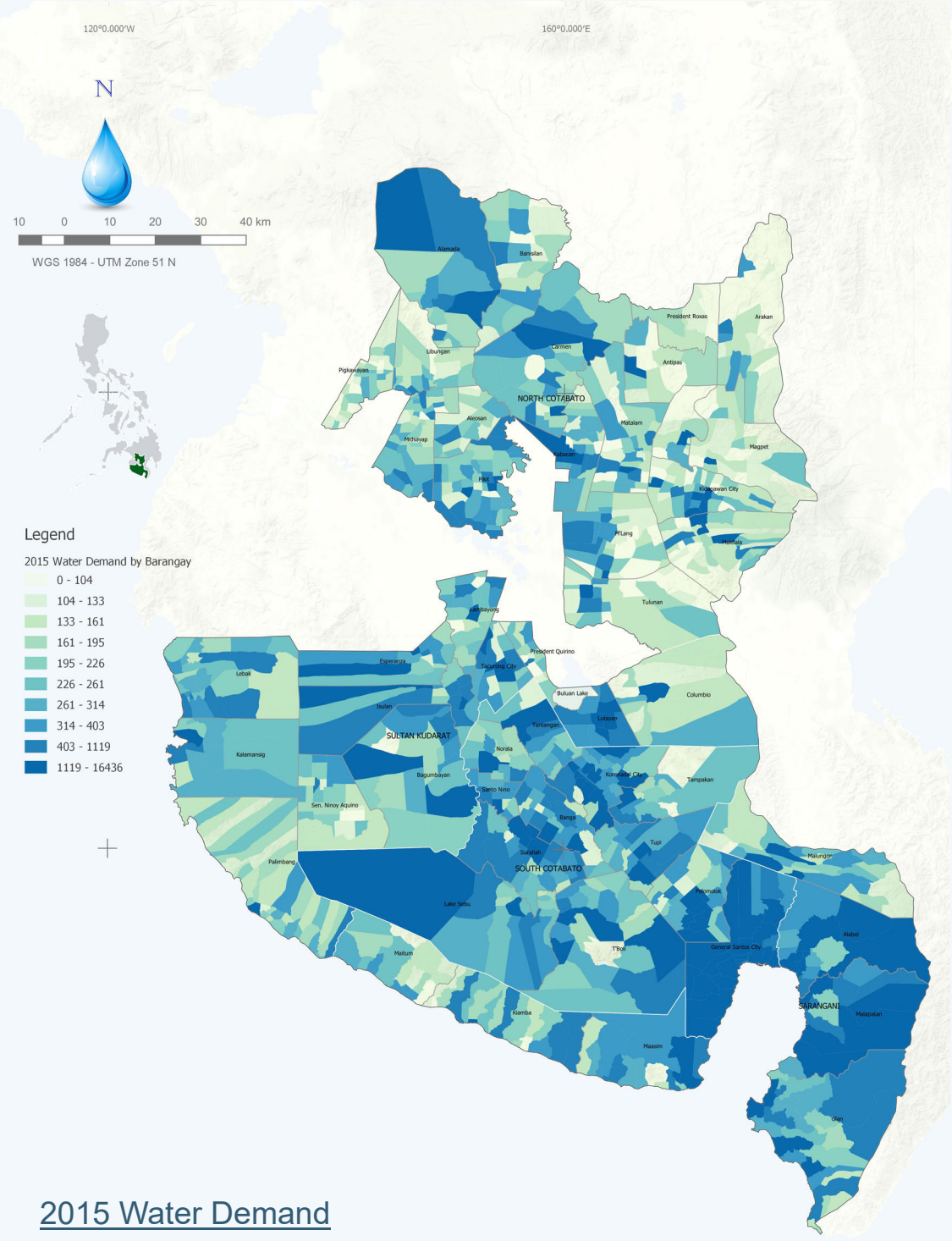
Figure 12: Projected Water Demand



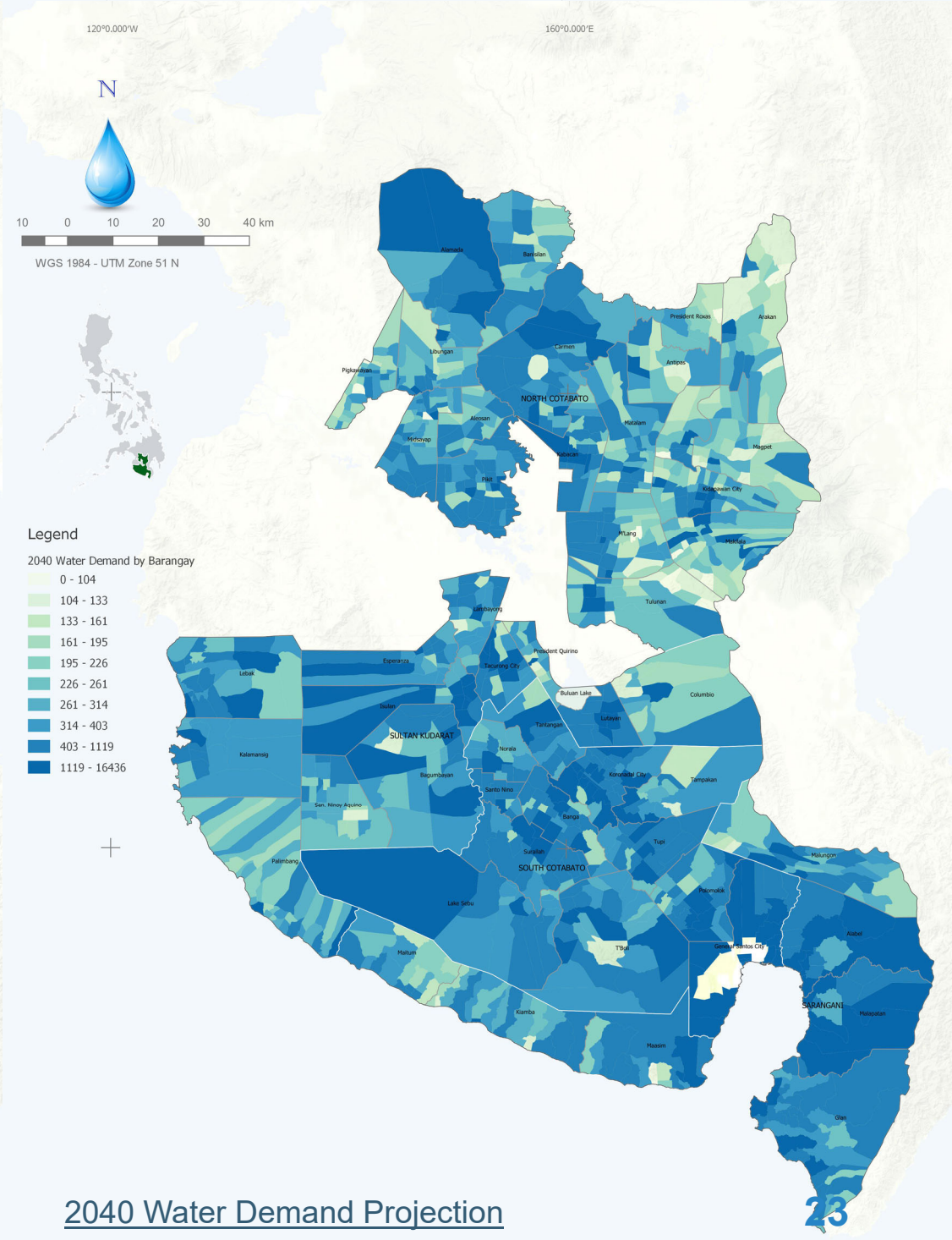
2015 Population



2040 Population Projection



2015 Water Demand



2040 Water Demand Projection

120°0.000'W

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WGS 1984 - UTM Zone 51 N

Alamada
Banisilan
President Roxas
Arakan
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Carmen
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Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
Buluan Lake
Columbio
Isulan
Lutayan
Tantangan
SULTAN KUDARAT
Kalamansig
Norala
Bagumbayan
Koronadal City
Tampakan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Palimbang
SOUTH COTABATO
Malungon
Polomolok
Lake Sebu
Alabel
Maitum
T'Boli
General Santos City
SARANGANI
Malapatan
Kiamba
Maasim
Glan

Legend

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

Water Districts and Areas Covered with Level III Service

LWUA, PAWD, NWRB Listahang Tubig, 2017 Data

WSS Infrastructure

Water service providers (WSPs) of various management types serve around 38% of SOCCSKSARGEN.[17]

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 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[18], 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 28 WDs in the region, 23 were operational and 5 nonoperational. These serviced around 37% of the population.

LGU-Led Water Utilities

There are 108 LGU-led water utilities in the region serving 13 areas — 94,245 users or roughly 2% of the total population.

Private Utilities/Others

There are 176 other WSPs in the region, supplying water to about 586,495 people or approximately 13%. These include cooperatives, private WSPs, etc.

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

Table 12: Water Service Provider per Province/City

Province	No. of LGUs	Type & No. of WSPs		Service Area	Population Served	
					Total	%
South Cotabato	12	WDs	10	1,248,070	426,585	34.2%
		LGU-led	28		11,770	0.8%
		BWSA	-		-	-
		RWSA	9		19,925	1.3%
		Private/Others	16		359,410	23.8%
		Subtotal	**72**	**1,509,735**	**817,690**	**54.2%**
Sultan Kudarat	12	WDs	4	253,211	125,619	49.6%
		LGU-led	55		39,205	4.8%
		BWSA	8		5,620	0.7%
		RWSA	4		8,500	1.0%
		Private/Others	76		111,680	13.8%
		Subtotal	**147**	**812,095**	**290,624**	**35.8%**
Cotabato (North Cotabato)	18	WDs	9	840,200	264,462	31.5%
		LGU-led	6		1,350	0.1%
		BWSA	4		860	0.1%
		RWSA	-		-	-
		Private/Others	7		79,580	5.8%
		Subtotal	**26**	**1,379,747**	**346,252**	**25.1%**
Sarangani	7	WDs	4	177,731	13,476	7.6%
		LGU-led	19		41,920	7.7%
		BWSA	4		680	0.1%
		RWSA	3		3,240	0.6%
		Private/Others	77		35,825	6.6%
		Subtotal	**107**	**544,261**	**95,141**	**17.5%**
Cotabato City	1	WDs	1	123,756	158,686	100%
		LGU-led	-		-	-
		BWSA	-		-	-
		RWSA	-		-	-
		Private/Others	-		-	-
		Subtotal	**1**	**299,438**	**158,686**	**53.0%**
SOCCSKSARGEN	50	WDs	28	2,642,968	988,828	37.4%
		LGU-led	108		94,245	2.1%
		BWSA	16		7,160	0.2%
		RWSA	16		31,665	0.7%
		Private/Others	176		586,495	12.9%
		Grand Total	**344**	**4,545,276**	**1,708,393**	**37.6%**

[17] Data on water districts were based on LWUA and PAWD reports; other WSP data were based on Listahang Tubig (data as of 2017)

[18] Local Water Utilities Administration (LWUA), PAWD, NWRB Listahang Tubig

120°0.000'W

160°0.000'E

N

9 0 9 18 27 36 km

WGS 1984 - UTM Zone 51 N

80°0.000'N

20°0.000'S

Alamada
Banisilan
President Roxas
Arakan
Carmen
Libungan
Pigkawayan
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North Cotabato
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Kabacan
Magpet
Pikit
Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Lebak
Tacurong City
Buluan Lake
Columbio
Isulan
Sultan Kudarat
Tantangan
Lutayan
Norala
Kalamansig
Koronadal City
Tampakan
Bagumbayan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Malungon
Palimbang
South Cotabato
Lake Sebu
Polomolok
Alabel
Maitum
T'Boli
General Santos City
Sarangani
Kiamba
Maasim
Glan

Legend

% Open Defecation

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

Open Defecation

PSA, 2015 Data

Sanitation

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

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

Open Defecation

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

SOCCSKSARGEN has the eighth highest open defecation rate in the country. At 4.55%, the region's open defecation rate almost equals that of the entire country.

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 SOCCSKSARGEN.

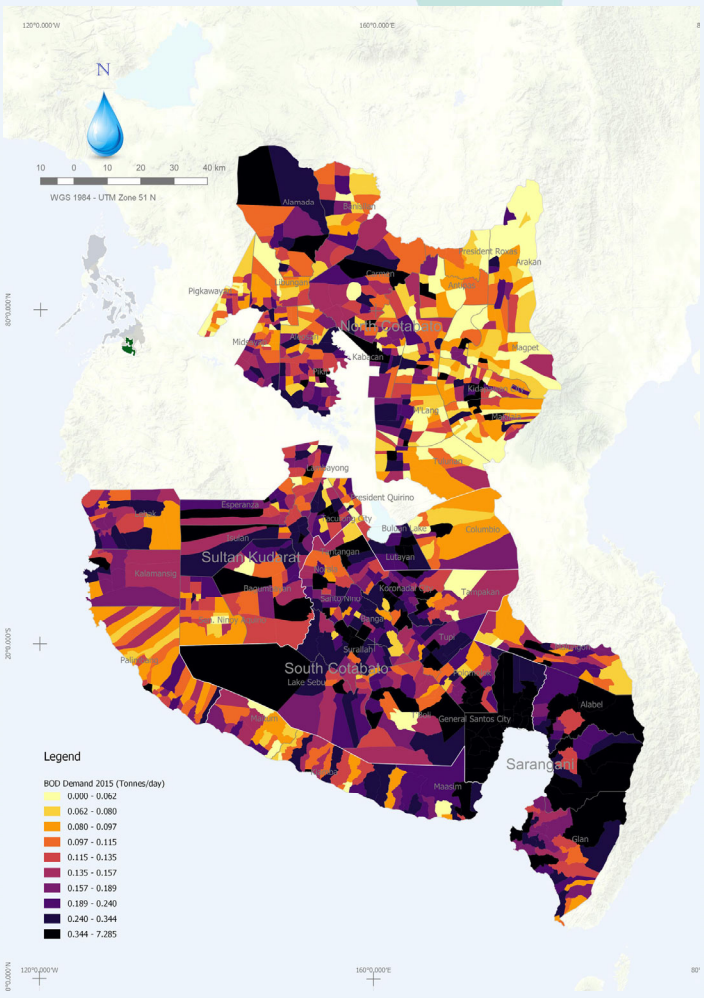


Figure 13: Biological Oxygen Demand, 2015

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.

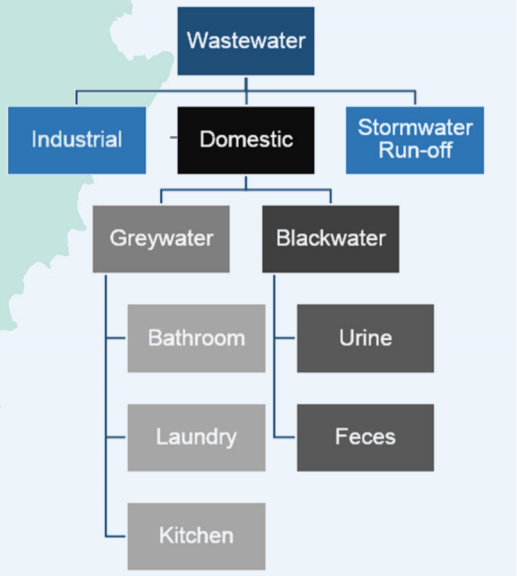


Figure 14: Categories of Wastewater

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[19] per person per day is used.

The wastewater[20] 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.

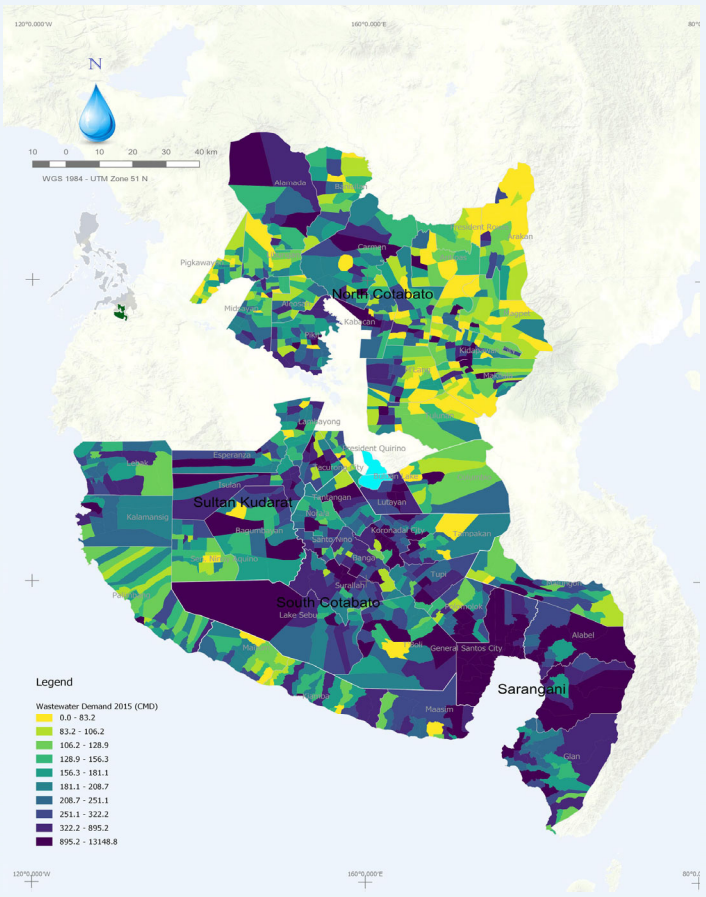
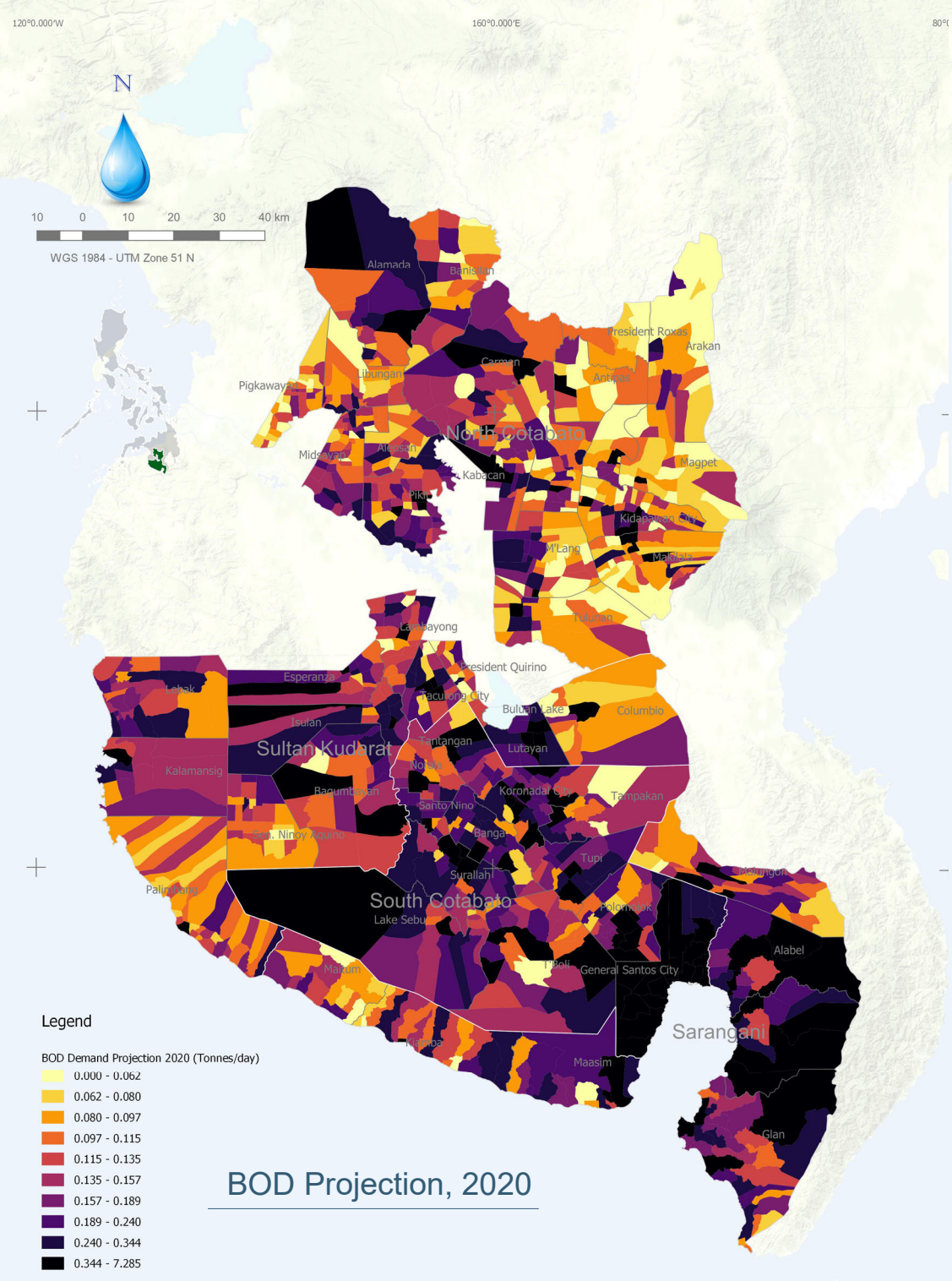
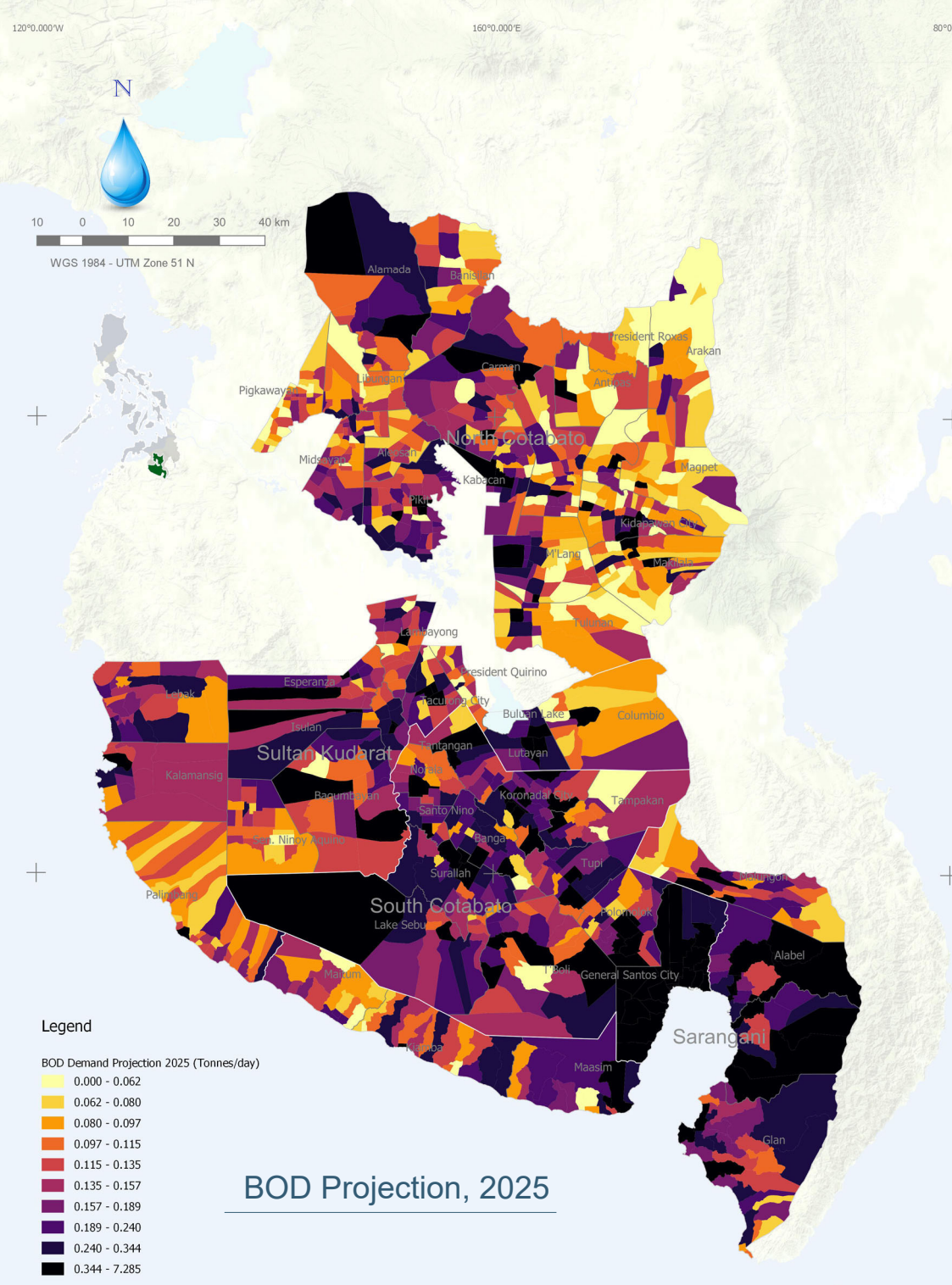
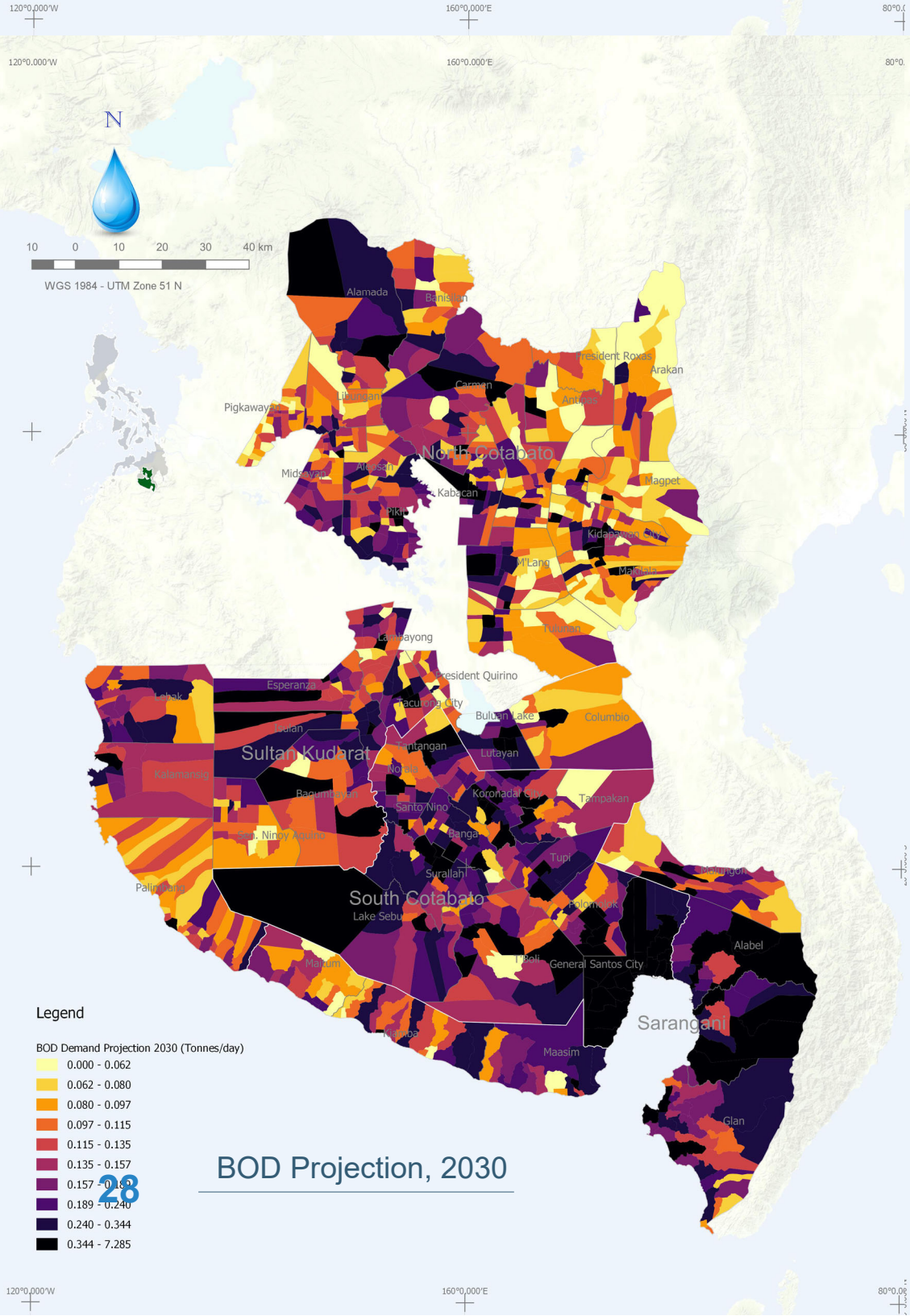


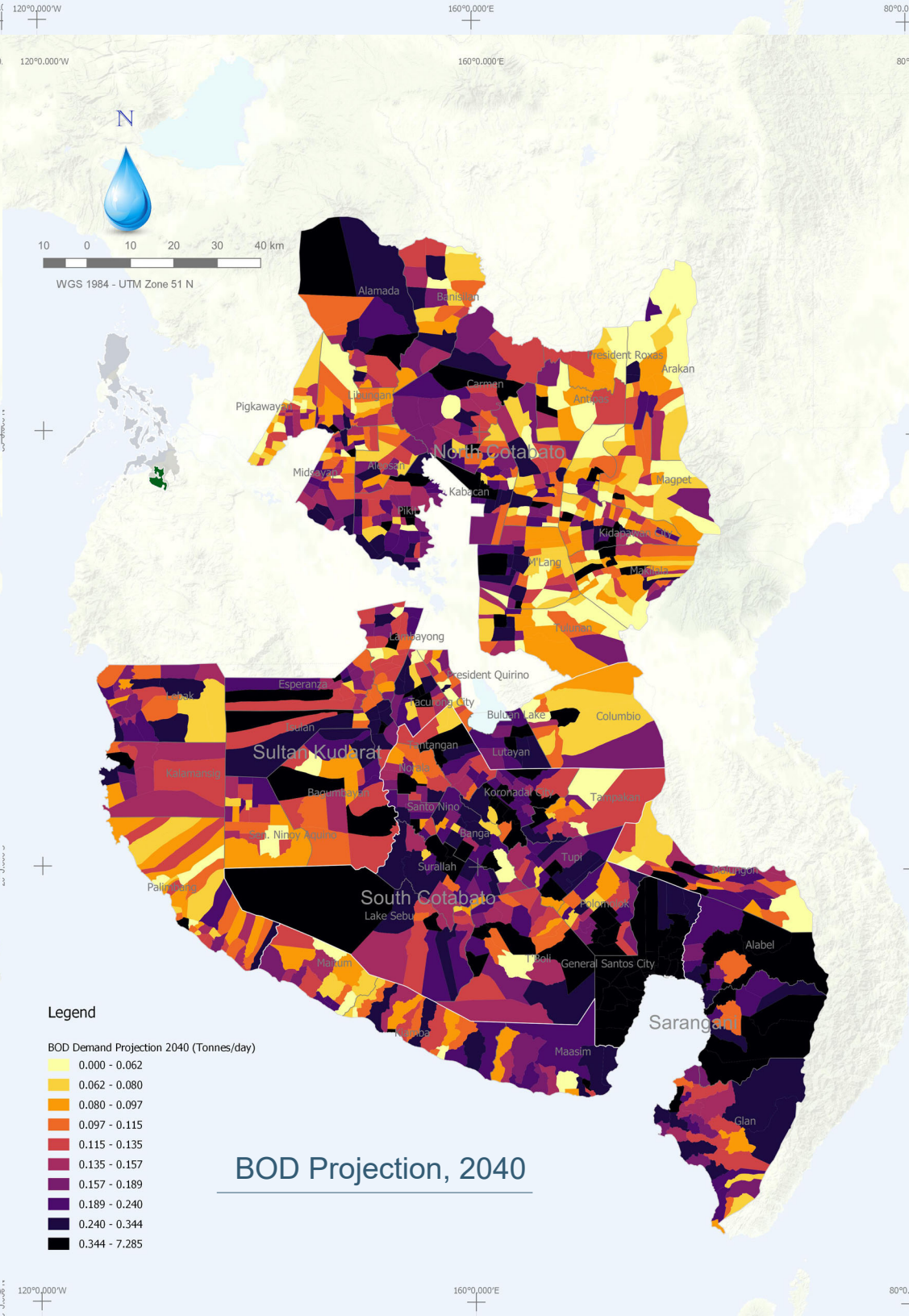
Figure 15: Wastewater Produced, 2015

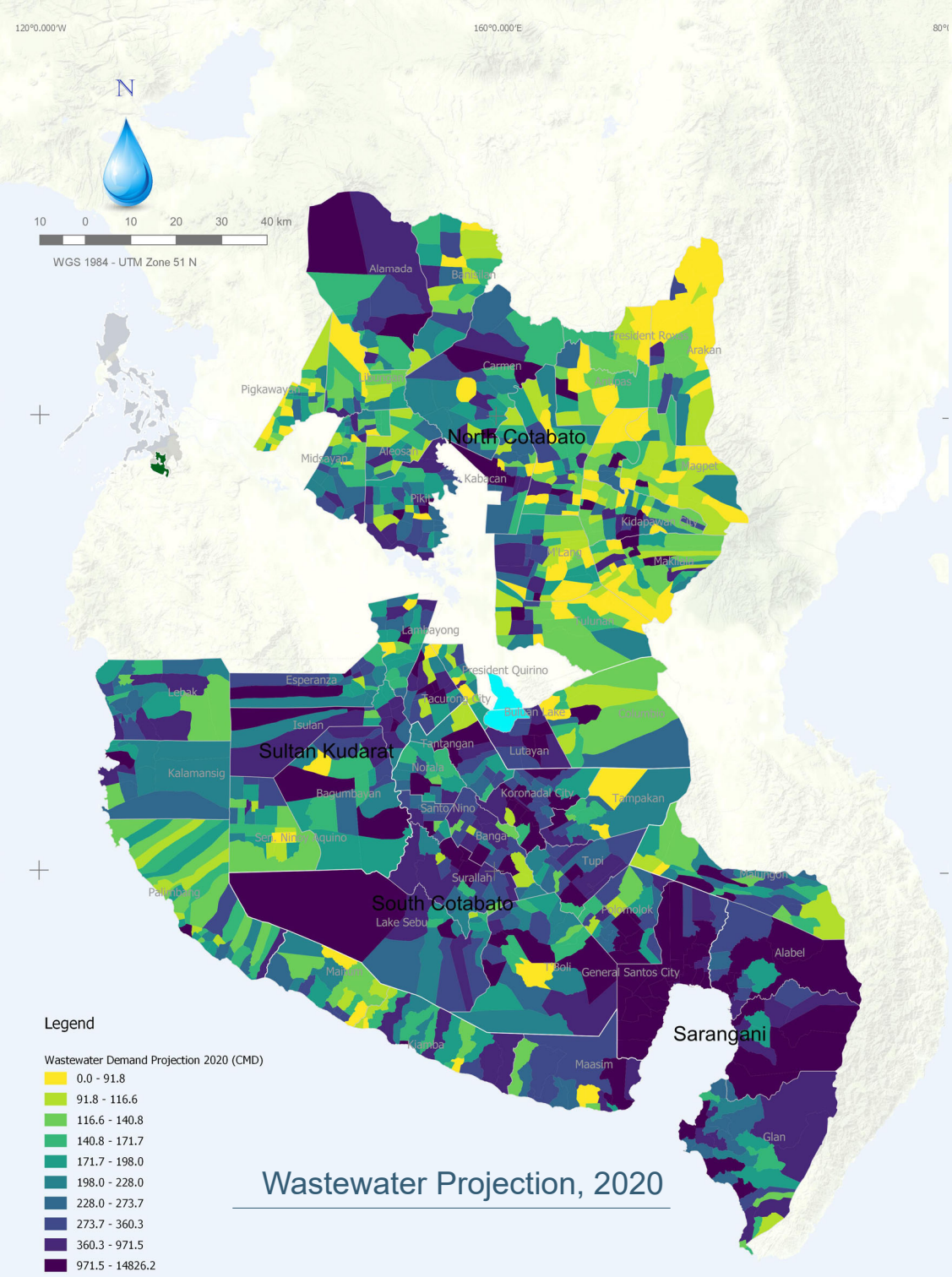
[19] *Philippine Environment Monitor (PEM), 2003*
[20] *Ibid.*

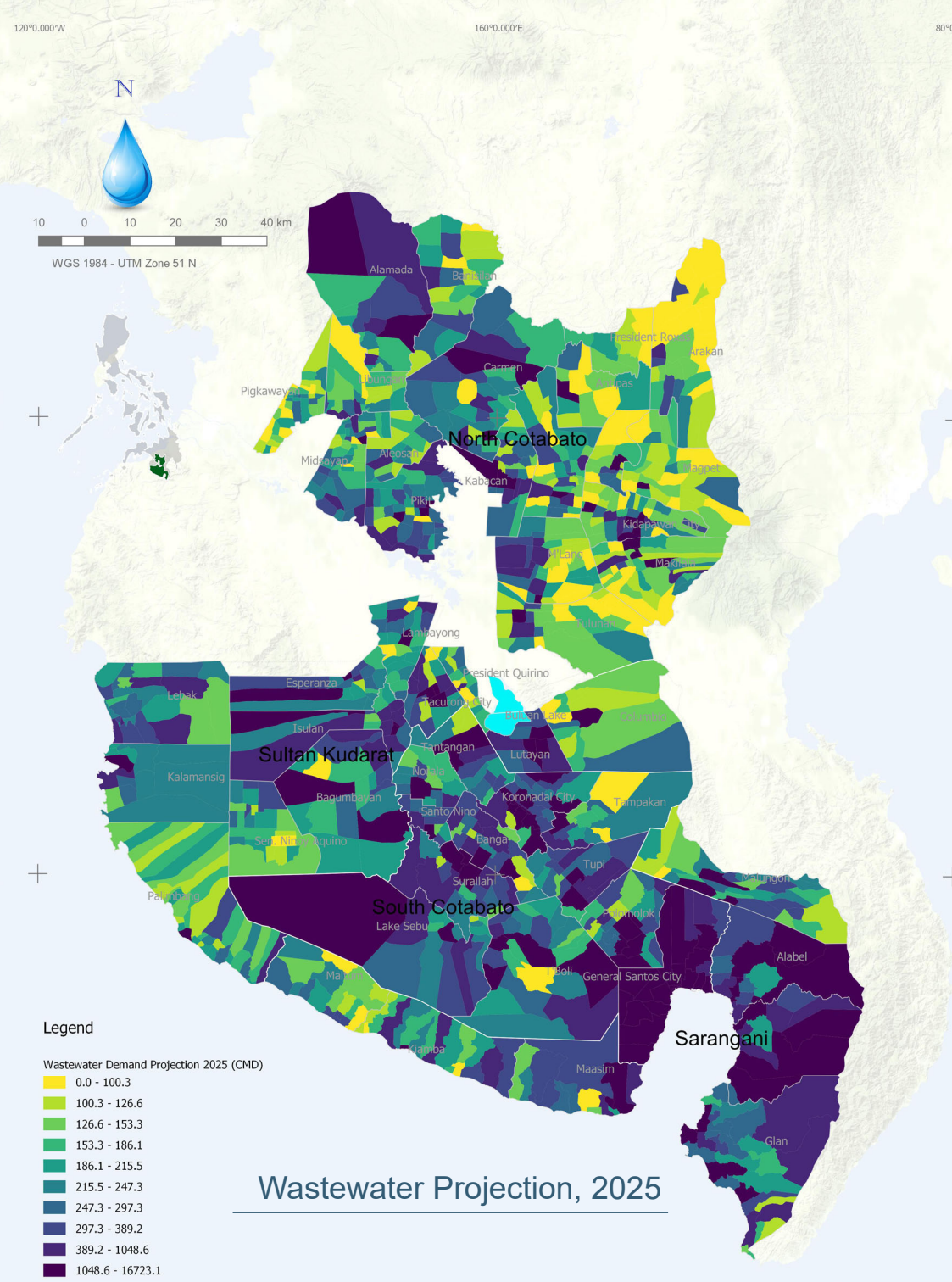

N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Legend
BOD Demand Projection 2020 (Tonnes/day)
0.000 - 0.062
0.062 - 0.080
0.080 - 0.097
0.097 - 0.115
0.115 - 0.135
0.135 - 0.157
0.157 - 0.189
0.189 - 0.240
0.240 - 0.344
0.344 - 7.285
BOD Projection, 2020


N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Legend
BOD Demand Projection 2025 (Tonnes/day)
0.000 - 0.062
0.062 - 0.080
0.080 - 0.097
0.097 - 0.115
0.115 - 0.135
0.135 - 0.157
0.157 - 0.189
0.189 - 0.240
0.240 - 0.344
0.344 - 7.285
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 - 0.062
0.062 - 0.080
0.080 - 0.097
0.097 - 0.115
0.115 - 0.135
0.135 - 0.157
0.157 - 0.189
0.189 - 0.240
0.240 - 0.344
0.344 - 7.285
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 - 0.062
0.062 - 0.080
0.080 - 0.097
0.097 - 0.115
0.115 - 0.135
0.135 - 0.157
0.157 - 0.189
0.189 - 0.240
0.240 - 0.344
0.344 - 7.285
BOD Projection, 2040


N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Alamada
Carmen
Pigkawayan
Midsayap
Aleosan
Kabacan
Piki
North Cotabato
Lambayong
President Quirino
Esperanza
Lebak
Isulan
Sultan Kudarat
Kalamansig
Bagumbayan
Tacurong City
Lutayan
Tantangan
Columbio
Koronadal City
Tampakan
Santo Nino
Banga
Surallah
Tupi
South Cotabato
Lake Sebu
Alabel
General Santos City
Maasim
Glan
Sarangani
Legend
Wastewater Demand Projection 2020 (CMD)
0.0 - 91.8
91.8 - 116.6
116.6 - 140.8
140.8 - 171.7
171.7 - 198.0
198.0 - 228.0
228.0 - 273.7
273.7 - 360.3
360.3 - 971.5
971.5 - 14826.2
Wastewater Projection, 2020


N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Alamada
Carmen
Pigkawayan
Midsayap
Aleosan
Kabacan
Piki
North Cotabato
Lambayong
President Quirino
Esperanza
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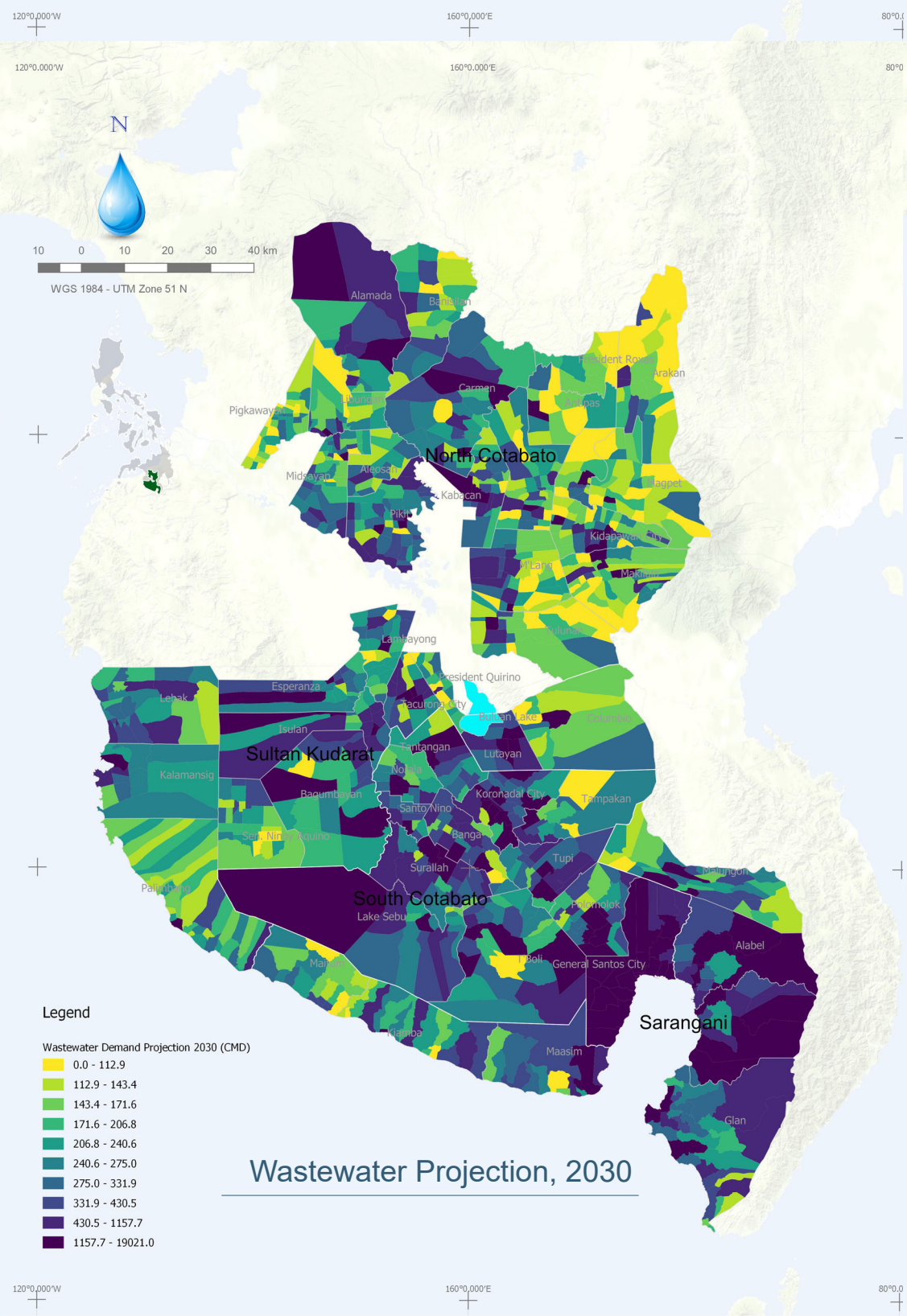
Sultan Kudarat
Kalamansig
Bagumbayan
Tacurong City
Lutayan
Tantangan
Columbio
Koronadal City
Tampakan
Santo Nino
Banga
Surallah
Tupi
South Cotabato
Lake Sebu
Alabel
General Santos City
Maasim
Glan
Sarangani
Legend
Wastewater Demand Projection 2025 (CMD)
0.0 - 100.3
100.3 - 126.6
126.6 - 153.3
153.3 - 186.1
186.1 - 215.5
215.5 - 247.3
247.3 - 297.3
297.3 - 389.2
389.2 - 1048.6
1048.6 - 16723.1
Wastewater Projection, 2025


N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Alamada
Carmen
Pigkawayan
Midsayap
Aleosan
Kabacan
Piki
North Cotabato
Lambayong
President Quirino
Esperanza
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Tacurong City
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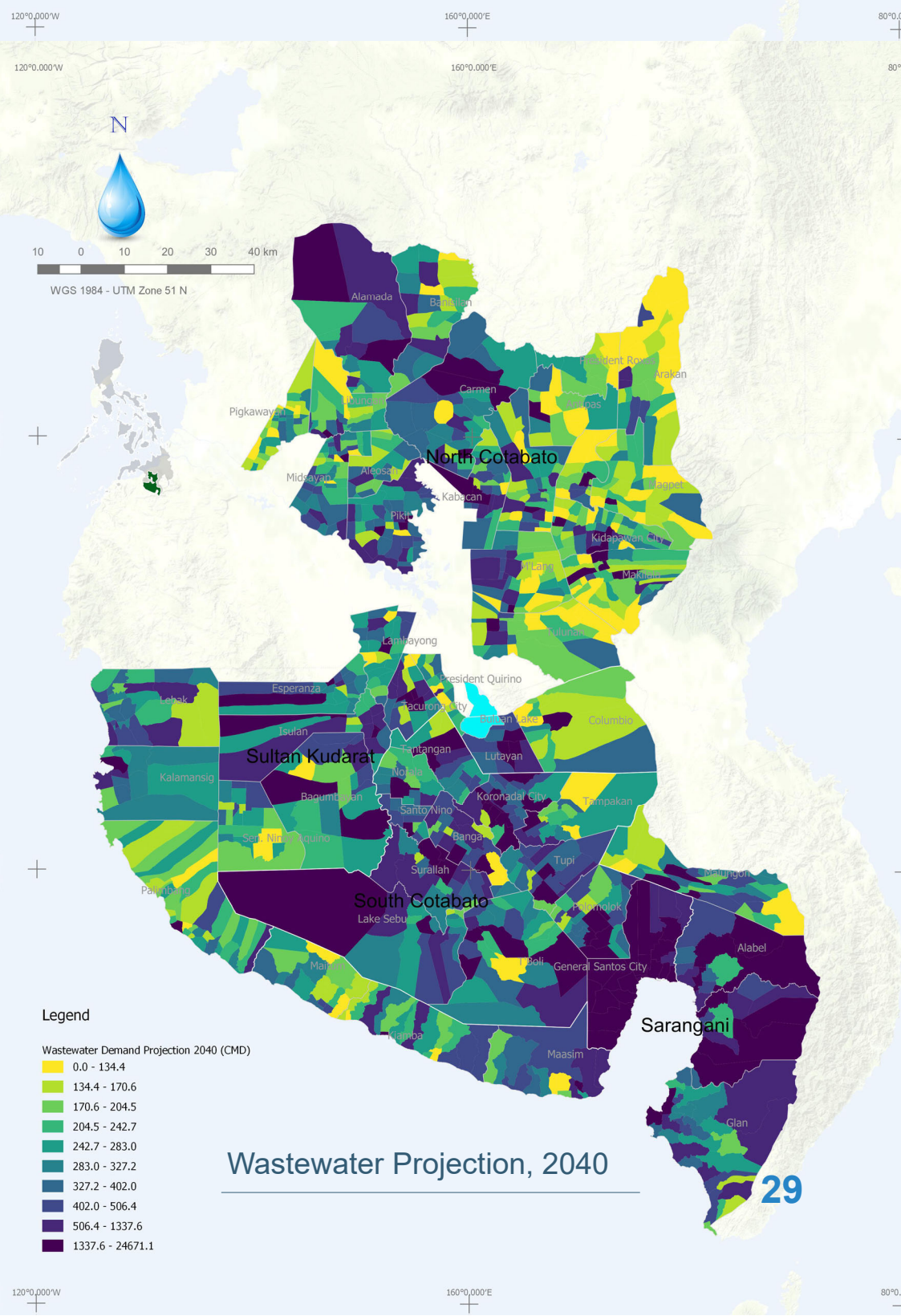
Koronadal City
Tampakan
Santo Nino
Banga
Surallah
Tupi
South Cotabato
Lake Sebu
Alabel
General Santos City
Maasim
Glan
Sarangani
Legend
Wastewater Demand Projection 2030 (CMD)
0.0 - 112.9
112.9 - 143.4
143.4 - 171.6
171.6 - 206.8
206.8 - 240.6
240.6 - 275.0
275.0 - 331.9
331.9 - 430.5
430.5 - 1157.7
1157.7 - 19021.0
Wastewater Projection, 2030


N
10 0 10 20 30 40 km
WGS 1984 - UTM Zone 51 N
Alamada
Carmen
Pigkawayan
Midsayap
Aleosan
Kabacan
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North Cotabato
Lambayong
President Quirino
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Tampakan
Santo Nino
Banga
Surallah
Tupi
South Cotabato
Lake Sebu
Alabel
General Santos City
Maasim
Glan
Sarangani
Legend
Wastewater Demand Projection 2040 (CMD)
0.0 - 134.4
134.4 - 170.6
170.6 - 204.5
204.5 - 242.7
242.7 - 283.0
283.0 - 327.2
327.2 - 402.0
402.0 - 506.4
506.4 - 1337.6
1337.6 - 24671.1
Wastewater Projection, 2040

120°0.000'W

160°0.000'E

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

80°0.000'N

20°0.000'S

60°0.000'N

120°0.000'W

160°0.000'E

Legend

With Water Quality Problem

Alamada
Banisilan
President Roxas
Arakan
Libungan
Carmen
Antipas
Pigkawayan
NORTH COTABATO
Aleosan
Matalam
Midsayap
Magpet
Kabacan
Pikit
Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
Buluan Lake
Columbio
Isulan
Lutayan
Tantangan
SULTAN KUDARAT
Norala
Kalamansig
Koronadal City
Tampakan
Bagumbayan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Malungon
Palimbang
SOUTH COTABATO
Polomolok
Lake Sebu
Alabel
T'Boli
General Santos City
Maitum
SARANGANI
Malapatan
Kiamba
Maasim
Glan

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.

As discussed earlier in “Water Resources”, SOCCSKSARGEN’s two major river basins cover most of its provinces and parts of regions that surround it. Table 13 shows the list of rivers in the region and their corresponding classification.

Table 13: Classification of Rivers

Province/City	River	Classification
Cotabato	Arakan	A
	Illan Bay (Parola Beach)	SC
	Kabacan*	B
	Kulaman*	A
	Libungan*	D
	M'lang	C
	Maalang	A/B
	Malasila*	B/C
	Marbel	B/C/D
	Matingao	B
	Nuangan	D
	Polangi*	D
	Rio Grande de Mindanao*	C
	Saguing	A/B
	Tinanan	B
Cotabato City	Iligan Bay	SC
General Santos City	Buayan	B
	Silway	C
	Sinawal	C
	Tinagacan	B
Kidapawan City	Naungan	B/C
Sarangani	Kalaong*	A
	Kiamba, Sarangani Area	SB
	Kipalbig	C
	Lun Masla	A
	Maasim, Sarangani Area	SB/SC
	Maribulan	C
	Pangi	B/C
	Sarangani Bay	SB/SC
	Siguil*	A
	Lun Padidu	A
South Cotabato	Atlayan	
	Banga*	B
	Kematu	C
	Klinan	C
	Lake Sebu	B/C
	Maitum, Sarangani Area	SB/SC
	Marbel	C
	Palian	B
	Sefali	C
	Toplan	C
Sultan Kudarat	Allah*	C
	Kipangkong	B
	Kraan *	A

**Principal rivers*

Chemical oxygen demand (COD) is the measurement of the oxygen needed to oxidize organic matter during the process of decomposition (Real Tech, Inc., 2015). The highest COD level is found in the coastal waters of General Santos City with about 682 mg/L. A high concentration of COD means a great amount of oxidizable organic material which would, in turn, reduce the level of dissolved oxygen in the water body. This reduction of dissolved oxygen available for aquatic organisms is detrimental to their survival.

The coastal waters of General Santos City have been found to have the highest total dissolved solids (TDS) concentration with 2000 mg/L — other water samples tested did not reach even the minimum threshold. A high concentration of TDS, like total suspended solids (TSS), could also reduce clarity of water, decrease photosynthesis, combine with heavy metals resulting in increased water temperature (KanCRN website, as cited by Murphy, 2007).

There is also a high rate of erosion and siltation in the area covered by the river basins.

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

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

Waterborne Diseases

Waterborne diseases are generally transmitted through water in which pathogenic microorganisms live. These diseases can be spread while bathing, washing, or drinking water, or by eating food exposed to contaminated water.[21]

In 2015, cases of cholera, acute watery diarrhea, typhoid and paratyphoid were reported in SOCCSKSARGEN, indicating that many people in the region still have no safe access to drinking water and sanitation facilities.

Based on the 2015 Food and Waterborne Diseases Report of the Department of Health (DOH), there were 70 cases of cholera, 22,019 cases of acute bloody diarrhea, and 4,054 cases of typhoid and paratyphoid.

As of 2017, the Department of the Interior and Local Government (DILG) reported 13 waterless[22] municipalities in the region (see Figure 16).

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

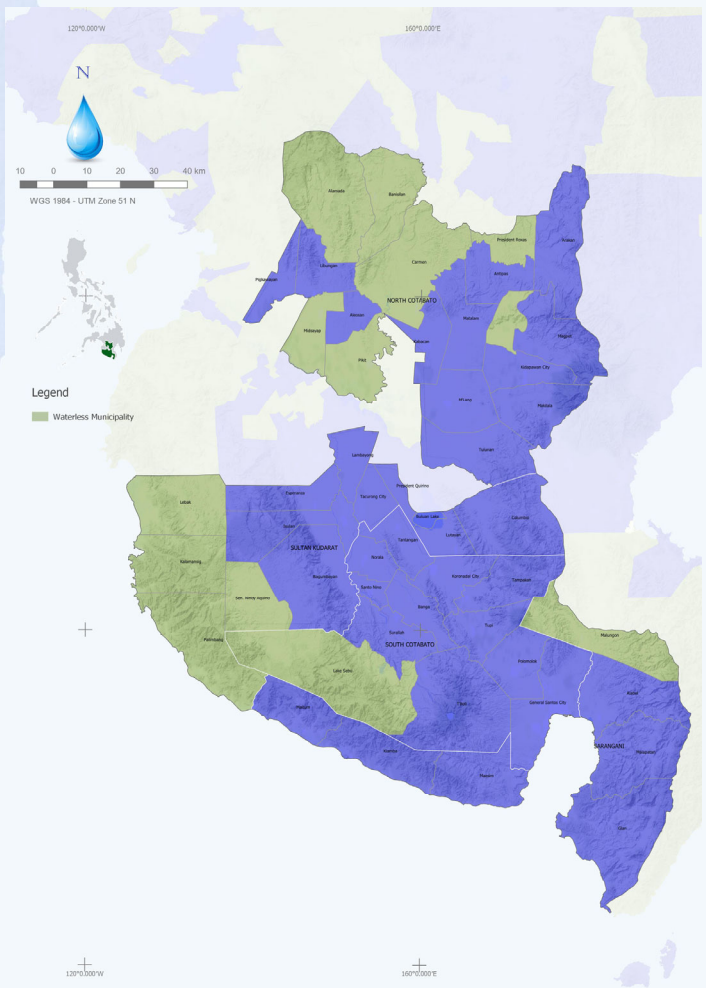

Figure 16: Waterless Municipalities

[21] *World Health Organization (WHO)*
[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 SOCCSKSARGEN, areas that require upgraded facilities, improved WSS systems as well as regular and extensive monitoring protocols were brainstormed and identified at the regional consultation and planning workshop.

Issues, Constraints, and Challenges

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

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

Planning and Development

The litany of problems besetting the WSS sector in Region XII is deeply rooted in the lack of a meticulously crafted development plan, funding insufficiency, poor monitoring and enforcement mechanisms, and questionable priority setting. This is validated by the following realities on the ground: there is no specific agency that fully focuses on WSS projects; planning bodies have inadequate capacity to come up with comprehensive plans; there are not enough financing and limited financing options for water projects, especially in lower class municipalities; studies on WSS sustainability are lacking; policies for planning and design are also limited, aggravating the lack of strong and effective management/administration of water system project implementation; and, there is no defined regulatory and/or monitoring agency that focuses on groundwater extraction issues.

Changing the untenable status quo would require the adoption and implementation of a number of facilitating measures. While the desired plan remains a work in progress, LCEs are encouraged to do the following: facilitate the approval and execution of government-funded WSS priority projects; attract private sector investments in water supply and sanitation business through fair and equitable policies that allow concessionaires to earn decent profits, implement cost recovery schemes and undertake facilities rehabilitation and water line expansion projects in a red tape-free environment.

Other recommendations include: forging of strong collaboration and robust partnership between LGU agencies and primary stakeholders; and cultivation of harmonious relationships, first, between water concessionaires and LGUs and, second, between neighboring LGUs.

The master plan development process must take into account the urgent need to address the prevailing weaknesses, inadequacies and gaps in efforts to safeguard public health. The job will require the services of highly qualified, competent and credentialed consultants. The major challenges include severe lack of STPs; lack of financing and fund sourcing options; outdated provincial water supply and sanitation plans; nonexistence of a separate agency to enforce the Sanitation Code of the Philippines; and defecation in rivers.

Service Provision

With no master plan to guide their actions and inadequate financial resources to fall back on, efforts of LGUs to boost public health through improved sanitation services almost always fall short of expectations. The weaknesses and gaps in service provision result in underserved, and in worst cases, unserved communities where sourcing of water for drinking, personal hygiene and other household necessities is a day-to-day struggle. In the same disadvantaged communities, where toilet bowls are a luxury, open defecation is the norm, a serious public health hazard exacerbated by the thoughtless disposal of domestic wastewater.

Even in communities fortunate enough to be covered by water district concessionaires, service provision leaves a lot to be desired. Consumers’ faith in water quality is shaky due to limited water treatment facilities, quality monitoring deficiencies owing to lack of requisite tools and equipment, the prohibitive cost of water quality tests as well as inadequate manpower to carry out compliance monitoring and sanitary inspections.

Pervasive concern has been raised about the spread of disease causing organisms due to the serious lack of treatment facilities for septage and sludge. Consumers also complain about a number of inconveniences, including frequent service interruptions, periodic tariff increases and water bill issues, among others.

Solving the various problems hindering the efficient delivery of water and sanitation service in Region XII remains an inescapable reality. Among the proposed remedial measures to address the concerns are: the establishment of water quality testing laboratories that offer affordable rates; setting up of septage treatment facilities in suitable locations; hiring and mobilization of sufficient number of sanitary inspectors; quick resolution of right-of-way issues to clear the way for construction and rehabilitation of essential facilities; and increased public sector investments to satisfy the WSS sector’s need for supportive services and complementary utilities. Special attention is also needed to mitigate the insufferable state of WSS in poorer communities.

There is an urgent call for LCEs and donor organizations to donate (or at the very least, subsidize the installation of) toilet bowls to impoverished beneficiaries, increase local awareness on the importance of hygiene and sanitation through IEC campaigns and conduct behavioral change mechanisms aimed at converting entire communities into WASH practitioners.

Regulation

The region’s poor track record in regulating the various functions of the WSS sector is one of its most glaring handicaps. At the root of the problem is the non-existence of a lead regulatory agency with a clear mandate to enforce the pertinent provisions of the Water Code of the Philippines. As a result, there is widespread noncompliance with the provisions of the code primarily because of weak local capacity to monitor, detect and penalize violations of existing laws and ordinances. Among the most common infractions that escape detection and punishment include illegal water drilling, excessive and unsustainable water extraction; violation of permitting requirements; and failure of water district concessionaires to honor their commitments and deliverables as stipulated in their service contract.

Proposed facilitating measures include vigorous lobbying targeting concerned national line agencies, legislators as well as regional, provincial and city/municipal officials in creating a lead water regulatory agency, and strengthening of local monitoring and enforcement arms to enforce compliance with water and sanitation-related laws.

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

Table 14: Hindering and Facilitating Factors

	Hindering Factors	Facilitating Factors
Planning and Development	**Water Supply and Sanitation**	
	Political intervention	Evidence-based planning
	Territorial turf attitude	
	Negative behaviors/attitudes	
	Poverty	
	Limited entrepreneurial understanding and skills	
	Water	
	Inadequate capacity of local planning bodies to come up with comprehensive plans on WSS	Media intervention
	Inadequate allocation for or lack of investments in water projects at the local level	Regional LGU consultations
	Limited funds and financing options	Sustainability of WSS projects
	Absence of a single agency to oversee WSS projects	Partnership with LGU line agencies and beneficiaries
	Absence of a regulatory and/or monitoring body re: groundwater extraction	
	Absence of a study on sustainability of groundwater extraction	Formulation of convergence framework to address gaps
	Limited policies governing planning and design	Preparation of a WASH plan
	Lack of bottom-up planning	LCEs' full support of the approval of MW4SP
	Lack of updated provincial water supply and sanitation plans	Consultations with grassroots communities
	Lack of water sources	PDIP/BDP/CLUP-based priority projects
	WSS projects given least priority by LGUs	Making CLUP mandatory for LGUs
	Inadequate database	Building goodwill with LGUs
	Lack of strong and effective management/administration re: water system projects	Financial assistance from LGUs to WDs
		Active participation in LED projects
	Sanitation	
	Absence of a single agency which oversees STP planning	Intensified research and development efforts
	Lack of technical staff/personnel who will prepare DEDs, STS and POW	
Service Provision	**Water**	
	Lack of subsidy from the national government	Implementation of WSP projects
	Poor security	Outsourcing of funds
	Lack of manpower in monitoring	Intensified IEC campaigns
	WSS not given top priority	TESDA NC II
	Lack of water sources	
	Absence of a database	
	Political interference	
	WASH programs not yet integrated	
	Viewing water and sanitation projects as undertakings that are not interlinked	
	Lack of legislative support	
	Sanitation	
	ROW problems; inability of LGUs to issue excavation permits for pipelines	Increased access to toilet facilities
	Expensive treatment facilities	Passing laws or ordinances on sanitation
	Low level of awareness in rural communities of the importance of sanitation	Local NGOs adopting CLT5 Approach to reduce open defecation
	Sanitation not a priority among households	
	Accessibility concerns	
Regulation	**Water**	
	Noncompliance of WSPs with the Water Code of the Philippines	Crafting and passing of local ordinances and national laws
	Noncompliance with standard infrastructure plans	Compliance with PNSDW 2017
	High cost of water quality tests	Strengthening linkages and partnerships
	Noncompliance with regulations governing water permits	Implementation of BWSA law
	Illegal water drillers	Increased private sector participation
	Lack of awareness of Philippine laws related to water supply, resources, etc.	
	Sanitation	
	Low penalty imposed on violators of the sanitation code	Clarity re: classification of toilet facilities
	Confusion re: definition of sanitation classification	Information/education campaigns
	Open defecation in rivers	Integration of iWASH and local development plans
	Illegal disposal particularly in domestic wastewater	

Regional Vision

"Full Access for All to Sustainable and Safe Water Supply and Sanitation for a Climate-Resilient SOCCSKSARGEN"

The SOCCSKSARGEN WSS vision was crafted by the visioning group with the goal of achieving universal and equitable access to safe and affordable water supply and sanitation by 2030.

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

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

Strategic Framework

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

The figure shows strategic priorities for SOCCSKSARGEN highlighting the provinces' individual plans. Priority areas include health and research, water exploration, septage management, alliance building, capacity building, 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: SOCCSKSARGEN 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.

SOCCSKSARGEN strives to achieve 94% access to safe water by 2022 and 100% by 2040. This means that more than 660,000 additional households will have access to safe water by year 2040. Improved access to sanitation is set at 83% for 2022 and universal access by 2030 and 2040.

Figures 18 and 19 graph the targets for water supply and sanitation for 2022, 2030 and 2040.

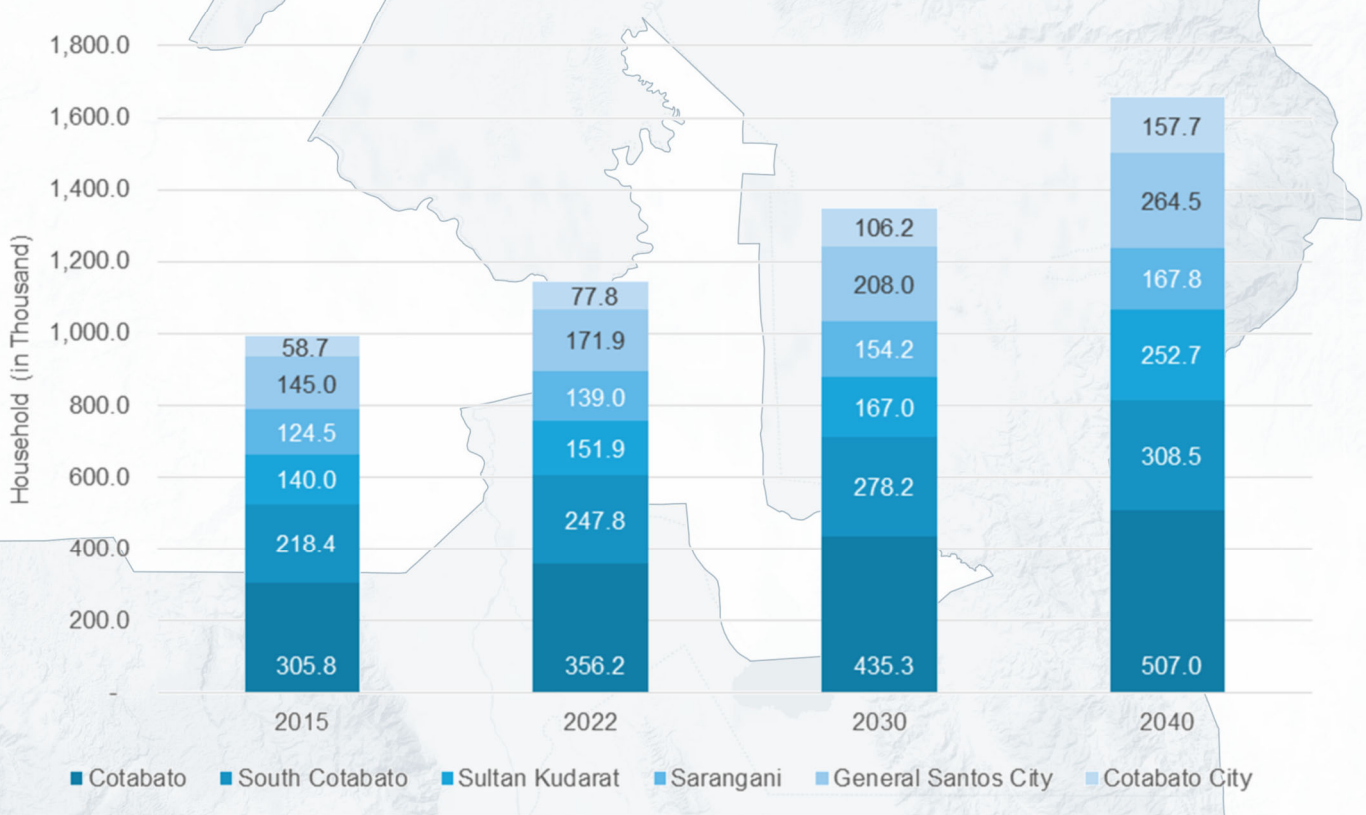

Figure 18: Targeted Households with Access to Safe Water

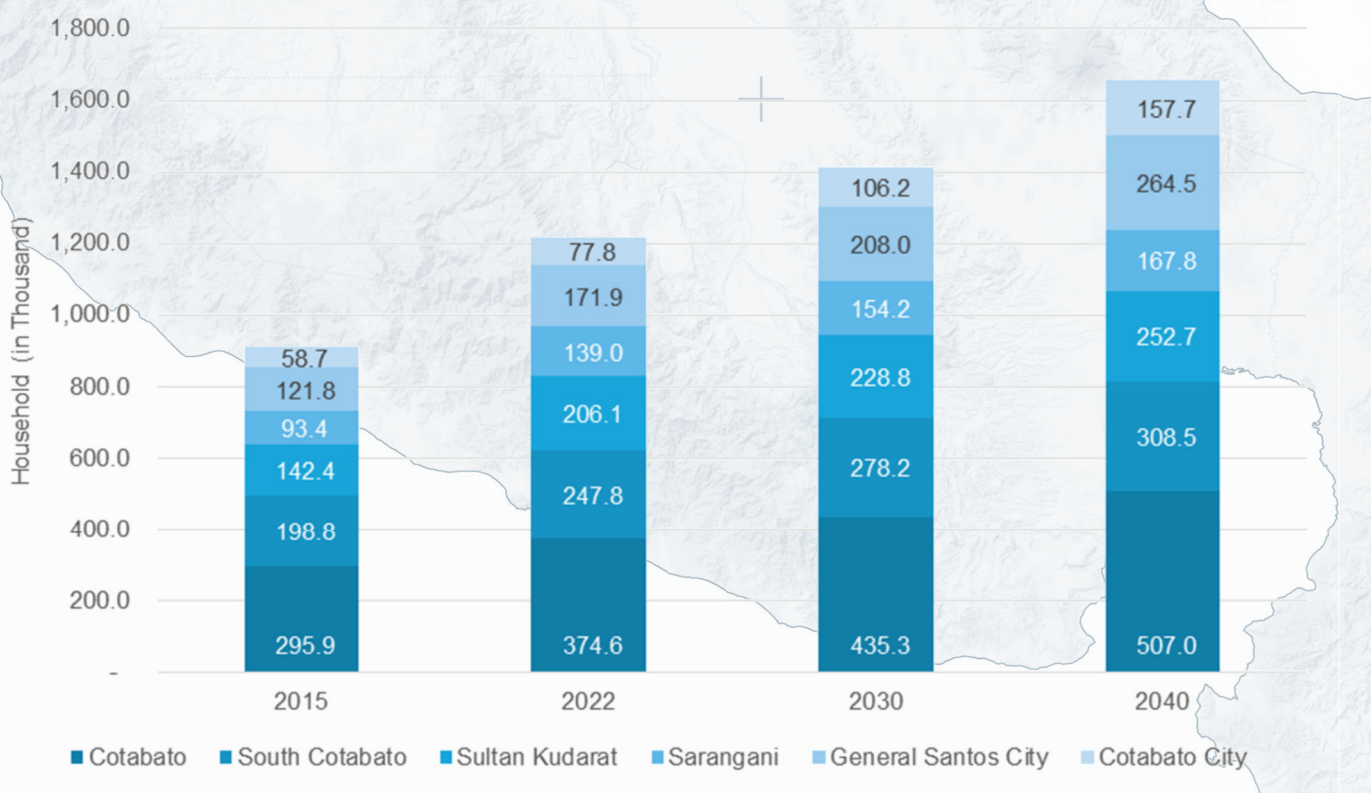

Figure 19: Targeted Households with Access to Sanitation Facilities

Water Supply Targets

COTABATO (NORTH COTABATO)			
	2022	2030	2040
With Access	98.0%	100.0%	100.0%
Level III	42.0%	45.0%	100.0%
Level II	26.0%	29.0%	0.0%
Level I	30.0%	26.0%	0.0%
No Access	2.0%	0.0%	0.0%

SOUTH COTABATO (excluding GENERAL SANTOS CITY)			
	2022	2030	2040
With Access	95.0%	100.0%	100.0%
Level III	45.0%	60.0%	100.0%
Level II	30.0%	35.0%	0.0%
Level I	20.0%	5.0%	0.0%
No Access*	5.0%	0.0%	0.0%

SULTAN KUDARAT			
	2022	2030	2040
With Access	74.0%	73.0%	100.0%
Level III	19.0%	19.0%	100.0%
Level II	10.0%	10.0%	0.0%
Level I	45.0%	44.0%	0.0%
No Access	26.0%	27.0%	0.0%

SARANGANI			
	2022	2030	2040
With Access	100.0%	100.0%	100.0%
Level III	20.0%	25.0%	100.0%
Level II	40.0%	45.0%	0.0%
Level I	40.0%	30.0%	0.0%
No Access	0.0%	0.0%	0.0%

GENERAL SANTOS CITY			
	2022	2030	2040
With Access	95.0%	100.0%	100.0%
Level III	55.0%	80.0%	100.0%
Level II	35.0%	20.0%	0.0%
Level I	5.0%	0.0%	0.0%
No Access	5.0%	0.0%	0.0%

COTABATO CITY			
	2022	2030	2040
With Access	95.0%	100.0%	100.0%
Level III	65.0%	80.0%	100.0%
Level II	25.0%	20.0%	0.0%
Level I	5.0%	0.0%	0.0%
No Access	5.0%	0.0%	0.0%

SOCCSKSARGEN			
	2022	2030	2040
With Access	93.9%	95.6%	100.0%
Level III	41.0%	49.4%	100.0%
Level II	21.5%	26.7%	0.0%
Level I	31.4%	19.5%	0.0%
No Access	6.1%	4.4%	0.0%

Sanitation Targets

COTABATO (NORTH COTABATO)			
	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%

SOUTH COTABATO (excluding GENERAL SANTOS CITY)			
	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%

SULTAN KUDARAT			
	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%

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

GENERAL SANTOS CITY			
	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%

COTABATO CITY			
	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%

SOCCSKSARGEN			
	2022	2030	2040
Improved	83.0%	100.0%	100.0%
Basic	5.4%	0.0%	0.0%
Shared/Communal/Limited	11.6%	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 XII was formulated. The participants deliberated on these proposed interventions to make them adaptable to actual local conditions. (These are discussed more thoroughly in the National Master Plan and may be adopted accordingly at the local level.)

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

Table 16: Proposed Strategic Interventions for Water Supply

Access to Safe Water	Planning and Development	Service Provision	Regulation	Promotion
95% Access to Safe Water in 2022 Universal Access in 2030	▪ Planning, program or project design ▪ Establishing labs and water quality testing centers ▪ Lobbying for the Regional WSS Masterplan	▪ M&E expansion ▪ Rehabilitation/Non-revenue water (NRW) reduction maintained at 20% of total production ▪ Integration/ Amalgamation ▪ Automation ▪ Residuals management ▪ Mitigation ▪ Water potability maintained at all times ▪ Providing 24/7 water supply service ▪ Achieving 100% coverage ▪ Residuals management	▪ Water resources protection ▪ Arbitration ▪ Environmental and social safeguards ▪ Compliance with PNSDW 2017 ▪ Close monitoring of Joint Agreement ▪ Compliance training from DOH ▪ Resource studies	▪ Willingness to connect and pay ▪ Demand creation

Table 17: Proposed Strategic Interventions for Sanitation

Access to Improved Sanitation	Planning & Development *Planning* *Program or Project Design* *Institution Building* *Training* *Financing* *Climate/Disaster Resiliency* *Policy*	Service Provision *Operations* *M&E* *Expansion* *Amalgamation* *Automation*	Regulation *Tariff/Pricing* *Resource* *Arbitration* *Registration, Permits, Rights*	Promotions *Social Preparation* *Advocacy* *Demand Creation* *Behavior Change*
Medium Access Areas with 30% to 59% Improved Sanitation Coverage	▪ Sustainable Sanitation Plan (LSSP) to be incorporated into the WSS Sector Plan, LDP, AIP, and local health plan ▪ Planning and developing sewerage system program to provide service in urban core; coordinating with those in charge of the septage management program; projecting urban sprawl ▪ Incorporating NSSMP subsidy grant for sewerage and septage management programs ▪ Planning for capacity development including septage and effluent management ▪ Passing a sanitation ordinance covering septage management services; possibly integrating it with the environment code and WQMA action plan	▪ Ensuring that the sanitation program focuses on implementing sewerage systems and completing septage management programs ▪ Expanding to urbanized and urbanizing barangays ▪ M&E system conforming to PSA/ census in place (covered by sewerage systems, desludged households, on-site systems) ▪ Initiating sewerage system programs	▪ Computation of tariff using full cost recovery with infusion of CapEx subsidy for sewerage projects ▪ LGU implementers' compliance training given by DOH and DENR (particularly re: sewerage systems); compliance with DA regulations/guidelines on disposal of by-products ▪ Imposing strict penalties on those not complying, including LGUs/WDs, by filing cases with the environmental ombudsman ▪ Imposing sanctions on building officials who fail to regulate septic tanks not compliant with code standards	▪ Ensuring that promotions focus on enjoining the public to: have their septic tanks desludged once SMP is in place; and know the importance of building the right septic tanks and the benefits of good sanitation ▪ Introducing concepts on Water Demand Management ▪ Promotions to build buy-in for paying for sanitation services

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.		

120°0.000'W

160°0.000'E

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

80°0.000'N

20°0.000'S

Legend

Approved Projects

Pending Projects

Alamada
Banisilan
President Roxas
Arakan
Libungan
Carmen
Antipas
Pigkawayan
NORTH COTABATO
Aleosan
Matalam
Midsayap
Magpet
Kabacan
Pikit
Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
Buluan Lake
Columbio
Isulan
Lutayan
Tantangan
SULTAN KUDARAT
Kalamansig
Norala
Bagumbayan
Koronadal City
Tampakan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Palimbang
SOUTH COTABATO
Malungon
Polomolok
Lake Sebu
Alabel
T'Boli
General Santos City
Maitum
SARANGANI
Malapatan
Kiamba
Maasim
Glan

LWUA Priority Projects

LWUA, 2018 Data

40

60°0.000'N

120°0.000'W

160°0.000'E

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).

SOCCSKSARGEN requires total investments for infrastructure development of about PhP6.3 billion and PhP12 billion to achieve 2022 and 2030 targets, respectively. Unit development costs employed to arrive at these sums are estimated at PhP35,800 per HH for Level III, PhP21,000 for Level II, and PhP9,400 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 SOCCSKSARGEN) were derived by applying regional cost factors (with respect to labor, material, and equipment costs) to the computed development base costs for NCR. NCR values are pegged at PhP31,800 per HH for Level III, PhP18,700 for Level II, and PhP8,400 for Level I.

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

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

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

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

Nonphysical Investments

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

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

Proposed interventions include the following:

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

The map on the left shows the five SOCCSKSARGEN LGUs where priority WD projects have been approved and those pending approval for LWUA's financial assistance (FA). Projects in two LGUs in Cotabato have been approved and those in three others are pending approval, as of this writing.

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/City	Total Investment Cost (in PhP Million) 2022	Total Investment Cost (in PhP Million) 2030
Cotabato (North Cotabato)	1,524.24	2,585.76
South Cotabato	953.46	3,202.03
Sultan Kudarat	314.58	358.23
Sarangani	666.54	873.01
General Santos City	1,917.10	3,342.18
Cotabato City	960.06	1,648.71
Total	**6,335.97**	**12,009.93**

[23] *Based on industry standards*

120°0.000'W

160°0.000'E

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

80°0.000'N

20°0.000'S

60°0.000'N

120°0.000'W

160°0.000'E

Legend

STP CLUSTERING

- R12-CL1
- R12-CL2
- R12-CL3
- R12-CL4
- R12-CL5
- R12-CL6
- R12-CL7
- R12-CL8
- R12-CL9
- R12-CL10
- R12-CL11
- R12-CL12
- R12-CL13
- R12-CL14
- R12-CL15
- R12-CL16
- R12-CL17
- R12-IN1
- R12-IN2
- R12-IN3
- R12-IN4
- R12-IN5
- R12-IN6
- R12-IN7
- R12-IN8
- R12-IN9
- R12-IN10
- R12-IN11

Alamada
Banisilan
President Roxas
Arakan
Carmen
Libungan
Antipas
Pigkawayan
NORTH COTABATO
Aleosan
Matalam
Midsayap
Magpet
Kabacan
Kidapawan City
Pikit
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
Buluan Lake
Columbio
Isulan
Lutayan
Tantangan
SULTAN KUDARAT
Norala
Kalamansig
Koronadal City
Tampakan
Bagumbayan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Malungon
Palimbang
SOUTH COTABATO
Polomolok
Lake Sebu
Alabel
General Santos City
T'Boli
Maitum
SARANGANI
Malapatan
Kiamba
Maasim
Glan

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).

SOCCSKSARGEN will need about PhP4.06 billion for basic sanitation from 2016 to 2022 to reach a target of 83%.

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

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

The region will need about PhP2.8 billion and PhP447 million for 2022 and 2030, respectively, for its septage management program.

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

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

For sewerage services, General Santos City will require PhP4.72 billion by 2022 and an additional PhP990 million by 2030. The computational template provided for a 25% coverage of sewerage services by 2022 and an additional 25% coverage by 2030. This includes the city's incremental population from 2015 to 2022 and from 2023 to 2030.

Candidate HUCs in South Cotabato (e.g., Koronadal City and Polomolok) and in Cotabato (e.g., cities of Kidapawan, Midsayap, and Pikit) may be closely examined initially as urbanization may set in more rapidly in these places than in other towns such as Isulan in Sultan Kudarat, and Glan and Marungon in Sarangani.

Nonphysical Investments

SOCCSKSARGEN, 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
Cotabato (North Cotabato)	11,103.27	2,066.74
South Cotabato	7,096.56	1,013.02
Sultan Kudarat	4,288.19	789.45
Sarangani	4,167.18	525.78
General Santos City	9,597.78	2,168.34
Cotabato City	3,255.22	1,836.08
Total	**39,508.20**	**8,399.42**

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 PhP1.76 billion to boost its WSS sector.

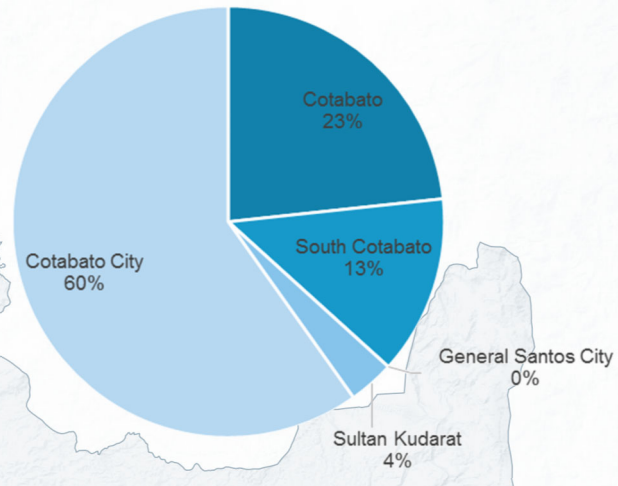

Figure 20: Distribution of Investment Requirement per Province/City

Cotabato (North Cotabato)								
Water Supply	Period	Budget Requirement (in PhP Million)	Sanitation	Period	Budget Requirement (in PhP Million)	Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)	
1 Metro Cotabato WD Expansion (New Source)	Medium Term	0.75	1 Metro Cotabato WD Cluster Septage Management Project Phases 1 & 2 (Phase 1 covering Cotabato City and Phase 2 covering Datu Odin Sinsuat and Sultan Kudarat)	Long Term	0.42			
2 Preparation of plans, design, documents and permits	Short Term	10.00	2 Construction of a septage treatment plant; signing a memorandum of agreement with stakeholders	Long Term	91.00			
3 Expansion of pipe laying projects	Long Term	50.00	3 Orientation on CLTS	Short Term	0.12			
4 Replacement of pipe laying projects	Long Term	150.00	4 Intensification of IEC program	Short Term	0.05			
	TOTAL	210.75		**Total**	**91.59**			
Water Supply and Sanitation	Period	Budget Requirement (in PhP Million)				**409.14**	**374,595**	
1 Orientation/briefing on WASH program in cities & municipalities; Formulate local WASH plans	Short Term	2.80						
2 Installation of water distribution lines & household connections; intensive IEC campaigns; delineation of critical areas for reforestation and rehabilitation; crafting of ordinance; construction and operation of septage treatment facility; conduct of research studies re: water supply and sanitation	Long Term	64.00						
3 Conduct of research studies re: water supply and sanitation	Short Term	40.00						
	Total	**106.80**						

South Cotabato							
Water Supply	Period	Budget Requirement (in PhP Million)	Water Supply	Period	Budget Requirement (in PhP Million)	Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)
1 Construction of water supply systems (Level I and II) in rural areas	Medium Term	60.00	1 IEC/advocacy campaigns	Short Term	-		
2 Provision of financial & material assistance to barangay water system projects	Medium Term	160.00	2 Construction of wastewater treatment facilities in every city/municipal public market	Short Term	-		
3 Construction/Expansion of waterworks system (Level III) in all barangays	Medium Term	10.00	3 Construction of septage treatment facilities in the cities of Koronadal, Polomolok and Surallah	Medium Term	-		
4 Construction of water analysis and testing center/ laboratory; procurement of additional laboratory facilities	Short Term	5.00	4 IEC symposia in every barangay (re: proper design of septic tanks)	Medium Term	-		
5 Installation of drinking fountains in public parks, markets and terminals	Short Term	1.00		**Total**	**0.00**		
6 Creation and operationalization of Local Drinking Water Quality Monitoring Committee	Short Term	-				**236.00**	**247,765**
7 Creation and operationalization of the RWSPDR Council	Long Term	-					
8 Creation of plantilla positions and hiring of personnel for water analysis services	Short Term	-					
9 Reorganization and capacity development of BWSA officers and personnel (i.e. management & maintenance)	Short Term	-					
10 Tree growing activities; development of eco-friendly open spaces; Adopt-a-Watershed Project	Long Term	-					
11 Conduct of water conservation advocacy orientations/symposia in every barangay	Long Term	-					
	Total	**236.00**					

General Santos City

	Water Supply	Period	Budget Requirement (in PhP Million)
1	Formulation of a water safety plan and technical evaluation of existing water distribution networks of RWSAs	Short Term	-
		Total	**0.00**

	Sanitation	Period	Budget Requirement (in PhP Million)
1	Reactivation of SWMB to address wastewater management issues	Short Term	-
2	Formulation of TOR for EMB grant fund for septage FS (updating)	Short Term	-
		Total	**0.00**

	Water Supply and Sanitation	Period	Budget Requirement (in PhP Million)
1	Creation of TWG (CPDO, CMO IBA, WMO,CHO,GSCWD and USAID-SURGE)	Short Term	-
2	Distribution of promotional materials	Short Term	-
3	PMS (pre-membership seminars), consultative meetings, RWSAs annual summit	Short Term	-
		Total	**0.00**

Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)
0.00	**171,873**

Sultan Kudarat

	Water Supply	Period	Budget Requirement (in PhP Million)
1	Expansion of Level 3 water system, Poblacion, Pres. Quirino	Medium Term	12.00
2	Water source development	Medium Term	13.00
3	Installation of water system Level 3 in Barangays Upper Katungal & Baras, Tacurong City	Short Term	12.00
4	Establishment of Level 2 water system, Province-wide	Short Term	-
5	Repair/Rehab of Level 2 water system throughout the province	Short Term	-
6	Construction of Level 2 water system in Kabulnan, Bagumbayan	Medium Term	12.00
7	Installation/Construction/Repair (Level 1 and Level 2 water system)	Medium Term	7.20
8	Construction of handwashing facilities (public elem. and high schools, day-care centers)	Short Term	2.16
9	Construction of provincial water analysis laboratory (re: bacteriological tests)	Short Term	2.00
		Total	**60.36**

	Sanitation	Period	Budget Requirement (in PhP Million)
1	Construction of a mechanized septage facility	Medium Term	-
2	Installation of sanitary toilets (water sealed)	Short Term	-
3	Procurement of concrete toilet bowls	Short Term	-
4	Construction of gender-sensitive comfort rooms in elementary and high schools, and day-care centers	Short Term	-
		Total	**0.00**

Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)
60.36	**206,059**

Cotabato City

	Water Supply	Period	Budget Requirement (in PhP Million)
1	Salintubig - Preparation of plans, design, documents and permits	Short Term	10.00
2	Expansion of pipe laying projects (bidding & procurement)	Long Term	50.00
3	Pipe replacement	Long Term	150.00
4	Formulation of a Cotabato City Drainage Master Development Plan	Short Term	50.00
5	Formulation of a five-year water efficiency and public information program	Medium Term	500.00
6	Tapping new sources of water	Short Term	200.00
		Total	960.00

	Sanitation	Period	Budget Requirement (in PhP Million)
1	Construction of a septage treatment plant; entering into a memorandum of agreement with stakeholders	Medium Term	91.00
		Total	**91.00**

Total Budget Requirement (in PhP Million)	HH Beneficiaries (2022)
1,051.00	**206,059**

120°0.000'W

160°0.000'E

N

10 0 10 20 30 40 km

WGS 1984 - UTM Zone 51 N

80°0.000'N

20°0.000'S

60°0.000'N

Legend

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

Alamada
Banisilan
Libungan
Pigkawayan
Carmen
President Roxas
Arakan
Antipas
NORTH COTABATO
Aleosan
Midsayap
Matalam
Magpet
Kabacan
Pikit
Kidapawan City
M'Lang
Makilala
Tulunan
Lambayong
President Quirino
Esperanza
Tacurong City
Lebak
Buluan Lake
Columbio
Isulan
Lutayan
Tantangan
SULTAN KUDARAT
Norala
Kalamansig
Bagumbayan
Koronadal City
Tampakan
Santo Nino
Sen. Ninoy Aquino
Banga
Tupi
Surallah
Malungon
Palimbang
SOUTH COTABATO
Polomolok
Lake Sebu
Alabel
T'Boli
General Santos City
Maitum
SARANGANI
Malapatan
Kiamba
Maasim
Glan

AM, Salintubig Pipeline WSS Projects

DILG-WSSPMO, 2019 List of DILG Projects

Identified Priority Projects (2019-2020)

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

Assistance To Municipalities (2019)			
Province	Municipality	Project Title	Amount (in PhP Million)
Cotabato	Alamada	Expansion Of Level 3 Water System	4.63
Cotabato	Alamada	New Construction Of Level 2 Potable Water Supply System	1.31
Cotabato	Arakan	Rehabilitation/Improvement Of Level 2 Water System	6.77
Cotabato	Carmen	New Construction Of Level 2 Potable Water Supply System In Barangay Langogan	2.00
Cotabato	Carmen	New Construction Of Level 2 Potable Water Supply System In Barangay Kimadzil	2.30
Cotabato	Carmen	New Construction Of Level 2 Potable Water Supply System In Barangay Tupig	2.29
Cotabato	Midsayap	Expansion Of Level 2 Potable Water System	0.91
Sarangani	Kiamba	Rehabilitation/Improvement Of Level 2 Water System In Luma, Lebe	2.85
Sarangani	Kiamba	Rehabilitation/Improvement Of Level 2 Water System In Tablao, Salakit	7.70
South Cotabato	Tampakan	Expansion Of Potable Water System In Barangay Maltana	1.52
South Cotabato	Tampakan	Construction Of Potable Water Supply System In Barangay Danlag	2.50
South Cotabato	Tampakan	Construction Of Potable Water Supply System In Barangay Palo 19	1.40
South Cotabato	T'boli	Improvement Of Level 3 Water System	2.00
		Total	**38.18**

SALINTUBIG (2019)			
Province	Municipality	Project	Amount (in PhP Million)
Cotabato	Aleosan	Potable water supply	10.00
Cotabato	Carmen	Potable water supply	6.00
Cotabato	Kabacan	Potable water supply (Pisan, Bangilan, Simbuhay,Dagupan, Sanggadong, Malanduague, Upper Paatan, Bangilan, Bannawag)	10.00
Cotabato	Midsayap	Potable water supply	12.30
Cotabato	Pikit	Potable water supply	8.25
Cotabato	President Roxas	Potable water supply	20.00
Cotabato	Tulunan	Potable water supply (Bacong,New Culasi,Nabundasan,Tambac)	10.00
Sarangani	Alabel	Potable water supply (Paraiso)	2.00
Sarangani	Kiamba	Potable water supply (Nalus, Luma, Maligang, Gasi, Tamadang, Katubao and Datu Dani)	6.00
Sarangani	Maitum	Potable water supply (Bati-An)	2.00
Sarangani	Malapatan	Potable water supply (Kinam)	2.00
South Cotabato	Lake Sebu	Potable water system	16.00
Sultan Kudarat	Palimbang	Provision of potable water system Level 2	3.00
		Total	**107.55**

LWUA (2017-2018)			
Province	Municipality	Project - Status	Amount (in PhP Million)
Cotabato	Aleosan	WD Expansion/Improvement - Awaiting docs from WD	20.00
Cotabato	Metro Kidapawan	WD Expansion/Improvement - Approved Feb. 14, 2018	100.00
Cotabato	Metro Midsayap	WD Admin Bldg - Approved Jan 24, 2018	10.00
South Cotabato	Polomolok	WD Expansion/Improvement - Awaiting docs from WD	110.00
South Cotabato	Santo Niño	WD Expansion/Improvement - Awaiting docs from WD	19.65
		Total	**259.65**

Appendix A: Provincial and HUC Profiles

NORTH COTABATO	17 municipalities	Alamada, Aleosan, Antipas, Arakan, Banisilan, Carmen, Kabacan, Libungan, Magpet, Makilala, Matalam, Midsayap, M'lang, Pigkawayan, Pikit, Pres. Roxas, Tulunan
	one (1) component city	Cotabato City (geographically located in ARMM)
	543 barangays	43 urban, 500 rural
Land Area	9,008.9 square kilometers	
Demographics (2015)	Population (2015) – 1,379,747 Population Growth Rate (2000 to 2015) – 2.4% Population Density – 153 per sq. km	
Economy	• Major industries - agriculture, fishery, forestry, livestock • Major products - chicken, goat, cattle, freshwater fish, rubber • Major crops - rice, corn, coffee, tropical fruits, vegetables	
Poverty Incidence	On Families – 34.5% On Population – 41.4%	

SARANGANI	7 municipalities	Alabel, Glan, Kiamba, Maasim, Maitum, Malapatan, Malungon
	141 barangays	24 urban, 1117 rural
Land Area	3,601.3 square kilometers	
Demographics (2015)	Population (2015) – 544,261 Population Growth Rate (2000 to 2015) – 1.9% Population Density – 151 per sq. km	
Economy	• Major industries - agriculture, fishery, forestry, livestock • Major products - rubber, cattle, milkfish • Major crops - rice, corn, coconut, banana, mango, sugarcane	
Poverty Incidence	On Families – 47.3% On Population – 55.2%	

GENERAL SANTOS CITY	General Santos City is the commercial, industrial, and administrative center of SOCCSKSARGEN.	
	26 barangays	22 urban, 4 rural
Land Area	492.9 square kilometers	
Demographics (2015)	Population (2015) – 594,446 Population Growth Rate (2000 to 2015) – 1.4% Population Density – 1,206 per sq. km	
Economy	• Major industries - agriculture, fishery, livestock and poultry production • Major products - hogs, cattle, tuna • Major crops - corn, pineapple, asparagus, banana, rice • General Santos City is named the "Tuna Capital of the Philippines". The city is the largest producer of sashimi-grade tuna in the Philippines.	

SOUTH COTABATO	10 municipalities	Banga, Lake Sebu, Norala, Polomolok, Sto. Niño, Surallah, Tampakan, Tantangan, T'boli, Tupi
	one (1) component city	Koronadal City
	one (1) highly urbanized city	General Santos City
	199 barangays (excluding General Santos City)	53 urban, 146 rural
Land Area	3,936.0 square kilometers	
Demographics (2015)	Population (2015) – 915,289 Population Growth Rate (2000 to 2015) – 1.9% Population Density – 233 per sq. km	
Economy	• Major industries - agriculture, fishery, forestry, livestock • Major products – wood, processed food, chicken, duck • Major crops - rice, corn, pineapple, papaya, fruits, vegetables • South Cotabato is known as the "Land of the Dreamweavers" as it is home to the *T'boli* tribe, which is known for their weaving art patterns that are based on their dreams.	
Poverty Incidence	On Families – 19.8% On Population – 24.6%	

SULTAN KUDARAT	11 municipalities	Bagumbayan, Columbio, Esperanza, Isulan, Kalamansig, Lambayong, Lebak, Lutayan, Palimbang, Pres. Quirino, Sen. Ninoy Aquino
	One (1) component city	Tacurong City
	249 barangays	36 urban, 213 rural
Land Area	5,298.3 square kilometers	
Demographics (2015)	Population (2015) – 812,095 Population Growth Rate (2000 to 2015) – 2.2% Population Density (2010) – 153 per sq. km	
Economy	• Major industries - agriculture, poultry production, fishery • Major products - crafts made of rattan, marbleized limestone • Major crops - rice, corn, coconut, African palm, Irish potatoes	
Poverty Incidence	On Families – 39.2% On Population – 48.0%	

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