

Table VI-5 SUMMARY OF INVENTORY SURVEY, CROPPING PATTERN

	North Sumatra				South Sulawesi				West Nusa Tenggara			
	VI		LD		VI		LD		VI		LD	
	PR.	FU.	PR.	FU.	PR.	FU.	PR.	FU.	PR.	FU.	PR.	FU.
Cropping Pattern (accumulated area in ha)												
a Paddy-Paddy-Palawija	55	1738	0	225	3864	470	20	20	6100	3937	2747	152
b Paddy-Paddy	11593	27139	2642	6219	19907	26919	1003	1385	560	0	901	0
c Paddy-Palawija-Palawija	20	225	0	2	633	412	542	50	2397	387	599	0
d Paddy-Palawija	3328	2555	478	311	9654	8344	425	390	5089	450	4177	0
e Paddy	13143	1116	1435	86	15217	9505	872	377	281	0	994	0
f Palawija-Palawija	2423	1833	735	252	704	673	0	0	103	0	0	0
g Others	6899	3597	2265	572	469	397	0	0	431	0	476	0
h Total	37461	38203	7555	7667	50448	46720	2862	2222	14961	4774	9894	152
Cropping Intensity (calculated on the above data)												
1 Overall (Paddy+palawija)	157%	202%	173%	202%	179%	181%	189%	186%	257%	291%	225%	300%
2 Paddy (excl. palawija)	130%	178%	136%	187%	146%	158%	136%	163%	145%	182%	139%	200%

PR.: Present Yield Rate  
FU.: Future Yield Rate

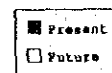
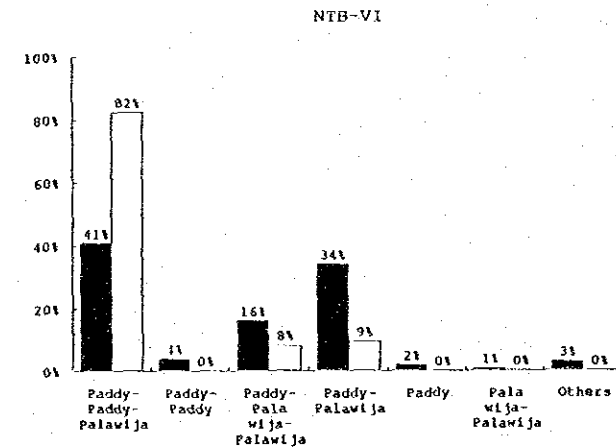
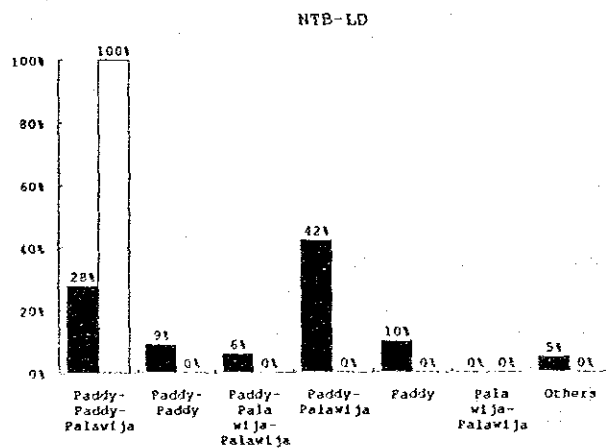
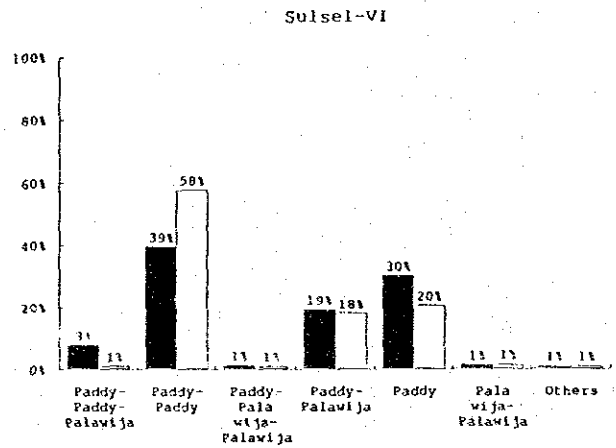
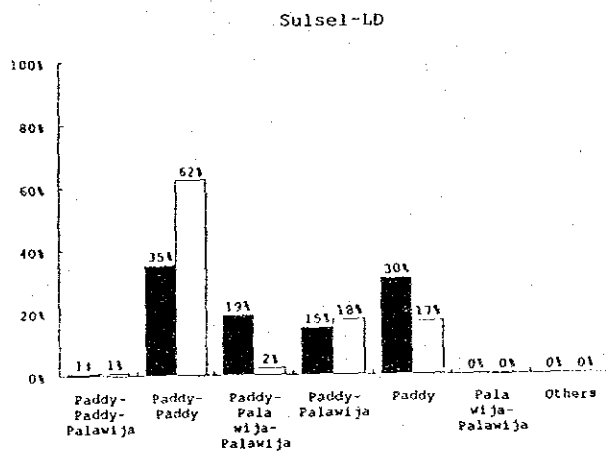
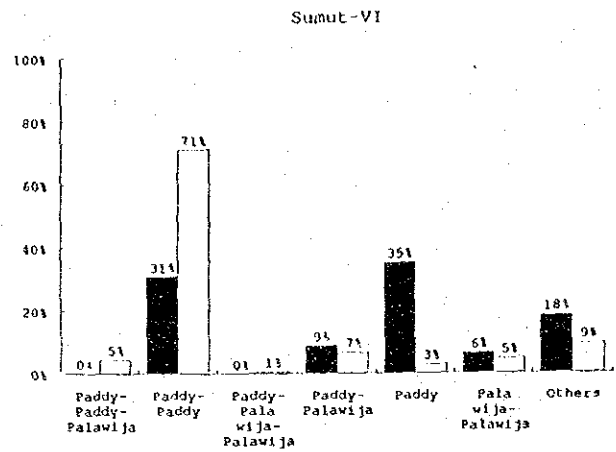
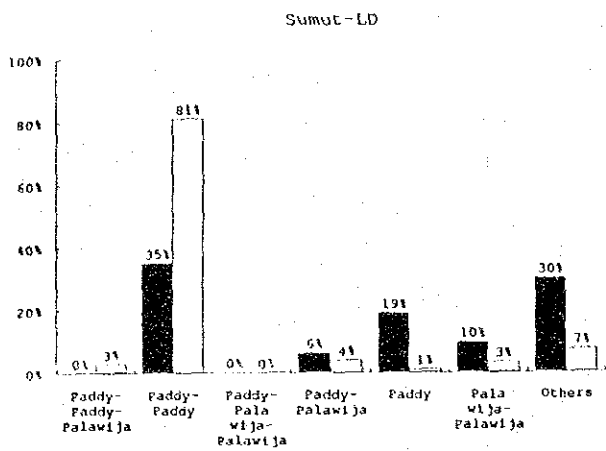


Fig. VI-3 SUMMARY OF INVENTORY SURVEY, CROPPING PATTERN ON WET PADDY FIELD

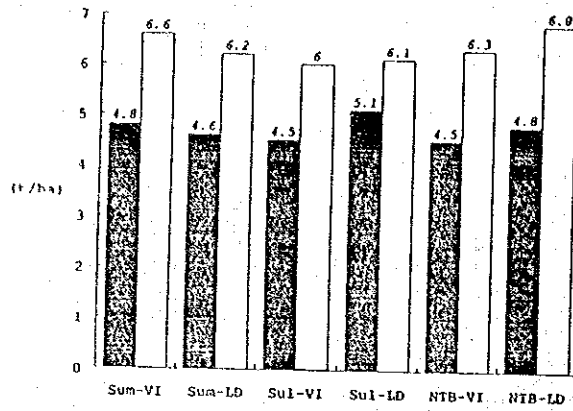
Table VI-6 SUMMARY OF INVENTORY SURVEY, YIELD RATE OF FOOD CROPS

Crops	(Unit)	North Sumatra				South Sulawesi				West Nusa Tenggara			
		VI		LD		VI		LD		VI		LD	
		PR.	FU.	PR.	FU.	PR.	FU.	PR.	FU.	PR.	FU.	PR.	FU.
<b>Paddy, Wet Season</b>													
X	(t/ha)	4.8	6.6	4.6	6.2	4.5	6.0	5.1	6.1	4.5	6.3	4.8	6.8
STD		0.951	1.395	1.147	1.262	1.097	1.333	1.294	1.499	0.990	0.993	0.541	0.552
n	(nos.)	222	242	30	31	319	298	8	8	123	115	22	18
<b>Paddy, Dry Season</b>													
X	(t/ha)	4.6	6.2	4.8	6.0	4.2	5.6	4.9	5.9	4.3	5.3	4.5	5.5
STD		0.946	1.319	1.115	1.274	1.262	1.376	1.056	1.302	1.118	1.008	0.306	0.431
n	(nos.)	166	221	23	29	284	266	8	8	79	73	14	12
<b>Paddy, Rainfed</b>													
X	(t/ha)	3.5	5.3	4.1	5.3	3.3	4.6	3.4	4.4	3.5	4.6	3.4	4.8
STD		0.786	0.933	0.953	0.857	1.243	1.520	1.749	2.286	0.863	0.796	0.513	0.528
n	(nos.)	122	102	12	11	216	198	7	7	50	47	11	10
<b>Paddy, Upland</b>													
X	(t/ha)	2.2	3.4	2.7	3.9	1.6	2.0			2.1	3.3		
STD		0.673	1.109	0.682	0.450	0.916	0.912			0.521	0.824		
n	(nos.)	22	15	8	7	11	11	0	0	12	10	0	0
<b>Maize</b>													
X	(t/ha)	2.9	4.0	2.9	3.9	1.8	2.6	2.1	2.6	2.1	2.7	2.4	2.7
STD		0.825	1.193	0.653	0.732	1.091	1.278	0.758	0.917	0.579	0.647	0.404	0.330
n	(nos.)	77	72	8	7	119	110	6	6	37	32	9	6
<b>Cassava</b>													
X	(t/ha)	17.6	22.4	19.0	23.3	5.8	8.0	5.0	7.0	12.0	16.1	11.7	16.6
STD		6.430	5.538	7.477	9.251	2.414	3.647			3.567	4.145	1.768	1.941
n	(nos.)	50	45	5	4	47	45	1	1	23	19	15	11
<b>Peanuts</b>													
X	(t/ha)	1.5	2.1	1.3	2.0	1.2	1.7	0.6	1.2	1.1	1.5	0.8	0.9
STD		0.458	0.466	0.058	0.451	0.752	0.833	0.200	0.436	0.737	0.831	0.378	0.200
n	(nos.)	38	36	3	3	113	98	4	4	41	34	7	6
<b>Green Peas</b>													
X	(t/ha)	0.8	1.2			1.1	1.5	0.6	0.8	0.8	1.1	0.7	1.1
STD		0.589	0.495			1.485	1.593	0.208	0.289	0.830	0.622	0.185	0.163
n	(nos.)	3	2	0	0	56	50	3	3	67	41	15	12
<b>Soybean</b>													
X	(t/ha)	0.9	1.2			1.1	1.7	1.3	1.8	1.0	1.4	1.0	1.6
STD		0.297	0.192			0.972	1.175	0.245	0.403	0.789	0.222	0.199	0.692
n	(nos.)	6	5	0	0	47	44	4	4	88	70	16	13

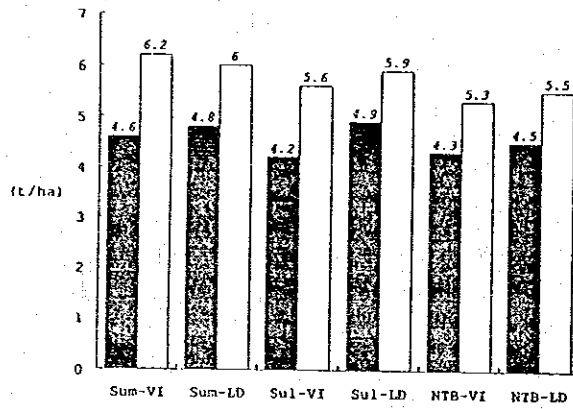
PR.: Present Yield Rate  
 FU.: Future Yield Rate  
 X : Average  
 STD: Standard Deviation  
 n : Number of Sample

Wet Paddy (Wet Season)

(1/2)



Wet Paddy (Dry Season)



Wet Paddy (Rainfed)

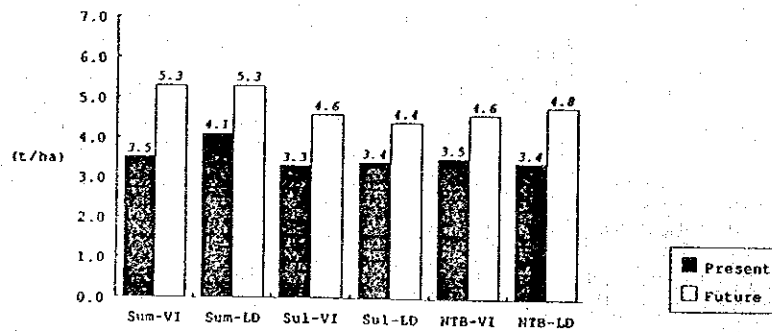
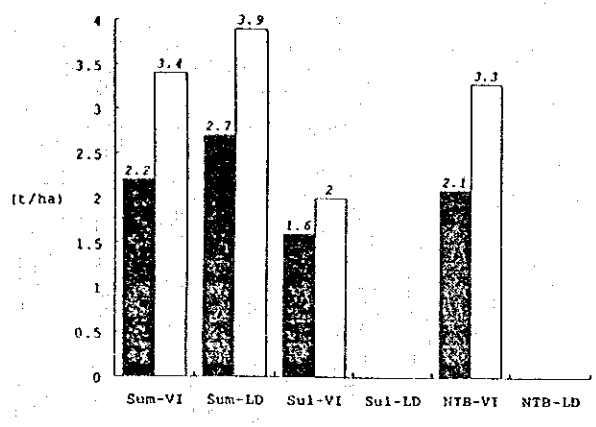
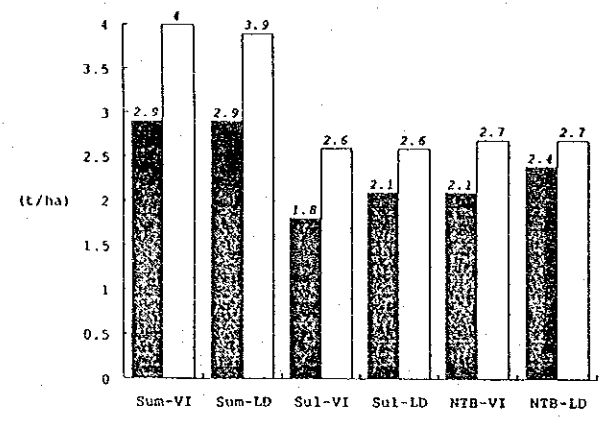


Fig. VI-4 SUMMARY OF INVENTORY SURVEY,  
AVERAGE YIELD RATE OF FOOD CROPS

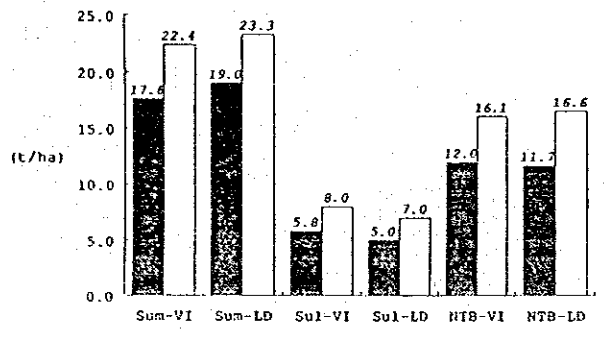
**Upland Paddy**



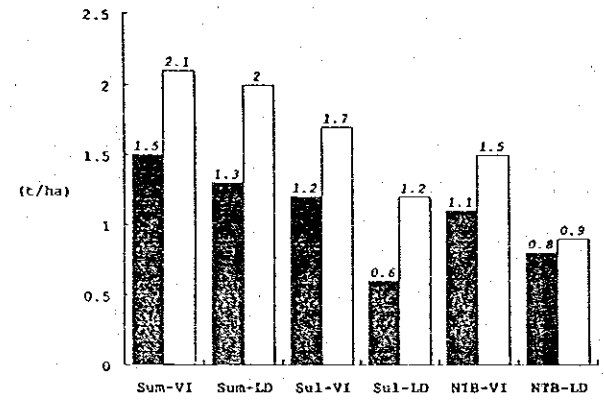
**Maize**



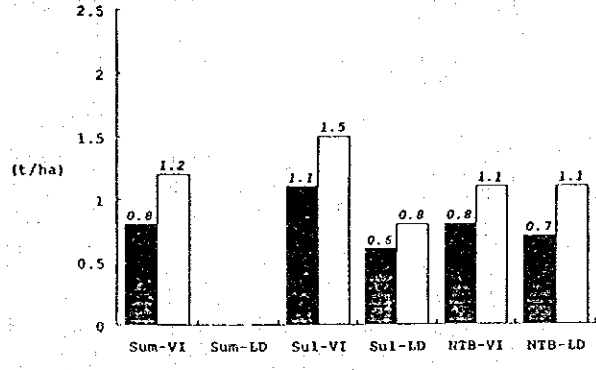
**Cassava**



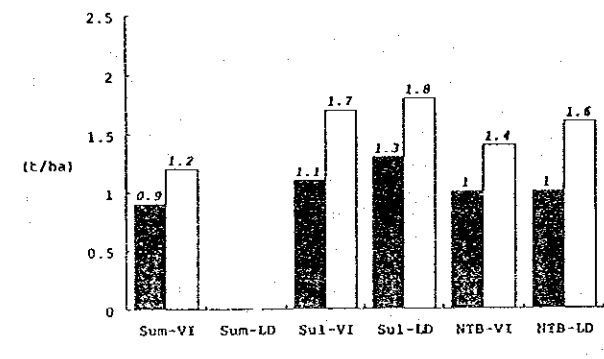
**Peanut**



**Green Pea**



**Soybean**



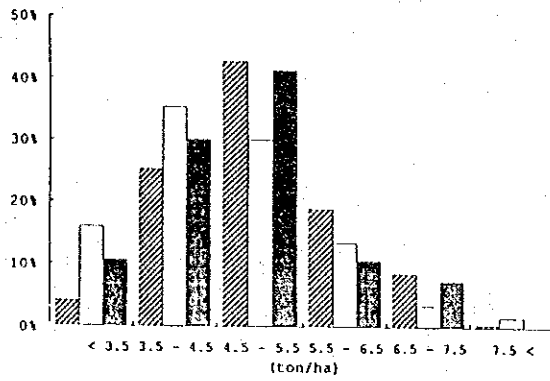
Present  
 Future

Table VI-7 SUMMARY OF INVENTORY SURVEY, YIELD RATE RANGE OF FOOD CROPS

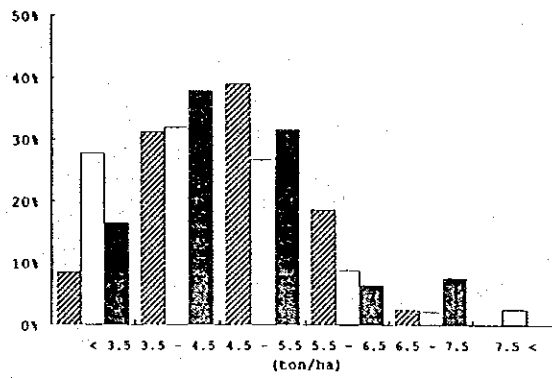
Crops	Yield Range (t/ha)	North Sumatra				South Sulawesi				West Nusa Tenggara			
		VI		LD		VI		LD		VI		LD	
		nos.	%	nos.	%	nos.	%	nos.	%	nos.	%	nos.	%
Paddy, Wet Season													
	< 3.5	9	4%	3	10%	51	16%	0	0%	13	11%	0	0%
	3.5 - 4.5	56	25%	10	33%	113	35%	2	25%	37	30%	3	15%
	4.5 - 5.5	95	43%	9	30%	96	30%	4	50%	51	41%	15	75%
	5.5 - 6.5	42	19%	5	17%	43	13%	1	13%	13	11%	2	10%
	6.5 - 7.5	19	9%	3	10%	11	3%	0	0%	9	7%	0	0%
	7.5 <	1	0%	0	0%	5	2%	1	13%	0	0%	0	0%
Paddy, Dry Season													
	< 3.5	14	8%	3	13%	79	28%	0	0%	13	16%	0	0%
	3.5 - 4.5	52	31%	3	13%	91	32%	2	25%	30	38%	4	33%
	4.5 - 5.5	65	39%	10	43%	76	27%	4	50%	25	32%	8	67%
	5.5 - 6.5	31	19%	5	22%	25	9%	1	13%	5	6%	0	0%
	6.5 - 7.5	4	2%	2	9%	6	2%	1	13%	6	8%	0	0%
	7.5 <	0	0%	0	0%	7	2%	0	0%	0	0%	0	0%
Paddy, Rainfed													
	< 2.5	7	6%	1	8%	65	30%	3	43%	6	12%	0	0%
	2.5 - 3.5	41	34%	1	8%	47	22%	2	29%	12	24%	4	44%
	3.5 - 4.5	50	41%	2	17%	58	27%	0	0%	23	46%	5	56%
	4.5 - 5.5	23	19%	8	67%	39	18%	1	14%	9	18%	0	0%
	5.5 - 6.5	1	1%	0	0%	3	1%	0	0%	0	0%	0	0%
	6.5 <	0	0%	0	0%	4	2%	1	14%	0	0%	0	0%
Paddy, Upland													
	< 1.5	1	5%	1	13%	5	45%	0	0%	0	0%	0	0%
	1.5 - 2.5	12	55%	0	0%	5	45%	0	0%	11	92%	0	0%
	2.5 - 3.5	8	36%	6	75%	0	0%	0	0%	1	8%	0	0%
	3.5 <	1	5%	1	13%	1	9%	0	0%	0	0%	0	0%
Maize													
	< 1.5	0	0%	0	0%	52	44%	1	17%	3	8%	0	0%
	1.5 - 2.5	23	30%	2	25%	29	24%	3	50%	21	57%	3	43%
	2.5 - 3.5	32	42%	5	63%	32	27%	2	33%	12	32%	4	57%
	3.5 <	22	29%	1	13%	6	5%	0	0%	1	3%	0	0%
Cassava													
	< 7.5	2	4%	0	0%	39	83%	1	100%	1	4%	0	0%
	7.5 - 12.5	7	14%	1	20%	8	17%	0	0%	13	57%	9	69%
	12.5 - 17.5	15	30%	1	20%	0	0%	0	0%	7	30%	4	31%
	17.5 <	26	52%	3	60%	0	0%	0	0%	2	9%	0	0%
Peanuts													
	< 0.75	2	5%	0	0%	20	18%	3	75%	21	51%	3	60%
	0.75 - 1.25	9	24%	0	0%	61	54%	1	25%	8	20%	1	20%
	1.25 - 1.75	14	37%	3	100%	14	12%	0	0%	4	10%	1	20%
	1.75 <	13	34%	0	0%	18	16%	0	0%	8	20%	0	0%
Green Peas													
	< 0.75	0	0%	0	0%	31	55%	2	67%	56	84%	9	69%
	0.75 - 1.25	0	0%	0	0%	17	30%	1	33%	9	13%	4	31%
	1.25 - 1.75	0	0%	0	0%	3	5%	0	0%	0	0%	0	0%
	1.75 <	0	0%	0	0%	5	9%	0	0%	2	3%	0	0%
Soybean													
	< 0.75	1	17%	0	0%	10	21%	0	0%	13	15%	2	14%
	0.75 - 1.25	4	67%	0	0%	27	57%	2	50%	69	78%	12	86%
	1.25 - 1.75	1	17%	0	0%	8	17%	2	50%	5	6%	0	0%
	1.75 <	0	0%	0	0%	2	4%	0	0%	1	1%	0	0%

Wet Paddy (Wet Season)

(1/2)



Wet Paddy (Dry Season)



Wet Paddy (Rainfed)

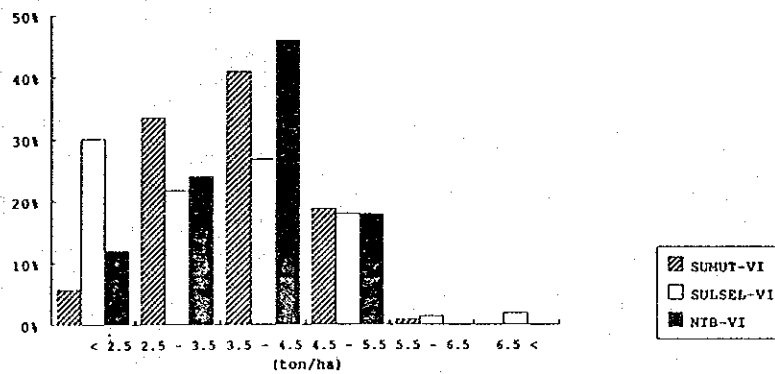
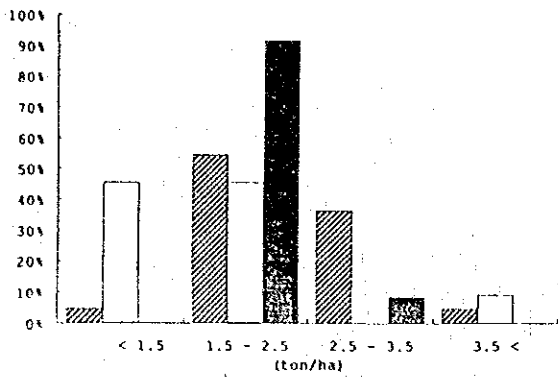


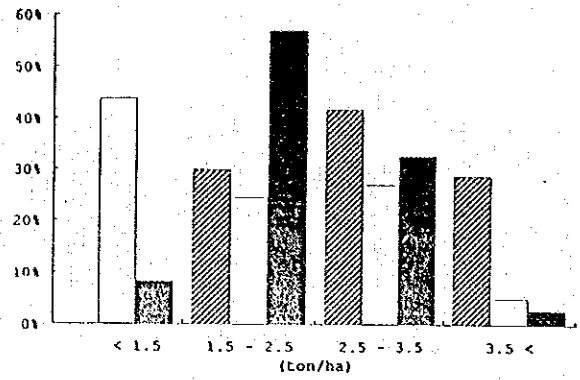
Fig. VI-5 SUMMARY OF INVENTORY SURVEY,  
YIELD RATE DISTRIBUTION OF FOOD CROPS

**Upland Paddy**

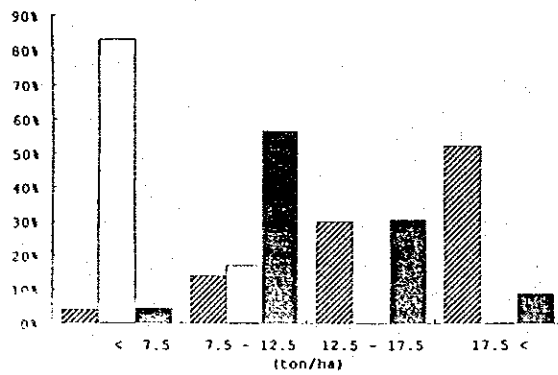


**Maize**

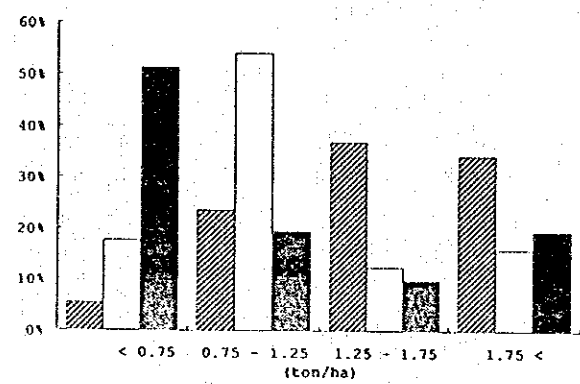
(2/2)



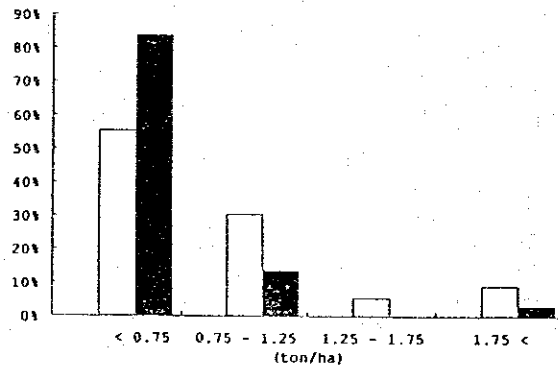
**Cassava**



**Peanut**



**Green Pea**



**Soybean**

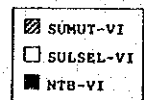
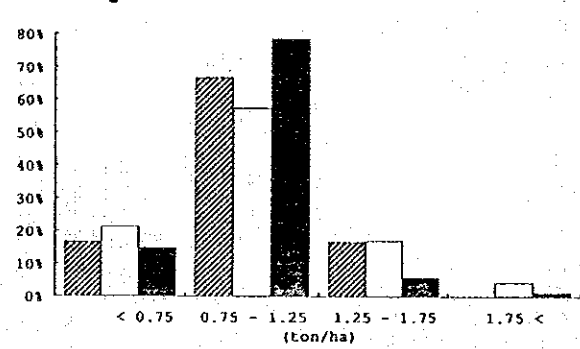




Table VI-8 CROPPING AREA OF REPRESENTATIVE SCHEMES

(1/5)

NORTH SUMATRA	Present	Season1			Season2			Season3			Future			Season1			Season2			Season3									
		Irr. Paddy	Rain. Paddy	Dryland	Plant. &MA	Irr. Paddy	Rain. Paddy	Dryland	Plant. &MA	Irr. Paddy	Rain. Paddy	Dryland	Plant. &MA	Irr. Paddy	Rain. Paddy	Dryland	Plant. &MA	Irr. Paddy	Rain. Paddy	Dryland	Plant. &MA	Irr. Paddy	Rain. Paddy	Dryland	Plant. &MA	Irr. Paddy	Rain. Paddy	Dryland	Plant. &MA
LD60011 Sumbari		34 Paddy	1 Paddy	20 Soybean	106 Coffee	31 Paddy	1	12	65	31	31 Paddy	1	12	65	71 Paddy	0	1 Soybean	74 Coffee	69 Paddy	48									
LD60038 Rauning (B)		5 Paddy				5 Paddy				2	5 Paddy				56 Paddy				59 Paddy	18									
										3	Soybean								Soybean	3									
										1	13 Maize				0						1								
										2	2 Soybean				0						3								
										37	62 Rubber				33 Rubber				22		1								
VI50025 Sumbul Berampu		124 Paddy				112 Paddy				73	112 Paddy				124 Paddy				112 Paddy	23									
										23	Chili										15								
										15	Peanut																		
VI50057 Sidomukti		0				0					0				27 Paddy				24 Paddy	24									
										11	11 Paddy				3 Paddy				3										
											0				0														
											36 Coconut				3 Coconut				3										
VI50091 Aek Palia		34 Paddy				31 Paddy				10	31 Paddy				38 Paddy				34 Paddy	28									
											0				0														
											2 Soybean				2 Soybean				1										
											22 Oil Palm				21 Oil Palm				7										
											Rubber			Rubber					7										
VI50129 Pangambatan (B)		30 Paddy				27 Paddy				14	27 Paddy				48 Paddy				43 Paddy	43									
											11				0														
											0				0														
											0				0														
VI50141 Aek Siparbue		23 Paddy				21 Paddy				11	21 Paddy				26 Paddy				23 Paddy	23									
										10	Peanut																		
											1			0															
											1 Peanut			0															
											5			5 Peanut															

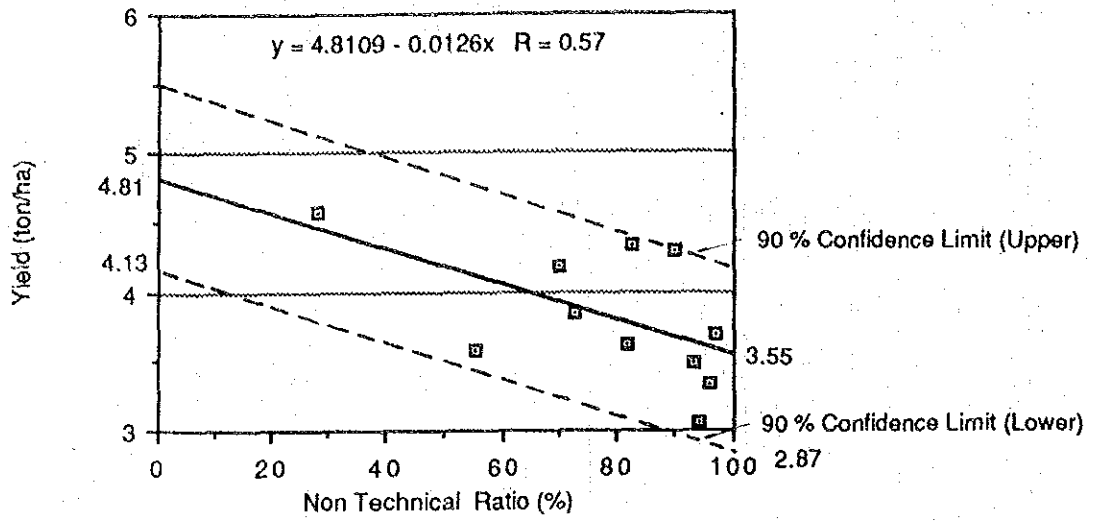
VI50218	Kutamale	Irr. Paddy	32 Paddy	29 Paddy Maize	18 11	40 Paddy	36 Paddy Maize	31 Maize 5	6
		Rain. Paddy	0			0			
		Dryland	17 Maize	10		12 Maize	7		
		Plant. &MA	0			0			
VI50240	Asahan VIII Pengajian	Irr. Paddy	45 Paddy	41 Paddy	8	55 Paddy	59 Paddy	59 Soybean	8
		Rain. Paddy	2 Paddy	2		0			
		Dryland	10 Soybean	6		4 Soybean	2		
		Plant. &MA	32 Rubber	23		25 Rubber	16		
VI50256	Aek Sibim	Irr. Paddy	40 Paddy	36 Paddy Peanut	12 3	48 Paddy	43 Paddy Peanut	37 3	
		Rain. Paddy	0			0			
		Dryland	0			0			
		Plant. &MA	58 Maize	35 Peanut	17	50 Maize	30 Peanut	15	

SOUTH SULAWESI		Present	Season1	Season2	Season3	Future	Season1	Season2	Season3
LD20003	Kalu	Irr.Paddy	47 Paddy	42 Paddy Soybean Maize	14 9 18	70 Paddy	63 Paddy Soybean	54 Maize 9	18
		Rain.Paddy	0			0			
		Dryland	32 Maize	19		2 Maize	5		
		Plant.&MA	11 Coconut	7		11 Coconut	7		
VI10055	Pajjenge	Irr.Paddy	100 Paddy	90 Paddy Peanut Soyb/Pean	9 25 25	143 Paddy	129 Paddy Peanut Soyb/Pean	37 25 25	
		Rain.Paddy	43 Paddy	39		0			
		Dryland	4 Peanut	2		4 Peanut	2		
		Plant.&MA	2 Peanut	1		2 Peanut	1		
VI10099	Radieng	Irr.Paddy	171 Paddy	154 Paddy Maize	93 25	224 Paddy	202 Paddy	202 Maize	25
		Rain.Paddy	0			0			
		Dryland	51 Maize	37		2 Maize	5		
		Plant.&MA	27 Coconut	16		27 Coconut	16		
VI10115	Kaindi	Irr.Paddy	57 Paddy	60 Paddy Maize Vegetable	45 8 7	124 Paddy	112 Paddy Maize Vegetable	66 8 7	
		Rain.Paddy	0			0			
		Dryland	104 Maize	62		47 Maize	28		
		Plant.&MA	3 Coconut	2		3 Coconut	2		
VI10140	Lembang Bata	Irr.Paddy	72 Paddy	65 Paddy	36 Maize	76 Paddy	68 Paddy	68 Maize	10
		Rain.Paddy	0			0			
		Dryland	0			0			
		Plant.&MA	0			0			
VI10168	Panrita	Irr.Paddy	55 Paddy	50 Paddy Maize	8 10	65 Paddy	59 Paddy Maize	10 10	
		Rain.Paddy	0			0			
		Dryland	3 Maize	2		0			
		Plant.&MA	15 Banana	9		3 Banana	5		

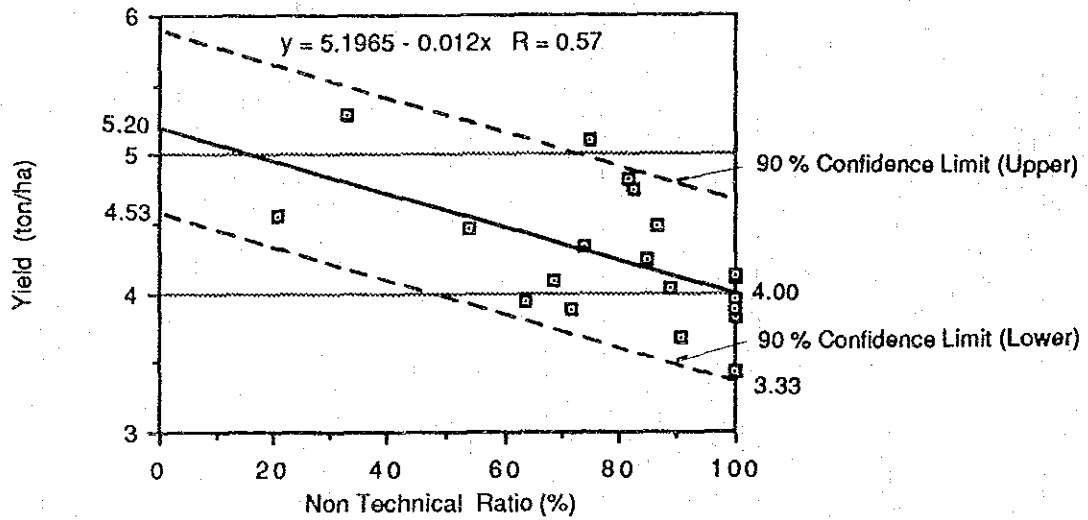
VII0182	Mario I-II-III	Irr. Paddy	50 Paddy	45 Paddy Peanut Maize	12 12 4	57 Paddy	51 Paddy Peanut Maize	14 12 4
		Rain. Paddy Dryland Plant. &MA	0 12 Maize 0	7		0 5 Maize 0	3	
VII0201	Pakelili II	Irr. Paddy	19 Paddy	17 Paddy Maize Peanut	11 5 1	54 Paddy	49 Paddy Maize Peanut	15 5 1
		Rain. Paddy Dryland Plant. &MA	0 35 Maize 104 Coconut	21 62		0 16 Maize 88 Coconut	10 53	
VII0227	Limpua / Padaelo	Irr. Paddy	77 Paddy	69 Paddy Maize	45 15	138 Paddy	124 Paddy	124 Maize 15
		Rain. Paddy Dryland Plant. &MA	0 20 Maize 12 Cocnut	12 11		0 0 0		
VII0287	Malimbu	Irr. Paddy	0	29		32 Paddy	29 Paddy	29
		Rain. Paddy Dryland Plant. &MA	32 Paddy 2 Maize 1 Banana	1 1		0 2 Maize 1 Banana	1 1	
VII0332	Salu Akung	Irr. Paddy	26 Paddy	23 Paddy	13	26 Paddy	23 Paddy	23
		Rain. Paddy Dryland Plant. &MA	0 0 0			0 0 0		
VII0354	Mariri	Irr. Paddy	0	31		63 Paddy	57 Paddy	57
		Rain. Paddy Dryland Plant. &MA	34 Paddy 50 Maize 23 Coconut	30 14		0 21 Maize 23 Coconut	13 14	

WEST NUSA TENGGARA	Present	Season1	Season2	Future	Season1	Season2	Season3
LD45010 Danar Jengkang	Irr. Paddy 5 Rain. Paddy 0 Dryland 0 Plant. &MA 218 Green Pea 130	5 Paddy 0 0	5 Paddy	5 Chili/Tobc 5	120 Paddy 0 0 103 Green Pea 61	108 Paddy	108 Chili/Tobc 5
VI32013 Mada Manini	Irr. Paddy 70 Rain. Paddy 0 Dryland 0 Plant. &MA 0	70 Paddy	63 Paddy Soybean 50	25	70 Paddy	63 Paddy Soybean 50	5 Soybean 25
VI33050 Uma Lebang	Irr. Paddy 68 Rain. Paddy 0 Dryland 24 Green Pea 14 Plant. &MA 4 Coconut 2	68 Paddy	61 Paddy Soybean 15	5 15	82 Paddy	80 Paddy Soybean 15	6 15
VI34004 Lokok Tripas	Irr. Paddy 34 Rain. Paddy 0 Dryland 19 Pean/Grep 11 Plant. &MA 0	34 Paddy	31 Paddy	20	34 Paddy	31 Paddy	31 Pean/Grep 20
VI35035 Lengkok Dudu	Irr. Paddy 24 Rain. Paddy 0 Dryland 0 Plant. &MA 20 Coconut 12	24 Paddy	22 Paddy	18	26 Paddy	23 Paddy	23 Chili/Tobc 18
VI35045 Kelokos Udang	Irr. Paddy 105 Rain. Paddy 0 Dryland 12 Maize 7 Plant. &MA 0	105 Paddy	95 Paddy	50	111 Paddy	100 Paddy	67 Maize/SwPo 50
VI36016 Raba Sangga	Irr. Paddy 111 Rain. Paddy 0 Dryland 1 Soybean 1 Plant. &MA 0	111 Paddy	100 Paddy Soybean 20	10 20	111 Paddy	100 Paddy Soybean 20	6 Soybean 10 20 Peanut 20
VI37003 Montong Sapah / Puri	Irr. Paddy 13 Rain. Paddy 20 Dryland 3 Green Pea 2 Plant. &MA 0	13 Paddy	12 Peanut 11	11	33 Paddy	30 Paddy Peanut 11	19 11

Paddy Yield and Non Technical Irrigation Ratio in North Sumatra, 1989



Paddy Yield and Non Technical Irrigation Ratio in South Sulawesi, 1989



Paddy Yield and Non Technical Irrigation Ratio in NTB, 1989

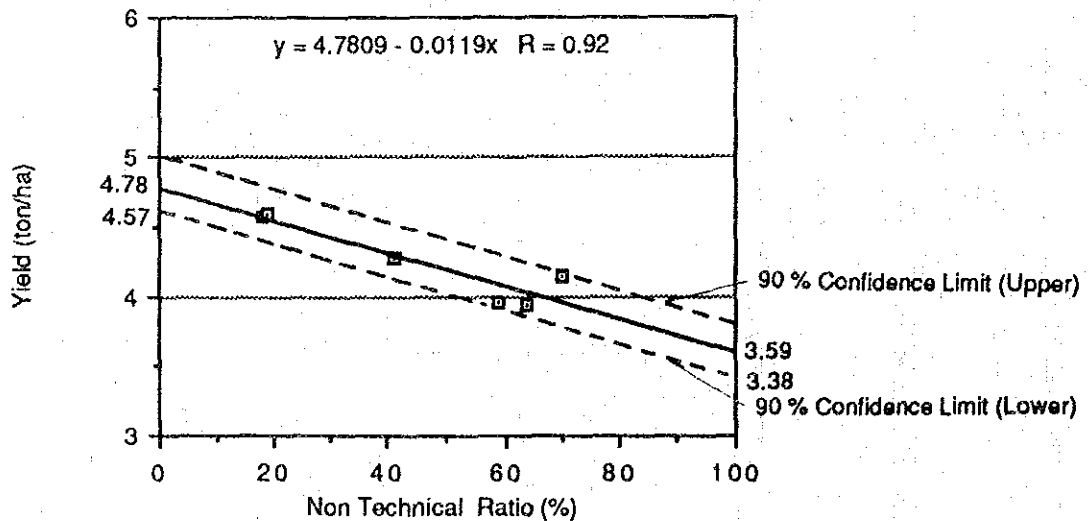


Fig. VI-6 PADDY YIELD AND NON TECHNICAL IRRIGATION RATIO

Table VI-9 CROP YIELD RATES ON WITH AND WITHOUT PROJECT CONDITION

Corp	(Unit: ton/ha)					
	North Sumatra		South Sulawesi		West Nusa Tenggara	
	Without Project	With Project	Without Project	With Project	Without Project	With Project
Irrigated Paddy	2.87	3.88	3.33	4.29	3.38	4.33
Rainfed Paddy	2.15	2.15	2.50	2.50	2.54	2.54
Dry Paddy	1.63	1.63	1.52	1.52	1.64	1.64
Maize	1.67	1.67	1.28	1.28	1.56	1.56
Cassava	9.81	9.81	9.31	9.31	9.87	9.87
Sewweet Potato	7.41	7.41	6.44	6.44	9.45	9.45
Peanut	0.87	0.87	0.88	0.88	1.05	1.05
Soybean	0.82	0.82	0.85	0.85	0.94	0.94
Green Pea	0.75	0.75	0.73	0.73	0.39	0.39

Table VI-10 PADDY PRODUCTION, WITH AND WITHOUT PROJECT CONDITION

Province	North Sumatra (10 Schemes)		South Sulawesi (12 Schemes)		West Nusa Tenggara (8 Schemes)	
	Total	Average	Total	Average	Total	Average
<u>Land Use (ha)</u>						
Without Project						
Irrigated Paddy Field	379	38	684	57	430	54
Rainfed Paddy Field	45	5	109	9	20	3
With Project						
Irrigated Paddy Field	560	56	1,072	89	594	74
Rainfed Paddy Field	3	0	0	0	0	0
<u>Harvested Area of Paddy (ha)</u>						
Without Project						
Wet Season						
Irrigated Paddy Field	344	34	615	51	389	49
Rainfed Paddy Field	42	4	99	8	18	2
Dry Season						
Irrigated Paddy Field	190	19	286	24	134	17
Rainfed Paddy Field	0	0	0	0	0	0
With Project						
Wet Season						
Irrigated Paddy Field	502	50	966	81	535	67
Rainfed Paddy Field	3	0	0	0	0	0
Dry Season						
Irrigated Paddy Field	423	42	699	58	265	33
Rainfed Paddy Field	0	0	0	0	0	0
<u>Cropping Intensity of Paddy (%)</u>						
Without Project						
Irrigated Paddy Field		155%		147%		134%
Rainfed Paddy Field		100%		100%		100%
With Project						
Irrigated Paddy Field		184%		172%		150%
Rainfed Paddy Field		100%				
<u>Wet Paddy Production</u>						
Without Project						
Irrigated Paddy						
Harvested area (ha)	534	53	901	75	523	65
Yield rate (t/ha)	29	3	40	3	27	3
Production (t)	1,534	153	3,001	250	1,769	221
Rainfed Paddy						
Harvested area (ha)	42	4	99	8	18	2
Yield rate (t/ha)	22	2	30	3	20	3
Production (t)	90	9	249	21	46	6
With Project						
Irrigated Paddy						
Harvested area (ha)	925	93	1,665	139	800	100
Yield rate (t/ha)	39	4	51	4	35	4
Production (t)	3,589	359	7,143	595	3,462	433
Rainfed Paddy						
Harvested area (ha)	3	0	0	0	0	0
Yield rate (t/ha)	22	2	30	3	20	3
Production (t)	6	1	0	0	0	0
<u>Total Amount of Wet Paddy Production (ha)</u>						
Without Project	1,624	162	3,250	271	1,815	227
With Project	3,595	360	7,143	595	3,462	433
Increment	1,971	197	3,893	324	1,647	206
Increment (%)		121%		120%		91%



Table VI-11 PADDY PRODUCTION, WITH AND WITHOUT PROJECT CONDITION

(1/3)

Code Name	LD60011 Sumbari	LD60038 Rauning (B)	VI50025 Sumbul Berampu	VI50057 Sidomukti	VI50091 Ack Palia	VI50129 Pangam- batan (B)	VI50141 Aek Siparbue	VI50218 Kutamale	VI50240 Asahan VIII Pengajian	VI50256 Aek Sihim
<b>Land Use (ha)</b>										
Without Project										
Irrigated Paddy Field	34	5	124	12	34	30	23	32	45	40
Rainfed Paddy Field	1	14	0	15	0	12	1	0	2	0
With Project										
Irrigated Paddy Field	77	66	124	27	38	48	26	40	66	48
Rainfed Paddy Field	0	0	0	3	0	0	0	0	0	0
<b>Harvested Area of Paddy (ha)</b>										
Without Project										
Wet Season										
Irrigated Paddy Field	31	5	112	11	31	27	21	29	41	36
Rainfed Paddy Field	1	13	0	14	0	11	1	0	2	0
Dry Season										
Irrigated Paddy Field	31	2	73	11	10	14	11	18	8	12
Rainfed Paddy Field	0	0	0	0	0	0	0	0	0	0
With Project										
Wet Season										
Irrigated Paddy Field	69	59	112	24	34	43	23	36	59	43
Rainfed Paddy Field	0	0	0	3	0	0	0	0	0	0
Dry Season										
Irrigated Paddy Field	48	18	112	24	28	43	23	31	59	37
Rainfed Paddy Field	0	0	0	0	0	0	0	0	0	0
<b>Cropping Intensity of Paddy (%)</b>										
Without Project										
Irrigated Paddy Field	200%	140%	165%	200%	132%	152%	152%	162%	120%	133%
Rainfed Paddy Field	100%	100%		100%		100%	100%		100%	
With Project										
Irrigated Paddy Field	170%	131%	200%	200%	182%	200%	200%	186%	200%	186%
Rainfed Paddy Field				100%						
<b>Wet Paddy Production</b>										
Without Project										
Irrigated Paddy										
Harvested area (ha)	62	7	185	22	41	41	32	47	49	48
Yield rate (t/ha)	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87
Production (t)	178	20	531	63	118	118	92	135	141	138
Rainfed Paddy										
Harvested area (ha)	1	13	0	14	0	11	1	0	2	0
Yield rate (t/ha)	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
Production (t)	2	28	0	30	0	24	2	0	4	0
With Project										
Irrigated Paddy										
Harvested area (ha)	117	77	224	48	62	86	46	67	118	80
Yield rate (t/ha)	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88
Production (t)	454	299	869	186	241	334	178	260	458	310
Rainfed Paddy										
Harvested area (ha)	0	0	0	3	0	0	0	0	0	0
Yield rate (t/ha)	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
Production (t)	0	0	0	6	0	0	0	0	0	0
<b>Total Amount of Wet Paddy Production (ha)</b>										
Without Project	180	48	531	93	118	142	94	135	145	138
With Project	454	299	869	192	241	334	178	260	458	310
Increment	274	251	338	99	123	192	84	125	313	172
Increment (%)	152%	523%	64%	106%	104%	135%	89%	93%	216%	125%

Code Name	LD20003 Kalu	VII0055 Pajenge	VII0099 Kadieng	VII0115 Kaindi	VII0140 Lembang Bata	VII0168 Panrita	VII0182 Mario I-II-III	VII0201 Pakelli II	VII0227 Limpua/ Padalelo	VII0287 Malimbu	VII0332 Salu Akung	VII0354 Mariri
<b>Land Use (ha)</b>												
Without Project												
Irrigated Paddy Field	47	100	171	67	72	55	50	19	77	0	26	0
Rainfed Paddy Field	0	43	0	0	0	0	0	0	0	32	0	34
With Project												
Irrigated Paddy Field	70	143	224	124	76	65	57	54	138	32	26	63
Rainfed Paddy Field	0	0	0	0	0	0	0	0	0	0	0	0
<b>Harvested Area of Paddy (ha)</b>												
Without Project												
Wet Season												
Irrigated Paddy Field	42	90	154	60	65	50	45	17	69	0	23	0
Rainfed Paddy Field	0	39	0	0	0	0	0	0	0	29	0	31
Dry Season												
Irrigated Paddy Field	14	9	93	45	36	8	12	11	45	0	13	0
Rainfed Paddy Field	0	0	0	0	0	0	0	0	0	0	0	0
With Project												
Wet Season												
Irrigated Paddy Field	63	129	202	112	68	59	51	49	124	29	23	57
Rainfed Paddy Field	0	0	0	0	0	0	0	0	0	0	0	0
Dry Season												
Irrigated Paddy Field	54	37	202	66	68	10	14	15	124	29	23	57
Rainfed Paddy Field	0	0	0	0	0	0	0	0	0	0	0	0
<b>Cropping Intensity of Paddy (%)</b>												
Without Project												
Irrigated Paddy Field	133%	110%	160%	175%	155%	116%	127%	165%	165%		157%	
Rainfed Paddy Field		100%								100%		100%
With Project												
Irrigated Paddy Field	186%	129%	200%	159%	200%	117%	127%	131%	200%	200%	200%	200%
Rainfed Paddy Field												
<b>Wet Paddy Production</b>												
Without Project												
Irrigated Paddy												
Harvested area (ha)	56	99	247	105	101	58	57	28	114	0	36	0
Yield rate (t/ha)	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33
Production (t)	186	330	823	350	336	193	190	93	380	0	120	0
Rainfed Paddy												
Harvested area (ha)	0	39	0	0	0	0	0	0	0	29	0	31
Yield rate (t/ha)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Production (t)	0	98	0	0	0	0	0	0	0	73	0	78
With Project												
Irrigated Paddy												
Harvested area (ha)	117	166	404	178	136	69	65	64	248	58	46	114
Yield rate (t/ha)	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29
Production (t)	502	712	1,733	764	583	296	279	275	1,064	249	197	489
Rainfed Paddy												
Harvested area (ha)	0	0	0	0	0	0	0	0	0	0	0	0
Yield rate (t/ha)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Production (t)	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Amount of Wet Paddy Production (ha)</b>												
Without Project												
	186	428	823	350	336	193	190	93	380	73	120	78
With Project												
	502	712	1,733	764	583	296	279	275	1,064	249	197	489
Increment	316	284	910	414	247	103	89	182	684	176	77	411
Increment (%)	170%	66%	111%	118%	74%	53%	47%	196%	180%	241%	64%	527%

(3/3)

Code Name	ID45010 Danar Jengkang	VI32013 Mada Manini	VI33050 Uma Lebang	VI34004 Lokok Tripas	VI35035 Lengkok Dudu	VI35045 Kelokos Udang	VI36016 Raba Sangga	VI37003 Montong Sapah/Puri
<b>Land Use (ha)</b>								
Without Project								
Irrigated Paddy Field	5	70	68	34	24	105	111	13
Rainfed Paddy Field	0	0	0	0	0	0	0	20
With Project								
Irrigated Paddy Field	120	70	89	34	26	111	111	33
Rainfed Paddy Field	0	0	0	0	0	0	0	0
<b>Harvested Area of Paddy (ha)</b>								
Without Project								
Wet Season								
Irrigated Paddy Field	5	63	61	31	22	95	100	12
Rainfed Paddy Field	0	0	0	0	0	0	0	18
Dry Season								
Irrigated Paddy Field	5	5	5	31	22	60	6	0
Rainfed Paddy Field	0	0	0	0	0	0	0	0
With Project								
Wet Season								
Irrigated Paddy Field	108	63	80	31	23	100	100	30
Rainfed Paddy Field	0	0	0	0	0	0	0	0
Dry Season								
Irrigated Paddy Field	108	5	6	31	23	67	6	19
Rainfed Paddy Field	0	0	0	0	0	0	0	0
<b>Cropping Intensity of Paddy (%)</b>								
Without Project								
Irrigated Paddy Field	200%	108%	108%	200%	200%	163%	106%	100%
Rainfed Paddy Field								100%
With Project								
Irrigated Paddy Field	200%	108%	108%	200%	200%	167%	106%	163%
Rainfed Paddy Field								
<b>Wet Paddy Production</b>								
Without Project								
Irrigated Paddy								
Harvested area (ha)	10	68	66	62	44	155	106	12
Yield rate (t/ha)	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38
Production (t)	34	230	223	210	149	524	358	41
Rainfed Paddy								
Harvested area (ha)	0	0	0	0	0	0	0	18
Yield rate (t/ha)	2.54	2.54	2.54	2.54	2.54	2.54	2.54	2.54
Production (t)	0	0	0	0	0	0	0	46
With Project								
Irrigated Paddy								
Harvested area (ha)	216	68	86	62	46	167	106	49
Yield rate (t/ha)	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
Production (t)	935	294	372	268	199	723	459	212
Rainfed Paddy								
Harvested area (ha)	0	0	0	0	0	0	0	0
Yield rate (t/ha)	2.54	2.54	2.54	2.54	2.54	2.54	2.54	2.54
Production (t)	0	0	0	0	0	0	0	0
<b>Total Amount of Wet Paddy Production (ha)</b>								
Without Project	34	230	223	210	149	524	358	87
With Project	935	294	372	268	199	723	459	212
Increment	901	64	149	58	50	199	101	125
Increment (%)	2650%	28%	67%	28%	34%	38%	28%	144%

Table VI-12 PROJECTED AVERAGE ANNUAL GROWTH RATES OF GRDP BY MAIN SECTORS IN REPELITA V

Province	GRDP excl. oil/gas		Annual Growth Rates (%)							
	in 1988 (Rp. bn)	in 1993 (Rp. bn)	Total GRDP	Agri- culture	Manufac- turing	Mining	Construc- tion	Trade	Transpor- tation	Others
DI Aceh	1,561	1,974	4.8	2.8	6.9	0.6	5.3	6.0	7.3	7.0
<u>North Sumatra</u>	<u>4,093</u>	<u>5,324</u>	<u>5.4</u>	<u>4.4</u>	<u>10.4</u>	<u>5.1</u>	<u>5.3</u>	<u>5.9</u>	<u>4.5</u>	<u>4.4</u>
West Sumatra	1,528	1,950	5.0	3.9	9.0	10.7	2.8	5.1	5.7	4.8
Riau	1,289	1,676	5.4	4.4	7.1	5.7	4.5	5.7	6.0	5.6
Jambi	636	820	5.2	3.4	11.1	9.6	6.2	4.9	5.4	4.9
South Sumatra	2,900	3,719	5.1	3.1	8.0	2.0	6.0	5.5	6.0	5.0
Bengkulu	341	456	6.0	5.5	8.6	10.4	6.0	6.8	7.7	5.2
Lampung	1,458	2,007	6.6	5.5	12.5	8.0	6.1	6.2	7.1	6.9
DKI Jakarta	10,250	14,242	6.8	4.3	10.1	-	5.9	5.6	5.5	6.6
West Java	12,684	17,957	7.2	3.2	11.9	5.9	7.3	7.4	8.4	6.6
Central Java	9,155	11,909	5.4	3.4	10.4	15.7	4.8	2.5	5.4	6.9
DI Yogyakarta	940	1,205	5.1	2.2	9.5	10.7	5.9	5.1	6.5	5.9
East Java	13,857	18,197	5.6	3.0	10.0	5.7	5.6	6.8	6.2	6.3
West Kalimantan	1,078	1,470	6.4	4.0	10.4	8.7	3.3	8.3	6.5	6.3
Central Kalimantan	587	746	4.9	3.6	8.7	6.6	2.3	3.5	6.5	7.5
South Kalimantan	1,063	1,363	5.1	3.9	8.5	8.7	5.7	5.0	4.5	5.6
East Kalimantan	1,372	1,845	6.1	4.5	10.1	9.6	7.8	5.5	5.4	5.3
North Sulawesi	769	986	5.1	2.9	10.5	0.6	5.2	2.7	6.9	6.9
Central Sulawesi	451	592	5.6	4.5	9.3	9.9	6.3	6.5	5.3	5.4
<u>South Sulawesi</u>	<u>2,221</u>	<u>2,821</u>	<u>4.9</u>	<u>4.1</u>	<u>7.9</u>	<u>2.1</u>	<u>7.4</u>	<u>5.5</u>	<u>5.5</u>	<u>5.0</u>
Southeast Sulawesi	396	545	6.6	6.3	13.6	1.4	4.6	7.2	8.9	6.5
Bali	1,250	1,697	6.3	3.4	9.1	0.7	5.9	8.4	9.3	7.6
<u>Nusa Tenggara Barat</u>	<u>673</u>	<u>850</u>	<u>4.8</u>	<u>3.7</u>	<u>9.0</u>	<u>1.7</u>	<u>4.6</u>	<u>6.0</u>	<u>6.0</u>	<u>6.4</u>
Nusa Tenggara Timur	566	695	4.2	3.1	11.0	7.7	5.5	5.9	6.6	4.4
Timor Timur	105	134	5.0	2.7	10.4	6.4	5.2	5.6	8.5	6.3
Maluku	664	860	5.3	4.9	8.5	5.1	7.0	5.0	7.2	4.4
Irian Jaya	638	862	6.2	3.5	10.1	7.6	7.1	3.8	6.8	6.9
Indonesia, excl. oil/gas	72,523	96,899	6.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Indonesia, incl. oil/gas	89,383	114,078	5.0	3.6	8.5	0.4	6.0	6.0	6.4	6.1
Oil/gas	16,860	17,179	0.4							

Source: Fifth Five Year Development Plan, 1989/90 - 1993/94.

Notes: 1988 GRDP provisional estimates only, in constant prices 1983.

Table VI-13 WETLAND PADDY PLANTED AREA BY PROVINCE AND INTENSIFICATION PROGRAM 1989

Province	(ha)					Total
	Supra Insus	Insus	Inmun	Intensi- fication	Non Intensi- fication	
D.I. Aceh	15,655	91,544	146,493	253,692	58,454	312,146
<b>Sumatera Utara</b>	<b>194,583</b>	<b>402,189</b>	<b>119,904</b>	<b>716,676</b>	<b>31,330</b>	<b>748,006</b>
	26%	54%	16%	96%	4%	
Sumatera Barat	77,414	255,519	17,153	350,086	267	350,353
Riau	0	40,096	34,969	75,065	17,339	92,404
Jambi	0	46,498	44,861	91,359	29,439	120,798
Sumatera Selatan	55,651	181,235	83,854	320,740	41,213	361,953
Bengkulu	3,635	21,820	35,425	60,880	8,932	69,812
Lampung	81,849	116,589	46,186	244,624	1,309	245,933
D.K.I. Jakarta	0	4,570	4,067	8,637	0	8,637
Jawa Barat	704,495	1,163,041	168,543	2,036,079	65	2,036,144
Jawa Tengah	354,648	1,030,377	211,275	1,596,300	0	1,596,300
D.I. Yogyakarta	54,014	44,424	6,298	104,736	0	104,736
Jawa Timur	396,633	1,075,242	151,305	1,623,180	5,370	1,628,550
Bali	20,408	148,146	9,916	178,470	0	178,470
<b>Nusa Tenggara Barat</b>	<b>76,240</b>	<b>83,609</b>	<b>96,759</b>	<b>256,608</b>	<b>8,617</b>	<b>265,225</b>
	29%	32%	36%	97%	3%	
Nusa Tenggara Timur	0	1,829	25,361	27,190	39,262	66,452
Timor Timur	0	1,593	6,303	7,896	10,282	18,178
Kalimantan Barat	0	67,830	71,517	139,347	89,341	228,688
Kalimantan Tengah	0	13,557	32,836	46,393	18,507	64,900
Kalimantan Selatan	0	127,593	187,250	314,843	5,786	320,629
Kalimantan Timur	0	12,033	21,790	33,823	11,513	45,336
Sulawesi Utara	0	40,150	42,816	82,966	1,499	84,465
Sulawesi Tengah	0	50,537	41,582	92,119	19,208	111,327
<b>Sulawesi Selatan</b>	<b>225,843</b>	<b>345,702</b>	<b>189,763</b>	<b>761,308</b>	<b>15,455</b>	<b>776,763</b>
	29%	45%	24%	98%	2%	
Sulawesi Tenggara	0	10,555	27,170	37,725	549	38,274
Maluku	0	6,699	0	6,699	1,677	8,376
Irian Jaya	0	156	1,435	1,591	12	1,603
<b>Indonesia</b>	<b>2,261,068</b>	<b>5,383,133</b>	<b>1,824,831</b>	<b>9,469,032</b>	<b>415,426</b>	<b>9,884,458</b>
	23%	54%	18%	96%	4%	

Source:

Statistik Intensifikasi Pertanian, Sekretariat Badan Pengendali Bimas, 1990

Table VI-14 PADDY PRODUCTION BY INTENSIFICATION PROGRAM, 1981-1988

		(ton)							
Province	Program	1981	1982	1983	1984	1985	1986	1987	1988
Sumut	INSUS	379,345	769,215	845,358	1,060,989	1,203,759	1,145,609	1,365,449	1,457,480
	INMUM	771,843	559,867	527,417	549,850	568,923	631,442	642,020	782,260
	Intens.	1,151,188	1,329,082	1,372,775	1,610,839	1,772,682	1,777,051	2,007,469	2,185,740
	Non-Intens.	511,486	505,627	459,757	411,161	376,242	290,940	311,631	297,198
	Total	1,662,674	1,834,709	1,832,532	2,022,000	2,148,924	2,067,991	2,319,100	2,482,938
Sulsel	INSUS	392,056	635,832	902,497	757,014	920,777	1,087,232	1,509,382	1,984,044
	INMUM	834,538	722,891	923,092	1,431,582	1,451,971	1,379,181	929,208	775,220
	Intens.	1,226,594	1,358,723	1,825,589	2,188,569	2,372,748	2,466,413	2,468,590	2,759,364
	Non-Intens.	791,999	495,743	393,882	350,811	317,086	276,329	124,151	80,557
	Total	2,018,593	1,854,466	2,219,471	2,539,380	2,689,834	2,742,742	2,592,741	2,839,921
NTB	INSUS	56,585	76,078	168,565	195,947	171,168	173,383	337,196	494,515
	INMUM	542,664	659,636	581,201	634,147	677,731	669,401	556,489	461,547
	Intens.	599,249	735,713	749,766	830,094	848,899	842,784	893,685	956,062
	Non-Intens.	230,513	148,560	122,480	121,996	92,499	89,973	55,927	54,272
	Total	829,762	884,273	872,246	952,090	941,398	932,757	949,612	1,010,334
Indonesia	INSUS	7,826,676	14,028,790	16,815,838	18,481,023	19,816,910	21,755,730	24,112,455	28,352,483
	INMUM	17,594,004	13,489,549	12,860,787	14,275,205	14,184,306	13,364,180	11,864,440	9,255,148
	Intens.	25,420,680	27,518,339	29,676,625	32,756,228	34,001,216	35,119,910	35,976,895	37,607,631
	Non-Intens.	7,353,496	6,065,338	5,626,116	5,380,218	5,031,729	4,606,851	4,101,300	4,068,539
	Total	32,774,176	33,583,677	35,302,741	38,136,446	39,032,945	39,726,761	40,078,195	41,676,170

Source: Statistik Intensifikasi Pertanian, Secretariat Badan Pengendali Bimas, Biro Perencanaan, 1990

Table VI-15 AGRICULTURAL CREDIT (KUT) PER HA FOR INTENSIFICATION ON WETLAND PADDY IN 1992/93

	Package A		Package B		Package C		Package D	
	Amount (kg/lt)	Value (Rp)	Amount (kg/lt)	Value (Rp)	Amount (kg/lt)	Value (Rp)	Amount (kg/lt)	Value (Rp)
Urea	150	33,000	250	55,000	250	55,000	250	55,500
TSP	100	28,000	100	28,000	125	35,000	125	35,000
ZA	-	-	-	-	100	22,000	100	22,000
KCl	-	-	75	21,000	100	28,000	100	28,000
Seed	-	15,000	-	15,000	-	15,000	-	15,000
Insecticide/Fungicide /Redenticiide	-	50,000	-	50,000	-	50,000	-	50,000
Herbicide	-	25,000	-	25,000	-	25,000	-	25,000
PPC/ZPT	-	-	-	-	-	-	-	32,000
.... /Purchase Sprayer	-	2,500	-	2,500	-	2,500	-	2,500
Production	-	50,000	-	50,000	-	90,000	-	90,000
Harvest	-	10,000	-	10,000	-	45,000	-	45,000
Fry (Young Fish)	-	-	-	-	-	105,000	-	105,000
Total		213,500		256,500		472,500		505,000

Table VI-16 NUMBER OF COOPERATIVES AND MEMBERS BY KABUPATEN IN 1989

Kabupaten	Number of Cooperatives			Number of Members		
	KUD	Non KUD	Total	KUD	Non KUD	Total
<u>North Sumatra</u>						
Province-Sumut	2	36	38	413	69,573	69,986
Nias	30	115	145	21,168	42,375	63,543
Tapanuli Selatan	73	95	168	20,077	16,466	36,543
Tapanuli Tengah	23	50	73	10,714	9,316	20,030
Tapanuli Utara	86	377	463	30,458	44,800	75,258
Labuhan Batu	44	79	123	40,120	16,390	56,510
Asahan	50	118	168	28,518	30,620	59,138
Simalungun	50	105	155	26,742	31,317	58,059
Dairi	25	74	99	50,554	16,654	67,208
Karo	34	58	92	13,140	8,062	21,202
Deli Serdang	51	125	176	27,177	27,708	54,885
Langkat	26	62	88	23,988	18,765	42,753
Sibolga	0	75	75	225	11,277	11,502
Tanjung Balai	2	74	76	741	9,432	10,173
Pem. Siantar	1	82	83	450	10,441	10,891
Tebing Tinggi	0	51	51	0	8,295	8,295
Medan	6	351	357	5,027	111,866	116,893
Binjai	2	81	83	174	21,222	21,396
<u>Total-Sumut</u>	<u>505</u>	<u>2,008</u>	<u>2,513</u>	<u>299,686</u>	<u>504,579</u>	<u>804,265</u>
<u>South Sulawesi</u>						
Province-Sulsel	1	17	18	353	415	768
Selayar	13	22	35	12,765	2,171	14,936
Bulukumba	19	56	75	57,348	16,970	74,318
Bantaeng	9	38	47	7,426	6,664	14,090
Jeneponto	17	47	64	64,758	6,542	71,300
Takalar	20	40	60	17,440	6,293	23,733
Gowa	30	93	123	20,707	13,343	34,050
Sinjai	14	37	51	45,632	4,691	50,323
Bone	34	83	117	70,794	13,159	83,953
Maros	14	50	64	52,843	11,238	64,081
Pangkep	22	47	69	29,017	7,551	36,568
Barru	17	34	51	37,005	7,552	44,557
Soppeng	13	65	78	58,391	16,816	75,207
Wajo	28	59	87	40,984	5,564	46,548
Sidrap	26	38	64	70,826	4,734	75,560
Pinrang	33	37	70	58,879	5,205	64,084
Enrekang	6	35	41	23,859	3,543	27,402
Luwu	56	67	123	53,291	50,197	103,488
Tator	18	57	75	42,462	10,040	52,502
Polmas	28	52	80	20,612	4,491	25,103
Majene	15	36	51	31,296	3,955	35,251
Mamuju	29	25	54	7,548	2,066	9,614
Ujung Pandang	8	300	308	10,035	45,919	55,954
Pare-Pare	4	74	78	8,036	10,332	18,368
<u>Total-Sulsel</u>	<u>474</u>	<u>1,409</u>	<u>1,883</u>	<u>842,307</u>	<u>259,451</u>	<u>1,101,758</u>
<u>West Nusa Tenggara</u>						
Province-NTB	2	15	17	0	2,214	2,214
Lombok Barat	22	172	194	35,366	34,815	70,181
Lombok Tengah	30	77	107	32,620	9,309	41,929
Lombok Timur	28	83	111	44,184	29,900	74,084
Sumbawa	27	81	108	14,239	9,775	24,014
Dompu	18	59	77	8,998	7,495	16,493
Bima	25	104	129	85,196	22,537	107,733
<u>Total-NTB</u>	<u>152</u>	<u>591</u>	<u>743</u>	<u>220,603</u>	<u>116,045</u>	<u>336,648</u>

Source:

Dalam Angka of Each Province in 1989.



Table VI-17 SUMMARY OF INVENTORY SURVEY, POPULATION AND LABOR FORCE

	North Sumatra		South Sulawesi		West Nusa Tenggara	
	VI	LD	VI	LD	VI	LD
Total Population of Farm Household						
Families	317	269	306	421	329	855
Persons	1,474	2,016	1,494	2,124	1,570	3,925
Labor Force						
Total labor force	798	879	632	893	838	2,271
Labor force per household	3.1	3.2	2.8	2.6	2.8	2.7
Labor Force by Occupation						
Farmers	674	830	520	853	595	1,278
Civil servant	18	24	17	26	21	42
Tradesmen	13	8	8	14	21	41
Others	72	41	8	1	84	273

Table VI-18 SUMMARY OF INVENTORY SURVEY, LAND OWNERSHIP AND STATUS

	North Sumatra		South Sulawesi		West Nusa Tenggara	
	VI	LD	VI	LD	VI	LD
Average Number of Land Owner (persons)						
Land-owning farmers	259	345	221	404	286	765
Land owner in the District	196	327	161	86	238	665
Land owner out of the District	8	5	7	42	4	10
Land Status Distribution in Average (ha)						
Private land	134	201	212	326	148	569
District land	26	22	5	0	13	27
National land	3	12	44	18	98	0
Boundary of Property Land (nos)						
Clear	227	31	319	10	124	20
Unclear	1	1	4	0	0	0

Table VI-19 SUMMARY OF INVENTORY SURVEY, AGRICULTURAL INSTITUTIONS

	North Sumatra				South Sulawesi				West Nusa Tenggara			
	VI		LD		VI		LD		VI		LD	
	nos.	%	nos.	%	nos.	%	nos.	%	nos.	%	nos.	%
Activity of Field												
Extension Workers												
a Active	213	87%	25	81%	301	92%	8	89%	109	89%	18	90%
b Not Active	25	10%	5	16%	24	7%	0	0%	10	8%	2	10%
c None	7	3%	1	3%	2	1%	1	11%	3	2%	0	0%
Rural Extension Center												
Program on Land Development												
a Positive	140	59%	22	69%	123	36%	5	56%	50	39%	12	60%
b Negative	98	41%	10	31%	219	64%	4	44%	78	61%	8	40%
Introduction of Agricultural												
Supporting Program												
a Insus	151	62%	15	47%	217	63%	7	88%	72	56%	13	68%
b Supra Insus	19	8%	2	6%	26	8%	1	13%	26	20%	4	21%
c Both a & b	0	0%	0	0%	5	1%	0	0%	0	0%	0	0%
d Others	75	31%	15	47%	97	28%	0	0%	30	23%	2	11%
Marketing activity of												
Village Unit Cooperative												
a Active	72	32%	9	28%	167	51%	1	11%	61	49%	10	59%
b not Active	155	68%	23	72%	163	49%	8	89%	63	51%	7	41%

Table VI-20 PRESENT AND FUTURE FARM LAND PER FARM HOUSEHOLD  
IN REPRESENTATIVE SCHEMES

(1/3)

NORTH SUMATRA

Scheme Code	Name of Scheme		Household/Population		Land Area Per Farm Household (ha)				
					Irrigated Paddy Field	Rainfed Paddy Field	Dryland	Plantation & Mixed Culture	Pasture
LD60011	Sumbari	Fram Household	120	Present	0.28	0.01	0.17	0.88	0.00
		Total Population	700	Future	0.64	0.00	0.08	0.62	0.00
LD60038	Rauning (B)	Fram Household	110	Present	0.05	0.13	0.03	0.56	0.00
		Total Population	530	Future	0.60	0.00	0.00	0.30	0.00
VI50025	Sumbul Berampu	Fram Household	175	Present	0.71	0.00	0.00	0.39	0.00
		Total Population	900	Future	0.71	0.00	0.00	0.39	0.00
VI50057	Sidomukti	Fram Household	80	Present	0.15	0.19	0.00	0.45	0.00
		Total Population	500	Future	0.34	0.04	0.00	0.41	0.00
VI50091	Aek Palia	Fram Household	226	Present	0.15	0.00	0.01	0.10	0.00
		Total Population	1,140	Future	0.17	0.00	0.01	0.09	0.00
VI50129	Pangambatan (B)	Fram Household	105	Present	0.29	0.11	0.00	0.00	0.00
		Total Population	570	Future	0.46	0.00	0.00	0.00	0.00
VI50141	Aek Siparbue	Fram Household	50	Present	0.46	0.02	0.02	0.18	0.00
		Total Population	200	Future	0.52	0.00	0.00	0.16	0.00
VI50218	Kutamale	Fram Household	150	Present	0.21	0.00	0.11	0.00	0.08
		Total Population	600	Future	0.27	0.00	0.08	0.00	0.07
VI50240	Asahan VIII Pengajian	Fram Household	40	Present	1.13	0.05	0.25	0.98	0.05
		Total Population	160	Future	1.65	0.00	0.10	0.65	0.05
VI50256	Aek Sihim	Fram Household	175	Present	0.23	0.00	0.00	0.33	0.00
		Total Population	900	Future	0.27	0.00	0.00	0.29	0.00
	Average	Fram Household	123	Present	0.37	0.05	0.06	0.39	0.01
	North Sumatra	Total Population	620	Future	0.56	0.00	0.03	0.29	0.01

## SOUTH SULAWESI

(2/3)

Scheme Code	Name of Scheme	Household/Population			Land Area Per Farm Household (ha)				
					Irrigated Paddy Field	Rainfed Paddy Field	Dryland	Plantation & Mixed Culture	Pasture
LD20003	Kalu	Fram Household	75	Present	0.63	0.00	0.43	0.15	0.00
		Total Population	350	Future	0.93	0.00	0.12	0.15	0.00
VI10055	Pajjenge	Fram Household	115	Present	0.87	0.37	0.03	0.02	0.00
		Total Population	530	Future	1.24	0.00	0.03	0.02	0.00
VI10099	Kadieng	Fram Household	146	Present	1.17	0.00	0.42	0.18	0.00
		Total Population	800	Future	1.53	0.00	0.06	0.18	0.00
VI10115	Kairi	Fram Household	217	Present	0.31	0.00	0.48	0.01	0.00
		Total Population	960	Future	0.57	0.00	0.22	0.01	0.00
VI10140	Lembang Bata	Fram Household	79	Present	0.91	0.00	0.00	0.00	0.00
		Total Population	250	Future	0.96	0.00	0.00	0.00	0.00
VI10168	Panrita	Fram Household	135	Present	0.41	0.00	0.02	0.11	0.00
		Total Population	700	Future	0.48	0.00	0.00	0.06	0.00
VI10182	Mario I-II-III	Fram Household	189	Present	0.26	0.00	0.06	0.00	0.00
		Total Population	900	Future	0.30	0.00	0.03	0.00	0.00
VI10201	Pakelli II	Fram Household	97	Present	0.20	0.00	0.36	1.07	0.00
		Total Population	650	Future	0.56	0.00	0.16	0.91	0.00
VI10227	Limpua / Padaelo	Fram Household	223	Present	0.35	0.00	0.09	0.09	0.10
		Total Population	1,000	Future	0.62	0.00	0.00	0.00	0.00
VI10287	Malimbu	Fram Household	80	Present	0.00	0.40	0.03	0.01	0.00
		Total Population	358	Future	0.40	0.00	0.03	0.01	0.00
VI10332	Salu Akung	Fram Household	30	Present	0.87	0.00	0.00	0.00	0.00
		Total Population	120	Future	0.87	0.00	0.00	0.00	0.00
VI10354	Mariri	Fram Household	100	Present	0.00	0.34	0.50	0.23	0.00
		Total Population	500	Future	0.63	0.00	0.21	0.23	0.00
	Average	Fram Household	124	Present	0.50	0.09	0.20	0.16	0.01
	South Sulawesi	Total Population	593	Future	0.76	0.00	0.07	0.13	0.00

## WEST NUSA TENGGARA

Scheme Code	Name of Scheme		Household/Population		Land Area Per Farm Household (ha)				
					Irrigated Paddy Field	Rainfed Paddy Field	Dryland	Plantation & Mixed Culture	Pasture
LD45010	Danar Jengkang	Fram Household	250	Present	0.02	0.00	0.00	0.37	0.00
		Total Population	1,200	Future	0.48	0.00	0.00	0.41	0.00
VI32013	Mada Manini	Fram Household	273	Present	0.26	0.00	0.00	0.00	0.05
		Total Population	1,200	Future	0.26	0.00	0.00	0.00	0.05
VI33050	Uma Lebang	Fram Household	150	Present	0.45	0.00	0.16	0.03	0.00
		Total Population	750	Future	0.59	0.00	0.02	0.03	0.00
VI34004	Lokok Tripas	Fram Household	46	Present	0.74	0.00	0.41	0.00	0.00
		Total Population	200	Future	0.74	0.00	0.41	0.00	0.00
VI35035	Lengkok Dudu	Fram Household	70	Present	0.34	0.00	0.00	0.29	0.00
		Total Population	330	Future	0.37	0.00	0.00	0.26	0.00
VI35045	Kelokos Udang	Fram Household	125	Present	0.84	0.00	0.10	0.00	0.00
		Total Population	500	Future	0.89	0.00	0.05	0.00	0.00
VI36016	Raba Sangga	Fram Household	205	Present	0.54	0.00	0.00	0.00	0.00
		Total Population	820	Future	0.54	0.00	0.00	0.00	0.00
VI37003	Montong Sapah / Puri	Fram Household	274	Present	0.05	0.07	0.01	0.00	0.00
		Total Population	1,400	Future	0.12	0.00	0.01	0.00	0.00
	Average	Fram Household	174	Present	0.41	0.01	0.09	0.15	0.01
	West Nusa Tenggara	Total Population	800	Future	0.50	0.00	0.06	0.09	0.01

Table VI-21 PRESENT PRODUCTION COST OF MAJOR CROPS PER HECTARE

Crop	Province	Seed	Fertilizer	Chemical	Sub Total	Labor	Others	Total
<u>PADDY</u>								
North Sumatra 10 Schemes	Amount (kg)	52	274	1.6		142		
	Price (Rp/kg)	500	250	8,742		2,676		
	Value (Rp)	25,800	68,500	13,550	107,850	380,200	15,640	503,690
South Sulawesi 12 Schemes	Amount (kg)	44	228	1.6		131		
	Price (Rp/kg)	509	240	7,358		3,211		
	Value (Rp)	22,350	54,750	11,650	88,750	420,700	14,321	523,771
West Nusa Tenggara 8 Schemes	Amount (kg)	44	260	1.0		142		
	Price (Rp/kg)	500	250	11,163		2,223		
	Value (Rp)	22,188	65,000	11,163	98,350	316,250	11,188	425,788
<u>MAIZE</u>								
North Sumatra 1 Scheme	Amount (kg)	30	250	4		94		
	Price (Rp/kg)	500	250	2,250		3,000		
	Value (Rp)	15,000	62,500	9,000	86,500	282,000	5,800	374,300
South Sulawesi 3 Schemes	Amount (kg)	33	167	0		66		
	Price (Rp/kg)	500	250	0		3,000		
	Value (Rp)	16,667	41,667	0	58,333	198,000	6,400	262,733
West Nusa Tenggara 3 Schemes	Amount (kg)	33	133	0		58		
	Price (Rp/kg)	500	250	0		2,000		
	Value (Rp)	16,333	33,333	0	49,667	116,667	6,400	172,733
<u>SOYBEAN</u>								
North Sumatra 1 Scheme	Amount (kg)	30	200	4		73		
	Price (Rp/kg)	1,400	290	9,000		3,000		
	Value (Rp)	42,000	58,000	36,000	136,000	219,000	6,250	361,250
South Sulawesi 1 Scheme	Amount (kg)	40	100	1		82		
	Price (Rp/kg)	1,200	250	6,000		2,000		
	Value (Rp)	48,000	25,000	6,000	79,000	164,000	5,300	248,300
West Nusa Tenggara 3 Schemes	Amount (kg)	38	65	1		71		
	Price (Rp/kg)	1,000	250	5,000		2,000		
	Value (Rp)	38,333	16,250	5,000	59,583	142,000	5,000	206,583
<u>PEANUT</u>								
North Sumatra 2 Schemes	Amount (kg)	43	190	0.5		132		
	Price (Rp/kg)	2,000	250	10,000		2,485		
	Value (Rp)	85,000	47,500	5,000	137,500	328,000	6,500	472,000
South Sulawesi 3 Schemes	Amount (kg)	46	133	0		79		
	Price (Rp/kg)	2,000	250	0		3,000		
	Value (Rp)	92,000	33,333	0	125,333	236,000	6,500	367,833
West Nusa Tenggara 2 Schemes	Amount (kg)	38	25	0		100		
	Price (Rp/kg)	800	250	0		2,460		
	Value (Rp)	30,000	6,250	0	36,250	246,000	4,300	286,550

Table VI-22 PRESENT PRODUCTION COST OF PADDY PER HECTARE

(1/3)

North Sumatra														
Scheme Code	Name of Scheme		Seed		Fertilizer				Chemical	Sub Total	Labor	Others	Total	
			Certified	Own	Urea	TSP	KCl	ZA						
LD60011	Sumbari	Amount (kg)	60	0	60	350	200	150	0	0	1	131		
		Price (Rp/kg)	500			250						3,000		
		Value (Rp)	30,000			87,500						13,000	130,500	393,000
LD60038	Rauning (B)	Amount (kg)	50	0	50	100	50	50	0	0	1	143	15,500	
		Price (Rp/kg)	500			250						2,000		
		Value (Rp)	25,000			25,000						12,000	62,000	286,000
VI50025	Sumbul Berampu	Amount (kg)	60	0	60	350	150	150	50	0	1	129	18,500	
		Price (Rp/kg)	500			250						3,000		
		Value (Rp)	30,000			87,500						13,000	130,500	387,000
VI50057	Sidomukti	Amount (kg)	50	50	0	350	200	100	50	0	2	123	23,900	
		Price (Rp/kg)	500			250						3,000		
		Value (Rp)	25,000			87,500						15,000	30,000	369,000
VI50091	Aek Palia	Amount (kg)	60	60	0	420	200	120	100	0	2	159	6,500	
		Price (Rp/kg)	500			250						3,000		
		Value (Rp)	30,000			105,000						5,000	142,500	369,000
VI50129	Pangambatan (B)	Amount (kg)	48	0	48	200	100	80	20	0	1.5	162	6,500	
		Price (Rp/kg)	500			250						2,000		
		Value (Rp)	24,000			50,000						7,500	81,500	324,000
VI50141	Aek Siparbuo	Amount (kg)	40	40	0	120	60	40	20	0	2	138	6,500	
		Price (Rp/kg)	500			250						3,000		
		Value (Rp)	20,000			30,000						5,500	61,000	414,000
VI50218	Kutamale	Amount (kg)	60	60	0	250	100	100	50	0	1	163	17,200	
		Price (Rp/kg)	500			250						3,000		
		Value (Rp)	30,000			62,500						9,000	101,500	489,000
VI50240	Asahan VIII Pengajian	Amount (kg)	40	40	0	400	200	100	100	0	3	117	20,500	
		Price (Rp/kg)	500			250						3,000		
		Value (Rp)	20,000			100,000						6,000	18,000	138,000
VI50256	Aek Sihim	Amount (kg)	48	0	48	200	100	100	0	0	1	156	31,500	
		Price (Rp/kg)	500			250						2,000		
		Value (Rp)	24,000			50,000						12,000	86,000	312,000
Average-Sumut		Amount (kg)	52	25	27	274	136	99	39	0	1.6	142		
		Price (Rp/kg)	500			250						2,676		
		Value (Rp)	25,800			68,500						8,742	107,850	380,200
											9,800	15,640	503,690	



## South Sulawesi

Scheme Code	Name of Scheme		Seed		Fertilizer					Chemical	Sub Total	Labor	Others	Total	
			Certified	Own	Urea	TSP	KCl	ZA							
LD20003	Katu	Amount (kg)	40	40	0	250	150	100	0	0	1.5		112		
		Price (Rp/kg)	500			250					10,000		3,000		
		Value (Rp)	20,000			62,500					15,000	97,500	336,000	6,500	440,000
VII10055	Pajjenge	Amount (kg)	40	40	0	300	150	100	50	0	2		136		
		Price (Rp/kg)	500			250					10,000		3,000		
		Value (Rp)	20,000			75,000					20,000	115,000	408,000	6,500	529,500
VII10099	Kadieng	Amount (kg)	45	0	45	200	100	50	50	0	1		166		
		Price (Rp/kg)	500			250					7,500		3,000		
		Value (Rp)	22,500			50,000					7,500	80,000	498,000	19,100	597,100
VII10115	Kaindi	Amount (kg)	40	40	0	300	150	100	50	0	1		154		
		Price (Rp/kg)	500			250					5,000		3,000		
		Value (Rp)	20,000			75,000					5,000	100,000	462,000	6,500	568,500
VII10140	Lembang Bata	Amount (kg)	50	50	0	300	300	0	0	0	1		118		
		Price (Rp/kg)	500			250					13,000		4,000		
		Value (Rp)	25,000			75,000					13,000	113,000	472,000	19,750	604,750
VII10168	Panrita	Amount (kg)	42	0	42	200	150	50	0	0	1		122		
		Price (Rp/kg)	500			250					9,000		3,000		
		Value (Rp)	21,000			50,000					9,000	80,000	366,000	12,500	458,500
VII10182	Mario I-II-III	Amount (kg)	50	0	50	250	200	50	0	0	1.5		117		
		Price (Rp/kg)	500			250					15,000		4,000		
		Value (Rp)	25,000			62,500					22,500	110,000	468,000	46,500	624,500
VII10201	Pakelli II	Amount (kg)	50	0	50	320	160	80	80	0	3		132		
		Price (Rp/kg)	500			250					5,000		3,000		
		Value (Rp)	25,000			80,000					15,000	120,000	396,000	6,500	522,500
VII10227	Limpua / Padaelo	Amount (kg)	40	40	0	270	170	50	50	0	1		131		
		Price (Rp/kg)	500			250					10,000		3,000		
		Value (Rp)	20,000			67,500					10,000	97,500	393,000	28,500	519,000
VII10287	Malimbu	Amount (kg)	40	40	0	100	100	0	0	0	4		122		
		Price (Rp/kg)	500			250					4,250		3,000		
		Value (Rp)	20,000			25,000					17,000	62,000	366,000	6,500	434,500
VII10332	Salu Akung	Amount (kg)	40	0	40	150	50	60	40	0	1		128		
		Price (Rp/kg)	500			250					10,000		3,000		
		Value (Rp)	20,000			37,500					10,000	67,500	384,000	6,500	458,000
VII10354	Mariri	Amount (kg)	50	0	50	100	70	0	0	30	1		134		
		Price (Rp/kg)	500			250					7,500		3,000		
		Value (Rp)	25,000			25,000					7,500	57,500	402,000	6,500	466,000
Average-Sulsel		Amount (kg)	44	21	23	228	146	53	27	3	1.6		131		
		Price (Rp/kg)	509			240					7,358		3,211		
		Value (Rp)	22,350			54,750					11,650	88,750	420,700	14,321	523,771

## West Nusa Tenggara

Scheme Code	Name of Scheme		Seed		Fertilizer				Chemical	Sub Total	Labor	Others	Total
			Certified	Own	Urea	TSP	KCl	ZA					
I.D45010	Danar Jengkang	Amount (kg)	40	40	0	200	100	50	50	0	1	147	
		Price (Rp/kg)	500			250					5,000	2,000	
		Value (Rp)	20,000			50,000					5,000	75,000	294,000
VI32013	Mada Manini	Amount (kg)	40	0	40	350	200	100	50	0	0.5	143	
		Price (Rp/kg)	500			250					20,000	2,000	
		Value (Rp)	20,000			87,500					10,000	117,500	286,000
VI33050	Uma Lebang	Amount (kg)	40	0	40	325	175	100	50	0	0.5	148	
		Price (Rp/kg)	500			250					15,000	2,000	
		Value (Rp)	20,000			81,250					7,500	108,750	296,000
VI34004	Lokok Tripas	Amount (kg)	55	55	0	230	150	50	30	0	1	136	
		Price (Rp/kg)	500			250					10,000	3,000	
		Value (Rp)	27,500			57,500					10,000	95,000	408,000
VI35035	Lengkok Dudu	Amount (kg)	50	50	0	250	150	100	0	0	2	126	
		Price (Rp/kg)	500			250					8,400	2,000	
		Value (Rp)	25,000			62,500					16,800	104,300	252,000
VI35045	Kelokos Udang	Amount (kg)	40	40	0	200	200	0	0	0	1	134	
		Price (Rp/kg)	500			250					15,000	2,000	
		Value (Rp)	20,000			50,000					15,000	85,000	268,000
VI36016	Raba Sangga	Amount (kg)	50	0	50	325	125	100	100	0	1	186	
		Price (Rp/kg)	500			250					15,000	2,000	
		Value (Rp)	25,000			81,250					15,000	121,250	372,000
VI37003	Montong Sapah / Puri	Amount (kg)	40	40	0	200	200	0	0	0	1	118	
		Price (Rp/kg)	500			250					10,000	3,000	
		Value (Rp)	20,000			50,000					10,000	80,000	354,000
Average-NTB		Amount (kg)	44	28	16	260	163	63	35	0	1.0	142	
		Price (Rp/kg)	500			250					11,163	2,223	
		Value (Rp)	22,188			65,000					11,163	98,350	316,250

Table VI-23 PRESENT PRODUCTION COST OF MAIZE PER HECTARE

Scheme Code	Name of Scheme		Seed	Fertilizer	Chemical	Sub Total	Labor	Others	Total
North Sumatra									
VI50218	Kutamale	Amount (kg)	30	250	4		94		
		Price (Rp/kg)	500	250	2,250		3,000		
		Value (Rp)	15,000	62,500	9,000	86,500	282,000	5,800	374,300
South Sulawesi									
VI10099	Kadieng	Amount (kg)	30	150	0		65		
		Price (Rp/kg)	500	250	0		3,000		
		Value (Rp)	15,000	37,500	0	52,500	195,000	6,400	253,900
VI10140	Lembang Bata	Amount (kg)	30	100	0		72		
		Price (Rp/kg)	500	250	0		3,000		
		Value (Rp)	15,000	25,000	0	40,000	216,000	6,400	262,400
VI10201	Pakelli II	Amount (kg)	40	250	0		61		
		Price (Rp/kg)	500	250	0		3,000		
		Value (Rp)	20,000	62,500	0	82,500	183,000	6,400	271,900
	Average-Sulsel	Amount (kg)	33	167	0		66		
		Price (Rp/kg)	500	250	0		3,000		
		Value (Rp)	16,667	41,667	0	58,333	198,000	6,400	262,733
West Nusa Tenggara									
VI32013	Mada Manini	Amount (kg)	30	150	0		62		
		Price (Rp/kg)	500	250	0		2,000		
		Value (Rp)	15,000	37,500	0	52,500	124,000	6,400	182,900
VI33050	Uma Lebang	Amount (kg)	40	120	0		55		
		Price (Rp/kg)	500	250	0		2,000		
		Value (Rp)	20,000	30,000	0	50,000	110,000	6,400	166,400
VI35045	Kelokos Udang	Amount (kg)	28	130	0		58		
		Price (Rp/kg)	500	250	0		2,000		
		Value (Rp)	14,000	32,500	0	46,500	116,000	6,400	168,900
	Average-NTB	Amount (kg)	33	133	0		58		
		Price (Rp/kg)	500	250	0		2,000		
		Value (Rp)	16,333	33,333	0	49,667	116,667	6,400	172,733

Table VI-24 PRESENT PRODUCTION COST OF SOYBEAN PER HECTARE

Scheme Code	Name of Scheme		Seed	Fertilizer	Chemical	Sub Total	Labor	Others	Total
North Sumatra									
VI50240	Asahan VIII Pengajian	Amount (kg)	30	200	4		73		
		Price (Rp/kg)	1,400	290	9,000		3,000		
		Value (Rp)	42,000	58,000	36,000	136,000	219,000	6,250	361,250
South Sulawesi									
LD20003	Kalu	Amount (kg)	40	100	1		82		
		Price (Rp/kg)	1,200	250	6,000		2,000		
		Value (Rp)	48,000	25,000	6,000	79,000	164,000	5,300	248,300
West Nusa Tenggara									
VI32013	Mada Manini	Amount (kg)	40	45	1		76		
		Price (Rp/kg)	1,000	250	5,000		2,000		
		Value (Rp)	40,000	11,250	5,000	56,250	152,000	5,000	213,250
VI36016	Raba Sangga	Amount (kg)	40	50	1		72		
		Price (Rp/kg)	1,000	250	5,000		2,000		
		Value (Rp)	40,000	12,500	5,000	57,500	144,000	5,000	206,500
VI37003	Montong Sapah / Puri	Amount (kg)	35	100	1		65		
		Price (Rp/kg)	1,000	250	5,000		2,000		
		Value (Rp)	35,000	25,000	5,000	65,000	130,000	5,000	200,000
	Average-NTB	Amount (kg)	38	65	1		71		
		Price (Rp/kg)	1,000	250	5,000		2,000		
		Value (Rp)	38,333	16,250	5,000	59,583	142,000	5,000	206,583

Table VI-25 PRESENT PRODUCTION COST OF PEANUT PER HECTARE

Scheme Code	Name of Scheme		Seed	Fertilizer	Chemical	Sub Total	Labor	Others	Total
North Sumatra									
VI50025	Sumbul Berampu	Amount (kg)	40	200	1		128		
		Price (Rp/kg)	2,000	250	10,000		3,000		
		Value (Rp)	80,000	50,000	10,000	140,000	384,000	6,500	530,500
VI50256	Aek Sihim	Amount (kg)	45	180	0		136		
		Price (Rp/kg)	2,000	250	0		2,000		
		Value (Rp)	90,000	45,000	0	135,000	272,000	6,500	413,500
	Average-Sumut	Amount (kg)	43	190	0.5		132		
		Price (Rp/kg)	2,000	250	10,000		2,485		
		Value (Rp)	85,000	47,500	5,000	137,500	328,000	6,500	472,000
South Sulawesi									
VI10055	Pajjenge	Amount (kg)	50	100	0		76		
		Price (Rp/kg)	2,000	250	0		3,000		
		Value (Rp)	100,000	25,000	0	125,000	228,000	6,500	359,500
VI10182	Mario I-II-III	Amount (kg)	48	200	0		78		
		Price (Rp/kg)	2,000	250	0		3,000		
		Value (Rp)	96,000	50,000	0	146,000	234,000	6,500	386,500
VI10201	Pakelli II	Amount (kg)	40	100	0		82		
		Price (Rp/kg)	2,000	250	0		3,000		
		Value (Rp)	80,000	25,000	0	105,000	246,000	6,500	357,500
	Average-Sulsel	Amount (kg)	46	133	0		79		
		Price (Rp/kg)	2,000	250	0		3,000		
		Value (Rp)	92,000	33,333	0	125,333	236,000	6,500	367,833
West Nusa Tenggara									
VI33050	Uma Lebang	Amount (kg)	35	50	0		108		
		Price (Rp/kg)	800	250	0		2,000		
		Value (Rp)	28,000	12,500	0	40,500	216,000	4,300	260,800
VI34004	Lokok Tripas	Amount (kg)	40	0	0		92		
		Price (Rp/kg)	800	0	0		3,000		
		Value (Rp)	32,000	0	0	32,000	276,000	4,300	312,300
	Average-NTB	Amount (kg)	38	25	0		100		
		Price (Rp/kg)	800	250	0		2,460		
		Value (Rp)	30,000	6,250	0	36,250	246,000	4,300	286,550

Table VI-26 PRESENT FARM ECONOMIC BALANCE IN REPRESENTATIVE SCHEMES

Scheme Code	Name of Scheme	Income			Expenditure	Surplus
		(Total)	(On-farm)	(Off-farm)		
(Unit: Rp. '000)						
<b><u>NORTH SUMATRA</u></b>						
LD60011	Sumbari	920	920	0	902	18
LD60038	Rauning (B)	1,050	1,050	0	990	60
VI50025	Sumbul Berampu	755	605	150	754	1
VI50057	Sidomukti	1,305	755	550	1,285	20
VI50091	Aek Palia	1,105	1,105	0	1,090	15
VI50129	Pangambatan (B)	1,129	1,129	0	1,140	-11
VI50141	Aek Siparbue	1,036	806	230	1,024	12
VI50218	Kutamale	594	444	150	573	21
VI50240	Asahan VIII Pengajian	917	817	100	802	115
VI50256	Aek Sihim	809	557	252	813	-4
	Average	962	819	143	937	25
<b><u>SOUTH SULAWESI</u></b>						
LD20003	Kalu	694	644	50	692	2
VI10055	Pajjenge	1,092	942	150	1,010	82
VI10099	Kadieng	634	634	0	591	43
VI10115	Kaindi	1,003	643	360	954	49
VI10140	Lembang Bata	928	748	180	890	38
VI10168	Panrita	811	811	0	798	13
VI10182	Mario I-II-III	1,030	930	100	990	40
VI10201	Pakelli II	1,001	701	300	990	11
VI10227	Limpua / Padaelo	766	766	0	676	90
VI10287	Malimbu	740	665	75	746	-6
VI10332	Salu Akung	1,257	1,257	0	1,069	188
VI10354	Mariri	701	171	530	708	-7
	Average	888	743	145	843	45
<b><u>WEST NUSA TENGGARA</u></b>						
LD45010	Danar Jengkang	1,285	1,285	0	1,230	55
VI32013	Mada Manini	831	771	60	810	21
VI33050	Uma Lebang	889	889	0	840	49
VI34004	Lokok Tripas	910	910	0	866	44
VI35035	Lengkok Dudu	790	490	300	801	-11
VI35045	Kelokos Udang	948	948	0	932	16
VI36016	Raba Sangga	789	489	300	815	-26
VI37003	Montong Sapah / Puri	1,235	1,235	0	1,164	71
	Average	960	877	83	932	27

Note: On-farm income is net income on food crops, fruits, cash crops, livestock and so on.  
Off-farm income comes from wage, pension, remittance and so on.



**APPENDIX-VII**

**OPERATION AND MAINTENANCE**





## APPENDIX VII OPERATION AND MAINTENANCE

### 1. GENERAL BACKGROUND

#### 1.1 General

Operation and Maintenance (O&M) Study put an emphasis on data collection, checking present O&M at fields and their analyses on the irrigation schemes at on-farm level. The data concerned have been collected mainly in the Ministry of Agriculture in Jakarta(MOA), Provincial Agricultural Departments(PRAS), Provincial Irrigation Department(PRIS). The collected data are broadly divided into following categories :

- 1). Law, Regulation, Decree on Operation & Maintenance (O&M) at On-farm Level,
- 2). Executing Organization related to O&M, and
- 3). Other Data related to O&M.

In addition to the above data collection, inventory survey by questionnaire as well as field investigation of the representative schemes had been executed in the study area i.e. South Sulawesi, West Nusa Tenggara and North Sumatra Province. On the basis of the above works, the collected data are analyzed as follows :

#### 1.2 Legal Base on O&M at Farm Level

There are various laws and regulations on water resources at national level as well as local level in Indonesia. Major law and regulations are listed below :

- a. Water Resources Development Law, (No.11, 1974)
- b. Government Regulation on Contribution for O&M cost for Water Resources Development Infrastructure, (No.6, 1981)
- c. Government Regulation on Water Management, (No.22, 1982)
- d. Government Regulation on Irrigation, (No.23, 1982)
- e. President Instruction on Establishment of Water User's Association(P3A), (No.2, 1984)

Among the above law, regulations and instruction, Water Resources Law is a basic law for water resources development on which the above 3 government regulations are mainly based. The President Instruction was prepared on the basis of these regulations and law.

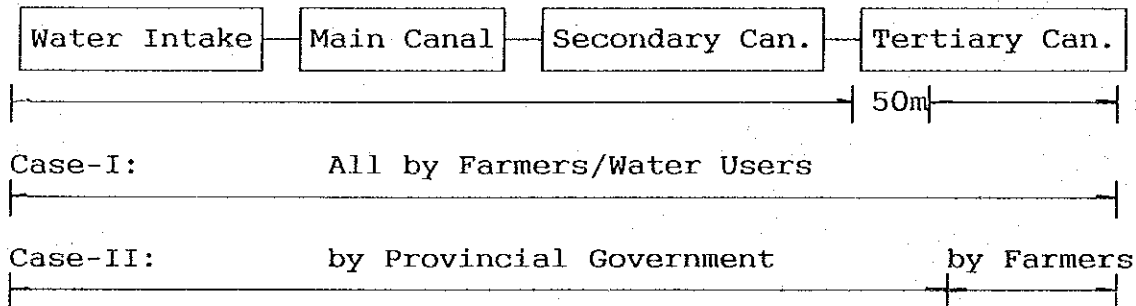
Basically it can be thought from the instruction that "O&M at farm level" is all efforts of water utilization and network maintenance within tertiary units or village irrigation area by use of irrigation network which are directly connected with farmers and their farm land. O&M is stipulated in the above 5 institutions as follows:

#### Demarcation of O&M

O&M for a tertiary unit, a whole village irrigation or a whole traditional communal irrigation such as Subak are to be made by water user's association. The village irrigation is defined as a irrigation where development and O&M of its network was/is executed by farmers/water users under control of the village administration with or without governmental support. [Case-I], (No.23, 1982)

Excepting the above village and traditional irrigation, provincial governments have responsibility of O&M for the irrigation network from a water-intake facility up to the point on a tertiary canal which is located at a 50-m downstream point from its turnout on a secondary canal. [Case-II], (No.23, 1982)

#### O&M Demarcation



#### Institutional Organization

At national level, Ministry of Home Affairs, Public Works and Agriculture are to give guidance to provincial governments on O&M at farm level as well as in major systems such as main or secondary systems. Respective ministers function as follows : (No.2, 1984)

- 1) Minister of Home Affairs gives guidance to Governors in order to encourage and establish P3A in Provinces.

- 2) Minister of Public Works gives guidance to provincial irrigation offices in O&M up to tertiary level in order to have efficient and effective water management.
- 3) Minister of Agriculture gives guidance on water use in equity and effective way at the farm level

At local level, Governor, Bupati, Camat, Kepala Desa as well as provincial irrigation and agricultural services are to support P3As institutionally and technically. Respective supports are as follows: (No.2, 1984) The organization is illustrated in Fig.VII-1.

- 1) Governor gives guidance of the frame of P3A's management. Bupati has the responsibility in conducting P3A management and development. Camat has the responsibility to coordinate and supervise the implementation of P3A management and development. Kepala Desa manage and develop P3As.
- 2) P3A's irrigation techniques are supported by Provincial Irrigation Service (PRIS). The supports with task are the guidance and assistance in planning, design and construction as well as O&M of tertiary networks and other networks at farm level.
- 3) P3A's agricultural techniques are supported by Provincial Agricultural Service (PRAS). The supports with task are guidance in irrigation water use in connection with water requirements, cropping patterns and so on suitable for site-specific conditions.

At the terminal level, a water user's association (P3A) is to be organized so as to use irrigation water within a tertiary unit or village irrigation area under technical guidance and policies of the local governments concerned. (No.23, 1982)

#### Water User's Association (P3A)

P3A is defined as an official body which is organizationally technically and financially capable to carry out development and O&M of irrigation network including its related structures at farm level (within a tertiary unit or village irrigation area). (No.2, 1984)

P3A is to be established by water users/farmers in a tertiary unit or village irrigation area for their mutual interests, with paying attention to traditional water management

institutions in the area. P3A establishment is to be completed with statutes and rules legalized by Bupati after getting an approval from Kepala Desa and Camat.(No.2, 1984)

Functions of P3A are i) O&M of its networks, ii) decision and management of regulations for its member including member's contribution, and iii) guidance and supervision of the members to follow the regulation.(No.2, 1984)

P3A consists of major three components i.e. members meeting, board and organized members. The board is composed of chairman, vice chairman, secretary, treasurer, technical conductor and block chief.(No.2, 1984) The organization is illustrated in Fig.VII-2.

#### Organization Fee/Irrigation Service Fee(ISF)

Institution, association or individual who directly get benefit from available water as the result of water resources development are obliged to participate with bearing O&M cost in the form of contribution.(No.6, 1981)

P3A is to decide and manage member's conditions which consist of cash payment, harvested crops and/or manpower for O&M of tertiary or village irrigation network as well as development of the association.(No.2, 1984)

#### Irrigation Committee

Irrigation committees are to be organized at provincial and kabupaten level for the coordination of various water users, aiming at the efficient use of irrigation water to meet the demand of various users. The committee is chaired by the governor at provincial level and by Bupati at Kabupaten level. Its members are the highest officials nominated by the chairman from representatives of water resources/irrigation, agricultural, fishery/livestock, health, agrarian or security service. (Elucidation, No.23, 1982) Their organizations are illustrated in Fig. VII-1.

### 1.3 Recent Government's Strategy in O&M

During the period of the Fourth National Development Plan, Pelita-IV(1984/85-88/89), it became clear that expansion of irrigation area and rehabilitation of existing systems would not support scheduled increase in food crop production without paying

attention to improvement of present O&M. The improvement of O&M for existing systems has been added in Irrigation Sub-Sector of the Fifth National Development Plan, Repelita-V(1989/90-93/94).

The Government issued new strategy on O&M and cost recovery in 1987. It is mentioned in the strategy that efficient O&M will be introduced in irrigation systems throughout Indonesia within 15 years and the O&M cost will be recovered directly from their beneficiaries through following ways :

- a. Transfer of responsibility for funding O&M expenditures to local governments,
- b. Collection of irrigation service fee(ISF) from beneficiaries to finance O&M cost of main system,
- c. Turnover of small government control irrigation systems (less than 500 ha) to P3As.

In order to promote these programs, IBRD, ADB and bilateral donor countries are assisting the Government mainly in large & medium-scale projects through various projects such as ISSP (Irrigation Sub Sector Project by IBRD) and TISP(Third Irrigation Subsector Project by ADB). The ISSP's approach as an example is given below :

STEP-1 Civil Works

- a. Completion of On-going Projects
- b. Improvement of Existing Projects  
(by Special Maintenance Program  
or Other Improvement Projects)

STEP-2 Efficient O&M

- a. Strengthening of P3A
- b. Training of Government Staff

STEP-3 Institutional Reform

- a. Introduction of Irrigation Service Fee(ISF)
- b. Turnover of Small System to Farmers
- c. Others

As mentioned in the above, the efficient O&M programs for medium and large-scale projects have been launched with various foreign assistance. On the other hand, those programs for small-scale schemes such as village irrigation schemes have not commenced yet up to now.

## 2. GENERAL OPERATION AND MAINTENANCE IN THE STUDY AREA

### 2.1 General

Inventory survey by questionnaire had been executed in the study area i.e. South Sulawesi, West Nusa Tenggara and North Sumatra Province. On the basis of the above information, the collected data are analyzed and these study results have been derived.

#### (1) Effectiveness of Collected Data

Effectiveness of the collected data has been checked in order to handle or evaluate them appropriately. Prior to the check, the collected data were processed to derive following question items. The calculated overall effectiveness is summarized as follows:

#### Data Effectiveness

Question Items	Effective Answer
1. Farmer's Organization	98.4 %
2. Operation Works	
- Irrigator	92.6 %
- Rotational Irrigation	95.7 %
3. Maintenance Works	
- Tree/Grass Cut	97.0 %
- Canal Re-shaping	95.4 %
- Minor Structure Repair	94.8 %
4. Farmer's Contributions	
- Cash Payment	99.7 %
- Payment in Kind	99.7 %
- Working Days for O&M	60.6 %

Among the above items, most of the questions were answered effectively except the question on working days for O&M which effective answers were only 61 %. It is thought that many interviewees could not count and sum up the working days correctly when questioned.

#### (2) Analyses of the Data

On the basis of the effective data, data analyses have been made from following view-points :

- a. Farmer's O&M Organization,
- b. Operation Works,
- c. Maintenance Works, and
- d. Farmer's Contribution to O&M.

## 2.2 Organization for O&M

The categories of present O&M organizations have been divided broadly into three groups i.e. P3A(water user's association), traditional group, no-organization which are explained below :

### 1) P3A/Water User's Association:

P3A is an official group which is organizationally, technically and financially capable to carry out O&M of a irrigation network including its related structures within a tertiary unit or village irrigation area. The proposed P3A organization by Presidential Instruction No2, 1984 is given in Fig. VII-2.

### 2) Traditional Group:

This group has not been authorized officially but has functions for O&M at present. Generally the group was organized not only for O&M but also for other general works in a traditional/local society. Those groups such as Subak in Lombok or Raja Bondar in North Sumatra are included in this group.

### 3) No-Organization:

In this category, farmers have not organized any O&M group at present and do not operate and maintain their network in any organizational way. Water charge/organization fee such as cash or payment in kind is not collected for O&M in this case.

Based on the above grouping, existing schemes have been classified as follows :

## Existing O&M Organization

Province	With-Organization		No-Group
	WUA/P3A*	Traditional Group	
<b>I. Village Irrigation Area</b>			
North Sumatra	48 %	28 %	24 %
South Sulawesi	9 %	45 %	46 %
West Nusa Tenggara	15 %	67 %	18 %
(Weighted Average)	(23 %)	(44 %)	(33 %)
<b>II. Land Development Area</b>			
North Sumatra	53 %	28 %	19 %
South Sulawesi	33 %	33 %	33 %
West Nusa Tenggara	45 %	55 %	0 %
(Weighted Average)	(47 %)	(38 %)	(15 %)
Overall W. Average	25 %	43 %	32 %

Note, \*;WUA/P3A: Organized Water User's Association

From the above summary table, following facts on water user's groups can be derived :

- i) In the study area, 3 provinces, 25 % of the schemes have official water user's associations(P3A), 43 % have traditional groups and 32 % of the schemes have not organized any water user's groups yet.
- ii) P3As have not been widely organized yet in South Sulawesi and West Nusa Tenggara Province and have started on becoming common O&M organization in North Sumatra Province.
- iii) O&M of irrigation system under farmer's groups or P3As are widely done in West Nusa Tenggara and North Sumatra Province. Half(about 50%) of the system are operated and maintained now without farmer's organization in South Sulawesi Province.

### 2.3 O&M of the System

Present O&M activities have been checked from following view-points :

- 1) Operation Works
  - a. There is an irrigator(Ulu-Ulu/Pekasih) who operates existing system or not.



- b. Rotational irrigation is executed in the system or not, when dry season.
- 2) Maintenance Works
- a. Tree/grass cutting for canals is periodically done or not.
- b. Canal sections are re-shaped periodically in order to maintain sufficient flow sections or not.
- c. Minor repairs of damaged structures are periodically executed in order to keep their functions or not.

Based on the above checking, following table showing present O&M activities has been derived :

Present Operation Works

Province	Irrigator Ulu2/Pekasih	Rotational Irrigation
I. Village Irrigation Area		
North Sumatra	65 %	50 %
South Sulawesi	30 %	40 %
West Nusa Tenggara	73 %	77 %
(Weighted Average)	(50 %)	(49 %)
II. Land Development Area		
North Sumatra	69 %	66 %
South Sulawesi	33 %	56 %
West Nusa Tenggara	90 %	95 %
(Weighted Average)	(70 %)	(74 %)
Overall W. Average	52 %	51 %

Present Maintenance Works

Province	Tree/Grass Cut	Canal Re-Shape	Minor Repairs of Structures
I. Village Irrigation Area			
North Sumatra	84 %	77 %	83 %
South Sulawesi	87 %	71 %	80 %
West Nusa Tenggara	90 %	87 %	91 %
(Weighted Average)	(86 %)	(76 %)	(83 %)
II. Land Development Area			
North Sumatra	88 %	77 %	87 %
South Sulawesi	100 %	89 %	89 %
West Nusa Tenggara	90 %	85 %	79 %
(Weighted Average)	(90 %)	(81 %)	(84 %)
Overall W. Average	87 %	76 %	83 %

From the above summary table, following study results on O&M activities can be derived :

- i) In the study area, 3 provinces, 52 % of the schemes have irrigators such as Ulu-Ulu or Pekasih who manage water distribution and maintenance works. In West Nusa Tenggara and North Sumatra Province, more than 65 % of the schemes have irrigators who manage water distribution. In South Sulawesi Province around 30 % have such irrigators and O&M are generally made without core responsible men.
- ii) Rotational irrigation in draught period is applied to 51 % of the schemes in the study area. This irrigation method is popular (about 77%) in West Nusa Tenggara Province, since the province is the driest province among the three provinces.
- iii) The above all three maintenance works are widely made in all 3 provinces. Around 80 % of the schemes carry out some maintenance works periodically. In case of structure maintenance, only simple works such as desilting are thought to be made at present.

#### 2.4 Farmer's Contribution to O&M

There are three forms of farmer's contributions for O&M at present which are cash payment, payment in kind and manpower. Payment in kind is generally made by paddy or other common crops in the irrigation area.

Manpower contribution could not be quantified by the results of the inventory survey because effective answers were 60 %. It is thought, however, that all schemes have some forms of manpower contribution for O&M as long as the schemes exist, since Gotong-Royong (cooperation works for communal purposes) has been widely accustomed in the study area. Within the limited available data, averaged manpower contribution is 50 days but the average is thought to be too high.

On the other hand, cash/crop payment as farmer's contribution to water charge are calculated as follows:

### Present Payment Contribution to O&M

Province	Payment in Cash		Payment in Kind	
	(%)	(Rp*)	(%)	(Kg#)
<b>I. Village Irrigation Area</b>				
North Sumatra	26 %	15,480	56 %	39
South Sulawesi	14 %	15,424	10 %	194
West Nusa Tenggara	26 %	13,176	67 %	68
(Weighted Average)	(21 %)	(14,939)	(36 %)	(69)
<b>II. Land Development Area</b>				
North Sumatra	22 %	15,960	72 %	35
South Sulawesi	67 %	9,750	22 %	81
West Nusa Tenggara	45 %	7,500	65 %	110
(Weighted Average)	(36 %)	10,805	(62 %)	(63)
<b>Overall W. Average</b>	<b>22 %</b>	<b>14,407Rp</b>	<b>38 %</b>	<b>69kg</b>

Note; ^: Schemes which have the payment custom, \*: Average Charge (Rp/ha/year), #: Average Weight in Paddy (Kg/ha/year)

From the above summary table, following study results on farmer's contribution to O&M can be derived :

- i) 22 % of the schemes in the study area have an internal regulation on irrigation service fee in cash payment which average payment is 14,400 Rp/ha/year, and 38 % have it in crop payment which average is 69 Kg/ha/year in paddy.
- ii) Around 60-70 % of the schemes have decided to collect water charge in any form from group members in West Nusa Tenggara and North Sumatra Province, but less than 30 % of the schemes in South Sulawesi Province have done. Generally water charge is paid in cash or in kind, and payment in paddy is ordained as the fee in most cases.

#### 2.5 Evaluation of Present O&M

The analyzed data have been evaluated in order to grasp general present conditions of the schemes investigated by the inventory survey executed during Phase-I Study.

#### Evaluation Items and their Marks

The evaluation items and their ranking marks have been considered through the above data analyses which are summarized as follows:

- a. O&M Organization(Full mark: 25 points)
  - Registered P3A Organization(25 points),
  - Traditional Farmer's Organization(15 points),
  - No Organization(0 point).
- b. Operation Activity(Full mark: 20 points)
  - Irrigator(10 points)
  - Rotational Irrigation in Drought Time(10 points)
- c. Maintenance Activity(Full mark: 25 points)
  - Grass/Tree Cutting along Canal(5 points)
  - Canal Re-shaping(10 points)
  - Minor Repairs for Structure(10 points)
- d. Cash/Crop Payment for Irrigation Service Fee  
(Full mark: 20 points)
  - Fee > 20,000 Rp (20 points)
  - Fee = 10,000 to 20,000 Rp (15 points)
  - Fee = 0 to 10,000 Rp (5 points)
  - No Fee (0 point)
- e. Manpower Contribution to O&M(Full mark: 10 points)
  - Manpower > 60 days (10 points)
  - Manpower = 30 to 60 days (8 points)
  - Manpower = 0 to 30 days (5 points)
  - No Manpower Contribution (0 points)

### Evaluation Results

In accordance with the above evaluation criteria, present O&M of the respective schemes have been evaluated. Their evaluated marks are given in Table VII-1 and are summarized below:

Averaged Marks in O&M Evaluation

Province	Village Irrigation	Land Development
North Sumatra	59	64
South Selawesi	40	53
West Nusa Tenggara	60	71
Overall Average	50	65

Note: Full mark is 100 points.

Averaged marks in respective Kabupaten is given in Table 2-2 and its distribution of the evaluated marks in each province is shown in Fig. VII-3.

## 2.6 General Conditions of Existing O&M

### North Sumatra Province

Traditional farmer's groups are said to have been organized in some districts which are listed below :

Traditional Farmer's Group

Location	Group Name	Irrigator
Tapanuli Utara	Raja Bondar	Raja Bondar
Dairi	Pulu Parit	Pulu Parit
Simalungun*	Panriahan Pamongkahan	Panriahan Pamongkahan

Note; \*: Excluded in the Study due to ADB Project.

Out of the above 3 traditional groups, "Raja Bondar" was checked at the sites in Kabupaten Tapanuli Utara. Raja Bondar means "King's Canal" in local language, since its irrigation system was originally constructed by farmers under the initiative of a local king in the olden days. Accordingly, original Raja Bondar was a farmer's O&M organization and not a general farmer's working group like "Subak" in Lombok Island. Nowadays some of Raja Bondar have been graded up to P3As which still keep traditional O&M customs. Most of the Raja Bondar or P3As collect irrigation service fee for O&M of their systems, and the fee is ordained by the groups to be payment in kind or cash. The charged payment in kind is crops such as paddy and soy beans which are commonly grown in the beneficiary area.

Periodical maintenance works of the system are made for 3 days on average by all the farmers. The water distribution is made by irrigators who is also called "Raja Bondar". Rotational irrigation is not common and dry season palawija is not irrigated in most cases.

### South Sulawesi Province

Traditional O&M group could not be found during the site visits. Generally, farmer's groups called as "Kolompok Petani" have been organized for group working, group purchase of farm inputs and so on. This farmer's group has a function of the O&M

organization in most cases. In some cases, there is a man in charge of O&M for their irrigation systems(irrigator). The irrigator often has special names such as "Mantriwae" in Kabupaten Soppeng and "Mandorowae" in Kabupaten Baru. Both of these two names mean "Water Master" in local language. In other case, a chief of the group(Kutua Kolompok) guides the group members for equal water distribution and system maintenance works. Most of the organized P3As originate in those Kolompok Petani and have taken over the customs of the groups. Not many groups or P3As collect irrigation service fee. Rotational irrigation is made in some groups and periodical maintenance works of the irrigation systems are carried out for 19 days on average by the all farmers.

#### West Nusa Tenggara Province

Active traditional farmer's working groups have been widely organized throughout the province. The traditional group functions as a cooperative general farming unit and has a function of the O&M for a irrigation system, and the group has a man in charge of water management(irrigator) in most cases. These groups and irrigator are generally called as follows :

#### Traditional Farmer's Group

Location	Group Name	Irrigator
Lombok	Subak	Pekasih
Eastern Sumbawa	Orong	Malar
Western Sumbawa#	So	Punggawa-So*

Note; #:Kabupaten Bima & Dompu, \*:Official of Village Office

In these groups the above irrigator acts as a key man in water distribution to respective farmer's farmlands and in regular maintenance works of farmer's irrigation system. Generally P3As were upgraded from those traditional groups and have taken over the customs of the groups. Most of the P3A or traditional groups collect irrigation service fee for O&M of their systems, and the fee is ordained by the groups to be payment in kind or cash. The charged payment in kind is crops such as paddy and coconut which are commonly grown in the beneficiary area.

Rotational irrigation is generally executed everywhere in the dry season and even in the wet season where enough irrigation water can not be supplied. It is felt from farmer's talks at the

field that water saving techniques are widely spread over the dry areas. Maintenance works are made periodically in the most of the irrigation systems for 17 days on average.

## 2.7 Present Constraints on O&M

Present O&M constraints in the study area have been studied on the basis of the above general data analyses and field visits to representative schemes, however, generally O&M situations depend upon site specific conditions on which a irrigation scheme is located. Following O&M constraints at farm level have been identified :

Authorized water user's associations(P3A) have not been widely organized yet in 3 provinces. In West Nusa Tenggara and North Sumatra, existing traditional O&M groups are needed to be transformed or authorized into P3As. In South Sulawesi, half of the schemes have not any form of O&M organization, therefore, farmers in those schemes are required to be organized in any type of O&M group as a first step and to be transformed to authorized P3As as a second step.

As for the system operation, efficient and equal water distribution are thought to be rarely made, since half of the schemes operate canal systems without irrigators such as Ulu-Ulu and Pekasih and without rotational irrigation when water is not sufficient, especially in South Sulawesi.

Execution of simple maintenance works for canal systems have been widely accustomed in all 3 provinces, but it is thought from field visits that the maintenance works are insufficient in many cases. It is necessary that maintenance works shall be made efficiently and canals & related structures shall be designed so as to minimize regular maintenance works as far as the design has an economic feasibility.

Generally collection of water charge has already started in all 3 provinces. About 20 % of the schemes have ordained the charge in cash and/or about 40 % in common crops, mainly paddy, in the irrigation area, but most of the schemes have not decided on the charge. In order to give a firm financial foundation to the farmer's O&M group, it is essential to introduce water charge to those which do not collect the charge at present.

### 3. OPERATION AND MAINTENANCE IN REPRESENTATIVE SCHEMES

#### 3.1 General

Field works/studies during Phase II had put an emphasis on field investigation, direct interviews with farmers in order to grasp present O&M conditions of the 30 representative schemes in 3 provinces.

The investigated present O&M conditions had been fed back to data analysis of the questionnaire survey carried out in Phase I.

#### 3.2 Organization for O&M

Present organizations for O&M are broadly divided into 3 categories in the 30 representative schemes. They are an authorized O&M group: P3A, a traditional O&M group like "Subak" and a general farmer's working group which often functions as an O&M group. Analyzed results are given in Table VII-2 and summarized below :

O&M Organization of 30 Representative Schemes

Description	North Sumatra	South Sulawesi	West Nusa Tenggara	Weighted Average
Authorized P3A	50 %	8 %	38 %	30 %
Traditional O&M Group	30 %	0 %	50 %	23 %
Farmer's Work Group	10 %	84 %	0 %	37 %
No-organization	10 %	8 %	12 %	10 %
Irrigator in Group	70 %	92 %	75 %	80 %
Schemes having O&M Rule	70 %	50 %	88 %	67 %
Penalty in Rule	30 %	42 %	75 %	47 %

Unit: Distribution in %

From the above summary table, following facts on water user's groups can be derived :

- i) Authorized P3A and not-authorized traditional O&M group are popular in both North Sumatra and West Nusa Tenggara Province, but they are not in South Sulawesi Province.
- ii) Farmer's working groups organized for mutual assistance (Gotong-royong) are popular in South Sulawesi, and the group acts as a water user's group



- in some cases.
- iii) About 10 % of the representative schemes have not had any type of O&M group yet in 3 provinces.
  - iv) 70-90 % of the schemes have a irrigator(Ulu-Ulu) who is in charge of O&M.
  - v) 50-90 % of the schemes have certain rules in which 30-75 % have some penalty rules.

### 3.3 O&M of the System

Present O&M in the 30 representative schemes are analyzed in following main view-points, and the analyzed results are given in Table 3-1 and summarized below :

#### 1) Operation Works

- Irrigation Schedule and Rotation,
- Water Availability,
- Flood Operation,
- Irrigation Record, and
- Farmer's desire to Government Support.

#### 2) Maintenance Works

- Periodic Maintenance,
- Procurement of Repair Materials
- Emergency Repair,
- Major Repair Works,
- Maintenance Record, and
- Farmer's desire to Government Support.

O&M Works of 30 Representative Schemes

Description	North Sumatra	South Sulawesi	West Nusa Tenggara	Weighted Average
<u>Operation Works</u>				
Primitive Irr.Schedule	10 %	75 %	38 %	43 %
Irrigation Rotation	60 %	50 %	50 %	53 %
Gate control in Flood	30 %	33 %	25 %	30 %
Irrigation Record	0 %	0 %	13 %	3 %
Desire to Gov.Support	60 %	92 %	100 %	83 %
<u>Maintenance Works</u>				
Canal Reshape/Desilting	60 %	75 %	100 %	77 %
Minor Structure Repair	50 %	58 %	0 %	40 %
Emergency Repair	70 %	50 %	13 %	47 %
Major Repair Works	30 %	8 %	0 %	13 %
Maintenance Record	20 %	0 %	38 %	17 %
Desire to Gov.Support	60 %	92 %	100 %	83 %

Unit: Distribution in %

From the data analysis, following facts on present O&M can be derived :

- i) Irrigation schedule is not widely prepared. Even if there is a schedule, the schedule is still based on traditional/primitive irrigation custom in most cases.
- ii) About 50 % of the schemes execute rotational irrigation, especially in drought period.
- iii) As a part of periodic maintenance, most of the schemes carry out grass/tree cutting and re-shaping/desilting works for their canals, but structure repairs are seldom made even though the repair is in a small-scale.
- iv) Existing farmer's groups have less experience in major construction/repairs of bigger-scale structures such as intake weirs or concrete lined canals.
- v) About 80 % of the farmers want Government support for operation as well as maintenance.
- vi) Most of the schemes do not keep records of O&M.

### 3.4 Farmer's Contribution to O&M

Farmer's contributions in the 30 representative schemes are analyzed in terms of water charge and manpower contribution for O&M, and the analyzed results are given in Table VII-2 and summarized below :

Farmer's Contribution of 30 Representative Schemes

Description	North Sumatra	South Sulawesi	West Nusa Tenggara	Weighted Average
<u>Water Charge</u>				
By Money:Distribution%	10 %	33 %	25 %	23 %
" Average Rp	50,000Rp	11,125Rp	3,500Rp	21,542Rp
By Crop:Distribution %	40 %	17 %	88 %	43 %
" Paddy Kg	101 kg	28 kg	51 kg	60 kg
<u>Manpower</u>				
Distribution %	80 %	92 %	100 %	90 %
Working Days	9.4 day	8.1 day	5.4 day	7.6 day

From the data analysis, following facts on present farmer's contribution have been derived :

- i) About 20-40 % of the representative schemes on average collect certain water charge in a form of money or crops.
- ii) Collected water charge is 21,500 Rp in currency or 60 kg in paddy on average.
- iii) Most of farmers maintain their irrigation systems by themselves and their annual working days are around a week.

### 3.5 Present Constraints in O&M

Present O&M constraints in the representative schemes had been studied on the basis of the above analyses, and following O&M constraints at farm level have been identified :

- i) Authorized O&M groups:P3A have not been established widely in 3 provinces, especially in South Sulawesi Province.
- ii) Written regulations of most of the O&M groups have not prepared though the groups have traditional not-written rules in most cases.
- iii) About 50 % of the schemes collect water charge, and their averaged charge is 21,500 Rp/year in cash payment or 60 kg-paddy in kind. Remaining 50 % of the schemes do not collect any type of water charge, therefore the groups have not any budget for O&M at present.
- iv) Irrigation schedule is not generally prepared and rotational irrigation is not widely spread even in drought period.
- v) Repair works for structures are not made in most cases though simple earth works such as canal re-shape /desilting works are done periodically.
- vi) Most of the schemes do not keep records for O&M.
- vii) Most of the farmers want Government supports to improve their present O&M.

### 3.6 Proposed O&M Improvement Plan

Based on the analysis of present O&M conditions, basic approach has been formulated to improve present O&M conditions which are detailed in Chapter IV. The general improvement plan in line with the above basic approach is explained below, and its details are discussed in Chapter IV :

#### 1) Promotion of Authorized P3A Organization

P3A is not widely organized in the representative schemes, especially schemes in South Sulawesi Province. It is essential to promote authorized P3A organization in line with existing regulations on irrigation through a channel of rural extension service(PPL).

#### 2) Giving Solid Financial Background to P3A Organization

About 50 % of the representative schemes have not started to collect any type of water charge yet. Accordingly, it is difficult for those schemes to operate and maintain their irrigation systems properly without any financial sources. It is necessary to give a solid financial background to those schemes through introduction of reasonable water charge.

#### 3) Extension of Written O&M Regulations for P3A Organization,

Most of the representative schemes operate and maintain their systems without written O&M rules/regulations but mainly with not-written traditional rules/customs at present. It is necessary to keep written O&M regulations at a minimum level which include organization structures and respective functions, water charge and manpower contribution.

#### 4) Extension of Improved Operation/Water Management

Preparation of irrigation schedule, rotational irrigation, gate control during floods and record keeping are not made widely in the representative schemes. The above minimum operation should be made in the schemes as a first step.

#### 5) Extension of Improved Maintenance

Periodic minimum maintenance works such as tree/grass

cutting or canal re-shaping/desilting are made in most of the schemes, however, periodic minimum structure repairs are hardly done at present mainly due to O&M budget shortage. With the above improvement of financial background by the introduction of reasonable water charge, farmers would carry out simple structure repair works by themselves. It is, however, necessary for provincial governments to give technical supports to farmers in normal maintenance works.

#### 6) Improvement of Rural Extension Systems for O&M

It is essential to extend the above improvement items to the farmers through rural extension workers(PPL) in collaboration with Provincial Irrigation Services(PRIS & PUD), and it is also required for Provincial Agricultural Services(PRAS) to train PPLs.

### 4. PROPOSED OPERATION AND MAINTENANCE PLAN

#### 4.1 Basic Plan in O&M at Farm Level

The proposed goal of O&M at farm level is that beneficiary farmers in the proposed schemes can operate and maintain their irrigation and drainage systems technically as well as financially by themselves in line with the Government's laws/regulations and Presidential Instructions related to O&M.

In order to achieve the above goal, following basic approach has been formulated to improve present O&M conditions, however, generally O&M situations depend upon site specific conditions on which an irrigation scheme is located.

- i) Promotion/encouragement of authorized P3A organization,
- ii) Giving solid financial background to P3A organization to be promoted through introduction of reasonable water charge,
- iii) Extension of written O&M regulations to P3A organization,
- iv) Extension of improved operation/water management including irrigation schedule, rotational irrigation and record keeping,

- v) Extension of improved maintenance including structure repair works and record keeping,
- vi) Improvement of rural extension system for O&M and training of rural extension workers(PPL).

On the basis of the above basic approach, respective improvement/strengthening plans have been formulated and are explained below :

#### 4.2 Improvement of O&M Organization

##### 4.2.1 Farmer's O&M Organization

Final goal for farmer's O&M organization is to establish a functionable authorized water user's association:P3A in line with present Government's strategy. Present conditions of existing farmer's groups, however, are quite various location by location. Accordingly, it is proposed to improve the groups step by step by the following way :

Development of Farmer's O&M Group

Step No	Present Group	Next Step
Step-1	No-group	General Working Group or Traditional O&M Group
Step-2	General Working Group	Traditional O&M Group or Authorized O&M G:P3A
Step-3	Traditional O&M Group	Authorized O&M G:P3A

The above step-by-step development to the authorized O&M group:P3A is shown in Fig. VII-4. In the final O&M organization P3A, it is recommended to have a following organization structure as shown in Fig. VII-2 :

- 1) Member's Meeting
- 2) Board of P3A:
  - Chairman,
  - Vice Chairman,
  - Secretary,
  - Treasurer,
  - Technical Conductor(Ulu-Ulu), and
  - Block Chief.

### 3) Members

In addition to the above organization structure, it is necessary to enforce O&M activities of the group members/farmers through introduction of written O&M rules or regulations, for most of the existing groups operate and maintain their systems without written O&M rules/regulations at present. It is proposed to introduce certain written O&M regulations at a minimum level to farmer's O&M groups as an initial step in order to establish firm groups.

#### 4.2.2 Government's Supporting Organization

It is essential to extend improved O&M to the farmers through rural extension workers(PPL) in collaboration with Provincial Irrigation Services(PUD) as well as Bupati's office, and it is also required for Provincial Agricultural Services(PRAS) to train PPLs. General organization and coordination recommended by the Government is shown in Fig. VII-1.

Phase II field investigation results revealed that most of representative schemes(73 %) have a channel to rural extension workers through PPL. On the other hand, less schemes(13 %) have a channel to PRIS at present, since most of village irrigation schemes are managed by beneficiary farmers under village administrations at present. Furthermore, small Government control irrigation systems which irrigation area is less than 500 ha will be turned over to beneficiary farmers in accordance with recent Government's strategy in O&M.

Present major PPL's activities are technical extension of farming practices, fertilizer application, crop protection, cropping systems and so on(See Appendix-VI). General O&M techniques including water management are extended in the part of the "Cropping Systems" or sometimes independent "Water Management" by PPLs, and staffs of PRAS Kabupaten(PUD) give design and construction supervision of major facilities such as intake weirs which receive Government's subsidy.

Taken the above present situations into consideration, it is proposed that O&M after construction of systems will be improved mainly by PPLs in collaboration with PUD and Bupati & Camat office. Accordingly, it is essential to strengthen present rural extension system of PRAS for O&M improvement.

In order to improve/strengthen present O&M in line with the basic O&M plan, it is proposed to train farmers in the proposed schemes as well as PPLs in following ways :

- i) Training of Water Management Staffs of PRAS by MOA Water Management Staffs,
- ii) Training of Water Management Staffs of Kabupaten Agricultural Office by Water Management Staffs of PRAS and MOA,
- iii) Training of PPL by Water Management Staffs of PRAS and Kabupaten Agricultural Office, and
- iv) Training of Farmers by PPL.

#### 4.2.3 Proposed O&M Equipment

O&M of the facilities are to be made basically by beneficiary farmer's O&M groups. Government's direct involvement in the long term will be minimized for O&M, but PRAS's extension services for O&M improvement are indispensable at present until the groups reach a certain level in O&M. Required O&M equipment for this purpose is listed in Table VII-3 and its total cost is estimated at 2,017 million Rp as given below :

Cost for O&M Equipment

Province	Cost
	(Million Rp)
1. North Sumatra	672.24
2. South Sulawesi	732.51
3. West Nusa Tenggara	612.15
Total	2,016.90

#### 4.3 Improvement of O&M of the System

##### Proposed Operation/Water Management

Preparation of irrigation schedule, rotational irrigation, gate control during floods and record keeping are not made widely in the proposed schemes at present. Following minimum system operation with supports of PPL should be made by farmer's O&M groups in the schemes as a first step :



- i) Seasonal irrigation schedules with irrigation blocks should be prepared through discussions in regular general meetings, and the schedule must be informed to every group members.
- ii) When irrigation water runs short, it is proposed to apply rotational irrigation. Rotation order and irrigation time of respective blocks should be decided through discussions in irregular meetings.
- iii) When it rains heavily, it is proposed to minimize damages of the systems by gate control of an intake weir and so on.
- iv) The above operation/water management activities should be recorded in order to improve these activities.

#### Proposed Maintenance

Periodic minimum maintenance works such as tree/grass cutting or canal re-shaping/desilting are made in most of the schemes, however, periodic structure repairs with purchased materials and timely emergency repairs are hardly done at present. Following minimum system maintenance with supports of PPL should be made by farmer's O&M groups in the schemes as a first step :

- i) Periodic system maintenance schedules should be prepared through discussions in regular general meetings, and the schedule must be informed to every group members.
- ii) When special maintenance works such as concrete works and gate replacement are required, it is proposed to open a general meeting to discuss and decide required material, its procurement/repair method, its budgetary preparation and repair schedule.
- iii) When emergency repair is required in case of floods and so on, it is proposed that the group leader or irrigator conduct the repair and the repair be completed within a right period by available group members in order to minimize the system damages.
- iv) The above maintenance activities should be recorded in order to improve these activities.

#### 4.4 Farmer's Contribution to O&M

About 60 % of the investigated schemes have not started to collect any type of water charge yet. Accordingly, it is difficult for those schemes to operate and maintain their irrigation systems properly without any financial sources.

On the other hand, the remaining 40 % of the schemes collect water charge as a form of organization fee and the charged rate is 14,400 Rp/ha/year or 69 kg-paddy/ha/year on average. The present average water charge would be about 17,600 Rp/ha/year, if the above payment in paddy can be converted to 20,700 Rp using a conversion rate of 300 Rp/kg-paddy. Allocation of present water charge is provisionally estimated as follows on the basis of interviews to farmers, PRAS and MOA :

##### Present Allocation of Water Charge at Farm Level

Allocation Item	Allocation	Calculated
Group Administration	45 %	8,000 Rp
Transportation & Materials	55 %	9,600 Rp
Total	100 %	17,600 Rp

Present material transportation and procurement cost amounts to 9,600 Rp/ha/year, however, many damaged main systems have been observed in the course of the field investigations. Accordingly, it is proposed to add another 12,400 Rp to present transportation and material cost of about 9,600 Rp provisionally. Furthermore, it is recommended that the proposed water charge of 30,000 Rp in total will be initiated as a trial and an adjustment for the charge will be made some years later depending upon future budgetary situations. It is essential at present to give a solid financial background to the farmer's O&M groups.

In case of land development schemes, irrigation service fee will be required to be paid by beneficiary farmers if they receive irrigation water from Government's main irrigation systems. In the case, the imposed irrigation service fee is to be paid within the above proposed water charge of 30,000 Rp/ha/year.

In addition to the above water charge, farmers spend some days for system maintenance. The average working day(50 days) estimated by questionnaire survey is much more than that(7.6

days) of the representative 30 schemes. The average working day by questionnaire survey is thought to be too high. Accordingly, the average working day in the 30 representative schemes is applied to the overall average value.

Farmers generally spend 7.6 working days in a year on average for system maintenance, especially for grass/tree cutting and re-shaping/desilting of canals. Structure maintenance is seldom made in most cases at present. Accordingly, it is proposed to add another 2.4 days for structure repair to the present working days(7.6 days) provisionally. Furthermore, it is recommended that the proposed 10 working days will be initiated as a trial and an adjustment will be made some years later depending upon future situations.

Accordingly the proposed farmer's contribution to the proposed O&M is as follows :

Proposed Farmer's Contribution to O&M

Items	Allocation	Amount
Water Charge	Group Administration	8,000 Rp
"	Transportation & Materials	12,000 Rp
	Total	30,000 Rp
Manpower		10 days

Unit: /ha/year, Water Charge=ISF + Organization Fee

Table VII-1 EVALUATED MARKS OF PRESENT O&amp;M

(1/9)

North Sumatra Province  
Land Development Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
1	60002	DAIRI	85	17	60023	LABUHAN BATU	65
2	60003	DAIRI	85	18	60025	LABUHAN BATU	10
3	60004	DAIRI	75	19	60027	LABUHAN BATU	10
4	60005	DAIRI	75	20	60028	TAPAN-TEN	5
5	60006	DAIRI	75	21	60029	TAPAN-TEN	30
6	60008	DAIRI	85	22	60031	TAPAN-TEN	13
7	60010	DAIRI	85	23	60033	TAPAN-UTARA	55
8	60011	DAIRI	80	24	60034	TAPAN-UTARA	65
9	60012	DAIRI	95	25	60035	TAPAN-UTARA	0
10	60013	DAIRI	85	26	60036	TAPAN-UTARA	65
11	60014	DAIRI	85	27	60037	TAPAN-SEL	90
12	60016	DAIRI	95	28	60038	TAPAN-SEL	45
13	60017	DAIRI	85	29	60040	TAPAN-SEL	90
14	60020	DAIRI	95	30	60041	TAPAN-SEL	80
15	60021	LANGKAT	70	31	60042	TAPAN-SEL	60
16	60022	LANGKAT	45	32	60045	TAPAN-SEL	80

North Sumatra Province  
Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
1	50001	DAIRI	85	26	50026	DAIRI	95
2	50002	DAIRI	95	27	50027	DAIRI	95
3	50003	DAIRI	75	28	50028	DAIRI	95
4	50004	DAIRI	95	29	50029	DAIRI	95
5	50005	DAIRI	95	30	50030	DAIRI	50
6	50006	DAIRI	95	31	50031	DAIRI	10
7	50007	DAIRI	95	32	50032	DAIRI	95
8	50008	DAIRI	85	33	50033	DAIRI	95
9	50009	DAIRI	95	34	50034	DAIRI	95
10	50010	DAIRI	95	35	50035	DAIRI	95
11	50011	DAIRI	85	36	50036	DAIRI	85
12	50012	DAIRI	85	37	50037	DAIRI	75
13	50013	DAIRI	55	38	50038	DAIRI	95
14	50014	DAIRI	10	39	50039	DAIRI	100
15	50015	DAIRI	10	40	50040	DAIRI	95
16	50016	DAIRI	75	41	50041	DAIRI	75
17	50017	DAIRI	95	42	50042	DAIRI	100
18	50018	DAIRI	85	43	50043	DAIRI	85
19	50019	DAIRI	75	44	50044	DAIRI	85
20	50020	DAIRI	75	45	50045	LANGKAT	95
21	50021	DAIRI	25	46	50046	LANGKAT	65
22	50022	DAIRI	85	47	50047	LANGKAT	30
23	50023	DAIRI	95	48	50048	LANGKAT	0
24	50024	DAIRI	85	49	50049	LANGKAT	30
25	50025	DAIRI	80	50	50050	LANGKAT	95

North Sumatra Province  
Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
51	50051	LANGKAT	85	101	50111	TAPAN-TEN	30
52	50052	LANGKAT	75	102	50112	TAPAN-TEN	33
53	50053	LANGKAT	55	103	50113	TAPAN-TEN	33
54	50054	LANGKAT	55	104	50114	TAPAN-TEN	33
55	50055	LANGKAT	95	105	50115	TAPAN-TEN	68
56	50056	LANGKAT	75	106	50116	TAPAN-TEN	78
57	50057	LANGKAT	0	107	50119	TAPAN-TEN	33
58	50058	LANGKAT	75	108	50121	TAPAN-TEN	65
59	50059	LANGKAT	55	109	50122	TAPAN-TEN	63
60	50060	LANGKAT	95	110	50123	TAPAN-TEN	8
61	50061	LANGKAT	45	111	50124	TAPAN-TEN	90
62	50062	LANGKAT	75	112	50125	TAPAN-TEN	73
63	50063	LANGKAT	65	113	50127	TAPAN-TEN	38
64	50064	LANGKAT	95	114	50129	TAPAN-TEN	65
65	50065	LANGKAT	45	115	50130	TAPAN-TEN	78
66	50066	LANGKAT	80	116	50131	TAPAN-TEN	65
67	50068	LABUHAN BATU	20	117	50133	TAPAN-UTARA	0
68	50069	LABUHAN BATU	65	118	50134	TAPAN-UTARA	70
69	50070	LABUHAN BATU	65	119	50135	TAPAN-UTARA	65
70	50072	LABUHAN BATU	5	120	50137	TAPAN-UTARA	0
71	50073	LABUHAN BATU	20	121	50138	TAPAN-UTARA	0
72	50074	LABUHAN BATU	65	122	50139	TAPAN-UTARA	55
73	50075	LABUHAN BATU	15	123	50141	TAPAN-UTARA	75
74	50076	LABUHAN BATU	20	124	50142	TAPAN-UTARA	70
75	50077	LABUHAN BATU	20	125	50143	TAPAN-UTARA	90
76	50078	LABUHAN BATU	20	126	50144	TAPAN-UTARA	25
77	50079	LABUHAN BATU	70	127	50145	TAPAN-UTARA	45
78	50080	LABUHAN BATU	20	128	50146	TAPAN-UTARA	5
79	50082	LABUHAN BATU	65	129	50147	TAPAN-UTARA	60
80	50084	LABUHAN BATU	45	130	50150	TAPAN-UTARA	70
81	50085	LABUHAN BATU	20	131	50153	TAPAN-UTARA	25
82	50086	LABUHAN BATU	65	132	50154	TAPAN-UTARA	70
83	50087	LABUHAN BATU	60	133	50155	TAPAN-UTARA	55
84	50088	LABUHAN BATU	5	134	50156	TAPAN-UTARA	20
85	50089	LABUHAN BATU	30	135	50157	TAPAN-UTARA	65
86	50091	LABUHAN BATU	45	136	50158	TAPAN-UTARA	55
87	50092	LABUHAN BATU	30	137	50159	TAPAN-UTARA	75
88	50095	TAPAN-TEN	75	138	50162	TAPAN-UTARA	90
89	50096	TAPAN-TEN	8	139	50163	TAPAN-UTARA	5
90	50097	TAPAN-TEN	33	140	50164	TAPAN-UTARA	70
91	50098	TAPAN-TEN	65	141	50165	TAPAN-UTARA	75
92	50099	TAPAN-TEN	60	142	50166	TAPAN-UTARA	0
93	50100	TAPAN-TEN	78	143	50167	TAPAN-UTARA	65
94	50101	TAPAN-TEN	75	144	50168	TAPAN-UTARA	60
95	50103	TAPAN-TEN	78	145	50169	TAPAN-UTARA	0
96	50104	TAPAN-TEN	33	146	50170	TAPAN-UTARA	75
97	50106	TAPAN-TEN	33	147	50171	TAPAN-UTARA	55
98	50108	TAPAN-TEN	5	148	50172	TAPAN-UTARA	0
99	50109	TAPAN-TEN	80	149	50173	TAPAN-UTARA	75
100	50110	TAPAN-TEN	23	150	50174	TAPAN-UTARA	0

North Sumatra Province  
Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
151	50175	TAPAN-UTARA	75	201	50248	TAPAN-SEL	65
152	50176	TAPAN-UTARA	70	202	50249	TAPAN-SEL	80
153	50177	TAPAN-UTARA	40	203	50250	TAPAN-SEL	50
154	50178	TAPAN-UTARA	0	204	50251	TAPAN-SEL	70
155	50179	TAPAN-UTARA	0	205	50252	TAPAN-SEL	80
156	50180	TAPAN-UTARA	0	206	50253	TAPAN-SEL	70
157	50182	TAPAN-UTARA	60	207	50254	TAPAN-SEL	80
158	50183	TAPAN-UTARA	65	208	50255	TAPAN-SEL	75
159	50184	TAPAN-UTARA	85	209	50256	TAPAN-SEL	75
160	50186	TAPAN-UTARA	65	210	50258	TAPAN-SEL	80
161	50187	TAPAN-UTARA	75	211	50259	TAPAN-SEL	90
162	50188	TAPAN-UTARA	35	212	50260	TAPAN-SEL	80
163	50189	KARO	70	213	50261	TAPAN-SEL	90
164	50190	KARO	78	214	50262	TAPAN-SEL	80
165	50191	KARO	0	215	50263	TAPAN-SEL	20
166	50192	KARO	65	216	50264	TAPAN-SEL	65
167	50193	KARO	35	217	50265	TAPAN-SEL	80
168	50194	KARO	75	218	50266	TAPAN-SEL	80
169	50195	KARO	85	219	50267	TAPAN-SEL	75
170	50196	KARO	75	220	50268	TAPAN-SEL	70
171	50197	KARO	85	221	50269	TAPAN-SEL	80
172	50198	KARO	35	222	50270	TAPAN-SEL	70
173	50199	KARO	85	223	50271	TAPAN-SEL	55
174	50200	KARO	85	224	50272	TAPAN-SEL	70
175	50201	KARO	75	225	50273	TAPAN-SEL	60
176	50202	KARO	10	226	50274	TAPAN-SEL	75
177	50203	KARO	85	227	50275	TAPAN-SEL	80
178	50204	KARO	35	228	50276	TAPAN-SEL	90
179	50205	KARO	35	229	50277	TAPAN-SEL	55
180	50206	KARO	65	230	50278	TAPAN-SEL	80
181	50207	KARO	10	231	50279	TAPAN-SEL	70
182	50208	KARO	65	232	50283	DELI SERDANG	0
183	50209	KARO	75	233	50288	DELI SERDANG	25
184	50210	KARO	75	234	50289	DELI SERDANG	5
185	50211	KARO	35	235	50293	DELI SERDANG	65
186	50212	KARO	35	236	50294	DELI SERDANG	75
187	50213	KARO	25	237	50296	DELI SERDANG	50
188	50214	KARO	35	238	50299	DELI SERDANG	85
189	50215	KARO	70	239	50300	DELI SERDANG	55
190	50216	KARO	85	240	50302	DELI SERDANG	40
191	50217	KARO	10	241	50303	DELI SERDANG	45
192	50218	KARO	80	242	50306	TAPAN-SEL	85
193	50220	KARO	25	243	50307	TAPAN-SEL	60
194	50225	ASAHAN	35	244	50308	TAPAN-SEL	80
195	50226	ASAHAN	60	245	50309	TAPAN-SEL	80
196	50228	ASAHAN	25	246	50310	TAPAN-SEL	80
197	50240	ASAHAN	88	247	50311	TAPAN-SEL	70
198	50245	ASAHAN	40				
199	50246	TAPAN-SEL	65				
200	50247	TAPAN-SEL	85				

South Sulawesi Province  
Land Development Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
1	20002	BONE	73	6	20009	JENEPONTO	55
2	20003	BONE	60	7	20010	BANTAENG	65
3	20004	BONE	35	8	20011	BANTAENG	75
4	20005	BONE	68	9	20017	SOPPENG	70
5	20008	GOWA	0	10	20393	POLMAS	25

South Sulawesi Province  
Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
1	10001	BANTAENG	55	36	10042	BONE	0
2	10003	BANTAENG	75	37	10043	BONE	5
3	10004	BANTAENG	20	38	10044	BONE	8
4	10005	BANTAENG	20	39	10046	BONE	8
5	10008	BANTAENG	20	40	10048	BONE	10
6	10009	BANTAENG	20	41	10049	BARRU	0
7	10010	BANTAENG	20	42	10050	BARRU	65
8	10012	BANTAENG	20	43	10051	BARRU	25
9	10013	BONE	8	44	10052	BARRU	15
10	10014	BONE	10	45	10053	BARRU	40
11	10015	BONE	8	46	10055	BARRU	55
12	10016	BONE	10	47	10056	BARRU	60
13	10017	BONE	8	48	10057	BARRU	0
14	10018	BONE	8	49	10058	BARRU	25
15	10019	BONE	8	50	10060	BARRU	70
16	10020	BONE	10	51	10061	BULUKUMBA	0
17	10022	BONE	8	52	10062	BULUKUMBA	20
18	10023	BONE	10	53	10063	BULUKUMBA	55
19	10024	BONE	15	54	10064	BULUKUMBA	65
20	10025	BONE	8	55	10065	BULUKUMBA	65
21	10026	BONE	10	56	10066	BULUKUMBA	55
22	10028	BONE	33	57	10067	BULUKUMBA	65
23	10029	BONE	23	58	10068	BULUKUMBA	55
24	10030	BONE	10	59	10069	BULUKUMBA	45
25	10031	BONE	13	60	10070	BULUKUMBA	55
26	10032	BONE	8	61	10071	BULUKUMBA	55
27	10033	BONE	33	62	10072	BULUKUMBA	65
28	10034	BONE	10	63	10073	BULUKUMBA	45
29	10035	BONE	8	64	10074	BULUKUMBA	55
30	10036	BONE	10	65	10075	BULUKUMBA	45
31	10037	BONE	8	66	10076	BULUKUMBA	55
32	10038	BONE	10	67	10077	BULUKUMBA	45
33	10039	BONE	10	68	10078	BULUKUMBA	45
34	10040	BONE	10	69	10079	BULUKUMBA	45
35	10041	BONE	10	70	10080	BULUKUMBA	55

South Sulawesi Province  
 Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
71	10081	BULUKUMBA	70	121	10132	ENREKANG	25
72	10082	BULUKUMBA	20	122	10133	ENREKANG	60
73	10083	BULUKUMBA	45	123	10134	ENREKANG	30
74	10084	BULUKUMBA	55	124	10135	ENREKANG	25
75	10085	BULUKUMBA	45	125	10136	ENREKANG	50
76	10086	BULUKUMBA	45	126	10138	ENREKANG	40
77	10087	BULUKUMBA	45	127	10139	GOWA	55
78	10088	BULUKUMBA	45	128	10140	GOWA	70
79	10089	BULUKUMBA	45	129	10141	GOWA	55
80	10090	BULUKUMBA	20	130	10142	GOWA	55
81	10091	BULUKUMBA	45	131	10143	GOWA	55
82	10092	BULUKUMBA	35	132	10144	GOWA	25
83	10093	BULUKUMBA	25	133	10145	GOWA	65
84	10094	BULUKUMBA	45	134	10146	GOWA	55
85	10095	BULUKUMBA	55	135	10147	GOWA	55
86	10096	BULUKUMBA	35	136	10148	GOWA	55
87	10097	BULUKUMBA	35	137	10149	GOWA	55
88	10098	BULUKUMBA	35	138	10150	GOWA	55
89	10099	BULUKUMBA	35	139	10151	JENEPONTO	45
90	10100	BULUKUMBA	75	140	10152	JENEPONTO	55
91	10101	BULUKUMBA	55	141	10153	JENEPONTO	55
92	10102	BULUKUMBA	45	142	10154	JENEPONTO	45
93	10103	ENREKANG	25	143	10155	JENEPONTO	20
94	10104	ENREKANG	30	144	10156	JENEPONTO	45
95	10105	ENREKANG	50	145	10157	JENEPONTO	0
96	10106	ENREKANG	60	146	10158	JENEPONTO	0
97	10107	ENREKANG	30	147	10159	JENEPONTO	25
98	10108	ENREKANG	25	148	10160	JENEPONTO	45
99	10109	ENREKANG	83	149	10161	JENEPONTO	55
100	10110	ENREKANG	65	150	10162	JENEPONTO	55
101	10112	ENREKANG	55	151	10163	JENEPONTO	55
102	10113	ENREKANG	70	152	10164	JENEPONTO	25
103	10114	ENREKANG	30	153	10165	JENEPONTO	55
104	10115	ENREKANG	70	154	10166	JENEPONTO	55
105	10116	ENREKANG	25	155	10167	JENEPONTO	55
106	10117	ENREKANG	30	156	10168	JENEPONTO	55
107	10118	ENREKANG	35	157	10169	JENEPONTO	55
108	10119	ENREKANG	30	158	10170	JENEPONTO	55
109	10120	ENREKANG	85	159	10171	JENEPONTO	55
110	10121	ENREKANG	75	160	10172	JENEPONTO	55
111	10122	ENREKANG	75	161	10173	MAROS	5
112	10123	ENREKANG	25	162	10174	MAROS	25
113	10124	ENREKANG	25	163	10175	MAROS	5
114	10125	ENREKANG	25	164	10176	MAROS	60
115	10126	ENREKANG	25	165	10177	MAROS	25
116	10127	ENREKANG	25	166	10178	MAROS	5
117	10128	ENREKANG	45	167	10180	MAROS	0
118	10129	ENREKANG	60	168	10182	MAROS	63
119	10130	ENREKANG	25	169	10183	MAROS	5
120	10131	ENREKANG	25	170	10184	MAROS	0



South Sulawesi Province  
Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
171	10185	MAROS	5	221	10241	MAROS	25
172	10186	MAROS	5	222	10242	MAROS	25
173	10187	MAROS	5	223	10243	MAROS	0
174	10188	MAROS	25	224	10244	MAROS	25
175	10189	MAROS	5	225	10245	MAROS	25
176	10190	MAROS	40	226	10246	MAROS	25
177	10191	MAROS	5	227	10247	MAROS	0
178	10192	MAROS	15	228	10248	SOPPENG	65
179	10193	MAROS	60	229	10249	SOPPENG	80
180	10194	MAROS	5	230	10250	SOPPENG	80
181	10195	SIDRAP	25	231	10251	SOPPENG	30
182	10196	SINJAI	75	232	10252	BULUKUMBA	25
183	10197	SINJAI	75	233	10253	BANTAENG	70
184	10198	SINJAI	75	234	10271	LUWU	30
185	10199	SINJAI	75	235	10272	LUWU	60
186	10200	SINJAI	75	236	10273	LUWU	30
187	10201	SINJAI	55	237	10274	LUWU	30
188	10202	SINJAI	75	238	10275	LUWU	65
189	10203	SINJAI	20	239	10276	LUWU	65
190	10204	SINJAI	65	240	10277	LUWU	30
191	10205	SINJAI	75	241	10278	LUWU	60
192	10206	SINJAI	75	242	10279	LUWU	30
193	10207	SINJAI	75	243	10280	LUWU	65
194	10208	SINJAI	30	244	10281	LUWU	65
195	10209	SOPPENG	73	245	10282	LUWU	55
196	10210	SOPPENG	75	246	10283	LUWU	65
197	10211	SOPPENG	90	247	10284	LUWU	65
198	10212	SOPPENG	85	248	10287	LUWU	55
199	10213	SOPPENG	80	249	10288	LUWU	45
200	10215	SOPPENG	90	250	10291	LUWU	65
201	10216	WAJO	80	251	10292	LUWU	65
202	10217	WAJO	0	252	10293	LUWU	65
203	10218	WAJO	90	253	10294	LUWU	55
204	10219	WAJO	55	254	10295	LUWU	65
205	10220	WAJO	5	255	10296	LUWU	65
206	10221	WAJO	15	256	10297	LUWU	65
207	10225	WAJO	0	257	10298	LUWU	65
208	10226	WAJO	25	258	10299	LUWU	65
209	10227	WAJO	55	259	10300	LUWU	65
210	10228	WAJO	50	260	10301	LUWU	65
211	10229	WAJO	85	261	10302	TANA TORAJA	30
212	10230	WAJO	85	262	10303	TANA TORAJA	30
213	10232	WAJO	0	263	10304	TANA TORAJA	30
214	10233	WAJO	15	264	10305	TANA TORAJA	30
215	10234	WAJO	40	265	10306	TANA TORAJA	55
216	10235	WAJO	90	266	10307	TANA TORAJA	30
217	10236	Pare-pare	80	267	10308	TANA TORAJA	25
218	10238	Pare-pare	60	268	10309	TANA TORAJA	30
219	10239	Pare-pare	80	269	10310	TANA TORAJA	25
220	10240	Pare-pare	80	270	10311	TANA TORAJA	30

South Sulawesi Province  
Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
271	10312	TANA TORAJA	55	311	10353	POLMAS	30
272	10313	TANA TORAJA	30	312	10354	POLMAS	0
273	10314	TANA TORAJA	30	313	10355	POLMAS	30
274	10315	TANA TORAJA	5	314	10356	POLMAS	25
275	10316	TANA TORAJA	5	315	10357	POLMAS	55
276	10317	TANA TORAJA	55	316	10358	POLMAS	45
277	10318	TANA TORAJA	55	317	10359	POLMAS	55
278	10319	TANA TORAJA	25	318	10360	POLMAS	30
279	10320	TANA TORAJA	0	319	10361	POLMAS	30
280	10321	TANA TORAJA	30	320	10362	POLMAS	30
281	10322	TANA TORAJA	55	321	10363	POLMAS	30
282	10323	TANA TORAJA	30	322	10364	POLMAS	55
283	10324	TANA TORAJA	30	323	10365	POLMAS	55
284	10325	TANA TORAJA	25	324	10366	POLMAS	30
285	10326	TANA TORAJA	25	325	10367	POLMAS	30
286	10327	TANA TORAJA	30	326	10368	POLMAS	55
287	10328	TANA TORAJA	30	327	10369	POLMAS	65
288	10329	TANA TORAJA	55	328	10370	POLMAS	30
289	10330	TANA TORAJA	55	329	10371	POLMAS	25
290	10331	TANA TORAJA	25	330	10372	POLMAS	20
291	10332	TANA TORAJA	60	331	10373	POLMAS	25
292	10333	TANA TORAJA	55	332	10374	POLMAS	65
293	10334	TANA TORAJA	30	333	10376	POLMAS	25
294	10335	TANA TORAJA	55	334	10377	POLMAS	50
295	10336	TANA TORAJA	30	335	10378	MAJENE	20
296	10337	POLMAS	30	336	10379	MAMUJU	5
297	10338	POLMAS	30	337	10380	MAMUJU	50
298	10339	POLMAS	65	338	10381	MAMUJU	30
299	10340	POLMAS	65	339	10382	MAMUJU	0
300	10341	POLMAS	65	340	10383	MAMUJU	30
301	10342	POLMAS	55	341	10384	MAMUJU	55
302	10343	POLMAS	65	342	10385	MAMUJU	0
303	10344	POLMAS	55	343	10386	MAMUJU	40
304	10345	POLMAS	60	344	10387	MAMUJU	10
305	10346	POLMAS	5	345	10388	MAMUJU	55
306	10347	POLMAS	65	346	10389	MAMUJU	30
307	10348	POLMAS	65	347	10390	MAMUJU	0
308	10350	POLMAS	30	348	10391	MAMUJU	30
309	10351	POLMAS	30	349	10392	MAMUJU	65
310	10352	POLMAS	33				

West Nusa Tenggara Province  
Land Development Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
1	43001	SUMBAWA	65	11	44007	LOMB. BARAT	85
2	43002	SUMBAWA	75	12	44008	LOMB. BARAT	90
3	43003	SUMBAWA	80	13	44010	LOMB. BARAT	65
4	43004	SUMBAWA	50	14	44012	LOMB. BARAT	95
5	43005	SUMBAWA	35	15	45004	LOMB. TIMUR	75
6	43006	SUMBAWA	75	16	45010	LOMB. TIMUR	80
7	43007	SUMBAWA	80	17	45016	LOMB. TIMUR	75
8	43010	SUMBAWA	65	18	45017	LOMB. TIMUR	75
9	43011	SUMBAWA	65	19	45023	LOMB. TIMUR	55
10	43012	SUMBAWA	50	20	46001	BIMA	80

West Nusa Tenggara Province  
Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
1	31004	LOMBOK TENGAH	50	31	33019	SUMBAWA	20
2	31005	LOMBOK TENGAH	70	32	33020	SUMBAWA	55
3	31006	LOMBOK TENGAH	0	33	33021	SUMBAWA	65
4	31007	LOMBOK TENGAH	0	34	33024	SUMBAWA	85
5	31008	LOMBOK TENGAH	70	35	33025	SUMBAWA	75
6	31009	LOMBOK TENGAH	70	36	33029	SUMBAWA	90
7	31010	LOMBOK TENGAH	70	37	33030	SUMBAWA	75
8	31011	LOMBOK TENGAH	0	38	33031	SUMBAWA	0
9	32002	DOMPU	70	39	33036	SUMBAWA	60
10	32003	DOMPU	80	40	33039	SUMBAWA	25
11	32004	DOMPU	80	41	33040	SUMBAWA	35
12	32005	DOMPU	80	42	33041	SUMBAWA	35
13	32007	DOMPU	80	43	33042	SUMBAWA	25
14	32008	DOMPU	80	44	33043	SUMBAWA	60
15	32013	DOMPU	75	45	33044	SUMBAWA	60
16	32016	DOMPU	80	46	33045	SUMBAWA	70
17	32017	DOMPU	80	47	33046	SUMBAWA	25
18	32020	DOMPU	80	48	33047	SUMBAWA	50
19	33002	SUMBAWA	55	49	33048	SUMBAWA	65
20	33005	SUMBAWA	85	50	33050	SUMBAWA	70
21	33006	SUMBAWA	90	51	33053	SUMBAWA	75
22	33007	SUMBAWA	50	52	33054	SUMBAWA	65
23	33009	SUMBAWA	70	53	33055	SUMBAWA	75
24	33010	SUMBAWA	40	54	33056	SUMBAWA	75
25	33012	SUMBAWA	0	55	33059	SUMBAWA	75
26	33013	SUMBAWA	0	56	33060	SUMBAWA	70
27	33014	SUMBAWA	0	57	33061	SUMBAWA	75
28	33015	SUMBAWA	35	58	34002	LOMBOK BARAT	70
29	33017	SUMBAWA	0	59	34003	LOMBOK BARAT	70
30	33018	SUMBAWA	0	60	34004	LOMBOK BARAT	85

West Nusa Tenggara Province  
Village Irrigation Schemes

(Full Mark:100)

No	Code No	Regency	Evaluated Marks	No	Code No	Regency	Evaluated Marks
61	34005	LOMBOK BARAT	80	101	35045	LOMBOK TIMUR	93
62	34006	LOMBOK BARAT	75	102	35046	LOMBOK TIMUR	75
63	34007	LOMBOK BARAT	83	103	36002	BIMA	85
64	34010	LOMBOK BARAT	65	104	36003	BIMA	85
65	34011	LOMBOK BARAT	85	105	36004	BIMA	85
66	34012	LOMBOK BARAT	55	106	36006	BIMA	73
67	34013	LOMBOK BARAT	65	107	36007	BIMA	65
68	34014	LOMBOK BARAT	35	108	36009	BIMA	75
69	34015	LOMBOK BARAT	35	109	36010	BIMA	85
70	34016	LOMBOK BARAT	35	110	36011	BIMA	95
71	34017	LOMBOK BARAT	35	111	36012	BIMA	75
72	34018	LOMBOK BARAT	35	112	36013	BIMA	25
73	34021	LOMBOK BARAT	35	113	36014	BIMA	80
74	34022	LOMBOK BARAT	35	114	36015	BIMA	70
75	34023	LOMBOK BARAT	35	115	36016	BIMA	70
76	34024	LOMBOK BARAT	20	116	36017	BIMA	35
77	34025	LOMBOK BARAT	40	117	36018	BIMA	35
78	35001	LOMBOK TIMUR	65	118	36019	BIMA	100
79	35002	LOMBOK TIMUR	65	119	36020	BIMA	75
80	35004	LOMBOK TIMUR	65	120	36023	BIMA	35
81	35007	LOMBOK TIMUR	70	121	36024	BIMA	60
82	35009	LOMBOK TIMUR	60	122	36026	BIMA	75
83	35010	LOMBOK TIMUR	65	123	36027	BIMA	35
84	35011	LOMBOK TIMUR	75	124	36029	BIMA	85
85	35012	LOMBOK TIMUR	75	125	36031	BIMA	35
86	35014	LOMBOK TIMUR	75	126	37001	LOMBOK TENGAH	80
87	35015	LOMBOK TIMUR	85	127	37002	LOMBOK TENGAH	23
88	35017	LOMBOK TIMUR	65	128	37003	LOMBOK TENGAH	20
89	35019	LOMBOK TIMUR	75	129	37004	LOMBOK TENGAH	20
90	35020	LOMBOK TIMUR	75	130	37005	LOMBOK TENGAH	30
91	35021	LOMBOK TIMUR	75	131	37006	LOMBOK TENGAH	85
92	35022	LOMBOK TIMUR	75	132	136002	BIMA	70
93	35028	LOMBOK TIMUR	65	133	136003	BIMA	60
94	35029	LOMBOK TIMUR	60	134	136004	BIMA	70
95	35030	LOMBOK TIMUR	65	135	136005	BIMA	80
96	35031	LOMBOK TIMUR	75	136	136006	BIMA	75
97	35032	LOMBOK TIMUR	65	137	136007	BIMA	80
98	35034	LOMBOK TIMUR	65				
99	35035	LOMBOK TIMUR	65				
100	35037	LOMBOK TIMUR	65				

Table VII-2

## SUMMARY OF EVALUATED MARKS OF PRESENT O&amp;M

Full Mark:100

No	Province	District/Kabupaten	Nos	Marks	Remarks
<b>I. Village Irrigation Schemes</b>					
1	North Sumatra	Tapanuli Selatan	39	73	
2	"	Tapanuli Tengah	29	52	
3	"	Tapanuli Utara	46	46	
4	"	Labuhan Batu	21	35	
5	"	Asahan	5	50	
6	"	Dairi	44	81	
7	"	Karo	31	55	
8	"	Deli Serdang	10	45	
9	"	Langkat	22	63	
Averaged Mark				59.0	
1	South Selawesi	Bulkumba	43	46	
2	"	Bantaeng	9	36	
3	"	Jenepono	22	44	
4	"	Gowa	12	54	
5	"	Sinjai	13	65	
6	"	Bone	32	11	
7	"	Maros	27	18	
8	"	Barru	10	36	
9	"	Soppeng	10	75	
10	"	Wajo	16	43	
11	"	Sdrap	1	25	
12	"	Enrekang	34	43	
13	"	Luwu	27	57	
14	"	Tana Toraja	35	34	
15	"	Polmas	39	41	
16	"	Majene	1	20	
17	"	Mamuju	14	29	
18	"	Pare-Pare	4	75	
Averaged Mark				39.9	
1	West Nusa Tenggara	Lombok Barat	20	54	
2	"	Lombok Tengah	14	43	
3	"	Lombok Timur	25	70	
4	"	Sumbawa	39	51	
5	"	Dompu	10	78	
6	"	Bima	29	68	
Averaged Mark				59.7	
<b>II. Land Development Schemes</b>					
1	North Sumatra	-	19	64	
2	South Selawesi	-	10	53	
3	West Nusa Tenggara	-	20	71	
Averaged Mark				64.6	

Table VII-3 EXISTING O&amp;M CONDITION OF REPRESENTATIVE SCHEMES(1/2)

## I. Existing O&amp;M Organization

No	Description	North Sumatra	South Selawesi	West Nusa Tenggara	Weight Average
A	Organization				
	Authorized O&M Group/P3A	50%	8%	38%	30%
	Traditional O&M Group	30%	0%	50%	23%
	General Farmer's Group	10%	84%	0%	37%
	No Organization	10%	8%	12%	10%
B	Organization Structure				
	Chief of Group	90%	92%	78%	88%
	Irrigator	70%	92%	75%	80%
	Assistant Irrigator	70%	8%	50%	40%
	Treasurer/Secretary	80%	8%	38%	40%
C	Group Regulation				
	Written Regulation	10%	0%	13%	7%
	Not-written Regulation	60%	50%	75%	60%
	Penalty in Regulation	30%	42%	75%	47%
D	Meeting for O&M				
	Regular Meeting	90%	92%	88%	90%
	Irregular Meeting	20%	0%	13%	10%
E	Others				
	Attendance:Irr.Committee	30%	8%	63%	30%
	Advice by Extension:PPL	60%	83%	75%	73%
	Advice by Irri.Service:PU	10%	0%	38%	13%

## II. Operation/Water Management

No	Description	North Sumatra	South Selawesi	West Nusa Tenggara	Weight Average
A	Irrigation Schedule	10%	75%	38%	43%
	Irrigation Rotation				
	- Year-round	50%	25%	50%	40%
	- Drought Time	60%	50%	50%	53%
B	Irrigation Water				
	- Enough Water	30%	8%	88%	37%
	- W.Shortage sometimes	40%	50%	12%	37%
	- Water Shortage	30%	42%	0%	27%
C	Flood Operation				
	- Close Intake Gate	30%	33%	25%	30%
	- Close Farm-inlet	20%	17%	0%	13%
D	Others				
	Keeping Irrigation Record	0%	0%	13%	3%
	Operation without Support	40%	8%	0%	17%
	Operation with Support	60%	92%	100%	83%

## III. Maintenance

No	Description	North Sumatra	South Selawesi	West Nusa Tenggara	Weighted Average
A	Periodic Maintenance				
	Grass/Tree Cut	80%	83%	100%	87%
	Canal Reshape/Desilting	60%	75%	100%	77%
	Mainor Repair of Structure	50%	58%	0%	40%
B	Procurement of Repair Material				
	Local Market	50%	42%	13%	37%
	Government Supply	30%	17%	13%	20%
C	Emergency Repair	70%	50%	13%	47%
D	Experience of Major Repair	30%	8%	0%	13%
E	Others				
	Keeping Maintenance Record	20%	0%	38%	17%
	Maintenan. without Support	40%	0%	62%	30%
	Maintenance with Support	60%	100%	38%	70%

## IV Farmer's Contribution for O&amp;M

No	Description	North Sumatra	South Selawesi	West Nusa Tenggara	Weighted Average
A	Water Charge				
	By Money: Distribution %	10%	33%	25%	23%
	" Average Charge Rp	50,000	11,125	3,500	21,542
	By Crop: Distribution %	40%	17%	88%	43%
	" Average Kg	Paddy:101	Paddy:28	Paddy:51	Paddy 60
B	Manpower Contribution				
	Distribution %	80%	92%	100%	90%
	Average Work Days Man/day	9.4 days	8.1 days	5.4 days	7.6 days

Table VII-4

## LIST PROPOSED O&amp;M EQUIPMENT

Unit: 1,000 Rp

No	Item of Equipment	Required Number	Unit Price	Total Price	Remarks
I NORTH SUMATRA PROVINCE[9 Kabupaten]					
1	4WD Vehicle	4	60,000	240,000	
2	Truck (Load 1.5-2.0 ton)	3	35,000	105,000	
3	Vehicle (Kijang Class)	6	30,000	180,000	
4	Motor Cycle (100-125cc Class)	22	4,000	88,000	2*
5	Type Writer	11	725	7,975	1*
6	Calculator	28	150	4,200	2*
7	Filing Cabinet	11	400	4,400	1*
8	Computer Set	1	8,000	8,000	
9	Measuring Tape (L:50 m)	13	80	1,040	1*
10	Measuring Tape (L:100 m)	13	150	1,950	1*
11	Convex Tape (L:3-5m)	13	75	975	1*
12	Theodolite Set	2	6,000	12,000	
13	Auto Level Set	2	2,500	5,000	
14	Current Meter	2	4,900	9,800	
15	Camera	13	300	3,900	1*
				(Sub-total 672,240)	
II SOUTH SELAWESI PROVINCE[18 Kabupaten]					
1	4WD Vehicle	4	60,000	240,000	
2	Truck (Load 1.5-2.0 ton)	3	35,000	105,000	
3	Vehicle (Kijang Class)	5	30,000	150,000	
4	Motor Cycle (100-125cc Class)	40	4,000	160,000	2*
5	Type Writer	20	725	14,500	1*
6	Calculator	46	150	6,900	2*
7	Filing Cabinet	20	400	8,000	1*
8	Computer Set	1	8,000	8,000	
9	Measuring Tape (L:50 m)	22	80	1,760	1*
10	Measuring Tape (L:100 m)	22	150	3,300	1*
11	Convex Tape (L:3-5m)	22	75	1,650	1*
12	Theodolite Set	2	6,000	12,000	
13	Auto Level Set	2	2,500	5,000	
14	Current Meter	2	4,900	9,800	
15	Camera	22	300	6,600	1*
				(Sub-total 732,510)	
III WEST NUSA TENGGARA PROVINCE[6 Kabupaten]					
1	4WD Vehicle	4	60,000	240,000	
2	Truck (Load 1.5-2.0 ton)	3	35,000	105,000	
3	Vehicle (Kijang Class)	5	30,000	150,000	
4	Motor Cycle (100-125cc Class)	16	4,000	64,000	2*
5	Type Writer	8	725	5,800	1*
6	Calculator	22	150	3,300	2*
7	Filing Cabinet	8	400	3,200	1*
8	Computer Set	1	8,000	8,000	
9	Measuring Tape (L:50 m)	10	80	800	1*
10	Measuring Tape (L:100 m)	10	150	1,500	1*
11	Convex Tape (L:3-5m)	10	75	750	1*
12	Theodolite Set	2	6,000	12,000	
13	Auto Level Set	2	2,500	5,000	
14	Current Meter	2	4,900	9,800	
15	Camera	10	300	3,000	1*
				(Sub-total 612,150)	
TOTAL COST:				2,016,900	

Note; \*:Numbers of Equipment in Each Kabupaten



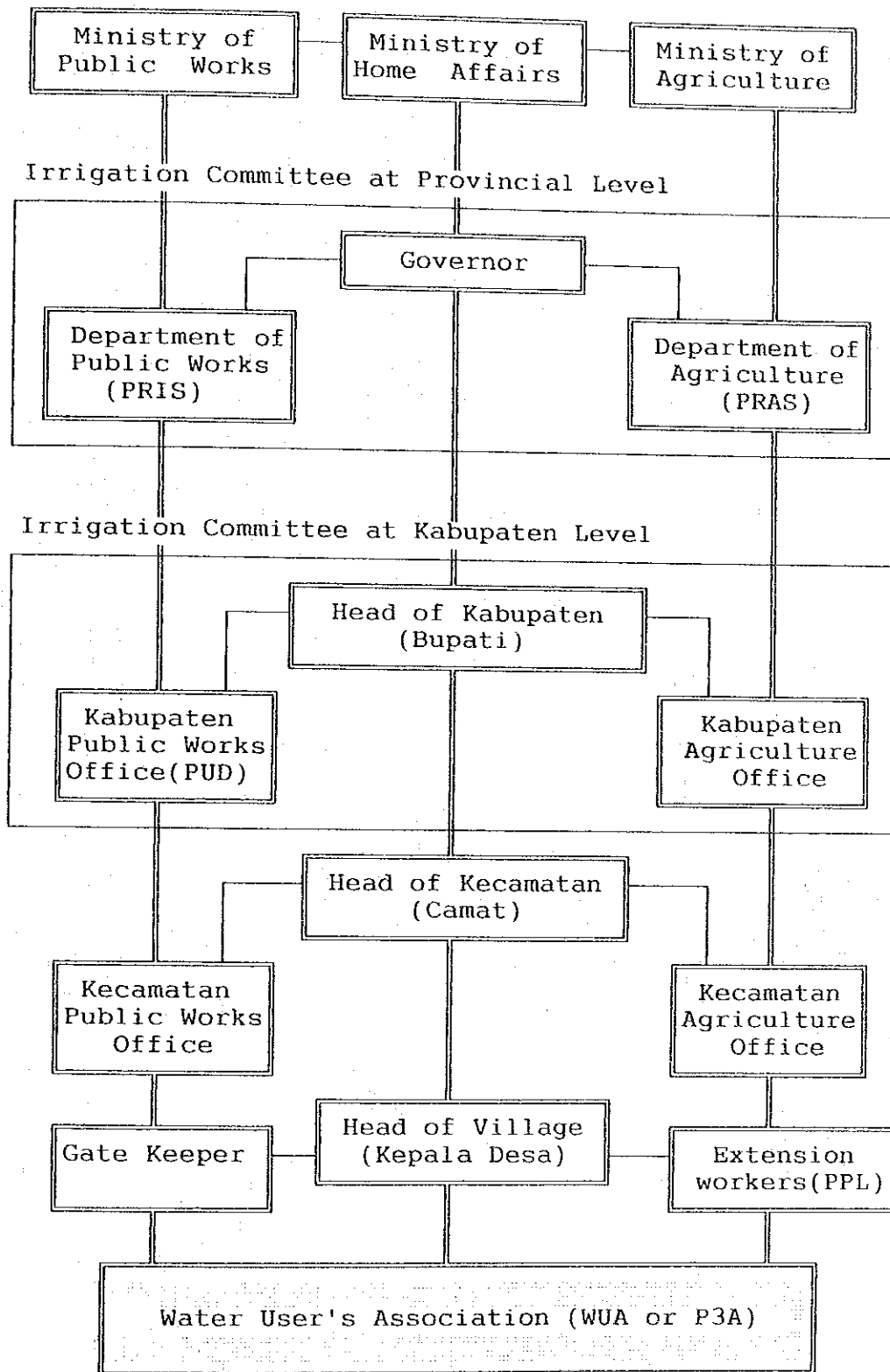
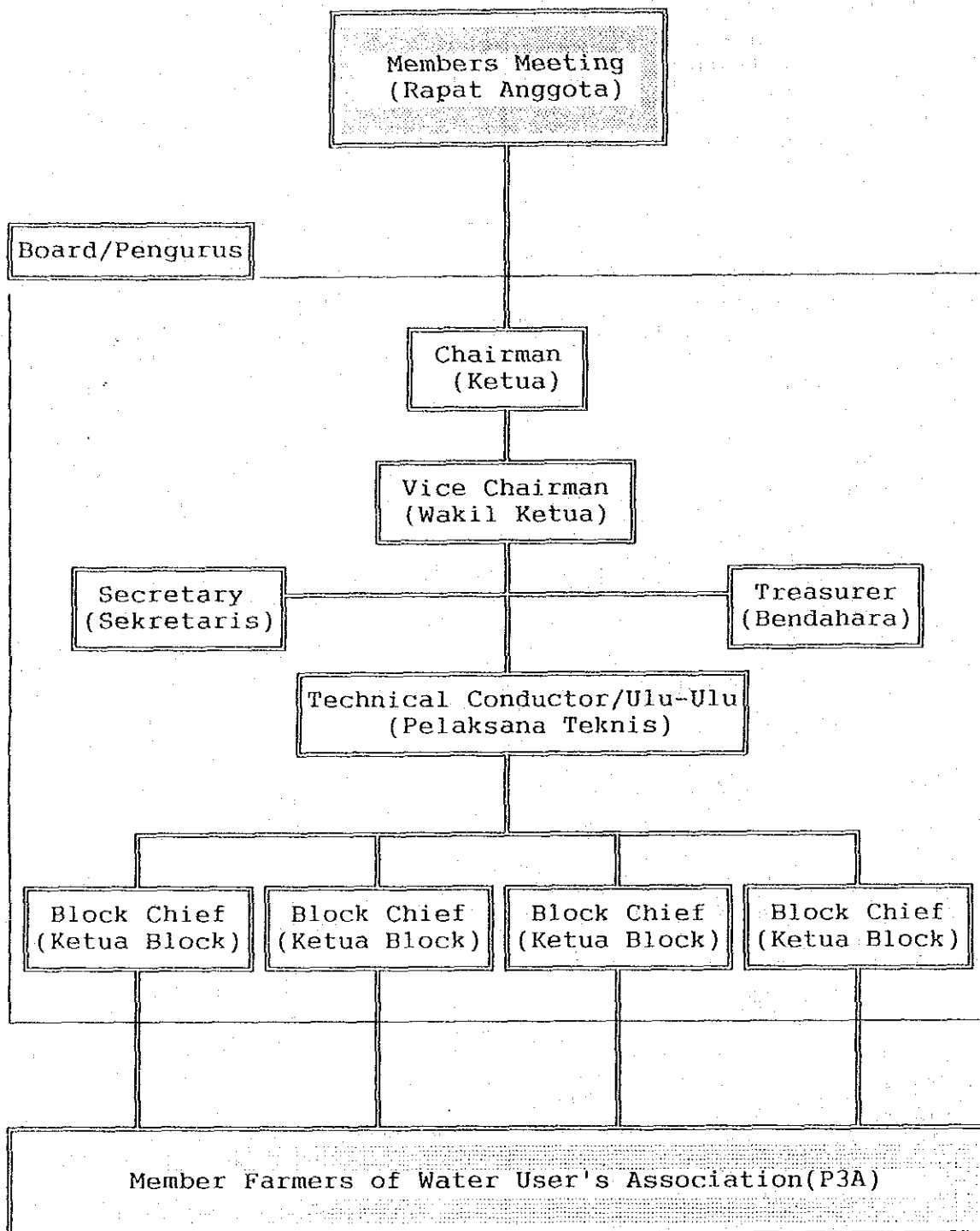


Fig. VII-1 O&M ORGANIZATION FOR IRRIGATION DEVELOPMENT PROJECTS



Source : Implementation Guidance of P3A Management in Appendix of the Presidential Instruction, No.2,1984.

Fig. VII-2 ORGANIZATION OF WATER USER'S ASSOCIATION(P3A)

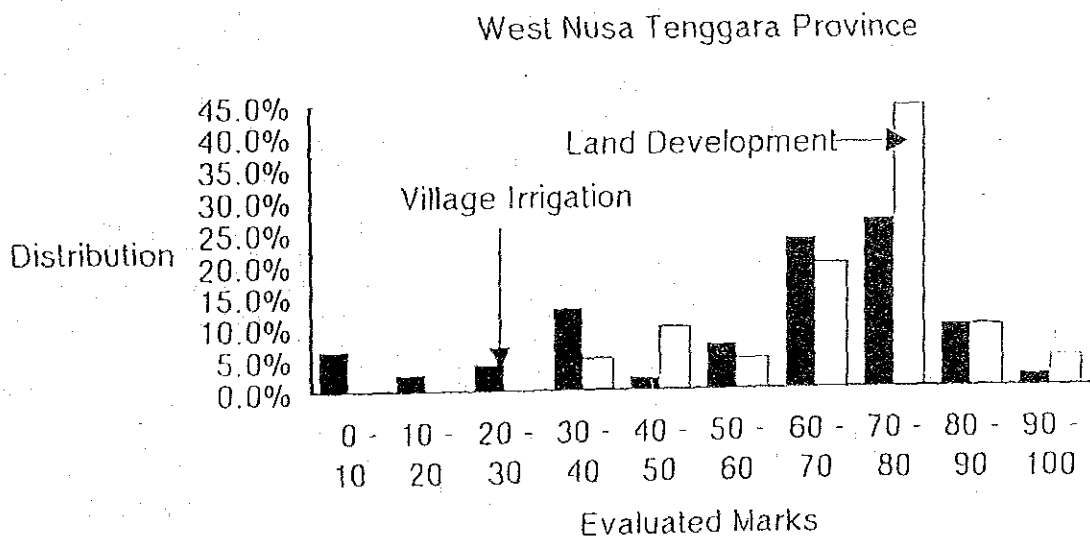
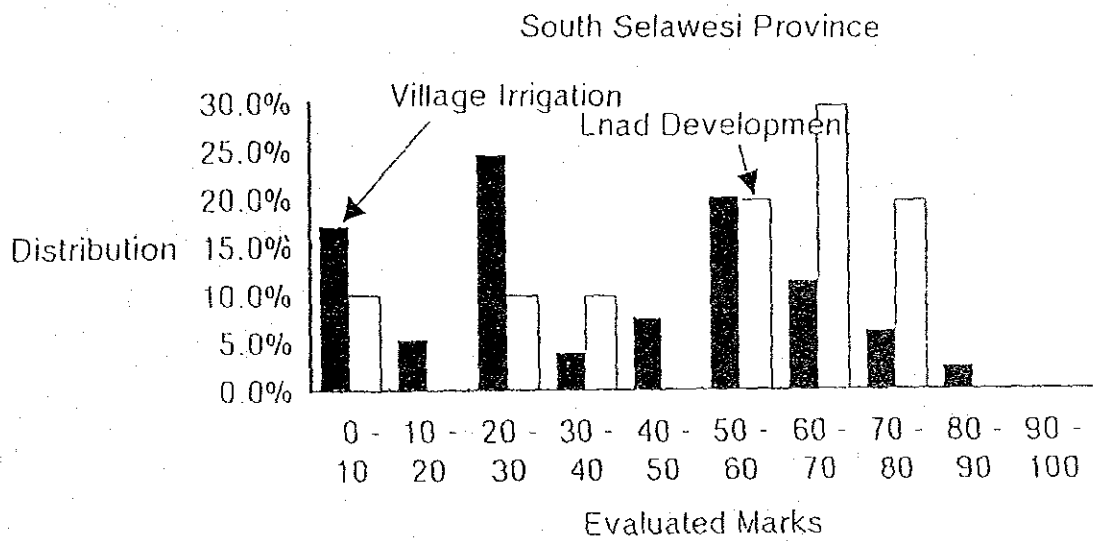
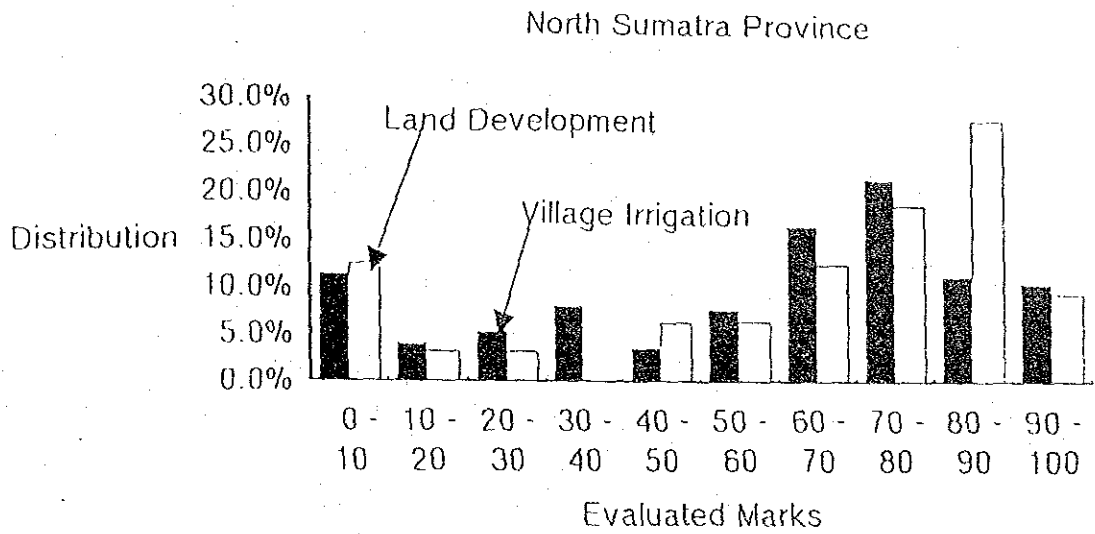
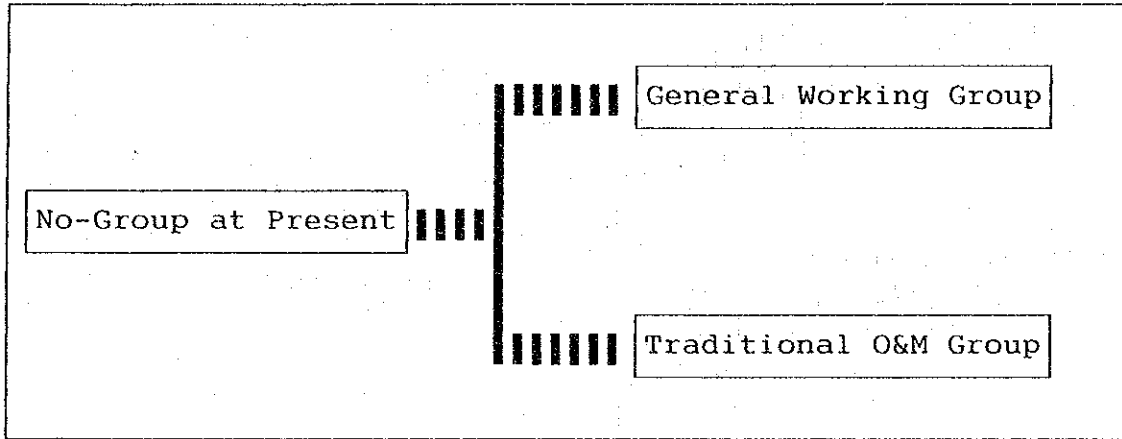
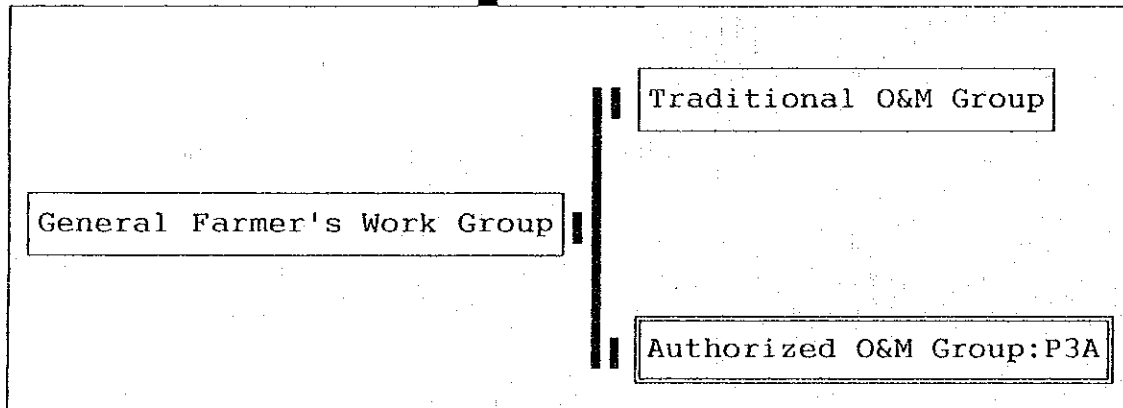


Fig. VII-3 DISTRIBUTION OF EVALUATED MARKS

Step-1



Step-2



Step-3

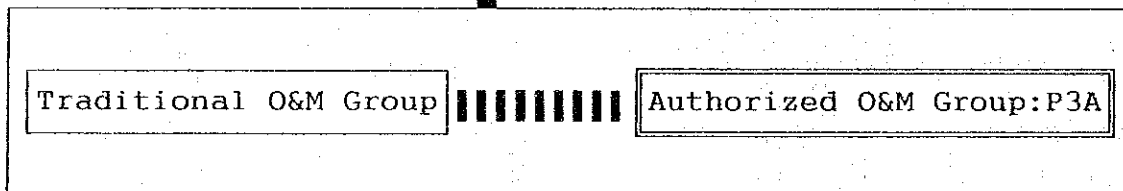


Fig. VII-4 IMPROVEMENT PLAN OF FARMER'S ORGANIZATION

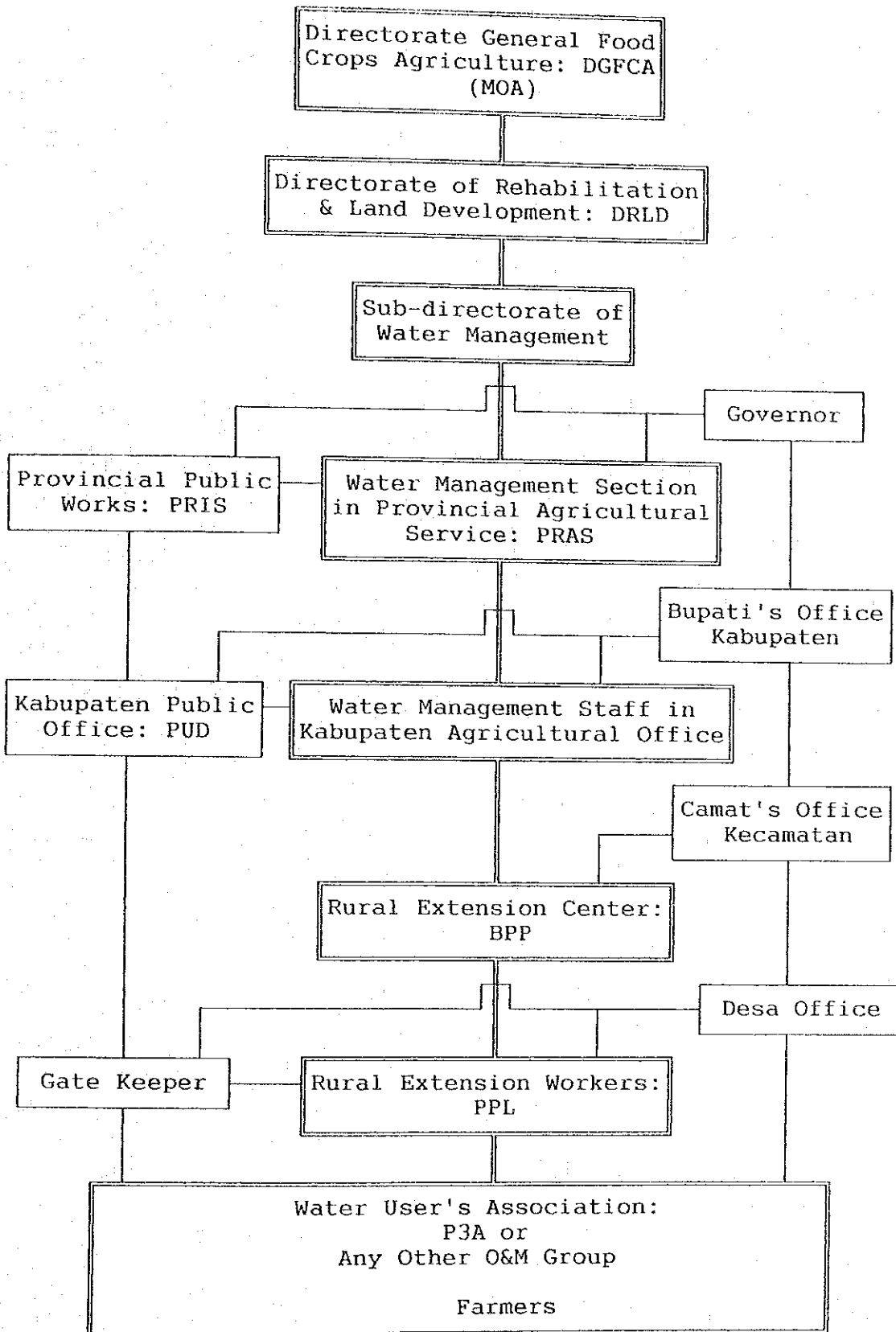


Fig. VII-5 PROPOSED ORGANIZATION FOR O&M IMPROVEMENT



**APPENDIX-VIII**

**COST ESTIMATE AND IMPLEMENTATION SCHEDULE**





## APPENDIX VIII COST ESTIMATE AND IMPLEMENTATION SCHEDULE

### 1. COST ESTIMATE

#### 1.1 Construction Cost

##### 1.1.1 Conditions

The construction cost is estimated based on the following conditions.

(1) The exchange rate used in the estimate is;

Yen 1.0 = Rp.15.5 (March 1992)

US\$ 1.0 = Rp.2,000 (March 1992)

= Yen 129

(2) Civil engineering works are to be carried out on the contract basis using contractor's own heavy construction machinery and equipment.

(3) Taxes on the construction materials, machinery and equipment to be imported from abroad are exempted from the estimated of construction cost.

(4) The construction cost comprises foreign and local currency portions. The local currency portion is estimated based on the current prices in North Sumatra Province, South Sulawesi Province and West Nusa Tenggara Province in September 1989 and the data collected from the on-going projects in the three provinces. The foreign currency portion is estimated based on the CIF prices at each provincial capitals referring to the FOB prices of materials, machinery and equipment in Japan in December 1989. The classification of local and foreign currency portions is defined as follows;

##### Local currency portion

- labor force,
- sand, gravel and wooden materials,
- raw cost for fuel, oil etc. and cement,
- inland transportation costs,
- contractors' general expenses and profit,
- expenses of engineering services for local consultant, and

- minor works.

Foreign currency portion

- reinforcement bar and other structural steel,
- cement excluding raw cost,
- fuel, oil etc. excluding raw cost,
- steel gates, diesel generators, motor and other metal works,
- depreciation costs for heavy construction machinery and equipment,
- vehicles to be required for construction supervision and O & M equipment for the project operation,
- contractors' general expenses and profit, and
- expense and fee of engineering services by foreign consultant.

(5) The physical contingency related to the construction quantities, around 5% of the direct cost, is included in the construction cost in view of the preliminary nature of the estimate. The price contingency; 0 % per annum for the foreign currency portion and 8 % per annum for the local currency portion, is also included in the project cost.

(6) To know the general condition of project cost for F/S schemes, project cost of 30 representative schemes are estimated in detail for example based on unit prices in the three provinces. Project cost for 795 F/S schemes are estimated using average unit cost which are decided considering the result of the representative schemes' cost estimation. Unit cost used in cost estimation for F/S Schemes are shown in below;

UNIT COST for 795 F/S SCHEMES

unit:1000Rp.

Gr.	L.D.Cost (/Ha)	Structures' Cost (/Ha)			Intake Facilities' Cost (/m or Ha)					
		NS	SS	NT	NS		SS		NT	
A1	900		1,500		-		-			-
A2	1,500		1,500		-		-			-
A3	1,000		1,500		-		-			-
A4	1,600		1,500		-		-			-
B1	1,300	1,200	900	900	N2,000	R400	N1,200	R400	N1,200	R600
B2	1,300	1,200	900	900	N2,000	R400	N1,200	R400	N1,200	R600
B3	1,300	1,200	900	900		400		400		400
B4	1,300	1,200	900	900	N2,000	R400	N1,200	R400	N1,200	R600
B5	1,300	1,200	900	900	N2,000	R400	N1,200	R400	N1,200	R600
B6	1,300	1,200	900	900		400		400		400
C1	-	1,200	900	900	N2,000	R400	N1,200	R400	N1,200	R600
C2	-	1,200	900	900	N2,000	R400	N1,200	R400	N1,200	R600
C3	-	1,200	900	900		400		400		400

Remarks; Intake cost in B1,B2,B4,B5,C1,C2 is per m in weir width  
Intake cost in B3,B6,C3 is per Ha (pumping irrigation)  
NS : North Sumatra  
SS : South Sulawesi  
NT : West Nusa Tenggara  
"N" before number means New Construction  
"R" before number means Rehabilitation

1.1.2 Estimate of Project Cost for Representative 30 Schemes

The total Project costs of representative 30 schemes projects are estimated at US\$ 2.55 million, which comprise US\$ 1.29 million equivalent of foreign currency and US\$ 1.26 million of local currency. The summary and breakdown of the cost estimate are shown in Table VIII- 4 through Table VIII- 6.

The prices of local materials and labor used in the estimate and unit rates for major works as shown in Table VIII-7 and Table VIII- 8 respectively.

1.2 Project Cost

The Project cost of recommended 340 schemes consists of Preparatory Works costs, Training costs, Institution costs, O&M Equipment costs, Land Acquisition costs, Administrative costs, Engineering Service costs, Physical Contingency costs, Value Added Tax, Price Escalation and Construction costs. Summary of the projects costs are shown bellows;

SUMMARY OF PROJECT COST FOR THE PROJECT SCHEMES  
(Unit;Million Rp.)

Division	F/C	Total L/C	Total
1. Preparatory Works	1,550	1,033	2,583
2. Civil Works	19,659	19,659	39,318
3. Training & Demonstration	145	827	972
4. Institutional Strengthening	298	128	426
5. O & M Equipment	1,833	203	2,036
6. Land Acquisition	0	426	426
7. Administration	0	1,966	1,966
8. Engineering Services	7,819	1,956	9,775
Sub Total (1-8)	31,304	26,198	57,502
9. Physical Contingency	1,565	1,310	2,875
Total	32,869	27,508	60,377
10. Value Added Tax		5,799	5,799
11. Price Escalation		13,472	13,472
GRAND TOTAL	32,869	46,779	79,648

(Million US\$)                                  16                                  23                                  40

Remarks ; 1 US\$ = Rp. 2,000 = YEN 129.0  
Price Index (Year 1992 = 100)

### 1.3 Annual Disbursement Schedule

The annual disbursement schedule is worked out based on the implementation schedule shown in Table VIII-10. The annual disbursement schedule is shown in Table VIII-11.

## 2. IMPLEMENTATION SCHEDULE

### 2.1 General

The plan of construction period is for five (5) years from 1994 to 1998, and loan period is for seven (7) years from 1993 to 2000.

The project work is divided into 4 working divisions which consist of preparatory works, civil works, training and post evaluation. The implementation schedule is shown in Table 8-1.

### 2.2 Preparatory works

Preparatory works consist of office arrangements in Jakarta and in each Provinces, and survey & investigation works.

The survey & investigation works should be completed by PRAS and PRIS in previous year to construction period which is inferred to be 1 year considering with the scale of each project.

### 2.3 Civil works

Civil works consist of land development and village irrigation projects. Civil works for 30 land development schemes including detailed design will be completed in 5 years from 1994 to 1998. Civil works for Village irrigation projects of 310 schemes will be carried out in 5 years from 1994 to 1998.

The work quantity is calculated from the result of inventory survey and detail survey of representative 30 area as shown in Table 8-2.

- (1) The construction period for each scheme is inferred to be one (1) year considering with the work quantity.
- (2) Major works of land development projects are clearing, leveling, formatting and new construction of on-farm canals.
- (3) Major works of village irrigation projects are rehabilitation or new construction of intake structure, canal and canal structures, and land development.

## 2.4 Training

It may be surmised that most of the districts in the objective schemes do not hold enough staff or technique required for implementation of the Project according to the result of the field survey. To realize the Project, it is necessary to hold staff required of agricultural service office of district, and to level up technical management on irrigation and drainage facilities, agricultural technique and facility management, and management ability for member of water management association, agricultural extension workers, and farmers. The Project is to rehabilitate the irrigation and drainage facilities in villages, and close and mutual understanding between the government and villages are required in order to carry out the Project. For this purpose, training of facilitator who arrange the view of the both parties should be made.

## 2.5 Post Evaluation

With the regard to monitoring and operational performance of the irrigation schemes and benefits achieved from the Project investment, the Project will support the establishment or strengthening of the Project Monitoring and Evaluation (PME) unit together with the engineers. Mainly the post evaluation should be carried out after around two years from completion of construction and rehabilitation work by each schemes. Project support will include provision of equipment and transportation facilities, and provision of consulting services and training as one of the strengthening of the institution.

Table VIII-1 SUMMARY OF PROJECT COST

Unit : Million Rp.

Item	LD Schemes		VI Schemes		Project Cost	
	F/C	L/C	F/C	L/C	F/C	L/C
1. Preparatory Works	119	79	198	954	2,385	2,583
2. Civil Work						
2.1 Land Development	1,689	1,690	3,379	1,317	2,634	3,006
2.2 Intake & Canal Structure	1,751	1,750	3,501	14,902	29,804	16,653
3. Training & Demonstration	11	64	75	763	897	145
4. Institutional Strengthening	23	10	33	118	393	298
5. O&M Equipments	141	15	156	1,692	1,880	1,833
6. Land Acquisition		33	33	393	393	426
7. Administration	600	344	344	1,622	1,622	1,966
8. Consulting Services	4,334	151	751	1,805	9,024	7,819
Total(1-8)	216	4,136	8,470	22,052	49,032	31,304
9. Physical Contingency	4,550	207	423	1,103	2,452	1,565
Total		4,343	8,893	23,155	51,484	32,869
10. Value Added Tax		852	852	4,947	4,947	5,799
11. Price Escalation		1,991	1,991	11,481	11,481	13,472
Grand Total	4,550	7,186	11,736	28,319	67,912	32,869
				39,593	67,912	46,779
						79,648

Price index : 1992=100

1Us\$ = Rp. 2,000 = ¥129.0