

Table IV-7 Planted Area of Major Crops in 1967 and 1979-1991

(Unit : 1,000 ha)

Year	Rice	Maize	Cassava	Sweet potato	Mung beans	Ground nut	Soybean	Sesame	Sugar cane	Jute	Cotton	Tobacco	Black pepper	Other crops total	Total
1967	2,514	117	2	1	48	23	8	15	5	8	4	17	1	249	2,763
1979	775	75	32	17	-	-	-	-	-	-	-	-	-	124	899
1980	1,443	101	38	19	16	4	5	7	1	0.2	0.2	-	-	191	1,634
1981	1,482	85	24	16	39	10	3	6	2	1	0.2	9	0	195	1,677
1982	1,622	61	14	9	37	8	3	8	8	1	0.3	9	0	158	1,780
1983	1,690	50	11	5	40	10	5	10	9	2	0.3	9	0	151	1,841
1984	1,450	48	7	5	35	6	5	9	7	1	0.5	12	0	136	1,586
1985	1,702	46	9	5	39	9	10	12	8	2	1	11	0.1	152	1,854
1986	1,708	43	9	7	26	6	7	14	7	3	1	11	0.1	134	1,842
1987	1,428	39	22	17	29	5	11	16	7	5	1	12	0.1	164	1,592
1988	1,858	50	27	8	44	9	12	11	7	3	1	12	0.2	184	2,042
1989	1,861	49	10	7	26	5	13	12	7	2	0.2	11	0.2	142	2,003
1990	1,890	45	11	8	25	6	15	9	6	2	1	16	0.3	144	2,034
1991	1,819	46	11	9	27	6	14	10	7	1	0.1	17	0.2	148	1,967
1991(%)	92.5	2.3	0.6	0.5	1.4	0.3	0.7	0.5	0.4	0.1	0.0	0.9	0.0	7.5	100.0

Data source : Situation and Objective of Agricultural Development Policies (in Khmer), MAFF.

Table IV-8 Production of Major Crops in 1967 and 1979-1991

(Unit: 1,000 ton)

Year	Rice	Maize	Cassava	Sweet potato	Mung beans	Ground nut	Soybean	Sesame	Sugar cane	Jute	Cotton	Tobacco	Black pepper	Other crops total
1967	2,457	150	23	13	25	21	7	10	380	2	3	10	2	646
1979	538	80	187	51	-	-	-	-	-	-	-	-	-	318
1980	1,564	101	239	60	10	2	3	1	40	0.2	0.1	-	-	456
1981	1,352	85	144	48	21	6	1	3	56	0.5	0.2	4	0	369
1982	1,646	51	75	71	18	5	1	3	240	0.5	0.2	4	0	469
1983	1,617	35	42	16	20	7	2	4	300	1	0	5	0	432
1984	1,385	48	31	13	16	3	3	4	190	1	0.2	5	0	314
1985	1,996	42	17	16	21	5	13	6	169	3	0.3	5	0.1	297
1986	2,224	50	63	27	16	4	7	7	154	4	1	6	0	339
1987	1,814	47	116	98	23	5	5	8	164	8	0.4	6	0.1	481
1988	2,520	41	267	77	22	4	9	3	138	3	0.1	7	0.3	571
1989	2,233	54	64	24	17	6	12	6	245	2	0.3	5	0.3	436
1990	2,500	88	60	21	12	3	20	4	256	2	0	4	0.3	470
1991	2,230	43	56	39	17	4	22	8	145	1	0	8	0.3	343

Data source: Situation and Objective of Agricultural Development Policies (in Khmer), MAFF.

Table IV-9 Fish Products and Growth Index

<Fish Products>	(,000 ton)							
Quota	1980	1985	1986	1987	1988	1989	1990	1991
Total	19.60	70.60	73.60	82.10	86.80	76.00	111.40	117.80
Fresh water product	18.40	56.40	64.20	62.20	61.20	50.50	65.10	74.70
Rearing product	-	3.00	2.20	2.50	4.60	5.50	6.40	6.70
Sea product	1.20	11.20	7.20	17.40	21.00	20.00	39.90	36.40

<Growth Index>	1980=100							
Quota	1980	1985	1986	1987	1988	1989	1990	1991
Total	100	360	376	419	443	418	568	601
Fresh water product	100	307	349	338	333	274	354	406
Rearing product	100	-	-	-	-	-	-	-
Sea product	100	933	600	450	1750	2167	3325	3033

Source : Statistics Book 1980-1991, Ministry of Planning

Table IV-10 Livestock Raising 1961-1991

(Unit : 1,000 heads)

Year	Cattle	Buffalo	Pig	Chicken/duck	Draught ox	Draught buff.
1961	1,240	435	671	2,802		
1962	1,322	471	689	2,927		
1963	1,403	512	846	3,495		
1964	1,530	579	935	3,376		
1965	1,535	620	976	4,193		
1969	2,300	900				
1979	735	350	50	872		
1980	772	375	131	2,442	562	277
1985	1,560	613	1,203	6,398	780	425
1986	1,705	635	1,161	7,347	786	452
1987	1,852	659	1,251	7,164	893	453
1988	1,947	675	1,531	9,171	910	525
1989	2,098	740	1,741	8,720	936	466
1990	2,235	737	1,516	8,164	1,017	483
1991	2,323	766	1,630	8,376	1,090	494

Data source : Statistics Book 1980 - 1991, Statistics Department, Ministry of Planning, 1993.

From 1961 - 1965 is based on Agricultural Development in Cambodia (mimeo),

Asian Economic Research Institute, 1971.

Figures for 1969 and 1979 are from MAFF.

Table IV-11 Rice Production by Province

(Unit : 1,000 ton)

Province/city	1980	1985	1986	1987	1988	1989	1990	1991	Average*
I- Plain region									
1-Phnom Penh	3.0	5.0	13.0	16.0	15.0	13.0	16.4	19.0	13.9
2-Kandal	97.0	147.0	140.0	142.0	118.0	129.0	164.6	177.0	145.4
3-Kompomg Cham	195.0	169.0	234.0	187.0	236.0	269.5	261.3	256.6	230.5
4-Svay Rieng	87.0	108.0	146.0	91.0	156.0	145.1	143.0	154.0	134.7
5-Prey Veng	202.0	228.0	320.0	244.0	267.0	282.5	388.4	275.0	286.4
6-Takeo	166.0	193.0	268.0	226.0	269.0	338.5	284.2	292.6	267.3
Sub total	750.0	850.0	1,121.0	906.0	1,061.0	1,177.6	1,257.9	1,174.2	1,078.2
(51.6%)									
II- Tonle Sap Lake Region									
1-Kompomg Thom	130.0	92.0	109.0	116.0	105.0	145.0	135.3	149.3	121.7
2-Siem Reap	173.0	160.0	159.0	131.0	130.0	173.3	137.1	169.0	151.3
3-Banteay menchey					129.0	126.2	97.1	226.0	144.6
4-Battambang	303.0	232.0	270.0	264.0	120.0	188.2	119.0	125.0	188.3
5-Pursat	39.0	84.0	69.0	53.0	113.0	73.0	83.0	99.0	82.0
6-Kompomg Chhnang	46.0	57.0	74.0	47.0	68.0	65.4	90.2	96.0	71.1
Sub-total	691.0	625.0	681.0	611.0	665.0	771.1	661.7	864.3	697.0
(33.4%)									
III- Coastal region									
1-Kompomg Som	13.0	14.0	12.0	16.0	12.0	15.0	12.0	15.0	13.7
2-Kompot	93.0	140.0	113.0	140.0	170.0	99.2	80.8	148.0	127.3
3-Koh Kong	10.0	11.0	6.0	5.0	4.0	7.1	4.0	7.5	6.4
Sub-t-tal	116.0	165.0	131.0	161.0	186.0	121.3	96.8	170.5	147.4
(7%)									
IV- Plateau & mountain region									
1-Kompomg speu	95.0	78.0	64.0	52.0	78.0	110.0	41.0	87.0	72.9
2-Preah Vihear	13.0	20.0	22.0	18.0	16.0	19.0	25.0	10.4	18.6
3-Stung Treng	10.0	13.0	14.0	11.0	12.0	10.5	15.0	16.2	13.1
4-Rataanakiri	11.0	19.0	13.0	10.0	12.0	13.1	16.0	18.0	14.4
5-Mondulkiri	3.0	9.0	5.0	5.0	4.0	8.0	7.0	5.4	6.2
6-Kratie	28.0	33.0	42.0	41.0	40.0	47.1	47.2	44.0	42.0
Sub-total	160.0	172.0	160.0	137.0	162.0	207.7	151.2	181.0	167.3
(8%)									
National total	1,717.0	1,812.0	2,093.0	1,815.0	2,074.0	2,277.7	2,167.6	2,390.0	2,089.9

* Average is of from 1985 to 1991.

Source: Statistics Book 1980-1991, Ministry of Planing.

Table IV-12 Major Disease of Livestock Identified in Cambodia

Cattle & Buffalo	Pigs	Poultry
Virus disease:		
Foot and Mouth*	Swine fever	Newcastle
Rinder pest**	Swine pox	Fowl pox
		Marek's
		Infectious bronchitis
		Duck plague
Bacterial disease:		
Hemorrhagic septicaemia*	Erysipelas	Fowl cholera
Anthrax*	Pasteurellosis	
Black leg*	Bacterial diarrhoeas	
Tuberculosis	Salmonellosis	
	Leptospirosis	
Rickettsial and Protozoal disease:		
Anaplasmosis		Coccidiosis
Babesiosis		
External parasites:		
Cattle tick	Mange	Lice
	Lice	Mite
Internal parasite:		
Liverfluke	Ascarids	Ascarids
Nematodes	Strongyles	Strongyles
- Neoascaris	Trichonella	Tape worm
- Strongyles		

* Coered by vaccination programme.

** Last record in the 1970's, no vaccination programme at present.

Data source DAPH.

Table IV-13(1/2) Present Land Use in Kandal Stung Study Area (ha)

Land units	Land use Categories	Gross area (ha)	Villages, roads, etc.		Wet season rice		Wet season upland crops		Cattle grazing, or unused	
			(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)
Hc	Vr	375	60	225	10	38	10	38	20	75
Hs	Vr	755	20	151	5	38	10	76	65	491
A1	Vp	1,430	15	215	75	1,073	5	72	5	72
Hy	Vp	167	80	134	10	17	10	17	0	0
Le	Vc	344	50	172	10	34	10	34	30	103
Ht	Cb	330	0	0	10	33	0	0	90	297
Le	Cb	459	50	230	10	46	10	46	30	138
O1	P1	760	0	0	95	722	0	0	5	38
Y1	P1	1,435	0	0	95	1,363	0	0	5	72
O2	Ps	1,511	5	76	85	1,284	0	0	10	151
O3	Ps	0	0	0	0	0	0	0	0	0
Y2	Ps	2,451	5	123	90	2,206	0	0	5	123
Lw	Pw	428	0	0	90	385	0	0	10	43
Ls	Sp	138	0	0	0	0	0	0	100	138
Le	Fb	344	50	172	10	34	10	34	30	103
Ls	O	138	0	0	0	0	0	0	100	138
La	O	235	0	0	0	0	0	0	100	235
Total		11,300	13	1,496	64	7,273	3	316	20	2,216

Table IV-13(2/2) Present Land Use in Tonle Bati Study Area (ha)

Land units	Land use Categories	Gross area (ha)	Villages, roads, etc.		Wet season rice		Wet season upland crops		Cattle grazing, or unused	
			(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)
Hc	Vr	360	60	216	20	72	10	36	10	36
Hs	Vr	0	0	0	0	0	0	0	0	0
A1	Vp	0	0	0	0	0	0	0	0	0
Hy	Vp	0	0	0	0	0	0	0	0	0
Le	Vc	84	10	8	10	8	5	4	75	63
Ht	Cb	0	0	0	0	0	0	0	0	0
Le	Cb	112	10	11	10	11	5	6	75	84
O1	P1	2,895	0	0	95	2,750	0	0	5	145
Y1	P1	0	0	0	0	0	0	0	0	0
O2	Ps	0	0	0	0	0	0	0	0	0
O3	Ps	1,738	5	87	85	1,477	0	0	10	174
Y2	Ps	792	10	79	85	673	0	0	5	40
Lw	Pw	185	0	0	50	93	0	0	50	93
Ls	Sp	225	0	0	0	0	0	0	100	225
Le	Fb	84	10	8	10	8	5	4	75	63
Ls	O	225	0	0	0	0	0	0	100	225
La	O	200	0	0	0	0	0	0	100	200
Total		6,900	6	410	74	5,093	1	50	20	1,347

Table IV-14 Achievement of Cultivated Area of Rice in Kandal Stung Study Area (1993*)

Commune	(1)Nursery area				(2)Transplanted area				(3)Direct seeded area				(2+3)Grand total area (ha)
	IR36		Total		IR36		Total		Deep water		Total		
	4 months	6 months	variety	area	4-month	6-month	6-month	6-month	6-month	6-month	6-month	6-month	
2 Prek Roka	4	67	77	148	16	402	200	618	0	0	0	0	618
3 Kok Trap	6	52	23	81	37	310	210	557	0	0	0	0	557
4 Trea	4	69	13	86	17	414	200	631	0	0	0	0	631
5 Bakou	5	36	26	67	20	218	162	400	0	0	0	0	400
9 Preah Put	9	37	16	62	34	219	125	378	0	0	0	0	378
12 Anlong Romiet	8	26	13	47	30	156	81	267	0	0	0	0	267
14 Tien	0	33	23	56	0	195	200	395	0	0	0	0	395
18 Kong Noy	1	25	10	36	4	147	50	201	0	0	0	0	201
19 Thmey	0	41	17	58	0	244	170	414	0	0	0	0	414
20 Trapeang Veng**	0	54	28	82	0	322	134	457	0	0	0	0	457
21 Spean Thmar	9	51	32	92	34	308	146	488	32	29	61	0	549
22 Roluos	9	36	18	63	34	217	159	410	0	0	0	0	410
23 Tbeng**	0	23	8	31	0	137	81	218	0	0	0	0	218
Total	55	549	304	909	226	3,289	1,918	5,433	32	29	61	0	5,494
%	6	60	33	100	4	60	35	99	0.6	0.5	1.1	0	100

Data source is Kandal Steung district Office.

* The data cover the period from May to October 15, 1993.

** These figures are 80 and 30 % of Trapeang Veng and Tbeng, respectively, according to their area included to the study area.

Table IV-15 Cultivated Area of Rice in Tonle Bati Study Area (1992-93)**

	Commune	Area of Rice Field*	Early*	Medium	Late	Dry season		Double*** cropping
						Ordinary	Receding	
1	Krang Thnoug	1,460	0	1,220	240	30	0	30
2	Cham Pei	720	70	580	140	0	100	70
3	Kandang****	360	65	22	80	0	0	65
4	Put Sar	1,460	100	1,170	290	0	500	100
5	Trapieng Sap****	220	15	180	45	0	0	15
	Total	4,220	250	3,172	795	30	600	280
	%	100	6	75	19	0.7	-	7

* Obtained from District Office and adjusted by confirmation with chief of commune.

** The cultivated area of rice in each season is obtained through interviews to chief of each commune.

*** The area for double cropping is early rice or dry season rice followed by medium or late rice.

**** These figures are of 50 % of Champei and Kandang and 25 % of Trapieng Sap, respectively, according to their area included to the study area.

**Table IV-16 Inputs Requirement
for Present Rice Farming Practice in Study Area**

			(Inputs/ha)
Operation Items	Kind of input	Unit	Quqntity
1	Nursery preparation:		
	Labor	man/day	4
	Cattle	harrow/day	1
	Manure	kg	1,200-2,400
	Fertilizers (16:20:0)	kg	20-40
	Seed	kg	50-60
2	Plowing		
	Labor	man/day	14
	Cattle	harrow/day	14
3	Fertilizing		
	Labor	man/day	4
	Urea	kg	50
	16:20:00	kg	100
	Manure	kg	1,800
4	Harrowing		
	Labor	man/day	7
	Cattle	harrow/day	7
5	Transplanting	man/day	30
6	Weeding	man/day	6
7	Water and field management	man/day	7
8	Harvesting	man/day	15-20
9	Transportation	man/day	6
		cattle-cart/day	6
10	Threshing	man/day	15
11	Plant protection		
	Labor	man/day	2
	Chemicals	liter	1

Data source : A Baseline Survey of Rainfed Lowland Rice Culture in Cambodia,
IRRI-Cambodia Projct,1991. Adjusted based on the interviews to farmers.

**Table IV-17 Planted Area and Production of Upland Crops
in Kandal Stung Study Area (1989)**

Khum	Maize*		Sugar cane		Casterbean		Cassava		Sweet Potato		Total planted area
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	
	(ha)	(t)	(ha)	(t)	(ha)	(t)	(ha)	(t)	(ha)	(t)	(ha)
2 Prek Roka	2	2.3	1	45	1	1	1	6	3	11	8
3 Kok Trap	2	2.3	1	45	0	0	1	6	2	7	6
4 Trea	2	2.3	0	0	1	1	1	6	2	7	6
5 Bakou	1	1.2	0	0	2	2	0	0	2	7	5
9 Preah Put	2	2.3	1	45	0	0	0	0	2	7	5
12 Anlong Romiet	1	1.2	1	45	2	2	0	0	2	7	6
14 Tien	1	1.2	0	0	0	0	0	0	2	7	3
18 Kong Noy	1	1.2	0	0	0	0	0	0	8	28	9
19 Thmey	2	2.3	1	45	2	2	1	6	5	18	11
20 Trapeang Veng	3	3.5	1	45	2	2	1	6	5	18	12
21 Spean Thmar	1	1.2	0	0	1	1	0	0	2	7	4
22 Roluos	1	1.2	0	0	0	0	0	0	2	7	3
23 Tbeng	3	3.5	1	45	2	2	2	12	6	21	14
Total	22	25.3	7	315	13	13	7	42	43	151	92

Data source is Kandal Stung district Office.

Table IV-18. Number of Sugar Palm Trees and Production of Sugar in the Study Area (1991)

Commune	No. of Tree in Production	Production** (ton)	No. of Family	Average/Family	
				No. of Tree	Production (kg)
Kandal Stung Area					
2 Prek Roka	6,130	153	682	9.0	225
3 Kok Trap	2,405	60	728	3.3	83
4 Trea	4,930	123	846	5.8	146
5 Bakou	1,215	30	618	2.0	49
9 Preah Put	1,215	30	364	3.3	83
12 Anlong Romiet	740	19	451	1.6	41
14 Tien	0	0	373	0.0	0
18 Kong Noy	1,215	30	220	5.5	138
19 Thmey	4,930	123	258	19.1	478
20 Trapeang Veng	7,530	188	355	21.2	530
21 Spean Thmar	0	0	448	0.0	0
22 Roluos	0	0	412	0.0	0
23 Tbeng	9,930	248	557	17.8	446
Sub-total	40,240	1,006	6,312	6.4	159
Bati Area					
1 Krang Thnung	250	6	1,154	0.2	5.4
2 Champei	0	0	875	0.0	0.0
3 Kandang	520	13	905	0.6	14.4
4 Put Sar	0	0	905	0.0	0.0
5 Trapieng Sap	6,860	172	2,113	3.2	81.2
Sub-total	7,630	191	5,952	1.3	32.0
Grand total	47,870	1,197	12,264	-	-

Data source : Kandal Stung and Bati District Offices.

* The production is estimated on the basis of 25 kg per tree per year.

Table IV-19 Number of Livestock in Kandal Stung District (1979-1990)

(unit : head)

Year	Cattle		Buffalo		Pig		Chicken/duck	
	(increase %/year)		(increase %/year)		(increase %/year)		(increase %/year)	
1979	6,007		183		1,050		15,805	
1980	10,860	81	161	-12	1,208	15	24,871	57
1981	12,306	13	92	-43	6,783	462	52,331	110
1982	13,457	9	47	-49	9,605	42	58,808	12
1983	13,869	3	34	-28	10,089	5	78,800	34
1984	16,648	20	21	-38	11,198	11	82,052	4
1985	16,545	-1	12	-43	8,255	-26	72,885	-11
1986	18,742	13	17	42	9,611	16	77,985	7
1987	20,143	7	16	-6	7,627	-21	88,087	13
1989	25,597	27	9	-44	10,680	40	87,663	0
1990	25,824	1	9	0	10,673	0	129,187	47

Data source: Kandal Stung District Office.

Table IV-20 Number of Livestock in Kandal Stung District (1993)

(Unit : Head)

Khum	Cattle for draft			Cattle <3years			Swine				Poultry		
	Ox	Cow	Total	Ox	Cow	Total	Boar	Sow	Pig for market	Piglet	Total	Chicken	Duck
1 Doeum Rus	962	938	1,900	705	692	1,397	5	19	885	62	971	15,487	428
2 Prek Roka	357	392	749	215	234	449	6	16	460	35	517	5,267	372
3 Kok Trap	512	496	1,008	618	536	1,154	7	17	580	25	629	5,535	382
4 Trea	302	364	666	164	186	350	6	21	710	64	801	7,095	264
5 Bakou	284	218	502	207	188	395	3	9	456	25	493	4,482	219
6 Rokar	276	213	489	120	192	312	4	7	481	22	514	2,394	84
7 Rolean Ken	586	392	978	238	207	445	7	12	596	42	657	2,367	276
8 Ampil Prey	712	621	1,333	307	342	649	5	14	693	38	750	4,997	562
9 Preah Put	526	464	990	242	175	417	2	6	327	34	369	2,182	96
10 Sienreap	498	567	1,065	219	242	461	5	18	395	29	447	2,936	195
11 Choeng Koeup	314	302	616	148	205	353	4	14	583	35	636	6,243	130
12 Anlong Romiet	464	627	1,091	286	291	577	6	15	492	28	541	3,755	169
13 Kandok	252	236	488	185	128	313	7	17	638	20	682	5,862	392
14 Tien	535	622	1,157	316	325	641	4	8	412	23	447	4,286	138
15 Prek Sieng	466	457	923	244	201	445	5	16	354	34	409	3,829	336
16 Baeng Kyang	408	428	836	204	205	409	7	22	593	47	669	4,964	572
17 Prek Kampus	226	235	461	102	117	219	4	19	571	35	629	2,389	220
18 Kong Noy	164	256	420	98	102	200	2	4	264	18	288	2,675	88
19 Thmey	248	362	610	201	192	393	3	8	392	22	425	2,682	56
20 Trapeang Veng	488	625	1,113	347	262	609	2	6	510	16	534	2,210	58
21 Spean Thmar	284	396	680	208	190	398	3	7	275	30	315	7,010	118
22 Roluos	570	614	1,184	302	308	610	2	4	254	24	284	1,790	40
23 Tbeng	226	231	457	143	97	240	5	12	526	38	581	5,902	132
Total	9,660	10,056	19,716	5,819	5,617	11,436	104	291	11,447	746	12,588	106,339	5,327

Data source : Kandal Stung District Office.

Table IV-21 Number of Livestock in Kandal Stung Study Area (1993)

(Unit : Head)

Commune	Cattle for draft				Cattle				Poultry Family			No./family				
	Ox		Cow		Cattle <3years		Cattle		Pig	Poultry	Family	No.	Draft	Total	Pig	Poultry
	Ox	Cow	Ox	Cow	Ox	Cow	Total	Total								
2 Prek Roka	357	392	749	215	234	449	1,198	517	5,639	682	1.1	1.8	0.8	8.3		
3 Kok Trap	512	496	1,008	618	536	1,154	2,162	629	5,917	728	1.4	3.0	0.9	8.1		
4 Trea	302	364	666	164	186	350	1,016	801	7,359	846	0.8	1.2	0.9	8.7		
5 Bakou	284	218	502	207	188	395	897	493	4,701	618	0.8	1.5	0.8	7.6		
9 Preah Put	526	464	990	242	175	417	1,407	369	2,278	364	2.7	3.9	1.0	6.3		
12 Anlong Romiet	464	627	1,091	286	291	577	1,668	541	3,942	451	2.4	3.7	1.2	8.7		
14 Tien	535	622	1,157	316	325	641	1,798	447	4,424	373	3.1	4.8	1.2	11.9		
18 Kong Noy	164	256	420	98	102	200	620	288	2,763	220	1.9	2.8	1.3	12.6		
19 Thmey	248	362	610	201	192	393	1,003	425	2,738	258	2.4	3.9	1.6	10.6		
20 Trapeang Veng	488	625	1,113	347	262	609	1,722	510	2,268	410	2.7	4.2	1.2	5.5		
21 Spean Thmar	284	396	680	208	190	398	1,078	315	7,128	448	1.5	2.4	0.7	15.9		
22 Roluos	570	614	1,184	302	308	610	1,794	284	1,830	412	2.9	4.4	0.7	4.4		
23 Tbeng	226	231	457	143	97	240	697	526	6,034	557	0.8	1.3	0.9	10.8		
Total	4,960	5,667	10,627	3,347	3,086	6,433	17,060	7,319	63,967	6,367	1.6	2.7	1.1	10.0		

Data source : Kandal Stung District Office.

Table IV-22 Number of Livestock in Tonle Bati Study Area

Year	Commune	Cattle>3year		<3year	Swine			Poultry	
		Ox	Cow	Total	Sow	Total	Chicken	Duck	
1990	Champey	1,619	617	572	2,236	210	1,220	5,886	2,522
	Put Sar	2,240	1,337	1,419	4,996	28	1,138	7,872	2,232
	Krang Thnung	920	764	1,035	2,719	18	706	5,494	1,128
	Kandang	910	835	485	2,230	125	713	9,898	1,345
	Trapieng Sap	2,498	1,254	1,633	5,385	119	2,319	15,974	1,547
	Total	8,187	4,807	4,572	17,566	500	6,096	45,124	8,774
1991	Champey	1,219	618	339	2,176	210	1,220	5,449	2,122
	Put Sar	2,240	1,237	1,519	4,996	28	1,138	7,872	128
	Krang Thnung	920	764	1,029	2,713	18	706	5,494	315
	Kandang	910	835	985	2,730	125	731	5,892	547
	Trapieng Sap	2,478	1,254	1,653	5,385	119	2,319	15,974	259
	Total	7,767	4,708	5,525	18,000	500	6,114	40,681	3,371
1992	Champey	828	444	540	1,812	111	995	8,303	6,355
	Put Sar	2,090	1,348	933	4,371	80	813	5,600	1,300
	Krang Thnung	1,164	915	850	2,929	50	901	6,500	550
	Kandang	720	914	717	2,351	125	807	7,725	650
	Trapieng Sap	3,241	1,295	934	5,470	74	1,810	16,024	547
	Total	8,043	4,916	3,974	16,933	440	5,326	44,152	9,402
1993	Champey	856	605	659	2,120	113	1,010	5,306	1,500
	Put Sar	2,100	1,300	985	4,385	100	1,051	5,700	1,500
	Krang Thnung	1,170	900	873	2,943	80	781	3,500	600
	Kandang	750	500	1,121	2,371	530	837	8,500	400
	Tapieng Sap	3,560	1,296	523	5,379	150	1,812	1,700	206
	Total	8,436	4,601	4,161	17,198	973	5,491	24,706	4,206

Number of Animal per Family (1993)

	Family No	Ox	Total Cattle	Pig	Poultry
Champey	875	1.0	2.4	1.2	7.8
Put Sar	1,371	1.5	3.2	0.8	5.3
Krang Thnung	1,154	1.0	2.6	0.7	3.6
Kandang	905	0.8	2.6	0.9	9.8
Trapieng Sap	2,113	1.7	2.5	0.9	0.9
Total	6,418	1.2	2.7	0.9	4.5

Data source : Bati District Office.

Table IV-23 Number of Cattle Vaccinated in and around Study Area

(1) Kandal Stung Study Area (Program for Vaccination in 1994)

Commune	Plan	Coverage
Rolean Ken	1,730	
Rokar	958	
Doem Ros	1,805	
Tbeng	1,218	
Spean Thmar	557	
Total	6,268	20%

Total number of commune in the District is 23, and the total number of cattle in 1993, was about 31,200 heads.

Data source is Agricultural Office of Kandal Stung District.

(2) Tonle Bati Study Area (Number of Cattle Vaccinated)

	1991	coverage	1992	coverage	1993	coverage	1994*	Coverage
Total no. of cattle**	40,611	%	41,604	%	43,794	%		%*
Black leg***	14,135	35	7,838	19	0	0	2,771	6
Hemorrhagic S.***	1,935	5	5,311	13	3,334	8	13,352	30
FMD***	5,908	15	4,495	11	1,730	4	3,424	8
Anthrax***	0	0	1,200	3	0	0	1,832	4

* Program, coverage is estimated the number of livestock in 1993.

** Data source is Agricultural Office of Takeo Province.

*** Data source is Agricultural Office of Bati District.

Table IV-24 (1/2) Average Farm Size and Family Size in Kandal Stung Study Area

Farm size (Ha)	Family Size													Family No.	Total area (ha)
	1	2	3	4	5	6	7	8	9	10	11	12	13		
S < 0.19														0	0.00
0.20 - 0.39		1	1	1										3	0.89
0.40 - 0.59		2		3	4	1	1							11	5.45
0.60 - 0.79			1	3	2	1	1							8	5.56
0.80 - 0.99							1							1	0.90
1.00 - 1.19		1		4	8	8		2	1	1				25	27.38
1.20 - 1.39				1	2		1	1	1					6	7.77
1.40 - 1.59					3		4	1	3					11	16.45
1.60 - 1.79								2						2	3.39
1.80 - 1.99														0	0.00
2.00 - 2.24					1			1	4			2		8	16.96
2.25 - 2.49														0	0.00
2.50 <								1						1	2.50
															87.23
Total Number of fam:	0	4	2	12	20	10	8	8	9	1	0	2	0	76	
Person	0	8	6	48	100	60	56	64	81	10	0	24	0	457	
Average family size (person),(457/76)														6.0	
Area total (ha)															87.23
Average farm size/family (ha/family),(87.23 ha/76)															1.15

Note: Result of farm household survey

Table IV-24 (2/2) Average Farm Size and Family Size in Tonle Bati Study Area

Farm size (Ha)	Family Size													Family No.	Total area (ha)
	1	2	3	4	5	6	7	8	9	10	11	12	13		
< 0.19														0	0.00
0.20 - 0.39														0	0.00
0.40 - 0.59		1												1	0.50
0.60 - 0.79			1	2	5	3	1	1						13	9.04
0.80 - 0.99						1	1							2	1.79
1.00 - 1.19			1	1	3					1				6	6.57
1.20 - 1.39			1					1		1				3	3.89
1.40 - 1.59				1	2	1								4	5.98
1.60 - 1.79														0	0.00
1.80 - 1.99														0	0.00
2.00 - 2.24						2	2	2	1			1		8	16.96
2.25 - 2.49														0	0.00
2.50 <							2	1	1					4	10.00
															54.72
Total Number of fam:	0	1	3	4	10	7	7	4	4	0	1	0	0	41	
Person	0	2	9	16	50	42	49	32	36	0	11	0	0	247	
Average family size (person),(247/41)														6.0	
Area total (ha)															54.72
Average farm size/family (ha/family),(54.72 ha/41)															1.33

Note: Farm household survey.

Table IV-25 (1/2) Present Farm Household Budget in Kandal Stung Study Area

(Unit: 1,000Riel)

Sample No.	Size of Family	Farm Income			Farming Cost			Net farm income	Off farm income	Total net income
		Crop	Livestock	Total	Crop	Stock	Total			
3	7	440	349	789	228	72	300	489	100	589
5	7	880	160	1,040	274	42	316	724	100	824
8	9	525	190	715	53	30	83	632	1,380	2,012
9	4	525	100	625	67	200	267	358	360	718
10	5	525	330	855	26	7	33	822	180	1,002
13	5	525	100	625	113	8	121	504	1,440	1,944
14	4	630	520	1,150	128	184	312	838	720	1,558
17	5	630	150	780	92	96	188	592	1,000	1,592
18	12	1,100	400	1,500	223	72	295	1,205	160	1,365
22	5	630	200	830	244	57	301	529	720	1,249
25	9	735	379	1,114	108	191	299	815	300	1,115
26	4	315	108	423	75	60	135	288	600	888
29	4	525	350	875	162		162	713	75	788
40	9	735	240	975	83	59	142	833	90	923
46	2	210	120	330	32	24	56	274	5	279
	91	8,930	3,696	12,626	1,908	1,102	3,010	9,616	7,230	16,846
Ave	6	595	246	842	127	74	201	641	482	1,123
US\$		270	110 0	380 0	60	30	90	290	220	510

Source : Farm household survey result.

Table IV-25 (2/2) Present Farm Household Budget in Tonle Bati Study Area

(Unit: 1,000Riel)

Sample No.	Size of Family	Farm Income			Farming Cost			Net farm income	Off farm income	Total net income
		Crop	Livestock	Total	Crop	Stock	Total			
3	6	800	70	870	74	25	99	771	0	771
4	3	720	50	770	74	20	94	676	0	676
13	5	524	175	699	129	36	165	534	0	534
14	5	394	155	549	169	6	175	374	0	374
15	8	504	170	674	204	4	208	466	0	466
16	4	216	158	374	140	6	146	228	0	228
17	6	336	100	436	142	6	148	288	0	288
18	7	576	115	691	184	4	188	503	0	503
20	9	570	158	728	214		214	514	0	514
22	8	500	30	530	194	27	221	309	0	309
25	6	500	150	650	205	67	272	378	0	378
26	5	375	170	545	262	70	332	213	0	213
27	5	250	36	286	155		155	131	0	131
28	4	375	245	620	165	55	220	400	0	400
29	4	250	130	380	135	61	196	184	0	184
30	3	350	30	380	123	65	188	192	0	192
32	5	562	246	808	586	116	702	106	0	106
36	6	750	93	843	331	49	380	463	0	463
40	9	1,500	189	1,689	162	53	215	1,474	0	1,474
	108	10,052	2,470	12,522	3,648	670	4,318	8,204		8,204
Ave	6	529	130	659	192	35	227	432		432
US\$		240	60 0	300 0	90	20	100	200		200

Source : Farm household survey result.

Table IV-26 (1/2) Present Living Cost Structure in Kandal Stung Study Area
(Unit:1,000Riel)

Sample No.	No. of Family	Total Living Cost	Food	Fuel	House	Cloth	Health	Culture	Education	Childcare	Transport
3	7	696.0	389.1	20.2	43.8	55.0	52.9	2.8	16.0	29.9	86.3
5	7	1181.0	660.2	34.2	74.4	93.3	89.8	4.7	27.2	50.8	146.4
8	9	2452.0	1370.7	71.1	154.5	193.7	186.4	9.8	56.4	105.4	304.0
9	4	603.0	337.1	17.5	38.0	47.6	45.8	2.4	13.9	25.9	74.8
10	5	1187.0	663.5	34.4	74.8	93.8	90.2	4.7	27.3	51.0	147.2
13	5	1610.0	900.0	46.7	101.4	127.2	122.4	6.4	37.0	69.2	199.6
14	4	867.0	484.7	25.1	54.6	68.5	65.9	3.5	19.9	37.3	107.5
17	5	673.0	376.2	19.5	42.4	53.2	51.1	2.7	15.5	28.9	83.5
18	12	1721.0	962.0	49.9	108.4	136.0	130.8	6.9	39.6	74.0	213.4
22	5	1375.0	768.6	39.9	86.6	108.6	104.5	5.5	31.6	59.1	170.5
25	9	1782.0	996.1	51.7	112.3	140.8	135.4	7.1	41.0	76.6	221.0
26	4	814.0	455.0	23.6	51.3	64.3	61.9	3.3	18.7	35.0	100.9
29	4	920.0	514.3	26.7	58.0	72.7	69.9	3.7	21.2	39.6	114.1
40	9	828.0	462.9	24.0	52.2	65.4	62.9	3.3	19.0	35.6	102.7
46	2	354.0	197.9	10.3	22.3	28.0	26.9	1.4	8.1	15.2	43.9
	91	17063.0	9538.2	494.8	1075.0	1348.0	1296.8	68.3	392.4	733.7	2115.8
Ave	6	1127.5	630.3	32.7	71.0	89.1	85.7	4.5	25.9	48.5	139.8
US\$		513	286	15	32	40	39	2	12	22	64
%		100.0%	55.9%	2.9%	6.3%	7.9%	7.6%	0.4%	2.3%	4.3%	12.4%

Source : Farm household survey result.

Table IV-26 (2/2) Present Living Cost Structure in Tonle Bati Study Area
(Unit:1,000Riel)

Sample No.	No. of Family	Total Living Cost	Food	Fuel	House	Cloth	Health	Culture	Education	Childcare	Transport
3	6	760.0	393.7	50.2	57.8	102.6	45.6	32.7	41.8	23.6	12.2
4	3	445.0	230.5	29.4	33.8	60.1	26.7	19.1	24.5	13.8	7.1
13	5	375.0	194.3	24.8	28.5	50.6	22.5	16.1	20.6	11.6	6.0
14	5	325.0	168.4	21.5	24.7	43.9	19.5	14.0	17.9	10.1	5.2
15	8	301.0	155.9	19.9	22.9	40.6	18.1	12.9	16.6	9.3	4.8
16	4	298.0	154.4	19.7	22.6	40.2	17.9	12.8	16.4	9.2	4.8
17	6	352.0	182.3	23.2	26.8	47.5	21.1	15.1	19.4	10.9	5.6
18	7	527.0	273.0	34.8	40.1	71.1	31.6	22.7	29.0	16.3	8.4
20	9	584.0	302.5	38.5	44.4	78.8	35.0	25.1	32.1	18.1	9.3
22	8	416.0	215.5	27.5	31.6	56.2	25.0	17.9	22.9	12.9	6.7
25	6	313.0	162.1	20.7	23.8	42.3	18.8	13.5	17.2	9.7	5.0
26	5	436.0	225.8	28.8	33.1	58.9	26.2	18.7	24.0	13.5	7.0
27	5	313.0	162.1	20.7	23.8	42.3	18.8	13.5	17.2	9.7	5.0
28	4	311.0	161.1	20.5	23.6	42.0	18.7	13.4	17.1	9.6	5.0
29	4	298.0	154.4	19.7	22.6	40.2	17.9	12.8	16.4	9.2	4.8
30	3	254.0	131.6	16.8	19.3	34.3	15.2	10.9	14.0	7.9	4.1
32	5	497.0	257.4	32.8	37.8	67.1	29.8	21.4	27.3	15.4	8.0
36	6	543.0	281.3	35.8	41.3	73.3	32.6	23.3	29.9	16.8	8.7
40	9	896.0	464.1	59.1	68.1	121.0	53.8	38.5	49.3	27.8	14.3
	108	8244.0	4270.4	544.1	626.5	1112.9	494.6	354.5	453.4	255.6	131.9
Ave	6	433.9	224.8	28.6	33.0	58.6	26.0	18.7	23.9	13.5	6.9
US\$		197	102	13	15	27	12	8	11	6	3
%		100%	51.8%	6.6%	7.6%	13.5%	6.0%	4.3%	5.5%	3.1%	1.6%

Source : Farm household survey result.

Table IV-27 Staffing of Kandal Province Agricultural Office by Grade

Sections	Engineer	Assitant Engineer	Agent	Worker	Total
Director (blanc)					
Vice Director	incharge of Veterinary, Account and Materials				
Vice Director	incharge of Agronomy, hydrology and FFP				
Vice Director	incharge of Personnel				
Vice Director	incharge of Forestry and Fisheries				
Vice Director	incharge of				
(1) Administration and Personnel Section					
Section chief	0	1	0	0	1
Vice section chief	0	2	0	0	2
Staff	0	0	10	3	13
Sub-total	0	3	10	3	16
(2) Planning Section					
Section chief	1	0	0	0	1
Vice section chief	0	1	0	0	1
Staff	0	1	1	5	7
Sub-total	1	2	1	5	9
(3) Account Section					
Section chief	1	0	0	0	1
Vice section chief	9	1	0	0	1
Staff	1	1	6	0	8
Sub-total	2	2	6	0	10
(4) Forestry and Fisheries Section					
Section chief	Incharge of Forestry				
Staff	4	13	19	1	37
Section chief	Incharge of Fisheries				
Staff	12	16	42	0	70
Workers	0	0	0	28	28
Sub-total	16	31	61	29	137
(5) Veterinary Section					
Section chief	0	1	0	0	1
Vice section chief	0	1	0	0	1
Staff	7	7	15	0	29
Sub-total	7	9	15	0	31
(6) Agronomy and Machinery Section					
Section chief	0	1	0	0	1
Vice section chief	0	2	0	0	2
Staff	6	7	15	0	28
Worker	19(machinery)				
Sub-total	6	10	15	19	50
(7) Material Section					
Section chief	0	1	0	0	1
Vice section chief	0	1	0	0	1
Staff	0	0	19	0	19
Worker	0	0	0	3	3
Sub-total	0	2	19	3	24
(8) Hydrology Section					
Section chief	0	1	0	0	1
Vice section chief	0	1	0	0	1
Staff	8	10	18	2	38
Sub-total	8	12	18	2	40
Kandal Province Agri-office Headquater Tota	40	71	145	61	317

Datasource: Agricultural Office of Kandal Province, 1994.

Table IV-28 Staffing of Takeo Province Agricultural Office by Grade

Director
 Vice Director incharge of Agronomy, Hydrology, Veterinary, Kompong Ampil School
 Vice Director incharge of Administration, Personnel, Planning, Account and Materials
 Vice Director incharge of Forestry, Fisheries, Machinery

Sections	Engineer	Assitant Engineer	Agent	Worker	Total
(1) Administration and Personnel Section					
Section chief	1				1
Vice section chief		1			1
Staff	1		6	13	20
Sub-total	2	1	6	13	22
(2) Planning Section					
Section chief					
Vice section chief				1	1
Staff	1		1	1	3
Sub-total	1	0	1	2	4
(3) Account Section					
Section chief					
Vice section chief		1			1
Staff		2	1		3
Sub-total	0	3	1	0	4
(4) Forestry and Fisheries Section					
Section chief Incharge of Forestry				1	1
Staff	1	3	5	17	26
Section chief Incharge of Fisheries				1	1
Staff	2	2	7	20	31
Workers					0
Sub-total	3	5	12	39	59
(5) Veterinary Section					
Section chief		1			1
Vice section chief		1			1
Staff	2	3	16	6	27
Sub-total	2	5	16	6	29
(6) Agronomy and Machinery Section					
Section chief			1		1
Vice section chief		2			2
Staff	3	14	24	15	56
Sub-total	3	16	25	15	59
(7) Material Section					
Section chief		1			1
Vice section chief			2		2
Staff			1	15	16
Sub-total	0	1	3	15	19
(8) Hydrology Section					
Section chief	1				1
Vice section chief		1	1		2
Staff	4	13	12	49	78
Sub-total	5	14	13	49	81
(9) Kampong Ampil School					
Section chief					0
Vice section chief					0
Staff	0	1	8	5	14
Sub-total	0	1	8	5	14
Takeo Province Agri-office Headquater Total	16	46	85	144	291

Data source: Agricultural Office of Takeo Province, 1994.

Table IV-29 Number of Rice Mill by Commune in Study Area

Name of Khum	Rice mill
Kandal Stung Area	5
1 Tra Peang Veng	6
2 Thmei	10
3 Trea	5
4 Spean Thmo	2
5 Roleous	2
6 Preah Puth	5
7 Tien	3
8 Ba Ku	5
9 Kok Trap	2
10 Kung Noy	3
11 Anlong Remeath	7
12 Prek Roka	5
13 Tbeng	60
Total	
Tonle Bati Area	
1 Krang Thnung	10
2 Cham Pei	15
3 Kandoeung	11
4 Puth Sar	17
5 Trapeang Sap	14
Total	67

Capacity of rice mill is approximately 150 kg/ hour to 400 kg/ hour.

Source: Interview survey by JICA study team in Chief of Commune.

**Table IV-30 Present Land Use in and around Kandal Stung
Priority Development Area**

Commune	Village	Total No. of		Agricultural land								Rice field area per family (ha)	
		popu- lation	house- hold	Total area (ha)	Agri. land total (ha)	Rice field		Upland crops (ha)	Scrubs (ha)	Forest (ha)	Village Others (ha)		
						Double cropping (ha)	Single cropping (ha)						
Anlung Romeat	Kang Cheung	347	76	88	43	0	43	0	27	0	7	11	0.6
	Kang Tbong	352	66	66	39	0	39	0	14	0	6	7	0.6
	Kang Lech	278	62	77	41	0	41	0	17	0	5	14	0.7
	Sre Kok	369	82	104	55	0	55	0	27	0	6	16	0.7
Bakou	Kampong Toul	388	73	122	49	0	49	0	47	7	9	10	0.7
	Bakou	469	92	97	62	0	60	2	0	0	7	28	0.7
	Khmout	342	73	87	54	0	48	6	0	0	4	29	0.7
	Veal Kandal	309	72	115	62	0	61	1	0	0	9	44	0.8
	Por Dos	324	74	66	49	0	48	1	0	0	4	13	0.6
	Tbong Kdey	558	106	112	72	0	68	4	0	0	5	35	0.6
	Svay Minh	674	118	83	63	0	30	33	0	0	3	17	0.3
Kong Noy	Kong Noy	402	99	150	88	0	88	0	0	5	14	43	0.9
	Srey Sambath	203	37	87	42	0	42	0	0	5	5	35	1.1
	Trapieng Somre	181	40	52	27	0	27	0	0	3	5	17	0.7
Preah Puth	Krang Trea	291	75	102	88	6	82	0	0	0	4	10	1.2
	Ben Bauv	235	40	71	58	9	49	0	0	1	3	9	1.5
	Preah Puth	307	70	86	71	10	61	0	0	1	4	10	1.0
	Krang Sbauv	405	104	132	114	30	84	0	0	0	8	10	1.1
	Baor Na	366	67	109	91	17	74	0	0	0	7	11	1.4
Roluos	Krapeu Troum	526	143	195	168	0	168	0	0	0	16	11	1.2
	Prash Theat	334	87	151	123	0	123	0	0	0	10	18	1.4
	Kandal	526	123	205	173	0	173	0	0	0	16	16	1.4
Tien	Krang Kroch	328	80	96	85	16	69	0	0	0	5	6	1.1
	Thmey	410	103	163	123	5	118	0	0	4	9	27	1.2
Total	24 villages	8,924	1,962	2,616	1,840	93	1,700	47	132	26	171	447	0.9
%				100	70	4	65	2	5	1	7	17	
Agricultural land					100	5	92	3					

Data source: Agricultural Office of Kandal Stung District, 1994.

**Table IV- 31 Present Land Use in and around Tonle Bati
Priority Development Area**

Commune	Village	Total No. of		Agricultural land								Rice field area per family (ha)	
		popu- lation	house- hold	Total area (ha)	Agri. land total (ha)	Rice field		Upland crops (ha)	Shrubs (ha)	Forest (ha)	Village Others (ha)		
						Double cropping (ha)	Single cropping (ha)						
Champey	Demdong	648	126	240	207	1	205	1	8	0	23	2	1.6
	Mkak	739	156	296	228	1	226	1	26	0	38	4	1.5
Kandang	Hakunuman	280	60	55	44	0	44	0	0	0	4	7	0.7
	Chroa Sdao	704	118	193	171	0	171	0	0	0	22	0	1.4
Kreing Thnoug	Tonle Bati	1,007	168	366	270	6	258	6	0	0	92	4	1.6
	Haknoukman	601	92	188	127	0	127	0	0	0	55	6	1.4
	Tbong Damrey	616	106	156	137	0	137	0	0	0	19	0	1.3
Put Sar	Krang Thnoug	747	132	192	146	0	146	0	0	0	44	2	1.1
	Krang Russey	472	95	139	130	0	130	0	0	0	7	2	1.4
Total	9 villages	5,814	1,053	1,825	1,460	8	1,444	8	34	0	304	27	1.4
%				100	80	0	79	0	2	0	17	1	
Agricultural land					100	0.5	98.9	0.5					

Data source: Agricultural Office of Bati District, 1994.

Table IV-32 Planted Area and Production of Rice in and around Kandal Stung Priority Development Area

Commune	Early rice*		4-month variety		6-month variety		Total		Yield (ton/ha)
	Planted area (ha)	Production (ton)	Planted area (ha)	Production (ton)	Planted area (ha)	Production (ton)	Planted area (ha)	Production (ton)	
Bakou	20	36	211	211	158	158	389	405	1.0
Preah Put	34	61	217	326	125	186	376	573	1.5
Anlong Romiet	30	54	150	150	81	81	261	285	1.1
Tien	0	0	194	310	200	300	394	610	1.5
Kong Noy	4	7	144	173	48	53	196	233	1.2
Roluos	34	61	217	326	159	239	410	626	1.5
Total	122	219	1,133	1,474	771	1,017	2,026	2,710	1.3
%	6	8	56	54	38	38	100	100	

Data source : Agricultural Office of Kandal Stung district for 1993-94 crop season.

* Most of the early rice was IR36, dry season rice was not grown.

Table IV-33 Planted Area and Production of Rice in and around the Tonle Sap Priority Development Area

Commune	Dry season*		Early rice*		4-month variety		6-month variety		Total	
	Planted area (ha)	Production (ton)	Planted area (ha)	Production (ton)	Planted area (ha)	Production (ton)	Planted area (ha)	Production (ton)	Planted area (ha)	Production (ton)
Krang Thnung	25	45	150	180	715	857	50	58	940	1,140
Champey**	179	358	44	87	544	1,087	723	1,450	1,490	2,982
Kandang	0	0	38	45	777	699	72	112	887	856
Putsar**	309	464	201	402	1,134	2,269	500	1,250	2,144	4,385
Total	513	867	433	714	3,170	4,912	1,345	2,870	5,461	9,363
%	9	9	8	8	58	52	25	31	100	100

Data source : Agricultural Office of Bati District, 1993-94 crop season.

* Variety for the dry and early season crop is mostly IR36 in 1993-94 crop season.

** Most of these areas are for receding-rice cultivation.

Table IV-34 Inputs Requirement for Present Rice Farming Practice
(Inputs/ha)

Operation Items	Kind of input	Unit	Quantity
1 Nursery preparation:			
	Labor	man/day	4
	Cattle	harrow/day	1
	Manure	kg	1,200-2,400
	Fertilizers (16:20:0)	kg	20-40
	Seed	kg	50-60
2 Ploughing			
	Labor	man/day	14
	Cattle	harrow/day	14
3 Fertilising			
	Labor	man/day	4
	Urea	kg	50
	DAP or 16:20:00	kg	100
	Manure	kg	1,800
Harrowing			
	Labor	man/day	7
	Cattle	harrow/day	7
5 Transplanting			
		man/day	30
6 Weeding			
		man/day	6
7 Water and field management			
		man/day	7
8 Harvesting			
		man/day	15-20
9 Transportation			
		man/day	6
		cattle-cart/day	6
10 Threshing			
		man/day	15
11 Plant protection			
	Labor	man/day	2
	Chemicals	liter	1

Data source : A Baseline Survey of Rainfed Lowland Rice Culture in Cambodia,
IRRI-Cambodia Projct, 1991. Adjusted based on the interviews to farmers.

**Table IV-35 Planted Area and Production of Upland Crops
in and around Kandal Stung Priority Development Area**

	Maize		Sugar cane		Casterbean		Cassava		Sweet potato		Total planted area (ha)
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	
	(ha)	(t)	(ha)	(t)	(ha)	(t)	(ha)	(t)	(ha)	(t)	
Bakou	1	1.2	0	0	2	2	0	0	2	7	5
Preah Put	2	2.3	1	45	0	0	0	0	2	7	5
Anlong Romiet	1	1.2	1	45	2	2	0	0	2	7	6
Tien	1	1.2	0	0	0	0	0	0	2	7	3
Kong Noy	1	1.2	0	0	0	0	0	0	8	28	9
Roluos	1	1.2	0	0	0	0	0	0	2	7	3
Total	7	8.1	2	90	4	4	0	0	18	63	31

Data source is Kandal Stung district Office. Data for Tonle Bati project area is not available, may be due to negligible small area.

Table IV-36 Number of Sugar Palm Trees and Production of Sugar in and around Priority Development Area (1991)

Commune	No. of Tree in Production	Production* (ton)	No. of Family	Average/Family	
				No. of Tree	Production (kg)
Kandal Stung Area:					
Bakou	1,215	30	618	2.0	49
Preah Put	1,215	30	364	3.3	83
Anlong Romiet	740	19	451	1.6	41
Tien	0	0	373	0.0	0
Kong Noy	1,215	30	220	5.5	138
Roluos	0	0	412	0.0	0
Total	4,385	110	2,438	1.8	45
(Kandal Stung Master Plan area			6,312	6.4	159)
Tonle Bati Area:					
Krang Thnung	250	6	1,154	0.2	5.4
Champeï	0	0	875	0.0	0.0
Kandang	520	13	905	0.6	14.4
Put Sar	0	0	905	0.0	0.0
Total	770	19	3,839	0.2	5.0
(Tonle Bati Master Plan area			5,952	1.3	32)

Data source : Kandal Stung and Bati District Offices.

* The production is estimated on the basis of 25 kg per tree per year.

**Table IV-37 Number of Livestock in and around Kandal Stung
Priority Development Area (1994)**

Commune/Village	Cattle							Pig	Poultry	No. of house hold	Animal number/family			
	Cattle for draft			Cattle <3years			Cattle Total				Draft cattle	Total cattle	Pig	Poultry
	Ox	Cow	Total	Ox	Heifer	Total								
Anlong Romiet	178	126	304	71	54	125	429	117	2,987	359	0.8	1.2	0.3	8.3
Kang Cheung	40	21	61	10	10	20	81	20	110	76	0.8	1.1	0.3	1.4
Kang Tbong	40	25	65	14	9	23	88	23	200	66	1.0	1.3	0.3	3.0
Kang Lech	25	12	37	20	17	37	74	19	175	62	0.6	1.2	0.3	2.8
Sre Kok	45	52	97	25	17	42	139	24	1,677	82	1.2	1.7	0.3	20.5
Kampong Toul	28	16	44	2	1	3	47	31	825	73	0.6	0.6	0.4	11.3
Bakou	217	162	379	96	120	216	595	230	770	443	0.9	1.3	0.5	1.7
Bako*														
Khmut	30	70	100	50	20	70	170	70	230	73	1.4	2.3	1.0	3.2
Veal Kandal	31	20	51	14	10	24	75	50	170	72	0.7	1.0	0.7	2.4
Por Dos	48	23	71	7	12	19	90	30	70	74	1.0	1.2	0.4	0.9
Tbong Kdey	64	39	103	15	70	85	188	50	250	106	1.0	1.8	0.5	2.4
Svay Minh	44	10	54	10	8	18	72	30	50	118	0.5	0.6	0.3	0.4
Kong Noy	92	45	137	23	37	60	197	55	505	176	0.8	1.1	0.3	2.9
Kong Noy	40	15	55	8	18	26	81	15	220	99	0.6	0.8	0.2	2.2
Serey Sambath	21	7	28	1	5	6	34	10	130	37	0.8	0.9	0.3	3.5
Trapieng Somret	31	23	54	14	14	28	82	30	155	40	1.4	2.1	0.8	3.9
Preah Put	239	197	436	95	137	232	668	144	1,665	356	1.2	1.9	0.4	4.7
Krang Trea	32	19	51	25	37	62	113	10	134	75	0.7	1.5	0.1	1.8
Ben Bauv	25	32	57	6	21	27	84	19	198	40	1.4	2.1	0.5	5.0
Preah Puth	53	48	101	15	22	37	138	25	237	70	1.4	2.0	0.4	3.4
Krang Sbauv	76	50	126	34	35	69	195	65	859	104	1.2	1.9	0.6	8.3
Bor Na	53	48	101	15	22	37	138	25	237	67	1.5	2.1	0.4	3.5
Roluos	158	231	389	62	58	120	509	234	842	353	1.1	1.4	0.7	2.4
Krapeu Troum	68	82	150	26	21	47	197	95	387	143	1.0	1.4	0.7	2.7
Prash Theat	30	69	99	12	18	30	129	57	213	87	1.1	1.5	0.7	2.4
Kandal	60	80	140	24	19	43	183	82	242	123	1.1	1.5	0.7	2.0
Tien	134	40	174	35	17	52	226	100	1,000	183	1.0	1.2	0.5	5.5
Krang Kroch	36	6	42	5	5	10	52	20	70	80	0.5	0.7	0.3	0.9
Thmey	98	34	132	30	12	42	174	80	930	103	1.3	1.7	0.8	9.0
Total	1,018	801	1,819	382	423	805	2,624	880	7,769	1,870	1.0	1.4	0.5	4.2

Data source : Agricultural Office of Kandal Stung District.

* Data is not available.

**Table IV-38 Number of Livestock in and around Tonle Bati
Priority Development Area (1994)**

Commune/Village	Cattle							Pig	Poultry	No. of house holds	No./family			
	Cattle for draft			Cattle <3years			Cattle Total				Draft cattle	Total cattle	Pig	Poultry
	Ox	Cow	Total	Ox	Heifer	Total								
Champey														
Demdong	128	123	251	55	40	95	346	124	1,156	126	2.0	2.7	1.0	9.2
Mkak	132	121	253	45	45	90	343	120	1,139	156	1.6	2.2	0.8	7.3
Kandang														
Hakunuman	96	110	206	32	46	78	284	157	941	60	3.4	4.7	2.6	15.7
Kraing Thnoug														
Tonle Bati	147	108	255	63	63	126	381	146	700	168	1.5	2.3	0.9	4.2
Haknoukman	137	104	241	50	34	84	325	143	685	92	2.6	3.5	1.6	7.4
Chroa Sdao	152	119	271	60	53	113	384	145	680	118	2.3	3.3	1.2	5.8
Tboung Damrey	164	114	278	56	56	112	390	150	1,385	106	2.6	3.7	1.4	13.1
Krang Thnoug	140	110	250	53	50	103	353	139	670	132	1.9	2.7	1.1	5.1
Put Sar														
Krang Russey	186	90	276	34	74	108	384	96	813	95	2.9	4.0	1.0	8.6
Total	1,282	999	2,281	448	461	909	3,190	1,220	8,169	1,053	2.2	3.0	1.2	7.8

Data source: Agricultural Office of Bati District.

Table IV-39 Number of Rice Mill in and around Project Development Area

Commune/Village	Number of Ricemill	Remarks
Kandal Stung Project Area		
Roluos		
1 Kandal	1	
2 Prash Theat	1	
3 Krapeu Troum	1	
Preah Puth		
1 Krang Trea	2	
2 Ben Bauv	1	
3 Prah Puth	1	
4 Krang Sbauv	1	
5 Bor Na	1	
Tien		
1 Krang Kroch	1	
2 Thmey	3	
Ba Ku		
1 Bakou	1	
2 Khmout	1	
3 Veal Kandal	1	
4 Pou Doss	1	
5 Tbong Kdey	2	
6 Svay Minh	2	
Kung Noy		
1 Kong Noy	1	
2 Serey Sambath	1	
3 Trapaing Somret	1	
Anlong Remeath		
1 Kang Cheung	1	
2 Khang Tbong	0	
3 Khang Lech	1	
4 Sre Kok	1	
5 Kampong Tourl	0	
Total	27	(Milling Capacity estimation: 27 x 0.15 t/hr = 4.05 t/hr. 4.1 t/hr x 200 day/year x 4 hr/day = 3,300 t/year)
Tonle Bati Project Area		
Krang Thnung		
1 Krang Thnung	3	
2 Haknuman	0	
3 Chrong Sdau	1	
4 Tonle Bati	3	
5 Tbong Dam Rei	5	
Cham Pei		
1 Demdong	3	
2 Mkak	3	
Kandoeung		
1 Haknuman	1	
Puth Sar		
1 Krang Russey	1	(20 x 0.15 t/hr = 3.0t/hr 3.0 t/hr x 200 day/year x 4hr/day = 2,400 t/year)
Total	20	

Source : Inventory survey by JICA study team, 1994.

**Table IV-40 Main Income Source of Farm Household
in Priority Development Area**

Income source	Kandal Stung (No of household)		Tonle Bati (No. of household)	
1. Farm income				
1) Rice	118	100%	44	100%
2) Other crop	9	8%		0%
3) Livestock	93	79%	39	89%
2. Off-Farm income				
1) Salary	17	14%	1	2%
2) Labour wage	39	33%	9	20%
3) Small susiness	32	27%	4	9%
4) Others*	2	2%	0	0%
Rice cultivation only	7	6%	5	11%
Rice and Livestock	16	14%	24	55%
Rice, Livestock and other crops	13	11%	0	0%
Rice, Livestock and off-farm income	57	48%	13	30%
Rice and off-farm income	25	21%	2	5%
Total	118	100%	44	100%

Note: Others include home garden vegetable, fishing, housing materials, firewood, etc.

Table IV-41 Income of Farm Household in Priority Development Area

Kandal Stung	Gross farm income				Production cost		
	Cultivated area (ha)	Yield/ha ton	Production ton	U.price US\$/ton	Gross income US\$	Fertilizer others	Feed/ Total cost US\$
1. Farm income							
1.1 Paddy*	0.9	1.4	1.26	182	229		27
1.2 Vegetables**					40	2	2
1.3 Palm sugar(nos,kg)	No. of tree	kg/tree	kg				
	1.8	25	45	0.4	18		
1.4 Livestock (head)	(head)	(%)		(\$/head)			
Cattle	1.4	15	0.21	118	25		
Pig ***	0.5	150	0.75	68	51	17	17
Poultry	4.2	150	6.3	1.4	9		
Total farm income					372		46
2. Off-farm income					158		
3. Farm household income					530		(say=50)

Tonle Bati

1, Farm in come							
1.1 Paddy *	1.4	1.4	1.96	182	357		42
1.2 Vegetables **					21	1	1
1.2 Palm sugar	tree	kg/tree	kg				
	0.2	25	5	0.4	2		
1.3 Livestock	head(a)	% of (a)	head	(\$/head)			
Cattle	3	15	0.45	118	53		
Pig ***	1.2	150	1.8	68	122		40
Poultry	7.8	150	11.7	1.4	16		
Total farm income					572		83
2. Off-farm income					28		
3. Farm household income					600		

* Production cost of rice is about \$ 30/ha.

** Vegetable is produced at homegarden, and cost is about 5 % of production value.

*** Unit price of piglet is \$9/head, purchased feeds is about\$9/150 days.

These figures were obtained through the household survey.

**Table IV-42 Living Expenditure of Farm Household
in Priority Development Area**

	Kandal Stung Project Area		Tonle Bati Project Area	
1. Food item	737	69%	871	0%
(US\$)	(335)		(396)	
Non-Food items				
Medicine/health	126	12%	111	0%
School/education	79	7%	78	0%
Housing	40	4%	9	0%
Clothing	67	6%	63	0%
Transportation	8	1%	16	0%
Others	8	1%	5	0%
Sub Total	328	31%	283	0%
(US\$)	(149)		(128)	
Total	1065	100%	1154	0%
(US\$)	(484)		(524)	

Source: Farm household survey conducted by survey team 1994.

Table IV-43 Farmers' Needs and Problems in the Study Area

	Kandal Stung (76 samples)		Tonle Bati (41 samples)		Total (117 samples)	
		(%)		(%)		(%)
Major problems in dry season:						
Domestic water	74	97	30	73	104	89
Irrigation water	60	79	30	73	90	77
Fire station	10	13	0	0	10	9
Pump for irrigation	9	12	21	51	30	26
Health services	0	0	0	0	0	0
Major constraints for farm operations:						
Inconvenience to get chemical fertilizers	43	57	41	100	84	72
Inconvenience to get agro-chemical	27	36	27	66	54	46
Shortage of draught animal	35	46	28	68	63	54
Labour shortage	14	18	0	0	14	12
Shortage of HYV seed	0	0	40	98	40	34
Shortage of Agro-machinery power	0	0	21	51	21	18
Major constraints on living:						
Shortage of food for home use	35	46	41	100	76	65
Shortage of living expenses	41	54	21	51	62	53
Inconvenience for medical treatment	49	64	11	27	60	51
Insufficient school facilities	56	74	16	39	72	62
Health education	0	0	18	44	18	15

Table IV-44(1/2) Present Land Use and Land Suitabilities in Kandal Stung Area (ha)

Land units	Land use Categories	Gross area (ha)	Villages, roads, etc.		Wet season rice		Wet season upland crops		Cattle grazing, or unused		Wet season rice		Dry season rice		Dry season rice	
			(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	Suitability	Area (ha)	Suitability	Area (ha)	Suitability	Area (ha)
Hc	Vr	375	60	225	10	38	10	38	20	75	S2	150	S3	150	S2	150
Hs	Vr	755	20	151	5	38	10	76	65	491	N1	604	N2	604	S3	604
AI	Vp	1,430	15	215	75	1,073	5	72	5	72	S2	1,216	S2	1,216	S2	1,216
Hy	Vp	167	80	134	10	17	10	17	0	0	S1	33	S1	33	S1	33
Le	Vc	344	50	172	10	34	10	34	30	103	N1	172	N2	172	N1	172
Ht	Cb	330	0	0	10	33	0	0	90	297	N1	330	N1	330	N1	330
Le	Cb	459	50	230	10	46	10	46	30	138	N1	230	N2	230	N1	230
O1	P1	760	0	0	95	722	0	0	5	38	S3	760	S3	760	S3	760
Y1	P1	1,435	0	0	95	1,363	0	0	5	72	S1	1,435	S1	1,435	S1	1,435
O2	Ps	1,511	5	76	85	1,284	0	0	10	151	N1	1,435	N1	1,435	N2	1,435
O3	Ps	0	0	0	0	0	0	0	0	0	S2	0	S2	0	S2	0
Y2	Ps	2,451	5	123	90	2,206	0	0	5	123	S1	2,328	S2	2,328	S2	2,328
Lw	Pw	428	0	0	90	385	0	0	10	43	S2	428	S2	428	S2	428
Ls	Sp	138	0	0	0	0	0	0	100	138	N1	138	S3	138	N2	138
Le	Fb	344	50	172	10	34	10	34	30	103	N1	172	N2	172	N1	172
Ls	O	138	0	0	0	0	0	0	100	138	N1	138	S3	138	N2	138
La	O	235	0	0	0	0	0	0	100	235	N	235	N	235	N	235
Total		11,300	13	1,496	64	7,273	3	316	20	2,216	87%	9,804		9,804		9,804
												S1	S1	S1	S1	1,468
												S2	S2	S2	S2	4,122
												S3	S3	S3	S3	1,364
												N1	N1	N1	N1	904
												N2	N2	N2	N2	1,711
												N	N	N	N	235
												S1+S2+S3	S1+S2+S3	S1+S2+S3	S1+S2+S3	6,954
												N	N	N	N	3,979

Table IV-44 (2/2) Present Land Use and Land Suitabilities in Tonle Bati Area (ha)

Land units	Land use Categories	Gross area (ha)	Villages, roads, etc.		Wet season rice		Wet season upland crops		Cattle grazing, or unused		Wet season rice		Dry season rice		Dry season upland crops		
			(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)
Hc	Vr	360	60	20	72	10	36	10	36	10	36	S2	S3	144	144	S2	144
Hs	Vr	0	0	0	0	0	0	0	0	0	0	N1	N2	0	0	S3	0
A1	Vp	0	0	0	0	0	0	0	0	0	0	S2	S2	0	0	S2	0
Hy	Vp	0	0	0	0	0	0	0	0	0	0	S1	S1	0	0	S1	0
Le	Vc	84	10	10	8	5	4	75	63	4	75	N1	N2	76	76	N1	76
Ht	Cb	0	0	0	0	0	0	0	0	0	0	N1	N1	0	0	N1	0
Le	Cb	112	10	10	11	5	6	75	84	6	75	N1	N2	101	101	N1	101
O1	P1	2,895	0	95	2,750	0	0	5	145	0	5	S3	S3	2,895	2,895	S3	2,895
Y1	P1	0	0	0	0	0	0	0	0	0	0	S1	S1	0	0	S1	0
O2	Ps	0	0	0	0	0	0	0	0	0	0	N1	N1	0	0	N2	0
O3	Ps	1,738	5	85	1,477	0	0	10	174	0	10	S2	S2	1,651	1,651	S2	1,651
Y2	Ps	792	10	85	673	0	0	5	40	0	5	S1	S2	713	713	S2	713
Lw	Pw	185	0	50	93	0	0	50	93	0	50	S2	S2	185	185	S2	185
Ls	Sp	225	0	0	0	0	0	100	225	0	100	N1	S3	225	225	N2	225
Le	Fb	84	10	10	8	5	4	75	63	4	75	N1	N2	76	76	N1	76
Ls	O	225	0	0	0	0	0	100	225	0	100	N1	S3	225	225	N2	225
La	O	200	0	0	0	0	0	100	200	0	100	N	N	200	200	N	200
Total		6,900	6	74	5,093	1	50	20	1,347	94%	6,490	6,490	6,490	6,490	6,490		6,490
												S1	S1	0	0	S1	0
												S2	S2	2,549	2,549	S2	2,693
												S3	S3	3,489	3,489	S3	2,895
												N1	N1	0	0	N1	252
												N2	N2	252	252	N2	450
												N	N	200	200	N	200
												S1+S2+S3	S1+S2+S3	6,038	6,038	S1+S2+S3	5,588
												N	N	3,741	3,741	N	3,597

Table IV-45 Proposed Cropping Pattern in Study Area

	Kandal Stung Area			Tonle Bati Area			Area Total				
1. With Prek Thnot Reservoir											
1.1 Irrigation development area(h	4,200 (ha)			4,200 (ha)			8,400 (ha)				
Area planted(ha)	WS	DS	Total	WS	DS	Total	WS	DS	Total		
	4,200	2,100	6,300	4,200	2,100	6,300	8,400	4,200	12,600		
Early dry sseasc	50%	2,100	2,100	50%	2,100	2,100	0	4,200	4,200		
Early wet season	50%	2,100	2,100	50%	2,100	2,100	4,200	0	4,200		
Medium rice(H'	30%	1,260	1,260	30%	1,260	1,260	2,520	0	2,520		
HYV-area		3,360	2,100	5,460		3,360	2,100	5,460	6,720	4,200	10,920
Medium rice(L\	20%	840	840	20%	840	840	1,680	0	1,680		
	38%	1,596	1,596	38%	1,596	1,596	0	3,192	3,192		
	38%	1,596	1,596	38%	1,596	1,596	0	3,192	3,192		
	12%	504	504	12%	504	504	0	1,008	1,008		
	200%	4,200	4,200	8,400	200%	4,200	4,200	8,400	8,400	16,800	
1.2 Non irrigation development ar	3,100 (ha)			900 (ha)			4,000 (ha)				
Area planted(ha)	WS	DS	Toatl	WS	DS	Total	WS	DS	Total		
	3,224	0	3,224	954	30	984	4,178	30	4,208		
Early dry sseason rice			0		30	30	0	30	30		
Early wet season	4%	124	124	6%	54	54	178	0	178		
Medium rice	63%	1,953	1,953	80%	720	720	2,673	0	2,673		
Late rice	37%	1,147	1,147	20%	180	180	1,327	0	1,327		
	104%	3,224	0	3,224	106%	954	30	954	4,178	30	4,208
2. Without Prek Thnot Reservoir											
2.1 Irrigation development area(h	1,950 (ha)			1,600 (ha)			3,550 (ha)				
Area planted(ha)	WS	DS	Total	WS	DS	Total	WS	DS	Total		
	1,950	900	2,850	1,600	800	2,400	3,550	1,700	5,250		
Early dry sseasc	46%	900	900	50%	800	800	0	1,700	1,700		
Early wet season	50%	975	975	50%	800	800	1,775	0	1,775		
Medium rice(H'	30%	585	585	30%	480	480	1,065	0	1,065		
HYV-area		1,560	900	2,460		1,280	800	2,080	2,840	1,700	4,540
Local variety	20%	390	390	20%	320	320	710	0	710		
	14%	270	270	15%	240	240	0	510	510		
	14%	270	270	15%	240	240	0	510	510		
	14%	270	270	15%	240	240	0	510	510		
	174%	1,950	1,440	3,390	180%	1,600	1,280	2,880	3,550	2,720	6,270
2.2 Non irrigation development ar	5,350 (ha)			3,500 (ha)			8,850 (ha)				
Area planted(ha)	WS	DS	Toatl	WS	DS	Total	WS	DS	Total		
	5,564	0	5,564	3,710	30	3,740	9,274	30	9,304		
Early dry season rice			0		30	30	0	30	30		
Early wet season	4%	214	214	6%	210	210	424	0	424		
Medium rice	63%	3,371	3,371	80%	2,800	2,800	6,171	0	6,171		
Late rice	37%	1,980	1,980	20%	700	700	2,680	0	2,680		
	104%	5,564	0	5,564	106%	3,710	30	3,740	9,274	30	9,304

Table IV-46 Proposed Farming Practices

Inputs	Unit	Maize & soybeans*	Rice	Groundnut	Sweet potato	Greengrams	Sesame	Chilli(dry)	Vegetables
(Yield projected)**	ton/ha	Maize 3, Soybeans 1.5	4.0	2.0	15	1.0	0.5	2	10
1. Seed	kg	15(maize) 20(beans)	50	90	30,000 (seed cuttings)	20	10	0.3	0.3
2. Fertilizers									
Urea	kg	100	70	50	100			250	250
Compound(15:15:15)	kg	400	200	300	200		200	300	300
3. Agro-chemicals***									
Seed dress	gram	90	90	90					
Insecticide	litre	2	2	4	2	2		2	2
Fungicide	litre	2	2	3	2	2		2	2
4. Labour input	man/day	150	130	110	90	90	90	110	110
5. Animal power	oxen/day	20	28	20	25	3	3	20	20
6. Machinery									
Sprayer	hr	2	2	2	2	2		2	2
Thresher/sheller	hr								
7. Miscellaneous									

(About 15 % of item 1 to 6)

* Maize and soybeans are grown as mixed crop.

** Yiled for rice is in paddy, maize and groundnut for shelled grain.

*** These pesticides are planned to be applied to avoid disastarous damages by pests, but not for accustomed usage.

Insecticides and fungicides recommendable are Fenitrothion, Buprofezin, Dithiocarbamate(Polycarbamate), Benomyl, etc.

Table IV-47 Research Results on Yield Performance

(1) Results of On Farm Adaptive Trial for Early Varieties in 1991 Wet Season in Kandal Province

Location entry No.	IR66	IR72	KRU	Check
29	4.0	4.9	3.5	4.0
30	2.9	4.1	3.6	3.0
31	3.5	4.5	4.1	3.7
32	3.7	4.5	5.4	4.1
33	3.5	4.2	4.2	3.8
34	5.6	5.0	5.4	4.3
35	7.0	7.0	6.5	7.0
36	6.5	6.5	5.8	6.0
37	6.8	5.4	6.8	3.8
38	4.6	4.4	5.0	4.0
39	6.3	5.8	5.0	5.8
40	3.0	3.0	5.8	2.5
Average	4.8	4.9	5.1	4.3

Source: Annual Research Report 1992, IRRI-Cambodia Project.

The trial was conducted in the farmers' field under the local conditions and with their practices.

(2) Results of Advanced Yield Trial for Medium Varieties in Tonle Bati District

Variety tested	1990	1991	Average
IR41431-16-2-2-2	4.3	4.1	4.2
IR42856-7-7-232	4.2	3.4	3.8
IR43342-10-1-1-3-3*	4.4	4.0	4.2
IR43552-18-3-4-3	4.1	3.9	4.0
OR142-99*	4.9		4.9
IR24705-11-3-3-3-3	3.8		3.8
IR28224-3-2-3-2	4.6		4.6
MTL64	4.3		4.3
PPD-6	5.4		5.4
IR31238-474-3-PI		4.3	4.3
IR36974-13-3-3-3		4.2	4.2
IR45411-40-2-1*		4.4	4.4
IR54742-31-16-25-22-3		3.5	3.5
IR42(CHECK)	3.7	3.8	3.75
Average	4.4	3.6	4.0

Source: Annual Research Report, IRRI-Cambodia Project, 1990 and 1991.

(3) Varieties Performed more than 4.0 ton /ha, OYT -Taraditional Medium, Wet Season at CARRDI, 1991

Variety entry No. *	Yield	Variety entry No. *	Yield
9	4.1	44	4.0
11	4.2	51	4.2
12	4.0	59**	4.5
14	5.3	60	4.4
15	6.1	61	4.6
25	4.3	62	4.1
38	5.3	63	4.6
39	4.1	67	4.8
40	5.0	69	4.6
41	6.0	71	4.0
42	4.6	87	4.1
43	4.3	112	4.4

Source: Annual Research Report 1991, IRRI-Cambodia Project.

* These varieties performed more than 4.0 ton/ha of yield, and were belonging to the varieties which were selected further OYT.

** IR42

Table IV-48 Anticipated Rice Production in Study Area

	With project condition										Without project condition										Incremental production of rice				
	Year after implementation					Year after implementation					Year after implementation					Year after implementation					Year after implementation				
	Present	1	2	3	4	5	Present	1	2	3	4	5	Present	1	2	3	4	5	Present	1	2	3	4	5	
1. With Prek Thnot Reservoir																									
1.1 Irrigation area																									
HYV:	Yield(t/ha)	5,460	10,920	13,650	16,380	19,110	21,840	5,460	10,920	13,650	16,380	19,110	21,840	5,460	10,920	13,650	16,380	19,110	21,840	5,460	10,920	13,650	16,380	19,110	21,840
Local variety:	Yield(t/ha)	840	1,512	1,848	2,100	2,352	2,520	840	1,512	1,848	2,100	2,352	2,520	840	1,512	1,848	2,100	2,352	2,520	840	1,512	1,848	2,100	2,352	2,520
Irrigated rice-total:	Yield(t/ha)	12,600	24,864	30,996	36,960	42,924	48,720	12,600	24,864	30,996	36,960	42,924	48,720	12,600	24,864	30,996	36,960	42,924	48,720	12,600	24,864	30,996	36,960	42,924	48,720
Non Irrigation area	Yield(t/ha)	6,300	12,432	15,498	18,480	21,462	24,360	6,300	12,432	15,498	18,480	21,462	24,360	6,300	12,432	15,498	18,480	21,462	24,360	6,300	12,432	15,498	18,480	21,462	24,360
1.2 Non irrigation area	Yield(t/ha)	3,224	4,836	5,803	6,770	7,415	8,060	3,224	4,836	5,803	6,770	7,415	8,060	3,224	4,836	5,803	6,770	7,415	8,060	3,224	4,836	5,803	6,770	7,415	8,060
1.3 Study area total	Yield(t/ha)	15,128	31,176	38,570	45,797	52,602	59,240	15,128	31,176	38,570	45,797	52,602	59,240	15,128	31,176	38,570	45,797	52,602	59,240	15,128	31,176	38,570	45,797	52,602	59,240
2. Without Prek Thnot Reservoir																									
2.1 Irrigation area																									
HYV:	Yield(t/ha)	2,460	4,920	6,150	7,380	8,610	9,840	2,460	4,920	6,150	7,380	8,610	9,840	2,460	4,920	6,150	7,380	8,610	9,840	2,460	4,920	6,150	7,380	8,610	9,840
Local variety:	Yield(t/ha)	390	702	858	975	1,092	1,170	390	702	858	975	1,092	1,170	390	702	858	975	1,092	1,170	390	702	858	975	1,092	1,170
Irrigated rice-total:	Yield(t/ha)	5,250	10,358	12,912	15,395	17,878	20,290	5,250	10,358	12,912	15,395	17,878	20,290	5,250	10,358	12,912	15,395	17,878	20,290	5,250	10,358	12,912	15,395	17,878	20,290
Non Irrigation area	Yield(t/ha)	2,850	5,622	7,008	8,355	9,702	11,010	2,850	5,622	7,008	8,355	9,702	11,010	2,850	5,622	7,008	8,355	9,702	11,010	2,850	5,622	7,008	8,355	9,702	11,010
2.2 Non irrigation area	Yield(t/ha)	2,400	4,736	5,904	7,040	8,176	9,280	2,400	4,736	5,904	7,040	8,176	9,280	2,400	4,736	5,904	7,040	8,176	9,280	2,400	4,736	5,904	7,040	8,176	9,280
2.3 Study area total(12,400ha)	Yield(t/ha)	14,554	24,314	29,659	34,933	39,277	43,550	14,554	24,314	29,659	34,933	39,277	43,550	14,554	24,314	29,659	34,933	39,277	43,550	14,554	24,314	29,659	34,933	39,277	43,550

Note: The planted area of crops are based on Table III-26.

Table IV-49 Anticipated Upland Crops Production in the Area

	With project condition					Without project condition					Incremental production of crops										
	Year after implementation					Year after implementation					Year after implementation										
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5						
1. With Prek Thnot Reservoir																					
1.1. Irrigation development area																					
	(ha)	Production(ton)					Production(ton)				(ha)	Production(ton)									
Kandal Stung	1,596	2,394	3,192	3,990	4,469	4,788	0					1,596	2,394	3,192	3,990	4,469	4,788				
(4,200 ha)		1,756	1,915	2,075	2,234	2,394						1,596	1,756	1,915	2,075	2,234	2,394				
Maize(38%)																					
Soybeans(38%)																					
Vegetables(12%)	504	2,520	3,528	4,032	4,536	5,040						504	2,520	3,528	4,032	4,536	5,040				
Tonie Bati	1,596	2,394	3,192	3,990	4,469	4,788	0					1,596	2,394	3,192	3,990	4,469	4,788				
(4,200 ha)		1,756	1,915	2,075	2,234	2,394						1,596	1,756	1,915	2,075	2,234	2,394				
Maize(38%)																					
Soybeans(38%)																					
Vegetables(12%)	504	2,520	3,528	4,032	4,536	5,040						504	2,520	3,528	4,032	4,536	5,040				
Total	3,192	4,788	6,384	7,980	8,938	9,576	0					3,192	4,788	6,384	7,980	8,938	9,576				
(8,400 ha)		3,511	3,830	4,150	4,469	4,788						3,192	3,511	3,830	4,150	4,469	4,788				
Maize(38%)																					
Soybeans(38%)																					
Vegetables(12%)	1,008	5,040	7,056	8,064	9,072	10,080						1,008	5,040	7,056	8,064	9,072	10,080				
2. Without Prek Thnot Reservoir																					
2.1 Irrigation development area																					
		Present					Present					Present									
	(ha)	1.2	1.5	2.0	2.5	2.8	3.0	(ha)	1.2	1.5	2.0	2.5	2.8	3.0	(ha)	1.2	1.5	2.0	2.5	2.8	3.0
Maize	270	405	540	675	756	810	0														
Soybeans	270	297	324	351	378	405	0														
Vegetables	270	1,350	1,890	2,160	2,430	2,700	0														
Kandal Stung	(1,950 ha)																				
Maize(14%)																					
Soybeans(14%)																					
Vegetables(14%)	270	1,350	1,890	2,160	2,430	2,700															
Tonie Bati	(1,600 ha)																				
Maize(15%)	240	360	480	600	672	720	0														
Soybeans(15%)	240	264	288	312	336	360	0														
Vegetables(15%)	240	1,200	1,680	1,920	2,160	2,400	0														
Sub-total	(3,400 ha)																				
Maize(15%)	510	765	1,020	1,275	1,428	1,530	0														
Soybeans(15%)	510	561	612	663	714	765	0														
Vegetables(15%)	510	2,550	3,570	4,080	4,590	5,100	0														

Note: Production of upland crop without project condition is assumed as negligible small, as same as the present condition.

Table IV-50 Incremental Agricultural Benefit (Financial)

	Without Prek Thnot Reservoir			
	With Prek Thnot Reservoir		Non Irrigation area	
	Irrigation Area	Non Irrigation area	Kandal Stung	Tonle Bati
I. Future:				
1.1 Gross production value(future):				
Rice	1,056	2.5 ton	1,028	1,056
Maize	174 *	0.14 ha	64	69
Soybeans	160 *	0.14 ha	59	63
Vegetables	382	0.14 ha	445	477
Livestock(increased)	172	0.76 head	62	66
1.2 Total(gross income/ha)	1,943		1,659	1,731
Kandal Stung	1,943			
Tonle Bati				
1.3 Production cost(future)				
Rice	126	1.0 ha	123	126
Maize & soybeans	54	0.14 ha	20	21
Vegetables	17	0.14 ha	20	21
Livestock: Increased	28 **		10	11
1.4 Total production cost	198		173	180
Kandal Stung	198			
Tonle Bati				
1.5 Net production value	1,745		1,486	1,551
Kandal Stung	1,745			
Tonle Bati				
II. Present:				
2.1 Gross production value(present)				
Rice:	218	1.20 ton/ha	255	218
Kandal Stung	218	1.20 ton/ha		
Tonle Bati				
2.2 Total(production cost/ha)	30	1.00 ha	30	30
Kandal Stung	30	1.00 ha		
Tonle Bati				
2.3 Net production value(present)	188		225	188
Kandal Stung	188			
Tonle Bati				
III. Net incremental value				
Kandal Stung area	1,557		1,261	1,326
Tonle Bati area	1,557			
Production of maize and soybeans	(3ton/ha + 1.5ton/ha)*38 % = 1,710 kg		Production of maize & soybeans 30 % of (3ton/ha + 1.5ton/ha = 4.5 ton/ha),203kg	
Maize&soybeans fed to pig, no of pig	1,710 kg* 30 % = 513 kg, 513/250 = 2.1 heads		Production of pig 203Kg/ 250kg/pig = 0.8 heads	
Production value of pig/ha	2.1 heads x 82\$/head = 172 US\$		Production value of pig/ha 0.8heads x 82 US\$/head =65.6 US\$	
Production of vegetables	12 % of net irrigated area = 10 ton /ha x 0.12 = 1.2 ton		Production of vegetables 15 % of net irrigated area = 10 ton /ha x 0.15 = 1.5 ton	
Production cost of rice	84.5US\$/ha (Tab. III-31)			
Production cost of maize & soybeans	143.1US\$/ha (Tab. III-31)			
Production cost of vegetables	30% of production cost of maize&soybeans,9 \$of piglet, and 5% of gross value.			
Production cost of livestock				

Note: See Table IV-51 for production cost.

Table IV-5(1/2) Crop Budget (Financial) for Proposed Farming Practices

(Currency unit: US\$)

Items	Rice		Maize/Soybeans		Groundnut		Sweetpotato		Sesame		Chillif(dry)		Chinese Cabbage									
	Unit	Qty	Price	Amount	Qty	Price	Amount	Qty	Price	Amount	Qty	Price	Amount	Qty	Price	Amount						
1. Output																						
Yield	ton/ha	4	182	728	3	218	654	2	682	15	45	675	0.5	582	291	1	910	910	10	318	3180	
Gross income		3	182	546	1.5	400	600								291		910				3180	
				1254			1254															
2. Input																						
Seed-a	kg/ha	50	204	10.2	20	255	5.1						10	500	5.0	0.3	1364	0.4	0.3	1364	0.4	
Seed-b	kg/ha	70	218	15.3	100	218	21.8	50	218	100	218	21.8			250	21	5.3	2.50	2.50	218	54.5	
Urea	kg/ha	200	264	52.8	400	264	105.6	300	264	200	264	52.8	200	264	52.8	300	264	79.2	300	264	79.2	
15-15-15	kg/ha	90	511	0.1	90	511	46.0	90	511			0.0						0.0			0.0	
Seed dress	gr/ha	2	511	1.0	2	511	1.0	4	511	2	511	1.0			2	511	1.0	2	511	1.0	1.0	
Insecticide	kg/ha	2	511	1.0	2	511	1.0	3	511	1.5	2	511	1.0		2	511	1.0	2	511	1.0	1.0	
Fungicide	kg/ha	130	0	0.0	150	0	0.0	110	0	0.0	90	0	0.0	90	0	110	0	0.0	0	0	50	0.0
Labour	day/ha	28	0	0.0	20	0	0.0	20	0	0.0	25	0	0.0	3	0	20	0	0.0	0	0	9	0.0
Draught	dy/ha	2	59	0.1	2	59	0.1	2	59	0.1	2	59	0.1		2	59	0.1	2	59	0.1	2	59
Sprayer	hr	2	59	0.1	2	59	0.1	2	59	0.1	2	59	0.1		2	59	0.1	2	59	0.1	2	59
Miscellaneous(5% of above items)			4.0				6.8				4.1				2.9		6.8				7.0	
Total production cost			84.5			143.6		100.5		86.9		60.7		143.1								143.1
3. Net income			(HYV)	643.5		1110.4		1263.5		588.1		230.3		766.9								3036.9
			(Local)	461.5																		

**Table IV-51 (2/2) Income and Production Cost of Pig
with Project Condition(Financial)**

Items	Unit (head)	Production (head)	Unit price (US\$)	Amount (US\$)
1. Output				
Product	head	1	82	82
Gross income				82
2. Inputs				
Piglet	head	1	9	9
Feeds	kg	250	*	8
Miscellaneous	(5 % of Gross income)			4
Total cost				21
3. Net income				61

Note: The price of pig feed is the same price of production cost of maize/soybeans.
Production cost of maize/soybeans is US\$143.6/4500kg, 250kg=8 \$.

Table IV-52 Incremental Benefit in Priority Development Area(Economic)

Items	Unit price/quan'ty	Kandal Stung	Tonle Bati
With project :			
Rice		(2,850) ha	(2,400) ha
Production		11,000 ton	9,300 ton
Gross production value	207 US\$/ton	2,277,000 US\$	1,925,100 US\$
Production cost	270 US\$/ha	769,500 US\$	648,000 US\$
Net production value		1,507,500 US\$	1,277,100 US\$
Secondary crops:			
Maize	270 ha	810 ton	240 ha 720 ton
Soybeans	270 ha	405 ton	240 ha 360 ton
Gross production value:			
Maize	147 US\$/ton	119,070 US\$	105,840 US\$
Soybeans	283 US\$/ha	114,615 US\$	101,880 US\$
Production cost	348 US\$/ton	93,960 US\$	83,520 US\$
Net production value		139,725 US\$	124,200 US\$
70% of NPV		97,808 US\$	86,940 US\$
Vegetables:	270 ha	2,700 ton	240 ha 2,400 ton
Gross production value	280 US\$/ton	756,000 US\$	672,000 US\$
Production cost	294 US\$/ha	79,380 US\$	70,560 US\$
Net production value		676,620 US\$	601,440 US\$
Pig:*	1,440 heads	98,000 US\$	1,280 heads 87,000 US\$
Production cost			
Piglet	9 \$/head	13,000 US\$	9 \$/head 12,000 US\$
Others	5%of gross value	5,000 US\$	5%of gross value 4,000 US\$
Net production value		80,000 US\$	71,000 US\$
Total net production value**		2,361,928 US\$	2,036,480 US\$
Without project:			
Rice	2,070 ha	2,900 ton	1,730 ha 2,420 ton
Gross production value	207 US\$/ton	600,300 US\$	500,940 US\$
Production cost	153 US\$/ha	316,710 US\$	264,690 US\$
Net production value		283,590 US\$	236,250 US\$
Total incremental benefit(Economic)		2,078,338 US\$	1,800,230 US\$
(Incremental economic benefit / hectare)		1,066 US\$	1,125 US\$

* Pig is fed with about 30% of production of maize and soybeans.
Cost for feed is counted as production cost of maize and soybeans.

** 70% of net income of maize and soybeans is included.

Refer to Table IV-53 (Crop Baged)

Table IV-53 Crop Budget (Economic) for Proposed Farming Practices

Items	Rice			Maize/Soybeans			Chinese Cabbage			
	Unit	Q'ty ton/ha	Price US\$/ton	Amount (US\$)	Q'ty ton/ha	Price US\$/ton	Amount US\$	Q'ty ton/ha	Price US\$/ton	Amount US\$
1. Output	ton/ha	4	207	828	3	147	441.0	10	280	2800
Yield	ton/ha	3	207	621	1.5	283	424.5			
Gross income							865.5			2800
2. Production cost										
2.1 Input			Cent	\$		Cent	\$		Cent	\$
Seed-a	kg/ha				15	15	2.3			
Seed-b	kg/ha	50	21	10.5	20	28	5.6	0.3	120	0.4
Urea	kg/ha	70	16	11.2	100	16	16.0	250	16	40.0
15-15-15	kg/ha	200	31	62.0	400	31	124.0	300	31	93.0
Seed dress	kg/ha	90	45	0.4	90	45	0.4		45	0.0
Insecticide	kg/ha	2	45	0.9	2	45	0.9	2	45	0.9
Pesticide	kg/ha	2	45	0.9	2	45	0.9	2	45	0.9
Labour	day/ha	130	80	104.0	150	80	120.0	110	80	88.0
Draught animal	day/ha	28	160	44.8	20	160	32.0	20	160	32.0
Sprayer	hr	2	5	0.1	2	5	0.1	2	5	0.1
Sub Total				234.8			302.2			255.0
2.2 Miscellaneous				35.2			45.3			38.3
Total production cost				270.0			347.5			293.5
3. Net income				(HYV) 558.0			518.0			2,506.5
				(Local) 351.0						

Table IV-54 Typical Household Budget with Project Condition

1. With Prek Thnot Reservoir condition

Items	Kandal Stung (1.2 ha)				
	Rice	Maize Soybeans	Veget.	Other crop	Livestock
Gross income	1,267	209	192	458	51
Production cost	152	65	21	21	2
Net income	1,115	144	192	437	49
Proposed living expenditure					
Total outgo					
Net reserve					

Items	Kandal Stung (1.2 ha)				
	Rice	Maize Soybeans	Veget.	Other crop	Livestock
Gross income	546			51	179
Production cost	101			2	34
Net income	445			49	145
Proposed living expenditure					
Total outgo					
Net reserve					

2. Without Prek Thnot Reservoir condition

Items	Kandal Stung (0.9 ha / Farm household)				
	Rice	Maize / Soybeans	Veget.	Other crop	Livestock
Gross income	925	60	50	400	50
Production cost	76	34	18	18	20
Net income	849	26	50	382	50
Proposed living expenses					
Total outgo					
Net reserve					

2.2 Non-irrigation area

Items	Kandal Stung (1.2 ha / Farm household)				
	Rice	Maize / Soybeans	Veget.	Other crop	Livestock
Gross income	546			51	179
Production cost	101			2	34
Net income	445			49	145
Proposed living expenses					
Total outgo					
Net reserve					

Note: Other crop includes sugar palm, vegetable planted in home garden, etc.

Rice income: 0.9 ha x 565 ton x 182 \$
 Maize income: 0.14 ha x 3 tons x 0.7 x 0.9 ha x 218 \$
 Soybeans income: 0.14 ha x 1.5 ton x 0.7 x 0.9 ha x 400 \$
 Livestock (increase): 189 kg / 250 = 0.7 heads, 0.7 x 82 = 57 \$
 This cost is included in production cost of maize

Items	Tonle Bati (1.3 ha)				
	Rice	Maize Soybeans	Veget.	Other crop	Livestock
Gross income	1,372	226	207	496	67
Production cost	165	70	22	22	1
Net income	1,207	156	185	474	66
Proposed living expenditure					
Total outgo					
Net reserve					

Items	Tonle Bati (1.3 ha)				
	Rice	Maize Soybeans	Veget.	Other crop	Livestock
Gross income	592			67	139
Production cost	110			1	38
Net income	482			66	101
Proposed living expenditure					
Total outgo					
Net reserve					

Items	Tonle Bati (1.3 ha / Farm household)				
	Rice	Maize / Soybeans	Veget.	Other crop	Livestock
Gross income	1,480	100	90	670	20
Production cost	118	30	21	21	40
Net income	1,362	70	90	649	20
Proposed living expenses					
Total outgo					
Net reserve					

Items	Tonle Bati (1.3 ha / Farm household)				
	Rice	Maize / Soybeans	Veget.	Other crop	Livestock
Gross income	592			67	139
Production cost	110			1	38
Net income	482			66	101
Proposed living expenses					
Total outgo					
Net reserve					

Rice income: 1.4 ha x 5.8 x 182 \$
 Maize income: 0.15 ha x 3.0 ton x 0.7 x 218 \$
 Soybeans income: 0.15 ha x 1.5 ton x 0.7 x 400 \$
 Livestock (increase): 0.15 ha x (3.0+1.5)*0.3*1.4=265kg/250=1.1 head
 1.1 x 82 = 90.2 \$

Table IV-55 Proposed Staffing and Facilities of Agricultural Development Centres

Items	Kandal Stung	Kandal Stung	Tonle Bati	Total
	No. 1	No. 2		
Staffing				
Administration				
General manager	1	1	1	3
Section chief	1	1	1	3
Clerk	1	1	1	3
Accountant	1	1	1	3
Typist	1	1	1	3
Vehicle driver	5	5	5	15
Office boy	3	3	3	9
Agricultural extension				
Section chief*	1	1	1	3
Subject matter specialist	3	3	3	9
Field extension worker	7	10	10	27
Life improvement extension				
Section chief**	1	1	1	3
Life improvement worker	3	5	6	14
Supply and marketing				
Section chief	1	1	1	3
Storehouse manager	1	2	3	6
Clerk	2	4	6	12
Store keeper	2	4	6	12
Operation and maintenance				
Assistant civil engineer	1	1	1	3
Maintenance work supervisor	2	2	2	6
Farm machinery mechanic	1	1	1	3
Farm machinery operator	2	2	2	6
Ditch tender	0	2	2	4
Buildings				
Main office	550 m ²	550 m ²	(550) m ²	1,100 m ²
Staff quarters	2,220 m ²	2,640 m ²	3,060 m ²	7,920 m ²
Store house	1,000 m ²	1,500 m ²	2,000 m ²	4,500 m ²
Garage	75 m ²	75 m ²	75 m ²	225 m ²
Generator house & others	70 m	70 m	20 m	160 m
Community hall				
Office	1,000 m ²	1,500 m ²	1,630 m ²	4,130 m ²
Quarters	1,400 m ²	2,100 m ²	2,240 m ²	5,740 m ²
Trial/demonstration farm				
Centre	1 ha	1 ha	1 ha	3 ha
Community hall	0.1 ha	0.1 ha	0.1 ha	0.3 ha
Equipment				
4WD vehicle	4 units	4 units	4 units	12 units
Minibus (20 persons)	1 unit	1 unit	1 unit	3 units
Mobile extension unit	1 unit	1 unit	1 unit	3 units
Cold storage of vaccine (solar energy type)	1 set	1 set	1 set	3 sets
Copy/printing machine	1 set	1 set	1 set	3 sets
Personal computer	2 sets	2 sets	2 sets	6 sets
Generator	1 set	1 set	1 set	3 sets
Portable generator	2 sets	2 sets	2 sets	6 sets
Motor cycle for worker	16 units	24 units	28 units	68 units
Farm machinery***	1 set	1 set	1 set	3 sets

Note: * The section chief is one of the specialists.

** The section chief is the life improvement specialist.

*** Including tractor, trailer, plow, harrow, sprayer, thresher, etc.

Table IV- 56 Proposed Cropping Pattern in Priority Development Area

Irrigation development area	Kandal Stung Area					Tonle Bati Area			
	Area planted(ha)	Proportion	1,950 (ha)			Proportion	1,600 (ha)		
			WS	DS	Total		WS	DS	Total
Rice:			1,950	900	2,850		1,600	800	2,400
Early dry season(HYV)	46%			900	900	50%		800	800
Early wet season(HYV)	50%		975		975	50%	800		800
Medium rice(HYV)	30%		585		585	30%	480		480
HYV-area			1,560	900	2,460		1,280	800	2,080
Local variety	20%		390		390	20%	320		320
Maize*	14%			270	270	15%		240	240
Soybeans*	14%			270	270	15%		240	240
Vegetables	14%			270	270	15%		240	240
Total area/intensity*	174%		1,950	1,440	3,390	180%	1,600	1,280	2,880

* Maize and soybeans are of mixed cultivation.

Table IV- 57 Anticipated Crop Production in Priority Development Area

Irrigation area	Kandal Stung area							Tonle Bati area						
	Yield(t/ha)	Year after implementation						Present	Year after implementation					
		Present	1	2	3	4	5		1	2	3	4	5	
(ha)	1.4	2.0	2.5	3.0	3.5	4.0	(ha)	1.4	2.0	2.5	3.0	3.5	4.0	
Rice:														
HYV	2,460	4,920	6,150	7,380	8,610	9,840	2,080	4,160	5,200	6,240	7,280	8,320		
Local	390	780	858	975	1,092	1,170	320	448	640	704	800	896	960	
Total production	2,850	5,700	7,008	8,355	9,702	11,010	2,400	4,800	5,904	7,040	8,176	9,280		
Upland crops														
Yield(t/ha)														
Maize		1.2	1.5	2.0	2.5	2.8	3.0	1.2	1.5	2.0	2.5	2.8	3.0	
Soybeans		1.0	1.1	1.2	1.3	1.4	1.5	1.0	1.1	1.2	1.3	1.4	1.5	
Vegetables			5.0	7.0	8.0	9.0	10.0		5.0	7.0	8.0	9.0	10.0	
Upland crops:														
Maize	270	405	540	675	756	810	240	360	480	600	672	720		
Soybeans	270	297	324	351	378	405	240	264	288	312	336	360		
Vegetables	270	1,350	1,890	2,160	2,430	2,700	240	1,200	1,680	1,920	2,160	2,400		

**Table IV-58 Proposed Staffing and Facilities
of Agricultural Development Centres**

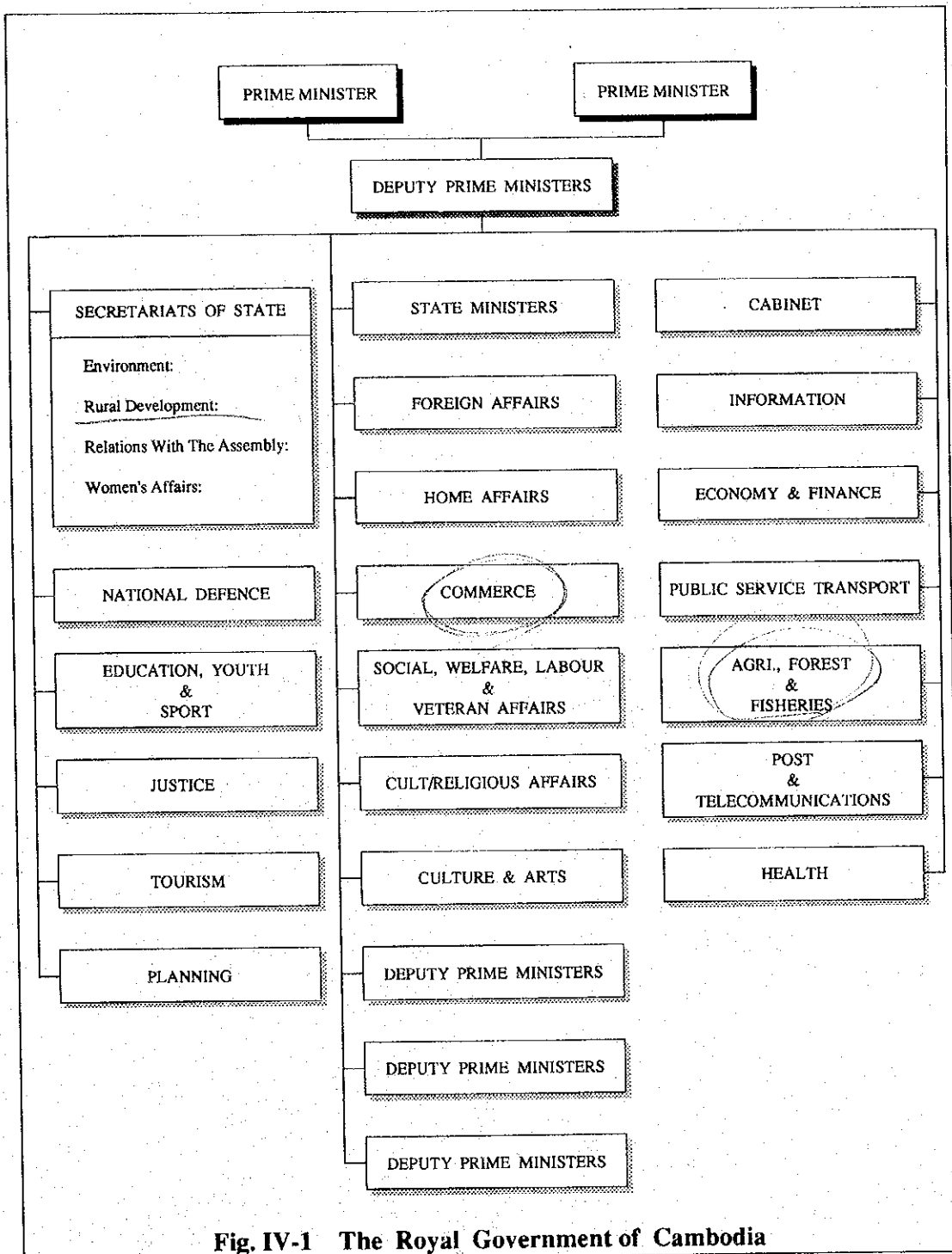
Items	Kandal Stung No. 2	Tonle Bati
Staffing		
Administration		
General manager	1	1
Section chief	1	1
Clerk	1	1
Accountant	1	1
Typist	1	1
Vehicle driver	5	5
Office boy	2	2
Security	2	2
Agricultural extension		
Section chief*	1	1
Subject matter specialist	3	3
Field extension worker	7	3
Life improvement extension		
Section chief**	1	1
Life improvement worker	3	2
Supply and marketing		
Section chief	1	1
Storehouse manager	1	1
Clerk	2	2
Store keeper	2	2
Operation and maintenance		
Assistant civil engineer	1	1
Maintenance work supervisor	2	2
Farm machinery mechanic	1	1
Farm machinery operator	2	2
Ditch tender	2	2
Buildings		
Main office	500 m ²	(500) m ²
Staff quarters	1,200 m ²	1,000 m ²
Store house	660 m ²	560 m ²
Garage	75 m ²	75 m ²
Generator house & others	50 m ²	- m ²
Community hall		
Office	950 m ²	390 m ²
Quarters	1,000 m ²	500 m ²
Trial/demonstration farm		
Centre	1 ha	1 ha
Community hall	0.1 ha	0.1 ha
Equipment		
4WD vehicle	4 units	4 units
Minibus (20 persons)	1 unit	1 unit
Mobile extension unit	1 unit	1 unit
Cold storage of vaccin(solar energy type)	1 set	1 set
Copy/printing machine	1 set	1 set
Personal computer	2 sets	2 sets
Generator	1 set	1 set
Portable generator	2 sets	2 sets
Mortor cycle for worker	14 units	9 units
Farm machinery***	1 set	1 set

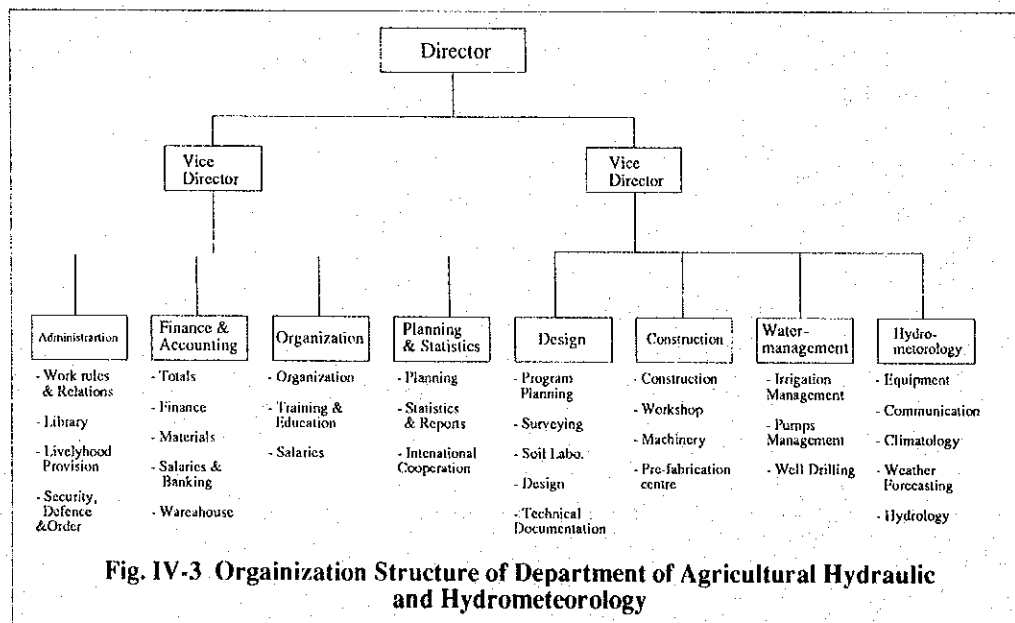
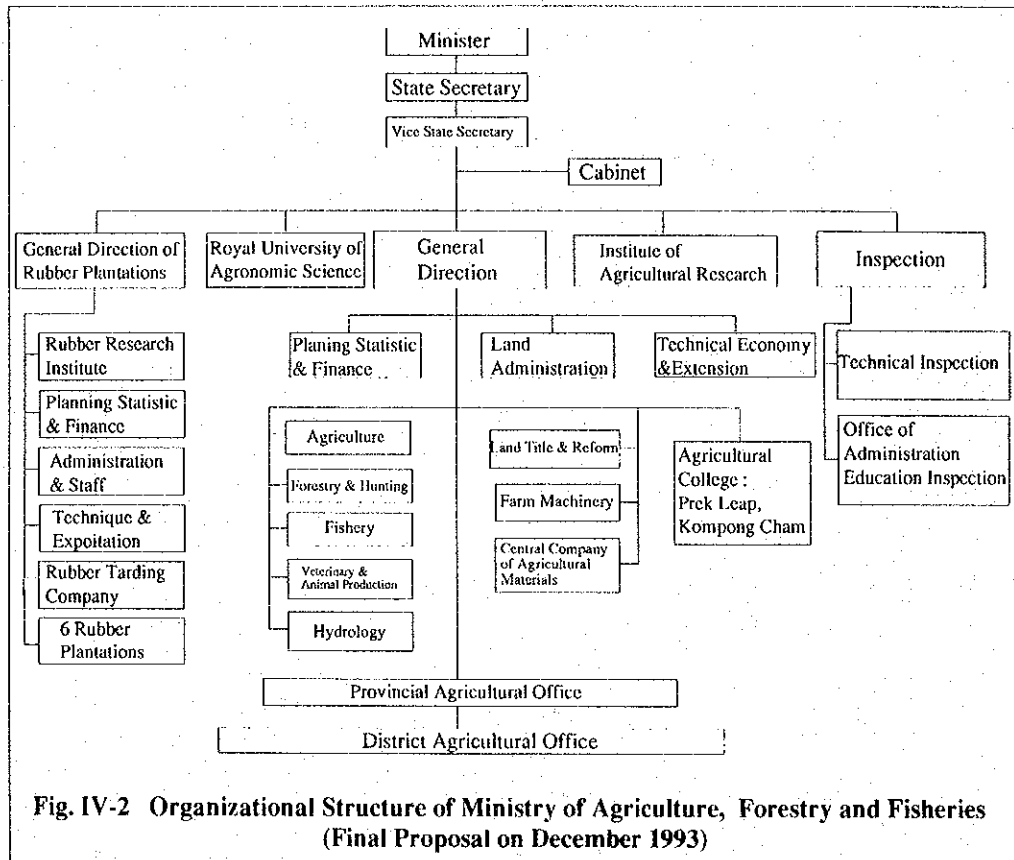
Note: * The section chief is one of the specialists.

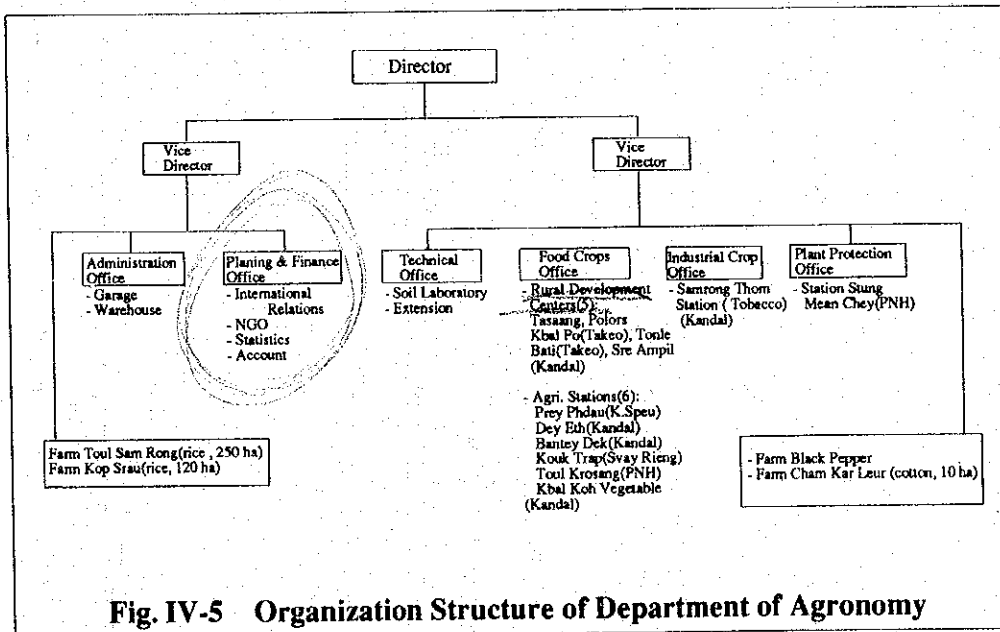
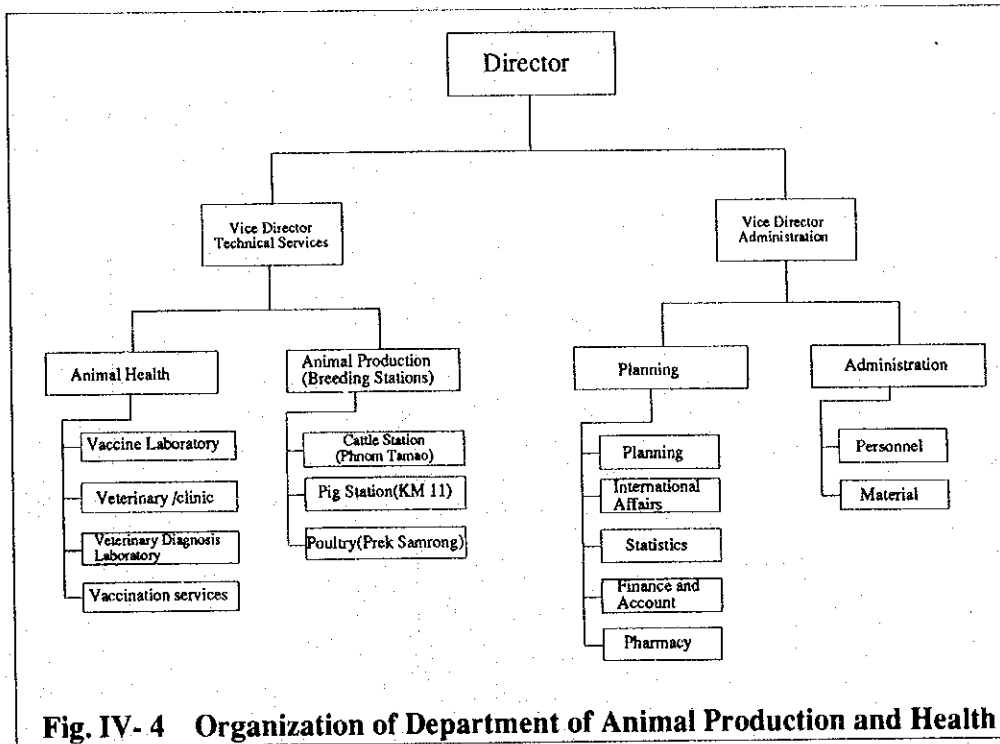
** The section chief is the life improvement specialist.

*** Including tractor, trailer, plow, harrow, sprayer, thresher, etc.
(550) Existing office is used.

Figures







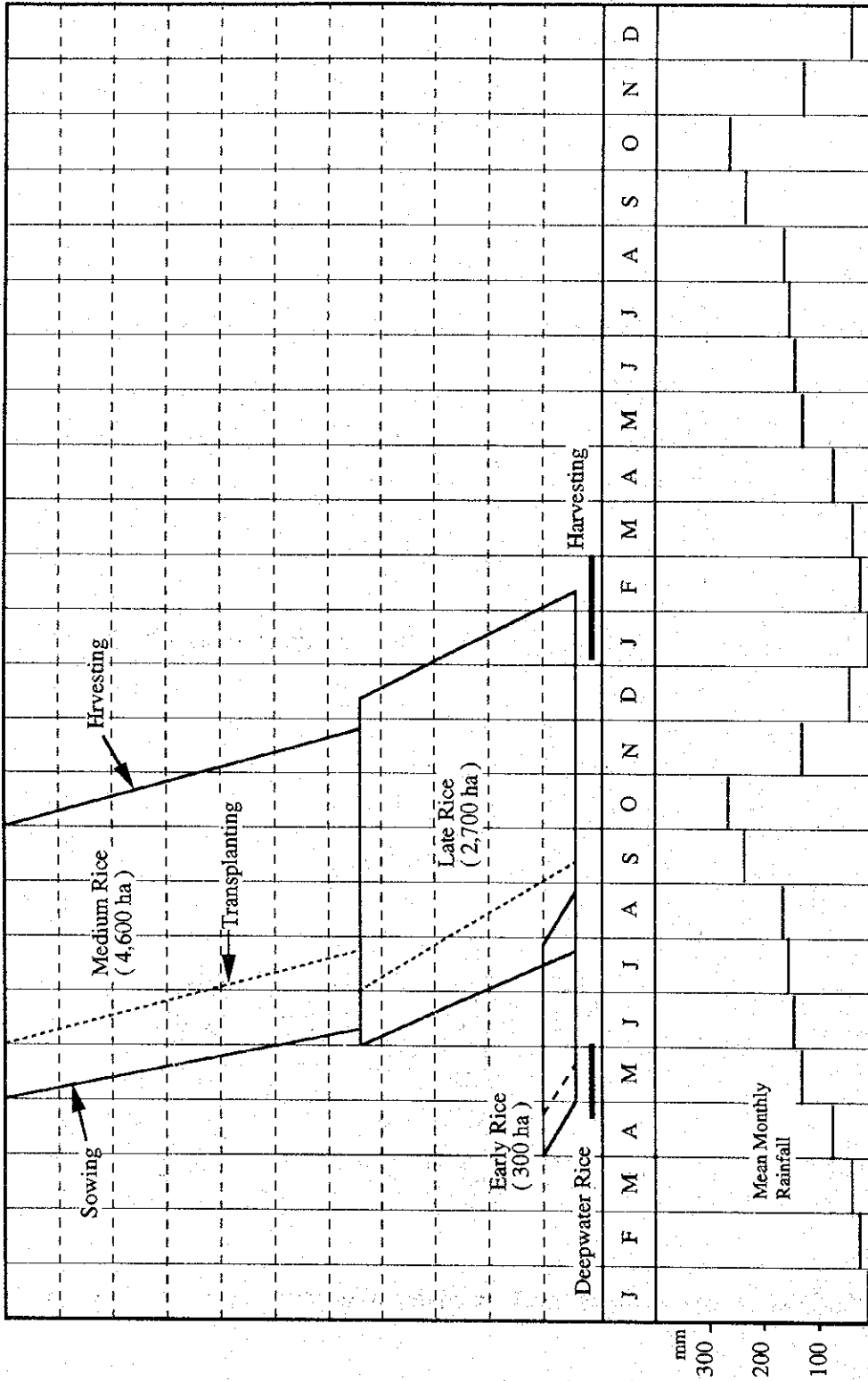


Fig. IV-6 Present Cropping Pattern in Kandal Stung Study Area

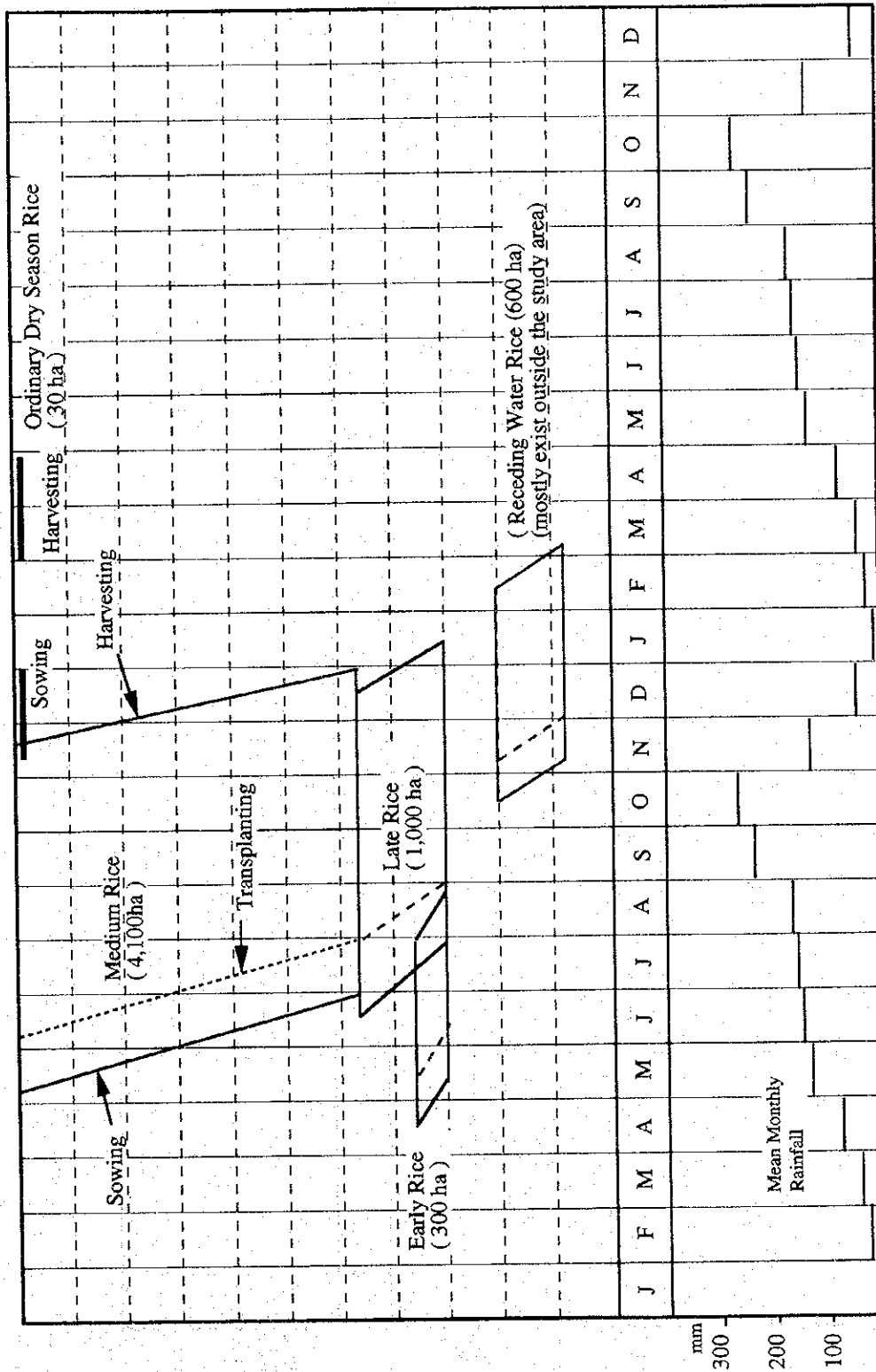


Fig. IV-7 Present Cropping Pattern in Tonle Bati Study Area

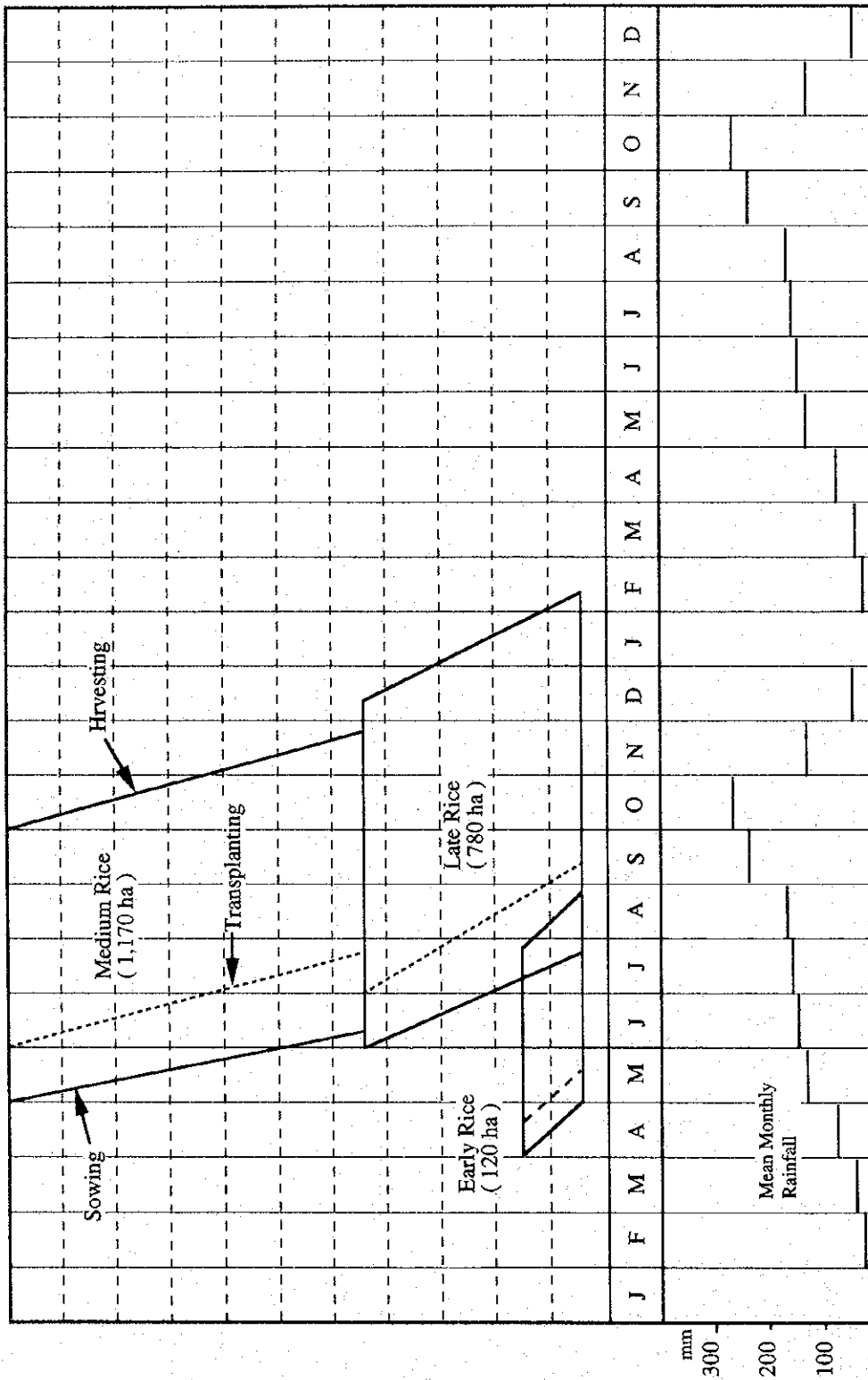


Fig. IV-8 Present Cropping Pattern in Kandal Stung Priority Development Area

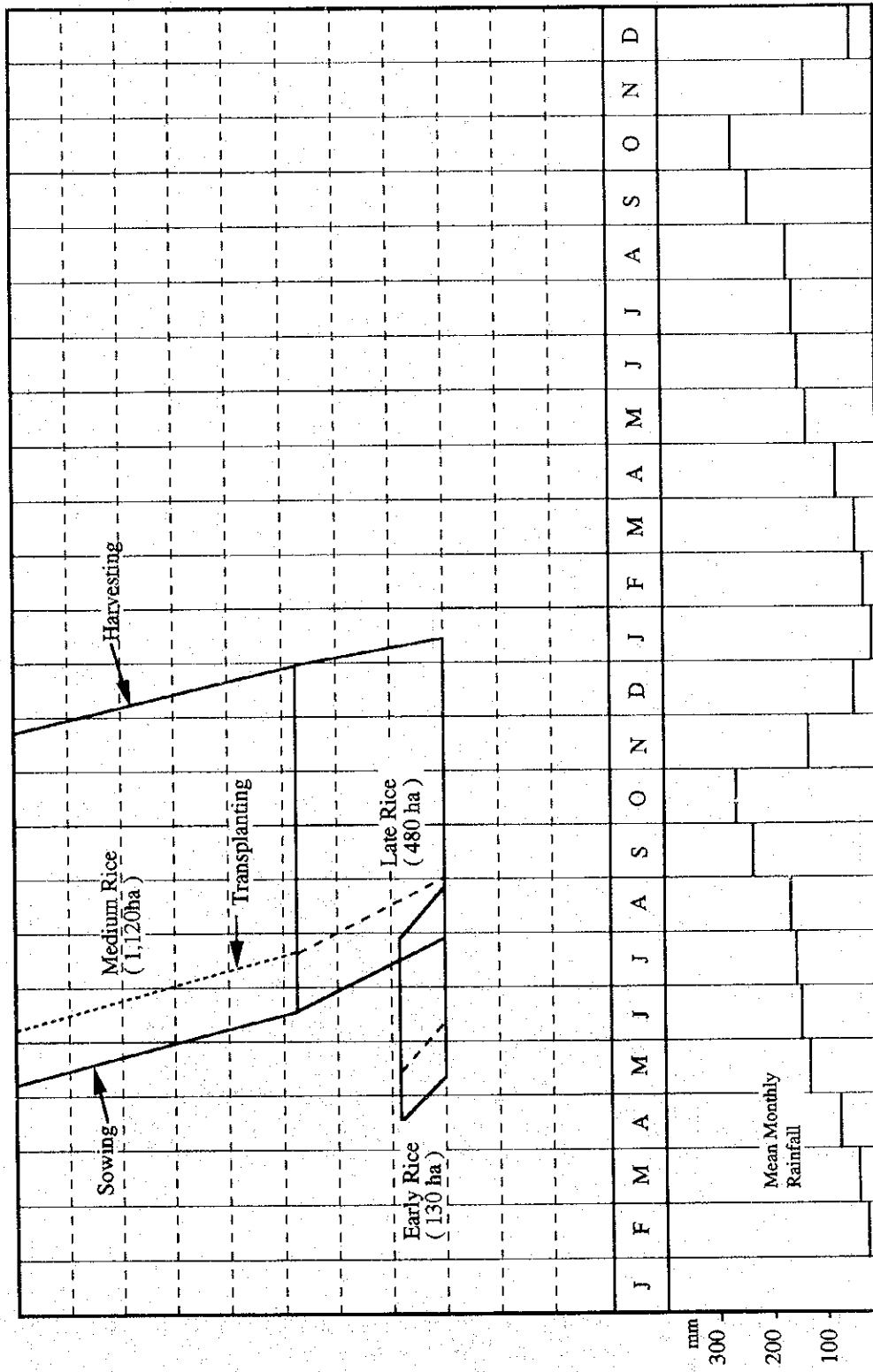
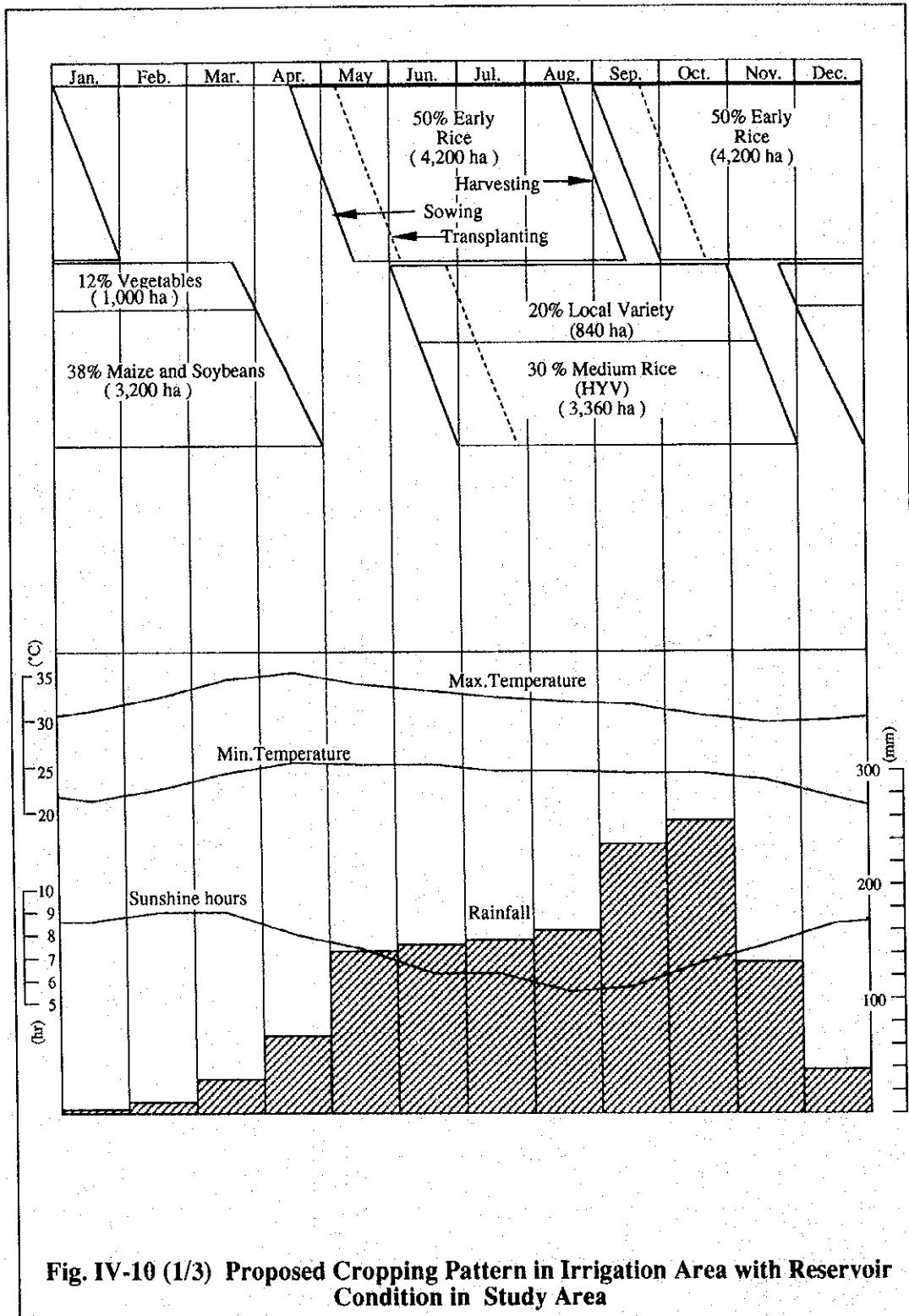
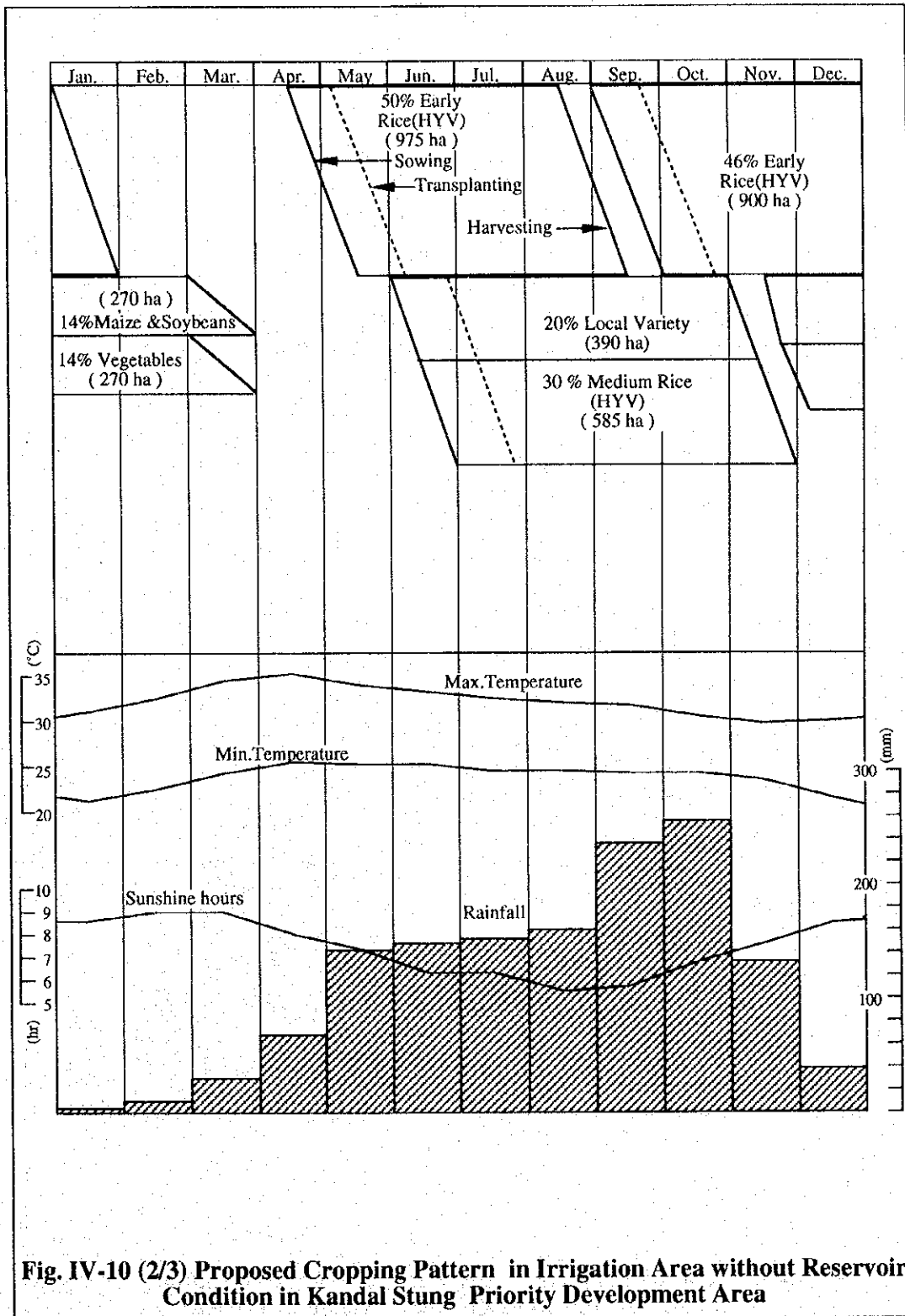
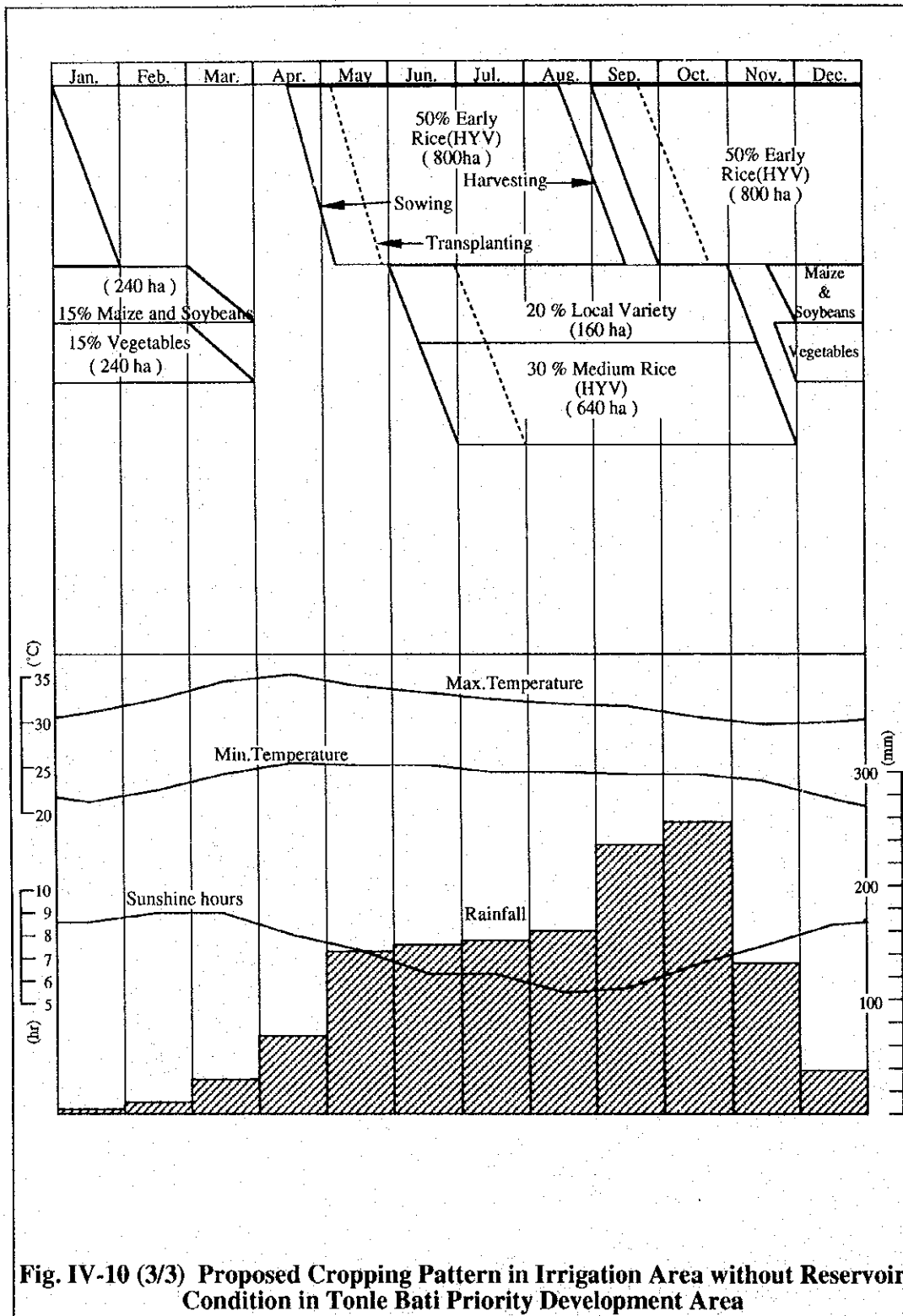
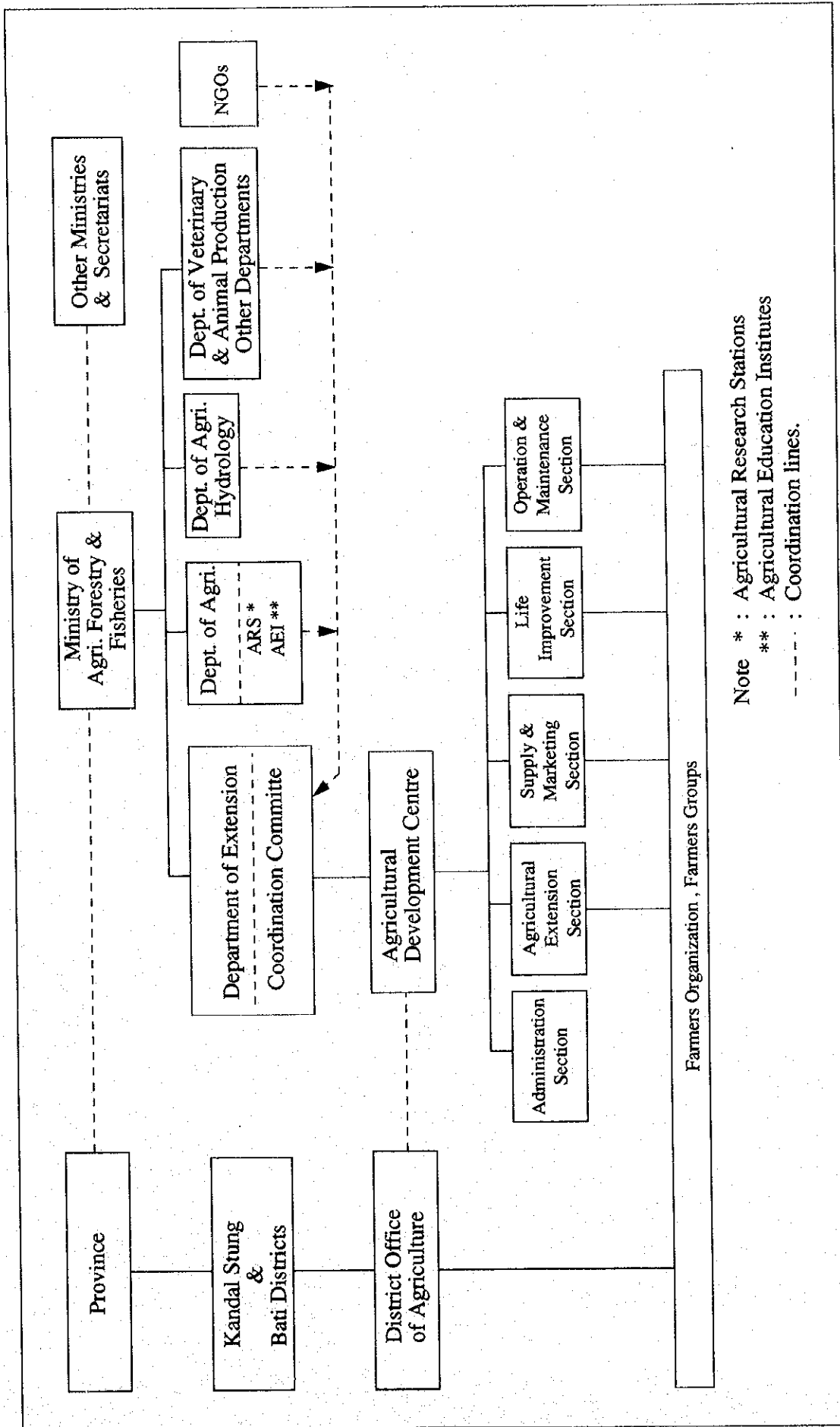


Fig. IV-9 Present Cropping Pattern in Tonle Bati Priority Development Area









Note * : Agricultural Research Stations
 ** : Agricultural Education Institutes
 - - - - : Coordination lines.

Fig. IV-11 Proposed Operation System and Organization of Agricultural Development Centre

APPENDIX IV-1
NOTES ON LAND OWNERSHIP IN CAMBODIA

Appendix IV-1

NOTES ON LAND OWNERSHIP IN CAMBODIA

Between 1979 and 1986, when the land was the exclusive property of the State, 3 forms of collectivization in rice growing, known as Krom Samaki or Solidarity Groups, were practiced:

1. the land worked in common throughout the growing cycle;
2. ploughing and planting out done in common, with tilling and harvesting done on a family basis;
3. land distributed to families at the beginning of each season.

Between 1986 and 1989 interest in these forms of organisations was falling and collectivisation was less strictly applied. Form 2 became more prominent since it ensured that the harvest would go to whoever had worked to produce it. Gradually, family subsistence production thus became recognised leading to the appointment of a 'Family Food Production Committee' by the authorities.

In 1989, the National Assembly amended the Constitution and introduced concepts of private ownership of land, with 3 land tenure regimes coming into being:

1. private ownership around the house;
2. possession: usufruct rights to state owned land against payment of a fee;
3. concession: grants of surplus land or land to be cultivated by farmers who are in a position to expand their cropping activities.

The distribution of land was carried out in 3 stages:

1. the farmer declares the land he has worked during the last two or three years, as preliminary to his being granted a provisional title;
2. (more or less simultaneous with stage 1) the villages are required to determine quotas of land per inhabitant (i.e. cultivated area divided by the number of people in the village in 1989);
3. the land tenure survey stage, during which topographic surveys are carried out, the farmers' statements are verified and cadastral maps established. The substantive land title will now be registered by the Cadastre Department set up for this purpose.

It has been observed that the privatisation of land has had both positive and negative results: on the one hand, it has motivated farmers to rebuilding and maintaining the paddy bunds, as well as planting sugarpalms. On the other hand, although land distribution is often done in a proper manner, the productivity of land varies and the various powers in the village can and do influence the allocation of the land.

It is also clear that, in particular, the third tenure regime creates (substantial) differences between families in villages. Those who have -or can manage to get access to- the means of production are more likely to advance faster than those who have not. An important element in this context is the fact that some farmers have no animal traction but, instead, are obliged to resort to hiring or make a disproportionate return for any labour they agree to exchange (FAO;1991).

APPENDIX IV-2
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Appendix IV-2

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