

LAND SUITABILITY MAP

ARABICA COFFEE

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS

MOUNTAIN PROVINCE



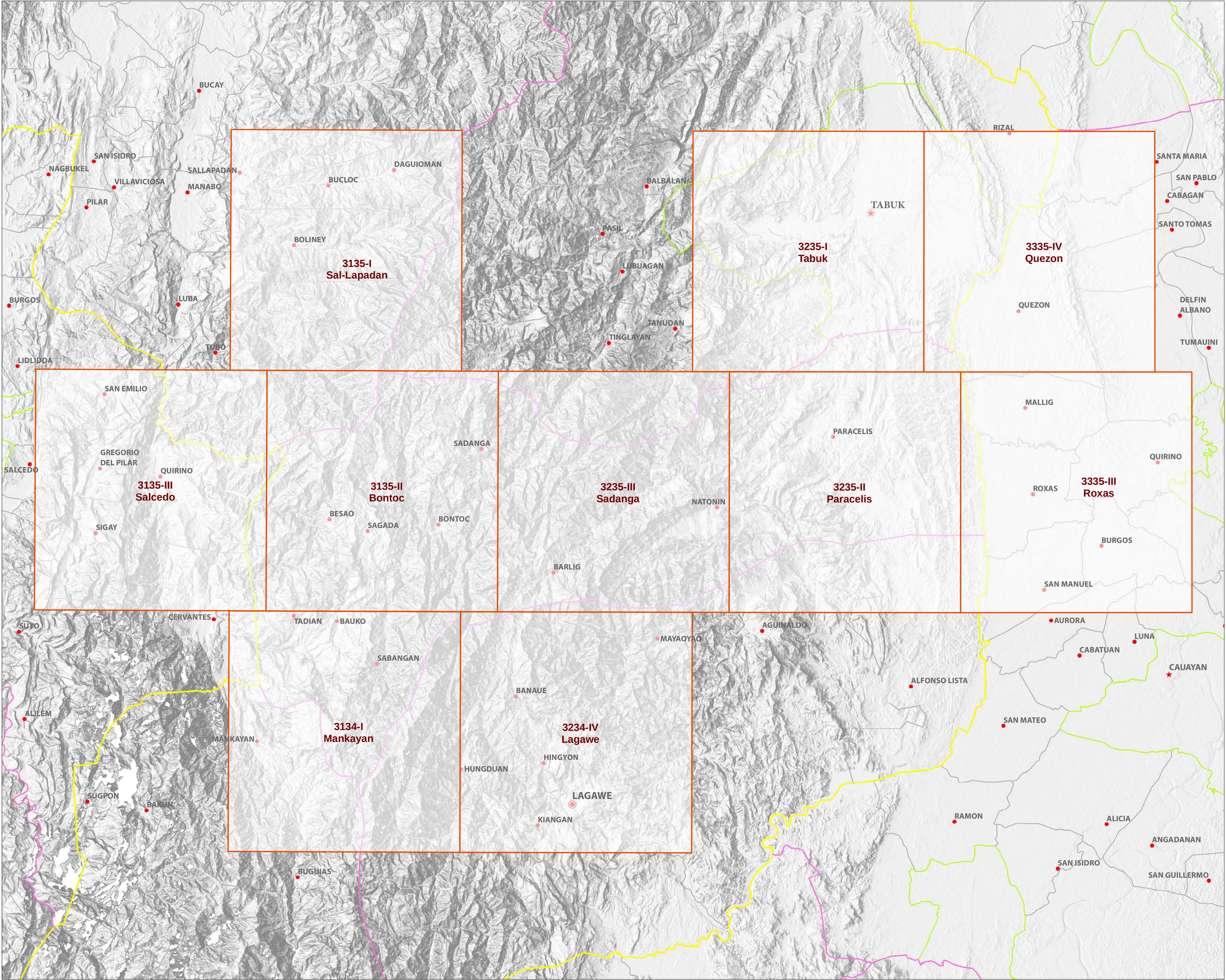
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF AGRICULTURE
BUREAU OF SOILS AND WATER MANAGEMENT

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MAP INDEX

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS

MOUNTAIN PROVINCE



LEGEND

Places

★ Capital City

★ City

● Capital Town

● Town

Administrative Boundary

Regional

Provincial

City

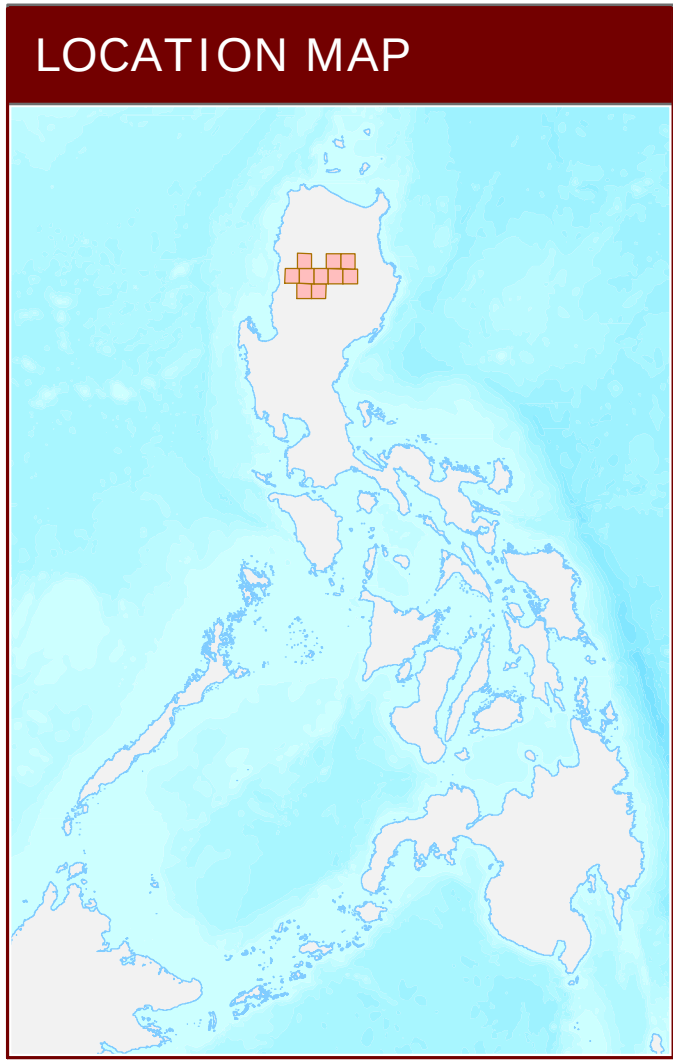
Municipal

Map Index

Index grid

Topographic Relief

Bathymetry



LAND SUITABILITY MAP FOR ARABICA COFFEE

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS MOUNTAIN PROVINCE, CAR

EXTENT OF SUITABILITY FOR ARABICA COFFEE PRODUCTION BY MUNICIPALITY

MUNICIPALITY	EXISTING COFFEE (Ha)			TOTAL EXISTING AREA (Ha)	EXPANSION AREA (Ha)						CONFLICT RESOLUTION (Ha)						TOTAL POTENTIAL EXPANSION AREA (Ha)
					Coconut		Shrubland, unmanaged*		Grassland, unmanaged*		Rice paddy, non-irrigated		Corn		Other crops		
	S1	S2	S3		S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	
BARLIG	-	-	41	41	-	-	-	2	-	4	-	-	-	-	-	-	6
BAUKO	-	2	101	103	-	-	-	49	4	125	-	1	-	-	-	-	178
BESAO	-	-	27	27	-	-	-	2	-	22	-	-	-	-	-	-	24
BONTOC	-	-	4	4	-	-	-	16	-	29	-	-	-	-	-	-	45
NATONIN	-	23	192	215	-	-	-	204	-	22	-	-	-	-	-	-	226
PARACELIS	-	36	30	66	-	-	-	51	-	51	-	-	-	-	-	-	103
SABANGAN	-	-	15	15	-	-	-	14	-	35	-	-	-	-	-	-	49
SADANGA	-	-	6	6	-	-	-	-	-	13	-	3	-	-	-	-	17
SAGADA	-	3	12	15	-	-	-	23	-	2	-	-	-	-	-	-	25
TADIAN	-	-	45	45	-	-	-	7	-	22	-	13	-	-	-	-	42
TOTAL	-	64	472	536	-	-	-	370	4	325	-	17	-	-	-	-	715

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

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 ARABICA COFFEE 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
Coffee (Arabica)	S1	<8	>100	CL, SiCL, SCL, SC, SiC, C, HC	WD,MWD	5.6 -7.2	high	none-slight	none-slight	none-few	1000-2000	2001-4500	I, III, IV
	S2	8 - 30	30 - 100	FSL, L, SiL	SPD,PD	5.1 - 5.5 7.3 - 7.8	medium	moderate	moderate	common	500-1000 2000-2500	1000-2000	I, II
	S3	>30	<30	S, LS, CSL, SL	VPD,ED	<5.0 - > 7.9	low	severe	severe	many	<500 >2500	<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 - 500 - 1000m or 2000 - 2500m E13 - < 500m or > 2500m	SOIL DRAINAGE D2 - Somewhat poorly drained to poorly drained D3 - Very poorly drained or excessively drained	SOIL DEPTH Sh2 - Shallow to moderately deep (30 - 100cm) Sh3 - Very shallow (< 30cm)	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

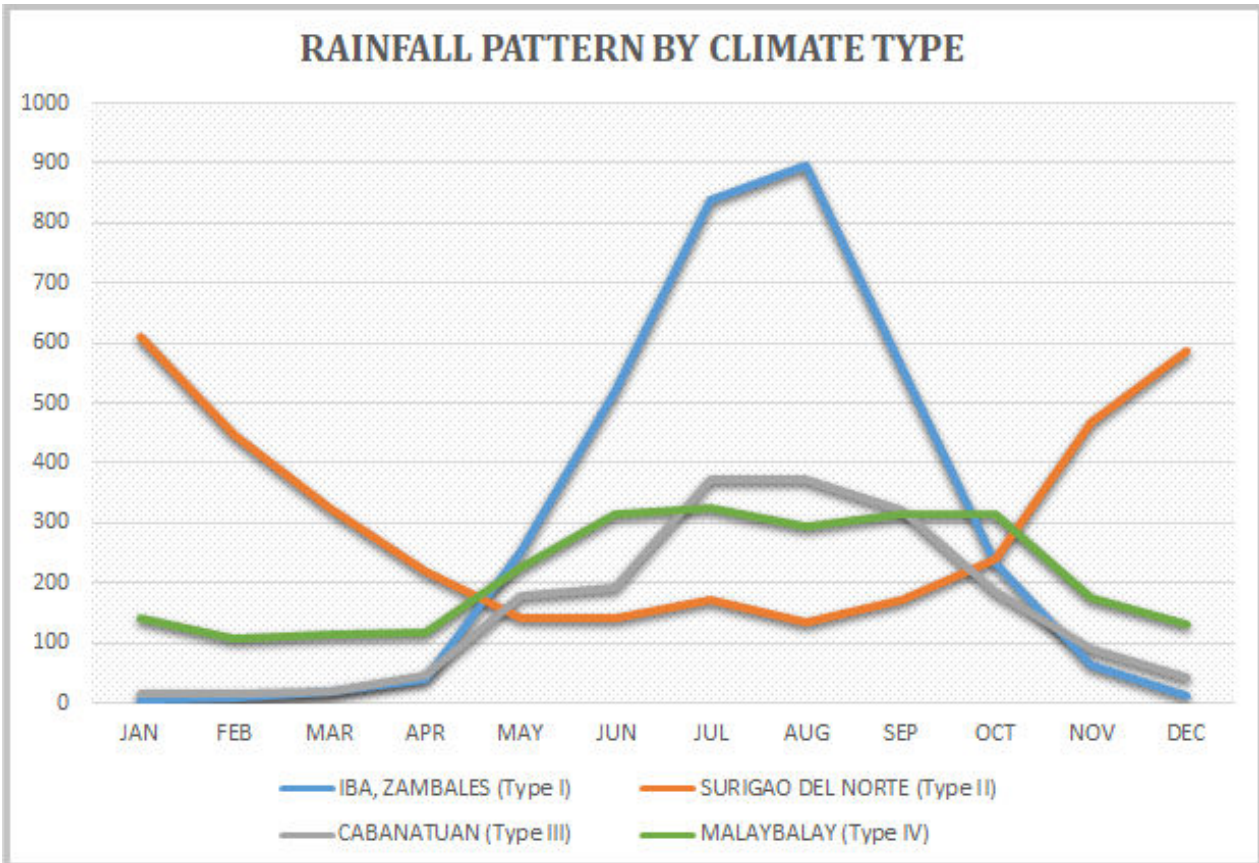
CODE	LAND LIMITATION	CODE	LAND LIMITATION	CODE	LAND LIMITATION	CODE	LAND LIMITATION
1	E3-Rc3	11	T2-E3	21	T2-E12-E3-Sh2-Rc3	31	T3-E12-E3-Rc2
2	E3-Sh2-Rc3	12	T2-E3-Rc2	22	T3	32	T3-E12-E3-Rc3
3	E12	13	T2-E3-Rc3	23	T3-E3	33	T3-E12-E3-Sh2-Rc3
4	E12-Rc2	14	T2-E3-Sh2-Rc2	24	T3-E3-Rc2	34	T3-E12-E3-Sh3-Rc2
5	E12-Sh2	15	T2-E3-Sh2-Rc3	25	T3-E3-Rc3	35	T3-E12-E3-Sh3-Rc3
6	E12-Sh2-Rc2	16	T2-E12	26	T3-E3-Sh2-Rc3		
7	Rc2	17	T2-E12-E3	27	T3-E3-Sh3-Rc2		
8	Sh2-Rc2	18	T2-E12-E3-Rc2	28	T3-E3-Sh3-Rc3		
9	Sh2-Rc3	19	T2-E12-E3-Rc3	29	T3-E12		
10	T2	20	T2-E12-E3-Sh2-Rc2	30	T3-E12-E3		

CODE	LAND USE
2	Rice paddy, non-irrigated
4	Corn
81	Coffee
82	Cacao
116	Coconut
126	Grassland
134	Shrubland, unmanaged

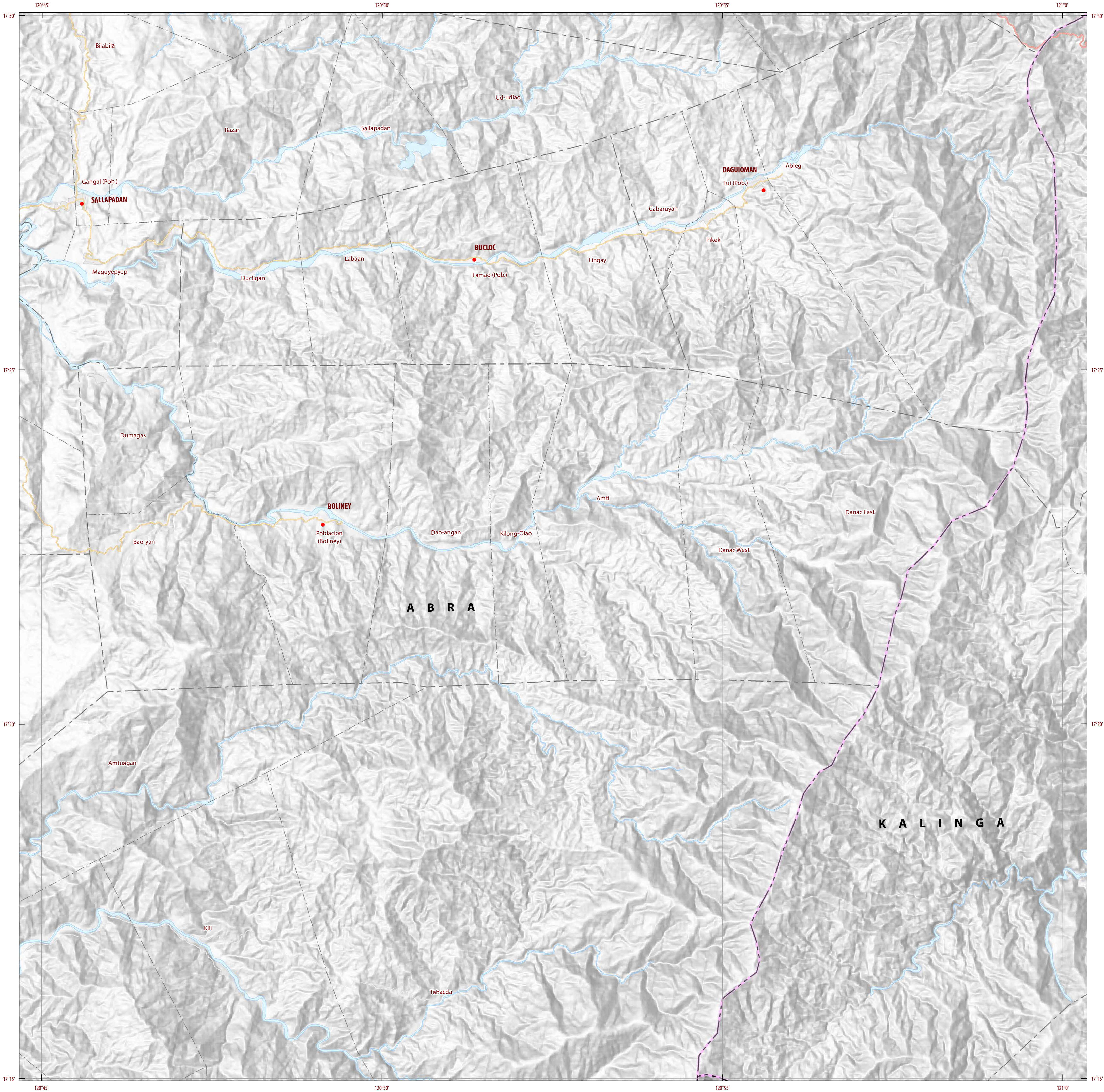
CLIMATE TYPE

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. 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.

Western part of Mountain Province belongs to Type I climate classification and the rest on Eastern part belongs to Type III.



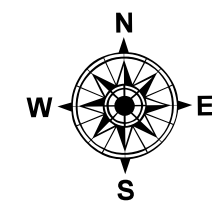
Source: PAGASA 2018, *Climatological Normals (Rainfall)*, Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), accessed 27 July 2018, <<https://www1.pagasa.dost.gov.ph/index.php/climate/climatological-normals>>.





LAND SUITABILITY MAP
ARABICA COFFEE

LAND RESOURCES EVALUATION AND SUITABILITY
ASSESSMENT OF STRATEGIC PRODUCTION AREAS



SCALE 1 : 50 000



Universal Transverse Mercator Zone 51 N, PRS 1992 Datum
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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
- Coffee
- 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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ADJOINING SHEETS

3135-I

3135-III 3135-II 3235-III

INDEX MAP

MISCELLANEOUS INFORMATION

SOURCES OF INFORMATION : Topographic information taken from NAMRIA Topographic Map at 1:50,000 scale. Land resources information from the Agricultural Land Management and Evaluation Division (ALMED), Soils Survey Division (SSD) and Laboratory Services Division (LSD) of BSWM. Rice areas obtained from the Land Use System (FAO, 2015) and Philippine Rice Information System (PRISM) (IRRI, 2015). Data analysis and compilation through the **Land Resources Evaluation and Suitability Assessment of Strategic Production Areas for Coffee and Cacao Project** implemented by BSWM (2017).

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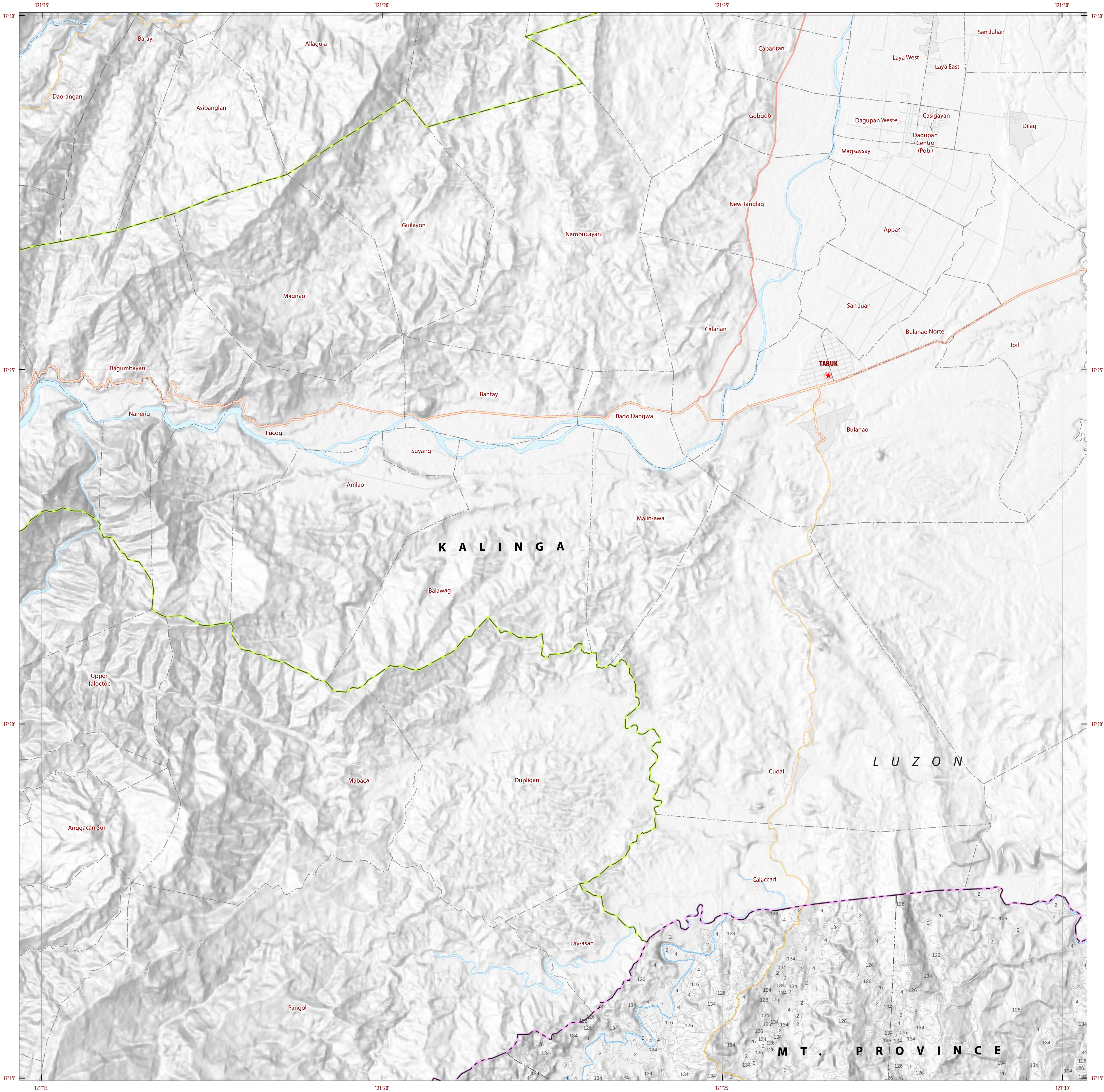
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MOUNTAIN PROVINCE

Sheet 1 of 10

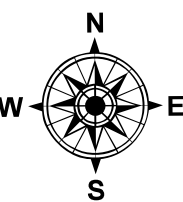
Sheet No. 3135-I





LAND SUITABILITY MAP
ARABICA COFFEE

LAND RESOURCES EVALUATION AND SUITABILITY
ASSESSMENT OF STRATEGIC PRODUCTION AREAS



SCALE 1 : 50 000

00.512345

Kilometers

00.5123

Miles

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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.

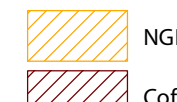
S3

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.

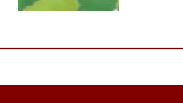
Not Suitable/ Not Relevant

OTHER SIGNS

NGP Areas

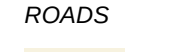
Coffee

Land limitation

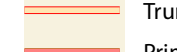
Land use

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

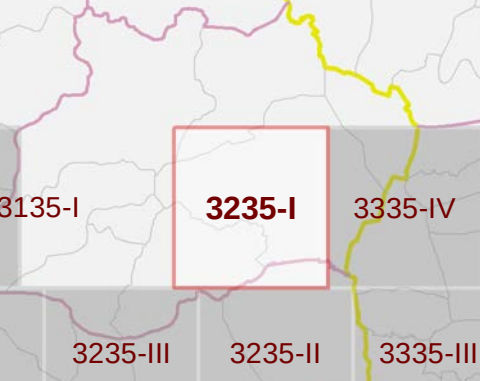
Built-up

Fishpond

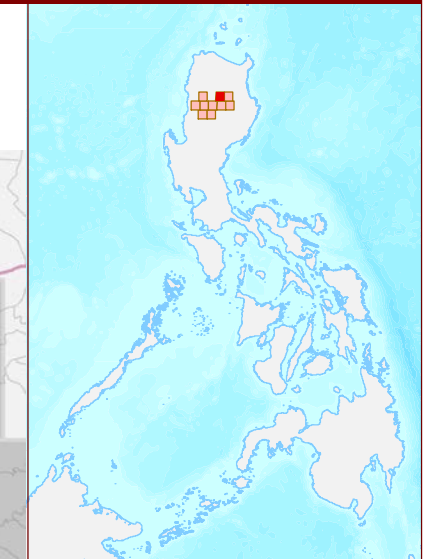
Mangrove

ADJOINING SHEETS

3235-I



INDEX MAP



MISCELLANEOUS INFORMATION

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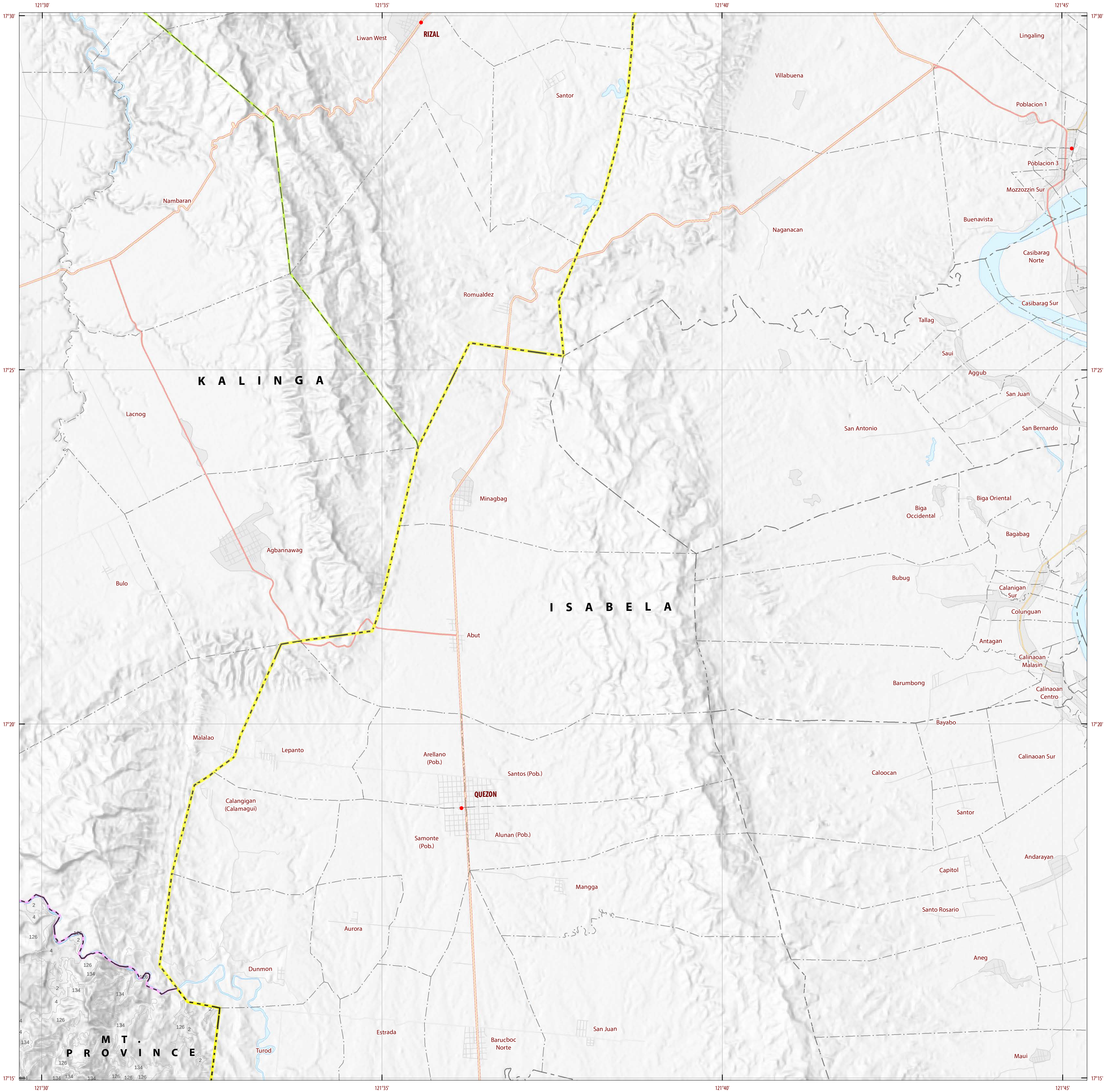
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MOUNTAIN PROVINCE

Sheet 2 of 10

Sheet No. 3235-I



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LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS

SCALE 1 : 50 000

Universal Transverse Mercator Zone 51 N, PRS 1992 Datum
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LEGEND

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Not Suitable/ Not Relevant

OTHER SIGNS

- NGP Areas
- Coffee
- 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

3335-IV

INDEX MAP

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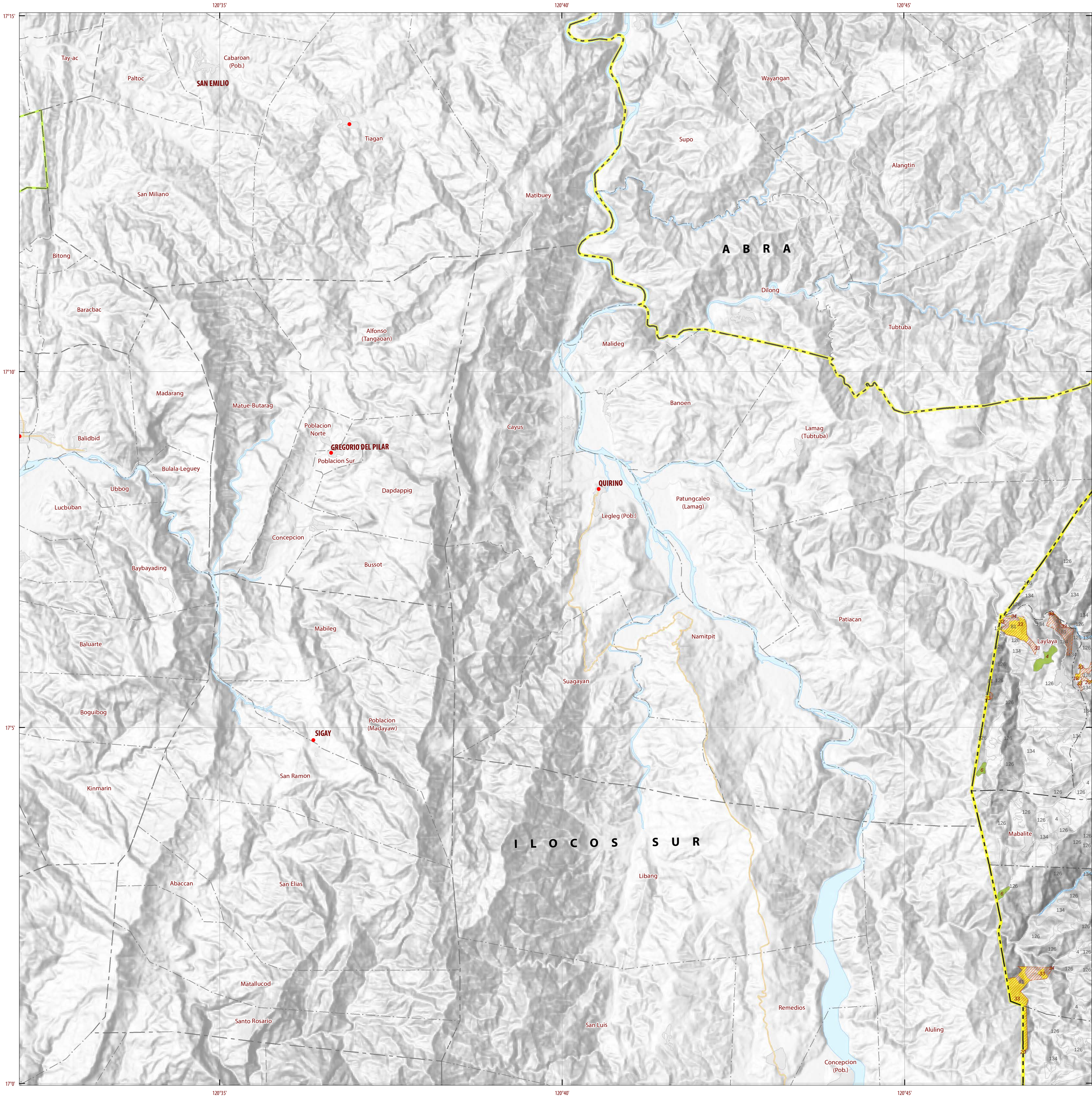
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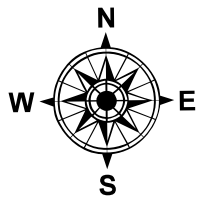
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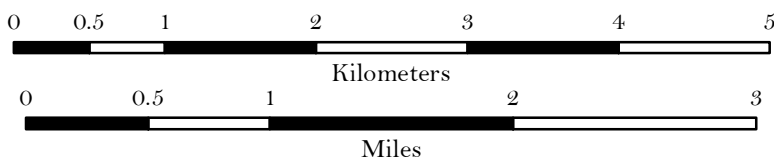


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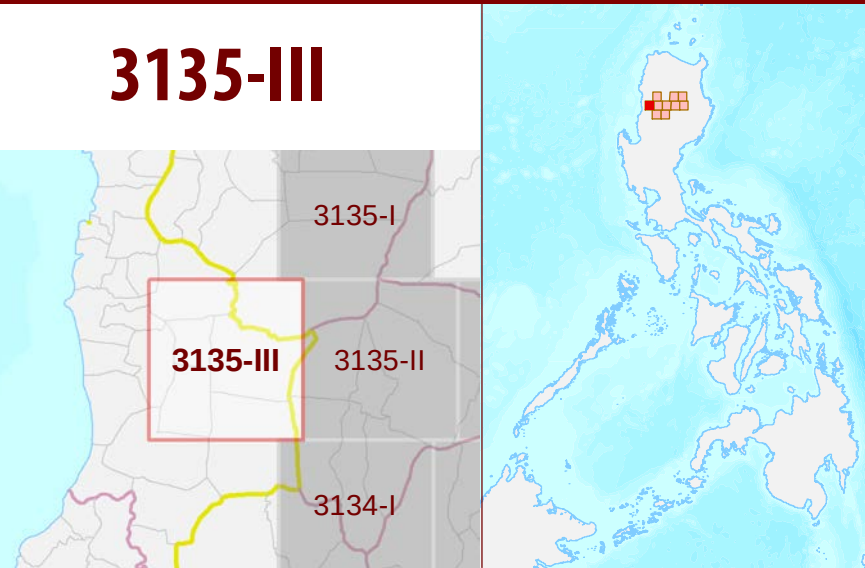
OTHER SIGNS

- NGP Areas
- Coffee
- Land limitation
- Land use

CONVENTIONAL SIGNS

- ROADS**
 - Expressway
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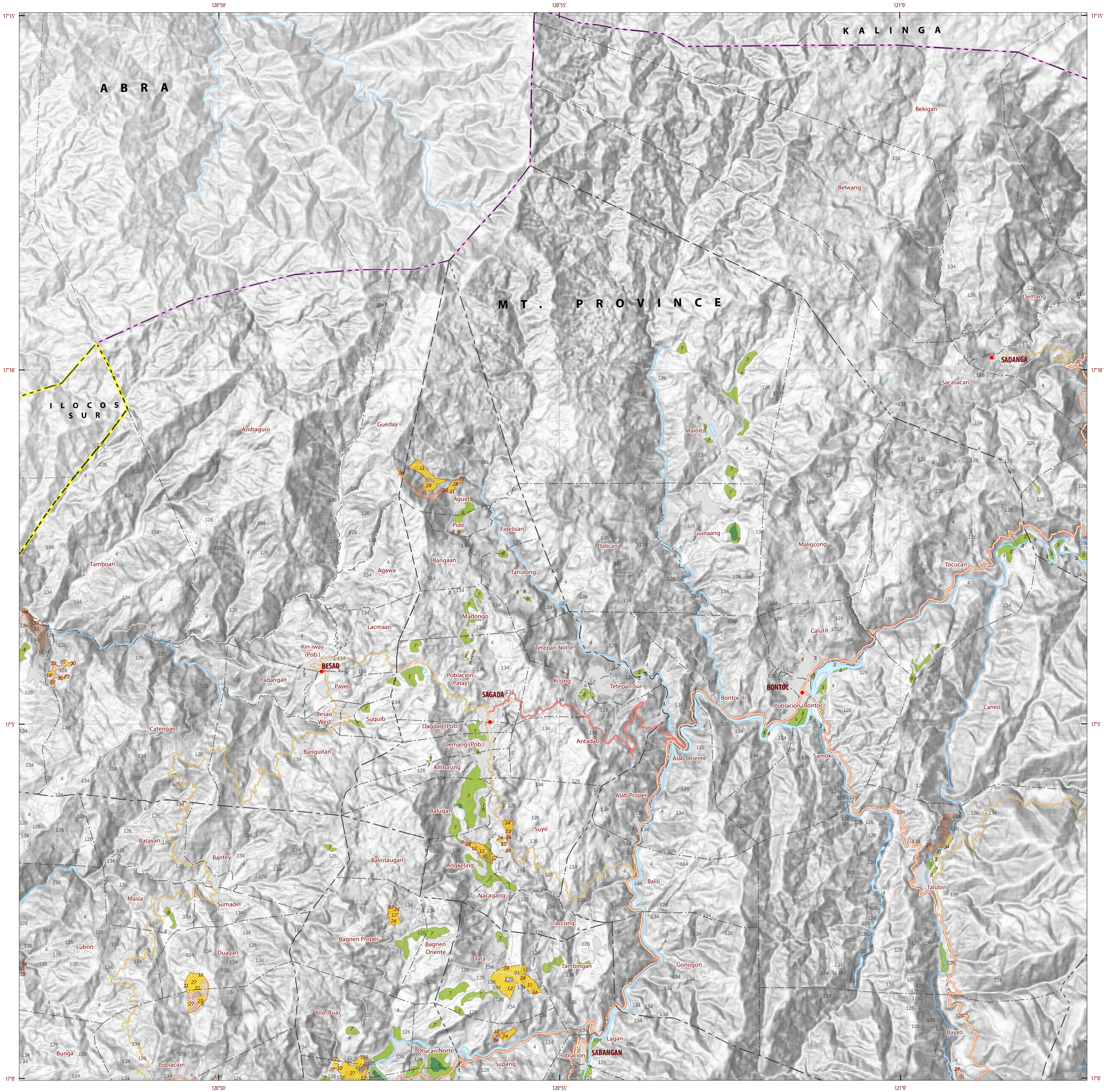
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LAND SUITABILITY MAP
ARABICA COFFEE

LAND RESOURCES EVALUATION AND SUITABILITY
ASSESSMENT OF STRATEGIC PRODUCTION AREAS

SCALE 1 : 50 000

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

Coffee

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

3135-II

3135-I 3235-I

3135-III 3135-II 3235-III

3134-I 3234-IV

INDEX MAP

MISCELLANEOUS INFORMATION

SOURCES OF INFORMATION

: Topographic information taken from NAMRIA Topographic Map at 1:50,000 scale. Land resources information from the Agricultural Land Management and Evaluation Division (ALMED), Soils Survey Division (SSD) and Laboratory Services Division (LSD) of BSWM. Rice areas obtained from the Land Use System (FAO, 2015) and Philippine Rice Information System (PRISM) (IRRI, 2015). Data analysis and compilation through the Land Resources Evaluation and Suitability Assessment of Strategic Production Areas for Coffee and Cacao Project implemented by BSWM (2017).

Project Leader

: BERNARDO B. PASCUA

GIS and Cartography

: IRVIN K. SAMALCA

Funding Agency

: Department of Agriculture - Bureau of Agricultural Research (DA-BAR)

Collaborating Agencies

: Philippine Council on Agriculture and Fisheries (PCAF)
: Department of Agriculture Regional Field Office of CAR, Region II, IV-A, IV-B, VI, VII, VIII, IX, X, XI, XII and CARAGA(XIII)
: Local Government Unit (LGU) of covered provinces and municipalities

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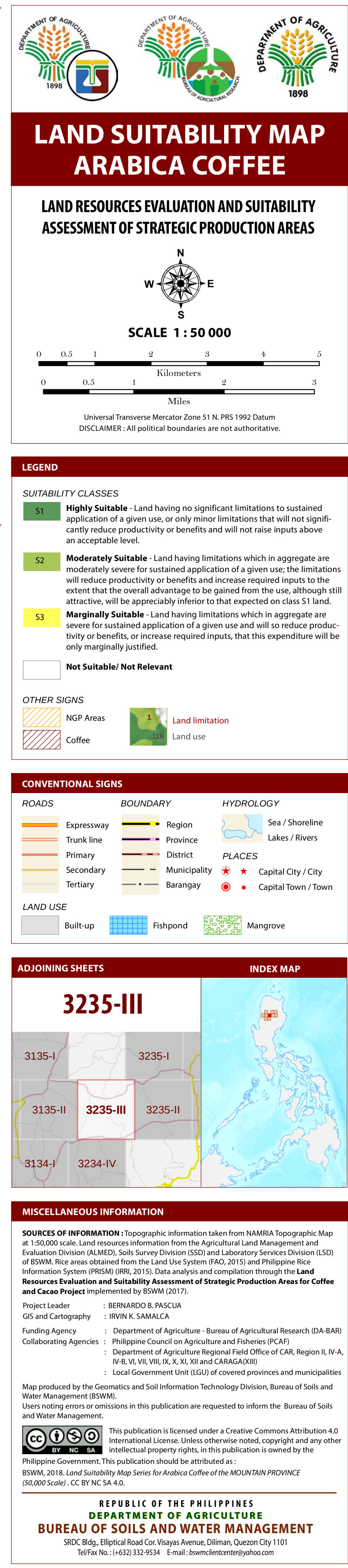
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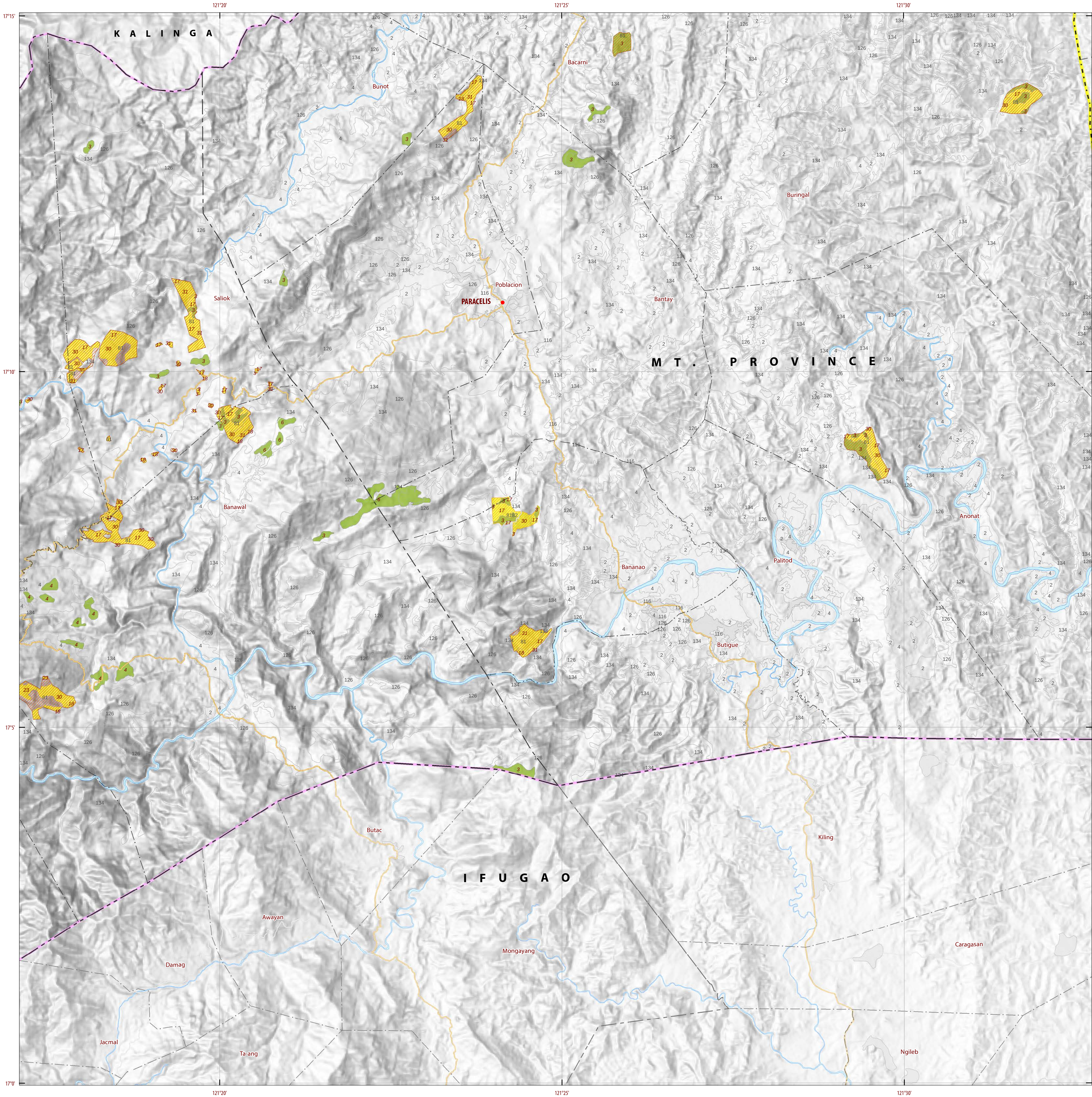
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MOUNTAIN PROVINCE

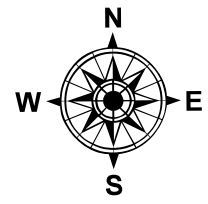
Sheet 5 of 10 Sheet No. 3135-II



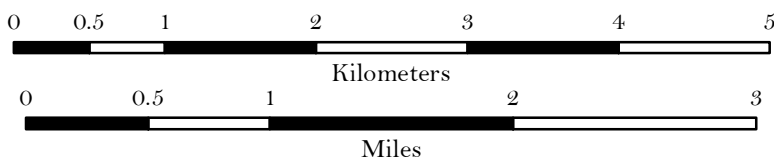


LAND SUITABILITY MAP ARABICA COFFEE

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS



SCALE 1 : 50 000



Universal Transverse Mercator Zone 51 N, PRS 1992 Datum
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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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- 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

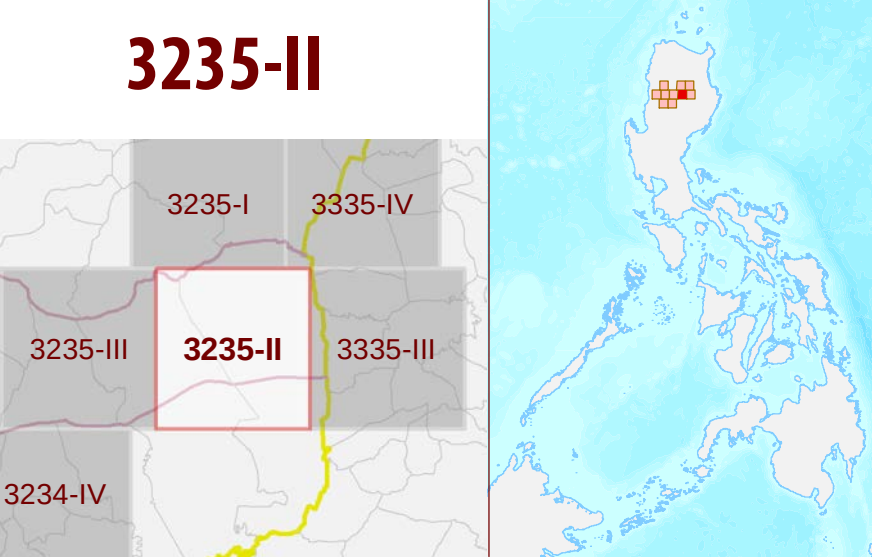
OTHER SIGNS

- NGP Areas
- Coffee
- 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

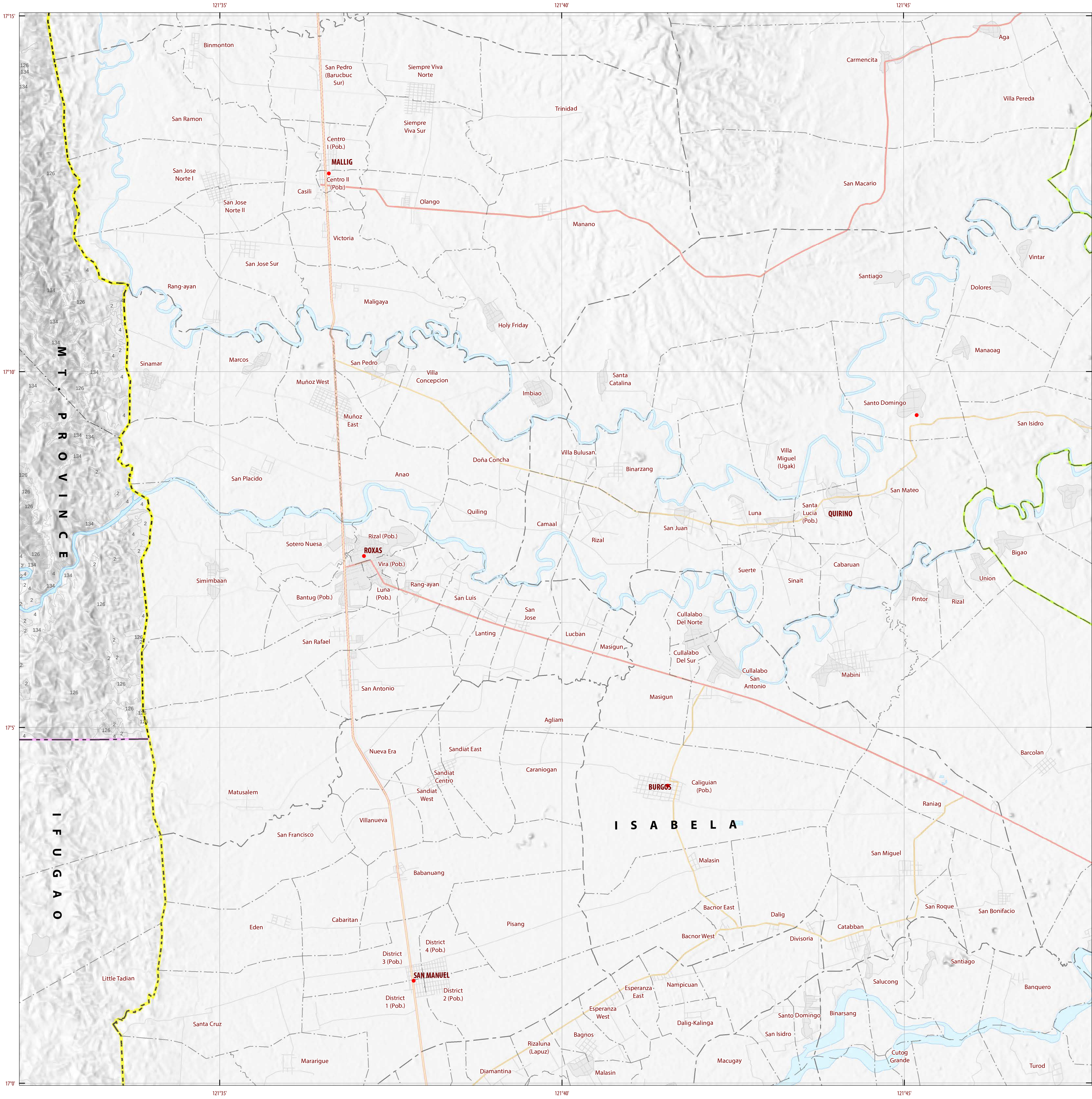
SOURCES OF INFORMATION : Topographic information taken from NAMRIA Topographic Map at 1:50,000 scale. Land resources information from the Agricultural Land Management and Evaluation Division (ALMED), Soils Survey Division (SSD) and Laboratory Services Division (LSD) of BSWM. Rice areas obtained from the Land Use System (FAO, 2015) and Philippine Rice Information System (PRISM) (IRRI, 2015). Data analysis and compilation through the **Land Resources Evaluation and Suitability Assessment of Strategic Production Areas for Coffee and Cacao Project** implemented by BSWM (2017).

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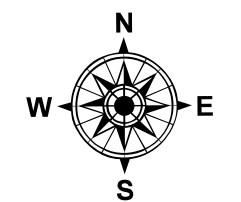




LAND SUITABILITY MAP

ARABICA COFFEE

LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS



SCALE 1 : 50 000



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Not Suitable/ Not Relevant

OTHER SIGNS

- NGP Areas
- Coffee
- 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

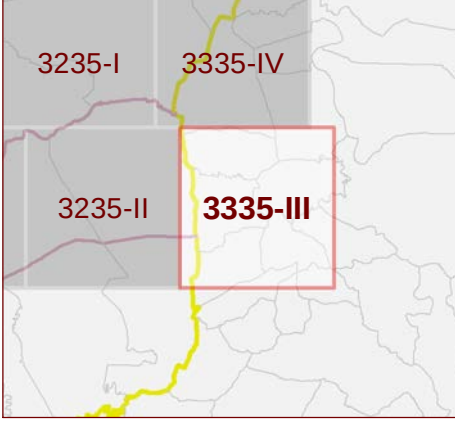
- Capital City / City
- Capital Town / Town

LAND USE

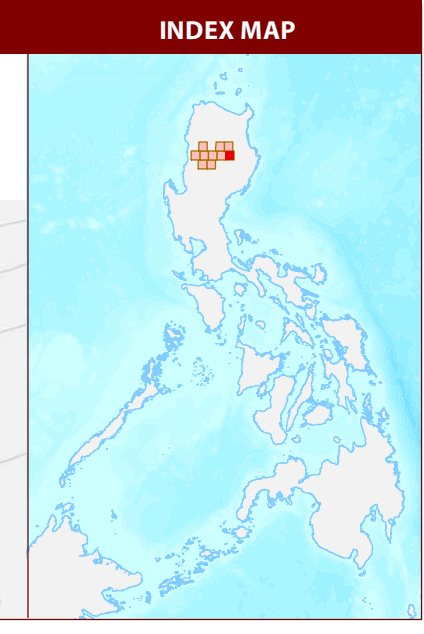
- Built-up
- Fishpond
- Mangrove

ADJOINING SHEETS

3335-III



INDEX MAP



MISCELLANEOUS INFORMATION

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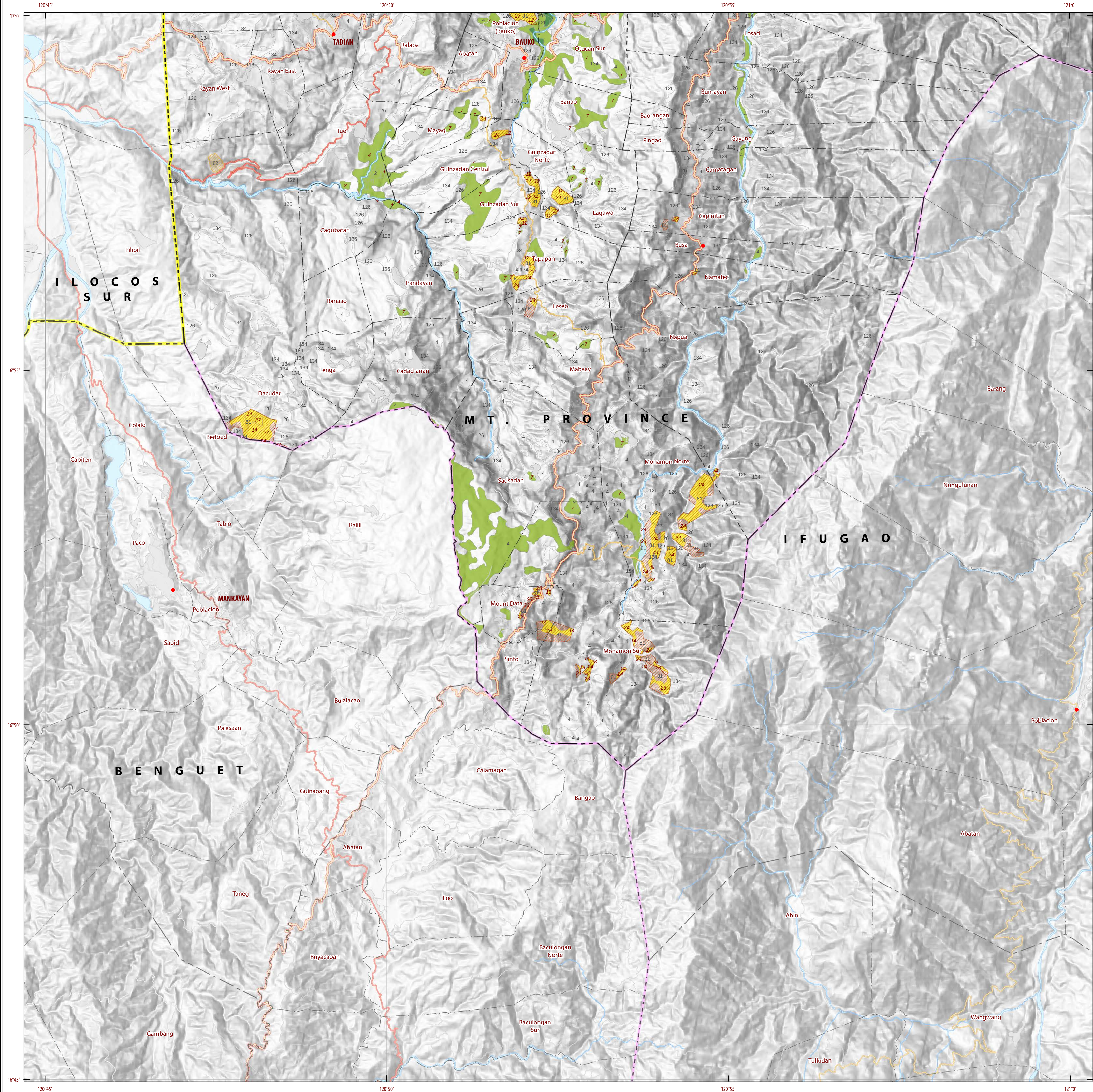
Project Leader : BERNARDO B. PASCUA
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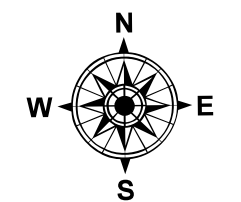
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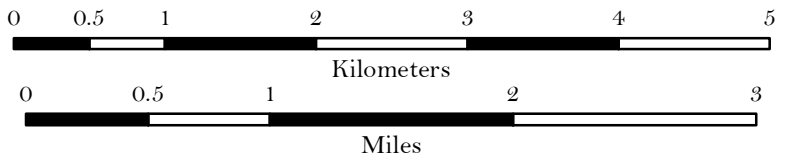


LAND SUITABILITY MAP
ARABICA COFFEE

LAND RESOURCES EVALUATION AND SUITABILITY
ASSESSMENT OF STRATEGIC PRODUCTION AREAS



SCALE 1 : 50 000



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- Not Suitable/ Not Relevant**

OTHER SIGNS

- NGP Areas
- Coffee
- Land limitation
- Land use

CONVENTIONAL SIGNS

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

LAND USE

- Built-up
- Fishpond
- Mangrove

ADJOINING SHEETS

3134-I

3135-III 3135-II 3235-III

3134-I 3234-IV

INDEX MAP

MISCELLANEOUS INFORMATION

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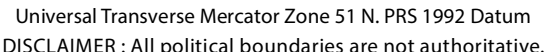
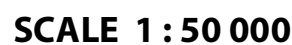
MOUNTAIN PROVINCE

Sheet 9 of 10

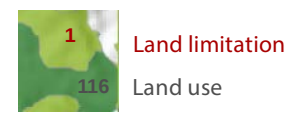
Sheet No. 3134-I



LAND RESOURCES EVALUATION AND SUITABILITY ASSESSMENT OF STRATEGIC PRODUCTION AREAS



SUITABILITY CLASSES

☐ Not Suitable/ Not Relevant

ROADS

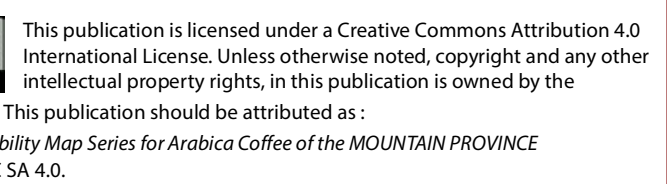
BOUNDARY



INDEX MAP

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MOUNTAIN PROVINCE Sheet 10 of 10 Sheet No. 3234-IV