

REPUBLIC OF THE PHILIPPINES

**MASTER PLAN STUDY
ON
THE INTEGRATED AGRICULTURAL DEVELOPMENT PROJECT
IN MARINDUQUE**

DATABASE

JANUARY 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

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THE INTEGRATED AGRICULTURAL DEVELOPMENT PROJECT
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DATABASE

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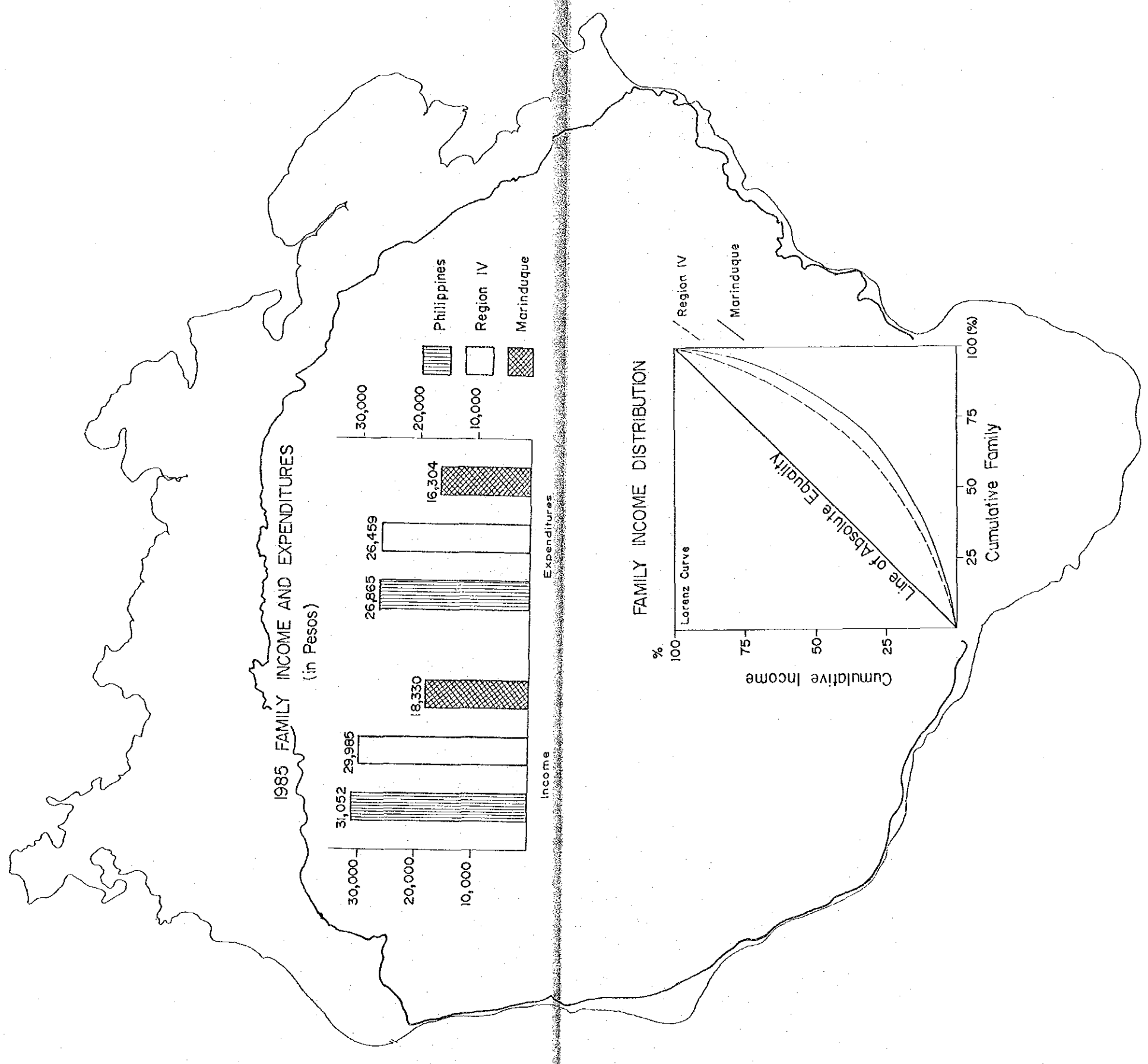
JANUARY 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

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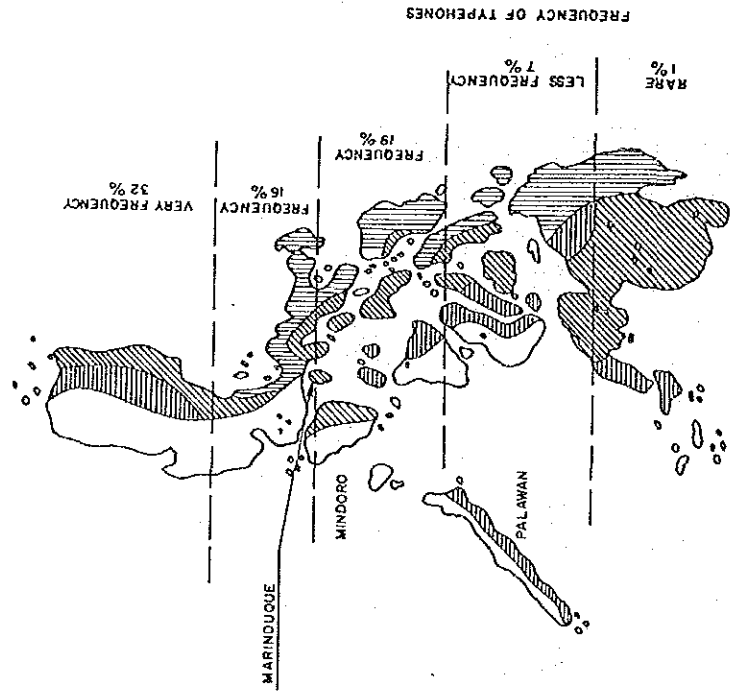
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FAMILY INCOME LEVEL AND DISTRIBUTION IN 1985



CLIMATOLOGICAL CONDITIONS

TYPES OF CLIMATE IN THE PHILIPPINES



LEGEND: TYPES OF CLIMATE

CORONAS CLASSIFICATION

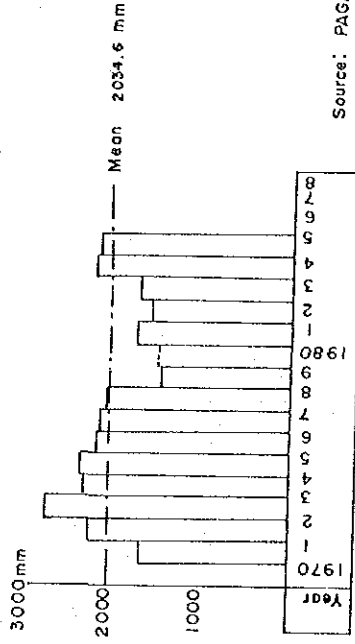
Two pronounced seasons dry from November to April; wet during the rest of the year.

1st Type: rest of the year.

3rd Type: Seasons not very pronounced, relatively dry from November to April and wet during the rest of the year.

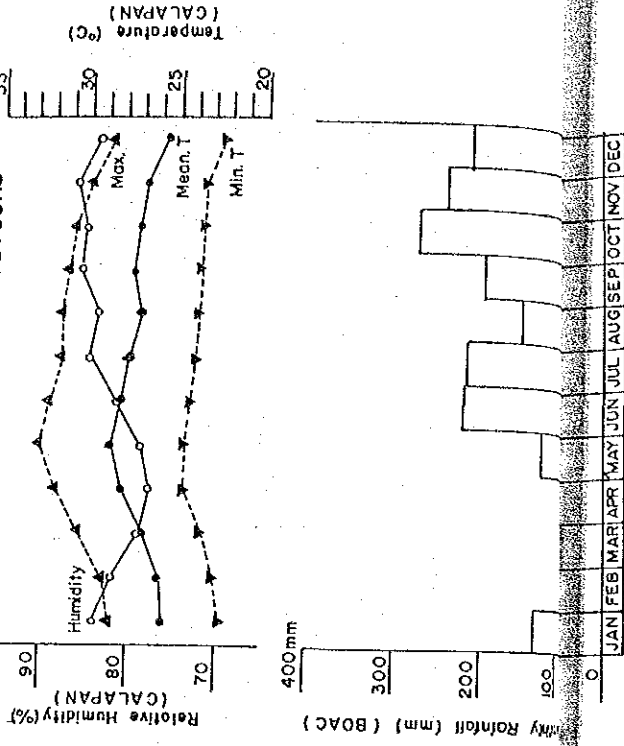
4th Type: Rainfall more or less evenly distributed throughout the year.

ANNUAL RAINFALL (BOAC)

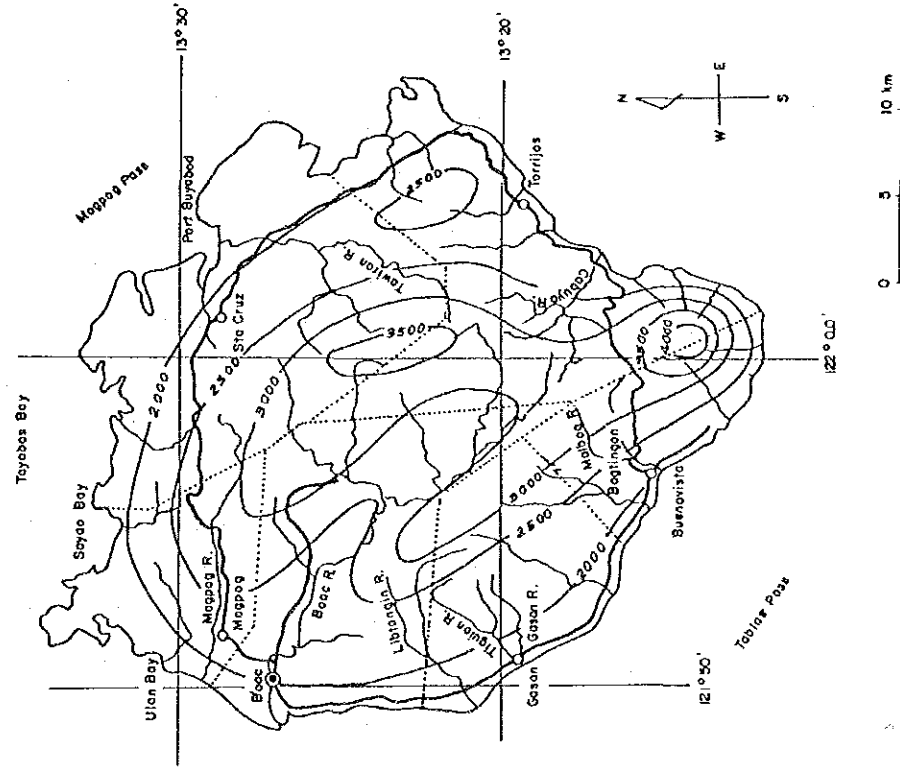


Source: PAGASA

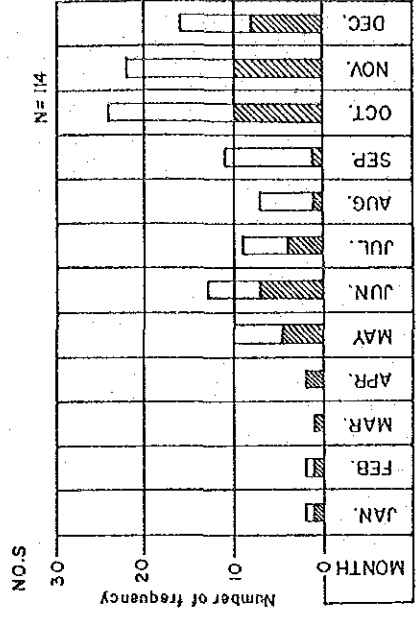
GENERAL CLIMATIC CONDITIONS



ISOHYETAL MAP OF ANNUAL RAINFALL (MM)

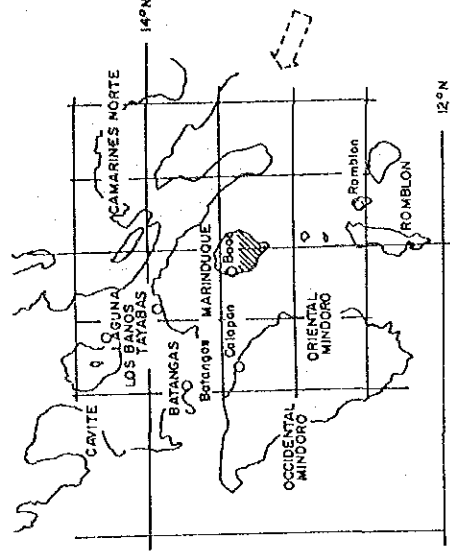


FREQUENCY OF TROPICAL CYCLONES IN MARINDUQUE



Note: The oblique lines above represent the number of typhoons.

PERIOD	F. of T.C.
1951 - 1960	30
1961 - 1970	27
1971 - 1980	38
1981 - 1987	19
TOTAL	114 (4.22)

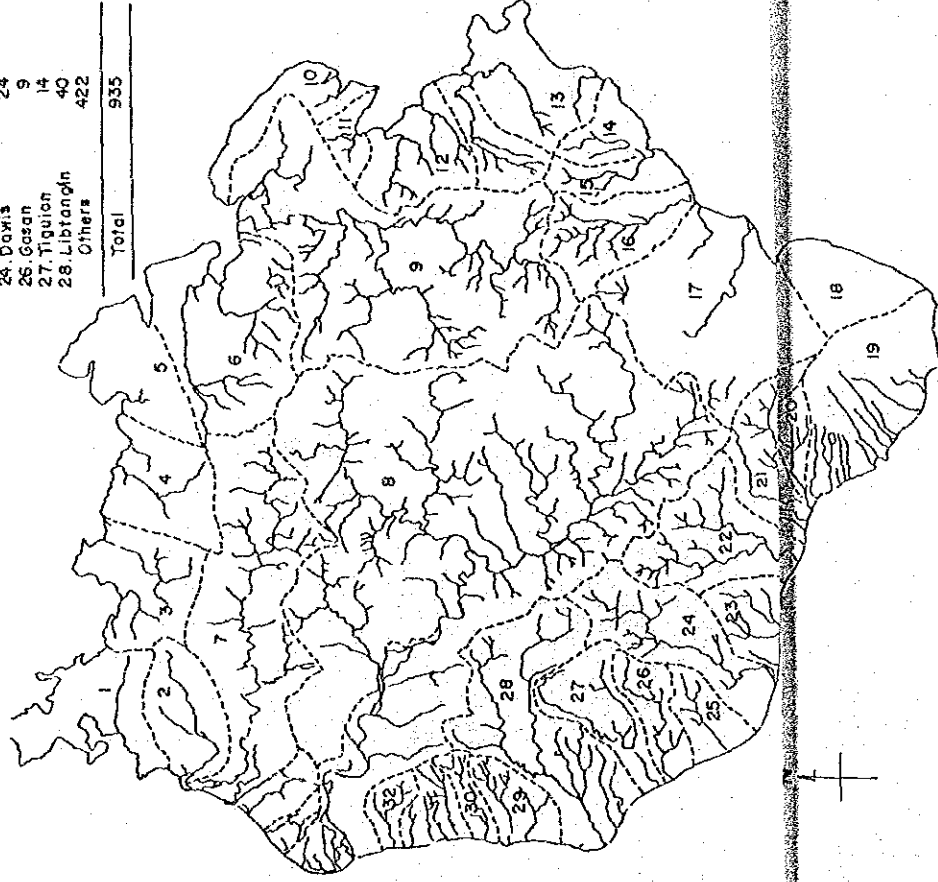


Note: () figure is a mean value of Tropical Cyclones Number of tropical cyclones passed through the area from 121°E to 123°E and 12°30N to 14°30N

HYDROLOGICAL CONDITIONS

RIVER BASIN MAP

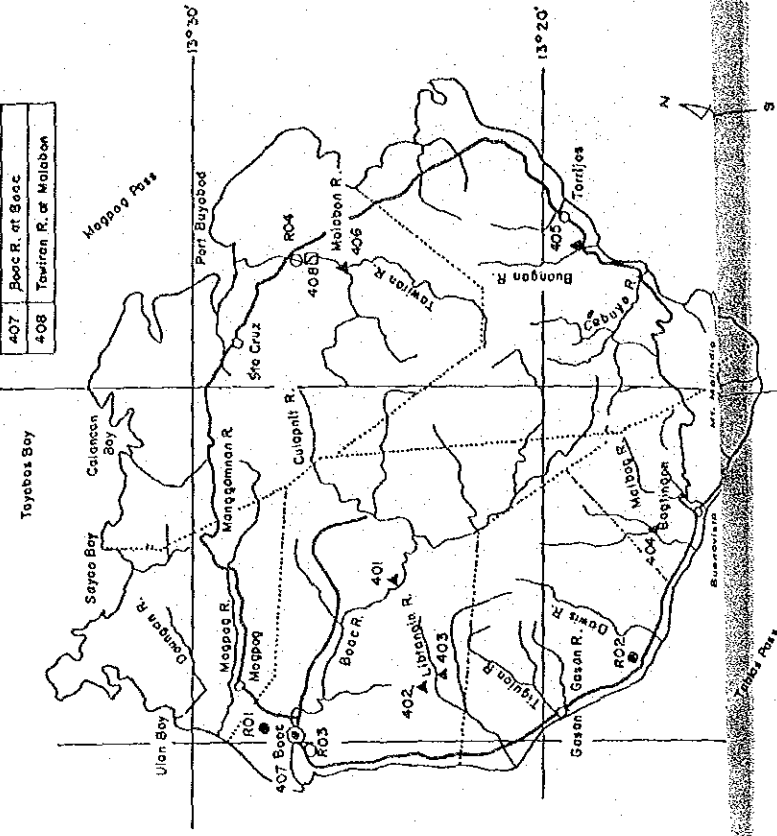
River Basin	Drainage Area (sq. km)
7. Mogpog	58
8. Boac	227
9. Tawiran	99
16. Buangan	19
21. Malbog	23
22. Caigangan	27
24. Dawis	24
26. Gasan	9
27. Tiguan	14
28. Libtangin	40
Others	422
Total	935



HYDROLOGICAL MAP

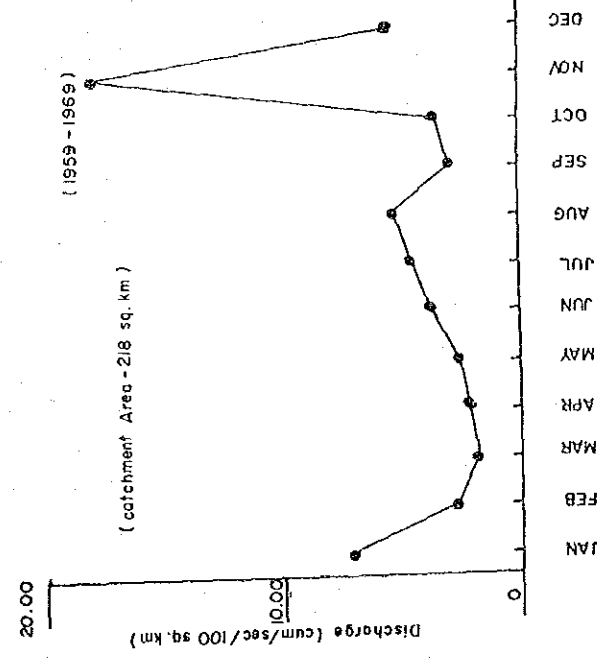
Rainfall Stations	Stream Gaging Station
RO1 Tansa (Boac)	401 Boac R. at Binungo
RO2 Gasan	402 Tugos N.R. at Tugos
RO3 Capitol in Boac	403 Tugos E.R. at Tugos
RO4 Tawiran E. School	404 Bagtingan R. at Bagtingan
	405 Buangan R. at Buangan
	406 Tawiran R.
	407 Boac R. at Boac
	408 Tawiran R. at Malabon

* Existing Stations

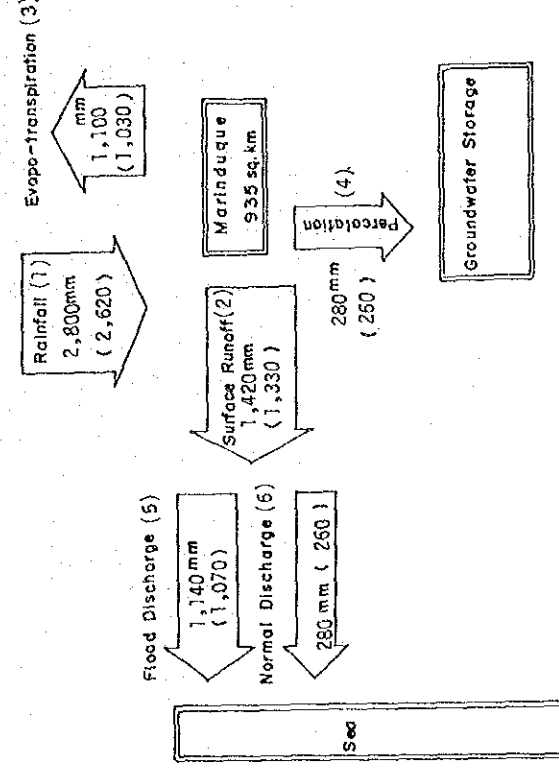


LEGEND
 ● Rainfall Station
 ▲ Stream Gaging Station
 ○○ JICA Station (Water Level and Rainfall Gaging Station)

MEAN MONTHLY DISCHARGE OF BOAC RIVER



WATER BALANCE IN MARINDUQUE (UNIT: MCM/YEAR)

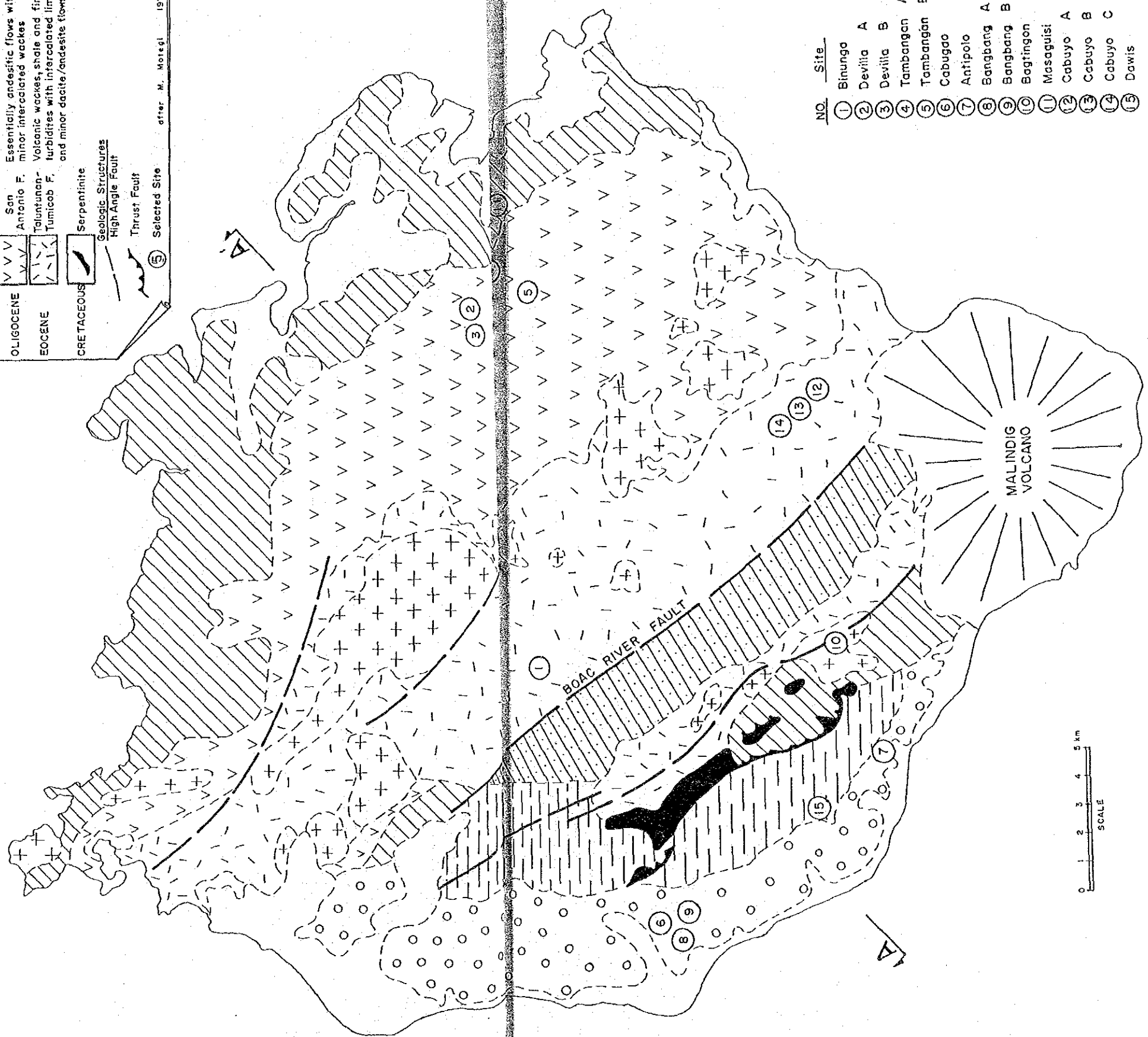


Legend:
 (1) Annual Rainfall: based on Isohyetal Map of Annual Rainfall
 (2) Surface Runoff: (1) x 50%
 (3) Evapo-transpiration: 1,600mm (Open Pan Evaporation) x 70%
 (4) Percolation: (1)-(2)-(3)
 (5) Flood Discharge: assumed at 80% of Annual Discharge
 (6) Normal Discharge: (2)-(5)

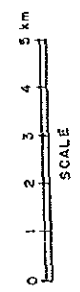
GEOLOGICAL MAP

EXPLANATION		
Age	Formation/Rock Unit	Description
RECENT	Alluvium	Fluvial sand & gravel, flood plain, delta & beach deposits
PLEISTOCENE	Malindig Volcanics	Andesite, tuff and agglomerate
	Boac F.	Terrace gravel member; essentially elevated detritic sand & gravel; Silt member; Largely reworked tuff of tuffaceous clastics
PLIOCENE	Gasan F.	Largely tuff or tuffaceous clastics
	Porvado F.	Molasses deposit; essentially conglomerate, sandstone and shale
UPPER MIOCENE	Diorite & related porphyries	
MIDDLE MIOCENE	Tarrijos F.	Andesite to basalt flows and agglomerate with minor intercalated clastics; includes reefal lenses intercalated with the volcanics
LOWER MIOCENE		
OLIGOCENE	San Antonio F.	Essentially andesitic flows with minor intercalated wacks
EOCENE	Taluntunan-Tumicob F.	Volcanic wacks, shale and fine turbidites with intercalated limestone and minor dacite/andesite flows
CRETACEOUS	Serpentinite	
	Geologic Structures	
	High Angle Fault	
	Thrust Fault	
	Selected Site	

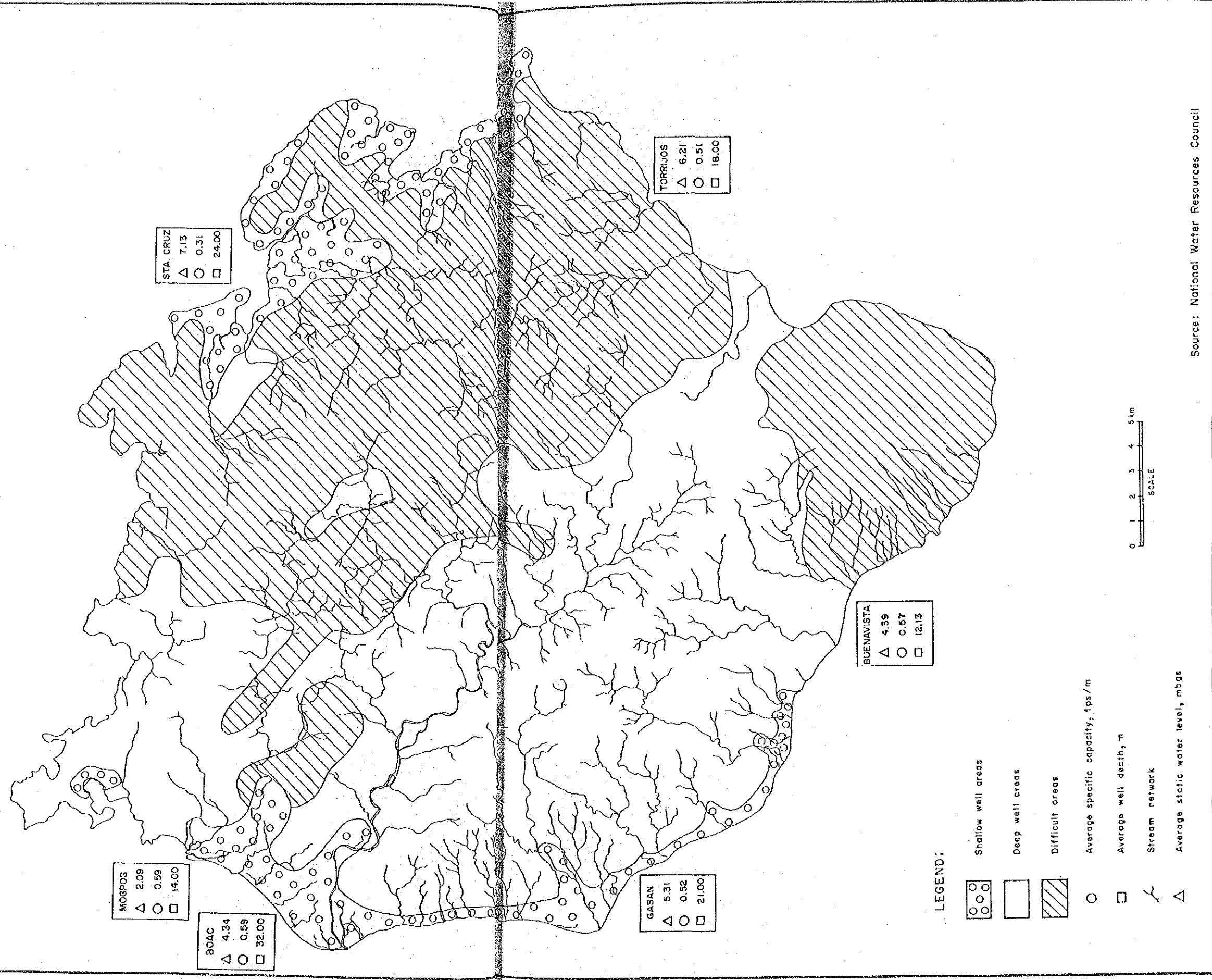
after M. Maizel 1975



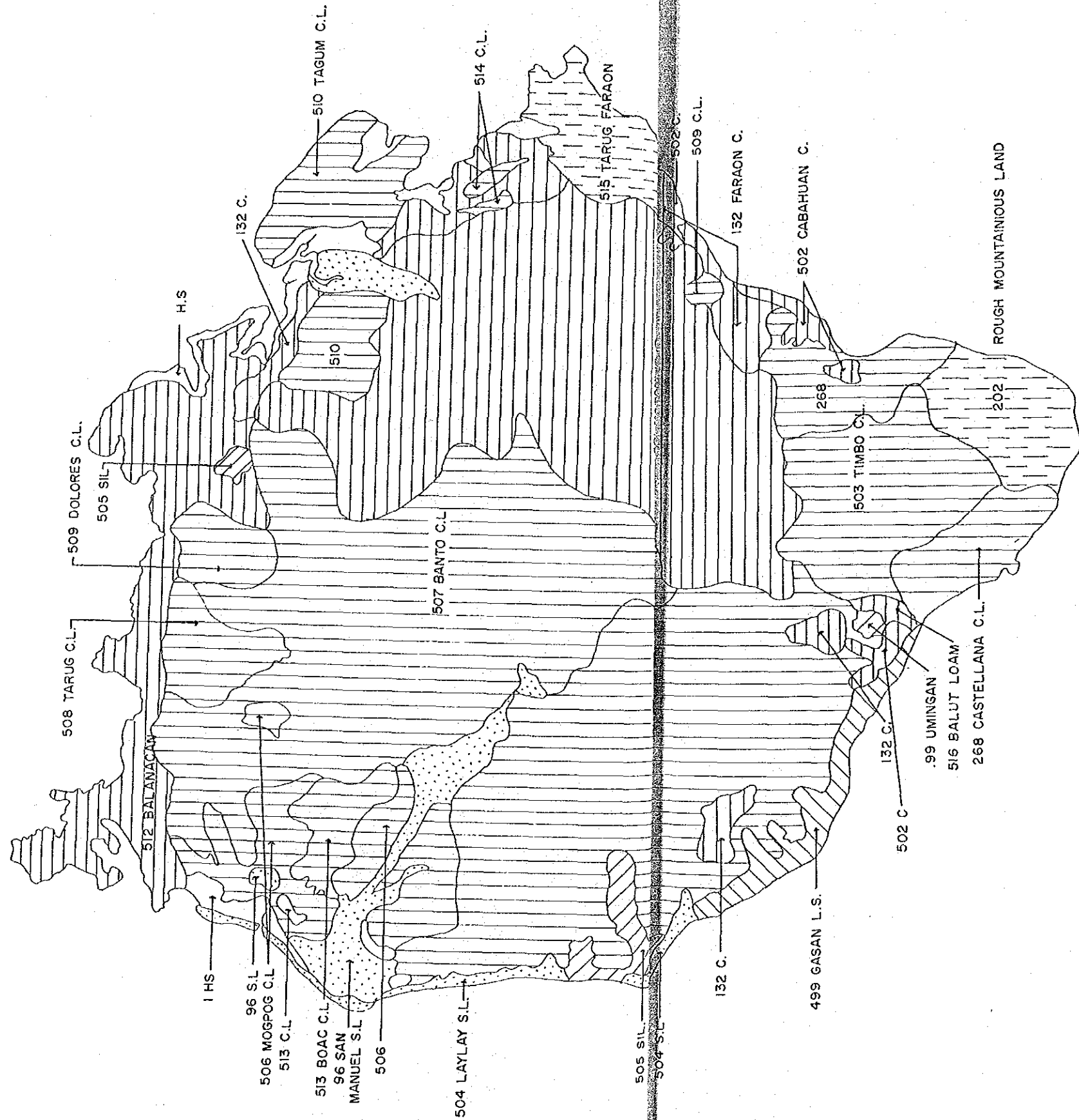
- | NO. | Site |
|-----|-------------|
| 1 | Binunga |
| 2 | Devilla A |
| 3 | Devilla B |
| 4 | Tambangan A |
| 5 | Tambangan B |
| 6 | Cabugao |
| 7 | Antipolo |
| 8 | Bangbang A |
| 9 | Bangbang B |
| 10 | Bagtingon |
| 11 | Masaguisi |
| 12 | Cabuyo A |
| 13 | Cabuyo B |
| 14 | Cabuyo C |
| 15 | Dawis |









GROUNDWATER MAP

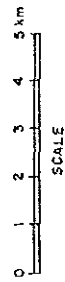


SOIL MAP

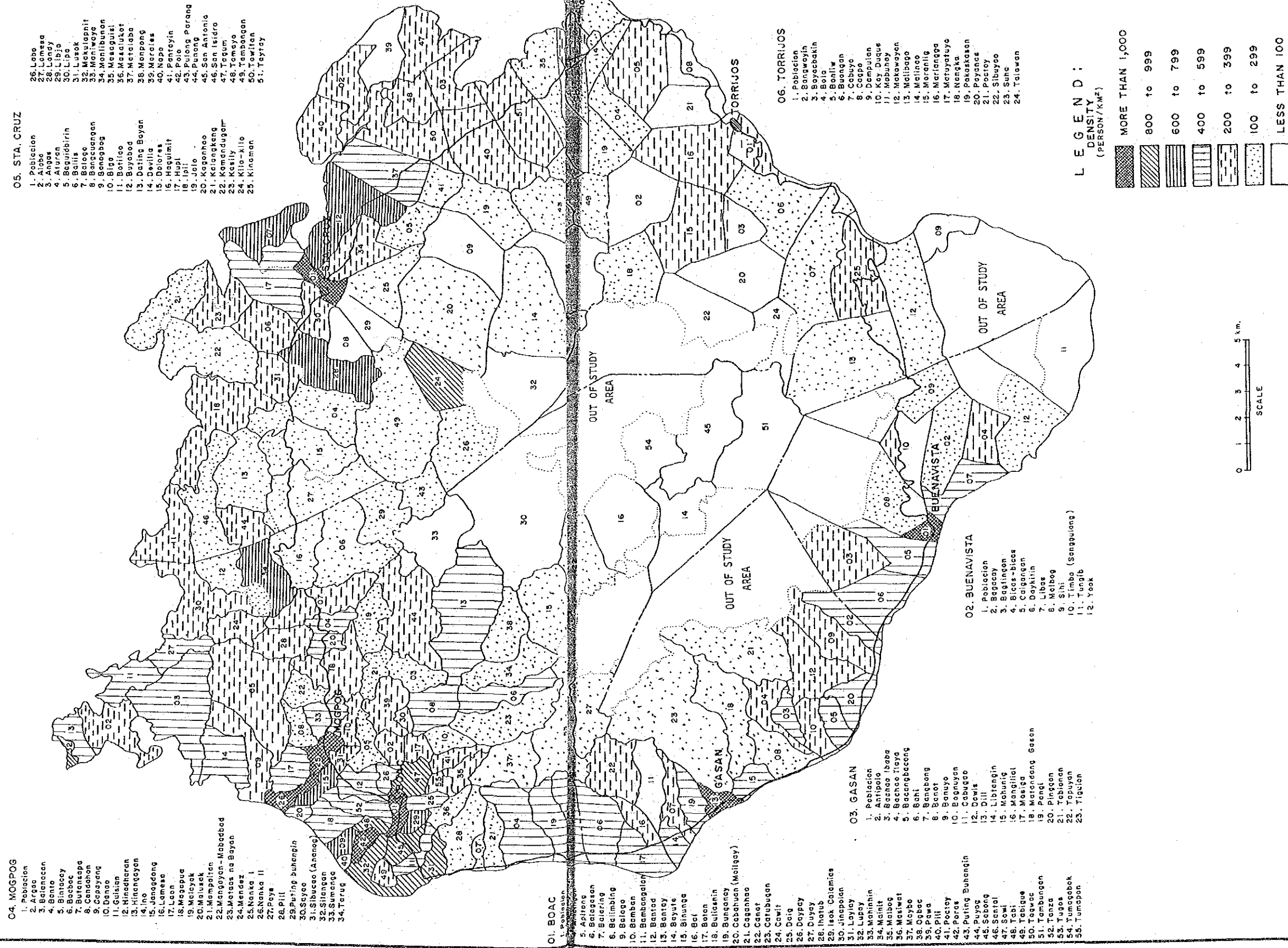


LEGEND :

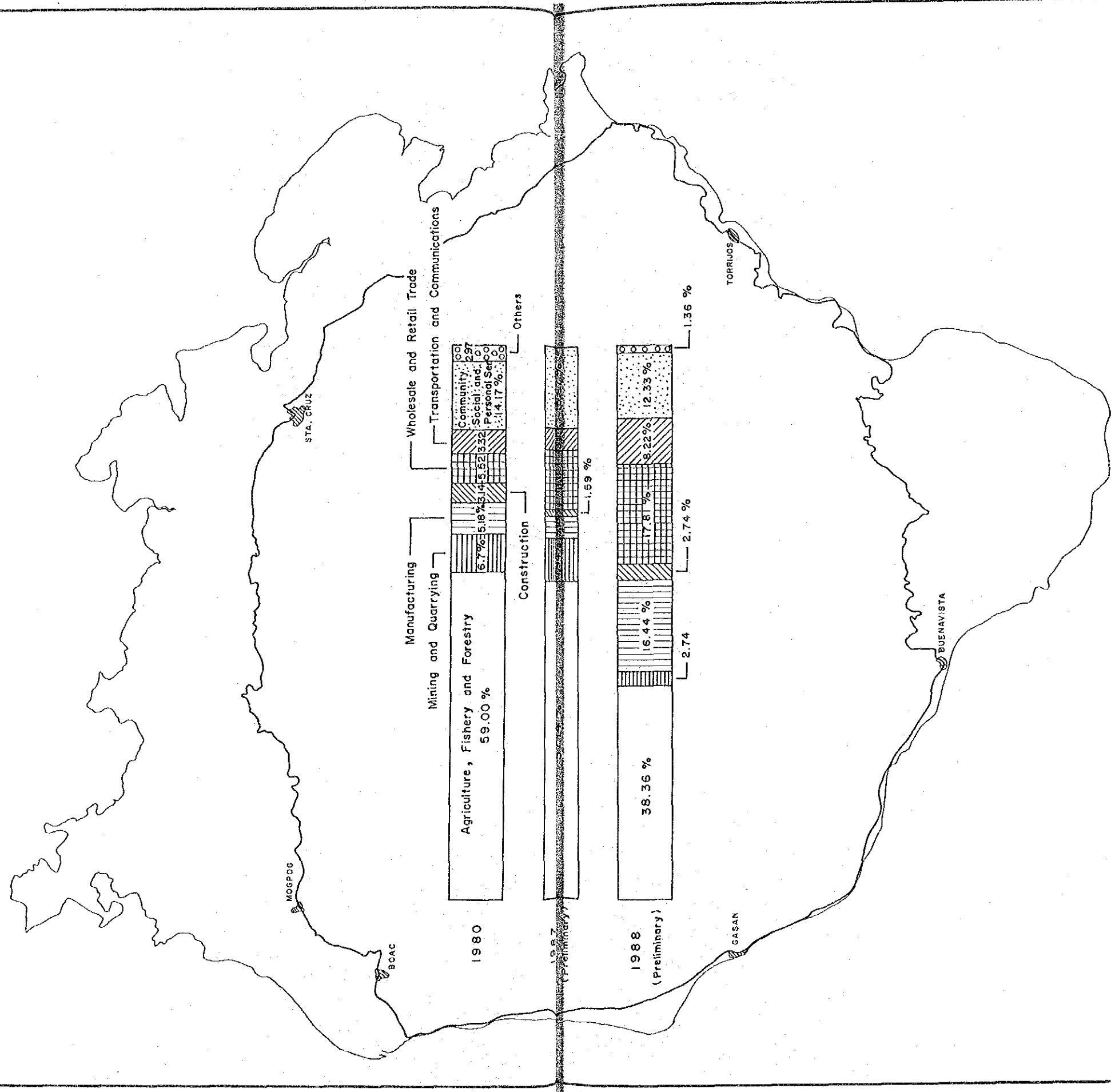
-  H.S. HYDROSOL
-  S.L. SANDY LOAM
-  L.S. LOAMY SAND
-  SIL. SILT LOAM
-  C.L. CLAY LOAM
-  C. CLAY



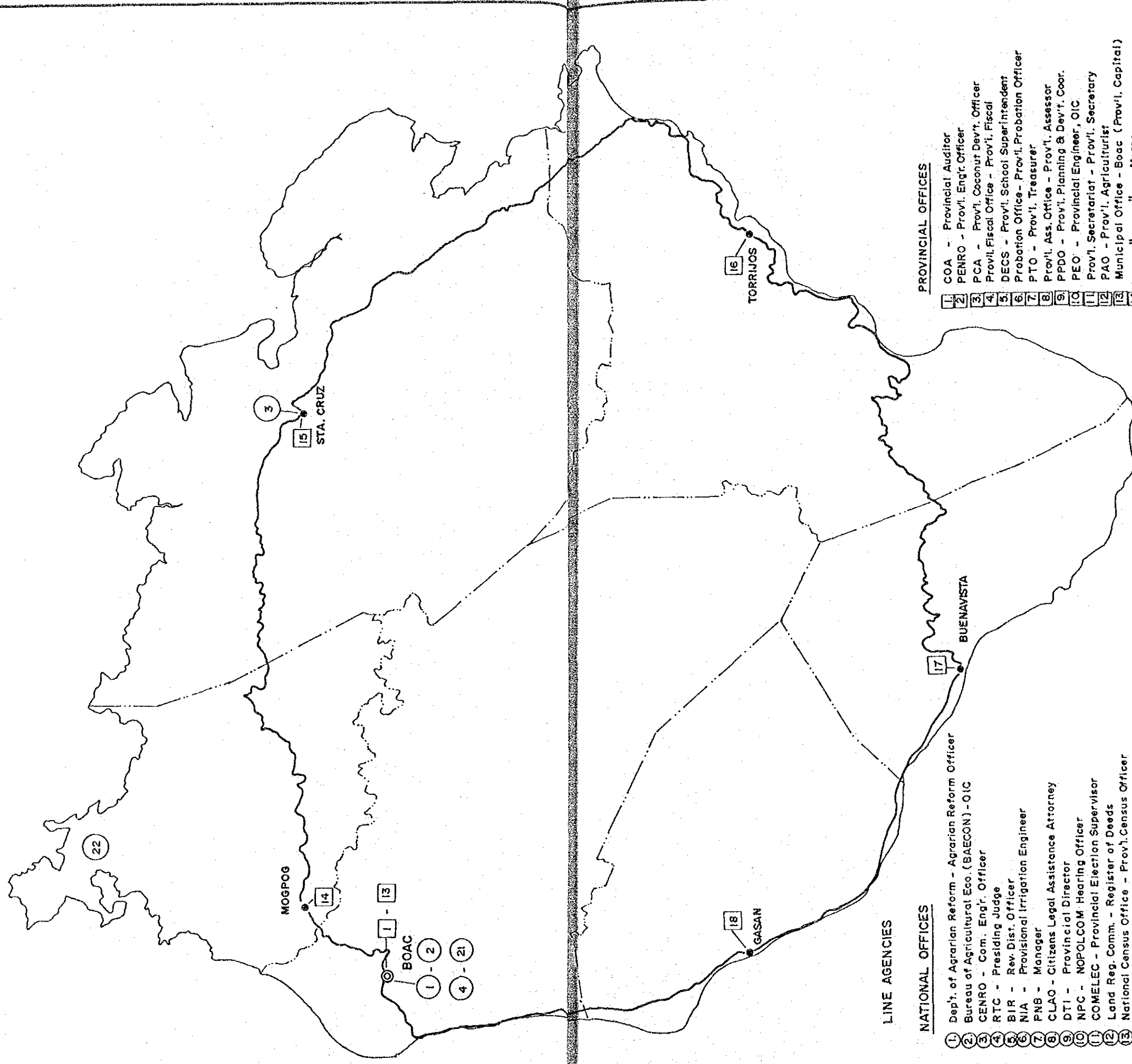
POPULATION DENSITY



DISTRIBUTION OF LABOR FORCE BY INDUSTRY



LOCATION MAP OF GOVERNMENT AGENCIES



LINE AGENCIES

- NATIONAL OFFICES**
- 1 Dep't. of Agrarian Reform - Agrarian Reform Officer
 - 2 Bureau of Agricultural Eco. (BAECON) - OIC
 - 3 CENRO - Com. Eng'r. Officer
 - 4 RTC - Presiding Judge
 - 5 BIR - Rev. Dist. Officer
 - 6 NIA - Provisional Irrigation Engineer
 - 7 PNB - Manager
 - 8 CLAO - Citizens Legal Assistance Attorney
 - 9 DTI - Provincial Director
 - 10 NPC - NOPOLCOM Hearing Officer
 - 11 COMELEC - Provincial Election Supervisor
 - 12 Land Reg. Comm. - Register of Deeds
 - 13 National Food Authority - Prov'l. Census Officer
 - 14 IPHO - Provincial Health Officer
 - 15 DLG - Prov'l. Gov't. Operation Officer
 - 16 Bu. of Post - District Postal Inspector
 - 17 Bu. of Telecom. - Chief Operator
 - 18 DSWD - Prov'l. Social Welfare Officer
 - 19 Phil. National Red Cross - Prov'l. Administrator
 - 20 Bu. of Treasury - Treasury Fiscal Officer
 - 21 PPA - Terminal Supervisor
 - 22

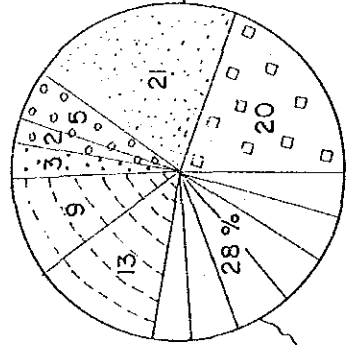
PROVINCIAL OFFICES

- 1 COA - Provincial Auditor
- 2 PENRO - Prov'l. Eng'r. Officer
- 3 PCA - Prov'l. Coconut Dev't. Officer
- 4 Prov'l. Fiscal Office - Prov'l. Fiscal
- 5 DECS - Prov'l. School Superintendent
- 6 Probation Office - Prov'l. Probation Officer
- 7 PTO - Prov'l. Treasurer
- 8 Prov'l. Ass. Office - Prov'l. Assessor
- 9 PPDO - Prov'l. Planning & Dev't. Coor.
- 10 PEO - Provincial Engineer, OIC
- 11 Prov'l. Secretariat - Prov'l. Secretary
- 12 PAO - Prov'l. Agriculturist
- 13 Municipal Office - Boac (Prov'l. Capital)
- 14 " " - Mogpog
- 15 " " - Sta. Cruz
- 16 " " - Torrijos
- 17 " " - Buena Vista
- 18 " " - Gasan

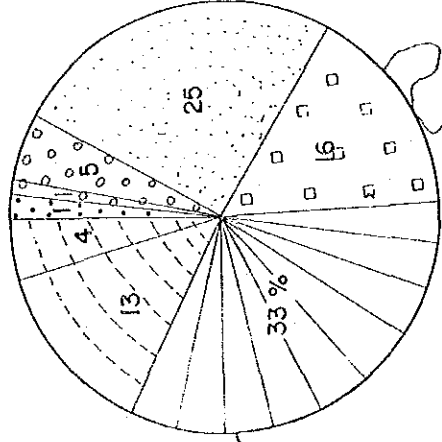


LAND OWNERSHIP AND FARM TENANCY BY AREA

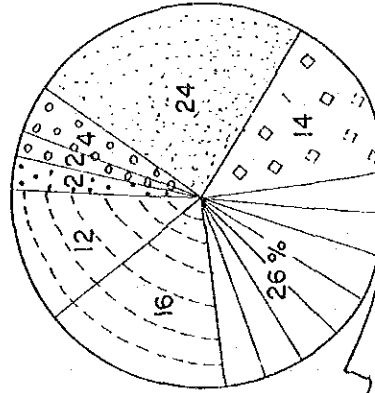
Mogpog
2168 farms



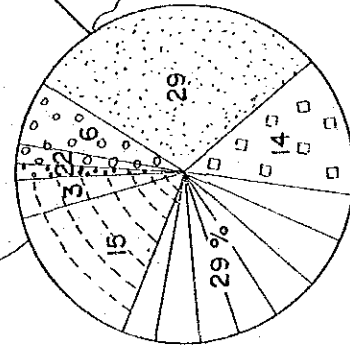
Santa Cruz
4658 farms



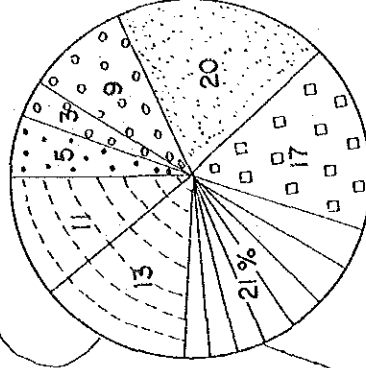
Boac
3516 farms



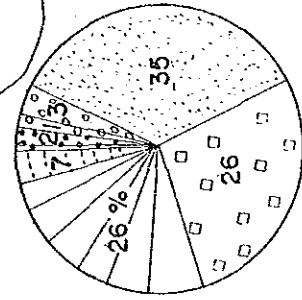
Gasan
2073 farms



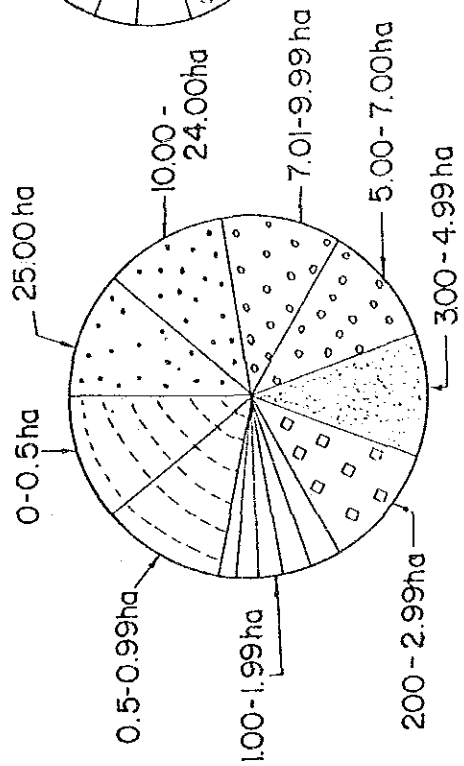
Torrijos
3011 farms



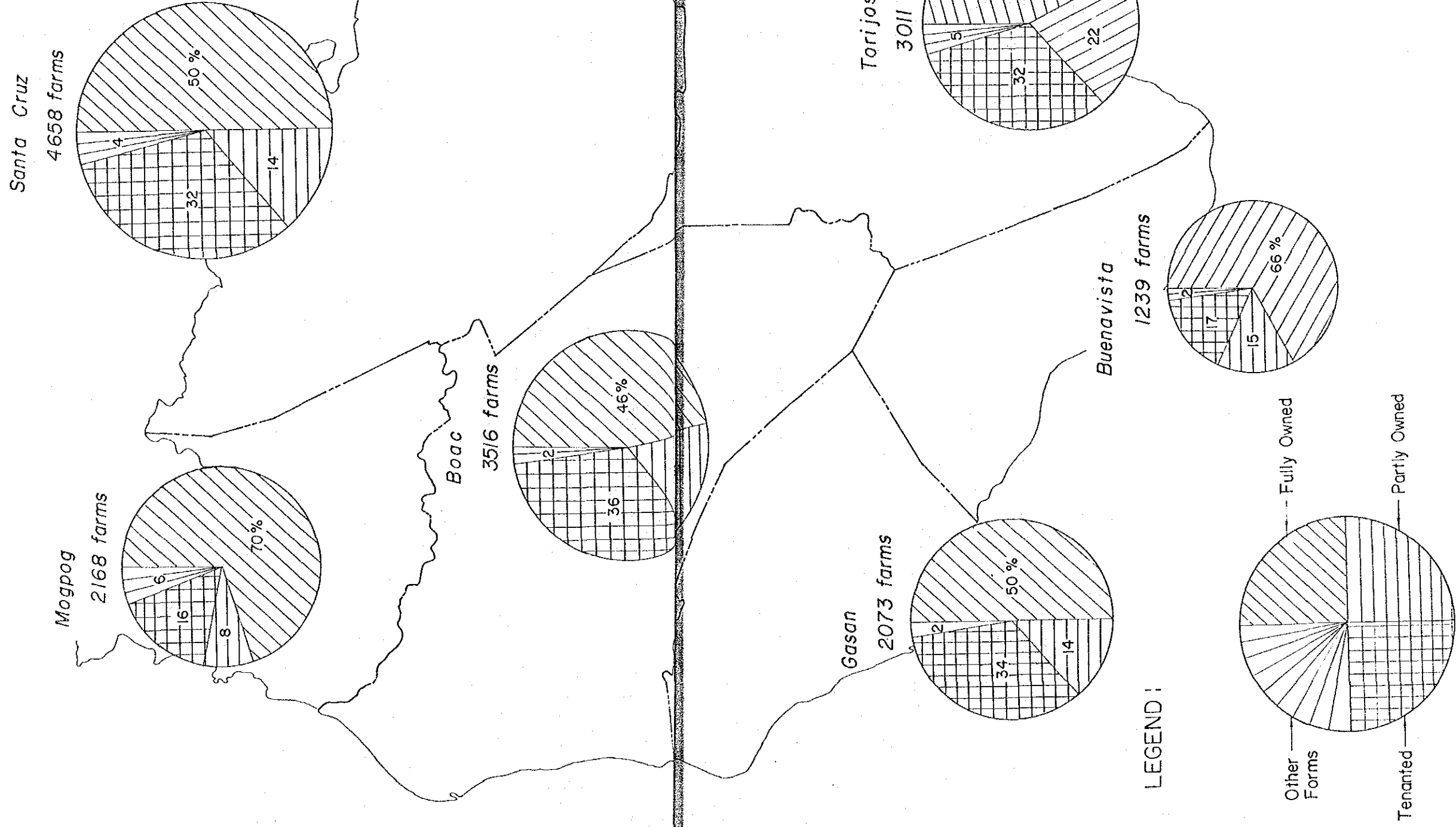
Buenavista
1239 farms



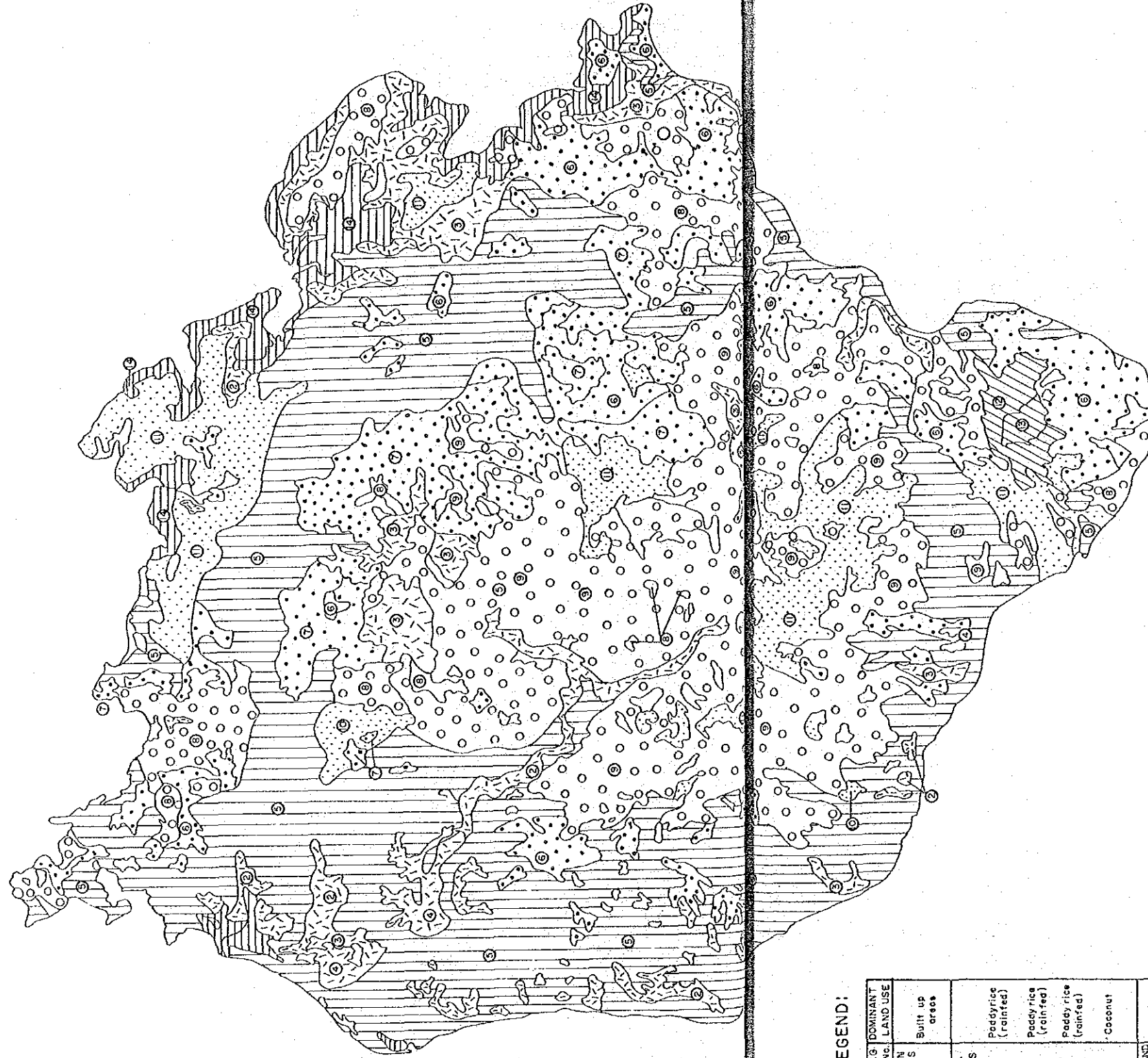
LEGEND:



DISTRIBUTION OF LAND OWNERSHIP AND FARM TENANCY

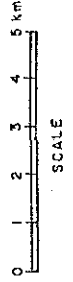


PRESENT LAND USE

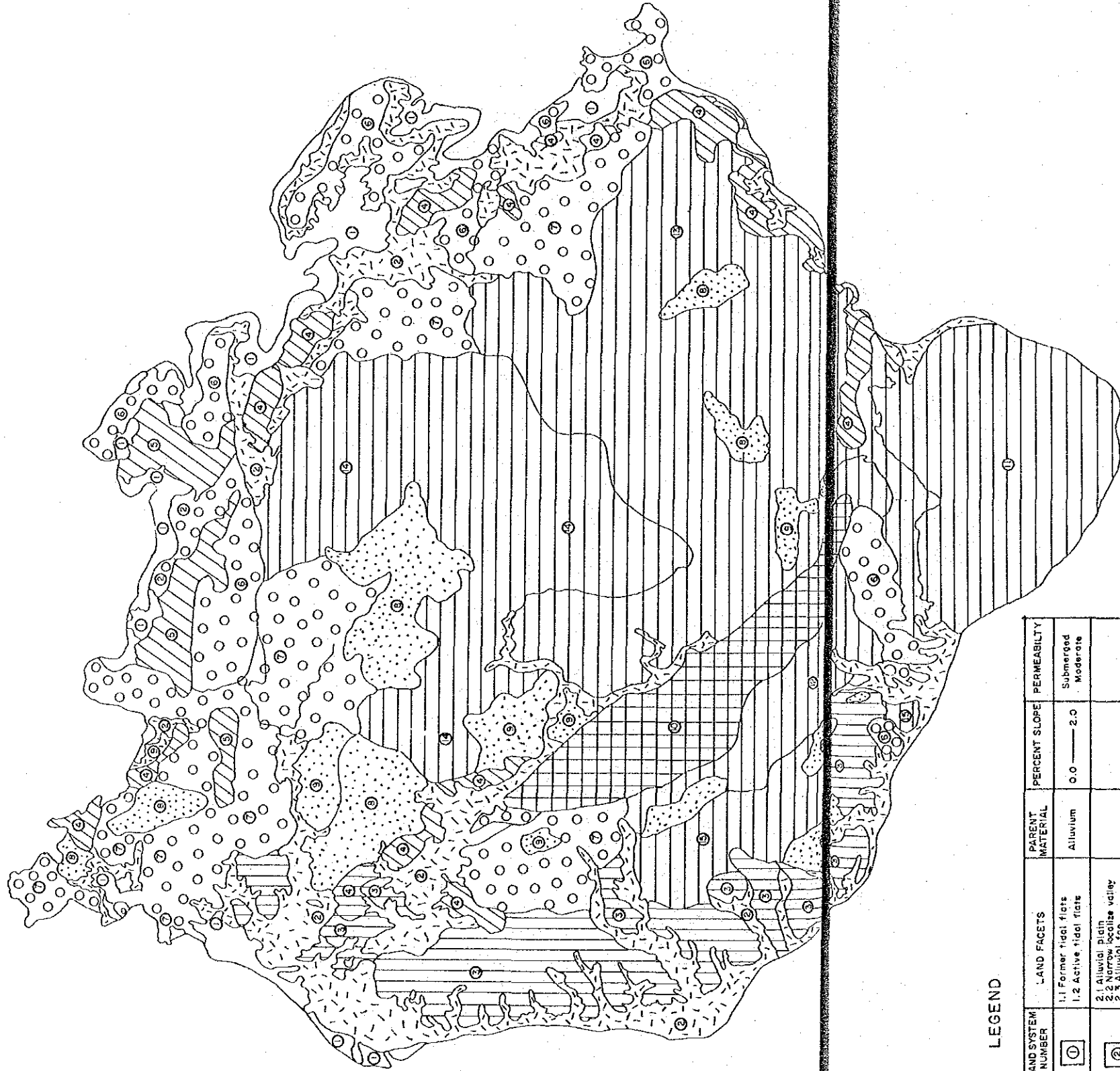


LEGEND:

MAPPING UNIT NO.	DOMINANT LAND USE
URBAN AREAS	Built up areas
AGRI-AREAS	Paddy rice (rainfed)
	Paddy rice (rainfed)
	Paddy rice (rainfed)
	Coconut
GRASSLAND SHrubLAND	Grasses
	Grasses
	Shrubs and Brushes
	Shrubs and Brushes
WOODLAND AREAS	Secondary Forest
	Secondary forest
	Primary mossy forest
WETLAND AREAS	Mangro and Fishpond

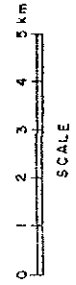


LAND CLASSIFICATION

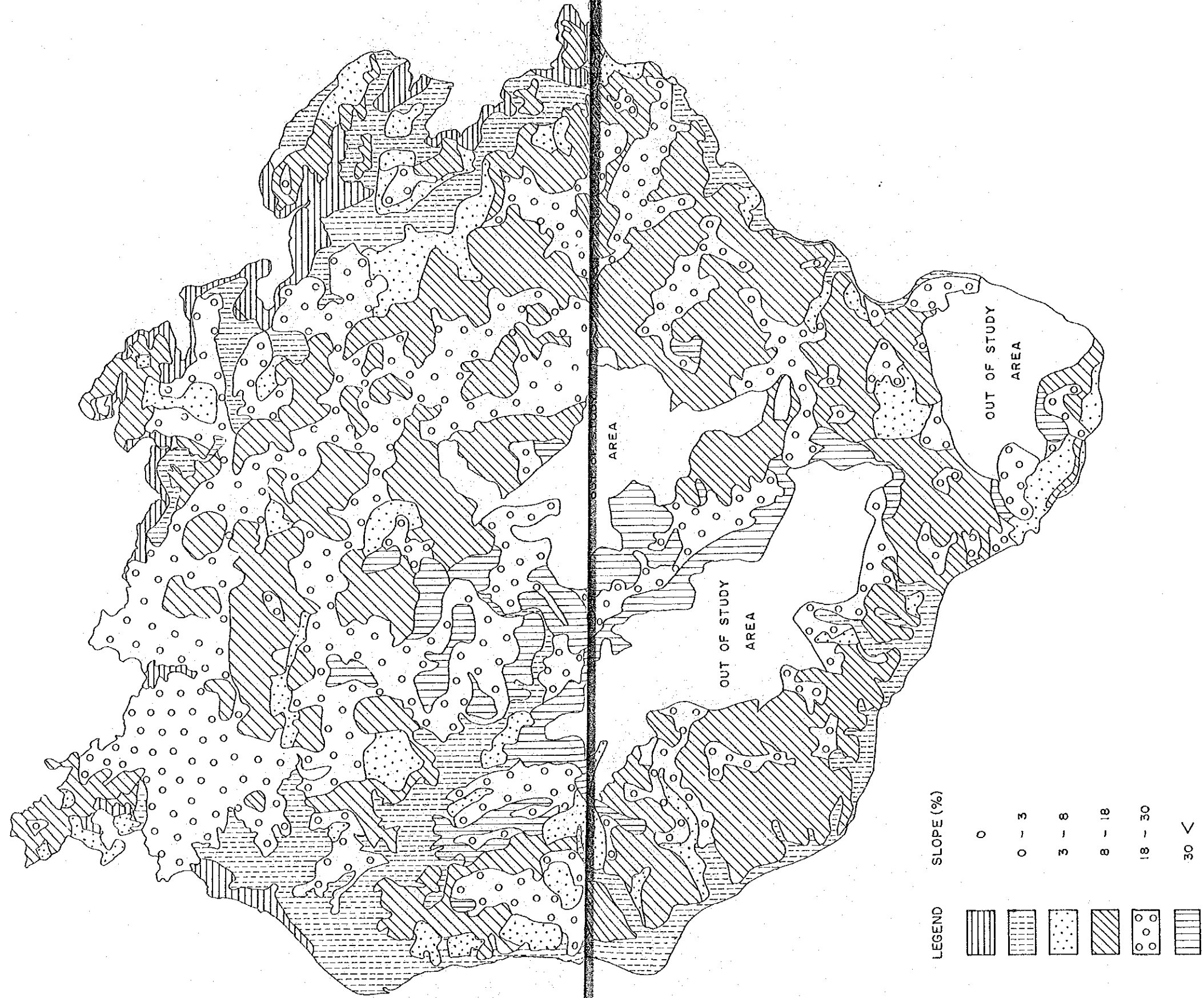


LEGEND

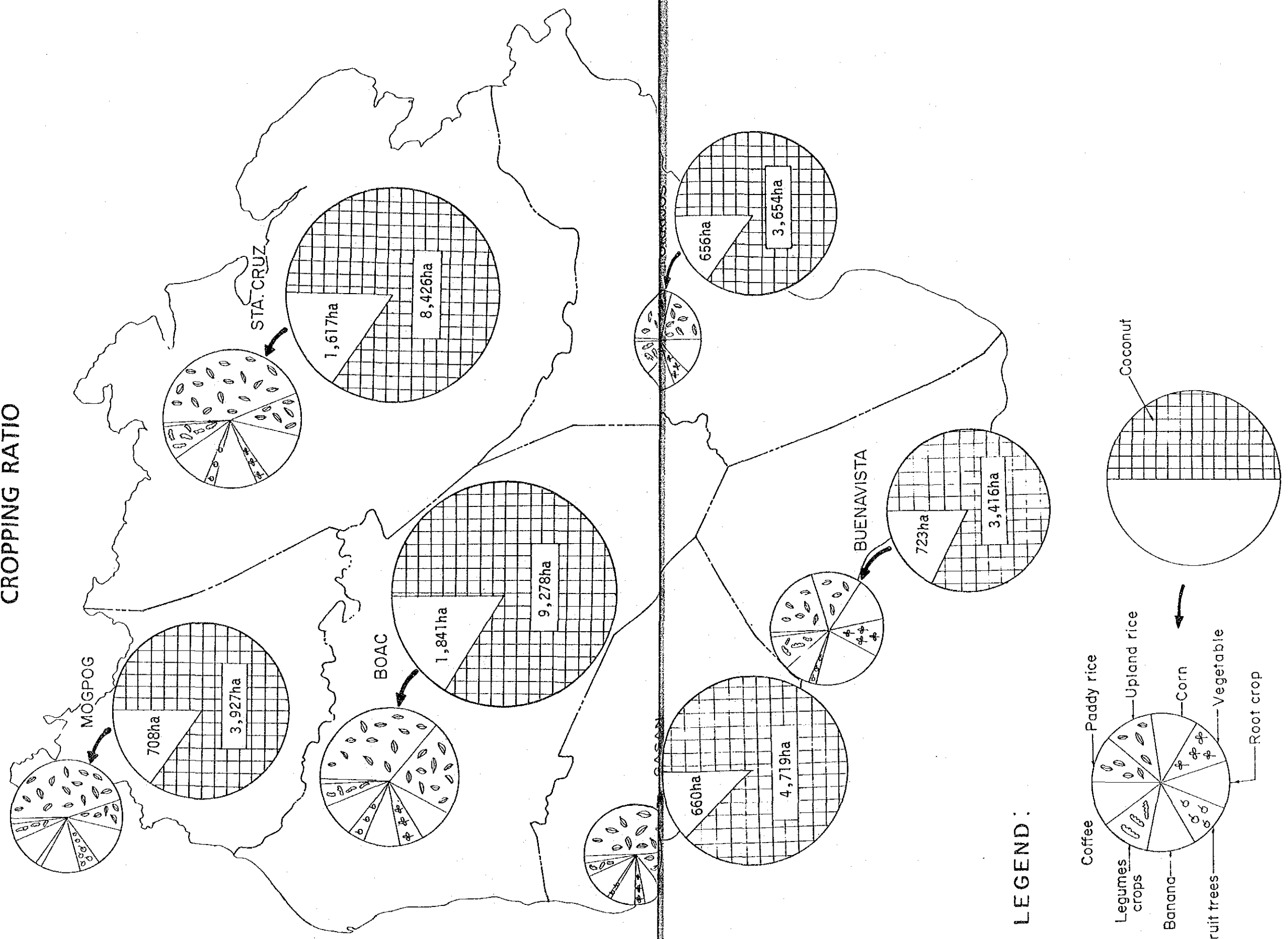
LAND SYSTEM NUMBER	LAND FACETS	PARENT MATERIAL	PERCENT SLOPE	PERMEABILITY
①	1.1 Former tidal flats 1.2 Active tidal flats	Alluvium	0.0 — 2.0	Submerged Moderate
②	2.1 Alluvial plain 2.2 Narrow, karstlike valley 2.3 Alluvial fan 2.4 Paver terrace 2.5 Lower alluvial terrace 2.6 River flood plains	Alluvium	0.0 — 8.0	Moderate
③	3.1 Ridges 3.2 Sideslope	Sedimentary	0.0 — 5.9	Moderate
④	3.3 narrow V shape terrace 3.4 Footslope 4.1 Ridges 4.2 Sideslope 4.3 Depression	Limestone	0 — 5.0	Moderate slow
⑤	5.1 Sinkholes 5.2 Ridges 5.3 Sideslope	Limestone	25 — 50	Moderate slow
⑥	6.1 Ridges 6.2 Sideslope 6.3 Piedmont plain	Volcanic	3 — 55	Moderate
⑦	7.1 Ridges 7.2 Sideslope	Volcanic	24 — 50	Moderate slow
⑧	8.1 Ridges 8.2 Sideslope 8.3 Alluvial valley	Diorite	25 — 40	Moderate slow
⑨	9.1 Ridges 9.2 Sideslope	Limestone	50 — 60	Moderate slow
⑩	10.1 Ridges 10.2 Sideslope	Sedimentary	20 — 55	Moderate-slow
⑪	11.1 Cone 11.2 Footslope 11.3 Alluvial fan	Volcanic	3 — 40	Moderate
⑫	12.1 Ridges 12.2 Sideslope	Volcanic	30 — 40	Moderate slow
⑬	13.1 Ridges 13.2 Sideslope	Volcanic	35 — 40	Slow
⑭	14.1 Ridges 14.2 Sideslope	Volcanic	25 — 60	Moderate slow
⑮	15.1 Ridges 15.2 Sideslope	Volcanic	30 — 40	Slow



LAND SLOPE MAP

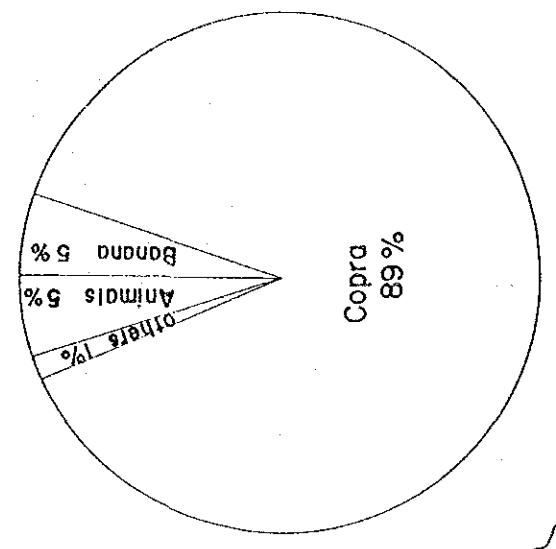


CROPPING RATIO



INFLOW AND OUTFLOW OF AGRICULTURAL PRODUCTS IN 1987

Others	5%
Vegetables	9%
Flour	12%
Sugar	16%
Rice	58%



OUTFLOW
3,405 Tons

INFLOW
2,476 Tons

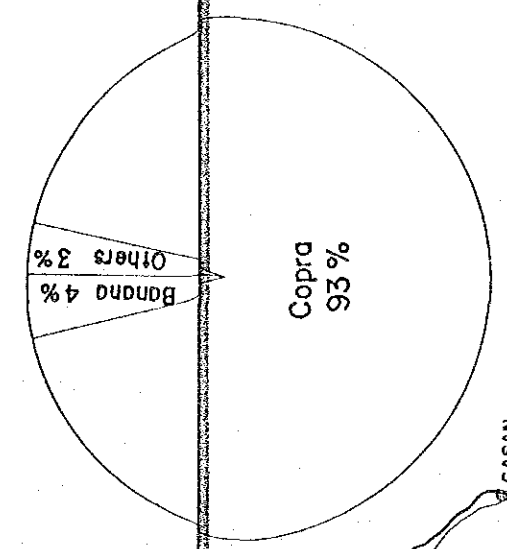
STA. CRUZ PORT

BALANACAN PORT

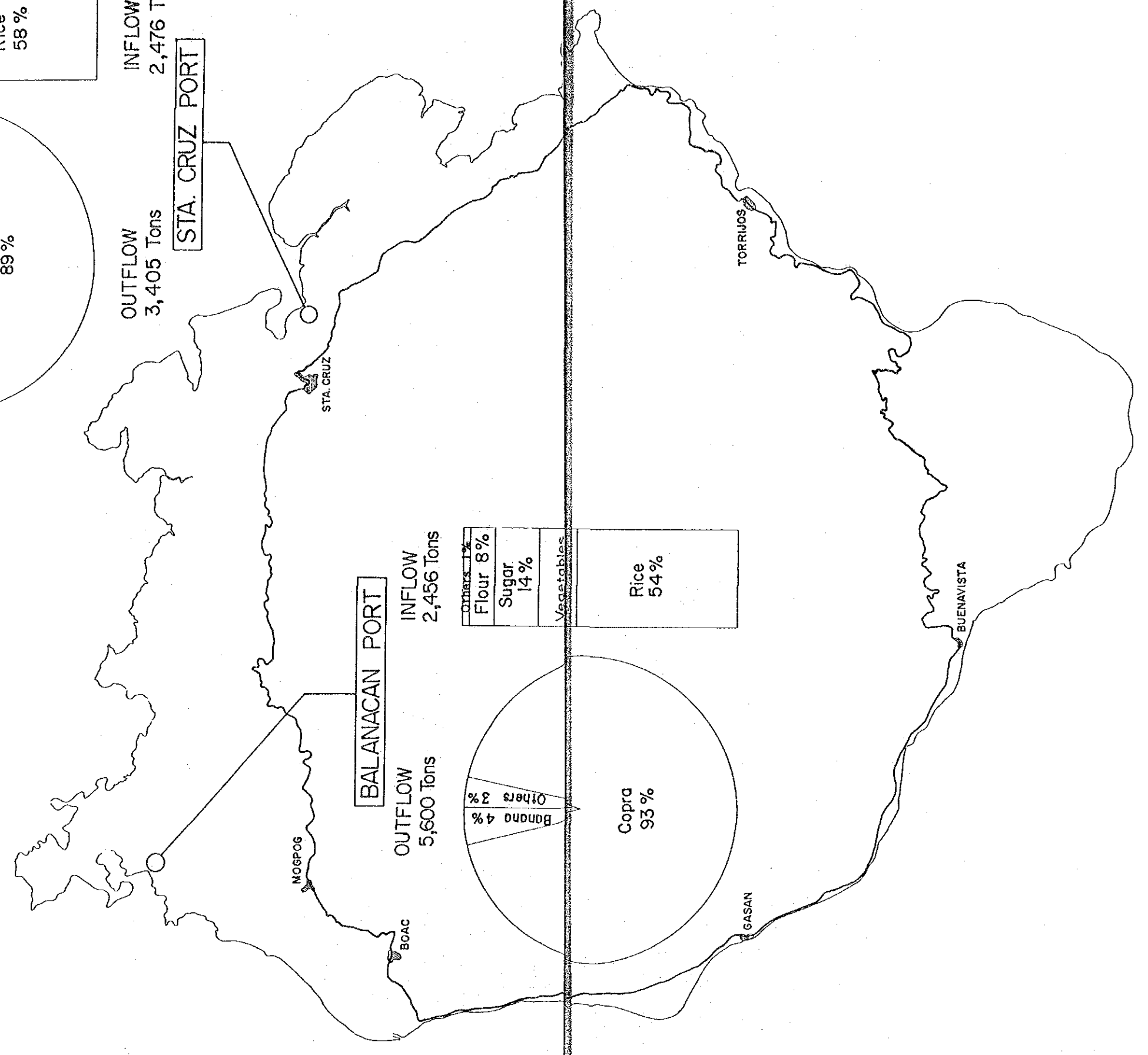
OUTFLOW
5,600 Tons

INFLOW
2,456 Tons

Others	1%
Flour	8%
Sugar	14%
Vegetables	1%



Rice	54%
------	-----



FARMER'S ORGANIZATION

MOGPOG	
FAA	NO. 7 MEMBER 258
FIA	NO. 1 MEMBER 40
IA	NO. 1 MEMBER 24

MOGPOG

BOAC

BOAC	
FAA	NO. 20 MEMBER 579
FIA	NO. 3 MEMBER 322

MEMBER 30

GASAN

GASAN	
FAA	NO. 5 MEMBER 103
FIA	NO. 1 MEMBER 28
IA	NO. 1 MEMBER 45

BUENAVISTA

BUENAVISTA	
FAA	NO. 2 MEMBER 76
FIA	NO. 1 MEMBER 25
IA	NO. 2 MEMBER 145

TORRIJOS

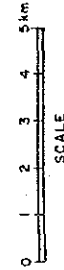
TORRIJOS	
FAA	NO. 9 MEMBER 296
FIA	NO. 1 MEMBER 29
IA	NO. 10 MEMBER 329

SANTA CRUZ	
FAA	NO. 24 MEMBER 778
FIA	NO. 5 MEMBER 145
IA	NO. 2 MEMBER 200

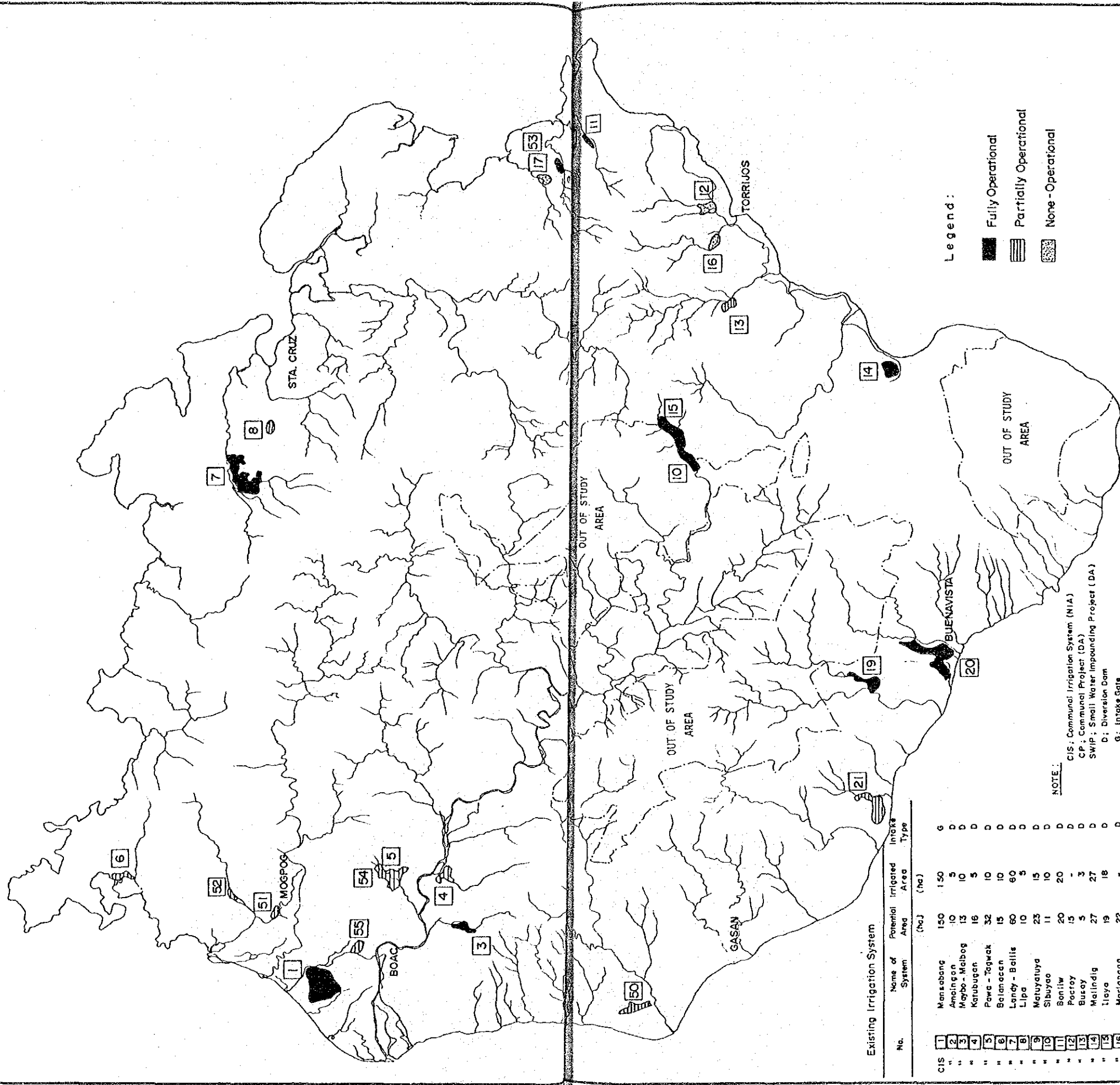
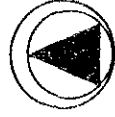
STA. CRUZ

LEGEND :

- FAA = FARMER'S ASSOCIATION
- FIA = FISHERMEN'S ASSOCIATION
- IA = IRRIGATOR'S ASSOCIATION



EXISTING IRRIGATION SYSTEM



Legend:

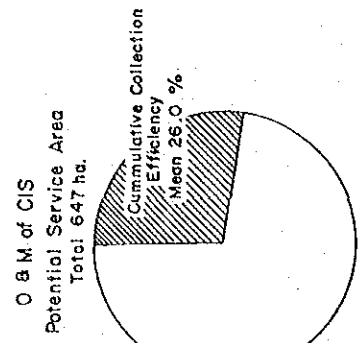
- Fully Operational
- ▨ Partially Operational
- ▩ None - Operational

NOTE:
 CIS: Communal Irrigation System (NIA)
 CP: Communal Project (DA)
 SWIP: Small Water Impounding Project (DA)
 D: Diversion Dam
 G: Intake Gate
 P: Pump
 I: Impounding Type
 #1: Individual Pump & Self-Irrigation



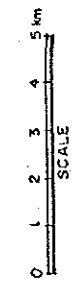
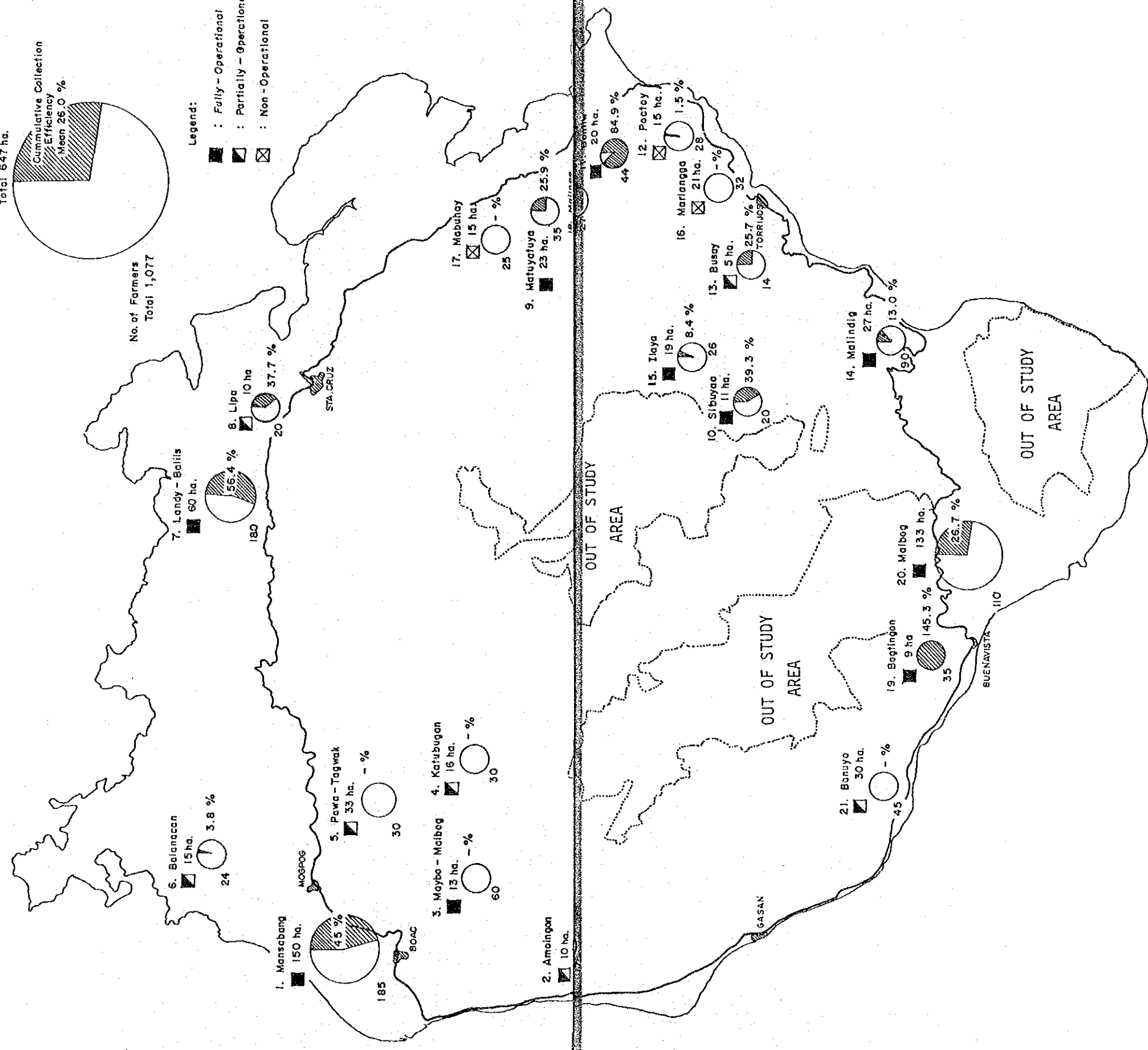
Existing Irrigation System			
No.	Name of System	Potential Irrigated Area (ha)	Intake Type
1	Mansabang	150	G
2	Amalinan	10	D
3	Mapo-Mabog	13	D
4	Karubagan	16	D
5	Pawa-Tagwak	32	D
6	Balanacan	15	D
7	Landy-Balis	60	D
8	Lipa	10	D
9	Matuyayaya	23	D
10	Sibuyao	11	D
11	Sonitw	20	D
12	Pactay	15	D
13	Busey	5	D
14	Melindig	27	D
15	Llaya	19	D
16	Marianga	22	D
17	Mabuhay	15	D
18	Malinao	12	D
19	Bagtingan	9	D
20	Malbog	133	D
21	Banuye	30	D
50	Masiga	53	P
51	Loon	59	P
52	Bintakay	12	P
53	Mabuhay	27	D
54	Pawa	12	I
55	Bantad	17	I
Total		827	517
Others (#1)		417	389
G. Total		1,240	906

O & M COMMUNAL IRRIGATION SYSTEM

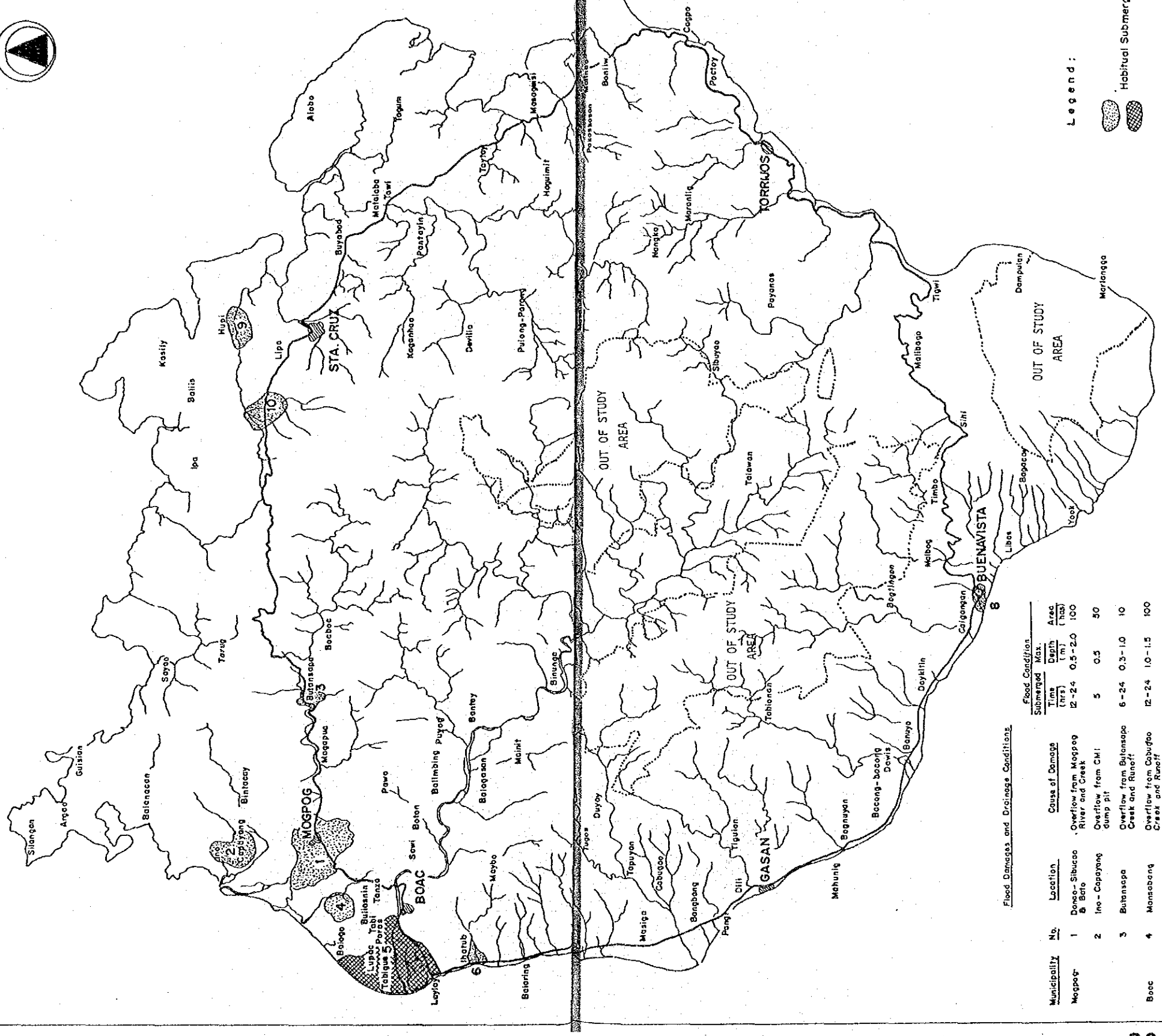
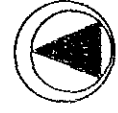


No. of Farmers
Total: 1,077

- Legend:
- : Fully - Operational
 - ▨ : Partially - Operational
 - : Non - Operational



PRESENT DRAINAGE CONDITIONS



Flood Damages and Drainage Conditions

Municipality	No.	Location	Cause of Damage	Flood Condition		
				Time (hrs)	Submerged (m ²)	Max. Depth (m)
Mogpog	1	Dugo-Sibucco	Overflow from Mogpog River and Creek	12-24	0.5-2.0	100
	2	Ino-Capayang	Overflow from CMI dump pit	5	0.5	50
	3	Bunansa	Overflow from Bunansa Creek and Runoff	6-24	0.3-1.0	10
Baco	4	Monsabang	Overflow from Cabugoo Creek and Runoff	12-24	1.0-1.5	100
	5	Tobique	Overflow from Baco River	6	0.3-0.5	150
	6	Ihelub	Overflow from Itatata Creek	4-6	0.3	10
Buena Vista	7	Bungoy	Overflow from Creek	6	0.3	15
	8	Bvt. Caligangan and Poblacion	Runoff	4	0.3-0.5	15
Sta. Cruz	9	Hupl	Runoff Water	3-6	0.3-0.5	30
	10	Landy	Overflow from Creek	3-4	0.3-0.5	40
Total						520

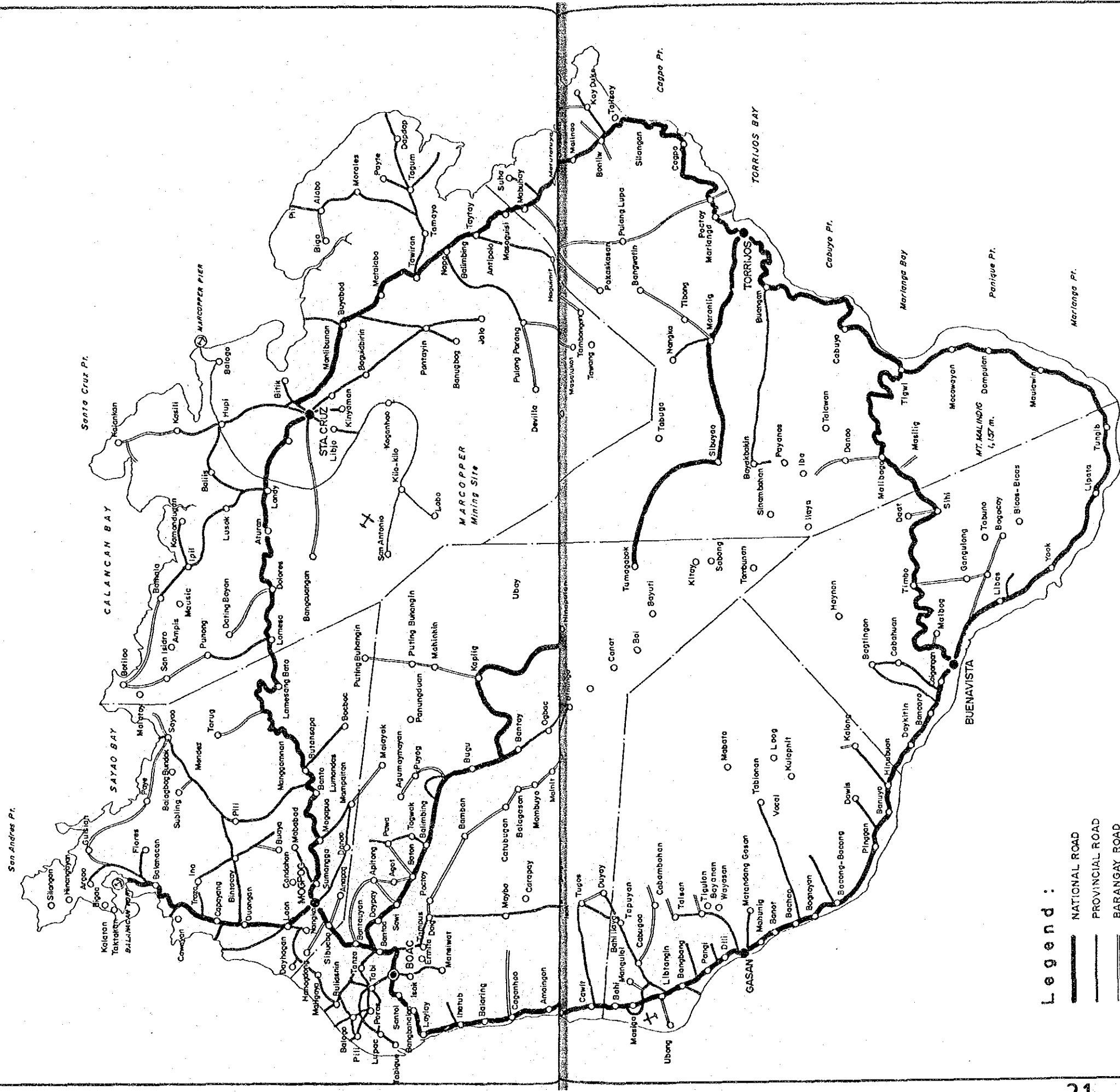
Source: Provincial Engineering Office and JICA Study Team (as of Aug. 1989)

Legend:

- Habitual Submerged Area



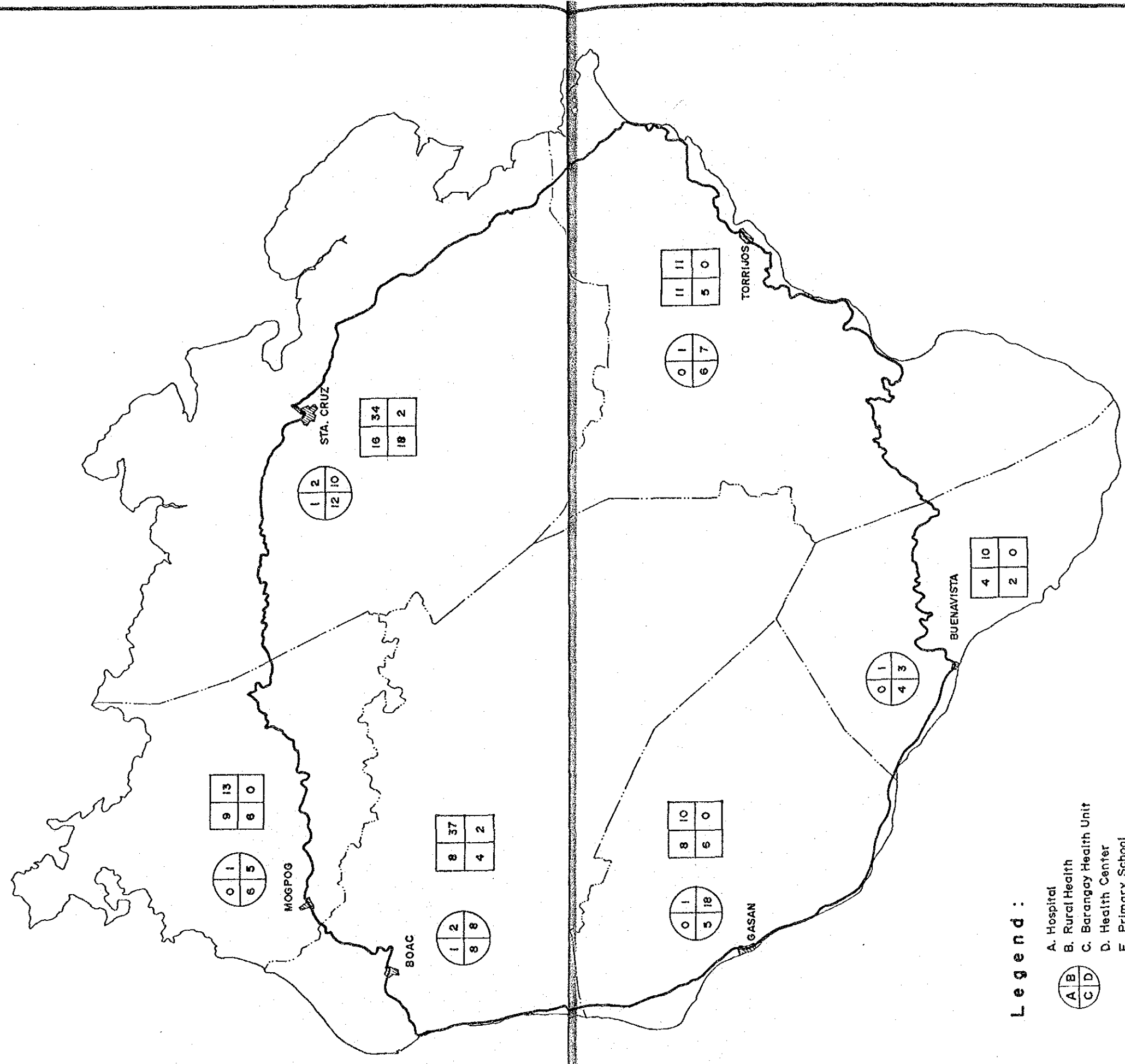
EXISTING ROAD NETWORK



- Legend :**
- NATIONAL ROAD
 - PROVINCIAL ROAD
 - BARANGAY ROAD
 - MARCOPPER MINING ROAD (PRIVATE)
 - PROVINCIAL CAPITAL
 - MUNICIPALITY
 - BARANGAY
 - MUNICIPAL BOUNDARY



GEOGRAPHIC SITUATION OF SOCIAL SERVICES INSTITUTION

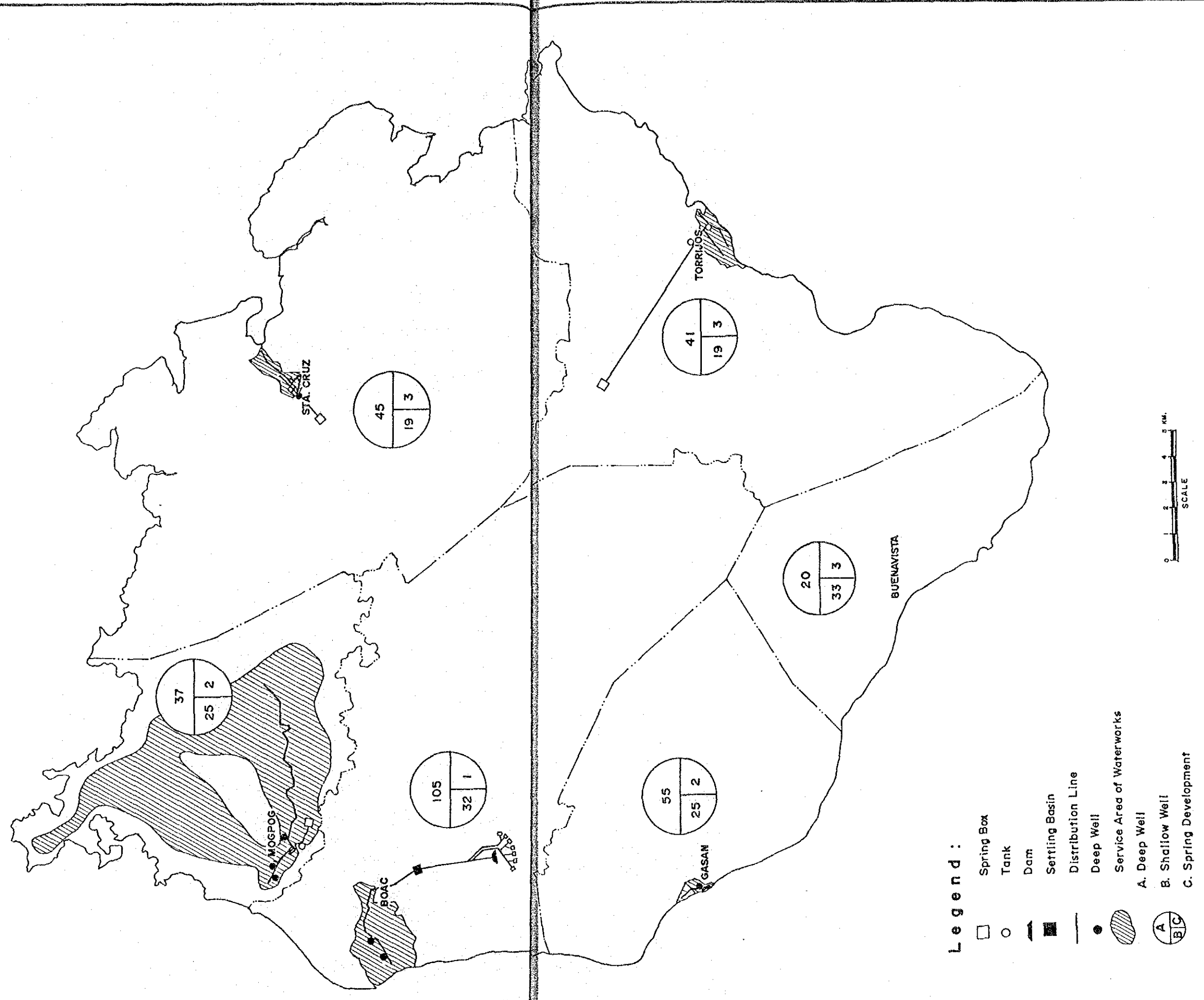


Legend :

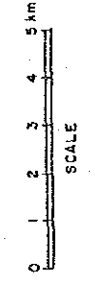
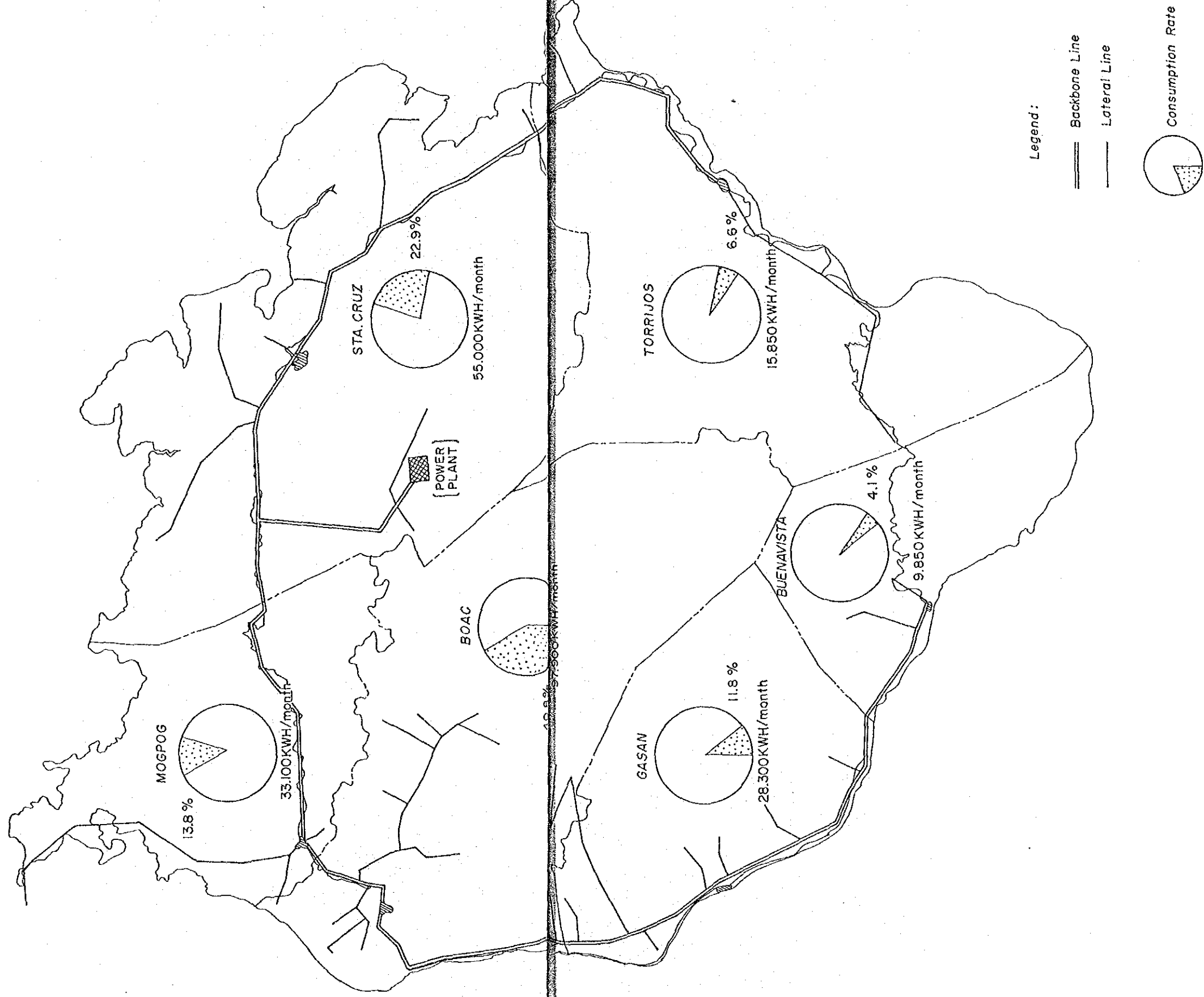
- A. Hospital
- B. Rural Health
- C. Barangay Health Unit
- D. Health Center
- E. Primary School
- F. Elementary School
- G. High School
- H. College



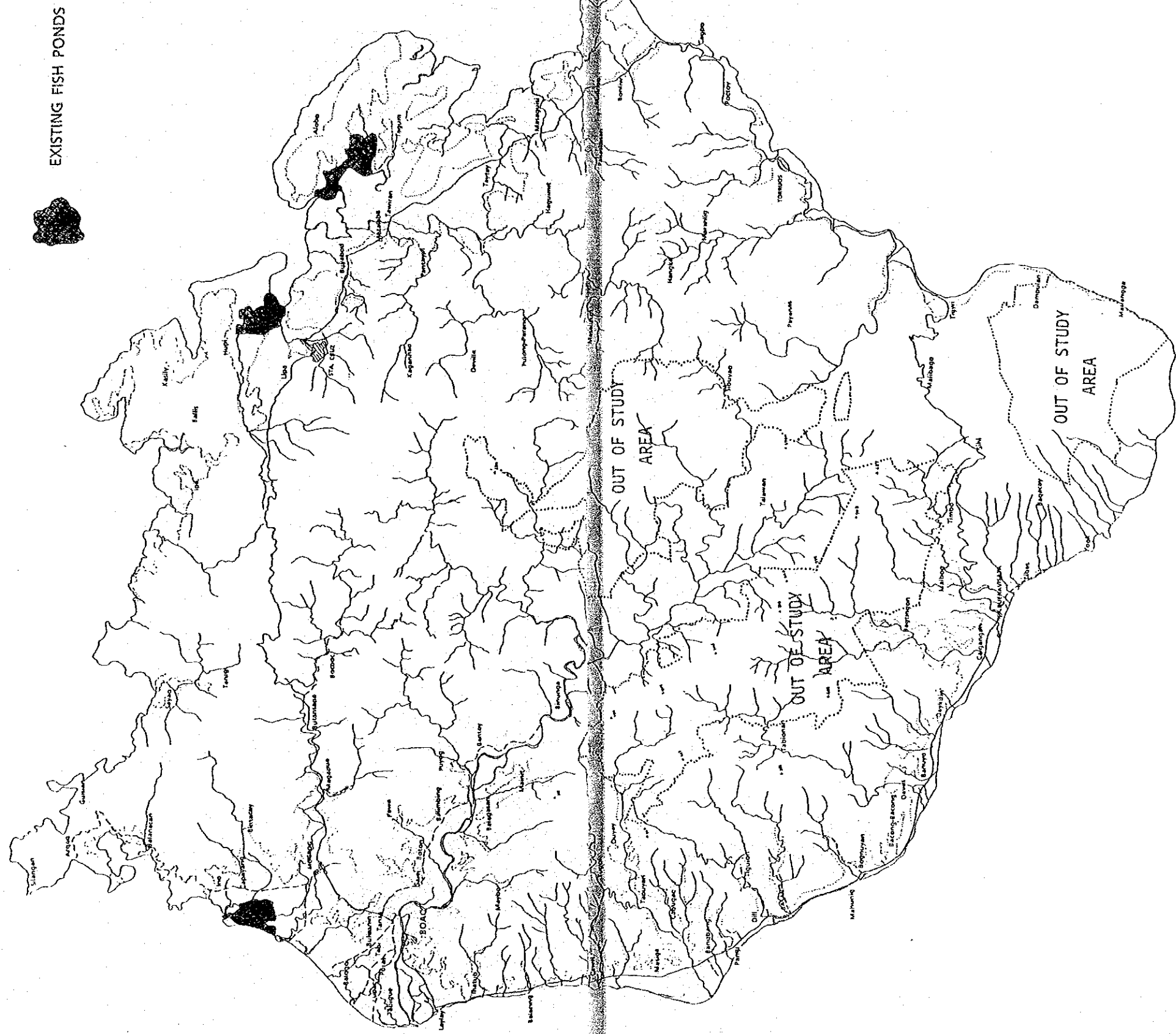
GEOGRAPHIC SITUATION OF WATER SUPPLY FACILITIES



TRANSMISSION LINE NETWORK & CONSUMPTION MAP



LOCATION MAP OF EXISTING FISH PONDS



JICA