TABLE J2-13 ON-FARM DEVELOPMENT COST ESTIMATION

Description of Item	Unit	Quantity	Unit Rate			Amount (₱'000)			Remarks
			F/C	L/C	Total	F/C	L/C	Total	
On-farm Development Cost									
1. Capayas System									
(1) Farm Ditch	ha	1,160	421	218	639	488	253	741	16.2 m/ha
(2) Supplementary Farm Ditch	"	1,160	1,170	533	1,703	1,357	618	1,975	50.9 m/ha
(3) Farm Drain	"	1,160	127	62	189	147	72	219	14.1 m/ha
(4) Farm Road	"	1,160	369	180	549	428	209	637	46.2 m/ha
(5) On-farm Structure	"	1,160	471	309	780	546	358	904	
(6) Miscellaneous 5%						234	90	324	
Sub Total						(3,200	1,600	4,800)	
2. Bayongan System									
(1) Farm Ditch	ha	4,140	421	218	639	1,743	903	2,646	
(2) Supplementary Farm Ditch	"	4,140	1,170	533	1,703	4,844	2,207	7,051	
(3) Farm Drain	"	4,140	127	62	189	526	257	783	
(4) Farm Road	"	4,140	367	180	549	1,528	745	2,273	
(5) On-farm Structure	"	4,140	471	309	780	1,950	1,279	3,229	
(6) Miscellaneous 5%						509	309	818	
Sub Total						(11,100	5,700	16,800)	
Grand Total						((14,300	7,300	21,600))	

TABLE J2-14 LAND ACQUISITION & COMPENSATION COST

Description of Item	Unit	Quantity	Unit Rate			Amount (P'000)			Remarks
			F/C	L/C	Total	F/C	L/C	Total	
1. Capayas System									
(1) Capayas Dam									
Mountain Area	ha	20	-	4,000	4,000	-	80		
Waste Area	"	80	-	6,000	6,000	-	480		
Sub Total						(-	560	560)	
(2) Canal									
Waste Area	ha	3	-	6,000	6,000	-	18	18	
Cultivated Area	"	23	-	10,000	10,000	-	230	230	
Sub Total						(-	248	248)	
Total							808	808	
							≒ 900	900	
2. Bayongan System									
(1) Bayongan Dam									
Mountain Area	ha	36	-	4,000	4,000	-	144	144	
Waste Area	"	145	-	6,000	6,000	-	870	870	
Coconuts Area	"	43	-	10,000	10,000	-	420	420	
Paddy Field	"	34	-	10,000	10,000	-	340	340	
Up-land	"	92	-	10,000	10,000	-	920	920	
Residential house	house	30	-	20,000	20,000	-	600	600	
Housing site	"	30	-	2,400	2,400	-	72	72	
Sub Total						(-	3,376	3,376)	
(2) Canal									
Waste Area	ha	10	-	6,000	6,000	-	60	60	
Cultivated Area	"	85	-	10,000	10,000	-	850	850	
Sub Total						(-	910	910)	
(3) Resettlement Cost	Family	30	-	6,000	6,000	-	180	180	
Sub-Total						(-	180	180)	
Total							4,466≒4,500	4,500	

TABLE J2-I5(1) ADMINISTRATION COST

Description of Item	Unit	Quantity	Amount (₱'000) F/C	L/C	Total	Remarks
1. Personal Cost				2,900	2,900	refer to TABLE J2-15(2)
2. Equipment Cost			1,350	50	1,400	" TABLE J2-15(3)
3. Repair & Mentenance Cost			1,280	320	1,600	" TABLE J2-15(3)
4. Training Cost			1,500	-	1,500	" TABLE J2-15(4)
Total			(4,130	3,270	7,400)	
			= 4,100	3,300	7,400	

TABLE J2-15(2) ADMINISTRATION COST

1. PERSONAL COST

a) Detailed Design Stage ('000)

NIA Design Staff ₱2,100/month x 95 Man-Month ≒ 200

b) Construction Stage

		('000)
Project Management		
Project Manager	50,000 x 1 per =	50
Assistant Manager	37,000 x 1 per =	37
Secretary	10,000 x 1 per =	10
Administrative Section		
Section Chief	25,000 x 1 per =	25
Accounting Clark	18,800 x 1 per =	18.8
- Ditto - Assistant	16,700 x 2 per =	33.4
Administrative Clerk	18,800 x 1 per =	18.8
- Ditto - Assistant	16,700 x 2 per =	33.4
Typist	13,600 x 2 per =	27.2
Land Acquisition Section		
Section Chief	25,000 x 1 per =	25
Clerk	16,700 x 2 per =	33.4
Assistant	13,600 x 2 per =	27.2
Typist	13,600 x 2 per =	27.2
Construction Section		
Section Chief	25,000 x 1 per =	25
Civil Engineer	24,300 x 2 per =	48.6
Technician	23,000 x 6 per =	138
Topo-surveyor	23,000 x 2 per =	46
Others		
Driver	18,800 x 6 per =	112.8
Security Guard	15,800 x 5 per =	79
Janitor	13,600 x 5 per =	68
Total		₱883.8/year

883.8 x 3 = 2,651.4 ≒ 2,700

('000)

c) Grand Total 200 + 2,700 = 2,900

TABLE J2-15(3) ADMINISTRATION COST

2. EQUIPMENT COST FOR CONSTRUCTION SUPERVISION

Description	Q'ty	Unit Rate F/S	Unit Rate L/C	Amount F/C	Amount L/C	Amount Total
. Jeep	6 Nos	150	-	900	-	900
. Motorcycle	6 "	10	-	60	-	60
. Theodrite	2 "	30	-	60	-	60
. Level	2 "	12	-	24	-	24
. Current Meter	2 "	20	-	40	-	40
. Radio Set	1 "	60	-	60	-	60
. Walkie-Talkie	10 "	3	-	30	-	30
. Automatic Rain Gauge	1 "	20	-	20	-	20
. Personal Computer	1 "	100	-	100	-	100
. Miscellaneous				56	-	56
. Transportation Cost	L.S				50	50
Total				1,350	50	1,400

3. REPAIR AND MAINTENANCE COST

. Vehicle Repair	₱150,000 x 15% x 6 units	= 130,000
. Vehicle Fuel	₱ 6.5/ℓ x 15 ℓ/day x 300 days x 6 units	= 175,000
. Building Maintenance	₱ 3,600,000 x 5%	= 180,000
. Office Suppliers		43,000
		528,000

₱ 528,000 x 3 years = 1,584,000 = ₱ 1,600,000

TABLE J2-15(4) ADMINISTRATION COST

4. TRAINNING COST

{. 6 persons/year x 3 years = 18 persons
{. 15 days/ 1 times . 1 time/year

. Transportation charge
₱ 18,000 x 18 per = ₱ 324,000

. Accommodation charge
₱ 1,500 x 18 per x 15 days = ₱ 405,000

. Domestic transportation charge
₱ 7,200 x 18 per = ₱ 129,600

. Allowance charge
₱ 1,500 x 18 per x 15 days = ₱ 405,000

(Attendance Cost)

. Accommodation charge
₱ 1,500 x 3 time x 15 days x 1 per = ₱ 67,500

. Domestic transportation charge
₱ 7,200 x 1 per x 3 times = ₱ 21,600

. Allowance charge
₱ 1,500 x 1 per x 3 time x 15 days = ₱ 67,500

Total ₱ 1,420,000
= 1,500,000

TABLE J2-16 INVESTIGATION FOR DETAILED DESIGN

Description of Item	Unit	Quantity	Unit Rate			Amount (₱'000)			Remarks
			F/C	L/C	Total	F/C	L/C	Total	
(1) Topo-Survey									
. Survey for Bayongan Dam	km	4.0		4,000	4,000		16	16	
. Survey for Capayas Dam	km	3.0		4,000	4,000		12	12	
. Survey for Canal System	km	160.0	-	3,800	3,800		608	608	
(2) Geology Survey									
. Drilling at Capayas Dam site	m	100		300	300		30	30	
. Drilling at Bayongan Dam site	m	100		300	300		30	30	
. Test pits at Capayas Dam site	place	5		700	700		4	4	
. Test pits at Bayongan Dam site	place	5		700	700		4	4	
. Seismic prospecting test	km	1					30	30	
. Laboratory test of Dam Material	L.S	-					20	20	
. Corn penetration test at Canal route	place	150		100	100		15	15	
. Laboratory test of Canal Material	L.S						10	10	
Miscellaneous 10%							121	121	
Total							900	900	

TABLE J2-17 COST FOR CONSULTANT SERVICES

Description of Item	Unit	Quantity	Unit Rate			Amount (₱'000)		
			F/C	L/C	Total	F/C	L/C	Total
1. Detail Design Stage								
(1) Remuneration								
Foreign Expert	Man-Month	70	160,000	-	160,000	11,200	-	11,200
Local Expert	"	25	60,000	-	60,000	1,500	-	1,500
Sub Total						(12,700	-	12,700)
(2) Direct Cost								
Air Freight	Time	13	20,000	-	20,000	260	-	260
Equipments	L.S	-	-	-	-	110	-	110
Miscellaneous		-	-	-	-	30	-	30
Sub Total						(400	-	400)
(3) Indirect Cost								
Hotel charges	Man-Month	75	-	30,000	30,000	-	2,250	2,250
Domestic Air Freight	Time	40	-	2,000	2,000	-	80	80
Transportation charge	"	30	-	20,000	20,000	-	600	600
Office supplies	Month	12	-	5,000	5,000	-	60	60
Printing	"	12	-	5,000	5,000	-	60	60
Miscellaneous	L.S	-	-	-	-	-	150	150
Sub Total							(3,200	3,200)
Total						((13,100	3,200	16,300))
2. Construction Supervision Stage								
(1) Remuneration								
Foreign Expert	Man-Month	90	155,000	-	155,000	13,900	-	13,900
Local Expert	"	60	60,000	-	60,000	3,600	-	3,600
Sub Total						(17,500	-	17,500)
(2) Direct Cost								
Air Freight	Time	6	20,000	-	20,000	120	-	120
Equipments	L.S	-	-	-	-	110	-	110
Miscellaneous		-	-	-	-	70	-	70
Sub Total						(300	-	300)
(3) Direct Cost								
Hotel charge	Man-Month	6	-	30,000	30,000	-	180	180
Domestic Air Freight	Time	180	-	2,000	2,000	-	216	216
Office Supplies	Month	36	-	2,000	2,000	-	72	72
Miscellaneous		-	-	-	-	-	32	32
Sub Total							(500	500)
Total						((17,800	500	18,300))
Grand Total						(((30,900	3,700	34,600)))

TABLE J2-18 EQUIPMENT COST FOR O & M

Description of Item	Unit	Quantity	Unit Rate			Amount (¥'000)			Remarks
			F/C	L/C	Total	F/C	L/C	Total	
Equipment Cost for O & M									
Bulldozer 8t	Nos	2	746			1,492	-	1,492	
Backhoe 0.25m³	"	1	951			951	-	951	
Motor Grader L=2.5 m	"	1	740			740	-	740	
Dump Truck 4t	"	3	243			729	-	729	
Truck with Crane 2t	"	1	160			160	-	160	
Truck pickup 2t	"	3	95			285	-	285	
Concrete Mixer 0.2 m³	"	1	30			30	-	30	
Drainage Pump ϕ100 m/m	"	3	15			45	-	45	
Weed Cutter	"	20	4			80	-	80	
Jeep	"	4	150			600	-	600	
Motorcycle	"	6	10			60	-	60	
Walkie - Talkie	"	10	3			30	-	30	
Sub Total						(5,202	-	5,202)	
Miscellaneous (10%)						598	-	598	
Spare parts (10%)						500	-	500	
Transportation etc.	L.S					-	800	800	
Total						((6,300	800	7,100))	

TABLE J2-19 DETAIL DISBURSEMENT SCHEDULE

(Unit: P'000)

Item	System	Year	1	2	3	4	5	6	Total
			1987	1988	1989	1990	1991	1992	
・Preparatory Work		F/C		2,000					2,000
		L/C		1,700					1,700
・Construction Work	Capayas	F/C			14,300	11,500	0	2,800	28,600
		L/C			7,100	6,000	0	1,100	14,200
	Bayongan	F/C			27,300	40,900	54,600	13,700	136,500
		L/C			12,600	18,900	25,200	6,200	62,900
・On-farm Development	Capayas	F/C			1,600	1,300	0	300	3,200
		L/C			800	600	0	200	1,600
	Bayongan	F/C			2,200	3,300	4,400	1,200	11,100
		L/C			1,100	1,700	2,300	600	5,700
・Land Acquisition and Compensation	Capayas	F/C		0	0				0
		L/C		400	500				900
	Bayongan	F/C		0	0				0
		L/C		1,800	1,800				3,600
・Engineering & Administration		F/C	13,000	4,400	4,400	4,400	4,400	4,300	35,000
		L/C	4,200	800	800	700	700	700	7,900
・O & M Equipment	Capayas	F/C				1,300			1,300
		L/C				200			200
	Bayongan	F/C					5,000		5,000
		L/C					600		600
・Pilot Farm		F/C			3,800				3,800
		L/C			0				0
(Sub Total)		F/C	13,100	6,400	53,600	62,700	68,400	22,300	226,500
		L/C	4,200	4,900	24,700	28,100	28,800	8,800	99,300
・Physical Contingencies		F/C	2,000	1,100	8,100	9,500	10,400	3,400	34,500
		L/C	600	700	3,500	4,200	4,300	1,400	14,700
(Sub Total)		F/C	15,100	7,500	61,700	72,200	78,800	25,700	261,000
		L/C	4,800	5,200	28,400	32,300	33,100	10,200	114,000
・Price Escalation		F/C	3,500	2,600	27,200	38,300	49,200	18,200	139,000
		L/C	3,100	4,900	31,100	40,700	47,700	16,500	144,000
(Total)		F/C	18,600	10,100	88,900	110,500	128,000	43,900	400,000
		L/C	7,900	10,100	59,500	73,000	80,800	26,700	258,000
		Total	26,500	20,200	148,400	183,500	208,800	70,600	658,000

TABLE J2-20(1) OPERATION & MAINTENANCE COST

Description	Annual Cost
. Salary & Wage	913,100
. Administration & General Expenditure	273,900
. Equipment Repair & Maintenance	1,040,000
. Fuel Cost	508,000
. Office Maintenance	400,000
	₱ 3,135,000/year

3,135,000 ÷ 5300 ha = ₱ 592/year

1. Salary & Wage (Per Year)

Position	Grade	per year	No.	Total Cost
Irrigation Superintendent	17	34,300	0.5	17,000
Senior Engineer B	14	25,500	0.5	12,800
Operation & Maintenance Sec.				
Section Engineer	12	21,000	0.5	10,500
Engineer A	11	19,000	1	19,000
Engineer Aide C	6	11,500	3	34,500
Administrative Sec.				
Casher A	8	14,200	0.5	7,100
Senior Accounting Clerk	8	14,200	0.5	7,100
Billing Clerk	5	10,500	1	10,500
Collection Representative	8	14,200	1	14,200
Store keeper	5	10,500	0.5	5,300
Clerk B	5	10,500	0.5	5,300
Security Guard	5	10,500	3	31,500
Heavy Equipment Operator	8	14,200	7.5	106,500
Vehicle Driver	7	12,800	1.5	19,200
Janitor	1	7,200	0.5	3,600
Zone II Office				
Zone Engineer	12	21,000	1	21,000
Engineer A	11	19,000	1	19,000
Engineering Aide C	6	11,500	4	46,000
Agriculturist	11	19,000	1	19,000
Farmer Organization Specialist	6	11,500	5	57,500
Supervising Water Management Technologist	11	19,000	1	19,000
Water Master	6	11,500	5	57,500
Gate Keeper	3	8,600	14	120,400
Ditch Tender	2	7,800	26	202,800
Clerk B	5	10,500	2	21,000
Vehicle Driver	7	12,800	2	25,600
Total			84	₱ 913,100/year

TABLE J2-20(2) OPERATION & MAINTENANCE COST

2. Administration & General Expenditure Cost

913,100 x 0.30	=	₱ 273,900/year

3. Equipment Depreciation Cost

5,200,000 x 0.1	=	₱ 520,000/year

4. Equipment Maintenance Cost

5,200,000 x 0.1	=	₱ 520,000/year

5. Fuel Cost

Heavy Equipment		
₱6.5/ℓ x 20ℓ/day x 200 days/year x 4	=	104,000
Truck		
₱6.5/ℓ x 20ℓ/day x 200 days/year x 7	=	182,000
Vehicle		
₱6.5/ℓ x 15ℓ/day x 300 days/year x 6	=	175,500
Motorcycle & others (10%)		46,500
		₱ 508,000/year

6. Office Maintenance Cost

Building Maintenance Cost		
6,000,000 x 5%/year	=	300,000
Office Suppliers		100,000
		₱ 400,000/year

TABLE J2-21 PILOT-FARM COST

Description of Item	Unit	Quantity	Unit Rate			Amount (₱'000)			Remarks
			F/C	L/C	Total	F/C	L/C	Total	
1. Detail Design Cost								(700)	
2. Construction Cost									
1) Land Reclamation									
. Land leveling	ha	25			4,000			100	
. Deep plawing	"	25			800			20	
. Ridge preparation	"	25			1,200			30	
2) On-farm Facilities									
. Farm Ditch	ha	25			700			18	
. Supplementary Farm Ditch	ha	25			1,800			45	
. Farm Road	ha	25			600			15	
. On-farm structure	ha	25			800			20	
. Farm Drain	ha	25			200			5	
. Diversion Dam	ps	1						700	
. Pumping station	ps	1						500	
Sub Total								(1,453)	
3. Equipment									
. Equipment	L.S	1						640	
. Spare parts	L.S	1						64	
Sub Total								(704)	
4. Building									
. Operation office	m	300			1,500			450	
. Equipment sheid	m	100			1,000			100	
. Store house	m	50			1,200			60	
Sub Total								(550)	
5. Miscellaneous 10%								(393)	
Total								((3,800))	

ANNEX K. AGRO--ECONOMY

ANNEX K. AGRO-ECONOMY

LIST OF TABLES

LIST OF FIGURES

TABLE K1-1 POPULATION, MIGRATION AND LITERACY

Area	Population (1980)						Population (1970)	Population Growth Rate (%/Yr.)	No. of Migrants		Literate Ratio (%)
	Area (sq.km)	Population ('000)	Density	Urban Portion (%)	No. of Household ('000)	Average Household size			In-Migrant ('70-'80) ('000)	Out-Migrant ('70-'80) ('000)	
1. Project Municipalities	393.38	65.6	167	8.7	11.8	5.6	53.9	2.0	N.A	N.A	75.9
(1) San Miguel	91.56	12.2	133	11.1	2.2	5.5	10.0	2.0	N.A	N.A	82.5
(2) Trinidad	94.27	15.1	160	12.1	2.8	5.4	11.2	2.9	N.A	N.A	73.0
(3) Ubay	207.55	38.3	184	6.7	6.8	5.6	32.7	1.6	N.A	N.A	75.0
2. Bohol Province	4,117.26	806.0	196	15.1	147.1	5.5	683.3	1.7	N.A	N.A	77.6
3. Central Visayas	14,951.42	3,787.4	253	32.0	698.1	5.4	3,032.7	2.2	N.A	89.8	76.1
4. Philippines	299,000.00	48,098.5	161	37.3	8,607.2	5.6	36,684.5	2.7	N.A	N.A	82.7

Source: 1980 Census of Population, NCSO

TABLE K1-2 GAINFULL WORKERS 15 YEARS OLD AND OVER BY MAJOR OCCUPATION GROUP, BOHOL: 1975 & 1980

Major Occupation Group	1980 Number	1980 Percent	1975 Number	1975 Percent
Total (A)	244,970	100.00	219,855	100.00
Professional, technical & related workers	11,972 (130)	4.81	9,083 (100)	4.13
Administrative, executive and managerial workers	742 (66)	0.30	1,121 (100)	0.51
Clerical & related workers	5,060 (220)	2.07	2,298 (100)	1.05
Sales workers	12,884 (91)	5.26	14,185 (100)	6.45
Services workers	13,463 (137)	5.50	9,809 (100)	4.46
Agricultural, animal husbandary & forestry workers, fishermen & hunters	153,593 (108)	62.70	142,271 (100)	64.71
Production & related workers, transport equipment, operators and laborers	44,641 (115)	18.22	38,956 (100)	17.72
Workers not classifiable by occupation	2,795	1.14	2,132	0.97
Population 15 years old and over (B)	475,955		428,609	
Percentage of Gainful Worker (A)/(B)	51.5%		51.3%	

Source: 1980 Census of Population and Housing, Bohol, NCSO

TABLE K1-3 NUMBER OF GAINFUL WORKERS BY OCCUPATION

(Unit: '000)

Year/Sex	Population		Number of Gainful Workers by Occupation								
				Agriculture, Forest and Fishery							
	Total	15yeats Old and Above	Total	Total	Crop Production	Production of Livestock, Poultry & Others	Forestly & Logging	Fishing	Mining & Quarrying	Manufac-turing	All Other Occupations
1. Bohol (Total)											
			(100.0)	(56.7)	(49.4)		(0.5)	(6.8)	(0.2)	(15.7)	(27.6)
1970 Both Sex	683.3	384.3	224.3	127.2	110.7		1.2	15.3	0.5	35.3	61.3
			(100.0)	(72.8)	(62.5)		(0.7)	(9.6)	(0.3)	(5.5)	(21.4)
Male	333.8	181.8	149.4	108.8	93.4		1.0	14.4	0.4	8.2	32.0
			(100.0)	(24.6)	(23.1)		(0.3)	(1.2)	(0.1)	(56.2)	(59.1)
Female	349.5	202.5	74.9	18.4	17.3		0.2	0.9	0.1	27.1	29.3
			(100.0)	(63.5)	(52.7)	(0.5)	(0.5)	(10.2)	(0.1)	(12.4)	(24.0)
1980 Both Sex	806.0	475.9	245.0	155.8	129.2	1.3	0.4	24.9	0.3	30.6	58.5
			(100.0)	(78.7)	(65.1)	(0.1)	(0.0)	(12.8)	(0.1)	(4.1)	(17.2)
Male	399.3	229.6	188.1	148.3	122.4	1.3	0.4	24.2	0.3	7.7	32.1
			(100.0)	(15.2)	(12.0)	(0.0)	(0.0)	(1.2)	(0.0)	(40.2)	(46.4)
Female	406.7	246.3	56.9	7.5	6.8	0.0	0.0	0.7	0.0	22.9	26.4
2. Bohol (Rural)											
			(100.0)	(62.2)	(54.8)		(0.5)	(6.9)	(0.2)	(18.1)	(19.4)
1970 Both Sex	586.6	203.3	189.4	117.9	103.8		1.0	13.1	0.4	34.3	36.8
			(100.0)	(78.4)	(68.0)		(0.6)	(9.7)	(0.2)	(4.5)	(16.9)
Male	286.8	145.7	128.6	100.8	87.5		0.8	12.5	0.3	5.8	21.7
			(100.0)	(28.1)	(26.8)		(0.3)	(1.0)	(0.2)	(46.9)	(24.8)
Female	299.8	57.6	60.8	17.1	16.3		0.2	0.6	0.1	28.5	15.1
			(100.0)	(69.3)	(58.4)	(0.5)	(0.0)	(10.3)	(0.0)	(13.6)	(13.7)
1980 Both Sex	683.1	399.6	207.5	143.8	121.1	1.1	0.2	21.4	0.2	28.2	28.4
			(100.0)	(84.1)	(70.5)	(0.6)	(0.1)	(12.8)	(0.1)	(3.9)	(12.0)
Male	339.5	193.5	162.8	136.9	114.8	1.0	0.2	20.9	0.2	6.3	19.6
			(100.0)	(15.4)	(14.1)	(0.2)	(0.0)	(1.1)	(0.0)	(49.0)	(19.0)
Female	343.6	206.1	44.7	6.9	6.5	0.1	0.0	0.5	0.0	21.9	8.8
3. Project Municipalities (Total)											
1970 Both Sex	54.2	27.8	16.2	9.2	8.0		0.1	1.1	0.6	2.5	4.5
Male	26.8	13.4	11.0	8.0	6.9		0.1	1.0	0.0	0.6	2.4
Female	27.8	14.4	5.2	1.2	1.1		0.0	0.1	0.0	1.9	2.1
1980 Both Sex	66.0	29.8	15.3	9.8	8.1	0.1	0.0	1.6	0.0	1.9	3.6
Male	33.0	14.8	12.0	9.4	7.8	0.1	0.0	1.5	0.0	0.5	2.1
Female	33.0	15.0	3.3	0.4	0.3	0.0	0.0	0.1	0.0	1.4	1.5

Note : (1) The figures in the parenthesis show the percentage to the total gainful workers.
(2) The figures for the number of gainful workers by occupation in the Project municipalities are estimated in the basis of the percentage to the total gainful workers by occupation in the total Bohol.

Source : Census of Population, NCSO.

TABLE K1-4 LABOR FORCE

Item	Philippines	Central Visayas	Bohol
1. Projected household population			
- 15 years old and over (1,000)	27,877	2,275	399
- Percent in the labor' force (%)	50.8	60.0	62.9
2. Percent of labor force			
- Employed (%)	94.6	97.3	97.3
- Unemployed (%)	5.4	2.7	2.7
3. Percent of employed			
- Agriculture (%)	51.5	54.4	53.2
- Fishery (%)	5.0		10.2
- Other industries (%)	36.5	N.A.	36.6

Source: 1981 Population Census

TABLE K2-5 ACCOMPLISHMENT AREA OF AGRARIAN REFORM, BOHOL PROVINCE

			1984 Target	1984, March Cumulative Accomplishment
1. OLT Area				
Total	TT		8,504	8,504
	LO		1,307	1,307
	P		14,344	14,344
	A	(ha)	6,349.7	6,349.7
Rice	TT		6,166	6,166
	LO		710	710
	P		10,947	10,947
	A	(ha)	4,708.8	4,708.8
Corn	TT		1,756	1,756
	LO		507	507
	P		2,521	2,521
	A	(ha)	1,330	1,330
LOT Under 474 Rice	TT		551	551
	LO		86	86
	P		826	826
	A	(ha)	291.8	291.8
ULT Under 474 Corn	TT		31	31
	LO		4	4
	P		50	50
	A	(ha)	18.7	18.7
2. Leasehold Area				
Total	TT		18,728	18,728
	LO		16,969	16,969
	P		29,889	29,889
	A	(ha)	8,740.9	8,740.9
Rice	TT		14,448	14,448
	LO		12,869	12,869
	P		24,020	24,020
	A	(ha)	6,595.9	6,595.9
Corn	TT		4,280	4,280
	LO		4,100	4,100
	P		5,869	5,869
	A	(ha)	2,144.7	2,144.7

Note: OLT = Operation Land Transfer
TT = Tenant Tiller
LO = Land Owner
P = Parcels
A = Area (ha)

Source: Ministry of Agrarian Reform, Tagbilaran

TABLE K3-6 ACTUAL CONSUMPTION OF RICE AND CORN, BOHOL

Year	Total Production (a)	Seeds (b)	Waste (c)	Other Usage (d)	Outward trading (e)	For Actual Consumption: a-(b to e) = (f)	Converted to Rice/ Corn Grid (g)	Inward trading to Rice/ Corn Grid (h)	Total Rice/Corn Grid g + h = i
Palay									
1981	113,401	5,800	6,800	4,500	8,328	87,973	58,940	5,326	64,266
1982	104,455	5,300	6,200	4,100	6,848	82,007	54,940	6,275	61,215
1983	42,042	5,300	2,500	1,700	4,634	28,908	19,370	25,643	45,013
Corn									
1981	20,605	300	620	410	2,094	17,181	11,170	9,795	20,965
1982	26,970	370	810	540	1,514	23,736	15,430	6,588	22,018
1983	14,244	430	430	280	1,641	11,463	7,450	6,943	14,393

	Population (j)	Per Capita Consumption i j = k (Rice/Corn Grid)	Rice Eating Boholanos: Population j x 0.72 = l	Rice Eating Boholanos: Per Capita i ÷ l	Corn Grid Eating Boholanos: Population j x 0.28 = m	Corn Grid Eating Boholanos: Per Capita i ÷ m
Palay						
1981	814,712	78.9 kg	586,592	109.6 kg	228,120	-
1982	824,068	74.3	593,329	103.2	230,739	-
1983	833,394	54.0	600,044	75.0	233,350	-
Corn						
1981	814,712	25.7	586,592	-	228,120	91.9 kg
1982	824,068	26.7	593,329	-	230,739	95.4
1983	833,394	17.3	600,044	-	233,350	61.7

TABLE K3-7 SUPPLY-DEMAND BALANCE FOR RICE WITHOUT THE PROJECT
(Bohol Province)

	1982 Years	2000 Years
1. Supply	104,455 tons (Palay)	114,800 tons (Annual growth of 0.5%)
2. Demand		
Population	824,068 persons	966,400 persons (1% in 1980 to '90, 0.7% in 1990 to 2000)
Rice eating in Bohol Area	593,300 persons (72%)	695,800 persons (72%)
a) Consumption of rice per Capita		
103 kg	61,110	71,670
120 kg	71,200	83,500
130 kg	77,130	90,450
b) Seeds	3,800	3,800
c) Waste and Other Use (a x 8%)		
103 kg	4,890	5,730
120 kg	5,700	6,680
130 kg	6,170	7,240
d) Demand rice (a+b+c)		
103 kg	69,800	81,200
120 kg	80,700	93,980
130 kg	87,100	101,490
e) Demand palay (d/0.65)		
103 kg	107,380	124,920
120 kg	124,150	144,580
130 kg	134,000	156,140
3. Balance		
103 kg	-2,925	-10,120
120 kg	-19,695	-29,780
130 kg	-29,545	-41,340

Note: 1. 103 kg per Capita in actual figure in 1982.

2. Annual growth rate of palay at 0.5% is assumption.

TABLE K3-8 CONSUMPTION PER CAPITA

(Kg)

	Rice	Corn Grits
At Present		
Bohol (estimated in 1982)		
Average (total Population)	74.3	26.7
Rice eating in Bohol Area	103.2 (72%)	95.4 (28%)
Central Visayas (1974)	41.4	81.0
West Visayas (1974)	113.7	9.5
East Visayas (1974)	98.8	28.7
Philippines (1974)	103.2	19.1
Projection		
1979/80	114.4	22.8 (Corn 35.1)
1984/85	124.1	20.8 (Corn 32.0)
1989/90	131.0	19.0 (Corn 29.3)

Note: 1. Per Capita consumption of Bohol was counted based on actual Production, domestic trading in 1982 and population estimated by Provincial Office.

2. Figures in 1974 are based on the Regional Consumption Patterns For Major Foods, 1974-76, Dep. of Agriculture, 1978.

3. Projection figures are based on the Integrated Agricultural Production and Marketing Project, Policy Analysis Staff, MOA, 1980.

TABLE K4-9 LOCAL MARKET

Item	San Miguel	Trinidad	Ubay	Talibon
No. of Market	2	1	1	1
Location	Poblacion and Mahayag	Poblacion	Poblacion	Poblacion
Area in SQ.M.	10,000 10,000	10,134	11,428	7,442
No. of Stalls	77 75	39	30	108
Market Day	Tuesday Sunday	Thursday	Sunday	Wednesday

Source: Socio-Economic and Physical Profile, P.D.S.

TABLE K4-10 NUMBER OF RICE & CORN MILLERS (1982)

Miller	San Miguel	Trinidad	Ubay	Pilar	Sierra Bullones	Dagohoy
Rice	7	7	12	5	13	1
Corn	-	-	-	-	1	-
Rice/Corn	-	1	-	2	1	2
Total Miller	7	8	12	7	15	3
Total Capacity/Day per 50 kg/Bag	849	884	1,572	570	1,314	558

Source: NFA, Region VII

TABLE K4-11 NUMBER OF WHOLESALERS/RETAILERS

(Unit: person)

	San Miguel	Trinidad	Ubay
Retail only	6	7	31
Wholesale only	4	1	2
Wholesale/Retail	16	8	33

Source: NFA, Tagbilaran
Derived from Socio-Economic and Physical Profile, Provincial Development Staff.

TABLE K4-12 NUMBER OF WAREHOUSEMEN, WAREHOUSES & STORAGE CAPACITIES (1982)

Municipality	No. of Warehousemen	No. of Warehouses	Palay/Rice Capacity (in bags)
San Miguel	2	2	15,480
Trinidad	2	2	2,160
Ubay	8	9	25,500
Pilar	3	3	1,700
Sierra Bullones	8	8	18,041
Dagohoy	3	3	2,920
Tagbilaran	14	15	216,240
Bohol	101	107	393,671

TABLE K4-13 SELLING PRICES BY FARM MERKETING COOPERATIVE, SAN MIGUEL (20th April, 1985)

1.	Cereal		
	Peanut (unshelled)	farm gate price	₱6/ganta (2.5 kg)
		farm gate price	₱2.4/kg
	Mungobeans	farm gate price	₱11/kg
		selling price	₱20/kg
	Paddy (local)	farm gate price	₱3.6/kg
	Rice	selling price	₱6.5/kg
	Bran	selling price	₱3/kg
2.	Fertilizer		
	14-14-14	₱270/bag of 50 kg	
	16-20-0	₱270/bag of 50 kg	
	(Price of commercial dealer is one peso higher than ₱270)		
3.	Pesticides		
	Growell	₱85/1	
	Brodan	₱65/one bottle of 236 c.c.	
	Azodrin	₱60/one bottle of 240 gm	
	Mipcin	₱115/550 gm	
	Furadan	₱35/kg (granules)	
	Malataize	₱90/one bottle	
	Fungicide		
	Hinosan	₱95/250 gm (Powder)	
	Benlate	₱90/100 gm (Powder)	
	Fungitox	₱49/120 gm (Powder)	
	Herbicide		
	Agroxone	₱115/906 gm	
	Rat		
	Racumin	₱26.05/100 gm (Powder)	
	Zinc Phosphide	₱275/5 kg (Powder)	

TABLE K4-14 PRICE INFORMATION COLLECTED FROM KADIWA CENTER, TRINIDAD
(20th April, 1985)

Eggplants	₱5/kg	(local)
Ampalaya	₱5/kg	(local)
Pechay	₱1.0 to 1.5/plant	(local)
Squash	₱2.3 to 2.5/kg	(local)
Stringbeans	₱1.0 to 2.0/bundle	(local)
Watermelon	₱1.5/small piece	(Ubay, Gabi)
Camote	₱12/can of 13 kg	(harvesting season, local)
	₱20/can of 13 kg	(at present)
Peanuts (Carmen), Tomato	(large size --- Cebu, small size --- local)	

TABLE K4-15 PRICE INFORMATION COLLECTED FROM MERCHANT, UBAY
(20th April, 1985)

	Farm Gate Price	Market Price	Origin
Squash	₱2/kg	₱3/kg	Ubay
Tomato (harvesting season)	3	7	Cebu or
(non-harvesting season)	4	8 to 12	Local
Eggplant (harvesting season)	8		Local
(non-harvesting season)	10		Local
Watermelon		4	Ubay
Stringbeans	₱20/bundle of 20 pieces	30/bundle	Local
Green pepper (large)	₱6/kg	8/kg	Local
Camote	₱25/can of 16 kg (₱1.6/kg)	₱2.5/kg	Local
Peanuts (unshelled)	₱10/kg	₱12/kg	Local
Cassava	₱12/can of 10 kg		Local
Sugarcane	₱32/25 pieces		

Note: The merchant go to Cebu from Ubay Port twice a week. They must pay transportation cost per basket of 40 to 50 kg as follows:

₱2/Cebu handling + ₱1/PPA Cebu + ₱5/freight charge Cebu to Ubay + ₱2/Ubay handling + ₱0.25/PPA Ubay = ₱10.25 of total transportation cost per basket.

TABLE K4-16 MARKET FEE COLLECTED IN MARCH, 1985, TAGBILARAN

(Unit: ₱)

Items	Agora	Cogon	Mango
Total (March)	123,456	16,457	143,152
Vegetable	13,208	2,775	676
Meat	3,253	3,188	-
Fish	2,845	4,098	844
Parking & Others	104,150	6,396	141,632

Source: Agora Central Market, Tagbilaran

TABLE K4-17 MARKET PRICES IN TAGBILARAN, AGRO MARKET

(19th April, 1985)

Vegetables	Local Products	Incoming from Cebu	
Watermelon	-	₱12/one piece of small size (equivalent 3 kg) ₱18/one piece of large size	
Mungbeans	₱32/ganta, ₱12/kg		
Tomato	₱2/kg	Tomato	₱5/kg
Stringbeans	₱1 to 1.2/one bundle	Onion (White)	₱6/kg
Cucumber	₱5/kg	Onion (red)	₱7/kg
Sweet Potato	₱3.5/kg	Cabbage	₱6/kg
Eggplant	₱6/kg	Green peas	₱15/kg
Ginger	₱6/kg	Carrot	₱10/kg
Red pepper	₱12/kg	Ginger	₱6/kg
Ampalaya	₱5.5/kg	Baguio beans	₱8/kg
Squash	₱1.5/one piece	Sayote	₱0.75/piece
Pechay	₱1/one pland	Garlic	₱70/kg
Rice (Lovan)	₱6.5/kg	White potato	₱7 (small)/kg
Rice (HYV)	₱6.5/kg	"	₱10 (large)/kg
Corn Grind	₱6.2/kg		
Bran	₱4.0/kg		

TABLE K4-18 TRANSPORTATION COST

1. Information from BAEcon, Tagbilaran

Transportation Cost is divided by two kinds as follows:

1) Personal use--Farmer or merchant carry a little number sacks using bus

2) Trucking--Dealer or NFA transport many sacks using trucks

Transportation cost for personal use is as follows:

Rice sack: Correspond to passengers cost

Tagbilaran to Ubay ..... ₱24/sack by bus

Tagbilaran to Trinidad ..... ₱20/sack by bus

Tagbilaran to San Miguel ..... ₱18/sack by bus

Trucking cost is as follows:

Fertilizer:

Tagbilaran to any place ..... ₱0.15/km/sack

Tagbilaran to Ubay ..... ₱0.15 x 124km = ₱18.6/sack

Tagbilaran to San Miguel ..... ₱0.15 x 86km = ₱12.9/sack

2. Information from Farm Marketing Cooperative, San Miguel

Rice: San Miguel to Talibon ..... ₱3.00/sack by bus

San Miguel to Tagbilaran ..... ₱5.00/sack by bus

San Miguel to Talibon ..... ₱300.0/one trip, 100 sacks by truck

Fertilizer: Tagbilaran to San Miguel ..... ₱5 to ₱6/sacks by bus

3. Information from Agri. Technician, MOAF, Trinidad

Trinidad to Tagbilaran ..... ₱3/sack by passenger truck
(₱2 of one sack + handling cost ₱0.5 x 2 times)

TABLE K4-19 PORT HANDLING CHARGE

	Basis	Arrastre (₱)	Stevedore (₱)	(Note)
General Cargos				
Non Prime Commodities	RT	27.15	5.70	Copra
Prime Commodities				
Rice	RT	15.0	5.2	
Corn	RT	15.0	5.2	
Eggs	RT	14.5	5.2	
Chickens	RT	4.79	5.2	
Canned fish	RT	26.25	5.2	
Canned milk	RT	27.15	5.2	
Live Animal				
Large	per head	34.45	5.7	
Small	"	1.65	1.15	
Vehicle	ton	14.25	5.1	
Log, Lumber	1,000 bd., ft.	49.97	11.90	
Iron & Steel Products	RT	23.70	11.90	
Dangerous Cargo	150% of applicable rates			Fertilizer

Note: According to the information from PPA, Talibon, number of vessels Talibon to Cebu are two kinds of special days (Sun., Tue. and Thur.) and every day.
Gross register tonnage is 137.16 tons and net register tonnage is 74.54 tons.
General cargos consist of sacks, bags, boxes, crates, cartons cases, drums and other loose cargos.
Talibon Port was traded during 15th March to 15th April, 1985 as follows:

1) No. of vessels 21 2) GRT 4,385 3) Inward 136 MT
4) Outward 583 MT 5) Passengers: Cebu to Talibon 1,758 Talibon to Cebu 1,105

On 18th April, 1985, the following cargos were shipped.

Rice ..... 108 sacks
Pig ..... 25 heads
Cow ..... 15 heads
Dry fish ..... 11 sacks
Shells and sea foods ..... 5 sacks

TABLE K4-20 STATISTICS ON CONVENTIONAL CARGOES IN DOMESTIC TRADE
AT TAGBILARAN SUBPORT
(OUTWARD)

(Unit: Tonnage)

Commodity	1978	1979	1980	1981	1982	1983
Copra	25,257.3	17,546.1	17,373.4	24,295.7	19,457.9	16.894.9
Live Animal	190.9	228.5	1,064.6	354.7	549.2	367.8
Palay and Rice	1,057.8	1,018.1	2,114.5	2,079.7	337.8	604.7
Corn	36.4	301.3	12.7	94.2	13.7	141.0
Other Cereals	10.7	25.8	15.0	180.2	168.3	297.0
Sugar	7.5	63.5	0	6.7	0.6	0.6
Bottled Cargo	14,318.6	2,553.9	480.6	1,142.9	1,568.1	1,261.9
Empty Bottled	16,264.9	16,579.0	10.160.1	9,006.2	9,150.5	7,135.2
Other Consumer Goods	84.2	0	20.2	11.9	229.9	66.7
Cement	2.9	0	0	0	0	0
Fertilizer	2.5	0.1	0	0	2.5	0.5
Chemicals	2.1	5.2	0	1.6	0	20.9
Lumber	18.3	10.1	56.4	57.0	27.4	9.1
Plywood & Veneer	1.0	0.8	0	6.9	0	0
Animal Feed	3.1	1.3	2.9	28.9	38.1	109.1
Metal & Metal Products	10,535.0	8,996.1	7,657.4	5,694.5	4,942.6	6,470.5
Petroleum Products	-	-	0	121.7	476.2	125.7
Native Products	-	-	2,430.0	3,292.6	920.2	849.6
General Cargo	9,413.6	11,957.6	12,243.8	10,812.1	12,076.8	14,177.2
Grand Total	67,206.9	58,847.5	53,635.3	57,315.6	50,759.8	

TABLE K4-21 STATISTICS ON CONVENTIONAL CARGOES IN DOMESTIC TRADE AT TAGBILARAN SUBPORT
(INWARD)

(Unit: Tonnage)

Commodity	1978	1979	1980	1981	1982	1983
Copra	0	0	0	0	0	0
Live Animal	0.5	12.6	2.9	11.5	29.2	13.4
Palay & Rice	513.9	333.9	678.5	2,015.6	2,825.4	20,293.2
Corn	10,429.7	12,377.6	9,839.6	12,268.5	7,636.2	8,430.7
Other Cereals	2,250.8	2,791.3	2,887.7	2,729.4	2,526.2	3,277.3
Sugar	2,651.5	3,046.8	2,752.1	2,519.3	1,675.0	1,899.4
Bottled Cargo	19,386.8	18,636.7	12,861.3	10,917.7	12,170.1	10,096.9
Empty Bottles	4,790.8	3,775.7	1,217.6	1,045.0	1,133.1	525.8
Other Consumer Goods	759.2	36.1	784.6	4,172.8	4,631.0	4,546.2
Cement	10,722.6	18,299.7	16,768.9	19,112.8	10,756.5	15,131.5
Fertilizer	4,902.5	4,371.6	4,929.3	2,916.1	4,006.1	2,592.7
Chemicals	130.1	132.9	0	36.3	103.7	137.7
Plywood & Veneer	867.5	732.3	662.8	653.8	596.2	684.5
Animal Feed	6,388.5	11,009.9	4,595.0	4,845.3	6,461.5	5,625.6
Metal & Metal Products	13,851.8	18,374.1	10,445.3	4,432.1	10,439.2	11,380.9
Petroleum Products	-	-	23,972.5	21,452.1	26,653.1	28,757.8
Native Products	-	-	0	29.1	6.4	16.5
General Cargo	50,313.3	60,349.2	41,103.8	36,430.3	31,105.8	
Grand Total	136,167.4	151,150.0	134,173.8	126,675.9	124,779.0	

TABLE K4-22 STATISTICS ON CONVENTIONAL CARGOES IN DOMESTIC TRADE AT TAGBILARAN SUBPORT (1982)
(OUTWARD)

(Unit: Tonnage)

Commodity	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Copra	1,174.0	450.6	2,070.0	582.5	1,478.7	1,977.1	2,081.3	921.9	3,597.2	2,743.2	623.0
Live Animal	202.9	19.3	13.5	46.9	26.3	35.8	25.1	55.3	24.2	22.3	25.1
Palay and Rice	33.9	5.1	2.9	55.6	25.9	17.3	5.8	4.2	13.5	20.3	48.6
Corn	0.1	0	0	0.8	0	4.3	0.6	0	0.4	4.6	2.9
Other Cereals	0	0	0	0	145.0	15.0	0	0.8	0	0	0
Sugar	0	0	0	0	0	0.6	0	0	0	0	0
Bottled Cargo	489.1	314.2	191.8	130.0	75.2	22.2	60.0	0	26.3	14.3	167.1
Empty Bottles	868.7	716.6	625.5	1,110.5	537.0	859.3	1,001.5	571.1	979.9	623.9	387.0
Other Consumer Goods	5.6	162.3	2.0	1.3	9.8	3.8	1.6	6.6	18.8	2.6	1.8
Cement	0	0	0	0	0	0	0	0	0	0	0
Fertilizer	0	0	0	0	2.5	0	0	0	0	0	0
Chemicals	0	0	0	0	0	0	0	0	0	0	0
Lumber	0	0	2.9	7.9	0	0	6.1	0.8	1.2	0.5	7.4
Plywood & Veneer	0	0	0	0	0	0	0	0	0	0	0
Animal Feed	3.5	4.5	0	2.1	4.0	1.6	0	3.7	1.1	17.7	0
Metal & Metal Products	347.2	538.3	542.5	656.9	255.7	628.6	315.7	370.4	271.7	419.5	264.2
Petroleum Products	39.9	50.4	756.1	920.9	30.7	56.5	25.6	32.9	61.9	43.9	60.4
Native Products	78.5	91.6	21.5	34.7	63.2	87.2	59.6	66.7	45.9	132.0	53.4
General Gargo	981.3	848.4	94.6	83.4	613.7	1,735.8	1,193.3	934.3	951.0	821.2	542.7
Grand Total	4,224.6	3,201.0	4,323.0	3,634.0	3,268.0	5,455.0	4,776.0	2,968.0	5,993.0	4,866.0	2,183.5

TABLE K4-23 STATISTICS ON CONVENTIONAL CARGOES IN DOMESTIC TRADE AT TAGBILARAN SUBPORT (1982)
(INWARD)

(Unit: Tonnage)

Commodity	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Copra	0	0	0	0	0	0	0	0	0	0	0
Live Animal	2.1	1.6	8.5	1.3	1.9	1.2	1.6	2.2	3.3	3.3	2.0
Palay & Rice	592.6	4.4	0.8	1.3	215.8	18.0	597.2	533.2	593.0	247.6	2.9
Corn	881.8	724.4	538.6	266.0	383.7	1,016.2	990.0	434.5	604.9	371.3	415.1
Sugar	187.1	104.7	115.9	139.5	150.0	176.0	93.4	104.1	98.1	191.7	121.4
Other Cereals	108.7	219.6	195.6	133.1	293.2	191.8	233.8	192.9	187.4	242.3	295.2
Bottled Cargo	1,069.9	1,075.5	1,202.8	1,556.9	669.9	1,118.0	1,230.1	796.1	914.0	956.3	672.0
Empty Bottles	226.7	510.5	178.7	12.9	124.8	0	7.8	18.6	8.7	3.7	8.4
Other Consumer Goods	350.4	251.5	326.5	520.1	449.8	362.2	438.3	282.5	415.5	453.9	343.5
Cement	1,485.5	1,284.0	482.4	1,320.8	535.7	462.2	1,201.6	885.0	8.0	1,845.7	600.0
Fertilizer	5.0	0	7.6	35.0	114.0	833.8	81.6	65.7	1,422.0	625.0	802.5
Chemicals	19.4	3.8	6.1	1.7	23.6	12.2	4.6	8.9	8.5	6.9	0.8
Lumber	105.6	164.8	54.3	207.2	257.2	218.3	285.8	255.4	154.4	207.5	67.9
Plywood & Veneer	42.2	59.3	37.8	35.6	64.3	47.2	74.3	48.3	37.5	62.4	30.3
Animal Feed	466.6	389.3	593.5	502.3	519.2	535.9	526.4	440.5	693.4	670.8	610.1
Products	221.2	1,729.6	50.0	1,132.6	864.6	640.7	1,325.2	725.1	463.5	913.9	826.8
Petroleum Products	862.9	6,386.1	329.5	1,406.8	2,577.1	2,099.8	187.7	2,940.6	1,367.9	2,156.1	2,303.6
Native Products	1.5	0.3	6.5	0.4	0.5	0.9	0.7	0	0	0.1	0.5
General Cargo	1,682.5	1,635.0	2,160.3	2,727.6	2,150.6	2,015.2	2,011.7	1,863.6	2,163.2	2,071.0	1,830.7
Grand Total	8,311.6	14,545.0	6,822.0	10,008.0	9,395.0	9,750.0	9,921.0	9,596.0	9,140.0	11,029.0	8,933.0

TABLE K5-24 CONSUMER PRICE INDEX ON ALL ITEMS

Period	Philippines	Central Visayas
1970	34.6	
1971	39.8	
1972	46.4	
1973	53.9	60.0
1974	72.5	74.9
1975	77.5	81.9
1976	85.0	89.2
1977	93.0	96.1
1978	100.0	100.0
1979	117.5 (+17.5)	117.5 (+17.5)
1980	138.9 (+18.2)	140.9 (+19.9)
1981	157.1 (+13.1)	159.0 (+12.8)
1982	173.2 (+10.2)	183.3 (+15.3)
1983	190.5 (+10.0)	204.5 (+11.6)

Source: Philippine Economic Indicators, NEDA

TABLE K5-25 CONSUMER PRICE INDEX ON ALL ITEMS

	Philippines			Central Visayas		
	1983	1984	'84/'83	1983	1984	'84/'83
January	178.7 (100)	238.2 (100)	+33.2	190.5	240.3	+26.1
February	179.6	245.4	36.6	193.1	257.5	33.4
March	180.0	250.8	39.3	193.5	262.8	35.8
April	180.9	254.6	40.7	194.1	266.7	37.4
May	182.2	258.9	42.1	196.1	270.4	37.9
June	184.4	275.2	49.2	198.6	287.1	44.6
July	188.8	299.8	58.8	206.2	315.9	53.2
August	192.2	308.2	60.4	211.4	322.2	52.6
September	193.0	315.7	63.6	209.5	328.1	56.6
October	195.4	320.1	63.8	210.5	342.4	62.7
November	207.2	332.6	60.5	222.9	351.5	57.7
December	228.8 (128)	337.7 (142)	47.6	227.9	356.2	56.3

Source: NEDA

TABLE K5-26 PRICE ESCALATION, FACTOR

	1985	1986	1987	1988	1989	1990	1991	1992
Local Currency								
Provision on the basis on price May, 1985	A	B	C	D	E	F	G	H
Price rise index for end of the year	30%	20%	20%	15%	10%	8%	8%	8%
Cumulative	Ax1.15	Bx1.15x1.2	Cx1.15x1.2^2	Dx1.15x1.2^2x1.15	Ex1.15x1.2^2x 1.5x1.1	Fx1.15x1.2^2x 1.5x1.1x1.08		
Escalation to be applied	1.15A	1.38B	1.656C	1.904D	2.095E	2.262F	2.443G	2.639H
Foreign Currency								
Price rise index for end of the year	8%	9%	9%	9%	7.5%	6%	6%	6%
Cumulative	Ax1.04	Bx1.04x 1.09	Cx1.04x 1.09^2	Dx1.04x1.09^3	Ex1.04x1.09^3x 1.075	Fx1.04x1.09^3x 1.075x1.06		
Escalation to be applied	1.04A	1.133B	1.235C	1.346D	1.447E	1.534F	1.626G	1.724H

TABLE K5-27 IMPORT OF AGRICULTURAL COMMODITIES

Year	(1) Total Import Value (MUS$)	(2) Import of Food (MUS$)	(3) (2)/(1) (%)	(4) Import of Cercals (MUS$)	(5) (4)/(1) (%)	(6) Import of Rice ('000 ton)
1953	452	76	16.8	21	4.6	-
54	478	79	16.5	25	5.2	42.6
55	547	102	18.6	37	6.8	63.5
56	506	88	17.3	26	5.1	42.4
57	613	108	17.6	37	6.0	77.9
58	558	117	20.9	52	9.3	230.7
59	523	68	7.7	23	4.4	6.5
60	603	85	14.1	24	4.0	-
61	611	101	16.5	48	7.9	186.4
62	586	87	14.8	28	4.8	-
63	618	104	16.8	58	9.4	256.3
64	780	122	15.6	66	8.5	299.9
65	807	155	19.2	94	11.6	569.2
66	852	122	14.3	52	6.1	108.1
67	1062	160	15.1	84	7.9	291.5
68	1150	132	11.5	40	3.5	-
69	1131	124	10.9	38	3.4	-
70	1090	103	9.4	32	2.9	-
71	1186	145	12.2	65	5.5	367.8
72	1229	174	14.2	84	6.8	449.9
73	1596	202	12.7	111	6.9	311.4
74	3143	309	9.8	154	4.9	167.9
75	3459	322	9.3	175	5.0	145.3
76	3633	298	8.2	157	4.3	55.2
77	3914	298	7.6	21	0.5	-
78	4732	293	6.2	121	2.6	N.A.
79	6142	359	5.8	144	2.3	N.A.
80	7727	456	5.9	214	2.8	N.A.
81	7946	532	6.7	230	2.9	N.A.
82	7667	600	7.8	242	3.2	N.A.
83	7487	515	6.9	249	3.3	N.A.

Source: NEDA philippine Statistical Yearbook

TABLE K5-28 TRADING AND PRODUCTION ON RICE & CORN (BOHOL)

(Unit: tons)

	Trading (Domestic)					
	Equivalent to Palay		Corn		Palay + Corn	
	Inward	Outward	Inward	Outward	Inward	Outward
1978	(767)	(1,579)	(10,430)	(36)	(11,197)	(1,615)
1979	(499)	(1,519)	(12,378)	(301)	(12,877)	(1,820)
1980	(1,013)	(3,157)	(9,840)	(13)	(10,853)	(3,170)
1981	7,949	8,328	15,069	2,094	23,018	10,422
1982	9,366	6,848	10,136	1,514	19,502	8,362
1983	38,273	4,634	10,681	1,641	48,954	6,275

	Production (BAEcon)			Palay	
				Outward	Inward
	Palay	Corn	Total	Production	Production
1978	93,920	18,415	112,335	(1.7)%	(0.8)%
1979	92,320	19,405	111,725	(1.6)	(0.5)
1980	133,160	18,436	151,596	(2.4)	(0.8)
1981	113,401	20,605	134,006	7.3	7.0
1982	104,455	26,970	131,425	6.6	9.0
1983	42,042	14,244	56,286	11.0	91.0

		Balance (Palay + Corn)			
			Consumed in		
	Outward	Production	Bohol	Inward	Inward
	Production	-Outward=(a)	(a)+Inward=(b)	(a)	(b)
1978	(1.4)%	(110,720) tons	(121,917) tons	(10.1)%	(9.2)%
1979	(1.6)	(109,905)	(122,782)	(11.7)	(10.5)
1980	(2.1)	(148,426)	(159,279)	(7.3)	(6.8)
1981	7.8	123,584	146,602	18.6	15.7
1982	6.4	123,063	150,927	15.8	12.9
1983	11.1	50,011	105,240	97.9	46.5

Note: Trading figures for 1981 to 1983 are totalized on Tagbilaran Port and Tubigon Port.
Figures in parenthesis show trade on Tagbilaran.

TABLE K5-29 DOMESTIC TRADING

(Unit: tons)

Inward

	Palay & Rice			Corn		
	Tagbilaran	Tubigon	Total	Tagbilaran	Tubigon	Total
1978	514	n.a.	(514)	10,430	n.a.	(10,430)
1979	334	n.a.	(334)	12,378	n.a.	(12,378)
1980	679	n.a.	(679)	9,840	n.a.	(9,840)
1981	2,016	3,310	5,326	12,269	2,800	15,069
1982	2,825	3,450	6,275	7,636	2,500	10,136
1983	20,293	5,350	25,643	8,431	2,250	10,681

Outward

	Palay & Rice			Corn		
	Tagbilaran	Tubigon	Total	Tagbilaran	Tubigon	Total
1978	1,058	n.a.	(1,058)	36	n.a.	(36)
1979	1,018	n.a.	(1,018)	301	n.a.	(301)
1980	2,115	n.a.	(2,115)	13	n.a.	(13)
1981	2,080	3,500	5,580	94	2,000	2,094
1982	338	4,250	4,588	14	1,500	1,514
1983	605	2,500	3,105	141	1,500	1,641

Total

	Palay & Rice		Corn		Palay & Rice+Corn	
	Inward	Outward	Inward	Outward	Inward	Outward
1978	(514)	(1,058)	(10,430)	(36)	(10,944)	1,094
1979	(334)	(1,018)	(12,378)	(301)	(12,712)	1,319
1980	(679)	(2,115)	(9,840)	(13)	(10,519)	2,128
1981	5,326	5,580	15,069	2,094	20,395	7,674
1982	6,275	4,588	10,136	1,514	16,411	6,102
1983	25,643	3,105	10,681	1,641	36,324	4,746

Note: n.a. means non-available.
Palay & Rice is majority transfered by rice.
Source: Philippines Port of Authorities, Tagbilaran and Tubigon.

TABLE K5-30 RICE PRICE STRUCTURE, 1995

			Unit Price	1995 Financial	1995 Economic
1)	Export Price of Thai 5% broken white rice, FOB, Bangkok in 1983 constant price	1/	US$/ton	327	327
2)	Converted in 1985 constant price	2/	US$/ton	327	327
3)	Ocean freight and insurance		US$/ton	35	35
4)	Average export price of Philippine, FOB, Cebu	3/	US$/ton	253	253
		4/	₱/ton	4,554	4,554
5)	Port handling charge and others	5/	₱/ton	-80	-65
6)	Transportation cost to selling center, Cebu		₱/ton		
	Project area to Cebu (Sub total)		₱/ton	-160	-125
	Area to Talibon (Truck)	6/	₱/ton	(75)	(58)
	Talibon to Cebu				
	Handling at Talibon	5/	₱/ton	(25)	(20)
	Freight Charge	6/	₱/ton	(35)	(27)
	Handling at Cebu	5/	₱/ton	(25)	(20)
7)	Price of milled rice, Project Area		₱/ton	4,314	4,364
8)	Palay equivalent price, area	7/	₱/ton	2,890	2,924
9)	Milling costs less value of by-products	7/	₱/ton	0	0
10)	Transportation cost (farm-mill)		₱/ton	-10	-9
11)	Farm gate price of palay		₱/ton	2,880	2,915
			US$/ton	160	162

Note: 1/ Office Memorandum, July 13, 1984, World Bank

2/ According to the weighted index of commodity prices (1977-1979 constant dollars), World Bank, index of cereals in as follows:

1983: 88%, 1984: 82%, 1985: 88%

Hence, price converted in 1985 constant is assumed as the same price in 1983.

3/ Average export price of Philippine is estimated as that of 30% broken rice. Difference of prices between broken 5% and 30% is estimated at 30%.

4/ Official exchange rate is used in ₱18 per US$.

5/ 0.82 of standard conversion factor is applied to convert to economic price.

6/ 0.777 of conversion factor for transportation is applied to convert to economic price.

7/ Conversion rate rice to palay is 0.67.

8/ Milling cost ... ₱18/rice bag of 50 kg
₱360/ton of rice
₱234/ton of palay

By-products .... 1,000 kg of rice = 1,538 kg of palay about 10% of 1,538 kg of palay includes the by-products represented by bran.
154 kg x 1.5 ₱/kg = ₱231

Milling costs less value of by-products
234 - 231 = 0.

TABLE K5-31 CORN PRICE STRUCTURE, 1995

		Unit Price	1995 Financial	1995 Economic
1)	Export Price, US No. 2 Yellow FOB, Gulf Ports in 1983 constant 1/	US$/ton	113	113
2)	Converted in 1985 constant price 2/	US$/ton	113	113
3)	Ocean freight	US$/ton	25	25
4)	CIF Price, Cebu	US$/ton ₱/ton	138 2,485	138 2,485
5)	Port handling charge & others, Cebu	₱/ton	80	65
6)	Transport cost and handling fee, Cebu to Talibon (ship)	₱/ton	160	125
7)	Transportation cost Talibon to Project area (Truck) 3/	₱/ton	75	60
8)	Corn Price ex-mill project area	₱/ton	2,800	2,735
9)	Transportation cost farm to mill 4/	₱/ton	-10	-10
10)	Farm gate corn price	₱/ton	2,790	2,725

Note: 1/ Office Memorandum, July 13, 1984, World Bank

2/ Conversion rate to 1985 constant price is the same as rice price structure.

3/ Consumption place is considered as the project area. Because demand and supply balance for corn in three municipalities shall be negative at present and in 2000 years.

4/ Corn is marketed as corn grains. Then milling cost is not considered.

TABLE K5-32 ECONOMIC PRICE OF FERTILIZER FORECAST IN 1995

	Items		Unit	Urea	DAP	Potassium Chloride
1)	Projected Price in 1983 Constant	1/	US$/ton	260	294	100
2)	Converted in 1985 Constant Price	2/	US$/ton	290	330	112
3)	Ocean Freight	3/	US$/ton	19	30	25
4)	CIF Price, Cebu		US$/ton	309	360	137
		4/	₱/ton	5,562	6,480	2,466
5)	Handling charge and others	5/	₱/ton	456	530	202
6)	Price of Cebu Port		₱/ton	6,018	7,010	2,668
7)	Transportation cost to distribution center, Cebu	6/	₱/ton	15	15	15
8)	Cost of handling at distribution center		₱/ton	20	20	20
9)	Ex-warehouse price for implementation by manufacture/importer Cebu		₱/ton	6,053	7,045	2,703
10)	Transportation Cost from Cebu to Project Area		₱/ton	125	125	125
	of which: Handling Cebu Port			(20)	(20)	(20)
	Freight Charge, Cebu to Talibon			(27)	(27)	(27)
	Handling Talibon Port			(20)	(20)	(20)
	Talibon to Area			(58)	(58)	(58)
11)	Cost of handling by dealers at Project Area		₱/ton	15	15	15
12)	Transportation cost dealers to farmer		₱/ton	8	8	8
13)	Farm gate price of fertilizer		₱/ton	6,201	7,193	2,851
14)	Farm gate price per nutrient		₱/kg	13.48 7/	10.36 8/	4.75 9/

Note: 1/ Office Memorandum, July 13, 1984, World Bank

2/ Manufacturing unit value index in 1983 constant is estimated at 111.8 in 1985 on Office Memorandum, July 13, 1984. World Bank.

3/ Based on the trading statistics, 1983

4/ Official exchange rate is ₱18.00.

5/ Handling charge and other is estimated at 10% of CIF price of Cebu. 0.820 of standard conversion factor is applied to convert to economic price.

6) The fertilizer manufacturers/importers who has been approved the ex-warehouse prices by the Fertilizer Industry Authority locate at Cebu, Ormoc and Gogo in Southern Island District. Such manufacturers/importers would be the distribution center of fertilizer for the Project Area. 0.777 of conversion factor for transportation is applied to convert to economic price.

7/ Nutrient price of Nitrogen
(6.201 ÷ 0.46 = 13.48 ₱/kg).

8/ Nutrient price of Phosphorous (N.P.K ratio is 18-46-0)
13.48 ₱/kg of N x 180 kg = ₱2,426.
₱7,193 - ₱2,426 = ₱4,767
₱4,767 ÷ 0.46 = 10,363 ₱/ton ÷ ₱10.36/kg.

9/ Nutrient Price of Potassium
(60% of P_2O5 = 2.851 ÷ 0.6 = 4.75 ₱/kg)

TABLE K5-33 FORECASTED PRICES IN 1995

(Peso)

Item	Unit	Financial	Economic
Crop			
Palay	ton	2,880	2,915
Corn	ton	2,790	2,725
Mungbean	ton	11,000	11,000
Peanuts (with shell)	ton	10,000	8,200
Casava	ton	1,200	985
Camote	ton	1,600	1,310
Watermelon	ton	2,000	1,640
Fertilizer			
N	kg	13.81	13.48
P	kg	10.99	10.36
K	kg	4.91	4.75
Lime	ton	700	574
Pesticides			
Seciro XLR	l	64	52
Furadan 3G	kg	45	37
Thiodan EC	l	185	152
Aldrex	kg	195	160
Malation 50%	l	200	164
Lennorte	kg	100	82
Difoltan	kg	200	164
Benlate	100gm	44	36
Comport	ton	112	109
Herbicides			
2.4D Amino	l	110	90
Hedonol	l	74	60
Butachlor	l	110	90
Seeds			
Watermelon (sugababy)	kg	840	690
Rice (certified)	kg	3.5	3.6
Unskilled labor	₱/day	11.5	5.6
Machinery cost (Paddy)	₱/ha	898	736
Draft animal cost (Paddy)	₱/ha	165	135
Machinery cost (Diversification)	₱/ha	425	349

TABLE K5-34 CROP BUDGET PER HECTARE WITH PROJECT (ECONOMIC)

(Unit: ₱)

Cost Items	Paddy, Transplant		Paddy, Direct Seed		Mung-bean	Peanut	Corn	Water-melon	Sweet Potato (un-irrig.)	Cassava (un-irrig.)
	Wet	Dry	Wet	Dry						
Seeds	180	180	360	360	225	638	54	1,380	2,500	910
Compost	-	-	-	-	-	-	545	1,308	-	-
Lime	861	-	861	-	861	861	1,722	1,722	861	861
Fertilizer	1,272	1,405	1,221	1,354	1,144	541	1,294	1,685	1,133	848
Pesticides	1,310	1,310	1,310	1,310	896	1,124	707	2,447	629	-
Herbicides	180	180	233	233	-	-	-	-	-	-
Others	84	90	84	90	100	128	-	-	400	400
Draft Animal										
Man-day	330	330	221	221	215	314	314	344	285	285
Animal-day	74	74	74	74	74	74	74	74	135	135
Machinery										
Man-day	221	221	134	134	143	223	273	267	-	-
Machinery	331	331	331	331	157	157	157	157	-	-
Total Cost	4,843	4,121	4,829	4,107	3,815	4,060	5,140	9,384	5,943	3,439
Gross income	12,243	13,118	12,243	13,118	11,000	13,940	7,358	14,596	14,148	13,987
Net Prod. Value	7,400	8,987	7,414	9,011	7,185	9,880	2,218	5,212	8,205	10,548
N.P.V./G.I.	60%	68%	61%	69%	65%	70%	30%	36%	58%	75%

TABLE K5-35 CROP BUDGET PER HECTARE WITH PROJECT (FINANCIAL)

(Unit: ₱)

Cost Items	Paddy, Transplant		Paddy, Direct Seed		Mung-bean	Peanut	Corn	Water-melon	Sweet Potato (un-irrig.)	Cassava (un-irrig.)
	Wet	Dry	Wet	Dry						
Seeds	175	175	350	350	225	638	54	1,380	2,500	910
Compost	-	-	-	-	-	-	-	-	-	-
Lime	1,050	-	1,050	-	1,050	1,050	2,100	2,100	1,050	1,050
Fertilizer	1,320	1,456	1,267	1,403	1,187	745	1,212	1,190	1,177	882
Pesticides	1,594	1,594	1,594	1,594	720	1,370	861	1,697	765	-
Herbicides	220	220	286	286	-	-	-	-	-	-
Others	156	172	156	172	100	170	-	-	400	400
Draft Animal										
Man-day	677	677	454	454	442	644	644	707	585	584
Animal-day	91	91	91	91	91	91	91	91	165	165
Machinery										
Man-day	454	454	132	132	293	459	560	547	-	-
Machinery	404	404	404	404	404	404	404	404	-	-
Total Cost	6,141	5,243	5,784	4,886	4,512	5,571	5,937	8,769	6,442	3,991
Gross income	12,096	12,960	12,096	12,960	11,000	17,000	7,533	17,800	17,280	17,040
Net Prod. value	5,995	7,717	6,312	8,074	6,488	11,429	1,596	9,031	10,838	13,049
N.P.V./G.I.	49%	60%	52%	62%	59%	67%	21%	51%	63%	77%

TABLE K5-36 CROP BUDGET PER HECTARE WITH THE PROJECT (ECONOMIC)

(Unit: Peso)

Cost Items	Paddy, Transplant Wet Season			Paddy, Transplant Dry Season			Paddy, Direct Seed Wet Season			Paddy, Direct Seed Dry Season			Mungbean		
	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)
Seeds	50kg	3.6₱	180	50kg	3.6₱	180	100kg	3.6₱	360	100kg	3.6₱	360	25kg	9₱	225
Compost	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lime	1,500kg	574₱/t	861	-	-	-	1,500kg	574₱/t	861	-	-	-	1,500kg	574₱/t	861
Fertilizer															
Urea	138kg	N 13.48	837	160	N 13.48	970	133	N 13.48	807	155	N 13.48	940	-	-	-
Super-phos	210	P 10.36	435	210	P 10.36	435	200	P 10.36	414	200	P 10.36	414	-	-	-
MP	-	-	-	-	-	-	-	-	-	-	-	-	50	K 4.75	143
16-20-0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-14-14	-	-	-	-	-	-	-	-	-	-	-	-	250	N.P.K.	1,001
Pesticides															
Seven XLR	1 lit.	52	52	1 lit.	52	52	1 lit.	52	52	1 lit.	52	52	-	-	-
Furadan EC	34kg	37	1,258	34kg	37	1,258	34kg	37	1,258	34kg	37	1,258	16kg	37	592
Thiodan	-	-	-	-	-	-	-	-	-	-	-	-	2 lit.	152	304

CROP BUDGET PER HECTARE WITH THE PROJECT (ECONOMIC)

(Unit: Peso)

	Paddy, Transplant Wet Season			Paddy, Transplant Dry Season			Paddy, Direct Seed Wet Season			Paddy, Direct Seed Dry Season			Mungbean		
	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)
Herbicides															
2.4D Amine	2 lit.	90	180	2 lit.	90	180	-	-	-	-	-	-	-	-	-
Butachlor	-	-	-	-	-	-	1.25 lit.	90	113	1.25 lit.	90	113	-	-	-
Hedonal	-	-	-	-	-	-	2 lit.	60	120	2 lit.	60	120	-	-	-
Others	42 sack	2₱	84	45 sack	2₱	90	42 sack	2₱	84	45 sack	2₱	90	-	-	100
Draft Animal															
Man-day	58.9	5.6	330	58.9	5.6	330	39.5	5.6	221	39.5	5.6	221	38.4	5.6	215
Animal-day	0.55ha	135₱/ha	74	0.55ha	135₱/ha	74	0.55ha	135₱/ha	74	0.55ha	135₱/ha	74	0.55ha	135₱/ha	74
Machinery															
Man-day	39.5	5.6	221	39.5	5.6	221	23.9	5.6	134	23.9	5.6	134	25.5	5.6	143
Machinery	0.45ha	736₱/ha	331	0.45ha	736₱/ha	331	0.45ha	736₱/ha	331	0.45ha	736₱/ha	331	0.45ha	349₱/ha	157
Total Cost			4,843			4,121			4,829			4,107			3,815
Gross income	4.2t	2,915₱	12,243₱	4.5t	2,915₱	13,118₱	4.2t	2,915₱	12,243₱	4.5t	2,915₱	13,118₱	1.0t	11,000₱	11,000
Net Prod. Value			7,400			8,987			7,414			9,011			7,185
			60%			68%			61%			69%			65%

Note: Rate of accreage between draft animal and machinery is 55% : 45%.

TABLE K5-37 CROP BUDGET PER HECTARE WITH THE PROJECT (ECONOMIC)

(Unit: Peso)

Cost Items	Peanuts			Corn			Vegetable (Watermelon)			Sweet Potato (un-irrigated)			Cassava (un-irrigated)		
	Qt.	Unit price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)
Seeds	125kg	5.1₱	638	20kg	2.7₱	54	2kg	690₱	1,380	Cutting 50,000	0.05₱	2,500	Cutting 13,000	0.07₱	910
Compost	-	-	-	5ton	109	545	12ton	109	1,308	-	-	-	-	-	-
Lime	1,500kg	574₱/t	861	3,000kg	574₱/t	1,722	3,000kg	574₱/t	1,722	1,500kg	574₱/t	861	1,500kg	574₱/t	861
Fertilizer															
Urea	-	-	-	50kg	N 13.48	303	89kg	N 13.48	540	-	-	-	-	-	-
Super-phos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MP	50kg	K 4.75	143	50kg	K 4.75	143	-	-	-	100kg	K 4.75	285₱	-	-	-
16-20-0	94kg	N.P.	398	200kg	N.P.	848	-	-	-	200kg	N.P.	848	200kg	N.P.	848
14-14-14	-	-	-	-	-	-	286kg	N.P.	1,145	-	-	-	-	-	-
Pesticides															
Seven XLR	-	-	-	1.5 lit.	52	78	-	-	-	-	-	-	-	-	-
Furadan EC	-	-	-	17kg	37	629	17kg	37	629	17kg	37	629	-	-	-
Aldrex	6kg	160	960	-	-	-	-	-	-	-	-	-	-	-	-
Malathion 50%	1 lit.	164	164	-	-	-	3 lit.	164	492	-	-	-	-	-	-
Lannate	-	-	-	-	-	-	3kg	82	246	-	-	-	-	-	-
Benlate	-	-	-	-	-	-	3kg	360	1,080	-	-	-	-	-	-
Other Material	85 sack	1.5₱	128	-	-	-	-	-	-	200	2	400	200	2	400
Draft Animal															
Man-day	56.0	5.6	314	56.0	5.6	314	61.5	5.6	344	50.9	5.6	285	50.8	5.6	285
Anumal-day	0.55ha	135₱/ha	74	0.55ha	135₱/ha	74	0.55ha	135₱/ha	74	1ha	135₱/ha	135	1ha	135₱/ha	135
Machinery															
Man-day	39.9	5.6	223	48.7	5.6	273	47.6	5.6	267	-	-	-	-	-	-
Machinery	0.45ha	349₱/ha	157	0.45ha	349₱/ha	157	0.45ha	349₱/ha	157	-	-	-	-	-	-
Total Cost			4,060			5,140			9,384			5,943			3,439
Gross income	1.7t	8,200₱	13,940	2.7t	2,725₱	7,358	8.9t	1,640₱	14,596	10.8t	1,310	14,148	14.2t	985	13,987
Net Prod. Value			9,880			2,218			5,212			8,205			10,548
N.P.V./G.I.			70%			30%			36%			58%			75%

Note: Malathion for peanuts in un-irrigated upland field is not applied.

TABLE K5-38 CROP BUDGET PER HECTARE WITHOUT THE PROJECT (ECONOMIC)

(Unit: Peso)

Cost Items	Rainfed Paddy Wet			Rainfed Paddy Dry			Sweet Potatoes			Cossava		
	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)	Qt.	Unit Price (₱)	Value (₱)
Seeds	55kg	3.6	198	55kg	3.6	198	Cutting 10,000	0.05	500	Cutting 4,000	0.07	280
Fertilizer 16-20-0	7kg		30	8.2kg		35	-		-	-		-
14-14-14	42kg		168	44kg		176	-		-	40kg		160
Pesticides & Herbicides	1.6qt	66	105	1.2qt	66	80	-		-	-		-
Hawesting/Thresher	128kg	2.915/k	373	100kg	2,915/k	292	-		-	-		-
Labor	76day	5.6	426	65.4day	5.6	366	36	5.6	202	33.5	5.6	188
Animal		135₱/ha	135		135₱/ha	135			135			135
										90sack	2	180
Total Cost			1,435			1,282			837			943
Gross income	1.37t	2,915₱	3,994	1.26t	2,915	3,673	2.02t	1,310	2,646	4.71t	985	4,639
Net Production Value			2,559			2,391			1,809			3,696
N.P.V./G.I.			64%			65%			68%			80%

Economic Costs of Farm Labor

1. Methods of Estimation

Pricing of farm labor is the assessment of the opportunity cost. The opportunity costs are estimated in the following general criteria.

Point A: The opportunity for off-farm employment

During the "non-peak" period farmers can, and often do, undertake activities like fishing, carpentry, home repairs, wood gathering, cottage industries like hat weaving and basket making, construction work and other casual labor. Wage rates of these jobs are unclear. According to the labor wage survey, the meal cost for hired labor seems to be about five pesos.

Point B: The farm work season as usual (non-peak period)

The opportunities for work would compete with the permanent off-farm employment opportunities. The less productive off-farm employment is scarce, the more farm labor force is drawn into farm work. Average labor wage is considered at about seven pesos per day.

Point C: The full employment peak periods

On the employment level corresponding to full employment peak period, the opportunity cost is equal to the observed market wage rate. Average farm hired labor wage of 11.5 pesos in the project area is considered as market wage rate.

Point D: The attractive farm wage rate for outside labor market

Labor would be hired under the more demand than the full employment for farmers themselves. Then wage rate goes up. The opportunity cost of alternative labor pool corresponds to the highest level of farm labor wage in the project area.

It is postulated that the marginal opportunity cost of labor supplied for farm work in the project area can be represented by an "S-shaped" curve which is drawn in FIGURE K5-1 and FIGURE K5-2 using Point A, B, C and D as mentioned above.

2. Available Farm Labor Force

Farm labor force to be available in th project area will depend upon labor inside and outside the project area. TABLE K5-39 and TABLE K5-40 indicate the mandays per month of full time and part time farmer with and without project inside the project area. TABLE K5-41 explains available farm labor force inside and outside the project area.

3. Total Labor Demand by Month

The labor demand by month which is shown in TABLE K5-42 and TABLE K5-43 was calculated based on the data of labor distribution by crops. These man days by month are converted to percentage of potential full employment as shown at TABLE K5-44 and TABLE K5-45.

4. Wage Rate by Month

Wage rate, namely, marginal opportunity cost is assumed by application of percentage of potential full employment to "S-shaped" curve. (TABLE K5-46 and TABLE K5-47)

TABLE K5-39 AVAILABLE FARM LABOR FORCE INSIDE THE PROJECT AREA (WITH PROJECT)

(Unit: 10^3 man-days)

Year	No. of Farm (household)	Full Time Farmer (household)	Part Time Farmer (household)	Family Labor per Farm: Full Time (person)	Family Labor per Farm: Part Time (person)	Man-days per Month: Full Time	Man-days per Month: Part Time	Man-days per Month: Total
1990	2,000	1,600	400	2.1	1.1	87	11	98
1991	2,220	1,820	400	2.1	1.1	99	12	111
1992	3,260	2,650	610	2.1	1.1	145	17	162
1993	3,270	2,660	610	2.2	1.2	152	19	171
1994	3,290	2,670	620	2.2	1.2	153	19	172
1995	3,300	2,680	620	2.3	1.3	160	21	181

Note: Labor days per month is average 26 days.

TABLE K5-40 AVAILABLE FARM LABOR FORCE INSIDE THE PROJECT AREA (WITHOUT PROJECT)

(Unit: 10^3 man-days)

Year	No. of Farm (household)	Full Time Farmer (household)	Part Time Farmer (household)	Family Labor per Farm: Full Time (person)	Family Labor per Farm: Part Time (person)	Man-days per Month: Full Time	Man-days per Month: Part Time	Man-days per Month: Total
1990	2,000	1,000	1,000	2.1	1.1	55	29	84
1991	2,010	1,005	1,005	2.1	1.1	55	29	84
1992	2,025	1,013	1,012	2.1	1.1	55	29	84
1993	2,040	1,020	1,020	2.1	1.1	56	29	85
1994	2,055	1,028	1,027	2.1	1.1	56	29	85
1995	2,070	1,035	1,035	2.1	1.1	56	30	86

TABLE K5-41 AVAILABLE FARM LABOR FORCE PER MONTH INCLUDING SURROUNDING AREAS

(Unit: 10^3 man-days)

Year	Without Project			With Project		
	Inside	Outside	Total	Inside	Outside	Total
1990	84	65	149	98	65	163
1991	84	66	150	111	66	177
1992	84	68	152	162	68	230
1993	85	69	153	171	69	239
1994	85	70	154	172	70	242
1995	86	71	155	181	71	252

Note:
A. Population of project municipalities ..... 66,000 persons
B. Population of project area ..... 10,870 persons
C. B/A 16.5%
D. Population of 15 years old and above ..... 29,800 persons
E. Population of 15 years old and above excluding those in project area ..... 29,800 x (1 - 0.165) = 24,880
F. Available farm labor force is assumed at 24,800 x 10% = 2,490 persons
G. Available farm labor force per month 2,490 x 26 = 64,740 man-days

TABLE K5-42 TOTAL LABOR DEMAND BE MONTH WITHOUT PROJECT

(Unit: 10^3 man-days)

Jan.	Feb.	Mar.	Apr.	May	June
20.6	11.0	32.7	24.8	33.4	66.6

July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
41.3	28.4	20.2	49.8	43.1	41.5	413.9

TABLE K5-43 TOTAL LABOR DEMAND BY MONTH WITH PROJECT

(Unit: 10^3 man-days)

Year	AL.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1990	163	13.1	7.7	29.9	18.9	20.4	52.8	28.4	13.6	9.0	40.6	35.3	32.0	301.7
1991	177	13.1	8.1	29.9	18.9	20.4	56.5	46.2	16.6	16.5	50.5	32.9	34.0	343.6
1992	230	44.0	51.2	96.9	81.9	44.8	109.5	138.3	57.0	53.5	128.7	80.5	90.3	979.5
1993	239	ibid												
1994	242	ibid												
1995	252	ibid												

Note: AL; Available labor forces(inside and outside the Project Area) per month.

TABLE K5-44 MONTHLY FARM LABOR DEMAND AS PERCENTAGE OF POTENTIAL FULL EMPLOYMENT (WITHOUT PROJECT)

(Unit: %)

Year	AL.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1990	149	14	7	22	17	22	45	28	19	14	33	29	28
1991	150	14	7	22	17	22	44	28	19	14	33	29	28
1992	152	14	7	21	16	22	44	27	19	13	33	28	27
1993	153	13	7	21	16	22	43	27	19	13	33	28	27
1994	154	13	7	21	16	22	43	27	18	13	32	28	27

TABLE K5-45 MONTHLY FARM LABOR DEMAND AS PERCENTAGE OF POTENTIAL FULL DEVELOPMENT (WITH PROJECT)

(Unit: %)

Year	AL.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1990	163	8	5	18	12	15	32	17	8	6	25	22	20
1991	177	7	5	17	11	12	32	26	9	9	29	19	19
1992	230	19	22	42	36	19	48	60	25	23	56	35	39
1993	239	18	21	41	34	19	46	58	24	22	54	34	38
1994	242	18	21	40	34	19	45	57	24	22	53	33	37

TABLE K 5-46 WAGE RATE BY MONTH WITHOUT PROJECT

(Unit: peso/man-day)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1990	5.2	5.1	5.6	5.3	5.6	6.5	5.6	5.4	5.2	6.0	5.8	5.8
1991	5.2	5.1	5.8	5.3	5.6	6.5	5.6	5.4	5.2	6.0	5.8	5.8
1992	5.2	5.1	5.5	5.3	5.6	6.5	5.5	5.4	5.2	6.0	5.8	5.7
1993	5.2	5 1	5.5	5.3	5.6	6.4	5.5	5.4	5.2	6.0	5.8	5.7
1994	5.2	5.1	5.5	5.3	5.6	6.4	5.5	5.4	5.2	6.0	5.8	5.7

TABLE K5-47 WAGE RATE BY MONTH WITH PROJECT

(Unit: peso/man-day)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1990	5.2	5.1	5.3	5.3	5.3	5.9	5.3	5.2	5.1	5.6	5.5	5.4
1991	5.2	5.1	5.3	5.3	5.3	5.9	5.6	5.2	5.2	5.8	5.4	5.4
1992	5.4	5.6	6.4	6.1	5.4	6.8	7.8	5.6	5.6	7.3	6.0	6.2
1993	5.4	5.5	6.4	6.0	5.4	6.7	7.5	5.6	5.5	7.2	6.0	6.2
1994	5.4	5.5	6.3	6.0	5.4	6.7	7.5	5.6	5.5	7.2	5.9	6.1

TABLE K5-48 TOTAL LABOR COSTS BY MONTH WITHOUT PROJECT

(Unit: 10^3 peso)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1990	107	56	183	131	187	433	231	153	105	299	250	241	2,076
1991	107	56	183	131	187	433	231	153	105	299	250	241	2,076
1992	107	56	180	131	187	433	227	153	105	299	250	237	2,165
1993	107	56	180	131	187	426	227	153	105	299	250	237	2,158
1994	107	56	180	131	187	426	227	153	105	299	250	237	2,158

TABLE K5-49 TOTAL LABOR COSTS BY MONTH WITH PROJECT

(Unit: 10^3 peso)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	Average Wage
1990	68	39	167	100	114	343	159	73	47	244	205	186	1,745	5.8 ₱/day
1991	68	41	167	100	114	367	259	90	86	303	191	197	1,983	5.8
1992	238	261	533	434	251	712	761	308	278	772	467	524	5,539	5.7
1993	238	261	533	434	251	701	761	308	278	772	467	524	5,528	5.6
1994	238	261	533	434	251	701	761	308	278	772	467	524	5,528	5.6

FIGURE K5–1 TYPICAL PRODUCTIVITY COST FOR FARM LABOR

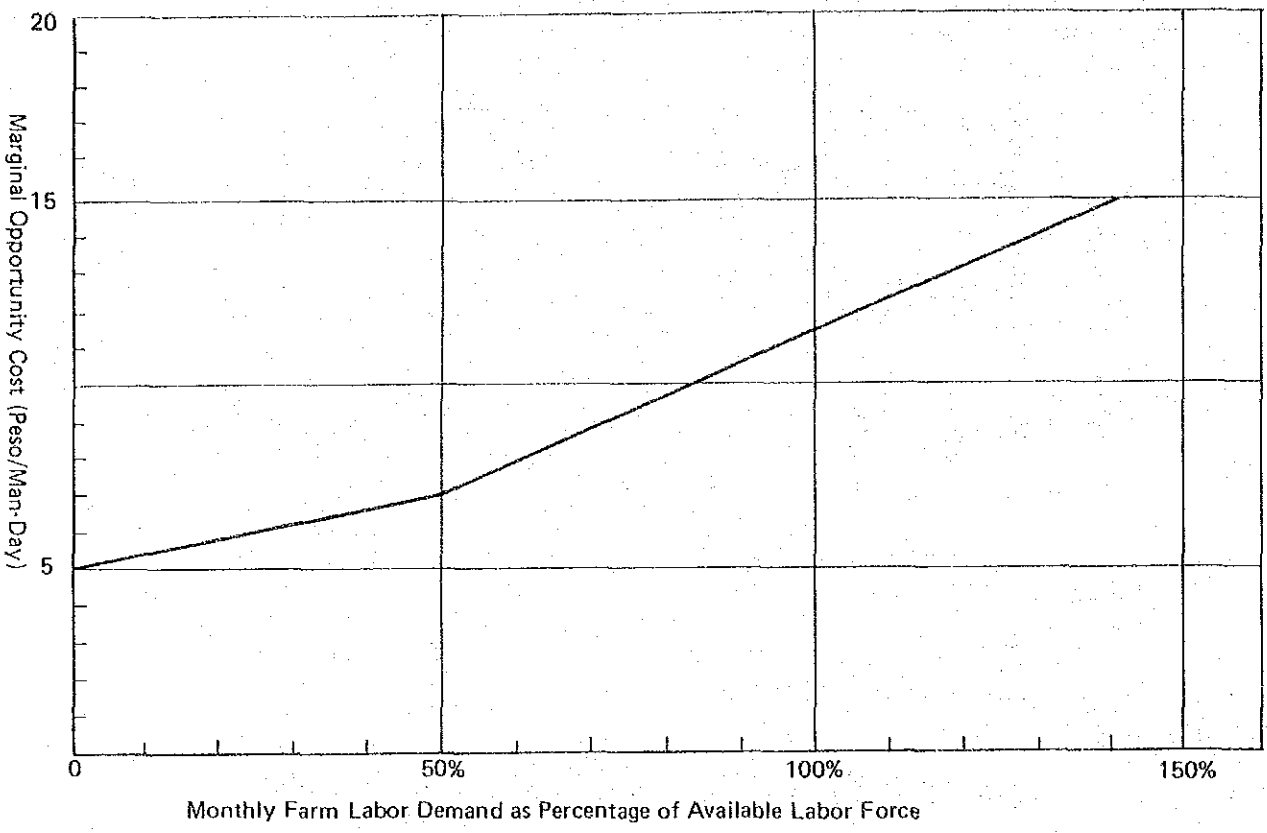

FIGURE K5–2 OPPORTUNITY COST CURVE FOR FARM LABOR

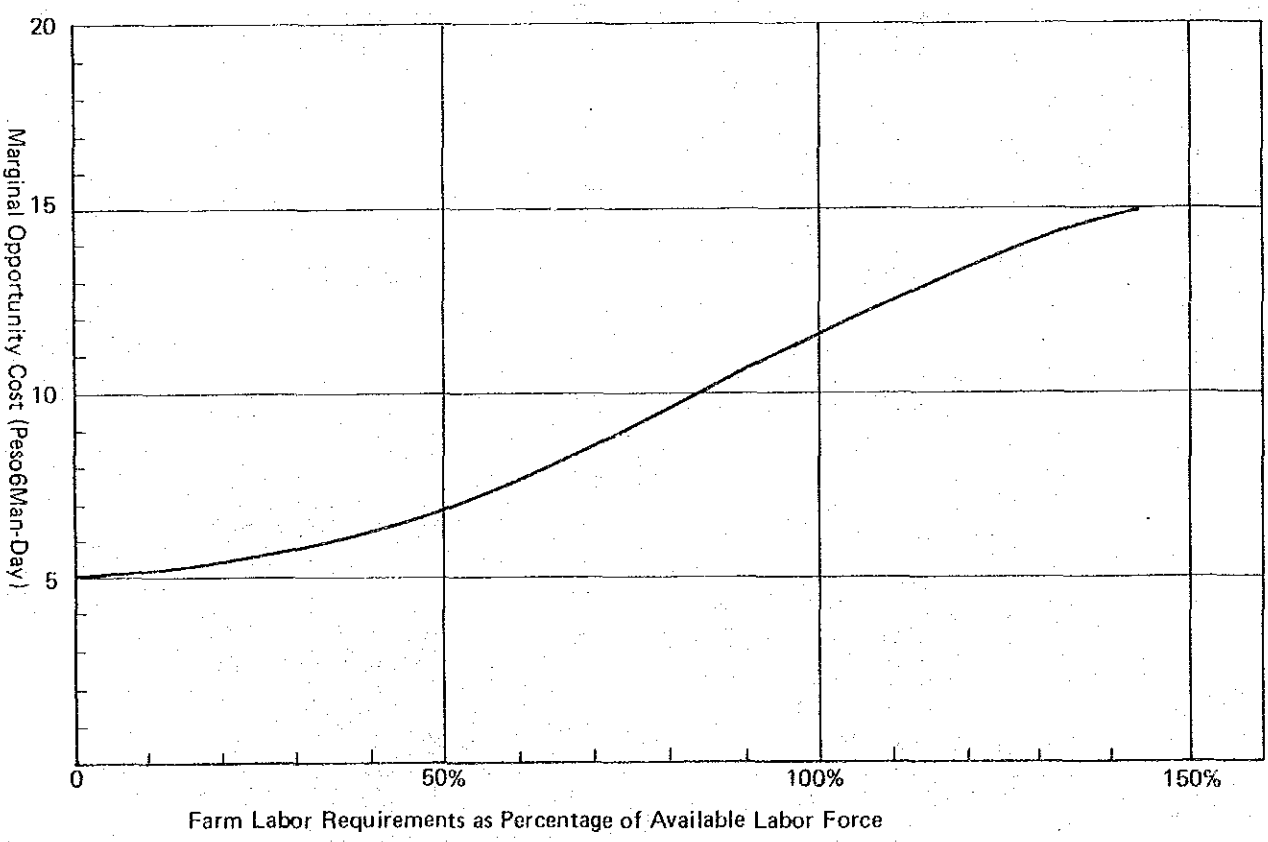

TABLE K5-50 CROPPED AREA

(Unit: ha)

		1990	1991	1992	1993	1994
Without Project						
Rainfed Paddy	(Wet)	1,350	1,350	1,350	1,350	1,350
	(Dry)	1,140	1,140	1,140	1,140	1,140
	(Sub-total)	2,490	2,490	2,490	2,490	2,490
Cassava		570	570	570	570	570
Sweet Potato		430	430	430	430	430
Total		3,490	3,490	3,490	3,490	3,490
With Project						
Irrigated Paddy	(Wet)	-	700	4,420	4,420	4,420
	(Dry)	390	390	3,300	3,300	3,300
	(Sub-total)	390	1,090	7,720	7,720	7,720
Bean		47	47	420	420	420
Peanut		47	47	420	420	420
Corn		48	48	420	420	420
Vegetable		48	48	420	420	420
Un-irrigated Cassave		130	130	720	720	720
Un-irrigated Sweet Potato		-	90	480	480	480
Remaining Area						
Rainfed Paddy	(Wet)	1,350	1,050	-	-	-
	(Dry)	890	890	-	-	-
Cassava		440	440	-	-	-
Sweet Potato		430	330			
Total		3,820	4,380	10,600	10,600	10,600

TABLE K5-S1 GROSS PRODUCTION VALUE WITH PROJECT

(1,000 P)

Project Year		1 1987	2 1988	3 1989	4 1990	5 1991	6 1992	7 1993	8 1994	9 1995	10 1996	11 1997	12 1998	13 1999
Irrigated Paddy	P.Q. (t)				1,132	3,173	21,146	24,859	27,220	28,796	30,253	31,500	32,499	33,414
	Price (P/t)				2,915									
	G.P.V.				3,300	9,249	61,641	72,464	79,346	83,940	88,187	91,823	74,735	97,402
Bean	P.Q. (t)				28	33	262	299	340	340	383	383	416	416
	Price (P/t)				11,000									
	G.P.V.				308	363	2,882	3,289	3,740	3,740	4,213	4,213	4,576	4,576
Peanut	P.Q. (t)				47	56	434	514	551	593	597	640	673	714
	Price (P/t)				8,200									
	G.P.V.				385	459	3,559	4,215	4,518	4,863	4,895	5,248	5,519	5,855
Corn	P.Q. (t)				77	91	691	813	854	933	981	1,023	1,097	1,134
	Price (P/t)				2,725									
	G.P.V.				210	248	1,883	2,215	2,327	2,542	2,673	2,787	2,989	3,090
Vegetable	P.Q. (t)				254	298	2,294	2,647	2,857	3,025	3,235	3,403	3,589	3,738
	Price (P/t)				1,640									
	G.P.V.				417	489	3,762	4,341	4,685	4,961	5,305	5,581	5,886	6,130
Non-Irrigated Cassava	P.Q. (t)				1,105	1,287	6,406	7,327	7,886	8,390	8,894	9,398	9,811	10,224
	Price (P/t)				982									
	G.P.V.				676	1,268	6,310	7,213	7,768	8,264	8,761	9,257	9,664	10,071
Sweet Potato	P.Q. (t)				-	684	3,264	3,738	3,987	4,227	4,515	4,755	4,989	5,184
	Price (P/t)				-	1,310								
	G.P.V.				-	876	4,276	4,897	5,223	5,537	5,915	6,229	6,536	6,791
Sub-total					5,296	12,972	84,313	98,634	107,607	113,847	119,949	125,138	129,905	139,915
Remaining Area														
Rainfed Paddy	P.Q. (t)				2,971	2,560								
	Price (P/t)				2,915									
	G.P.V.				8,600	7,462								
Cassava	P.Q. (t)				2,077	2,077								
	Price (P/t)				985									
	G.P.V.				2,046	2,046								
Sweet Potato	P.Q. (t)				869	670								
	Price (P/t)				1,310									
	G.P.V.				1,138	878								
Sub-total					11,844	10,386								
Grand Total Value					17,140	23,358	84,313	98,634	107,607	113,847	119,949	125,138	129,905	133,915

TABLE K5-52 GROSS PRODUCTION VALUE WITHOUT PROJECT

(1,000 ₱)

		1 1987	2 1988	3 1989	4 1990	5 1991	6 1992	7 1993	8 1994	9 1995	10 1996	11 1997	12 1998	13 1999
Rainfed Paddy Wet	P.Q. (t)				1,850	1,863	1,877	1,877	1,890	1,904	1,904	1,917	1,917	1,931
	Price (₱/t)				2,915									
	G.P.V.				5,393	5,431	5,471	5,471	5,509	5,550	5,550	5,588	5,588	5,629
Rainged Paddy Dry	P.Q. (t)				1,436	1,448	1,448	1,459	1,471	1,471	1,482	1,482	1,493	1,493
	Price (₱)				2,915									
	G.P.V.				4,186	4,221	4,221	4,253	4,288	4,288	4,320	4,320	4,352	4,352
Cassava	P.Q. (t)				2,684	2,691	2,702	2,708	2,713	2,719	2,724	2,731	2,736	2,741
	Price (₱/t)				985									
	G.P.V.				2,644	2,651	2,661	2,667	2,672	2,678	2,683	2,690	2,695	2,700
Sweet Potato	P.Q. (t)				869	873	873	873	873	877	877	877	877	882
	Price (₱/t)				1,310									
	G.P.V.				1,138	1,144	1,144	1,144	1,144	1,149	1,149	1,149	1,149	1,155
Total Value					13,361	13,447	13,497	13,535	13,613	13,665	13,702	13,747	13,784	13,836

TABLE K5-53 PRODUCTION COST WITH PROJECT (ECONOMIC)

(Unit: 1,000 ₱)

	4 1990	5 1991	6 1992	7 1993	8 1994	9 1995	10 1996	11 1997	Annual Pro. Cost per ha. (₱) 1st Yr.	2nd	3rd	4th	5th
Irrigated													
Palay	1,492	4,001	30,002	28,931	30,481	32,919	34,981	34,981	refer to note				
Mungbean	143	143	1,290	1,299	1,388	1,458	1,602	1,602	3,050	3,050	3,240	3,430	3,815
Peanut	153	153	1,374	1,384	1,478	1,552	1,705	1,705	3,250	3,250	3,450	3,650	4,060
Corn	197	197	1,739	1,751	1,873	1,969	2,159	2,159	4,110	4,110	4,370	4,630	5,140
Vegetable	360	360	3,173	3,195	3,415	3,590	3,940	3,940	7,500	7,500	7,970	8,440	9,384
Non-irrigated													
Cassava	358	358	2,002	2,025	2,170	2,276	2,476	2,476	2,750	2,750	2,920	3,100	3,439
Sweet Potato	-	428	2,281	2,308	2,452	2,624	2,853	2,853	4,750	4,250	5,050	5,350	5,943
Sub-total	2,703	5,640	-	-	-	-	-	-					
Remaining Area													
Rainfed Paddy	3,526	2,880	-	-	-	-	-	-					
Cassava	368	368	-	-	-	-	-	-					
Sweet Potato	405	311	-	-	-	-	-	-					
Sub-total	4,299	3,559	-	-	-	-	-	-					
Grand Total Value	7,002	9,199	41,861	40,893	43,257	46,388	49,716	49,716					

Note: Annual Pro. Cost per ha. (₱)

	Wet Season Paddy				Dry Season Paddy			
	T.P.		D.S.		T.P.		D.S.	
Year	exis.	new.	exis.	new.	exis.	new.	exis.	new.
1st Yr.	3,630	3,970	3,620	3,960	3,090	4,320	3,080	4,310
2nd Yrs.	4,120	3,880	4,100	3,860	3,500	3,300	3,490	3,290
3rd Yrs.	4,360	4,120	4,350	4,100	3,710	3,500	3,700	3,490
4th Yrs.	4,843	4,360	4,829	4,350	4,121	3,710	4,107	3,700
5th Yrs.	4,843	4,843	4,829	4,829	4,121	4,121	4,107	4,107

Note: T.P.: Transplant
D.S.: Direct seedling
exis.: existing paddy field
new.: new reclamation paddy field

Application of lime per ha. for paddy is planned as follows.

1. Wet season paddy-existing field: 1.5 ton, new field: 2.5 ton in 1st year, 1.5 ton after 2nd year.
2. Dry season paddy-existing field: 0, new field: 2.5 ton in 1st year.

TABLE K5-54 PRODUCTION COST WITHOUT PROJECT (ECONOMIC)

(Unit: 1,000 ₱)

		1990	1991	1992	1993	1994
Rainfed Paddy						
(Wet)	Area (ha)	1,600				
	Cost/ha (₱)	1,435				
	P.C. (₱)	2,296	2,310	2,330	2,350	2,370
(Dry)	Area (ha)	1,300				
	Cost/ha (₱)	1,282				
	P.C. (₱)	1,667	1,680	1,690	1,710	1,720
Cassava	Area (ha)	570				
	Cost/ha (₱)	837				
	P.C. (₱)	477	480	485	490	490
Sweet Potato	Area (ha)	430				
	Cost/ha (₱)	943				
	P.C. (₱)	418	420	425	430	430
Total Production Cost		4,858	4,890	4,930	4,980	5,010

TABLE K5-55 INCREMENT NET PRODUCTION VALUE

(Unit. million Peso)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
With Project										
Gross Production Value	17.14	23.36	84.31	98.63	107.61	113.85	119.95	125.14	129.91	133.92
Production Cost	7.00	9.20	41.86	40.89	43.26	46.39	49.72	49.72	49.72	49.72
Net Production Value	10.14	14.16	42.45	57.74	64.35	67.46	70.23	75.42	80.19	84.20
Without Project										
Gross Production Value	13.36	13.45	13.50	13.54	13.61	13.67	13.70	13.75	13.78	13.84
Production Cost	4.86	4.89	4.93	4.98	5.01	5.01	5.05	5.05	5.05	5.05
Net Production Value	8.50	8.56	8.57	8.56	8.60	8.66	8.65	8.70	8.73	8.79
Incremental N.P.V.	1.64	5.60	33.88	49.18	55.75	58.80	61.58	66.72	71.46	75.41

Tilapia Fingerling Production

Breeding tilapia nilotica or nile tilapia is being successfully undertaken in small backyard fishponds built along irrigated ricefields along the shorelines of Laguna de Bay. With the increasing demand for tilapia nilotica fingerlings, Bereau of Fishery officers at the Bay demonstration fish farm encourage them to build breeding ponds. Technical assistance and fish seeds were provided by the Burean. Today, there are one hundred twenty three families living in Sitio Kabaritan barangay. They are operating their own backyard fishponds for tilapia fingerling production. A typical backyard fishpond has an area of 200 to 400 square meters with a depth of 1.0 to 1.5 meters. It is reported that most of these families have an average income 800 pesos per month.

A. Pond Preparation

Chicken manure is applied to the pond bottom with water depth of about 6 centimeters at the rate of 1.0 kilogram for every 10 sq. m.. One week after fertilization, water in the fishpond is increased and maintained from 40 - 60 centimeters.

B. Stocking of Tilapia Breeders/Seeds

Breeders are properly selected and stocked at the rate of one breeder per square meter with a sex ratio of one male to four females.
If breeders are not available, fingerlings are stocked at the rate of two per square meter. After ten weeks, they become sexually mature.

The pond is drained again and breeders are selected. The chosen breeders are restocked in the pond.

C. Feeding System

Oridinarily, fine rice bran is given to fingerlings at the rate of 2% to 3% of there body weight twice a day during the first month of culture. Feeding rate in the second month is doubled. Feeding rate varies from 2% to 5% of the total body weight depending on the size of the fish.

D. Economy

1. Gross income per month

a. No. of breeders to spawn during the month ..... 50% or 100% of breeders

b. Fry per breeder/month ..... 200 fry

c. Production of 100 breeders ..... 20,000 fry

d. Mortality rate/total in rearing fry to fingerlings in lings in 1 - 2 months ..... 20% of 20,000 or 4,000 fry

e. Production per month less mortality ..... 16,000 fry

f. Value of production .....

Financial price - ₱0.2 x 16,000 fry = 3,200 Pesos
Economic price - 3,200 pesos x 0.82 = 2,620 Pesos

2. Cost	Financial ₱	Economic ₱
a. Fertilizer - 20kg chicken manure of ₱1.0/kg.	20	16
b. Feeds - 20kg five rice bran at ₱4.0/kg.	80	66
c. 200 Tilapia nilotica breeders 4.5₱/breeder x 200 ÷ 12 month (assumed to be replaced once a year)	75	62
d. Depreciation cost of 200m^2 backyard fishpond. 2,000₱ ÷ 20 yrs. ÷ 12 month (Economic life is assumed at 20 yrs.)	8	6
e. Wages of one caretaker at ₱1,000/month	1,000	1,000
f. Wages of assistant at ₱500/month	500	250
g. Miscellaneous 10%	167	140
Total Cost	1,850	1,540

3. Returns per month

	Financial	Economic
Gross income	3,200	2,620
Production Cost	1,850	1,540
Returns	1,350	1,080

4. Returns per year

Financial 1,350 x 10 month = 13,500₱
Economic 1,080 x 10 month = 10,800₱
(2 month is rest month)

5. Benefit per square meter per year

Financial 13,500₱ ÷ 200m^2 = 68₱/m^2
Economic 10,800₱ ÷ 200m^2 = 54₱/m^2

Note: This tilapia fingering production is based on the following data.

Mr. O. Z. Comia, Fishery Extension Specialist, Region VII.

Tilapia Breeding - A Profitable Backyard Industry.

The prices of cost and income are updated.

Economy of Floating Cage Fish Culture with Ten Compartment

1. Income		
a. Production (1,800 fish/cage x 10 cages, survival rate of 90%)	18,000	fish
b. Total weight of fish for 10 cages	3,600	kg.
c. Sale of fish at ₱15.0/kilo, 2 crops annually	108,000	Peso
2. Cost		
a. Operating cost		
Fingerings 2,000 fish/cage x ₱0.3 x 10 cages	6,000	Peso
Feeds 2,500 kg x ₱4,000/kg	10,000	
Wages of one caretaker ₱1,000/month x six month	6,000	
Miscellaneous expenses	2,000	
10% contingency cost	2,400	
Total Operating Cost	52,800	
b. Average annunal capital (10 fish cages, wooden banca, guard shed, spring balance)	6,667	
c. 10% Sales Tax	5,947	
d. Total Cost	65,414	
3. Net Income for One Year		
Financial	42,586	Peso
Economic		
108,000 - (52,800 + 6,667) = 48,533		
48,533 x 0.82 =	39,800	Peso

Source: Dumanjug-Ronda SWIM Project, Draft Feasibility Study Report, Aug., 1984, NIA.

TABLE K5-56 ECONOMIC PROJECT COST

(Unit: '000 ₱)

Item	Total			1987			1988			1989		
	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total
a. Financial Cost	261,000	114,000	375,000	15,100	4,800	19,900	7,500	5,200	12,700	61,700	28,400	90,100
b. Financial Land Acq.	-	5,175	5,175	-	-	-	-	2,530	2,530	-	2,645	2,645
c. Economic Land Acq.	-	1,220	1,220	-	-	-	-	600	600	-	620	620
d. a - b + c	261,000	110,045	371,045	15,100	4,800	19,900	7,500	3,270	10,870	61,700	26,375	88,075
e. L.C. x 0.827		91,007			3,970			2,704			21,812	
f. Economic Cost c + e	261,000	91,007	352,007 (94%)	15,100	3,970	19,070	7,500	2,704	10,204	61,700	21,812	83,512

Item	1990			1991			1992		
	FC	LC	Total	FC	LC	Total	FC	LC	Total
a. Financial Cost	72,200	32,300	104,500	78,800	33,100	111,900	25,700	10,200	35,900
b. Financial Land Acq.	-	-	-	-	-	-	-	-	-
c. Economic Land Acq.	-	-	-	-	-	-	-	-	-
d. a - b + c	72,200	32,300	104,500	78,800	33,100	111,900	25,700	10,200	35,900
e. L.C. x 0.827		26,712			27,374			8,435	
f. Economic Cost c + e	72,200	26,712	98,912	78,800	27,374	106,174	25,700	8,435	34,135

Note: Conversion factor for construction is 0.827

TABLE K5-57 O & M COST

Total Financial Cost	3,135₱ x 10^3
Total Economic Cost	3,135 x 0.82 = 2,570₱ x 10^3
O & M Cost for Capayas area	2,570 x 0.22 = 565₱ x 10^3
O & M Cost for Bayongan area	2,570 x 0.78 = 2,005₱ x 10^3

(Ratio allocated is based on that of physical area)

O & M Cost (Unit: 1,000₱)

Sub-project area	1990	1991	1992	1993
Capayas	170	390	565	565
Bayongan	-	-	2,005	2,005
Total	170	390	2,570	2,570

TABLE K5-58 REPLACEMENT COST

Item	Net Cost	Incl. Physical Contingency	Capayas	Bayongan	Economic life
Gate	3,854	4,430	600	3,830	25 years
O & M equipment	7,100	8,170	1,730	6,440	10 years

TABLE K5-59 REPLACEMENT SCHEDULE

(Unit: million Peso)

Year	O & M equip.	Gate	Year	O & M equip.	Gate	Year	O & M equip.	Gate
1990	-	-	2000	-	-	2010	-	-
1991	-	-	2001	6.44	-	2011	6.44	-
1992	-	-	2002	-	-	2012	-	-
1993	-	-	2003	-	-	2013	-	-
1994	-	-	2004	-	-	2014	-	0.6
1995	-	-	2005	-	-	2015	-	-
1996	-	-	2006	-	-	2016	-	3.83
1997	-	-	2007	-	-	2017	-	-
1998	-	-	2008	-	-	2018	-	-
1999	1.73	-	2009	1.73	-	2019	-	-

Year	O & M equip.	Gate	Year	O & M equip.	Gate
2020	-	-	2030	-	6.44
2021	-	-	2031	-	-
2022	-	-	2032	-	-
2023	-	-	2033	-	-
2024	-	-	2034	-	-
2025	-	-	2035	-	-
2026	-	-	2036	-	-
2027	-	-			
2028	-	-			
2029	1.73	-			

TABLE K5-60

PROJECT ECONOMIC COST AND RETURN

(ORIGINAL CASE)

(Unit: million Peso)

Project Year	Project Cost	O & M Cost	Replace Cost	Total Cost	Agricul. N.P.V.	Drinking Water	Inland Fishery	Total Benefit	Project Return	Present Worth Value 15%	Present Worth Value 16%
1 (1987)	20.07	-	-	20.07	-	-	-	-	-20.07	-17.45	-17.30
2 (1988)	10.20	-	-	10.20	-	-	-	-	-10.20	-7.71	-7.58
3 (1889)	83.51	-	-	83.51	-	-	-	-	-83.51	-54.91	-53.50
4 (1990)	98.91	0.17	-	99.08	1.64	1.17	-	2.81	-96.27	-55.04	-53.17
5 (1991)	106.17	0.39	-	106.56	5.60	1.17	-	6.77	-99.79	-49.61	-47.51
6 (1992)	34.14	2.57	-	36.71	33.88	1.17	2.05	37.10	0.39	0.17	0.16
7 (1993)	-	2.57	-	2.57	49.18	1.17	2.05	52.40	49.83	18.73	17.63
8 (1994)	-	2.57	-	2.57	55.75	1.17	2.05	58.97	56.40	18.44	17.20
9 (1995)	-	"	-	2.57	58.80	1.17	2.05	62.02	59.45	16.90	15.63
10 (1996)	-	"	-	2.57	61.58	1.17	2.05	64.80	62.23	15.38	14.11
11 (1997)	-	"	-	2.57	66.72	1.17	2.05	69.94	67.37	14.48	13.17
12 (1998)	-	"	-	2.57	71.46	1.17	2.05	74.68	72.11	13.48	12.15
13 (1999)	-	"	1.73	4.30	75.41	1.17	2.05	78.63	74.33	12.08	10.79
14 (2000)	-	"	-	2.57	"	"	"	"	76.06	10.75	9.52
15 (2001)	-	"	6.44	9.01	"	"	"	"	69.62	8.56	7.51
16 (2002)	-	"	-	2.57	"	"	"	"	76.06	8.13	7.08
17 (2003)	-	"	-	"	"	"	"	"	"	7.07	6.10
18 (2004)	-	"	-	"	"	"	"	"	"	6.15	5.26
19 (2005)	-	"	-	"	"	"	"	"	"	5.34	4.53
20 (2006)	-	"	-	"	"	"	"	"	"	4.65	3.91
21 (2007)	-	"	-	"	"	"	"	"	"	4.04	3.37
22 (2008)	-	"	-	"	"	"	"	"	"	3.51	2.90
23 (2009)	-	"	1.73	4.30	"	"	"	"	74.33	2.99	2.45
24 (2010)	-	"	-	2.57	"	"	"	"	76.06	2.66	2.16
25 (2011)	-	"	6.44	9.01	"	"	"	"	69.62	2.11	1.70
26 (2012)	-	"	-	2.57	"	"	"	"	76.06	2.01	1.60
27 (2013)	-	"	-	2.57	"	"	"	"	"	1.75	1.38
28 (2014)	-	"	0.60	3.17	"	"	"	"	75.46	1.51	1.18
29 (2015)	-	"	-	2.57	"	"	"	"	76.06	1.32	1.03
30 (2016)	-	"	3.83	6.40	"	"	"	"	72.23	1.09	0.84
31 (2017)	-	"	-	2.57	"	"	"	"	76.06	1.00	0.76
32 (2018)	-	"	-	"	"	"	"	"	"	0.87	0.66
33 (2019)	-	"	-	"	"	"	"	"	"	0.76	0.57
34 (2020)	-	"	-	"	"	"	"	"	"	0.66	0.49
35 (2021)	-	"	-	"	"	"	"	"	"	0.57	0.42
36 (2022)	-	"	-	"	"	"	"	"	"	0.50	0.36
37 (2023)	-	"	-	"	"	"	"	"	"	0.43	0.31
38 (2024)	-	"	-	"	"	"	"	"	"	0.38	0.27
39 (2025)	-	"	-	"	"	"	"	"	"	0.33	0.23
40 (2026)	-	"	-	"	"	"	"	"	"	0.28	0.20
41 (2027)	-	"	-	"	"	"	"	"	"	0.25	0.17
42 (2028)	-	"	-	"	"	"	"	"	"	0.21	0.15
43 (2029)	-	"	1.73	4.30	"	"	"	"	74.33	0.18	0.13
44 (2030)	-	"	-	2.57	"	"	"	"	76.06	0.16	0.11
45 (2031)	-	"	6.44	9.01	"	"	"	"	69.62	0.13	0.09
46 (2032)	-	"	-	2.57	"	"	"	"	76.06	0.12	0.08
47 (2033)	-	"	-	"	"	"	"	"	"	0.11	0.07
48 (2034)	-	"	-	"	"	"	"	"	"	0.09	0.06
49 (2035)	-	"	-	"	"	"	"	"	"	0.08	0.05
50 (2036)	-	"	-	"	"	"	"	"	"	0.07	0.05
Total	353.00	116.21	28.94	498.15	3,270.19	54.99	92.25	3,417.43	2,919.28	5.73	-10.44

EIRR = 15 . . . 15 + 5.73/(5.73+10.44) = 15.35

TABLE K5-61 PROJECT ECONOMIC COST AND RETURN
(10% INCREASE OF PROJECT COST)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS (2)	PROJECT RETURN (3) =(2)-(1)	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)			(14 %)	(15 %)
1 1987	22.08	0.0	22.08	0.0	-22.08	-19.37	-19.20
2 1988	11.22	0.0	11.22	0.0	-11.22	-8.63	-8.48
3 1989	91.86	0.0	91.86	0.0	-91.86	-62.00	-60.40
4 1990	108.80	0.17	108.97	2.81	-106.16	-62.86	-60.70
5 1991	116.79	0.39	117.18	6.77	-110.41	-57.34	-54.89
6 1992	37.55	2.57	40.12	37.10	-3.02	-1.38	-1.31
7 1993	0.0	2.57	2.57	52.40	49.83	19.91	18.73
8 1994	0.0	2.57	2.57	58.97	56.40	19.77	18.44
9 1995	0.0	2.57	2.57	62.02	59.45	18.28	16.90
10 1996	0.0	2.57	2.57	64.80	62.23	16.79	15.38
11 1997	0.0	2.57	2.57	69.94	67.37	15.94	14.48
12 1998	0.0	2.57	2.57	74.68	72.11	14.97	13.48
13 1999	0.0	4.30	4.30	78.63	74.33	13.53	12.08
14 2000	0.0	2.57	2.57	78.63	76.06	12.15	10.75
15 2001	0.0	9.01	9.01	78.63	69.62	9.75	8.56
16 2002	0.0	2.57	2.57	78.63	76.06	9.35	8.13
17 2003	0.0	2.57	2.57	78.63	76.06	8.20	7.07
18 2004	0.0	2.57	2.57	78.63	76.06	7.19	6.15
19 2005	0.0	2.57	2.57	78.63	76.06	6.31	5.34
20 2006	0.0	2.57	2.57	78.63	76.06	5.53	4.65
21 2007	0.0	2.57	2.57	78.63	76.06	4.85	4.04
22 2008	0.0	2.57	2.57	78.63	76.06	4.26	3.51
23 2009	0.0	4.30	4.30	78.63	74.33	3.65	2.99
24 2010	0.0	2.57	2.57	78.63	76.06	3.28	2.66
25 2011	0.0	9.01	9.01	78.63	69.62	2.63	2.11
26 2012	0.0	2.57	2.57	78.63	76.06	2.52	2.01
27 2013	0.0	2.57	2.57	78.63	76.06	2.21	1.75
28 2014	0.0	3.17	3.17	78.63	75.46	1.92	1.51
29 2015	0.0	2.57	2.57	78.63	76.06	1.70	1.32
30 2016	0.0	6.40	6.40	78.63	72.23	1.42	1.09
31 2017	0.0	2.57	2.57	78.63	76.06	1.31	1.00
32 2018	0.0	2.57	2.57	78.63	76.06	1.15	0.87
33 2019	0.0	2.57	2.57	78.63	76.06	1.01	0.76
34 2020	0.0	2.57	2.57	78.63	76.06	0.88	0.66
35 2021	0.0	2.57	2.57	78.63	76.06	0.78	0.57
36 2022	0.0	2.57	2.57	78.63	76.06	0.68	0.50
37 2023	0.0	2.57	2.57	78.63	76.06	0.60	0.43
38 2024	0.0	2.57	2.57	78.63	76.06	0.52	0.38
39 2025	0.0	2.57	2.57	78.63	76.06	0.46	0.33
40 2026	0.0	2.57	2.57	78.63	76.06	0.40	0.28
41 2027	0.0	2.57	2.57	78.63	76.06	0.35	0.25
42 2028	0.0	2.57	2.57	78.63	76.06	0.31	0.21
43 2029	0.0	4.30	4.30	78.63	74.33	0.27	0.18
44 2030	0.0	2.57	2.57	78.63	76.06	0.24	0.16
45 2031	0.0	9.01	9.01	78.63	69.62	0.19	0.13
46 2032	0.0	2.57	2.57	78.63	76.06	0.18	0.12
47 2033	0.0	2.57	2.57	78.63	76.06	0.16	0.11
48 2034	0.0	2.57	2.57	78.63	76.06	0.14	0.09
49 2035	0.0	2.57	2.57	78.63	76.06	0.12	0.08
50 2036	0.0	2.57	2.57	78.63	76.06	0.11	0.07
TOTAL	388.30	145.15	533.45	3417.43	2883.98	4.41	-14.68

EIRR= 14 ..... 14 + 4.41 / (4.41 + 14.68) = 14.23

TABLE K5-62 PROJECT ECONOMIC COST AND RETURN
(20% INCREASE OF PROJECT COST)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS (2)	PROJECT RETURN (3) =(2)-(1)	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)			(13 %)	(14 %)
1 1987	24.08	0.0	24.08	0.0	-24.08	-21.31	-21.13
2 1988	12.24	0.0	12.24	0.0	-12.24	-9.59	-9.42
3 1989	100.21	0.0	100.21	0.0	-100.21	-69.45	-67.64
4 1990	118.69	0.17	118.86	2.81	-116.05	-71.18	-68.71
5 1991	127.40	0.39	127.79	6.77	-121.02	-65.69	-62.86
6 1992	40.97	2.57	43.54	37.10	-6.44	-3.09	-2.93
7 1993	0.0	2.57	2.57	52.40	49.83	21.18	19.91
8 1994	0.0	2.57	2.57	58.97	56.40	21.22	19.77
9 1995	0.0	2.57	2.57	62.02	59.45	19.79	18.28
10 1996	0.0	2.57	2.57	64.80	62.23	18.33	16.79
11 1997	0.0	2.57	2.57	69.94	67.37	17.56	15.94
12 1998	0.0	2.57	2.57	74.68	72.11	16.64	14.97
13 1999	0.0	4.30	4.30	78.63	74.33	15.18	13.53
14 2000	0.0	2.57	2.57	78.63	76.06	13.74	12.15
15 2001	0.0	9.01	9.01	78.63	69.62	11.13	9.75
16 2002	0.0	2.57	2.57	78.63	76.06	10.76	9.35
17 2003	0.0	2.57	2.57	78.63	76.06	9.52	8.20
18 2004	0.0	2.57	2.57	78.63	76.06	8.43	7.19
19 2005	0.0	2.57	2.57	78.63	76.06	7.46	6.31
20 2006	0.0	2.57	2.57	78.63	76.06	6.60	5.53
21 2007	0.0	2.57	2.57	78.63	76.06	5.84	4.85
22 2008	0.0	2.57	2.57	78.63	76.06	5.17	4.26
23 2009	0.0	4.30	4.30	78.63	74.33	4.47	3.65
24 2010	0.0	2.57	2.57	78.63	76.06	4.05	3.28
25 2011	0.0	9.01	9.01	78.63	69.62	3.28	2.63
26 2012	0.0	2.57	2.57	78.63	76.06	3.17	2.52
27 2013	0.0	2.57	2.57	78.63	76.06	2.81	2.21
28 2014	0.0	3.17	3.17	78.63	75.46	2.46	1.92
29 2015	0.0	2.57	2.57	78.63	76.06	2.20	1.70
30 2016	0.0	6.40	6.40	78.63	72.23	1.85	1.42
31 2017	0.0	2.57	2.57	78.63	76.06	1.72	1.31
32 2018	0.0	2.57	2.57	78.63	76.06	1.52	1.15
33 2019	0.0	2.57	2.57	78.63	76.06	1.35	1.01
34 2020	0.0	2.57	2.57	78.63	76.06	1.19	0.88
35 2021	0.0	2.57	2.57	78.63	76.06	1.06	0.78
36 2022	0.0	2.57	2.57	78.63	76.06	0.93	0.68
37 2023	0.0	2.57	2.57	78.63	76.06	0.83	0.60
38 2024	0.0	2.57	2.57	78.63	76.06	0.73	0.52
39 2025	0.0	2.57	2.57	78.63	76.06	0.65	0.46
40 2026	0.0	2.57	2.57	78.63	76.06	0.57	0.40
41 2027	0.0	2.57	2.57	78.63	76.06	0.51	0.35
42 2028	0.0	2.57	2.57	78.63	76.06	0.45	0.31
43 2029	0.0	4.30	4.30	78.63	74.33	0.39	0.27
44 2030	0.0	2.57	2.57	78.63	76.06	0.35	0.24
45 2031	0.0	9.01	9.01	78.63	69.62	0.28	0.19
46 2032	0.0	2.57	2.57	78.63	76.06	0.28	0.18
47 2033	0.0	2.57	2.57	78.63	76.06	0.24	0.16
48 2034	0.0	2.57	2.57	78.63	76.06	0.22	0.14
49 2035	0.0	2.57	2.57	78.63	76.06	0.19	0.12
50 2036	0.0	2.57	2.57	78.63	76.06	0.17	0.11
TOTAL	423.60	145.15	568.75	3417.43	2848.68	6.15	-16.69

EIRR= 13 ..... 13 + 6.15 / (6.15 + 16.69) = 13.27

TABLE K5-63 PROJECT ECONOMIC COST AND RETURN
(10% DECREASE OF TARGET YIELD)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS (2)	PROJECT RETURN (3) =(2)-(1)	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)			(12 %)	(13 %)
1 1987	20.07	0.0	20.07	0.0	-20.07	-17.92	-17.76
2 1988	10.20	0.0	10.20	0.0	-10.20	-8.13	-7.99
3 1989	83.51	0.0	83.51	0.0	-83.51	-59.44	-57.88
4 1990	98.91	0.17	99.08	2.28	-96.80	-61.52	-59.37
5 1991	106.17	0.39	106.56	5.47	-101.09	-57.36	-54.87
6 1992	34.14	2.57	36.71	28.67	-8.04	-4.07	-3.86
7 1993	0.0	2.57	2.57	42.54	39.97	18.08	16.99
8 1994	0.0	2.57	2.57	48.21	45.64	18.43	17.17
9 1995	0.0	2.57	2.57	50.63	48.06	17.33	16.00
10 1996	0.0	2.57	2.57	52.80	50.23	16.17	14.80
11 1997	0.0	2.57	2.57	57.42	54.85	15.77	14.30
12 1998	0.0	2.57	2.57	61.72	59.15	15.18	13.65
13 1999	0.0	4.30	4.30	65.23	60.93	13.96	12.44
14 2000	0.0	2.57	2.57	65.23	62.66	12.82	11.32
15 2001	0.0	9.01	9.01	65.23	56.22	10.27	8.99
16 2002	0.0	2.57	2.57	65.23	62.66	10.22	8.87
17 2003	0.0	2.57	2.57	65.23	62.66	9.13	7.85
18 2004	0.0	2.57	2.57	65.23	62.66	8.15	6.94
19 2005	0.0	2.57	2.57	65.23	62.66	7.28	6.14
20 2006	0.0	2.57	2.57	65.23	62.66	6.50	5.44
21 2007	0.0	2.57	2.57	65.23	62.66	5.80	4.81
22 2008	0.0	2.57	2.57	65.23	62.66	5.18	4.26
23 2009	0.0	4.30	4.30	65.23	60.93	4.50	3.66
24 2010	0.0	2.57	2.57	65.23	62.66	4.13	3.34
25 2011	0.0	9.01	9.01	65.23	56.22	3.31	2.65
26 2012	0.0	2.57	2.57	65.23	62.66	3.29	2.61
27 2013	0.0	2.57	2.57	65.23	62.66	2.94	2.31
28 2014	0.0	3.17	3.17	65.23	62.06	2.60	2.03
29 2015	0.0	2.57	2.57	65.23	62.66	2.34	1.81
30 2016	0.0	6.40	6.40	65.23	58.83	1.96	1.50
31 2017	0.0	2.57	2.57	65.23	62.66	1.87	1.42
32 2018	0.0	2.57	2.57	65.23	62.66	1.67	1.25
33 2019	0.0	2.57	2.57	65.23	62.66	1.49	1.11
34 2020	0.0	2.57	2.57	65.23	62.66	1.33	0.98
35 2021	0.0	2.57	2.57	65.23	62.66	1.19	0.87
36 2022	0.0	2.57	2.57	65.23	62.66	1.06	0.77
37 2023	0.0	2.57	2.57	65.23	62.66	0.95	0.68
38 2024	0.0	2.57	2.57	65.23	62.66	0.84	0.60
39 2025	0.0	2.57	2.57	65.23	62.66	0.75	0.53
40 2026	0.0	2.57	2.57	65.23	62.66	0.67	0.47
41 2027	0.0	2.57	2.57	65.23	62.66	0.60	0.42
42 2028	0.0	2.57	2.57	65.23	62.66	0.54	0.37
43 2029	0.0	4.30	4.30	65.23	60.93	0.47	0.32
44 2030	0.0	2.57	2.57	65.23	62.66	0.43	0.29
45 2031	0.0	9.01	9.01	65.23	56.22	0.34	0.23
46 2032	0.0	2.57	2.57	65.23	62.66	0.34	0.23
47 2033	0.0	2.57	2.57	65.23	62.66	0.30	0.20
48 2034	0.0	2.57	2.57	65.23	62.66	0.27	0.18
49 2035	0.0	2.57	2.57	65.23	62.66	0.24	0.16
50 2036	0.0	2.57	2.57	65.23	62.66	0.22	0.14
TOTAL	353.00	145.15	498.15	2828.48	2330.33	22.46	-0.64

EIRR= 13 ..... 12 + 22.46 / (22.46 + 0.64) = 12.97

TABLE K5-64 PROJECT ECONOMIC COST AND RETURN
(20% DECREASE OF TARGET YIELD)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS (2)	PROJECT RETURN (3) =(2)-(1)	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)			(10 %)	(11 %)
1 1987	20.07	0.0	20.07	0.0	-20.07	-18.25	-18.08
2 1988	10.20	0.0	10.20	0.0	-10.20	-8.43	-8.28
3 1989	83.51	0.0	83.51	0.0	-83.51	-62.74	-61.06
4 1990	98.91	0.17	99.08	1.75	-97.33	-66.48	-64.11
5 1991	106.17	0.39	106.56	4.17	-102.39	-63.58	-60.76
6 1992	34.14	2.57	36.71	20.24	-16.47	-9.30	-8.81
7 1993	0.0	2.57	2.57	32.68	30.11	15.45	14.50
8 1994	0.0	2.57	2.57	37.45	34.88	16.27	15.14
9 1995	0.0	2.57	2.57	39.25	36.68	15.56	14.34
10 1996	0.0	2.57	2.57	40.81	38.24	14.74	13.47
11 1997	0.0	2.57	2.57	44.91	42.34	14.84	13.43
12 1998	0.0	2.57	2.57	48.69	46.12	14.70	13.18
13 1999	0.0	4.30	4.30	51.84	47.54	13.77	12.24
14 2000	0.0	2.57	2.57	51.84	49.27	12.97	11.43
15 2001	0.0	9.01	9.01	51.84	42.83	10.25	8.95
16 2002	0.0	2.57	2.57	51.84	49.27	10.72	9.28
17 2003	0.0	2.57	2.57	51.84	49.27	9.75	8.36
18 2004	0.0	2.57	2.57	51.84	49.27	8.86	7.53
19 2005	0.0	2.57	2.57	51.84	49.27	8.06	6.78
20 2006	0.0	2.57	2.57	51.84	49.27	7.32	6.11
21 2007	0.0	2.57	2.57	51.84	49.27	6.66	5.51
22 2008	0.0	2.57	2.57	51.84	49.27	6.05	4.96
23 2009	0.0	4.30	4.30	51.84	47.54	5.31	4.31
24 2010	0.0	2.57	2.57	51.84	49.27	5.00	4.03
25 2011	0.0	9.01	9.01	51.84	42.83	3.95	3.15
26 2012	0.0	2.57	2.57	51.84	49.27	4.13	3.27
27 2013	0.0	2.57	2.57	51.84	49.27	3.76	2.94
28 2014	0.0	3.17	3.17	51.84	48.67	3.38	2.62
29 2015	0.0	2.57	2.57	51.84	49.27	3.11	2.39
30 2016	0.0	6.40	6.40	51.84	45.44	2.60	1.98
31 2017	0.0	2.57	2.57	51.84	49.27	2.57	1.94
32 2018	0.0	2.57	2.57	51.84	49.27	2.33	1.75
33 2019	0.0	2.57	2.57	51.84	49.27	2.12	1.57
34 2020	0.0	2.57	2.57	51.84	49.27	1.93	1.42
35 2021	0.0	2.57	2.57	51.84	49.27	1.75	1.28
36 2022	0.0	2.57	2.57	51.84	49.27	1.59	1.15
37 2023	0.0	2.57	2.57	51.84	49.27	1.45	1.04
38 2024	0.0	2.57	2.57	51.84	49.27	1.32	0.93
39 2025	0.0	2.57	2.57	51.84	49.27	1.20	0.84
40 2026	0.0	2.57	2.57	51.84	49.27	1.09	0.76
41 2027	0.0	2.57	2.57	51.84	49.27	0.99	0.68
42 2028	0.0	2.57	2.57	51.84	49.27	0.90	0.62
43 2029	0.0	4.30	4.30	51.84	47.54	0.79	0.53
44 2030	0.0	2.57	2.57	51.84	49.27	0.74	0.50
45 2031	0.0	9.01	9.01	51.84	42.83	0.59	0.39
46 2032	0.0	2.57	2.57	51.84	49.27	0.61	0.41
47 2033	0.0	2.57	2.57	51.84	49.27	0.56	0.37
48 2034	0.0	2.57	2.57	51.84	49.27	0.51	0.33
49 2035	0.0	2.57	2.57	51.84	49.27	0.46	0.30
50 2036	0.0	2.57	2.57	51.84	49.27	0.42	0.27
TOTAL	353.00	145.15	498.15	2239.87	1741.72	12.38	-14.14

EIRR= 10 ..... 10 + 12.38 / (12.38 + 14.14) = 10.47

TABLE K5-65 PROJECT ECONOMIC COST AND RETURN
(5% FALL OF PADDY PRICE)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS	PROJECT RETURN	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)	(2)	(3) =(2)-(1)	(14 %)	(15 %)
1 1987	20.07	0.0	20.07	0.0	-20.07	-17.61	-17.45
2 1988	10.20	0.0	10.20	0.0	-10.20	-7.85	-7.71
3 1989	83.51	0.0	83.51	0.0	-83.51	-56.37	-54.91
4 1990	98.91	0.17	99.08	2.21	-96.87	-57.36	-55.39
5 1991	106.17	0.39	106.56	5.93	-100.63	-52.26	-50.03
6 1992	34.14	2.57	36.71	34.02	-2.69	-1.23	-1.16
7 1993	0.0	2.57	2.57	48.78	46.21	18.47	17.37
8 1994	0.0	2.57	2.57	54.99	52.42	18.38	17.14
9 1995	0.0	2.57	2.57	58.21	55.64	17.11	15.82
10 1996	0.0	2.57	2.57	60.43	57.86	15.61	14.30
11 1997	0.0	2.57	2.57	65.34	62.77	14.85	13.49
12 1998	0.0	2.57	2.57	69.93	67.36	13.98	12.59
13 1999	0.0	4.30	4.30	73.57	69.27	12.61	11.26
14 2000	0.0	2.57	2.57	73.57	71.00	11.34	10.03
15 2001	0.0	9.01	9.01	73.57	64.56	9.04	7.93
16 2002	0.0	2.57	2.57	73.57	71.00	8.73	7.59
17 2003	0.0	2.57	2.57	73.57	71.00	7.65	6.60
18 2004	0.0	2.57	2.57	73.57	71.00	6.71	5.74
19 2005	0.0	2.57	2.57	73.57	71.00	5.89	4.99
20 2006	0.0	2.57	2.57	73.57	71.00	5.17	4.34
21 2007	0.0	2.57	2.57	73.57	71.00	4.53	3.77
22 2008	0.0	2.57	2.57	73.57	71.00	3.98	3.28
23 2009	0.0	4.30	4.30	73.57	69.27	3.40	2.78
24 2010	0.0	2.57	2.57	73.57	71.00	3.06	2.48
25 2011	0.0	9.01	9.01	73.57	64.56	2.44	1.96
26 2012	0.0	2.57	2.57	73.57	71.00	2.35	1.88
27 2013	0.0	2.57	2.57	73.57	71.00	2.06	1.63
28 2014	0.0	3.17	3.17	73.57	70.40	1.80	1.41
29 2015	0.0	2.57	2.57	73.57	71.00	1.59	1.23
30 2016	0.0	6.40	6.40	73.57	67.17	1.32	1.01
31 2017	0.0	2.57	2.57	73.57	71.00	1.22	0.93
32 2018	0.0	2.57	2.57	73.57	71.00	1.07	0.81
33 2019	0.0	2.57	2.57	73.57	71.00	0.94	0.71
34 2020	0.0	2.57	2.57	73.57	71.00	0.83	0.61
35 2021	0.0	2.57	2.57	73.57	71.00	0.72	0.53
36 2022	0.0	2.57	2.57	73.57	71.00	0.63	0.46
37 2023	0.0	2.57	2.57	73.57	71.00	0.56	0.40
38 2024	0.0	2.57	2.57	73.57	71.00	0.49	0.35
39 2025	0.0	2.57	2.57	73.57	71.00	0.43	0.30
40 2026	0.0	2.57	2.57	73.57	71.00	0.38	0.27
41 2027	0.0	2.57	2.57	73.57	71.00	0.33	0.23
42 2028	0.0	2.57	2.57	73.57	71.00	0.29	0.20
43 2029	0.0	4.30	4.30	73.57	69.27	0.25	0.17
44 2030	0.0	2.57	2.57	73.57	71.00	0.22	0.15
45 2031	0.0	9.01	9.01	73.57	64.56	0.18	0.12
46 2032	0.0	2.57	2.57	73.57	71.00	0.17	0.11
47 2033	0.0	2.57	2.57	73.57	71.00	0.15	0.10
48 2034	0.0	2.57	2.57	73.57	71.00	0.13	0.09
49 2035	0.0	2.57	2.57	73.57	71.00	0.12	0.08
50 2036	0.0	2.57	2.57	73.57	71.00	0.10	0.07
TOTAL	353.00	145.15	498.15	3195.50	2697.35	8.61	-9.33

EIRR= 14 ..... 14 + 8.61 / (8.61 + 9.33) = 14.48

TABLE K5-66 PROJECT ECONOMIC COST AND RETURN
(10% FALL OF PADDY PRICE)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS	PROJECT RETURN	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)	(2)	(3) =(2)-(1)	(13 %)	(14 %)
1 1987	20.07	0.0	20.07	0.0	-20.07	-17.76	-17.61
2 1988	10.20	0.0	10.20	0.0	-10.20	-7.99	-7.85
3 1989	83.51	0.0	83.51	0.0	-83.51	-57.88	-56.37
4 1990	98.91	0.17	99.08	1.27	-97.81	-59.99	-57.91
5 1991	106.17	0.39	106.56	5.40	-101.16	-54.91	-52.54
6 1992	34.14	2.57	36.71	30.95	-5.76	-2.77	-2.62
7 1993	0.0	2.57	2.57	45.17	42.60	18.11	17.02
8 1994	0.0	2.57	2.57	51.05	48.48	18.24	17.00
9 1995	0.0	2.57	2.57	53.64	51.07	17.00	15.70
10 1996	0.0	2.57	2.57	56.00	53.43	15.74	14.41
11 1997	0.0	2.57	2.57	60.77	58.20	15.17	13.77
12 1998	0.0	2.57	2.57	65.22	62.65	14.45	13.00
13 1999	0.0	4.30	4.30	68.90	64.60	13.19	11.76
14 2000	0.0	2.57	2.57	68.90	66.33	11.98	10.59
15 2001	0.0	9.01	9.01	68.90	59.89	9.58	8.39
16 2002	0.0	2.57	2.57	68.90	66.33	9.39	8.15
17 2003	0.0	2.57	2.57	68.90	66.33	8.31	7.15
18 2004	0.0	2.57	2.57	68.90	66.33	7.35	6.27
19 2005	0.0	2.57	2.57	68.90	66.33	6.50	5.50
20 2006	0.0	2.57	2.57	68.90	66.33	5.76	4.83
21 2007	0.0	2.57	2.57	68.90	66.33	5.09	4.23
22 2008	0.0	2.57	2.57	68.90	66.33	4.51	3.71
23 2009	0.0	4.30	4.30	68.90	64.60	3.89	3.17
24 2010	0.0	2.57	2.57	68.90	66.33	3.53	2.86
25 2011	0.0	9.01	9.01	68.90	59.89	2.82	2.26
26 2012	0.0	2.57	2.57	68.90	66.33	2.76	2.20
27 2013	0.0	2.57	2.57	68.90	66.33	2.45	1.93
28 2014	0.0	3.17	3.17	68.90	65.73	2.15	1.68
29 2015	0.0	2.57	2.57	68.90	66.33	1.92	1.48
30 2016	0.0	6.40	6.40	68.90	62.50	1.60	1.23
31 2017	0.0	2.57	2.57	68.90	66.33	1.50	1.14
32 2018	0.0	2.57	2.57	68.90	66.33	1.33	1.00
33 2019	0.0	2.57	2.57	68.90	66.33	1.18	0.88
34 2020	0.0	2.57	2.57	68.90	66.33	1.04	0.77
35 2021	0.0	2.57	2.57	68.90	66.33	0.92	0.68
36 2022	0.0	2.57	2.57	68.90	66.33	0.81	0.59
37 2023	0.0	2.57	2.57	68.90	66.33	0.72	0.52
38 2024	0.0	2.57	2.57	68.90	66.33	0.64	0.46
39 2025	0.0	2.57	2.57	68.90	66.33	0.56	0.40
40 2026	0.0	2.57	2.57	68.90	66.33	0.50	0.35
41 2027	0.0	2.57	2.57	68.90	66.33	0.44	0.31
42 2028	0.0	2.57	2.57	68.90	66.33	0.39	0.27
43 2029	0.0	4.30	4.30	68.90	64.60	0.34	0.23
44 2030	0.0	2.57	2.57	68.90	66.33	0.31	0.21
45 2031	0.0	9.01	9.01	68.90	59.89	0.24	0.16
46 2032	0.0	2.57	2.57	68.90	66.33	0.24	0.16
47 2033	0.0	2.57	2.57	68.90	66.33	0.21	0.14
48 2034	0.0	2.57	2.57	68.90	66.33	0.19	0.12
49 2035	0.0	2.57	2.57	68.90	66.33	0.17	0.11
50 2036	0.0	2.57	2.57	68.90	66.33	0.15	0.09
TOTAL	353.00	145.15	498.15	2987.67	2489.52	12.06	-7.98

EIRR= 14 ..... 13 + 12.06 / (12.06 + 7.98) = 13.60

TABLE K5-67 PROJECT ECONOMIC COST AND RETURN
(10% INCREASE OF PRDUCTION COST)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS	PROJECT RETURN	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)	(2)	(3) =(2)-(1)	(14 %)	(15 %)
1 1987	20.07	0.0	20.07	0.0	-20.07	-17.61	-17.45
2 1988	10.20	0.0	10.20	0.0	-10.20	-7.85	-7.71
3 1989	83.51	0.0	83.51	0.0	-83.51	-56.37	-54.91
4 1990	98.91	0.17	99.08	2.11	-96.97	-57.41	-55.44
5 1991	106.17	0.39	106.56	5.85	-100.71	-52.31	-50.07
6 1992	34.14	2.57	36.71	32.91	-3.80	-1.73	-1.64
7 1993	0.0	2.57	2.57	48.31	45.74	18.28	17.20
8 1994	0.0	2.57	2.57	54.64	52.07	18.25	17.02
9 1995	0.0	2.57	2.57	57.38	54.81	16.85	15.58
10 1996	0.0	2.57	2.57	59.38	56.81	15.32	14.04
11 1997	0.0	2.57	2.57	64.97	62.40	14.77	13.41
12 1998	0.0	2.57	2.57	69.71	67.14	13.94	12.55
13 1999	0.0	4.30	4.30	73.66	69.36	12.63	11.27
14 2000	0.0	2.57	2.57	73.66	71.09	11.35	10.05
15 2001	0.0	9.01	9.01	73.66	64.65	9.06	7.95
16 2002	0.0	2.57	2.57	73.66	71.09	8.74	7.60
17 2003	0.0	2.57	2.57	73.66	71.09	7.66	6.61
18 2004	0.0	2.57	2.57	73.66	71.09	6.72	5.74
19 2005	0.0	2.57	2.57	73.66	71.09	5.90	5.00
20 2006	0.0	2.57	2.57	73.66	71.09	5.17	4.34
21 2007	0.0	2.57	2.57	73.66	71.09	4.54	3.78
22 2008	0.0	2.57	2.57	73.66	71.09	3.98	3.28
23 2009	0.0	4.30	4.30	73.66	69.36	3.41	2.79
24 2010	0.0	2.57	2.57	73.66	71.09	3.06	2.48
25 2011	0.0	9.01	9.01	73.66	64.65	2.44	1.96
26 2012	0.0	2.57	2.57	73.66	71.09	2.36	1.88
27 2013	0.0	2.57	2.57	73.66	71.09	2.07	1.63
28 2014	0.0	3.17	3.17	73.66	70.49	1.80	1.41
29 2015	0.0	2.57	2.57	73.66	71.09	1.59	1.23
30 2016	0.0	6.40	6.40	73.66	67.26	1.32	1.02
31 2017	0.0	2.57	2.57	73.66	71.09	1.22	0.93
32 2018	0.0	2.57	2.57	73.66	71.09	1.07	0.81
33 2019	0.0	2.57	2.57	73.66	71.09	0.94	0.71
34 2020	0.0	2.57	2.57	73.66	71.09	0.83	0.61
35 2021	0.0	2.57	2.57	73.66	71.09	0.72	0.53
36 2022	0.0	2.57	2.57	73.66	71.09	0.64	0.46
37 2023	0.0	2.57	2.57	73.66	71.09	0.56	0.40
38 2024	0.0	2.57	2.57	73.66	71.09	0.49	0.35
39 2025	0.0	2.57	2.57	73.66	71.09	0.43	0.31
40 2026	0.0	2.57	2.57	73.66	71.09	0.38	0.27
41 2027	0.0	2.57	2.57	73.66	71.09	0.33	0.23
42 2028	0.0	2.57	2.57	73.66	71.09	0.29	0.20
43 2029	0.0	4.30	4.30	73.66	69.36	0.25	0.17
44 2030	0.0	2.57	2.57	73.66	71.09	0.22	0.15
45 2031	0.0	9.01	9.01	73.66	64.65	0.18	0.12
46 2032	0.0	2.57	2.57	73.66	71.09	0.17	0.11
47 2033	0.0	2.57	2.57	73.66	71.09	0.15	0.10
48 2034	0.0	2.57	2.57	73.66	71.09	0.13	0.09
49 2035	0.0	2.57	2.57	73.66	71.09	0.12	0.08
50 2036	0.0	2.57	2.57	73.66	71.09	0.10	0.07
TOTAL	353.00	145.15	498.15	3194.34	2696.19	7.15	-10.71

EIRR= 14 ..... 14 + 7.15 / (7.15 + 10.71) = 14.40

TABLE K5-68 PROJECT ECONOMIC COST AND RETURN
(20% INCREASE OF PRODUCTION COST)

(UNIT : MILLION PESO)

	YEAR	PROJECT COST			INCREMENTAL BENEFITS	PROJECT RETURN	PRESENT WORTH VALUE	
		CAPITAL	O & M	TOTAL (1)	(2)	(3) =(2)-(1)	(3)*DISCOUNT RATE (13 %)	(14 %)
1	1987	20.07	0.0	20.07	0.0	-20.07	-17.76	-17.61
2	1988	10.20	0.0	10.20	0.0	-10.20	-7.99	-7.85
3	1989	83.51	0.0	83.51	0.0	-83.51	-57.88	-56.37
4	1990	98.91	0.17	99.08	1.41	-97.67	-59.90	-57.83
5	1991	106.17	0.39	106.56	4.93	-101.63	-55.16	-52.78
6	1992	34.14	2.57	36.71	28.73	-7.98	-3.83	-3.64
7	1993	0.0	2.57	2.57	44.22	41.65	17.70	16.65
8	1994	0.0	2.57	2.57	50.32	47.75	17.96	16.74
9	1995	0.0	2.57	2.57	52.74	50.17	16.70	15.43
10	1996	0.0	2.57	2.57	54.86	52.29	15.40	14.11
11	1997	0.0	2.57	2.57	60.00	57.43	14.97	13.59
12	1998	0.0	2.57	2.57	64.74	62.17	14.34	12.90
13	1999	0.0	4.30	4.30	68.69	64.39	13.15	11.72
14	2000	0.0	2.57	2.57	68.69	66.12	11.95	10.56
15	2001	0.0	9.01	9.01	68.69	59.68	9.54	8.36
16	2002	0.0	2.57	2.57	68.69	66.12	9.36	8.13
17	2003	0.0	2.57	2.57	68.69	66.12	8.28	7.13
18	2004	0.0	2.57	2.57	68.69	66.12	7.33	6.25
19	2005	0.0	2.57	2.57	68.69	66.12	6.48	5.48
20	2006	0.0	2.57	2.57	68.69	66.12	5.74	4.81
21	2007	0.0	2.57	2.57	68.69	66.12	5.08	4.22
22	2008	0.0	2.57	2.57	68.69	66.12	4.49	3.70
23	2009	0.0	4.30	4.30	68.69	64.39	3.87	3.16
24	2010	0.0	2.57	2.57	68.69	66.12	3.52	2.85
25	2011	0.0	9.01	9.01	68.69	59.68	2.81	2.26
26	2012	0.0	2.57	2.57	68.69	66.12	2.76	2.19
27	2013	0.0	2.57	2.57	68.69	66.12	2.44	1.92
28	2014	0.0	3.17	3.17	68.69	65.52	2.14	1.67
29	2015	0.0	2.57	2.57	68.69	66.12	1.91	1.48
30	2016	0.0	6.40	6.40	68.69	62.29	1.59	1.22
31	2017	0.0	2.57	2.57	68.69	66.12	1.50	1.14
32	2018	0.0	2.57	2.57	68.69	66.12	1.32	1.00
33	2019	0.0	2.57	2.57	68.69	66.12	1.17	0.88
34	2020	0.0	2.57	2.57	68.69	66.12	1.04	0.77
35	2021	0.0	2.57	2.57	68.69	66.12	0.92	0.67
36	2022	0.0	2.57	2.57	68.69	66.12	0.81	0.59
37	2023	0.0	2.57	2.57	68.69	66.12	0.72	0.52
38	2024	0.0	2.57	2.57	68.69	66.12	0.64	0.45
39	2025	0.0	2.57	2.57	68.69	66.12	0.56	0.40
40	2026	0.0	2.57	2.57	68.69	66.12	0.50	0.35
41	2027	0.0	2.57	2.57	68.69	66.12	0.44	0.31
42	2028	0.0	2.57	2.57	68.69	66.12	0.39	0.27
43	2029	0.0	4.30	4.30	68.69	64.39	0.34	0.23
44	2030	0.0	2.57	2.57	68.69	66.12	0.31	0.21
45	2031	0.0	9.01	9.01	68.69	59.68	0.24	0.16
46	2032	0.0	2.57	2.57	68.69	66.12	0.24	0.16
47	2033	0.0	2.57	2.57	68.69	66.12	0.21	0.14
48	2034	0.0	2.57	2.57	68.69	66.12	0.19	0.12
49	2035	0.0	2.57	2.57	68.69	66.12	0.17	0.11
50	2036	0.0	2.57	2.57	68.69	66.12	0.15	0.09
	TOTAL	353.00	145.15	498.15	2972.17	2474.02	8.83	-10.96

EIRR= 13 ..... 13 + 8.83 / (8.83 + 10.96) = 13.45

TABLE K5-69 PROJECT ECONOMIC COST AND RETURN
(ONE YEAR DELAY TO START LAND RECLAMATION)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS (2)	PROJECT RETURN (3) =(2)-(1)	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)			(14 %)	(15 %)
1 1987	20.07	0.0	20.07	0.0	-20.07	-17.61	-17.45
2 1988	10.05	0.0	10.05	0.0	-10.05	-7.73	-7.60
3 1989	79.24	0.0	79.24	0.0	-79.24	-53.48	-52.10
4 1990	98.25	0.17	98.42	1.07	-97.35	-57.64	-55.66
5 1991	106.40	0.39	106.79	3.62	-103.17	-53.58	-51.29
6 1992	37.60	2.57	40.17	12.77	-27.40	-12.48	-11.85
7 1993	1.25	2.57	3.82	41.87	38.05	15.21	14.30
8 1994	0.0	2.57	2.57	54.42	51.85	18.18	16.95
9 1995	0.0	2.57	2.57	59.85	57.28	17.61	16.28
10 1996	0.0	2.57	2.57	63.89	61.32	16.54	15.16
11 1997	0.0	2.57	2.57	62.77	60.20	14.24	12.94
12 1998	0.0	2.57	2.57	67.65	65.08	13.51	12.16
13 1999	0.0	4.30	4.30	75.84	71.54	13.03	11.63
14 2000	0.0	2.57	2.57	78.63	76.06	12.15	10.75
15 2001	0.0	9.01	9.01	78.63	69.62	9.75	8.56
16 2002	0.0	2.57	2.57	78.63	76.06	9.35	8.13
17 2003	0.0	2.57	2.57	78.63	76.06	8.20	7.07
18 2004	0.0	2.57	2.57	78.63	76.06	7.19	6.15
19 2005	0.0	2.57	2.57	78.63	76.06	6.31	5.34
20 2006	0.0	2.57	2.57	78.63	76.06	5.53	4.65
21 2007	0.0	2.57	2.57	78.63	76.06	4.85	4.04
22 2008	0.0	2.57	2.57	78.63	76.06	4.26	3.51
23 2009	0.0	4.30	4.30	78.63	74.33	3.65	2.99
24 2010	0.0	2.57	2.57	78.63	76.06	3.28	2.66
25 2011	0.0	9.01	9.01	78.63	69.62	2.63	2.11
26 2012	0.0	2.57	2.57	78.63	76.06	2.52	2.01
27 2013	0.0	2.57	2.57	78.63	76.06	2.21	1.75
28 2014	0.0	3.17	3.17	78.63	75.46	1.92	1.51
29 2015	0.0	2.57	2.57	78.63	76.06	1.70	1.32
30 2016	0.0	6.40	6.40	78.63	72.23	1.42	1.09
31 2017	0.0	2.57	2.57	78.63	76.06	1.31	1.00
32 2018	0.0	2.57	2.57	78.63	76.06	1.15	0.87
33 2019	0.0	2.57	2.57	78.63	76.06	1.01	0.76
34 2020	0.0	2.57	2.57	78.63	76.06	0.88	0.66
35 2021	0.0	2.57	2.57	78.63	76.06	0.78	0.57
36 2022	0.0	2.57	2.57	78.63	76.06	0.68	0.50
37 2023	0.0	2.57	2.57	78.63	76.06	0.60	0.43
38 2024	0.0	2.57	2.57	78.63	76.06	0.52	0.38
39 2025	0.0	2.57	2.57	78.63	76.06	0.46	0.33
40 2026	0.0	2.57	2.57	78.63	76.06	0.40	0.28
41 2027	0.0	2.57	2.57	78.63	76.06	0.35	0.25
42 2028	0.0	2.57	2.57	78.63	76.06	0.31	0.21
43 2029	0.0	4.30	4.30	78.63	74.33	0.27	0.18
44 2030	0.0	2.57	2.57	78.63	76.06	0.24	0.16
45 2031	0.0	9.01	9.01	78.63	69.62	0.19	0.13
46 2032	0.0	2.57	2.57	78.63	76.06	0.18	0.12
47 2033	0.0	2.57	2.57	78.63	76.06	0.16	0.11
48 2034	0.0	2.57	2.57	78.63	76.06	0.14	0.09
49 2035	0.0	2.57	2.57	78.63	76.06	0.12	0.08
50 2036	0.0	2.57	2.57	78.63	76.06	0.11	0.07
TOTAL	352.86	145.15	498.01	3353.06	2855.05	2.58	-15.72

EIRR= 14 ..... 14 + 2.58 / (2.58 + 15.72) = 14.14

TABLE K5-70 PROJECT ECONOMIC COST AND RETURN
(TWO YEAR DELAY TO START LAND RECRAMATION)

(UNIT : MILLION PESO)

YEAR	PROJECT COST			INCREMENTAL BENEFITS (2)	PROJECT RETURN (3) =(2)-(1)	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
	CAPITAL	O & M	TOTAL (1)			(13 %)	(14 %)
1 1987	20.07	0.0	20.07	0.0	-20.07	-17.76	-17.61
2 1988	10.02	0.0	10.02	0.0	-10.02	-7.85	-7.71
3 1989	79.26	0.0	79.26	0.0	-79.26	-54.93	-53.50
4 1990	94.20	0.17	94.37	1.07	-93.30	-57.22	-55.24
5 1991	105.66	0.39	106.05	2.14	-103.91	-56.40	-53.97
6 1992	37.71	2.57	40.28	9.49	-30.79	-14.79	-14.03
7 1993	4.68	2.57	7.25	18.15	10.90	4.63	4.36
8 1994	1.26	2.57	3.83	43.89	40.06	15.07	14.04
9 1995	0.0	2.57	2.57	55.29	52.72	17.55	16.21
10 1996	0.0	2.57	2.57	60.72	58.15	17.13	15.69
11 1997	0.0	2.57	2.57	64.42	61.85	16.12	14.63
12 1998	0.0	2.57	2.57	67.77	65.20	15.04	13.53
13 1999	0.0	4.30	4.30	72.54	68.24	13.93	12.42
14 2000	0.0	2.57	2.57	75.84	73.27	13.24	11.70
15 2001	0.0	9.01	9.01	78.63	69.62	11.13	9.75
16 2002	0.0	2.57	2.57	78.63	76.06	10.76	9.35
17 2003	0.0	2.57	2.57	78.63	76.06	9.52	8.20
18 2004	0.0	2.57	2.57	78.63	76.06	8.43	7.19
19 2005	0.0	2.57	2.57	78.63	76.06	7.46	6.31
20 2006	0.0	2.57	2.57	78.63	76.06	6.60	5.53
21 2007	0.0	2.57	2.57	78.63	76.06	5.84	4.85
22 2008	0.0	2.57	2.57	78.63	76.06	5.17	4.26
23 2009	0.0	4.30	4.30	78.63	74.33	4.47	3.65
24 2010	0.0	2.57	2.57	78.63	76.06	4.05	3.28
25 2011	0.0	9.01	9.01	78.63	69.62	3.28	2.63
26 2012	0.0	2.57	2.57	78.63	76.06	3.17	2.52
27 2013	0.0	2.57	2.57	78.63	76.06	2.81	2.21
28 2014	0.0	3.17	3.17	78.63	75.46	2.46	1.92
29 2015	0.0	2.57	2.57	78.63	76.06	2.20	1.70
30 2016	0.0	6.40	6.40	78.63	72.23	1.85	1.42
31 2017	0.0	2.57	2.57	78.63	76.06	1.72	1.31
32 2018	0.0	2.57	2.57	78.63	76.06	1.52	1.15
33 2019	0.0	2.57	2.57	78.63	76.06	1.35	1.01
34 2020	0.0	2.57	2.57	78.63	76.06	1.19	0.88
35 2021	0.0	2.57	2.57	78.63	76.06	1.06	0.78
36 2022	0.0	2.57	2.57	78.63	76.06	0.93	0.68
37 2023	0.0	2.57	2.57	78.63	76.06	0.83	0.60
38 2024	0.0	2.57	2.57	78.63	76.06	0.73	0.52
39 2025	0.0	2.57	2.57	78.63	76.06	0.65	0.46
40 2026	0.0	2.57	2.57	78.63	76.06	0.57	0.40
41 2027	0.0	2.57	2.57	78.63	76.06	0.51	0.35
42 2028	0.0	2.57	2.57	78.63	76.06	0.45	0.31
43 2029	0.0	4.30	4.30	78.63	74.33	0.39	0.27
44 2030	0.0	2.57	2.57	78.63	76.06	0.35	0.24
45 2031	0.0	9.01	9.01	78.63	69.62	0.28	0.19
46 2032	0.0	2.57	2.57	78.63	76.06	0.28	0.18
47 2033	0.0	2.57	2.57	78.63	76.06	0.24	0.16
48 2034	0.0	2.57	2.57	78.63	76.06	0.22	0.14
49 2035	0.0	2.57	2.57	78.63	76.06	0.19	0.12
50 2036	0.0	2.57	2.57	78.63	76.06	0.17	0.11
TOTAL	352.86	145.15	498.01	3302.00	2803.99	6.59	-14.81

EIRR= 13 ..... 13 + 6.59 / (6.59 + 14.81) = 13.31

TABLE K5-71 PROJECT ECONOMIC COST AND RETURN
(THREE YEAR DELAY AND START LAND RECLAMATION)

(UNIT : MILLION PESO)

M	YEAR	PROJECT COST			INCREMENTAL BENEFITS (2)	PROJECT RETURN (3) =(2)-(1)	PRESENT WORTH VALUE (3)*DISCOUNT RATE	
		CAPITAL	O & M	TOTAL (1)			(12 %)	(13 %)
1	1987	20.07	0.0	20.07	0.0	-20.07	-17.92	-17.76
2	1988	10.02	0.0	10.02	0.0	-10.02	-7.99	-7.85
3	1989	79.07	0.0	79.07	0.0	-79.07	-56.28	-54.80
4	1990	93.89	0.17	94.06	1.07	-92.99	-59.10	-57.03
5	1991	101.70	0.39	102.09	5.14	-96.95	-55.01	-52.62
6	1992	37.19	2.57	39.76	7.67	-32.09	-16.26	-15.41
7	1993	4.84	2.57	7.41	14.27	6.86	3.10	2.92
8	1994	4.68	2.57	7.25	19.57	12.32	4.98	4.63
9	1995	1.27	2.57	3.84	44.79	40.95	14.77	13.63
10	1996	0.0	2.57	2.57	56.16	53.59	17.25	15.79
11	1997	0.0	2.57	2.57	62.25	59.68	17.16	15.56
12	1998	0.0	2.57	2.57	65.86	63.29	16.25	14.60
13	1999	0.0	4.30	4.30	68.83	64.53	14.79	13.17
14	2000	0.0	2.57	2.57	72.54	69.97	14.32	12.64
15	2001	0.0	9.01	9.01	75.84	66.83	12.21	10.69
16	2002	0.0	2.57	2.57	78.63	76.06	12.41	10.76
17	2003	0.0	2.57	2.57	78.63	76.06	11.08	9.52
18	2004	0.0	2.57	2.57	78.63	76.06	9.89	8.43
19	2005	0.0	2.57	2.57	78.63	76.06	8.83	7.46
20	2006	0.0	2.57	2.57	78.63	76.06	7.88	6.60
21	2007	0.0	2.57	2.57	78.63	76.06	7.04	5.84
22	2008	0.0	2.57	2.57	78.63	76.06	6.29	5.17
23	2009	0.0	4.30	4.30	78.63	74.33	5.48	4.47
24	2010	0.0	2.57	2.57	78.63	76.06	5.01	4.05
25	2011	0.0	9.01	9.01	78.63	69.62	4.10	3.28
26	2012	0.0	2.57	2.57	78.63	76.06	3.99	3.17
27	2013	0.0	2.57	2.57	78.63	76.06	3.57	2.81
28	2014	0.0	3.17	3.17	78.63	75.46	3.16	2.46
29	2015	0.0	2.57	2.57	78.63	76.06	2.84	2.20
30	2016	0.0	6.40	6.40	78.63	72.23	2.41	1.85
31	2017	0.0	2.57	2.57	78.63	76.06	2.27	1.72
32	2018	0.0	2.57	2.57	78.63	76.06	2.02	1.52
33	2019	0.0	2.57	2.57	78.63	76.06	1.81	1.35
34	2020	0.0	2.57	2.57	78.63	76.06	1.61	1.19
35	2021	0.0	2.57	2.57	78.63	76.06	1.44	1.06
36	2022	0.0	2.57	2.57	78.63	76.06	1.29	0.93
37	2023	0.0	2.57	2.57	78.63	76.06	1.15	0.83
38	2024	0.0	2.57	2.57	78.63	76.06	1.03	0.73
39	2025	0.0	2.57	2.57	78.63	76.06	0.92	0.65
40	2026	0.0	2.57	2.57	78.63	76.06	0.82	0.57
41	2027	0.0	2.57	2.57	78.63	76.06	0.73	0.51
42	2028	0.0	2.57	2.57	78.63	76.06	0.65	0.45
43	2029	0.0	4.30	4.30	78.63	74.33	0.57	0.39
44	2030	0.0	2.57	2.57	78.63	76.06	0.52	0.35
45	2031	0.0	9.01	9.01	78.63	69.62	0.42	0.28
46	2032	0.0	2.57	2.57	78.63	76.06	0.41	0.28
47	2033	0.0	2.57	2.57	78.63	76.06	0.37	0.24
48	2034	0.0	2.57	2.57	78.63	76.06	0.33	0.22
49	2035	0.0	2.57	2.57	78.63	76.06	0.29	0.19
50	2036	0.0	2.57	2.57	78.63	76.06	0.26	0.17
	TOTAL	352.73	145.15	497.88	3246.04	2748.16	15.16	-10.15

EIRR= 13 ..... 12 + 15.16 / (15.16 + 10.15) = 12.60

TABLE K6-72 FARM BUDGET OF AVERAGE SIZE FARMER

	Without Project	With Project	
1. Size of Farm (ha)	1.87	1.87	
Palay land	1.52	1.52	(100%)
Upland	0.35	0.35	
2. Area of Crop (ha)			
Palay (wet)	1.37	1.26	(83%)
Palay (dry)	1.14	0.95	(12.5%)
Bean	-	0.12	(7.9%)
Peanut	-	0.12	(7.9%)
Corn	-	0.12	(7.9%)
Watermelon	-	0.11	(7.8%)
Cassava	0.11	0.21	
Sweet potato	0.08	0.14	
Total	2.70	3.03	
Cropping Intensity (%)	144	162	
3. Production (ton)			
Palay (wet)	2.34	5.29	
Palay (dry)	1.56	4.28	
Bean	-	0.12	
Peanut	-	0.20	
Corn	-	0.32	
Watermelon	-	0.98	
Cassava	0.53	2.98	
Sweet potato	0.16	1.51	
4. Gross Production Income (₱)			
Palay (wet)	6,739	15,235	
Palay (dry)	4,493	12,326	
Bean	-	1,320	
Peanut	-	2,000	
Corn	-	893	
Watermelon	-	1,960	
Cassava	636	3,576	
Sweet potato	256	2,416	
Total (a)	12,124	39,726	
5. Production Cost (₱)			
Palay (wet)	2,410	7,738	
Palay (dry)	1,800	4,981	
Bean	-	541	
Peanut	-	669	
Corn	-	712	
Watermelon	-	965	
Cassava	140	618	
Sweet potato	93	755	
Total (b)	4,443	16,979	

TABLE K6-72 FARM BUDGET OF AVERAGE SIZE FARMER (Cont'd)

	Without Project	With Project
6. Farm Income (a - b)	7,681	22,747
7. Irrigation Fee	-	1,000
8. Amortization cost of on-farm work	-	1,793
9. Disposal Farm Income	7,681	19,954
Living Cost:		
Annual Growth Rate of Standard of Living		
2%	7,100	7,100
3% (1975 to 1999)	8,300	8,300
5%	11,000	11,000
7%	14,600	14,600

Note: 1. Average size farm is based on the agro-economic survey. (Main report, Chapter 3.3.9.)

2. Cropping pattern and target yield in the full development stage are based on those used in economic justification study.

3. Irrigation fee is estimated at 2 cavan for wet season and 3 cavan for dry season.

4. Living cost per farm household is surveyed at 5,310 peso at present. Living cost in future is forecasted considering annual growth rate of a standard of living.

5. Amortization cost of on-farm work

1) On farm work cost ..... about 43,470 thousand peso including price escalation
2) On farm work cost per ha. .... 8,200 ₱
3) Credit consition assumed .....
interest 10%, repayment period 20 years
4) Amortization cost .....

$$8,200 \times \frac{i(1+i)^n}{(1+i)^n-1}$$

$= 8,200 \times 0.117 = 959$ ₱/ha

5) 959 ₱ x 1.87 ha = 1,793 ₱

TABLE K7-73 FOREIGN CURRENCY TO BE REPAYED

(Unit: 1,000 pesos)

	(1) 1987	(2) 1988	(3) 1989	(4) 1990	(5) 1991	(6) 1992	Total
Preparatory Work	-	2,000	-	-	-	-	2,000
Construction Work	-	-	41,600	52,400	54,600	16,500	165,100
Administration	14,000	4,400	4,400	4,400	4,400	4,300	35,900
O & M Equipment	-	-	-	1,300	5,000	-	6,300
Pilot Farm	3,800	-	-	-	-	-	3,800
Subtotal	17,800	6,400	46,000	58,100	64,000	20,800	213,100
Physical Escalation	2,600	1,100	6,900	8,710	9,600	3,120	32,030
Subtotal	20,400	7,500	52,900	66,810	73,600	23,920	245,130
Price Escalation	4,900	2,600	23,646	35,676	46,074	17,318	130,214
Total	25,300	10,100	76,546	102,486	119,674	41,238	375,344

TABLE K7-74 TOTAL VALUE OF INTEREST DURING REPAYMENT PERIOD

(Unit: 1,000 pesos)

Year	Total Principal (A)	Annual Principal (A÷20)=C	Total Interest C x K = D	Annual Interest D ÷ 20
1987	25,300	1,265	5,313	266
1988	10,100	505	2,121	106
1989	76,546	3,827	16,073	804
1990	102,486	5,124	21,521	1,076
1991	119,674	5,984	25,133	1,257
1992	41,238	2,062	8,660	433

Note: $K = i \times 1/2 \times n(n+1)/2 = 4.2$
i: 0.04 n: 20

TABLE K7-75 ANNUAL AMORTIZATION VALUE

(Unit: 1,000)

Borrowing Year	Total Principal	Annual Principal	Interest	Amortization
1987	25,300	1,265	266	1,531
1988	10,100	505	106	611
1989	76,546	3,827	804	4,631
1990	102,486	5,124	1,076	6,200
1991	119,674	5,984	1,257	7,241
1992	41,238	2,062	433	2,495

TABLE K 7-76 REPAYMENT PLAN OF FOREIGN CURRENCY

(Unit: 1,000 pesos)

Borrowing Year	1987	1988	1989	1990	1991	1992	Interest During Grace Period	Annual Repayment	Total
Borrowing Money	25,300	10,100	76,546	102,486	119,674	41,238	-	-	375,344
Paying Year									
1 (1987)	1,012	-	-	-	-	-	1,012	-	1,012
2 (1988)	"	404	-	-	-	-	1,416	-	1,416
3 (1989)	"	"	3,062	-	-	-	4,478	-	4,478
4 (1990)	"	"	"	4,099	-	-	8,577	-	8,577
5 (1991)	"	"	"	"	4,787	-	13,364	-	13,364
6 (1992)	"	"	"	"	"	1,650	15,014	-	15,014
7 (1993)	"	"	"	"	"	"	15,014	-	15,014
8 (1994)	"	"	"	"	"	"	15,014	-	15,014
9 (1995)	"	"	"	"	"	"	15,014	-	15,014
10 (1996)	1,012	"	"	"	"	"	15,014	-	15,014
11 (1997)	1,531	404	"	"	"	"	14,002	1,531	15,533
12 (1998)	"	611	3,062	"	"	"	13,598	2,142	15,740
13 (1999)	"	"	4,631	4,099	"	"	10,536	6,773	17,269
14 (2000)	"	"	"	6,200	4,787	"	6,437	12,973	19,410
15 (2001)	"	"	"	"	7,241	1,650	1,650	20,214	21,864
16 (2002)	"	"	"	"	"	2,495	-	22,709	22,709
17 (2003)	"	"	"	"	"	"	-	"	"
18 (2004)	"	"	"	"	"	"	-	"	"
19 (2005)	"	"	"	"	"	"	-	"	"
20 (2006)	"	"	"	"	"	"	-	"	"
21 (2007)	"	"	"	"	"	"	-	"	"
22 (2008)	"	"	"	"	"	"	-	"	"
23 (2009)	"	"	"	"	"	"	-	"	"
24 (2010)	"	"	"	"	"	"	-	"	"
25 (2011)	"	"	"	"	"	"	-	"	"
26 (2012)	"	"	"	"	"	"	-	"	"
27 (2013)	"	"	"	"	"	"	-	"	"
28 (2014)	"	"	"	"	"	"	-	"	"
29 (2015)	"	"	"	"	"	"	-	"	"
30 (2016)	1,531	"	"	"	"	"	-	"	"
31 (2017)	-	611	"	"	"	"	-	21,178	21,178
32 (2018)	-	-	4,631	"	"	"	-	20,567	20,567
33 (2019)	-	-	-	6,200	"	"	-	15,936	15,936
34 (2020)	-	-	-	-	7,241	"	-	9,736	9,736
35 (2021)	-	-	-	-	-	2,495	-	2,495	2,495

ANNEX L. FUTURE STUDY REQUIRED FOR DETAILED DESIGN

ANNEX L. FUTURE STUDY REQUIRED FOR DETAILED DESION

Following survey and investigation shall be completed prior to the commencement of detailed design;

1. Reservoir and Dam

a) Topographic Survey

Detailed topographic survey for;

1) Bayongan dam axis and cross sections.
2) Bayongan dam spillway alignment and cross sections.
3) Bayongan dam intake tunnel alignment and its entrance and outlet.
4) Bayongan dam access road from borrow (hilly gravel) area to the damsite.
5) Capayas dam axis and cross sections.
6) Capayas spillway alignment and cross sections.
7) Capayas intake conduit alignment and cross sections.

b) Geology

Additional drilling (@20^{m} x 5 hole) at Capayas damsite.

c) Construction material

More detailed quantity and quality survey of;

1) Hilly gravel for shell zone of Bayongan dam.1/

Item		Quantity
- Seismic Prospecting	:	1 km
- Drilling	:	5 x 20 m
- Test Pits	:	20
- Laboratory Test		
Specific Gravity	:	10
N. Moisture Contents	:	10
Gradation	:	10
Compaction (Large-Scale)	:	3 x 3 curve
Permeability (Large-Scale)	:	3
UU Test (Large-Scale)	:	3 x 3
CU Test (Large-Scale)	:	3 x 3
Consolidation (Large-Scale)	:	3
Absorption	:	5
Conpressive Strength	:	5
Soundness	:	5

1/ : Soil-mechanical test of the hilly gravel should be performed with large scaled apparatus.

2) Earth material for core zone of ditto.

3) Earth material for Capayas dam.

Item		Quantity
- Test Pit	:	5
- Specific Gravity	:	5
- N. Moisture Contents	:	5
- Gradation	:	5
- Liquid Limit	:	5
- Plastic Limit	:	5
- Compaction	:	2 x 3
- Permeability	:	3
- UU Test	:	2 x 3
- CU Test	:	2 x 3
- Consolidation	:	3

4) Rock material for riprap and too drain of both dams.

5) Filter materials and concrete aggragates for both dams.

2. Canal Systems

a) Topographic Survey

Topographic survey of the proposed alignment of main and lateral irrigation canals and connecting drainage canal should be carried out and their total length is as follows;

- Main Irrigation Canal	:	20 km
- Lateral Irrigation Calal	:	90 km
- Drainage canal	:	50 km
Total		160 km

b) Geology

- Compenetration Test	:	150 places
- Laboratory Test	:	L.S.