

LAND SUITABILITY MAP

CACAO

**LAND RESOURCES EVALUATION AND SUITABILITY
ASSESSMENT OF STRATEGIC PRODUCTION AREAS**

PROVINCE OF SULTAN KUDARAT



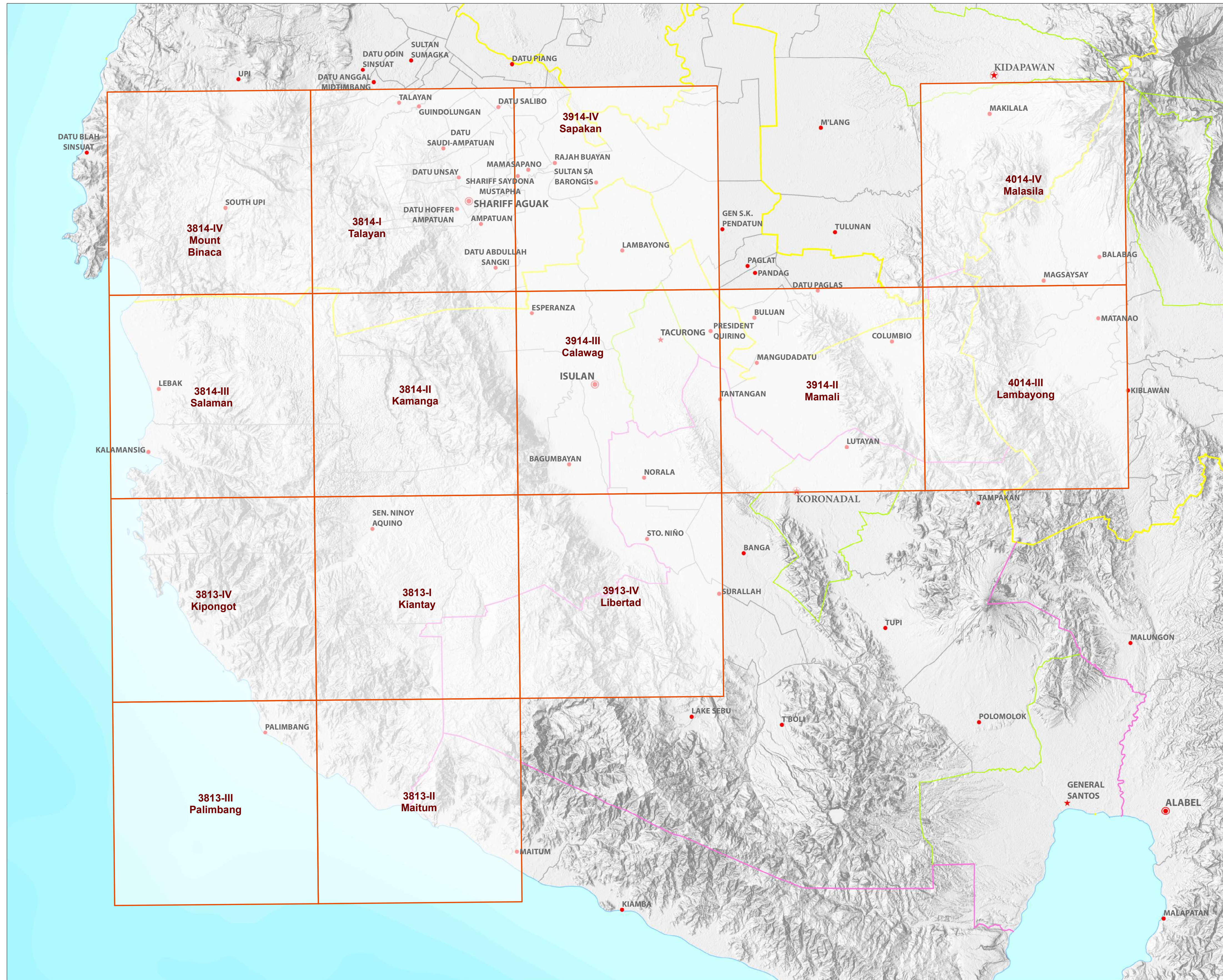
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DEPARTMENT OF AGRICULTURE
BUREAU OF SOILS AND WATER MANAGEMENT

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LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS

PROVINCE OF SULTAN KUDARAT



LEGEND

Places

- ★ Capital City
- ★ City
- Capital Town
- Town

Administrative Boundary

- Regional
- Provincial
- City
- Municipal

Map Index

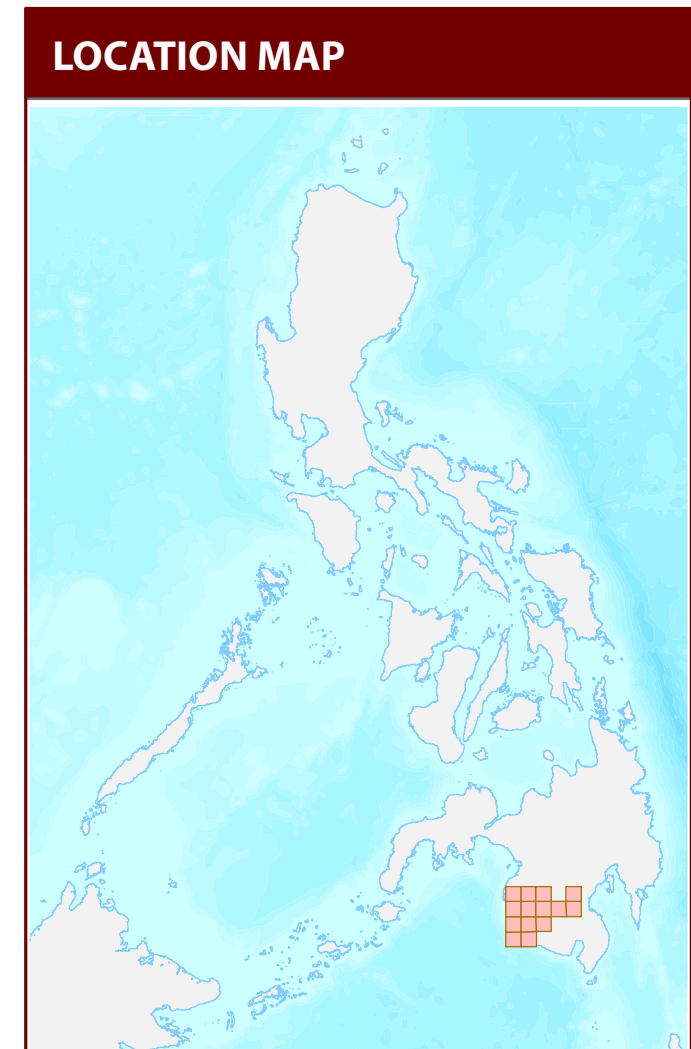
- Index grid

Topographic Relief

- Topographic relief symbol

Bathymetry

- Bathymetry symbol



MISCELLANEOUS INFORMATION

Land suitability information produced by the Bureau of Soils and Water Management (BSWM) through the Land Resources Evaluation and Suitability Assessment of Strategic Production Areas for Major Commodities Project duly supported by the Philippine Council on Agriculture and Fisheries (PCAF) and funded by the Bureau of Agricultural Research (BAR).

Map produced by the Geomatics and Soil Information Technology Division, Bureau of Soils and Water Management (BSWM).

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LAND SUITABILITY MAP FOR CACAO

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS SULTAN KUDARAT, REGION XII

EXTENT OF SUITABILITY FOR CACAO PRODUCTION BY MUNICIPALITY

MUNICIPALITY	EXISTING CACAO (Ha)			TOTAL EXISTING AREA (Ha)	EXPANSION AREA (Ha)						CONFLICT AREA (Ha)						TOTAL POTENTIAL EXPANSION AREA (Ha)
	S1	S2	S3		Coconut		Shrubland, unmanaged*		Grassland, unmanaged*		Corn		Oil palm		Other crops		
					S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	
BAGUMBAYAN	-	-	-	-	2,527	522	58	-	342	5,303	3,623	10,892	77	31	-	-	23,374
CITY OF TAGURONG	-	-	-	-	162	-	4	-	2,904	59	3,175	-	1,809	-	9	-	8,122
COLUMBIO	-	-	-	-	41	-	14	8	4,312	237	1,942	-	-	-	-	-	6,555
ESPERANZA	-	-	-	-	692	603	-	31	28	100	3,891	1,567	-	-	-	-	6,913
ISULAN	-	-	-	-	461	280	28	179	-	1,317	4,999	1,319	1,556	146	-	-	10,285
KALAMANSIG	-	-	-	-	2,516	-	371	10	173	-	77	-	-	-	-	-	3,147
LAMBAYONG	-	-	-	-	152	-	-	-	-	4,262	11	-	-	-	-	-	4,425
LEBAK	20	-	-	20	4,456	2,035	87	109	210	92	520	2,258	-	-	1	-	9,769
LUTAYAN	-	-	-	-	920	-	331	-	638	-	3,857	-	-	-	-	-	5,746
PALMBANG	-	-	-	-	6,589	871	6	747	-	1,447	1,276	1,656	-	-	-	-	12,593
PRESIDENT QUIRINO	-	-	-	-	1,277	-	-	-	-	3,590	-	-	-	-	-	-	4,868
SEN. NINOY AQUINO	-	-	-	-	-	-	-	-	3,208	-	12,607	-	-	-	-	-	15,815
TOTAL	20	-	-	20	19,795	4,310	899	1,084	8,607	11,764	31,212	30,312	3,442	177	10	-	111,611

Note: Delivery of cacao planting materials must be started on the onset of rainy season.
*establishment of shade trees prior to planting of cacao.

SUITABILITY CLASSES:

Highly Suitable (S1) Land having no significant limitation to sustained application of a given use, or only minor limitations that will not significantly reduce productivity or benefits and will not raise inputs above an acceptable level.	Marginally Suitable (S3) Land having limitations which in aggregate are severe for sustained application of a given use and will so reduce productivity or benefits, or increase required inputs, that this expenditure will be only marginally justified.
Moderately Suitable (S2) Land having limitation which in aggregate are moderately severe for sustained application of a given use; the limitation will reduce productivity or benefits and increase required inputs to the extent that the overall advantage to be gained from the use, although still attractive, will be appreciably inferior to that expected on class S1 land.	Not Suitable / Not Relevant Land having limitations which may be surmountable in time but which cannot be corrected with existing knowledge at currently acceptable cost; the limitations are so severe as to preclude successful sustained use of the land in the given manner. Existing forest, shrubland greater than 18% slope, irrigated paddy rice and miscellaneous land types such as built up areas, roads, etc are considered as not relevant.

AGRONOMIC REQUIREMENT OF CACAO PRODUCTION

LAND UTILIZATION TYPE	SUITABILITY RATING	SLOPE (%)	SOIL DEPTH (cm)	SOIL TEXTURE	SOIL DRAINAGE	SOIL REACTION (pH)	INHERENT FERTILITY	FLOODING CLASS	EROSION CLASS	ROCK OUTCROPS	ELEVATION (masl)	ANNUAL RAINFALL (mm)	CLIMATIC TYPE
Cacao	S1	<8	>100	CL, SiCL, SCL, SC, SiC, C, HC	WD, MWD	5.6 - 7.2	high	none-slight	none-slight	none-few	<1000	2001-4500	I, III, IV
	S2	8 - 30	50 - 100	FSL, L, SIL	SPD, PD	5.1 - 5.5 7.3 - 7.8	medium	moderate	moderate	common	1000-1500	1000-2000	I, II
	S3	>30	<50	S, LS, CSL, SL	VPD, ED	<5.0 - > 7.9	low	severe	severe	many	>1500	<1000 >4500	

SLOPE (%) 0 - 3 - level to gently sloping 3 - 8 - gently sloping to undulating 8 - 18 - undulating to rolling 18 - 30 - rolling to moderately steep 30 - 50 - steep >50 - very steep	SOIL DRAINAGE ED - excessively drained WD - well drained MWD - moderately well drained SPD - somewhat poorly drained PD - poorly drained VPD - very poorly drained	SOIL REACTION (pH) <4.5 - extremely acid 4.5 - 5.0 - very strongly acid 5.1 - 5.5 - strongly acid 5.6 - 6.0 - medium acid 6.1 - 6.5 - slightly acid 6.6 - 7.2 - neutral 7.3 - 7.8 - mildly alkaline 7.9 - 8.4 - moderately alkaline >8.5 - strongly alkaline	SOIL TEXTURE Coarse S - sand LS - loamy sand CSL - coarse sandy loam SL - sandy loam Medium FSL - fine sandy loam L - loam SIL - silt loam CL - clay loam SiCL - silty clay loam SCL - sandy clay loam Fine SC - sandy clay SiC - silty clay C - clay HC - heavy clay
SOIL DEPTH (cm) 0 - 30 - very shallow 30 - 50 - shallow 50 - 100 - moderately deep > 100 - deep to very deep	SURFACE IMPEDIMENT ROCK OUTCROPS <10% - none - few 10 - 30% - common >30% - many		

LAND LIMITATIONS DESCRIPTION AND COMBINATIONS

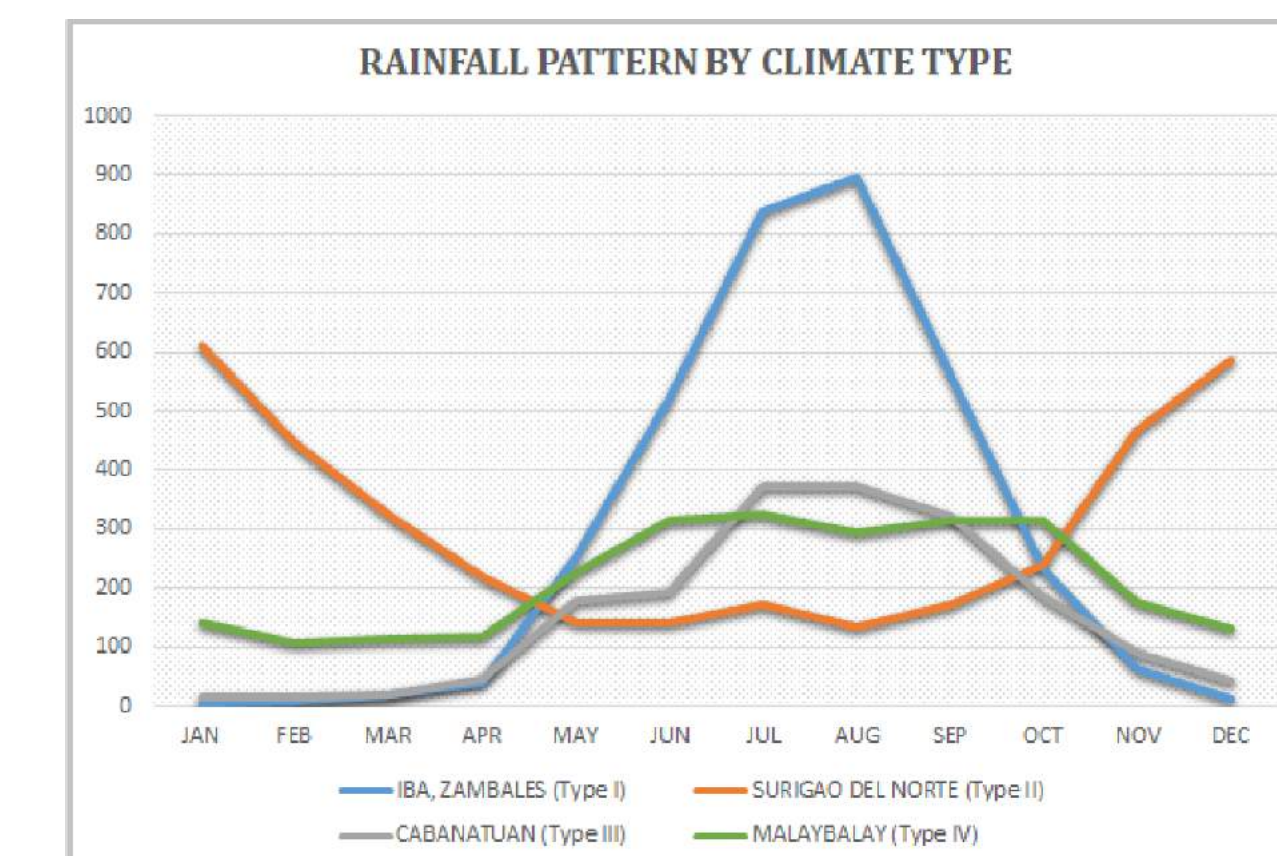
ELEVATION E12 - 1000m - 1500m E13 - > 1500m	SOIL DRAINAGE D2 - Somewhat poorly drained to poorly drained D3 - Very poorly drained or excessively drained	SOIL DEPTH Sh2 - Moderately deep (50 - 100cm) Sh3 - Very shallow to shallow (<50cm)	SOIL EROSION E2 - Moderate erosion E3 - Severe erosion
SLOPE/TOPOGRAPHY T2 - Undulating to moderately steep T3 - Steep to very steep	SOIL TEXTURE Tc - Coarse texture	ROCK OUTCROPS Rc2 - Common Rc3 - Many	FLOODING F2 - Moderate seasonal flooding F3 - Severe seasonal flooding

CODE	LIMITATION	CODE	LIMITATION	CODE	LIMITATION	CODE	LIMITATION	CODE	LIMITATION	CODE	LIMITATION	CODE	LIMITATION	CODE	LANDUSE
1	E2-Sh2-Rc2	11	F2-D2	21	T2-E12-E3	31	T3-E3	41	T3-E13-E3-Sh3-Rc2	51	T3-E12-E3-Sh3-Rc3	6	Corn		
2	E12	12	F3-D2	22	T2-E12-E3-Rc2	32	T3-E3-Rc2	42	T3-E13-E3-Sh3-Rc3	52	T3-E13-E3	7	Coffee		
3	E12-E2-Sh2-Rc3	13	Sh2	23	T2-E12-E3-Sh2-Rc2	33	T3-E3-Sh3-Rc2	43	T3-F3-D2	53	T3-E13-E3-Sh3-Rc3	8	Cacao		
4	E12-E3-Sh2-Rc3	14	Sh2-Rc2	24	T2-E12-E3-Sh2-Rc3	34	T3-E3-Sh3-Rc3	44	T3	54	T3-E13	9	Banana		
5	E12-Rc2	15	T2	25	T2-E13-E3	35	T3-E12	45	T3-E3	55	Tc	10	Coconut		
6	E12-Sh2-Rc2	16	T2-E3	26	T2-E13-E3-Sh2-Rc2	36	T3-E12-E3	46	T3-E3-Rc3			11	Oil palm		
7	E12-Sh2-Rc3	17	T2-E3-Rc2	27	T2-E13-E3-Sh2-Rc3	37	T3-E12-E3-Rc2	47	T3-E3-Sh3-Rc3			12	Grassland		
8	E13	18	T2-E3-Sh2-Rc2	28	T2-F2-D2	38	T3-E12-E3-Sh3-Rc2	48	T3-E12			13	Shrubs, unmanaged		
9	E13-E3-Sh2-Rc3	19	T2-E3-Sh2-Rc3	29	T2-F3-D2	39	T3-E12-E3-Sh3-Rc3	49	T3-E12-E3						
10	E13-Sh2-Rc2	20	T2-E12	30	T3	40	T3-E13-E3	50	T3-E12-E3-Rc3						

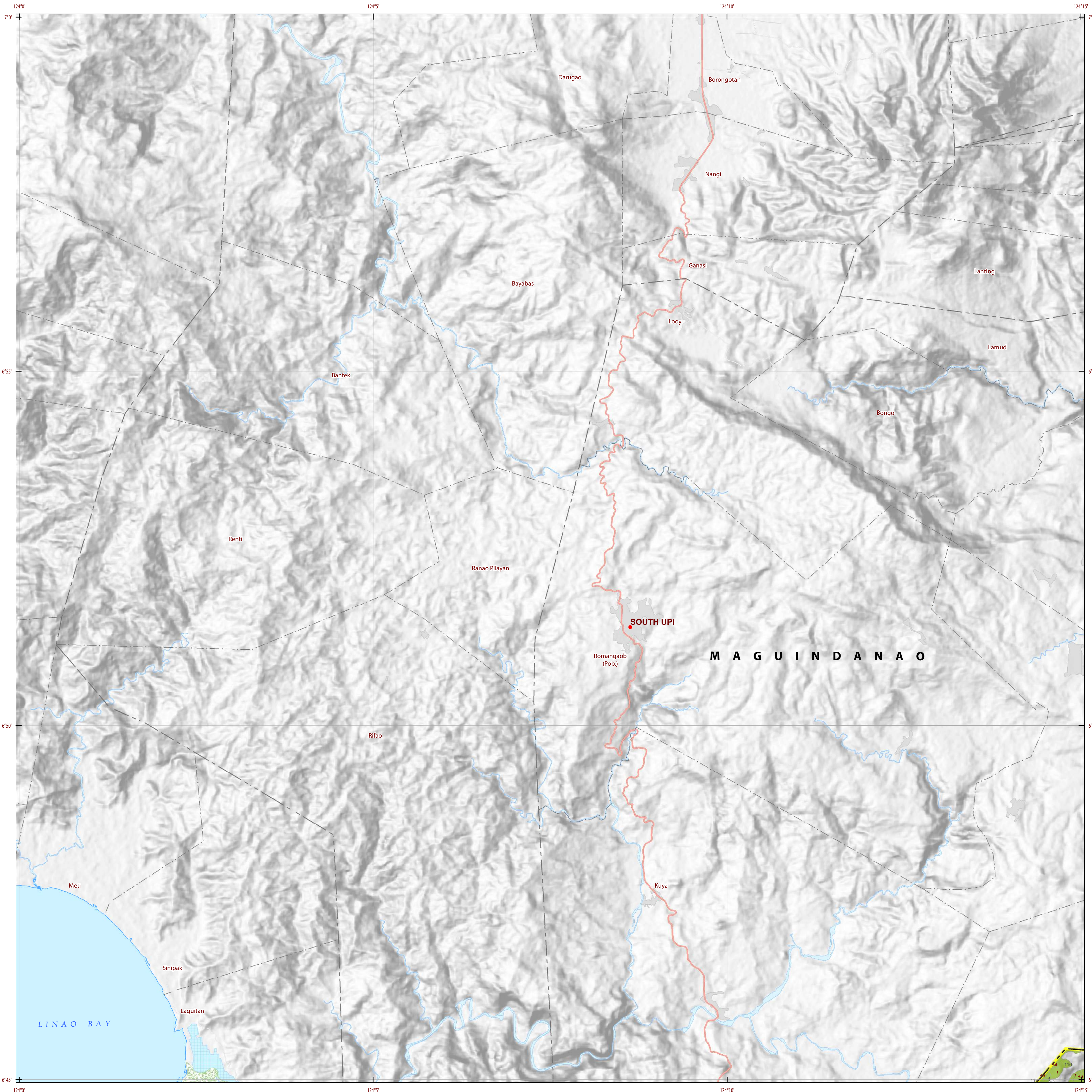
CLIMATE TYPE

TYPE I : Two wet 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. Maximum 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 December to February or 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 II since it has no dry season.

The Eastern part of Sultan Kudarat is classified as climatic Type III and the Southern part lies to climatic Type IV.

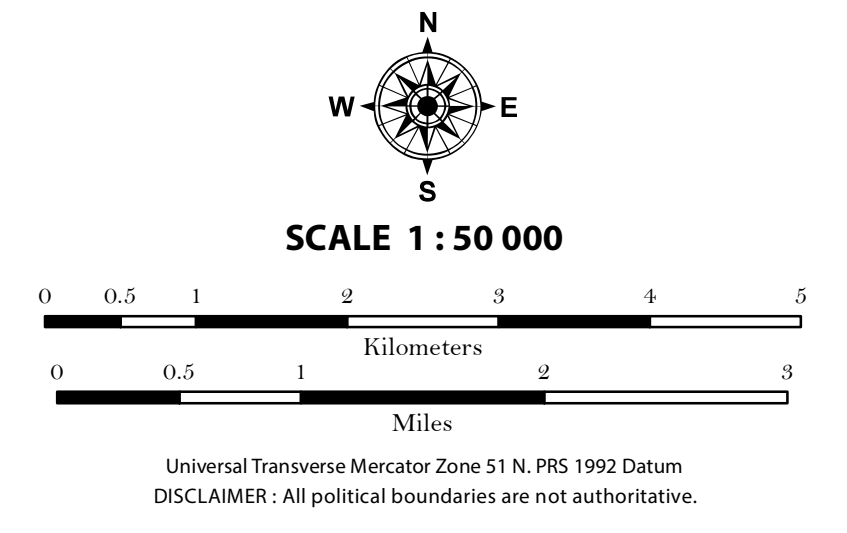


Source: PAGASA 2018, *Climatological Normals (Rainfall)*, Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), accessed 27 July 2018, <<https://www1.pagasa.dost.gov.ph/index.php/climate/climatological-normals>>.



LAND SUITABILITY MAP CACAO

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS



LEGEND

SUITABILITY CLASSES

- S1 Highly Suitable** - Land having no significant limitations to sustained application of a given use, or only minor limitations that will not significantly reduce productivity or benefits and will not raise inputs above an acceptable level.
- S2 Moderately Suitable** - Land having limitations which in aggregate are moderately severe for sustained application of a given use; the limitations will reduce productivity or benefits and increase required inputs to the extent that the overall advantage to be gained from the use, although still attractive, will be appreciably inferior to that expected on class S1 land.
- S3 Marginally Suitable** - Land having limitations which in aggregate are severe for sustained application of a given use and will so reduce productivity or benefits, or increase required inputs, that this expenditure will be only marginally justified.

Not Suitable/ Not Relevant

OTHER SIGNS

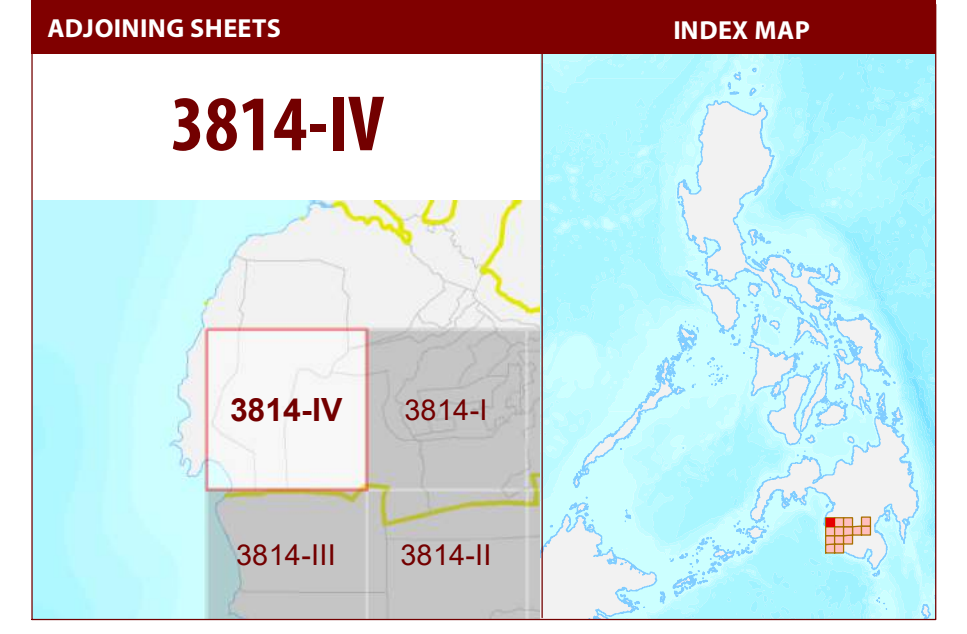
- NGP Areas
- Cacao
- Land limitation
- Land use

CONVENTIONAL SIGNS

ROADS	BOUNDARY	HYDROLOGY
Expressway	Region	Sea / Shoreline
Trunk line	Province	Lakes / Rivers
Primary	District	PLACES
Secondary	Municipality	★ Capital City / City
Tertiary	Barangay	● Capital Town / Town

LAND USE

- Built-up
- Fishpond
- Mangrove



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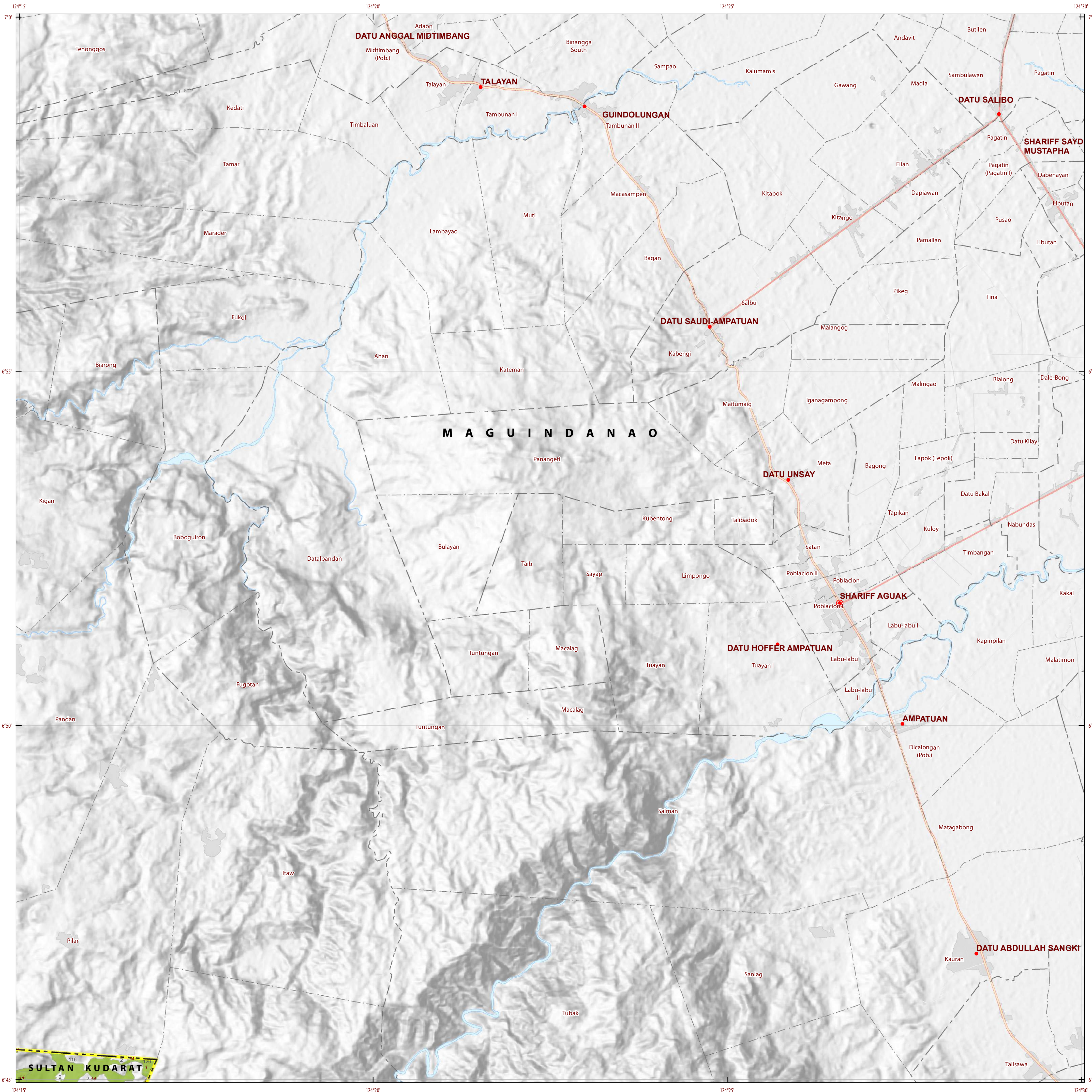
Project Leader : BERNARDO B. PASCUA
 GIS and Cartography : IRWIN K. SAMALCA

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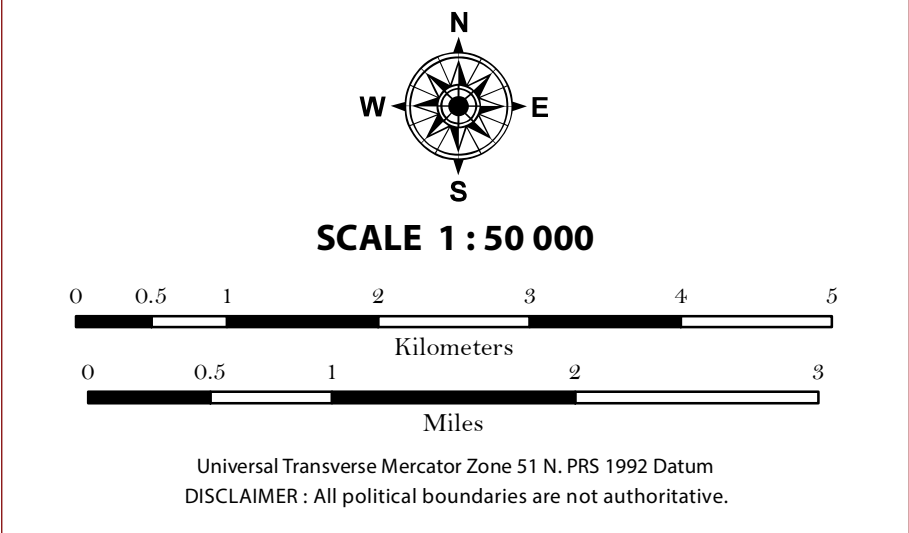
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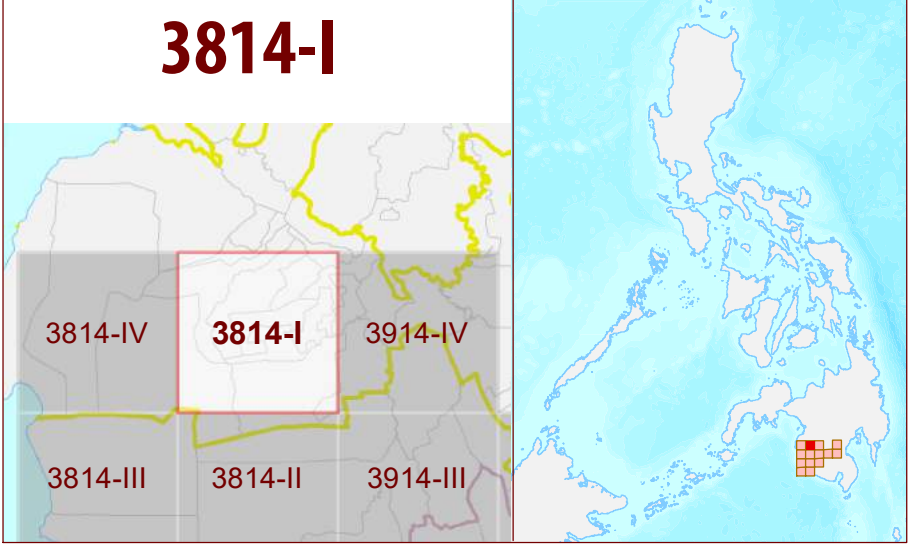
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- OTHER SIGNS**
- NGP Areas
 - Cacao
 - Land limitation
 - Land use

CONVENTIONAL SIGNS

- | | | |
|-----------------|-----------------|-----------------------|
| ROADS | BOUNDARY | HYDROLOGY |
| Expressway | Region | Sea / Shoreline |
| Trunk line | Province | Lakes / Rivers |
| Primary | District | PLACES |
| Secondary | Municipality | ★ Capital City / City |
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| LAND USE | | |
| Built-up | Fishpond | Mangrove |

ADJOINING SHEETS INDEX MAP



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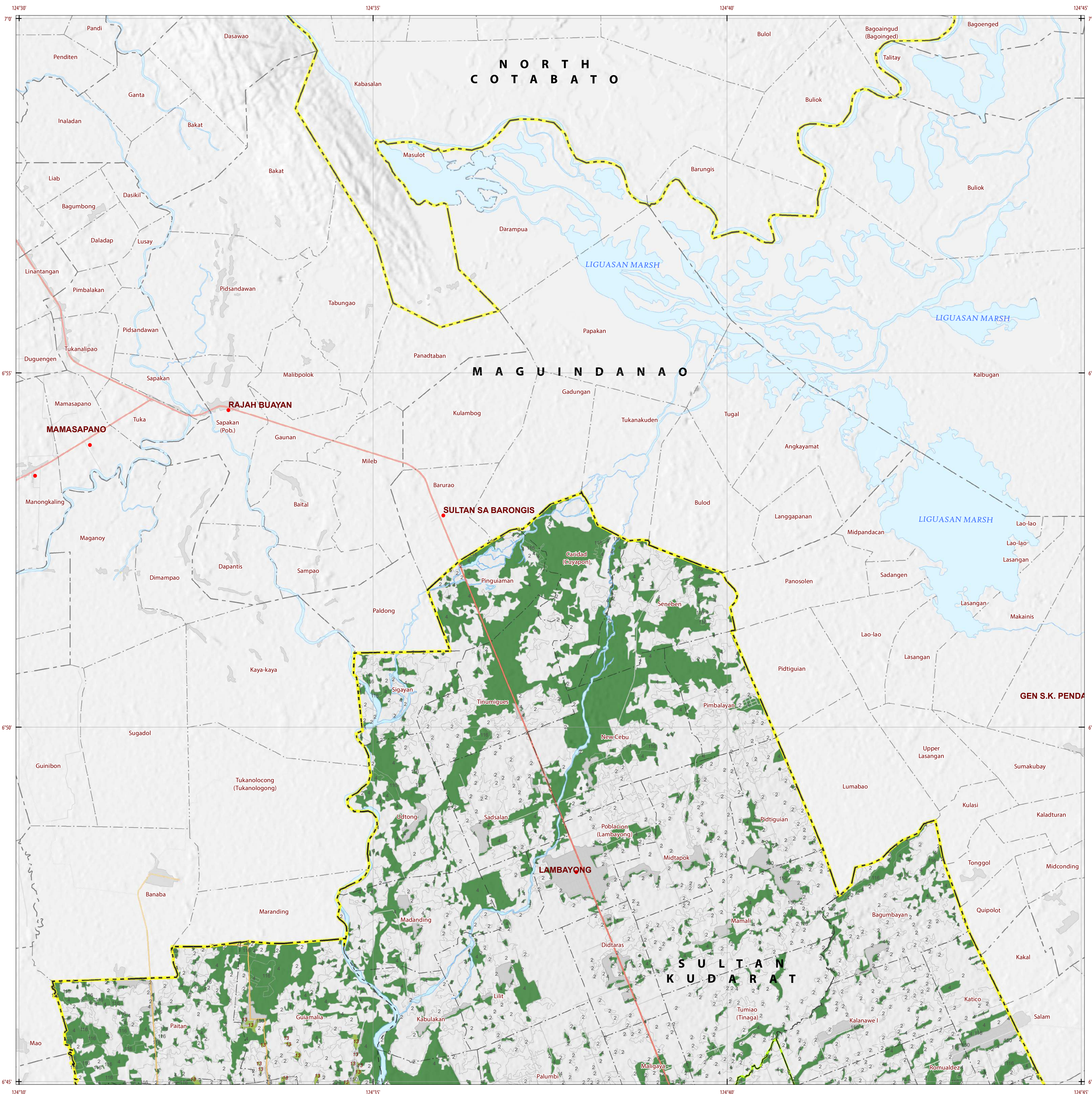
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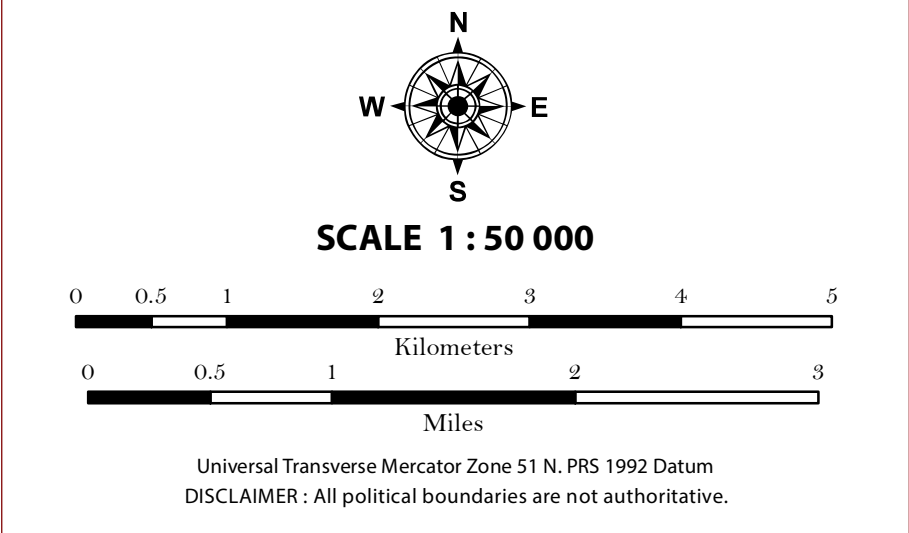
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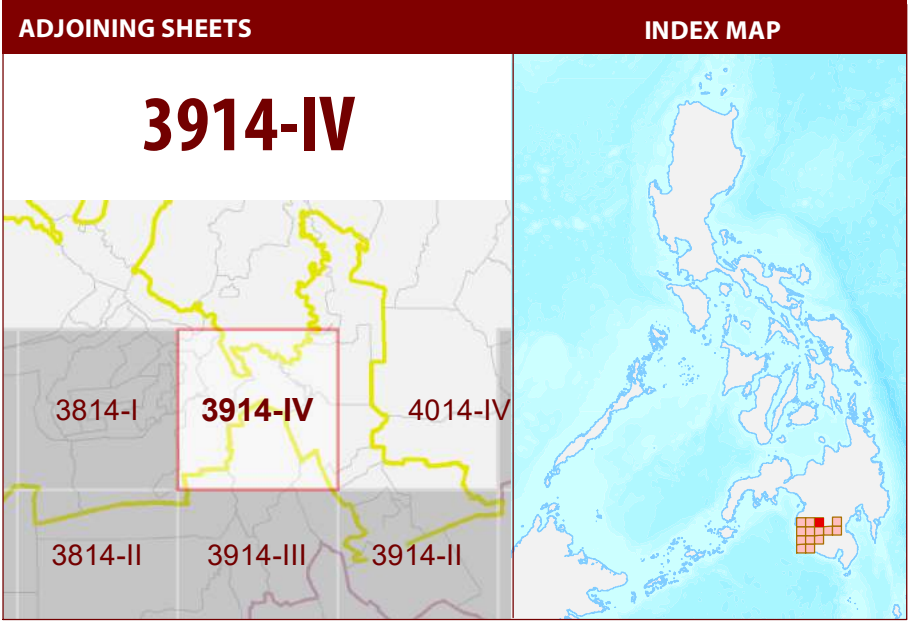
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- OTHER SIGNS**
- NGP Areas
 - Cacao
 - Land limitation
 - Land use

- CONVENTIONAL SIGNS**
- | | | |
|--------------|-----------------|---------------------|
| ROADS | BOUNDARY | HYDROLOGY |
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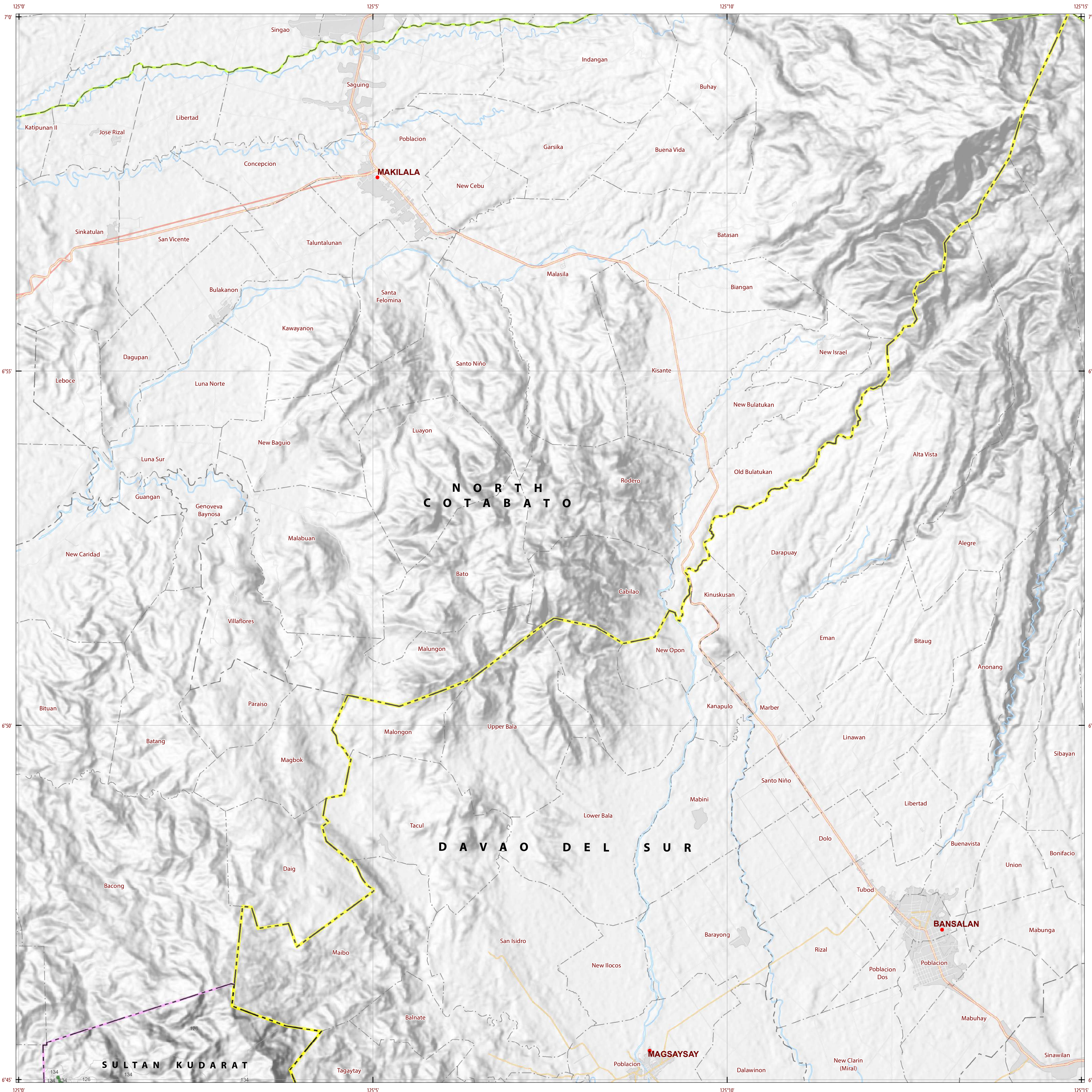
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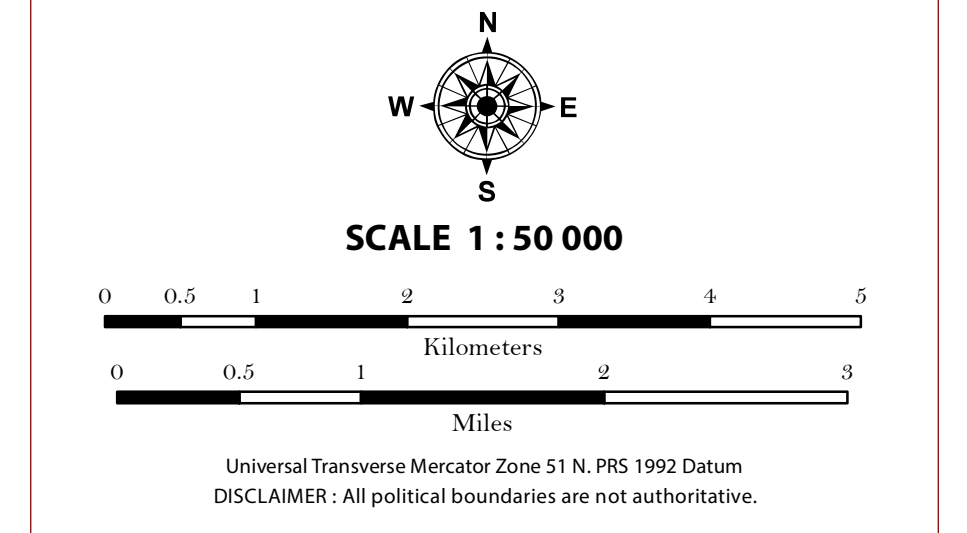
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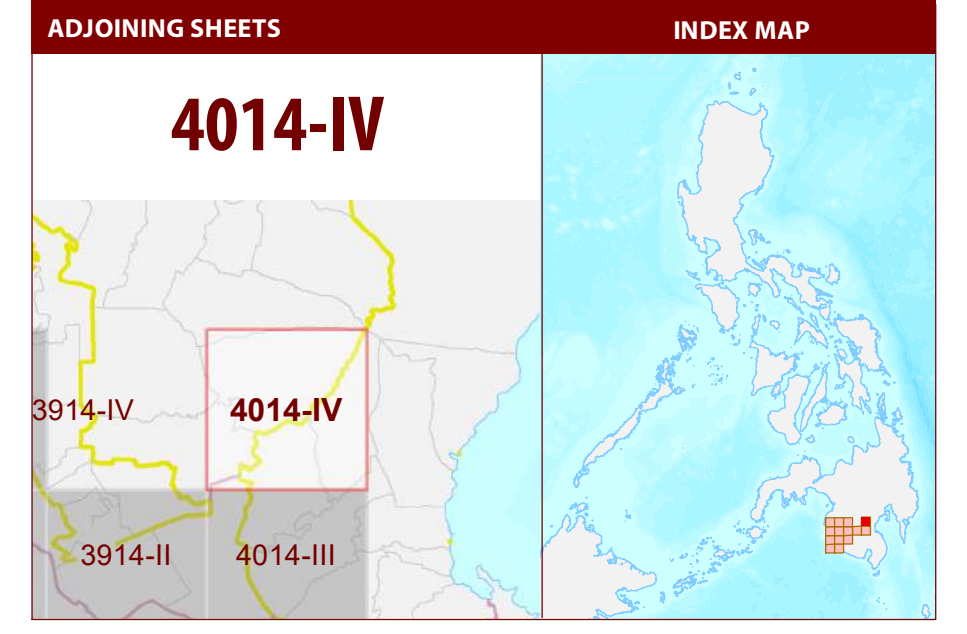
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LAND SUITABILITY MAP CACAO

**LAND RESOURCES EVALUATION AND SUITABILITY
ASSESSMENT OF STRATEGIC PRODUCTION AREAS**

SCALE 1 : 50 000

0 0.5 1 2 3 4 5
Kilometers

0 0.5 1 2 3
Miles

Universal Transverse Mercator Zone 51 N, PRS 1992 Datum
DISCLAIMER: All political boundaries are not authoritative.

LEGEND

SUITABILITY CLASSES

- S1 Highly Suitable** - Land having no significant limitations to sustained application of a given use, or only minor limitations that will not significantly reduce productivity or benefits and will not raise inputs above an acceptable level.
- S2 Moderately Suitable** - Land having limitations which in aggregate are moderately severe for sustained application of a given use; the limitations will reduce productivity or benefits and increase required inputs to the extent that the overall advantage to be gained from the use, although still attractive, will be appreciably inferior to that expected on class S1 land.
- S3 Marginally Suitable** - Land having limitations which in aggregate are severe for sustained application of a given use and will so reduce productivity or benefits, or increase required inputs, that this expenditure will be only marginally justified.

Not Suitable/ Not Relevant

OTHER SIGNS

- NGP Areas
- Cacao
- Land limitation
- Land use

CONVENTIONAL SIGNS

ROADS	BOUNDARY	HYDROLOGY
Expressway	Region	Sea / Shoreline
Trunk line	Province	Lakes / Rivers
Primary	District	PLACES
Secondary	Municipality	★ Capital City / City
Tertiary	Barangay	● Capital Town / Town

LAND USE

- Built-up
- Fishpond
- Mangrove

ADJOINING SHEETS

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MISCELLANEOUS INFORMATION

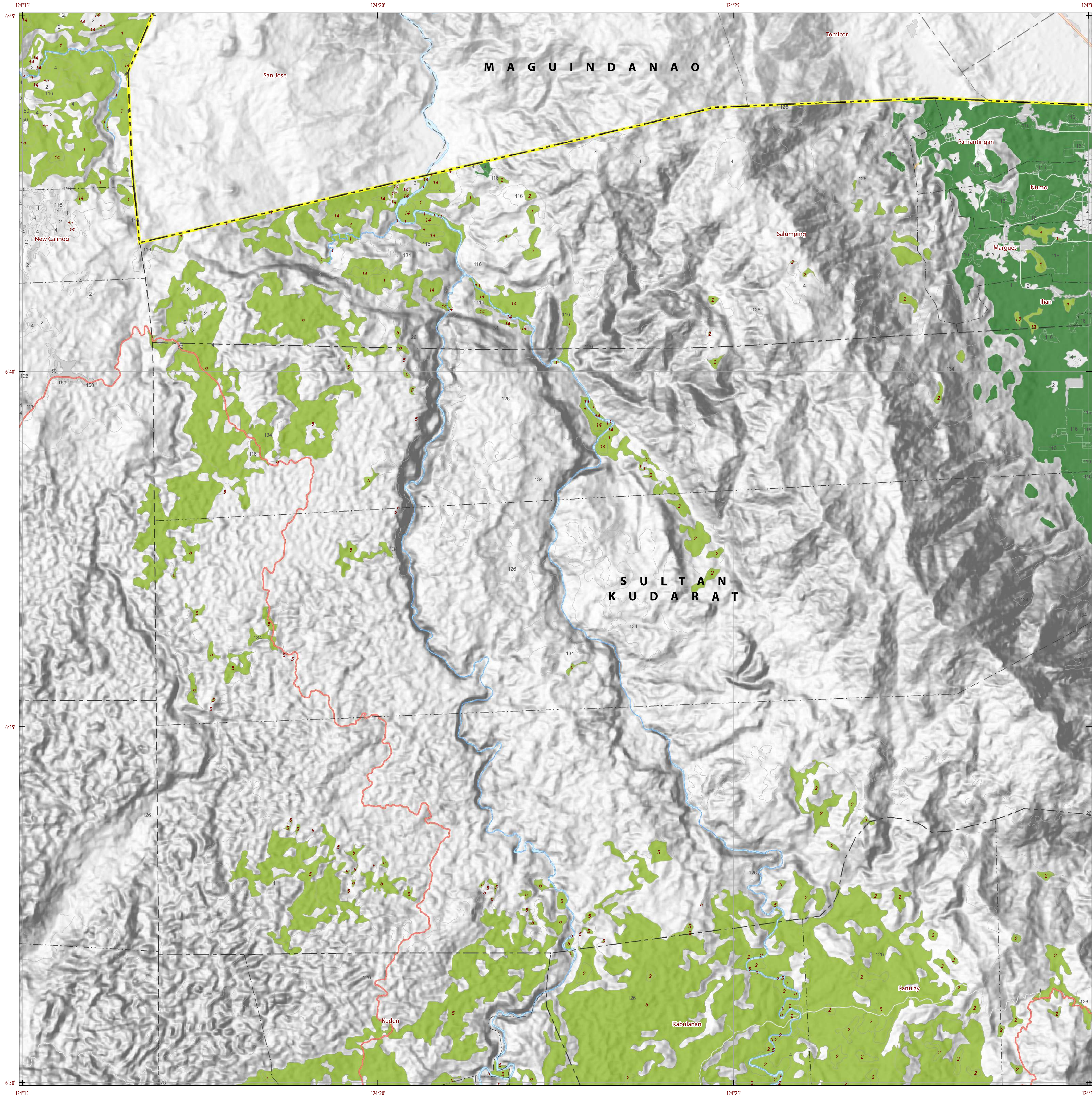
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Project Leader : BERNARDO B. PASCUA
GIS and Cartography : IRWIN K. SAMALCA

Funding Agency : Department of Agriculture - Bureau of Agricultural Research (DA-BAR)
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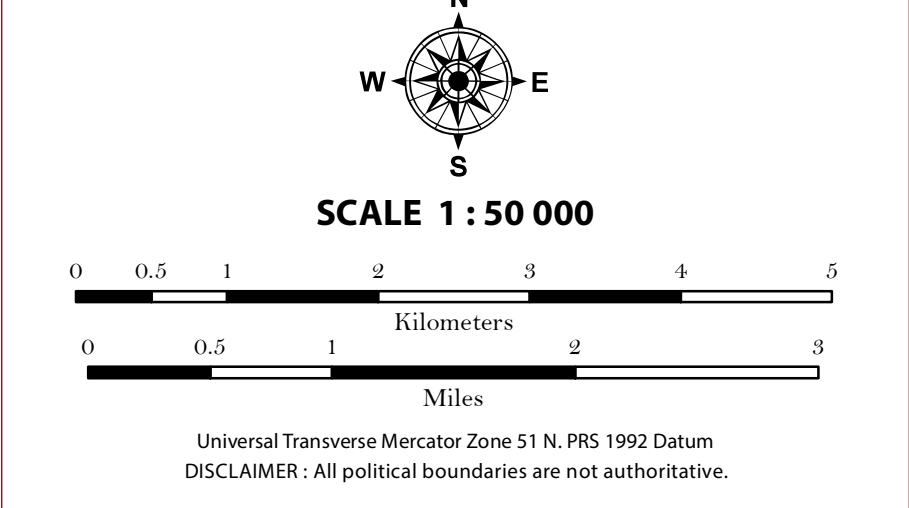
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LAND SUITABILITY MAP CACAO

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS



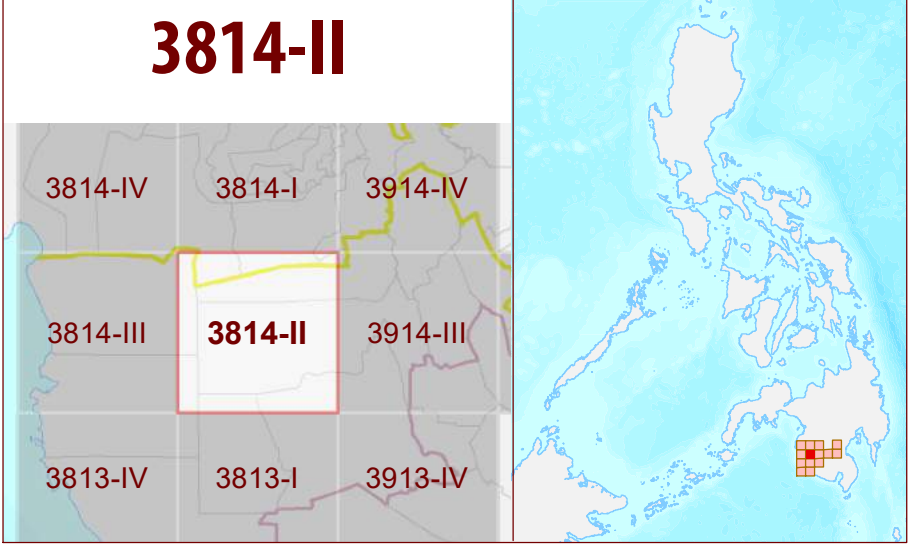
LEGEND

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 - Not Suitable/ Not Relevant**
- OTHER SIGNS**
- NGP Areas
 - Cacao
 - Land limitation
 - Land use

CONVENTIONAL SIGNS

- ROADS**
- Expressway
 - Trunk line
 - Primary
 - Secondary
 - Tertiary
- BOUNDARY**
- Region
 - Province
 - District
 - Municipality
 - Barangay
- HYDROLOGY**
- Sea / Shoreline
 - Lakes / Rivers
- PLACES**
- Capital City / City
 - Capital Town / Town
- LAND USE**
- Built-up
 - Fishpond
 - Mangrove

ADJOINING SHEETS



MISCELLANEOUS INFORMATION

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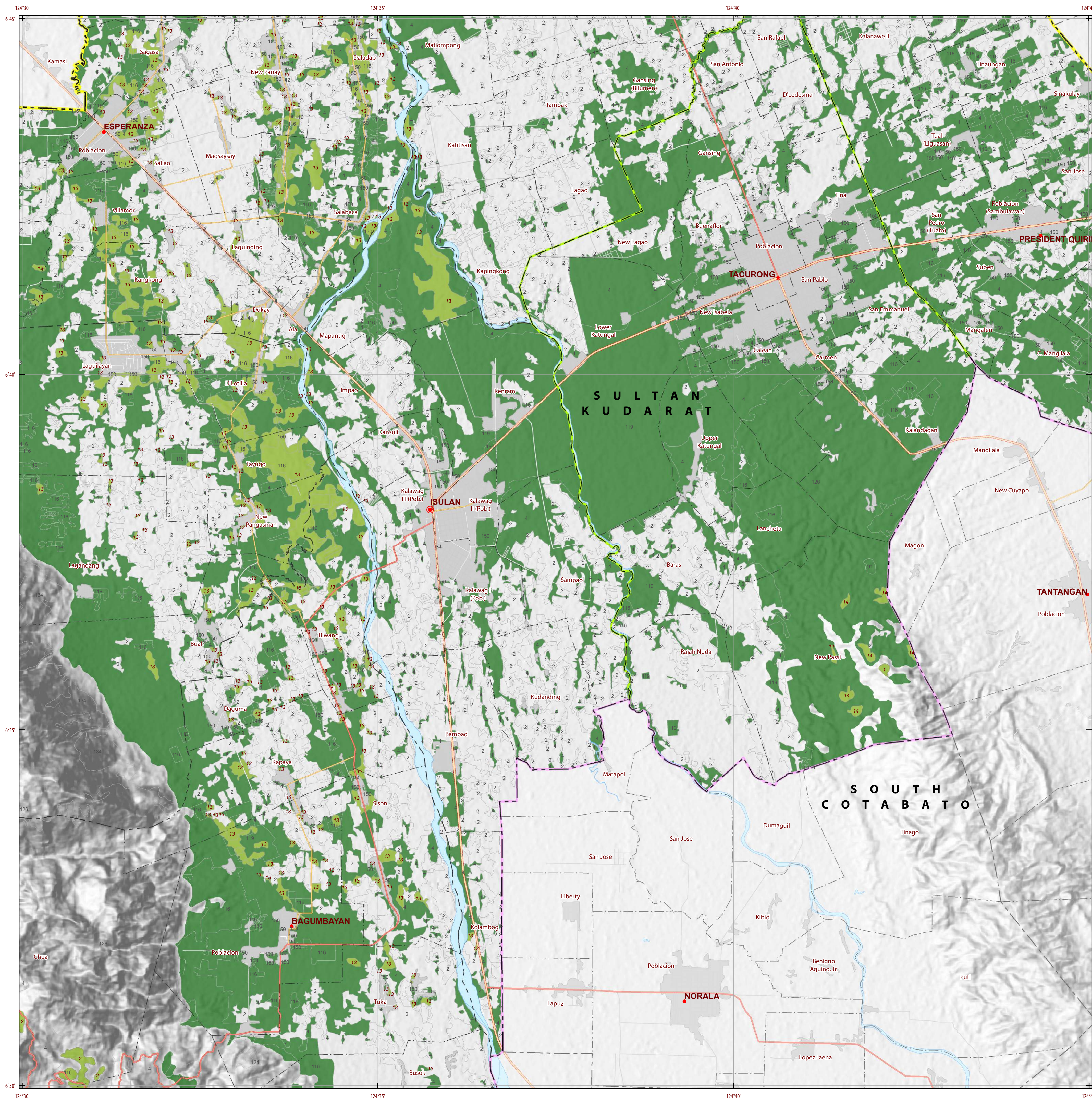
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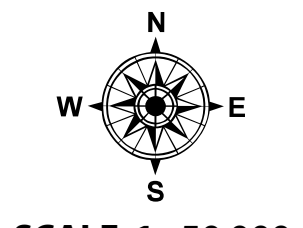
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LAND SUITABILITY MAP CACAO

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS

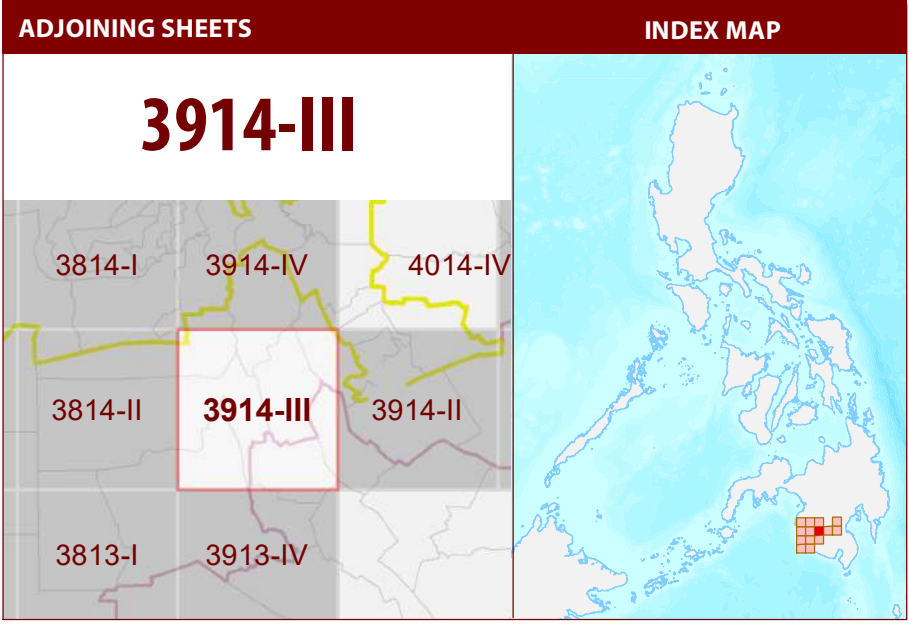


Universal Transverse Mercator Zone 51 N, PRS 1992 Datum
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- OTHER SIGNS**
- NGP Areas
 - Cacao
 - Land limitation
 - Land use

- CONVENTIONAL SIGNS**
- | ROADS | BOUNDARY | HYDROLOGY |
|------------|--------------|-----------------------|
| Expressway | Region | Sea / Shoreline |
| Trunk line | Province | Lakes / Rivers |
| Primary | District | PLACES |
| Secondary | Municipality | ★ Capital City / City |
| Tertiary | Barangay | ● Capital Town / Town |
- LAND USE**
- Built-up
 - Fishpond
 - Mangrove



MISCELLANEOUS INFORMATION

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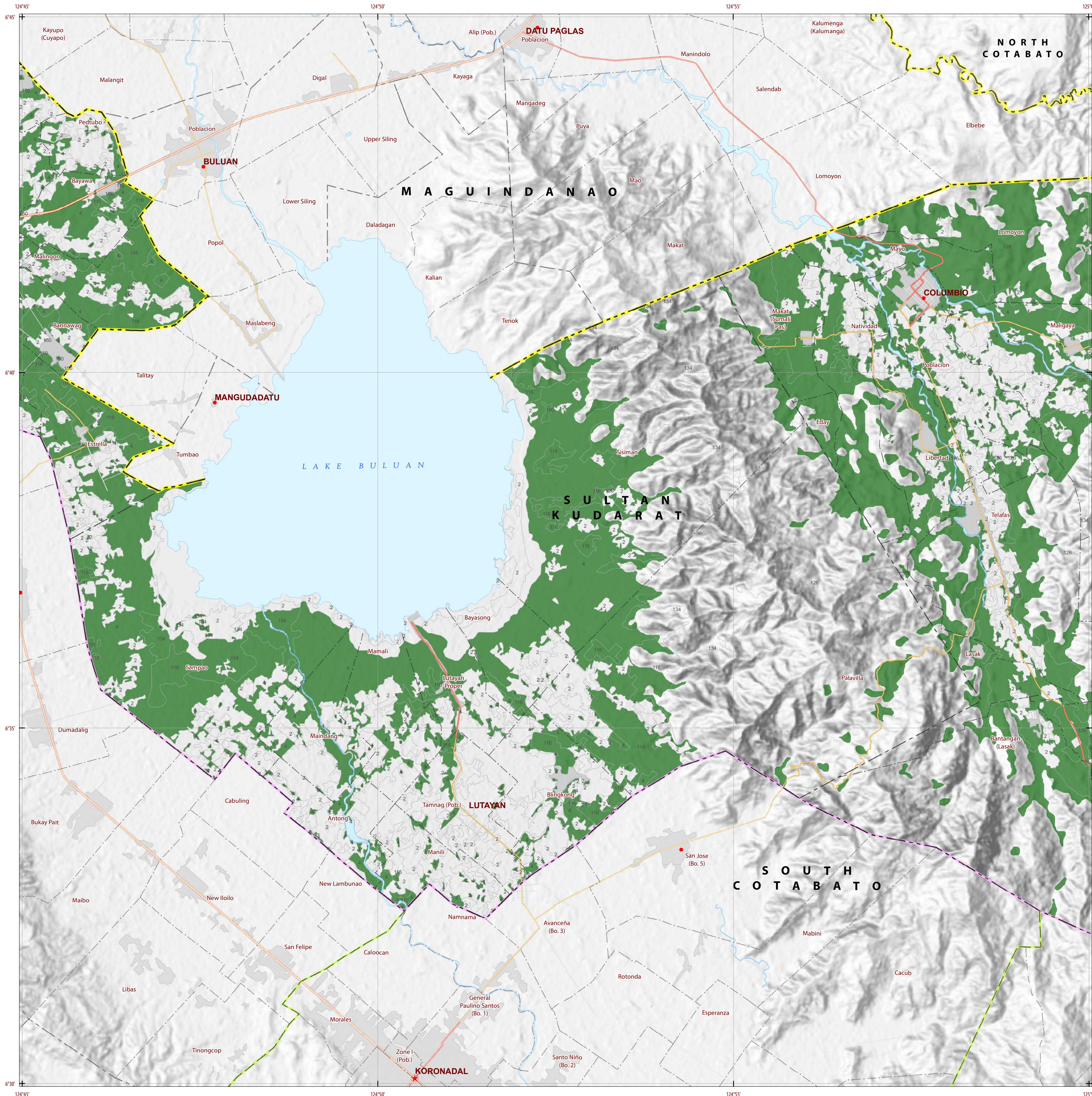
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LAND SUITABILITY MAP CACAO

**LAND RESOURCES EVALUATION AND SUITABILITY
ASSESSMENT OF STRATEGIC PRODUCTION AREAS**

SCALE 1 : 50 000

0 0.5 1 2 3 4 5
Kilometers

0 0.5 1 2 3
Miles

Universal Transverse Mercator Zone 51 N, PRS 1992 Datum
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LEGEND

SUITABILITY CLASSES

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OTHER SIGNS

- NGP Areas
- Cacao
- Land limitation
- Land use

CONVENTIONAL SIGNS

ROADS	BOUNDARY	HYDROLOGY
Expressway	Region	Sea / Shoreline
Trunk line	Province	Lakes / Rivers
Primary	District	PLACES
Secondary	Municipality	★ Capital City / City
Tertiary	Barangay	● Capital Town / Town

LAND USE

- Built-up
- Fishpond
- Mangrove

ADJOINING SHEETS

3914-II

INDEX MAP

MISCELLANEOUS INFORMATION

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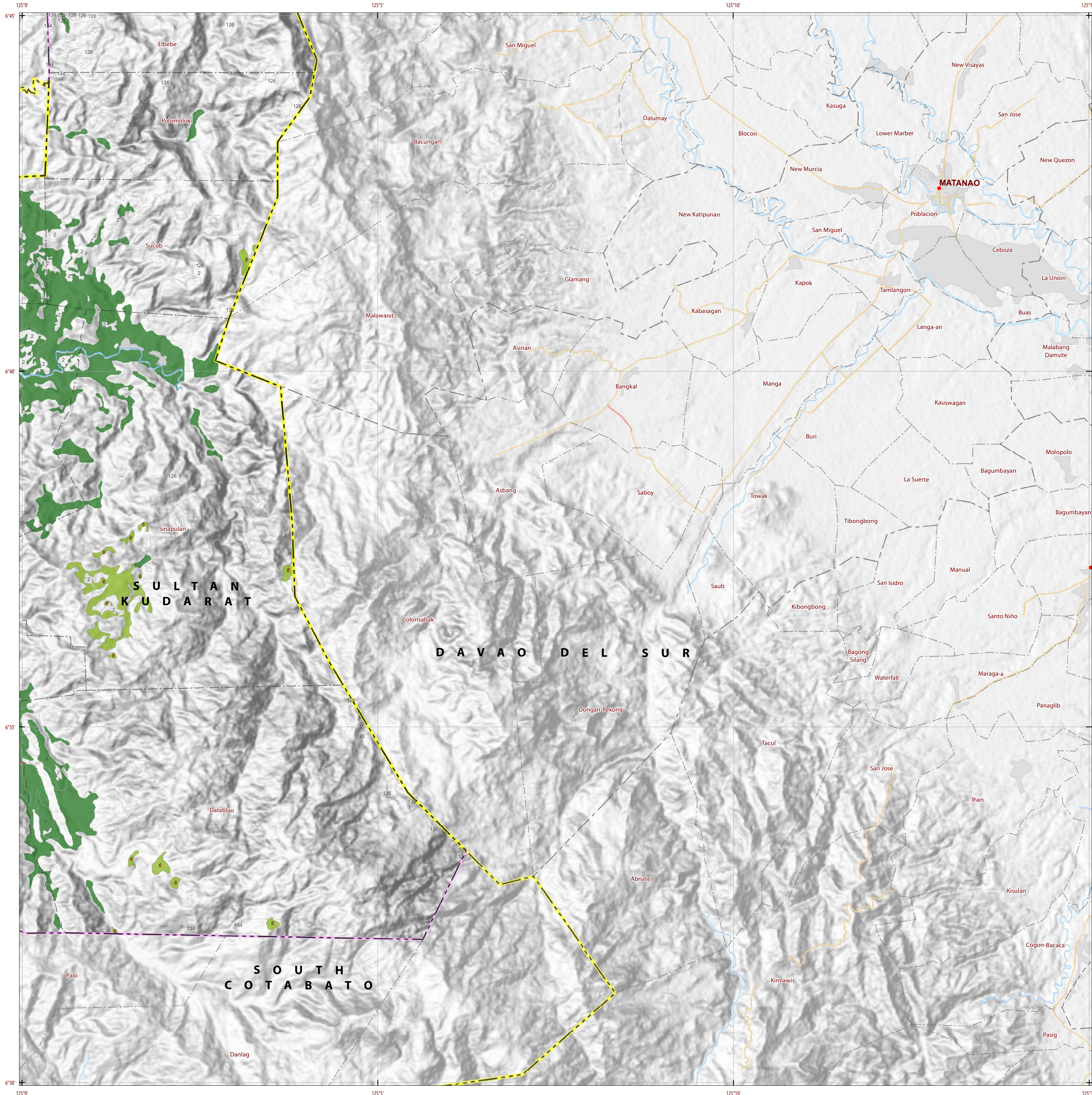
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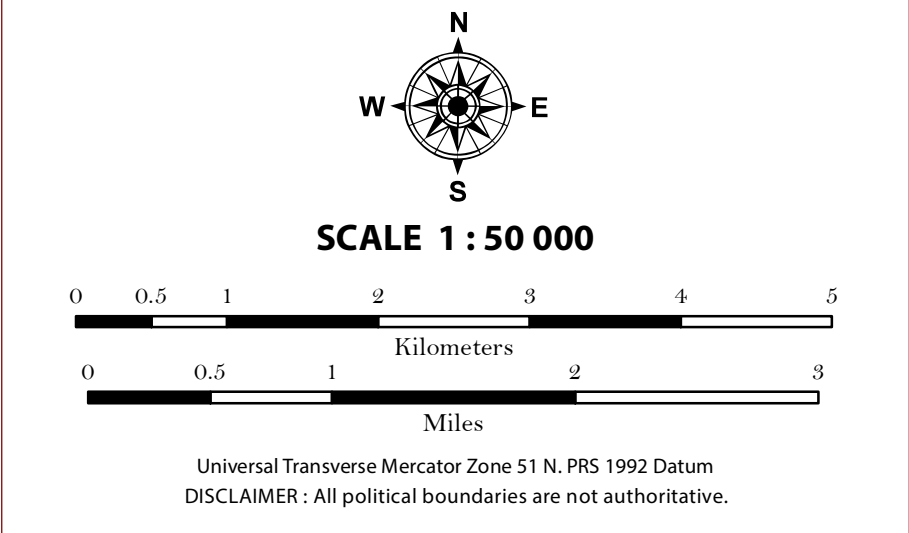
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PROVINCE OF SULTAN KUDARAT Sheet 8 of 14 Sheet No. 3914-II



LAND SUITABILITY MAP CACAO

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS



LEGEND

SUITABILITY CLASSES

- S1 Highly Suitable** - Land having no significant limitations to sustained application of a given use, or only minor limitations that will not significantly reduce productivity or benefits and will not raise inputs above an acceptable level.
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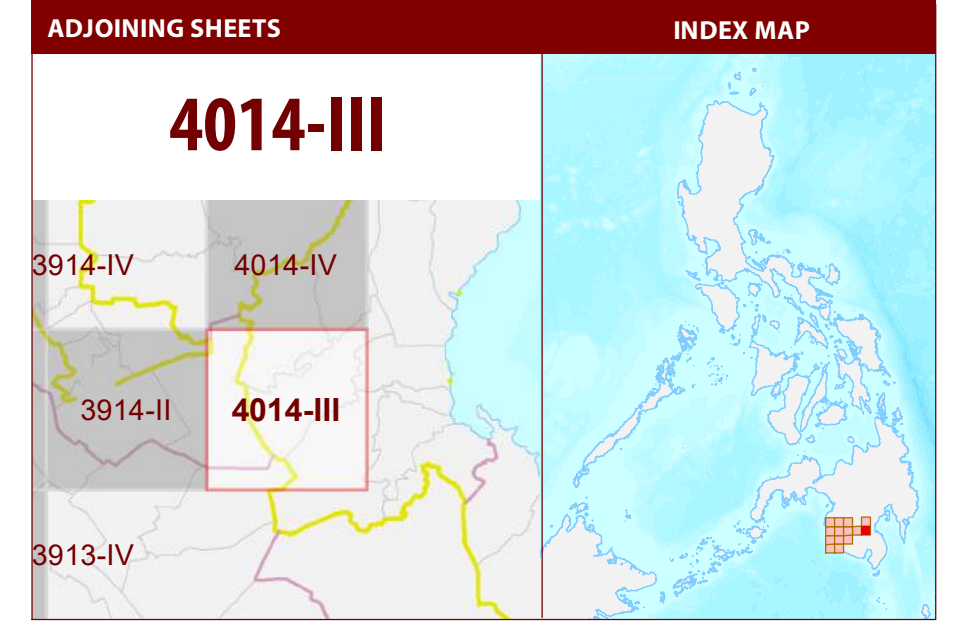
Not Suitable/ Not Relevant

OTHER SIGNS

- NGP Areas
- Cacao
- Land limitation
- Land use

CONVENTIONAL SIGNS

ROADS	BOUNDARY	HYDROLOGY
Expressway	Region	Sea / Shoreline
Trunk line	Province	Lakes / Rivers
Primary	District	PLACES
Secondary	Municipality	★ Capital City / City
Tertiary	Barangay	● Capital Town / Town
LAND USE		
Built-up	Fishpond	Mangrove



MISCELLANEOUS INFORMATION

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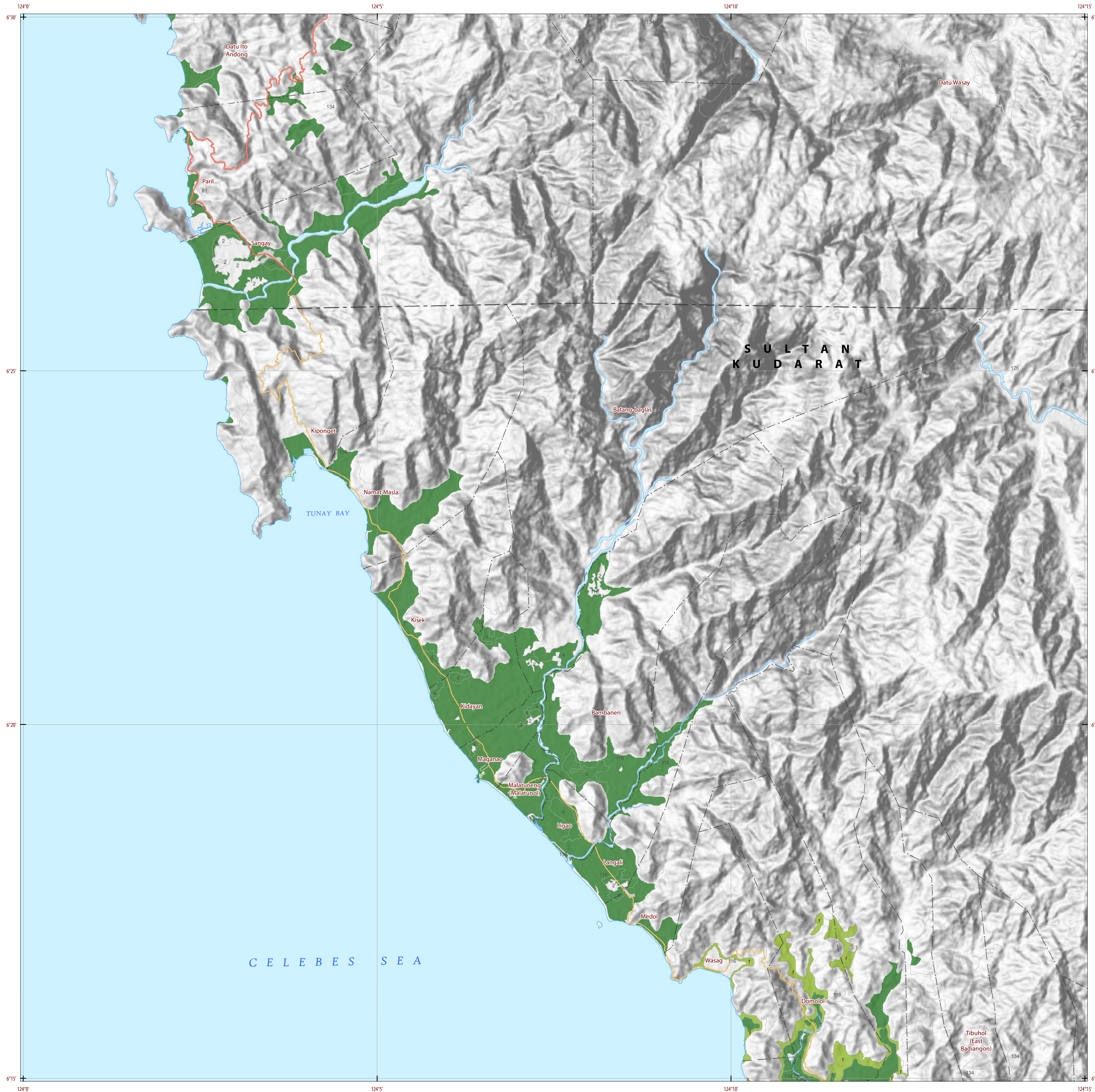
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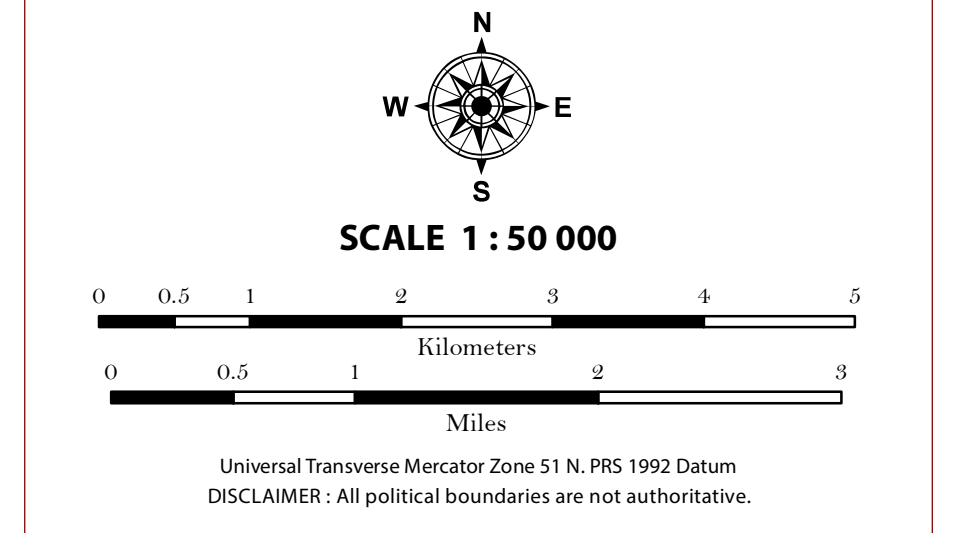
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LAND SUITABILITY MAP CACAO

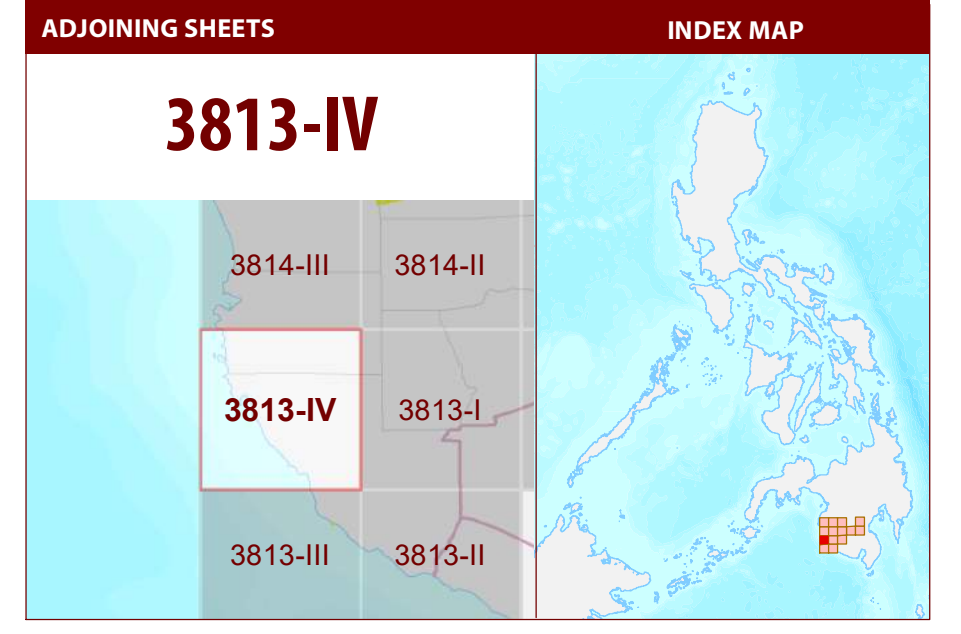
LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS



LEGEND

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- OTHER SIGNS**
- NGP Areas
 - Cacao
 - Land limitation
 - Land use

- CONVENTIONAL SIGNS**
- | | | |
|--------------|-----------------|-----------------------|
| ROADS | BOUNDARY | HYDROLOGY |
| Expressway | Region | Sea / Shoreline |
| Trunk line | Province | Lakes / Rivers |
| Primary | District | PLACES |
| Secondary | Municipality | ★ Capital City / City |
| Tertiary | Barangay | ● Capital Town / Town |
- LAND USE**
- Built-up
 - Fishpond
 - Mangrove



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LAND SUITABILITY MAP CACAO

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS

Scale and orientation information:

N
W E
S

SCALE 1 : 50 000

0 0.5 1 2 3 4 5
Kilometers

0 0.5 1 2 3
Miles

Universal Transverse Mercator Zone 51 N, PRS 1992 Datum
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OTHER SIGNS

- NGP Areas
- Cacao
- Land limitation
- Land use

CONVENTIONAL SIGNS

ROADS

- Expressway
- Trunk line
- Primary
- Secondary
- Tertiary

BOUNDARY

- Region
- Province
- District
- Municipality
- Barangay

HYDROLOGY

- Sea / Shoreline
- Lakes / Rivers

PLACES

- Capital City / City
- Capital Town / Town

LAND USE

- Built-up
- Fishpond
- Mangrove

ADJOINING SHEETS

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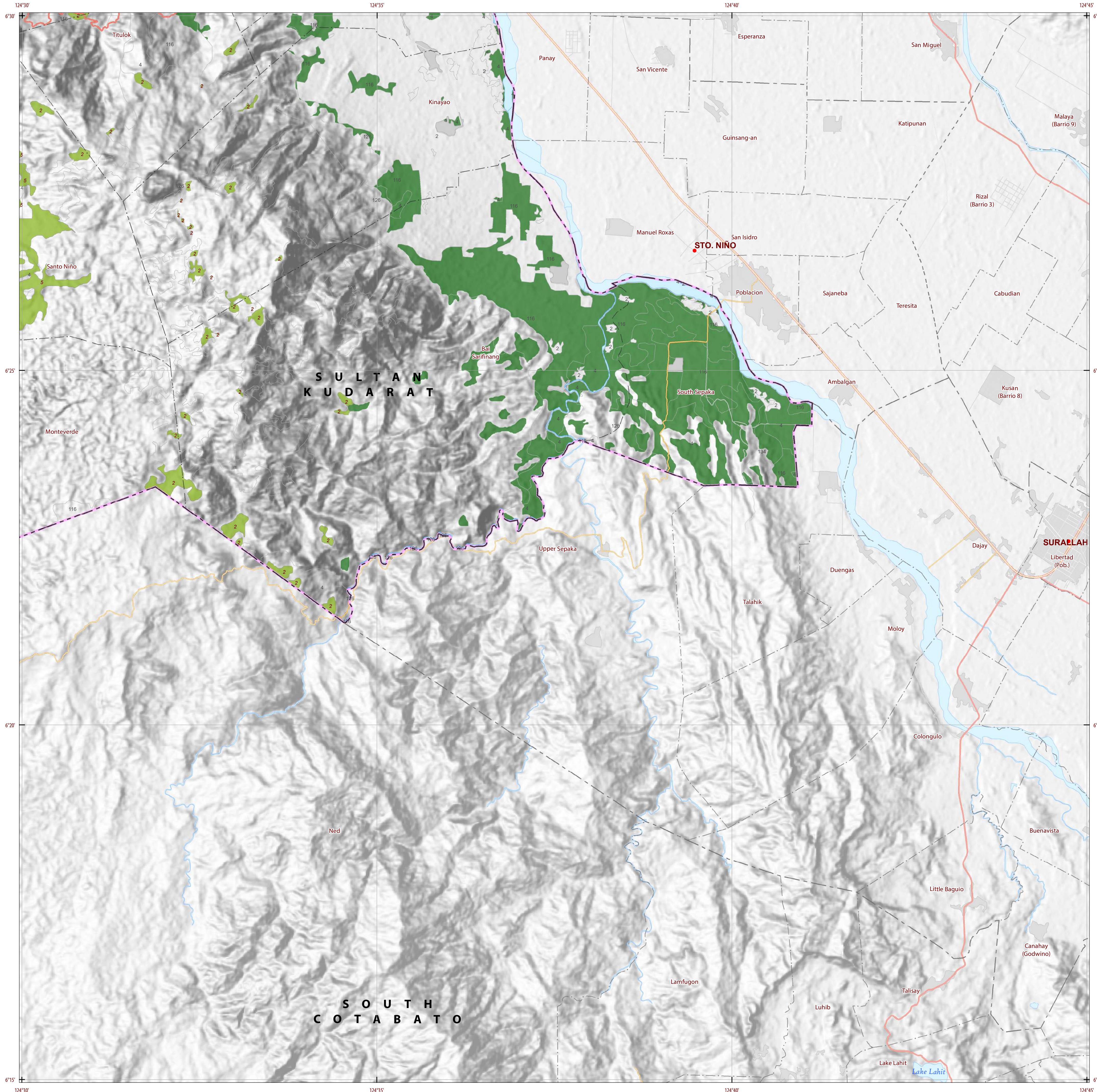
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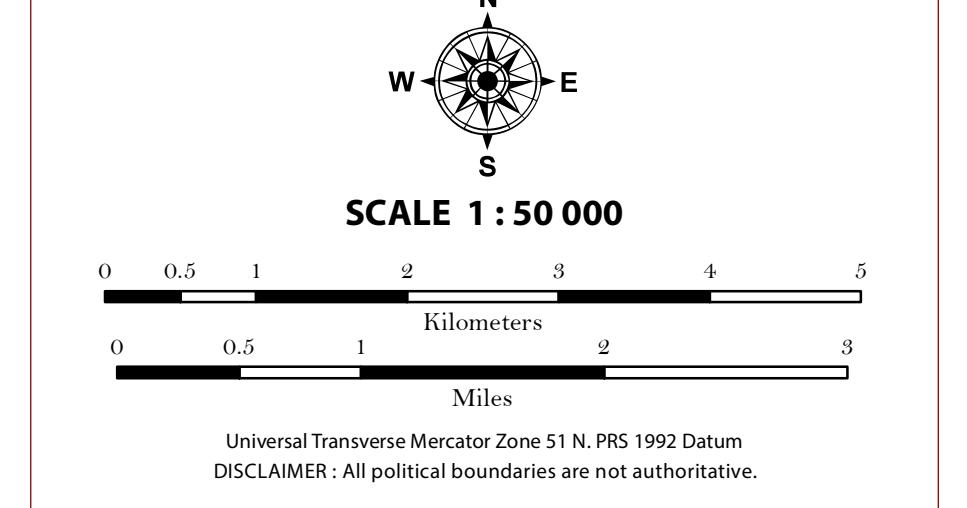
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LAND SUITABILITY MAP CACAO

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LEGEND

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OTHER SIGNS

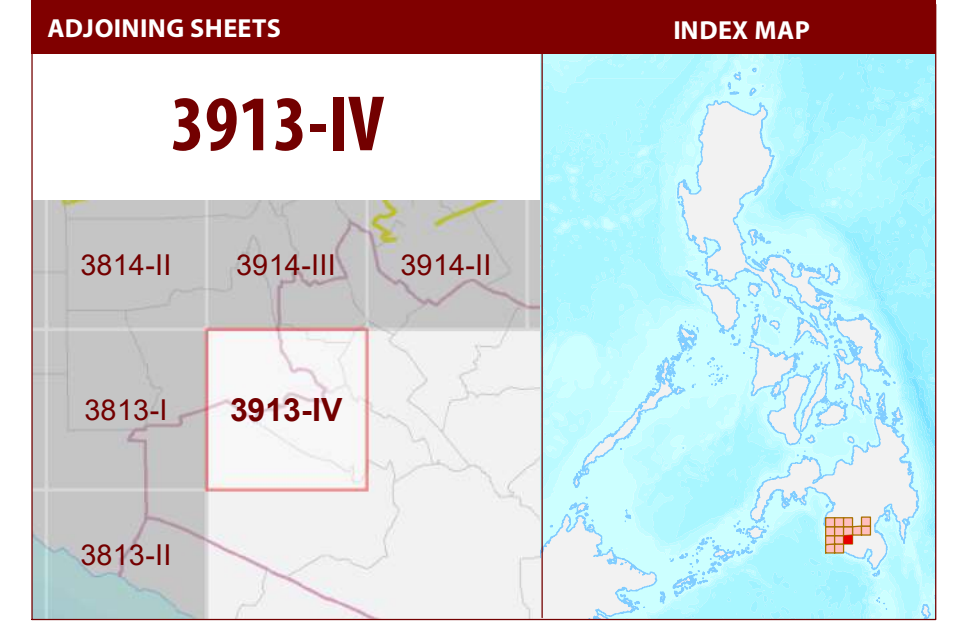
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CONVENTIONAL SIGNS

ROADS	BOUNDARY	HYDROLOGY
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LAND USE

- Built-up
- Fishpond
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MISCELLANEOUS INFORMATION

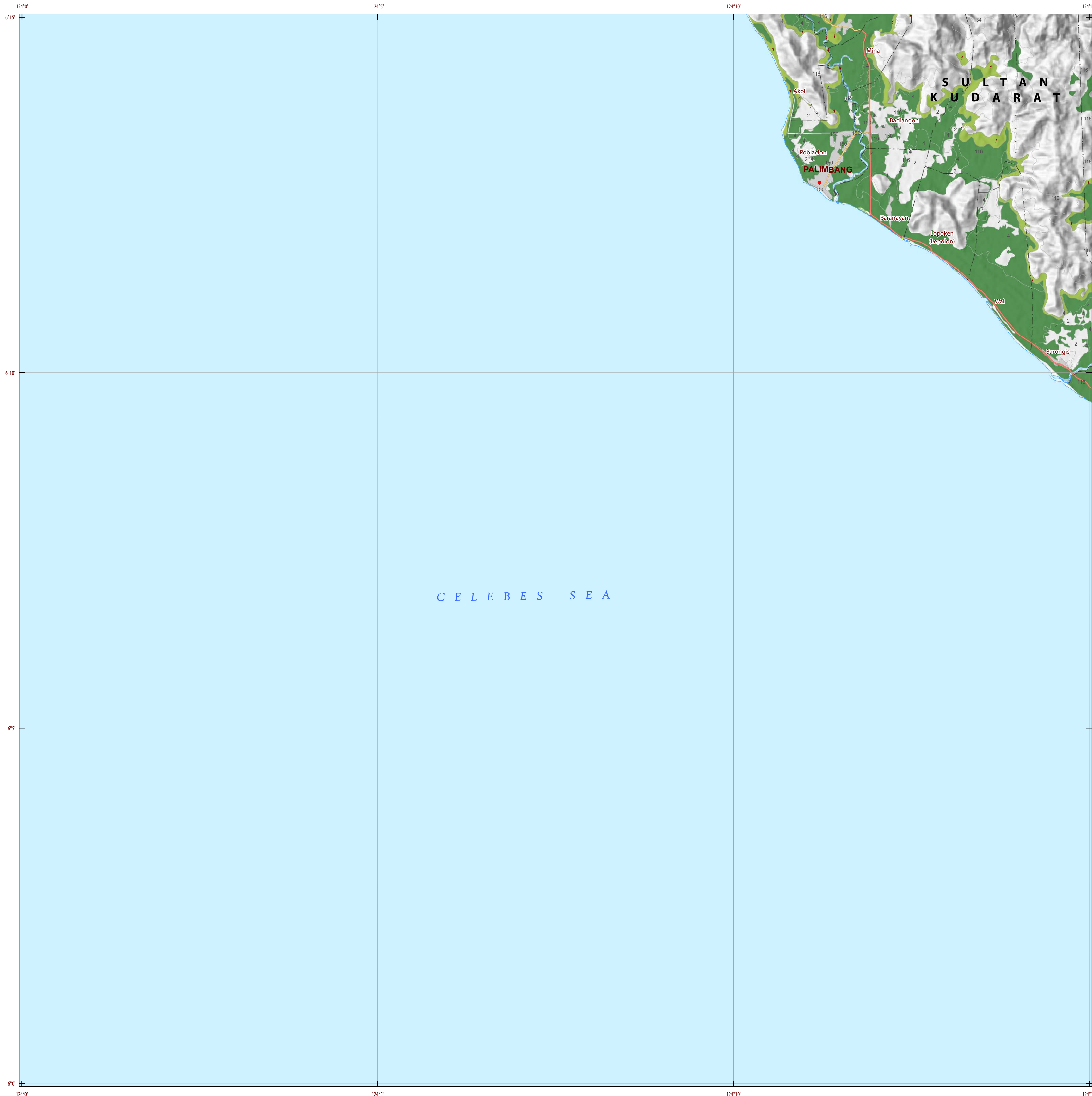
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GIS and Cartography : IRWIN K. SAMALCA

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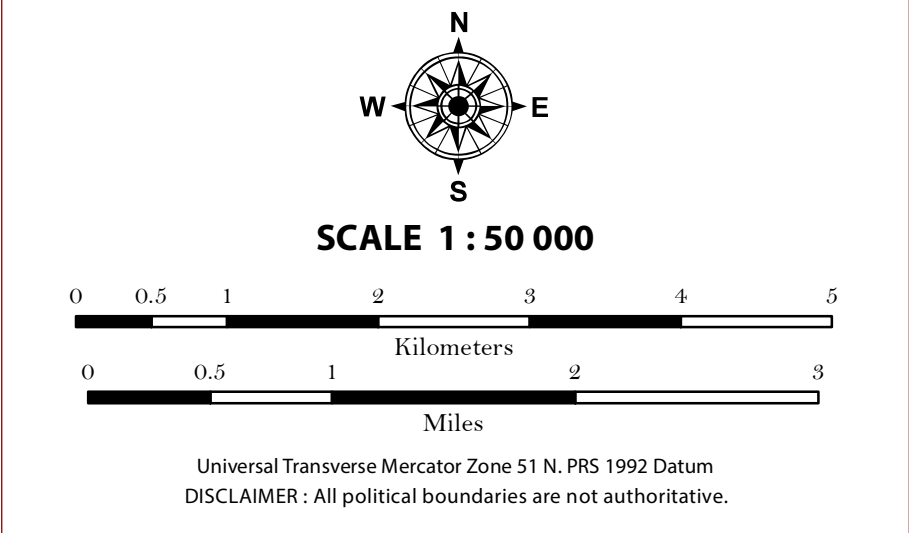
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LAND SUITABILITY MAP CACAO

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS



LEGEND

SUITABILITY CLASSES

- S1 Highly Suitable** - Land having no significant limitations to sustained application of a given use, or only minor limitations that will not significantly reduce productivity or benefits and will not raise inputs above an acceptable level.
- S2 Moderately Suitable** - Land having limitations which in aggregate are moderately severe for sustained application of a given use; the limitations will reduce productivity or benefits and increase required inputs to the extent that the overall advantage to be gained from the use, although still attractive, will be appreciably inferior to that expected on class S1 land.
- S3 Marginally Suitable** - Land having limitations which in aggregate are severe for sustained application of a given use and will so reduce productivity or benefits, or increase required inputs, that this expenditure will be only marginally justified.

Not Suitable/ Not Relevant

OTHER SIGNS

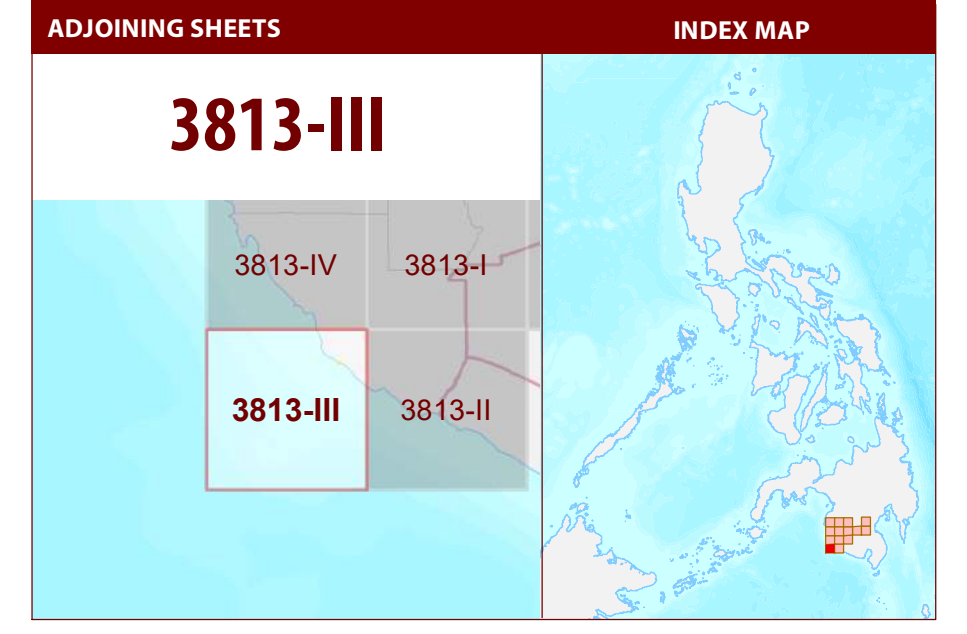
- NGP Areas
- Cacao
- Land limitation
- Land use

CONVENTIONAL SIGNS

ROADS	BOUNDARY	HYDROLOGY
Expressway	Region	Sea / Shoreline
Trunk line	Province	Lakes / Rivers
Primary	District	PLACES
Secondary	Municipality	★ Capital City / City
Tertiary	Barangay	● Capital Town / Town

LAND USE

- Built-up
- Fishpond
- Mangrove



MISCELLANEOUS INFORMATION

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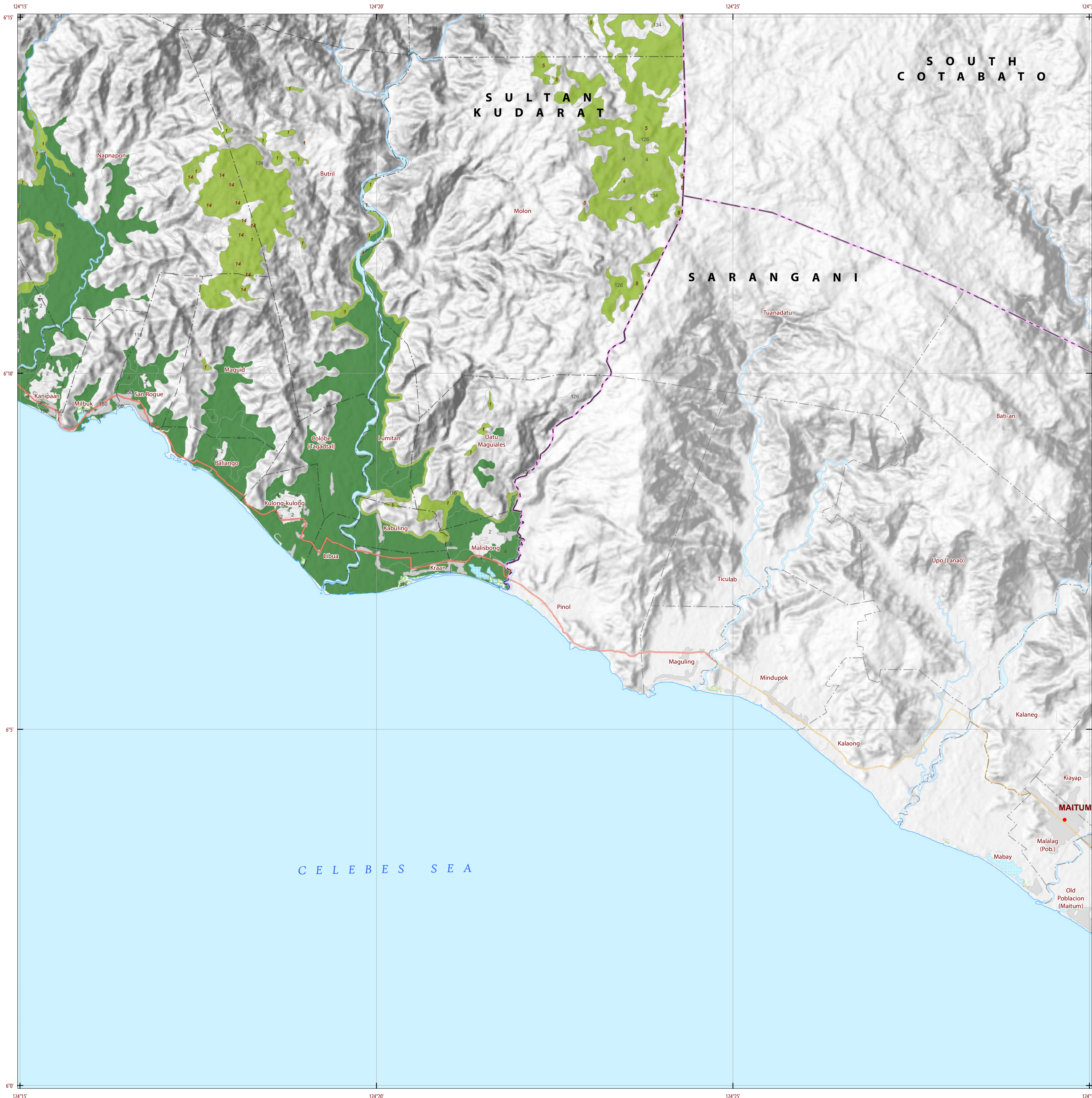
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DEPARTMENT OF AGRICULTURE 1898

LAND SUITABILITY MAP CACAO

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS

SCALE 1 : 50 000

0 0.5 1 2 3 4 5 Kilometers

0 0.5 1 2 Miles

Universal Transverse Mercator Zone 51 N, PRS 1992 Datum
DISCLAIMER: All political boundaries are not authoritative.

LEGEND

SUITABILITY CLASSES

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LAND USE

- Built-up
- Fishpond
- Mangrove

ADJOINING SHEETS

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3813-III 3813-II

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MISCELLANEOUS INFORMATION

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