Table IV-4.1.1 Summary of Small Pond Development Plan in Trapeang Snao Village, Nhaeng Nhang Commune

Pond No.	Type	Status	Sub-Village	Leader	Member	Family	Pond Size (m)			Existing Farm Land (ha)	Total Volume (m^3)	Proposed Condition			Construction Cost	Assets of Group Leader								Remarks
					(nos.)	(nos.)	(m)	(m)	(m2)			Effective Volume (m3)	Irrigable 1st (ha)	Irrigable 2nd (ha)	(US$)	Cow	Pig	Chicken	Duck	Electlic Device	Trans-port	Land (ha)	Others	
1	G	R	1	Chheum Chann	5	26	20	12	240	0.51	410	256	0.10	0.05	574	4	4	40	10	Bt	Bi(3)	3.00		
2	I	R	1	Chheum Nonn	1	7	18	17	306	0.19	567	374	0.15	0.07	789	4	2	9	15	Rd	Bi	2.50		
3	I	R	1	Pill Toch	1	6	18	10	180	0.17	284	166	0.07	0.03	113	4	2			Bt,Tv		0.70		
4	I	R	1	Khorm Bross	1	4	10	23	230	0.12	366	216	0.09	0.04	404	2	1	150				0.90		
5	G	N	2	Ngouo Duk	5	21	16	26	416	0.95	803	544	0.22	0.10	1,491	6		40		Bt,Tv	Bi(2)	3.00	buffalo(5)	
6	G	N	2	Minh Horn	4	19	34	17	578	0.87	1,167	812	0.32	0.15	2,165	5		10	7	Bt,Rd	Bi(2),Mc(2)	4.00		
7	Gc	N	2	Chhum Choum	4	16	50	13	650	0.30	1,119	756	0.30	0.14	1,680	7	2	30	10	Bt,Tv,Rd	Mc,Bi(3)	1.50		
8	G	N	2	Minh Sariun	3	9	12	20	240	0.20	410	256	0.10	0.05	763	4	2	5	20	Bt,Rd	Bi(2)	2.00		
9	G	R	3	Tob Bunheun	5	28	16	17	272	0.75	828	567	0.23	0.10	371	2		3	7	Bt,Tv,Rd	Bi(2)	1.40		
10	G	N	3	Soun Seun	4	19	16	21	336	0.50	630	420	0.17	0.08	1,170									
11	Gc	R	3	Naet Sopheap	5	20	80	11	880	0.38	1,455	959	0.38	0.17	1,499									
12	G	R	4	San Sariun	5	21	40	25	1000	1.00	2,244	1,631	0.65	0.30	2,678	2		10	9	Bt,Rd	Mc,Bi	2.00		
13	I	N	7	Nop Nat	1	5	11	15	165	0.30	266	156	0.06	0.03	499	4	1	10	120	Bt,Tv	Bi	0.50		
14	I	R	4	Prak Yorm	1	5	21	12	252	0.54	432	272	0.11	0.05	487	4	1	10	8	Bt,Tv,Rd	Bi(2),Mc	2.20	Pump	Widow
15	G	R	4	Chey Sakhorn	4	17	14	16	224	0.36	389	244	0.10	0.04	363	4	1	5	100	Bt,Tv,Rd	Mc,Bi	1.50		
16	G	N	4	Leuk Beun	4	18	24	24	576	0.35	1,202	846	0.34	0.15	2,229	4		20		Bt,Rd	Bi	1.20		
17	I	N	4	Ouk Nhen	1	6	12	12	144	0.11	230	132	0.05	0.02	429	6	1			Bt,Rd	Mc,Bi	1.50		
18	Gc	N	4	Saom Pral	5	25	27	45	1215	0.83	2,795	2,051	0.82	0.37	4,610	3	1	10		Bt,Tv,Rd	Mc,Bi	1.50		
19	I	R	5	Chey Khott	1	4	13	15	195	0.08	329	201	0.08	0.04	392	4	1	2		Bt,Tv,Rd	Bi	0.90		
20	I	R	5	Ehamn Thol	1	6	12	16	192	0.12	320	194	0.08	0.04	329	4	1	20	130	Bt,Tv,Rd	Bi(3),Mc	2.00		Female
21	G	R	6	Oul Som Ol	5	23	17	24	408	1.27	792	538	0.22	0.10	678	4	1	20		Bt,Tv,Rd	Bi(2),Mc	2.00		
22	I	N	6	Khem Phei	1	6	19	17	323	0.21	605	401	0.16	0.07	1,124									
23	I	N	6	Ou Horn	1	7	13	26	338	1.70	609	398	0.16	0.07	1,130									
24	I	N	6	Vann Phat	1	4	11	14	154	0.44	246	143	0.06	0.03	458	5	1	17	5	Bt,Tv	Bi			
25	G	N	6	Sar Por	4	15	21	12	252	0.50	432	272	0.11	0.05	803	5	1	20	8	Bt,Tv	Bi(2)			
26	G	R	3	Chab Neam	4	19	47	12	564	0.79	1,017	676	0.27	0.12	1,366					Bt,Rd	Bi	0.70		
27	G	N	7	Mean Korn	4	17	20	15	300	0.58	549	360	0.14	0.07	1,020	6	4	20		Bt,Tv	Mc(2),Bi	3.00		
28	G	N	3	Yi Bunthan	5	26	15	12	180	0.52	297	178	0.07	0.03	553	1	1	20	14		Mc,Bi(2)	1.00		
29	I	N	6	Ou Pach	1	3	20	14	280	0.13	503	325	0.13	0.06	935	2		2			Bi	1.00		Female
30	I	R	3	Pa Vuthy	1	7	15	13	195	0.07	329	201	0.08	0.04	406	3	2	4	4	Bt,Tv	Bi	1.00		
Total					88	409			11,285	14.84	21,619	14,545	5.82	2.64	31,505									

Note: Type; I= individual pond, G= Group pond, Gc= Canal pond (Canal No.8)
Status; N= New pond, R= Existing pond
Bt=battery, Tv=television set, Rd=radio or radio casette, Mc=motorcycle, Bi=Bicycle
Number within ( ) shows number of items,number is one for others without ( ).

Table IV-5.1.1 Proposed Planted Area

(Unit: ha)

	USP	Ang160 SRP	Kim Sei SRP	PDP
Irrigable area	3,500	25	27	5.82
Paddy	3,500	25	24	0.00
Local	2,400	17	16	0.00
HYV	1,100	8	8	0.00
Diversified crops	1,050	5	3	7.46
Vegetables	550	1	1	3.74
Maize	100	1	1	0.00
Groundnut	100	1	1	0.93
Soybean	100	1	0	0.93
Mung-bean	100	0	0	0.93
Sesame	100	1	0	0.93
Total of planted area	4,550	30	27	7.46
Cropping Intensity (%)	130%	120%	100%	128%

Table IV-5.1.2 Anticipated Unit Yield of Four Priority Projects

(Unit: kg/ha)

Crop		Average	Range
Paddy	Local	2,800	2,500 - 3,000
	HYV	3,300	3,000 - 3,500
Diversified crops	Vegetables	7,400	4,000 - 10,000
	Maize	2,000	1,800 - 2,200
	Groundnut	850	800 - 900
	Soybean	1,000	900 - 1,100
	Mung-bean	1,000	800 - 1,300
	Sesame	800	700 - 850

Table IV-5.1.3 Prospective Crop Production

(Unit: ton)

	USP	Ang160 SRP	Kim Sei 160	PDP
Paddy				
Local	6,720	48	45	-
HYV	3,630	26	26	-
Total of paddy	10,350	74	71	-
Diversified crops				
Vegetables	4,070	7	7	27.7
Maize	200	2	2	-
Groundnut	85	1	1	0.8
Soybean	100	-	-	0.9
Mung-bean	100	1	-	0.9
Sesame	80	1	-	0.7

Table IV-5.1.4 Food Balance in the Project Area

Present

	Unit	USP	Ang160 SRP	Kim Sei SRP	PDP
Beneficiaries	family	4,020	130	37	88
Average family size	person/family	5.2	5.5	4.9	5.3
Population	person	20,904	715	181	466
Average farm size (paddy	ha/family	0.87	1.10	1.33	1.15
Paddy production					
Planted area	ha	3,260	143	49	101
Unit yield	kg/ha	1,320	1,320	1,320	1,320
Paddy production	ton	4,303	189	65	134
Demand of paddy					
Rice consumption *1	kg/capita	151.2	151.2	151.2	151.2
Consumption	ton	3,161	108	27	71
Milling rate *1	%	62%	62%	62%	62%
Paddy	ton	5,098	174	44	114
Post-harvest loss and seed *1	%	17%	17%	17%	17%
Requirement of paddy	ton	6,142	210	53	137
Food balance	ton	(1,839)	(21)	12	(3)
Surplus/Deficit	kg/family	(457)	(164)	316	(39)
(to demand)	%	-30%	-10%	22%	-3%

With Project

	Unit	USP	Ang160 SRP	Kim Sei SRP	PDP
Beneficiaries	family	4,020	130	37	88
Average family size	person/family	5.2	5.5	4.9	5.3
Population	person	20,904	715	181	466
Average farm size (paddy	ha/family	0.87	1.10	1.33	1.15
Paddy field	ha	3,500	143	49	101
Irrigable area	ha	3,500	25	27	6
Paddy planted area	ha	3,500	25	24	0
Local	ha	2,400	17	16	0
HYV	ha	1,100	8	8	0
Unit yield					
Local	kg/ha	2,800	2,800	2,800	2,800
HYV	kg/ha	3,300	3,300	3,300	3,300
Production					
Local	ton	6,720	48	45	0
HYV	ton	3,630	26	26	0
Rain-fed area	ha	0	118	22	95
Unit yield	kg/ha	1,320	1,320	1,320	1,320
Production	ton	0	156	29	126
Total production of paddy	ton	10,350	230	101	126
Incremental production	ton	6,047	41	36	(8)
	kg/family	1,504	315	961	(87)
Balance	ton	4,208	20	47	(11)
Surplus/Deficit	kg/family	1,047	151	1,277	(127)
(to demand)	%	69%	9%	89%	-8%

Note: *1: Based on the MAFF's indicator

Table IV-5.1.5 Crop Budget of With- and Without-project Conditions

Proposed Cropping Pattern (With-project)

	Name of crops			Local paddy (medium)			HYV paddy (early)			Vegetables			Maize			Groundnut			Soybean			Mung-bean			Sesame		
			Unit	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)
1	**Gross Income**		**Riel**			**1,081**			**1,035**			**5,118**			**1,238**			**1,119**			**1,216**			**1,416**			**1,453**
	Main products		kg	2,800	370	1,036	3,300	300	990	7,400	690	5,106	2,000	600	1,200	850	1,300	1,105	1,000	1,200	1,200	1,000	1,400	1,400	800	1,800	1,440
	By-product		kg	2,800	16	45	2,800	16	45	740	16	12	2,400	16	38	850	16	14	1,000	16	16	1,000	16	16	800	16	13
				straw			straw			waste fruits			corn stalk			stem and waste nuts			stems and waste beans			stems, waste beans			stems		
2	**Production Cost**		**Riel**			**373**			**386**			**542**			**256**			**380**			**328**			**319**			**208**
2.1	**Inputs**		**Riel**			**253**			**264**			**440**			**185**			**301**			**254**			**246**			**145**
	Seed		kg	65	400	26	50	400	20	6.8	8,800	60	20	2,000	40	40	4,000	160	65	1,800	117	50	2,200	110	8	2,500	20
	Farm manure (wet)		ton	3	25,000	75	3	25,000	75	4	25,000	100	0	25,000	0	0	25,000	0	0	25,000	0	0	25,000	0	0	25,000	0
	Fertilizer	Urea	kg	80	800	64	100	800	80	105	800	84	80	800	64	55	800	44	55	800	44	55	800	44	40	800	32
		DAP	kg	45	1,000	45	45	1,000	45	100	1,000	100	40	1,000	40	50	1,000	50	50	1,000	50	50	1,000	50	60	1,000	60
		KCL	kg	25	800	20	25	800	20	70	800	56	30	800	24	25	800	20	25	800	20	25	800	20	25	800	20
	Agro-chemicals		liter	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0
	Others			10%	of above	23	10%	of above	24	10%	of above	40	10%	of above	17	10%	of above	27	10%	of above	23	10%	of above	22	10%	of above	13
2.2	**Labor**		**m-d**	**90**		**27**	**90**		**27**	**110**		**0**	**80**		**0**	**65**		**0**	**60**		**0**	**60**		**0**	**50**		**0**
	Hired labor		**m-d**	**9**	3,000	**27**	9	3,000	**27**	0	3,000	**0**	0	3,000	**0**	0	3,000	**0**	0	3,000	**0**	0	3,000	**0**	0	3,000	**0**
	Family labor		m-d	81	0	0	81	0	0	110	0	0	80	0	0	65	0	0	60	0	0	60	0	0	50	0	0
2.3	**Draft animal**		**Riel**			**56**			**56**			**42**			**42**			**39**			**39**			**39**			**39**
	Land preparation		anml-d	6.0		42	6.0		42	4.0		28	4.0		28	4.0		28	4.0		28	4.0		28	4.0		28
	Plowing		anml-d	5.0	7,000	35	5.0	7,000	35	4.0	7,000	28	4.0	7,000	28	4.0	7,000	28	4.0	7,000	28	4.0	7,000	28	4.0	7,000	28
	Paddling		anml-d	1.0	7,000	7	1.0	7,000	7	0.0	7,000	0	0.0	7,000	0	0.0	7,000	0	0.0	7,000	0	0.0	7,000	0	0.0	7,000	0
	Transportation		anml-d	2.0	7,000	14	2.0	7,000	14	2.0	7,000	14	2.0	7,000	14	1.5	7,000	11	1.5	7,000	11	1.5	7,000	11	1.5	7,000	11
2.4	**Tool/Equipment**		**Riel**			**31**			**32**			**48**			**23**			**34**			**29**			**28**			**18**
2.5	**Interest of input credit**		**Riel**			**6**			**7**			**12**			**6**			**6**			**6**			**6**			**6**
3	**Net Return**		**Riel**			**707**			**649**			**4,576**			**983**			**739**			**888**			**1,097**			**1,245**
	Net Return ratio (3)/(1)		**%**			**65%**			**63%**			**89%**			**79%**			**66%**			**73%**			**77%**			**86%**
	Net Return ratio (3)/(2)		**%**			**189%**			**168%**			**844%**			**384%**			**195%**			**271%**			**344%**			**600%**

Present Crop Budget (Without Project)

	Name of crops			Local paddy (medium/late)			HYV paddy (early)			Vegetables			Maize			Groundnut			Soybean			Mung-beans			Sesame		
			Unit	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)	Q'ty	Price (Riel)	Value (1000Riel)
1	**Gross Income**		**Riel**			**510**			**417**			**2,766**			**557**			**592**			**608**			**637**			**636**
	Main products		kg	1,320	370	488	1,320	300	396	4,000	690	2,760	900	600	540	450	1,300	585	500	1,200	600	450	1,400	630	350	1,800	630
	By-product		kg	1,320	16	21	1,320	16	21	400	16	6	1,080	16	17	450	16	7	500	16	8	450	16	7	350	16	6
				straw			straw			waste fruits			corn stalk			stem and waste nuts			stems and waste beans			stems and waste beans			stems		
2	**Production Cost**		**Riel**			**203**			**195**			**296**			**150**			**264**			**212**			**203**			**83**
2.1	**Inputs**		**Riel**			**105**			**98**			**223**			**92**			**200**			**153**			**145**			**36**
	Seed		kg	65	400	26	50	400	20	6.8	8,800	60	20	2,000	40	40	4,000	160	65	1,800	117	50	2,200	110	8	2,500	20
	Farm manure (wet)		ton	1	25,000	25	1	25,000	25	2	25,000	50	0	25,000	0	0	25,000	0	0	25,000	0	0	25,000	0	0	25,000	0
	Fertilizer	Urea	kg	30	800	24	30	800	24	50	800	40	30	800	24	15	800	12	15	800	12	15	800	12	10	800	8
		DAP	kg	20	1,000	20	20	1,000	20	45	1,000	45	20	1,000	20	10	1,000	10	10	1,000	10	10	1,000	10	5	1,000	5
		KCL	kg	0	800	0	0	800	0	10	800	8	0	800	0	0	800	0	0	800	0	0	800	0	0	800	0
	Agro-chemicals		liter	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0
	Others			10%	of above	10	10%	of above	9	10%	of above	20	10%	of above	8	10%	of above	18	10%	of above	14	10%	of above	13	10%	of above	3
2.2	**Labor**		**m-d**	**80**		**24**	**80**		**24**	**90**		**0**	**70**		**0**	**60**		**0**	**50**		**0**	**50**		**0**	**45**		**0**
	Hired labor		**m-d**	**8**	3,000	**24**	8	3,000	**24**	0	3,000	**0**	0	3,000	**0**	0	3,000	**0**	0	3,000	**0**	0	3,000	**0**	0	3,000	**0**
	Family labor		m-d	72	0	0	72	0	0	90	0	0	70	0	0	60	0	0	50	0	0	50	0	0	45	0	0
2.3	**Draft animal**		**Riel**			**56**			**56**			**42**			**42**			**39**			**39**			**39**			**39**
	Land preparation		anml-d	6.0		42	6.0		42	4.0		28	4.0		28	4.0		28	4.0		28	4.0		28	4.0		28
	Plowing		anml-d	5.0	7,000	35	5.0	7,000	35	4.0	7,000	28	4.0	7,000	28	4.0	7,000	28	4.0	7,000	28	4.0	7,000	28	4.0	7,000	28
	Paddling		anml-d	1.0	7,000	7	1.0	7,000	7	0.0	7,000	0	0.0	7,000	0	0.0	7,000	0	0.0	7,000	0	0.0	7,000	0	0.0	7,000	0
	Transportation		anml-d	2.0	7,000	14	2.0	7,000	14	2.0	7,000	14	2.0	7,000	14	1.5	7,000	11	1.5	7,000	11	1.5	7,000	11	1.5	7,000	11
2.4	**Tool/Equipment**		**Riel**			**16**			**15**			**27**			**13**			**24**			**19**			**18**			**7**
2.5	**Interest of input credit**		**Riel**			**2**			**2**			**5**			**2**			**1**			**1**			**1**			**1**
3	**Net Return**		**Riel**			**307**			**222**			**2,470**			**407**			**329**			**396**			**434**			**553**
	Net Return ratio (3)/(1)		**%**			**60%**			**53%**			**89%**			**73%**			**55%**			**65%**			**68%**			**87%**
	Net Return ratio (3)/(2)		**%**			**151%**			**113%**			**834%**			**271%**			**125%**			**187%**			**214%**			**666%**

Table IV-5.1.6 Production Value, Production Cost and Net Return (1/2

1 USP Average farm size (paddy): 0.87 ha/family

	Project area (million Riel)				Average farm size family (1,000 Riel)			
	Planted area (ha)	Gross income	Production cost	Net return	Planted area (ha)	Gross income	Production cost	Net return
Proposed (With-project)								
Local paddy (medium)	2,400	2,593.9	896.0	1,697.9	0.60	645	223	422
HYV paddy (early)	1,100	1,138.3	424.9	713.4	0.27	283	106	177
Subtotal	3,500	3,732.2	1,320.9	2,411.3	0.87	928	329	600
Vegetable	550	2,814.8	298.1	2,516.7	0.14	700	74	626
Maize	100	123.8	25.6	98.3	0.02	31	6	24
Groundnut	100	111.9	38.0	73.9	0.02	28	9	18
Soybean	100	121.6	32.8	88.8	0.02	30	8	22
Mung-bean	100	141.6	31.9	109.7	0.02	35	8	27
Sesame	100	145.3	20.8	124.5	0.02	36	5	31
Subtotal	1,050	3,459.0	447.1	3,011.9	0.26	860	111	749
Total	4,550	7,191.2	1,768.0	5,423.2	1.13	1,789	440	1,349
Present (Without-project)								
Local paddy (medium)	2,730	1,391.0	553.5	837.5	0.68	346	138	208
Local paddy (late)	70	35.7	14.2	21.5	0.02	9	4	5
HYV paddy (early)	460	191.9	89.9	101.9	0.11	48	22	25
Subtotal	3,260	1,618.5	657.6	960.9	0.81	403	164	239
Vegetable	50	138.3	14.8	123.5	0.01	34	4	31
Maize	10	5.6	1.5	4.1	0.00	1	0	1
Groundnut	10	5.9	2.6	3.3	0.00	1	1	1
Mung-bean	30	19.1	6.1	13.0	0.01	5	2	3
Subtotal	100	168.9	25.0	143.9	0.02	42	6	36
Total	3,360	1,787.5	682.7	1,104.8	0.84	445	170	275
Incremental								
Paddy	240	2,113.7	663.3	1,450.4	0.06	526	165	361
Vegetables	500	2,676.5	283.3	2,393.2	0.12	666	70	595
Other diversified crops	450	613.6	138.7	474.8	0.11	153	35	118
Total	1,190	5,403.7	1,085.3	4,318.4	0.30	1,344	270	1,074

Average farm size (paddy) Total: 1.10 ha/family

2 Ang160 SRP Irrigable area: 0.19 ha/family

	Project area (million Riel)				Average farm size family (1,000 Riel)			
	Planted area (ha)	Gross income	Production cost	Net return	Planted area (ha)	Gross income	Production cost	Net return
Proposed (With-project)								
Local paddy (medium)	17	18.4	6.3	12.0	0.13	141	49	93
HYV paddy (early)	8	8.3	3.1	5.2	0.06	64	24	40
Subtotal	25	26.7	9.4	17.2	0.19	205	73	132
Vegetable	1	5.1	0.5	4.6	0.01	39	4	35
Maize	1	1.2	0.3	1.0	0.01	10	2	8
Groundnut	1	1.1	0.4	0.7	0.01	9	3	6
Mung-bean	1	1.4	0.3	1.1	0.01	11	2	8
Sesame	1	1.5	0.2	1.2	0.01	11	2	10
Subtotal	5	10.3	1.7	8.6	0.04	80	13	66
Total	30	37.0	11.1	25.9	0.23	285	86	199
Present (Without-project)								
Local paddy (medium)	21	10.7	4.3	6.4	0.16	82	33	50
HYV paddy (early)	7	2.9	1.4	1.6	0.05	22	11	12
Subtotal	28	13.6	5.6	8.0	0.22	105	43	61
Vegetable	1	2.8	0.3	2.5	0.01	21	2	19
Maize	1	0.6	0.2	0.4	0.01	4	1	3
Subtotal	2	3.3	0.4	2.9	0.02	26	3	22
Total	30	16.9	6.1	10.9	0.23	130	47	84
Incremental								
Paddy	(3)	13.0	3.8	9.2	(0.02)	100	29	71
Vegetables	0	2.4	0.2	2.1	0.00	18	2	16
Other diversified crops	3	4.7	1.0	3.7	0.02	36	8	28
Total	0	20.1	5.1	15.0	0.00	154	39	115

Table IV-5.1.6 Production Value, Production Cost and Net Return (2/2

Average farm size (paddy) Total: 1.33 ha/family

3 Kim Sei SRP Irrigable area: 0.73 ha/family

	Project area (million Riel)				Average farm size family (1,000 Riel)			
	Planted area (ha)	Gross income	Production cost	Net return	Planted area (ha)	Gross income	Production cost	Net return
Proposed (With-project)								
Local paddy (medium)	16	17.3	6.0	11.3	0.43	467	161	306
HYV paddy (early)	8	8.3	3.1	5.2	0.22	224	84	140
Subtotal	24	25.6	9.1		0.65	691	245	446
Vegetable	1	5.1	0.5	4.6	0.03	138	15	124
Maize	1	1.2	0.3	1.0	0.03	33	7	27
Groundnut	1	1.1	0.4	0.7	0.03	30	10	20
Subtotal	3	7.5	1.2		0.08	202	32	170
Total	27	33.0	10.2		0.73	893	277	616
Present (Without-project)								
Local paddy (medium)	20	10.2	4.1	6.1	0.54	275	110	166
HYV paddy (early)	6	2.5	1.2	1.3	0.16	68	32	36
Subtotal	26	12.7	5.2	7.5	0.70	343	141	202
Vegetable	0	0.0	0.0	0.0	0.00	0	0	0
Maize	1	0.6	0.2	0.4	0.03	15	4	11
Subtotal	1	0.6	0.2	0.4	0.03	15	4	11
Total	27	13.3	5.4	7.9	0.73	358	145	213
Incremental								
Paddy	(2)	12.9	3.8	-7.5	(0.05)	348	104	244
Vegetables	1	5.1	0.5	4.6	0.03	138	15	124
Other diversified crops	1	1.8	0.5	1.3	0.03	49	13	36
Total	0	19.8	4.9	-7.9	0.00	535	131	404

Average farm size (paddy) Total: 1.15 ha/family

4 Trapeang Snao PDP Irrigable area: 0.066 ha/family

	Project area (million Riel)				Average farm size family (1,000 Riel)			
	Planted area (ha)	Gross income	Production cost	Net return	Planted area (ha)	Gross income	Production cost	Net return
Proposed (With-project)								
Local paddy (medium)	0.00	0.0	0.0	0.0	0.000	0	0	0
HYV paddy (early)	0.00	0.0	0.0	0.0	0.000	0	0	0
Subtotal	0.00	0.0	0.0	0.0	0.000	0	0	0
Vegetable	3.74	19.1	2.0	17.1	0.043	218	23	194
Groundnut	0.93	1.0	0.4	0.7	0.011	12	4	8
Soybean/Mung-bean	0.93	1.1	0.3	0.8	0.011	13	3	9
Mung-bean	0.93	1.3	0.3	1.0	0.011	15	3	12
Sesame	0.93	1.4	0.2	1.2	0.011	15	2	13
Subtotal	7.46	24.0	3.2	20.8	0.085	272	36	236
Total	7.46	24.0	3.2	20.8	0.085	272	36	236
Present (Without-project)								
Local paddy (medium)	4.95	2.5	1.0	1.5	0.056	29	11	17
HYV paddy (early)	0.58	0.2	0.1	0.1	0.007	3	1	1
Subtotal	5.53	2.8	1.1	1.6	0.063	31	13	19
Vegetable	0.05	0.1	0.0	0.1	0.001	2	0	1
Maize	0.00	0.0	0.0	0.0	0.000	0	0	0
Groundnut	0.00	0.0	0.0	0.0	0.000	0	0	0
Soybean/Mung-bean	0.00	0.0	0.0	0.0	0.000	0	0	0
Mung-bean	0.05	0.0	0.0	0.0	0.001	0	0	0
Sesame	0.00	0.0	0.0	0.0	0.000	0	0	0
Subtotal	0.10	0.2	0.0	0.1	0.001	2	0	2
Total	5.63	2.9	1.1	1.8	0.064	33	13	20
Incremental								
Paddy	(5.53)	-2.8	-1.1	-1.6	-0.063	(31)	(13)	(19)
Vegetables	3.69	19.0	2.0	17.0	0.042	216	23	193
Other diversified crop	3.67	4.8	1.1	3.7	0.042	55	13	42
Total	1.83	21.0	2.0	19.0	0.021	239	23	216

Table IV-5.2.1 Requirement of VEWs and FFSs

	USP	Ang160 SRP	Kim Sei SRP	PDP
Beneficiaries	4,020	130	37	88
FWUG	72	1 *1	1 *1	1 *2
Irrigable area (ha)	3,500	25	27	5.8
Villages concerned	32	1	1	1
Requirements of VEWs				
Paddy	120	3	2	-
Vegetables/div, crops	120	3	2	5 *3
Requirement of FFS				
Paddy	4	(1) *4	(1) *4	(1) *4
Vegetables/div. crops	4	(1) *4	(1) *4	(1) *4
Paddy seed production *5	1	-	-	-

Note *1: FWUC
*2: Pond User Group (PUG)
*3: 2 VEWs for 1st stage and 3 VEWs for 2nd stage, 5 VEWs in total.
*4: FFS will be held together with neighboring villages
*5: FFS for seed production farmers group of about 30 members

Table IV-5.2.2 Proposed Annual Number of Demonstration Plots

	Paddy		Vegetables / Div. crops		Total *	Construction year
	Local Variety	HYV	Rainy season	Dry season		
USP	12	12	12	12	48	Paddy: 12, Vegetable: 6
Ang160 SRP	1	1	1	1	4	Paddy: 2, Vegetable: 0
Kim Sei SRP	1	1	-	1	3	Paddy: 2, Vegetable: 1
PDP	-	-	1	1	2	Paddy: 0, Vegetable: 2

Note *: Total plots of USP, Ang160 SRP, and PDP will be reduced to 18, 3 and 0 plots, respectively

Table IV-5.2.3 Implementation Schedule and Cost of Extension Activit

Implementation Schedule

1 USP

Stage	2005 Construction	2006 Production 1	2007 Production 2	2008 Production 3	2009 Production 4
FFS (Sessions)					
Paddy	(2)	(2)			
Vegetables/Diversified crops	(1)	(2)	(1)		
Paddy seed production		(1)			
Demonstration Plot					
Paddy (Local and HYV)	(12)	(24)	(24)	(24)	
Vegetables/Diversified crops	(6)	(12)	(12) (12)	(12) (12)	(12)

2 Ang161 SRP

Stage	2002 Construction	2003 Production 1	2004 Production 2	2005 Production 3	2006 Production 4
FFS (Persons participated)					
Paddy	(1)				
Vegetables/Diversified crops	(1)				
Demonstration Plot					
Paddy (Local and HYV)	(2)	(2)	(2)	(2)	
Vegetables/Diversified crops	(1)	(1) (1)	(1) (1)	(1) (1)	(1)

3 Kim Sei SRP

Stage	2003 Construction	2004 Production 1	2005 Production 2	2006 Production 3	2007 Production 4
FFS (Persons participated)					
Paddy	(1)				
Vegetables/Diversified crops	(1)				
Demo-plot					
Paddy (Local and HYV)	(2)	(2)	(2)	(2)	
Vegetables/Diversified crops	(1)	(1)	(1)	(1)	

4 Tr. Snao PDP

Stage	2002 Stage-1	2003 Stage-1	2004 Stage-1	2005 Stage-2	2006 Stage-2
FFS (Persons participated)					
Vegetables/Diversified crops	(1)		(1)		
Demonstration Plot					
Vegetables/Diversified crops		(1) (1)	(1) (1)	(1) (1)	

Cost Estimation (Unit: Riel 1000)

	USP	Ang160 SRP	Kim Sei SRP	PDP	Total
FFS *1					
Quantity	(session)	(person)	(person)	(person)	(person)
Paddy	4	3	2	0	125
Vegetables/Diversified crop	4	3	2	5	128
Seed production	1	0	0	0	30
Total	9	6	4	5	283
Unit cost *2	5,120	170.7	170.7	170.7	
Cost	46,080	1,024	683	854	48,641
Demo-plot					
Quantity	(plot)	(plot)	(plot)	(plot)	(plot)
Paddy	84	8	8	0	100
Vegetables/Diversified crop	78	7	4	6	95
Unit Cost	*3	*3	*3		
Paddy	177	177	177	*4	
Vegetables/Diversified crop	191	191	191	161	
Cost					
Paddy	14,868	1,416	1,416	0	17,700
Vegetables/Diversified crop	14,898	1,337	764	966	17,965
Total	29,766	2,753	2,180	966	35,665
Total	75,846	3,777	2,863	1,820	84,306

Note *1: 30 participants per FFS sessio
*2: FFS cost includes Trainer cost and material / venue expens
*3: Demo-plot cost includes input and per diem for monitoring and technical guidance by DA
*4: Per diem for monitoring and technical guidance by DAFF for PD

Table IV-5.4.1 Duties of Respective Positions of FWUC

APEX Committee

Chair man & vice-chairman: responsible for management of FWUC
Secretary: responsible for administrative matter and general affairs of FWUC

Accounting and Administration Unit

Accountant : responsible for accounting, management of collected ISF, and credit service only for the weak
Guard: responsible for security of Apex office and marketing facilities and equipment
Cleaner : responsible for cleaning of office and related area

Marketing Unit

Manager: responsible for marketing and distribution of ISF paddy and diversified crops
Accountant : responsible for accounting and marketing /distribution of marketing unit
Marketing coordinator: responsible for marketing /distribution between the unit and buyers/middlemen
Inspector : responsible for checking and recording assembling / shipping product quantity and the quality
Driver: responsible for transportation of crops and O & M of trucks
Cleaner : responsible for cleaning of office and marketing facilities

O & M Unit

Technician : responsible for maintenance of irrigation facilities of the USP, and monitoring & evaluation
SO : responsible for operation of reservoirs and main canal

Dispute resolution Unit

Dispute coordinator: responsible for resolution of dispute

SC FWUC

Chairman : responsible for O & M of secondary canal, its tertiary canals and their water courses
Vice-chairman : responsible for O & M of secondary canal, its tertiary canals and their water courses
Accountant : responsible for accounting of SC FWUC, management of collected ISF from SC FWUC, and credit service only for the weak
Warehouse manager : responsible for management of warehouse (depot)
SO : responsible for operation of secondary canal and demo-plot.
Cleaner : responsible for cleaning of office and warehouse (depot)

FWUG

FO: responsible for O & M of tertiary canal, collection/ reporting of farmers information and opinion, operation of Demo-plot, and monitoring & evaluation

Table IV-5.4.2 Annual O&M Costs of FWUC for the USP

Annual Personnel Expenses of FWUC

Designation		Unit	Quantity		Unit rate	Amount	Remarks
				M/M	R. 1,000	R. 1,000	
Apex. Commi.	Chairman	Person	1	1	120	120	1 month / Year
	Vice Chairman	Person	1	2	120	240	2 months / Year
	Secretary	Person	1	12	120	1,440	
	Accountant	Person	1	12	120	1,440	
	Technician	Person	2	24	100	2,400	
	Dispute Coordinator	Person	1	3	100	300	3 months/Year
	Scheme Operator(SO)	Person	2	24	80	1,920	
	Driver	Person	1	12	80	960	
	Guard	Person	1	12	80	960	
	Cleaner	Person	1	12	40	480	
	Sub-total		**12**	**114**		**10,260**	
6 SC FWUCs	Chairman	Person	5	5	120	600	1 month / Year
	Vice Chairman	Person	5	10	120	1,200	2 months / Year
	Accountant	Person	6	72	120	8,640	
	Scheme Operator(SO)	Person	6	72	80	5,760	
	Farmer Organizers(FO)	Person	72	864	80	69,120	
	Warehouse Manager	Person	6	36	60	2,160	
	Cleaner	Person	6	36	40	1,440	Part time services
	Sub-total		**106**	**1095**		**88,920**	
	Total					**99,180**	
Marketing Unit	Manager (Marketing Unit)	Person	1	12	120	1,440	
	Markeing Coordinator	Person	1	12	100	1,200	
	Accountant	Person	1	12	120	1,440	
	Inspectors	Person	2	24	100	2,400	
	Driver	Person	2	24	80	1,920	First 4years:0
	Cleaner	Person	2	24	40	960	Part time services
	Sub-total					**9,360**	
	Grand Total					**108,540**	

Notes: Chairman and Vice-chairman for Apex Committee are selected from among 6 FWUCs.
Annual personnel expenses of marketing unit for stage 1 is Riel 7.44 million, and
that for stage 2 is Riel 9.36 million.

Annual Running Costs of FWUC

Designation		Unit	Q'ty	Unit rate	Amount	Remarks
				R.1,000	R.1,000	
Apex. Commi.	Office Expenses					
	Stationaries	LS/month	12	40	480	
	Meeting	LS/month	4	200	800	4 times / Year
	Consumsbles	LS/month	12	40	480	
	Fuel for Equipment				0	
	Generator(Diesel)	Day	280	16	4,480	10 l/day
	Car (Diesel)	Car/Day	280	8	2,240	5 l/day
	Motor Bike (Gasoline)	Car/Day	560	6.6	3,696	3 l/day/Unit
	Spare Parts					2 % of Equip. Cost
	Generator	2 %/year	1	200	200	
	Car (Pick-up)	2 %/year	1	1,600	1,600	
	Motor Bike	2 %/year	2	96	192	
	Maintenance Cost of Reservoirs and Main Canal					
		Ha	3,500	4	14,000	
	Sub-total				**28,168**	
6 SC FWUCs	Office Expenses					
	Stationaries	LS/month	72	40	2,880	
	Meeting	LS/month	24	200	4,800	4 times/year
	Consumsbles	LS/month	72	40	2,880	
	Fuel for Equipment					
	Motor Bike (Gasoline)	Car/Day	1,680	6.6	11,088	3 l/day/Unit
	Spare Parts					2% of Equip. Cost
	Motor Bike	2 %/year	6	96	576	
	Maintenance Cost of Secondary to On-farm canals					
		Ha	3,500	4	14,000	
	Sub-total				**36,224**	
	Total				**64,392**	
Marketing Unit	Office Expenses/Consumables				1,440	
	Fuel for Equipment					
	Generator(Diesel)	Day	280	16	4,480	
	Truck				12,000	
	Repair/spare parts				1,200	
	Entrance charge				920	
	Sub-total				**20,040**	
	Grand Total				**84,432**	(R. 1,000)

Note: O&M costs of marketing unit for stage 1 and stage 2 are Riel 5.92 million and Riel 20.04 million ,respectively.

Table IV-5.5.1 Training Subjects to Project Office

(1) FWUC and Its Formation
- Trainees: 13 in total
- Training subjects:
  - Irrigation plan
  - FWUC and its objectives and organization
  - FWUC formation process
  - Responsibility / duty and right, etc.

(2) On-farm Development
- Trainees: 13 in total
- Training subjects:
  - Tertiary unit and construction of tertiary canals and water courses
  - Land acquisition
  - Member list and cadaster
  - O & M of on-farm facilities, etc.

(3) Management Course
- Trainees: 13 in total
- Training subjects:
  - FWUC and formation process of FWUC
  - Organization management
  - ISF, revenue and expense of FWUC
  - Dispute resolution, etc.
  - Accounting (bank account, cash book, accounting book, etc.)
  - Budgeting (ISF, revenue and expense of FWUC), etc.

(4) O & M of Irrigation Facilities
- Trainees: 4 in total
- Training main subjects:
  - Irrigation plan of the USP
  - Water management at reservoir, main canal, and secondary canal, tertiary canal and water course levels
  - Maintenance work including repair work
  - Preparation of annual water distribution schedule
  - ISF and cost for O & M, etc.

(5) Marketing Course
- Trainees: 13 in total
- Training main subjects:
  - ISF, revenue an expense of FWUC
  - Free market policy of Cambodia
  - Marketing and distribution of paddy and diversified crops
  - Crop quality and market price
  - Preparation of marketing program for FWUC
  - Statistics and data processing, etc.

(6) Farming Practice
- Trainees: 6 in total
- Training main subjects:
  - Irrigation to diversified crops
  - Water management at on farm level
  - Crop quality and market price, etc.

Table IV-5.5.2 Training Subjects to Farmers and FWUC

(1) FWUC and Its Formation
- Trainees: 4,020 in total
- Actual Period of Training: 1 day x 64 times (63 persons / one time)
- Training subjects:
    - Irrigation plan
    - FWUC and its objectives and organization
    - FWUC formation process
    - Responsibility / duty and right, etc.

(2) On-farm Development Course
- Trainees: 72 FOs: 72 in total
- Actual Period of Training: 2 days x 18 times (4 persons / one time)
- Training subjects:
    - Tertiary unit and construction of tertiary canals and water courses
    - Land acquisition
    - Member list and cadaster
    - O & M of on-farm facilities, etc.

(3) Management Course
- Trainees: 12 chairmen / vice-chairmen of 6 SC FWUCs, one secretary, 8 accountants, one dispute coordinator: 22 in total
- Actual Period of Training: 2 days x 5 times (22 persons / one time)
- Training subjects :
    - FWUC and formation process of FWUC
    - Organization management
    - ISF, revenue and expense of FWUC
    - Dispute resolution, etc.
    - Accounting (bank account, cash book, accounting book, etc.)
    - Budgeting (ISF, revenue and expense of FWUC), etc.

(4) O & M of Irrigation Facilities Course
- Trainees: 8 SOs, 72 FOs and two technicians: 82 in total
- Actual Period of Training: 3 days x 4 times (21 persons / one time)
- Training main subjects:
    - Irrigation plan of the USP
    - Water management at reservoir, main canal, secondary canal, tertiary canal and water course levels
    - Maintenance work including repair work
    - Preparation of annual water distribution schedule
    - ISF and cost for O & M, etc.

(5) Marketing Course
- Trainees: one marketing unit manager, one marketing coordinator, two product inspectors and 6 warehouse managers : 10 in total
- Actual Period of Training: 2 days x 5 times (10 persons / one time))
- Training main subjects:
    - ISF, revenue an expense of FWUC
    - Free market policy of Cambodia
    - Marketing and distribution of paddy and diversified crops
    - Crop quality and market price
    - Preparation of marketing program for FWUC
    - Statistics and data processing, etc.

(6) Farmer Training Course
- Trainees: 120 leader farmers in total
- Actual Period of Training: 2 days x 6 times (20 persons / one time)
- Training main subjects:
    - Irrigation to diversified crops
    - Water management at on farm level
    - Crop quality and market price, etc.

Table IV-5.5.3 Design Matrix for Institutional Development and Capacity Building Program for Formation and Operation of FWUC, USP

Target Group: Farmers in USP **Implementation Period: 6 years**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
Overall Goal			
Increase in farm income.			
Purpose of Program			
Increase in agricultural product amount in the Study Area.	Production of paddy increases by 100 % and diversified cropping area reaches 500 ha in dry season.	Yield measurement and planting records	Crop prices are not lowered. Extreme drought does not occur.
Outputs			
1 FWUC is established.	Most of farmers become a member of FWUC. FWUC is registered.	Cadaster, certificate of registration, and approved statute	
2-1 Irrigation water is distributed to the end of field.	Yield of paddy is maintained high and diversified cropping area reaches 500 ha in dry season.	Planting records	
2-2 FWUC is managed and administered well.	Unit ISF is eqaul to or more than planned value. Collection rate of ISF reaches 70%.	Receiving slips and account books	
2-3 Irrigation facilities function well and irrigation water is distributed well through irrigation water conveyance system.	Actual discharge is kept within the error of 20% of scheduled discharge.	Discharge measurement records and water distribution schedules	
2-4 Selling of paddy and diversified crops goes well.	Stored paddy volume is not over the design capacity of store house. Commission for selling and buying reaches Riel 90 million.	Records in warehouses of SC FWUCs and Assumbling/Shipping Facility, and annual acounting report	
2-5 Paddy and diversified crop production increases and be stable.	Production of paddy increases by 100 % and diversified cropping area reaches 500 ha in dry season.	Yield measurement and planting records	
Project Activities		**Inputs**	
1 **Activities for FWUC Formation** (Process & schedule, see Fig.IV-5.4.2 & 5.4.3)	**Activities of Experts** (Training subjects, See Table IV-5.5.1&2)		
1-1 Create farmers awareness and elect a coordinator in each tertiary unit.	Prepare implementation program and guideline for FWUC formation	Experts: FWUC expert, Irrigation O&M expert, on-farm development expert, senior accountant, legal officer, marketing expert, senior agronomist	Rehabilitation and reconstruction works of irrigation facilities and rural roads are carried out in parallel to this program.
1-2,3 Establish FWUG with election of farmer organizer (FO) and prepare cadaster in each tertiary unit.	Conduct on-the-job training to the project office staff and FWUC staff		
1-4 Establish SC FWUCs and elect SC FWUC committee members by Fos.		The project office: Project manager, FWUC formation staff, agricultural extension expert, water management staff, maintenance staff, irrigation facilities design staff, administration staff.	
1-5,6 Form Apex committee and prepare statute. Manage farmers participation in construction works.	Supervise the progress of FWUC formation and farmers participation to construction works.		
1-7,8 Register FWUC.			
2 **Activities of FWUC and the Project Office (See Table IV-5.4.1 Duties)**			
2-1 Survey, design and construct on-farm facilities.	Prepare guideline for on-farm development and conduct on-the-job training.	Office: (i) project office cum FWUC office including lecture rooms and seminar rooms and assembling and shipping facilities (**see Fig.IV-6.1.1**), and (ii) 6 SC FWUC offices and depots.	
2-2 FWUC management and administration	Prepare manual for institutional management, ISF collection, accounting, budgeting, procurement, etc. and conduct on-the-job training.		MOWRAM, MRD and MAFF fully cooperate.
2-3-1 Prepare irrigation schedule, operation program and maintenance and repairing program.	Prepare manual for O&M of irrigation facilities and conduct training.		
2-3-2 Operate irrigation facilities and maintain and repair facilities.	Conduct on-the-job training.		**Pre-Conditions**
2-4 Sell paddy collected as ISF and provide marketing assistance to members.	Prepare guidelines for marketing and conduct on-the-job training.	Equipment: a generator, computers, and a copy machine, and other office equipment and tools, and a pick-up truck, two trucks and motorbikes.	Farmers agree to this program.
2-5-1 Prepare farming plan with member farmers.	Prepare manual for farming practices and farming plan.		Village and commune chiefs cooperate with farmers on this program.
2-5-2 Guide farmers to learn improved farming practise in Demo-plot.	Conduct on-the-job training.		
2-6 Conduct monitoring and evaluation (M&E) agriculture production.	Train on M&E methods.		

Table IV-5.6.1 Estimated Cost for Environmental Conservation Program

Program	Unit	Cost	Remark
1. Environmental Monitoring against Human-health Hazard			
Water quality analysis during construction stage	US$/year	3,744	twice a year, 16 samples/time, (dry and rainy seasons)
Water quality analysis after construction	US$/year	1,872	once a year, 16 samples/time (rainy season)
2. Affected Households Assistance			
Compensation (cultivated land expropriation)	L.S. (US$)	23,000	for users of entitled property, 23 ha
Displacement allowance (house relocation)	L.S. (US$)	26,800	for users of non-entitled property (Tumnup Lok: 20 houses, Kpob Trobek: 47 houses)
3. Remuneration			
Professional assigned during construction stage	US$/year	1,320	6 months/year, 220 US$/month*
Professional after completion	US$/year	780	3 months/year, 260 US$/month*
			*: Included in administration costs

Note: The office cost and administrative cost is not included.
Base data for estimating above are as of 2001.

Table IV-6.3.1 Project Cost for Upper Slakou River Irrigation Reconstruction Pla
(Feasibility Study)

(Unit : Million Riel)

Work Item	Financial Cost			Cost of US$*	Per ha Cost (US$/ha)
	F/C	L/C	Total		
I. Preparatory Works	2,484.9	846.3	3,331.2	828,000	237
II. Direct Construction Cost					
1) Tumnup Lok Reservoi	5,000.8	2,216.2	7,217.0	1,794,000	513
2) Diversion Canal	5,401.4	2,120.6	7,522.0	1,870,000	534
3) Kpob Trobek Reservoir	4,976.3	2,196.6	7,172.9	1,783,000	509
4) Main Canal	2,203.0	1,002.3	3,205.3	797,000	228
5) Secondary Canal	11,300.8	5,789.6	17,090.4	4,249,000	1,214
6) Tertiary Development	1,452.0	687.1	2,139.1	532,000	152
7) Building Works	299.2	225.6	524.8	130,000	37
Sub-total	30,633.5	14,238.0	44,871.5	11,156,000	3,187
III. O&M Equipment					
1) Project Office	151.6	3.6	155.2	39,000	11
2) FWUCs	2.2	6.7	8.9	2,000	1
3) Building Works	2.9	0.0	2.9	1,000	0
Sub-total	156.7	10.3	167.0	42,000	12
IV. Institutional Developmen	666.9	1,760.8	2,427.7	604,000	173
V. Relocation and Land Compensation Cos					
1) Land Compensatior	0.0	92.5	92.5	23,000	7
2) House Relocation	3.3	104.5	107.8	27,000	8
Sub-total	3.3	197.0	200.3	50,000	15
VI. Administration Cos	155.7	824.3	980.0	244,000	70
VII. Consulting Services					
1) Design & Construction Supervisio	4,256.2	563.9	4,820.1	1,198,000	342
2) Institutional Development & Capacity Buildin	7,665.5	59.6	7,725.1	1,921,000	549
Sub-total	11,921.7	623.5	12,545.2	3,119,000	891
Total (I VII)	46,022.7	18,500.2	64,522.9	16,042,000	4,583
VIII. Contingencies					
1) Physical Contingency 10% of (I VII)	4,602.3	1,850.0	6,452.3	1,604,000	458
2) Price Escalation**	3,755.7	1,893.7	5,649.4	1,405,000	401
Sub-total	8,358.0	3,743.7	12,101.7	3,009,000	859
IX. Grand Total	54,380.7	22,243.9	76,624.6	19,050,000	5,443

Note * : Exchange rate ; Riel 4,022.20/US
** : Price escalation rate; 2.5% per annum for foreign currency portion and 3.0% per annum for local currency por

Table IV-6.3.2 Annual Disbursement of Upper Slakou Irrigation Reconstruction Pla

(Unit : Million Riel)

Work Item	2002	2003	2004	2005	2006	2007	2008	2009	Total
I. Preparatory Works	0	3,331.2	0	0	0	0	0	0	3,331.2
II. Direct Construction Cost									
1) Tumnup Lok Reservoi	0	721.7	2,165.1	4,330.2	0	0	0	0	7,217.0
2) Diversion Canal	0	1,504.4	6,017.6	0	0	0	0	0	7,522.0
3) Kpob Trobek Reservoi	0	717.2	2,151.9	4,303.8	0	0	0	0	7,172.9
4) Main Canal	0	641.1	2,564.2	0	0	0	0	0	3,205.3
5) Secondary Canal	0	1,709.1	5,127.0	10,254.3	0	0	0	0	17,090.4
6) Tertiary Development	0	0	855.6	1,283.5	0	0	0	0	2,139.1
7) Building Works	524.8	0	0	0	0	0	0	0	524.8
Sub-Total	524.8	5,293.5	18,881.4	20,171.8	0	0	0	0	44,871.5
III. O&M Equipment									
1) Project Office	155.2	0	0	0	0	0	0	0	155.2
2) FWUCs	6.7	0	2.2	0	0	0	0	0	8.9
3) Marketing Assistance Facilitie	0	0	0	2.9	0	0	0	0	2.9
Sub-Total	161.9	0	2.2	2.9	0	0	0	0	167.0
IV. Institutional Developmen	648.5	173.8	173.8	367.8	614.6	449.2	0	0	2,427.7
V. Relocation and Land Compensation Cos									
1) Land Compensatio	74.0	18.5	0	0	0	0	0	0	92.5
2) House Relocatio	86.2	21.6	0	0	0	0	0	0	107.8
Sub-Total	160.2	40.1	0	0	0	0	0	0	200.3
VI. Administration Cos	173.5	173.5	188.6	207.3	84.5	53.8	53.8	45.0	980.0
VII. Consulting Service									
1) Design and Construction Supervisio	964.0	1,205.1	1,446.1	1,204.9	0	0	0	0	4,820.1
2) Institutional Development & Capacity Buildin	2,313.3	479.0	563.5	816.9	3,499.7	52.7	0	0	7,725.1
Sub-Total	3,277.3	1,684.1	2,009.6	2,021.8	3,499.7	52.7	0	0	12,545.2
Total (I□VII)	4,946.2	10,696.2	21,255.6	22,771.6	4,198.8	555.7	53.8	45.0	64,522.9
VIII. Contingencies									
1) Physical Contingency	494.6	1,069.6	2,125.6	2,277.2	419.9	55.6	5.3	4.5	6,452.3
2) Price Escalation	128.7	571.4	1,733.7	2,519.0	568.5	104.0	12.2	11.9	5,649.4
Sub-Total	623.3	1,641.0	3,859.3	4,796.2	988.4	159.6	17.5	16.4	12,101.7
IX. Grandnd Total (I□VIII)	5,569.5	12,337.2	25,114.9	27,567.8	5,187.2	715.3	71.3	61.4	76,624.6

Table IV-6.3.3 Project Cost of Small Reservoir Rehabilitation Plan (Feasibility Study)

(Unit : Thousand Riel)

Description	Ang 160 SRP			Kim Sei SRP			Total
	F/C	L/C	Sub-total	F/C	L/C	Sub-total	
1) Preparatory Works	43,613	12,698	56,311	1,560	451	2,011	58,322
2) Direct Construction Cost	78,606	38,629	117,235	128,775	60,522	189,297	306,532
3) Institutional Developmen	754	3,680	4,434	599	2,923	3,522	7,956
4) Administration Cost	672	2,385	3,057	672	2,385	3,057	6,114
5) Engineering Services	3,524	13,833	17,357	3,885	15,244	19,129	36,486
Sub-total	127,169	71,225	198,394	135,491	81,525	217,016	415,410
6) Contingencies	15,919	9,393	25,312	20,426	13,219	33,645	58,957
Total	143,088	80,618	223,706	155,917	94,744	250,661	474,367

Table IV-6.3.4 Annual Disbursement Schedule of Small Reservoir Rehabilitation Plan

(Unit : Thousand Riel)

Description	2002	2003	2004	2005	2006	Total
I. Ang 160 SRP						
1) Preparatory Works	56,311	0	0	0	0	56,311
2) Direct Construction Cost	117,235	0	0	0	0	117,235
3) Institutional Developmen	1,534	1,436	732	732	0	4,434
4) Administration Cost	3,057	0	0	0	0	3,057
5) Engineering Services	17,357	0	0	0	0	17,357
6) Contingencies	24,782	229	139	162	0	25,312
Sub-total	220,276	1,665	871	894	0	223,706
II.Kim Sei SRP						
1) Preparatory Works	0	2,011	0	0	0	2,011
2) Direct Construction Cost	0	189,297	0	0	0	189,297
3) Institutional Developmen	0	1,363	1,075	542	542	3,522
4) Administration Cost	0	3,057	0	0	0	3,057
5) Engineering Services	0	19,129	0	0	0	19,129
6) Contingencies	0	33,182	205	120	138	33,645
Sub-total	0	248,039	1,280	662	680	250,661
Grand Total	220,276	249,704	2,151	1,556	680	474,367

Table IV-6.3.5 Project Cost of Small Pond Development Plan (Feasibility Study)

(Unit : Thousand Riel)

Description	F/C	L/C	Sub-total
1) Direct Construction Cost	78,618	48,102	126,720
2) Institutional Development	337	1,645	1,982
3) Administration Cost	362	40	402
4) Engineering Services	2,575	10,104	12,679
Sub-total	81,892	59,891	141,783
5) Contingencies	21,259	17,507	38,766
Total	103,151	77,398	180,549

Table IV-6.3.6 Annual Disbursement Schedule of Small Pond Development Plan

(Unit : Thousand Riel)

Description	2002	2003	2004	2005	2006
1) Direct Construction Cost	5,068	10,138	10,138	12,672	12,672
2) Institutional Development	169	661	320	832	0
3) Administration Cost	222	20	20	20	20
4) Engineering Services	515	1,014	1,014	1,267	1,267
5) Contingencies	760	1,836	2,111	3,155	3,392
Total	6,734	13,669	13,603	17,946	17,351

Description	2007	2008	2009	2010	2011	Total
1) Direct Construction Cost	25,344	12,672	12,672	12,672	12,672	126,720
2) Institutional Development	0	0	0	0	0	1,982
3) Administration Cost	20	20	20	20	20	402
4) Engineering Services	2,534	1,267	1,267	1,267	1,267	12,679
5) Contingencies	7,645	4,269	4,726	5,195	5,677	38,766
Total	35,543	18,228	18,685	19,154	19,636	180,549

Table IV-6.3.7 Project Cost of Rural Road Rehabilitation Program (Feasibility Study)

(Unit : Thousand Riel)

Description	F/C	L/C	Total
1) Preparatory Works	107,000	45,800	152,800
2) Direct Construction Cost	1,863,545	1,210,706	3,074,251
3) Administration Cost	7,535	26,715	34,250
4) Engineering Services	65,514	257,199	322,713
Sub-total	2,043,594	1,540,420	3,584,014
5) Contingencies	329,161	261,987	591,148
Total	2,372,755	1,802,407	4,175,162

Table IV-6.3.8 Annual Disbursement Schedule of Rural Road Rehabilitation Program

(Unit : Thousand Riel)

Description	2002	2003	2004	Total
1) Preparatory Works	0	152,800	0	152,800
2) Direct Construction Cost	0	1,690,838	1,383,413	3,074,251
3) Administration Cost	13,700	10,275	10,275	34,250
4) Engineering Services	193,627	64,543	64,543	322,713
5) Contingencies	26,741	296,891	267,516	591,148
Total	234,068	2,215,347	1,725,747	4,175,162

Table IV-8.1 Proposed Mitigation Measures and Monitoring Framework (1/2)

Program: Watershed Management
Target Area: Sub-area I
Mitigation Measures and Monitoring Framework: (1) Items to be managed a) Conservation of forest resources from uncontrolled deforestation and encroachment of forest areas; and b) Promotion of reforestation and land use control in the catchment areas. (2) Activities a) Mapping of land use and forest classification of the catchment areas; b) Zoning and identifying the areas to be protected and managed, and selecting prioritized micro-watershed; and c) Conducting the plans mentioned in Chapter II-4.9, and expansion to other identified areas. (3) Indexes to be monitored a) Land use conditions and vegetation coverage in the catchment areas; and b) Forestry activities such as logging and production. (4) Management area and monitoring stations The management and monitoring area will comprise the whole catchment areas (approx. 520km^2). (5) Monitoring period and frequency Periodic monitoring, for the time being, should be conducted at least once a year by patrolling and interview to local people.
Remark: According to Takeo Forestry Office, the upper catchment areas about from the provincial boundary are under the control of military at present. And Noreay Mountain range is granted to military from Tram Kak District in 2001 in order to prohibit the local people from entering the mountain because of UXO issue. Therefore, the above activities are proposed as long-term program, and should be included in the official plan of DOFW of MAFF.

Program: Forest Resource Conservation
Target Area: Sub-area III, V, VI to conserve Sub-area I
Mitigation Measures and Monitoring Framework: Aggressive planting to form residential forest is introduced around the villages or individual houses in the beneficiary areas of USP, SRP, and PDP, in order to reduce excessive logging and exploitation in Sub-area I. (1) Probable species to be introduced a) Firewood with fast growing: Akasya (Acacia spp.), Preng Khal (Eucalyptus spp.); b) Timber: Chhoeu Teal (Dipterocarpus spp.), Koki (Hopea spp.); and c) Fruits: Daung (Cocos nucifera), Svay (Mangifera indica). (2) Activities a) Consultation with VDCs or FGs for selection of the species to be planted; b) Procurement of nursery trees and necessary materials, and distribution to the beneficiary areas; c) Instruction of planting and nursing for VDCs/FGs in collaboration with Takeo Forestry Office; and d) Ensuring sustainability by extension to seedling production in collaboration with Takeo Forestry Office and NGOs. (3) Indexes to be monitored a) Progress of planting and nursing, and status of residential forests; and b) Products of residential forests and utilization of products. (4) Management area and monitoring stations The monitoring stations will comprise all the planted areas as residential forests. (5) Monitoring period and frequency Periodic monitoring should be conducted at least twice a year by patrolling and interview to VDCs' staffs or local people.
Remark: The technical assistance and the extension toward VDCs/FGs for planting and nursing are indispensable. It is therefore recommendable that executing agency of the priority projects prepare and implement above activities under close corporation with DOFW of MAFF, Takeo Forestry Office, and NGOs.

Table IV-8.1 Proposed Mitigation Measures and Monitoring Framework (2/2)

Program: Water-related Hazard Prevention

Target Area: Sub-area II, III, IV, V, VI

Mitigation Measures and Monitoring Framework:

(1) Items to be managed

a) Reduction of a risk of such water-borne diseases as malaria;
b) Protection of the water for drinking/domestic use from quality deterioration; and
c) Management and enhancement of fishery resources.

(2) Activities

a) Procurement and stock of minimum-hazard chemicals for extermination of mosquitoes and larvae, and spraying on the reservoirs or ponds if required;
b) Procurement and distribution of mosquito nets to households living in close proximity of reservoirs or ponds;
c) Health education for local people; and
d) Education for local people on proper fertilizing manner and on drainage water control.

(3) Indexes to be monitored

a) Condition of catching water-borne diseases and number of out-patients (*);
b) Water quality especially from the viewpoint of drinking water (*);
c) Condition of fertilizer utilization (*);
d) Condition of utilization of agricultural chemicals, if any (*); and
e) Condition of fishery activities.

(4) Management area and monitoring stations

a) Proximity areas to reservoirs or ponds in Sub-area II, V, and VI as monitoring of water-borne diseases;
b) Fixed points of water bodies in Sub-area III, IV, V, and VI as monitoring of water quality;
c) Proposed irrigation areas and beneficiaries in Sub-area III, V, and VI as monitoring of utilization of fertilizer and agricultural chemicals; and
d) Areas in/around the water bodies in Sub-area II, IV, V, and VI as monitoring of fishery activities.

(5) Monitoring period and frequency

a) The water quality monitoring should be conducted at least twice a year during the construction stage (dry season and rainy season), and at least once a year after the completion (rainy season).
b) Other monitoring works mentioned above should be conducted at least once a year.

Remark:

Most of the above activities should be prepared and implemented as a regional health project in collaboration with MOH, DOH Takeo, and NGOs. However, monitoring works marking "*" should be integrated to the priority projects for avoiding human-health hazard before it happens.

Program: Affected Households Assistance (AHA)

Target Area: Sub-area II, III, V

Mitigation Measures and Monitoring Framework:

(1) Items to be managed

a) Minimization of the negative impacts on the households whose houses will be relocated or whose land-use status will be changed; and
b) Support for attaining the land-affected households' former living standards.

(2) Approaches of mitigation measures

a) Preparation and provision of adequate compensation for land-affected households, if any, who are legal land users;
b) Preparation and provision of support and assistance scheme for land-affected households who are illegal land users in the State-owned land, in order to maintain the former living condition; and
c) Establishment of a committee, in order to facilitate development of AHA scheme including above and to realize the effectiveness of the scheme.

(3) Indexes to be monitored

a) Actual progress of AHA scheme; and
b) Socio-economic conditions and requirement of the land-affected households.

(4) Management area and monitoring stations

The management and monitoring area should include all the land-affected households.

(5) Monitoring period and frequency

The monitoring period should be settled until land-affected households achieve self-sustenance.

Remark:

The above activities are prerequisite for implementation of the priority projects, and should be developed as the environmental conservation program for the priority projects.

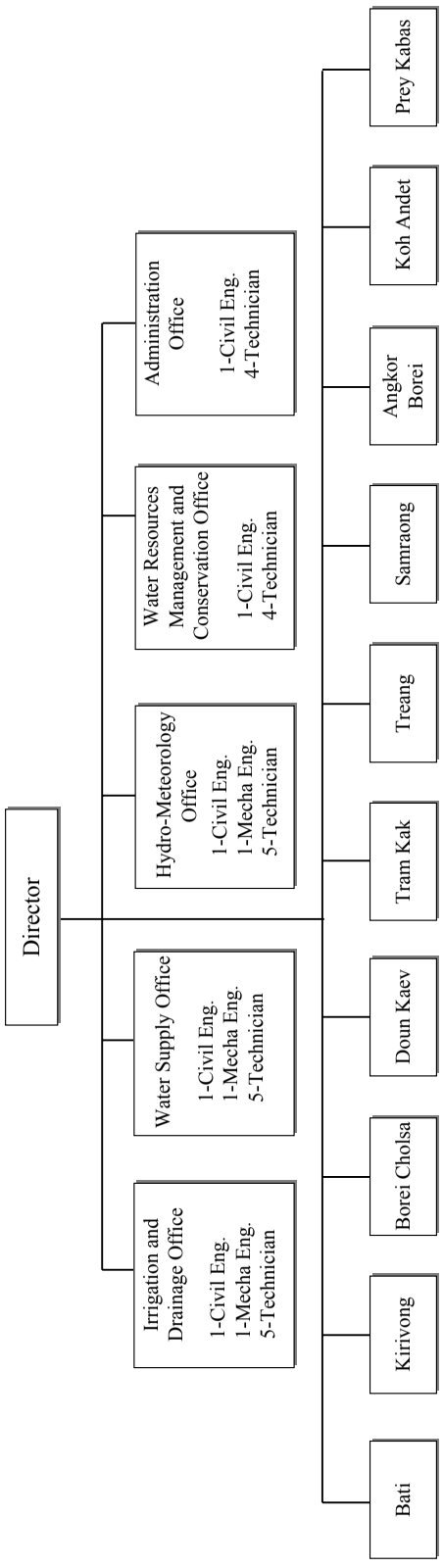
Figures

The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin,The Kingdom of Cambodia

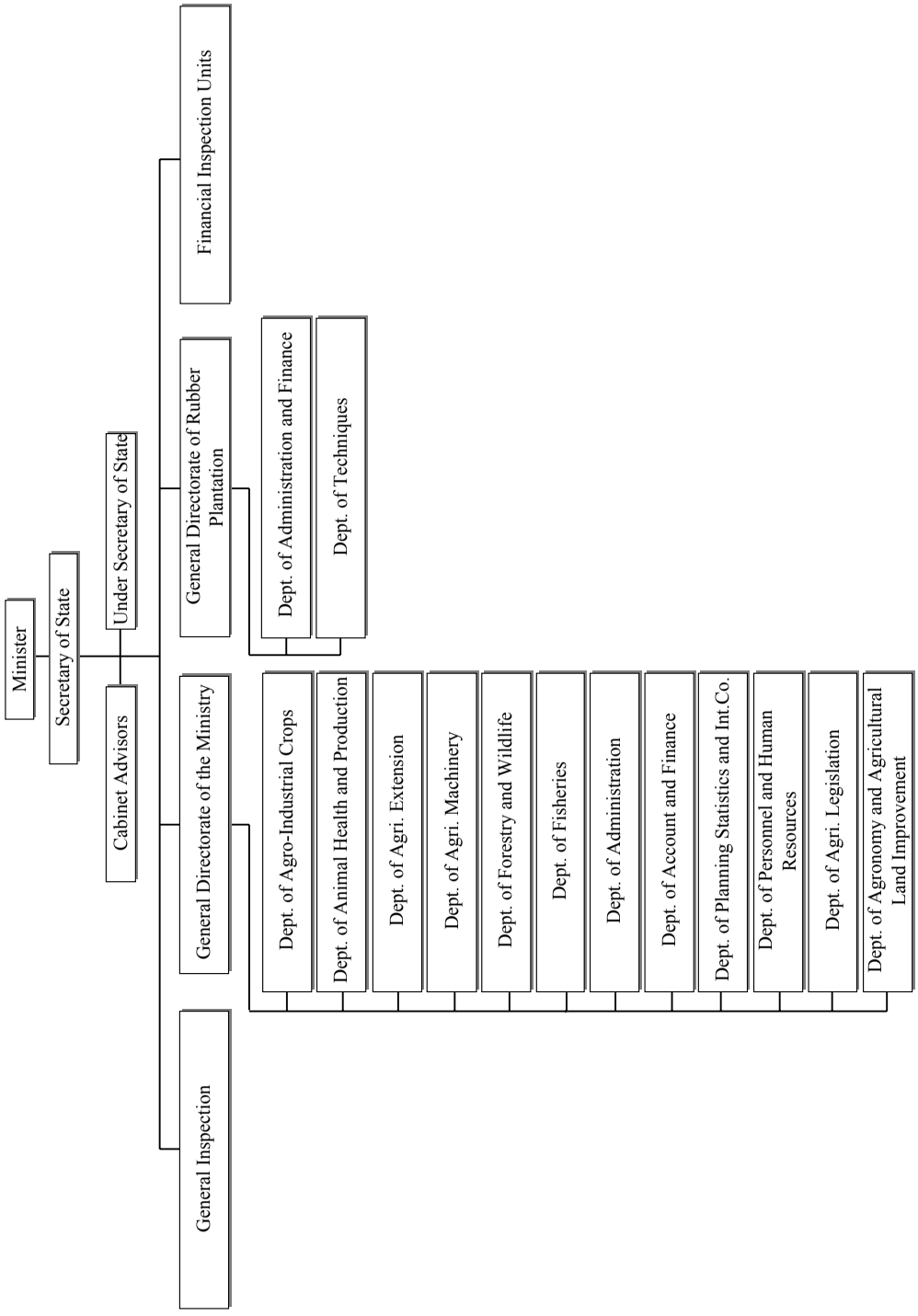
Japan International Cooperation Agency

Figure I-2.1

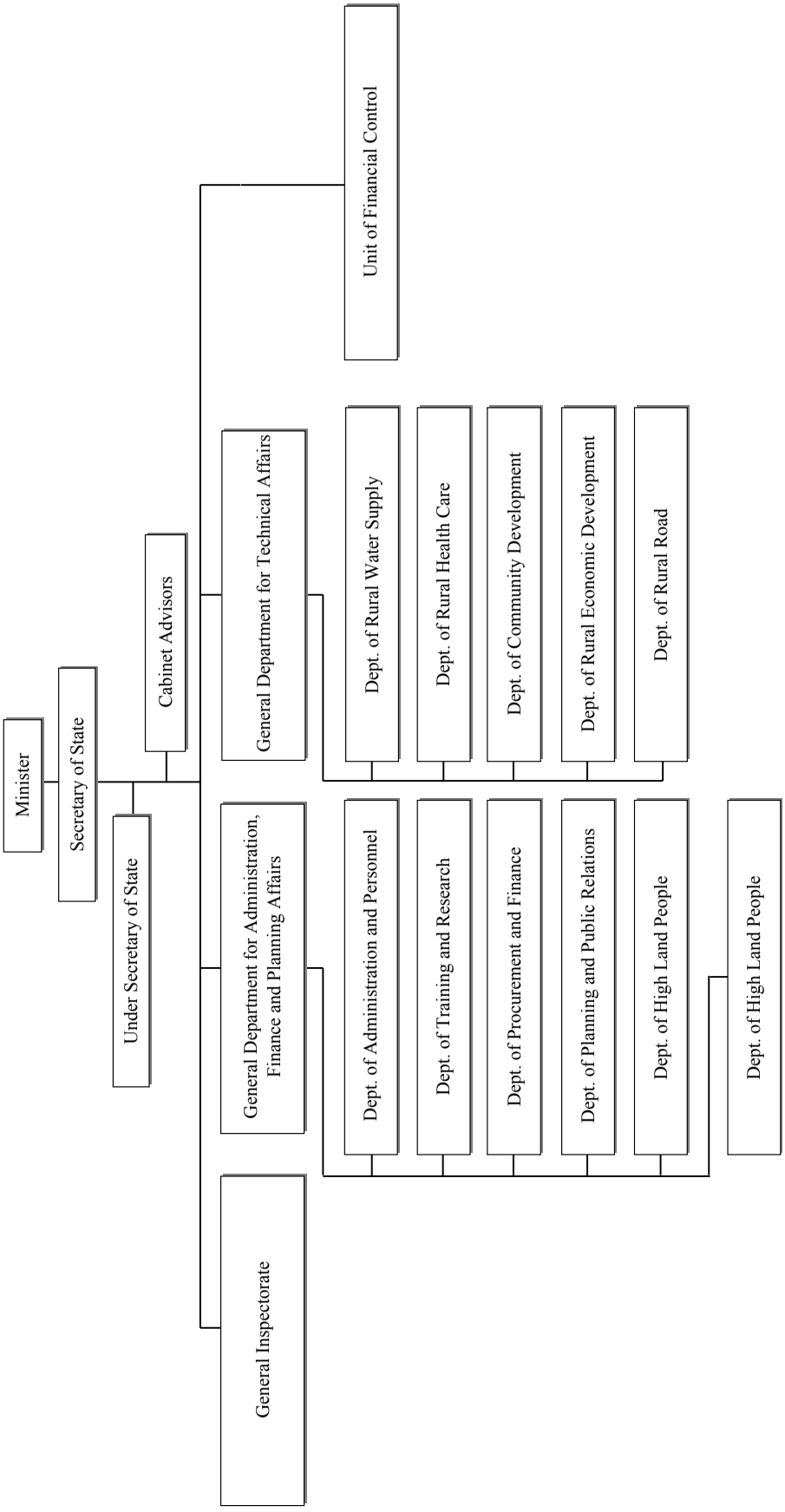
Ministry of Water Resources and Meteorology



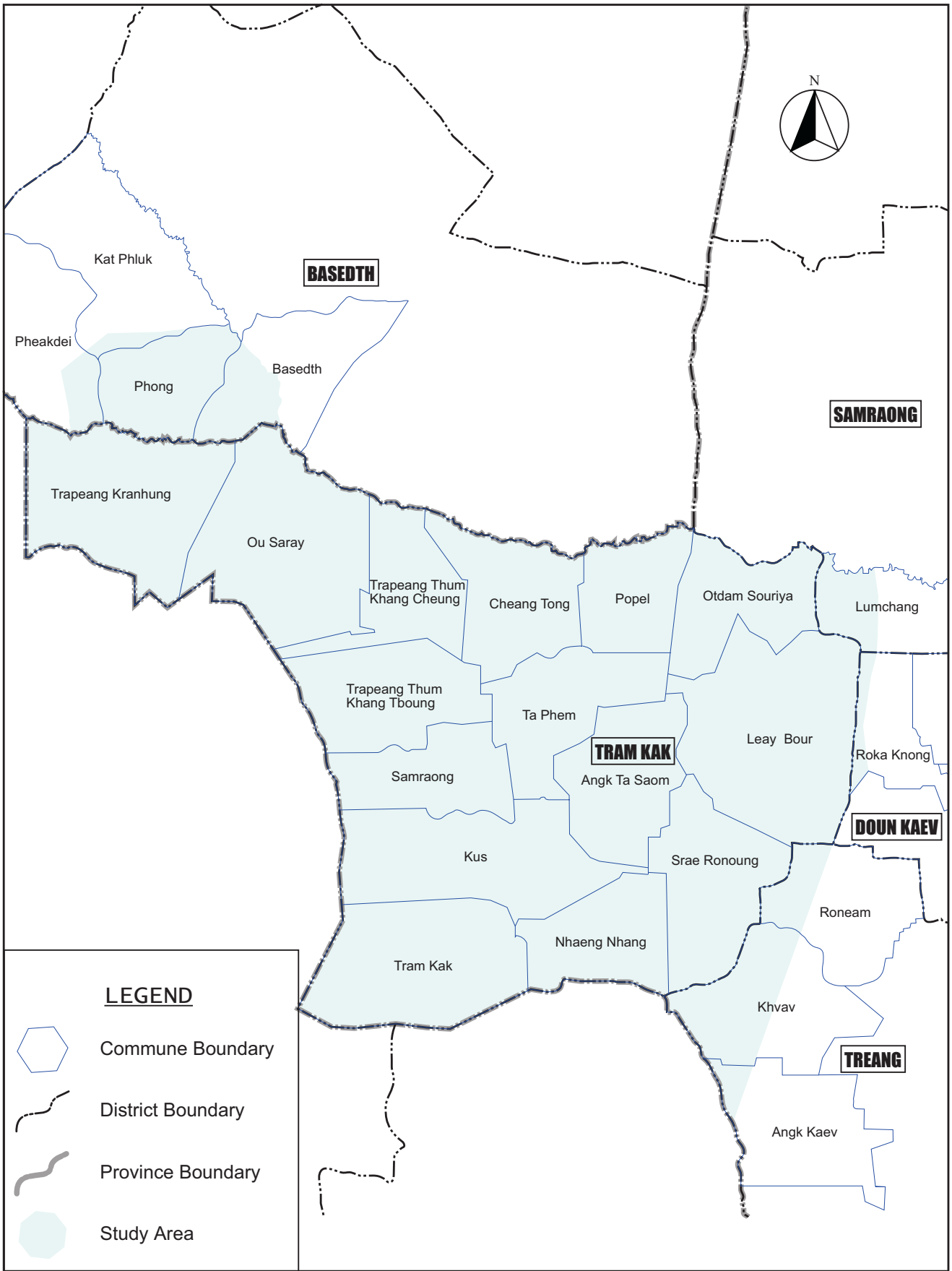
The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin,The Kingdom of Cambodia	Figure. I-2.2
Japan International Cooperation Agency	Department of Water Resources and Meteorology, Takeo



The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin,The Kingdom of Cambodia	Figure I-2.3
Japan International Cooperation Agency	Ministry of Agriculture, Forestry and Fisheries



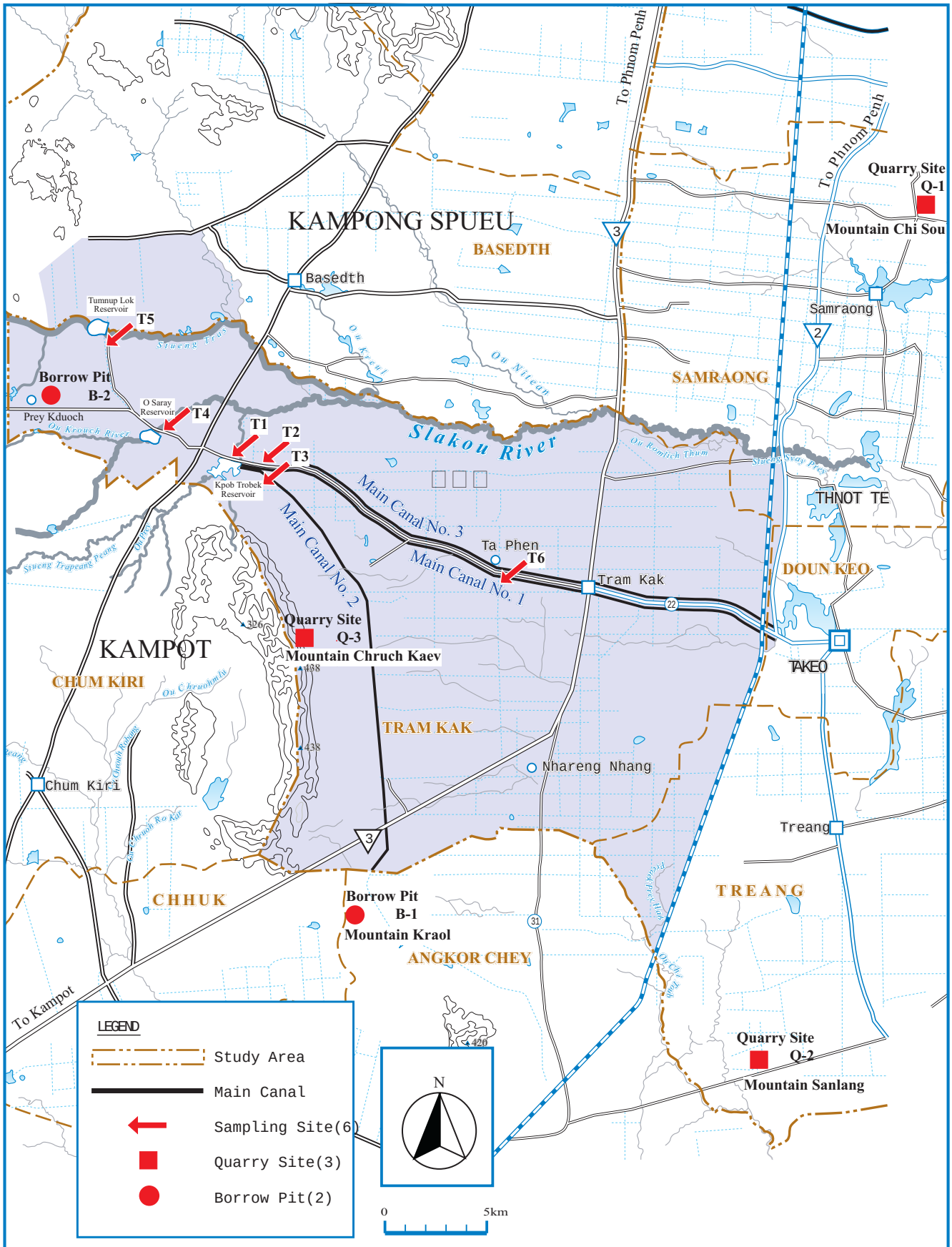
The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin,The Kingdom of Cambodia	Figure I-2.4
Japan International Cooperation Agency	Ministry of Rural Development



The Study on the Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin, The Kingdom of Cambodia

Japan International Cooperation Agency

Figure II-1.1.1
Location and Administrations in the Study Area

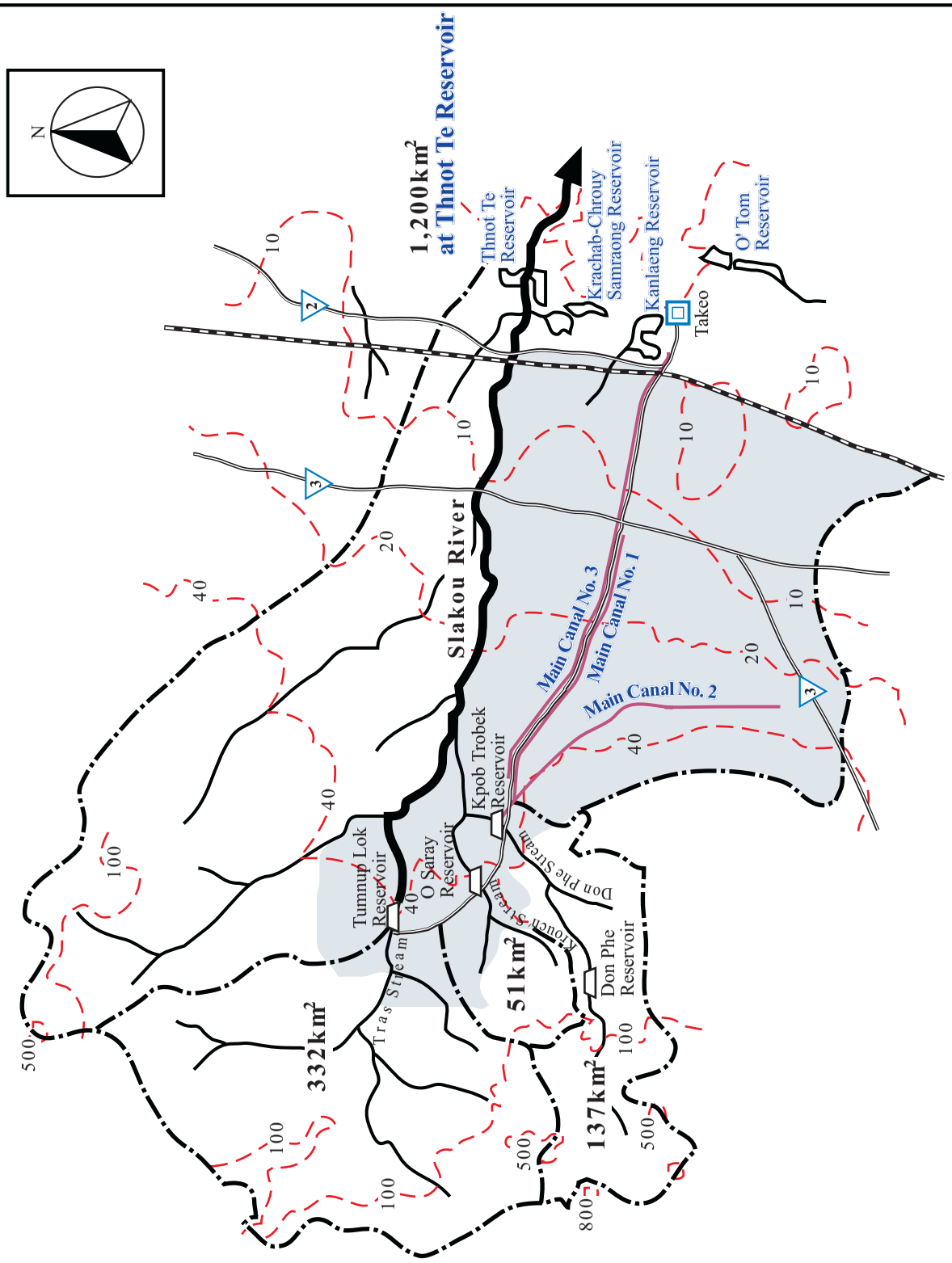


The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin, The Kingdom of Cambodia

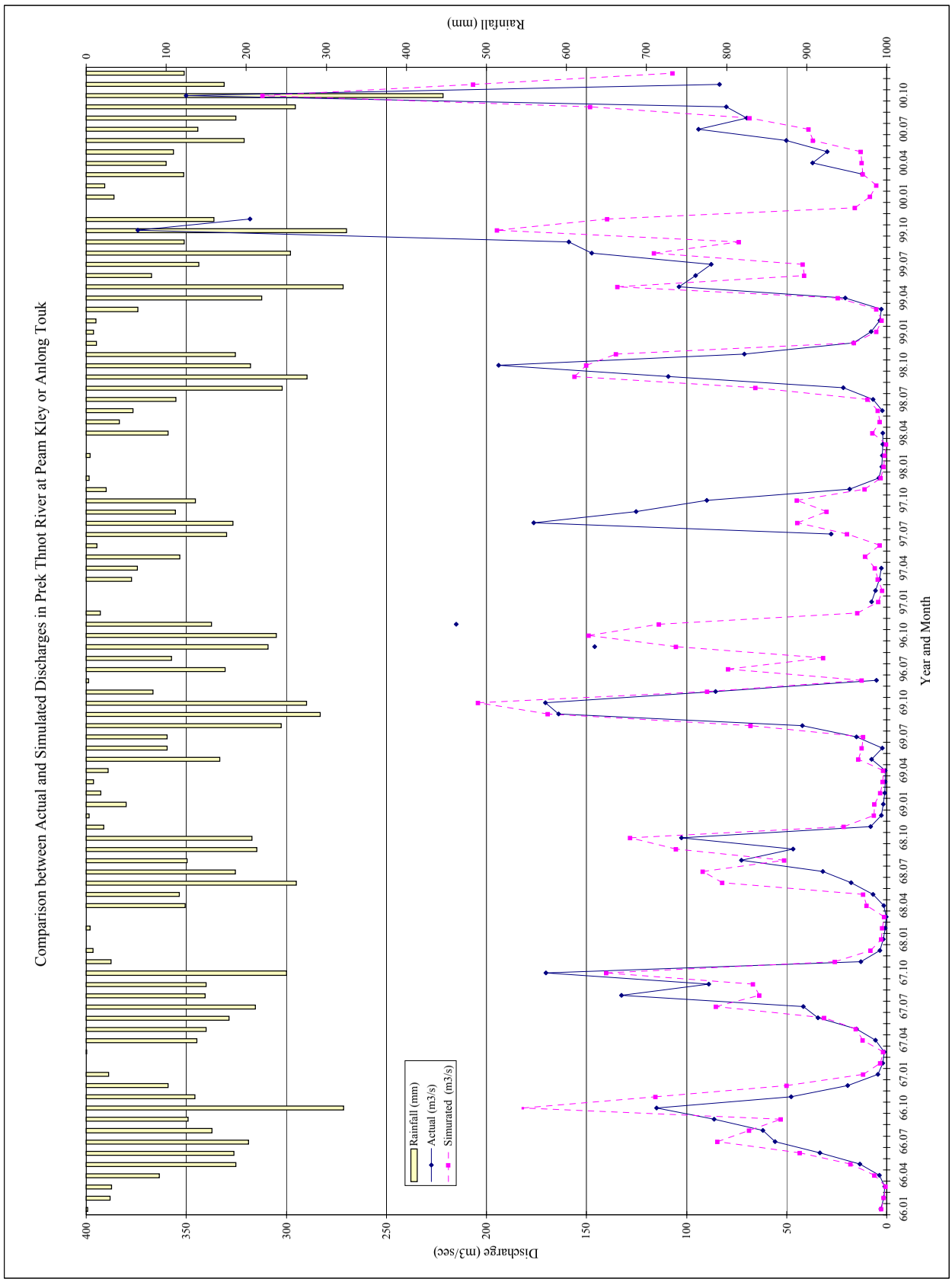
Japan International Cooperation Agency

Figure II-1.2.1

Location Map of Sampling Sites, Quarry Sites and Borrow Pits



The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin, The Kingdom of Cambodia	Figure II-1.3.1 Slakou River System
Japan International Cooperation Agency	



The Study on The Rehabilitation and Reconstruction of Agricultural Production System in The Slakou River Basin,The Kingdom of Cambodia	Figure II-1.3.2 Comparison between Actual Runoff and Simulated Runoff by Rainfall Distribution Method in Prek Thn River
Japan International Cooperation Agency	