

Figure 3.16 Proposed Agricultural Development Projects

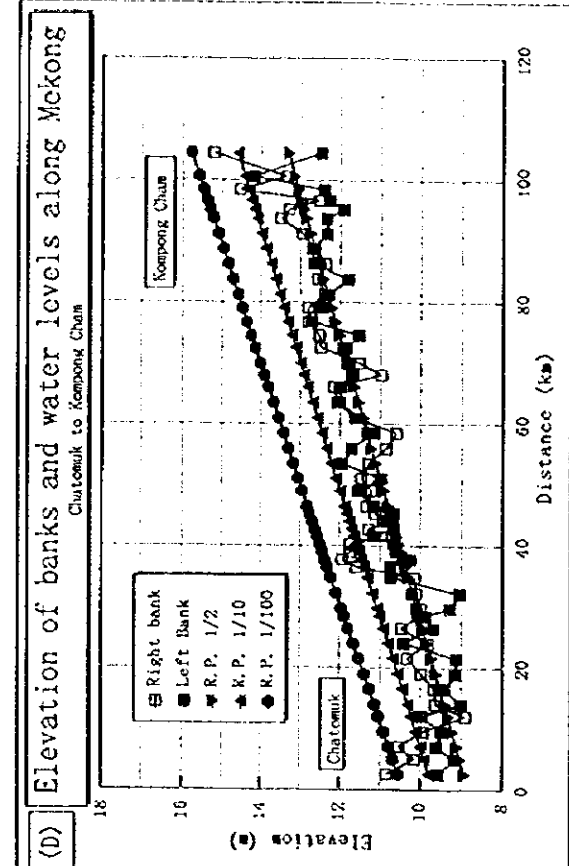
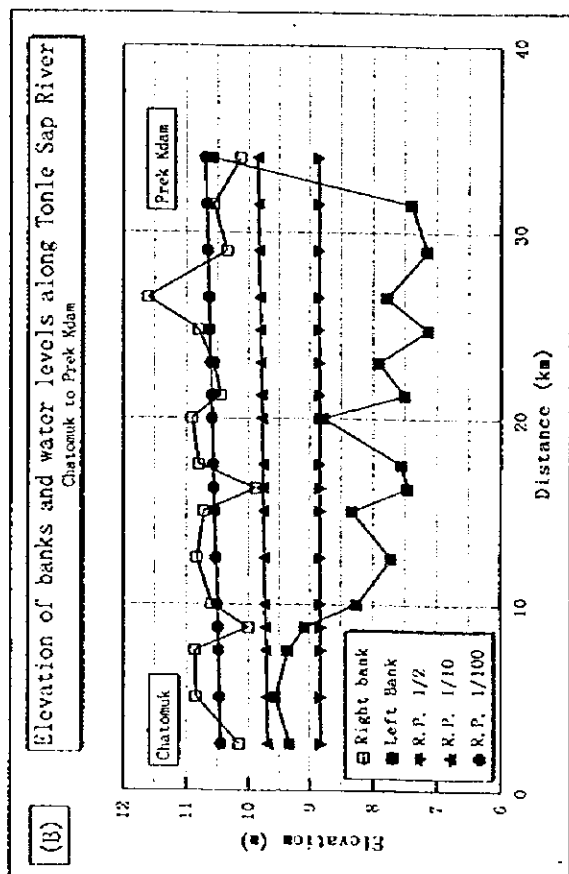
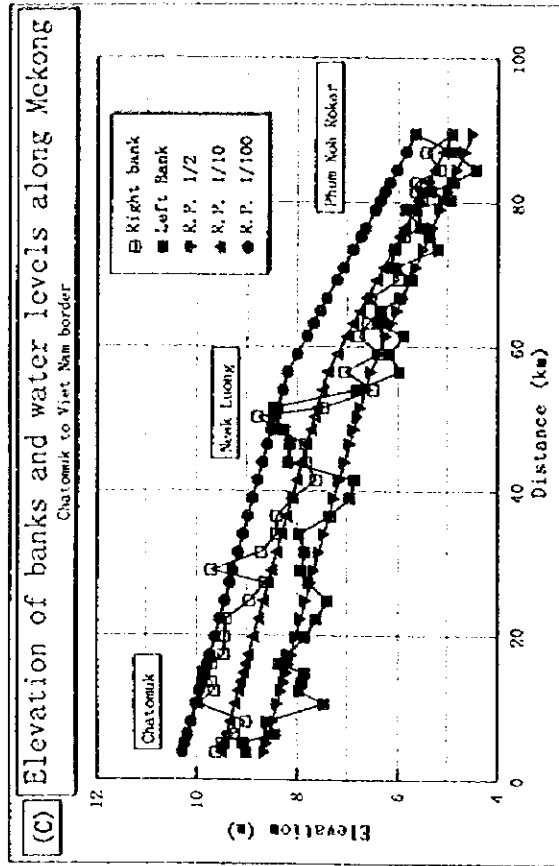
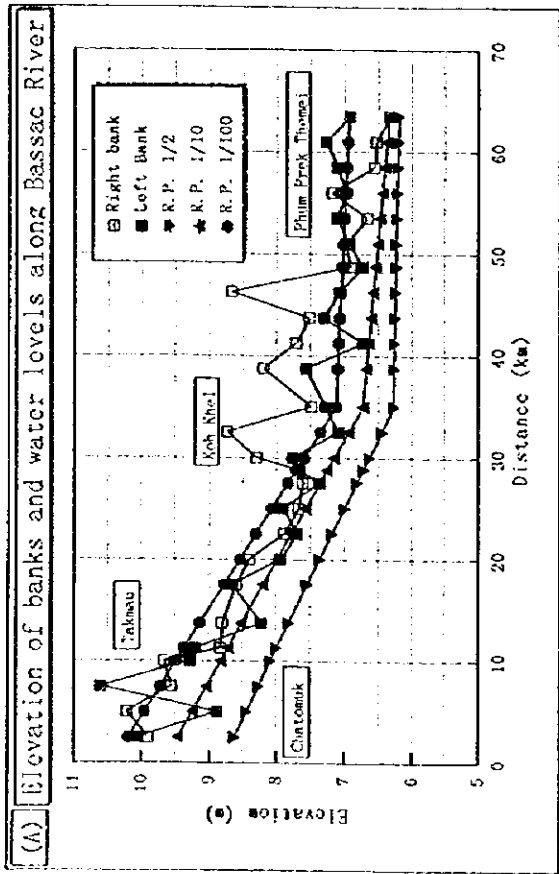


Figure 3.17 Elevation of Banks and Design Water Level (1/2, 1/10, 1/100 R.P.) along Mekong, Bassac and Tonle Sap River

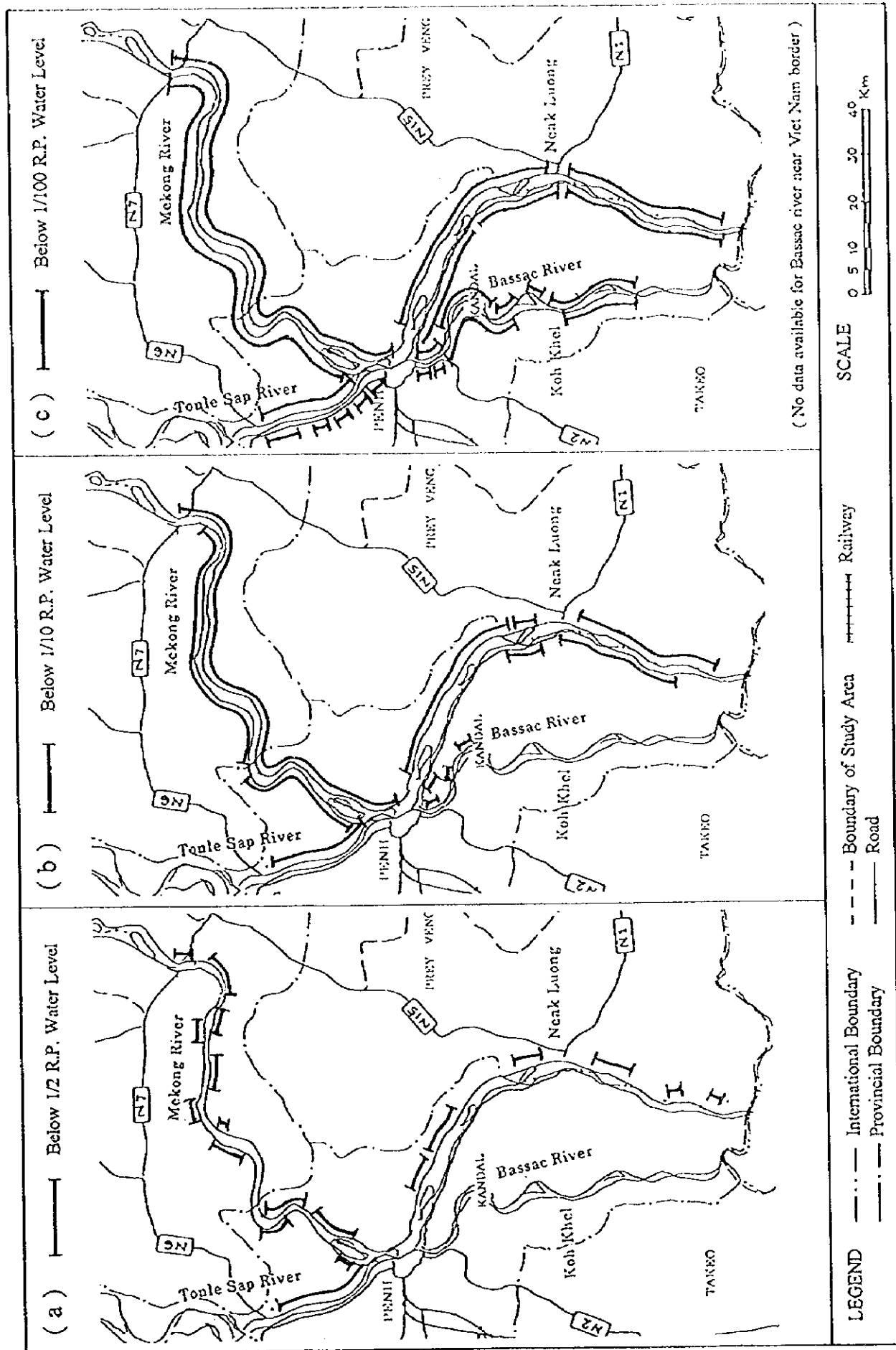


Figure 3.18 Stretches of Left and Right Bank along Mekong, Bassac and Tonle Sap River below 1/2, 1/10 and 1/100 Return Period Flood Level

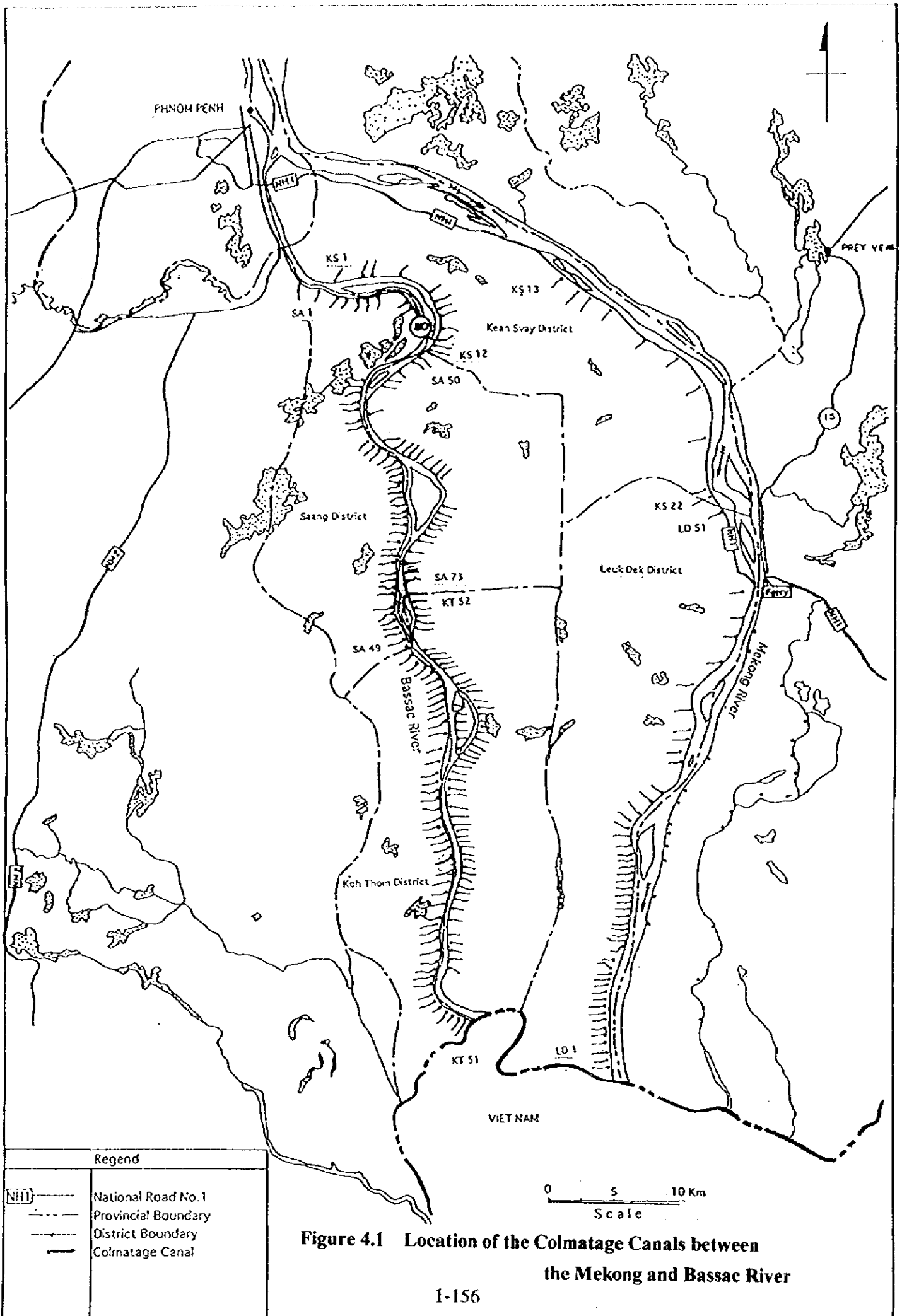
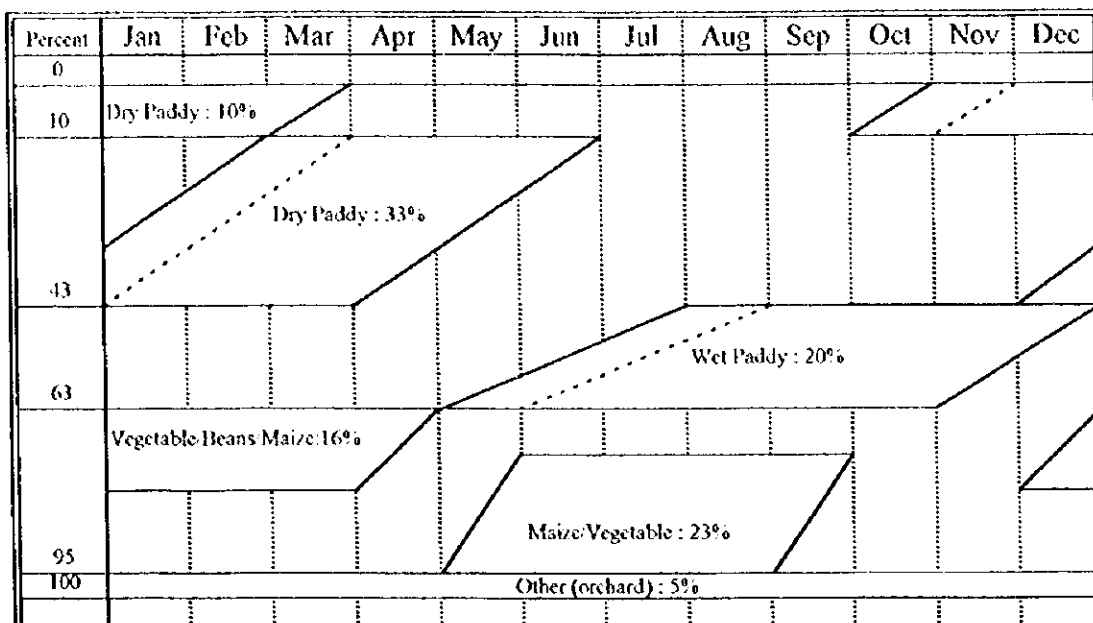
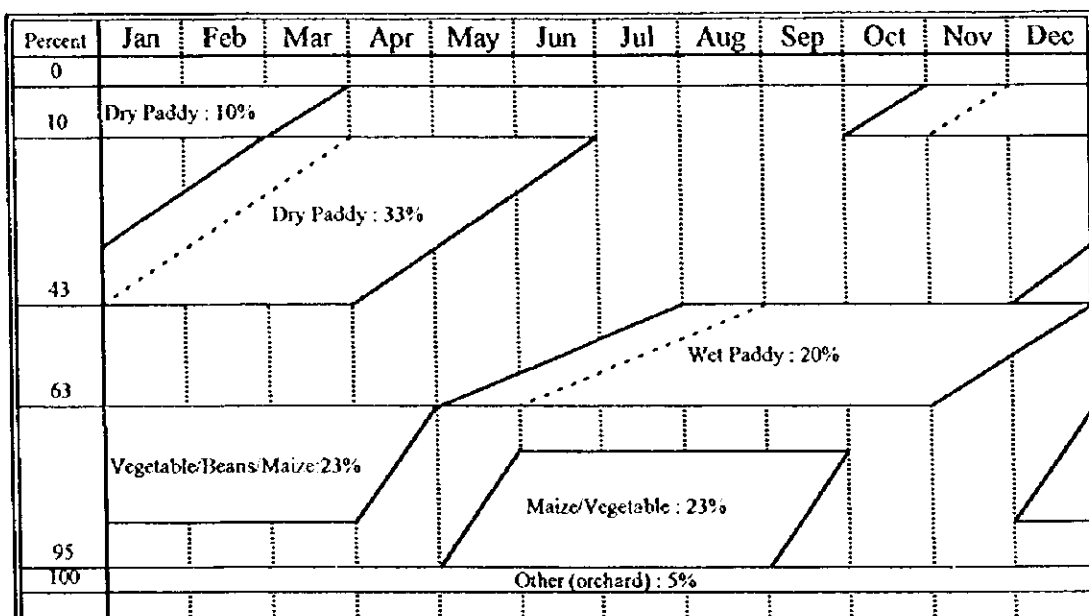


Figure 4.1 Location of the Colmatage Canals between the Mekong and Bassac River



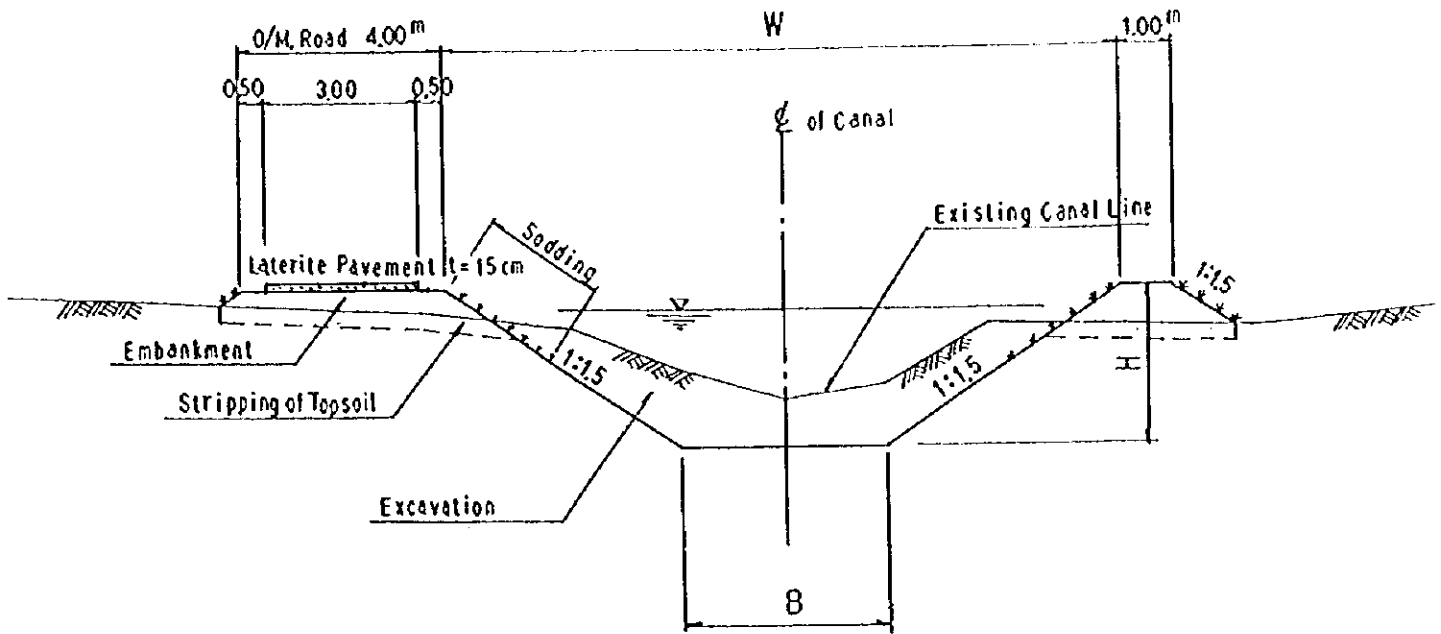
Source: Field Survey and Rural Socio-Economic Survey

Figure 4.3 Present Cropping Pattern of Colmatage System in Kandal Province



Source: Field Survey and Rural Socio-Economic Survey

Figure 4.4 Proposed Cropping Pattern of Colmatage System in Kandal Province



Typical Dimension of Designed Colmatage Canal

* Coefficient of roughness : $n = 0.025$

Type	Bottom Width (m)	Height of Canal (m)	Water Depth (m)	Freeboard (m)	Slope of Canal (1 : m)	Gradient of Canal (1 / 1)	Velocity (m/s)	Discharge Capacity (m ³ /s)	Remarks
A	$B \leq 6$	2.00	1.60	0.40	1.5	2,000	0.89	7.7	Culvert
B	$6 < B \leq 10$	2.50	2.10	0.40	1.5	3,000	0.96	22.4	2 series gate
C	$10 < B \leq 15$	2.50	2.10	0.40	1.5	3,000	1.02	33.3	3 series gate
D	$15 < B \leq 20$	3.00	2.60	0.40	1.5	4,000	1.03	57.2	5 series gate
E	$B \geq 20$	3.00	2.60	0.40	1.5	4,000	1.07	80.0	7 series gate

Figure 4.5 Typical Type of Colmatage Canal

Zone/District Name and Construction Works Components	Implementation Period					
	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
	WET SEASON/ DRY SEASON					
Zone I Kean Svay -Reconstruction of gate, 5Nos. -Rehabilitation of canal length, 12 km -Reconstruction of bridge, 4 Nos.	-----	-----	-----	-----	-----	-----
Zone II Leuk Dek -Reconstruction of gate, 10 Nos. -Rehabilitation of canal length, 0 km -Reconstruction of bridge, 42 Nos.	-----	-----	-----	-----	-----	-----
Zone III Kean Svay and Saang -Reconstruction of gate, 9 Nos. -Rehabilitation of canal length, 7 km -Reconstruction of bridge, 19 Nos.	-----	-----	-----	-----	-----	-----
Zone IV Saang -Reconstruction of gate, 10 Nos. -Rehabilitation of canal length, 11.3 km -Reconstruction of bridge, 54 Nos.	-----	-----	-----	-----	-----	-----
Zone V Koh Thorn -Reconstruction of gate, 16 Nos. -Rehabilitation of canal length, 1.38 km -Reconstruction of bridge, 94 Nos.	-----	-----	-----	-----	-----	-----

Note : - - - - - : Survey Work and Detail Design Stage
 ----- : Construction Stage

Figure 4.6 Implementation Schedule for Colmatage Improvement Project

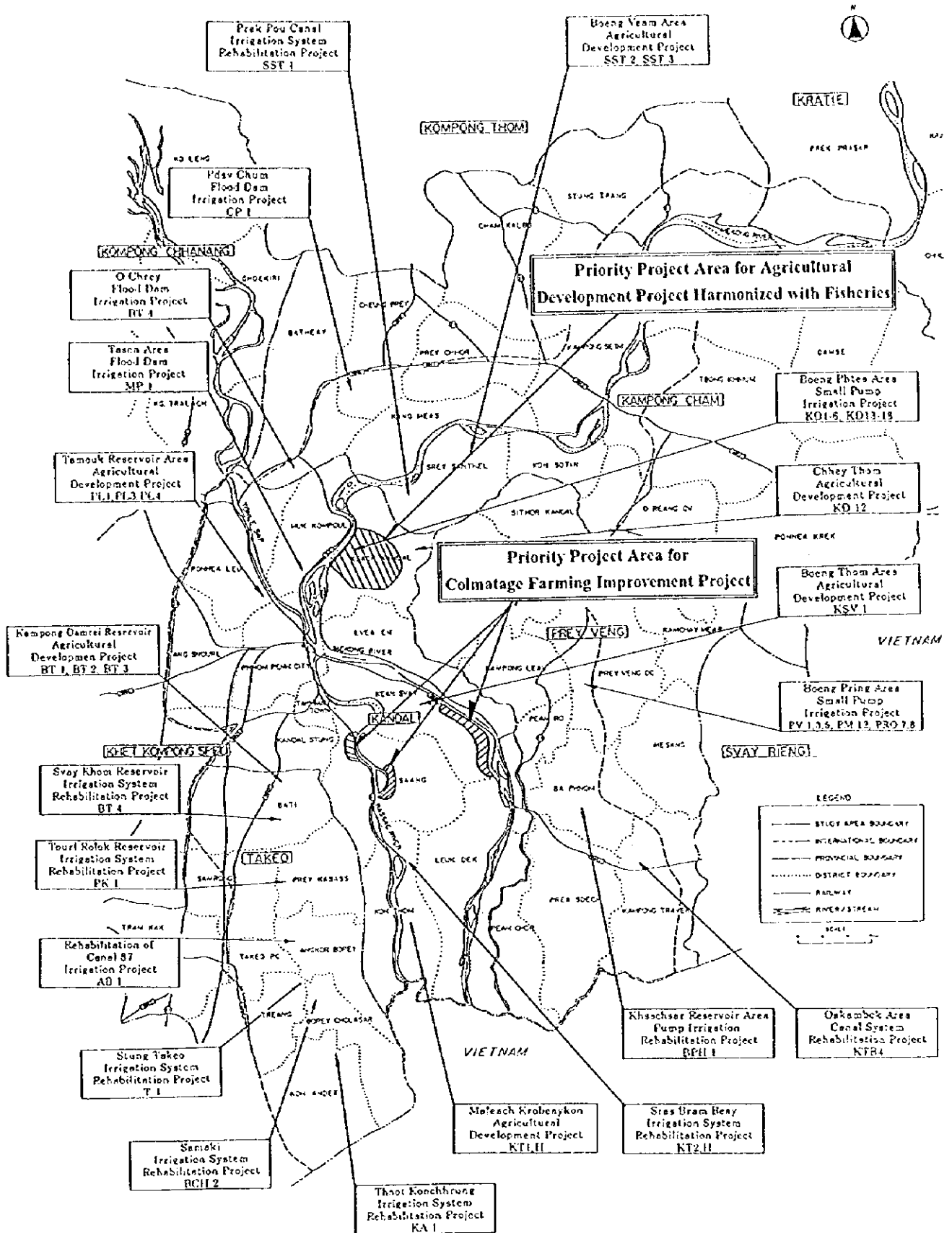


Figure 5.1 Preliminary Selection of Priority Project Area

Table 1.1 Some Socio-Economic Indicators of Cambodia

1. GDP in Riels(1995)	:	7,200 Billion Riels				
GDP in US\$(1995)	:	2,923 Million US\$				
2. GDP per Capita(1995)	:	287 US\$				
3. Annual Growth of GDP(%)		1990	1991	1992	1993	1994
		1.2	7.6	7.1	4.1	4.0
4. GDP by Sector(1995)	:	Agriculture; 44.5%		Industry; 18.8%	Service; 36.7%	
5. Balance of Trade(million US\$)			Exports	Imports	Balance	
		1993	283	471	-188	
		1994	490	726	-236	
		1995	856	1,188	-332	
6. Share of Agricultural Sector(%)				1989	1994	
		Agricultural Sector		52.3	44.9	
		Paddy		21.2	12.8	
		Other crops & rubber		11.2	10.1	
		Livestock		13.4	13.2	
		Fishery		3.9	3.9	
		Forestry		2.5	4.9	
7. Population(1995)	:	9,856,000				
		Phnom Penh; 6.9%	Other urban; 7.7%	Rural; 85.4%		
8. Population Density(persons/sq km)	:	51				
9. Annual Increase of Population(%)	:	2.8				
10. Employed Population(%)		Agriculture, Fishery, Forestry		75.1		
		Industry		4.5		
		Business, Services & Trade		20.4		
11. Family Size(1993/94)		Whole country	5.6	Phnom Penh	5.9	
				Other urban	5.9	
				Rural	5.5	
12. Total Land	:	181,035 sq.km				
13. Cultivable Area(1989)	:	3,785,000 ha				
14. Irrigable Area(1992)		410,000 ha				
		Wet season				
		307,000 ha				
		Dry season				
		103,000 ha				
		Beneficial Areas of Colmatage		52,000 ha		
15. Forest		12,143,000 ha				
16. Number of Farm Households		1,503,314				
17. Averaged Farm Size(ha)		Paddy farmers		1.0-1.5 ha		
		Upland crop farmers		0.2-0.5 ha		
18. Planted Area with Paddy(1995)		Wet season		1,869,991 ha		
		Dry season		216,000 ha		
		<u>Total</u>		<u>2,085,991 ha</u>		
19. Paddy Production and Yield(1995)				Wet Season	Dry Season	
		Production (ton)		2,802,827	645,000	
		Yield (t/ha)		1.64	3.00	
20. Number of Fishery Households (1993)		Fish catch		25,572 families		
		Aquaculture		3,467 families		
		Fish processing		1,406 families		

(continued)

21. Monthly Income per Household(1993/94)	Whole country	169,271 Riels	(67\$)			
	Phnom Penh	535,542 Riels	(214\$)			
	Other urban areas	264,350 Riels	(106\$)			
	Rural Areas	130,849 Riels	(52\$)			
22. Monthly Expenditure per Household (1993/94)	Whole country	290,600 Riels	(116\$)			
	Phnom Penh	781,200 Riels	(312\$)			
	Other urban areas	439,500 Riels	(176\$)			
	Rural Areas	238,800 Riels	(96\$)			
23. Poverty Line(Riels/month/family-1994/94)	Whole country	NA				
	Phnom Penh	371,533				
	Other urban areas	223,220				
	Rural Areas	185,835				
24. Poverty Incidence(%)-1993/94		<u>Households</u>	<u>Persons</u>			
	Whole country	38	30			
	Phnom Penh	24	19			
	Other urban	35	27			
	Rural	40	32			
25. Annual Increase of Consumer Prices (%)	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
	151.5	150.5	112.5	41.1	17.8	3.5
26. Population with access to safe water	Whole country	35	(%)			
	Urban	65				
	Rural	26				
27. Population with access to health services	Whole country	53	(%)			
	Urban	80				
	Rural	50				

Source : Cambodia situation analysis
Socio-economic Survey 1993/94
Monthly bulletin of statistics
Economic and monetary statistics review
Agricultural statistics

Table 1.2 Estimation of Food Balance (1993/94)

	Paddy Production (ton)	Remaining Paddy for Consumption (ton)	Additional Food Crops (ton)	Food Available for Consumption (ton)	Population (persons)	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
Kampong 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	12,486	500	8,241	68,500	-2,856
Monduliri	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

Table 1.3 Estimation of Food Balance (1996)

	Paddy Production (ton)	For Seed & Post Harvest Loss (15%)	Remaining Paddy for Consumption (ton)	Converted into Milled Rice (62%)	Population (persons)	Food Requirement per Year(ton)	Food Balance Surplus (ton)
Phnom Penh	15,810	2,372	13,439	8,332	855,430	129,341	-121,009
Kandal	249,125	37,369	211,756	131,289	984,400	148,841	-17,552
Kampong Cham	325,000	48,750	276,250	171,275	1,513,500	228,841	-57,566
Svay Rieng	214,500	32,175	182,325	113,042	474,200	71,699	41,343
Prey Veng	549,625	82,444	467,181	289,652	990,300	149,733	139,919
Takeo	437,312	65,597	371,715	230,463	753,300	113,899	116,564
Kompong Thom	162,960	24,444	138,516	85,880	559,500	84,596	1,284
Siem Reap	251,535	37,730	213,805	132,559	662,500	100,170	32,389
Battambang	295,120	44,268	250,852	155,528	716,600	108,350	47,178
Banteay Mean Chey	148,557	22,284	126,273	78,290	544,600	82,344	-4,054
Pursat	105,256	15,788	89,468	55,470	324,300	49,034	6,436
Kompong Chhnang	150,791	22,619	128,172	79,467	349,600	52,860	26,607
Sihanouk Ville	13,765	2,065	11,700	7,254	90,000	13,608	-6,354
Kep	4,150	623	3,528	2,187	25,770	3,896	-1,709
Kampot	215,021	32,253	182,768	113,316	517,300	78,216	35,100
Koh Kong	8,115	1,217	6,898	4,277	74,400	11,249	-6,972
Kompong Speu	171,810	25,772	146,039	90,544	557,200	84,249	6,295
Preah Vihear	30,600	4,590	26,010	16,126	106,000	16,027	99
Stung Treng	22,950	3,443	19,508	12,095	71,900	10,871	1,224
Ratanakiri	22,095	3,314	18,781	11,644	75,300	11,385	259
Monduliri	9,380	1,407	7,973	4,943	25,400	3,840	1,103
Kratie	44,350	6,653	37,698	23,372	228,500	34,549	-11,177
Total	3,447,827	517,174	2,930,653	1,817,005	10,500,000	1,587,598	229,407

Table 2.1 Socio-Economic Demarcation of the Study Area

1. Total Study Area		1,188,000 ha	
2. Population		3,440,930	
3. Population Density (persons/sq km)		289	
4. Family Size		5.4	
5. Cultivated Area (net)		679,090 ha	
6. Potential Cultivable Area (LUMO)		734,500 ha	
7. Averaged FarmSize		1.2ha	
8. Planted Area	Paddy-	wet season	324,700 ha
		dry season	139,720 ha
	Other crops-	wet season	37,970 ha
		dry season	32,480 ha
		Total	534,870 ha
9. Irrigated Area			
	9.1 Existing systems	Number	292
		Area: wet season	33,650 ha
		dry season	77,789
		Total	109,439
	9.2 Colmatage canals	Number	386
		Area: wet paddy	7,351 ha
		dry paddy	52,103
		upland crops	18,479
		Total	77,933
10. Inundation Area	0.0~0.3m	554,760 ha	(46.7 %)
	0.3~1.0	114,344	(9.6)
	1.0~1.5	165,632	(13.9)
	1.5~3.0	159,976	(13.5)
	Above3.0	193,188	(16.3)
11. Paddy Production	Wet season	598,855 ton	
	Dry season	442,985 ton	
	Total	1,041,840 ton	
12. Paddy Yield	Wet season	1.75 t/ha	
	Dry	3.42 t/ha	
13. Poverty Line	2,230,020 Riels/family/year		
14. Farm Household Income	Kratie	672,630 Riels/year	
	Kampong Cham	916,950	
	Kandal	1,357,850	
	Prey Veng	672,630	
	Takeo	803,560	

Table 2.2 Agricultural Land Use Distribution in the Study Area

Remote Sensing Analysis

(Unit : ha)

Province	Agricultural Land					Idle Land				Total (B)
	Dry Season Paddy	Wet Season Paddy	Upland Crops	Plantation	Sub Total (A)	Waste land	Grassland	Swamp	Sub Total	
Kratie	3,400	1,600	0	0	5,000	900	200	7,100	8,200	13,200
Kampong Cham	27,600	39,000	200	10,500	77,300	1,900	5,600	66,200	73,700	151,000
Prey Veng	132,700	50,000	400	100	183,200	1,600	7,900	53,900	63,400	246,600
Kandal	29,600	79,300	1,900	1,300	112,100	800	19,600	121,100	141,500	253,600
Takeo	12,700	85,500	0	0	98,200	2,800	18,000	21,200	42,000	140,200
Total	206,000	255,400	2,500	11,900	475,800	8,000	51,300	269,500	328,800	804,600

Source: Remote Sensing Analysis, JICA Study Team

Agro-Ecosystem Map

(Unit : ha)

Province	Major Vegetation							Ratio of (A)/(C)	Ratio of (B)/(C)
	Dry Season Paddy	Wet Season Paddy	Floating rice	Rice and cereals	Cereals/ annual crops	Rubber	Total (C)		
Kratie	0	6,800	0	0	2,500	0	9,300	54%	142%
Kampong Cham	0	69,600	19,300	7,500	46,600	3,500	146,500	53%	103%
Prey Veng	15,700	216,700	23,200	0	0	0	255,600	72%	96%
Kandal	2,800	129,200	5,600	0	57,300	0	194,900	58%	130%
Takeo	14,400	102,400	15,900	0	300	0	133,000	74%	105%
Total	32,900	524,700	64,000	7,500	106,700	3,500	739,300	64%	109%

Source: Agro-Ecosystem Map, LUMO, MAFF

Table 2.3 Classification of Interviewed Farmers in the Study Area

Province	Classification								TOTAL	Distribution (%)
	Land Owned Farmer (872)				Tenant Farmer (25)			Unknown		
	Paddy Practicing Farmer (855)				Dry Paddy Practicing Farmer	Not Paddy Practicing Farmer	Unknown			
Wet Season Paddy	Dry Season Paddy	Dry and Wet Season Paddy	Not Paddy Practicing Farmer	Dry Paddy Practicing Farmer	Not Paddy Practicing Farmer	Unknown	TOTAL	Distribution (%)		
Kratie	6	18	8	0	0	2	0	34	3.8%	
Kampong Cham	90	64	77	9	1	8	0	249	27.7%	
Prey Veng	87	81	89	0	0	1	0	258	28.7%	
Kandal	48	159	95	8	1	12	3	326	36.2%	
Takeo	1	4	28	0	0	0	0	33	3.7%	
TOTAL	232	326	297	17	2	23	3	900	100.0%	
Distribution (%)	25.8%	36.2%	33.0%	1.9%	0.2%	2.6%	0.3%	100.0%	-	

Source : Rural Socio-Economic Survey, JICA Study Team

Table 2.4 Number of Upland Crops Practicing Farmers in the Study Area

Farmer Type / Province (No. of Farmers)			Number of Upland Crops Practicing Farmers							Upland Crops Introducing Ratio (%)
			Number of Practicing Upland Crops							
			1	2	3	4	5	6	7	
Wet Season Paddy Practicing Farmer	Kratic	(6)	2	2						33.3
	Kampong Cham	(90)	41	10	17	5	8		1	45.6
	Prey Veng	(87)	33	9	6	13	4			37.9
	Kandal	(48)	7	3	2	2				14.6
	Takeo	(1)	0							0.0
	TOTAL	(232)	83	24	25	20	12		1	1
Dry Season Paddy Practicing Farmer	Kratic	(18)	10	3	3	3	1			55.6
	Kampong Cham	(64)	49	5	19	19	5		1	76.6
	Prey Veng	(81)	51	35	8	7	1			63.0
	Kandal	(159)	109	48	45	9	7			68.6
	Takeo	(4)	0							0.0
	TOTAL	(326)	219	91	75	38	14		1	
Wet and Dry Season Paddy Practicing Farmer	Kratic	(8)	2	1	1					25.0
	Kampong Cham	(77)	20	7	10	2	1			26.0
	Prey Veng	(89)	38	17	9	9	3			42.7
	Kandal	(95)	65	27	34	3	1			68.4
	Takeo	(28)	8	3	2	3				28.6
	TOTAL	(297)	133	55	56	17	5			
Not Paddy Practicing Farmer	Kampong Cham	(9)	9		3	3	3			100.0
	Kandal	(8)	8	2	3	1	2			100.0
	TOTAL	(17)	17	2	6	4	5			100.0
TOTAL	Kratic	(32)	14	6	4	3	1			43.8
	Kampong Cham	(240)	119	22	49	29	17		2	49.6
	Prey Veng	(257)	122	61	23	29	8			47.5
	Kandal	(310)	189	80	84	15	10			61.0
	Takeo	(33)	8	3	2	3				24.2
	TOTAL	(872)	452	172	162	79	36		2	1

Source: Rural Socio-Economic Survey, JICA Study Team

Note: Following 36 crops are practiced in the Study Area.

Vegetables: Fruit-bottle gourd, chili, cucumber, eggplant, melon, pumpkin, tomato, watermelon, wax gourd

Leaf and Stem-cabbage, chinese kale, lettuce, onion

Root-cassava, radish, ginger, lotus, sweet potato, taro, yambean

Legume: longbean, mungbean, peanut, soybean

Industrial Crop: mat grass, sesame, tobacco

Fruit tree: banana, cashewnut, coconut, jack fruit, lime, mango, papaya

Others: maize, sugarcane

Table 2.5 Number of Upland Crops Practicing Farmers by Crop in the Study Area

Farmer Type / Province		Maize	Cucum-ber	Mung bean	Tobacco	Sesame	Chili	Peanut	Sweet Potato	Egg plant	Cabbage	Others	Total	AVG. No. of Crops / Farmer
Wet Paddy Practicing Farmer	Kratie (2)	2	0	0	0	0	0	0	0	0	0	0	2	1.00
	Kampong Cham (41)	24	7	10	13	12	2	4	3	2	0	20	97	2.37
	Prey Veng (33)	6	17	2	0	2	0	0	3	10	4	39	83	2.52
	Kandal (7)	3	0	4	0	0	0	0	0	0	1	5	13	1.86
	Takeo (0)	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL (83)	35	24	16	13	14	2	4	6	12	5	64	195	2.35	
Dry Paddy Practicing Farmer	Kratie (10)	3	1	0	5	6	0	1	1	0	0	5	22	2.20
	Kampong Cham (49)	40	9	4	32	22	4	3	1	2	1	8	126	2.57
	Prey Veng (51)	45	6	3	2	7	0	11	0	0	1	1	76	1.49
	Kandal (109)	68	16	27	4	2	20	2	8	0	4	42	193	1.77
	Takeo (0)	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL (219)	156	32	34	43	37	24	17	10	2	6	56	417	1.90	
Wet and Dry Paddy Practicing Farmer	Kratie (2)	0	0	0	1	0	0	0	0	0	0	2	3	1.50
	Kampong Cham (20)	12	2	3	9	4	1	0	1	0	1	4	37	1.85
	Prey Veng (38)	4	15	3	0	4	0	2	3	5	3	35	74	1.95
	Kandal (65)	42	4	17	4	6	6	2	1	0	5	21	108	1.66
	Takeo (8)	2	2	4	0	0	0	0	0	1	0	7	16	2.00
TOTAL (133)	60	23	27	14	14	7	4	5	6	9	69	238	1.79	
Not Paddy Practicing Farmer	Kampong Cham (9)	7	0	1	9	5	0	0	0	2	0	3	27	3.00
	Kandal (8)	6	1	2	0	2	2	1	0	1	0	4	19	2.38
	TOTAL (17)	13	1	3	9	7	2	1	0	3	0	7	46	2.71
TOTAL	Kratie (14)	5	1	0	6	6	0	1	1	0	0	7	27	1.93
	Kampong Cham (119)	83	18	18	63	43	7	7	5	6	2	35	287	2.41
	Prey Veng (122)	55	38	8	2	13	0	13	6	15	8	75	233	1.91
	Kandal (189)	119	21	50	8	10	28	5	9	1	10	72	333	1.76
	Takeo (8)	2	2	4	0	0	0	0	0	1	0	7	16	2.00
	TOTAL (452)	264	80	80	79	72	35	26	21	23	20	196	896	1.98
Ratio (%)	58%	18%	18%	17%	16%	8%	6%	5%	5%	4%	43%	-	-	

Source: Rural Socio-Economic Survey, JICA Study Team

Note: Data are plural answers.

Table 2.6 Production, Planted Area and Yield Data of the Study Area

Crop	Item	Wet Season			Dry Season			Total		
		Production (ton)	Planted Area (ha)	Yield (ton/ha)	Production (ton)	Planted Area (ha)	Yield (ton/ha)	Production (ton)	Planted Area (ha)	Yield (ton/ha)
Paddy	Whole Five Provinces (A)	1,050,000	620,000	1.69	563,000	171,000	3.29	1,613,000	791,000	2.04
	Study Area (B)	599,000	342,000	1.75	443,000	129,000	3.43	1,042,000	471,000	2.21
	Ratio (B/A)	57%	55%	103%	79%	75%	104%	65%	60%	108%
Maize	Whole Five Provinces (A)	47,000	33,100	1.42	6,900	6,500	1.06	53,900	39,600	1.35
	Study Area (B)	39,000	26,600	1.47	6,600	6,100	1.08	45,600	32,700	1.39
	Ratio (B/A)	83%	80%	103%	96%	94%	102%	85%	83%	102%
Mungbean	Whole Five Provinces (A)	1,800	9,800	0.18	3,400	4,800	0.71	5,200	14,600	0.36
	Study Area (B)	500	1,500	0.33	3,100	4,300	0.72	3,600	5,800	0.62
	Ratio (B/A)	28%	15%	181%	91%	90%	102%	69%	40%	174%
Vegetable	Whole Three Provinces ¹⁾ (A)	20,700	3,400	6.09	47,300	8,100	5.84	68,000	11,500	5.91
	Study Area (B)	14,800	2,700	5.48	37,400	7,000	5.34	52,200	9,700	5.38
	Ratio (B/A)	71%	79%	90%	79%	86%	91%	77%	84%	91%
Sweet Potato	Whole Four Provinces ²⁾ (A)	2,400	600	4.00	9,800	2,200	4.45	12,200	2,800	4.36
	Study Area (B)	1,000	300	3.33	6,600	1,300	5.08	7,600	1,600	4.75
	Ratio (B/A)	42%	50%	83%	67%	59%	114%	62%	57%	109%
Sesame	Whole Three Provinces ³⁾ (A)	6,300	6,900	0.91	300	700	0.43	6,600	7,600	0.87
	Study Area (B)	2,600	3,000	0.87	300	600	0.50	2,900	3,600	0.81
	Ratio (B/A)	41%	43%	95%	100%	86%	117%	44%	47%	93%

Source: Provincial Agricultural Office of Concerned Five Provinces

Note: Based on the district area distribution of the Study Area, all data are proportioned

¹⁾The vegetable data of Kampong Cham and Prey Veng are not included

²⁾The sweet potato data of Kampong Cham are not included.

³⁾The sesame data of Kandal and Takeo are not included.

Table 2.7 Research Organizations under the Department of Agronomy, MAFF

Type	Location		Crop	Established Year	Number of Staff			Expenditure in 1995 (Riel)	Concerned Organization	
					Professional	Technician				Others
					1st grade	2nd grade				
Research Station	Kampong Speu	Prey Pdau	Rice	1981	3	1	2	12	9,685,241	-
	Kandal	Toul Krasing	Rice	1986	0	3	0	12	16,761,100	-
	Kandal	Dey Eih ¹⁾	Rice	1967	2	7	6	14	3,618,000	-
	Kandal	Banteay Dek	Maize	1989	0	5	0	12	7,423,500	-
	Kandal	Kbal Koh	Vegetable	1985	1	8	2	0	10,149,610	-
	Svay Rieng	Kouk Trob	Rice	1985	2	2	4	0	12,966,125	-
Agricultural Development Center	Svay Rieng	Ta Saang	Rice	1987	3	1	0	1	10,453,750	-
	Takeo	Tonle Bati	Rice	1986	1	5	3	8	6,930,000	-
	Kandal	Sre Ampil ²⁾	Rice	-	-	-	-	-	12,141,085	-
	Takeo	Kabal Po	Rice & Veg.	1989	0	1	0	0	350,000	-
	Svay Rieng	Po Lors	Rice & Veg.	1989	1	4	1	1	9,646,600	-
Rural Development Center	Kampong Speu	Veal Pong	Rice	1984	2	0	0	0	N/A	World Vision
	Kandal	Kandal Stung	Rice	1984	1	0	0	0	N/A	World Vision
	Kandal	Kop Srau	Rice	1987	1	4	1	0	3,420,950	-
State Farm	Kampong Cham	Chankar Locu	Cotton	1982	2	4	3	39	20,515,560	-
	Kampot	Kampong Som	Black Pepper	1981	0	0	4	27	19,240,560	-
	Battambang	Toul Samrong ³⁾	Rice	1979/82	2	2	6	59	N/A	-
	Kandal	Kop Srau	Rice	1986	1	4	3	9	N/A	HEKS
National Cattle Breeding Station	Takeo	Tamau ⁴⁾	Cattle	1982	2	3		25	N/A	VVS

Source: Administration Section, Department of Agronomy, MAFF.

Note: 1)-United with Sre Ampil Agricultural Development Center.

2)-United with Dey Eih Vegetable Research Station.

3)-From 1979 to 1982, under provincial gov't management.

4)-Managed by Department of Animal Production, MAFF.

Table 2.8 Number of Staff of Techniques, Economy and Extension Office in Provincial Agricultural Office

Section	Kandal	Kampong Cham	Prey Veng	Takeo
Director	1	-	1	1
Deputy Director	1	-	2	1
Planning, Techniques and Economy Section	3	-	10	5
Training Section	2	-	4	3
Technical Advice and Extension Section	10	-	10	24
Food Family Production and Nutrition Section	2	-	6	5
Total	19	16	33	39

Source: Provincial Agricultural Office

Note: In Kompong Cham Province, this office is under preparation.

Table 2.9 Summary of Existing Irrigation Systems

	Existing(ha)				Potential(ha)			
	<200	200-1000	>1000	Total	<200	200-1000	>1000	Total
Total Area(ha):				109439				179698
- Wet Season	2971	6154	22410	33650	3310	11797	41255	56362
- Dry Season	9560	25111	42118	75789	9659	36651	67026	123336
Number of Systems	186	84	22	292	151	105	36	292
Date of Construction:				292				292
-Before 1953	34	20	9	63	27	26	10	63
-1953-75	30	7	0	37	26	11	0	37
-1975-79	110	51	12	173	88	61	24	173
-1980 after	12	6	1	19	10	7	2	19
Status of Systems:				292				292
-Full Operational	53	16	5	74	52	17	5	74
-Partially Operational	115	68	17	200	80	82	27	189
-Not Operational	18	0	0	18	19	6	4	29
Water Source:				292				292
-Reservoir	156	70	12	238	133	86	19	238
-Lake	9	1	2	12	3	4	5	12
-Major River	2	0	1	3	1	2	1	4
-Minor River	16	12	6	34	11	13	9	33
-Stream	3	1	1	5	3	0	2	5
Irrigation System	186	86	25	292	151	105	36	292
Gravity (G)	40	23	6	69	36	25	8	69
Traditional Lifting (T)	11	7	0	18	9	8	0	17
Mobile Pump (MP)	6	1	2	9	4	1	3	8
G & T	26	21	4	51	18	25	7	50
G & MP	47	9	2	48	42	12	1	55
T & MP	26	7	1	34	22	14	2	38
T.M & G	16	8	3	14	13	9	5	27
Pumping Station	13	8	2	22	6	11	8	25
Others	1	1	2	28	1	0	2	3
Cropping:				292				292
-Wet Season only	20	14	4	31	16	10	4	30
-Dry Season only	124	51	8	190	109	64	18	191
-Wet & Dry Seasons	42	19	10	71	26	31	14	71
Yields:				322				360
Wet Season:								
-<1.5 ha	27	14	8	49	13	15	5	33
-1.5-2.0 t/ha	19	10	4	33	23	10	10	43
->2.0 t/ha	3	1	0	4	6	15	3	24
Dry Season:								
-<2.0 ha	34	24	6	64	31	25	11	67
-2.0-3.0 t/ha	109	41	10	160	94	48	17	159
->3.0 t/ha	2	8	2	12	8	22	4	34

Table 2.10 Inventory of Colmatage System

Province	NO.	District	Number of Canal	Number of Village	Number of Families	Canal Length	Mean Length of Canal(km)	Farm Land			Yield		Irrigation Type		Remarks		
								Upland Crops(ha)	Wet Season Rice(ha)	Dry Season Rice(ha)	Total (ha)	Wet Season Rice(ha)	Dry Season Rice(ha)	Grav.ity		Traditi-onal type	Pump
Kompong Cham	1	Kroch Chhmar	9	7	1567	12.6	1.4	296	10	316	622	3.2	3.8	2	7	7	
	2	Tbong Khmum	5	5	1095	14.5	2.9	1829	105	326	2260	3.5	3.5	0	5	5	
	3	O Reang Ov	4	2	200	9.2	2.3	76	-	255	331	0.0	3.5	0	4	4	
	4	Koh Sotin	14	5	17559	14.0	1.0	1406	-	425	1831	0.0	3.0	0	14	14	
	5	Srey Santhel	12	12	150	32.4	2.7	305	34	555	894	3.0	3.0	0	12	12	
	6	Stung Trang	6	6	1822	22.8	3.8	1157	-	1451	2608	0.0	3.5	2	5	4	
	7	KomPong Siem	5	5	2063	7.0	1.4	1666	-	1432	3098	0.0	3.4	0	4	4	
	8	Kang Meas	23	23	4029	34.5	1.5	417	1111	304	1832	3.6	3.8	0	23	23	
sub total	8		78	65	28485	147.0	1.9	7152	1260	5064	13476	3.3	3.4	4	74	73	
Prey Veng	1	Peam Ro	9	20	4402			180	0	3025	3205	0.0	5.4	5	0	4	
	2	Peam Chor	35	56	5400	35.0	1.0	2630	200	5985	8815	0.0	4.7	12	10	20	
	2		44	76	9802	1.0	1.0	2810	200	9010	12020	0.0	5.1	17	10	24	
Kandal	1	Ksach Kandal	NA			0.0											
	2	Muk Kampoul	4	4	795	28.8	7.2	243	96	362	701	2.8	3.0	0	4	4	N.R.NO. 6A
	3	Lvea Em	NA			0.0											
	4	Kean Svay	22	19	9360	28.6	1.3	2020	709	1248	3977	3.0	3.7	2	20	20	N.R.NO.1
	5	Saang	74	107	17168	170.2	2.3	3320	2325	3615	9260	2.8	3.2	0	66	66	
	6	Leuk Dek	51	101	3221	102.0	2.0	0	0	3205	3205	0.0	4.0	0	0	51	
	7	Koh Thom	103	100	16451	236.9	2.3	2034	2761	5469	10264	2.5	3.5	10	0	88	
sub total	7		254	331	46995	566.5	2.2	7617	5891	13839	27407	2.8	3.5	12	90	229	
Takeo	1	Angkor Borey	2		2754	43.4	21.7	450	0	6200	6650	0.0	3.2	1	1	1	Large scale
	2	Borey Cholasar	5		2064	62.5	12.5	250	0	9830	10080	0.0	3.3	0	5	5	Almost all
	3	Koh Andet	2		990	18.0	9.0	0	0	7200	7200	0.0	3.3	0	2	2	canals are
	4	Prey Kabass	1		203	3.0	3.0	0	0	900	900	0.0	3.3	0	1	1	rehabilitated.
sub total	4		10	601.1	126.9	11.6	700	0	24130	24830	0.0	3.3	1	9	9		
total	21		386	472	85883	841.4	2.2	18279	7351	52103	77733	2.0	3.8	34	183	335	

Table 2.11 Administrative Division

KRATIE

District	Commune	Village
Prek Prasap	8	48
Chhlong	8	40
Sub-total	16	88
Sambo	10	52
Kratie	14	74
Snoul	5	29
Total	45	243

KANDAL

District	Commune	Village
Ksach Kandal	18	95
Muk Kampoul	9	47
Lvoa Km	15	43
Kean Svay	12	44
Saang	16	117
Leuk Dek	7	24
Koh Thom	11	92
Ponhoa Leu	14	140
Ang Snourl	16	307
Kandal Stung	23	155
Sub-total	141	1,064
Takhmau	6	19
Total	147	1,083

KAMPONG CHAM

O Reang Ov	8	141
Koh Sotin	8	85
Srey Santhol	14	86
Kang Meas	11	93
Kroch Chhmar	12	72
Tbong Khmum	22	323
Stung Trang	14	74
Kampong Seim	15	111
Prey Chhor	15	176
Cheung Prey	10	74
Batheay	12	79
Kampong Cham	4	31
Sub-total	145	1,345
Dambe	7	63
Memot	18	175
Ponnea Krek	9	142
Chamkar Leu	13	86
Total	192	1,811

TAKEO

Bati	15	168
Prey Kabass	13	110
Angkor Borey	6	34
Sub-total	34	312
Samrong	11	147
Takeo PC	3	40
Tram Kak	14	243
Borey Cholasar	5	38
Treang	14	153
Koh Andet	6	68
Kiri Vong	12	114
Total	99	1,115

PREY VENG

Ba Phnom	9	108
Kamchay Near	8	128
Kampong Travok	13	122
Kanh Chreuch	8	99
Peam Chor	10	51
Peam Ro	8	41
Pear Reang	11	84
Preah Sdech	11	145
Prey Veng DC	11	138
Kampong Leay	8	42
Sithor Kandal	11	60
Sub-total	108	1,018
Mesang	8	118
Total	116	1,136

Source: Provincial offices

Table 2.12 Statistics on Basic Education in the Study Area (1)

KAMPONG CHAM Primary school	Schools	Class rooms	Teachers	Students	Girls	Girl %	Std./ Room	Std/ Tch.	Drop outs Total	Drop outs Female	Drop %	Rooms needed
Oreang Ov	30	203	246	12,855	5,590	43.5	64	60	278	235	2.2	
Koh Sotin	32	231	286	15,762	7,049	44.7	69	63	18	6	0.1	
Srey Santhei	39	312	452	17,502	8,212	46.9	57	43	289	98	1.7	
Kang Meas	40	311	450	14,714	6,583	44.7	48	36	408	200	2.8	
Kroch Chhmar	36	192	239	12,341	4,659	37.8	65	61	480	53	3.9	
Tbong Khmum	71	409	549	26,583	11,543	43.4	65	56	-	-	-	
Stung Trang	36	204	251	12,767	5,891	46.1	63	60	352	155	2.8	
Kampong Seim	41	286	529	18,909	8,578	45.4	67	39	754	345	4.0	
Prey Chhor	57	360	552	24,101	11,090	46.0	67	49	449	205	1.9	
Cheung Prey	39	259	307	12,123	5,202	42.9	47	46	555	257	4.5	
Batheay	37	237	326	14,221	5,458	38.4	61	50	805	414	5.7	
Kampong Cham	8	93	178	6,689	3,023	45.2	72	40	211	73	3.1	
Dambe	33	93	116	5,125	214	4.2	56	62	397	169	7.7	
Memot	61	193	191	10,958	3,698	33.7	57	85	1,250	564	11.4	
Ponnea Krek	50	245	274	15,597	6,554	42.0	64	48	289	191	1.8	
Chamkar Leu	46	261	302	18,084	7,862	43.5	70	71	193	117	1.1	
Total	656	3,889	5,248	238,331	101,206	42.5	62	52	6,738	3,082	3.2	
Secondary sch.												
Oreang Ov	2	25	70	1,493		32.8	60	22	149		10.0	35
Koh Sotin	2	36	69	1,358		37.1	38	21	180		13.3	33
Srey Santhei	3	39	139	1,927		41.1	50	15	44		2.3	53
Kang Meas	2	29	130	1,174		38.5	41	10	48		4.1	30
Kroch Chhmar	2	21	37	885		37.5	43	26	5		0.6	20
Tbong Khmum	3	28	89	1,496		39.8	54	18	54		3.6	37
Stung Trang	3	28	77	1,411		42.2	51	51	16		1.1	32
Kampong Seim	3	71	262	3,301		41.0	47	13	307		9.3	85
Prey Chhor	2	32	114	1,697		41.0	54	16	3		0.2	46
Cheung Prey	1	8	29	1,490		30.0	62	18	0		0	13
Batheay	3	44	135	1,273		36.4	29	10	32		2.5	33
Kampong Cham	0	0	0	0		0	0	0	0		0	0
Dambe	1	5	11	141		27.7	29	15	15		10.6	4
Memot	1	12	40	706		37.7	59	19	0		0	14
Ponnea Krek	3	20	46	1,007		29.0	51	24	80		7.9	21
Chamkar Leu	2	27	76	1,155		43.9	45	16	98		8.5	26
Total	33	425	1,324	19,514		38.6	46	16	1,081		5.3	482

Sources: Department of Education, KAMPONG CHAM Province, number of students per a room and per a teacher, and drop-out rate were calculated by the study team.

Table 2.12 Statistics on Basic Education in the Study Area (2)

TAKED	Schools	Class rooms	Teachers	Students	Girls	Girl %	Std./ Room	Std/ Tch.	Drop outs	Drop %	Rooms needed	Need of rehabi.
<u>Primary school</u>												
Bati	44	383	451	21,880	9,260	42.3	58	54	594	2.7	488	126
Prey kabass	31	355	350	16,471	7,128	43.3	47	52	352	2.1	384	50
Angkor Borey	14	112	127	6,669	2,965	44.5	60	60	174	2.6	152	43
Samrong	37	404	388	19,974	8,792	44.0	50	57	443	2.2	432	40
Takeo PC	14	133	183	7,588	3,446	45.5	57	45	173	2.3	163	61
Tram Kak	58	569	636	28,898	12,665	43.8	51	50	356	1.2	653	72
Borey Cholasar	18	79	90	3,555	1,433	40.3	45	50	106	3.0	94	21
Treang	47	337	396	19,044	8,067	42.4	57	55	682	3.6	443	122
Koh Andet	17	134	163	6,618	3,343	50.5	50	46	88	1.3	181	52
Kiri Vong	50	292	325	15,459	6,775	43.8	53	57	459	3.0	371	91
Total	330	2,798	3,109	146,136	63,874	43.7	53	53	3,427	2.3	3,361	678
<u>Secondary sch.</u>												
Bati	3	30	95	1,087	256	23.6	37	12	49	4.5	30	
Prey kabass	5	73	111	1,229	330	26.9	17	12	90	7.3	54	
Angkor Borey	2	13	32	361	70	19.4	28	13	19	5.3	13	
Samrong	5	63	92	1,358	321	23.6	22	16	88	6.5	46	
Takeo PC	0	0	0	0	0	0	0	0	0	0	0	
Tram Kak	2	35	62	1,000	334	33.4	29	17	57	5.7	29	
Borey Cholasar	1	10	18	176	32	18.2	18	11	0	0	8	
Treang	3	40	66	924	231	25.0	24	15	44	4.8	31	
Koh Andet	3	34	41	751	189	25.2	23	20	20	2.7	23	
Kiri Vong	3	41	74	756	184	24.3	19	11	70	9.3	34	
Total	27	339	591	7,642	1,947	25.5	23	14	437	5.7	268	
<u>High school</u>												
Bati	1	32	75	1,039	281	27.0	33	15	140	13.5	32	
Prey kabass	1	24	61	715	153	21.4	30	12	36	5.0	24	
Angkor Borey	0	0	0	0	0	0	0	0	0	0	0	
Samrong	2	46	69	1,155	354	30.6	26	18	73	6.3	37	
Takeo PC	1	50	98	2,168	766	35.3	44	23	3	0.1	54	
Tram Kak	2	62	109	1,965	652	33.2	32	19	103	5.2	62	
Borey Cholasar	0	0	0	0	0	0	0	0	0	0	0	
Treang	1	26	59	780	217	27.8	30	14	7	0.9	26	
Koh Andet	0	0	0	0	0	0	0	0	0	0	0	
Kiri Vong	1	23	73	874	221	25.3	38	13	83	9.5	32	
Total	9	263	544	8,696	2,644	30.4	34	17	445	5.1	267	

Source: Department of Education, TAKEO Province

Table 2.12 Statistics on Basic Education in the Study Area (3)

PREY VENG	Schools	Class rooms	Teachers	Students	Girls	Girl %	Std/ Room	Std/ Tch.	Drop outs	Drop %	Rooms needed	Need rebh	Plan
Primary school													
Ba Phnom	38	246	451	14,036	6,061	43.0	58	35	155	1.1	389	35	190
Kamchay Mear	32	251	263	12,036	4,930	41.0	48	53	130	1.1	257	10	55
Kampong Travek	43	321	449	19,593	8,913	45.5	62	49	1,540	7.9	412	43	190
Kanh Chreuch	32	190	269	11,284	5,100	45.2	60	48	215	1.9	260	52	112
Peam Chor	32	123	208	7,444	3,043	40.9	61	43	227	3.0	192	34	121
Peam Ro	25	159	311	9,581	4,282	44.7	61	34	328	3.4	235	61	134
Pear Reang	57	463	538	20,531	9,047	44.1	45	43	583	2.8	492	94	152
Preah Sdech	45	279	387	15,895	6,512	41.0	57	47	19	0.1	335	87	174
Prey Veng DC	43	309	417	14,831	6,295	42.4	48	40	431	2.9	326	63	104
Kampong Leav	24	188	352	9,287	4,086	44.0	50	29	552	5.9	234	48	94
Sithor Kandal	44	277	307	13,237	6,059	45.8	48	51	134	1.0	283	27	55
Mesang	44	231	141	18,426	7,288	39.6	80	190	209	1.1	353	91	148
Total	459	3,037	4,093	166,241	71,616	43.1	55	46	4,523	2.7	3,768	645	1,529
Secondary sch.													
Ba Phnom	5	47	113	1,003	265	26.4	22	10			34	10	5
Kamchay Mear	4	33	67	1,629	134	21.3	20	10			21	0	0
Kampong Travek	5	62	95	1,163	331	28.5	19	13			40	5	10
Kanh Chreuch	4	12	43	225	29.6	64	20	20			20	5	5
Peam Chor	1	6	20	142	27	19.0	24	8			4	0	0
Peam Ro	3	11	101	784	307	39.2	72	8			19	0	5
Pear Reang	7	52	117	1,429	410	28.7	28	13			41	15	25
Preah Sdech	3	28	59	649	27	4.2	24	12			21	5	5
Prey Veng DC	5	43	67	930	180	19.4	22	15			27	5	8
Kampong Leav	2	20	48	489	125	25.6	25	11			14	0	0
Sithor Kandal	3	23	62	909	291	32.0	40	16			23	5	10
Mesang	3	34	58	644	134	20.8	19	12			18	0	5
Total	45	371	850	9,530	2,456	25.8	26	12			282	50	83
High school													
Ba Phnom	1	34	93	1,005	307	30.5	30	11			30	0	5
Kamchay Mear	1	30	43	1,592	160	27.0	20	15			18	0	0
Kampong Travek	1	45	84	1,147	295	25.7	26	14			35	5	10
Kanh Chreuch	1	25	48	631	190	30.1	26	14			16	0	5
Peam Chor	1	21	46	520	118	22.7	25	12			16	0	0
Peam Ro	1	43	112	1,095	385	35.2	26	10			32	0	5
Pear Reang	1	33	85	847	200	23.6	26	11			25	0	5
Preah Sdech	1	39	94	1,217	356	29.3	32	14			32	5	5
Prey Veng DC	1	23	42	557	136	24.4	25	14			18	5	10
Kampong Leav	1	51	146	1,933	698	36.1	38	14			55	35	10
Sithor Kandal	1	33	62	848	258	30.4	26	14			22	5	0
Mesang	1	41	64	1,031	182	17.7	26	17			24	10	0
Total	12	418	919	11,423	3,285	28.8	28	13			323	65	50

Source: Department of Education, PREY VENG Province

Table 2.12 Statistics on Basic Education in the Study Area (4)

KANDAL	Schools	Class rooms	Teachers	Students	Girls	Girl %	Std./ Room	Std/ Tch.	Drop outs	Drop %	Room need	Need rehb	Plan
Primary school													
Ksach Kandal	41	326	558	19,190		45.1	59	38	65	0.3	24	29	3
Muk Kampoul	31	227	390	12,875		46.2	57	36	48	0.4	15	8	4
Lvea Em	32	189	348	11,310		44.0	60	36	114	1.0	16	2	13
Kean Svay	41	365	635	26,163		45.5	72	45	437	1.7	54	3	7
Saang	60	464	664	30,584		43.5	66	51	709	2.3	57	1	6
Leuk Dek	19	90	199	8,432		44.0	94	43	94	1.1	11	3	2
Koh Thom	35	292	523	21,313		47.6	73	44	565	2.7	20	2	3
Ponhea Leu	33	266	365	15,250		42.0	58	46	200	1.3	18	-	2
Ang Snourl	44	279	401	16,749		45.9	61	47	312	1.9	22	-	3
Kandal Stung	35	252	439	15,422		44.6	62	39	433	2.8	-	6	2
Takhmau	11	116	282	9,753		46.1	84	36	73	0.7	40	-	1
Total	382	2,866	4,804	187,041		45.0	66	43	3,050	1.6	277	53	45
Secondary sch.													
Ksach Kandal	8	80	185	3,655		34.4	46	21	240	6.6	20	5	3
Muk Kampoul	3	24	72	1,745		37.7	32	11	12	1.6	8	-	2
Lvea Em	3	23	74	1,187		34.8	52	17	63	5.3	5	3	3
Kean Svay	5	56	195	2,936		40.6	53	16	129	4.4	26	-	3
Saang	6	71	183	3,265		40.8	45	16	169	5.2	24	-	3
Leuk Dek	2	14	34	484		36.6	35	16	13	2.7	4	1	1
Koh Thom	5	63	167	2,389		38.1	38	15	96	4.0	9	2	2
Ponhea Leu	4	40	107	1,413		30.8	36	14	60	4.2	10	1	1
Ang Snourl	5	46	147	2,480		34.2	54	18	149	6.0	9	2	2
Kandal Stung	3	23	109	1,437		40.4	63	14	70	4.9	5	3	1
Takhmau	2	27	96	1,834		40.4	68	20	45	2.5	12	1	2
Total	46	467	1,369	21,825		37.2	47	17	1,046	4.8	132	18	23
High school													
Ksach Kandal	1	15	38	580		30.9	39	16	9	1.6	5	-	1
Muk Kampoul	2	39	135	1,926		38.1	50	15	17	0.9	4	-	1
Lvea Em	1	10	50	771		32.6	78	16	2	0.3	5	3	1
Kean Svay	1	35	120	2,204		37.3	63	19	105	4.8	16	-	2
Saang	1	31	78	1,456		36.5	47	19	11	0.8	12	-	2
Leuk Dek	1	16	57	867		33.1	55	16	55	6.3	2	2	1
Koh Thom	1	13	41	454		34.8	35	12	3	0.7	5	-	1
Ponhea Leu	1	25	66	818		35.2	33	13	106	13.0	5	-	1
Ang Snourl	1	7	38	282		23.4	41	8	-	-	6	-	1
Kandal Stung	1	18	72	979		37.2	55	14	28	2.9	3	3	1
Takhmau	1	22	141	1,895		38.1	87	14	65	3.4	13	-	2
Total	12	231	836	12,232		36.0	53	15	401	3.3	76	8	11

Source: Department of Education, KANDAL Province

Table 2.12 Statistics on Basic Education in the Study Area (5)

KAMPONG CHAM High school	Schools	Class rooms	Teachers	Students	Girls	Girl %	Std./ Room	Std/ Tch.	Drop outs	Drop %	Rooms needed	Need of rehabl.
Oreang Ov	0	0	0	0		0	0	0	0	0	0	0
Koh Sotin	1	24	89	1,957		35.1	82	23	182	9.3	47	23
Srey Santhe I	1	29	123	1,726		41.3	60	15	38	2.2	42	13
Kang Meas	1	32	104	1,686		44.2	53	17	114	6.8	37	5
Kroch Chhmar	1	24	62	1,165		41.7	49	20	0	0	31	7
Tbong Khmum	1	38	145	2,655		34.7	70	19	7	0.3	76	36
Stung Trang	0	0	0	0		0	0	0	0	0	0	0
Kampong Seim	0	0	0	0		0	0	0	0	0	0	0
Prey Chhor	1	23	147	1,884		37.0	82	13	0	0	46	23
Cheung Prey	1	27	90	1,192		25.5	45	14	17	1.4	29	10
Batheay	0	0	0	0		0	0	0	0	0	0	0
Kampong Cham	2	81	380	5,951		39.4	74	16	257	4.3	140	59
Dambe	0	0	0	0		0	0	0	0	0	0	0
Memot	0	0	0	0		0	0	0	0	0	0	0
Ponnea Krek	1	10	23	570		26.1	57	26	117	20.5	13	3
Chamkar Leu	1	15	52	1,230		36.8	82	25	89	7.2	28	13
Total	11	303	1,215	20,016		37.7	67	17	821	4.1	489	192

Source: Department of Education, KAMPONG CHAM Province

KRATIE Primary school	Schools	Class rooms	Teachers	Students	Girls	Girl %	Std./ room	Std/ tch.	Drop outs	Drop %	Rooms needed	Rehabl. needed
Whole province	190	816	1,055	41,367			51	48				
Secondary sch.												
Whole province	11	100	413	3,796			38	10				
High school												
Whole province	2	22	158	1,659			76	11				

Source: Ministry of Education

Table 2.13 Hospitals and Health Centers(1)

KARATIE: Provincial hospital 1

District	District hospital	Commune Health Centers			Total	Planned
		Good	Need repair	Need new		
Prek Prasap	1	0	3	0	3	
Chhlong	1	0	2	0	2	
Sambo	1	-	-	-	-	
Kratie	1	1	5	0	6	
Snoul	1	1	1	0	2	
Total	5	2	11	0	13	

Source: Ministry of Health

KAMPONG CHAM: Provincial hospital 4

O Reang Ov	1	1	4	0	5	
Koh Sotin	1	-	-	-	-	
Srey Santhel	1	1	5	1	7	
Kang Meas	1	2	3	0	5	
Kroch Chhmar	1	0	5	0	5	
Tbong Khmum	1	-	-	-	-	
Stung Trang	1	0	0	2	2	
kampong Seim	1	1	1	0	2	
Prey Chhor	1	1	1	2	4	
Cheung prey	1	-	-	-	-	
Batheay	1	3	0	0	3	
Kampong Cham	1	-	-	-	-	
Dambe	1	-	-	-	-	
Memot	1	-	-	-	-	
Ponnea Krek	1	0	2	0	2	
Chamkar Leu	1	4	0	0	4	
Total	16	13	21	5	39	

Source: Ministry of Health

PREY VENG: Provincial hospital 2

Ba Phnom	1		9	0	9	
Kamchay Mear	1		6	2	8	
Kampong Travek	1	2	8	0	10	
kanh Chreuch	1		4	0	4	
Peam Chor	1		3	7	10	
Peam Ro	1		5	3	8	
Pear Reang	1		11	0	11	
Preah Sdech	1		2	0	2	
Prey Veng DC	0	3	3	5	11	
Kampong Leav	1		3	3	6	
Sithor Kandal	1		10	0	10	
Mesang	1		7	1	8	
Total	11	5	71	21	97	

Source: Department of Health, Prey Veng

Table 2.13 Hospitals and Health Centers(2)

KANDAL: Provincial hospital 1

District	District hospital	Commune Health Centers			Total	Planned
		Good	Need repair	Need new		
Ksach Kandal	1	0	5	4	9	
Muk Kampoul	1	1	2	3	6	
Lvea Em	1	0	1			
Kean Svay	1	0	5	12	17	
Leuk Dek	1	0	1			
Saang	1	0	6	6	12	
Koh Thom	1	0	1	11	12	
Ponhea Leu	1	1	3	6	10	
Ang Snourf	1	0	8	0	8	
Kandal Stung	1	0	3	11	14	
Takhmau	0	0	1			
Total	10	2	33	53	88	

Source: Department of Health, Kandal

TAKEO: Provincial hospital 1

District	District hospital	Commune Health Centers			Total	Planned
		Good	Need repair	Need new		
Bati	1	2	2	11	15	13
Samrong	1	3	2	6	11	0
Prey Kabass	1	3	1	9	13	13
Angkor Borey	1	0	1	5	6	0
Borey Cholasar	1	0	1	4	5	0
Treang	1	1	1	11	13	0
Koh Andet	1	1	0	5	6	0
Tram Kak	1	4	2	8	14	9
Doun Kev	0	0	1	2	3	15
Kirivong	1	2	3	7	12	20
Total	9	16	14	68	98	70

Source: Department of Health, Takeo

Table 2.14 Comprehensive Evaluation of Each District

District	Crop Diversification	Self-sufficiency	Population Density	Farm Income per ha (R/ha/ha)	Aeri. Income/Cultivng Expenditure X 100	Average Yield (kg/ha)	Ratio of Input to Output	Yield per ha (R/ha/ha)	Cultivate Area	Total/Evaluation	Ranking																		
												1: Less than 10%	2: 11-20	3: 21-30	4: 31-50	5: Above 50%	1: Not met	2: 101-200	3: 201-300	4: 301-400	5: Above 400	1: Less than 100,000	2: 100,001-200,000	3: 200,001-300,000	4: 300,001-400,000	5: Above 400,000	1: Less than 20%	2: 20-30	3: 30-40
Kratie Province																													
1. Prek Prasap																													
2. Dholone																													
Total																													
Kampong Cham																													
1. Ream																													
2. Koh Sotin																													
3. Srey Satchel																													
4. Kana Meas																													
5. Krok Chmar																													
6. Thong Kmon																													
7. Stung Treng																													
8. Kampong Seim																													
9. Prey Chhor																													
10. Cheung Prey																													
11. Sattrey																													
12. Banbe																													
Total																													
Kandal Province																													
1. Krach Kandal																													
2. Mak Kandal																													
3. Veal Ean																													
4. Kam Srey																													
5. Saan																													
6. Leuk Dek																													
7. Koh Thom																													
8. Pongea Leu																													
9. Kandi Svay																													
Total																													
Prey Veng Province																													
1. Peam Re																													
2. Peam Chhor																													
3. Kanh Chreach																													
4. Sitbor Kandal																													
5. Preaek																													
6. Prey Veng DC																													
7. Kampong Leay																													
8. Ba Thon																													
9. Preaek Svay																													
10. Kampong Travek																													
11. Measung																													
Total																													
Takeo Province																													
1. Bati																													
2. Prey Mahab																													
3. Andok Boeay																													
4. Samrong																													
5. Takan IC																													
6. Tam Kak																													
7. Prey Chhlabar																													
8. Preaek																													
9. Koh Angel																													
Total																													

Table 3.1 Summary of the Lowland Irrigation System

Provincial Name	Item	Existing (ha)				Rehabilitation (ha)			
		>200	200- 5000	5000>	Total	>200	200- 5000	5000>	Total
Kratie	System No.	52	0	0	52	52	0	0	52
	Village	127	0	0	127	133	0	0	133
	Houshold	2,191	0	0	2,191	2,362	0	0	2,362
	Wet Season(ha)	0	0	0	0	0	0	0	0
	Dry Season(ha)	1,676	0	0	1,676	1,901	0	0	1,901
	Total (ha)	1,676	0	0	1,676	1,901	0	0	1,901
Kompong Cham	System No.	32	13	1	46	22	23	1	46
	Village	49	117	15	181	53	178	15	246
	Houshold	3,722	15,966	1,952	21,640	4,685	20,287	1,952	26,924
	Wet Season(ha)	460	7,351	5,582	13,393	840	12,951	5,582	19,373
	Dry Season(ha)	743	2,350	3,000	6,093	1,506	13,565	3,000	18,071
	Total (ha)	1,203	9,701	8,582	19,486	2,346	26,516	8,582	37,444
Kandal	System No.	28	36	0	64	25	39	0	64
	Village	102	417	0	519	94	447	0	541
	Houshold	9,129	51,956	0	61,085	8,294	53,992	0	62,286
	Wet Season(ha)	951	10,621	0	11,572	955	13,259	0	14,214
	Dry Season(ha)	2,326	15,872	0	18,198	2,635	29,816	0	32,451
	Total (ha)	3,277	26,493	0	29,770	3,590	43,075	0	46,665
Prey Veng	System No.	69	26	0	95	47	46	2	95
	Village	176	117	0	293	113	204	67	384
	Houshold	9,990	17,613	0	27,603	7,298	26,571	10,530	44,399
	Wet Season(ha)	1,540	4,160	0	5,700	1,485	11,660	6,150	19,295
	Dry Season(ha)	4,145	13,107	0	17,252	2,812	16,506	12,150	31,468
	Total (ha)	5,685	17,267	0	22,952	4,297	28,166	18,300	50,763
Takeo	System No.	5	29	1	35	5	29	1	35
	Village	8	329	57	394	10	374	60	444
	Houshold	869	36,050	8,571	45,490	950	37,470	8,600	47,020
	Wet Season(ha)	20	2,965	0	2,985	30	3,450	0	3,480
	Dry Season(ha)	670	25,900	6,000	32,570	805	32,440	6,200	39,445
	Total (ha)	690	28,865	6,000	35,555	835	35,890	6,200	42,925
Total	System No.	186	104	2	292	151	137	4	292
	Village	462	980	72	1,514	403	1,203	142	1,748
	Houshold	25,901	121,585	10,523	158,009	23,589	138,320	21,082	182,991
	Wet Season(ha)	2,971	25,097	5,582	33,650	3,310	41,320	11,732	56,362
	Dry Season(ha)	9,560	57,229	9,000	75,789	9,659	92,327	21,350	123,336
	Total (ha)	12,531	82,326	14,582	109,439	12,969	133,647	33,082	179,698

Note; >200 ha : Small Scale Irrigation Project

200- 5,000 ha : Medium Scale Irrigation Project

5,000 ha> : Large Scale Irrigation Project

Source : Irrigation Rehabilitation Study in Cambodia, Mekong Secretariat, 1994

Table 3.2 Comprehensive Evaluation of Each Zone

	Agro-Economic Indicators										Physical Indicators													
	Crop Diversification	Self-sufficiency of Paddy	Population Density (person /km ²)	Dry season Paddy Area (dry/wet+dry v x 100)	Average Paddy Yield (kg/ha)	Farm Income/ha (Riel/ha)	GCPV of Paddy per ha (Riel/ha)	Irrigation Area by Colmatage /Cultivable Area x 100	Total Irrigable Area/ Cultivable Area x 100	Inundation Area	Rural Road Density	Number of Wells /km ²	Sub-Total											
													1: Less than 10%	2: 11 - 20	3: 21 - 30	4: 31 - 50	5: Above 50%	1: Less than 100	2: 101 - 200	3: 201 - 300	4: 301 - 400	5: Above 400	1: Less than 20%	2: 21 - 30
1	4	0	2	2	2	4	1	3	2	20	5	3	1	9	29									
2	4	0	4	3	2	3	1	3	2	22	5	5	2	12	34									
3	1	0	3	1	2	2	1	0	3	13	2	4	2	8	21									
4	1	5	3	1	2	1	1	1	1	16	3	4	2	9	25									
5	1	5	3	2	3	2	2	0	2	20	3	3	2	8	28									
6	3	5	3	5	4	5	4	2	3	34	5	2	3	10	44									
7	2	0	5	5	4	5	4	1	1	27	5	3	2	10	37									
8	1	5	5	1	2	2	1	0	2	19	1	4	2	7	26									
9	4	0	3	5	5	4	4	5	5	35	5	5	5	15	50									
10	5	5	3	5	5	5	5	5	5	43	5	1	3	9	52									
11	1	5	3	3	3	1	2	4	4	26	4	2	4	10	36									
12	4	5	2	5	5	2	5	5	4	38	5	1	1	7	45									
13	1	5	3	2	3	1	2	0	1	18	2	5	2	9	27									

Note : Farm income per hectare was calculated based on the result of the rural socio-economic survey conducted by the JICA Study Team in 1996.
 Farm Income per farm household / Average farm size = Farm income per ha.
 Farm incomes are composed of incomes from paddy, upland crops and livestock.

Table 3.3 Land Use Availability in Each Zone

(Unit: 1,000ha)

Zone No.	Without the Rehabilitation of Irrigation System						With the Rehabilitation of Irrigation System						Balance					
	Cultivated Area			Rainfed Area			Cultivable Area			Rainfed Area			Cultivable Area			Rainfed Area		
	Colmatage System		Irrigation System	Rainfed Area	Colmatage System		Irrigation System	Rainfed Area	Colmatage System		Irrigation System	Rainfed Area	Colmatage System		Irrigation System	Rainfed Area		
	Wet	Dry			Wet	Dry			Wet	Dry			Wet	Dry			Wet	Dry
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	
1	43.9	5.0	3.5	0.2	2.3	32.9	47.8	5.0	3.5	0.8	3.6	34.9	3.9	0	0.6	1.3	2.0	
2	32.4	1.8	1.2	3.0	0.9	25.5	35.3	1.8	1.2	3.0	2.4	26.9	2.9	0	0.0	1.5	1.4	
3	38.0	1.5	0.3	8.7	4.1	23.4	41.3	1.5	0.3	11.4	11.5	16.6	3.3	0	2.7	7.4	-6.8	
4	101.7	0.0	0.0	2.6	1.3	97.8	110.8	0.0	0.0	3.7	2.5	104.6	9.1	0	1.1	1.2	6.8	
5	78.5	0.0	0.0	2.5	13.0	63.0	85.5	0.0	0.0	9.2	24.8	51.5	7.0	0	6.7	11.8	-11.5	
6	31.0	0.2	3.0	4.1	3.2	20.5	33.7	0.2	3.0	5.3	5.8	19.4	2.7	0	1.2	2.6	-1.1	
7	22.5	0.3	0.4	0.9	1.9	19.0	24.4	0.3	0.4	2.7	3.8	17.2	1.9	0	1.8	1.9	-1.6	
8	62.1	0.0	0.0	8.1	5.4	48.6	67.6	0.0	0.0	9.7	9.0	48.9	5.5	0	1.6	3.6	0.3	
9	40.6	8.4	5.7	1.3	8.0	17.2	44.2	8.4	5.7	1.3	10.8	18.0	3.6	0	0.0	2.8	0.8	
10	22.9	4.8	8.7	0.0	3.0	6.4	24.9	4.8	8.7	0.0	9.3	2.1	2.0	0	0.0	6.3	-4.3	
11	113.3	0.7	24.1	1.0	29.7	57.8	123.4	0.7	24.1	1.4	35.1	62.1	10.1	0	0.4	5.4	4.3	
12	22.1	2.8	6.0	0.0	1.5	11.8	24.1	2.8	6.0	0.0	2.8	12.5	2.0	0	0.0	1.3	0.7	
13	70.1	0.0	0.0	1.3	1.5	67.3	76.3	0.0	0.0	7.9	1.9	66.5	6.2	0	6.6	0.4	-0.8	
Total	679.1	25.5	52.9	33.7	75.8	491.2	739.3	25.5	52.9	56.4	123.3	481.2	60.2	0.0	22.7	47.5	-10.0	

Note : Wet : Wet Season Cropping, Dry : Dry Season Cropping.

(1) : Sourced by Provincial Agricultural Office

(2) : Sourced by Agro-Echsystem Map, LUMO

(16)=(10)-(4), (17)=(11)-(5), (18)=(12)-(6), (13)=(7)-(1)

Table 3.4 Classification of 13 Zones by Agricultural Characteristics

Type	A	B	C	D	E
Zone No.	Zone 3,4,8	Zone 5,11,13	Zone 1,2	Zone 6,7,9	Zone 10,12
Main Crop Types	Paddy	Paddy	Paddy + Upland Crops	Paddy + Upland Crops	Paddy + Upland Crops
Cultivated Crops	Paddy	Paddy	Paddy, Cereal	Paddy, Cereal, Legume, Vegetable	Paddy, Cereal, Legume, Vegetable
Farming Season	Wet	Wet + Dry	Wet	Wet + Dry (Wet Season : Paddy > Upland Crops)	Wet + Dry (Wet Season : Upland Crops > Paddy)
Characteristics	Item 1	Total Paddy Planted Area / Total Planted Area > 90%	Total Upland Crops Planted Area / Total Planted Area > 10%	Total Upland Crops Planted Area / Total Planted Area > 10%	Total Upland Crops Planted Area / Total Planted Area > 10%
	Item 2	Wet Season Planted Area / Total Planted Area > 80%	Wet Season Planted Area / Total Planted Area > 70%	Wet Season Planted Area / Total Planted Area < 70% (Wet Season : Paddy > Upland Crops)	Wet Season Planted Area / Total Planted Area < 70% (Wet Season : Upland Crops > Paddy)

Source: JICA Study Team (Original statistics, collected from the concerned provinces, are modified in accord with area proportion to the zone.)

Table 3.5 Agricultural Development Target of Each Zone

Type of Main Cropping Pattern ¹⁾ Zone No.	A			B			C			D			E		
	Zone 3	Zone 4	Zone 8	Zone 5	Zone 11	Zone 13	Zone 1	Zone 2	Zone 6	Zone 7	Zone 9	Zone 10	Zone 12		
Major Cultivated Crops	Paddy	Paddy	Paddy	Paddy	Paddy	Paddy	Paddy + Cereal	Paddy + Cereal	Paddy + Cereal + Vegetable	Paddy + Vegetable	Paddy + Cereal + Vegetable	Cereal + Paddy	Paddy + Cereal		
Present	-	-	-	Paddy	Paddy	Paddy	-	-	Vegetable Paddy + Legume	Paddy + Vegetable	Paddy + Vegetable	Paddy + Vegetable + Legume	Paddy + Cereal		
Conditions	1.66 2.50	1.61 2.56	1.81 3.16	1.85 3.39	1.66 3.00	1.83 3.81	1.67 2.40	1.53 2.41	2.75 3.81	1.88 3.35	2.08 3.64	1.85 4.22	1.70 4.65		
	1.30 1.33	1.13 0.98	1.10 1.20	1.29 1.00	0.90 0.90	1.30 1.00	1.39 1.33	1.14 0.80	2.10 1.09	1.96 1.21	1.39 1.52	1.63 0.94	1.30 1.00		
	23	-	-	-	10	-	25	30	9	4	96	154	35		
	1	9	6	29	5	12	67	4	15	1	4	-	12		
	9	12	13	19	24	8	2	3	9	5	16	4	8		
	1	-	-	3	1	-	-	-	-	-	-	-	-		
Existing National Road	NR 6	-	NR 2,3,4	NR 15	NR 2,3	NR 1	-	-	-	NR 5,6A	NR 1	-	-		
Type of Basic Plan ²⁾	(1) Colmatage (2) Agri. with Fish (3) Rainfed Agri.	- - ⊙	- - ⊙	- - ⊙	Δ ○ ○	- ○ ○	○ ○ ○	○ ○ ○	Δ ⊙ Δ	Δ ⊙ Δ	⊙ ⊙ Δ	⊙ ⊙ Δ	⊙ ⊙ Δ		
1. Wet Season Paddy	Variety Improvement Yield Improvement	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○	○ ○		
2. Dry Season Paddy	Area Expansion Yield Improvement	- -	- -	- -	- ○	- ○	- ○	- ○	- ○	- ○	- ○	- ○	- ○		
3. Wet Season Upland Crops	Cereals/Legumes Vegetables	- ○	- ○	- ○	- ○	- ○	- ○	- ○	- ○	- ○	- ○	- ○	- ○		
4. Dry Season Upland Crops	Cereals/Legumes Vegetables	○ -	○ -	○ -	○ -	○ -	○ -	○ -	○ -	○ -	○ -	○ -	○ -		

Main Cropping Pattern: /

A: Paddy Cropping Zone in Wet Season
 B: Paddy Cropping Zone in both Wet & Dry Season
 C: Paddy + Upland Crops Cropping Zone in Wet Season
 D: Paddy + Upland Crops Cropping Zone in both Wet & Dry Season (Wet Paddy > Wet Upland Crops)
 E: Paddy + Upland Crops Cropping Zone in both Wet & Dry Season (Wet Upland Crops > Wet Paddy)

Basic Plan³⁾ (1): Colmatage Farming Improvement Plan
 (2): Agricultural Development Plan Harmonized with Fisheries
 (3): Rainfed Agricultural Development Plan

⊙: There are many possible areas.
 ○: There are moderate possible areas.
 Δ: There are a few possible areas.
 -: There are no possible areas.

Table 3.6 Incremental Agricultural Production by Zone

Zone	Without Project					With Project					Incremental Benefit:					
	Planted areas (ha)			Yield (t/ha)	Production (ton)	Planted areas (ha)			Yield (ton/ha)	Production (ton)		Planted areas (ha)			Production (ton)	
	Irrigated area		Rainfed			Irrigated area		Rainfed		Irrigated area		Rainfed	Irrigated area			Rainfed
	Wet season	Dry season			Wet season	Dry season			Wet season	Dry season			Wet season	Dry season		
1	5,293	5,841	32,802	1.84	60,356	5,838	7,149	34,843	3.00	1.85	38,961	64,460	545	1,308	2,041	43,065
2	4,787	2,123	25,482	1.82	46,377	4,787	3,653	26,820	3.00	1.85	25,320	49,617	0	1,530	1,338	28,560
3	10,195	4,419	23,343	1.79	41,784	12,945	11,774	16,601	3.00	1.85	74,157	30,712	2,750	7,355	-6,742	63,085
4	2,550	1,340	97,777	1.82	173,089	3,680	2,500	104,500	3.00	1.85	18,540	193,325	1,130	1,160	6,723	38,776
5	2,505	12,982	63,051	2.18	132,586	9,205	24,818	51,477	3.90	1.85	132,690	95,232	6,700	11,836	-11,574	95,336
6	4,276	6,206	20,508	2.96	60,704	5,450	8,870	19,420	4.30	1.85	61,576	35,927	1,174	2,664	-1,088	36,799
7	1,229	2,257	18,967	2.75	52,159	3,014	4,112	17,314	3.90	1.85	27,791	32,031	1,785	1,855	-1,653	7,663
8	8,152	5,350	48,555	1.64	79,630	9,730	8,996	48,834	3.40	1.85	63,668	90,343	1,578	3,646	279	74,381
9	9,639	13,773	17,218	3.09	53,204	9,639	16,562	18,039	3.90	1.85	102,184	33,372	0	2,789	821	82,352
10	4,795	11,661	6,454	3.67	23,686	4,795	17,960	2,185	4.30	1.85	97,847	4,042	0	6,299	-4,269	78,203
11	1,685	53,850	57,812	2.37	132,149	2,080	59,225	62,095	3.40	1.85	208,437	114,876	395	5,375	4,283	191,164
12	2,860	7,440	11,829	4.07	48,144	2,860	8,755	12,475	4.30	1.85	49,945	23,079	0	1,315	646	24,879
13	1,255	1,525	67,303	2.05	137,971	7,920	1,940	66,450	4.30	1.85	42,398	122,933	6,665	415	-853	27,359
Total	59,221	128,767	491,101		1,041,839	81,943	176,314	481,053			943,514	889,949	22,722	47,547	-10,048	791,622

**Table 3.7 Summary of the Proposed Priority Agricultural Development Project
Harmonized with Fisheries in the Study Area**

No.	Zone No.	Project Name	District Name	Study Area (ha)	Service Area (ha) *		Project Cost (1,000 US\$)	Project Component
					Wet Season	Dry Season		
Kampong Cham province								
1	(2)	Boeng Veam Area Agricultural Development Project	Srey Santhel / Koh Sotin	20,000	0/5,000	610/10,000	15,200	-Flood protection dike, -Gate structure -Reha. of colmatage canal, -New irrigation canal -Reha. of reservoir dike
2	(2)	Prek Pou Canal Irrigation System Rehabilitation Project	Srey Santhel	11,000	2,966/3,000	0/1,500	5,000	-Upgrade of pump station -Reha. and new main canal -Gate structure, -New secondary canal
3	(3)	Palay Chum Flood Dam Irrigation Project	Cheung Prey	6,000	3,085/5,000	0/0	8,700	-Construction of flood protection dike -New reservoir dike -New irrigation canal and gate structure
4	(7)	O Chrey Flood Dam Irrigation Project	Batheay	2,500	800/2,000	0/950	1,300	-Construction of flood protection and polder dike -Gate structure -Irrigation canal
Kandal province								
5	(7)	Tamouk Reservoir Area Agricultural Development Project	Ponhea Leu	10,000	180/300	2,052/1,000	7,300	-Rehabilitation of reservoir dike and canal -Polder dike -Gate structure and irrigation canal
6	(9)	Boeng Thom Area Agricultural Development Project	Kean Svay	20,000	700/1,400	2,300/3,500	6,200	-Rehabilitation of reservoir dike, colmatage canals and irrigation canal -Gate structure
7	(6)	Chhey Thom Area Agricultural Development Project	Ksach Kandal	10,000	3,850/5,000	0/2,000	7,200	-Rehabilitation of main and secondary canals -Flood protection dike and intake structure -Pump station
8	(10)	Maleach Krobeaykon Area Agricultural Development Project	Koh Thom	1,000	0/0	811/1,000	7,200	-Reha. of polder dike and colmatage canal -Gate structure & pump station -Irrigation canal
9	(6)	Boeng Phtea Area Small Pump Irrigation Project	Ksach Kandal	8,000	136/250	2,083/1,000	5,400	-Irrigation canal -Intake structure -Mobile pump
10	(7)	Tasen Area Flood Dam Irrigation Project	Muk Kampoul	2,000	0/0	1,215/2,000	1,200	-Flood protection dike -Rehabilitation of irrigation and colmatage canal -Reha. of reservoir dike and gate structure
11	(10)	Sras Bram Bay Irrigation System Rehabilitation Project	Koh Thom	6,000	0/0	1,380/3,000	4,000	-Flood protection dike -Rehabilitation of irrigation canal -New irrigation canal and gate structures
Prey Veng province								
12	(4)	Boeng Pring Area Small Pump Irrigation Project	Prey Veng DC / Kamp. Leav / Peam Ro	10,000	370/3,000	160/600	1,700	-Main and secondary canals -Intake structure -Pump station and mobile pump
13	(5)	Oakambok Area Canal System Rehabilitation Project	Kamp. Travek	5,000	0/3,000	0/200	3,200	-Rehabilitation and new main canals -Intake facilities and secondary canal -Rehabilitation of colmatage canal
14	(5)	Khsachsar Reservoir Area Pump Irrigation Rehabilitation Project	Ba Phnom	10,000	0/6,200	0/6,200	7,100	-Pump rehabilitation -Rehabilitation of main (Pol Pot) canal -Secondary canals
Takeo province								
15	(11)	Tourel Rolok Reservoir Irrigation System Rehabilitation Project	Prey Kabass	3,000	250/500	1,250/2,000	2,100	-Reservoir rehabilitation -Rehabilitation of main canal -Intake facilities & secondary canal
16	(11)	Thnot Konchhrung Irrigation System Rehabilitation Project	Koh Andet	9,000	0/0	1,700/3,000	3,100	-Reha. of reservoir dike & irrigation canal -Gate structure and secondary canal -Upgrade of pump facilities
17	(8)	Svay Khom Reservoir Irrigation System Rehabilitation Project	Bati	6,000	0/0	350/3,000	3,800	-Reha. of reservoir dike & irrigation canal -Gate facilities -Intake facilities
18	(11)	Stung Takeo Irrigation System Rehabilitation Project	Koh Andet / Treang	13,000	0/0	1,000/6,000	10,700	-Rehabilitation of Takeo river -Rehabilitation diversion weir -Rehabilitation of irrigation canal
19	(11)	Samaki Irrigation System Rehabilitation Project	Borey Chelasar	3,300	0/0	200/1,500	1,800	-Diversion weir -Rehabilitation of main canal -Secondary canal
20	(8)	Kampong Damrei Reservoir Agricultural Development Project	Bati	9,000	2,000/2,100	2,150/2,350	-	-Study has done by JICA -Double cropping
21	(11)	Rehabilitation of Canal 87 Irrigation Project	Angkor Borey	2,000	0/0	1,000/1,200	-	-EU is implementing -Canal rehabilitation

Note: Service area and development components are roughly planned by the study team on the 1:50,000 map.
Wet Season (ha) : 3,085/5,000 means the existing/estimated development service area
Dry Season (ha) : 0/1,500 means the existing/estimated development service area
Project cost is the rehabilitation/construction cost of facilities

Table 3.8 Check List for Initial Environmental Evaluation

Columns	A	B	C	D	E	F	Comments
1) Hydrology							
1-1 Low flow regime		○					
1-2 Flood regime			○				
1-3 Operation of dams			○				
1-4 Fall of water table			○				
1-5 Rise of water table			○				
2) Pollution							
2-1 Solute dispersion			○				
2-2 Toxic substances			○				
2-3 Organic pollution			○				
2-4 Anaerobic effects			○				
2-5 Gas emission			○				
3) Soils							
3-1 Soil salinity			○				
3-2 Soil properties			○				
3-3 Saline groundwater			○				
3-4 Saline drainage			○				
3-5 Saline intrusion			○				
4) Sediment							
4-1 Local erosion			○				
4-2 Hinterland effect			○				
4-3 River morphology			○				
4-4 Channel regime			○				
4-5 Sedimentation		○					
4-6 Estuary erosion			○				
5) Ecology							
5-1 Project lands			○				
5-2 Water bodies		○					
5-3 Surrounding area			○				
5-4 Valleys & shores			○				
5-5 Wetlands & plains			○				
5-6 Rare species						○	No data
5-7 Animal migration			○				
5-8 Natural industry			○				
6) Socio-economy							
6-1 Population change			○				
6-2 Income & amenity						○	No data
6-3 Human migration			○				
6-4 Resettlement			○				
6-5 Women's role			○				
6-6 Minority groups			○				
6-7 Sites of value			○				
6-8 Regional effects			○				
6-9 User involvement		○					
6-10 Recreation			○				
7) Health							
7-1 Water & sanitation			○				
7-2 Habitation			○				
7-3 Health services			○				
7-4 Nutrition			○				
7-5 Relocation effect			○				
7-6 Disease ecology			○				
7-7 Disease hosts			○				
7-8 Disease control			○				
7-9 Other hazards			○				
8) Imbalances							
8-1 Pests & weeds			○				
8-2 Animal diseases			○				
8-3 Aquatic weeds			○				
8-4 Structural damage			○				
8-5 Animal imbalances						○	No data

A = Positive impact very likely, B = Positive impact possible,
 C = No impact likely, D = Negative impact possible,
 E = Negative impact very likely, F = No judgement possible at present.

Note : Each impact is the synthetic and average one based on the overall environmental examination of the comprehensive Study Area. It may be little different by specified and limited area.

Table 4.1 Summary of the Colmatage Canal in Each District

District Name	Number of canals	Mean Canal Dimension (m)			Length (km)	
		Top Width	Bottom Width	Depth	Total	Mean
Kean Svay	22	12.4	-	3.5	29.9	1.42
Saang	74	20.7	13.1	2.3	147.6	1.99
Koh Thom	103	15.9	7.3	3.3	241.8	2.35
Leuk Dek	51	2.9	-	2.1	89.0	1.35
Total/ Average	250	13.0	9.7	2.8	508.3	2.03

Table 4.2 Zoning of Colmatage Farming Area

Type	District Name	Number of Canal	Water Source	Density of Canal (km/ canal)	Farm Land (ha)			Main Cropping(**)
					Upland Crops	Wet Rice	Dry Rice	
Zone I	Kean Svay	10	Mekong	2.5	1,550	473	618	U
Zone II	Leuk Dek	51	Mekong	1.0	0	0	3,205	D
Zone III	Kean Svay	12	Mekong		470	236	630	
	& Saang	10	& Bassac		212	113	195	
sub total		22		1.3	682	349	825	U & D
Zone IV	Saang	64	Bassac	0.9	3,108	2,213	3,420	U, D & W
Zone V	Kho Thom	103	Bassac	0.6	2,034	2,761	5,469	U, D & W
Total		250		0.9	7,374	5,796	13,537	

Note: (**), U: Upland Crops, D: Dry Season Rice, W: Wet Season Rice

Table 4.3 Present Condition of Colmatage System in the Project Area

ZONE No.	District Name	Number of Canal	Total(*) Length of Canal (km)	Number of Village	Number of Families	Water Source	Length of River (km)	Interval of Each Colmatage (m)	Upland Crops	Farm Land (ha)		Mean Width of Cultivated Area (m)	Irrigation Type		Remarks	
										Wet Season Rice	Dry Season Rice		Gravity	Pump		
ZONE I	Kean Svay	10	16.70 (1.85)	14	4070	Mekong	25	2500.0 (4=3)/1	1550	473	618	1581 (6=6)/2	0	10	10	-Dry season rice -Developmental potentiality is the highest. -Large Scale Farming -Access to site is good.
ZONE II	Leuk Dek	51	89.00 (1.75)	101	3221	Mekong	50	980.4	0	3205	3205	360	0	0	51	-Access to site is bad -Dry season rice only -Small Scale Farming
ZONE III	Kean Svay Saang	12 10	13.20 13.00	13 20	5290 1680	Mekong & Bassac	14 15	1166.7 1500.0	470 212	236 113	630 195	1012 400	2	10	10	-Access to site is good, -Farming Practice is not so aggressive
	sub total	22	26.20 (1.2)	33	6970		29	1318.2	682	349	825	1412	6	17	17	
ZONE IV	Saang	64	134.58 (2.1)	87	15488	Bassac	60	937.5	3108	2213	3420	650	0	64	64	-Wet & Dry season rice and upland crops -Access to site is good
ZONE V	Kho Thom	103	241.80 (2.34)	100	16451	Bassac	62	601.9	2034	2761	5469	424	10	0	88	-Wet & Dry season rice is main -Small Scale Farming -Access to site is bad
	Total	250	508.3 (2.03)	335	46200	-	226	904.0	7374	5796	13537	525	16	91	230	

Note : (*) : Total length of the Mekong/Bassac river in each zone

Table 4.4 Present Land Use of Related Four Districts in 1995/96

District	Wet Season			Dry Season				Annual Crops Sub Total (8)-(9)-(10)-(11) (ha)	Orchard (10) (ha)	Total (10)+(9)+(11) (ha)	Double Cropping Area (11) (ha)	Total Cropping Area (12)-(10)-(11) (ha)	Cropping Intensity (13)-(12)/(10)*100 (%)	
	Paddy Planted		Total (3)-(1)-(2) (ha)	Paddy Trans-Seeding planted		Field Crops (6) (ha)	Total (7)-(4)-(5)-(6) (ha)							
	(1) (ha)	(2) (ha)		(4) (ha)	(5) (ha)									
	Planted Area (ha)	Production (ton)	Planted Area (ha)	Production (ton)	Planted Area (ha)	Production (ton)								
Kean Svay	38,211	1,468	1,807	3,275	4,654	479	625	5,758	9,033	287	9,320	8,467	109%	
Saang	51,479	7,243	4,714	11,957	8,800	1,488	4,812	15,100	27,057	1,864	28,921	26,609	108%	
Leuk Dek	37,216	281	4,430	4,711	3,690	182	1,168	5,040	9,751	0	9,751	9,751	100%	
Koh Thom	50,305	4,065	4,577	8,642	8,750	817	4,285	13,850	22,492	1,492	23,984	22,090	108%	
Total	177,211	13,057	15,528	28,585	25,894	2,966	10,888	39,748	68,333	5,643	71,976	66,917	107%	
Distribution(%)	-	18%	22%	40%	36%	4%	15%	55%	95%	5%	100%	7%	95%	-

Note: Data of (9) and (11) are in 1989.

Source: Provincial Agricultural Office, Kamdi

Table 4.5 Planted Area and Production of Wet Season Field Crops of Related Four Districts in 1995/96

District	Maize		Sweet Potato		Cassava		Mungbean		Vegetables		Sesame		Sugar cane		Peanut		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)	Planted Area (ha)	Production (ton)	Planted Area (ha)	Production (ton)	Planted Area (ha)	Production (ton)	Planted Area (ha)	Production (ton)	
Kean Svay	1,615	2,547	11	39	12	54	45	13	1,031	5,155	4	1,400	1	757	20,439	51	31	4,714	29,171
Saang	2,803	3,439	11	39	12	54	45	13	1,031	5,155	4	1,400	1	757	20,439	51	31	4,714	29,171
Leuk Dek	4,400	7,505	11	39	12	54	45	13	1,031	5,155	4	1,400	1	757	20,439	51	31	4,714	29,171
Koh Thom	4,434	6,935	11	39	12	54	45	13	1,031	5,155	4	1,400	1	757	20,439	51	31	4,714	29,171
Total	13,252	20,426	44	155	48	216	189	52	4,126	20,625	16	5,640	3	3,028	81,716	204	123	18,876	101,944
Avg. Yield (ton/ha)	1.54	1.54	3.55	3.55	4.50	4.50	0.56	0.56	4.87	4.87	0.25	0.25	26.95	26.95	0.63	0.63	-	-	-
Distribution (%)	85.3%	85.3%	0.1%	0.1%	0.1%	0.1%	0.3%	0.3%	8.8%	8.8%	0.0%	0.0%	5.0%	5.0%	0.4%	0.4%	-	-	100.0%

Source: Provincial Agricultural Office, Kamdi

Table 4.6 Planted Area and Production of Dry Season Field Crops of Related Four Districts in 1995/96

District	Maize		Sweet Potato		Cassava		Mungbean		Vegetables		Sugarcane		Peanut		Castor Oil Plant		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)	Planted Area (ha)	Production (ton)	Planted Area (ha)	Production (ton)	Planted Area (ha)	Production (ton)	Planted Area (ha)	Production (ton)
Kean Svay	69	83	18	108	17	120	65	42	1,121	3,043	67	33	30	24	7	8	490	623
Saang	637	1,006	78	976	29	182	55	229	1,888	10,380	8	4	53	34,650	1,187	7	4,032	32,857
Leuk Dek	190	144	205	1,203	7	50	354	342	1,92	854	19	8	35	1	1	3	1,368	2,638
Koh Thom	116	139	148	2,088	7	50	1,470	1,400	1,960	7,840	116	38	119	4,865	127	101	400	16,347
Total	1,012	1,372	749	4,580	57	402	2,442	2,013	4,152	19,576	210	103	713	24,990	1,562	7	6,200	54,768
Avg. Yield (ton/ha)	1.36	1.36	5.85	5.85	7.03	7.03	0.82	0.82	4.72	4.72	0.49	0.49	1.16	1.16	0.1%	0.1%	-	-
Distribution (%)	9.3%	9.3%	6.5%	6.5%	0.5%	0.5%	22.4%	22.4%	38.1%	38.1%	1.9%	1.9%	12.4%	12.4%	0.1%	0.1%	-	-

Source: Provincial Agricultural Office, Kamdi

Table 4.7 Comparison of Agricultural Production with/without the Project

Location	Project	Farmland (ha)		Cropping Intensity (%)						Planted Area (ha)				Total				
		Upland		Paddy		Upland		Paddy		Upland		Paddy						
		Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season					
Kean Svay	Without	13,537	5,796	7,374	26,707	43	20	16	23	5	107	11,484	5,341	4,273	6,143	1,335	28,576	
		(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
Koh Thom	With	13,537	5,796	7,374	26,707	43	20	23	23	5	114	11,484	5,341	6,143	6,143	1,335	30,446	
		(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)

PRODUCTION

Location	Project	Paddy Production (ton)		Field Crops Production (ton)		Total	Total Production
		Dry Season	Wet Season	Dry Season	Wet Season		
Kean Svay	Without	37,897	12,819	11,473	12,347	23,820	74,537
		(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
Koh Thom	With	48,233	15,490	19,380	13,483	32,863	96,586
		(127%)	(121%)	(169%)	(109%)	(138%)	(130%)

PADDY PRODUCTION

Location	Project	Dry Season Paddy			Wet Season Paddy				
		Major Varieties	Average Yield (ton/ha)	Planted Area (ha)	Major Varieties	Average Yield (ton/ha)	Planted Area (ha)		
Kean Svay	Without	IR36, IR66	3.3	11,484	37,897	Traditional, IR42	2.4	5,341	12,819
			(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
Koh Thom	With	IR66, IR72, IR Kesar	4.2	11,484	48,233	Traditional, IR42, Santepheap	2.9	5,341	15,490
			(127%)	(100%)	(127%)	(100%)	(121%)	(100%)	(121%)

FIELD CROPS PRODUCTION I

Location	Project	Vegetables (45%)			Peanuts (40%)			Maize (15%)			Total	
		AVG. Yield (ton/ha)	Area (ha)	Production (ton)	AVG. Yield (ton/ha)	Area (ha)	Production (ton)	AVG. Yield (ton/ha)	Area (ha)	Production (ton)		
Kean Svay	Without	4.7	1,923	9,038	0.9	1,709	1,538	1.41	641	897	4,273	11,473
		(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
Koh Thom	With	5.5	2,764	15,203	1.1	2,457	2,703	1.6	921	1,474	6,143	19,380
		(117%)	(144%)	(168%)	(122%)	(144%)	(176%)	(114%)	(144%)	(144%)	(144%)	(169%)

FIELD CROPS PRODUCTION II

Location	Project	Maize (85%)			Vegetables (15%)			Total
		AVG. Yield (ton/ha)	Area (ha)	Production (ton)	AVG. Yield (ton/ha)	Area (ha)	Production (ton)	
Kean Svay	Without	1.5	5,221	7,832	4.9	921	4,515	12,347
		(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
Koh Thom	With	1.7	5,221	8,876	5.0	921	4,607	13,483
		(113%)	(100%)	(113%)	(102%)	(100%)	(102%)	(109%)

Table 4.8 Index for Ranking of Rehabilitation Priority District

District Name	Socio-Economic Factor						Infrastructural Factor						Ranking Total
	Population Density		Total Farm Income		Self Sufficiency of Paddy		Annual Irrigation Area		Road Density		Deterioration of Water Control Facility *		
	person/kl	Ranking	Riels/year X 1000	Ranking	ton	Ranking	ha/person	Ranking	Km/kl	Ranking	%	Ranking	
Kean Svay	441	1	1,400	3	-8307	1	0.42	1	1.2	1	45%	1	8
Saang	301	2	1,100	1	-331	2	0.56	2	0.4	2	18%	2	11
Leuk Dek	121	4	1,300	2	1522	3	1	4	0.1	4	4%	4	21
Kho Thom	248	3	1,800	4	5975	4	0.62	3	0.2	3	8%	3	20

Note; Deterioration of water control facility(%)=Number of existing/Number of colmatage canal in each District

Table 4.10 Agricultural Benefit

	Wet Season			Dry Season				Orchard (Banana)	Total
	Paddy	Maize	Vegetables	Paddy	Maize	Beans	Vegetables		
<u>Without Project</u>									
Yield(kg/ha)	2,400	1,500	4,900	3,300	1,400	900	4,700	6,200	
Unit Price(Riels/kg)	334	261	1,000	334	261	1,700	1,000	350	
Gross Production Value(Riels/ha)	839,520	391,500	4,900,000	1,154,340	365,400	1,530,000	4,700,000		
Cost of Production(Riels/ha)	155,457	324,928	872,068	233,905	317,123	379,726	872,068		
Net Production Value(Riels/ha)	684,063	66,572	4,027,932	920,435	48,277	1,150,274	3,827,932	1,807,544	
Planting Area(ha)	5,341	5,221	921	11,484	427	2,350	1,496	1,335	28,575
Total NPV(Million Riels)	3,654	348	3,710	10,570	21	2,727	5,727	2,413	28,158
<u>With Project</u>									
Yield(kg/ha)	2,900	1,700	5,400	4,200	1,600	1,100	5,500	7,800	
Unit Price(Riels/kg)	334	261	1,000	334	261	1,700	1,000	350	
Gross Production Value(Riels/ha)	1,014,420	445,700	5,400,000	1,489,160	417,600	1,885,000	5,500,000		
Cost of Production(Riels/ha)	167,537	364,466	895,063	306,081	349,876	441,326	1,022,753		
Net Production Value(Riels/ha)	846,883	79,214	4,514,937	1,183,079	68,724	1,443,674	4,477,247	2,085,175	
Planting Area(ha)	5,341	5,221	921	11,484	614	3,379	2,150	1,335	30,445
Total NPV(Million Riels)	4,523	414	4,158	13,357	42	4,878	9,626	2,784	39,782
Incremental Benefit(Million Riels)	870	66	443	2,787	22	2,152	3,899	371	10,614

Note: NPV per hectare includes income from by-products
Yield of banana is in number of hands.

Table 4.9 Cost Estimation of Rehabilitation for Colmatage Canal between Mekong and Bassac River
(Unit: US\$)

Zone No.	Name of District	Type of Colmatage Canal	Existing Canal					Cost of Implementation Works					Total (US \$)	Remarks		
			Number	Length (m)	Gate (Nos.)	Proposed canal		Intake Gate		Bridge Amount (US \$)						
						Number	Length (m)	Number	Amount (US \$)		Number	Amount (US \$)				
Zone-I	Kean Svay	A	5	4,750	-	-	-	-	-	-	4	77,967	77,967			
		B	-	-	-	-	-	-	-	-	-	-	-	-		
		C	1	2,000	1	2,000	155,128	1	269,274	-	-	-	-	424,402		
		D	2	4,150	2	4,150	398,448	2	1,028,893	2	1,427,342	-	-	1,427,342		
		E	2	5,800	2	5,800	680,886	2	1,418,551	-	-	-	-	2,099,237		
Sub - total			10	16,700	5	11,950	1,234,463	5	2,716,519	4	77,967	4,028,948				
Zone-II	Leuk Dek	A	51	89,150	2	-	-	10	681,082	-	-	42	818,648	1,499,730		
		B	-	-	-	-	-	-	-	-	-	-	-	-		
		C	-	-	-	-	-	-	-	-	-	-	-	-	-	
		D	-	-	-	-	-	-	-	-	-	-	-	-	-	
		E	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sub - total			51	89,150	2	-	-	10	681,082	-	-	42	818,648	1,499,730		
Zone-III	Kean Svay Saang	A	16	19,050	6	-	-	6	408,649	-	-	15	292,374	701,024		
		B	4	4,700	2	4,700	291,641	2	361,381	-	-	3	108,699	761,721		
		C	-	-	-	-	-	-	-	-	-	-	-	-	-	
		D	2	2,450	1	2,450	235,229	1	514,447	-	-	1	43,236	792,911		
		E	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sub - total			22	26,200	9	7,150	526,869	9	1,284,477	19	444,309	2,255,655				
Zone-IV	Saang	A	11	17,015	1	-	-	2	156,216	-	-	8	153,933	292,149		
		B	11	20,690	1	10	16,490	1	180,691	9	526,096	1,530,011				
		C	17	36,385	2	17	36,385	2	538,549	16	627,444	3,988,160				
		D	22	50,142	4	22	50,142	4	2,057,786	18	778,248	7,650,252				
		E	3	10,350	1	3	10,350	1	709,176	3	182,858	2,107,064				
Sub - total			64	134,582	9	52	113,567	10	3,622,417	54	2,070,579	15,567,636				
Zone-V	Koh Thom	A	55	91,770	2	-	-	8	544,866	-	-	50	974,581	1,519,447		
		B	36	102,925	4	55	99,935	6,201,089	6	1,084,144	33	1,195,685	8,480,918			
		C	5	17,500	2	4	12,500	969,550	2	538,549	4	156,861	1,664,960			
		D	6	21,300	-	6	21,300	2,045,049	-	-	6	259,416	2,304,465			
		E	1	4,500	-	1	4,500	528,274	-	-	1	60,953	589,227			
Sub - total			103	238,005	8	46	138,235	9,743,962	16	2,167,558	94	2,647,496	14,559,016			
Total		A	138	221,735	11	-	-	26	1,770,813	-	-	119	2,319,504	4,090,317		
		B	51	128,325	7	49	121,125	7,515,954	9	1,626,216	45	1,630,480	10,772,649			
		C	23	55,885	5	22	50,885	3,946,845	5	1,346,372	20	784,305	6,077,522			
		D	32	78,042	7	32	78,042	7,492,944	7	3,601,126	25	1,080,900	12,174,970			
		E	6	20,650	3	6	20,650	2,424,190	3	2,127,527	4	243,811	4,795,528			
Grand - total			250	504,637	33	109	270,702	21,379,934	50	10,472,053	213	6,059,000	37,910,987			