

I.3 MASTER PLAN AREA(Data on Provincial Basis)

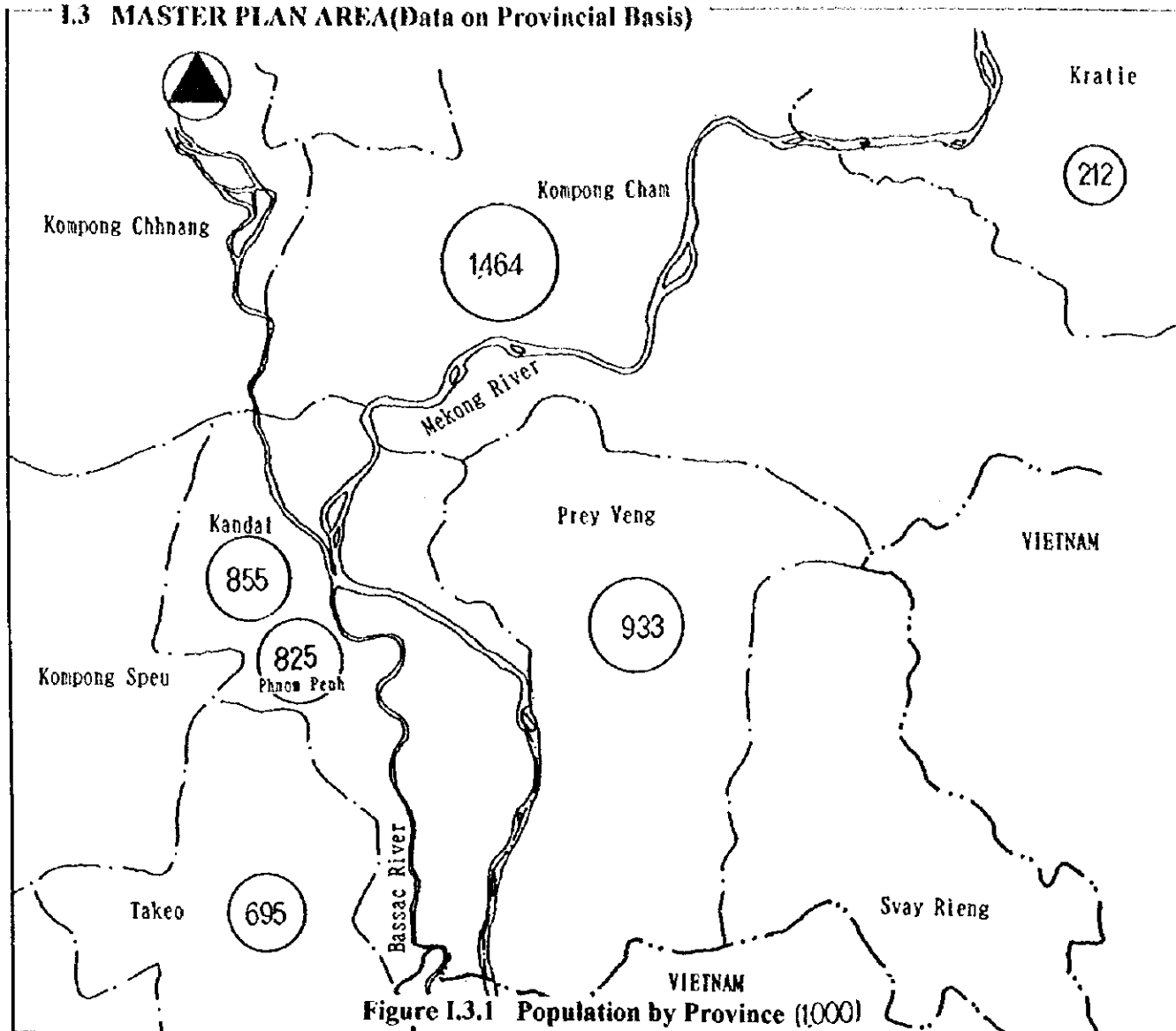
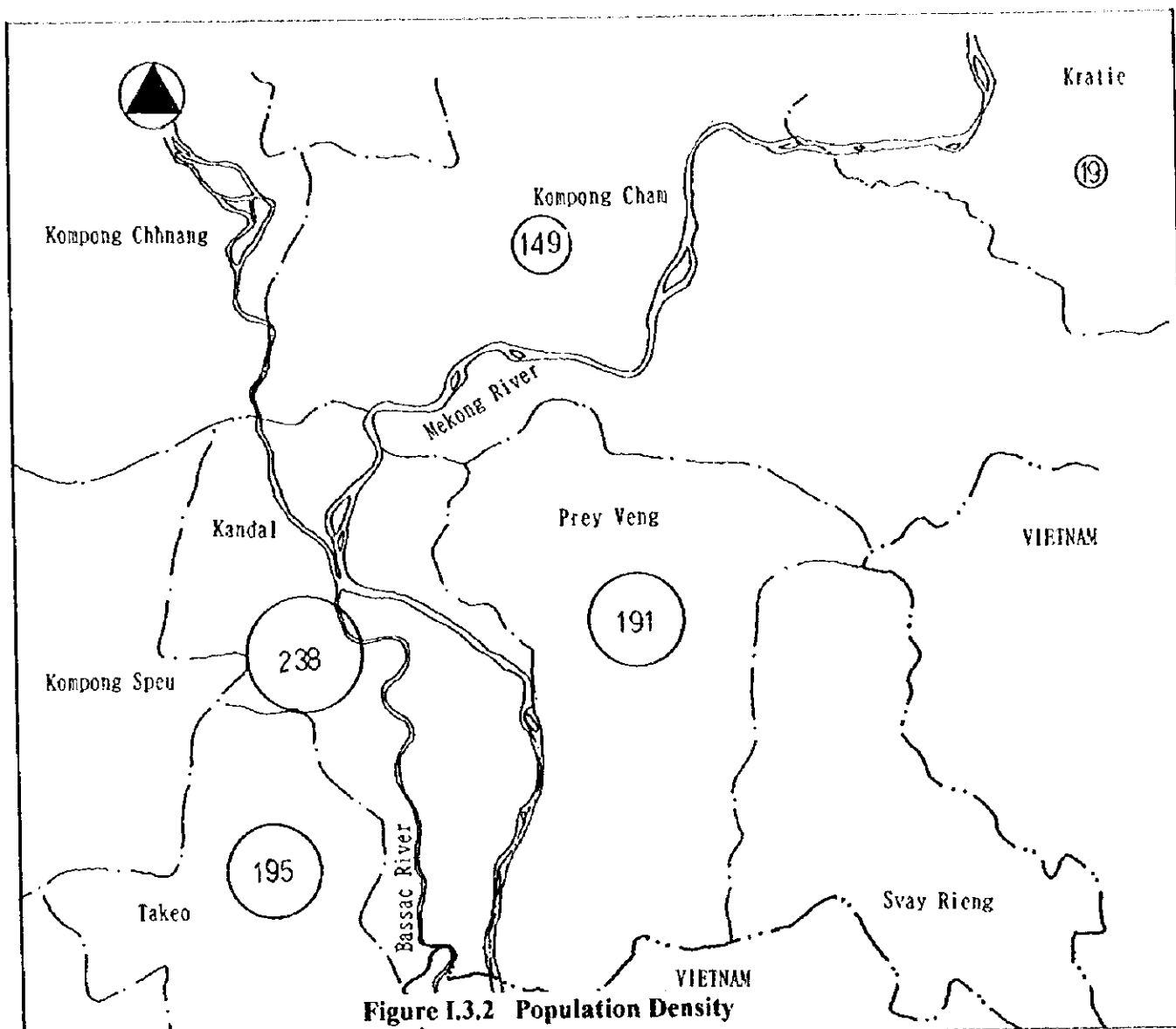


Figure I.3.1 Population by Province (1,000)

Population by Province

(unit:1,000)

Province	1981	1986	1993	1994
Whole Country	6,679	7,672	9,653	9,856
Phnom Penh City	329	561	810	825
Kandal	720	762	893	855
Kompong Cham	1066	1,205	1,417	1,464
Svay Rieng	292	329	442	443
Prey Veng	672	758	900	933
Takeo	531	598	675	695
Kompong Thom	379	427	498	490
Siem Reap	177	538	598	680
Banteay Mean Chey	-	-	190	520
Battambang	718	810	670	685
Pursat	175	197	310	325
Kompong Chhnang	221	249	329	326
Sihanouk Ville	53	59	114	121
Kampot	354	399	482	481
Koh Kong	26	29	74	71
Kompong Speu	340	383	494	490
Preah Vihear	69	78	92	98
Ratanakiri	45	51	71	64
Stung Treng	39	44	67	56
Mondulkiri	16	18	23	22
Kratie	157	177	204	212



Population Density (1994)

Province	Land Area (km ²)	Population (1,000)	Population Density
Whole Country	181,035	9,856	54
Phnom Penh City	267	825	3,090
Kandal	3,591	855	238
Kompong Cham	9,799	1,461	149
Svay Rieng	2,966	443	149
Prey Veng	4,883	933	191
Takeo	3,563	695	195
Kompong Thom	13,811	490	35
Siem Reap	15,271	680	45
Banteay Meanchey	9,937	520	52
Battambang	10,433	685	66
Pursat	12,692	325	26
Kompong Chhnang	5,521	326	59
Kompong Som	868	121	139
Kampot	5,209	481	92
Koh Kong	11,160	71	6
Kompong Speu	7,017	490	70
Preah Vihear	13,788	98	7
Stung Treng	11,092	56	5
Ratanakiri	10,782	64	6
Mondulkiri	14,288	22	2
Kratie	11,091	212	19

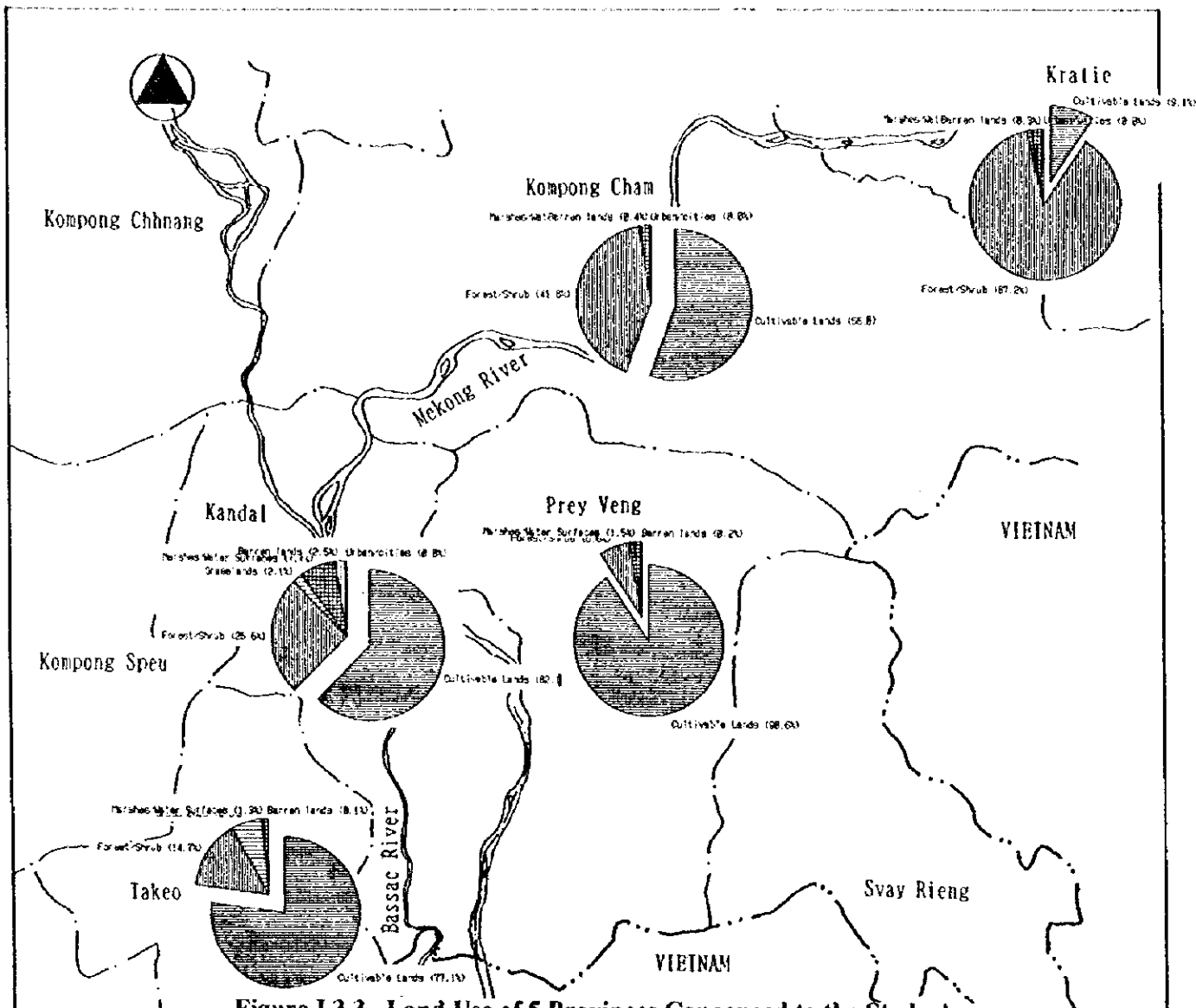
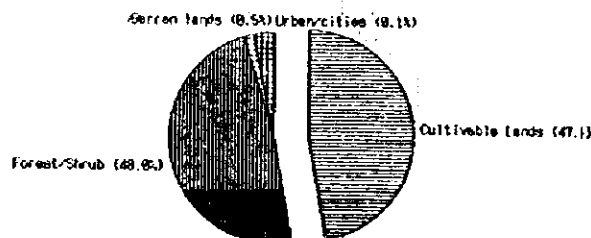


Figure I.3.3 Land Use of 5 Provinces Concerned to the Study Area

Land Use of Provinces Concerned to the Study Area

	(unit: km ²)							Total	(%)
	Kandal	Kompong Cham	Kratie	Prey Veng	Takeo	Phnom Penh			
Urban/cities	1	4	0	0	0	27	32	0.09	
Cultivable Lands	2,276	5,218	1,096	4,390	2,644	298	15,922	47.16	
Forest/Shrub	935	3,889	10,517	321	505	31	16,198	47.98	
Grasslands	78	6	105	50	233	19	491	1.45	
Marshes/Water Surfaces	282	202	310	74	46	27	941	2.79	
Barren lands	91	39	33	12	2	0	177	0.52	
Total	3,663	9,358	12,061	4,847	3,430	402	33,761	100.00	

Land Use of 5 Provinces Concerned to the Study Area



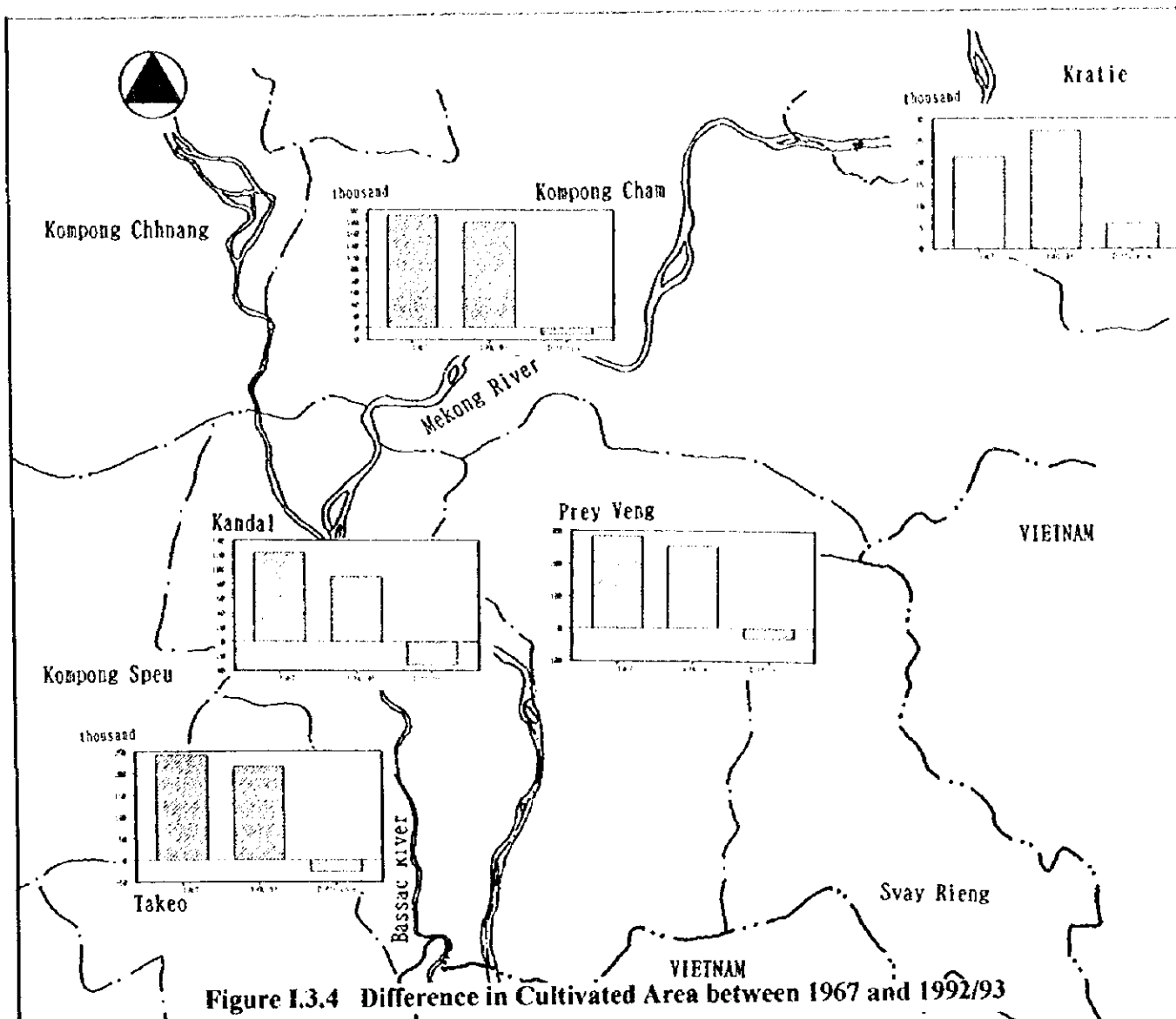
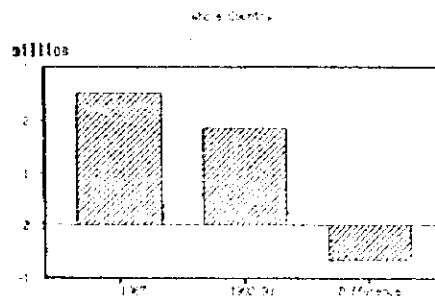


Figure I.3.4 Difference in Cultivated Area between 1967 and 1992/93

Difference of Cultivated Area between 1967 and 1992/93

Province	Cultivated Area (ha)			%
	1967	1992/93	Difference	
Whole Country	2,509,500	1,811,000	-665,500	73.18
Kandal/Phnom Penh	123,500	91,000	-32,500	73.68
Kompong Cham	191,200	179,760	-11,440	94.02
Svay Rieng	182,600	165,320	-17,280	90.54
Prey Veng	285,300	253,960	-31,340	89.02
Takeo	243,700	216,280	-27,420	88.75
Kompong Thom	170,100	132,650	-37,450	77.98
Siem Reap	273,200	158,900	-114,300	58.16
Battambang	473,200	143,810	-329,390	30.39
Banteay Mean Chey	-	121,500	121,500	-
Pursat	99,500	56,360	-43,140	56.61
Kompong Chhnang	106,300	80,880	-25,420	76.09
Sihanouk Vill	-	9,920	9,920	-
Kampot	158,100	102,890	-55,510	61.96
Koh Kong	5,900	5,300	-600	89.83
Kompong Speu	141,100	69,260	-71,840	49.09
Preah Vihear	-	9,000	9,000	-
Stung Treng	5,800	10,980	5,180	189.31
Ratanakiri	23,200	1,950	-18,250	21.31
Mondulkiri	5,200	1,100	-1,100	78.85
Kratie	21,300	27,180	5,880	127.61



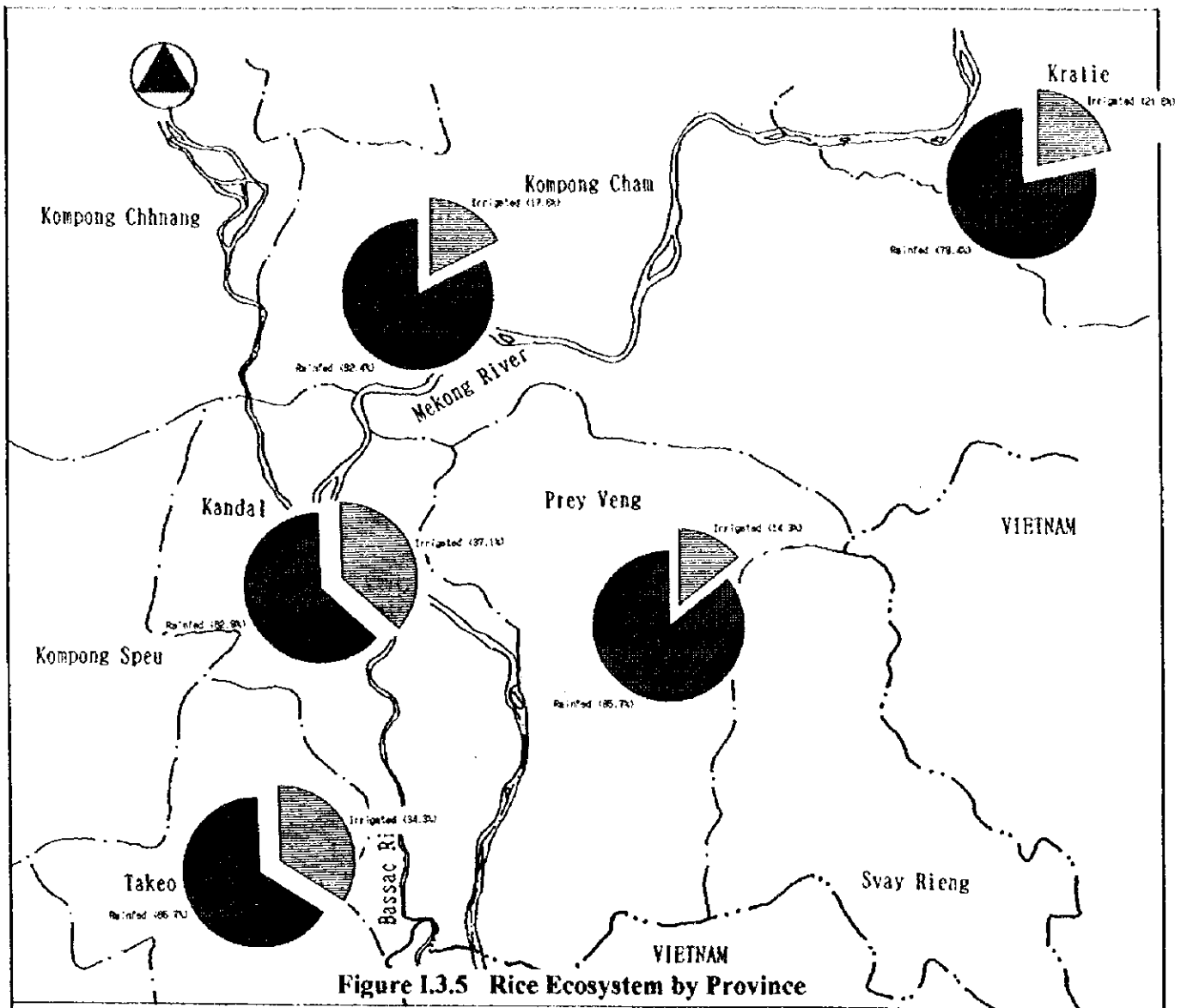
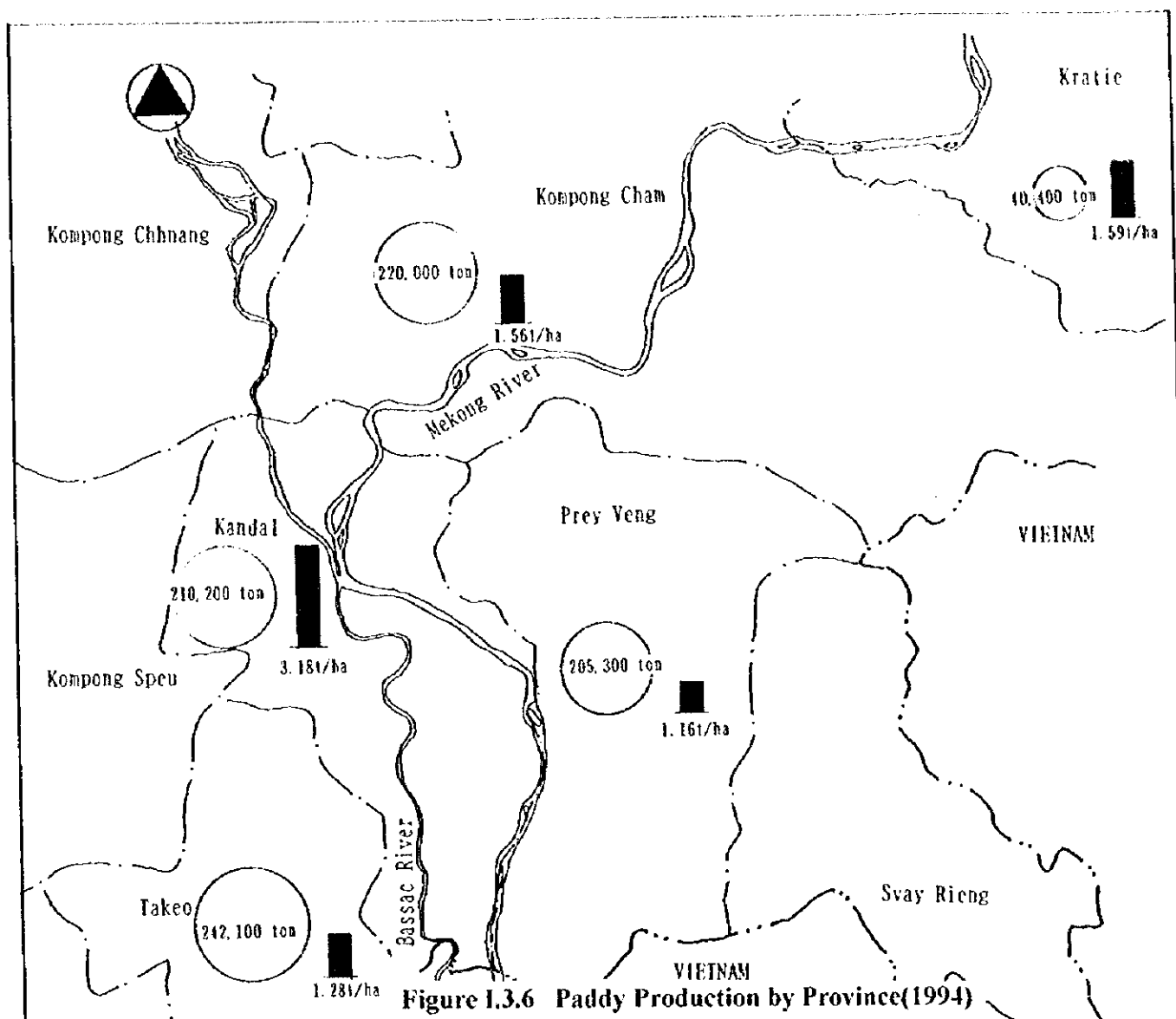


Figure I.3.5 Rice Ecosystem by Province

Rice Ecosystem by Province

Province	Total (ha)	Irrigated Area (ha)					Floating Rice	Rainfed Rice	Irrigated Area (%)					Floating Rice	Rainfed Rice
		Single Wet	Double Wet	Total Wet	Double Dry	Recession			Single Wet	Double Wet	Total Wet	Double Dry	Recession		
Phnom Penh/Kandal	91,000	10,092	1,490	11,582	2,940	18,260	1,000	57,218	11.1	1.6	12.7	3.2	20.1	1.1	62.9
Kompong Cham	179,760	20,305	3,965	24,270	225	3,100	4,000	148,165	11.3	2.2	13.5	0.1	1.7	2.2	82.4
Svay Rieng	165,320	8	235	243	315	0	3,000	161,762	0.0	0.1	0.1	0.2	0.0	1.8	97.8
Prey Veng	253,960	4,455	3,625	8,080	4,729	12,593	11,000	217,558	1.8	1.4	3.2	1.9	5.0	4.3	85.7
Takeo	216,280	1,235	11,210	12,445	10,590	31,050	20,000	147,195	0.6	5.2	5.8	4.9	14.4	9.2	65.7
Kompong Thom	132,650	10,200	22,520	32,720	1,370	0	30,000	68,560	7.7	17.0	24.7	1.0	0.0	22.6	51.7
Siem Reap	158,900	13,160	5,100	18,260	3,000	3,245	12,000	127,395	8.3	3.2	11.5	1.9	2.0	7.6	77.0
Battambang	143,810	2,820	21,170	23,990	507	0	7,000	112,313	2.0	14.7	16.7	0.4	0.0	4.9	78.1
Banteay Meanchey	121,500	100	9,020	9,120	93	0	16,000	96,287	0.1	7.4	7.5	0.1	0.0	13.2	79.2
Pursat	56,360	4,317	0	4,317	0	0	6,000	46,043	7.7	0.0	7.7	0.0	0.0	10.6	81.7
Kompong Chhnang	80,880	5,415	200	5,615	100	609	11,000	63,556	6.7	0.2	6.9	0.1	0.8	13.6	78.6
Kompong Som	9,920	0	0	0	0	0	9,920	9,920	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Kampot	102,890	2,030	2,950	4,980	1,310	0	96,540	96,540	2.0	2.9	4.8	1.3	0.0	0.0	93.8
Koh Kong	5,300	0	0	0	0	0	5,300	5,300	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Kompong Speu	69,260	11,606	6,952	18,558	743	0	49,959	49,959	16.8	10.0	26.8	1.1	0.0	0.0	72.1
Preah Vihear	9,000	0	0	0	0	0	9,000	9,000	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Stung Treng	10,980	0	0	0	0	0	10,980	10,980	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Ratanakiri	4,950	0	0	0	0	0	4,950	4,950	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Monduliri	4,100	0	0	0	0	0	4,100	4,100	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Kratie	27,180	2,547	0	2,547	0	3,317	21,316	21,316	9.4	0.0	9.4	0.0	12.2	0.0	78.4
Total	1,844,000	88,290	88,437	176,727	25,982	22,174	121,000	1,448,117	4.8	4.8	9.6	1.4	3.9	6.6	78.5



Paddy Production by Province (1994)

Province	Cultivated Area (ha)			Harvested Area (ha)	Yield (t/ha)	Production (ton)
	Total	Wet Season	Dry Season			
Whole Country	1,924,000	1,754,000	170,000	1,494,000	1.49	2,223,000
Phnom Penh	9,900	8,630	1,270	7,330	1.68	12,300
Kandal	83,790	45,000	38,790	66,040	3.18	210,200
Kompong Cham	190,390	170,000	20,390	141,390	1.56	220,000
Svay Rieng	159,700	156,950	2,750	148,930	1.04	154,400
Prey Veng	230,290	195,700	34,590	177,560	1.16	205,300
Takeo	227,750	185,160	42,590	189,100	1.28	242,100
Kompong Thom	127,460	124,600	2,860	89,630	1.50	134,100
Siem Reap	178,860	169,700	9,160	153,660	1.44	221,000
Battambang	143,520	141,340	2,180	75,920	2.00	152,100
Banteay Mean Chey	126,500	126,500	-	80,830	2.05	165,300
Pursat	56,160	65,380	780	58,160	1.46	84,700
Kompong Chhnang	83,370	76,190	7,180	67,750	1.27	86,200
Sihanouk Vill	9,270	9,270	-	9,260	1.18	10,900
Kampot	124,720	123,740	980	108,000	1.34	144,600
Koh Kong	3,500	3,500	-	3,360	1.43	4,800
Kompong Speu	78,740	77,780	960	60,490	1.36	82,400
Preah Vihear	17,000	17,000	-	12,050	1.86	22,400
Stung Treng	13,280	13,280	-	9,400	0.86	8,100
Ratanakiri	13,050	13,000	50	6,650	2.26	15,000
Monduliri	5,000	5,000	-	3,010	2.23	6,700
Kratie	31,750	26,280	5,470	25,480	1.59	40,400

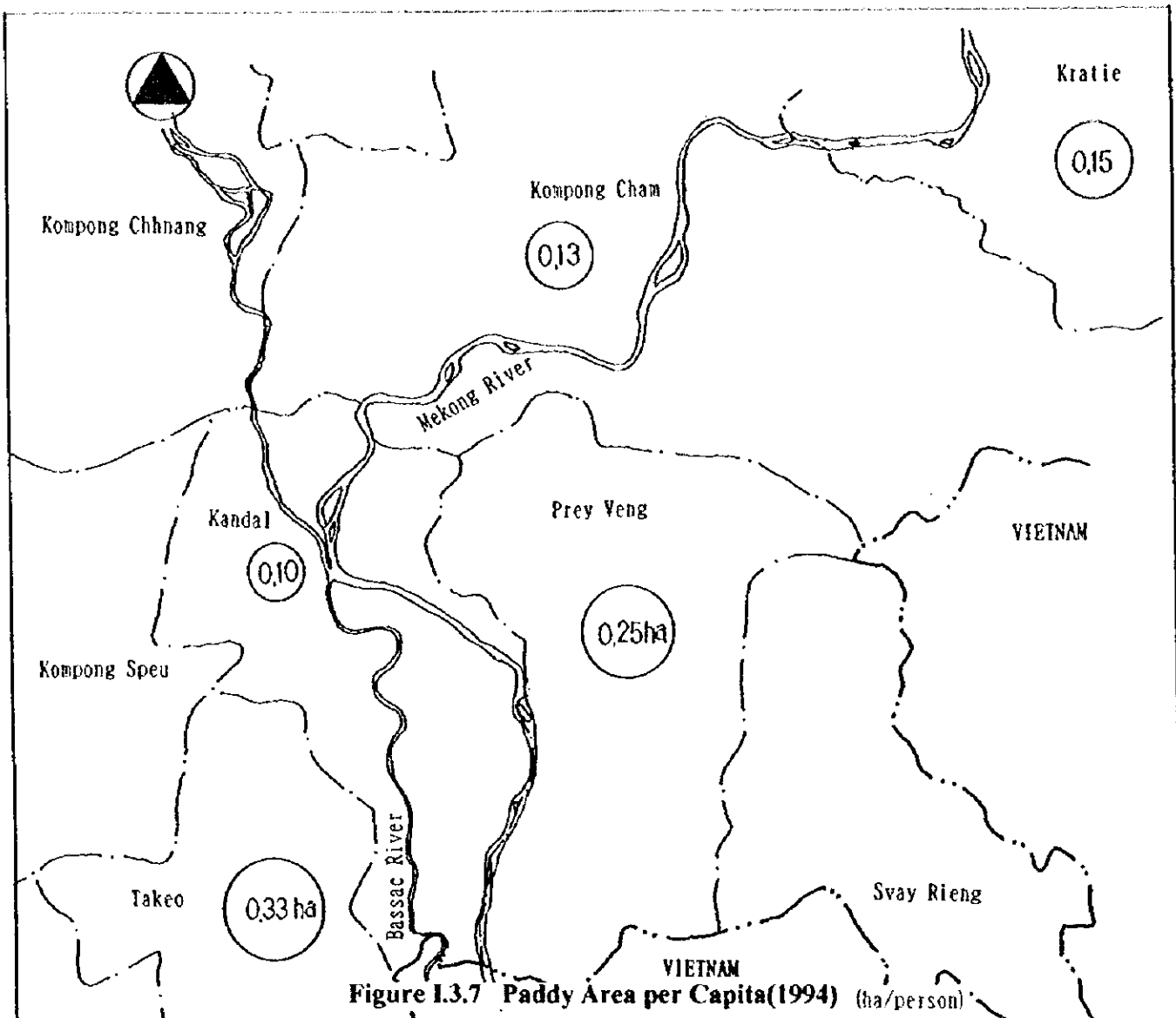
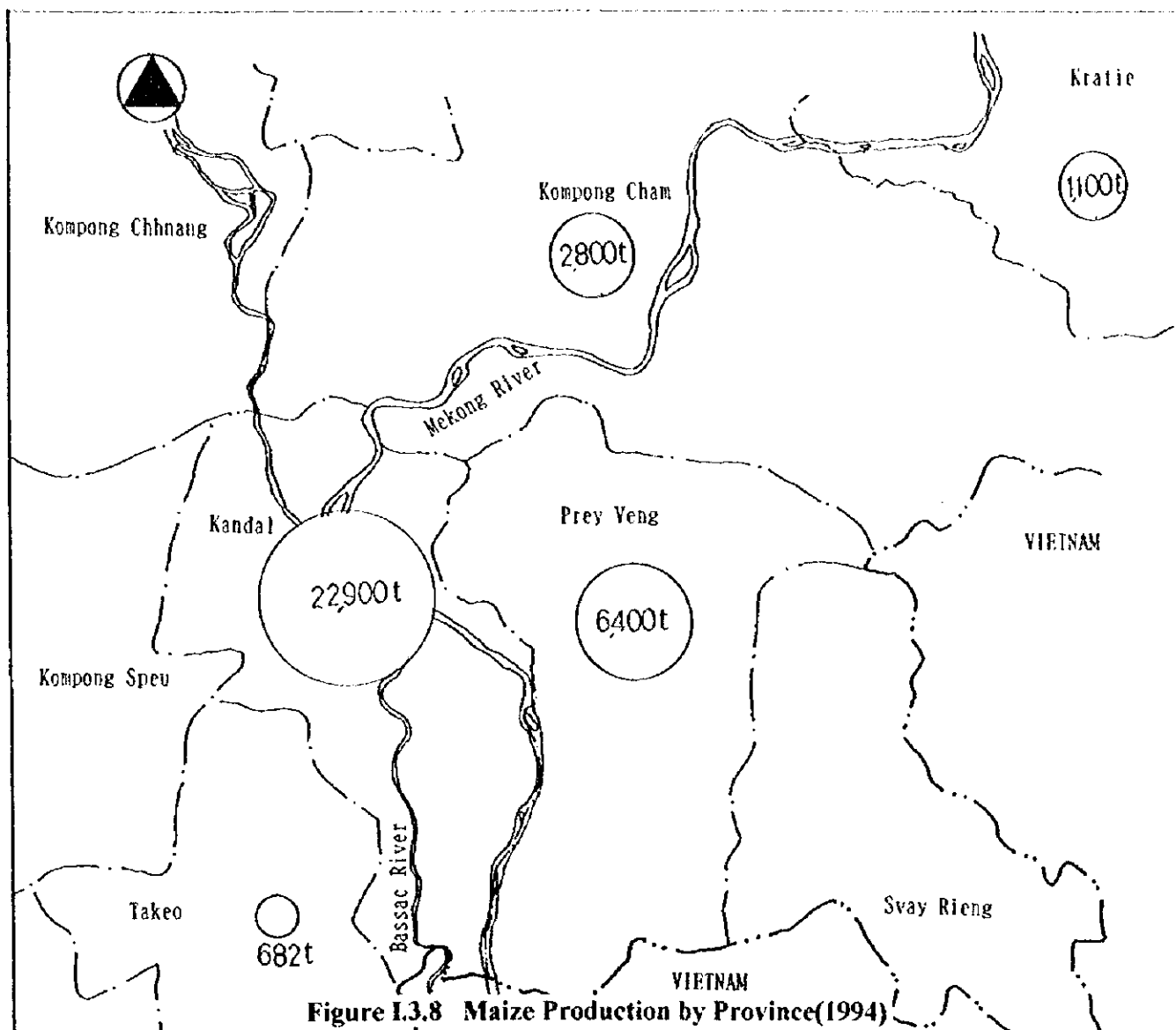


Figure I.3.7 Paddy Area per Capita(1994) (ha/person)

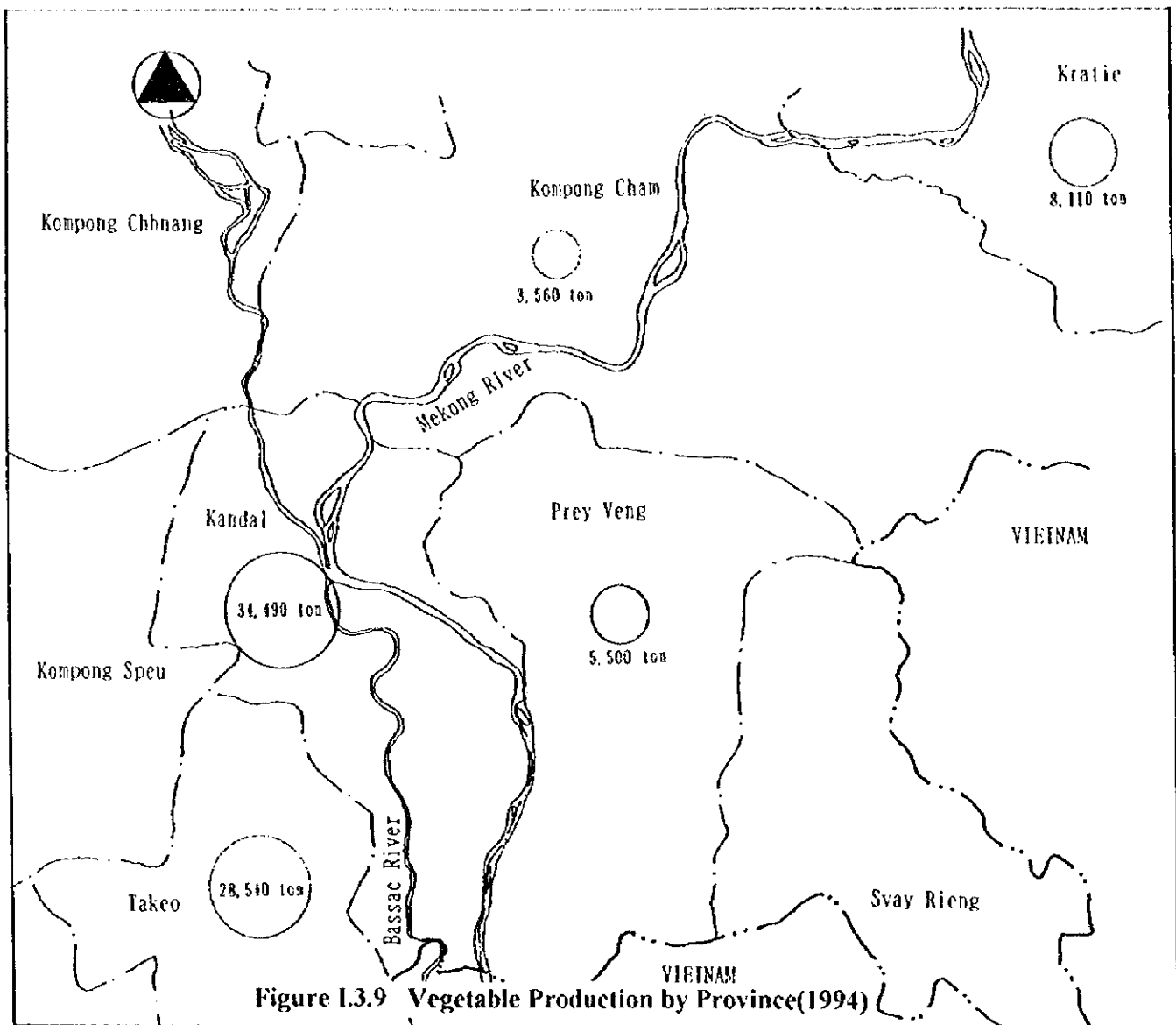
Paddy Area Per Capita (1994)

Province	Paddy Field (ha)	Population (1,000)	Paddy Field (ha/capita)
Whole Country	1,921,000	9,856	0.20
Phnom Penh	9,900	825	0.01
Kandal	83,790	855	0.10
Kompong Cham	190,390	1,464	0.13
Svay Rieng	159,700	443	0.36
Prey Veng	230,290	933	0.25
Takeo	227,750	695	0.33
Kompong Thom	127,460	490	0.26
Siem Reap	178,860	680	0.26
Banteay Mean Chey	126,500	520	0.24
Battambang	143,520	685	0.21
Pursat	66,160	325	0.20
Kompong Chhnang	83,370	326	0.26
Kompong Som	9,270	121	0.08
Kampot	124,720	481	0.26
Koh Kong	3,500	71	0.05
Kompong Speu	78,740	490	0.16
Preah Vihear	17,000	98	0.17
Stung Treng	13,280	56	0.24
Ratanakiri	13,050	61	0.20
Mondulkiri	5,000	22	0.23
Kratie	31,750	212	0.15



Maize Production by Province (1994)

Province	Cultivated Area (ha)			Harvested Area (ha)	Yield (t/ha)	Production (ton)
	Total	Wet Season	Dry Season			
Whole Country	52,000	44,000	8,000	37,000	1.22	45,000
Phnom Penh	460	220	240	460	1.00	460
Kandal	18,700	15,700	3,000	15,200	1.51	22,900
Kompong Cham	10,600	10,260	340	2,930	0.96	2,800
Svay Rieng	28	28	-	28	1.00	28
Prey Veng	8,300	5,700	2,600	6,200	1.03	6,400
Takeo	702	452	250	700	0.97	682
Kompong Thom	760	760	-	800	0.79	630
Siem Reap	1,140	730	410	1,130	0.98	1,110
Battambang	850	550	300	850	0.98	830
Banteay Mean Chey	710	710	-	710	1.00	710
Pursat	350	320	30	350	0.97	340
Kompong Chhnang	1,820	1,220	600	1,380	0.87	1,200
Sihanouk Vill	0	-	-	-	-	-
Kampot	1,800	1,650	150	1,800	1.00	1,800
Koh Kong	200	120	80	200	0.75	150
Kompong Speu	560	560	-	560	0.89	500
Preah Vihear	530	530	-	530	1.57	830
Stung Treng	520	520	-	290	0.93	270
Ratanakiri	950	950	-	950	1.21	1,150
Mondulkiri	920	920	-	920	1.21	1,110
Kratie	2,100	2,100	-	1,012	1.09	1,100



Vegetable Production by Province(1994)

Province	Cultivated Area(ha)			Harvested Area(ha)	Yield (t/ha)	Production (ton)
	Total	Wet Season	Dry Season			
Whole Country	35,000	22,000	13,000	34,000	5.79	197,000
Phnom Penh	960	490	470	950	5.76	5,470
Kandal	5,560	2,290	3,270	5,440	6.34	34,490
Kompong Cham	2,750	1,410	1,340	1,990	1.79	3,560
Svay Rieng	870	600	270	870	5.33	4,640
Prey Veng	1,520	850	670	1,450	3.79	5,500
Takeo	4,300	3,070	1,230	4,300	6.64	28,540
Kompong Thom	790	700	90	760	7.26	5,520
Siem Reap	2,560	1,080	1,480	2,560	7.24	18,540
Battambang	980	590	390	980	8.58	8,410
Banteay Mean Chey	640	640	-	640	5.03	3,220
Pursat	650	350	300	650	7.77	5,050
Kompong Chhnang	2,780	870	1,910	2,780	4.71	13,100
Sihanouk Vill	60	50	10	60	11.00	660
Kampot	5,030	4,350	680	5,030	8.87	44,600
Koh Kong	200	110	90	200	5.50	1,100
Kompong Speu	2,840	2,730	110	2,830	0.72	2,050
Preah Vihear	400	400	-	400	1.88	750
Stung Treng	530	530	-	530	4.98	2,630
Ratanakiri	360	360	-	360	2.08	750
Mondulkiri	210	210	-	210	1.48	310
Kratie	1,010	320	690	1,010	8.03	8,110

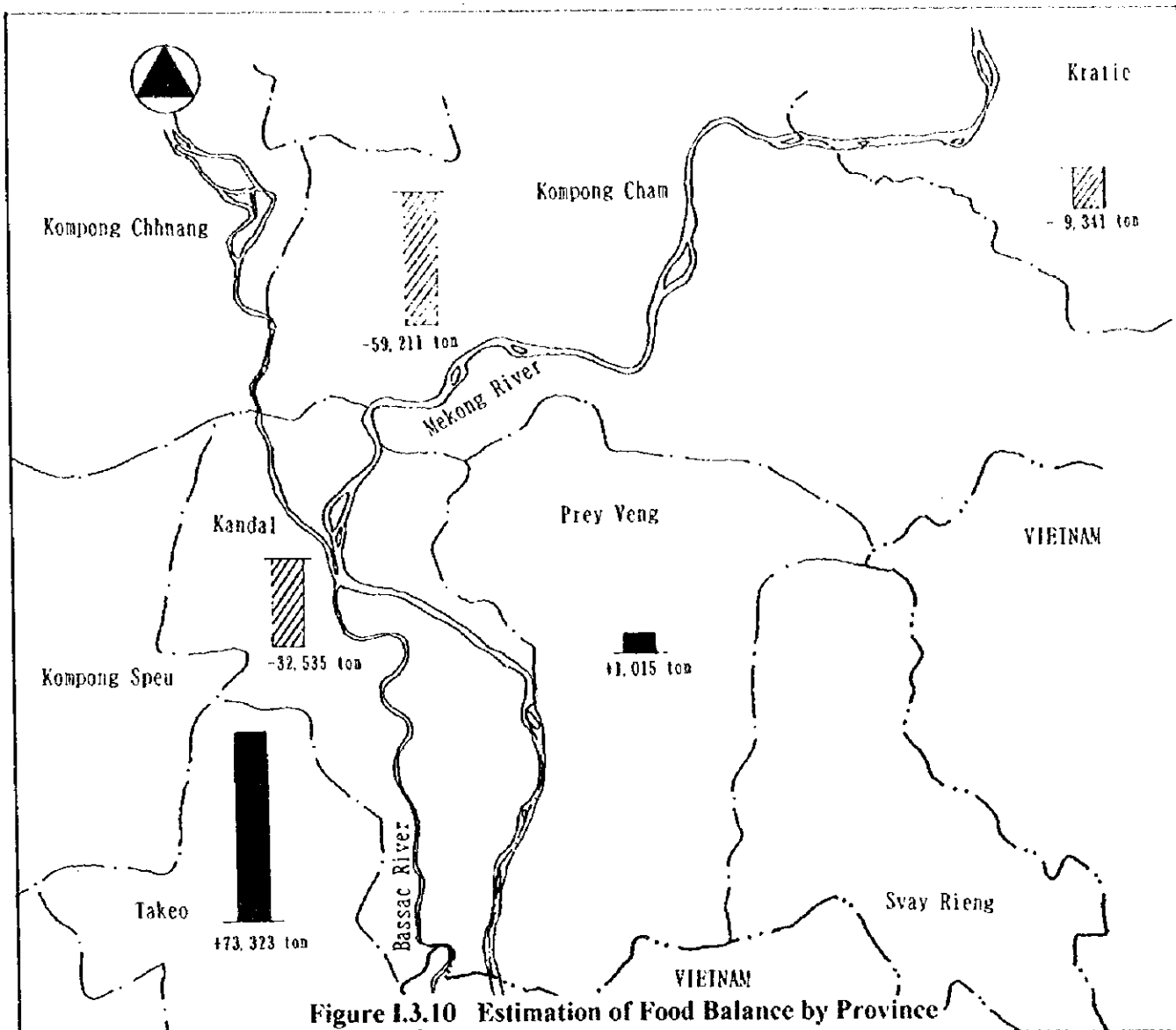
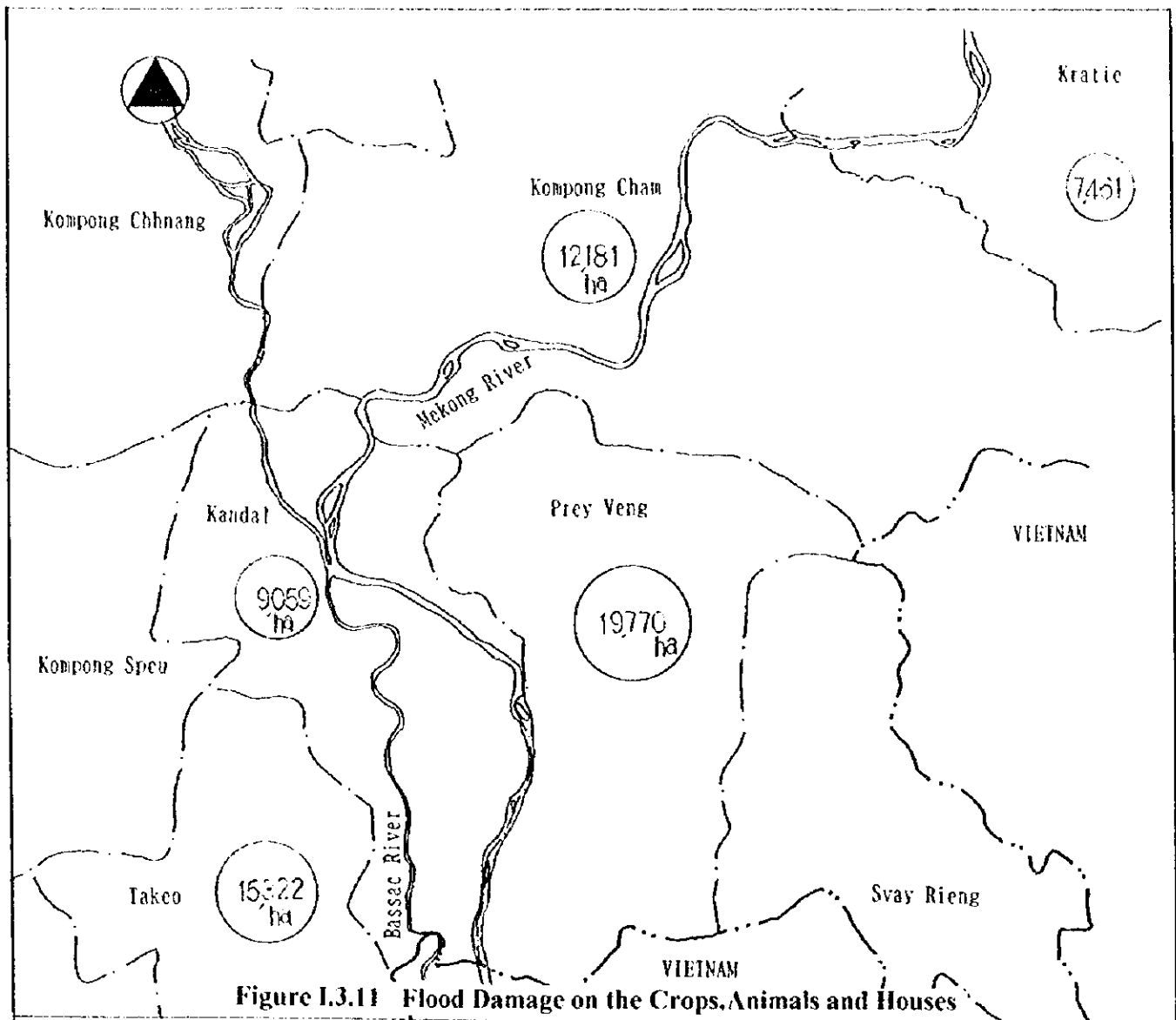


Figure I.3.10 Estimation of Food Balance by Province

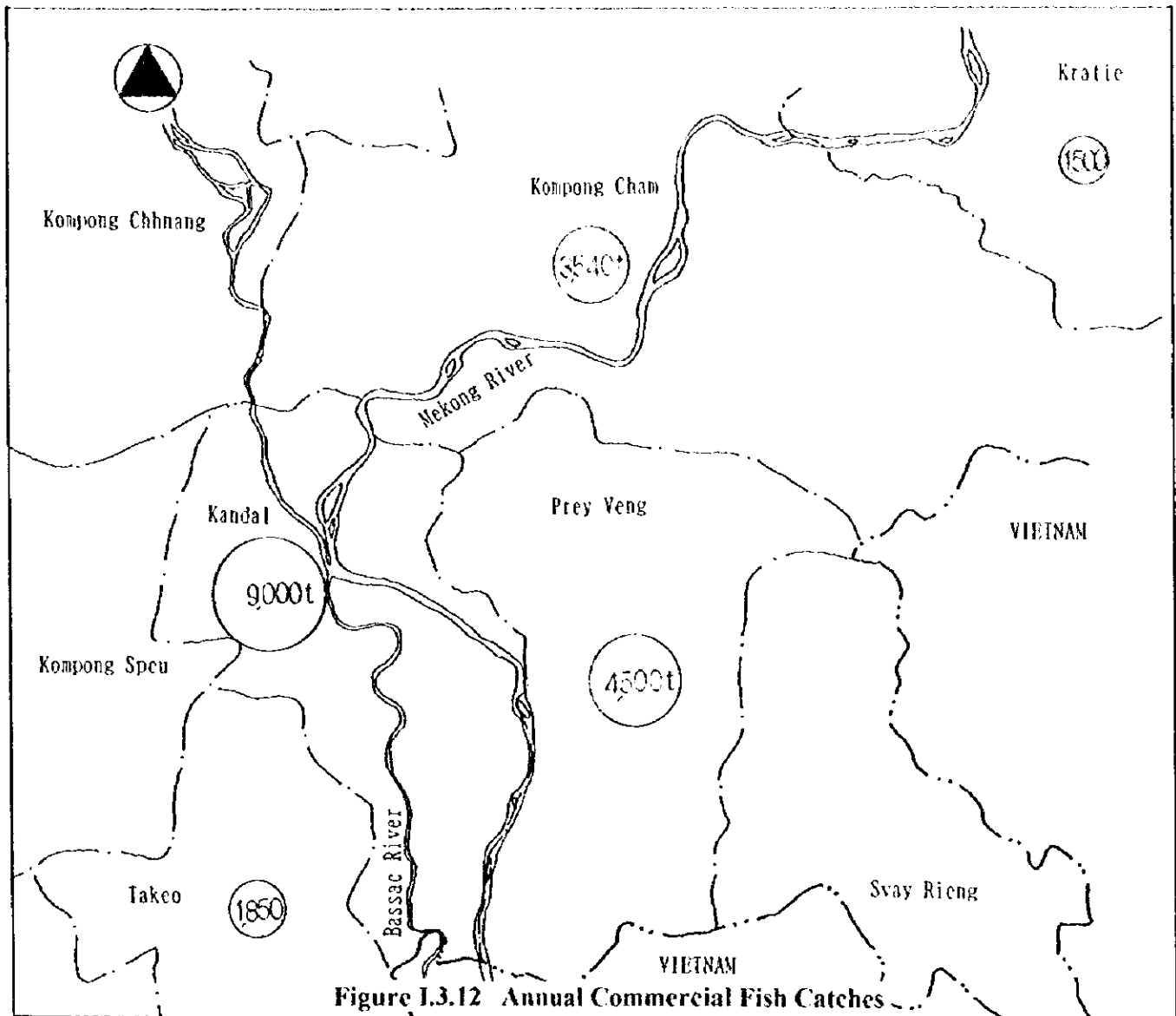
Estimation of Food Production by Province (1993-94)

Province	Paddy Production (ton)	Remaining Paddy for Consumption (ton)	Additional Food Crops (ton)	Food Available for Consumption (ton)	Population (person)	Balance of Food's Rice (ton)
Phnom Penh	10,225	8,691	230	5,618	909,760	-141,762
Kandal	166,635	141,640	23,675	111,491	889,050	-32,535
Kompong Cham	283,645	241,099	20,100	169,581	1,412,300	-59,211
Svay Rieng	156,576	133,090	1,000	83,526	440,015	12,235
Prey Veng	272,007	231,206	7,600	150,948	925,525	1,015
Takeo	309,455	263,037	11,800	174,883	626,910	73,323
Kompong Thom	122,000	103,700	5,000	69,294	490,120	-10,105
Siem Reap	205,200	174,420	4,200	112,380	594,890	15,968
Battambang	217,300	184,705	2,850	117,367	628,320	15,580
Banteay Mean Chey	148,600	126,310	1,100	79,412	414,490	12,265
Pursat	74,795	63,576	900	40,317	290,300	-6,713
Kompong Chhnang	92,411	78,549	3,015	51,715	320,175	-155
Sihanouk Ville	10,900	9,265	55	5,799	82,650	-7,591
Kampot	115,305	98,009	6,100	66,866	453,570	-6,615
Koh Kong	6,000	5,100	200	3,362	68,355	-7,711
Kompong Speu	84,950	72,207	4,500	49,268	472,105	-27,212
Preah Vihear	29,175	24,799	500	15,875	100,490	-405
Stung Treng	16,452	13,984	850	9,520	57,975	128
Ratanakiri	14,690	12,485	500	8,241	68,500	-2,856
Mondulkiri	4,750	4,037		2,503	23,500	-1,302
Kratie	42,279	35,937	5,800	28,081	231,000	-9,341
Total	2,383,350	2,025,847	99,975	1,356,047	9,500,000	-183,000



Flood Damage by Province (1994)

Province	Paddy Field (ha)				Other Crops (ha)	Animals (head)		Hydraulic Structures		
	Seedling	Paddy Planted	Rice (ton)	Paddy (ton)		Cows	Pigs	Houses (places)	Outlets Culvert (pls)	Dikes/Em-bankments (m)
Whole Country	10,792	132,295	51	129	34,055	164	1,012	387	81	5,530
Phnom Penh	516	481			167		68	128		100
Kandal	381	9,059		7	4,021	2	56	32	36	4,785
Kompong Cham	1,326	12,181			21,547					
Svay Rieng		10,656			22					
Prey Veng	2,335	19,770			4,053					
Takeo	1,518	15,322								
Kompong Thom	200	15,610								
Siem Reap	65	2,410							10	
Battambang	1,287	17,971			3,093	49	278	151		
Banteay Meanchey		5,931								
Pursat	319	3,385								644
Kompong Chhnang	306	4,793								
Sihanouk Vill										
Kampot	684	1,002								15
Koh Kong	10	781	54	122	13	100	587	73		
Kompong Speu	1,364	4,373			101				20	
Preah Vihear										
Stung Treng	451	800								
Ratanakiri		267				13	58			
Mondulkiri										
Kratie		7,461			1,015					



Annual Commercial Fish Catches

Province	(unit: ton)														
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
A. Fresh Water Fish (112)	18,400	50,780	65,400	58,681	56,703	59,400	66,381	64,654	65,800	56,038	71,500	82,400	77,450	75,900	71,140
1. Inland Capture															
Phnom Penh	2,000	5,498	6,182	4,031	4,716	5,740	7,500	4,200	5,610	3,250	4,600	5,800	4,000	5,200	3,500
Kandal	1,500	7,054	10,688	4,582	7,698	10,375	15,182	10,800	11,809	7,200	12,500	14,000	11,800	10,500	9,000
Kompong Cham	1,000	1,204	3,070	4,519	3,823	4,280	4,583	5,140	5,167	3,400	5,100	6,200	5,950	5,900	3,540
Takeo	600	151	1,399	1,629	775	1,441	1,430	1,269	1,315	1,620	1,900	2,000	2,033	1,800	1,850
Kompong Thom	2,500	1,980	4,828	6,240	4,620	2,470	2,582	5,180	4,515	4,100	4,100	4,800	4,780	5,200	4,800
Siem Reap	2,000	9,034	8,266	8,202	7,932	8,450	9,041	9,575	8,990	8,200	9,000	9,000	9,760	8,800	8,500
Battambang	1,300	5,197	6,663	6,647	4,895	3,700	3,790	3,500	3,787	3,900	4,300	4,500	5,068	5,200	4,800
Pursat	2,500	7,357	8,734	8,252	5,913	5,410	5,990	7,000	4,193	5,700	7,200	9,700	8,300	7,800	8,000
Kompong Chhnang	3,700	11,492	11,589	10,724	12,332	10,220	9,660	12,100	11,012	9,900	12,000	14,000	12,500	12,200	12,200
Stung Treng	-	-	187	900	100	670	520	450	467	520	680	700	500	600	500
Kratie	300	-	892	1,180	896	1,500	1,552	1,140	1,666	1,005	1,300	1,400	1,423	1,400	1,500
Banteay Meanchey	-	-	-	-	-	-	-	-	83	105	150	200	260	300	250
Prey Veng	1,000	1,813	2,902	1,715	1,093	2,138	2,351	1,800	2,581	1,600	2,230	3,400	2,516	3,000	4,500
Sub-Total	18,400	50,780	65,400	58,681	55,093	56,400	64,181	62,154	61,200	50,500	65,100	75,700	69,900	67,900	62,910
2. Aquaculture					1,610	3,000	2,200	2,500	4,600	5,535	6,400	6,700	8,550	8,000	8,200
B. Marine															
Kampot	200	443	1,015	7,376	5,670	5,216	2,398	5,755	7,673	8,000	8,030	8,100	8,100	8,000	7,600
Sihanouk Vill	500	371	1,002	2,069	1,363	2,249	1,202	5,150	7,890	9,120	9,300	8,300	8,600	8,000	8,760
Kho Kong	500	-	998	-	683	3,714	3,619	6,517	5,437	8,930	22,570	20,000	17,000	17,000	13,700
Sub-Total	1,200	814	3,015	9,444	7,717	11,178	7,217	17,417	21,000	26,050	39,900	36,400	33,700	33,000	30,000
Total	19,600	51,594	68,415	68,125	64,424	70,578	73,628	82,071	86,800	82,688	111,400	118,800	111,150	108,900	101,140

I.4 AGRO AND SOCIOECONOMIC CHARACTERISTICS BY DISTRICT

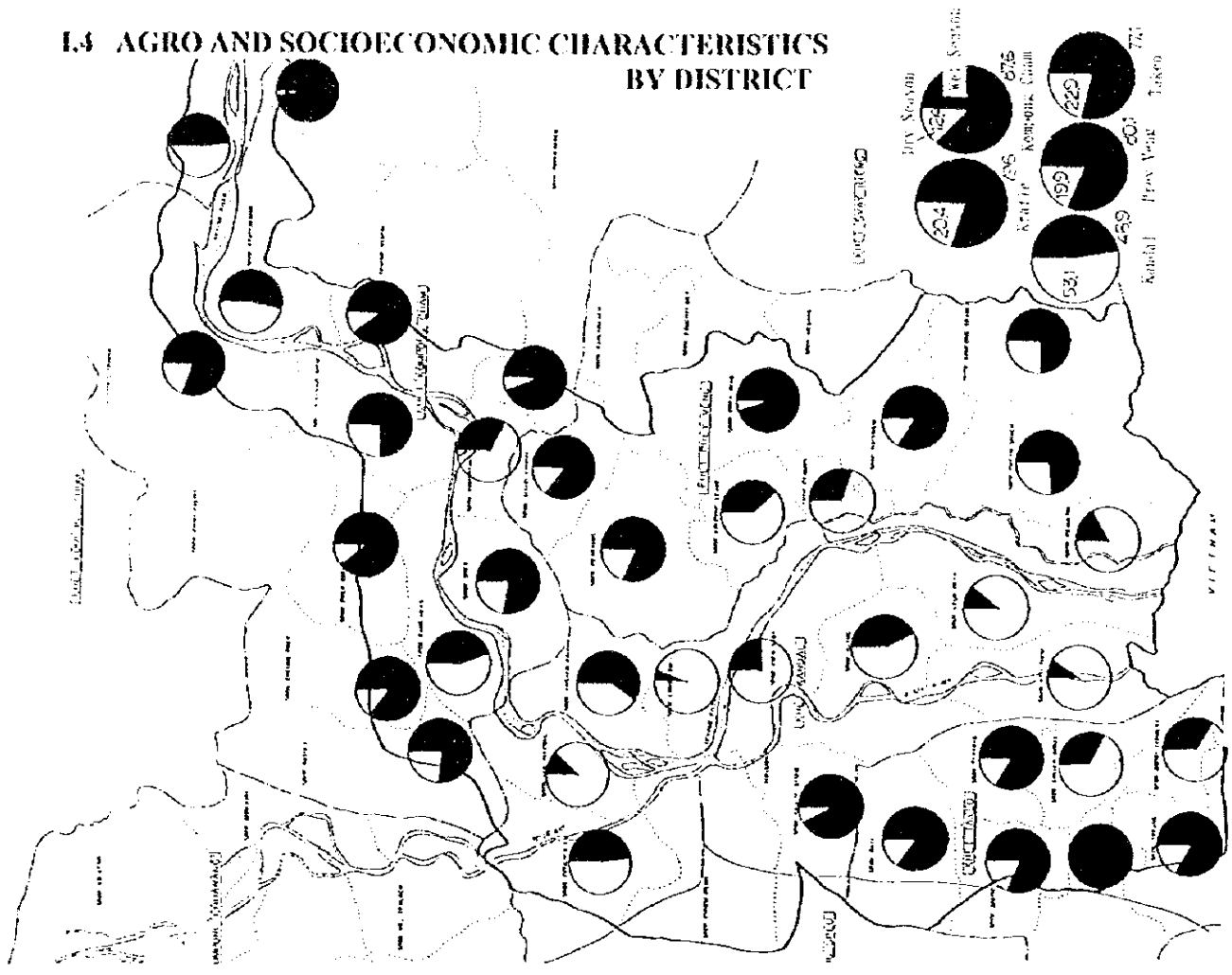


Figure I.4.2 Composition of Paddy Farming

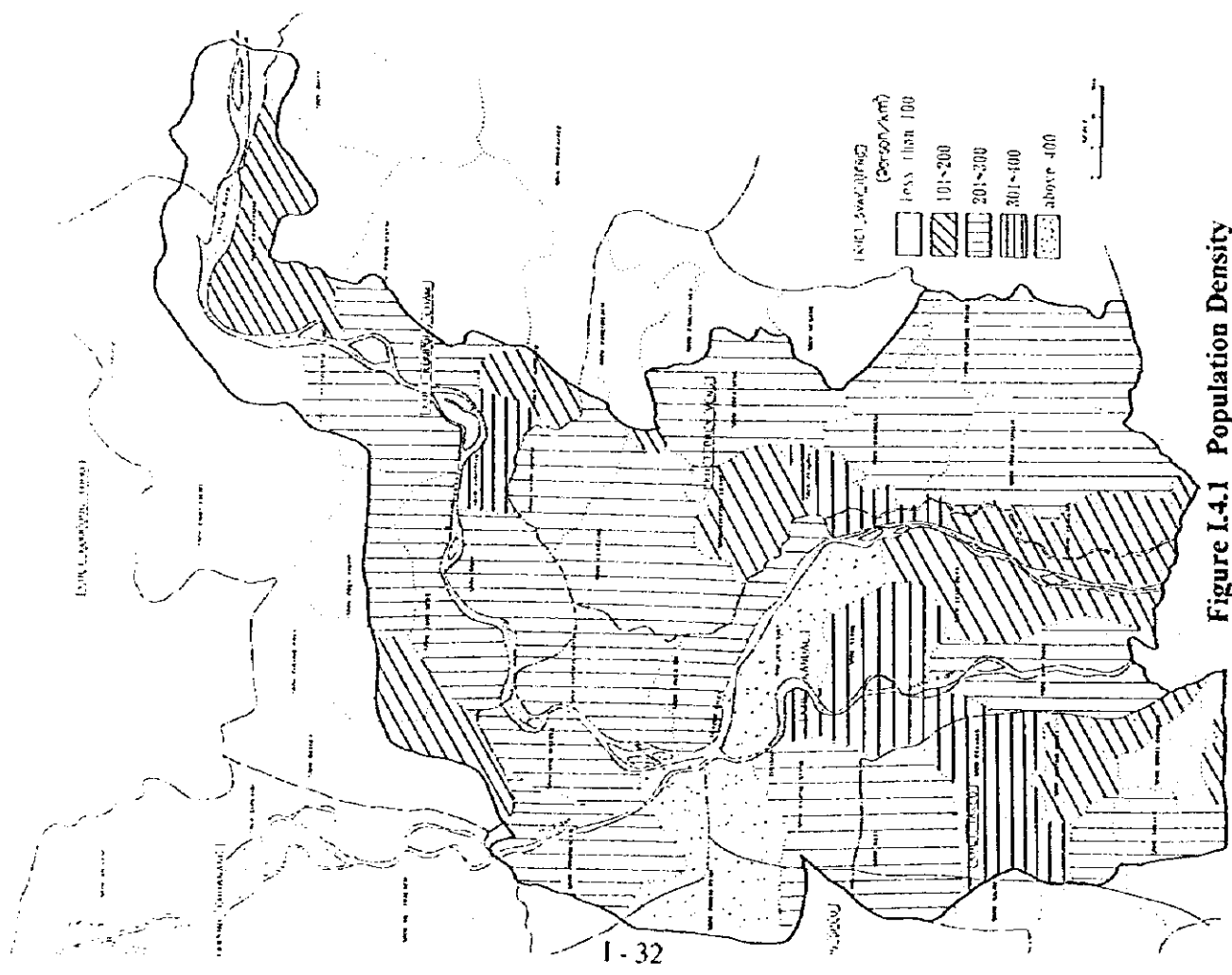


Figure I.4.1 Population Density



Figure I.4.4 Composition of Gross Crop Production Value

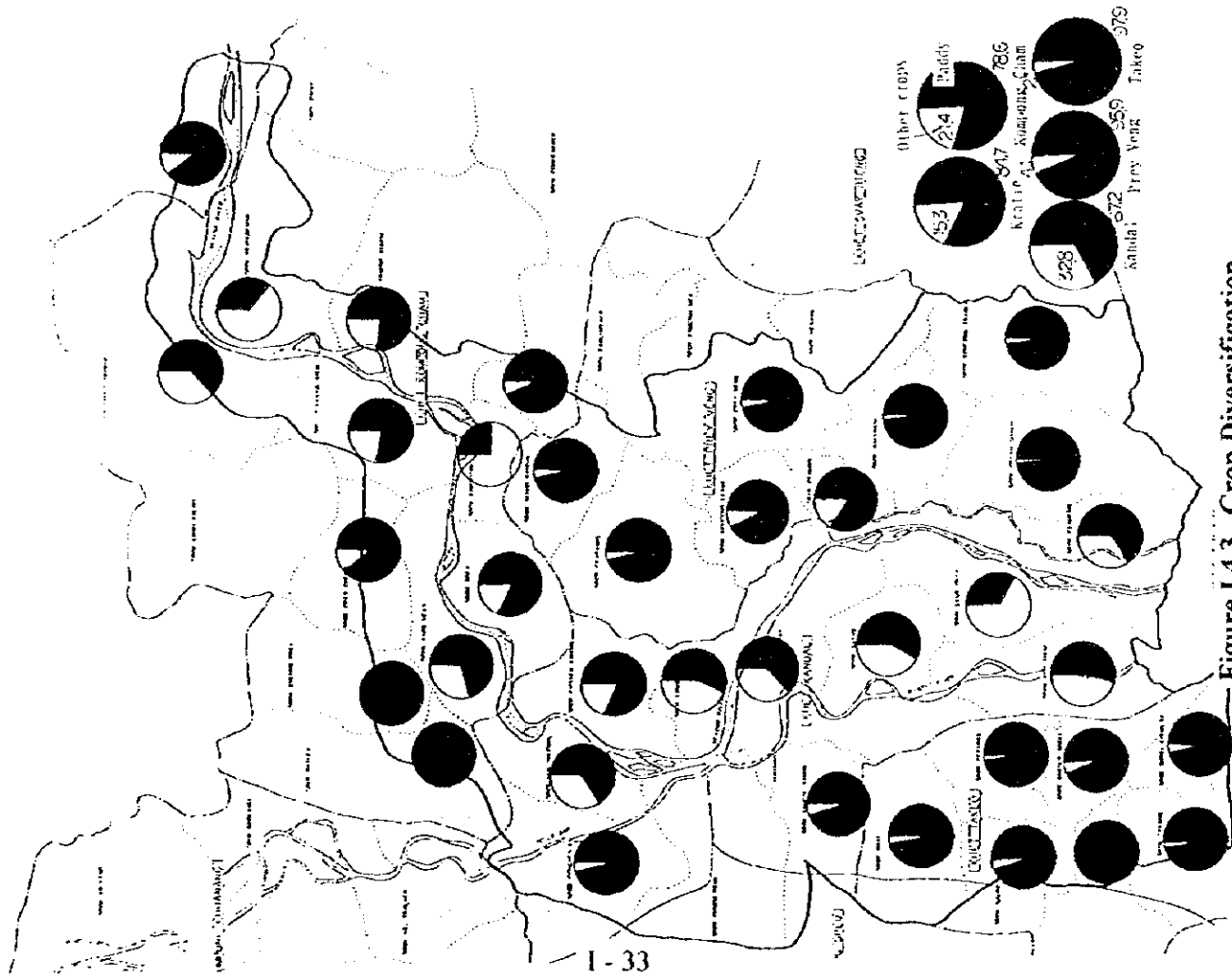


Figure I.4.3 Crop Diversification

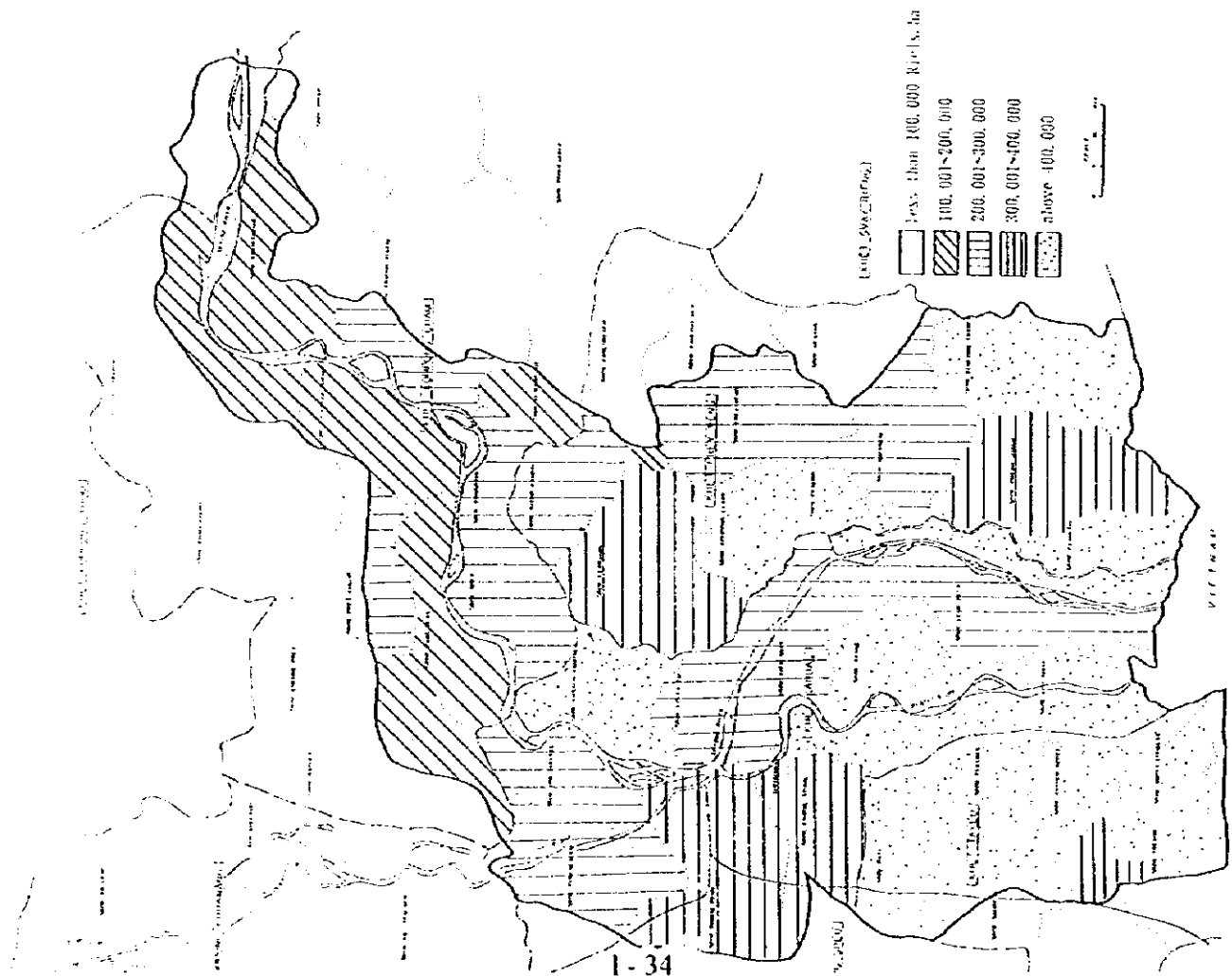


Figure I.4.5 Gross Crop Production Value per Hectare

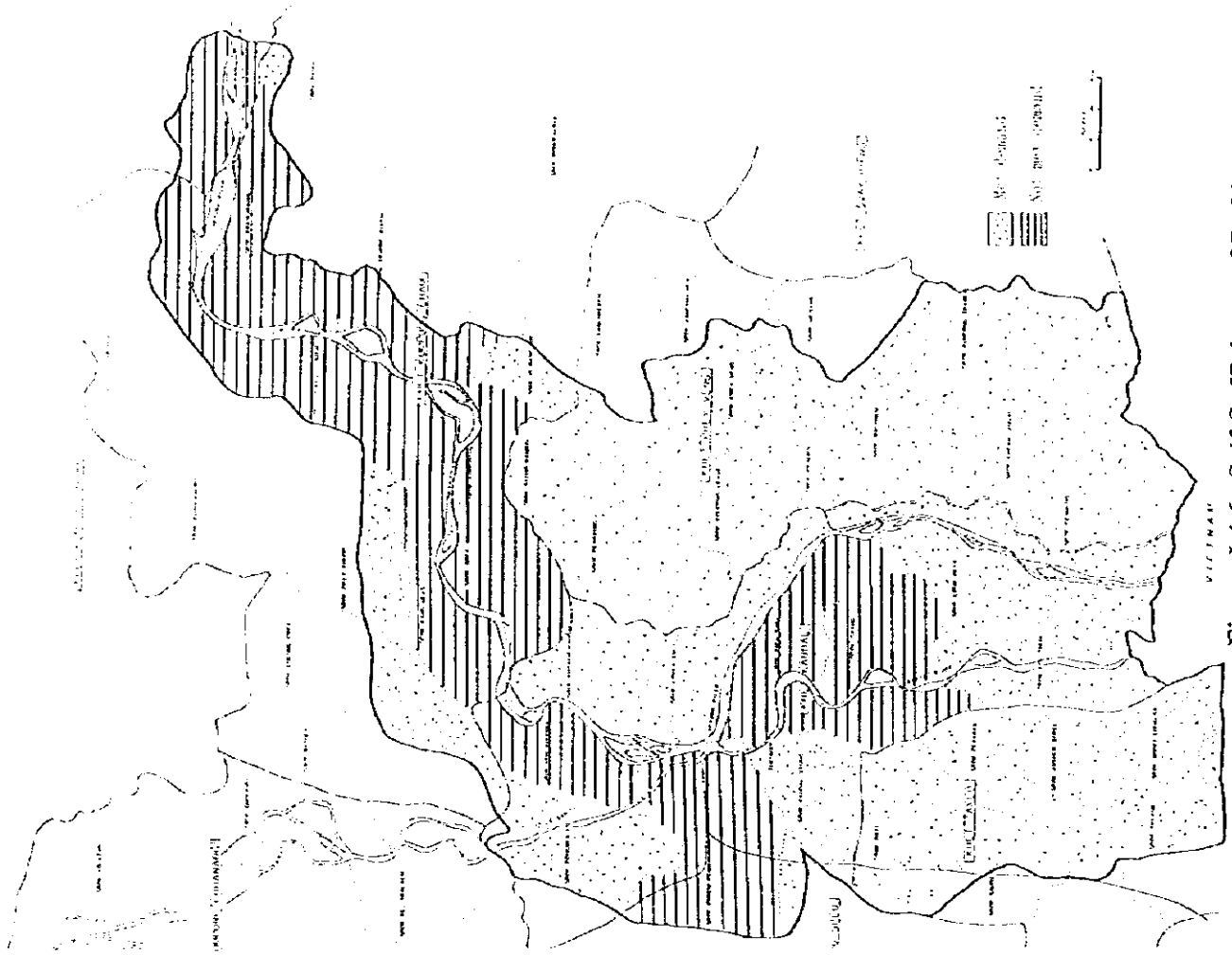


Figure I.4.6 Self-Sufficiency of Paddy

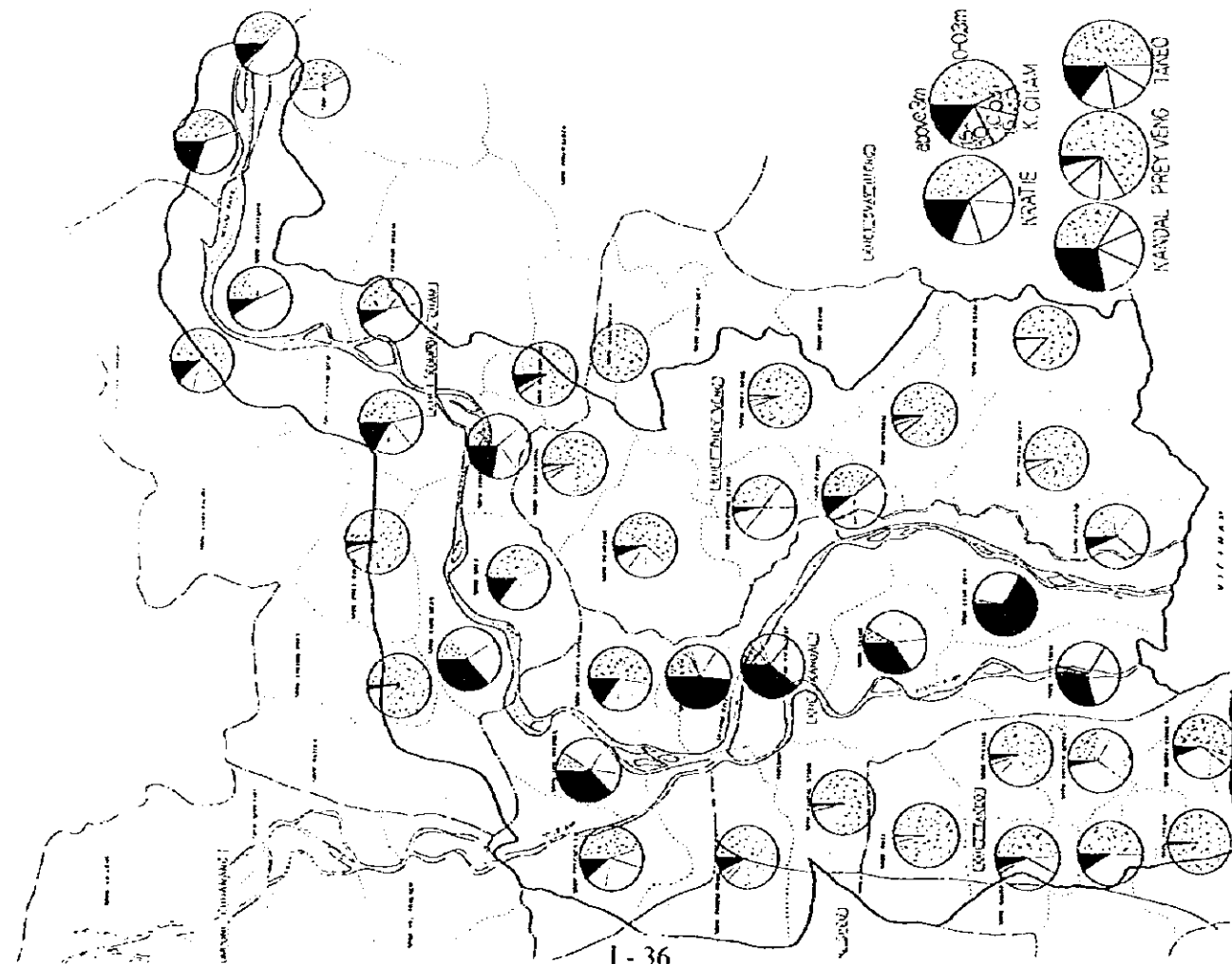


Figure I.4.9 Inundation by Water Depth

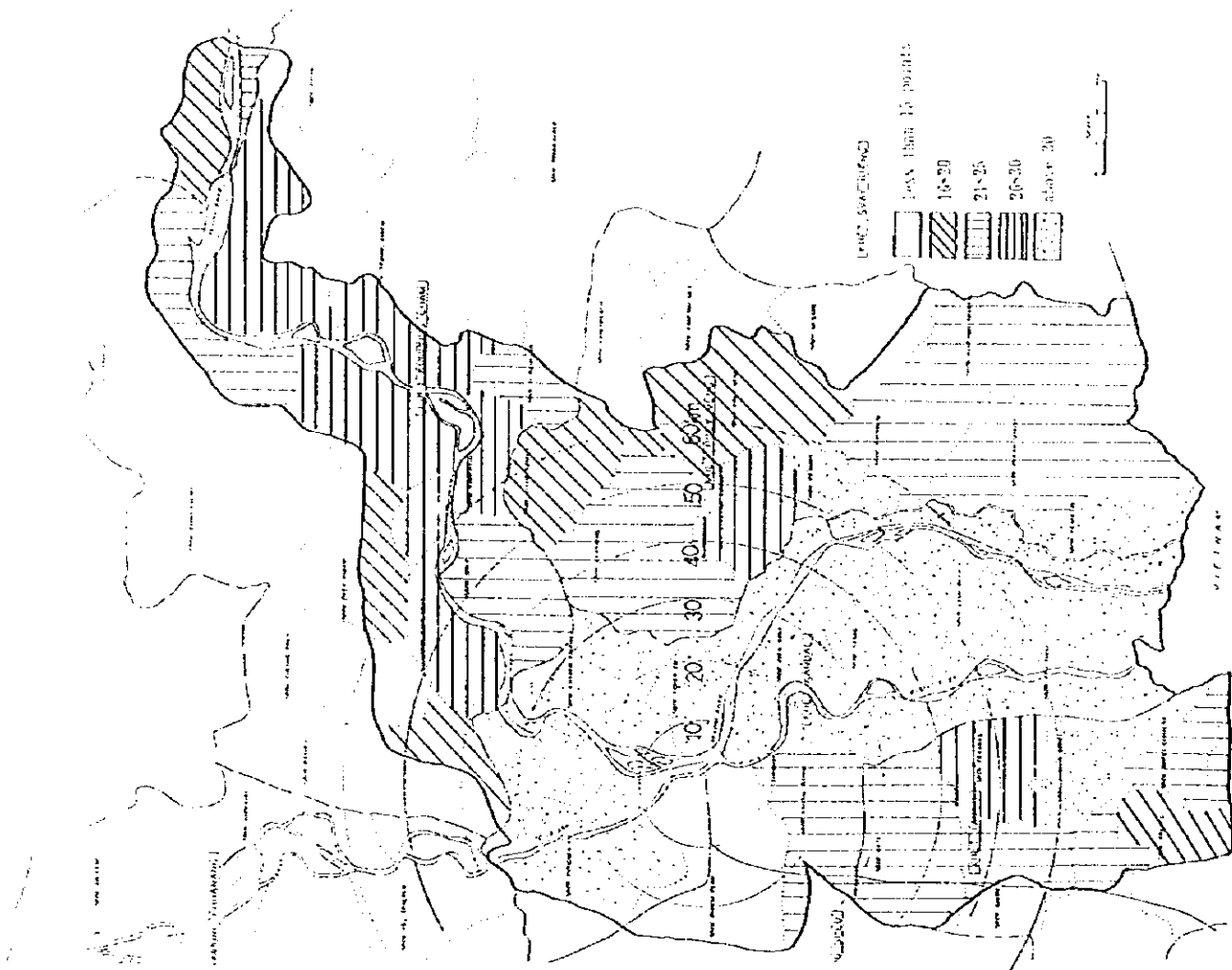
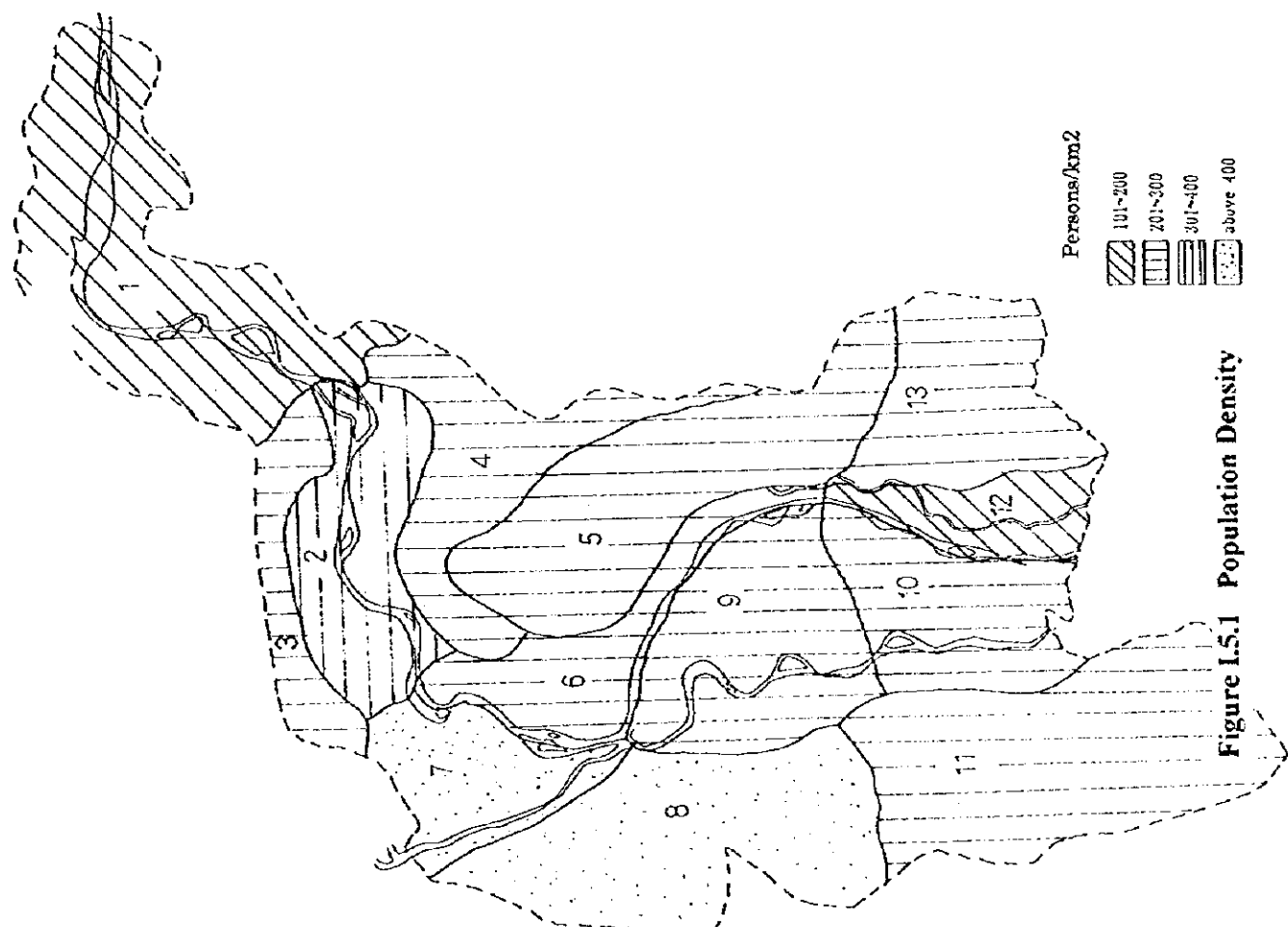
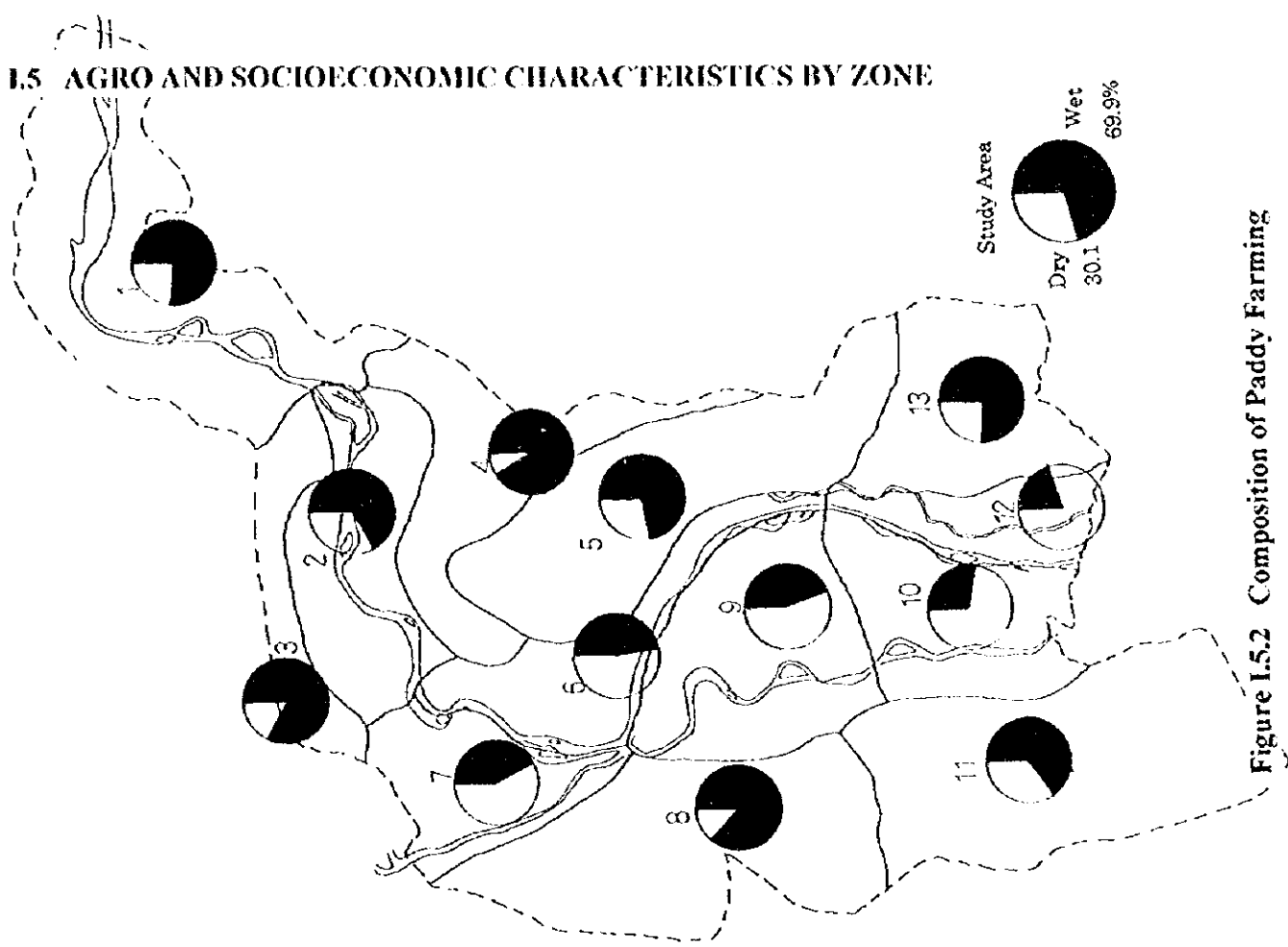


Figure I.4.10 Comprehensive Evaluation of Agricultural Activities by District

I.5 AGRO AND SOCIOECONOMIC CHARACTERISTICS BY ZONE



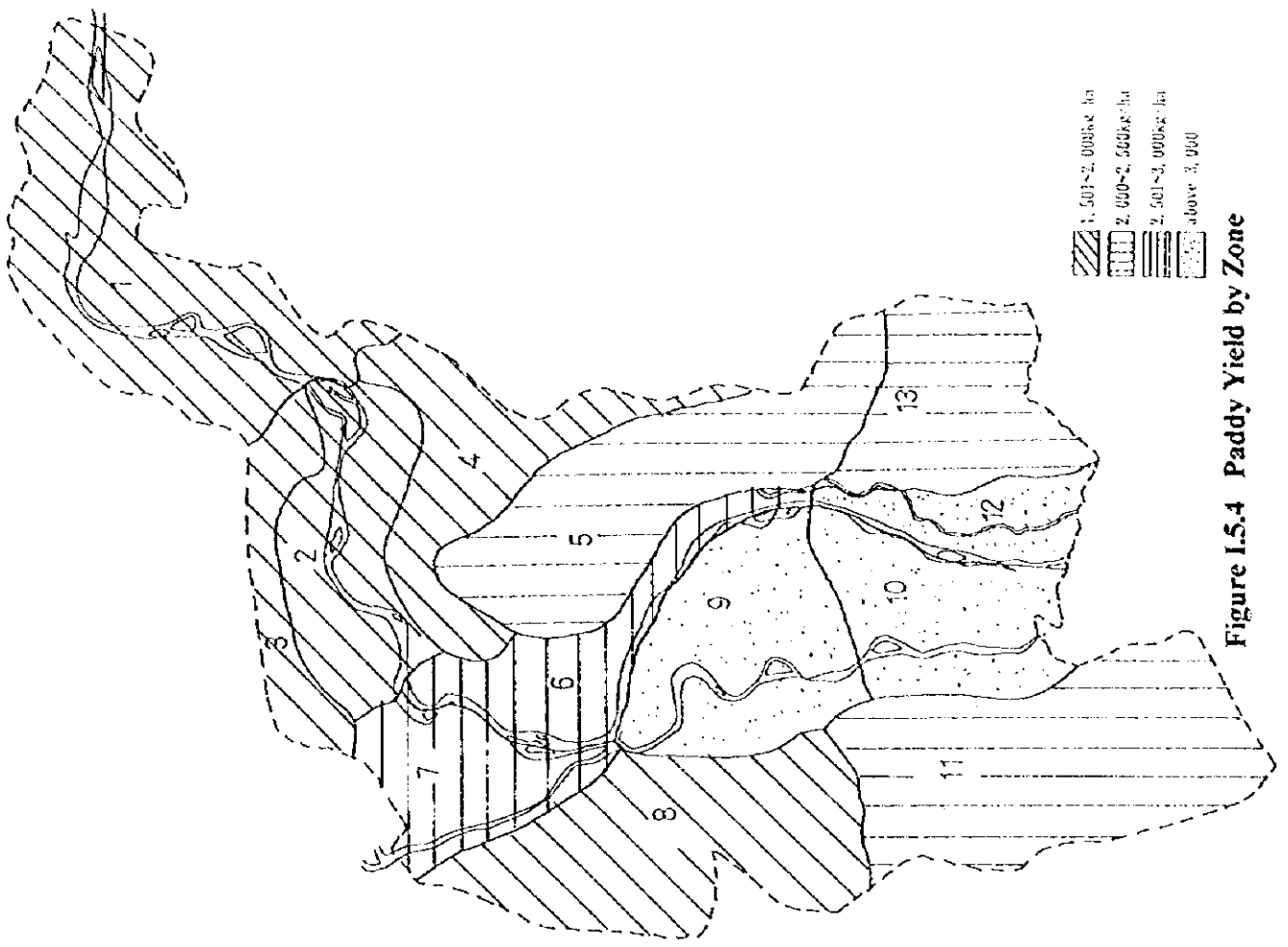


Figure I.5.4 Paddy Yield by Zone

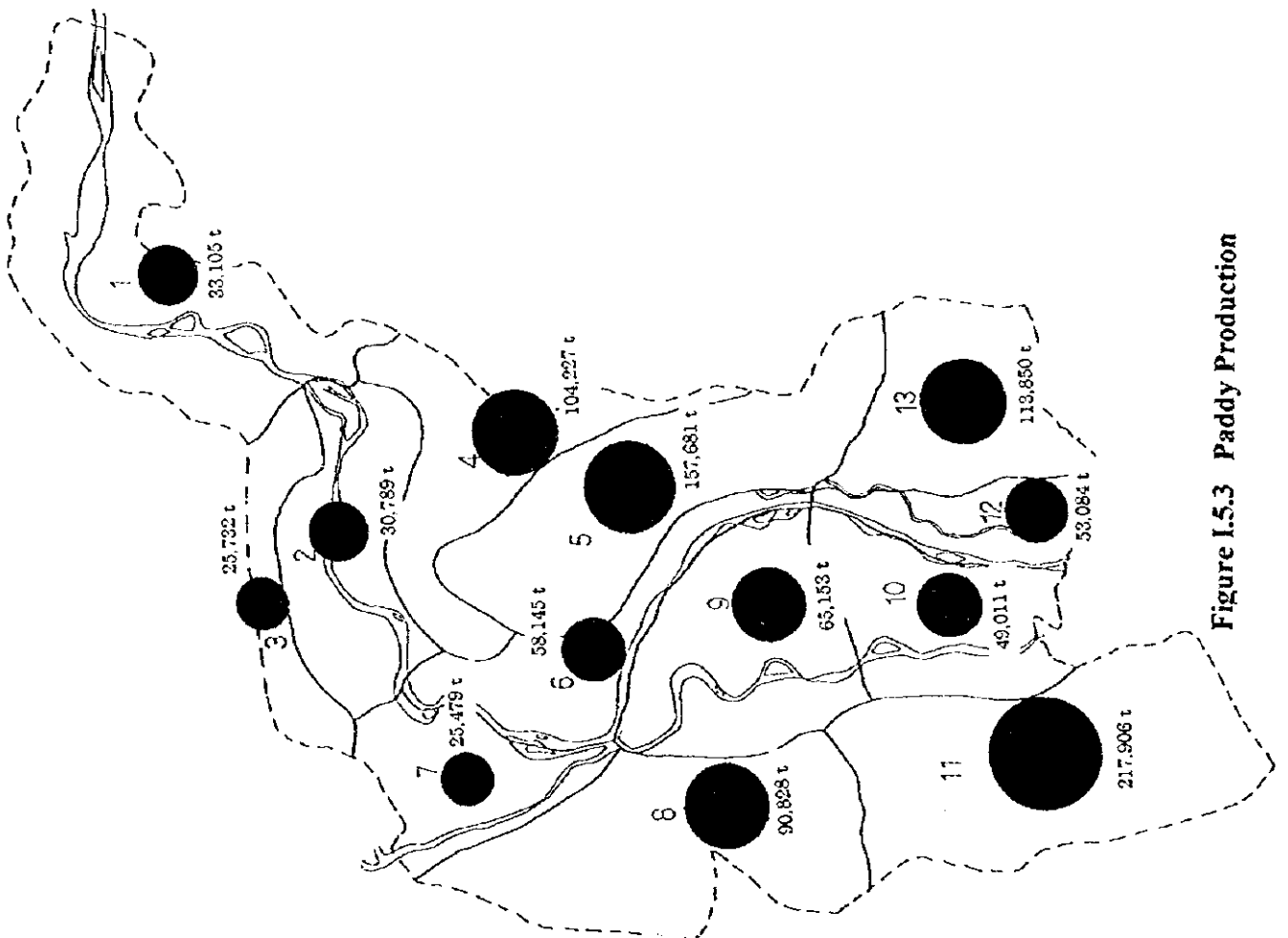


Figure I.5.3 Paddy Production

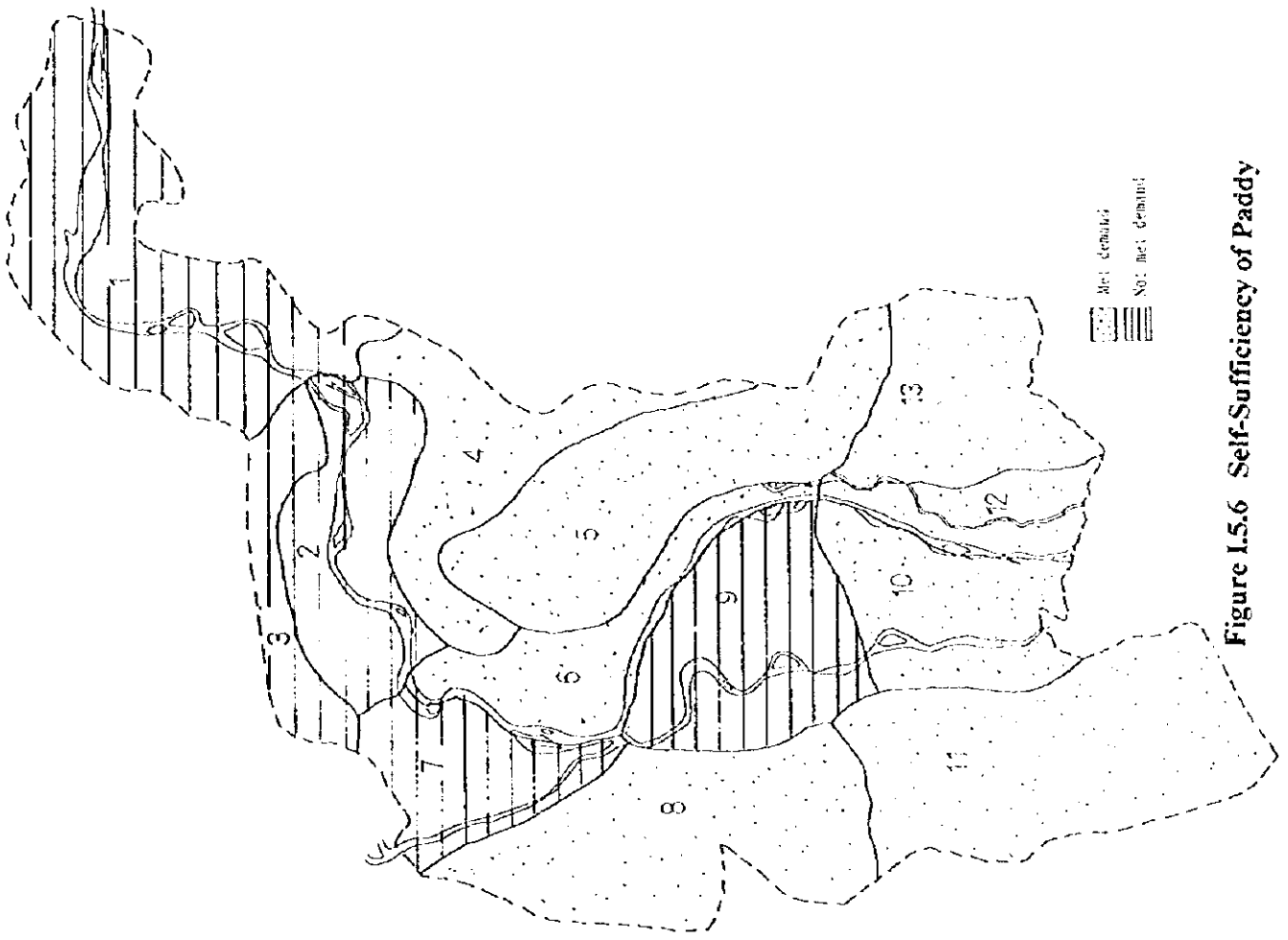


Figure I.5.6 Self-Sufficiency of Paddy

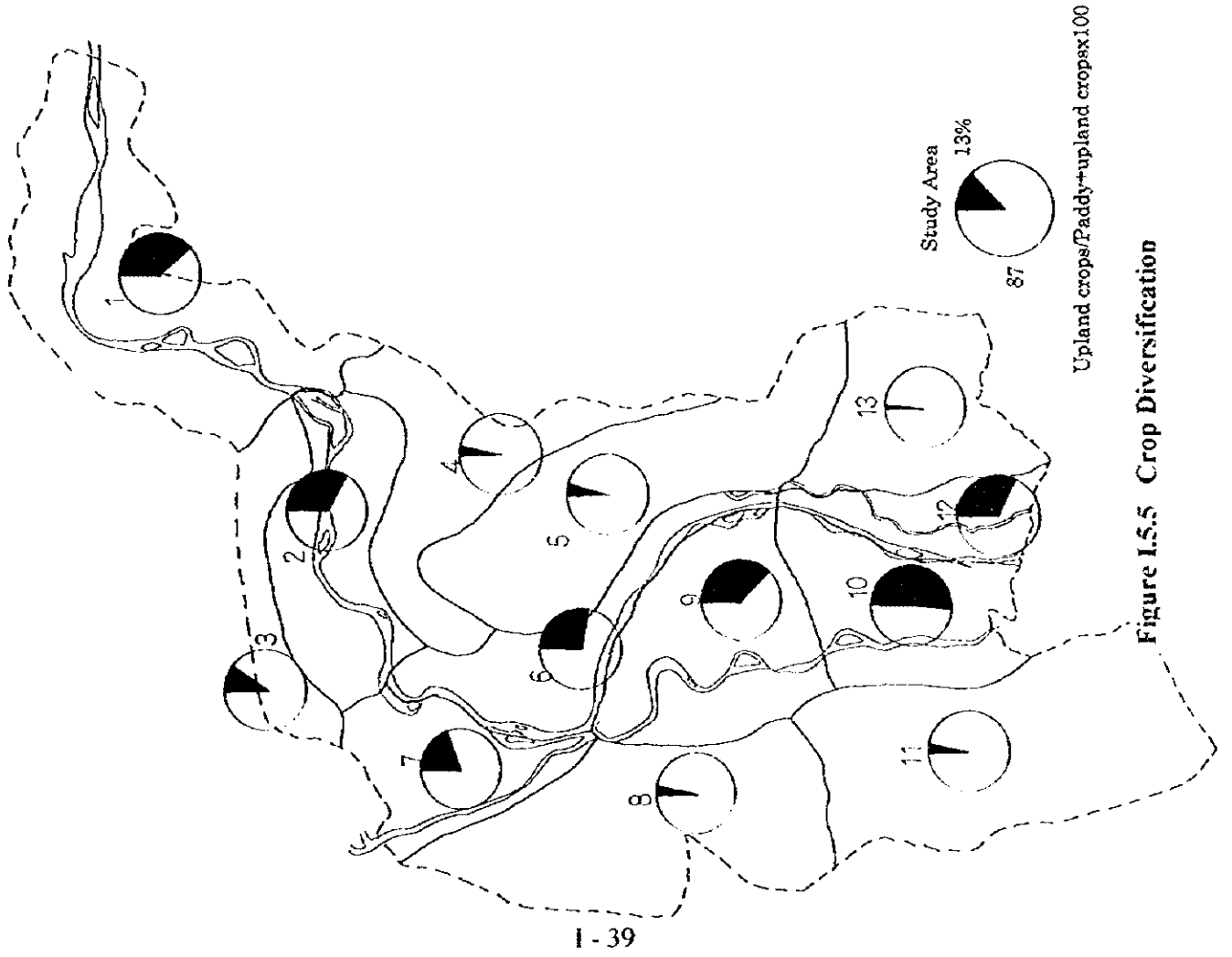


Figure I.5.5 Crop Diversification

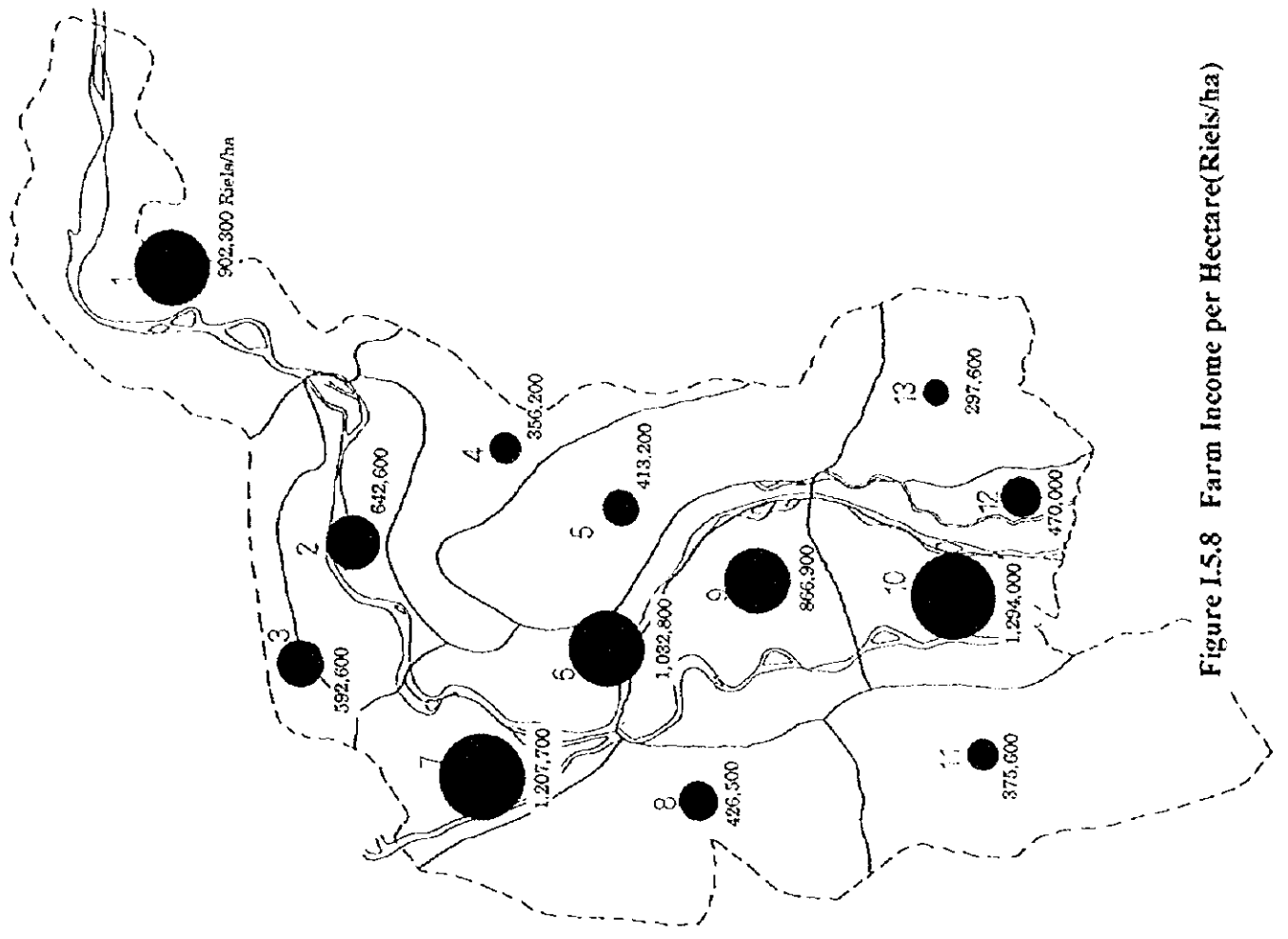


Figure I.5.8 Farm Income per Hectare (Riels/ha)

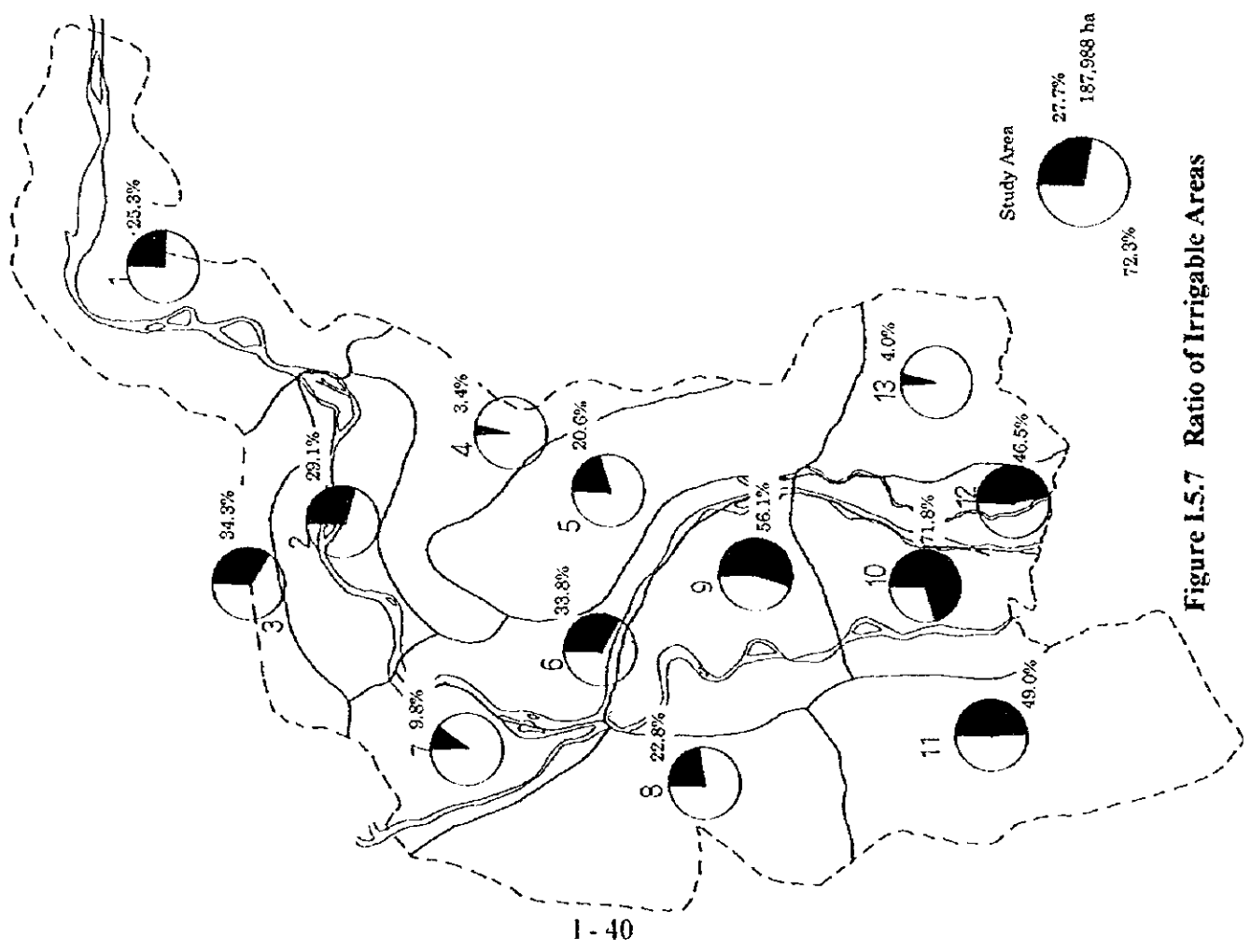


Figure I.5.7 Ratio of Irrigable Areas

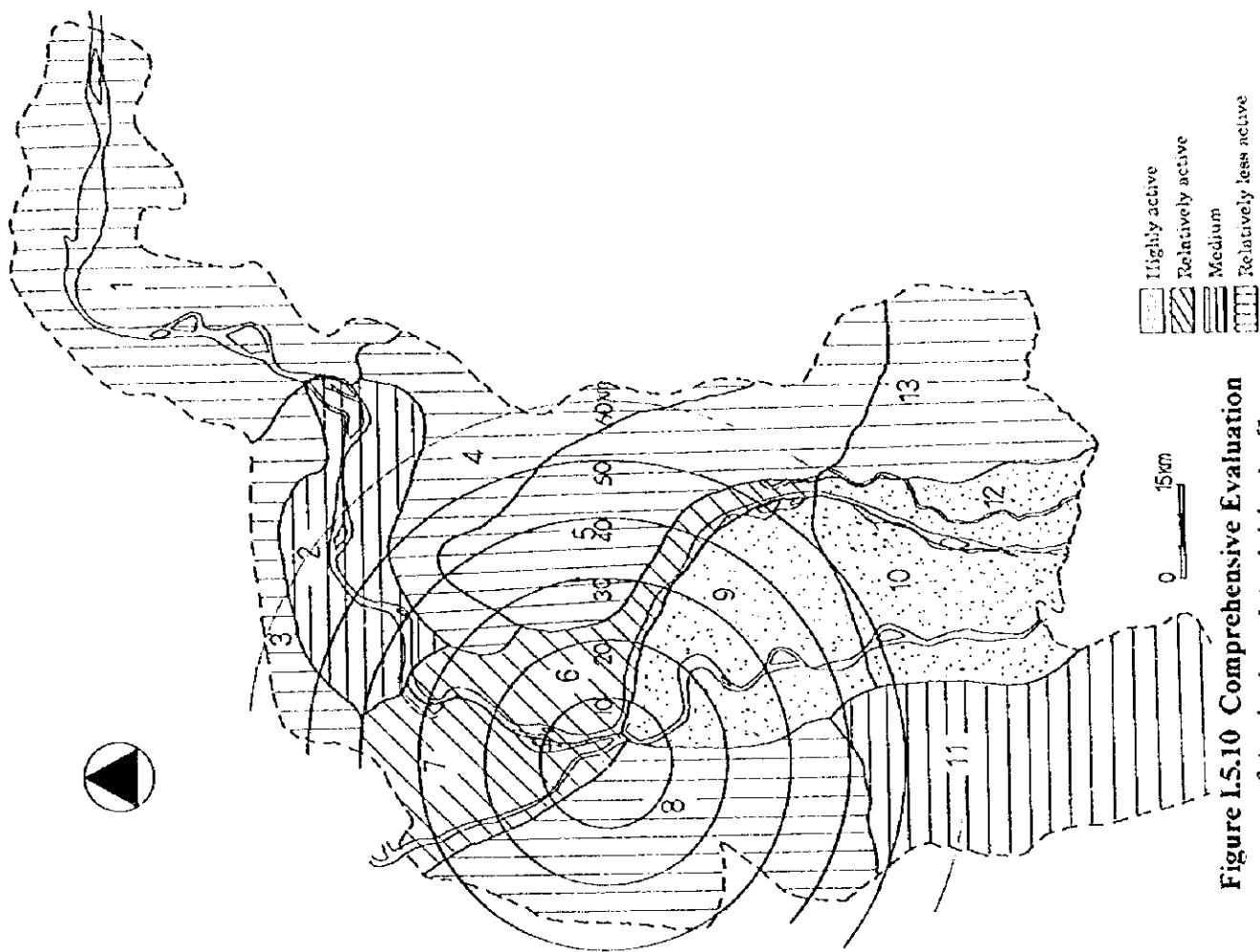


Figure I.5.10 Comprehensive Evaluation of Agricultural Activities by Zone

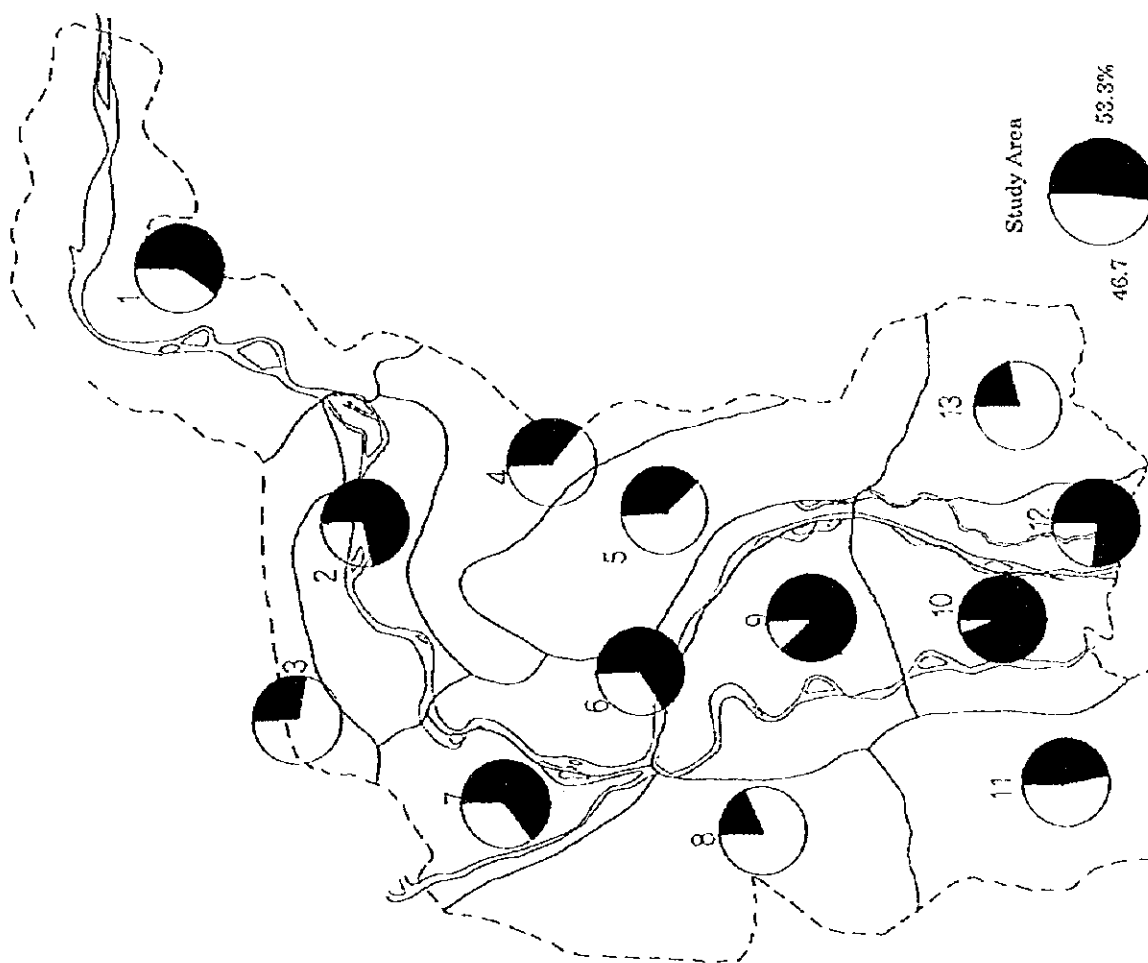


Figure I.5.9 Inundation Area(0.3m~above 3.0m)

Table I.5.1 Comprehensive Evaluation of Zones

	Agro-Economic Indicators										Physical Indicators			
	Crop Diversification	Self-sufficiency of Paddy	Population Density (person /km ²)	Dry season Paddy Area (dry/wet-dry % x 100)	Average Paddy Yield (kg/ha)	Farm Income/ha (Riel/ha)	GCPV of Paddy per ha (Riel/ha)	Irrigation Area by Colmstage /Cultivable Area x 100	Total Irrigable Area/ Cultivable Area x 100	Inundation Area	Rural Road Density	Number of Wells /km ²	Sub-Total	
													Sub-	total
1: Less than 10%	0: Not met	1: Less than 100	1: Less than 20%	1: 1,000 - 1,500	1: Less than 400,000	1: Less than 600,000	1: Less than 5%	1: Less than 20%	1: Less than 0.2	1: Less than 0.2 km/ha	1: Less than 0.2			
2: 11 - 20		2: 101 - 200	2: 21 - 30	2: 1,501 - 2,000	2: 400,001 - 600,000	2: 600,000 - 700,000	2: 6 - 10	2: 21 - 30	2: 0.2 - 0.3	2: 0.2 - 0.3	2: 0.2 - 0.3			
3: 21 - 30		3: 201 - 300	3: 31 - 40	3: 2,001 - 2,500	3: 600,001 - 800,000	3: 700,000 - 800,000	3: 11 - 20	3: 31 - 40	3: 0.3 - 0.4	3: 0.3 - 0.4	3: 0.3 - 0.4			
4: 31 - 50		4: 301 - 400	4: 41 - 50	4: 2,501 - 3,000	4: 800,001 - 1,000,000	4: 800,000 - 1,000,000	4: 21 - 30	4: 41 - 50	4: 0.4 - 0.5	4: 0.4 - 0.5	4: 0.4 - 0.5			
5: Above 50%	5: Met	5: Above 400	5: Above 50%	5: Above 3,000	5: Above 1,000,000	5: Above 1,000,000	5: Above 30%	5: Above 50%	5: Above 0.5	5: Above 0.5	5: Above 0.5			
1	4	0	2	2	4	1	3	2	20	5	3	1	9	29
2	4	0	4	2	3	1	3	2	22	5	5	2	12	34
3	1	0	3	1	2	1	0	3	13	2	4	2	8	21
4	1	5	3	1	1	1	1	1	16	3	4	2	9	25
5	1	5	3	2	2	2	0	2	20	5	3	2	8	28
6	3	5	3	5	5	4	2	3	34	5	2	3	10	44
7	2	0	5	5	5	4	1	1	27	5	3	2	10	37
8	1	5	5	1	2	1	0	2	19	1	4	2	7	26
9	4	0	3	5	4	4	5	5	35	5	5	5	15	50
10	5	5	3	5	5	5	5	5	43	5	1	3	9	52
11	1	5	3	3	1	2	4	4	26	4	2	4	10	36
12	4	5	2	5	2	5	5	4	38	5	1	1	7	45
13	1	5	3	2	1	2	0	1	18	2	5	2	9	27

1.6 FEASIBILITY STUDY AREA

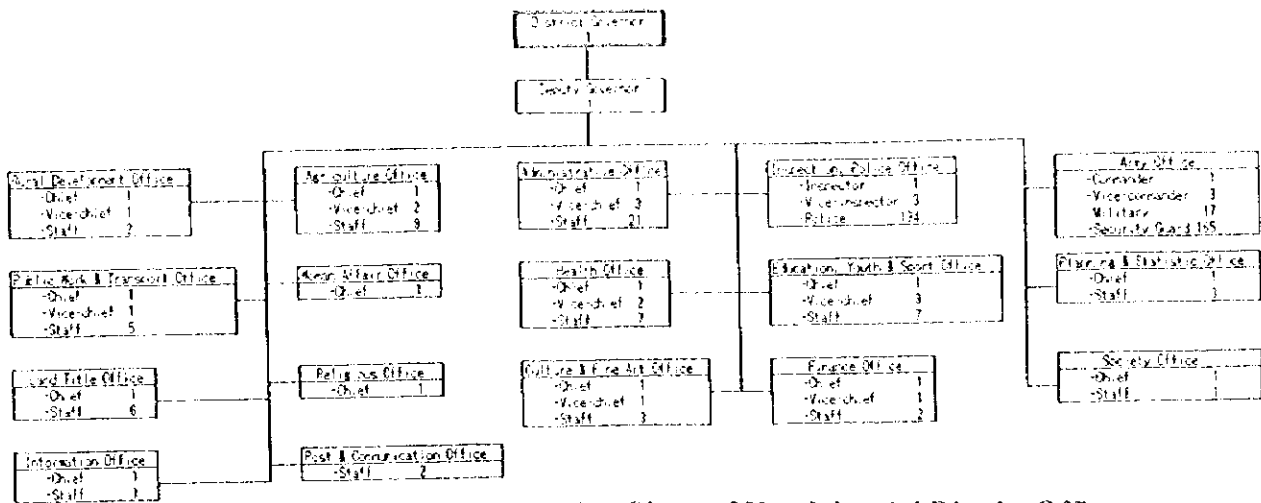


Figure I.6.1 Organization Chart of Ksach kandal District Office

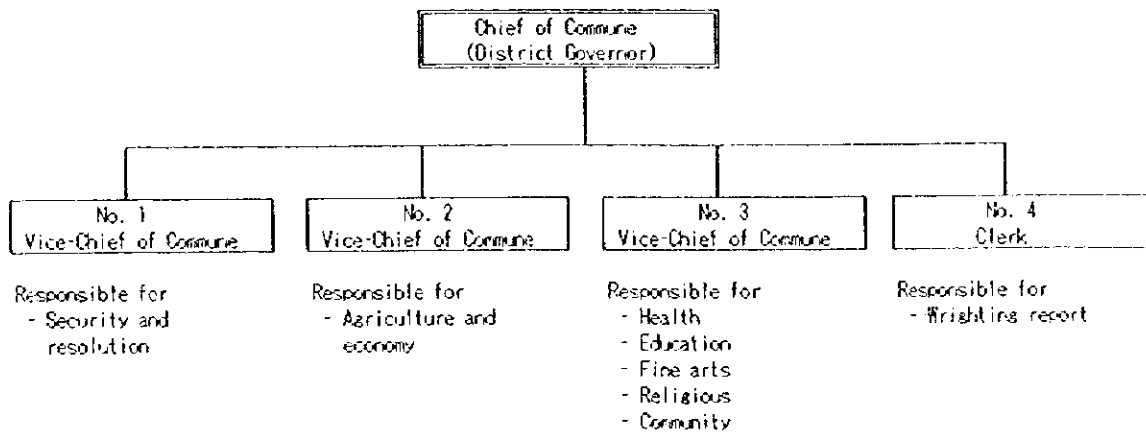


Figure I.6.2 Organization Chart of Commune Office

Table I.6.1 Administrative Status of Boeng Phtea Area

District	Commune	Village	Population	No. of Households	Averaged Family Size	No. of COC	No. of COC	No. of VDC	
Ksach Kandal	Prek Tamerk	Svay Att Leu	837	159	5.28	1 COC		1	
		Svay Att kandal	881	123	5.37			1	
		Svay Att Krom	869	149	5.83			1	
		Krong	1,812	291	5.54			1	
		Boeng Kaanchap Dheung	1,074	196	5.48			1	
		Boeng Kaanchap Ibong	1,088	209	5.21			1	
		Prek Tamerk	808	163	4.96			1	
		Antung	1,184	216	5.48			1	
	Sub-Total	8,133	1,506	5.40	8				
	Puk Russei	Puk Russei	Agn Cheng Leu	1,690	316	5.35	1 COC		1
			Agn Cheng Krom	1,610	300	5.37			1
			Kroch Seauch	1,793	312	5.75			1
			Puk Reusei Leu	1,631	300	5.44			1
			Puk Reusei kandal	1,408	256	5.49			1
			Pul Reusei Krom	1,960	396	5.00			1
			Sub-Total	10,110	1,890	5.38			7
	Santung	Threi	982	192	5.11	1 COC	1		
	Vihearsour	Vihearsour	Prei Chas	1,615	312	5.18	1 COC		1
			Seda	1,422	247	5.76			1
			Vihearsour Cheung	2,073	376	5.51			1
			Vihearsour Ibong	1,413	259	5.46			1
			Sub-Total	6,523	1,194	5.46			4
	Prek Apeil	Ia Tut	1,285	220	5.84	1 COC	1		
	Total			27,033	4,992	5.42	1	5	20

Source: Ksach Kandal District Office

Table I.6.2 Administrative Status of Colmatage Area

District	Commune	Village	Population	No. of Households	Averaged Family Size	Averaged Farm Size (ha)	No. of CDC	No. of CDC	No. of VDC	
Kean Sway	Bantey Dek	Kandal Krom	1,325	250						
		1-2	1,050							
	Samrong Thon		5,618	1,054	5.30	1.12 ha	1000	2 CDC		
		1-2-3	5,586	1,054						
	Kampong Prohm		2,942	595						
		Sub-Total	15,471	3,919						
	Saen	Ta Lone	Chong Koh Tod	1,490	274					
			Phum Ta Lone	2,376	440					
		Rosa Krous	Phum Prek Thei	1,782	330	5.48	1.85 ha	1000	No	
			Kseiv	1,350	250					
Prek Koy			702	130						
		Sub-Total	7,699	1,424						
Total		23,160	4,343	5.23						

Reference: Total Land Ksach Kandal 35,300 ha, of which cultivable area 19,981 ha (56%)

Total Land Kean Sway 38,200 ha, of which cultivable area 10,988 ha (29%)

Total Land Saen 51,500 ha, of which cultivable area 28,664 ha (56%)

District	Commune	Village	Existing Irrigation Area (ha)			Total	
			Upland Crops	Wet Season	Dry Season		
Kean Sway	Bantey Dek	Kandal Krom	200	0	0	200	
		1-2	450	13	43	503	
	Samrong Thon		460	3	480	930	
		1-2-3	200	0	170	370	
	Kampong Prohm		1,300	13	850	2,003	
		Sub-Total	20	20	30	70	
	Saen	Ta Lone	Chong Koh Tod	35	45	117	197
			Phum Ta Lone	102	50	120	312
		Rosa Krous	Phum Prek Thei	122	110	254	486
			Kseiv	60	56	18	134
Prek Koy			339	321	529	1,189	
		Sub-Total	1,659	364	1,229	3,252	

Table I.6.3 Self-Sufficiency of Milled Rice in the Three Districts

Province	District	Commune	No. of Villages	No. of Poor Inhabitants	No. of Households	Households Growing Paddy	Paddy Production (ton)	Paddy Surplus (ton)	Chronic Paddy Surplus (ton)	Surplus per Capita (kg)	Chronic Surplus per Capita (kg)		
Kandahar	Mean Sway	Banqash Dook	3	10,288	1,985	1,730	3,171	-1,158	75	-2	-7		
		Chobay Jesh	3	5,545	1,304	1,121	1,078	-355,823	-347	-80	-58		
		Deu Edtin	3	6,419	2,277	1,714	1,782	-55,653	-56	-10	-10		
		Komond Sway	3	7,886	1,598	1,516	1,358	-511,153	-347	-65	-44		
		Kowal Kowal	3	12,181	1,540	818	1,012	-1,488,800	-1,491	-114	-114		
		Kowal	4	12,748	2,278	1,875	964	-1,458,176	-1,458	-114	-114		
		Kopur Dham	4	11,216	1,642	1,819	1,500	-947,598	-947	-84	-84		
		Phum Thum	4	8,848	1,642	572	866	-810,458	-910	-103	-103		
		Preak Aeng	6	10,127	1,987	57	142	-1,479,422	-1,479	-146	-146		
		Preak Inna	6	12,248	2,401	820	1,128	-1,297,247	-1,285	-108	-108		
		Sampovna Thum	6	15,584	3,316	2,833	3,800	-883,834	-353	-25	-25		
		Vea Sbov	4	6,508	1,228	1,228	1,908	-967,900	-957	-153	-153		
		Sub-total	46	121,500	23,821	14,895	16,908	-9,303,103	-8,242	-78	-78		
		Kandahar	Kandahar	Baak Jav	4	3,592	1,151	618	1,151	41,525	65	72	19
				Chay Thum	6	5,756	1,932	1,052	1,829	58,726	238	10	41
				Komond Chamiane	4	4,151	879	810	1,104	-36,231	76	-16	18
				Kowal Choukay	4	4,988	955	815	845	-416,770	-416	-65	-85
				Kowal Dindava Jai	4	4,443	951	1,100	1,521	-330,487	-313	-50	-41
				Preak Prasab	7	9,757	1,878	1,645	2,192	-375,071	-372	-38	-32
				Preak Aneli	4	3,548	716	716	788	-209,825	-209	-52	-52
				Preak Lueng	3	5,088	968	470	872	-331,152	-331	-85	-85
				Preak Jai Koy	10	9,819	1,833	1,046	1,350	-810,637	-531	-36	-54
				Preak Jai Meak	6	9,776	1,838	1,838	2,798	-58,650	71	-9	-9
				Pak Bysseel	3	4,628	942	942	2,482	557,768	878	120	90
				Kowal Doodlweez	6	6,158	1,172	1,172	811	-546,714	-123	-81	-20
				Samlung	3	5,574	1,092	873	889	-407,485	-259	-72	-46
				Sithor	3	3,454	684	851	221	-417,135	-406	-201	-117
				Sway Dham	6	4,774	819	782	711	-365,188	-365	-77	-76
				Sway Romlet	6	2,875	541	501	114	-332,071	-372	-133	-123
				Taa Aek	8	10,127	1,879	1,721	2,762	-131,798	262	-13	23
				Vilpeal Sway	8	10,127	1,879	1,721	2,762	-131,798	262	-13	23
				Sub-total	68	105,446	20,715	16,064	22,192	-4,895,558	-2,849	-65	-27
				Sayan	Sayan	Kheer	10	12,522	2,245	2,245	2,347	-711,948	-484
		Kowal Anlong Dhen	4			4,802	1,031	349	451	-652,342	-622	-149	-143
		Kowal Kowal	6			3,542	1,808	1,872	2,128	-367,737	-128	-36	-32
		Kowal Kowal	5			5,445	1,158	1,148	732	-577,959	-275	-84	-51
		Kowal Kowal Jontaa	15			12,735	2,785	2,412	10,825	3,818,602	4,938	284	332
		Kowal Koy	5			5,403	950	750	2,370	421,871	421	81	81
		Prasab	9			20,492	3,872	3,788	3,385	-1,395,181	-786	-88	-93
		Preak Anbel	7			11,022	2,153	1,842	783	-1,436,783	-1,099	-114	-100
		Preak Koy	5			2,887	415	1,105	2,090	-67,550	54	7	7
		Rovaa Kowal	2			10,844	2,327	2,627	2,376	-439,486	38	-41	8
		Saan Phum	4			6,088	1,099	305	578	-645,806	-618	-108	-102
		Setboi	9			10,008	2,144	1,314	1,314	-857,568	-716	-83	-72
		Sway Pratal	5			7,822	1,434	782	782	-776,494	-620	-102	-81
		Sway Bolun	8			11,162	2,230	2,174	18	-1,392,781	-1,839	-153	-146
Taa Lon	9	15,284	3,122	2,432	3,450	-687,742	-542	-65	-64				
Treay Siba	8	9,008	1,892	1,423	2,183	-285,015	-69	-29	-27				
Tuek Vi	11	159,745	31,868	26,507	25,130	-6,334,295	-895	-40	-40				
Sub-total	119	159,745	31,868	26,507	25,130	-6,334,295	-895	-40	-40				

Source: Crop and Food Supply Assessment Mission 1980/81, WFP/FAO

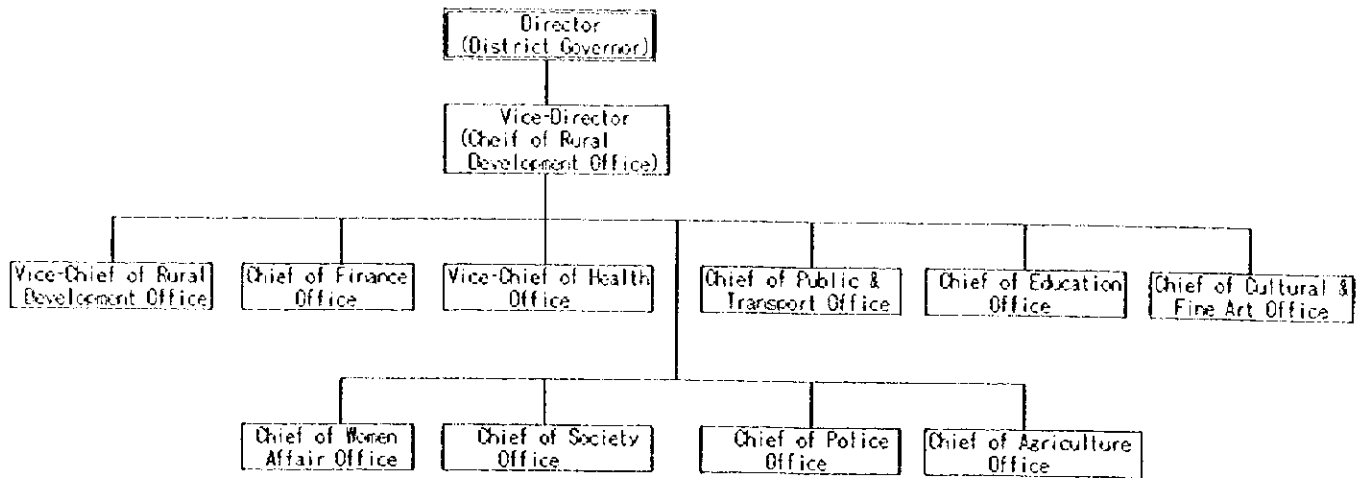


Figure I.6.3 Organization Chart of District Development Committee

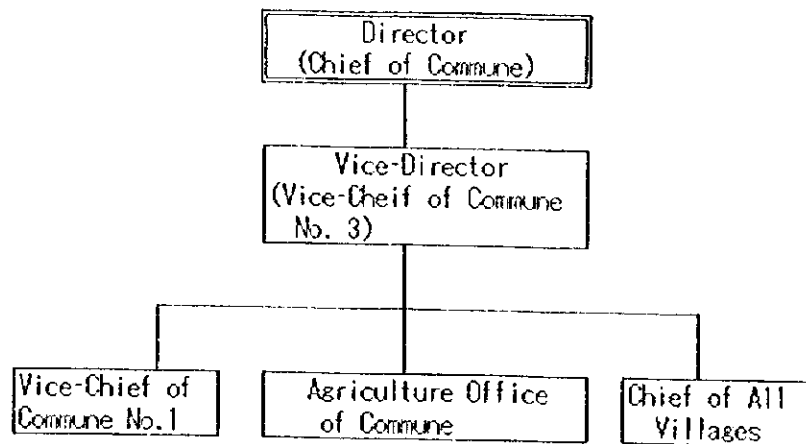
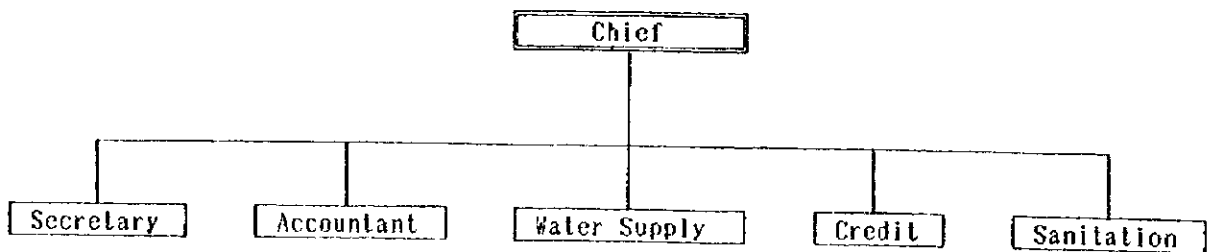


Figure I.6.4 Organization Chart of Commune Development Committee



Source. Ministry of Rural Development

Note. Number of members under the chief is 5, 7 and 9 depending on village size and responsibilities of members are vary in each village.

Chief is elected by village people every three(3) years.

Figure I.6.5 Organization Chart of Village Development Committee

1.7 PROJECT EVALUATION

Table 1.7.1 Price of Structure of Paddy

	Unit	Economic Price
IBRD price projection in 2005 at 1990 constant price (5% broken white rice, FOB Bangkok) 1/	US\$/ton	233
Converted to 1997 constant price 2/	US\$/ton	283
Export price, FOB Kompong Som 3/	US\$/ton	255
Port handling charge 4/	US\$/ton	9
Transportation cost from mill in Province to port 5/	US\$/ton	10
Margin of whole salers 6/	US\$/ton	13
Rice price ex-mill	US\$/ton	223
Paddy equivalent price(65% milling recovery)	US\$/ton	145
Milling cost	US\$/ton	13
Paddy price at mill	US\$/ton	132
Average cost of transportation, farm to mill 7/	US\$/ton	7
Farmgate price	US\$/ton	122
Farmgate price 8/	Riels/kg	334

Note.1/World Bank's Price Forecasts, August 1995, adjusted into 1997 constant prices, and FOB price at Kompong Som was assumed to be the same as that of Bangkok port in Thailand
 2/IBRD international price index(x1.2138)
 3/Derived by taking 10% discount from the price of 5% broken rice FOB, Bangkok
 4/Conversion factor of 0.85 was applied to 10\$/ton
 5/Transportation cost was estimated at 0.055 \$/ton/km, and distance from study area to port was averaged at 205km, CF=0.85
 6/5% of FOB price
 7/5% of paddy price at mill was applied
 8/Exchange rate:2,737 Riels=1US\$

Table 1.7.2 Price Structure of Maize

	Unit	Economic Price
IBRD price projection in 2005 at 1990 constant price US No. 2 Yellow FOB Gulf 1/	US\$/ton	86
Converted to 1997 constant price 2/	US\$/ton	104
Freight and insurance	US\$/ton	25
FOB Price at Kompong Som port	US\$/ton	129
Transportation from wholesale to warehouse at port 3/	US\$/ton	9
Wholesale to warehouse at port	US\$/ton	9
Wholesaler's price	US\$/ton	111
Wholesaler's margin	US\$/ton	6
Ex-warehouse price	US\$/ton	105
Transportation and handling cost from farm to warehouse 4/	US\$/ton	10
Farmgate price	US\$/ton	95
Farmgate price	Riels/kg	261

Note.1/World Bank's Price Forecasts, August 1995, adjusted into 1997 constant prices
 2/IBRD international price index(x1.2138)
 3/Conversion factor of 0.85 was applied
 4/Transportation cost was estimated at 0.055\$/ton/km, and distance from study area to port was averaged at 205km, CF=0.85
 5/5% of FOB price
 6/Exchange rate:2,737 Riels=1US\$

Table I.7.3 Price Structure of Fertilizer

	Unit	Urea (46-0-0)	DAP (16-20-0)	M. of Potash
IBRD projection price in 2005 in 1990 constant price 1/	US\$/ton	137	153	99
Converted to 1997 constant price(x 1.2138) 2/	US\$/ton	166	186	120
Ocean Freight and Insurance to Cambodian Port	US\$/ton	40	60	60
Import Price CIF at Kompong Som	US\$/ton	206	246	180
Port handling, storage and processing charge	US\$/ton	8	8	8
Wholesale price	US\$/ton	214	254	188
Wholesale margin 3/	US\$/ton	11	13	9
Transportation Cost from Port to retail 4/	US\$/ton	10	10	10
Dealers Margin	US\$/ton	12	14	10
Average Cost of Transportation from Distribution Center to Farm 5/	US\$/ton	2	2	2
Farmgate Price	US\$/ton	249	293	219
Farmgate Price 6/	Riels/kg	682	801	600

Table I.7.4 Farmgate Price of Crops and Inputs

	Unit	Financial Economic	
Crops:			
Paddy	Riels/kg	316	334
Maize	Riels/kg	257	261
Mungbean	Riels/kg	1,700	1,700
Chinese kale	Riels/kg	1,000	1,000
Sesame	Riels/kg	1,500	1,500
Banana	Riels/hand	350	350
Piglet	Riels/head	40,000	40,000
Pig fattened	Riels/live body weight	3,000	3,000
River fishes	Riels/kg	2,700	2,700
Inputs:			
Urea	Riels/kg	800	682
16-20-0	Riels/kg	730	801
Manure	Riels/cart(500kg)	5,000	5,000
Somicidin	Riels/kg	31,750	29,782
Azodrine	Riels/lit.	12,500	11,725
Trifon	Riels/lit.	27,900	26,170
Rice bran	Riels/kg	250	250
Fish meal	Riels/kg	900	900
Labour	Riels/man.day	3,500	1,750
Hired animal	Riels/animal.day	8,000	4,000
Seeds:			
Paddy	Riels/kg	350	350
Mungbean	Riels/kg	2,500	2,500
Sesame	Riels/kg	1,000	1,000
Maize	Riels/kg	700	700
Chinese kale	Riels/kg	20,000	18,760
Banana nursery	Riels/tree	450	450
Motor pump(small)	Riels/unit	875,000	820,750
Motor pump(rental)	Riels/hour	2,500	2,345

Table I.7.5 Calculation of Standard Conversion Factor

	1992	1993	1994	(unit: million US\$)		Average
				1995	1996	
① Total Imports(CIF)	350.7	486.4	754.8	1,213.0	1,109.0	782.8
② Total Exports(FOB)	264.5	283.0	462.9	809.0	659.0	495.7
③ Total Import Tax	31.7	69.0	105.1	121.4	119.6	89.4
④ Total Export Tax	4.0	4.1	7.3	6.8	2.9	5.0
⑤ Subsidy on Export:	-	-	-	-	-	-
⑥ = ① + ②	615.2	769.4	1,217.7	2,022.0	1,768.0	1,278.5
⑦ = ① + ② + ③ - ④ + ⑤	642.9	834.3	1,315.5	2,136.6	1,884.7	1,362.8
⑧ SCF = ⑥ / ⑦	0.957	0.922	0.926	0.946	0.938	0.938

Source: Calculated based on the data of IMF and Ministry of Economy and Finance

Table 1.7.6 Cost and Return of Crops

Cost and Return of Crops(financial)

Season:Wet Season

Crop:Rainfed Wet Paddy(Low Land)

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quant-ity	Value (Riels)	Quant-ity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labour	MD		90	-	95	-
Hired labour	MD	3,500	20	70,000	25	87,500
Bullock Labor	day	8,000	7	56,000	7	56,000
Sub-total				126,000		143,500
b. Input Cost						
Seed	kg	350	120	42,000	120	42,000
Manure	Carts	5,000	1	5,000	2	10,000
Fertilizer						
Urea	kg	800	48	38,400	50	40,000
16-20-0	kg	730	0	0	25	18,250
Agri-Chemicals	kg	31,750	0.25	7,938	0.50	15,875
Pumping water	Hours	2,500	0	0	0	0
Sub-total				93,338		126,125
Miscellaneous(5% of total)				11,544		14,191
Total Costs				230,882		283,816
2. Gross Income				534,198		640,374
a. Main Product	kg	316	1,610	508,760	1,930	609,880
b. By-product	kg	10	2,544	25,438	3,049	30,494
3. Net Profit				303,316		356,558

Cost and Return of Crops(economic)

Season:Wet Season

Crop:Rainfed Wet Paddy(Low Land)

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quant-ity	Value (Riels)	Quant-ity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labour	MD	1,750	90	157,500	95	166,250
Hired labour	MD	1,750	20	35,000	25	43,750
Bullock Labor	day	4,000	7	28,000	7	28,000
Sub-total				63,000		71,750
b. Input Cost						
Seed	kg	350	120	42,000	120	42,000
Manure	Carts	5,000	1	5,000	2	10,000
Fertilizer						
Urea	kg	682	48	32,736	50	34,100
16-20-0	kg	801	0	0	25	20,025
Agri-Chemicals	kg	29,780	0.25	7,445	0.50	14,890
Pumping water	Hours	2,345	0	0	0	0
Sub-total				87,181		121,015
Miscellaneous(5% of total)				7,904		10,146
Total Costs				158,085		202,911
2. Gross Income				563,178		675,114
a. Main Product	kg	334	1,610	537,740	1,930	644,620
b. By-product	kg	10	2,544	25,438	3,049	30,494
3. Net Profit				405,093		472,203

Cost and Return of Crops(financial)

Season:Dry Season
Crop:Recession Rice

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quantity	Value (Riels)	Quantity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labour	MD		100	-	105	-
Hired labour	MD	3,500	20	70,000	25	87,500
Bullock Labor	MAD	8,000	15	120,000	15	120,000
Sub-total				190,000		207,500
b. Input Cost						
Seed	kg	350	134	46,900	134	46,900
Manure	Carts	5,000	1	5,000	2	10,000
Fertilizer						
Urea	kg	800	80	64,000	90	72,000
16-20-0	kg	730	0	0	40	29,200
Agri-Chemicals	kg	12,500	0.5	6,250	1.0	12,500
Pumping water	Hours	2,500	15	37,500	7	17,500
Sub-total				159,650		188,100
Miscellaneous(5% of total)				18,403		20,821
Total Costs				368,053		416,421
2. Gross Income						
a. Main Product	kg	316	2,900	916,400	3,480	1,099,680
b. By-product	kg	10	4,582	45,820	5,498	54,984
3. Net Profit				594,167		738,243

Cost and Return of Crops(economic)

Season:Dry Season
Crop:Recession Rice

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quantity	Value (Riels)	Quantity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labour	MD	1,750	100	175,000	105	183,750
Hired labour	MD	1,750	20	35,000	25	43,750
Bullock Labor	MAD	4,000	15	60,000	15	60,000
Sub-total				95,000		103,750
b. Input Cost						
Seed	kg	350	134	46,900	134	46,900
Manure	Cart	5,000	1	5,000	2	10,000
Fertilizer						
Urea	kg	682	80	54,560	90	61,380
16-20-0	kg	801	0	0	40	32,040
Agri-Chemicals	kg	11,725	0.5	5,863	1.0	11,725
Pumping water	Hours	2,345	15	35,175	7	16,415
Sub-total				147,498		178,460
Miscellaneous(5% of total)				12,763		14,853
Total Costs				255,261		297,063
2. Gross Income						
a. Main Product	kg	334	2,900	968,600	3,480	1,162,320
b. By-product	kg	10	4,582	45,820	5,498	54,984
3. Net Profit				759,159		920,241

Cost and Return of Crops(financial)

Season:Wet Season
Crop:Maize

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quant-ity	Value (Riels)	Quant-ity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labor	MD		45	-	50	-
Hired labor	MD	3,500	0	0	0	0
Bullock Labor	MAD	8,000	6	48,000	8	64,000
Sub-total				48,000		64,000
b. Input Cost						
Seed	kg	700	30	21,000	30	21,000
Manure	Carts	5,000	1	5,000	3	15,000
Fertilizer						
Urea	kg	800	50	40,000	60	48,000
16-20-0	kg	730	50	36,500	60	43,800
Agri-Chemicals	kg	31,750	1	31,750	1	31,750
Pumping water	Hours	2,500	10	25,000	5	12,500
Sub-total				159,250		172,050
Miscellaneous(5% of total)				10,908		12,424
Total Costs				218,158		248,474
2. Gross Income				393,210		472,880
a. Main Product	kg	257	1,530	393,210	1,840	472,880
b. By-product	ton	0	0	0	0	0
3. Net Profit				175,052		224,406

Cost and Return of Crops(economic)

Season:Wet Season
Crop:Maize

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quant-ity	Value (Riels)	Quant-ity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labor	MD	1,750	45	78,750	50	87,500
Hired labor	MD	1,750	0	0	0	0
Bullock Labor	MAD	4,000	6	24,000	8	32,000
Sub-total				102,750		119,500
b. Input Cost						
Seed	kg	700	30	21,000	30	21,000
Manure	Carts	5,000	1	5,000	3	15,000
Fertilizer						
Urea	kg	682	50	34,100	60	40,920
16-20-0	kg	801	50	40,050	60	48,060
Agri-Chemicals	kg	29,780	1	29,780	1	29,780
Pumping water	Hours	2,345	10	23,450	5	11,725
Sub-total				153,380		166,485
Miscellaneous(5% of total)				13,481		15,052
Total Costs				269,611		301,037
2. Gross Income				399,330		480,240
a. Main Product	kg	261	1,530	399,330	1,840	480,240
b. By-product	ton	0	0	0	0	0
3. Net Profit				129,719		179,203

Cost and Return of Crops(financial)

Season:Wet Season
Crop:Sesame

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quant-ity	Value (Riels)	Quant-ity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labor	MD		52	0	55	0
Hired labor	MD	3,500	0	0	0	0
Bullock Labor	MAD	8,000	6	48,000	8	64,000
Sub-total				48,000		64,000
b. Input Cost						
Seed	kg	1,000	8	8,000	8	8,000
Manure	Carts	5,000	1	5,000	2	10,000
Fertilizer						
Urea	kg	800	0	0	0	0
16-20-0	kg	730	50	36,500	60	43,800
Agri-Chemicals	kg	12,500	2	25,000	2	25,000
Pumping water	Hours	2,500	0	0	0	0
Sub-total				74,500		86,800
Miscellaneous(5% of total)				6,447		7,937
Total Costs				128,947		158,737
2. Gross Income						
a. Main Product	kg	1,500	450	675,000	540	810,000
b. By-product	kg	0	0	0	0	0
3. Net Profit						
				546,053		651,263

Cost and Return of Crops(economic)

Season:Wet Season
Crop:Sesame

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quant-ity	Value (Riels)	Quant-ity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labor	MD	1,750	52	91,000	55	96,250
Hired labor	MD	1,750	0	0	0	0
Bullock Labor	MAD	4,000	6	24,000	8	32,000
Sub-total				115,000		128,250
b. Input Cost						
Seed	kg	1,000	8	8,000	8	8,000
Manure	Carts	5,000	1	5,000	2	10,000
Fertilizer						
Urea	kg	682	0	0	0	0
16-20-0	kg	801	50	40,050	60	48,060
Agri-Chemicals	kg	11,720	2	23,440	2	23,440
Pumping water	Hours	2,345	2	4,690	2	4,690
Sub-total				81,180		94,190
Miscellaneous(5% of total)				10,325		11,707
Total Costs				206,505		234,147
2. Gross Income						
a. Main Product	kg	1,500	450	675,000	540	810,000
b. By-product	kg	0	0	0	0	0
3. Net Profit						
				468,495		575,853

Cost and Return of Crops(financial)

Season:Dry Season
Crop:Mungbean

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quantity	Value (Riels)	Quantity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labor	MD		40	0	50	0
Hired labor	MD	3,500	0	0	0	0
Bullock Labor	MAD	8,000	10	80,000	12	96,000
Sub-total				80,000		96,000
b. Input Cost						
Seed	kg	2,500	30	75,000	30	75,000
Manure	Cart	5,000	1	5,000	2	10,000
Fertilizer						
Urea	kg	682	0	0	0	0
16-20-0	kg	730	100	73,000	120	87,600
Agri-Chemicals	kg	12,500	2	25,000	2	25,000
Pumping water	Hours	2,500	2	5,000	2	5,000
Sub-total				183,000		202,600
Miscellaneous(5% of total)				13,842		15,716
Total Costs				276,842		314,316
2. Gross Income				1,115,000		1,341,000
a. Main Product	kg	1,700	650	1,105,000	780	1,326,000
b. By-product	kg	5	2,000	10,000	3,000	15,000
3. Net Profit				838,158		1,026,684

Cost and Return of Crops(economic)

Season:Dry Season
Crop:Mungbean

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quantity	Value (Riels)	Quantity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labor	MD	1,750	40	70,000	50	87,500
Hired labor	MD	1,750	0	0	0	0
Bullock Labor	MAD	4,000	10	40,000	12	48,000
Sub-total				110,000		135,500
b. Input Cost						
Seed	kg	2,500	30	75,000	30	75,000
Manure	Carts	5,000	1	5,000	2	10,000
Fertilizer						
Urea	kg	682	0	0	0	0
16-20-0	kg	801	100	80,100	120	96,120
Agri-Chemicals	kg	11,720	2	23,440	2	23,440
Pumping water	Hours	2,345	2	4,690	2	4,690
Sub-total				188,230		209,250
Miscellaneous(5% of total)				15,696		18,145
Total Costs				313,926		362,895
2. Gross Income				1,115,000		1,341,000
a. Main Product	kg	1,700	650	1,105,000	780	1,326,000
b. By-product	kg	5	2,000	10,000	3,000	15,000
3. Net Profit				801,074		978,105

Cost and Return of Crops(financial)

Season:Dry/Wet Season
Crop:Leafy Vegetables(Kale)

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quant-ity	Value (Riels)	Quant-ity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labor	MD		90	0	110	0
Hired labor	MD	3,500	90	315,000	90	315,000
Bullock Labor	MAD	8,000	10	80,000	12	96,000
Sub-total				395,000		411,000
b. Input Cost						
Seed	kg	20,000	0.5	10,000	0.5	10,000
Manure	Carts	5,000	1	5,000	3	15,000
Fertilizer						
Urea	kg	800	100	80,000	100	80,000
15-15-15	kg	870	400	348,000	480	417,600
Agri-Chemicals	kg	31,750	2	63,500	3	95,250
Pumping water	Hours	2,500	3	7,500	4	10,000
Sub-total				514,000		627,850
Miscellaneous(5% of total)				47,842		54,676
Total Costs				956,842		1,093,526
2. Gross Income						
a. Main Product	kg	1,000	5,000	5,000,000	6,000	6,000,000
b. By-product	ton	0	0	0	0	0
3. Net Profit						
				4,043,158		4,906,474

Cost and Return of Crops(economic)

Season:Dry/Wet Season
Crop:Leafy Vegetables(Kale)

	Unit	Unit Price (Riels)	Without Project		With Project	
			Quant-ity	Value (Riels)	Quant-ity	Value (Riels)
1. Production Cost						
a. Labor Cost						
Family labor	MD	1,750	90	157,500	110	192,500
Hired labor	MD	1,750	90	157,500	90	157,500
Bullock Labor	MAD	4,000	10	40,000	12	48,000
Sub-total				355,000		398,000
b. Input Cost						
Seed	kg	18,760	0.5	9,380	0.5	9,380
Manure	Carts	5,000	1	5,000	3	15,000
Fertilizer						
Urea	kg	682	100	68,200	100	68,200
15-15-15	kg	815	400	326,000	480	391,200
Agri-Chemicals	kg	29,780	2	59,560	3	89,340
Pumping water	Hours	2,345	3	7,035	4	9,380
Sub-total				475,175		582,500
Miscellaneous(5% of total)				43,693		51,605
Total Costs				873,868		1,032,105
2. Gross Income						
a. Main Product	kg	1,000	5,000	5,000,000	6,000	6,000,000
b. By-product	ton	0	0	0	0	0
3. Net Profit						
				4,126,132		4,967,895

Cost and Return of Crops (rural, 1971)

Crop: Banana

	Unit	Unit Price (Riels)	Without Project						With Project					
			1st year		2nd year		3rd year		1st year		2nd year		3rd year	
			Quantity	Value (Riels)	Quantity	Value (Riels)	Quantity	Value (Riels)	Quantity	Value (Riels)	Quantity	Value (Riels)	Quantity	Value (Riels)
1. Production Cost														
a. Labor Cost														
Family labour	WAD		50	0	50	0	50	0	50	0	50	0		
Hired labour	WAD	5,500	40	140,000	0	0	0	0	40	140,000	0	0		
Bullock labour	MO	3,000	0	0	0	0	0	0	0	0	0	0		
Sub-total				140,000		0		0		140,000		0		
b. Inputs														
Nursery	Pieces	450	1,300	585,000	0	0	0	0	1,600	720,000	0	0		
Fertilizer (15-15-15)	kg	870	0	0	0	0	0	0	80	69,600	90	78,300		
Manure	Carts	5,000	5	25,000	0	0	0	0	0	30,000	5	25,000		
Insecticides	kg	12,500	0	0	0	0	0	0	1	12,500	1	12,500		
Pumping	Hours	2,500	0	0	0	0	0	0	0	12,500	0	12,500		
Sub-total				610,000		0		0		844,600		128,300		
Miscellaneous (5% of total)				42,000		0		0		54,347		6,750		
Total Cost				840,000		0		0		1,098,947		135,050		
2. Gross Income														
Main Product	Hands	350	6,000	2,100,000	6,200	2,170,000	6,200	2,170,000	6,600	2,310,000	7,800	2,730,000		
3. Net Profit	Riels			1,260,000		2,170,000		2,170,000		1,221,053		2,594,947		

Average: 1,806,607

Average: 2,137,643

Cost and Return of Crops (economic)

Crop: Banana

	Unit	Unit Price (Riels)	Without Project						With Project					
			1st year		2nd year		3rd year		1st year		2nd year		3rd year	
			Quantity	Value (Riels)	Quantity	Value (Riels)	Quantity	Value (Riels)	Quantity	Value (Riels)	Quantity	Value (Riels)	Quantity	Value (Riels)
1. Production Cost														
a. Labor Cost														
Family labour	WAD	1,750	50	87,500	50	87,500	50	87,500	50	87,500	50	87,500		
Hired labour	WAD	1,750	40	70,000	0	0	0	0	40	70,000	0	0		
Bullock labour	MO	4,000	0	0	0	0	0	0	0	24,000	0	0		
Sub-total				157,500		87,500		87,500		131,500		87,500		
b. Inputs														
Nursery	Pieces	450	1,300	585,000	0	0	0	0	1,600	720,000	0	0		
Fertilizer (15-15-15)	kg	810	0	0	0	0	0	0	80	69,600	90	78,300		
Manure	Carts	5,000	5	25,000	0	0	0	0	0	30,000	5	25,000		
Insecticides	kg	11,725	0	0	0	0	0	0	1	11,725	1	11,725		
Pumping	Hours	2,345	0	0	0	0	0	0	0	11,725	0	11,725		
Sub-total				610,000		0		0		833,600		121,900		
Miscellaneous (5% of total)				41,650		4,600		4,600		53,692		11,010		
Total Cost				833,150		92,100		92,100		1,073,842		220,310		
2. Gross Income														
Main Product	Hands	350	6,000	2,100,000	6,200	2,170,000	6,200	2,170,000	6,600	2,310,000	7,800	2,730,000		
3. Net Profit	Riels			1,266,850		2,077,900		2,077,900		1,236,158		2,509,690		

Average: 1,607,544

Average: 2,055,175

Fattening Pig

	(Unit: Riels/head) (6 months)
Income	
1. Weight of pig fattened (kg/head)	70
2. Unit price (Riels/live body weight)	3,000
Gross Income	210,000
Cost of Production	
3. Purchase of piglet (Riels/head)	40,000
4. Feed (Riels)	
Rice bran	15,000
5. Medical care (Riels)	8,000
6. Labour (Riels)	25,000
Total	88,000
Net Income (Riels)	124,000

Fish Culture in Paddy Field

	(Unit: Riels/ha)
Income	
1. Yield (kg/ha)	300
2. Price per (Riels/kg)	2,000
Gross Income	600,000
Expense	
3. Fry (5,000 fries)	43,000
4. Labour	13,000
5. Others	3,000
Total	64,000
Net Income per ha (Riels)	536,000

Note: only in wet season

Table I.7.7 Incremental Agricultural Benefits

STAGE-I								
Without Project	Wet Season			Dry Season			Orchard (Banana)	Total
	Paddy	Maize	Sesame	Paddy	Muramba	Vegetables		
Yield(kg/ha)	1,810	-	-	2,900	-	-	-	-
Unit Price(Riels/kg)	334	-	-	334	-	-	-	-
Gross Production Value(Riels/ha)	583,178	-	-	1,014,430	-	-	-	-
Cost of Production(Riels/ha)	158,055	-	-	255,261	-	-	-	-
Net Production Value(Riels/ha)	405,093	-	-	759,159	-	-	-	-
Planting Area(ha)	796	-	-	1,217	-	-	-	-
Total NPV(Million Riels)	293	-	-	924	-	-	-	1,953
With Project								
Yield(kg/ha)	1,930	-	-	3,490	-	-	-	-
Unit Price(Riels/kg)	334	-	-	334	-	-	-	-
Gross Production Value(Riels/ha)	675,114	-	-	1,217,304	-	-	-	-
Cost of Production(Riels/ha)	202,911	-	-	297,063	-	-	-	-
Net Production Value(Riels/ha)	472,203	-	-	920,241	-	-	-	-
Planting Area(ha)	947	-	-	1,622	-	-	-	-
Total NPV(Million Riels)	447	-	-	1,433	-	-	-	2,569
Incremental Benefit(Million Riels)	143	0	0	569	0	0	0	718
Notes: NPV per hectare includes income from by-products								
STAGE-II								
Without Project	Wet Season			Dry Season			Orchard (Banana)	Total
	Paddy	Maize	Sesame	Paddy	Muramba	Vegetables		
Yield(kg/ha)	-	-	-	-	650	5,000	-	-
Unit Price(Riels/kg)	-	-	-	-	1,700	1,000	-	-
Gross Production Value(Riels/ha)	-	-	-	-	1,115,000	5,000,000	-	-
Cost of Production(Riels/ha)	-	-	-	-	313,926	873,868	-	-
Net Production Value(Riels/ha)	-	-	-	-	801,074	4,126,132	1,937,544	-
Planting Area(ha)	-	-	-	-	286	123	74	433
Total NPV(Million Riels)	-	-	-	-	229	508	134	870
With Project								
Yield(kg/ha)	-	-	-	-	790	6,000	-	-
Unit Price(Riels/kg)	-	-	-	-	1,700	1,000	-	-
Gross Production Value(Riels/ha)	-	-	-	-	1,326,000	6,000,000	-	-
Cost of Production(Riels/ha)	-	-	-	-	362,835	1,032,105	-	-
Net Production Value(Riels/ha)	-	-	-	-	978,165	4,967,895	2,665,175	-
Planting Area(ha)	-	-	-	-	572	245	74	891
Total NPV(Million Riels)	-	-	-	-	553	1,217	154	1,931
Incremental Benefit(Million Riels)	0	0	0	0	330	710	21	1,061
STAGE-III								
Without Project	Wet Season			Dry Season			Orchard (Banana)	Total
	Paddy	Maize	Sesame	Paddy	Muramba	Vegetables		
Yield(kg/ha)	-	-	-	-	-	-	-	-
Unit Price(Riels/kg)	-	-	-	-	-	-	-	-
Gross Production Value(Riels/ha)	-	-	-	-	-	-	-	-
Cost of Production(Riels/ha)	-	-	-	-	-	-	-	-
Net Production Value(Riels/ha)	-	-	-	-	-	-	-	-
Planting Area(ha)	-	-	-	-	-	-	-	-
Total NPV(Million Riels)	-	-	-	-	-	-	-	0
With Project								
Yield(kg/ha)	-	1,840	540	-	-	-	-	-
Unit Price(Riels/kg)	-	261	1,500	-	-	-	-	-
Gross Production Value(Riels/ha)	-	480,240	810,000	-	-	-	-	-
Cost of Production(Riels/ha)	-	301,037	234,147	-	-	-	-	-
Net Production Value(Riels/ha)	-	179,203	575,853	-	-	-	-	-
Planting Area(ha)	-	97	227	-	-	-	-	-
Total NPV(Million Riels)	-	17	131	-	-	-	-	524
Incremental Benefit(Million Riels)	0	17	131	0	0	0	0	148
Total Incremental Agricultural Benefit from Stage I to Stage III(Million Riels)	143	17	131	569	330	0	21	1,926

Table I.7.8 Project Benefits by Stage

Stage	Agricultural Benefits			(Unit: million Riels)		
	Agricultural Production	Rehabilitation of Barren Lands	Prevention of Flood Damage	Fishry Benefits		
				Fish Catch	Fish culture in Reservoir	Paddy Field
Stage-I	718	393		243	-	51
Stage-II	1,061	393	385 (every 10 years)	243	-	51
Stage-III	148	393		243	270	51
Total	1,926	393	385	243	270	51

Table 1.7.9 Economic Project Cost by Stage

	Project Cost (US\$)						Project Cost (Million Kwf/s)		
	Financial Cost			Economic Cost			Economic Cost		
	Total	LC	FC	Total	LC	FC	Total	LC	FC
Stage I									
1. Construction Cost									
1) Construction of farm roads	1,092,933	216,838	876,125	984,529	108,404	876,125	2,698	297	2,401
2) Rehabilitation of the reservoirs	2,819,577	537,578	2,311,999	2,580,788	268,789	2,311,999	7,071	736	6,335
3) Rehabilitation of canals	129,560	25,439	104,121	116,841	12,720	104,121	320	35	285
4) Construction of weir	637,707	133,339	504,368	571,038	66,670	504,368	1,565	183	1,382
5) Construction of the intake gates	149,331	11,819	137,492	143,407	5,925	137,482	393	16	377
6) Agricultural supporting activities	536,575	17,925	519,250	527,913	8,663	519,250	1,446	24	1,423
Sub Total	3,395,683	942,338	4,453,315	4,924,514	471,169	4,453,345	13,493	1,291	12,202
2. Project Administration	40,320	10,320	0	20,160	20,160	0	55	55	0
3. Consulting Services									
1) Detail design	215,827	0	215,827	215,827	0	215,827	591	0	591
2) Construction supervision	323,741	0	323,741	323,741	0	323,741	887	0	887
Sub Total	539,568	0	539,568	539,568	0	539,568	1,478	0	1,478
4. Agricultural Supporting Activities	80,820	71,520	9,300	45,090	35,760	9,300	123	98	25
5. Physical Contingency	605,639	105,418	500,221	552,930	52,709	500,221	1,515	141	1,374
Total	6,662,030	1,159,596	5,502,434	6,082,232	579,798	5,502,434	16,665	1,589	15,076
Stage II									
1. Construction Cost									
1) Construction of farm roads	613,224	267,878	345,346	479,285	133,939	345,346	1,313	367	946
2) Rehabilitation of the colmatage canals	135,173	116,251	78,919	137,046	58,127	78,919	376	159	216
3) Installation of the intake gates	1,470,851	88,453	1,382,398	1,426,625	44,227	1,382,398	3,909	121	3,788
4) Construction of concrete bridges	48,325	7,457	40,868	44,597	3,729	40,868	122	10	112
Sub Total	2,327,573	480,042	1,847,531	2,087,552	240,021	1,847,531	5,720	658	5,062
2. Project Administration	26,880	26,880	0	13,440	13,440	0	37	37	0
3. Consulting Services									
1) Detail design	93,103	0	93,103	93,103	0	93,103	255	0	255
2) Construction supervision	139,654	0	139,654	139,654	0	139,654	393	0	393
Sub Total	232,757	0	232,757	232,757	0	232,757	638	0	638
4. Agricultural Supporting Activities	77,720	71,520	6,200	41,960	35,760	6,200	115	98	17
5. Physical Contingency	266,493	57,844	208,649	237,571	28,922	208,649	651	79	572
Total	2,931,423	636,286	2,295,137	2,613,280	318,143	2,295,137	7,160	872	6,288
Stage III									
1. Construction Cost									
1) Construction of farm roads	466,764	90,710	376,054	421,409	45,355	376,054	1,155	124	1,030
2) Rehabilitation of the district roads	76,464	64,248	12,216	44,340	32,124	12,216	124	88	33
3) Construction of concrete bridges	50,374	8,742	41,632	46,003	4,371	41,632	126	12	114
4) Construction of the flood control gates	586,095	32,378	553,717	569,906	16,189	553,717	1,562	44	1,517
5) Construction of the fish pond	125,509	14,190	111,319	118,414	7,095	111,319	324	19	305
Sub Total	1,305,206	210,268	1,094,938	1,200,072	105,131	1,094,938	3,289	268	3,000
2. Project Administration	26,880	26,880	0	13,440	13,440	0	37	37	0
3. Consulting Services									
1) Detail design	52,208	0	52,208	52,208	0	52,208	145	0	143
2) Construction supervision	78,312	0	78,312	78,312	0	78,312	215	0	215
Sub Total	130,520	0	130,520	130,520	0	130,520	358	0	358
4. Agricultural Supporting Activities	77,720	71,520	6,200	41,960	35,760	6,200	115	98	17
5. Physical Contingency	151,093	30867	120,226	138,600	15,431	123,169	380	42	337
Total	1,694,359	339,335	1,355,024	1,524,392	169,769	1,354,624	4,177	465	3,712
Grand Total	11,287,812	2,135,417	9,152,395	10,220,104	1,067,709	9,152,395	28,093	2,976	25,078

Table I.7.10 EIRR (agriculture + fishery)

- Stage I + Stage II + Stage III -

(unit: million Riels)

Year	Capital Cost	O & M Cost	Total	Benefit	Return	Present Worth Value by Discount Rate					
						Int. = 0.08		Int. = 0.10		Int. = 0.12	
						Cost	Benefit	Cost	Benefit	Cost	Benefit
1	2,317	7	2,324	431	-1,893	2,324	431	2,324	431	2,324	431
2	6,500	20	6,520	1,018	-5,502	5,590	873	5,388	842	5,193	812
3	7,849	29	7,878	1,405	-6,473	6,254	1,115	5,919	1,056	5,607	1,000
4	1,948	31	1,979	2,110	131	1,455	1,551	1,352	1,441	1,258	1,341
5	5,213	31	5,244	2,488	-2,778	3,563	1,878	3,256	1,531	2,976	1,399
6	1,138	34	1,170	2,540	1,370	737	1,601	660	1,434	593	1,287
7	3,041	34	3,075	2,884	-191	1,794	1,683	1,578	1,480	1,391	1,305
8	0	34	34	2,884	2,850	18	1,558	16	1,345	14	1,165
9	0	34	34	2,884	2,850	17	1,443	14	1,223	12	1,040
10	941	34	975	3,269	2,294	452	1,514	376	1,260	314	1,053
11	0	34	34	2,884	2,850	15	1,237	12	1,011	10	829
12	0	34	34	2,884	2,850	14	1,145	11	919	9	740
13	0	34	34	2,884	2,850	13	1,060	10	835	8	661
14	0	34	34	2,884	2,850	12	982	9	759	7	580
15	0	34	34	2,884	2,850	11	909	8	690	6	527
16	0	34	34	2,884	2,850	10	842	7	628	6	470
17	0	34	34	2,884	2,850	9	779	7	571	5	420
18	0	34	34	2,884	2,850	9	722	6	519	4	375
19	0	34	34	2,884	2,850	8	668	6	472	4	335
20	941	34	975	2,834	1,909	209	619	145	429	101	299
21	0	34	34	2,884	2,850	7	573	5	390	3	267
22	0	34	34	2,884	2,850	6	530	4	354	3	238
23	0	34	34	2,884	2,850	6	491	4	322	3	213
24	0	34	34	2,884	2,850	5	455	3	293	2	190
25	0	34	34	2,884	2,850	5	421	3	266	2	170
26	0	34	34	2,884	2,850	5	390	3	242	2	151
27	0	34	34	2,884	2,850	4	361	3	220	2	135
28	0	34	34	2,884	2,850	4	334	2	200	1	121
29	0	34	34	2,884	2,850	4	310	2	182	1	108
30	4,792	34	4,826	3,269	-1,557	480	325	277	187	161	109
31	0	34	34	2,884	2,850	3	265	2	150	1	86
32	0	34	34	2,884	2,850	3	246	2	137	1	77
33	0	34	34	2,884	2,850	3	228	1	124	1	69
34	0	34	34	2,884	2,850	2	211	1	113	1	61
35	0	34	34	2,884	2,850	2	195	1	103	1	55
36	0	34	34	2,884	2,850	2	181	1	93	1	49
37	0	34	34	2,884	2,850	2	167	1	85	1	44
38	0	34	34	2,884	2,850	2	155	1	77	0	39
39	0	34	34	2,884	2,850	2	143	1	70	0	35
40	941	34	975	3,269	2,294	45	150	22	72	10	35
41	0	34	34	2,884	2,850	1	123	1	58	0	28
42	0	34	34	2,884	2,850	1	114	1	53	0	25
43	0	34	34	2,884	2,850	1	105	1	48	0	22
44	0	34	34	2,884	2,850	1	99	1	44	0	20
45	0	34	34	2,884	2,850	1	90	0	40	0	18
46	0	34	34	2,884	2,850	1	84	0	36	0	16
47	0	34	34	2,884	2,850	1	77	0	33	0	14
48	0	34	34	2,884	2,850	1	72	0	30	0	13
49	0	34	34	2,884	2,850	1	68	0	27	0	11
50	941	34	975	3,269	2,294	21	70	8	28	3	11
Total	36,500	1,643	38,203	138,406	100,198	23,133	29,441	21,455	22,950	20,047	18,505

EIRR = 11.00 %

B/C Ratio	8 %	1.27
B/C Ratio	10 %	1.07
B/C Ratio	12 %	0.92

Table I.7.11 EIRR(only agricultural benefits)

- Stage -I only -

(unit: million Riels)

Year	Capital Cost	O & M Cost	Total	Benefit	Return	Present Worth Value by Discount Rate					
						Int. = 0.08		Int. = 0.10		Int. = 0.12	
						Cost	Benefit	Cost	Benefit	Cost	Benefit
1	2,317	7	2,324	431	-1,893	2,324	431	2,324	431	2,324	431
2	6,500	20	6,520	1,018	-5,502	5,500	873	5,388	842	5,198	812
3	7,849	29	7,878	1,405	-6,473	6,254	1,115	5,919	1,056	5,607	1,000
4	0	29	29	1,405	1,376	21	1,033	20	960	18	893
5	0	29	29	1,405	1,376	20	956	18	872	16	797
6	0	29	29	1,405	1,376	18	885	16	793	15	712
7	0	29	29	1,405	1,376	17	820	15	721	13	636
8	0	29	29	1,405	1,376	16	759	14	655	12	567
9	0	29	29	1,405	1,376	15	703	12	596	10	507
10	941	29	970	1,405	435	449	651	374	542	312	452
11	0	29	29	1,405	1,376	12	603	10	492	8	404
12	0	29	29	1,405	1,376	12	558	9	448	7	361
13	0	29	29	1,405	1,376	11	517	8	407	7	322
14	0	29	29	1,405	1,376	10	478	8	370	6	287
15	0	29	29	1,405	1,376	9	443	7	338	5	257
16	0	29	29	1,405	1,376	8	410	6	306	5	229
17	0	29	29	1,405	1,376	8	380	6	278	4	205
18	0	29	29	1,405	1,376	7	352	5	253	4	183
19	0	29	29	1,405	1,376	7	326	5	230	3	163
20	941	29	970	1,405	435	208	301	144	209	101	146
21	0	29	29	1,405	1,376	6	279	4	190	3	130
22	0	29	29	1,405	1,376	5	258	4	173	2	116
23	0	29	29	1,405	1,376	5	239	3	157	2	104
24	0	29	29	1,405	1,376	5	222	3	143	2	93
25	0	29	29	1,405	1,376	4	205	3	130	2	83
26	0	29	29	1,405	1,376	4	190	2	118	2	74
27	0	29	29	1,405	1,376	4	176	2	107	1	66
28	0	29	29	1,405	1,376	3	163	2	97	1	59
29	0	29	29	1,405	1,376	3	151	2	89	1	53
30	941	29	970	1,405	435	96	140	56	81	32	47
31	0	29	29	1,405	1,376	3	129	2	73	1	42
32	0	29	29	1,405	1,376	2	120	1	67	1	37
33	0	29	29	1,405	1,376	2	111	1	60	1	33
34	0	29	29	1,405	1,376	2	103	1	55	1	30
35	0	29	29	1,405	1,376	2	95	1	50	1	27
36	0	29	29	1,405	1,376	2	88	1	45	0	24
37	0	29	29	1,405	1,376	2	81	1	41	0	21
38	0	29	29	1,405	1,376	2	75	1	38	0	19
39	0	29	29	1,405	1,376	1	70	1	34	0	17
40	941	29	970	1,405	435	45	65	21	31	10	15
41	0	29	29	1,405	1,376	1	60	1	28	0	13
42	0	29	29	1,405	1,376	1	55	1	26	0	12
43	0	29	29	1,405	1,376	1	51	0	23	0	11
44	0	29	29	1,405	1,376	1	48	0	21	0	10
45	0	29	29	1,405	1,376	1	44	0	19	0	9
46	0	29	29	1,405	1,376	1	41	0	18	0	8
47	0	29	29	1,405	1,376	1	38	0	16	0	7
48	0	29	29	1,405	1,376	1	35	0	14	0	6
49	0	29	29	1,405	1,376	1	32	0	13	0	5
50	941	29	970	1,405	435	21	30	8	12	3	5
Total	21,371	1,419	22,790	68,899	48,096	15,242	15,956	14,432	12,784	13,745	10,536

EIRR = 8.64 %

B/C Ratio 8 % 1.05
 B/C Ratio 10 % 0.88
 B/C Ratio 12 % 0.77

Table I.7.12 EIRR(stage I + stage II:agriculture + fishery)

- Stage -I + Stage II -

(unit: million Riel)

Year	Capital Cost	O & M Cost	Total	Benefit	Return	Present Worth Value by Discount Rate					
						Int. = 0.08		Int. = 0.10		Int. = 0.12	
						Cost	Benefit	Cost	Benefit	Cost	Benefit
1	2,317	7	2,324	431	-1,893	2,324	431	2,324	431	2,324	431
2	6,500	20	6,520	1,018	-5,502	5,590	873	5,389	842	5,199	812
3	7,849	29	7,878	1,405	-6,473	6,254	1,115	5,919	1,056	5,607	1,000
4	1,949	31	1,979	2,110	131	1,455	1,551	1,352	1,441	1,258	1,341
5	5,213	31	5,244	2,466	-2,778	3,569	1,678	3,256	1,531	2,976	1,339
6	0	31	31	2,466	2,435	20	1,554	17	1,392	16	1,249
7	0	31	31	2,466	2,435	18	1,439	16	1,265	14	1,115
8	0	31	31	2,466	2,435	17	1,332	14	1,150	13	996
9	0	31	31	2,466	2,435	16	1,234	13	1,046	11	889
10	941	31	972	2,466	1,494	450	1,142	375	951	313	734
11	0	31	31	2,466	2,435	13	1,058	11	884	9	709
12	0	31	31	2,466	2,435	12	979	10	786	8	633
13	0	31	31	2,466	2,435	11	907	9	714	7	565
14	0	31	31	2,466	2,435	11	840	8	649	6	505
15	0	31	31	2,466	2,435	10	777	7	590	6	451
16	0	31	31	2,466	2,435	9	720	7	537	5	402
17	0	31	31	2,466	2,435	8	666	6	488	5	353
18	0	31	31	2,466	2,435	8	617	6	444	4	321
19	0	31	31	2,466	2,435	7	571	5	403	4	286
20	941	31	972	2,466	1,494	209	529	144	367	101	256
21	0	31	31	2,466	2,435	6	490	4	333	3	228
22	0	31	31	2,466	2,435	6	454	4	303	3	204
23	0	31	31	2,466	2,435	5	426	3	275	2	182
24	0	31	31	2,466	2,435	5	389	3	250	2	162
25	0	31	31	2,466	2,435	5	360	3	228	2	145
26	0	31	31	2,466	2,435	4	333	3	207	2	130
27	0	31	31	2,466	2,435	4	309	2	189	1	116
28	0	31	31	2,466	2,435	4	286	2	171	1	103
29	0	31	31	2,466	2,435	3	265	2	155	1	92
30	4,011	31	4,042	2,466	-1,576	402	245	232	141	135	82
31	0	31	31	2,466	2,435	3	227	2	128	1	73
32	0	31	31	2,466	2,435	3	210	1	117	1	66
33	0	31	31	2,466	2,435	2	195	1	106	1	59
34	0	31	31	2,466	2,435	2	180	1	97	1	52
35	0	31	31	2,466	2,435	2	167	1	88	1	47
36	0	31	31	2,466	2,435	2	154	1	80	1	42
37	0	31	31	2,466	2,435	2	143	1	73	0	37
38	0	31	31	2,466	2,435	2	132	1	66	0	33
39	0	31	31	2,466	2,435	2	123	1	60	0	30
40	941	31	972	2,466	1,494	45	114	21	54	10	27
41	0	31	31	2,466	2,435	1	105	1	50	0	24
42	0	31	31	2,466	2,435	1	97	1	45	0	21
43	0	31	31	2,466	2,435	1	90	1	41	0	19
44	0	31	31	2,466	2,435	1	83	0	37	0	17
45	0	31	31	2,466	2,435	1	77	0	34	0	15
46	0	31	31	2,466	2,435	1	72	0	31	0	13
47	0	31	31	2,466	2,435	1	66	0	28	0	12
48	0	31	31	2,466	2,435	1	61	0	25	0	11
49	0	31	31	2,466	2,435	1	57	0	23	0	10
50	941	31	972	2,466	1,494	21	53	8	21	3	9
Total	31,602	1,513	33,115	118,400	85,285	20,546	25,976	19,190	20,402	18,056	16,573

EIRR = 10.93 %

B/C Ratio	8 %	1.26
B/C Ratio	10 %	1.06
B/C Ratio	12 %	0.92

Table I.7.13 EIRR(only agricultural benefit)

- Stage I + Stage II + Stage III -

(unit: million Riels)

Year	Capital Cost	O & M Cost	Total	Benefit	Return	Present Worth Value by Discount Rate					
						Int. = 0.08		Int. = 0.10		Int. = 0.12	
						Cost	Benefit	Cost	Benefit	Cost	Benefit
1	2,039	7	2,106	431	-1,675	2,106	431	2,106	431	2,106	431
2	5,803	20	5,823	987	-4,862	4,997	823	4,817	800	4,647	771
3	7,195	29	7,224	1,111	-6,113	5,735	882	5,427	835	5,142	791
4	1,948	31	1,979	1,816	-163	1,455	1,335	1,352	1,240	1,258	1,154
5	5,213	31	5,244	2,172	-3,072	3,589	1,478	3,256	1,349	2,976	1,232
6	1,136	34	1,170	2,246	1,076	737	1,415	660	1,268	593	1,138
7	3,041	34	3,075	2,320	-755	1,794	1,354	1,578	1,191	1,391	1,049
8	0	34	34	2,320	2,286	18	1,253	16	1,082	14	937
9	0	34	34	2,320	2,286	17	1,161	14	984	12	837
10	941	34	975	2,705	1,730	452	1,253	376	1,043	314	871
11	0	34	34	2,320	2,286	15	995	12	813	10	667
12	0	34	34	2,320	2,286	14	921	11	739	9	595
13	0	34	34	2,320	2,286	13	853	10	672	8	532
14	0	34	34	2,320	2,286	12	790	9	611	7	475
15	0	34	34	2,320	2,286	11	731	8	555	6	424
16	0	34	34	2,320	2,286	10	677	7	505	6	378
17	0	34	34	2,320	2,286	9	627	7	459	5	338
18	0	34	34	2,320	2,286	9	581	6	417	4	302
19	0	34	34	2,320	2,286	8	538	6	373	4	269
20	941	34	975	2,705	1,730	269	580	145	402	101	286
21	0	34	34	2,320	2,286	7	461	5	314	3	215
22	0	34	34	2,320	2,286	6	427	4	285	3	192
23	0	34	34	2,320	2,286	6	395	4	259	3	171
24	0	34	34	2,320	2,286	5	366	3	236	2	153
25	0	34	34	2,320	2,286	5	339	3	214	2	136
26	0	34	34	2,320	2,286	5	314	3	195	2	122
27	0	34	34	2,320	2,286	4	290	3	177	2	106
28	0	34	34	2,320	2,286	4	269	2	161	1	97
29	0	34	34	2,320	2,286	4	249	2	146	1	87
30	4,792	34	4,826	2,705	-2,121	490	283	277	155	161	90
31	0	34	34	2,320	2,286	3	213	2	121	1	68
32	0	34	34	2,320	2,286	3	198	2	110	1	62
33	0	34	34	2,320	2,286	3	183	1	100	1	55
34	0	34	34	2,320	2,286	2	169	1	91	1	49
35	0	34	34	2,320	2,286	2	157	1	83	1	44
36	0	34	34	2,320	2,286	2	145	1	75	1	39
37	0	34	34	2,320	2,286	2	135	1	68	1	35
38	0	34	34	2,320	2,286	2	125	1	62	0	31
39	0	34	34	2,320	2,286	2	115	1	56	0	28
40	941	34	975	2,705	1,730	45	125	22	60	10	23
41	0	34	34	2,320	2,286	1	90	1	47	0	22
42	0	34	34	2,320	2,286	1	92	1	42	0	20
43	0	34	34	2,320	2,286	1	85	1	39	0	18
44	0	34	34	2,320	2,286	1	78	1	35	0	16
45	0	34	34	2,320	2,286	1	73	0	32	0	14
46	0	34	34	2,320	2,286	1	67	0	29	0	13
47	0	34	34	2,320	2,286	1	62	0	26	0	11
48	0	34	34	2,320	2,286	1	58	0	24	0	10
49	0	34	34	2,320	2,286	1	53	0	22	0	9
50	941	34	975	2,705	1,730	21	58	8	23	3	3
Total	34,997	1,643	36,645	112,748	76,103	21,803	24,352	20,175	19,060	18,813	15,428

EIRR = 9.37 %

B/C Ratio 8 % 1.12
 B/C Ratio 10 % 0.94
 B/C Ratio 12 % 0.82

Table I.7.14 Financial Analysis

Boeng Kitea Area (Cultivation Area)

Farm Size: 0.60 ha
Farm Model: Without Project

1. Crop Production

	Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Riels/kg)	Value (Riels)	Production Cost (Riels)	Net Income (Riels)
Dry season paddy irrigated	0.57	2,900	1,653	318	522,345	235,530	286,795
Season	0.57	450	257	1,500	384,750	73,500	311,250
Total	1.14						598,000

- 2. Fishery Income (Riels/year) 163,000
- 3. Off-farm Income (Riels/year) 375,000
- 4. Total Income (Riels) 1,136,000
- 5. Living Expense (Riels/year)-Family size 5.75 person/family 722,000
- 6. Disposable Income (Riels/year) 414,000

Farm Model-With Project

1. Crop Production

	Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Riels/kg)	Value (Riels)	Production Cost (Riels)	Net Income (Riels)
U.Paddy irrigated	0.57	2,490	1,094	318	626,918	278,040	348,778
Season	0.57	540	308	1,500	461,700	80,480	371,220
Mangrove	0.57	780	445	1,700	755,820	179,160	576,660
Total	1.71						1,296,658

- 2. Fishery Income (Riels/year) 265,527
- 3. Off-farm Income (Riels/year) 610,875
- 4. Total Income (Riels) 2,173,060
- 5. Living Expense (Riels/year)-Family size 5.75 person/family 1,176,138
- 6. Disposable Income (Riels/year) 996,922

Boeng Kitea Area (Recession Area)

Farm Size: 1.70 ha
Farm Model: Without Project

1. Crop Production

	Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Riels/kg)	Value (Riels)	Production Cost (Riels)	Net Income (Riels)
Recession rice	0.40	2,900	1,160	318	368,568	165,320	201,234
Season paddy	1.30	1,610	1,993	318	610,512	277,655	332,854
Total	1.60						534,687

- 2. Fishery Income (Riels/year) 334,000
- 3. Off-farm Income (Riels/year) 550,000
- 4. Total Income (Riels) 1,418,687
- 5. Living Expense (Riels/year)-Family size 6.73 person/family 1,050,000
- 6. Disposable Income (Riels/year) 368,687

Farm Model-With Project (1)

1. Crop Production

	Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Riels/kg)	Value (Riels)	Production Cost (Riels)	Net Income (Riels)
Recession rice	0.80	2,490	2,764	318	979,744	390,231	489,511
Season paddy	1.20	1,900	2,316	318	719,856	349,575	391,277
Total	2.00						800,736

- 2. Fishery Income (Riels/year) 544,000
- 3. Off-farm Income (Riels/year) 295,950
- 4. Total Income (Riels) 2,320,826
- 5. Living Expense (Riels/year)-Family size 6.73 person/family 1,719,450
- 6. Disposable Income (Riels/year) 610,376

Brown (Hatched Area)/Faded Area)

Farm Size: 1.09 ha
Farm Model: Without Project

1. Crop Production

	Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Riels/kg)	Value (Riels)	Production Cost (Riels)	Net Income (Riels)
Wet season paddy rainfed	1.05	1,618	1,691	316	534,138	242,426	291,712
Pig raising	2 head				420,000	172,000	248,000
Total	1.05						539,712

2. Fishery Income(Riels/year) 50,000
3. Off-farm Income(Riels/year) 898,000
4. Total Income(Riels)) 1,437,712
5. Living Expense(Riels/year)-Family size 4.32 person/family 1,320,000
6. Disposable Income(Riels/year) 117,712

Farm Model: With Project (1)

1. Crop Production

	Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Riels/kg)	Value (Riels)	Production Cost (Riels)	Net Income (Riels)
Wet season paddy rainfed	1.05	1,930	2,027	316	640,374	298,007	342,367
Pig raising	4 head				840,000	344,000	496,000
Total	1.05						838,367

2. Fishery Income(Riels/year) 81,450
3. Off-farm Income(Riels/year) 1,462,842
4. Total Income(Riels)) 2,382,659
5. Living Expense(Riels/year)-Family size 4.92 person/family 2,150,280
6. Disposable Income(Riels/year) 232,379