



SAMAR
INTEGRATED RURAL DEVELOPMENT PROJECT

THE MASTER PLAN
FOR
THE INTEGRATED AGRICULTURAL/ RURAL
DEVELOPMENT PROJECT
IN WESTERN SAMAR

MAIN REPORT

DECEMBER 1988

JAPAN INTERNATIONAL COOPERATION AGENCY

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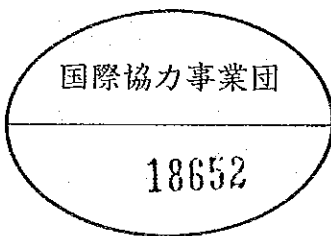
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PREFACE

In response to a request from the Government of the Republic of the Philippines, the Japanese Government has decided to conduct a Master Plan Study on the Integrated Agricultural/Rural Development Project in Western Samar and entrusted the study to the Japan International Cooperation Agency (JICA).

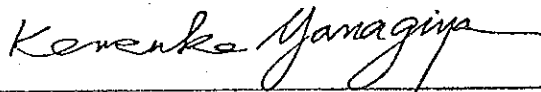
JICA sent to the Philippines a survey team headed by Mr. Yoshio ARAI, SANYU CONSULTANTS INC., in 1987 and 1988.

The team exchanged views on the study with the officials concerned of the Government of the Philippines and conducted field surveys in the Samar province. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the development of the province and to the promotion of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

December, 1988



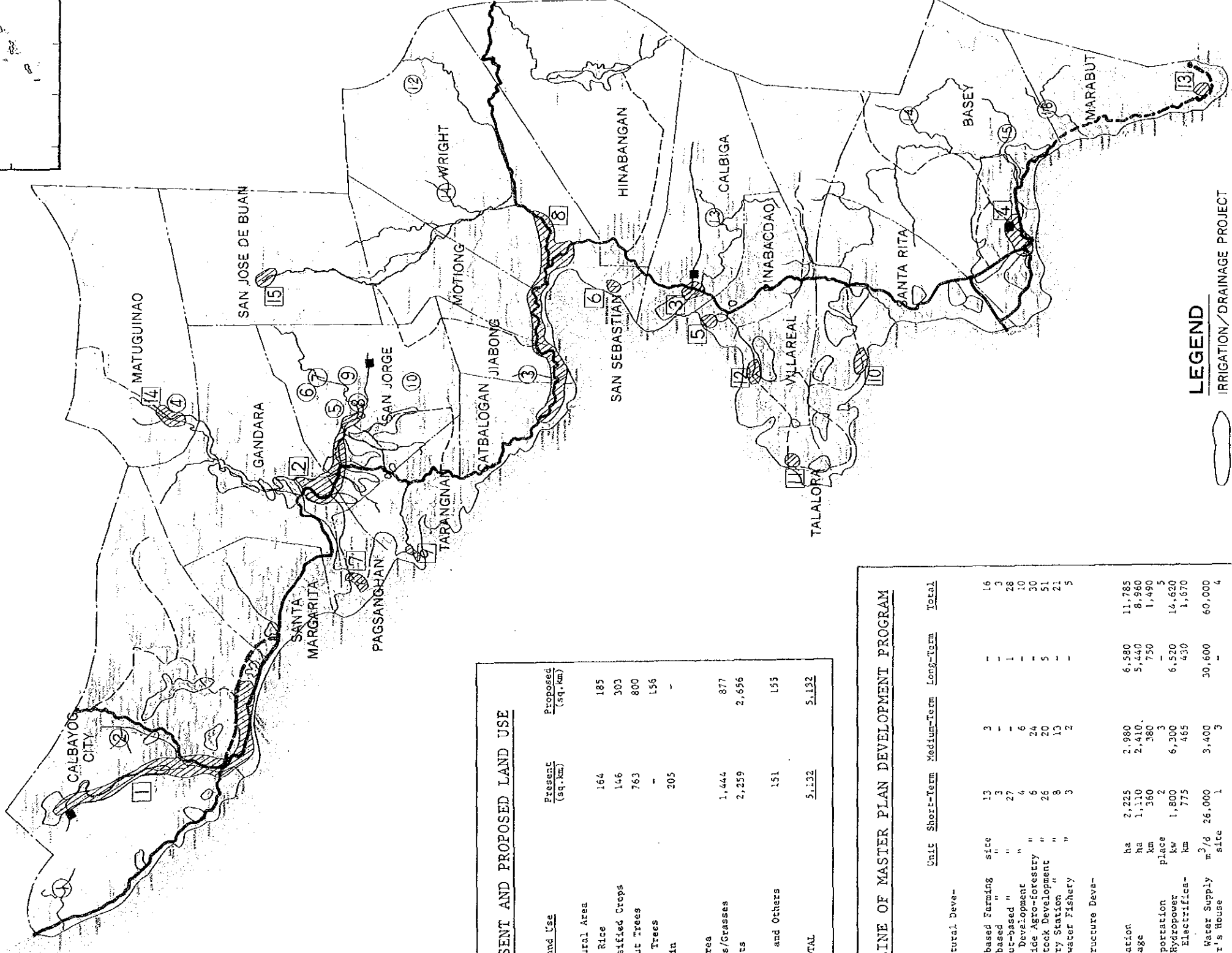
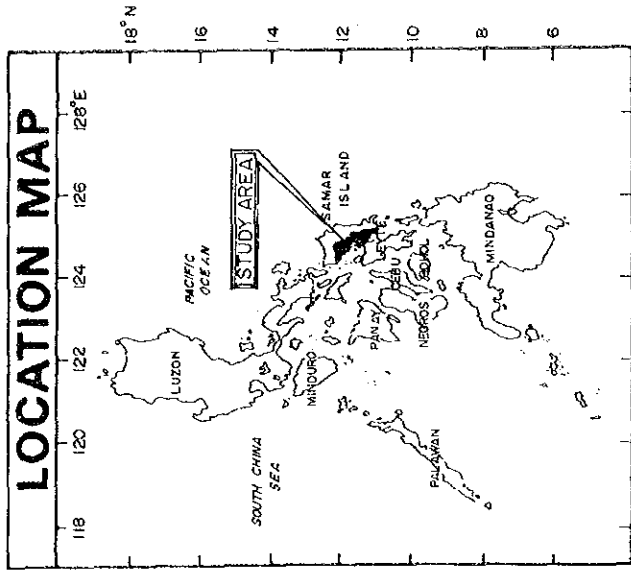
KENSUKE YANAGIYA

President

Japan International Cooperation Agency

GENERAL PLAN

THE INTEGRATED AGRICULTURAL/ RURAL DEVELOPMENT PROJECT IN WESTERN SAMAR



PRESENT AND PROPOSED LAND USE

Land Use	Present (sq.km)	Proposed (sq.km)
I. Agricultural Area		
Paddy Rice	164	185
Diversified Crops	146	303
Coconut Trees	763	800
Fruit Trees	-	156
Kaingin	205	-
II. Forest Area		
Shrubs/Grasses	1,444	877
Forests	2,259	2,656
III. Wetland and Others		
	151	155
TOTAL	5,132	5,132

OUTLINE OF MASTER PLAN DEVELOPMENT PROGRAM

Component	Unit	Short-Term	Medium-Term	Long-Term	Total
1. Agricultural Development					
1) Rice-based Farming	size	13	3	-	16
2) Corn-based	"	3	-	1	3
3) Coconut-based	"	27	-	1	28
4) Abaca Development	"	4	6	-	10
5) Hillside Agro-forestry	"	6	24	-	30
6) Livestock Development	"	26	20	5	51
7) Nursery Station	"	8	13	-	21
8) Freshwater Fishery	"	3	2	-	5
2. Infrastructure Development					
1) Irrigation	ha	2,225	2,980	6,580	11,785
2) Drainage	ha	1,110	2,410	5,440	8,960
3) Road	km	360	380	750	1,490
4) Transportation	place	2	3	-	5
5) Mini-Hydropower	kw	1,800	6,300	6,520	14,620
6) Rural Electrification	km	1,775	465	430	1,670
7) Rural Water Supply	m ² /d	26,000	3,400	30,600	60,000
8) Farmer's House	site	1	3	-	4
3. Social Services Development					
1) Health Services (BHS)	place	30	40	120	190
2) Education	room	610	770	820	2,200
3) Housing	D.U.	1,350	1,350	2,600	5,300
4) Communication	sta.	76	41	28	145
4. Small-Scale and Cottage Industry	place	7	2	2	11
5. ADPP	place	1	-	-	1

- LEGEND**
- IRRIGATION/ DRAINAGE PROJECT
 - RURAL WATER SUPPLY PROJECT AND WATER SOURCE
 - MINI-HYDROPOWER GENERATION PROJECT
 - ROAD DEVELOPMENT
National Roads (Existing, Proposed)
Other Roads (Existing, Proposed)
 - BOUNDARY OF MUNICIPALITY
 - MAJOR RIVER

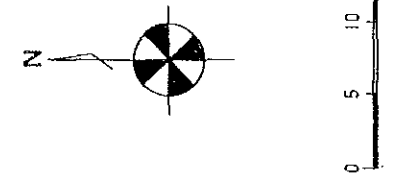


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" D	Soil, Land Use and Conservation
" E	Agriculture
" F	Irrigation and Drainage
" G	Road and Transportation
" H	Rural Electrification and Mini-hydropower
" J	Rural Water Supply
" K	Social Infrastructure
" L	Rural Sociology and Farmers' Organization
" M	Cost Estimate
" N	Agro-Economy

APPENDIX II (Plans for Development of Priority Project)

CHAPTER 1.	Introduction
" 2.	Agricultural Development
" 3.	Agricultural Infrastructural Development
" 4.	Post-Harvest and Marketing Services Assistance
" 5.	Farmers' Organization Development
" 6.	Agricultural Development and Promotion Center (ADPC)
" 7.	Development Cost
" 8.	Implementing Program
" 9.	Project Evaluation

ABBREVIATION

ABBREVIATIONS

AGENCIES, INSTITUTIONS AND ORGANIZATIONS

BAEcon	Bureau of Agricultural Economics
BAPA	Barangay Power Association
BAS	Bureau of Agricultural Statistics
BAEx	Bureau of Agricultural Extension
BAT	Bureau of Air Transportation
BCGS	Bureau of Coast and Geodetic Survey
BDT	Bureau of Domestic Trade
BFD	Bureau of Forest Development
BFT	Bureau of Foreign Trade
BIR	Bureau of Internal Revenue
BL	Bureau of Lands
BMG	Bureau of Mines and Geo-Sciences
BOI	Board of Investment
BOP	Bureau of Posts
BOS	Bureau of Soils
BSMI	Bureau of Small and Medium Industries
BUTEL	Bureau of Telecommunications
CB/CBP	Central Bank of the Philippines
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DBM	Department of Budget and Management
DECS	Department of Education, Culture and Sports
DFA	Department of Foreign Affairs
DLG	Department of Local Government
DOF	Department of Finance
DOH	Department of Health
DOLE	Department of Labor and Employment
DOTC	Department of Transportation and Communication
DPWH	Department of Public Works and Highways
DSWD	Department of Social Welfare Development
DTI	Department of Trade and Industry
ELCO	Electric Cooperative
EOJ	Embassy of Japan
FDC	Forestry Development Center
FIDA	Fiber Industry Development Authority
FNRI	Food and Nutrition Research Institute
FORI	Forest Research Institute
FPOP	Family Planning Organization of the Philippines
FPRDI	Forest Products Research and development Institute
FSDC	Farm System Development Corporation

GCMCC	Government Corporation Monitoring Coordinating Committee
GSIS	Government Service Insurance System
IBRD	International Bank for Reconstruction and Development
IRRI	International Rice Research Institute
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
JSPS	Japan Society for the Promotion of Science
LBP	Land Bank of the Philippines
LWUA	Local Water Utilities Administration
MWSS	Metropolitan Waterworks and Sewerage System
NACTAD	National Council on Integrated Area Development
NACIDA	National Cottage Industries Development Authority
NDC	National Development Corporation
NCSSO	National Census and Statistics Office
NEA	National Electrification Administration
NEDA	National Economic and Development Authority
NEPC	National Environmental Protection Council
NFA	National Food Authority
NHA	National Housing Authority
NIA	National Irrigation Administration
NIST	National Institute of Science and Technology
NLUC	National Land Use Committee
NMYC	National Manpower and Youth Council
NNC	National Nutrition Council
NPC	National Power Corporation
NPCC	National Pollution Control Commission
NRCP	National Research Council of the Philippines
NWRC	National Water Resources Council
OEA	Office of Energy Affairs
OECE	Overseas Economic Cooperation Fund
PAGASA	Philippine Atmospheric Geophysical and Astronomical Service Administration
PCA	Philippine Coconut Authority
PCARRD	Philippine Council for Agricultural Resources Research and Development
PCCI	Philippines Chamber of Commerce and Industry
PCIERD	Philippine Council for Industry and Energy Research and Development
PCGG	Presidential Commission on Good Government
PCGR	Presidential Commission on Government Reorganization
PNB	Philippine National Bank
PNOC	Philippine National Oil Corporation
PPA	Philippine Ports Authority

RDC	Regional Development Council
RWDC	Rural Waterworks Development Corporation
SAMELCO I	Samar I Electric Cooperation Inc.
SAMELCO II	Samar II Electric Cooperation Inc.
SIRDP	Samar Integrated Rural Development Project
SSS	Social Security System
TBAC	Technical Board for Agricultural Credit
UEP	University of the Eastern Philippines
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UP	University of the Philippines
VISCA	Visayas State College of Agriculture

OTHER TERMS

A & D	Alienable and Disposable
AFF	Agro-Forestry Farms
APD	Areas for Priority Development
AITTP	Agro-Industrial Technology Transfer Program
BHS	Barangay Health Station
CAL	Certificate of Agricultural Leasehold
CCHP	Comprehensive Community Health Program
CBR	Crude Birth Rate
CDR	Crude Death Rate
CEDP	Community Employment and Development Program
CLT	Certificate of Land Transfer
CPI	Consumer Price Index
CSME	Cottage, Small and Medium Enterprise
CSMI	Cottage, Small and Medium Industries
EO	Executive Order
FB	Farmer Beneficiary
FIES	Family Income and Expenditure Survey
FOB	Free on Board
GDP	Gross Domestic Product
GNP	Gross National Product
GO	Government Organization
GOJ	Government of Japan
GOP	Government of the Philippines
GRDP	Gross Regional Domestic Product
GVA	Gross Value Added
HNFP	Health Nutrition and Family Planning
IAD	Integrated Area Development
IEC	Information, Education and Communication
IMR	Infant Mortality Rate
ISH	Integrated Survey of Households
KKK	Kilusang Kabuhayan at Kaunlaran
LADP	Local Administration Development Program
LHO	Leasehold Operation
KIT	Land Investment Trust
MCRA	Married Couples of Reproductive Age
MIA	Manila International Airport
MIS	Management Information System
NFE	Non Formal Education
NGO	Non-Government Organization
ODA	Official Development Assistance
OECE	Overseas Economic Cooperation Fund
OSY	Out-of School Youth
PD	Presidential Decree
PFNP	Philippine Food and Nutrition Program
RA	Republic Act
R & D	Research and Development
RDIP	Regional Development Investment Program
RDF	Regional Development Fund
RHU	Rural Health Unit
TB	Tuberculosis
TFR	Total Fertility Rate
TLA	Timber Lease Agreement
WFP	World Food Program

CONVERSION FACTORS, MEASUREMENT AND GLOSSARY

CONVERSION FACTORS

<u>Unit</u>		<u>Comparison</u>	<u>English Equivalent</u>
Unit of Length:			
Millimeters	(mm)	0.001 m	0.0394 inch
Centimeter	(cm)	0.01 m	0.3937 inch
Meter	(m)		3.2809 feet
Kilometer	(km)	1,000 m	0.6214 mile
Unit of Area:			
Square centimeter	(cm ²)	0.0001 m ²	0.155 square inch
Square meter	(m ²)		10.764 square feet
Hectare	(ha)	10,000 m ²	2.471 acres
Square kilometer	(km ²)	1,000,000 m ²	0.3861 square mile
Unit of Volume:			
Cubic centimeter	(cm ³)		0.061 cubic inch
Liter	(lit)	1,000 cm ³	0.264 US gallons (0.21997 gallons)
Cubic meter	(m ³)	1,000 lit	35.3147 cubic feet
Unit of Weight:			
Gram	(g)		0.0353 ounce
Kilogram	(kg)	1,000 g	2.2046 pounds
Metric ton	(ton or mt)	1,000 kg	2,204.6 pounds

UNIT OF MEASUREMENT

mm	:	millimeter(s)
cm	:	centimeter(s)
m	:	meter(s)
km	:	kilometer(s)
cm ²	:	square centimeter(s)
m ²	:	square meter(s)
km ²	:	square kilometer(s)

lit	:	liter(s)
m ³	:	cubic meter(s)
MCM or 10 ⁶	:	million cubic meter(s)
lit/sec	:	liter per second
m/sec	:	meter(s) per second
PPM or ppm	:	part(s) per million
g	:	gram(s)
kg	:	kilogram(s)
ton	:	ton(s)
cavan	:	50 kg
m ³ /sec	:	1,000 lit/sec = 35.3145 cubic feet per second = 15,850 US gallons per minute
knot(s)	:	1.86 km/hr = 0.515 m/sec
lit/sec/day	:	8.64 mm depth over one hectare
10 mm depth over one (1) hectare	:	= 1.157 lit/sec/day = 3,532 cubic feet
sec	:	second(s)
min	:	minute(s)
hr	:	hour(s)
Max. or max.	:	maximum
Min. or min.	:	minimum
%	:	percent(s)
No.	:	number
°C	:	degree centigrade
°F	:	degree fahrenheit
Cl	:	chlorine
HP	:	horse power
W	:	watt(s)
KW	:	kilowatt(s)
MW	:	megawatt(s)
WH	:	watt(s) hour
KWH	:	kilowatt(s) hour = 1,000 WH

MWH	:	megawatt(s) hour = 1,000 KWH
EL	:	elevation above MSL
MSL	:	mean sea level
FWL	:	full water level
HWL	:	high water level
LWL	:	low water level
ET	:	evapotranspiration
ETcrop	:	evapotranspiration of crop
N	:	nitrogen
P	:	phosphorus
K	:	potassium
LV	:	local variety
LIV	:	local improved variety
HYV	:	high yielding variety
O & M	:	operation and maintenance
EIRR	:	economic internal rate of return
B/C	:	benefit cost ratio
FY	:	fiscal year (1st of January to 31st of December)
₱	:	peso(s) = US\$ 0.049 (as of June, 1987)
\$:	dollar(s) = 20.50 pesos (as of June, 1987)

GLOSSARY

Study Area	:	Area of 5,132 km ² covered by the Master Plan of the Integrated Agricultural/Rural Development Project in Western Samar
province	:	A political subdivision of a country comprising several municipalities
municipality	:	A political subdivision of a province comprising several barangays
Barangay	:	A political subdivision of a municipality comprising several villages
poblacion	:	A political center of a town
Monsoon	:	Periodic wind that blows from the sea to the continent and oppositely in rainy season

Trade wind	:	One of three Philippines air currents, comprising from a generally easternly direction reaching the island during the period from February to April.
Tropical cyclone	:	PAGASA classifies the tropical cyclone by the wind speed as follows; <ul style="list-style-type: none"> - Tropical Depression ; up to 17.1 m/sec (33 knots) - Tropical Storm ; 17.2 m/sec (34 knots) to 32.6 m/sec (63 knots) - Typhoon ; over 32.7 m/sec (64 knots)
Paddy (Oryza sativa)	:	The rice plant which bears a staple cereal, or the cereal itself unhulled.
IR62 or 64	:	High yielding varieties from IRRI, Los Baños, Philippines
Cogon (Imperata cylindrica)	:	A coarse grass which usually covers idle lands or abandoned clearing.
Ganta	:	A common unit of volume for rice equivalent to 2.24 kg of milled rice
Bamboo (Bambusa spinosa)	:	A woody grass with a big hollow in the center of the internodes, growing in groves or clumps reaching a height of about 25 m or more.
Nipa (Nypa fructicans)	:	Heave-leafed type of palm used in thatching huts.
Share Tenancy	:	A practice where operators rent the land they work and pay as rent a share of the cash or crops grown.
Carabao	:	The animal that most farmers used for plowing and other farm works. It is about the size of an ox and its similar to the water buffalo in other countries.
Fiesta	:	Spanish term for feast, celebrated pompously once a year to honor the patron saint.
Payatak	:	Traditional land preparation method, by trampling by using more than two carabaos without any other instruments.
Kaingin	:	Deforestation by shifting cultivation with slashing and burning forest/brush.
Banca	:	small boat
Survival rate	:	The number who graduate/ the number who enroll
Intra-regional	:	Within a region
Inter-regional	:	Between regions

SUMMARY

SUMMARY

(Introduction)

1. In response to the request of the Government of the Republic of the Philippines, the Government of Japan through the Japan International Cooperation Agency (JICA) dispatched Preliminary Study Team to the Philippines and concluded the Implementing Arrangement of the Technical Cooperation (I/A) between the Samar Integrated Rural Development Project (SIRD) and JICA for the Master Plan Study on the Integrated Agricultural/Rural Development in Western Samar in the Republic of the Philippines on December 3, 1986.

In accordance with the I/A, JICA dispatched the Study Team composed of 13 members to the Philippines for three times of the field survey in 1987 and 1988.

This Final Report consists of Main Report, Appendix I and Appendix II which was prepared based upon the study on the findings and observations of the field survey.

(Methodology of Survey and Study)

2. The Master Plan for the Project is formulated based on the result of the field surveys conducted on the physical, social and economic conditions to grasp the present situation, the inhabitants' needs through inquiry survey and the Philippine government's national and regional development plans in review.

Through the three procedures as above, well balanced development plan among the sectoral development components shall be provided for revitalizing the economy, improving the inhabitants' living standards, and balancing the disparity in distribution of wealth so as to keep prosperity of the Samar province.

(The Study Area)

3. The Samar province, the western portion of the Samar island, is located at about 500 km south-east of Manila, the capital of the Philippines. The Samar island has the width of about 80 km by east-west and about 150 km by north-south in its central part of the island and is located at the eastern margin of the Philippine Islands facing the Philippine Trench on the east, the Pacific Ocean on the north, and those shallow areas of the Samar Sea and the Visayan Sea on the west and the south, respectively.
4. The climate in the Samar island can be categorized into two types (II and IV) according to the Coronas climate classification system. The annual rainfall is 2,636 mm, mean temperature 28°C, mean humidity 80 percent, and annual mean evaporation 1,460 mm in Catarman.

The area of the Samar island excluding islets is divided into 39 river basins, 23 of which are located in the area of the Samar province, and 60 percent of their drainage area is shared by seven major basins. A height of specific runoff is from 1,500 to 3,000 mm per year in the Samar province and the flood runoff is characterized by "fast rising and fast drawing flood".

5. The coastal plain and the valley land form an area with 0-3 percent of slope to cover about 9.0 percent of the total Study Area. In the area of this category, three types of fluvial deposit soils as San Manuel Loam, Bigaa Loam, and Tingib soil series are dominant in the Jibatan, Gandara and Basey river basins. The San Manuel Loam soils are deep and fertile, classified into Class A (very good land for cropping), while the Bigaa Loam and Tingib Clay Loam are classified into Class B (good land) and Class C (moderately good land), respectively due to various degree of poor drainability. The plateau and

hilly cultivable area with 3 to 8 percent of slope cover 18.4 percent of the total Study Area. The soils of the said area are classified into Class C and Class D (fairly good land).

(Background of National and Regional Economy)

6. Economy in the Philippines had grown for the decade in 1970s with bilateral and multi-lateral cooperation increased to promote the large scale development projects. As a result, GNP had marked the annual growth rate of 6.2 percent on an average from 1970 to 1980, although slowed down its pace until 1983. After 1984, however, the recession of world economy has brought the Philippines a serious stagnation. And after the political turmoil in February 1986, the new government has established the new policy "Medium Term Philippine Development Plan 1987-92". The said development plan takes major goals free from poverty, generation of more productive employment, promotion of equity and social justice.

7. Region VIII, Eastern Visayas, is one of the regions left behind development marking the low annual income of 17,577 pesos on an average and 67.5 percent of the total household earns income under 15,000 pesos only. Not only the Samar province but Region VIII, although blessed with abundant natural resources have been left intact in development due to lack in investment and technology. Under the circumstances, the Government of the Philippines has taken up the Master Plan Study of the Integrated Agricultural/Rural Development in Western Samar.

(Economic and Social Conditions in the Study Area)

8. Population growth trend in the Samar province shows the high death ratio of infant and outflow of population as serious problems. The unemployment and underemployment have marked considerably large figures, which result in low income on an average. A living conditions of the inhabitants remain depressed and considerably large number of people are on the poverty line based on the malnutrition.

9. Industry of the Samar province has an agriculture-oriented sectoral structure with about 60 percent of workers classified into the agricultural sector. However, the productivity in the agriculture as well as in the other sectors remains at a low level. On the other hand, the cottage industries and small scale manufacturers are considered to be at their infant stage. Marketing structure with insufficient infrastructure has not yet formed necessary marketing channels. The social services including financial services as well are so limited in their functions that the inhabitants can develop neither the production nor the living conditions.

(Problems and Constraints for Development)

10. The physical problems noted for the development of the Study Area are capital investment and technology for the maximum utilization of the existing natural resources like land and water which, although abundant, have been kept unexploited.

On the other hand, the economic constraints are found in four categories, low production and low productivity, lack of capital, lack of market/marketing facilities, and lack of appropriate technology.

The above four categories have influenced one another and formed a kind of vicious circle. Furthermore, from the social point of view, the low level of infrastructure and social services has caused the outflow of population and the obstacles of economic development.

(Inhabitants' Needs)

11. For successful development, the survey of inhabitants' needs has been conducted for 100 Barangays by equal number of the Barangay captains in each municipality.

As a result of their low living conditions and poor production at present, four main items concerned as road networks, water

supply, education and agriculture have been closed up as targets. The living conditions are so much depressed that their concern might be said to be oriented more to the improvement of the social services than the development of productive activities.

(Review of National and Regional Development Policies)

12. The three regional development plans in 1978-82, 84-87 and 87-92 have been reviewed as to clarify the evolution of the regional development policies. It is eminent that the economic policy maker has established the three main targets as economic growth, equality of benefit and up-leveling of welfare which are traditionally common in many development policies. It might be, however, borne in mind that these three elements have the trade-off relations and it is a difficult task to pursue all of them at the same time so as to be integrated with well balanced growth in understanding the aforementioned circumstances and policies, with some projections on population and labor force, the economic growth targets have been formulated according to the strategy fixed for short, medium and long terms. For increase in employment and household income to the targeted level, a large amount of investment and appropriate technology will be required in the future. The targets composed of various elements will be realized only through the incentive of the government and inhabitants efforts.

(Development Strategies and Target of the Master Plan)

13. In consideration of the depressed conditions of the Samar province at present, the following three fundamental overall strategies of the Master Plan are worked out by the Study Team for their specific time targets.

Short Term Development (5 Years range)

Target ; Satisfaction of Basic Human Needs (BHN)

Strategy; Up-leveling to the national rural average

Medium Term Development (10 Years range)

Target ; Escape from poverty

Strategy; Up-leveling to the national average

Long Term Development (20 Years range)

Target ; Prosperity of the Samar province

Strategy; Up-leveling to the highest average (Greater Manila Zone)

These overall strategies will be applicable as far as possible in each of the sectoral development.

(Employment Increase Target)

14. Based on the projection of available labor force and the reduction of target in the unemployment/underemployment, the employment required is obtained. For the Samar province the unemployment will be reduced to seven percent by 1992 and eventually to the ideal level of four percent in the year 2007.

The underemployment ratio target fixed in the same way as above. Jobs required by underemployment are calculated in assumption of available jobs by 20 percent of the underemployment in number. Requirement for jobs will become large and for targeted income increase, the job creation is indispensable.

(Up-leveling of Income and Expenditure Increase)

15. The average annual income per household in the Samar province in 1985 as a result of comparison with a target is as follows:

<u>Item</u>	<u>Samar Province</u>	<u>Philippine Rural Average</u>	<u>Philippine Average</u>	<u>Greater Manila</u>
Peso in 1985	18,254	19,215	31,052	57,193
Index	100.0	105.3	170.1	313.3

At the initial stage, the remarkable growth will not be expected due to insufficiency in kinds of jobs; however after the development to a certain level of the growth, it will be accelerated to reach the final target. A large gap in income level between the depressed area like the Samar province and Greater Manila is shown clearly. The target of income increase more than three times for 20 years is ambitious but realistic. In this case, the target shall be fixed at constant price in 1985.

With the above target, there is a remarkably high investment requirement for development as estimated in this report.

16. In the other respect, the average annual expenditure per household in the Samar province is also lower than that of others as shown below:

<u>Item</u>	<u>Samar Province</u>	<u>Philippine Rural Average</u>	<u>Philippine Average</u>	<u>Greater Manila</u>
Peso in 1985 Index	15,937 100.0	19,397 121.7	26,856 168.5	48,453 304.0

The income class of which the expenditure is bigger than the income gains under 10,000 pesos in the Samar province; between 1,000 - 10,000 pesos in rural and between 10,000 and 15,000 pesos in the average of the Philippines. It means that there exists the class of low income which marks chronically deficit household account in the Samar province. Without target as the income increases, the expenditure will increase and this will stimulate the local economic activities.

(Proposed Land Use)

17. Out of the total Study Area of 5,132 km² in the Samar province, proposed land use for agricultural land, forest land, wetland and built-up land are planned by 2,321 km² (45.2%), 2,656 km², (51.8%), 129 km² (2.5%) and 26 km² (0.5%), respectively. The

agricultural land is to be allotted by 185 km² for paddy, 303 km² for diversified crops, 800 km² for coconut trees, 156 km² for fruit trees, and 877 km² for shrub/grasses. On the other hand, the land use plan is further classified by categories of land slope as follows;

Level land (0-3% slope)	Rice-based farming
Gently sloping land (3-8% slope) ...	Corn-based farming
Upland (8-15% slope)	Coconut-based farming
Upland (15-18% slope)	Agroforestry

(Proposed Water Resources Development)

18. In the Samar province, runoff data for long term are available only for the Tenane River. The design water discharge in the ten- year return period is 0.79 m³/sec/100 km². As a result of probability analysis, the flood discharges in the probability of once two years, ten years and 50 years are 1.42, 2.93 and 4.38 m³/sec per km², respectively.

By using hydrological probability analysis of the Tenane River, the design year and water year are determined in 1968, and this is meant to be equivalent to probability of once ten years.

The Samar province is fortunate to have enough water resources with much rainfall. The total water resource available is about one billion m³ per year, which is 1.8 times of annual water demand in the year 2007.

(Irrigation Development)

19. There are 30 communal irrigation systems (CISs) for about 2,000 ha and 21 pump irrigation systems (PISs) for about 1,600 ha in the Samar province. Most systems with potential area of 20 - 300 ha are in small scale. The total potential area with irrigation facilities reaches to about 3,600 ha. Only several irrigation systems are in operation due to no rehabilitation works of facilities damaged by flood, poor operation and

maintenance works by farmers, inactiveness of irrigators' association and some failures in design and implementation of facilities. The total irrigated area per annum is only about 460 ha or 13 percent of the total potential area.

20. The rehabilitation of the existing systems should firstly be implemented under the proposed irrigation development. The farmers having knowledge of irrigation have no problem on the right-of-way acquisition for the facilities. The irrigation development projects to be quickly beneficial and comparatively small investment will be desirable for first implementation. The proposed total area will be about 2,140 ha. In taking into account the geological, geographical and hydrological conditions, about 50 CIPs and PIPs will be considered as new irrigation development area of about 3,110 for the medium term development and about 6,580 ha for the long term development. As a result, the total acreage of the irrigation development for irrigated paddy fields is about 11,830 ha.

(Drainage Development)

21. The modernized drainage facilities are not found in the Study Area. A lot of area is under poor drainage with small scale and are infected by endemic of schistosomiasis, especially, in the low-lying farmlands. In the Gandara River basin, stagnant flood water area is observed after heavy rain by typhoon. The flow discharge comes on the low-lying areas in the Sapinit River basin due to high water level of the Gandara River.

After draw-down of water level in the Gandara River, the low-lying area is still inundated due to lack of lateral drainage canal and small capacity of the Sapinit River.

22. The main purpose of the drainage in this area is emphasized on the schistosomiasis control. In the contaminated area by schistosomiasis, it is proposed improvement and reinforcement of the existing drainage facilities and introduction of lateral

drainage canals. The destruction of the habitat for snails as intermediate host of cercaria is one of the best counter-measures in combination with other measures in order to prevent multiplication of snails. Introduction of the drainage systems in the swampy, hill-foot poor drainage area and the low-lying area, will be able to reduce the contamination of schistosomiasis. The target area will be about 9,150 ha of the area.

(Agricultural Development)

23. The agricultural development of the Project Area has various problems and constraints found during the field survey, which are: (i) the average farm size of 2.6 ha is smaller than the national average of 2.9 ha and the parcels are being fragmented year by year, (ii) the present shifting farming has resulted in enlargement of cogonal fallow/abandoned area with very low crop yield, (iii) the crop damages of typhoon and heavy rainfall are unavoidable constraints for the land-based development, and estimated crop damages at 10.7 percent of the total production of major crops on an average in 1980 - 1986, (iv) poor agricultural facilities such as farm-to-market roads and irrigation and drainage systems hamper agricultural development, (v) the existing land tenure of cultivable land discourages many farmers to improve farm facilities and even their farm management, and (vi) the agricultural supporting services inclusive of extension services are inadequately provided.

24. The objective and target of the agricultural production are (i) attainment of self-sufficiency in food supply, (ii) attainment of maximum production to support agro-processing industries to be established, (iii) development of new cash crops through the promotion of research/trial activities, (iv) increase in productive efficiency through introduction of small-scaled farm machinery, (v) livestock development, especially increase of carabao population together with introduction of sheep/goat and duck, and (vi) development of

freshwater fishery, particularly for the improvement of nutrition condition in the interior area.

Along with implementation of the proposed infrastructure projects, the promotion of agricultural development has to be pursued with an integrated approach in changing the governmental supporting policy from "purely commodity-specific and production oriented" way to "agri-business linked community development oriented" way.

It is tentatively estimated that paddy production will be increased to about 2.7 times of the present. Then, the self-sufficiency rate in rice supply will be raised from 49 percent to 84 percent in 2007. Also the crop production of the major crops will be increased to two - three times of the present productions.

(Rural Road Development)

25. Transportation in the Samar province is taken by road, sea, riverine, and air. The road networks are about 920 km in the total length including the Maharlika highway linking the Leyte and Samar islands by San Juanico bridge. Major ports in the Samar province are Catbalogan and Calbayog, and the navigable waterways are the Basey and Gandara Rivers. The Samar province has the secondary airport of Calbayog and a feeder airport of Catbalogan.
26. One of the major problems on transportation is insufficiently provided road networks causing inaccessibility between the poblacion and the hinterland. Road construction of 810 km is planned in addition to the existing roads of 920 km in the long term development. As a result, the road density will be improved from 0.16 km per km² of the land area at present to 0.31 km per km².

(Rural Electrification Plan)

27. Rural electrification and electric distribution in the Samar province are being handled by two electric cooperatives of SAMELCO I and SAMELCO II under the supervision of NEA. SAMELCO I was founded in Calbayog City with a diesel power plant of 350 KW, Ton-ok Hydropower Plant of 1,080 KW and a 5 MVA substation, while SAMELCO II was founded in Wright with a diesel power plant of 5,000 KW and a 5 MVA substation.

The existing power sources of SAMELCOs I and II can meet about a half of the total electric demand in the Samar province and the rest has been supplied by NPC through the Leyte-Samar subgrid. The present electric rates of SAMELCOs I and II are at 2.75 pesos and 2.35 pesos per KWH, respectively.

28. Power distribution is made insufficiently at present in the Samar province due to heavy voltage drop, brownout, etc. Electrification ratio in the Study Area is about 21 percent, whereas it is about 48 percent on the national average. Low electrification ratio may be caused by comparatively high power rate against low living standards. The rural electrification is one of the important national policies and is expanded by extension of distribution lines along the major roads. All Barangays shall be energized and electric house-connection shall be promoted as far as possible.

(Mini-Hydropower Development)

29. The Leyte-Samar Inter-island Transmission Line (138 KV) to be connected with Tongonan Geothermal Power Plant (112.5 MW) and 30 MVA Wright Substation will be completed by October 1988 by NPC under financial assistance of OECF. The said transmission line will contribute much in capacity increase to supply power in the Samar province and promote rural electrification at low electric rate.

30. There exist high potentialities of hydropower generation in the Samar province because of abundant precipitation and prevailing steep topography. Theoretically, hydropower potentiality can be projected at about 70 KW per km² of the land in the Samar province.

Development of mini-hydropower is handled by NEA. Under the NEA program, construction of Bugtong Hydropower Plant with 1,800 KW capacity is going to implement by financial assistance of the United Kingdom. On the other hand, Ulot Hydropower Plant is expected to generate power of 3,300 KW. Development of hydropower of the Ulot and Blanca Rivers is proposed to be included in the medium term development, while the rest of 13 potential sites are planned in the long term development.

(Water Supply Development)

31. Water supply system in the Philippines is classified into three; Level-I, Level-II and Level-III services, and is administered by the Rural Water-works under LWUA, RWDC, DLG and DPWH. Although the service rate of the Samar province in 1984 was reported at 67 percent, it is observed by the Study Team that the actual service rate of the Samar province is only 23 percent.

About 800 wells and springs are utilized for water supply in the Samar province and almost all water resources depend on groundwater. Water supply projects of Level-I service are on-going in the Samar province under the assistance of OECF, IBRD and other international/foreign agencies.

32. Water resources in the Samar province are quite abundant. Level-II and Level-III services by using pipeline system shall be developed by the Project.

Development of engineering on deep wells particularly in hydro-geological investigation and study as well as construction technology of deep wells shall be promoted. In the coastal area with lack of surface and spring water resources, deep wells shall be developed for water supply in applying the above-mentioned engineering.

The served population in the short term development will reach to 246,100 or about 47 percent of the service rate in the Samar province, while at the long term development, it will reach to 526,900 population or 85 percent of the service rate.

(Development of Social Infrastructure)

33. The health and medical facilities in the Samar province consist of 11 hospitals with 325 bed capacity in total, 25 rural health units and 89 Barangay health stations, all of which are below the national standards. The number of doctors, dentists and sanitary inspectors are currently below the national standards except nurses and midwives. Development of hospitals with 870 beds and 190 additional Barangay health stations is required to meet the national standards.

34. There are 731 elementary schools, 46 secondary schools, eight tertiary (college level) schools but no university in the Samar province. However, the ratio of teachers to pupils/students satisfies the national standards. The main problems are many incomplete school buildings, temporary and defective structures and low enrollment of elementary and secondary school children. Construction of 820 classrooms and rehabilitation of 1,080 classrooms for elementary schools, construction of 130 classrooms and rehabilitation of 170 classrooms for secondary schools and establishment of three new colleges in the geographical centers will be programmed for populace.

35. At present, 80 percent of dwelling units are made of light materials such as nipa, veneer and bamboo, etc. and 60 percent of the houses have a floor area less than 30 m². Development of resettlement houses is basic services for the landless, squatters and displaced families both in rural and urban areas. Economical housing shall be provided for the families living in obsolete house as well as those who are in emergency to have house belonging to the middle and high income groups.
36. In the Samar province, the major problems of communication facilities are lack of radio-telegraph stations, telecommunication and postal communication offices, and mail services and also shortage in personnel and vehicles. The new telegraph stations, national telegraph transfer service stations, new telephone and postal stations related facilities shall be provided.

(Farmers' Organization)

37. The farmers' organizations in the Samar province can be specified into eight categories of Area Marketing and Cooperatives, Samahang Nasyon (Pre-Coop), Farmers' Association, Rural Improvement Club, 4-H Club, Irrigators' Association, Agrarian Reform Beneficiaries Association, and Abaca Farmers' Association.

There exist 50 Farmers' Associations in number, but more than half of them remain dormant. The average number of membership per Association is about 30. Rural Improvement Club which is the farmer wives' group counts 96 with 30 members per Club. There are 52 4-H Clubs with the average membership of 18.

Irrigators' Associations under the administration of NIA is 11 in the Samar province with the average command area of 100 ha, and the average membership of 43. Agrarian Reform Beneficiaries' Association in the Samar province is 376 with the

average membership of 20 in 21 municipalities. There are only two Abaca Farmer's Associations with the total membership of less than 50, which are looked after by FiDA and DSWD.

38. The existing farmers' organizations in the Study Area are all peripheral in their function towards agricultural development, and it is recommended as a rule in the Master Plan that the ways and means as well as those of policy-making should be taken for revitalization of the multi-purpose agricultural cooperatives on the Barangay-basis.

In the Master Plan, the roles expected to be efficiently played by the farmers through the organized efforts are (i) agricultural production increase through provision of advanced supporting service, (ii) operation & maintenance (O & M) of the improved irrigation and drainage facilities and farm roads, (iii) O & M of new public utilities including potable water supply and rural electrification, and (iv) maintenance of facilities for social services such as public health, education and housing to be newly added or largely improved.

39. The basic approach to realization of agricultural production increase through advanced supporting services is made by cooperative system. Reflecting hardship of the cooperative development in the Philippines, rebuilding on the sound base it is proposed (i) to stop separating input supply from provision of rural credit, (ii) to put greater emphasis on the post-harvest operations aiming at giving much values added to for marketing the products, (iii) to safeguard the members' economic standard through eradication of the common shares, and (iv) to strengthen a perpendicular linkage between the local unit cooperatives and the area federations dealing with credit and marketing.

(Farm Economy)

40. Farm economy survey was conducted by the Study Team on the Barangay basis involving 83 sample farm household. As a result of the analysis and interviews, the typical farmers are considered as rice production farmers with 2.4 ha of land and 18,000 pesos of income, corn production farmers with 3.1 ha of land and 12,600 pesos of income, and coconut production farmers with 3.3 ha of land and 13,800 pesos of income, respectively.

The average household income, land holding area and tenancy agreement showed the endemic differences. The San Jorge/ Gandara area expressed the lowest average annual income of 17,180 pesos per household, the smallest land holding area of 2.5 ha per household and the highest tenancy agreement of 25 percent to the landowner. The tenancy agreement in the Samar province seems to be low in comparison with the other regions due to its low productivity.

41. Farm inputs such as seeds, fertilizers and chemicals are seldom to be purchased by farmers due to lack of funds and farm input dealers near them. Among the farm outputs only 20 percent of rice is marketed and 50 percent of corn and 70 percent of coconut are sold mainly for the cash income purpose. About a half of their production is sold to trader at the ten percent lower price than that to NFA.

(Development Cost and Implementing Program)

42. The total cost of the whole development is estimated at 8,450 million pesos based on June 1987 price level, which is scheduled as 2,292 million pesos for the short term development, 1,829 million pesos for the medium term development and 4,329 million pesos for the long term development.

The annual operation and maintenance cost is estimated at 83.2 million pesos for the short term development, 135.1 million pesos for the medium term development and 190.4 million pesos for the long term development.

43. Implementation of the development program is divided into three phases; short term (1988-1992), medium term (1993-1997) and long term (1998-2007). Implementation of the development program will be undertaken by the Samar Integrated Rural Development Project (SIRDP) in close cooperation with other sectoral line agencies concerned.

{Financial and Economic Evaluation}

44. Since the Project is intended for the fulfillment of the Basic Human Needs (BHN) for the inhabitants, it is quite difficult to evaluate the Project from the economic point of view, and the economic feasibility and viability will hardly be anticipated. The evaluations for farm economy such as improvement of nutritional level and stability of farm budget should be more emphasized when compared with the evaluations on the national economy.
45. The increase of the household income through the short term development is attained mainly by the augmentation of the farm income. The highest increase of annual net farm income is attained at 283 percent by the part-owner on a coconut production farm. The mushroom growth of income is also achieved even in a part-owner and a tenant farm and simultaneously their nutritional level of the recommendable dietary allowance can be realized except the tenant on a rainfed rice farm.
46. Taking into consideration the target of annual income per household; 19,216 pesos for the short-term development, 31,052 pesos for the medium-term development and 57,193 pesos for the long-term development, it is recommended that the non-farm income shall be increased by shifting the surplus family labor to the works on the secondary and tertiary sectors since it is quite difficult to increase the farm income by expanding the farm size.

47. Economic evaluation of the irrigation component, rural water supply component and rural electrification component were made by using the EIRR method and the water charge method. Economic feasibility or viability of the development will not be highly expected from the numerical analysis. The EIRR of the short term development is assumed at more or less five percent.

(Development of Priority Project)

48. Agricultural Development and Promotion Project (ADPP) shall be established in four selected areas in the Samar province as the priority projects of the Integrated Agricultural/Rural Development. Out of the four possible project sites for ADPP, an area in the part of the Gandara municipality and the bulk of the San Jorge municipality is considered the most selected priority project for establishment of ADPP while the three others are selected as sites for subprojects of ADPP.

In agricultural development, pilot facilities are quite useful as a demonstration window for smoothly introducing new crops, new varieties and advanced technology to take away anxiety of the conservative farmers for things new.

Pilot facilities are required as well for irrigation/drainage facilities, and farm-to-market roads as a show window for the entire Samar province.

49. The location of ADPP will be selected among the priority areas in terms of agricultural productivity and rural development, and the related priority areas are considered as the San Jorge/Gandara area, the Jamonini area, the Calbiga area and the Basey area. Among them, judging from the location, social and economic conditions and potential of agricultural production, the San Jorge/Gandara area is chosen as the central project of ADPP, while in the other areas of Jamonini, Calbiga and Basey, the subproject of ADPP will be established for the effective diffusion of the activities to the entire Samar province.

50. ADPP to be implemented as a show window of the Project consists of agricultural development, agricultural facilities development and others. Breakdown of the components is as follows:

- 1) Agricultural Development
 - Rice-based farming
 - Corn based farming
 - Coconut-based farming
 - Abaca development
 - Hillside farming/agroforestry development
 - Livestock development
 - Nursery development
 - Freshwater fishculture development

- 2) Agricultural Facilities Development
 - Irrigation development
 - Drainage development
 - Rural road development
 - Rural water supply development
 - Rural electrification
 - Rural health development
 - Development of farmhouse

- 3) Development of Post Harvest and Marketing Service Assistance
- 4) Development of Farmers' Organization
- 5) Agricultural Development and Promotion Center (ADPC)

51. Implementation of ADPP shall be started prior to the implementation of the Integrated Agricultural/Rural Development Project as a demonstration window of the development in the Samar province.

It is expected to receive the particular financial support from a foreign country/international agency for the implementation of ADPP for smoothly and effectively giving impact on the agricultural/rural development to the entire Samar province.

CHAPTER 1. INTRODUCTION

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In response to the request of the Government of the Republic of the Philippines, the Government of Japan through the Japan International Cooperation Agency (JICA) dispatched a Preliminary Study Team to the Philippines from November 26 to December 4, 1986 and concluded the Implementing Arrangement of the Technical Cooperation (I/A) between JICA and the Samar Integrated Rural Development Project (SIRD) for the Master Plan Study on the Integrated Agricultural/Rural Development Project in Western Samar in the Republic of the Philippines agreed upon between JICA and SIRD on December 3, 1986.

In accordance with the I/A, JICA dispatched the Study Team composed of 13 members to the Philippines for the first field survey from April 8 to May 25, 1987, the second field survey from July 27 to October 24, 1987 and the third field survey from June 1 to July 30, 1988, respectively.

Final Report consists of Main Report, Appendix I and Appendix II which was provided based upon the study on the findings and observations of the field survey conducted in the Philippines by the Study Team in cooperation with the SIRD office of the Philippines. Appendix I compiles data of the study for supporting the Master Plan while Appendix II compiles for the study on the priority projects.

The objective of the Study is to formulate the Master Plan for rural development of the Samar province of the Samar island. The Study Area covers the rural area of the Samar province except mountainous land and small islands.

CHAPTER 2. BACKGROUND

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2.1. From National Economic Point of View

The Philippine economy grown up during the decade of 1970's was accompanied with bilateral and multilateral cooperation. The Philippines has promoted the big scale development projects mainly in the field of industry, electricity and infrastructure specially transportation. GNP of the Philippines has marked the average annual growth rate of 6.2% from 1970 to 1980 and slowed down until 1983.

However, after 1983, due to the recession of world economy, the Philippines was faced with the problem on serious economic stagnation; the major economic indicators of statistics showed the negative growth in GNP, abnormal increase of consumer price index, augmentation of external debts as well as Peso's devaluation.

Such events promoted the government to revise its Five Year Development Plan (1983-87). In the revised Four Year Development Plan (1984-87), the components of development projects had to be modified to a large extent. In the agricultural sector, owing to the considerable investment made during the 1970's, self-sufficiency in rice, first target in the related policy has been achieved in 1982/83. However, the augmentation of rice consumption due to the population growth as well as the sudden slump of the economy in 1983, resulted in a reversal of the above situation. Hence the government has to redirect its policies and resorted to importation of rice. Then, after the political turmoil in February 1986, the new government has established the development policy by "Medium Term Philippine Development Plan 1987-92".

The new development plan takes the major highlights on the following goals;

- alleviation of poverty
- generation of more productive employment
- promotion of equity and social justice
- the attainment of sustainable economic growth

With the target of 6.9% annual growth rate of GNP on constant price basis, each of the sectoral growth targets are fixed as follows.

Primary sector	5.0%
Secondary sector	8.8%
Tertiary sector	6.6%

The primary sector still retained its original characteristic of comparatively moderate growth rate. However, it should be noted that agriculture remained to be a major concern in relation to the new government's development policies which put emphasis on the development of rural areas.

2.2. From Regional Economic Point of View

Region VIII, Eastern Visayas Region, composed of five provinces, is one of the underdeveloped regions. It marks the lowest average household income of 17,577 pesos annually in the Philippines. The households number and income by region in 1985 shows also that the percentage of household with income under 15,000 pesos in rural area marks 67.5% the highest in all the regions. Various other indicators present the depressed conditions of Region VIII, in which the Samar province occupies the lowest level of development in many aspects. Despite of the potential resources, the lack of development investment as well as of technology has caused the present depressed conditions of Region VIII and the Samar province in particular. Under the above mentioned circumstances and nation's policy, the government of the Philippines has applied the Master Plan of Integrated Agricultural/Rural Development in Western Samar.

CHAPTER 3. PRESENT SITUATION OF THE AREA

CHAPTER 3. PRESENT SITUATION OF THE STUDY AREA

3.1. Physical Environment

3.1.1. Location and Topographic Conditions

1) Location

The Samar province which occupies the western portion of the Samar island, is located at about 500 km south-east of Manila, the capital of the Philippines. The island is in the easternmost section of the Eastern Visayas Region and is considered as the third largest island in the Philippine archipelago.

The Study Area is located at the Samar province excluding five island municipalities. The latitude and longitude of the Study Area are about 125 degree North and 12 degree South, respectively. The Study Area, which has 5,132 km² or 40% of the total island's area, consists of 20 municipalities inclusive Catbalogan as the provincial capital, and one chartered city of Calbayog.

2) Topographical conditions

The crown of the island is located almost in the center at the elevation of 896 m above the mean sea level. The highlands, running from the crown in the north-south direction, present a characteristic landscape with considerably heavy undulation. The elevation of the highlands ranges from 600 to 800 m with rather flat top and very steep mountain side. Such a fusion topography characterizing the limestone zone is observed as doline or sink hole that prevail from the highland to the coastal area.

Many of the rivers, originating from the mountainous areas, flow down cutting the hilly areas to develop the alluvial plain in their lower reaches. Comparatively large-scaled alluvial plains

develop along the major rivers of Jibatan, Gandara, Calbiga and Basey. These alluvial plains, furthermore, extend into the coastal plains, which are found in considerably large scale along the coast.

3.1.2. Soil and Land Use

1) Soil

a) Geomorphology and vegetation

The Study Area consists of three land forms, i.e., depositional, solutional and denudational ones. Major portions, namely about 60% of the total Study Area is the denudational land forms including dissected sedimentary or volcanic hills and plateau. The depositional landforms including tidal flats, coastal alluvial plains and valleys occupy only about ten percent of the total Study Area and are found in the Jibatan, Gandara and Basey river basins as well as in the littoral extending between Wright and Sta. Rita municipalities. The solutional landforms (Karst formation), which have been formed of coralline limestone, are found in the hilly areas. (refer to Appendix D.1.2)

The general slope of lands was classified into six slope classes. The lands having the slope less than 8% (about 5 degrees) occupy about one sixth of the total Study Area. The slope of 8% is considered as the maximum for the irrigated agriculture. Furthermore, level to nearly level lands sloping less than 3%, which are suitable for paddy fields, occupy about six percent of the total Study Area. On the other hand, rolling to steep lands having the slope steeper than 18% (about 10 degrees) occupy about 70% of the total Study Area. Such steep lands will be retained as forest reserve from the aspect of soil and water conservation. (refer to Appendix D.1.3)

Majority of the steep hills and mountains in the interior are covered with dense Dipterocarp forests. Patches of cogon grass (*Imperata cylindrica*) and secondary growth forests of partly logged-over interspersed with cultivated lands are found in the undulating and rolling hills. In the alluvial plains and valleys, cultivated crops like rice, corn, rootcrops, coconuts, and abaca are found while mangroves and nipa palm occupy the tidal swamps. (refer to Appendix D.1.6)

b) Soils

The soil distribution pattern is closely related to the landforms on which the soils have been developed. According

to the Soil Taxonomy of USDA, the soils in tidal flats belong to Hydraquents; those in the alluvial plains and valleys are mainly Tropaquepts; and the predominant soils in the hills and plateau are Tropudalfs and Tropudults. These soils have been subdivided into 21 soils types as shown in Figure 3.1. (refer to Appendix D.1.7)

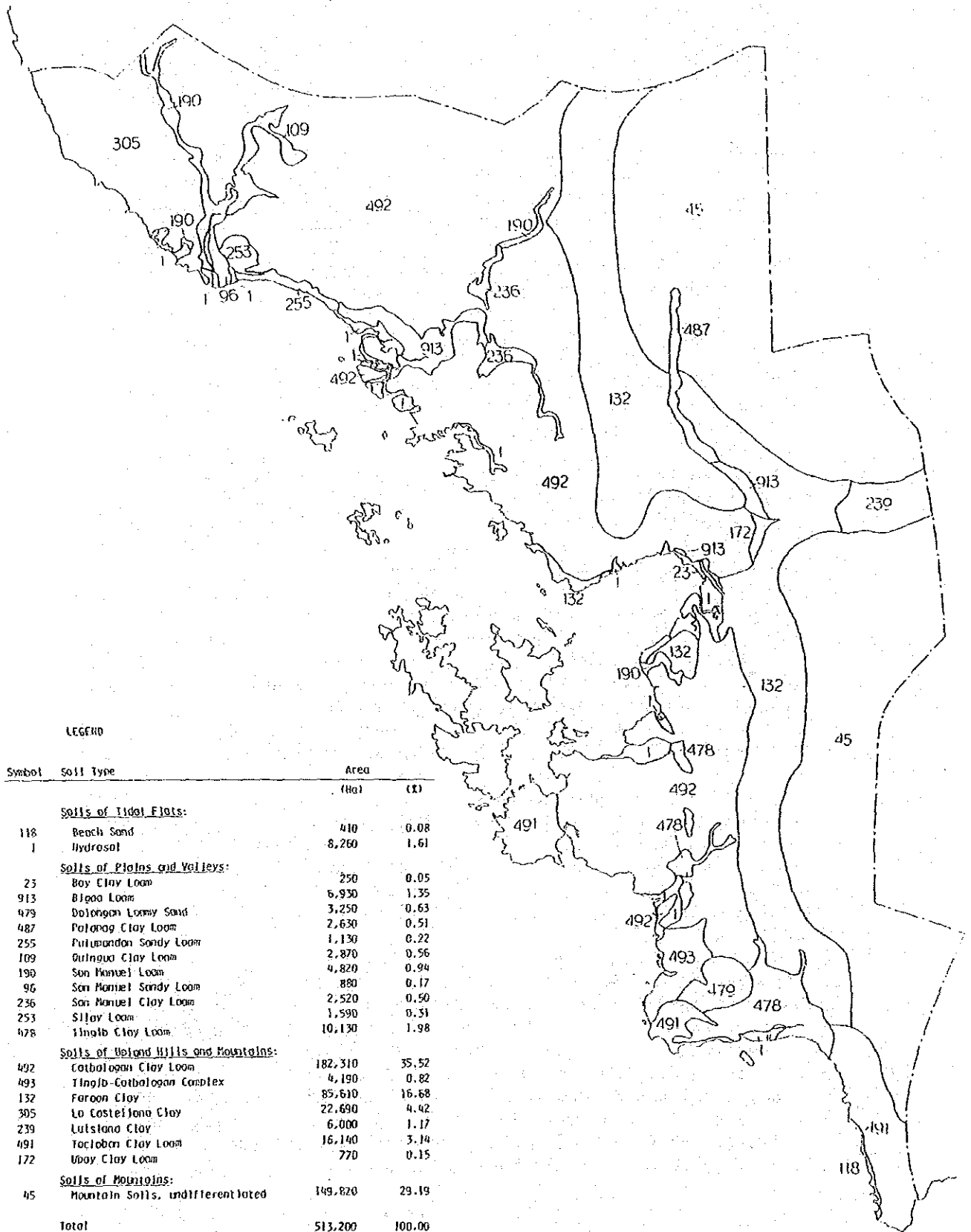
Hydrosols composed of marine deposits are found in tidal flats near bays and form brackish water swamps with mangroves and nipa palms as natural vegetation. These soils cover 8,260 ha or 1.6% of the total Study Area and some parts are used for fishponds at present. So-called potential acid sulphate soils (Sulfaquents), which will be strongly acidified by oxidation through the dehydration process, may exist in some parts. Therefore, it should be carefully treated to reclaim these soils by poldering for croplands.

Coastal plains and valleys are covered with soils derived from alluvial deposits. Predominant soil types are San Manuel Loam, Bigaa Loam and Tingib Clay Loam in the Jibatan, Gandara and Basey river basins, respectively. The typical profiles of major soil types are shown in Figure 3.2. San Manuel Loam, which covers 4,820 ha (0.9% of the total Study Area), is deep, fertile grayish brown to light brown soil. Having no drainage problem, this soil is considered as the best suitable for cropping. Various kinds of crops such as rice, corn, rootcrops, banana, coconuts and abaca are planted on this soil. Bigaa Loam, which covers 6,930 ha (1.4% of the total Study Area), has a brown to dark brown color with iron concretions in all layers. Similarly, Tingib Clay Loam which covers 10,130 ha (2.0% of the total Study Area), has a light grayish brown color with reddish brown streaks. Both Bigaa Loam and Tingib Clay Loam are poorly drained, therefore, only rice and Galiang (or Palawan Gabi, a kind of taro) are mainly cultivated.

In addition, Dolongan Loamy Sand, which covers 3,250 ha (0.6% of the total Study Area), is found only in Basey river basin near Barangay Dolongan. The soil has been formed by accumulation of organic materials and fine soil materials washed down from the higher surrounding area. Having poor drainability, rice, gabi and some pineapples are grown on this soil.

In upland and hilly areas, major soil types are Catbalogan Clay Loam and Faraon Clay. La Castellana Clay is found only in northwestern corner of the Study Area. Infertility and erosion susceptibility of these soils are main constraints on cropping. Catbalogan Clay Loam occupies 182,310 ha (35.5% of the total Study Area) and is moderately deep, light grayish brown to gray soil derived from stratified shale and sandstone. This soil is infertile acid Alfisols. Hard sticky soils are found in heavily eroded and exhausted lands. Faraon Clay, which

FIGURE 3.1. SOIL MAP



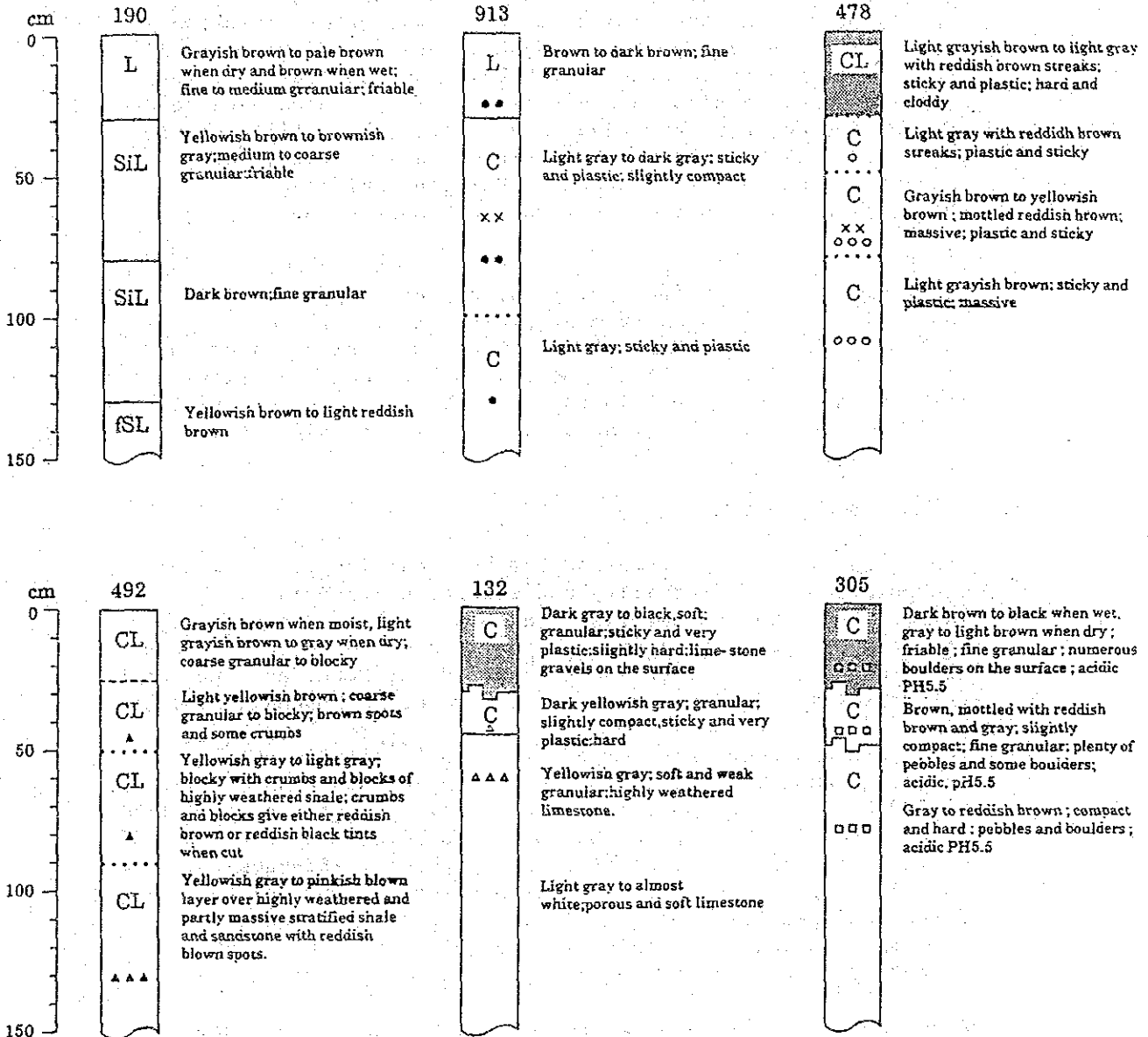
1/ 1/ Excluding the area of small islands

Source: Bureau of Soils, 1976



0 5 10 15 20 km

FIGURE 3.2. PROFILES OF MAJOR SOIL TYPES



LEGEND

- Clear Boundary
- - - Gradual Boundary
- Diffuse Boundary
- ┌ Irregular Boundary
- Iron Concretion
- Manganese Concretions
- ▲▲ Weathered Shale
- ▲▲ Weathered Limestone
- Pebbles and Boulders
- xx Iron Mottles
- Rich in organic matter (stippled)
- Moderate organic matter (stippled)

occupies 85,610 ha (16.7% of the total Study Area), is dark gray to black soil derived from coralline limestone. On the other hand, La Castellana Clay, which occupies 22,690 ha (4.4% of the total Study Area), is brown to dark brown soil derived from igneous rocks such as andesite, basalt, etc. As shown in Figure 3.2, both Faraon Clay and La Castellana Clay are shallow and contain weathered stones or pebbles and boulders. These soils have been eroded on steep slope. These lands have been denuded and coconuts and abaca are planted, but still cogon grasslands are predominant. In places, upland rice, corn, cassava and banana are planted by Kaingin (shifting cultivation) after slash and burning these grasses.

The key to the soil types and the physical and chemical properties of the surface soils are given in Appendix D.1.7. Most soils are slightly to moderately acidic. The acidity of soils in southern municipalities, i.e., Sta. Rita, Basey and Marabut shows stronger than those in other municipalities. Most soils are deficient in phosphate but rich in potassium. Soils in upland and hilly areas are low in organic matter contents.

c) Land capability

Land capability classification has been carried out from the viewpoints of soil fertility and erosion or flooding susceptibility as the limiting factors. The land capability has been grouped into four classes (A to D) for croplands and two classes (M and N) for pasture or forest lands and one class (X) for fishpond or reserved land. (refer to Appendix D.1.8)

Very good and good lands which have minor restriction for cropping, that is, Classes A and B lands occupy about 20,000 ha (4.0% of the total Study Area). About a half of the total Study Area, on the other hand, is covered by the lands having steep slope and erosion susceptibility (Classes C, D, M and N). These lands are not suitable for cultivation but for forest and pasturelands. Wetlands which can be used for fishponds (Class X) are distributed in the bay and their extents are about 8,500 ha (1.7% of the total Study Area).

Among soils of the alluvial plains and valleys, San Manuel series is classified as very good lands for cropping (Class A). However, other soils are classified as good lands (Class B) because of their poor drainability. In particular, both Dolongan and Tingib series are classified as Class C lands due to their flooding susceptibility.

In the hills and plateau, most soils are classified as Classes C and D lands because of their erosion susceptibility. Steep portions of Catbalogan and La Castellana series as well as Faraon series are regarded as the lowest class for cropping (Class D).

Conclusively, the Study Area contains two major limitations, i.e., soil erosion and flooding. On the rolling areas and steep hills where forest cover has been removed or where Kaingin clearings are rampant, surface runoff is excessive resulting in excessive soil erosion. In bottom lands which are water-logged throughout the year, drainage is a problem.

2) Land use

The lands have been classified into three categories, i.e., alienable and disposable land, classified forest and unclassified forest by BFD. The steep lands sloping more than 18% (about 10 degrees) are defined to be retained as forest reserve. (refer to Appendix D.2.1)

The land use pattern in the Study Area was studied by BOS in late 1970's and a land use map scaled 1:250,000 had been drawn with the delineation of dominant land use with associated ones. The map was checked on the site during field survey by using 1:50,000 scale topographic maps as the base map. The land use patterns in the remote areas where the approaches could be found difficult were checked by using a LANDSAT false-color image scaled 1:250,000 in addition to the information collected from the relevant authorities such as DA and city planning and development office as well as municipality offices. Finally, the land use map was modified to match the present situation. (refer to Appendix D.2.2)

As shown in Table 3.1, forest and cogon grasslands cover about 70% of the total Study Area while agricultural lands including Kaingin farming area occupy less than 25%. Paddy rice areas were estimated to be about 16,000 ha or 3.2% of the total Study Area. Coconut areas are predominant and occupy about 76,000 ha or about 15% of the total Study Area.

Table 3.1. Present Land Use

Land Use Category	Area	
	sq. km	%
I. Agricultural Land		
Paddy Rice	164	3.2
Diversified Crops	146	2.8
Coconut Trees	763	14.9
Kaingin Farming	205	4.0
<u>Sub-total</u>	<u>1,278</u>	<u>24.9</u>
II. Forest Land		
Shrubs/Grasses	1,444	28.1
Forests	2,259	44.0
<u>Sub-total</u>	<u>3,703</u>	<u>72.1</u>
III. Wetland		
Mangrove/Nipa	126	2.5
Fishponds	10	0.2
<u>Sub-total</u>	<u>136</u>	<u>2.7</u>
IV. Built-Up Land		
Settlement etc.	15	0.3
<u>Total</u>	<u>5,132</u>	<u>100.0</u>

3.1.3. Geology

1) Geological condition of the Samar island

The Samar island lies facing the Philippine Trench which is the zone where the Pacific Plate is creeping under the Philippine Plate, and the Philippine Fault. Active horizontal fault runs at the back of the island. Under the circumstances, the geological structure of the island is restricted by the fault systems in direction of NW-SE and NNW-SSE in parallel with these two major structural lines.

The geology of the island in general is torn by these fault systems with prevailing directions, and the observation has revealed that there exist the Cretaceous volcanic rock facies as base rocks, the tertiary layers including the Miocene Samar limestone at the lower part, the Pleistocene layers with marl and limestone as major

components in the middle, and the alluvial layers composed mainly of the river deposits in the upper part.

It is clearly learned that there is a certain relationship between such stratigraphy and topography. Outcrop of the later rock facies is observed from highlands to lower lands.

In detail, the earliest Cretaceous to Oligocene layers from the Samar highlands in the center of the island, and in the Karst zone as outer brim of the highland, the Oligocene to Miocene layers are the major component layers including the thick Samar limestone layer. The hilly area is composed of deposited rocks such as the limestone, marl, sandstone, etc. for the Neo-Tertiary to Pliocene. (refer to Appendix D.1.4)

2) Geological condition of the Samar province

Geology of the Samar province is composed mainly of the Catbalogan groups of the upper Miocene-Pliocene layers and Daram group of Oligocene-Miocene layers. In the areas contacting with the central mountain ranges and the southern part of the island, those layers having folding axis almost in NW-SE direction, present synclinal and anticlinal structures. In the areas north of the Maqueda bay and its surrounding areas, the geological structures are generally gentle. The alluvial layers are poorly developed for the whole island, although considerably well developed in the riparian areas and estuaries of the Jibatan, Gandara and Basey Rivers. (refer to Appendix D.1.4)

3.1.4 Climate

1) General

The climate in the Samar island can be categorized into two, Types II and IV according to the Coronas Climate Classification System.

Type II has no particular dry season but a very pronounced rainy period prevailing in the island, while Type IV has rainfall more or less evenly distributed through the year mainly over the north-western part of the island.

The Catbalogan station, which is located nearly in the middle of the Samar province, has been operated in synoptic observation since 1951. The records on general climate conditions of the area are available mainly by the said station. (refer to Appendix C.1.1)

Meteorological data for the Study Area are as follows:

<u>Item</u>	<u>Station</u>	<u>Duration</u>
Rainfall	Catbalogan	36 years (1951 - 1986)
Temperature	-do-	13 years (1974 - 1986)
Humidity	-do-	-do- (-do-)
Wind	-do-	-do- (-do-)
Cloudiness	-do-	-do- (-do-)
Evaporation	Catarman	11 years (1975 - 1985)

2) Rainfall

Mean annual rainfall in Catbalogan is 2,636.3 mm. About 45% of the annual rainfall concentrates in four months, from September to December. For annual rainfall, the maximum is 3,448.5 mm in 1952, while the minimum is 1,759.6 mm in 1973.

The monthly mean rainfall is 109.9 mm in April at the minimum and 315.8 mm in November at the maximum of the year. The rainfall in November is three times as much as that in April. The monthly rainfall is 900.2 mm at maximum in October, 1952, and 1.0 mm at minimum in May, 1983.

The maximum rainfall is 387.9 mm/day, 514.1 mm/2-day and 534.4 mm/3-day, respectively. (refer to Appendix C.1.2)

3) Temperature and humidity

The annual mean temperature is 27.6°C on an average with 31.9°C in mean maximum and 23.2°C in mean minimum. The monthly mean temperature is highest in May and lowest in January in a year, but the fluctuation among the months is as small as 3°C only.

The relative humidity is 80.2% on an average, 75.7% in April at minimum and 83.8% in December at maximum. The difference among the monthly mean relative humidity is small similarly to the case of the mean temperature. (refer to Appendix C.1.3)

4) Wind and cyclones

The mean wind velocity is 0.80 m/s (2.9 km/hr). The wind direction in the island varies seasonally in the influence of monsoons and trade winds. Southwesterly wind blows from June to September, while northeasterly wind flows from November to April. Northeasterly wind is brought frequently by tropical cyclones that sweeps over the island.

"Tropical cyclone" is a general term of tropical depression, tropical storm and typhoon. The frequency of tropical cyclones giving serious effects to the island was 147 for 38 years from 1948 to 1985, which means 3.9 times per year. (refer to Appendix C.1.4)

5) Cloudiness and evaporation

The cloudiness (Okta) is 6.3 on the annual mean basis and fluctuates slightly by month, and is 4.9 at minimum in April and 6.9 at maximum in August.

The evaporation data are not available in Catbalogan. However, according to the data in Catarman, the annual mean evaporation (Open Pan Evaporation) is 1,460 mm, and the maximum is 5 mm/day in April

and the minimum is 3 mm/day in November/December in the monthly means. (refer to Appendix C.1.5)

3.1.5. Rivers and Streams

1) River basins

The area of the Samar island (11,487 km²) excluding islets is divided into 39 river basins. Among them, 23 river basins (5,132 km²) are located in the area of the Samar province, and 60% of the area of the Samar province is shared by seven main river basins; Basey, Calbiga, Catubig, Gandara, Jibatan, Silaga and Ulot. (refer to Appendix C.2.1)

2) Streams

Regarding the time of concentration of runoff discharge, the concentration in short time is observed at the stream area connected to the river channel because of steep slope, but that in the river channel is relatively long time due to flat topography.

According to the existing data available for the similar rivers in the Samar island, it is estimated that the saline water intrusion reaches about ten kilometers upstream from the mouth of the rivers in the Samar province.

3) Flood runoff

The flood runoff in the Samar island has the characteristics of "fast rising up and fast drawing down flood". It indicates that rainfall intensity is strong and the river basins are steep and devastated. Based on the observed runoff discharge by typhoon "Herming" that occurred during field investigation, the mean runoff coefficient is estimated at 61%. (refer to Appendix C.5.3)

The flood discharges in the Study Area are estimated by applying a nomograph prepared by NIA. However, the values given by the graph need to be modified with the extra ratios in a range between 1.07 and 1.23. (refer to Appendix C.2.2)

3.1.6. Water Resources

The water resources in the Samar province are composed of surface water and groundwater. The mean rainfall and runoff depth in the Samar province are estimated at 3,630 mm/year and 2,180 mm/year, respectively.

For the area of the Samar province, runoff data are available only for the Tenane River which is a tributary of the Ulot River in the upper reaches. The daily discharge data are available for 14 years out of 27 years from 1959 to 1986.

1) Tenane River flow analysis

In evaluating the mean monthly discharge, a wide difference ranging between $2.68 \text{ m}^3/\text{sec}/100 \text{ km}^2$ in May and $10.47 \text{ m}^3/\text{sec}/100 \text{ km}^2$ in December has been observed. The runoff discharges in April, July and August vary largely, while those discharges in the months from November through February are comparatively stable. Such phenomena are caused by irregular or stable rainfall in these months.

The flow duration curve shows that 90% of the runoff discharges (assumed to normal discharge) are $1.3 \text{ m}^3/\text{sec}/100 \text{ km}^2$ and 75% of runoff discharges (equivalent to low water discharge) are $1.9 \text{ m}^3/\text{sec}/100 \text{ km}^2$. (refer to Appendix C.3.1)

2) Groundwater

The total amount of groundwater available in the Samar island can hardly be quantified due to insufficiency of observation data.

According to the NWRC's data, the total groundwater exploitable as safe yield level in this basin is estimated at about 2,880 MCM/year.

3) Water quality

Surface water and groundwater except for those found in the coastal area or particular places have good quality for irrigation. Since the water in the tidal compartment shows a high salt concentration of 1,500 to 30,000 ppm, it is not usable for irrigation purpose and others. For drinking water supply, spring water is the best source. Other water resources should be purified to improve the quality. (refer to Appendix J.1.6)

3.2. Economic, Social and Administrative Conditions

3.2.1. Economic and Social Aspects

1) Population

The population of the Samar province has grown at the average rate of 1.3% annually from 1970 to 1980 and totalled 501,439 in 1980. Birth rate had almost average level in the Philippines.

Factors which have greatly influenced low population growth rate of the Samar province are mortality, especially high ratio of infant mortality and out-migration to other provinces. As for population density, only Catbalogan, which has the comparative small area in the Samar province, shows a high density, about 500 persons per km². (refer to Appendix B.1.1)

2) Employment

The number of labor force in the Samar province has increased from 174,012 in 1970 to 198,839 in 1975 and 227,703 in 1980. In 1975, unemployment ratio marked 4.4% while it marked 7.4% in 1983.

Furthermore, underemployment number was marked considerably large at 65.2% in 1983. The labor wanting additional works due to insufficient income is defined by terms of underemployment labor, and the figure of 7.4% for unemployment and 65.2% for underemployment in 1983 shall be adopted. (refer to Appendix B.1.1)

Needless to say, regional development policy is to increase the job opportunity for labor so as to improve the present situation.

3) Household income

The average annual family income in the Samar island was reported as 4,157 pesos in 1975, which was 20% lower than the regional average. The average annual family income level per household in the Samar province was reported as 18,254 pesos in 1985 which correspond to 58% of the national average of the Philippines.

For planning purposes for the period 1987-1992, NEDA has fixed the poverty lines as follows:

Philippines	2,382 pesos/Month or	28,584 pesos/Year
Metro Manila	3,282 pesos/Month or	39,384 pesos/Year
Urban	2,912 pesos/Month or	34,944 pesos/Year
Rural	2,066 pesos/Month or	24,792 pesos/Year

The above figures shall be applied for the future five years but in case of applying these indices to the level of 1985, about 87.6% of inhabitants in the Samar province are classified below the poverty lines. The disparity between the different classes shall also be considered so as to be decreased in the future. (refer to Appendix B.1.1)

Aside from the income level, there are other indicators as poverty index such as the malnutrition, living and housing condition, sanitary or health care condition, etc. In fact, poverty line income itself has been fixed by means of malnutrition. However, only the figure of income will hereby be adopted as indicator due to their quantitative characteristics.

3.2.2. Economic Sectoral Overview

1) Gross Regional Domestic Product (GRDP)

Region VIII and the Samar province as a whole, has an agriculture oriented sectoral structure. Region-wide GRDP showed that primary sector occupied 55.8%, secondary 10.1% and tertiary 34.1%.

In the past records, each sector's growth in the Samar island projected that agriculture occupies 52.6%, industry 26.6% and services 20.7% for the period between 1980 and 1987. It is observed, however, that the service sector will seemingly enlarge its share due to the remarkable increase of commercial activities. (refer to Appendix B.1.2)

2) Employment by sector

Employment share of major sectors in the Samar province showed that agriculture and fishery occupied 58.3%, industries 12.2% and services 29.5% in 1983. Excluding self-employed workers, employment situation in each sector was evaluated as follows;

The total employment number was 144,291 in 1975, in which agriculture and fishery occupied 76.4%, industries 8.6% and services 15%, while in 1983 the total number was 200,670 in which agriculture accounted 57.0%, industries 12.2% and services 30.8%, respectively.

Particularly, the augmentation of wholesalers and retailers from 4.1% to 16.2% was considerably large, accompanied with slight increase of social services' share. (refer to Appendix B.1.2)

3) Brief sectoral overview

- a) Agriculture (including livestock, poultry, forestry, fishery) ... (Primary Sector)

The captioned sector's actualities and issues are explained in Section 3.3.

b) Industries ... (Secondary Sector)

Industries in the Samar province remain still in the infant stage being composed of small scale and cottage industries. However, emphasis is given to rural industrialization at present. This is in line with the objective to increase the employment opportunities and to level up the income of the inhabitants. The captioned sector's actualities and issues are explained in Section 3.4.

c) Infrastructure and services (Tertiary Sector)

Hereby only mentions one phenomenon that wholesalers and retailers as self-employed workers marked a considerable number. In fact, there are many small traders and shops owners who compose the distribution networks of majority of goods. (refer to Section 3.4)

3.2.3. Administration and Policy Making

1) Central and local governments

The formulation and implementation of the regional development plan with the aim to achieve the economic, social development, are basically a concern of the public sector, particularly in a province like the Samar province.

Each central government agency has a local office, which is in charge of identifying development projects to meet the needs and potentials of the area through consultation with the local government.

By a policy of administration decentralization, there has been a trend to transfer the responsibility for development from central government to local government. Practically, however, due to the lack of experienced technical staff in the local government, local agencies of the central government have been more directly concerned of the project finding.

2) Process of development planning

Each central government office formulates project proposal with the consensus of local government. Its proposed programs are submitted to the regional office of NEDA, who is responsible for integrating them and formulating the regional development plan. Also, submission is likewise made to the central government headquarters. The decentralization of planning process is achieved through the reorganization and strengthening of the Regional Development Council (RDC) as contained in Executive Order No.308 dated 11 September, 1987. All plans pertaining to the regional development are to be reviewed and approved by the RDC.

After the above mentioned process, NEDA headquarters will be in charge of establishing the regional development plan by way of consulting with all the concerned governmental agencies. In accordance with its planning guidelines, NEDA headquarters integrates the regional plans with the national agency plans and comes up with the Philippine Development Plan.

3) Process of implementation of development project

Once approved, plan implementation is carried out through sectoral agencies. Central government agencies sub-allots budget to their regional offices for project implementation as per approved plans and programs. In the implementation stage, it could hardly be said that the implementation has close contact with local governments themselves. After completion of the project, such as road construction or water supply system, the operation and maintenance will often be endorsed to the local government which suffers from lack of fund, equipment and staffs. As for development project and investment, the local government of the Samar province has been and will be inevitably dependent on the central government. It is observed that local government budget covers only current expenditure and more than 90% of development investment has been financed by the latter. This is mainly due to the difficulty of collecting local tax revenue. (refer to Appendix B.1.3)

3.3. Agriculture

3.3.1. Land Holding

1) Farm size

The 1981 Census of Agriculture recorded a total of 46,734 farm households occupying the area of 120,230 ha for the year of 1980 in the Samar province, assuming that the number of farms in the Census is equivalent to the farm households, etc. This means that an average farm size of 2.57 ha is about ten percent lower than the average farm size of the national level.

Farmers have an average of 1.9 parcels, each parcel has an average size of 1.38 ha. Parcels planted with paddy are divided into a number of plots, where the plots are smaller than 1,000 m², due to the slope of land. The farm households were classified according to the type of farm management as shown in Table 3.2.

Table 3.2. Number of Farm Households by Type of Farm Management (Whole Province)

<u>Type of Farm Management</u>	<u>No. of Farm</u>	<u>Ratio (%)</u>
Mainly rice cultivation	18,366	39.3
Mainly coconut cultivation	17,385	37.2
Others (corn, rootcrops, etc.)	10,983	23.5
<u>Total</u>	<u>46,734</u>	<u>100.0</u>

Source: 1980 Census of Agriculture, NCSO
(refer to Appendix E.1.1)

Out of the total number of 91,939 households in 1980 Census of Population, 51% were farm households, 15% fishermen, and the rest were engaged in non-farm occupations. Probably, the number of landless farm households was included in the number of "the rest".

There are about 3,900 forestry occupants in the public forest lands according to the data of BFD. It is considered that the

number of landless farm households is relatively small in the province because most of them easily find the lands for shifting farming in the forest lands.

It is estimated that there are 37,884 of total households in the Study Area with an average farm size of 2.8 ha as shown in Table 3.3.

Table 3.3. Average Farm Size (the Study Area)

<u>Kind of Farm Area</u>	<u>Area</u> (ha)
Planted under temporary crops	0.92
Planted under permanent crops	1.48
Idle	0.21
Grassland	0.04
Forest and others	0.14
<u>Total</u>	<u>2.79</u>

Source: 1981 Census of Agriculture (refer to Appendix E.1.1)

The data provided by the Bureau of Lands (BL) show that the titled lands cover only about 30% of the total cultivated area in the province. The poor condition of land registration might be one of the major obstacles to release formal agricultural credits and also to acquire the right-of-way in any development projects. (refer to Appendix E.1.1)

2) Land tenure and land reform

The data revealed that there has been a considerable decrease in the number of owner farms, while a corresponding increase has been recorded for the number of tenant farms. Likewise, during the same period there was a decline of farmland area owned, while a rise in farmland that was partly owned or tenanted. One of the probable reasons is that a considerable number of small farmers were obliged to sell their farmlands because of unstable and less income generated from the prevailing low productivity of lands. The

fragmentation of land year by year is also the reason for the above phenomena.

According to the Census, 63% of the total farm households are classified into the full-owner cultivators, while the total number of tenants or part-owner cultivators are as small as 37% of the total farm households in the province. However, the tenure status data in the Farm Economic Study is different from the Census data. As described in Section 3.3.7, full owner cultivators occupy only about 40% of total sample farmers.

In the province, of the total target area 3,431 ha for land transfer operation in the land reform program signed in 1972, only 5.5% were operated by the program as of May 1987. One of the major reasons of the above may be attributed to the fact that few tenants apply for land transfer operation due to the strong dependence on landowners. (refer on Appendix E.1.1)

3.3.2. Farm Production

1) Crops and cropping pattern

Crop production area is as a whole limited to the non-forest area (the alienable and disposable land) which has a gentle slope. The shifting farming is not only practiced within the alienable and disposable lands but is also expanding to forest area. One of the reasons for this might be that the arable land was occupied by the absentee land owners. The farmers engaged in this type of cultivation are not willing to be under a landlord with whom they are obliged to get share.

Among the crops planted in the Study Area, coconut occupies the largest portion of the crop area, followed by paddy inclusive of upland rice, cassava, camote (sweet potato), banana and abaca. The cropping season of these major crops are indicated in Figure 3.3.

The harvested areas of the major crops varied widely year by year under the poor irrigation and drainage conditions with relatively high frequency of typhoon attack in the province. Based on the data of the harvested area of major crops and the present land use, the present major cropping pattern and their cropping intensity are estimated for each category of cultivated land as shown in Table 3.4.

Table 3.4. Present Cropping Pattern

<u>Cultivated Area</u>	<u>Area</u> (ha)	<u>Cropping Intensity</u> (%)	<u>Cropping Pattern</u>
1. Lowland, irrigated	1,500	150	Paddy + Paddy/Fallow
2. Lowland, rainfed	14,900 ^{1/}	140	Paddy + Paddy/Fallow
3. Upland fields	14,600	150	Corn + Corn/Root crops /Beans/Upland rice
4. Coconut land	76,300	100 ^{2/}	
5. Shifting farming	20,500		
<u>Total</u>	<u>127,800</u>		

Note: 1/ ... Including non-irrigated area in the non-functional irrigation service area.

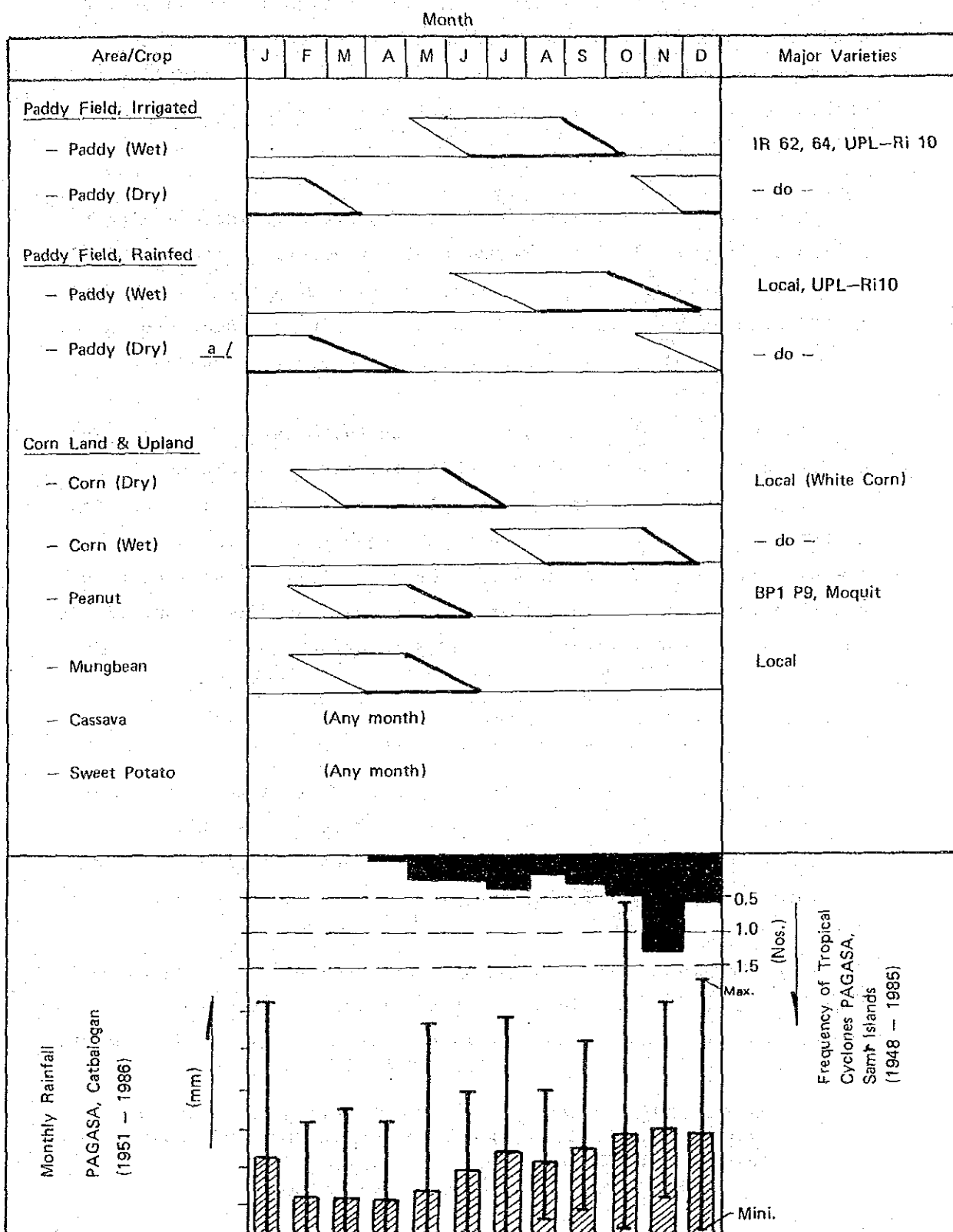
2/ ... Coconut intercropping area is as small as less than 20%.

The cogonal open lands occupy a large portion of the shifting farming area. There are many farmers who are reopening cogonal area for cropping even if they are aware of that the fertility of these reopened cogonal lands is poor. The cultivation of these fallow areas is very laborious and the cogon is difficult to eradicate. (refer to Appendix E.1.2).

2) Cultivation practices

In the irrigated areas, high yielding varieties of paddy are mostly transplanted at random. Even in the rainfed areas, high yielding paddy varieties cover more than 50% of the planting area while the upland rice is of local varieties. Fertilizer and chemicals are applied a little even in the irrigated area. Other

FIGURE 3.3. CROPPING CALENDAR OF MAJOR CROPS



Note: a/..... Depending upon the availability of rain water

crops including coconut, rootcrops and abaca are also planted without the application of fertilizer and chemicals. Carabaos are used in land preparation and hauling of crop production. The "Payatak system" (land preparation is done by carabao trampling without plowing) is still being practiced in the rainfed lowland area.

The farm machinery is very limited in number. There are only 351 units of power tillers, 27 units of four-wheel tractors, 26 units of combined/powered threshers, 15 units of paddy driers, and 1,592 units of local copra driers as a whole in the Samar province according to 1980 Census of Agriculture. (refer to Appendix E.1.2).

The shortage of draft animals causes the delay in the cropping of such crops as paddy and corn, which reduces the yield and cropping intensity due to the late planting or losing planting time. However, it is not easy to increase the number of carabaos immediately, while the introduction of power tillers and four-wheel tractors for the supplemental use to the draft animals is one of the most effective means to improve crop production.

3) Crop production

The yields of most crops in the province are lower than these of the national average as shown in Table 3.5. The yields of rootcrops and abaca are relatively high because the climate in the province is very suitable for the production of these crops.

The questions were posed by Farm Management Survey regarding to the problems and constraints on the obstacles to improve crop production. The answers by the respondents are summarized as below:

- Lack of infrastructure: infrastructure of irrigation system, farm-to-market roads, flood control and drainage are poor or inadequate.

Table 3.5. Crop Production in Samar Province
(Excluding Islands Municipalities)

Crop	Harvested Area (ha) *2	Unit Yield *3 (ton/ha)	Production (ton)
1. Paddy *1 (Including Upland Rice)	37,800 *2	1.64	61,992
2. Corn	7,600 *2	1.05	7,980
3. Sweet Potato	3,900	3.44	13,416
4. Cassava	3,700	4.51	16,687
5. Gabi	900	4.10	3,690
6. Peanut	600	0.80	480
7. Mungbean	9	0.50 *4	5
8. Coconut (Copra)	50,100	0.67 *5	33,540
9. All Banana	3,200	15.0 *5	48,000
10. Abaca	4,000	0.40	1,700
11. Cacao	27	0.91 *5	3
12. Coffee	12	2.66 *5	25
13. Citrus, (Calamansi)	4	28.80 *5	115
14. Other Citrus	13	11.68 *5	154
15. Mango	16	0.67 *5	11
16. Onion	18	1.74 *5	32
17. Vegetables, Fruity	146	9.38 *5	1,368
18. Vegetables, Leafy	29	3.53 *5	103
<u>Total</u>	<u>112,074</u>		<u>189,301</u>

Note: *1 ... Including upland rice

*2 ... Average of harvested area for 1984/85 to 1985/86

*3 ... Average of unit yield for 1980/81 to 1984/85

Comparison of unit yields for major crops between the national, regional and provincial levels are as follows;

Crops	Philippines		Region VIII		W. Samar
	(ton/ha)	(%)	(ton/ha)	(%)	(%)
Paddy	2.40	(100.0)	1.80	(75.0)	(68.3)
Corn	1.00	(100.0)	1.06	(106.1)	(105.0)
Sweet Potato	4.78	(100.0)	3.99	(83.5)	(72.0)
Cassava	7.77	(100.0)	4.15	(53.4)	(58.0)
Gabi	3.25	(100.0)	2.79	(85.9)	(126.2)
Mungbean	0.70	(100.0)	0.67	(95.7)	(71.4)
Peanut	0.84	(100.0)	0.50	(39.5)	(95.2)
Coconut	1.09	(100.0)	0.78	(71.6)	(40.3)
Abaca	0.54	(100.0)	0.43	(79.6)	(74.1)

*4 ... Average of unit yield for 1984/85 to 1985/86

*5 ... Unit yield in 1985/86

*6 ... Estimated on the basis of 1981 Census of Agriculture and BAS data for 1985/86

Source: 1981 Census of Agriculture (harvested area) and BAS data in the Samar province (unit yields)

- Prevalence of Schistosomiasis: schistosomiasis significantly affects farm-related labor activities as the consequence it brings about the low crop production.
- Tenure status: Majority of the farm households are tenants and part-owners who cannot afford to utilize land resources efficiently because of inaccessibility to institutional credit facilities, unfavorable sharing arrangement, and lack of technological know-how.
- Frequent occurrence of natural calamities: The province is often attacked by typhoon which causes enormous damages of crops. Other causes of crop destruction were pest/diseases and drought from 1980 to 1986. The total crop damage was recorded by 12% of the total production, where the share of typhoon damage to the total crop damage is as large as at about 60%.
- No "package technology transfer programs with formal credit" is available in the province except for the "Expanded Corn Program" which covers negligibly small corn area.

The estimated area of seed renewal with improved varieties is only less than ten percent of planted area for paddy and corn, based on the above seed amounts. Most farmers supply seeds from their own products for other crops. (refer to Appendix E.1.2)

4) Animal husbandry

Currently, the carabao seems to be deficient considerably in number. It is reported that the carabao diseases of "Septicemia" and the parasite diseases like "Liverfluke" are prevalent in the province. Relating to this, the most serious problems are (i) lack of vaccine to supply farmers (ii) insufficient number of veterinary staff (iii) no facilities of animal diagnostic and treatment services.

The raising scale of the other livestock and poultry per surveyed farm is small because most farmers intend to breed for home consumption. They have no incentive to make a large scale of husbandry since the supply condition and the price of commercial feeds are the significant obstacles. As a result, the supply of meat and egg still remains inadequate in the province.

According to "Farming System Development Project Report No.44, raising carabao is common in Gandara where one of its major small scale industries is cheese production from carabao's milk. The carabao's feed-stuffs are native grasses, rice straw and crop residue. The quality of these feed-stuffs is poor in nutrition (digestibility of about 45 to 55%). This might be one of the major reason why the yield level of potential milk has not been attained to the national standard. (refer to Appendix E.1.2)

3.3.3. Extension Services and Research Activities

There are about 130 agricultural extension workers in the Samar province as follows;

<u>Government Agencies</u>	<u>No. of Technicians</u>
Department of Agriculture (DA)	115
Philippine Coconut Authority (PCA)	9
Fiber Industry Development Authority (FIDA)	3
Farming System Development Project (FSDP)	5
<u>Total</u>	<u>133</u>

DA has a criteria that one farm management technician is supposed to take charge of five Barangays. Therefore, only 65% (650 Barangays) could be provided with extension services by above number of extension workers. Furthermore the extension services are extremely inadequate due to the following causes;

- The difficult accessibility to many Barangays, the lack of transportation facilities and the insurgency problems have significantly retarded and caused the stagnation of the extension services,
- The provincial office of the DA provides extension services mainly only for paddy and corn farming.
- The number of extension workers who are equipped with enough knowledge and technology is limited because there is insufficient fund for development of personnel.

Institutional organization for agricultural research activities is not located in the Samar province. However, there is a joint project of the DA and VISCA, that is, Farming System Development Project (FSDP). FSDP aims to develop appropriate research and technologies on improvement of farming system in the upland areas. (refer to Appendix E.1.3)

3.3.4. Agro-Related Production

1) Forestry

There are approximately 265,600 ha of the governmental forest land in the Samar province. According to the related law, no person, association, corporation, etc. are allowed to engage in logging industry without a license. Approximately 50,000 m³ of Dipterocarp, 20 tons of Almaciga and 700,000 linear meters of unsplit rattan are yearly extracted for the last five years in the province by legal loggers. These figures of the data do not include the extraction made by illegal loggers.

Majority of the farmers who occupy the forest land might be driven from the landless farmers whose means of livelihood are shifting farming and illegal logging.

In view of foregoing, the BFD is implementing the Integrated Social Forestry Program to conserve forest resources. The program awards the utilization right of about 4,600 ha of forest lands to about 1,120 farmers who occupied the land before 1981. As of 1986, about 580 ha of lands have been developed by 1,120 households under the program. The program covers 13 municipalities. (refer to Appendix E.1.4)

2) Fisheries

Total fish production in the Samar province is 12,000 tons annually. More than about 82% of them are landed by small-scale

fisheries, that are called as municipal fisheries who operate the fishing with only a small boat of less than three tons. The small-scale fisheries are operated by two types of fishermen, the full-time operators (about one third of the fishermen) and the part time operators. In most coastal rural areas which are located within about 10 km to the fishing ground, farmers are usually engaged not only in agriculture but also in fisheries as part-time fishermen so as to have supplemental income. (refer to Appendix E.1.4)

About 3,000 ha of brackish fishponds have been developed along the coast in the Samar province. Out of which, 1,800 ha of fishponds have been operated for the production of prawn, milkfish and crabs. These fishponds are large and managed by rich businessmen. On the other hand, the shell culture of green mussel has been developed rapidly along the coast of Maqueda bay. This can be managed and operated by some businessmen and also by sustenance fishermen due to the requirement of small amount of fund. (refer to Appendix E.1.4)

The diminution of the fishery resources in the Samar province has been alarmed by the concerned authorities since the end of 1970's. This can be attributed mainly to the increased number of modern fishing gear and to the remarkable increase of population particularly in the coastal areas. This is further aggravated by the indiscriminated exploitation of fishery resources by use of explosive and obnoxious substances. Another problem is the occurrence of red tide, in 1983 and 1987, which made impossible to sell fish due to the toxicity for the period of the red tide occurrence. (refer to Appendix E.1.4)

3.3.5. Post Harvest Facilities

As described previously, powered threshers and mechanical dryers are scarcely used in the Samar province, where manual threshing and sun drying are prevailing in paddy and corn cultivation.

In 1986 only about 1,200 tons of paddy and 300 tons of corn are procured by National Food Authority (NFA). Since the total capacity of NFA warehouses is about 5,600 tons and its rice mill capacity is about 2,400 tons per year, the capacities of these facilities are sufficient so far as the NFA procurement of agricultural products are limited to the said amount of paddy and corn. In case that the proposed agricultural development will be implemented, the capacity of the post-harvest facilities inclusive of NFA warehouses and rice mills should be expanded to cope with increase of the agricultural production.

The quality of paddy and corn in the province seems to be considerably at low level. The poor quality of paddy and corn might be caused by (1) poor grading of grains due to manual threshing, (2) deterioration of grain quality because of poor drainage of paddy fields, and (3) lack of dry yard and mechanical dryers.

As for privately owned facilities, there are 74 warehouses having the total capacity of about 1,200 tons, and 74 rice mills with the total capacity of 15.2 tons of paddy per hour. About 86% of the total milling capacity is covered by that of Kiskisan (small-scaled rice mill which hull and mill paddy with one process) which causes poor quality rice.

The total annual milling capacity of the NFA and private rice mills is about 30,000 tons of paddy. This milling capacity is almost sufficient for the total annual production of paddy for the latest thirteen years. However, it means that there is a short of the capacity by about 30 to 40% of total production in the normal production years. It is observed that manual milling is common in the rural area. (refer to Appendix E.1.5)

3.3.6. Supply/Demand Balance of Agricultural Products

There is the analysis of the supply/demand balance of agricultural products for 1981 to 1985 at the national to the

provincial levels. Region VIII is one of the rice deficient regions in the country. Its rice production could attain 49% of the total demand. Other agriculture products like vegetables, fruits, livestock and poultry are also deficient. The deficit is supplemented by imports from other regions. In the Samar province, rice is also deficient based on the JICA Study Team's analysis and the result is shown in Table 3.6. (refer to Appendix E.1.6)

Table 3.6. Supply/Demand Balance of Rice in the Samar Province (1980/81-1984/85) (Milled Rice)

<u>Per Capital</u> Consumption (kg/year)	<u>Demand</u> ('000 ton)	<u>Supply</u> ('000 ton)	<u>Balance</u> ('000 ton)
119.8	67.5	33.0	(-)34.5

Source: Bureau of Agriculture Statistics.

Out of 26 municipalities in the Samar province, 20 are rice deficient. Production of fruits, vegetables and livestock and poultry are also insufficient to meet the demand based on the actual food requirement data. There is a conclusion that the actual consumption of most agricultural products in the province is less than the standard one. (refer to Appendix E.1.6)

Since there are many farmers who can not afford to attain self-sufficiency in supply of rice as a basic commodity, it requires to increase the production of the commodity for the self-sufficiency at first.

3.3.7. Farm Economy

1) Farm and household characteristics

The socio-economic characteristics of the target group in the Study Area have been investigated primarily through the farm economy survey among the farm households and the Barangay captains as well as the interviews with the various local government and non-government institutions.

a) Farm economy survey

Farm economy survey was conducted to grasp the present economic status of farm households. The following eight Barangays were selected taking into consideration their geographical, topographical condition and type of crop production.

- San Agustin, Gandara
- Nacube, Gandara
- Pizzaro, Gandara
- Trinidad, the Calbayog city
- Mawacat, the Calbayog city
- Pilar, the Calbayog city
- Binocaran, Hinabangan
- Burgos, Basey

The number of households interviewed was 83, which corresponds to about 10% of the total households of the above mentioned Barangays. The sample farmers were selected at random from the farmers' list prepared by the Barangay captains.

b) Farm size by type of crops

The size of farm area operated inclusive of area rented in and operated free of charge among sample farmers is as follows; (refer to Appendix N.1.1).

- Mainly paddy production : 0.8 to 4.9 ha with the average of 2.4 ha.
- Mainly corn production : 1.9 to 6.5 ha with the average of 3.1 ha.
- Mainly coconut production: 2.4 to 9.7 ha with the average of 3.3 ha.

c) Tenure status

The number of full owners is only 20% of sample farmers and the remaining 80% are tenants or part owners who usually own limited land. The tenure status for full owner, part owner and tenant are 35, 45 and 20% in Gandara area, 25, 40 and 35% in Jibatan area, 75, 5 and 20% in Hinabangan areas and 50, 50 and 0% in Basey area, respectively. The absentee landlord occupies 5 to 10% of the total land holding in the Study Area.

The share of production and cost between landlord and tenant is 20 to 50% for landlord, 50 to 80% for tenant. The share for landlord seems to be small compared with the other provinces for the reason of low productivity in the Study Area. (refer to Appendix N.1.2)

d) Farm input

Most of the rice and corn farmers are producing their own seeds. The average seeding rate of paddy and corn is 45 and 25 kg/ha, respectively.

Only a few rice farmers use fertilizer wherein majority are applying commercial fertilizer such as urea, potash and complete. However, most farmers cannot use the fertilizer with recommended rates due to their inability to obtain credit, lack of capital and high costs of farm inputs.

Fertilizer and agro-chemicals are purchased by the farmers directly from the dealers. However, there are a few dealers who comply with the requirements of the farmers. (refer to Appendix N.1.3)

e) Farm output

The percentage of crop disposition is different by type of crops and area. (refer to Appendix N.1.3)

Only 20% of paddy (including upland rice) is sold to the market, while 50% of corn, 70% of coconut and 70% of other upland crops are sold. The farmers have a tendency to sell the farm products more through buyers (middlemen) visiting them on the place, than through NFA even though selling price is lower. The reasons are as follows;

- No transportation system from farm to market,
- Payment on the place by the visiting buyer, and
- Adequate timing of visiting and buying.

The visiting buyer purchases the farm products at the price approximately ten percent lower than that of NFA. As the consequence, about half of the sold amount of agricultural production is occupied by NFA and the remaining half by the private buyer. The farm gate prices of paddy, copra and corn are about 3.0 pesos, 3.2 pesos and 2.3 pesos per kg, respectively.

f) Employment pattern

On-farm employment in the paddy production in the Study Area is characterized by extensive agriculture with the low labor force participation rate except during the peak period. The farm economy survey indicates that only 90 man-days are provided on one hectare for rainfed rice production per annum. In the peak period, mainly housewives are hired to others' farm at the wage of 30 pesos per day. The working days in a year on others' farm are about 136 days on an average; 90 days for male and 168 days for female. The labor requirement for corn, coconut and

other fruit tree growing is rather constant except for the flowering stage and rainy season. 56 and 67 man-days/ha are provided for corn and coconut production, respectively.

Livestock and poultry are commonly raised by majority of farmers, requiring a constant labor supply throughout the year. However, most of the respondents own and raise only a few chickens and pigs. Some farmers own also carabaos which can be utilized for draft and transportation purposes.

Inland fishery is also practiced in nearby stream and swamps mainly for selling purpose. Most farmers are engaged in farming as mainly occupation, and in business enterprising as secondary occupation such as farm laboring and carpentry work.

g) Family income and expenditures pattern

The family income is generated from the farm, off-farm and non-farm occupation of the household members. The results of the farm economy survey and interviews made with farmers and agricultural technicians show that the annual income of typical farmers amount to; 18,000 pesos for rice production farmers (2.4 ha), 12,600 pesos for corn production farmers (3.1 ha) and 13,800 pesos for coconut production farmers (3.3 ha), respectively. These are all below the level from average income of 18,254 pesos for the Samar province. Of those amounts, 55% are derived from the farm business and 45% from off-farm and non-farm sources. (refer to Appendix N.1.4)

Farm income includes the return from crops, livestock and poultry production. Based on typical rice, corn and coconut farm size of 2.4, 3.1 and 3.3 ha, annual crop income per farm was estimated at 9,650, 4,250 and 5,450 pesos, respectively. Livestock and poultry income per farm averaged at 1,500 pesos. This includes the value of livestock and poultry products sold and consumed by the farm family.

Off-farm income derived from work for a wage on neighbor's farms. The farmers and the family members are hired on such operation as plowing and harrowing, transplanting, weeding, fertilizing and harvesting. The average off-farm income per farm family is estimated at 4,100 pesos per year.

Non-farm income includes income from wages and salaries of family members employed in government and private agencies, earning from cottage industries, gifts received from relatives, Sari-Sari store, remittance from family members and some other business. The average annual non-farm income per farm household is 2,750 pesos.

The expenditure pattern in the Study Area shows that the proportion for the food cost is quite high (67%) compared to that of Region VIII (63%) and the whole country (42%). To the contrary, the proportions of cost to be used for housing and household furnishing, education, clothing and recreation and personal care are very low. (refer to Appendix N.1.4)

2) Farm economy from the viewpoint of dietetics

a) Nutrition

Nutrition intake in Eastern Visayas Region is quite unbalanced. In particular, lack of vitamin A and vitamin B₂ can be observed. Lack of vitamin A often causes night blindness which is already widely spread in the Study Area.

Findings on the food consumed in Visayas revealed that cereals and cereal products, fruits and vegetables, and fish, meat and poultry are three food groups eaten adequately. While consumption of sugar and syrups, starchy roots and tubers, vitamin C-rich foods, eggs, milk and milk products and fats and oils, are more than one-half of recommended level. Intake of essential nutrients is likewise found inadequate except for protein and niacin. Therefore, the programs on backyard production of nutritious foods such as legumes, rootcrops, leafy and yellow vegetables should be continually encouraged. (refer to Appendix N.1.5)

b) Food cost of households with nutritionally adequate diets

An examination of the money value of food consumed by the household can more or less provide a basis for determining how much money the household need in order to consume as nutritionally adequate diet.

Based on the proportion for the food cost, one day food cost per capita in the Study Area is calculated as about five pesos. On the other hand, food cost per capita with nutritionally adequate diets is calculated at 16 pesos on the assumption that they have no self-supply products; it corresponds to about 6,000 pesos per year per capita so as to take nutritionally adequate food. This figure requires 47,000 pesos for a year as a family income. Therefore, crop production needs to be emphasized since this is one direct means of increasing family income, family food availability and decreasing food expenditure. (refer to Appendix N.1.5)

3.3.8. Farmers' Organization

1) Cooperative farmers' organizations

a) Area marketing cooperatives

In the Samar province there are two Area Marketing Cooperatives, one in the Calbayog city, and another is in the municipality of Gandara. Cooperative Rural Bank, another kind of Kilusang Bayan has not been organized in this province yet. (refer to Appendix L.1)

b) Cooperatives

There are 12 cooperatives, with 903 membership and the aggregate paid-up capital of 442,454 pesos. The average membership and paid-up capital per cooperative would be 75 and 36,870 pesos, respectively. However, 127 out of 903 members are dormant (almost exclusively in case of the credit cooperatives) and the paid-up capital also fluctuates by type of activity, as follows:

Type of Activity	Nos.	Paid-up Capital		Membership			Average /Co-op.
		Aggregate	Average /Co-op.	Active	Dormant	Total	
Credit	4	278,192	70,000	409	126	535	134 (24% Dorm.)
Fishery	2	20,000	10,000	68	-	68	34
Consumer	2	14,062	7,030	61	1	62	30
Palay Marketing	2	10,200	5,100	56	-	56	28
Copra Marketing	1	115,000	-	141	-	141	-
Grain Retailing	1	5,000	-	41	-	41	-

Copra marketing cooperative is the oldest of all - it was originally organized in 1964 and re-organized in 1972; seven years later the first credit cooperative came in 1979. Three additional credit cooperatives and one of the two consumer cooperatives were organized during 1980 and 1983; another consumer cooperative followed in 1986, and two fisheries, two palay markets and one grain retailers' cooperative came in 1987. (refer to Appendix L.1.1)

c) Samahang Nayon

The total number of Samahang Nayon (S.N.) so far registered in the Samar province is 271, with the aggregate paid-up capital of 225,260 pesos, with the total membership of 9,274. All of them were organized during five years from 1973 to 1977. However, only 20% of them, viz: 54 Samahang Nayons remain active as of the end of September 1987; the remaining 217

Samahang Nayons are dormant. It may be worthwhile to conduct a comparative study on the active Samahang Nayon on the one hand and the dormant Samahang Nayon, on the other.

	No. (%)	Membership		Paid-up Capital(pesos)	
		Total (%)	Aver./S.N. (%)	Average (%)	Aver./S.N. (%)
Active S.N.	54 (20)	2,327 (25)	43 (126)	102,379 (45)	1,896(228)
Dormant S.N.	217 (80)	6,947 (75)	32 (94)	122,879 (55)	566(68)
Total S.N.	271(100)	9,274(100)	34 (100)	225,260(100)	830(100)

Comparison between the active and dormant Samahang Nayon may be made on two phases of membership and paid-up capital. In both, dormant Samahang Nayon fares ill with the active Samahang Nayon: the former averages at about 75% in membership and merely 30% in paid-up capital when compared with the latter.

Actively functioning 54 Samahang Nayons in the Samar province today can be classified into seven kinds according to their nature of activity: (refer to Appendix L.1)

No.	Nature of Activity	Number (%)
1.	Supply of Consumer Goods	30 (55.6)
2.	Sari-Sari Store	15 (27.8)
3.	Extension of Credit	3 (5.6)
4.	Grain Retailing	3 (5.6)
5.	Carabao for Rent	1 (1.8)
6.	Swine Raising	1 (1.8)
7.	Supply of Agri. Inputs as well as Consumer Goods	1 (1.8)
	<u>Total</u>	<u>54 (100.0)</u>

2) Non-Cooperative farmers' organizations

There are seven different kinds of farmers' organizations falling under this category. They are; (a) Farmers' Associations; (b) Rural Improvement Club; (c) 4-H Club; (d) Irrigation Association; (e) Agrarian Reform Beneficiary Association, Inc.; (f) Abaca Farmers' Association, and (g) now-defunct Coconut Producers Federation. Government agencies assigned with administrative guidance and assistance towards these non-cooperative farmers' organizations are: DA for (a) to (c); NIA for (d); DAR for (e); FIDA for (f).

a) Farmers' association

This organization was created with the aims and purposes as briefed below;

- To establish closer relations between the farmers, the DA and other government agencies concerned;
- To develop cooperation between DA, other agencies and the farmers in such undertakings as to secure for every farmer the highest advantage in modern farming to raise the standard of living;
- To advance the methods of modern farming for the economic welfare of the country.

Under the previous administration, every farmer wishing to join Farmers' Association was requested to pay membership fee amounting to two pesos and one peso annual fee throughout his affiliation to the organization. Distribution of the membership/annual fees was used to be made as follows;

<u>Distribution</u>	<u>Membership Fee</u>	<u>Annual Fee</u>
Local Association	₱ 1.00	₱ 0.50
Municipal Federation	0.50	0.20
Provincial Federation	0.30	0.15
National Federation	0.20	0.15
<u>Total</u>	<u>2.00</u>	<u>1.00</u>

This kind of levying on the farmers is now abolished and the fund required for the activities of the Farmers' Association is usually contributed by the member farmers themselves.

b) Rural improvement club

Rural Improvement Club (RIC) was first organized in Montalban, Rizal, in 1934, and since then it has been spread all over the country. Prior to its organization, the task of teaching the fundamentals of improved home-making to rural women was done by a handful of home economic agents of the Bureau of Science. With the creation of the BAEx in 1952, this task is now being handled by extension workers: Home Management Technicians.

RIC has a slogan of "Better Homes for Better Living" and this is being aspired for through the efforts of the organized home-makers (farmers' wives) itemized as follows;

- Gain knowledge on the use of resources to achieve such important goals of education of children, nutrition and health, clothing, housing and financial security.

- Adopt health and sanitation practices;
- Gain skills on family relations and child-care; produce and/or utilize farm products to help attain food sufficiency and to process seasonal and surplus products and by-products for family use as well as for the market;
- Engage in profitable home industries to supplement the family income;
- Understand the community as well as the organizations and services available therein;
- Work together as an organized group for the improvement of the home and community.

RIC membership is composed of (i) home-makers aged 21 and above (for local clubs); (ii) all officers and members of RIC throughout the country (National RIC); and (iii) all levels of home management technicians.

RIC member pays ten pesos as registration fee as well as annual fee of five pesos to finance its wide range of activities.

c) 4-H club (Anak Bukid Club)

This is an organization of farm-boys/girls working together and developing themselves through a wide variety of experiences on the farm, in the home and community. It has colorful projects for implementation including those mentioned as follows.

Main Thrust: Feedlot cattle fattening/dispersal; Legume production mango/peanut; goat production; nutrition education

Lesser Thrust: Food production; Backyard hog raising/poultry raising/vegetable gardening/rice fish culture

Income Generating Projects: Clothing/crafts

The present administration has stopped the old practice of charging every boy or girl desirous of coming under the umbrella of 4-H Club the registration fee of one peso. Statistical details of the above-mentioned three non-cooperation farmers' organizations coming under administrative guidance of DA, viz: Farmers Association, RIC, and 4-H Club. (refer to Appendix L.2)

d) Irrigators' association

This is a farmers' organization of paddy cultivators who have an access to the land which was previously rainfed but later given physical facilities for irrigation/drainage by NIA. There are eleven irrigators' associations in the Samar province whose total command area and membership culminating at 1,154 and 471, respectively. (refer to Appendix L.2).

Irrigators' association members are thankful to NIA for its engineering work done towards their land and also for various services provided for them through its community organizers; NIA community organizers are commissioned for appropriate care and attention to the irrigators' association members with the frequency of two to three days/four nights. Every member of the irrigators' association contributes 75 kg (1.5 cavans) of paddy per ha per year for amortization of the land improvement cost previously borne by NIA. Among eleven irrigators' associations having been organized in the Samar province, one at Danao in the Calbayog city, which represents 11% in terms of the total command area and nine percent in terms of the entire membership, has been studied. The other irrigators' associations are assumed to be operating more or less in the similar manner as Danao irrigators' association.

Danao Irrigators' Association

The following information has been obtained through a personal talk with the secretary of Danao Irrigators' Association; he is also serving as Barangay captain. This irrigators' association has a command area of 125 ha on an average (100 ha in drought year, but 150 ha in the year of good rain) whose irrigation/drainage system was completed by NIA during 1980 to 1984. The command area is now subdivided into seven sectors, each one of which is attended by 25 persons who would be recruited from amongst the members as well as their family members primarily for canal maintenance. The total number of membership is 42.

Average yield of paddy in the pre-irrigation period remained around 1.3 tons per ha (25 cavans per ha), but it increased to 4.0 to 5.0 tons per ha (80 to 100 cavans per ha for two croppings a year), after the land improvement work was completed. 75 kg/ha (one and a half cavan/ha) of paddy contributed from the members is for amortization of the engineering cost borne by NIA.

Danao Irrigators' Association is managed by a group of officers comprising one president, vice-president, secretary, treasurer and auditor; it has a Board of ten directors.

e) Agrarian Reform Beneficiaries Association Inc. (ARBA)

There are 15,207 farmers who are affiliated to "ARBA" in the entire Samar island as of the end of August 1987. They are distributed among 782 Barangays in 55 municipalities, to be looked after by seven team offices which are located at Borongan and Oras in the Eastern Samar province, Catarman and Lao-ong in the Northern Samar province, and Catbalogan, Calbiga and Calbayog in the Samar province. These seven team offices are supervised by DAR in Catbalogan.

Confining our analytical study on ARBA, 117 ARBAs with 3,308 members are dispersed among eight northern municipalities under the care of the team office in the Calbayog city; 110 ARBAs with 2,714 members are existing in six central municipalities under the care of the team office in Catbalogan and, finally, 89 ARBAs with 1,717 members are scattering among seven southern municipalities being looked after by the team office located at Calbiga. (refer to Appendix L.3)

The ARBA member has to pay ten pesos for his identification card and three pesos as annual due. What he is entitled to receive in return is the services which seem abstractive rather than substantial. Such services include:

- Partnership in program implementation;
- Education and training;
- Problem solution through group action;
- Establishment of relationship between private and public entities; and
- Direct/indirect operation that affects the members' future.

Practical helps which are meant for an assurance of the members' economic betterment through an enlarged re-production in agriculture and/or agro-industries so as to enable them to become the genuine heirs to the tenanted land does not seem to be provided. Family-members, including wives, sons and daughters are also encouraged to organize themselves into the Women ARBA and Sons/Daughters' ARBA.

Each ARBA has a stereo-typed organizational set up by the office-bearers comprising of each one president, vice-president, secretary, treasurer, auditor, plus liaison-officer and public relations officer; ARBA's organizational structure assumes a pyramidal form with the Barangay captain at the base, and municipal, provincial, and regional chapters in-between, with the national chapter at its apex.

The carrier of the services promised to ARBA members is nobody but the Team Farmers' Affairs Officer (TFAO); yet, their total strength remains merely seven at present towards 15,207 ARBA members in the Samar Island (2,172 members per TFAO), and three TFAO's for the Samar province where there are 7,739 ARBA-members (2,580 members per TFAO). It is almost pathetic to see that TFAO is not provided with a bicycle even, to say nothing of motorcycle or jeep to fulfill his duty. (refer to Appendix L.2)

f) Abaca farmers' association

There are two Abaca Farmers' Associations: one is at Barangay Pizarro in Gandara municipality (17 members), and another at Barangay Cagbayang in the Oquendo district of the Calbayog city (30). Both of them are concentrating on planting of abaca trees, as well as marketing of raw fiber. The Abaca Farmers' Association at Barangay Cagbayang is now trying to convert itself into a marketing cooperative. These two associations are financially assisted by the Department of Social Welfare & Development in terms of loan-provision, although they are administratively put under FIDA.

g) Now de-funct coconut producers federation

In the Samar province, some 40,000 ha of land are planted to 4.0 million coconut trees, annually producing approx. 158 million nuts, equivalent to 1,000 tons of copra. About 19,000 coconut producers, primarily the landlords and full-owners of coconut plantation, were organized into a local chapter of the Philippine Coconut Producers Federation (COCOFED) during ten years starting from 1972. PCA had been mandated in 1971, under RP Act 6260, to act as the collection agent/trustee of the coconut levy amounting to 55 centavos per 100 kg of copra to be marketed by the COCOFED membership (levy payments meant for the forced savings on the part of the farmers to enable them to raise the 100 million pesos capital required for the investment company as the incentive for the Philippine coconut farmers).

PCA turned over the levy to COCOFED which was established in the following year of enactment of the said Act.

Eventually, COCOFED came to enjoy affiliation of some 600,000 members from amongst the nation-wide coconut producers; one-half of them, viz; 300,000 were made the shareholders of the United Coconut Planters Bank, and the remaining one-half, the holders of the life-insurance policies issued by the United Coconut Planters Assurance Corporation. In fact, these two financial companies were claimed to be the net-result of levying on coconut marketing. It would be unfair, however, if no mention should be made about awarding of scholarship on behalf of some of the COCOFED members' sons and daughters.

Nevertheless, it was undeniable that such a cultural way of money-disposal stood for a mere fraction of a huge amount of money raised through coconut levying.

The cordial relationship between PCA and COCOFED came to a sudden termination in 1982 when abandonment of coconut levying system was decreed, thus resulting in disbandment of COCOFED. Thereafter, PCA prepared a new scheme of organizing coconut farmers with the concept of uplifting the human rights inherent to the less privileged coconut populace, such as the farmers, tenants, and the factory-laborers participating in coconut industry.

3.4. Non Agricultural Sector (Second and Tertiary Sectors)

3.4.1. Small Scale and Cottage Industries

1) Agro-processing industry

Among the small scale and cottage industries, the agro-processing industry has been considered as an essential one. Nevertheless, almost all primary produce of agriculture and fisheries are consumed without processing at place or are exported to other provinces as raw materials until now. On forestry, there is the logging industry but no further processing is done.

The emphasis on the subject is observed in the development plan of NEDA and in the Integrated Area Development (IAD) of NACIAD as well as in the policy adopted by the DTI which has taken the initiatives to organize the People Economic Council (PEC) as well as to enlarge their provincial branch office activities.

2) Manufacturing and others

The number of manufacturing establishments occupied about 41% of total manufacturing establishments in the Samar Island. They are composed of small scale or cottage industry, such as mat weaving, bolo and knife making, rattan craft, fiber craft, garment, leather craft, ceramics, etc.

Regarding the actualities of small scale and cottage industries in the Samar province, according to the survey conducted by DTI, three sorts of constraints, such as financial, marketing and technical are monitored as major problems for the development of industry. Among other industrial establishment, transport has increased their activities, but construction and electricity has remained as before. (refer to Appendix B.4.1) Note: Coastal fisheries industry is excluded.

3.4.2. Marketing

1) Marketing of agricultural products

NFA occupies only 1.9% of procurement shares for paddy and 3.8% for corn produced in the Samar province in 1986. Except for copra, abaca and certain amount of corn, the majority of agricultural products are consumed on the place as daily food or animal food. (refer to Appendix B.4.2)

In the remote areas, small amount of products are sold at extremely low prices to the middlemen who visit the areas due to lack of transportation. Some portions of products are sold to dealers or traders in the poblacions. Main problems in the actualities are (1) NFA's limited procurement; (2) low farm gate price; and (3) "suki" system, meaningly, buyers lend the money with interest in advance and get the product before harvesting, etc.

2) Marketing of manufactured and other consumer goods

In the Samar province, it is observed that the establishment of services, particularly those of wholesaler and retailer have grown up remarkably in number.

By 1978 NCSO Census, wholesale and retail trade had 71.5% of the province total establishments of 3,197. Nevertheless, the lack

of specific data on their activities enables the reporter to estimate that these traders are not strictly classified to handling specific goods but buying and selling the miscellaneous goods with other provinces.

Storage and transportation facilities are not sufficient and the traders make commerce not only with comparatively large stores in the town like Catbalogan and the Calbayog city but also with many small shops called Sari-Sari stores in each municipality. There exists a difference of marketing price even within the narrow market. (refer to Appendix B.4.2)

3) Characteristics of marketing system

Marketing system is a matter not limited to one specific area like the Samar province, but has large expanse region-wide and nation-wide. Therefore, the marketing studies have been generally conducted according to commodity and not to area. There exist an exceptional study on marketing in Region VIII conducted by the BAS in 1983. (refer to Appendix B.4.2)

In fact, there has been a Marketing Assistance Project taken up by DA, and another assistance financed by Asian Development Bank in a nation-wide scale. The former has the scheme of extending the training to the farmers and the latter's scheme is composed of provision of communication facilities and formation of a training center.

4) Evaluation of policy for marketing of agricultural produce

In 1977, self supply for rice and in 1979 for white corn has been attained in the Philippines. In February 1986, the government has declared a new agricultural policy, in which the government showed a non-interference in the market. Even with the success of agricultural production increase to some extent, there still remains many barriers for the farmer to level up their income due to the marketing system and price policy.

3.4.3. Financial and Insurance Services

1) Agricultural loan

In the Samar province, there are at present four public banking institutions with a total of nine offices plus four private commercial banks.

<u>Bank</u>	<u>Number of Office</u>	<u>Location</u>
Philippine National Bank (PNB)	2	Catbalogan and Calbayog city
Development Bank of the Philippines (DBP)	1	Catbalogan
Rural Bank	5	Catbalogan, Calbayog, Sta. Margarita, Gandara and Basey
United Coconut Planters Bank (UCPB)	1	Calbayog city
<u>Total</u>	<u>9</u>	

The amount of production loan by the above banks is not clear. For paddy and corn compared with the loan extended to Leyte province, it can be observed that beneficial amount to the Samar province is extremely small. The latter introduced the annual average amount of about 92,000 pesos in paddy and 60 pesos in corn, respectively.

Two main reasons for limited production loan for paddy and corn are (1) the borrowers and the farmers have lost their credibility because of failure of repayment in the past, especially on the Masagana 99 loan and (2) due to limited irrigated areas. On the other hand, by the limited information of Rural Banks, main banks in the province, in totality, loan extended to agricultural sector still occupies comparatively a large share in the lending activities, about 98% of which have been extended to coconut and abaca planters and traders.

There have been also a certain amount of loans for livestock and poultry. The lending activities, however, have been fluctuating due to the market conditions and others. The problems are summarized as follows:

- The difficulty of borrowing the formal production loan by small farmers;
- The difficult procedure of borrowing for the farmers. (refer to Appendix B.4.3)

2) Crop insurance

Crop insurance is undertaken by the Philippine Crop Insurance Corporation (PCIC) founded by the support of banks. However, it is limited only to rice and corn covering the invested cost.

During the past six years, as for rice, area covered as well as beneficiaries number has been increased from 160 to 1,257 ha and 170 to 637 persons (half year), respectively. At present, the following are observed on this subject.

- Insurance services are limited only to rice and corn; for the Samar province, there is a need for insurance of coconut and abaca;
- Crop insurance grants mainly the lender for the investment and not directly the producer for the expected benefit by harvesting. (refer to Appendix B.4.3)

3) Finance for other sectors

It is observed that the commercial loan takes a considerable share but industrial loan is very minimal. Financial institutions will give high priority to reliable borrowers, as many directors of the aforementioned banks confirmed this policy in interview. In this point, commercial activities such as traders and shops have comparatively high credibility. However, it should be the concern

of financial institutions to encourage the growth of industrial investors and small scale enterprisers, since this sector is handicapped by the lack of capital as discussed in Section 3.4.1.

In conclusion, it can be said that activities in the non-agricultural sector in the Samar province is still under so much depressed conditions. Rural industrialization as well as improvement of financial, commercial and other activities shall be advanced and activated.

3.5. Irrigation and Drainage

3.5.1. Irrigation

1) Present irrigation facilities

There are two kinds of irrigation systems in the Study Area; 30 Communal Irrigation Systems (CIS) under NIA and 21 Pump Irrigation Systems (PIS) under former FSDC. The total potential area by both systems is about 3,500 ha. However, only several systems or an acreage of about 500 ha are partially operational as of June 1986, because of poor operation and maintenance of the system and budgetary constraints. (refer to Appendix F.1.1 and F.1.2)

The existing irrigation system consists of a main canal, lateral canals and on-farm facilities. Those canals are usually un-lined, and are under very poor conditions due to lack of operation and maintenance. The canal density of 31 m/ha including main and lateral canals, were initially designed. The designed density is larger than the minimum standards in upgrading or constructing irrigation system of NIA. The prospective standards are at about 20 m/ha of canals. (refer to Appendix F.1.1)

2) Water sources for irrigation

The water sources of these systems are either rivers and streams or springs that do not dry up even during the drought months of April and May (so called Summer season). Since the Study Area is mainly within the limestone formation, the presence of many springs on the foot of mountains are commonly found.

The results of the field investigation revealed that; three CISOs of Danao, Apolonia and Calapi and many PISOs located along the Gandara River, have stable water sources.

3) Water quality

Water quality of rivers and springs is no problem for irrigation except lower portion near the river mouth, having a high salt concentration of 1,500 to 30,000 ppm. However, weak alkalinity of 7.5 was observed in some locations. (refer to Appendix F.1.6)

3.5.2. Drainage

The existing paddy fields are located in narrow valley or both banks of rivers and streams. The rivers and streams are natural courses, that is, no river improvement with a dike has been done. When the drainage area receives much rainfall brought by typhoon, water level of the river goes up and sometimes flood flow over the field. The area is often inundated for a duration of one to two days on the field and the maximum water depth is one meter on an average.

Many micro-topographical conditions, even in the low-lying area, form many small depressions categorized as a swampy area due to lack of drainage canals, especially at the foot of the mountainous area. These conditions are mainly found in the Jibatan, Gandara and Basey River basins. The location of the area matches with a schistosomiasis endemic area. (refer to Appendix K.3)

3.5.3. On-Farm Facilities

Some on-farm facilities in the CISSs and PISs were not maintained by farmers because of no water reaching to the field. On the general plan of CISSs, the proposed density of the farm ditches is 9.3 m/ha. After they are damaged, these facilities become idle. The density of the existing farm ditch is quite small compared to prospective standard of 60 m/ha. In the present operational CIS area, however, the small scale on-farm facilities are observed to be well functioning. Those farm ditches are not lined in the area.

The farm drains and farm roads were not constructed yet for draining water on the field which causes the stagnation of shallow water. So, this is one of the reasons why the schistosomiasis endemic area is found. The presence of these stagnant water favors conditions to multiply snails as an intermediate host of cercaria.

3.6. Power Supply

3.6.1. System of Power Supply

The Government of the Philippines has taken up promotion of energy self-sufficiency and national electrification in its targets of important administrative policy. NPC is responsible for development of the large scale power generation which is the base of the national energy policy and has been tried to meet the large demand through providing the power plants and necessary power grids throughout the country. On the other hand, NEA is responsible for the rural electrification and development of mini-hydropower generation and dendro-thermal plants by providing ELCOs throughout the country to administer smoothly management and financing for the rural electrification.

The power supply system in the Philippines is roughly divided into three, the Luzon Grid, Visayas Grid and Mindanao Grid. The

Samar province is covered by the Leyte-Samar Subgrid of the Visayas Grid. Electric distribution for the Samar province is handled by two ELCOs of SAMELCOs I and II. (refer to Appendix H.1.1)

SAMELCO I was founded in 1974 in the Calbayog city and expanded its coverage of two municipalities in 1986 covering a whole area of his administration. SAMELCO I has a diesel generator with 350 KW and a mini-hydropower plant with 1,080 KW at Ton-ok. The present distribution of electricity by SAMELCO I reaches to cover eight municipalities, 92 Barangays and 7,374 households.

SAMELCO II was founded in 1975 in Wright municipality and will cover a whole area of his territorial areas when an expansion plan to two islands is realized as scheduled in 1987. SAMELCO II has a diesel generator with 5,500 KW and distributes electricity to cover over 11 municipalities, 104 Barangays and 11,220 households. SAMELCO II is receiving power supply from NPC and supplies electricity not only for his territorial area but also for three other ELCOs in the Samar island as mother cooperative.

3.6.2. Power Supply and Demand

Electric distribution and rural electrification in the Samar province is handled by two ELCOs of SAMELCO I and SAMELCO II. The both ELCOs have own power generating facilities, however, their existing capacity is not enough to meet the total demand in the Samar province. The power in shortfall is supplemented by receiving electricity from NPC. The power of NPC in Leyte-Samar Subgrid is originated at Tongonan Geothermal Power Plant in Leyte and transmitted to SAMELCO II through two ELCOs of DORELCO and LEYELCO in Leyte province.

Power rate in the Samar province is rather high in comparison with that in other ELCOs, because more than two thirds of the total demand has to receive the power from NPC through two ELCOs.

Actually, NPC sells power to DORELCO at 0.85 pesos per KWH on the average and SAMELCO II receives via DORELCO and LEYELCO at 1.79 pesos per KWH. However, SAMELCO II transmits power to SAMELCO I at 2.18 pesos per KWH and to both Northern and Eastern Samar provinces at 2.50 pesos per KWH in adding some transmission charge.

It is expected to complete a construction of Leyte-Samar Interconnected Transmission Line Project under financial assistance of OECF within 1988 and to improve the present situation on purchasing/transmitting power with certain complicated procedures by direct power supply to SAMELCO II from NPC. Thereafter, SAMELCO I is expected to receive electricity with the ratio at almost a half of the present.

3.6.3. Rural Electrification

Rural electrification in the Samar province as of August 1987 was recorded at 30% for energized and 21% for house connection. It is quite slow pace of the development in comparison with the nationwide electrification ratio of 58% for energized and 48% for house connection.

Concerning the power consumption by purposes, about 40% in residences are the largest consumer followed by about 20% in shops and public facilities and street lights of also about 20% while about 10% is the industrial sector so as to suggest the delay in the industrial development. Electricity for lighting is about seven percent in the rural area and about 38% in the urban area, while electricity for cooking is only 0.4% in the rural area and one percent in the urban.

Electric demand in the future in the Samar province will be doubled with the electricity of about 13.2 million KWH per annum presently supplied by SAMELCOs I and II when the future house connection of about 73,400 households would be realized.

3.7. Rural Water Supply

3.7.1. Overview

The Philippine government formulated the Rural Water Supply and Sanitation Master Plan in December 1982. The plan, aiming at raising the quality of life through the development of water supply and the improvement of sanitation in the rural area, was set up at the time when the United Nations launched the worldwide scheme of the International Drinking Water Supply and Sanitation Decade in 1982.

In 1982, the SIRDP and NEDA's Region VIII Office also jointly established the Comprehensive Development Plan for the Samar island. The plan included the development of rural water supply, particularly in Level I service using public wells, including high level services for the Calbayog waterworks and the Catbalogan water supply system for their improvement.

Under the above-mentioned two development plans, the rural water supply development projects were carried out with the construction of Level I service facilities. As of 1986, there were 800 deep/shallow wells and springs constructed for Level I service in the Samar province.

In August 1987 a field survey of wells in the Samar province was carried out by JICA Study Team. The survey covered the wells that were constructed under the supervision of DPWH. The Team also examined and analyzed the condition of wells as well as its water quality. As a result of the field survey, it was found that wells were not properly maintained, and therefore, rehabilitation and proper maintenance of the well facilities in the Level I services should be carried out.

3.7.2. Existing Waterworks

1) Classification of water supply system

In the Philippines, the water supply system is categorized into three service levels; namely, Level I service, Level II service and Level III service. (refer to Appendix J.1.1)

2) Administration of the waterworks

There are four government agencies which undertake water supply services. They are SWUA, RWDC, DLG, and DPWH (refer to Appendix J.1.2). These agencies have different administrative jurisdiction over different areas and/or aspects of the water supply system.

3) Present condition

a) Served population

About 50% of the water supply system in the rural area in the Philippines are Level I services. Served population was projected to be 85% in year 2000 based on the Rural Water Supply Master Plan in 1982. The present and planned water supply service rates in the Philippines are shown in Appendix J.1.3.

The served population in the Samar province in 1984 accounted to 67% according to the Socio-Economic Profile II, the Samar Province.

The JICA Study Team visited 13 municipalities to investigate the condition of the deep wells in their Barangays. According to the DPWH's constructed wells list and wells site map, some 60 wells were surveyed and water samples were collected for quality analysis. As a result of survey, damages and problems in the Level I services were found, as described below:

- Many wells need rehabilitation or repair. In many cases, replacement of parts for the hand pump, such as leather packing and piston rod, is needed. The piston rod lasts for a maximum of two years.
- Water from some wells has strong smell and contains iron, salts, and ammoniac nitrogen. These facts were especially observed in deep wells along the coastal area.

- Since communities/inhabitants in Level I service area cannot afford to repair their own well facilities due to lack of technology and shortage of fund, they entrust the repair and rehabilitation to their governmental agencies.

Under the above-mentioned circumstances, the present served population in Level I service had been reduced by 30 to 70% from the estimated served population in 1984. Based on the result of the survey, the actual served population rate in 1987 accounted only 23%.

b) Conditions of Level I and Level II water supply facilities

Almost all facilities on Level I and Level II services were constructed by the SIRDP and the DPWH with financial assistance from the IBRD. Only small number of wells were constructed by the community of the Barangay or municipality. At present the number of existing water supply facilities is estimated at about 800 including deep wells, shallow wells, and springs.

The average scale of the existing wells is as follows:

- Depth: average 40 to 50 feet
- Water discharge: average 0.37 lit./sec
(= 300 m³/day)
- Distance from wells to houses: average 32.5 m

Existing spring facilities are protected by the concrete structure according to the standard design. Spring water is transported by pipeline to the Barangay area where community faucets are installed.

In these Level I and Level II service systems, raw water has not been treated with chlorine.

c) Conditions of Level III water supply facilities

Level III services are provided in the cities or in the poblacion of the municipalities e.g., the Calbayog city, Catbalogan and Basey poblacions, etc.

- Catbalogan

The water supply system in Catbalogan, capital of the Province, was constructed by DLG in 1925 with the headworks of the Antiaw River as its water source. Then it was expanded by LWUA, and it is presently managed and operated by RWSA. There are 1,400 served households with registered connection and 6,000 with temporary or unregistered connection. The average daily supply water is 2,600 m³/day according to the RWSA. However, as water supply capacity is not sufficient for demand of the town, expansion has been carried out under the assistance of LWUA.

- Basey poblacion

Basey water supply system was constructed in 1920's and its water source is the Lo-og River. At present, the expansion project is being planned under LWUA's assistance since supply water capacity is far below the demand. This is due to increase of the population and expansion of the service area. The present condition of water supply is very poor, i.e., water can be supplied for only one hour per day, and served population is around 3,500, only 10% of the total population of Basey poblacion.

- Calbayog city

The Calbayog Water System is under the management of RWSA with technical advice of LWUA. The system covers not only the city proper but also 18 Barangays in the Oquendo district and Calbayog district. There were 1,300 registered served household in 1986. Water source is Pan-as Falls which is located in Barangay Pilar, about 32 km far from the city proper.

Transmission pipeline, heavily damaged by the typhoon in 1987 has not yet been repaired. It should, therefore, be urgently repaired and rehabilitated to resume its normal operations.

- Other municipalities

The poblacions of the municipalities of Calbiga, Jiabong, Motiong, Wright, Santa Margarita, etc., have Level III service systems of water supply. Their water sources are springs. These facilities also have to be repaired and expanded to meet the increase of demand and more effective services.

d) Maintenance and rehabilitation

In the rural area, operation and maintenance of the water supply facilities are the responsibility of RWSA (Rural Waterworks and Sanitation Association). Operation of the water supply is handled by the community at the Barangay or municipality/city level.

Water rates are collected from households by the community or by RWSA. The water rates for Level I and Level II services are one peso and seven pesos per month per household, respectively.

Generally, water rates collected from each household are spent for operation and maintenance of the water supply facilities. However, there are difficult and complicated problems in collecting water rates particularly in the Samar province;

viz., 30 to 70% of wells are not functioning, and wells are so inconveniently located in many cases that consumers have to bear the long distance to fetch their drinking water. Hence, this is the reason why they refuse to pay their water fees.

e) Water resources

In the Samar province, 99% of existing water sources is groundwater. The safety yield of groundwater is estimated at 2,800 MCM. It is also estimated that the water demand for the Year 2007 will only be 30 MCM. (refer to Appendix J.1.4.)

According to water quality analysis, spring water in the Samar province contains minerals with good quality for drinking. Therefore, it is expected that spring water will increasingly be utilized.

f) On-going projects

In the Samar province, several water supply projects are on-going under the assistance of foreign governments or international organizations such as OECF and IBRD as follows. (refer to Appendix J.1.6)

- SIRDP, water supply component, assisted by IBRD.
- Rural Water Supply Project (I), (II), assisted by OECF.
- First Rural Water Supply and Sanitation Project, assisted by IBRD.

3.8. Road and Transportation

3.8.1. Road

1) Road network

Main road network is formed by national roads and part of provincial roads in the Samar province. Total road length in the province (all types combined) as of 1987 is 920 km. A road density of 0.16 km/km² of land area, which is the lowest among the provinces in the Samar island. And the road density of the Samar province is 1.63 km/1,000 persons in 1987 against the targeted nation-wide figure of 3.02 km/1,000 persons as shown in Medium-Term Philippine

Development Plan (1987-1992). About 92% of provincial roads have gravel surface and 54% of Barangay roads are not paved. Bridges of provincial and Barangay roads are mostly made of timber. (refer to Appendix G.1.1 and G.1.2)

2) Problem on the present road network

It is observed that the Samar province is burdened with the following problems;

- Inaccessibility from some municipalities to the provincial capital such as Marabut, Matuginao, Pagsanghan, Talalora San Jose de Buan municipalities.
- Inaccessibility from Barangay to municipal centers because of poor quality road impassable during bad weather coupled with the limited load capacity of timber bridges.
- Lack of farm-to-market roads (Barangay roads) resulting in poor transportability between productive areas and consumption centers.
- Inadequate road maintenance because of the lack of funds and heavy equipment.

3.8.2. Transportation

1) Road transportation

Bus, jeepney and tricycle are the most common transportation facilities operating in the province. There are only six service routes for buses and 16 service routes for jeepneys at present. Almost all jeepneys are usually overloaded because the service level of jeepney does not satisfy the demand. Especially, transportation units from the remote Barangay to the municipal center are extremely at low level. (refer to Appendix G.2.1)

2) Sea and riverine transportation

There are eleven ports nationally financed in the province at present, but only two (Catbalogan and Calbayog) are accessible by

inter-island vessels. The rests are situated in their respective municipalities which can allow to harbor only motor Bancas and fishing boats. The number of passengers and load of cargo for the Catbalogan port has been decreased during 1980 to 1986, however, the number of passengers for the Calbayog port has been increased. (refer to Appendix G.2.2) The water-ways of the Basey and Gandara Rivers which are navigable to the internal area are about 21 and 86 km, respectively.

3) Air transportation

There are two existing airports in the Samar province composed of a secondary Calbayog airport and a feeder Catbalogan airport. The Calbayog port is a commercial port with four flights a week. Catbalogan airport is not utilized for commercial uses. The number of passengers at the Calbayog airport has been increased during the period from 1981 to 1984, but has been slightly decreased during the period from 1984 to 1986. (refer to Appendix G.2.3)

3.9. Social Infrastructure

3.9.1. Health Service

The health and medical organization in the Samar province consists of provincial office, district hospital, municipal hospital, rural health unit (RHU) and Barangay health station (BHS).

1) Present condition

a) Facilities

There are 11 hospitals composed of five public and six private hospitals in the Samar province. The hospital bed capacity is 325 of which 235 for public and 90 for private hospitals in 1987. The Samar province has 25 RHU and 89 BHS.

b) Manpower

There are 49 doctors, 23 dentists, 107 nurses, 133 midwives and 46 sanitary inspectors in the Samar province at present. Numbers of doctors and sanitary inspectors do not satisfy the national and regional standard.

c) Service level

Comparing to the average service ratio of Region VIII and the Philippines, the ratios of hospital and doctor to population for the Samar province are at low level. However, dentist to population ratio is at high level. Rural health unit and Barangay health station to population ratio for the Calbayog city are remarkably at low level. (refer to Appendix K.1.1)

d) Morbidity and mortality

Total birth registered in 1986 was 7,825 with 18.85 per 1,000 population and is approximately similar to that during the past five years. The rate was low in the Samar province compared to that of the Philippines with 32.2 per 1,000 population in 1985. URI (Upper Respiratory Infection) and Pneumonia were leading causes of morbidity, and mortality respectively. The rates of death and maternal death have increased during the period from 1985 to 1986, compared to the period from 1981 to 1984. There are many endemic areas of schistosomiasis in the Samar province.

2) Development problem

The current problem of health facilities, personnel and the condition of health and nutrition are shown as follows:

a) Health facilities

- Shortage of hospital bed in the Samar province.
- Shortage of rural health unit (RHU) and Barangay health station (BHS) especially in the Calbayog city.
- Lack of cold storage facilities of preserving medicines and so on due to no electricity or no stable electric supply.

b) Personnel

- Shortage of personnel, especially doctors and sanitary inspectors.
- Transfer of nurses and midwives from rural area to urban area in the Samar province.

c) Health and nutrition condition

Analyzing the morbidity and mortality rates as compared to those of other provinces in Region VIII, the following features are observed.

- High morbidity rate of diarrheas, influenza and measles in the Samar province.
- High mortality rate of mothers after child-birth and immature infants in the Samar province.
- Many endemic areas of schistosomiasis in the Samar province.

The followings are considered as causes for the problems:

- low income
- shortage of environmental sanitation facilities
- insufficiency of knowledge on sanitation practices
- insufficiency of public finance

3.9.2. Education

The educational system comprises six years of elementary school, four years of secondary school and four years of tertiary school in the Philippines. Education is compulsory for the first six years only at the elementary school.

1) Present condition

a) Number of schools

There are 731 elementary schools, of which 730 are public schools and one private school, 46 secondary schools of which 42 public schools and four private schools, and eight tertiary schools of which five are public and three private schools in the Samar province. The Samar province has no university, however, the University of Eastern Philippines, only one in the Samar island, is located in Catarman, the Northern Samar province.

b) Enrollment

The number of enrollment for elementary schools has decreased during the period from 1980 to 1986 in the Samar province, however, the enrollment has increased rapidly in 1987. On the other hand, the enrollment number of the Calbayog city has increased with annual growth rate of two percent.

c) Teacher to pupils/students ratio

The average numbers of pupils and students for every teacher are lower than the national standard ratio of 35 pupils or students to a teacher in all levels of elementary, secondary and tertiary schools in the Samar province.

d) Enrollment ratio

Enrollment ratio of elementary, secondary and tertiary schools in the Samar province are 46.9%, 20.6% and 8.7%, respectively, higher than that of the whole Philippines of 40.4%, 15.6% and 7.3%, respectively. The ratios of the Calbayog city are 23.6% and 8.6% for secondary and tertiary schools, however, the ratio for elementary school is not available.

e) Survival rate

Survival rates of elementary and secondary schools for the Samar province are estimated to be lower those that of the whole Philippines.

2) Development problem

The existing problems are shown as follows:

- low enrollment ratio of elementary and secondary schools
- high rate of drop out
- lack of classrooms
- incomplete school buildings such as temporary structure and defective condition
- shortage of educational opportunity for disadvantaged people

These facts are caused by low income, an insufficient knowledge on importance of the education and lack of a public finance.

3.9.3. Housing

Housing is fundamental and indispensable for family and society to be productive and stable.

1) Present conditions

a) Number of households

According to census of population and housing in 1980, there were 91,939 households with average household population of 5.45 in the Samar province.

b) Type of occupancy

Approximately 90% households have their own houses that is; 92% in the rural area and 80% in the urban area.

c) Type of building

Of the 91,939 households, single house accounted for 96.8% and duplex house for only 1.4%.

d) Construction material

Almost 80% of the households have roof of light materials such as nipa, veneer and bamboo against 20% with strong materials such as galvanized iron, concrete, brick asbestos.

2) Development problem

a) Under-standard dwelling unit

Many dwelling houses especially in the rural area do not satisfy the standard of housing due to their light construction materials as mentioned before.

b) Increase of illegally constructed houses

Illegal houses increase in the urban area, especially in Catbalogan and Calbayog.

c) Under-standard Houses Without Basic Facilities

Many houses occupy high percentage without water supply, toilet facility, light facility and access road. The following are considered as the causes;

- no purchasing power on the side of consumers due to low income
- public budget constraint
- lack of regulation and standard such as credit system and the standardization of housing material and module design system