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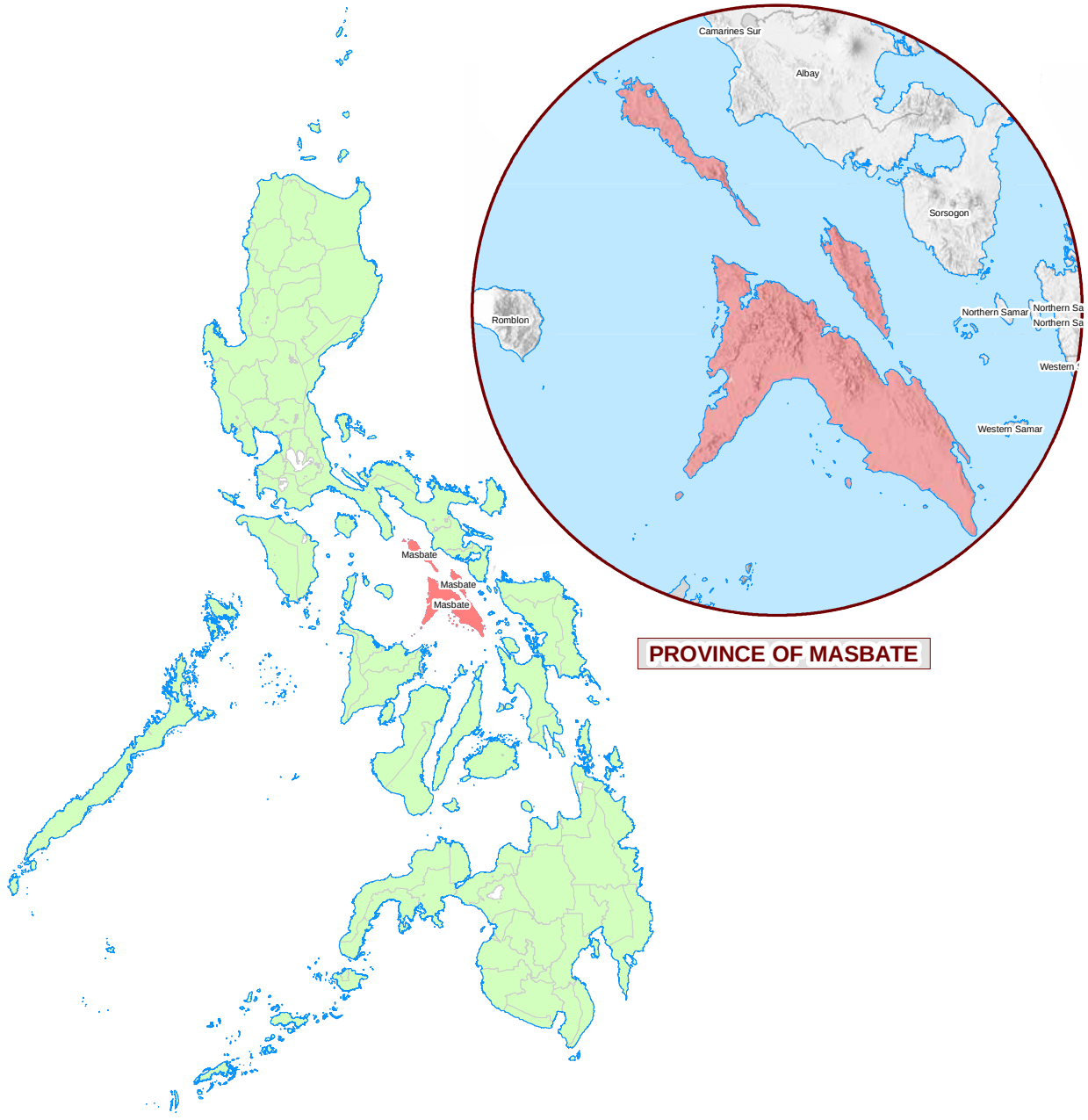
AGRICULTURAL LAND MANAGEMENT AND EVALUATION DIVISION

National Mapping, Characterization and Development of Spatial Database for the Coastal Areas Affected by Salinity



PROVINCE OF MASBATE

2020

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RATIONALE

Salinity is long time known as one of the problem soils. It directly affects the agriculture and fishery sector in terms of productivity and income. Seriously salt-affected soils result to a total crop failure. The reasons for salinity are 1) increasing trend in sea level rise, 2) over pumping of the aquifers, and 3) seepage along the river — that is, when seawater moves upstream into the river during periods of high tide and low river flow.

The Bureau of Soils and Water Management (BSWM) have initiated several studies regarding soil salinity, but a nationwide information system has never been developed for areas affected by salinity. A baseline information on salinity will be a significant input in infrastructure planning in agriculture and fishery, risk management— particularly disaster risk management and climate change adaptation,— and policy recommendations.

Based on BSWM Reconnaissance Survey in 1988, forty five (45) provinces are identified affected by salinity. They represent more than half of the country's provinces. However, the extent of this condition to Philippine soils is not yet established and thus the subject of this project.

This project generally aims to develop a national information system for the coastal areas affected by salinity. Specifically, it aims to:

1. describe the soil physico-chemical characteristics;

2. generate salinity maps;

3. develop spatial database on salinity for the coastal areas;

4. undertake suitability evaluation for agriculture and fisheries and prepare scenarios as input to policy.

MASBATE

I. SOIL/LAND PHYSICAL CHARACTERISTICS

A. General Description of Saline Affected Area

Masbate is an island province in the Philippines located near the middle of the nation's archipelago between latitudes 11°43’ north and 123°09’ east and 124°5’ east. It is bounded on the north by Burias and Ticao Pass, east by San Bernardino Strait, south by the Visayan Sea, and west by the Sibuyan Sea. It consists of three major islands: Masbate, Ticao and Burias.

There are nine (9) coastal municipalities in Masbate that are susceptible to soil salinity, hence the sites for sampling shown in Figure 1.1 and Table 1.1.

Figure 1.1 Map of Masbate With Sampling Points

Table 1.1. Coastal Areas and Municipalities in Masbate

No.	Municipality	No. of Barangay	No. of Sampling Sites	No. of Soil Samples Collected
1	Balud	32	5	15
2	Cawayan	37	2	6
3	Dimasalang	20	2	6
4	Mandaon	26	2	5
5	Masbate City	30	3	9
6	Milagros	27	3	9
7	Mobo	29	3	9
8	Placer	35	3	9
9	Uson	35	5	15
	TOTAL	**271**	**28**	**83**

B. Land Management Unit (LMU)

Land Management Unit is a recurring pattern of land which possesses similar physical characteristics such as soil type associated with relatively uniform land use or vegetation cover and parent material. The land management unit is the basis for integration of various resource information in suitability rating for different crops wherein each suitability class can be fitted with specific sets of management requirements and input. It is the building block of the pedo - ecological zone, which represents a broader landscape grouping such as lowland, upland, hillyland and highland.

Table 1.2. Land Management Units of Sampling Sites

LMU	Description	Municipality	Barangay
02 Active Tidal Flats (Natural Mangrove /Nipa)	Portions of the coastal landscape and presently grown to mangrove/nipa, swampy and marshy areas. The soil materials consist of fluvio-marine deposits and intermittently affected by the rise and fall of the tide and subject to tidal inundation.	Dimasalang Mandaon	Canumay Alas
03 Swamps (Tree Type)	Water saturated areas, intermittently or permanently water logged or inundated with a shrub or tree type vegetation.	Placer	Villa Inocencio
04 Marshes (Grassy type)	Includes all the swampy depressions on the back plain, characterized by permanently water logged and poorly drained areas.	Dimasalang Placer	Gaid Villa Inocencio
09 Broad Alluvial Plain	Generally flat low relief. The soil are very deep clay or heavy clay, moderately well drained to poorly drained, highly fertile and adaptable to wide range of crops dominated by paddy rice irrigated and non-irrigated.	Balud Cawayan Mandaon Milagros Mobo Placer Uson	Danao, Dao, Poblacion, Palani Cabayogan Alas Tagbon, Naranggasan, Capaculan Tabuc, Nasunduan, Lalaguna Daraga Badling, Magsaysay, San Mateo
19 Narrow Alluvial Plain (width <500 meters)	Landform represents a small strip of long and narrow alluvial lands with less than 500m width, such as infilled and inland valleys found between hills and mountains. It is formed by fluvial cycle and deposition of rain and fresh water.	Cawayan Masbate City Uson	Malbug Bolo, Pawa Poblacion

There are five (5) identified LMU's in the sampling sites: 02, 03, 04, 09, and 19. Table 1.2 shows the LMUs of the sampling sites per coastal municipality and barangay.

C. Flooding

Flooding happens on flat or low-lying areas when the soil is saturated by water or when the rate of rainfall exceeds the drainage capacity of the area and water remain on the surface for the certain period of time.

Majority of the farmer respondents (89%) observed flooding during the months of November to December. The common causes are heavy rainfall, typhoon, overflow of creeks, and sea level rise.

D. Elevation

The elevation of a geographic location is the height above sea level (meters above sea level). Since the coastal areas are in the lowland pedo-ecological zone, soil sampling points are taken from elevations ranging from 0-5masl, 5-10masl and 10-15masl. However, soil sample in Barangay San Mateo, Uson is taken from elevation 19masl.

E. Agro-Climate

Masbate belongs to Type 3 climate based on the Climate Map of the Philippines by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). Seasons are not pronounced, relatively dry from February to April, and wet during the rest of the year as shown in Figure 1.2.

Figure 1.2 Average Monthly Amount of Rainfall

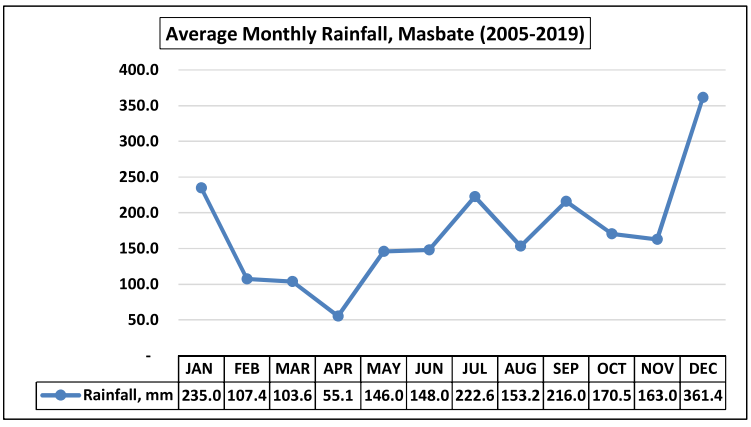
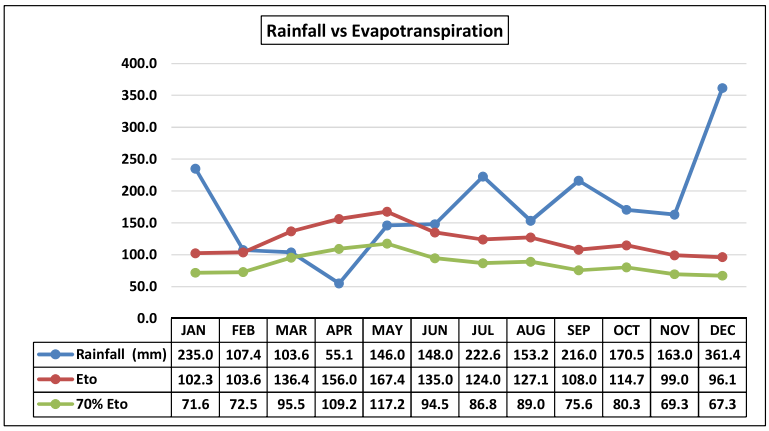


Figure 1.3 Comparison of the Average Rainfall and Evapotranspiration



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Rainfall (mm)	235.0	107.4	103.6	55.1	146.0	148.0	222.6	153.2	216.0	170.5	163.0	361.4
Eto	102.3	103.6	136.4	156.0	167.4	135.0	124.0	127.1	108.0	114.7	99.0	96.1
70% Eto	71.6	72.5	95.5	109.2	117.2	94.5	86.8	89.0	75.6	80.3	69.3	67.3

Evapotranspiration (Eto) is the sum of water transpired by the leaves of the crop and evaporation from the surrounding soil when water is not limited. Ideally, rainfall is considered to be sufficient if its amount is equal or higher than the potential evapotranspiration. In Figure 1.3 comparison of rainfall and evapotranspiration in Masbate, the average rainfall is relatively higher than the potential evapotranspiration from June to January. This means that soil moisture is sufficient to support crop cultivation. However, for the months of February to May, there is a need for supplemental irrigation.

F. Land Use/Vegetation

Land use involves the management and modification of natural environment. It also has been defined as "the total arrangements, activities, and inputs that people undertake in a certain land cover type." Land use and vegetation plays an important role in the identification of areas affected by salinity. It provides primarily indicative information on the physical and socio-economic activities prevailing in the area. On the other hand, salinity reduces the kinds of crops that can be grown for economic purposes due to chemical reactions between salt water and soil clay particles.

The common land use/vegetation in Masbate sampling sites are presented in Table 1.3. Some indicators of salinity per municipality are also indicated in this table.

Table 1.3 Land Use/Vegetation in Masbate Sampling Sites.

Municipality	Land Use/Vegetation	Some indicators of Salinity
1. Balud	Paddy rice irrigated and non-irrigated	Mangrove/nipa, beard grass, white crust on soil surface, poor yield, reddish leaves
2. Cawayan	Paddy rice irrigated and non-irrigated	Mangrove/nipa, beard grass, white crust on soil surface
3. Dimasalang	Paddy rice irrigated, mangrove, vegetables, corn	Mangrove/nipa, beard grass, white crust on soil surface, poor yield, reddish leaves
4. Mandaon	Paddy rice irrigated, mangrove, vegetables	Beard grass, reddish leaves
5. Masbate City	Paddy rice irrigated	Mangrove/nipa, beard grass, white crust on soil surface, poor yield, sedges, empty panicle, reddish leaves
6. Milagros	Paddy rice irrigated and non-irrigated	Mangrove/nipa, beard grass, white crust on soil surface, reddish leaves
7. Mobo	Paddy rice non-irrigated	Mangrove/nipa, beard grass, white crust on soil surface, poor yield, empty panicle, reddish leaves, stunted growth
8. Placer	Paddy rice non-irrigated, vegetables, corn	Beard grass, white crust on soil surface, poor yield, sedges, empty panicle, reddish leaves
9. Uson	Paddy rice irrigated and non-irrigated	Mangrove/nipa, beard grass, white crust on soil surface, poor yield, reddish leaves

Figure 1.4 Key Informant Interviews

II. CROP PRODUCTION ON SALINE AFFECTED AREAS

A. Key Informant Profile

Based on the 36 farmer respondents with 1:8 female-male ratio, the average years of age is 49. The eldest and youngest is 71 and 22 years old. Majority of the farmer respondents are the owners of their farm (61%), the rest are tenants (39%). The average farm size is 1.5 hectares per farmer and their average farming experience is 19 years.

B. Farm Production

The main products of Masbate that contribute to agricultural productivity are coconut, corn, rice, fish and cattle. Table 2.1 shows the average rice yield from CY 2015-2017 per municipality, based on the key informant interviews.

Table 2.1 Rice Production in Coastal Municipalities of Masbate

Coastal Municipalities	Average Rice Yield , kg/ha*					
	2015		2016		2017	
	1st Cropping	2nd Cropping	1st Cropping	2nd Cropping	1st Cropping	2nd Cropping
1. Balud	1,979	1,692	1,964	1,800	2,292	532
2. Cawayan	2,394	1,930	2,402	1,600	2,625	1,800
3. Dimasalang	1,083		1,417		1,417	
4. Mandaon	1,620	900	1,620	1,125	2,475	2,025
5. Masbate City	3,500	3,560	3,346	2,147	3,249	2,834
6. Milagros	3,462	1,995	3,324	3,787	3,064	3,720
7. Mobo	1,894	2,079	2,160	2,315	2,067	2,135
8. Placer	4,644		6,733		5,178	
9. Uson	6,450		4,700		7,133	

*Based on the key informant interview, rice yield for CY 2015-2017

C. Farm Input

Most of the commonly planted varieties used by key informants are based on its availability in the market and subsidy from the Municipal Agriculture Office, these are: PSB Rc 10 (Pagsanjan), PSB Rc 18 (Ala), PSB Rc 98 (Lian), NSIC Rc 222 (Tubigan 18), C4Red Rice, NSIC Rc 226 (Tubigan 20), NSIC Rc 216 (Tubigan 17), NSIC Rc 212 (Tubigan 15), PSB Rc 82 (Peñaranda), and NSIC Rc 182 (Salinas 1).

For fertilizers, they use inorganic fertilizers like urea (46-0-0), complete (14-14-14), and ammonium phosphate (16-20-0). They also use chemical herbicides 2,4-D, and nominee; and insecticides cymbus, furadan, karate, bushwack and lannate

D. Source of Irrigation

Table 2.2 Source of Irrigation for Paddy Rice

Source of Irrigation for Paddy Rice	%
National Irrigation Administration	3
Communal	23
Shallow Tubewell	6
Rainfed	59
Creek, river	9

Based on the 36 farmer respondents, only 3% have irrigation system assisted by NIA, while 23% have communal irrigation system. Most of them are rainfed (59%), while others have supplemental irrigation from shallow tubewell (6%) and pump water from creeks and rivers (9%).

E. Period of Salinity Occurrence and Practices to Address Salinity

Majority of the farmer respondents (53%) said that salinity affects their rice farms during the months of May to December, when typhoon and heavy rainfall occurs. They consider to adopt other suitable crops like watermelon, corn, or any crop suitable to the soil, but they still continue to plant rice as their main crop.

Most of the farmer-respondents' practices to address salinity are the following: 1) applying fertilizers and soil amendments, 2) planting other crops, and 4) flushing saline water with fresh water.

Figure 2.1 Auger Boring and Soil Sampling

Figure 2.2 Air Drying and Pulverizing of Soil Samples

III. SOIL CHEMICAL CHARACTERISTICS

Soil samples are brought to the BSWM Laboratory Services Division for the soil salinity/alkalinity test which includes pH (1:1) at 25^{0}C, Electrical Conductivity (EC) at 25^{0}C, Calcium (Ca), Magnesium (Mg), Sodium (Na), Potassium (K), Sum of Cations, Carbonate (CO_3), Bicarbonate (HCO_3), Chloride (Cl), Sulfate (SO_4), Sum of Anions, and Sodium Adsorption Ratio (SAR).

The EC test results are classified according to its salinity class and then used to map salinity in the coastal area. Other laboratory test results are gathered as input to the Saline-Affected Areas Database Information System (SADIS v1.1). This spatial database can be used as reference for future research studies on salinity.

A. Salinity Classification

The laboratory results for salinity testing, specifically the EC readings, are classified using Table 3.1 below, based on the BSWM/FAO Salinity Project in 1999. This salinity classification is rice-based and applicable to Philippine setting.

Table 3.1 Salinity Classification (Crop-based, Rice)

Electrical Conductivity *(mS/cm)*	Soil Salinity Class	Hazard for Crop Growth	Plant Response
0 - 2	Non Saline	Very low	Negligible
2.1 - 4	Slightly Saline	Low	Restricted yield of sensitive crops
4.1 - 8	Moderately Saline	Moderate	Restricted yield of many crops
8.1 - 16	Severely Saline	High	Only a few tolerant crops yield satisfactorily
>16	Very Severely Saline	Very high	Only a few tolerant forage grow satisfactorily

Table 3.2 shows the laboratory EC test results of soil samples per Municipality. Each EC readings are further classified using Table 3.1 above. The Municipalities of Dimasalang, part of Mandaon, and Milagros have very severely saline soil. These areas are very hazardous for crop growth and only a few tolerant forage can grow satisfactorily. In Masbate City, part of Dimasalang, and Mobo, the

soils are severely saline. These areas are also hazardous for crop growth, although at 60-90cm only very few plants have root system that can reach this depth. Moderately saline soils are in some areas of Masbate City, Milagros and Mobo. These are moderately hazardous for crop growth that will result to restricted yield on many crops.

Table 3.2 Electrical Conductivity (EC) of Soil Samples at Different Depths

Auger Ref	Barangay	Municipality	EC (mS/cm) @0-30cm	EC (mS/cm) @30-60cm	EC (mS/cm) @60-90cm
SS2	BOLO	MASBATE CITY	0.8540	0.3066	6.3150
SS3	PAWA	MASBATE CITY	11.1400	6.9810	10.7000
SS4	PAWA	MASBATE CITY	0.7220	0.9000	1.0240
SS5	GAID	DIMASALANG	17.9500	13.7000	13.8200
SS6	CANOMAY	DIMASALANG	40.1100	43.3000	40.5200
SS7	POBLACION	USON	0.7290	0.5480	0.4030
SS8	BADLING	USON	1.5430	1.3940	1.3940
SS9	BADLING	USON	0.7010	0.5920	0.4140
SS10	MAGSAYSAY	USON	1.6390	0.9540	0.5530
SS11	SAN MATEO	USON	0.7540	1.0090	0.7720
SS12	VILLA INOCENCIO	PLACER	2.6070	2.6890	3.0210
SS13	VILLA INOCENCIO	PLACER	0.8210	0.2940	1.9970
SS14	DARAGA	PLACER	1.5060	0.6920	0.4030
SS17	MALBUG	CAWAYAN	0.4310	1.9200	3.1110
SS21	CABAYOGAN	CAWAYAN	0.3800	1.8420	0.5800
SS23	LAGUINBANWA	MANDAON	44.8800	55.6600	
SS24	ALAS	MANDAON	0.7855	0.4016	0.4800
SS25	TAGPUAN	MILAGROS	5.9860	12.0300	30.9200
SS26	NARANGASAN	MILAGROS	0.8060	1.1630	0.3680
SS27	CAPACULAN	MILAGROS	0.5670	0.6340	0.7080
SS29	DANAO	BALUD	0.4430	0.3610	0.4170
SS30	DANAO	BALUD	0.4100	0.0540	0.2000
SS32	DAO	BALUD	0.4180	0.3930	0.2140
SS33	POBLACION	BALUD	0.3270	0.3110	0.1620
SS35	PALANI	BALUD	0.9670	0.7660	0.8210
SS36	TABUC	MOBO	8.2450	6.9870	5.3180
SS38	NASUNDUAN	MOBO	7.2100	6.3900	14.9200
SS39	LALAGUNA	MOBO	0.7420	0.4390	0.3190

Note: Please refer to Table 3.1

Soil Salinity Maps at three different depths (0-30cm, 30-60cm, and 60-90cm) are delineated using the corresponding Electrical Conductivity (EC) readings, then interpolation is used to estimate the soil salinity at unsampled locations to create a continuous representation. Tables 3.3-3.5 interpret the land area in hectares per municipality at different degrees of salinity.

Table 3.3 Coastal Land Area (in hectares) per Municipality at Different Degrees of Salinity (0-30 cm depth)

Coastal Municipality	Non Saline	Slightly Saline	Moderately Saline	Severely Saline	Very Severely Saline
1. Baleno	16.10				
2. Balud	5,081.40	677.50	278.92		
3. Cataingan			62.74		
4. Cawayan			9,838.22		
5. City of Masbate	350.99	97.04	1,417.91	759.82	
6. Dimasalang	342.11		12.66	88.75	843.47
7. Esperanza			2,361.85		
8. Mandaon	33.16	103.94	1,122.06	1,344.16	2,707.57
9. Milagros	3,052.19	1,607.23	7,031.95		
10. Mobo	41.25	246.21	1,007.80	69.06	
11. Palanas				158.02	412.98
12. Pio V. Corpuz			54.42		
13. Placer		395.17	8,820.84		
14. Uson	2,717.00	184.50	750.10	31.16	
TOTAL	**11,634.20**	**3,311.59**	**32,759.45**	**2,450.97**	**3,964.02**

Table 3.3 shows the land area (in hectares) affected by salinity for 0-30cm depth. Very severely saline is 3,964.02 hectares, mostly in Mandaon. Severely saline is 2,450.97 hectares, also mostly in Mandaon. Moderately saline is 32,759.45 hectares, mostly in Cawayan, Milagros and Placer. These areas have moderate to very high hazard to crop growth and only a few tolerant crops yield satisfactorily.

On Table 3.4 at 30-60cm depth, the land area affected by salinity is higher than at 0-30cm depth. Very severely saline is 4,297.42 hectares, mostly in Mandaon. Severely saline is 5,033.03 hectares, mostly in Milagros and Mandaon. Moderately saline is 6,370.50 hectares, mostly in Milagros, Masbate City and Mobo. These areas have moderate to very high hazard to crop growth and only a few tolerant crops yield satisfactorily.

Table 3.4 Coastal Land Area (in hectares) per Municipality at Different Degrees of Salinity (30-60 cm depth)

Coastal Municipality	Non Saline	Slightly Saline	Moderately Saline	Severely Saline	Very Severely Saline
1. Baleno		16.10			
2. Balud	5,053.78	558.49	425.56		
3. Cataingan	62.74				
4. Cawayan	9,838.22				
5. City of Masbate	406.58	220.64	1,544.52	454.00	
6. Dimasalang		341.92	12.93	114.91	817.24
7. Esperanza	2,327.98	33.87			
8. Mandaon	34.59	43.40	822.94	1,334.69	3,075.27
9. Milagros	5,889.94	447.90	2,419.12	2,934.41	
10. Mobo	47.95	266.87	1,049.51		
11. Palanas				166.08	404.92
12. Pio V. Corpuz	54.42				
13. Placer	9,049.47	166.54			
14. Uson	2,254.88	1,303.01	95.92	28.94	
TOTAL	**35,020.54**	**3,398.73**	**6,370.50**	**5,033.03**	**4,297.42**

Table 3.5 Coastal Land Area (in hectares) per Municipality at Different Degrees of Salinity (60-90 cm depth)

Coastal Municipality	Non Saline	Slightly Saline	Moderately Saline	Severely Saline	Very Severely Saline
1. Baleno			16.10		
2. Balud	5,040.27	518.31	479.24		
3. Cataingan		62.74			
4. Cawayan	1,373.59	8,464.62			
5. City of Masbate			665.26	1,506.49	454.00
6. Dimasalang		26.23	328.54	123.59	808.64
7. Esperanza		2,361.85			
8. Mandaon	33.16	42.00	751.87	1,370.56	3,113.29
9. Milagros	2,773.60	2,863.49	782.53	1,739.36	3,532.39
10. Mobo	36.03	19.97	1,006.68	301.64	
11. Palanas				176.16	394.84
12. Pio V. Corpuz		54.42			
13. Placer	2,174.38	7,041.63			
14. Uson	1,792.97	1,386.49	481.77	21.53	
TOTAL	**13,224.01**	**22,841.74**	**4,511.99**	**5,239.34**	**8,303.16**

Table 3.5 shows the largest area affected by salinity. Very severely saline is 8,303.16 hectares, mostly in Mandaon and Milagros. Severely saline is 5,239.34 hectares, mostly in Masbate City, Milagros and Mandaon. Moderately saline is 4,511.99 hectares, mostly in Mobo. These areas have moderate to very high hazard to crop growth and only a few tolerant crops yield satisfactorily.

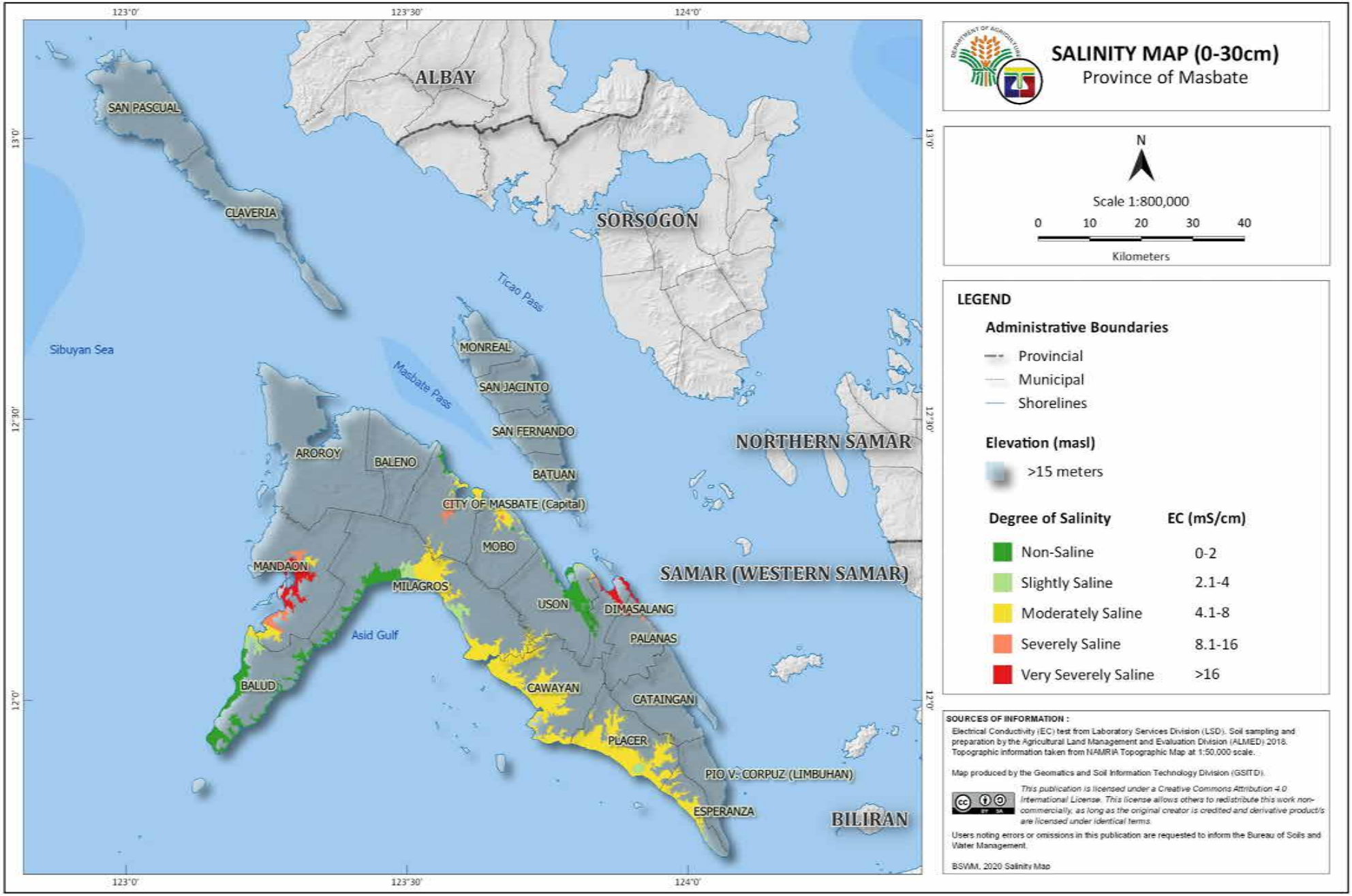
Table 3.6 Distribution of Coastal Land Area at Different Degrees of Salinity, Masbate Province

Salinity Class	Soil Depth (cm)					
	0-30		30-60		60-90	
	hectares	%	hectares	%	hectares	%
Non saline	11,634.20	21.50	35,020.54	64.71	13,224.01	24.43
Slightly saline	3,311.59	6.12	3,398.73	6.28	22,841.74	42.21
Moderately saline	32,759.45	60.53	6,370.50	11.77	4,511.99	8.34
Severely saline	2,450.97	4.53	5,033.03	9.30	5,239.34	9.68
Very Severely saline	3,964.02	7.32	4,297.42	7.94	8,303.16	15.34

Table 3.6 summarizes the total coastal land area of Masbate per degree of salinity and the notable result is that at soil depth 0-30cm, 60.53% of the coastal land area is moderately affected by salinity and only 15.34% is very severely saline at 60-90cm depth. Although only very few plants have root system that can reach this depth, there are chances that during dry months, salts will accumulate at the surface of the soil and thus, can be moderately to highly hazardous to crop growth that can result to restricted yield on many crops. In summary, majority of the soil samples are slightly saline to non saline.

B. Output Maps

The following are the output maps of the project: the Soil Salinity Maps of the Province of Masbate at 0-30cm depth; 30-60cm depth; and 60-90cm depth.



SALINITY MAP (0-30cm)

Province of Masbate

N

Scale 1:800,000

0 10 20 30 40

Kilometers

LEGEND

Administrative Boundaries

- Provincial
- Municipal
- Shorelines

Elevation (masl)

- >15 meters

Degree of Salinity	EC (mS/cm)
Non-Saline	0-2
Slightly Saline	2.1-4
Moderately Saline	4.1-8
Severely Saline	8.1-16
Very Severely Saline	>16

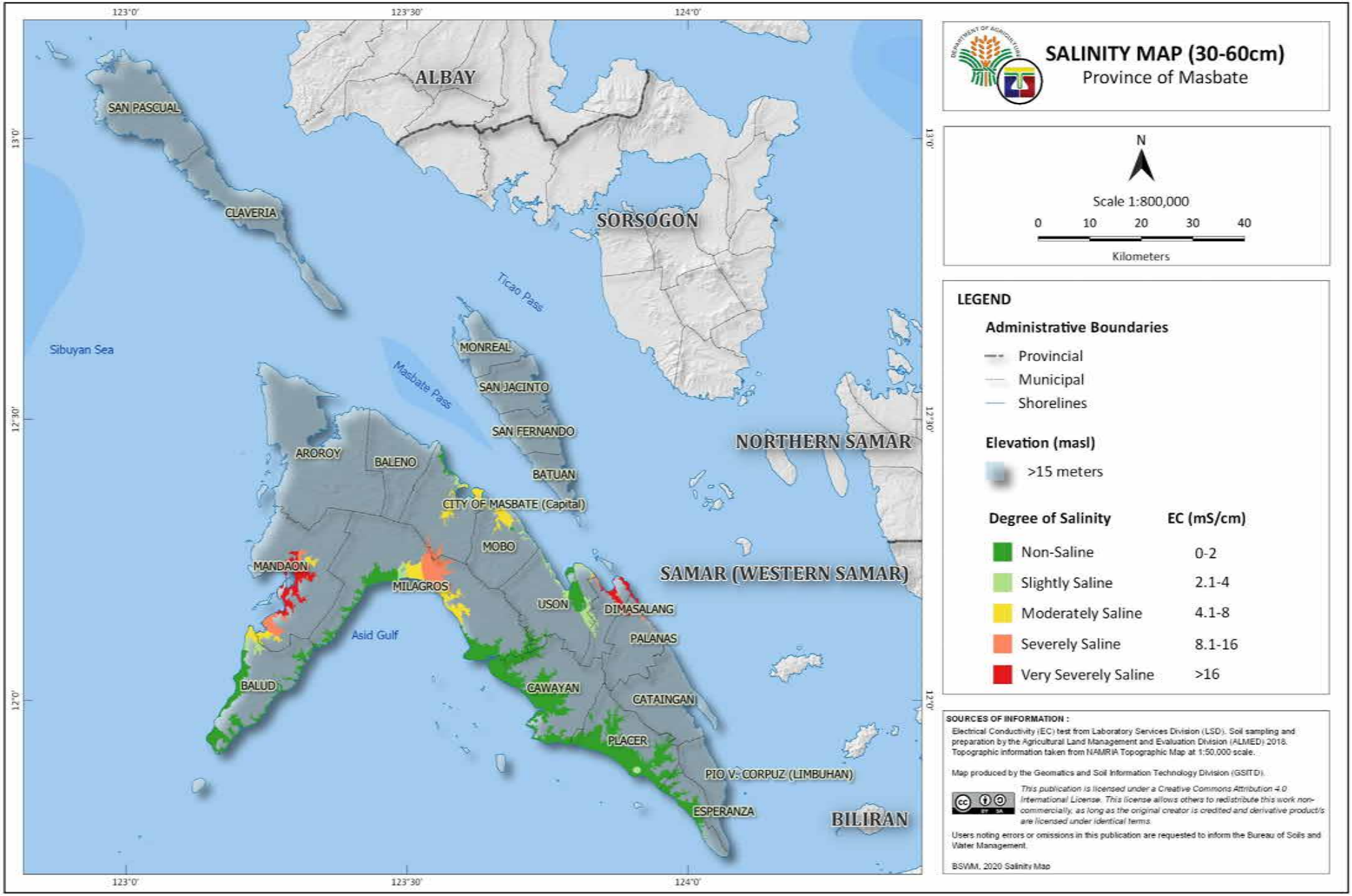
SOURCES OF INFORMATION :

Electrical Conductivity (EC) test from Laboratory Services Division (LSD). Soil sampling and preparation by the Agricultural Land Management and Evaluation Division (ALMED) 2018. Topographic information taken from NAMRIA Topographic Map at 1:50,000 scale.

Map produced by the Geomatics and Soil Information Technology Division (GSITD).

Users noting errors or omissions in this publication are requested to inform the Bureau of Soils and Water Management.

BSWM, 2020 Salinity Map



SALINITY MAP (30-60cm)

Province of Masbate

N

Scale 1:800,000

0 10 20 30 40

Kilometers

LEGEND

Administrative Boundaries

- Provincial
- Municipal
- Shorelines

Elevation (masl)

- >15 meters

Degree of Salinity	EC (mS/cm)
Non-Saline	0-2
Slightly Saline	2.1-4
Moderately Saline	4.1-8
Severely Saline	8.1-16
Very Severely Saline	>16

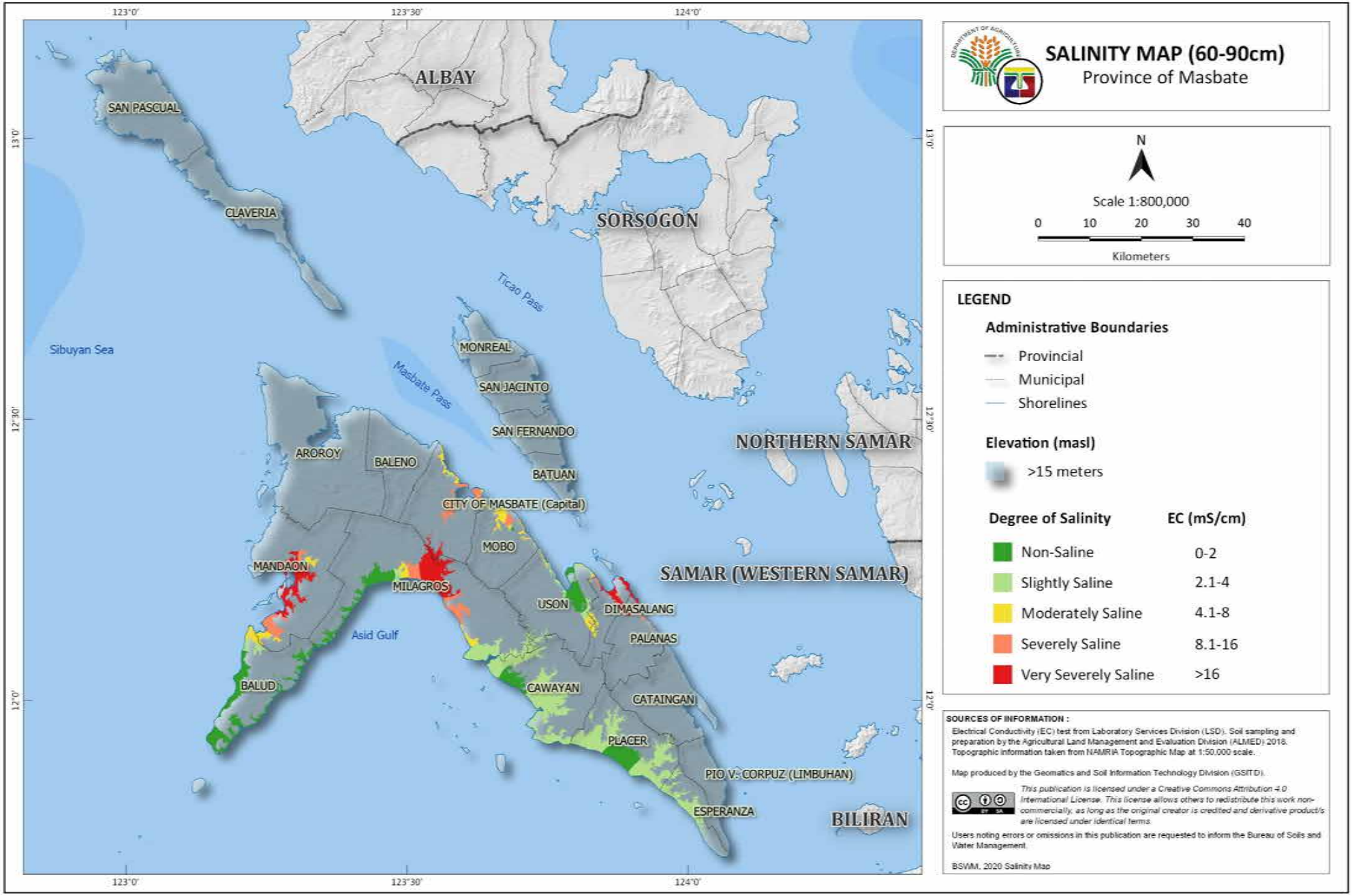
SOURCES OF INFORMATION :

Electrical Conductivity (EC) test from Laboratory Services Division (LSD). Soil sampling and preparation by the Agricultural Land Management and Evaluation Division (ALMED) 2018. Topographic information taken from NAMRIA Topographic Map at 1:50,000 scale.

Map produced by the Geomatics and Soil Information Technology Division (GSITD).

Users noting errors or omissions in this publication are requested to inform the Bureau of Soils and Water Management.

BSWM, 2020 Salinity Map



SALINITY MAP (60-90cm)
Province of Masbate

N

Scale 1:800,000

0 10 20 30 40

Kilometers

LEGEND

Administrative Boundaries

- Provincial
- Municipal
- Shorelines

Elevation (masl)

- >15 meters

Degree of Salinity	EC (mS/cm)
Non-Saline	0-2
Slightly Saline	2.1-4
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BSWM, 2020 Salinity Map

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