

## 5.7 Existing Agricultural Projects

### 5.7.1 Serruco Irrigation System

#### (1) Existing Conditions in the Study Area

There is only one CIS in the Project area, Serruco Communal Irrigation System (CIS). This CIS has a diversion dam on the Serruco River and irrigates 400ha covering five barangays; namely, San Luis, Batitao, Adcadarao, Tentay and Bagaycay.

#### (2) Administration

CIS Board Members are elected by all members of the farming beneficiaries; 92 farmers at present. Their administrators, such as the president are elected by mutual election of Board Members and tenure is two years.

#### (3) Water Management

Gate tenders who live near the turnouts of the canals and are appointed by Board Members manage water supply for paddy cropping. In the first cropping, however, water supply management is inexact due to dependence on unreliable rainfall as a water source. In the second cropping, water is supplied on a rotation basis while in the third cropping during dry season, a restricted irrigation area is designated and intensively irrigated, since the only water source is the Serruco River which holds a limited amount of water in this season. This water management system is called "Zoning".

#### (4) Water Fee

There are two categories of water fee namely -- amortization (P150/ha/cropping) and maintenance (P50/ha/cropping) and these fees are charged to every beneficiary. Before 1982, fees were paid in kind (palay), but since 1982 the same have been paid in cash.

Management wages are as follows:

Dam caretaker	-P100/month/person (one person only)
Gate tender	-P250/month/person (two persons)

(5) Cooperatives

Although there are some advocates for establishment of cooperatives by members of Samahang Nayon, there is no cooperative organization at present.

(6) Maintenance

Generally, the beneficiaries weed the canal three times a year on a volunteer basis and the gate tenders use water management fees to maintain canals.

5.7.2 KABSAKA Project

KABSAKA (an acronym for 'Kabusogan Sa Kaumhan an Ilongo phrase meaning bounty on the farm) is the popular name for the World Bank funded Rainfed Development (Iloilo) Project (RADIP). This is an extension project which plans to introduce multiple cropping technology to rainfed lowland rice fields in Iloilo, Panay Island. Most barangays in the Project area are now under the KABSAKA project excluding a few barangays irrigated by the Serruco CIS.

The objectives of the same are to increase land and labor productivity, to enhance farmers' income and to improve the nutritional status in the Project area. As a comprehensive approach to rural development, KABSAKA offers a package of services. This consists of extension services for KABSAKA technology, production credit for farmers under the Integrated Agricultural Financing (IAF) scheme, integration of livestock into crop production, verification trials, provision of required inputs, construction of water impounding dams, marketing assistance, community development and a nutritional program.

## RICE SUPPLY AND DEMAND PROJECTIONS

CROP YEAR	1980	82/83	83/84	84/85	89/90	94/95	99/2000
<u>Supply</u>							
<u>Yield (Mt/Ha)</u>							
Irrigated: Wet Season(WS)	2.43	2.69	2.78	2.87	3.16	3.41	3.66
Dry Season(DS)	3.02	3.16	3.20	3.25	3.50	3.70	3.90
Lowland rainfed: WS	1.87	2.00	2.04	2.08	2.19	2.32	2.44
DS	1.72	1.77	1.78	1.80	1.92	2.07	2.22
Upland: WS	1.32	1.14	1.15	1.16	1.24	1.36	1.49
DS	1.45	1.40	1.44	1.48	1.71	1.86	2.01
<u>Rice Area (1000 ha cropped)</u>							
Irrigated: WS	916	1,058	1,106	1,174	1,398	1,595	1,647
DS	690	728	777	824	984	1,114	1,148
Lowland rainfed: WS	1,122	1,034	981	903	661	402	344
DS	533	530	530	530	530	402	344
Upland: WS	334	250	250	250	350	350	350
DS	42	15	15	15	14	14	14
<u>Palay Production (1000 Mt)</u>							
Irrigated: WS	2,228	2,846	3,075	3,369	4,418	5,439	6,028
DS	2,085	2,300	2,486	2,678	3,444	4,122	4,477
Lowland rainfed: WS	2,101	2,086	2,001	1,878	1,448	933	839
DS	919	938	943	954	1,018	832	764
Upland: WS	442	285	288	290	434	476	522
DS	61	21	22	22	24	26	28
<u>T O T A L</u>	7,836	8,459	8,815	9,192	10,785	11,828	12,658
Loss: Seed, feed, waste (10.8%)	846	914	952	993	1,165	1,277	1,367
Palay Available for Consumption	6,989	7,545	7,863	8,199	9,620	10,550	11,291
Milling Recovery Ratio	0.65	0.653	0.654	0.655	0.66	0.665	0.670
<u>Rice Available for Consumption</u>	4,543	4,927	5,142	5,370	6,349	7,016	7,565
<u>Demand For Rice</u>							
Population (1000)	48,406	52,374	53,768	55,199	62,227	68,865	76,215
National Income Growth (% PA)	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Income Elasticity of Demand	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Per Capita Consumption (kg)	86.5	87.3	87.5	87.80	89.4	91.70	94.00
<u>Total Demand (1000 Mt)</u>	4,187	4,572	4,705	4,846	5,56,3	6315	7,164
<u>Surplus (1000 Mt)</u>	356	355	438	524	786	701	401
As Percent of Supply	7.83	7.20	8.51	9.76	12.38	9.99	5.30
As Percent of Demand	8.50	7.76	9.30	10.81	14.13	11.10	5.59

SENSITIVITY ANALYSIS ON RICE SUPPLY AND DEMAND

TEST CASE	Effect on Surplus (1000 tons of rice)				Resultant Net Surplus (1000 tons of rice)			
	1984/85	1989/90	1994/95	1999/2000	1984/85	1989/90	1994/95	1999/2000
Base Projection					524	786	701	401
Irrigated Rice Yield $\pm 20\%$	$\pm 707$	$\pm 926$	$\pm 1,134$	$\pm 1,255$	-183-+1,231	-140-+1,712	-433-+1,835	-854-+1,656
Lowland Rainfed Rice Yield $\pm 20\%$ (Wet & Dry)	$\pm 331$	$\pm 290$	$\pm 209$	$\pm 186$	193-	496- 1,076	492- 910	215- 587
Upland Rice Yield $\pm 20\%$ (Wet & Dry)	$\pm 36$	$\pm 54$	$\pm 60$	$\pm 65$	488-	732-	641-	336- 400
Lowland Rainfed $\pm 10\%$ (Wet & Dry)	$\pm 165$	$\pm 145$	$\pm 105$	$\pm 95$	359-	641-	596-	306- 496
Irrigated Area Ratio	-143	-200	-234	-259	381	586	467	142
Diversion Systems: MS=0.75 DS=0.50								
Communal: MS=0.75								
Irrigated Rice Area during dry season less 50,000 for Maisagana or crop diversification program	-95	-103	-110	-117	429	683	591	284
No New Nat'l. Irrigation project after the on-going projects but with communal projects and rehabilitation program	0	-224	-243	524	765	477	158	
Per Capita Demand in 1982/83 is 92.50 increasing by 0.5kg/yr without irrigation sector loans I-IV	-315	-411	-468	-534	209	375	233	-133
Three multipurpose projects only, plus communal projects and rehabilitation program	0	-64	-70	524	786	637	331	
	0	-21	-221	524	765	499	180	

TABLE IV-3

## GROSS NATIONAL PRODUCT PROJECTION FOR 1983 AND 1987

Item	Constant level (billion pesos)		Average annual real growth rates	Current level (billion pesos)	
	1983	1987	1983-87	1983	1987
Personal consumption expenditures	67.5	84.1	5.6	277.7	492.5
Government consumption expenditures	8.9	10.7	4.3	30.6	51.0
Gross domestic capital formation	28.6	38.8	7.1	117.7	223.9
Fixed capital formation	25.1	34.3	7.3	101.9	197.1
Construction	12.6	17.2	6.9	58.9	114.2
Government	4.9	6.0	4.2	23.0	40.2
Private	7.7	11.1	8.6	35.9	74.0
Durable equipment	12.4	17.2	7.8	43.0	82.9
Increase in stocks	3.5	4.5	5.5	15.9	26.9
Exports of goods and nonfactor services	20.9	29.4	8.7	80.2	159.1
Imports of goods and nonfactor services	20.6	26.6	6.4	96.2	176.4
GROSS NATIONAL PRODUCT	105.2	136.7	6.5	408.2	749.2

## GROSS NATIONAL PRODUCT AND COMPONENTS FOR 1983 AND 1984-87

(Percent Change)

	Actual <sup>1)</sup> 1983	Estimate <sup>2)</sup> First Semester 1984	Projections 1984	Annual Average 1985-1987
1. Real GNP	1.3	-5.4	-5.5	2.8
2. Real GNP by Expenditure Shares				
Personal consumption expenditure	2.9	1.6	1.6	2.5
Government consumption expenditure	-3.9	-11.8	-15.0	1.0
Gross domestic capital formation	-4.7	-34.5	-31.1	0.9
Exports of goods and nonfactor services	5.7	-1.2	-1.0	6.0
Imports of goods and nonfactor services	-1.6	-27.1	-27.0	1.3
3. Real Gross Domestic Product	1.1	-3.7	-4.5	3.0
Agriculture, fishery and forestry	-2.1	2.2	1.5	4.4
Industry	0.7	-9.0	-10.3	2.5
Mining and Quarrying	-2.5	-19.7	-19.0	2.2
Manufacturing	2.3	-6.3	-8.3	2.7
Construction	-4.8	-16.2	-17.0	1.5
Electricity, Gas and Water	10.0	4.7	5.0	5.6
Services	3.7	-2.4	-2.9	2.3

1) Revised as of 7 September 1984  
Preliminary estimate as of 7 September 1984

2) Source: NEDA

TABLE IV-5

**PRODUCTION PROTECTION OF MAJOR AGRICULTURAL  
CROPS AND FOOD FISH PRODUCTION**

Unit: 1000t

	Actual		Projections		
	1983	1984	1985	1986	1987
<u>TOTAL AGRICULTURAL CROPS</u>					
Food crops					
Grains					
Palay	7,295	7,412	7,671	8,100	8,675
Corn	3,134	3,334	3,601	3,961	4,341
Other Crops					
Coffee	88	89	98	103	110
Cacao	5			8	10
Sorghum	17	18	21	24	27
Beans, Seeds and Nuts	96	99	112	117	123
Fruits	7,038	6,321	6,396	6,614	6,815
Vegetables	858	886	914	939	968
Root Crops	2,961	3,019	3,064	3,116	3,190
Commercial Crops					
Sugar	2,000	2,200	2,056	1,848	1,861
Coconut	2,010	1,780	1,894	2,068	2,273
Tobacco	48	43	48	51	53
Rubber	75	76	81	82	83
Abaca	88	96	102	107	116
Cotton	12	13	16	21	32
Ramie	2	3	3	5	6
LIVESTOCK	1,033	1,068	1,117	1,173	1,232
POULTRY	238	248	263	282	302
FISHERY	1,533	1,656	1,745	1,843	1,948
<u>FOODFISH</u>					
Commercial	517	580	605	632	659
Traditional	n.a.	532	549	567	585
Oceanic	n.a.	48	56	65	74
Municipal	809	842	873	905	939
Marine	690	735	762	790	819
Inland	119	107	111	115	120
Aquaculture	281	324	363	401	442
Brackish water	184	226	257	280	305
Fresh Water	93	93	101	116	131
Seafarming	4	4	5	6	6

1. Figures may not add up to total due to rounding of numbers.  
Data as of 7 September 1984  
Sources: BFAR, FIDC

PRIORITY PROGRAMS AND PROJECTS

Program/Project	Description	Implementing Agency
<b>I. Production Programs</b>		
1. Masagana 99	A major rice production program aimed to increase the yield per hectare of palay crop land. The program provides a package of technology consisting of high yielding variety seeds, fertilizer, agricultural chemicals and extension services.	NFAC
2. Palayanng Bayan	A sister program to Masagana 99 which encourages the conversion of idle and virgin lands to production of staple crops, notably rice and corn.	DA
3. Corporate Farming Program	Primarily meant to augment rice production, the program directed big private corporations to supply their employees with their cereal needs either through direct importation or actual production.	NGA
4. Maisan 77	The program's operational scheme and strategy is patterned after that of Masagana 99. Its scope covers white corn, yellow corn, sorghum and soybeans. The goals are: to meet the requirements of the animal feed industry and to provide for growing human and industrial needs.	NFAC
5. Sugar Cane Program Development	Designed to make the sugar industry competitive in the world market. The program calls for increased productivity, market diversification strategies, phasing out of sub-marginal sugar cane farms, and mechanization.	PHILSUCOM
6. Coconut Rehabilitation Program	The program involves the planting of new, high yielding coconut hybrids to gradually replace the old variety.	PCA



TABLE IV-6  
(2 of 4)

Program/Project	Description	Implementing Agency
7. Integrated Cattle Development Program	<p>This program aims at increasing beef production by rationalizing present production techniques. Three types of cattle-raising projects are planned:</p> <p>a) Opening of large-scale ranches (8,000-20,000ha) in idle grassland areas</p> <p>b) Opening of medium-sized ranches (500-2,000ha) to engage in seed grass production for commercial purposes</p> <p>c) Promotion of backyard cattle raising/fattening as a supplementary source of income to small farmers</p>	BAI, LDC
8. Dairy Development Program	<p>The program has the objective of increasing local production of milk and thus reducing yearly importation.</p>	BAI
9. Animal Dispersal Program	<p>The main objective is to improve the farmers' capabilities to produce meat by providing them with the necessary animals on credit at liberal terms.</p>	BAI
10. Regional Abattoirs	<p>The program involves the establishment and rehabilitation of regional abattoirs in strategic areas in the country to achieve economic and efficient production, transport and marketing of meat.</p>	BAI
11. Rehabilitation of Stock Farms	<p>The project is aimed at upgrading the eight stockfarms of the BAI through breeding stock development, pasture development, physical facilities development, and manpower development.</p>	BAI
12. Expanded Fish Production Program	<p>The program aims to accelerate the pace of fish production; to encourage the processing of import-substituting products, e.g. canned fish and fish meal; and to develop and expand exports of fishery products.</p>	BFAR
13. Fruits and Vegetables Production Program	<p>The program focuses more on the proper timing of planting, harvesting, and marketing of produce with the purpose of minimizing adverse effects of seasonality of production and inefficient marketing.</p>	BPI, NFAC

TABLE IV-6  
(3 of 4)

Program/Project	Description	Implementing Agency
14. Fruit Industry Development Project	The project aims to expand areas planted to indigenous fruits with export potential (mango, papaya, avocado, pomelo) by establishing new plantations, increasing production level and improving the quality of orchards to cope with increasing demand for said fruits.	BPI, NFAC
15. National Cotton Development Program	Basically, the program can be subdivided into: a) agricultural production phase-production of the required volume of seed-cotton over a given targeted hectarage; b) processing and marketing phase-purchase of all seed cotton harvests, processing into lint and seed, and marketing of output to the textile mills.	PCC
II. Marketing and Storage Facilities Programs		
1. DBP Grains Processing & Storage Financing	The program seeks to develop and rehabilitate warehouse, mills, driers, and other facilities aside from providing part of the capital.	NGA
2. CB-IBRD Farm Mechanization Program	The program lends credit support to facilitate the acquisition of both production and post production facilities such as hand tillers, portable threshers and in-farm type driers.	
3. Grains Post-Harvest Technology Development	An integrated program of research, extension, manpower and skill development, credit, regulation and incentive designed to provide adequate and economic post-harvest facilities and equipment, upgrade and modernize existing facilities and practices, and institutionalize efficient in-farm and commercial processing and marketing techniques in order to reduce post-harvest losses from 15-37% to about 10-20%.	NGA

TABLE IV-6  
(4 of 4)

Program/Project	Description	Implementing Agency
4. Feedgrains Marketing Program	Aimed to support the current government thrusts on feedgrain production, the program seeks to develop an efficient marketing system through modernization of feedgrain processing facilities, price support and other investment incentives, extension of improved techniques on feedgrains processing and marketing, and integration of all direct and input-supplying activities from feedgrain harvesting up to industrial processing or consumption.	NGA
5. Buffer Stock Maintenance Program	Designed to maintain sufficient stocks of food-grains against unexpected calamities and production lean seasons, the program is being carried out through expansion of government storage capacity of 1.5 million cavans annually, strategic procurement and dispersal, and promotion of quedan system of storage and distribution.	NGA
III. Agrarian Reform Programs		
1. Agrarian Reform Estates Development Financing Program	This program aims to support Samahang Nayons, Area Marketing Cooperatives and other land reform beneficiaries to acquire and operate post-harvest facilities.	LBP
2. Land Settlement Project, Package II	The program is designed to rehabilitate and improve existing settlements. It aims to formulate an integrated program of action for the amelioration of the living conditions of settler families in Quirino, Nueva Vizcaya and Southern Leyte.	DAR

POPULATION BY BARANGAY IN THE PROJECT AREA

TABLE IV-7  
(1 of 2)

Municipality/ Barangay	Population	No. of Households	No. of Farm Households
<u>Ajuy</u>			
ADCADARAO	398	63	40
CENTRAL	763	134	33
LANJAGAN	1,280	230	79
PANTALAN NAVARRO	37	6	1
PINANTAN DIEZ	353	65	20
PINANTAN ELIZALDE	520	91	46
PINAY ESPINOZA	764	142	74
Poblacion	734	134	31
TAGUHINGIN	392	68	27
TANDUYAN	377	64	22
TIPACLA	620	110	42
TUBUGAN	36	7	4
TOTAL	6,274	1,114	419
<u>Concepcion</u>			
AGLOSONG	192	34	12
AGNAGA	498	89	63
MACALBONG	251	44	24
TAMIS-AC	347	58	24
TOTAL	1,288	225	123
<u>San Dionisio</u>			
BONDULAN	79	14	8
CAPINANG	391	66	22
DUGMAN	630	105	76
MOTO	169	34	17
PANGI	82	15	10
SANNICOLAS	53	10	2
SANTOL	461	87	29
TUBLE	776	139	70
TOTAL	2,641	470	234

TABLE IV-7  
(2 of 2)

POPULATION BY BARANGAY IN THE PROJECT AREA

Municipality/ Barangay	Population	No. of Households	No. of Farm Households
<u>Sara</u>			
AGUIRRE	268	49	26
ALDGUER	542	108	38
ALIBAYAG	482	82	33
ANORING	1,322	251	46
APELO	496	96	42
APOLOGISTA	875	164	36
APOSAGA	386	72	48
ARDEMIL	469	83	61
ASPERA	642	105	18
ASWE-PABRIAGA	361	61	26
BAGAYGAY	384	74	29
BAKABAK	800	147	57
BATITAO	220	39	23
BATO	537	96	41
CASTOR	100	17	8
CRESPO	543	105	36
DEVERA	1,271	225	102
DOMINGO	130	23	12
FERRARIS	431	74	25
GILDORÉ	149	26	11
IMPROGO	198	43	24
JUANEZA	256	41	34
LABIGAN	482	95	37
LANCIOLA	549	102	60
MALAPAYA	61	11	7
PADIOS	805	144	65
PASIG	631	118	34
POBLACION	3,571	600	131
POSADAS	479	78	45
PRECIOSA	258	43	15
SALCEDO	482	82	38
SANLUIS	706	115	72
TENTAY	659	117	73
ZERRUDO	906	164	72
TOTAL	20,451	3,650	1,425

## ESTIMATED POPULATION AND NUMBER OF HOUSEHOLDS

(Unit: Persons & Households)					
Item	Ajuy	Concepcion	San Dionisio	Sara	Total
<b>A. Municipality in 1980</b>					
1. Population <sup>1/</sup>	30,397	21,121	19,410	28,838	99,766
2. Households <sup>1/</sup>	5,403	3,662	3,386	5,120	17,571
- Average Family	(5.6) <sup>4/</sup>		(5.8)	(5.7)	
3. Farm Households <sup>2/</sup>	1,715	1,032	1,255	2,284	6,286
- Percent of Farms(%)	(31.7)	(28.2)		(37.1)	
<b>B. Municipality in 1984</b>					
1. Population <sup>3/</sup>	34,680	23,690	21,490	31,470	111,330
- Annual Growth Rate (%)	(3.3)	(2.8)		(2.5)	
<b>C. Project Area in 1984</b>					
1. Population	7,160	1,450	2,920	22,310	33,840
- Percent of Total	(20.6)	(6.1)		(13.6)	
2. Households	1,260	250	520	3,990	6,020
3. Farm Households	480	140	260	1,550	2,430
D. Project Area in 1995	9,570	1,850	3,530	26,700	41,720
E. Project Area in 2000	10,420	1,980	4,850	37,940	44,190

<sup>1/</sup> 1980 Population Census, NCSO, NEDA

<sup>2/</sup> 1981 Agriculture Census, NCSO

<sup>3/</sup> Population Projection, 1980-2000, NCSO

<sup>4/</sup> Percentage with ( ) is a ratio of (Project Area/whole municipality)

POPULATION BY AGE AND SEX, 1980

	Male				Female								
	Total	0v14	15v19	20v59	60v	Sub-total	Total	0v14	15v19	20v59	60v	Sub-total	Total
<u>Iloilo Province</u>	715,246	291,887	84,936	301,358	37,065	715,246	722,599	284,515	81,689	314,184	42,211	722,599	1,437,845
Ratio	1.000	0.408	0.119	0.421	0.052	0.497	1.000	0.394	0.113	0.435	0.058	0.503	
<u>Ajuy</u>	15,330	6,645	1,506	6,048	1,131	15,330	15,067	6,261	1,640	6,105	1,061	15,067	30,397
Ratio	1.000	0.433	0.098	0.395	0.074	0.504	1.000	0.416	0.109	0.405	0.070	0.496	
Increase or Decrease	-	1.061	0.824	0.938	1.423		-	1.056	0.965	0.931	1.207		
<u>Concepcion</u>	10,765	4,809	1,184	4,086	686	10,765	10,356	4,349	1,021	4,413	573	10,356	21,121
Ratio	1.000	0.447	0.110	0.379	0.064	0.510	1.000	0.420	0.099	0.426	0.055	0.490	
Increase or Decrease	-	1.096	0.924	0.900	1.231		-	1.066	0.876	0.979	0.948		
<u>San Dionisio</u>	9,781	4,433	1,096	3,657	595	9,781	9,629	4,248	963	3,874	544	9,629	19,410
Ratio	1.000	0.453	0.112	0.374	0.061	0.504	1.000	0.441	0.100	0.402	0.057	0.496	
Increase or Decrease	-	1.110	0.941	0.888	1.173		-	1.119	0.885	0.924	0.983		
<u>Sara</u>	14,323	6,258	1,588	5,583	894	14,323	14,515	6,153	1,572	5,890	900	14,515	28,838
Ratio	1.000	0.437	0.111	0.390	0.062	0.497	1.000	0.424	0.108	0.406	0.062	0.503	
Increase or Decrease	-	1.071	0.933	0.926	1.192		-	1.076	0.956	0.933	1.069		

Note: Increase or decrease in case of 1.000 at ratio of Iloilo Province

## PROJECT POPULATION DISTRIBUTION BY SEX AND AGE GROUP AS OF 1984

Municipality	Male					Female					Total	
	Sub- total	0~14	15~19	20~59	60~	Sub- total	0~14	15~19	20~59	60~		
Ajuy	Population Revised Ratio	3,579 1.000	1,489 0.416	336 0.094	1,478 0.413	276 0.077	3,579 1.000	1,435 0.401	372 0.104	1,507 0.421	265 0.074	7,158
Concepcion	Population Revised Ratio	722 1.000	312 0.432	76 0.105	286 0.397	48 0.066	722 1.000	293 0.405	69 0.095	319 0.442	42 0.058	1,445
Sandionisio	Population Revised Ratio	1,462 1.000	639 0.437	156 0.107	575 0.393	92 0.063	1,462 1.000	623 0.426	140 0.096	611 0.418	88 0.060	2,924
Sara	Population Revised Ratio	11,157 1.000	4,697 0.421	1,194 0.107	4,552 0.408	714 0.064	11,157 1.000	4,575 0.410	1,149 0.103	4,708 0.422	725 0.065	22,314
Total	Population	16,920	7,137	1,762	6,891	1,130	16,921	6,926	1,730	7,145	1,120	33,841



## PROJECTED POPULATION DISTRIBUTION BY SEX AND AGE AS OF 2000

Municipality	Male					Female						
	Sub- total	0~14	15~19	20~59	60~	Sub- total	0~14	15~19	20~59	60~	Total	
Ajuy	Population Revised Ratio	5,183 1.000	1,722 0.326	470 0.089	2,589 0.490	502 0.095	5,137 1.000	1,639 0.319	524 0.102	2,471 0.481	503 0.098	10,420
Concepcion	Population Revised Ratio	1,006 1.000	342 0.340	103 0.102	479 0.476	82 0.082	978 1.000	315 0.322	91 0.093	496 0.507	76 0.078	1,984
Sandionisio	Population Revised Ratio	1,950 1.000	677 0.437	203 0.104	918 0.471	152 0.078	1,897 1.000	647 0.341	180 0.095	916 0.483	154 0.081	3,847
Sara	Population Revised Ratio	14,165 1.000	4,689 0.331	1,445 0.102	6,898 0.487	1,133 0.080	13,773 1.000	4,490 0.326	1,391 0.101	6,680 0.485	1,212 0.088	27,938
Total	Population	22,404	7,430	2,221	10,884	1,869	21,785	7,091	2,186	10,563	1,945	44,189

## FARM HOUSEHOLDS AS OF 1984

Muni- cipality	Item	H.H. 1) in the Project Area	F.H.H. 2) in the Project Area	L.H.H. 3) in the Project Area	N.F.H. 4) in the Project Area	Remarks
Ajuy	No. of Households	1,263	476	378	409	
	Ratio	1.000	0.377	0.299	0.324	
			0.676		0.324	
Population	7,158	2,699	2,140	2,319		
Concep- cion	No. of Households	253	138	100	15	
	Ratio	1,000	0.545	0.395	0.060	
			0.940		0.060	
Population	1,445	787	571	87		
Sandio- nisio	No. of Households	519	257	157	105	
	Ratio	1.000	0.495	0.303	0.202	
			0.798		0.202	
Population	2,924	1,447	886	591		
Sara	No. of Households	3,985	1,556	1,684	745	
	Ratio	1.000	0.390	0.423	0.187	
			0.813		0.187	
Population	22,314	8,702	9,439	4,173		
Total	No. of Households	6,020	2,427	2,319	1,274	
	Population	33,841	13,635	13,036	7,170	
	No. per Household	5.6	5.6	5.6	5.6	

- 1) : Household  
 2) : Farming Household  
 3) : Landless Farm Laborer's Household  
 4) : Non-Farm Household

## FARM HOUSEHOLDS AS OF 2000

Municipality	Item	H.H. 1) in the Project Area	F.H.H. 2) in the Project Area	L.H.H. 3) in the Project Area	N.F.H. 4) in the Project Area	Remarks
Ajuy	No. of Households	1,850	698	553	599	
	Ratio	1.000	0.377	0.299	0.324	
			0.676		0.324	
	Population	10,420	3,928	3,116	3,376	
Concepcion	No. of Households	346	191	134	21	
	Ratio	1.000	0.552	0.388	0.06	
			0.940		0.06	
	Population	1,984	1,095	770	119	
Sandionisio	No. of Households	684	340	206	138	
	Ratio	1.000	0.497	0.301	0.202	
			0.798		0.202	
	Population	3,847	1,912	1,158	777	
Sara	No. of Households	4,989	1,947	2,110	932	
	Ratio	1.000	0.390	0.423	0.187	
			0.813		0.187	
	Population	27,938	10,896	11,818	5,224	
Total	No. of Households	7,869	3,176	3,003	1,690	
	Population	44,189	17,831	16,862	9,496	
	No. per Household	5.6	5.6	5.6	5.6	

1) : Household

2) : Farm Household

3) : Landless Farm Laborer's Household

4) : Non-Farm Household

## SCHOOL ATTENDANCE AS OF 1984

Municipality	Item	0~14	15~19	20~59	60~	Total
Ajuy	Age	0~12	13~16	17~21	22~	
	Enrollment	5,762	1,834	11	-	7,607
	Revised Enrollment	6,679	924	4	-	7,607
	Ratio	0.878	0.121	0.001	-	1.000
	Enrollment	1,572	216	2	-	1,790
Concepcion	Age	0~12	13~16	17~21	22~	
	Enrollment	3,537	886	176	-	4,599
	Revised Enrollment	3,980	549	70	-	4,599
	Ratio	0.866	0.119	0.015	-	1.000
	Enrollment	273	37	5	-	315
Sandionisio	Age	0~12	13~14	15~16	17~	
	Enrollment	3,782	361	276	-	4,419
	Revised Enrollment	4,143	276	-	-	4,419
	Ratio	0.938	0.062	-	-	1.000
	Enrollment	609	40	-	-	649
Sara	Age	0~12	13~16	17~21	22~	
	Enrollment	5,686	1,562	57	-	7,305
	Revised Enrollment	6,467	815	23	-	7,305
	Ratio	0.885	0.112	0.003	-	1.000
	Enrollment	5,272	667	19	-	5,958
<b>Total</b>		<b>7,726</b>	<b>960</b>	<b>26</b>	<b>-</b>	<b>8,712</b>

## SCHOOL ATTENDANCE AS OF 2000

Muni- cipality	Item	0~14	15~19	20~59	60~	Total
	Age	0~12	13~16	17~21	22~	
	Enrollment	5,762	1,834	11	-	7,607
Ajuy	Revised Enrollment	6,679	924	4	-	7,607
	Ratio	0.878	0.121	0.001	-	1.000
	Enrollment	2,287	315	3	-	2,605
	Age	0~12	13~16	17~21	22~	
	Enrollment	3,537	886	176	-	4,599
Concep- cion	Revised Enrollment	3,980	549	70	-	4,599
	Ratio	0.866	0.119	0.015	-	1.000
	Enrollment	375	52	6	-	433
	Age	0~12	13~14	15~16	17~	
	Enrollment	3,782	361	276	-	4,419
Sandio- nisio	Revised Enrollment	4,143	276	-	-	4,419
	Ratio	0.938	0.062	-	-	1.000
	Enrollment	801	53	-	-	854
	Age	0~12	13~16	17~21	22~	
	Enrollment	5,686	1,562	57	-	7,305
Sara	Revised Enrollment	6,467	815	23	-	7,305
	Ratio	0.885	0.112	0.003	-	1.000
	Enrollmnet	6,601	836	22	-	7,459
Total		10,064	1,256	31	-	11,351

\* Population in the Project area

\*\* Ratio of Education

DISTRIBUTION OF POPULATION AND SCHOOL ATTENDANCE AS OF 1984

Municipality	Male Age					Female				
	0-14	15-19	20-59	60+	Sub total	0-14	15-19	20-59	60+	Sub total
Ajuy	1,489	336	1,478	276	3,579	1,435	372	1,507	265	3,579
Population										
Farm Population	1,006	228	999	186	2,419	970	252	1,019	179	2,420
Enrollment	786	108	1	-	895	786	108	1	-	895
Concepcion	312	76	286	48	722	293	69	319	42	723
Population										
Farm Population	293	71	270	45	679	275	65	300	39	679
Enrollment	136	19	2	-	157	137	18	3	-	158
Sandionisio	639	156	575	92	1,462	623	140	611	88	1,462
Population										
Farm Population	510	125	458	73	1,166	497	112	488	70	1,167
Enrollment	304	20	-	-	324	305	20	-	-	325
Sara	4,697	1,194	4,552	714	11,157	4,575	1,149	4,708	725	11,157
Population										
Farm Population	3,818	971	3,701	580	9,070	3,719	934	3,828	590	9,071
Enrollment	2,636	333	10	-	2,979	2,636	334	9	-	2,979
Total	7,137	1,762	6,891	1,130	16,920	6,926	1,730	7,145	1,120	16,921
Population										
Farm Population	5,627	1,395	5,428	884	13,334	5,461	1,636	5,635	878	13,337
Enrollment	3,862	480	13	-	4,355	3,864	480	13	-	4,357

TABLE IV - 6

DISTRIBUTION OF POPULATION AND SCHOOL ATTENDANCE AS OF 2000

Municipality	Male					Female					Sub total	Total	
	0~14	15~19	20~59	60~	Sub total	0~14	15~19	20~59	60~	Sub total			
Ajuy													
Population	1,722	470	2,589	502	5,283	1,639	524	2,471	503	5,137	10,420		
Farm Population	1,164	318	1,750	339	3,571	1,108	354	1,671	340	3,473	7,044		
Enrollment	1,159	160	2	-	1,321	1,128	155	1	-	1,284	2,605		
Concepcion													
Population	342	103	479	82	1,006	315	91	496	76	978	1,984		
Farm Population	322	96	450	78	946	296	85	466	72	919	1,865		
Enrollment	190	27	3	-	220	185	25	3	-	213	433		
Sandionisio													
Population	677	203	918	152	1,950	647	180	916	154	1,897	3,847		
Farm Population	540	162	733	121	1,556	516	144	731	123	1,514	3,070		
Enrollment	406	27	-	-	433	395	26	-	-	421	854		
Sara													
Population	4,689	1,445	6,898	1,133	14,165	4,490	1,391	6,680	1,212	13,773	27,938		
Farm Population	3,812	1,175	5,608	921	11,516	3,651	1,131	5,431	985	11,198	22,714		
Enrollment	3,347	424	11	-	3,782	3,254	412	11	-	3,677	7,459		
Total													
Population	7,430	2,221	10,884	1,869	22,404	7,091	2,186	10,563	1,945	21,785	44,189		
Farm Population	5,838	1,751	8,541	1,459	17,589	5,571	1,714	8,299	1,520	17,104	34,693		
Enrollment	5,102	638	16	-	5,756	4,962	618	15	-	5,595	11,351		

TABLE IV-17

## MONTHLY LABOR FORCE AS OF 1984

Age	15 ~ 19	20 ~ 29	30 ~ 39	40 ~ 49	50 ~ 59	60 ~	Sub-total	Total
Male	$480 \times 0.5 \times 8 = 1,920$	$13 \times 1.0 \times 8 = 104$	$884 \times 0.5 \times 20 = 8,840$					
	$(1,395 - 380) \times 0.5 \times 20 = 10,150$	$(5,428 - 10) \times 1.0 \times 20 = 108,360$					129,374	
Female	$480 \times 0.5 \times 8 = 1,920$	$13 \times 1.0 \times 8 = 104$	$878 \times 0.5 \times 20 = 8,780$					
	$(1,363 - 378) \times 0.5 \times 20 = 9,850$	$(5,635 - 10) \times 1.0 \times 20 = 112,500$					133,154	$133,154 \times 0.75 = 99,865.5$
								229,239.5



MONTHLY LABOR FORCE AS OF 2000

Age	15 ~ 19	20 ~ 59	60 ~	Subtotal	Total
Male	$638 \times 0.5 \times 8 = 2,552$ $(1,751 - 503) \times 0.5 \times 20 = 12,480$	$16 \times 1.0 \times 8 = (8,541 - 13) \times 1.0 \times 20 = 170,560$	$128 \times 1,459 \times 0.5 \times 20 = 14,590$	200,310	347,176.5
Female	$618 \times 0.5 \times 8 = 2,472$ $(1,714 - 485) \times 0.5 \times 20 = 12,290$	$15 \times 1.0 \times 8 = (8,299 - 12) \times 1.0 \times 20 = 165,740$	$120 \times 1,520 \times 0.5 \times 20 = 15,200$	$195,822 \times 0.75 = 146,866.5$	

## WATER SUPPLY SITUATION IN SARA

Barangay	Households Served by Waterworks System				Types of Water Supply					Other (Specify)
	Number of Households	Served %	Number of Households	Unserved %	Pipe Water	Artesian Well	Open Well	Spring Water	Rain Water	
Ilaya- Poblacion	202				202					
Ilawod- Poblacion	294				294					
Market- Poblacion	76				76					
Aquirre	25		30		25			30		
Alibayog			96			13		83		
Aldeguer			107			35		72		
Anoring	75		100		75	80		100		
Apelo			99			19		80		
Apologista			135			35		100		
Aposaga	1		82		1	3		79		
Arante			94			14		80		
Ardemil			141			42		99		
Aspera	102		35		102	5		30		
Bagaygay			130			30		100		
Bakabak			141			45		96		
Batitao			37			7		30		
Bato	50		53		50	4		49		
Castillo			205			85		120		
Castor			24			4		20		
Crespe			114			64		50		
Devera			170			102		68		
Domingo	25		142		25	42		100		
Ferrarie			100			65		35		
Gildore			51			45		6		
Improge			65			15		45	5	
Juaneza	30		44		30	24		20		
Labigen			122			89		33		
Lanciola			92			54		38		
Latawan			53			23		30		
Malapaya			107			15		92		
Muyco			109			9		100		
Pabriaga			54			14		40		
Padios			84			34		50		
Pasig	60		60		60	20		40		
Posndas			80			35		45		
Preciosa			66			20		40	6	
Salcedo			76			26		50		
San Luis			127			27		100		
Tady			90			10		80		
Tintay			110			24		86		
Villahermosa			88			18		70		
Zerrudo			154			54		100		
<b>TOTAL</b>	<b>940</b>		<b>3,747</b>		<b>940</b>	<b>1,250</b>		<b>2,486</b>	<b>11</b>	

Source : Primary Survey PFO &amp; Municipal Government

## SOURCE OF WATER SUPPLY AND TYPES OF WATER SYSTEM, 1983 AJUY, ILOILO

Barangays	SOURCE OF WATER SUPPLY				TYPES OF WATER SYSTEM			
	Ground Water No. of HH	Spring No. of HH	Rain Water No. of HH	Others No. of HH	Pipe No. of HH	Artesian Well No. of HH	Pump No. of HH	Open Well No. of HH
1. Poblacion	1	2			198	28	15	15
2. Pantalan Nabaye		2			16			2
3. San Antonio		1			11	20		4
4. Progress	1	2						1
5. Lanjagan					2	2	2	2
6. Taguhangin						113	4	3
7. Pta. Bunglas						3	4	3
8. Rojas	53						1	3
9. Pant. Navarro	27		40			2	1	3
10. Pint. Diel						2	2	2
11. Central						2	50	20
12. Tipacla						1	3	3
13. Tanduyan						2	50	20
14. Pinay Espinosa							5	1
15. Adcadarao						2		1
16. Pint. Elizalde						2	3	1
17. Bucana Bunglas						2	4	55
18. Silagon		1				1		2
19. Badiangan	93							1
20. Agbobolo	1						2	
21. Tubugan						2		2
22. Bato Biasong	2	1				3	3	3
23. Pili							27	
24. Luca		2					10	44
25. Punta Buri		9			40		40	
26. Malayuan	50	50					100	100
27. Sto Rosario		250					50	
28. Culasi		4						
29. Progreso		23					38	31
30. Nasidman			56					56
31. Mangorocoro								169
32. Bay-ang	80	59					11	78
33. Tabubanhan				NO DATA				
34. Pedada				NO DATA				

Source : AWD/Bgy. Captains

## MEDICAL PERSONNEL

Item	Municipality	Ajuy (As of 1982)			Concepcion (As of 1981)			Sandionisio (As of 1980)			Sara (As of 1980)			Total
		MHO	RHU	BHC	RHU	BHC	RHU	BHC	RHU	BHC	Hospital	RHU	BHC	
No. of Beds										50			50	
Doctors		1	1							7	1		10	
Nurses		6	1		1		1			10	1		20	
Midwives			2	6	1	4	1	3		1	7	7	32	
Dentists		1	1							1	1		4	
Pharmacists										1			1	
Med-Tech.										1			1	
Sanitary Inspectors		2			2		1				1		6	
Institutional Workers													38	

Note : (2) private doctors in Ajuy

SCHOOLS

Municipality	Elementary		Primary		Secondary		Tertiary	
	In the Project area	Total	In the Project area	Total	In the Project area	Total	In the Project area	Total
Ajuy	34	12	1	11	4	11	1	1
						Municipal H.S. (1) Barangay H.S. (3)	Municipal H.S. (1)	
Concepcion	25	4	10	13	3	13	-	Concepcion College of Fisheries (1)
Sandionisio	29	8	11	8	2	8	-	
						Municipal H.S. (1) Barangay H.S. (1)		
Sara	42	34	12	7	4	7	3	
						H.S. in Poblacion (3) Barangay H.S. (2)		
Total	130	58	45	39	13	12	7	2
			(27.6%)	(22.4%)	(22.4%)		(12.1%)	(1.7%)

( ) : Ratio per Barangay in the Project Area

**DISTRIBUTION OF ALL ESTABLISHMENTS BY MAJOR INDUSTRY BY MUNICIPALITY,  
PROVINCE OF ILOILO AS OF 1978**

Municipality	Total No. of Establishments	No. of Establishments Classified by Major Division									
		Agric., Fishery & Forestry	Mining & Quarrying	Manu- facturing	Elect. Gas & Water	Con- struction	Wholesale & Retail Trade	Transport Storage & Trade	Fin. Inst. Real Estate & Business Services	Community, Social & Personnel Services	
Ajuy	215	0	0	67	0	0	79	45	1	23	
Concepcion	93	11	0	23	0	0	45	10	0	4	
Sandionisio	90	0	3	21	0	0	59	2	0	5	
Sara	256	4	0	88	1	1	61	44	1	56	
<b>Total</b>	<b>654</b>	<b>15</b>	<b>3</b>	<b>199</b>	<b>1</b>	<b>1</b>	<b>244</b>	<b>101</b>	<b>2</b>	<b>88</b>	

1) A survey of establishments is conducted every 3 years - the latest was in 1978

**NUMBER OF WHOLESALERS/RETAILERS BY MUNICIPALITY (RICE),  
PROVINCE OF ILOILO, 1983**

Municipalities	Total No. of Wholesalers & Retailers		Wholesalers		Retailers		Wholesalers/ Retailers	
	No. of Persons	No. of Units	No. of Persons	No. of Units	No. of Persons	No. of Units	No. of Persons	No. of Units
Ajuy	19	19	7	7	2	2	10	10
Concepcion	21	21	4	4	13	13	4	4
Sandionisio	16	16	5	5	7	7	4	4
Sara	41	41	26	26	2	2	13	13
<b>Total</b>	<b>97</b>	<b>97</b>	<b>42</b>	<b>42</b>	<b>24</b>	<b>24</b>	<b>31</b>	<b>31</b>

SOURCE : NFA ILOILO CITY

## LAND CLASS AND BASE UNIT MARKET VALUE

Land Category	Market Value (P/ha)				
Rice, irrigated	21,500	18,800	15,000	11,000	
Rice, unirrigated	12,000	10,500	9,000		
Rice, upland	4,000	3,000			
Corn	4,800	3,900	3,000		
Coconut	5,400	5,000	4,500		
Sugar	16,200	14,500	11,300	8,000	4,000
Tobacco	6,300	5,800			
Bamboo	6,000	5,500	5,000		
Fish Pond	33,000	29,700	26,400	23,000	
Inland Fisheries	6,000	5,500	5,000	4,000	
Nipa	4,000	3,000			
Saltbed	26,000	23,000	20,000	16,000	
Pasture	1,500				
Forest	2,000				
Mangrove	2,200				
Orchard	9,000	5,200			
Abaca	3,700	3,000			
Cogon	1,500				
Sorghum	5,200	4,700			
Ipil-ipil	4,500	4,000			

Source: Assessor Office in Sara

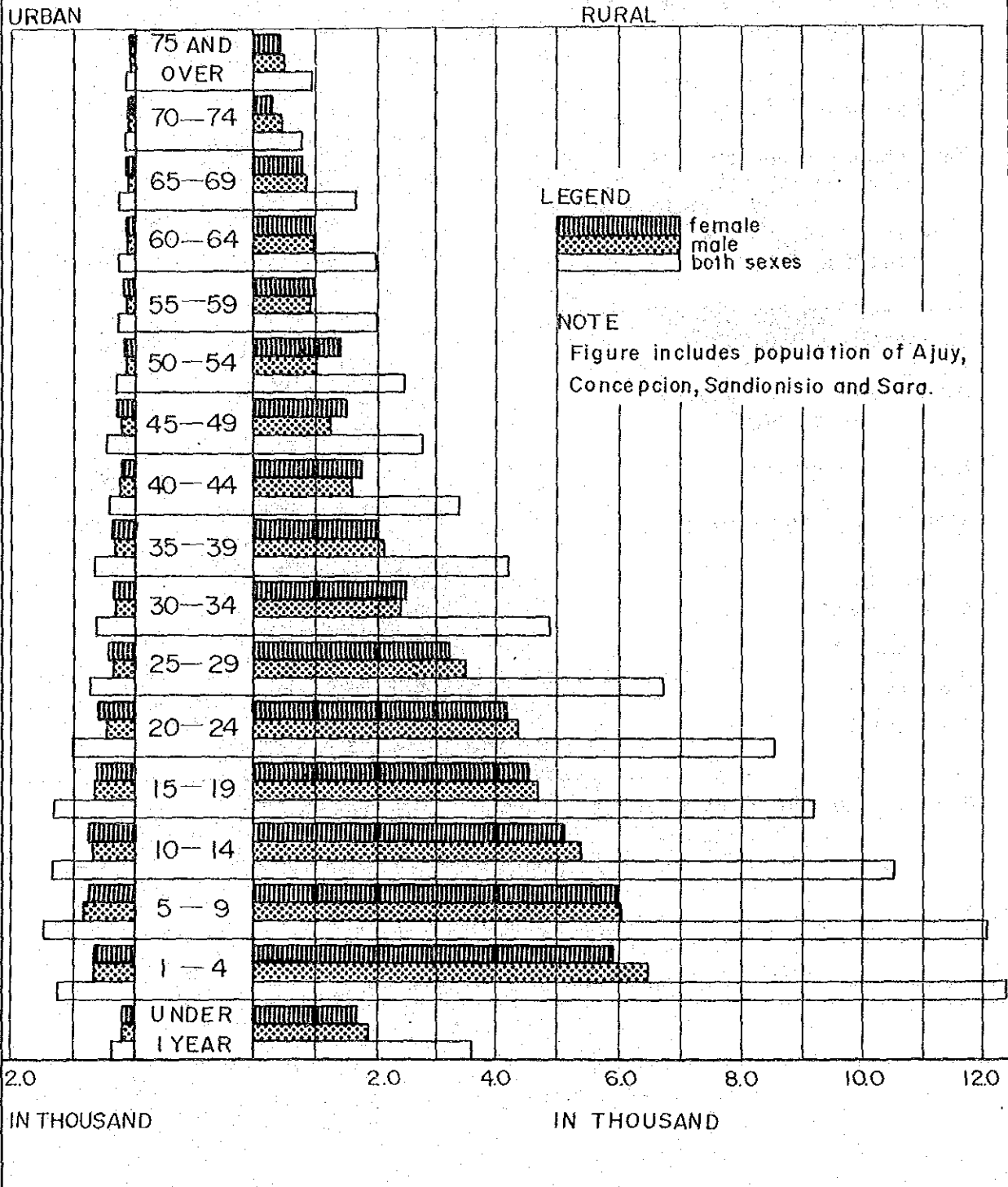


## ASSESSMENT LEVELS FOR BUILDINGS AND OTHER IMPROVEMENTS

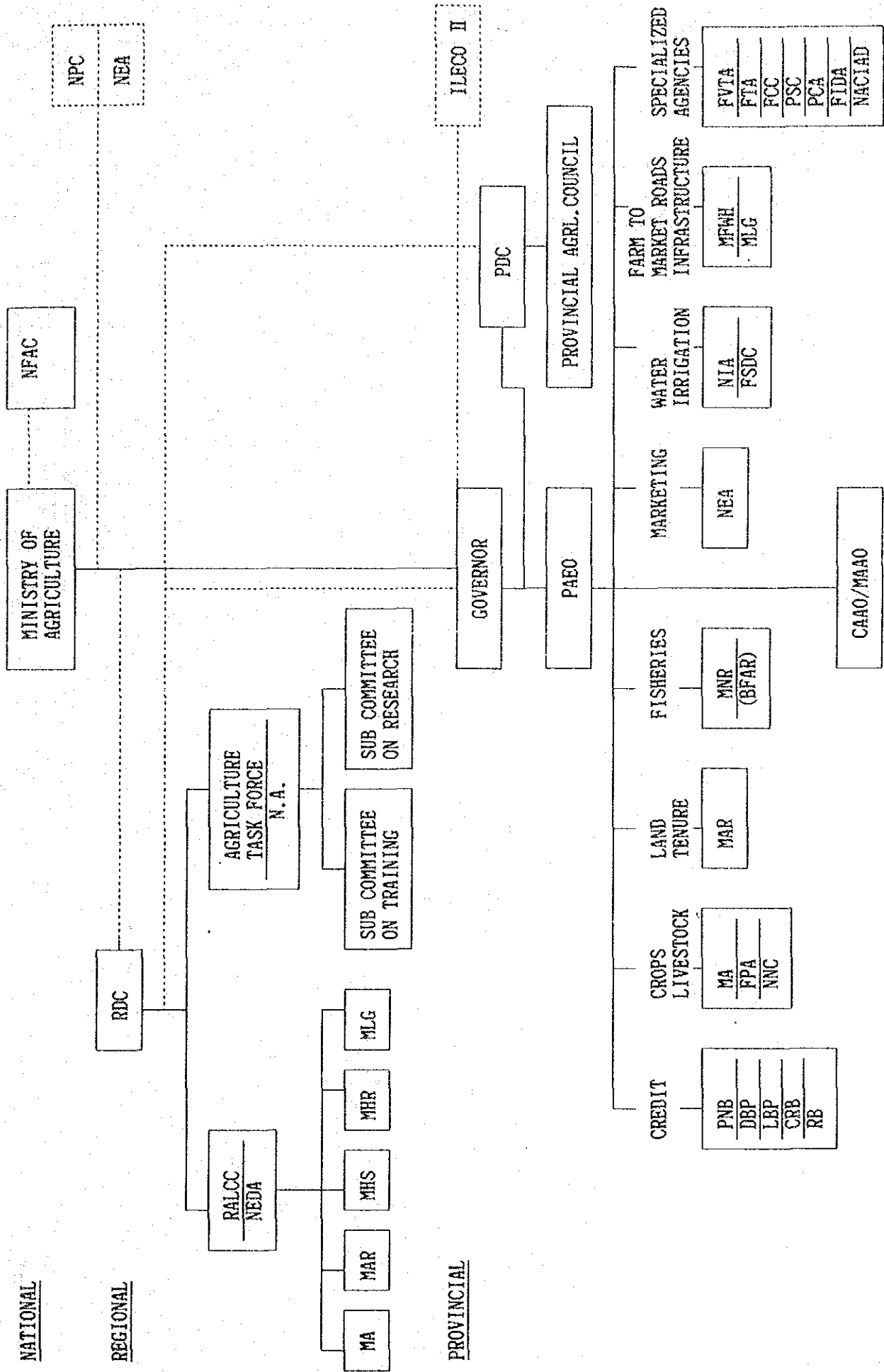
Market Value (P)	Residential	Commercial	Agricultural
30,000 or less	15%	50%	40%
More than 30,000 but not exceeding 50,000	20%	55%	45%
More than 50,000 but not exceeding 75,000	25%	60%	50
More than 75,000 but not exceeding 125,000	35	65	55
More than 125,000 but not exceeding 175,000	45	70	60
More than 175,000 but not exceeding 250,000	55	75	65
More than 250,000 but not exceeding 350,000	65	80	70
More than 350,000 but not exceeding 500,000	75	80	75
More than 500,000	80	80	80
Assessment Levels for Machinery			
<u>Actual Use</u>	<u>Assessment Level</u>		
Agricultural	60		
Residential	70		
Commercial	80		
Industrial	80		

Source: Assessor Office in Sara

POPULATION COMPOSITION BY AGE AND SEX



ORGANIZATION CHART OF INTEGRATED AGRICULTURAL DEVELOPMENT





APPENDIX V

AGRICULTURE



APPENDIX V

AGRICULTURE

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## APPENDIX V

### AGRICULTURE

#### 1. GENERAL

This report gives a full account of the present agricultural conditions in the Project area (gross area: 8320 ha) and of the proposed agricultural development plan for the proposed Project area (net area: 6,760 ha).

Data and information for this feasibility study were furnished by the following Philippine Government agencies and concerned associations:

- National Irrigation Administration (NIA)
- National Economic Development Authority (NEDA)
- National Electrification Administration (NEA)
- National Food Authority (NFA)
- Ministry of Agriculture and Food (MAF)
- Bureau of Soil (BS)
- Bureau of Agricultural Economics (BAEcon)
- Ministry of Agrarian Reform (MAR)
- Bureau of Agricultural Extension (BAEx)
- Provincial Development Staff Office, Iloilo Province
- Jalaur River Multipurpose Project Office
- KABSACA Management Office, MAF Region VI
- Municipal Offices of Ajuy, Concepcion, San Dionisio and Sara
- Cooperative Rural Bank of Iloilo
- Bureau of Plant Industry, Region VI (BPI)
- Area Marketing Cooperative, Sara (AMC)
- International Rice Research Institute (IRRI)
- Food and Nutrition Research Institute (FNRI)
- National Census and Statistics Office (NCSO)
- National Pollution Control Commission (NPCC)
- Fertilizer and Pesticide Authority (FPA)
- Philippine Sugar Commission (PHILSUCOM)
- Land Bank of the Philippines, Iloilo
- Central Bank of the Philippines, Iloilo
- Philippine Crop Insurance Corporation, Iloilo (PCIC)
- Bureau of Forest Development

Aside from the collected data and information, necessary investigations such as farm economic survey and discussions with farmers and field officers were conducted during two field work periods.

## 2. PRESENT CONDITIONS

### 2.1 Agricultural Conditions

#### 2.1.1 Location

The Study area is located in the northeastern part of Iloilo Province in Region VI. Sara Town which is the center of the Project area is approximately 105km northeast of Iloilo City. There is a frequent bus service to Iloilo City, which takes about two and a half hours. There is also a one and a half hour bus service to Estancia where there is shipping service to Manila. Administratively the Project area of 8,320ha extends over four municipalities in Iloilo Province; namely, Ajuy, Concepcion, San Dionisio and Sara.

#### 2.1.2 Human Resources

Human resources were studied through data from NCSO, barangay survey and farm survey, and a summary of the results is shown in TABLE V-1 to V-3.

The population of the four municipalities was about 111,000 in 1984 and the ratio of male to female population is even. This represents about 4% of the population of Iloilo Province, while population density of the four municipalities (186 persons/km<sup>2</sup>) is lower than that of Iloilo Province (271 persons/km<sup>2</sup>). The total number of barangays is 130, out of which 58 barangays are directly related to the Project area. The population in the Project area is approximately 34,000.

The number of farm households in the Project area is 2,427 which represents 35% of farm households and about 12% of total households in the four municipalities. Other major occupations include landless farm labor, civil service and trading. Labor force per farm household was estimated at 2.4 in consideration of population, the ratio of males to females, and percentage of school attendance.

### 2.1.3 Climate

According to Coronas' classification, the climate of the Project area belongs to Type-III which is characterized by "indistinct wet and dry seasons but relatively divided into dry season from November to April and rainy season from May to October". A summary of climatic conditions is presented in TABLE V-4.

Average monthly mean temperature is 27.4°C and the maximum and minimum monthly temperatures are 28.9°C in May and 26.1°C in January, respectively. The difference between the two is only 2.8°C. Wind is classified into two seasons according to the monsoon. Wind direction is south or southwest from June to September and north or northeast from October to May. The annual average of mean daily wind velocity is 12.7km/hr.

The beginning of the wet season varies every year, though rainfall from July to November is relatively stable while May and December are transition periods from dry season to wet season and wet season to dry season, respectively. Dry season is from January to April but rainfall during the same varies considerably each year. Average annual rainfall is 1835.7mm, 75% of which is concentrated in the 6 months from June to November.

This climate, with the long wet season, is quite advantageous for double cropping of paddy and diversified crop production.

### 2.1.4 Soil

The Project area is composed of a plain formed mostly of alluvial sediments which is mainly used for lowland paddy and the intermediate upland which is used for sugarcane, coconut and other crops. The alluvial plain soils which cover 80% of the Project area are classified into the Sara series and Bantog Series. These soils are best suited for crop production under irrigation. The intermediate upland area soils which cover the remaining 20% of the Project area are adaptable for diversified crops under irrigation.

### 2.1.5 Land Use

Land use was delineated by the most recent aerial photographs of the area (1983) and confirmed during field investigation. Land use according to crop types and other categories is summarized in the table below. Cropped lands which can not be included in the Project were classified as others.

Land Use Category	Area (ha)	Extent (%)
Paddy	6,320	75
- Irrigated area	1,590	19
- Rained area	4,730	58
Upland Crop	800	10
- Sugarcane	380	5
- Coconut	200	2
- Grassland and others	220	3
Bush	45	1
Hills	185	2
Residential area	245	3
Others	725	9
Total	8,320	100

As depicted in the above table, land use is roughly classified into five categories; namely, paddy, upland area, bush and hills, residential area and others. Paddy comprises the largest area of 76% while upland crops comprises the second largest area of 10%. Total farmland is 86% and irrigated area is occupied entirely by paddy. A breakdown of the irrigated area according to system is presented in the following table.

Irrigation System	Area (ha)
Irrigation by Private Weirs	460
Irrigation by Private Pumps	580
Irrigation by Private Impoundings	18
KABSAKA Impoundings	132
Serruco CIS	400
Total	1,590



Upland crop area is occupied predominantly by sugarcane and coconut. There are also many other perennial crops; however, these are mainly planted in and around residential areas.

#### **2.1.6 Farm size and Land Tenure**

TABLE V-5 shows land tenure and farm size based on the farm survey for 15 selected barangays in the Project area. The average farm size per household of the sample farms in the Project area is 2.4ha which is similar to the national average of 2.6ha (1980, Agricultural Census). The land tenure farm survey shows that 42.2% of total farms are farmer owned, while farm owners cultivate 54.9% of total farmland and landless farm laboreers cultivate 45.1%.

### **2.2 Agricultural Production**

#### **2.2.1 Cropping Pattern**

The major crops planted in the Project area are rice, sugarcane and coconut. In addition, corn, cassava, and upland rice are planted in hilly areas and vegetables, perennial crops and fruit trees are usually planted on a small scale in residential areas. Cropping seasons are determined by rainfall distribution which is affected by the monsoon. On the basis of farm survey results, the present cropping patterns of major crops are depicted in FIG. V-1.

According to the farm survey, the planting season of the 1st paddy crop began at different times in the last three years and varied by about one month from late April to late May due to variations in rainfall distribution. 2nd paddy cropping began from September to October. The gap between early and late paddy plantings of individual farmers is about two months.

Double and triple croppings of paddy are practiced using early maturing varieties with a rather strict schedule in rainfed and irrigated areas. Since most existing irrigation systems do not include reservoirs, cropping seasons of rainfed paddy and irrigated paddy vary. Single cropping, double cropping and triple cropping are practiced in 36.2%, 53.6% and 1.9% of total cropped area respectively. The cropping intensity of all paddy is 163% at present as shown in the table below. Sugarcane is

generally planted in the beginning of wet season and is harvested in dry season. Since manual sugarcane harvesting requires a large labor force, harvesting takes several months to complete.

Wet season in this area is relatively long and therefore sugarcane grows better than in Luzon Island. Coconut is harvested twice a year, just before wet season and at the end of wet season. Coconut production in the Project area is generally by extensive cultivation.

#### PRESENT CROPPING PATTERN IN THE PROJECT AREA BY CROP

Cropping Pattern	Area (ha)	Ratio (%)	Harvested Area (ha)	Cropping Intensity
<b>Paddy</b>				
1. Paddy (Rainfed)	2,275	33.0	2,275	
2. Paddy-Paddy (Rainfed)	2,455	35.6	4,910	
3. Paddy (Irrigated)	220	3.2	220	
4. Paddy-Paddy (Irrigated)	1,240	18.0	2,480	
5. Paddy-Paddy-Paddy (Irrigated)	130	1.9	390	
(Sub-total)	(6,320)	(91.6)	(10,275)	(163)
<b>Sugarcane</b>				
Plant cane	380	5.5	380	100
Ratoon Cane	(125)	(1.8)	(125)	
	(255)	(3.7)	(255)	
<b>Coconut</b>				
	200	2.9	200	100
<b>Total</b>	<b>7,410</b>	<b>100</b>	<b>10,855</b>	<b>154</b>

#### 2.2.2 Farming Practices

Present farming practices of major Project area crops, sugarcane and coconut are explained hereunder.

##### (1) Paddy

##### 1) Cropping method

Single cropping with transplanting using local rice varieties was practiced until the late 1970s. Early maturing and high yielding varieties and the direct-seeding method were simultaneously introduced in the late 1970s, and direct-seeding rapidly became the main planting method. The transplanting and random planting methods are still used in

7% of the area, while direct-seeding occupies the remaining 93%.

2) Seeds & variety

The ratio of cropped area for each variety is as follows:

- IR - 36	97%
- IR - 42	1%
- IR - 50	1%
- Local varieties	1%

Certified seeds produced by the farmers which are authorized by the Bureau of Plant Industry are used in only 0.5% of the area, as these certified seeds are very expensive at 170 - 175/45Kg.

3) Animal labor

Water buffalo (carabao) are widely used for land preparation at present, but the power tiller has become very popular recently. According to the results of a farm mechanization survey, the farm mechanization percentage for paddy cultivation work is 33% for plowing, 39% for harrowing, 100% for threshing and 77% for winnowing, as shown in TABLE V-6. Mechanization is advanced in order of irrigated transplanting, irrigated direct-seeding, rainfed direct-seeding and rainfed transplanting.

Cropping starts with plowing after the first rain of the wet season, and puddling is practiced one week after flooding. Within a week, puddling is carried out again and a wooden leveler is used for leveling. The field is then drained and rice seeds are directly sown. The land preparation period presently requires about 1 month. Land preparation for second cropping takes less time, 20 days, since the soil in the rainy season is soft and farmers work quickly.

4) Seeding

As for planting practices, seed selection by water and processing for pregermination is practiced, but seed

disinfection is a rare practice. Hastening of germination is usually sufficient. The amount of seeds used for both direct-seeding and transplanting is usually excessive. The amounts are about 90kg/ha for transplanting and 180kg/ha for direct-seeding.

This large amount of seedlings is intended to compensate for damage by rats, birds, pests and excessive water. However, although this method appears to establish seedlings well at an early stage, it leads to poor growth at a later stage resulting in poor production. Fertilizers, herbicides and pesticides are commonly used, but the amounts are less than those recommended by BAEx.

5) Plant care

Hand weeding is advised by BAEx to be carried out within one month after sowing, but the same is usually delayed. The farm input situation in the Project area is summarized in TABLE V-7. Fertilizer use in the Project area is compared with that of other areas in the following table.

Area	NO <sub>2</sub>	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub>
Irrigated			
Philippines <sup>1/</sup>	49.3	5.7	5.7
Western Visaya <sup>1/</sup>	55.9	6.1	6.1
Project Area <sup>2/</sup>	37.5	13.0	10.0
Rainfed			
Philippines <sup>1/</sup>	32.5	3.0	3.0
Western Visaya <sup>1/</sup>	31.8	2.1	2.1
Project Area <sup>2/</sup>	35.0	12.0	6.0
BS Recommendation <sup>3/</sup>	60.0	30.0	30.0

<sup>1/</sup> Patterns and Levels of Fertilizer and Pesticide Use in Philippine Rice and Corn Farms, as of 1983 Philippine BAEcon

<sup>2/</sup> Farm Survey

<sup>3/</sup> Recommendation for Masagana 99 by the Bureau of Soil

Fertilizer use in the Project area is still very low in comparison with BS recommendations. Agro-chemicals used are pesticide, 0.81%, and weedicide, 0.46% which are higher than the national average and the average for Region VI as shown in the table below.

**AGRO-CHEMICAL USE**

	Pesticide (%)	Weedicide (%)
Philippines	0.64	0.26
Region VI	0.58	0.31
Study Area	0.81	0.46

6) Harvesting

Medium level cutting by sickle is practised, and generally harvesting is conducted only by hired labor who are entitled to one fifteenth of the harvest in return for their work. Threshing and winnowing operations are conducted in the same way at rates of 1/15 and 1/25 of the harvest respectively.

If the weather allows after harvesting, rice stocks are laid on the ground for one or two days to dry. Since the first crop is harvested during the rainy season, drying can not be carried out in this fashion and threshing therefore occurs immediately after cutting. The yield loss of the first cropping which is caused by rain during maturing and harvesting reaches as much as 50%. To reduce this loss, adjustment of the cropping season and/or improvement of post-harvest facilities is required.

7) Labor Input

Present labor, draft animal and machine requirements are shown in TABLE V-8 for each farm operation. According to the table, the following trends occur.

- a) Transplanting requires more labor than direct seeding.

- b) Labor force for direct-seeding is required in the wet season more than in the dry season for both irrigated and rainfed paddy.
- c) Irrigated paddy requires more labor than rainfed paddy for direct seeding.
- d) More labor is required for transplanting in wet season than in dry season.
- e) Rainfed paddy requires more labor than irrigated paddy for transplanting.

A comparison of labor force input is presented in the table below.

	Unpaid & Family Labor (Man days)	Hired Labor			Total (days)
		Man (Man days)	Man & Animal (days)	Man & Machine (days)	
<b>Rainfed</b>					
All Provinces <sup>1/</sup>	32.75	29.45	4.92	3.04	70.16
Iloilo <sup>1/</sup>	9.95	18.32	8.23	2.94	39.44
Project Area <sup>2/</sup>	11.8	43.4	7.7	2.11	65.01
<b>Irrigated</b>					
All Provinces <sup>1/</sup>	28.95	30.76	3.84	2.56	66.11
Iloilo <sup>1/</sup>	22.03	37.42	4.49	6.05	69.99
Project Area <sup>2/</sup>	13.7	47.67	5.0	2.3	68.67

<sup>1/</sup> "Production cost/returns of palay in selected Philippine Provinces, May-June 1982 as of 1981, BAEcon

<sup>2/</sup> Farm Survey

This comparison indicates that the input of unpaid family labor force in the Project area is much less than that in the area compared.

## (2) Sugarcane

According to the farm survey, sugarcane is planted in upland areas on a large scale with about 45ha per farmer. Plantings are divided into plant cane and ratoon cane, and the 2 methods are rotated with one year of plant cane followed by two years of ratoon

cane. Planting season for plant cane varies from February to July and the harvesting of both plant and ratoon cane varies from November to March.

As shown in TABLE V-7 and V-8, the average rate of fertilizer application is 200kg/ha of  $\text{NO}_2$ , 76kg/ha of  $\text{P}_2\text{O}_5$  and 49kg/ha of  $\text{K}_2\text{O}$ . Agro-chemicals are rarely applied. Labor force requirement is high and more than one third of the total labor force is required for harvesting. Though sugarcane grows well in the area, obtainable profit from sugarcane cultivation is lower than that from vegetable cultivation. Sugarcane cultivation is decreasing for the following reasons:

- a) decrease in the world market price of sugarcane;
- b) requirement of extensive farm inputs and farm machinery;
- c) high interest rates from commercial banks; and
- c) increasing fertilizer prices

(3) Others

Corn planted in the service area is mostly composed of local varieties and is grown for 120 days from October to February in the late wet season and from March to August in the late dry season. However, the majority of corn is cultivated in the hilly area outside the Project area. Farmers tendency to plant corn is very low at present. The main reasons appear to be poor yield and also lack of good marketing channels and proper corn varieties. Mung beans are cultivated on a small scale in the dry season after the second cropping. Vegetables such as sweet potato, kangkong, eggplant, tomato and others are usually cultivated on farmers' homesteads.

### 2.2.3 Crop Production and Budget

(1) Crop Production

On the basis of the data (TABLE V-9 to V-12) of BAEcon, soil and meteorological studies, farm survey, and others, unit yield and production in the Project area for each crop was estimated as shown in the table below.

**CROP YIELD AND PRODUCTION IN THE PROJECT AREA**

Crop	Area	Unit Yield (t/ha)	Production (t)
Paddy	<u>10,275</u>	<u>2.16 (t/ha)</u>	<u>22,161</u>
1st Crop			
Irrigated	1,590	2.59	4,118
Rainfed	4,730	2.17	10,264
2nd Crop			
Irrigated	1,370	2.24	3,069
Rainfed	2,455	1.80	4,419
3rd			
Irrigated	130	2.24	291
Sugarcane	<u>380</u>	<u>56.9 (t/ha)</u>	<u>21,633</u>
Plant Cane	125	68.0	8,500
Ratoon Cane	255	51.5	13,133
Coconut	<u>200</u>	<u>480 (nuts)</u>	<u>96,000</u>

The total production of paddy is 22,200t, of sugarcane is 21,600t and of coconuts is 96,000 nuts. The rice yield of Iloilo Province according to the provincial socioeconomic profile is 3,453kg/ha for irrigated paddy and 1,946kg/ha for rainfed paddy. There is only a slight difference in the yields of rainfed paddy but the yield of irrigated paddy in the province seems to be significantly higher than that of the Project area. The reason for this low yield in the latter is instability of irrigation water resources.

As shown in the above table which presents the cultivated area of main crops, the total irrigated area of 1,590ha is cultivated with paddy. Total irrigated land area may be broken down into the items below.

- 8% or 130ha triple-cropped
- 78% or 1,240ha double-cropped
- 14% or 220ha single-cropped



On the basis of the rainfed paddy area of 4,730ha, the ratio of double and single cropping is 52% or 2,455ha and 48% or 2,275ha, respectively. Paddy planting methods are classified into transplanting and direct-seeding and the ratio of the two in the area is 7% or 442ha and 93% or 5,878ha, respectively. The difference in yield between transplanting and direct seeding methods is not significant at present.

The cropped area of other main crops, namely sugarcane, and coconut, is 380ha and 200ha, respectively. The cropping intensity in the Project area shown in the table of Section 2.2.1 is 154% which is very high. The cropping intensity for rice is 162%. The reasons for this high cropping intensity are itemized below:

- long rainy season extending from June to December
- introduction of early matured variety of 100 to 110 days
- direct wet seeding which requires less labor force

The farm survey conducted by the JICA Study Team suggests that the reasons for high and low or unstable yields are:

Irrigated paddy

low yield: pests, lack of water and little fertilizer

high yield: proper water supply

Rainfed paddy

low yield: lack of rain, pests and/or typhoon

high yield: sufficient rainfall and/or appropriate farming technology

For the above reasons, stable water supply for rice culture in the Project area is indispensable not only for production increase but also production stabilization. Common pests are rice blast and tungro disease. The main reason for the occurrence of rice blast seems to be the dense seeding method. As a counter-measure against tungro, a resistant variety should be adopted. Farmers in the Project area who plant rainfed paddy twice a year are quite progressive in promotion of an agricultural development program which entails provision of year-round irrigation water as an essential target.

(2) Crop Budget

A farm survey was conducted to determine the relationship between crop budget and crop and planting method. The results are shown in TABLE V-13 and a summary is tabulated below.

**PRESENT CROP PRODUCTION COST AND RETURN**

Item	Paddy				Sugarcane		Coconut
	Direct Seeding		Transplanting		Plant Cane	Ratoon Cane	
	Irrigated	Rainfed	Irrigated	Rainfed			
	<u>1st</u> 2nd	<u>1st</u> 2nd	<u>1st</u> 2nd	<u>1st</u> 2nd			
1. Production							
Cost (P)	<u>5,230</u> 4,730	<u>4,510</u> 4,310	<u>5,210</u> 4,920	<u>4,560</u> 3,820	18,090	12,560	300
2. Gross							
Income (P)	<u>6,860</u> 5,940	<u>5,750</u> 4,770	<u>6,860</u> 5,940	<u>5,750</u> 4,770	20,440	15,480	640
3. Net Income							
(2 - 1)	<u>1,630</u> 1,210	<u>1,250</u> 750	<u>1,660</u> 1,010	<u>1,190</u> 950	2,350	2,920	340

Note: Details may not add up to total as numbers were rounded off.

The present crop budget as determined by the survey is characterized by the following items.

- a) Net income and production of sugarcane is larger than that for paddy cultivation. In particular, the production cost of sugarcane is two to three times that of paddy.
- b) In paddy production, the most profitable planting method is irrigated direct seeding and the next is irrigated transplanting.
- c) Labor input for transplanting is more than that for direct seeding. On the other hand, the amount of input materials required for direct seeding is greater than that for transplanting.
- d) Since land preparation for irrigated transplanting is most mechanized and rainfed transplanting is least mechanized, cost of land preparation for irrigated transplanting is maximum while that for rainfed transplanting is minimum.

The survey shows that double cropping of paddy with a stable irrigation system can produce more income with less investment than sugarcane production.

#### 2.2.4 Farm Labor Balance

The farm labor force is classified into human laborers, draft animals and machinery. Each of these is further classified into family or owned and hired.

On the basis of demographic study, farm survey and others, farm labor force availability was estimated and farm labor force requirement and balance were calculated.

##### (1) Farm Labor Force Availability

###### 1) Labor

As stated in Appendix IV, population and number of households dependent on agriculture, that is farm households, farm laborers' households and their family members are tabulated below.

	All Occupations	Farm Households	Landless Farm Laborers' Households
No. of Households (%)	6,020 (100)	2,427 (40)	2,319 (39)
Population	33,840	13,640	13,040

On the basis of this data and in consideration of labor efficiency by age, sex and school attendance, the monthly labor force availability was estimated as in the following table.

(Unit: man-days/month)				
Age Sex	15-19	20-59	60-	Total
Male	12,070	10,8460	8,840	129,370
Female	8,830	84,450	6,590	99,870
Total	20,900	192,910	15,430	229,240

The efficiency of the farm labor force was estimated according to several criteria as follows:

- labor efficiency according to sex:

male	1.0
female	0.75

- labor efficiency according to age group:

from 15 to 19	0.5
from 20 to 59	1.0
over 60	0.5

- one month is equivalent to 20 working days

- working days of those attending school are 8 days per month

On the basis of the above data, labor force per household is estimated at 2.4.

## 2) Draft animals

Carabaos are commonly used in the Project area as draft animals for farming. The total number of carabao and available draft animals in the municipalities involved are shown in TABLE V-14 and the latter is estimated at about 7,220. Approximately 50% of farmers possess carabao with an average of 2.3 animals per farmer. Detailed data from the agro-economic survey is shown in TABLE V-32.

## 3) Mechanical power

Through the farm survey, the number of farm machines and degree of farm mechanization were studied and the results are tabulated below.

### NUMBER OF FARM MACHINES

Year	2-wheel Tractors	4-wheel Tractors	Threshers
1984	180	33	223

Note: details are shown in TABLE V-6.

### DEGREE OF FARM MECHANIZATION

(Unit: % of area)

	Land Preparation			Threshing	Winnowing
	Plowing	Harrowing	Leveling		
Ratio	16	59	0	100	62

4-wheel tractors are mainly used for sugarcane and the total number is insufficient for plowing a large paddy area. Since harrowing by 2-wheel tractor is more effective than by carabao for weeding and leveling, harrowing is highly mechanized.

#### (2) Required Labor Force and Balance

The present labor force requirement by crop and operation is explained in Section 2.2.2, Farming Practice and TABLE V-8 and summarized in the table below.

#### PRESENT LABOR FORCE REQUIREMENT

	Labor Force (man-days/ha)		Draft Animal Force (days)		Mechanical Power (days)	
	1st	2nd	1st	2nd	1st	2nd
<u>Rice</u>						
<u>Irrigated</u>						
Direct seeding	68.67	54.37	6.9	5.4	2.30	2.37
Trans planting	74.88	69.78	5.7	5.2	3.08	3.08
<u>Rainfed</u>						
Direct seeding	65.01	48.72	10.6	8.3	2.11	2.31
Trans planting	82.67	64.87	11.3	9.3	2.17	2.17
<u>Sugarcane</u>						
Plant cane	109.59				5.59	
Ratoon cane	66.6				4.0	
<u>Coconut</u>	42.0					

The total labor force requirement for each crop in the Project area is calculated in TABLE V-15 and FIG. V-2 and V-3. As farm machinery is comparatively easy to increase and thus does not represent a potential limiting factor for the Project, mechanical power was not calculated here. From these results it can be concluded that at present there is a large surplus labor force.

## 2.3 Marketing

### 2.3.1 Marketing of Farm Inputs

#### (1) Certified Seed

The production of certified seed is controlled by BPI, and the necessary amount of certified seed is basically being produced in each area. Certified seed production in the Project area is being carried out in Ajuy using the transplanting method with dapog seedbeds. The cultivated area is 101ha and the seed variety mainly produced is IR-36. The amount of seed produced is enough for about 1,500ha of direct seeded or 3,200ha of transplanted field. The municipal agriculture officer is responsible for the inspection of certified seed production. The producer's price for certified seed and the retail price were P160/45kg and P170/45kg in October 1984, respectively.

The area planted with certified seed is only 0.5% of the total Project area. The majority of paddy cultivators raise their own seed. Contamination by other varieties is not serious however, since this area is mainly monopolized by the IR-36 variety. In regard to yield, certified seed is said to be 5 to 10 cavans higher in yield than home grown seeds.

The amount of rice seed used in the conventional planting method is 180kg/ha which costs P680/ha if certified seeds are used. Therefore, it is judged that seed renewal every cropping season is nearly impossible. As an alternative plan, the method of home-seed production and severe selection by specific gravity should be extended.

Certified corn seeds are not produced in or around the Project area. The price of BPI Variety I and Sweet Corn is P9.5/kg and P14.5/kg, respectively. The main suppliers of certified seeds in the Project area are retail traders located in each town. With an increase in certified corn seed, some improvement can be expected; however, the present extensive cultivation method must be replaced by a more systematic approach. Integrated cultivation and introduction of certified seed, fertilizer and pesticide is necessary.

## (2) Fertilizer and Pesticide

The main suppliers of farm inputs are retail traders. The present average amount of farm inputs used in the Project area is as follows:

- herbicide	0.46(/ha	
- pesticide	0.81(/ha	
- fertilizer	(N-P-K contents, kg per ha)	35-12-6

The above amounts are only 25 to 50% of the recommended quantity under Masagana 99. The above data are for the year 1983 when the prices of farm inputs were lower than present day prices which have almost doubled since that period. Therefore, farmers can only afford to use lesser amounts of farm inputs today than previously. On the basis of the above, the commodity loan for farmers should be extended and enriched.

### 2.3.2 Marketing of Agricultural Products

The Philippine Government has set the farm gate support price to protect and stimulate farmers. A support market price to protect consumers is also provided. Details are presented in TABLE V-16 and V-17.

Paddy rice is generally bought from farmers mainly by middlemen, FACOMA, AMC and NFA and sent to market. A simplified typical market flow is presented in FIG. V-4. The disposition of paddy rice in the Project area was studied through farm survey. The ratio of rice sent to market is estimated at approximately 60% in the Project area. This amount represents the total of landlords, creditors and farmers combined. Breakdown of the same is shown in TABLE V-18.

The number of rice traders was surveyed and is shown in TABLE V-19. Supposing that 60% of total paddy in the Project area is sold by wholesalers in the area the average quantity sold is approximately 200t per whole saler. Since an easily available inexpensive post-harvest system does not exist in the Project area, farmers must sell their products, excluding the amount retained for consumption in the barangay, immediately after harvesting. Especially in the first cropping season, since paddy rice quality is low without proper post-harvest facilities, the product is bought by middlemen at a very low price. Details are shown in TABLE V-20 and V-21. To improve the present situation, appropriate post-harvest and storage facilities are essential.

### 2.3.3 Post-Harvest Facilities

Existing post-harvest facilities in the 4 municipalities concerned consist of 230 threshers, 13 driers, 47 mills and storage houses with a capacity of 663,649 cavans.

Estimating total paddy production at 22,000t with complete processing, the processing capacity of the rice mill has nearly sufficient capacity. Driers are completely insufficient at present, while a large surplus of storage facilities occurs when 60% of 22,000t of rice is sold. Details are shown in TABLE V-22.

The processing fee for milling and drying is about P12.5/cavans and P6.0-8.0/cavans, respectively as of July 1984. Since farmers deem drying to be unduly expensive, farmers store rice with high water content without milling and consume even fermented rice. The present problems of post-harvest facilities are:

- a) old rice mills with a recovery rate lower than 65%, except for the rubber-roll type;
- b) shortage of driers; and,
- c) poor storage system and significant storage loss.



#### 2.3.4 Food Balance

##### (1) Paddy Rice

The rough rice demand for present and future is estimated as shown below on the basis of data from NCSO and NIA Region VI.

#### RICE DEMAND IN THE PROJECT AREA

	Paddy Rice Consumption per Capita <u>1/</u>	Projected Population ('000) <u>2/</u>	Food Demand (t)
1984	186kg/Year	34	632
1987	- do -	42	7,812
2000	- do -	44	8,184

1/ NIA Region VI

2/ NCSO

Since annual paddy rice production in the Project area is 22,200t, with seeds and waste representing 7.9% and 7.1% of the total production, respectively, surplus of paddy rice available for export from the Project area is at least 12,500t.

##### (2) Vegetables

Present vegetable consumption per capita is 35.30kg at the national level and is estimated to become 58.01kg per capita in the year 2000 according to NCSO's projection. Panay Island rice production is quite prosperous and rice is exported to other islands. Vegetables, on the other hand, are imported mainly from Luzon and Negros Oriental.

Total vegetable demand in the year 2000 is estimated at 358,000t in Region VI and 8,760t in Project related municipalities (TABLE V-23 and V-24). Vegetable prices in Iloilo city and Manila were surveyed and the result is as shown in TABLE V-25 and as summarized in the table below.

## VEGETABLE PRICES

(Unit: P/kg)

	Tomato			Eggplant			Onion (Red)		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
<b>Wholesale</b>									
Manila	2.91	2.45	3.45	1.88	2.13	2.12	3.94	3.96	9.19
Iloilo City	4.45	4.70	3.63	1.78	1.96	1.79	5.12	4.71	9.36
(Manila=100)	156	192	105	95	92	94	130	119	102
<b>Retail</b>									
Manila	4.34	4.59	5.35	3.61	3.71	3.68	5.28	5.43	11.80
Iloilo City	5.9	6.26	6.51	2.45	2.70	2.98	6.92	6.78	12.47
(Manila=100)	136	136	122	68	73	81	131	125	106

Source: BAEcon. MA

In general, tomatoes and onions in Iloilo are more expensive than in Manila while eggplants are cheaper. Since vegetables are brought from Iloilo to the Project area, vegetables in Sara are more expensive than in Iloilo city.

### 2.4 Agricultural Support System

#### 2.4.1 National Programs for Agriculture and Food Supply

The agricultural development policy of the Philippine Government aims to increase the productivity and to strengthen international competitiveness through renovation of the agricultural structure and agrarian reform. Major programs for the same are Agrarian Reform, Masagana 99 and Maisagana at the national level and the KABSAKA Project at the provincial level.

##### (1) Agrarian Reform

The landlord system is deeply rooted in the rural area. This system caused the stagnation of farm input investment and introduction of new technology, and also hindered the improvement of farmers' living standards. The agrarian reform program which

started in June 1973 aims to renovate the production system. The landholding status of the Project area is presented in Section 2.1.6.

(2) Masagana 99

The objective of the Masagana 99 program which started in 1973 is to increase agricultural productivity. The National Food and Agriculture Council (NFAC), which is the agency responsible for the program, is implementing the same in cooperation with MAF, NFA, the Central Bank and other agencies concerned. The method to achieve the objective is introduction of a combination of modern technology and short term credit to purchase fertilizer, agro-chemicals, and certified seeds and to hire laborers. Since 1980, throughout Iloilo Province the KABSAKA Project has been given the highest priority in agricultural development; Masagana 99 activity, on the other hand, is presently static.

(3) Maisagana

This program commenced in 1974 and increased and stabilized the productivity of forage crops. The methodology to achieve the target is the same as that for Masagana 99.

(4) KABSAKA Project

The goal of the KABSAKA Project, which was instituted in 1980 under financing by the International Bank of Reconstruction and Development, is highly intensified utilization of the rainfed area in Iloilo Province. The objectives are: i) to increase cropping intensity and labor productivity in the rainfed area using KABSAKA technology, ii) to improve the farming economy through production increase, improvement of market circulation and livestock introduction; and, iii) hygiene and nutrition improvement.

The main components of the project are:

- a) Assistance of agricultural production by extension service, credit assistance, and expansion of livestock and poultry;
- b) Promotion of adaptive trials and research on cropping patterns, new local varieties and introduction of forage crops;

- c) Water impounding construction and afforestation of the catchment area;
- d) Marketing improvement of farm inputs supply and circulation of products;
- e) Hygiene and nutrition countermeasures and reduction of anemia, parasites and diarrhea;
- f) Human resources development by education and training of local people; and,
- g) Pilot village development by testing various comprehensive development schemes at the barangay level.

The co-existence of the Project and the KABSACA Project is considered appropriate for the following reasons.

- 1) The KABSACA Project will terminate in 1987 and accordingly, the two Projects will not overlap in time.
- 2) The objective area of KABSACA is rainfed area. Agricultural research work, staff training and education of the local people, is being conducted by the KABSACA Project. After termination of the same, the research results, and the trained personnel and local people can be utilized for the Project.
- 3) Water impoundings constructed under the KABSACA Project are located at a higher elevation. Therefore the area of KABSACA which overlaps that of the Project is sufficiently small that the boundary can be easily delineated through advanced negotiation.

#### 2.4.2 Experiment and Research Work

Experimental and research institutes directly and indirectly related to agricultural production include the International Rice Research Institute which is conducting research on development of new seed varieties, as well as the Maligya Rice Research Training Center (MRRTC) operated by the Bureau of Plant Industry (BPI) and the University of the Philippines in Los Banos (UPLB). In addition, the NIA supports various agricultural schemes concerning irrigation development and supply, management and drainage of irrigation water, as well as research on

agricultural production, soil distribution and irrigation extension; the BPI conducts research on food crops and fiber crops, and experiments on cultivation and prevention of disease and insect infestation; the BAI carries out research on increased animal products and livestock diseases.

The Asian Vegetable Research and Development Center in UPLB, Ministry of Agriculture and Food (Special Studies Division), the Philippine Council for Agriculture and Resources and Research, and the Bureau of Plant Industry are continuously conducting research on vegetable production and marketing. All of the agencies are at the same time publishing guidelines on how to plant vegetables for extension purposes. In addition, the Food and Nutrition Research Institute is conducting a nationwide food consumption survey concerning nutrition. The Ministry of Agriculture and Food (Cropping System Division) is conducting a vegetable production extension program in Region VI, mainly for potato and beans.

The main research systems concerned with the Project are the Visaya Experimental Station (VES) of BPI and the Sara Outreach Site of the KABSAKA Project. The main activities of VES are crop breeding, experiments in local adaptation, pest resistance, herbicide and fertilizer quality and seed multiplication, inspection and distribution. Although VES is not utilized for the education and training of agricultural extension workers and farmers, it is used for a variety of purposes indispensable for the success of the Project.

The Sara Outreach Site mainly carries out experiments to raise the cropping intensity in rainfed areas with double and triple cropping. The details of the experiments involve cropping season, planting method, adaptable variety selection, etc. The target of the KABSAKA Project, development of rainfed areas, is realistic and appropriate. However, it is very difficult to carry out the experiments in a limited time, since rainfed farming depends on the unstable factor of rainfall. The knowledge, technology and staff from this project must be effectively utilized for further development of the area. Significant benefits will accordingly be achieved by absorption of KABSAKA technology into the Project.

### 2.4.3 Agricultural Extension Service

The targets of the agricultural extension service are to increase agricultural productivity and qualitative improvement in the life of the farmers through agricultural extension. Details include:

- a) extension of general and technical knowledge concerning agriculture, home economics and youth education;
- b) improvement of agricultural productivity and farm economy; and,
- c) organization of farmers' associations, 4-H clubs, and others.

Agricultural extension is under BAEx, Ministry of Agriculture and Food and is being carried out by the staff of BAEx in cooperation with the staff of the government agencies concerned. The total number of BAEx staff in the 4 municipalities concerned is 40, details of which are shown in TABLE V-26 and V-27. According to the guideline of BAEx which recommends 160 farm households per technician, there are a satisfactory number of BAEx technicians available in the Project area.

BAEx activities are conducted in line with national programs like Masagana 99 and Maisagana, and local programs like the KABSAKA Project. The main activities are i) visiting farm households; ii) making demonstration farm plots; iii) instructing and training farmers; and, iv) qualitative improvement of BAEx technicians. Visiting farm households is especially important; nevertheless, poor transportation systems in rural areas hinder the fulfillment of this task. Previously the BAEx provided an interest free loan to their staff to enable them to buy motorcycles and a maximum fuel allowance of P375 per quarter. However no such program exists at present and there are about ten motorcycles among the staff. Improvement in means of transportation is therefore considered necessary to strengthen the visitation program of BAEx.

### 2.4.4 Agricultural Credit Situation

In Magasana 99, Maisagana, KKK and the KABSAKA Project, the farmer's credit system is included but actual activity is limited. The credit released to farmers in the 4 municipalities concerned by the Land Bank, PNB, Rural Bank Sara and Cooperative Rural Bank is shown in TABLE V-28. The maximum credit amount per hectare was P1,200 before 1983, P1,350

in 1983 and was raised to P2,700 in October 1984. The interest rate was initially 12% for 120 days but has also been raised to 25% for 210 days.

The credit system of Masagana 99, which is designed to be combined with the credit and agricultural extension service system, includes the following features:

- a) credit for paddy culture without mortgage is provided;
- b) credit is accepted by local banks with farming schedule instructed by BAEx to purchase farm inputs and hire labor;
- c) one farmer can not borrow credit for more than 4ha;
- d) farmers who request credit must be members of SELDA consisting of more than 3 persons who have collective liability for repayment;
- e) farmers receive credit in cash to hire laborers and commodity loans to buy fertilizer and agro-chemicals; and,
- f) repayment is acceptable in cash or in kind.

The low rate of credit repayment is a serious problem in all types of credit. One of the main reasons for low repayment is damage to crops due to natural calamities. Consequently, a system of crop insurance was established in Panay Island in 1981 and the present condition of the same is shown in TABLE V-29. The insurance system is expected to raise the repayment rate of credit.

The results of farm survey conducted in July 1984 suggest that bank credit was provided to 7% of the farmers, covering 14% of the farmers' requirement. Approximately 70% of farmers interviewed borrowed money from private lenders at higher interest rates than the banks, while 23% of farmers are cash self-reliant (TABLE V-30). From the above, strengthening of the credit system and alleviation of the large burden of high interest rate through establishment of the cooperative system appear to be an important and urgent issue.

#### **2.4.5 Farmers' Associations**

The Philippine Government is making an impressive effort to organize and promote farmers' associations in order to improve agricultural productivity in rural and remote areas as part of the program of agricultural development. There are many types of farmers'

associations such as Samahang Nayon, ARBA, Farmers' Irrigators Organization, Communal Irrigation Association, KKK and others.

The main farmers' associations in the Project area are tabulated below.

#### FARMERS' ASSOCIATIONS

MUNICIPALITY	SAMAHANG NAYON <sup>1/</sup>		ARBA <sup>2/</sup>		CIS <sup>3/</sup>	
	NO.	MEMBERS	NO.	MEMBERS	NO.	MEMBERS
SARA	22	844	32	876	1	106
AJUY	5	273	13	312		
CONCEPCION	6	197	12	366		
SAN DIONISIO	7	217	17	482		
TOTAL	40	1,531	74	2,034	1	106

<sup>1/</sup> MAR, Provincial Office

<sup>2/</sup> MAR, Regional Office

<sup>3/</sup> NIA, Provincial Office

Samahang Nayon, which was previously under the Ministry of Local Government and Community Development, but is now under the Ministry of Agriculture and Food, is organized as a barangay unit and forms the basic farmers' association. ARBA is implementing agrarian reformation under the Ministry of Agrarian Reformation and CIS is implementing operation and maintenance of irrigation facilities under FSDC.

The final targets of these associations are:

- a) promotion of the introduction and extension of new farming knowledge and technology;
- b) stable and timely supply of farm inputs;
- c) effective marketing of produce;
- d) credit assistance; and,
- e) improvement of farming facilities, etc.

The above associations, however, are not fully carrying out these tasks. The main reasons for insufficient activity in these areas are:



- a) improper organization;
- b) lack of funds;
- c) lack of leadership; and,
- d) problems with farmers' budgets caused by low and unstable productivity in agriculture.

Samahang Nayons are now being reactivated by MAF. Reactivation however, can not be conducted easily, as their activities cover a very wide range and the same must be integrated with many other government agencies concerned.

## 2.5 Agro-Related Industry

### 2.5.1 Livestock and Poultry

The goal of the Bureau of Animal Industry of MAF is nutrition improvement and multiplication of farm management through livestock promotion. To this end, one program, Maisagana and one project, KABSAKA Project has been established. The former has very few activities, while the latter has such components as demonstrations, introduction of improved breeds, credit to construct necessary facilities, vaccination, and increased production of forage crops.

Executive Order 626 was implemented to protect carabao. As female carabao under 3 years are favored for their meat, 80% of carabao are male. E.O. 626-A, prohibits the slaughter of female and male carabao under 11 and 7 years old, respectively. Transport of carabao beyond the provincial border is also prohibited.

In the Project area, there is no large scale livestock or poultry industry but family stock exist on almost every farm. According to data for Iloilo Province there are 9,024 carabaos, 1,129 cattle, 12,003 hogs and 185,641 chickens in the municipalities concerned. The breakdown is shown in TABLE V-31 while the adjustment of livestock from 1983 to 1984, in the study area according to the agro-economic survey is shown in TABLE V-32.

Since the total increase is not so large in comparison to the rate of increase, it is assumed that the livestock population started increasing very recently due to the Government's efforts in multiplication of the farm economy, nutrition improvement and increased standards of

living. This indicates that the livestock industry will be very prosperous in the near future.

## 2.5.2 Fisheries

The fishing industry in Iloilo Province is prosperous in comparison with other provinces on Panay Island. Of the 3 municipalities concerned in the Project, Ajuy, Concepcion and San Dionisio have successful inland fishing industries, as well as commercial and municipal fishing. According to 1982 data obtained from the BFAR, annual fish harvest in Iloilo Province included 42,585t from commercial, 49,197t from municipal and 21,830t from inland fishing with a ratio of 37.5%, 43.4% and 19.2%, respectively.

The area of inland fish catch in comparison to total inland fish catch in Iloilo Province was 7.6% in Ajuy, 21% in Concepcion, and 2.0% in San Dionisio, representing 7.5%, 2.1% and 2.3%, respectively of the total fish harvest. The percentage of area for the inland fish catch was 5.1% for Ajuy, 3.1% for Concepcion and 2.3% for San Dionisio, as shown in TABLE V-33. From the above, it is evident that of the 3 municipalities concerned, the position of the fishing industry in Ajuy is very important.

The average unit yield of inland fish catch was 1,500kg/ha in Ajuy and Concepcion and 1,758kg/ha in San Dionisio. An institution has been established in Concepcion for studies related to fisheries; namely, the Concepcion School of Fisheries.

## 2.6 Farmers' Economy and Interests

### 2.6.1 Farmers' Economy

The present situation of the farmer's economy was studied on the basis of data from the Farm Survey and estimations of the typical farm budget of irrigated and non-irrigated paddy cultivators. The estimated farm budget of the average farmer is shown in TABLE V-34 and a summary is tabulated below.

Unit: Peso			
Item	1.5ha Farm	2.4ha Farm (Average Size)	3.5ha Farm
Gross Income	19,485	27,812	38,042
Farm Income	13,963	22,290	32,520
Off-Farm Income	4,981	4,981	4,981
Income from Livestock	541	541	541
Production Cost	11,072	17,678	25,791
Net Farm Income	8,413	10,134	12,251
Living Expenses	7,780	9,370	11,330
Net Reserve	<u>633</u>	<u>764</u>	<u>921</u>

The characteristics determined from this analysis are presented below.

- a) Off-farm income is relatively small due to lack of industry in and around the Project area which can absorb the surplus labor force, as well as to the number of people who are working in Iloilo, Manila and abroad, and to low remittance.
- b) Earnings from gardening are quite high for irrigated farms.
- c) Earnings from working on other people's farms and from leasing carabao and machinery is greater for rainfed than for irrigated farms.
- d) Production cost is considerably higher with the present high inflation rate.
- e) There is a difference in living expenses between irrigated and rainfed paddy farmers.
- f) As net reserve is very small, farmers do not have the capacity to invest in farm improvements under present high inflation.

From this analysis it can be concluded that a production increase can hardly be expected with present unstable and low farm productivity and thus the standard of living in the Project area for farmers remains low.

#### **2.6.2 Farmers' Interests**

As it is the farmers who are directly engaged in agricultural production, the agricultural development plan must reflect the farmers interest in order to succeed. Accordingly, to determine farmers' interests in the Project area, a farm survey was conducted and the results

are shown in TABLE V-35 and V-36. From this survey, the following statements can be made.

- a) Present paddy farmers, particularly in irrigated paddy areas, are not willing to convert their paddy fields to other crops.
- b) Reasons for this unwillingness are 1) poor yield, ii) lack of knowledge, iii) low price and poor market prospects, iv) difficult cultural practices, and 5) the high price of inputs, in that order.
- c) All farmers are quite willing to be involved in the Project and wish to share in Project benefits.

From these results, it can be concluded that farmers are willing to plant rice but are reluctant at present to replace paddy with diversified crops.

### 3. AGRICULTURAL DEVELOPMENT PLAN

#### 3.1 General

##### 3.1.1 Basic Policy for the Agricultural Development Plan

The basic policy of the Project is to answer the needs of the subject area and the interests of area residents through formulation of an appropriate plan. This plan is to be based on the study of various factors both supportive and restrictive of Project implementation, such as government policy and economic conditions in the Philippines and socioeconomic conditions and characteristics of the Project area.

The Project will contribute to achievement of the various objectives of the Five Year Economic Development Plan including attainment of self-sufficiency in food supply, increased employment opportunities, and alleviating regional disparities. To fulfill these objectives, the most technically sound and economically feasible basin agricultural development plan must be established, giving particular importance to irrigation development which is the foundation of the former.

##### 3.1.2 Basic Concept for the Agricultural Development Plan

The basic concepts for the Project's agricultural development plan are i) unit yield increase of paddy rice, ii) highly intensified land utilization, iii) stabilization of agricultural productivity,

iv) increased farm income and improved standards of living for farmers, v) crop diversification, and vi) achievement of self-sufficient vegetable supply. Appropriate strategies are essential to achieve the above concepts.

### 3.1.3 Agricultural Development Strategies

Several strategies are planned for the achievement of the Project as presented hereunder.

- a) Through the establishment of a suitable irrigation system, unit yield of paddy will increase, land use will be maximized and consequently production will expand;
- b) Through the enrichment of the extension service, modern irrigation farming technology will be extended and the farming system will be stabilized;
- c) Through diversification of upland crops mainly vegetables under irrigation, self-sufficiency of vegetable supply will be raised and farm production will become multilateral and stable, resulting in improved living standards; and,
- d) Through the proposed cooperative system, the functions of which are i) farm inputs supply, ii) post-harvest system, iii) farmers credit and insurance and iv) training and education, farmers will be able to invest necessary amounts in farming and to sell their products with minimum exploitation.

### 3.1.4 Delineation of the Project Area for Agricultural Development

On the basis of the above agricultural development strategies, the Project area has been divided into two categories as defined below.

- a) Benefit Area  
The area benefited by irrigation development under the present Project, the major component of the same, is designated as the Benefit Area. As will be discussed hereinafter, a total net Benefit Area of 6,760ha has been proposed for irrigation under the Project. This Benefit Area is divided into 6,360ha of directly irrigated benefit area and 400ha of enriched benefit area, where the function of existing irrigation facilities will be upgraded. This enriched benefit area is also divided into 360ha of Serruco CIS and 40ha of KABSAKA Water Impoundings.

b) Indirect Benefit Area

The area which does not enjoy direct and indirect benefits of the proposed irrigation system, but is served by the agricultural development plan with regards to post-harvest system expansion, agricultural extension services, agricultural support systems, credit services, etc., is referred to as the Circumference Benefit Area. This area also includes those areas under the watershed management study.

### 3.2 Proposed Land Use

On the basis of present land use, land classification, topographic conditions, and water resources, a net benefit area of 6,760ha was determined to be the optimum scale in respect to technical viability and economic feasibility.

The total Project area of 8,320ha comprises 7,670ha of farmland with 650ha remaining. Out of the 7,670ha of farmland, the service area is 7,120ha and the irrigated benefit area in the service area is 6,760ha. On the basis of present conditions, the benefit area of 6,760ha is divided into a diversified crop area of 410ha and a paddy area of 6,350ha. The details of changes in land use are shown in TABLE V-37 and a summary is tabulated below.

(Unit: ha)

Land Category	Present Land Use	Proposed Land Use
Farmland		
Paddy Field	6,320	6,350
Irrigated	1,590	6,350
Rainfed	4,730	0
Irrigated Diversified Crops	-	410
Sugarcane	380	0
Coconut	200	0
Grassland	220	0
Right of Way	-	360
(Sub-total)	(7,120)	(7,120)
Others	1,200	1,200
(Residential area, roads, etc.)		
<b>TOTAL</b>	<b>8,320</b>	<b>8,320</b>

As shown in the above table, conversion of 350ha of the present sugarcane, coconut and grassland areas to irrigated paddy field and of 410ha to irrigated diversified crop area is proposed for the following reasons.

- a) Farmers are quite eager to plant paddy wherever water is available and even sugarcane; farmers are positive towards conversion of their sugarcane farms to paddy field;
- b) Expansion of paddy production is Government policy and as far as crop budget is concerned, under a proper irrigation system paddy is a relatively productive crop, the marketability of which is fairly competitive;
- c) According to the results of soil study, the soil of some irrigable upland area is not suitable for paddy production; and,
- d) Crop diversification is Government policy and introduction of the same can be expected to facilitate a multilateral and stable farm economy.

The area presently irrigated by the Serruco Communal Irrigation System (360ha out of 400ha) and KABSAKA Water Impounding (40ha out of 132ha) is regarded as enriched area. Right of way is estimated at 5% of the service area.

### **3.3 Proposed Cropping Pattern**

The cropping pattern was formulated on the basis of meteorological conditions, availability of water resources, agronomic conditions, and socioeconomic conditions in the Project area as well as at the national level to realize the following.

- a) Selection of the most suitable crops and cropping pattern to maximize benefit through the irrigation system established by the Project as a main component;
- b) Stabilization and optimization of the farm economy in consideration of demand and supply in the Project area and throughout the nation;
- c) Promotion of farmers' interests and acceptance of the Project by the farmers; and,
- d) Provision of equal benefit to all farmers as far as reasonably feasible.

### 3.3.1 Crop Selection

Paddy is recommended as the basic crop under the irrigation system in the Project area while other recommended crops consist of vegetables, corn and mung beans. Paddy is presently a principal crop in the Project area and is adopted as the basic crop in due consideration of productivity, marketability, profitability and farmers' interests.

Vegetables are presently cultivated in home gardens; however, they are a promising crop with regards to profitability, improved nutrition and marketability. In consideration of productivity, farming techniques, and area demand, tomato, eggplant, onion, carrot, cabbage and leek are suitable for adoption under the Project. Corn and mung beans are also recommended on the basis of productivity and marketability and are a necessary part of crop rotation in vegetable production. Diversified crops are adopted for rotation in irrigable upland area.

### 3.3.2 Proposed Cropping Pattern

The proposed cropping pattern was determined and is depicted in FIG. V-5. In order to formulate an appropriate cropping pattern for maximization of project benefits, the following were studied and the results compared.

- a) Optimum time for most effective utilization of irrigation water supplied under the Project;
- b) Optimum cropping period for minimum loss of seed due to intensive rainfall or monsoons at the germination stage and for minimum loss of produce during storing and drying at harvest time;
- c) Coordination of the cropping season to obtain the sunshine required for target yield and production;
- d) Necessary interval between croppings to maximize the benefit of irrigation water resources and in consideration of labor force availability; and,
- e) Suitable interval between early and late farmers, commencement dates expressed as the slope of cropping pattern in FIG. V-5 to utilize irrigation water most effectively after due consideration of labor force availability.

Double cropping of paddy starting from early May is the major cropping pattern in the Project area. On the other hand as the water resource of Serruco C.I.S. is different from that of the Project and of



KABSAKA water impoundings, delay of the above cropping season by one month is considered appropriate.

In the Asue lower basin, 5 croppings biannually are proposed as some farmers presently practise triple cropping and many farmers are quite eager to plant as much paddy as possible. There is sufficient water available for this cropping pattern.

To determine a suitable cropping pattern for vegetables, outbreaks of pests in rainy season, sunshine, productivity and ease of farming practices were studied. Corn and root vegetables in rainy season and leafy vegetables, fruit vegetables and mung beans in dry season are recommended. The proposed cropping pattern for diversified crops is depicted in FIG. V-6. Fallow should be practised as necessary to prevent damage from continuous cropping and to maintain soil fertility.

### 3.3.3 Cropping Area and Cropping Intensity

After due consideration of the study on proposed land use, crop selection and cropping pattern, the optimum scale of cropping area was studied and determined as presented in the following table.

Crop	Area (ha)	Cropped Area (ha)	Cropping Intensity (%)
Paddy Irrigated	6,350		208
1st		6,350	
2nd		6,350	
3rd		500	
Diversified Crops Irrigated	410		275
1st		410	
2nd		410	
3rd		308	
	6,760	14,328	212

The detailed cropping area in the benefit area is shown in TABLE V-38 comparing such factors as the present cropping area, estimated cropping area without the Project and the proposed cropping area with the Project. Without Project, Serruco C.I.S. and KABSAKA W.I. were assumed to have achieved their targets and the ordinary service area will therefore remain the same.

Serruco C.I.S. and KABSAKA W.I. were divided into two areas however, a benefit area and an enriched area, and the function of the existing irrigation facilities for the same will be upgraded through the Project. Double cropping of 200% will be practised in both areas.

As shown in the map in FIG. V-7, diversified crop area is divided into 6 blocks in due consideration of soil classification, and labor availability. The diversified crop area is 410ha and the vicinity of the Project area is regarded as the market of diversified crop products. Cropping intensities are 208% for paddy, 275% for diversified crops and 212% for the entire Project area, respectively.

### **3.4 Proposed Farming Practices**

To promote agricultural productivity and stability the first essential factor is a proper water supply which will be established through the Project. Subsequent to establishment of a water supply, a second indispensable factor to increase agricultural productivity is proper farming practices. On the basis of the data from BAEx, IRRI, BS, BPI and PCARR the proposed farming practices are as described hereunder.

#### **(1) Paddy**

The direct wet-seeding planting method is presently practiced in 93% of the Project area with an unstable water supply system. On the basis of the crop budget with the Project (refer to Crop Budget in section 3.7) and effective use of irrigation water, the transplanting method is judged more advantageous than direct seeding. As a national trend, however, the direct seeding method is gradually increasing as it minimizes the peak labor requirement and the risk of production loss due to unstable water supply. In the Jalaur River Multipurpose Project, the ratio of transplanting is 70 - 80% at present. Considering these conditions, the proper and realistic ratio of transplanting and direct seeding is estimated at 4:6.

The proposed farming practices are expressed in detail in TABLE V-39 and summarized below.

1) Variety

IR 36 which is commonly planted is now susceptible to tungro disease. IR 60 is recommended as an alternative variety. IR-18348-36-3-3, the so called 8-ton variety which is now propagated in VER is also a promising variety.

2) Seeds

Good certified seeds shall be sown through selection of specific gravity and forced sprouting. The seed amount should be reduced to 150kg/ha from the present 180kg/ha for direct seeding (TABLE V-40) and 44kg/ha for transplanting as recommended in Masagana 99.

3) Fertilizer

On the basis of the data shown in TABLE V-41 and FIG V-8, recommended fertilizer amounts are as follows:

1st crop	
basal fertilizer	58-30-30 (N-P-K)
top dressing	29-0-0
2nd & 3rd crop	
basal fertilizer	63-30-30
top dressing	32-0-0

Application time should be determined carefully according to observed paddy growth to maximize the effect of fertilizer.

4) Organic matter

Rice straw should be plowed in to maintain soil fertility. Azolla, which is now extended as a national program, should be effectively utilized to reduce the application of expensive commercial fertilizer.

5) Water control

Mid-season drainage and shallow flooding should be properly controlled.

6) Pest control

Pest forecasting and early pest control should be practiced.

7) Weeding

Since weed control at an early time is important, hand weeding within one month after sowing or transplanting is recommended.

8) Harvesting and drying

Harvesting should be done at an appropriate time to minimize harvesting and milling loss. Crops should be properly dried at proposed I.C.C. with arrangement in advance.

(2) Vegetables

There are many good varieties of fruit, leafy and root vegetables. However, since vegetable production is relatively new, rather than high yielding varieties, varieties which are easy to grow and widely resistant to pests are recommended. Proposed standard farming practices for the major vegetables, (tomato, cabbage and onion) are shown in TABLE V-42, V-43 and V-44.

As shown in the analysis, vegetable production is generally quite profitable. However, damage to soil due to continuous cropping is a serious problem. The causes of damage are imbalance or lack of some minerals in the soil, unfavorable soil reaction, deterioration of physical soil structure, integration of toxicity, and reaction of soil micro- and macro-organisms.

The necessary fallow period for each crop is as follows:

- Crops which cause minimal damage under continuous cropping: Corn, sugarcane, onion, carrot, radish, cabbage, tobacco
- Crops which require more than 1 year of fallow period: Peanut
- Crops which require more than 2 years: Soybean, cucumber, leek, garlic
- Crops which require 3 - 4 years: Tomato, french beans

- Crops which require 5 - 6 years: Watermelon, eggplant

Before extension of these crops to general farmers, small demonstration plots near the proposed ICC by BAEx will make important contributions in determining appropriate and practical farming practices on the basis of local climate, soil condition and marketability.

### (3) Mung Beans

The mung bean is suitable as a short period crop and as a fallow crop between other crops as it improves soil fertility. Activities required for proper mung bean production are shown in TABLE V-45 and the important points of the same are summarized below:

- leguminous bacteris: Inoculation is practical if considered necessary in consultation with BS.
- appropriate variety: Appropriate variety is to be selected in consultation with BPI.
- plant density: Recommended plant density for drilling and rows is 20-25 plants/m of 0.5m row distance and 56 plants/m<sup>2</sup>, respectively. The seed amount for drilling and row hills is 30-35kg/ha and 20-25 kg/ha, respectively. Proper density should be adopted for each variety.

### (4) Corn

Corn varieties which grow well in rainy season and are resistant to pests are recommended, as corn cultivation is proposed during rainy season which is unsuitable for some other vegetables. Proposed farming practices are shown in TABLE V-46 while the summary of farm inputs and estimated labor force is tabulated in TABLE V-47.

## 3.5 Future Labor Balance

Assuming that the Project will become fully effective after 1998, the future labor balance was analysed with 2000 as the base year.

Population increase, the advancement of agricultural technology and unit yield increase are forecasted. Increases in the former will cause a corresponding increase in labor requirement. Accordingly, labor force availability and requirement are analysed hereunder.

### 3.5.1 Projection of Labor Force Availability

As analysed in Chapter IV, the population and households in the Project area in the year 2000 which are envisioned to be dependent on agriculture, (ie. farm households, farm laborers' households and their family members) are summarized in the table below. The population of those who will be dependent on agriculture in 2000 is about 34,700 or 78% of the total population.

	All Occupations	Farm Households	Landless Farm Labor Households
No. of Households	7,869	3,176	3,003
Population %	44,189 (100)	17,831 (40)	16,862 (38)

Using the same estimation as 2.2.4 considering labor efficiency by age, sex and school attendance, the monthly labor force availability was estimated as given in the following table.

(Unit: man days/month)

Sex	Age 15-19	20-59	60-66	Total
Male	15,030	170,690	14,590	200,310
Female	11,070	124,400	11,400	146,870
Total	26,100	295,090	25,990	347,180

According to the data above, labor force per household is 2.8 which represents an increase of 0.4 from the present 2.4. As for draft animals the trend of carabao increase in the Project area is not clear and therefore the number of carabao presently used as draft animals was adopted for analysis of the future labor balance.

### 3.5.2 Labor Force Requirement and Balance with Project

After due consideration of the increase in the labor force requirement resulting from the introduction of advanced farming technology and the unit yield increase, labor force requirement under with Project conditions was estimated and the detailed results according to crop type, planting method and operation are shown in TABLE V-47 & 48 and summarized in the table below.

REQUIRED LABOR FORCE PER HECTARE

	Man Labor (Man-day)		Animal Power (day)		Mechanical Power (day)	
	F <sup>1/</sup>	H <sup>2/</sup>	F	H	F	H
Paddy						
Direct seeding						
1st	17.2	76.28	1.6	4.1	-	2.61
2nd	15.95	74.63	1.35	3.85	-	2.68
Transplanting						
1st	16.0	86.88	1.6	4.1	-	3.08
2nd	15.65	86.13	1.35	3.85	-	3.08
Diversified Crop						
Corn	15	36.2	-	2	-	1.2
Tomato	72	78.2	-	2	-	1.2
Mung Beans	13	26.2	-	2	-	1.2
Cabbage	38	78.2	-	2	-	1.2
Onion	47	87.2	-	2	-	1.2

<sup>1/</sup> Family labor force

<sup>2/</sup> Hired labor force

The increase in required labor force for paddy cultivation with Project conditions is 20 - 35 man-days. The required labor force for vegetable production is very high at 150.2 for tomato, 134.2 for onion and 116.2 for cabbage.

Considering the cropped area and cropping season with the Project, the total labor force requirement and balance was estimated as shown in TABLE V-49 and FIG. V-9. The average monthly total labor requirement is 34% of the available labor force. The month with maximum total labor requirement is February at 77% and the second is October at 72%. Both months are paddy harvest seasons. The available labor force is concluded to be sufficient under present conditions.

According to the draft animal balance of TABLE V-50 and FIG. V-10 the total draft animal requirement is 4% of the available draft animal population. The maximum is only 16.6% in October and therefore the number of available draft animals is sufficient for with Project conditions.

### 3.6 Anticipated Crop Yield and Production

#### (1) Crop Yield

Agricultural productivity changes in relation to introduction of agricultural technology, extension of new varieties and other agronomic and economic factors. The unit yields in future without Project and with Project were anticipated as tabulated below.

#### ANTICIPATED CROP YIELD

		(Unit: t/ha)		
		Present	Without Project	With Project
Paddy				
Irrigated	1st	2.59	2.8	4.6
	2nd	2.24	2.5	5.0
	3rd	2.24	2.5	5.0
Rainfed	1st	2.17	2.3	
	2nd	1.80	1.9	
Diversified Crops				
	Corn	-	-	3.5
	Mung Beans	-	-	1.0
	Tomato	-	-	20.0
	Cabbage	-	-	15.0
	Onion	-	-	15.0



The assumed yields of paddy rice Without Project represent a 5% increase in present yield for rainfed and a 10% increase in present yields for irrigated area. A large increase in productivity of rainfed paddy can not be expected without stable water supply, although KABSAKA Project is extending service and KABSAKA technology to promote the efficient use of rainfed area. On the other hand, paddy productivity in irrigated area can be expected to increase more than rainfed paddy but not to so high a percentage since the present irrigation system without a reservoir does not provide a stable water supply.

On the basis of unit yield data for the surrounding irrigation systems of NIA Region and others, the projected yield of paddy is 4.6t/ha for 1st crop and 5.0t/ha for 2nd and 3rd crops.

The major factors which enable increases in paddy productivity are i) stable supply of irrigation water, ii) use of certified seeds, iii) timely application of proper amount of fertilizer, and iv) proper weeding and pest control. Paddy unit yield of the last ten years in the NIA irrigation system of Region VI is as shown in TABLE V-51 and FIG. V-11. After 1978, yield is stable at more than 4.0t/ha. The yields which changed with commencement of irrigation water supply are tabulated in TABLE V-52. The unit yield in the 10th year is already 4.5t/ha for the 1st crop and 4.1t/ha for the 2nd crop. Judging from this, targeted yield seems feasible.

The grace period for target yield is assumed at 5 years, considering the fact that the farmers are ready to accept the irrigation system and to adopt modern farming practices and that they have a higher standard of fertilizer and agro-chemical input.

Tomato, cabbage, eggplant, carrot, leek and onion are recommended as major vegetable crops in the Project area considering present and future demand and cultivation methods. Other recommended diversified crops are corn and mung beans. The targeted yield of major diversified crops are 3.5t/ha for corn, 1.0t/ha for mung beans, 20.0t/ha for tomato, 15.0t/ha for cabbage and 15.0t/ha for onion, as shown in the above table.

## (2) Crop Production

Present paddy production is approximately 22,200t from a gross area of 6,320ha and a cropped area of 10,375ha. Estimated paddy production without Project is approximately 25,700t from a cropped area of 10,155ha. Paddy production with Project is anticipated at 63,500t/year which is about 2.5 times the estimated production Without Project. Anticipated crop production is shown in TABLE V-53 and summarized in the table below.

### CROP PRODUCTION IN THE BENEFIT AREA

	W/O Project		W. Project	
	Cropped Area (ha)	Production (t)	Cropped Area (ha)	Production (t)
Paddy	10,155	25,700	13,200	63,500
Irrigated	3,425	11,100	13,200	63,500
Rainfed	6,730	14,600	-	-
Sugarcane	380	21,600	-	-
Coconut	200	9,600 (Nuts)	-	-
Tomato	-	-	718	12,300
Corn	-	-	205	700
Mung Beans	-	-	205	200

### 3.7 Farmers' Economy

With Project implementation, a sufficient and stable water supply will be established and agricultural facilities will be improved. Through these improvements, agricultural productivity will increase and crop and farm budgets will correspondingly improve.

In order to evaluate Project financial feasibility from the aspect of farmers, crop budgets and typical farm budgets were analysed under both with Project and without Project conditions as shown in TABLE V-54 to V-56. The summary of the crop budget is shown in TABLE V-57. The maximum net income with Project conditions is P30,620 for tomato and the minimum is P2,910 for mung beans. The net income of paddy is approximately from

₱4,000 to ₱5,300. The incremental benefit with Project compared to without Project averages ₱3,180 for direct seeded paddy and ₱3,540 for transplanted paddy.

In comparison of the average farm budget without Project and with Project, the net farm income without Project is ₱10,554 without project and ₱28,624 with Project. The net reserve is expected to increase ₱1,020 from ₱780 without Project to ₱1,804 with Project.

### **3.8 Proposed Support Services**

Many of the agricultural development programs have not realized expected targets because agricultural development requires integrated components and simultaneously intensive, strong and continuous instruction and operation. For example, after construction of project facilities, production increase can not be maintained without supply of fertilizer, agro-chemicals and so on. Along with supply of farm inputs, an agricultural extension service system is indispensable as are credit system, post-harvest facilities and advantageous marketing system for increase and stabilization of agricultural production and improvement in farmers' living standards.

#### **3.8.1 Agricultural Extension Work**

Although farmers in the Project area are accustomed to paddy cultivation, the projected shift from rainfed paddy cultivation to irrigated paddy cultivation and introduction of irrigated vegetable cultivation will entail some major adjustments for the farmers concerned in terms of working habits and management practices. In this sense agricultural extension is extremely important and is undertaken by the Ministry of Agriculture and Food. To implement this extension work practically and smoothly, the following three components are necessary.

##### **(1) Demonstration Areas**

The chief objective of demonstration areas is to demonstrate to farmers advanced farming practices under irrigation. The demonstration areas also serve as test sites for application of recent agricultural technology and adaptability of vegetable production techniques.

The Project area is divided into several parts, each of which are used as a demonstration area for a one year period by rotation as Project implementation proceeds. In this demonstration area extension work will be carried out intensively by BAEx staff and additional personnel. As a source of personnel for extension work, experts presently working for the KABSACA Project which will terminate in 1987 will be quite useful.

(2) Staff Training

Though technical staff are experienced in paddy production, personnel must be trained in:

- a) Paddy cultivation under systematic irrigation water supply and extension;
- b) Implementation and coordination with the concerned agencies of the Government and the private sector; and
- c) Vegetable production techniques and marketability.

(3) Transportation Improvement

Visits to farmers are an essential part of extension work; however, at present, lack of vehicles presents a major constraint to the same. Therefore motorcycles, fuel allowance and operation and maintenance should be provided to BAEx personnel in the four related municipalities.

### 3.8.2 Farm Mechanization

With Project implementation, the land preparation period will be shortened and agricultural productivity increased. Corresponding to this the farm machinery requirement will also increase. The necessary quantity and capacity of tractors, threshers, dryers, mills and warehouses were studied and results are summarized hereunder.

(1) Plowing

Plowing is generally conducted by carabao and four wheel tractors. Present rate of land plowed by tractor is 17%. There are 33 four wheel tractors in the four related municipalities. The area which can be plowed by these tractors is estimated according to the following formula:

$$\text{Area (A)} = \text{Quantity (B)} \times \text{Capacity (C)} \times K_1 \times K_2 \times \text{Working Days (D)} + K_3$$

Quantity of tractors = 33

Tractor capacity = 5 ha/day

$K_1$  = 0.75

: Ratio of available tractors

$K_2$  = 0.67

: Ratio of workable days in a certain month based on the year 1971 which had the maximum annual rainfall in the last twenty years and on the months of May and June, which have the minimum number of workable days in the year. A workable day was classified according to the following criteria:

Rainfall	rate of workable days
0 - 10 mm	1.0
10 - 40 mm	0.5
Over 40 mm	0

$K_3$  = 0.17

Ratio of area to be presently operated

$$A = 33 \times 5 \times 0.75 \times 0.67 \times 40 + 0.17$$

$$= 19,509 \text{ (ha)}$$

The area of 19,509ha is greater than the Project area and surrounding arable land combined. Therefore, it can be concluded that the number of four wheel tractors is sufficient.

## (2) Harrowing

Harrowing is presently carried out by a combination of two wheel tractors and carabao. The area which can be harrowed by the existing tractors under Project conditions is estimated with the same formula as above:

B = 180  
C = 2 ha/day  
D = 40 days  
K<sub>1</sub> = 0.75  
K<sub>2</sub> = 0.67  
K<sub>3</sub> = 0.7

therefore

A = 10,340 (ha)

If the entire area is harrowed by two wheel tractors alone,  
K<sub>3</sub> = 1.0  
therefore

A = 7,236

In this case also, existing tractors are considered sufficient for the Project.

### (3) Threshing

There are 223 existing mechanical threshers with an average capacity of 380kg/hr as registered in NFA. Total capacity per day is 542t (working ration: 0.8) which is less than the peak production of 731.4t/day with Project conditions. However, the shortage is not large and it is hoped that the necessary amount of threshers will be introduced by the private sector.

### (4) Drying

There are 13 existing dryers in the four related municipalities. Drying should be carried out immediately after harvest to minimize loss due to decomposition. This means drying facilities should be located near the farmers. However, as the total capacity of drying facilities is insufficient and the cost too high, drying facilities are not available to ordinary farmers.

Costs of solar drying and drying machines were studied as a means to extend appropriate drying methods and thereby minimize post-harvest loss, and the results are shown in TABLE V-58. Costs for a solar drying yard were ₱0.08/kg, for a flat type drying machine ₱0.238/kg and for a rotation type drying machine ₱0.187/kg. The drying yard had the lowest cost.

The total drying yard requirement was studied and peak time of the same was determined to be ten days from October 10 to October 20. During this period harvested area per day is 159ha, yield is 4.6t/ha and total production is 731.4t. The capacity of the drying yard for ten days is estimated by the following formula:

$$\begin{aligned} \text{Capacity for} \\ \text{Total Period (A)} &= \text{Capacity per drying period (B)} \\ &\quad \times \text{Total Period (C)} \\ &\quad \times \text{Ratio of Workable Days (D)} \end{aligned}$$

$$B = 14.6 / 2 \text{ days}$$

$$C = 10$$

$$D = 0.69$$

Therefore

$$A = 50.37$$

Therefore the number of drying yards required is 146.

The tertiary blocks of the proposed irrigation system number 151. Since each tertiary block is operated by the block's farmers' group and the cropping time must vary with each block, each farmers' group should possess its own drying yard and manages and coordinates the same with the block's cropping schedule.

For the above reasons, the optimum number of drying yards is 151.

#### (5) Rice Mills

Existing rice mills number 47 with a capacity of 15.79 t/hr (315.8 cavans/hr). Assuming that existing rice mills operate 8 hours/day, with a working ratio of 0.8 and 200 days/year, the total milled amount is 20,211t/year. Anticipated annual paddy production is 63,460t. Therefore the deficiency is 43,249t. The possibility of introducing rice mills by the private sector was therefore studied as follows:

Mill capacity:	0.5t/hr
Cost of mill and engine:	P95,000
Operation hours:	1,280 hrs (200 days x 8 hr x 0.8)

Fixed cost:	₱54,640/year (₱42.69/hr)
with 35% interest	
Variable cost:	₱45.84/hr
Estimated milling charge:	₱0.177/kg
Present milling charge:	₱0.294/kg (₱12.5/cavan of 42.5kg)

A milling charge of ₱0.177/kg could be implemented which is much lower than the present charge. Supposing that the present charge is adopted, the minimum operation period required to gain a profit is only 540 hours or 84 days. Rice milling is thus sufficiently profitable to encourage private sector investment, and accordingly, no deficit is expected in rice mill facilities with the Project.

#### (6) Warehouses

Existing warehouses number 19 units with a capacity of 33,182t (663,649 cavans). Supposing that the necessary warehouse capacity is one half of total production, the necessary capacity becomes 31,730t (one half of 63,460t). From this it can be concluded that the present number of warehouses is sufficient.

### 3.8.3 Farm Input Supply and Production Loans

#### (1) Farm Input Supply

There are already several farm input suppliers in each municipality involved. There thus exists a sufficient channel for supply of necessary farm materials. However at present, farm materials are comparatively scarce and retail traders stock is generally minimal. Therefore, for timely supply of necessary farm inputs, coordination of advance orders by the farmers' association is indispensable.

#### (2) Production Loans

Production loans are very scarce since the repayment rate of production loans is poor reducing available funds for production loans. One of the major objectives of Samahang Nasyon is to save funds from their members and make the same available through the cooperative rural bank as a members' production loan. This method is ideal and can aid farmers in effective utilization of funds.



#### **3.8.4 Farmers' Associations**

The major farmers' association in the Project area is Samahang Nayan. Samahang Nayons in the Project area are now being reactivated by MAF. Through this movement, the establishment of cooperative rural banks and area marketing cooperatives which handle farmer's production loans, farm input supply and marketing is planned. However, only about 1 out of every 50 reactivated Samahang Nayan is active.

Since irrigators' associations with Samahang Nayan as a core will be organized with Project implementation this organization could be utilized to establish farmers' cooperatives which will in turn facilitate realization of Project objectives. Considering present conditions, the farmer's cooperative should handle farmer's credit, farm input supply, post harvest facilities, marketing, farmers' enlightenment and general affairs. These functions must be closely coordinated and organization for the same is as shown in FIG. V-12.

TABLE V-1  
(1 of 2)  
(2 of 2)

**BASIC DEMOGRAPHIC DATA: GENERAL**

	Ajuy	Concepcion	San Dionisio	Sara	Total
No. of Barangays	34	25	29	42	130
Category (ha)	19,342	9,702	12,677	18,300	60,021
Population in 1984	34,682	23,691	21,493	31,473	111,339
Density (person/km <sup>2</sup> )	179	244	170	172	186
Total No. of Households	6,165	4,109	3,748	5,586	19,608
No. of Farm Households	1,957	1,158	1,389	2,492	6,986
Population 1995	46,363 (3.1) <sup>1/</sup>	30,376 (2.6)	26,702 (2.2)	37,742 (1.8)	138,183 (2.2)
Population 2000	50,503 (1.8) <sup>2/</sup>	32,548 (1.4)	28,257 (1.2)	39,388 (0.9)	150,696 (1.8)

Source: Estimated from the date of national census and Statistic Office

**BASIC DEMOGRAPHIC DATA: PROJECT AREA**

	Ajuy	Concepcion	San Dionisio	Sara	Total
No. of Barangays	12	4	8	34	58
Population 1984	7,158 (21) <sup>3/</sup>	1,445 (6)	2,924 (14)	22,314 (71)	33,841 (30)
Total No. of Households	1,263 (21) <sup>4/</sup>	253 (6)	519 (14)	3,985 (71)	6,020 (31)
No. of Farm Households	476 (24) <sup>5/</sup>	138 (12)	257 (19)	1,556 (62)	2,427 (35)
Population 1995	9,566 (3.1) <sup>6/</sup>	1,852 (2.6)	3,531 (2.2)	26,711 (1.8)	41,720 (2.2)
Population 2000	10,420 (1.8) <sup>7/</sup>	1,984 (1.4)	3,847 (1.2)	27,938 (0.9)	44,189 (1.8)

Source: Population

<sup>1/</sup> & <sup>6/</sup>: 1982 is regarded as the standard year for annual population growth rate in percentage

<sup>2/</sup> & <sup>7/</sup>: 1995 is regarded as the standard year for annual population growth rate in percentage

<sup>3/</sup> & <sup>4/</sup> & <sup>5/</sup>: Ratio in % toward Project area/whole municipality

AGE DISTRIBUTION OF POPULATION  
IN THE PROJECT AREA, AS OF 1984

Age	Male	Female	Total
0-14	7,137 (21)	6,926 (20)	14,063 (42)
15-19	1,762 (5)	1,730 (5)	3,492 (10)
20-59	6,891 (20)	7,145 (21)	14,036 (41)
60-	1,130 (3)	1,120 (3)	2,250 (7)
Total	16,920 (50)	1,6921 (50)	33,841 (100)

FARM HOUSEHOLDS IN THE PROJECT AREA AS OF 1984

Municipality	Item	All Households	Farm Households	Landless Households	Other Households
Ajuj	Number of Households	1263 (100)	476 (38)	378 (30)	409 (32)
	Population	7,158	2,699	2,140	2,319
Concepcion	Number of Households	253 (100)	138 (55)	100 (40)	15 (5)
	Population	1,445	787	571	87
San Dionisio	Number of Households	519 (100)	257 (50)	157 (30)	105 (20)
	Population	2,927	1,447	886	591
Sara	Number of Households	3,985 (100)	1,556 (39)	1,684 (42)	745 (20)
	Population	22,314	8,702	9,439	4,173
TOTAL	Number of Households	6,020 (100%)	2,427 (40%)	2,319 (39%)	1,274 (21%)
	Population	33,841	13,635	13,036	7,170

Source: Estimated from data of National Census and Statistic Office

SUMMARY OF CLIMATIC CONDITIONS

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Temperature (°C) Iloilo (1949-83)	26.1	26.4	27.2	28.6	28.9	28.0	27.4	27.4	27.5	27.5	27.3	26.7	27.4
Daily Max. Temperature (°C) Iloilo (1949-83)	28.2	29.7	30.9	32.3	32.3	31.2	30.4	30.1	30.3	30.7	30.3	29.5	30.5
Daily Min. Temperature (°C) Iloilo (1949-83)	22.6	22.7	23.3	24.7	24.9	24.5	24.3	24.3	24.3	24.1	23.9	23.4	23.9
Difference (°C)	5.6	7.0	7.6	7.6	7.4	6.7	6.1	5.8	6.0	6.6	6.4	6.1	6.6
Mean Relative Humidity (%) Iloilo (1949-83)	82	80	76	74	78	82	85	85	85	85	85	85	82
Mean Wind Velocity (km/hr) Iloilo (1949-83)	16.4	16.4	16.5	14.5	10.5	9.1	11.4	12.1	9.5	9.8	11.5	14.3	12.7
Mean Cloudiness (tenth) Iloilo (1949-83)	6	6	5	5	6	8	8	8	8	7	7	7	7
Monthly Mean Evaporation Value (mm) Sara (1979-83)	109.7	129.6	161.3	182.3	160.1	107.8	108.5	100.9	96.9	98.3	94.2	100.0	1,564.4
Estimated Monthly Mean Rainfall (mm) Sara	79.5	37.1	42.6	42.9	112.3	257.9	237.7	227.2	215.6	229.7	215.7	137.6	1,835.7
Source: PAGASA													

TABLE V-4

## DISTRIBUTION OF FARMS AND AREA BY SIZE AND TENURE

Tenure	Total	Less than 1.0 ha							5.0 and over
		1.0 ha	~ 1.9	2.0 ~ 2.9	3.0 ~ 3.9	4.0 ~ 4.9	5.0 and over		
<b>A. Farms Reported (unit: farms)</b>									
1. Full Owner	126 (15.7)	18	29	37	13	6	23		
2. Amortizing Owner	253 (31.5)	7	65	121	36	21	3		
3. Lessee	345 (43.0)	13	116	143	54	12	7		
4. Share Tenant	63 (7.9)	1	21	26	11	4	-		
5. Manager	5 (0.6)	-	-	3	-	-	2		
6. Part-owner Lessee	7 (0.9)	-	2	2	-	2	1		
7. Lessee Share Tenant	3 (0.4)	-	-	3	-	-	-		
<b>Total</b>	<b>802 (100)</b>	<b>39</b>	<b>(29.0)</b>	<b>(41.8)</b>	<b>(14.2)</b>	<b>(5.6)</b>	<b>(4.5)</b>	<b>36</b>	
<b>B. Area Reported (unit: ha)</b>									
1. Full Owner	521.5 (26.9)	9.1	31.5	75.9	39.0	24.0	342.0		
2. Amortizing Owner	544.7 (28.0)	3.6	75.8	250.2	111.2	86.9	17.0		
3. Lessee	697.4 (35.9)	6.8	136.5	298.1	164.9	50.1	41.0		
4. Share Tenant	126.6 (6.5)	0.5	24.0	52.5	33.0	16.6	-		
5. Manager	25.0 (1.3)	-	-	6.0	-	-	19.0		
6. Part-owner Lessee	20.1 (1.0)	-	2.6	4.5	-	8.0	5.0		
7. Lessee Share Tenant	7.3 (0.4)	-	-	7.3	-	-	-		
<b>Total</b>	<b>1,942.6 (100)</b>	<b>(1.0)</b>	<b>(13.9)</b>	<b>(35.8)</b>	<b>(17.9)</b>	<b>(9.6)</b>	<b>(21.8)</b>	<b>424.0</b>	
<b>C. Average Area Operated (unit: ha/farm)</b>									
1. Full Owner	4.1	0.5	1.1	2.1	3.0	4.0	14.9		
2. Amortizing Owner	2.2	0.5	1.2	2.1	3.1	4.1	5.7		
3. Lessee	2.0	0.5	1.2	2.1	3.1	4.2	5.9		
4. Share Tenant	2.0	0.5	1.1	2.1	3.0	4.2	-		
5. Manager	5.0	-	-	2.0	-	-	9.5		
6. Part-owner Lessee	2.9	-	1.3	2.3	-	4.0	5.0		
7. Lessee Share Tenant	2.4	-	-	2.4	-	-	-		
<b>Average</b>	<b>2.4</b>	<b>0.5</b>	<b>1.2</b>	<b>2.1</b>	<b>3.1</b>	<b>4.1</b>	<b>11.8</b>		

Source: Agro-economic survey in selected barangay samples in the Project Area, November 1984.

## FARM MECHANIZATION FOR PADDY CULTIVATION

(Unit: % Area)

Farm Operation	Direct Seeding				Transplanted				Weghted Mean In Area
	Irrigated		Rainfed		Irrigated		Rainfed		
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	
Land Preparation									
Plowing	38	38	7	7	92	92	-	-	33
Harrowing	69	70	50	71	100	100	17	17	39
Leveling	-	-	-	-	-	-	-	-	-
Threshing	100	100	100	100	100	100	100	100	100
Winnowing	53	57	62	59	100	100	100	83	77

Source: Agro-Economic Survey