

付 表

表 I-1.1 JICA 調査団及びカウンターパート名簿

JICA Study Team

Mr. Toshikazu Higashikawa	Team Leader
Mr. Nobuo Sambe	Agricultural Production Infrastructure (1)
Mr. Hajime Kamo	Agricultural Production Infrastructure (2)
Mr. Hiroyoshi Matsuura	Water Utilization / Hydrology
Mr. Masakuni Nakayama	Survey
Mr. Seiji Itaya	Rural Society / Participatory Approach
Mr. Shinichi Yano	Farmer Water User Community
Mr. Hisashi Ishikawa	Agriculture / Pedology
Mr. Akeshi Mori	Agro-product Processing / Marketing
Mr. Norihiko Inoue	Environment
Mr. Yutaka Niikawa	Design / Cost Estimation
Mr. Yuichi Fukasaka	Project Evaluation
Mr. Seiji Yakushiji	Foundation / Soil Mechanics
Mr. Makoto Yokota	Coordinator

Working Group of Counterpart Personnel

Mr. Mean Rykann	Team Leader of the Working Group Director, DWRAM, Takeo
Mr. Yin Savuth	Hydraulic Engineer, Central Office of MOWRAM
Mr. Chhuy Hy Karona	Irrigation Engineer, Central Office of MOWRAM
Mr. Men Mlob Bonn	Farmer Water User Community / Irrigation Engineer, Central Office of MOWRAM
Mr. San No	Hydraulic Engineer, DWRAM, Takeo
Mr. Hang Sodara	Hydrologist, DWRAM, Takeo
Mr. Soun Sophal	Hydrologist, DWRAM, Takeo
Mr. Rany Vireak	Agro-Economist, Central Office of MAFF
Ms. Lyleng Sovannary	Agricultural Extension Expert, Takeo Office, MAFF
Mr. Men Uowsereryvuth	Environment Expert, Takeo Office, MOE

表 I-2.1 カンボディア国の社会経済指標

1	GDP in Riel Billion (1999)	11,900
	GDP in US\$ Million (1999)	3,116
2	GDP per Capita (1999)	US\$ 265
3	GDP by Sector (1998)	
	Agriculture	43 %
	Industry	20 %
	Services	37 %
4	Balance of Trade (1998)	
	Export (US\$ Million)	705.4
	Import (US\$ Million)	1,092.2
5	Annual Growth of GDP (1999)	4 %
6	Population (1998)	
	Whole	11,437,656
	Phnom Penh	999,804
	Takeo Province	790,168
7	Population Density (persons/ km <sup>2</sup> ) (1998)	
	Whole	64
	Phnom Penh	3,448
	Takeo Province	222
8	Population Growth (1998)	2.49 %
9	Population below Poverty Line (1997)	36 %
10	Total Number of Households (1998)	2,162,086
	Phnom Penh	173,678
	Takeo Province	155,030
11	Inflation Rate (1999)	4.5 %
12	Unemployment Rate (1999)	2.8 %
13	Exchange Rate to US\$	
	1995	Riel 2,450.80
	1998	Riel 3,744.40
	2001	Riel 3,835.38

Source: Cambodia: Statistical Appendix, Oct. 2000 by IMF, Washington, D.C.

General Population Census of Cambodia 1998, July, 1999 by UN Population Fund

表 II-1.1.1 調査対象地域の行政村と村

No.	Province	District	Commune	Nos of Villages	
				Total	in the Study Area
1	Kampong Spueu	Basedth	Basedth	22	5
2			Kat Phluk	11	4
3			Pheakdei	9	1
4			Phong	13	13
5	Takeo	Doun Kaev	Roka Knong	12	1
6		Samraong	Lumchang	10	4
7		Tram Kak	Angk Ta Saom	22	22
8			Cheang Tong	16	16
9			Kus	30	30
10			Leay Bour	25	25
11			Nhaeng Nhang	11	11
12			Ou Saray	12	12
13			Trapeang Kranhung	7	7
14			Otdam Souriya	14	14
15			Popel	12	12
16			Samraong	16	16
17			Srae Ronoung	17	17
18			Ta Phem	23	23
19			Tram Kak	13	13
20		Trapeang Thum Khang Cheung	11	11	
21		Trapeang Thum Khang Tboung	13	13	
22		Treang	Khvav	11	3
23			Angk Kaev	8	1
24			Roneam	11	2
Total					
2 Provinces		5 Districts	24 Communes	277 Villages	

表 II-1.4.1 調査対象地域の土壌と土地適応性

Soils group	Area (ha)	Land unit of soil group	Characteristics of landunit	Land Use	Productivity	Potential crops in rainy season	Potential crops in dry season (irrigated condition)
A. Recent alluvial soils	2,200	1. Natural levees	Recent alluvial soils suffered by food from Slakou, and O Saray rivers	Paddy and secondary crops	Low - medium	Paddy, secondary crops, vegetables, tree crops	Paddy, secondary crops, vegetables, tree crops
B. Old alluvial gray soils	3,900	2. Old alluvial plain	Old alluvium soils upstream of Slakou river basin	Paddy, secondary crops, and forest	Low	Paddy, secondary crops, vegetables, tree crops	Paddy, secondary crops, vegetables, tree crops
C. Gray soils	2,900	3. Mountain foot	Foot of Kamnkanh mountain, slightly sloped land	Paddy, secondary crops, and forest	Low	Paddy, secondary crops, vegetables, tree crops	Paddy, secondary crops, vegetables, tree crops
D1. Gray lessive soils (1)	46,500	4. Level plain	Cultivated flat land	Paddy field	Low - medium	Paddy, secondary crops, vegetables, tree crops	Paddy, secondary crops, vegetables, tree crops
D2. Gray lessive soils (2)	4,700		Cultivated flat land	Paddy field	Low	Paddy, secondary crops, vegetables, tree crops	Paddy, secondary crops, vegetables, tree crops
D3. Gray lessive soils (3)	2,800	5. Older terrace	Almost flat land	Forest and secondary crops	Very low	Tree crops	Tree crops
E. Red yellow soils	2,000	6. Mountain/hill	Eroded soils of Kamnkanh mountain	Forest	Very low	(Forest)	(Forest)
Total area	65,000						

Source: Soil Map (1/50,001) prepared by Land Use Mapping Office of MAFF and JICA Study Team

表 II-1.5.1 調査対象地域の現況土地利用

(Unit: ha)

Province and District Commune Name	Total Area	Cultivated Land			Other Land						
		Paddy land	Secondary crop land	Total	Resident. area	Land for buildings	Road	Canal / Stream	Reservoir / Pond	Bush / Shrub	Forestry land
Kompong Spueu Province											
1 Basedth	5,190	2,300	110	2,410	350	20	20	140	70	1,210	970
Takeo Province											
2 Doun Taev	720	550	10	560	60	10	10	20	10	50	0
3 Samroang	1,800	1,430	10	1,440	180	10	30	30	30	80	0
4 Tram Kak											
1 Angk Ta Saom	3,277	2,742	25	2,767	310	30	21	29	13	107	0
2 Cheang Tong	2,990	2,469	47	2,516	237	21	33	67	16	101	0
3 Kus	5,203	3,367	150	3,517	350	5	13	24	95	140	1,058
4 Leay Bour	6,237	4,654	200	4,854	400	10	42	36	25	206	665
5 Nhaeng Nhang	2,423	2,097	34	2,131	135	13	18	17	24	85	0
6 O Saray	5,346	2,060	653	2,713	440	29	90	302	90	977	705
7 Trapeang Kranhung	5,018	1,276	56	1,332	195	16	75	145	39	2,491	725
8 Otdam Souriya	2,921	2,450	50	2,500	205	19	19	69	0	97	13
9 Popel	2,049	1,764	22	1,786	134	5	5	36	10	73	0
10 Samraong	2,202	1,365	15	1,380	184	5	13	26	5	55	533
11 Srae Ronoung	3,331	2,354	150	2,504	265	20	18	30	17	100	378
12 Ta Phem	3,474	3,009	12	3,021	241	16	16	40	19	121	0
13 Tram Kak	4,173	2,514	60	2,574	273	57	42	13	47	103	1,065
14 Trap. Thum Khang Cheung	2,592	2,124	35	2,159	201	8	22	30	5	86	81
15 Trap. Thum Khang Tbound	3,458	1,914	50	1,964	211	47	52	30	78	78	998
Sub-total	54,694	36,157	1,559	37,716	3,781	301	479	894	483	4,820	6,220
5 Treang	2,596	2,103	11	2,114	239	19	31	26	17	110	40
Total	65,000	42,540	1,700	44,240	4,610	360	570	1,110	610	6,270	7,230
Ratio	100%	65%	3%	68%	7%	1%	1%	2%	1%	10%	11%

Note: Forestry land is included in mountain area

Source: Tram Kak District: Tram Kak District Office

Other Districts: Estimation by aerial photograph and field investigation

表 II-1.5.2 Tram Kak 郡の作付面積

(Unit: ha)

	Paddy	Maize	Cassava	Sweet potato	Mung-bean	Groundnut	Vegetable	Sugarcane
1994	33,000	37	128	52	173	48	535	25
1995	34,500	36	168	58	160	52	487	31
1996	34,453	35	141	70	135	71	403	22
1997	33,619	23	56	48	131	65	548	22
1998	32,500	32	230	30	73	50	230	15
1999	34,552	31	210	208	118	52	950	68
2000	33,155	53	150	55	208	58	250	55
Average	33,683	35	155	74	143	57	486	34

Source: Tram Kak District Office

表 II-1.5.3 調査対象地域の作付面積、単位収量及び生産量

Crop category and name	Estimated planted area		Average yield	Range of yield	Production (ton)	Source of estimation
	(ha)	(%)				
Paddy Total	39,600	97.2%			51,480	1*
Early paddy	3,900	9.6%	1.3	0.5 - 3.0.	5,070	1* and 2*
Medium paddy	33,700	82.7%	1.3	0.75 - 2.5	43,810	1* and 2*
Late paddy	1,600	3.9%	1.3		2,080	1* and 2*
Dry season paddy	400	1.0%	1.3		520	1* and 2*
Secondary crops Total	1,160	2.8%				
Maize	40	0.1%	0.9	0.8 - 1.1	36	1*
Tuber crops	270	0.7%			945	
Cassava	180	0.4%	4	3.0 - 5.0	720	1*
Sweet potato	90	0.2%	2.5	2.0 - 3.0	225	1*
Beans	240	0.6%			100	
Mung-bean	170	0.4%	0.4	0.3 - 0.5	68	1*
Groundnut	70	0.2%	0.45	0.4 - 0.5	32	1*
Sugarcane	40	0.1%	12	10 - 15	480	1*
Vegetables	570	1.4%	4		2,280	1*
Watermelon			4	2 - 6		
Eggplant			3.5	3 - 4		
Cucumber			4	3 - 5		
Pumpkin			4.5	4 - 5		
String bean			3	2 - 5		
Total	40,760					

Note \*1: Estimated planted area is obtained by applying a rate of 85% of cultivated areas in Tram Kak District to Study Area (Table II-1.5.2).

\*2: Interview survey with commune chiefs and farmers

表 II-1.5.4 経営規模別の農家経済状況

(Unit: Riel/household)

	Actual Cash Income and Expenses								Income & Outgo considering self-consumed products of typical farm household		
	Farm Size Class (ha/household)							Average			Typical Farmer *1
	< 0.25	0.25 - 0.5	0.5 - 0.75	0.75 - 1.0	1.0 - 1.5	1.5 - 2.0	> 2.0				
No. of respondents	11	29	55	35	39	22	10	201	90		
Average family size	3.6	4.8	4.9	5.5	6.0	6.2	7.1	5.4	5.1		
Average farm size (ha)	0.16	0.40	0.64	0.87	1.16	1.64	2.58	0.92	0.80		
Paddy field (ha)	0.13	0.35	0.58	0.80	1.09	1.50	2.50	0.85	0.74	Riel	%
<b>A Gross Income</b>											
<b>Farm Income</b>											
Paddy	5,182	5,345	7,745	22,057	42,205	58,500	76,500	25,413	13,311	355,940 *2	43%
Vegetables/Other crop	15,818	15,103	16,118	9,414	18,449	17,955	12,500	15,261	13,511	27,022 *3	3%
Fruits	14,545	8,448	1,845	1,429	5,462	6,091	900	4,540	1,683	3,367 *3	0%
Livestock	170,909	254,828	289,691	306,857	285,000	292,045	301,000	281,060	296,367	311,185 *4	38%
Subtotal	206,455	283,724	315,400	339,757	351,115	374,591	390,900	326,274	324,872	697,514	85%
<b>Off-farm Income</b>											
Sale Fish	0	345	4,909	429	0	0	0	1,468	3,167	3,167	0%
Salary	0	0	1,455	99,429	0	57,273	152,400	31,562	39,556	39,556	5%
Wage by on-farm job	0	0	0	2,000	0	909	0	448	778	778	0%
Wage by off-farm job	30,182	118,276	48,727	43,343	42,564	49,273	61,000	56,284	46,633	46,633	6%
<b>Business/</b>											
Cottage industry	1,545	22,414	18,182	14,571	11,795	9,091	0	14,114	16,778	16,778	2%
Firewood collection	31,455	2,759	14,145	10,857	11,282	56,364	75,000	19,970	12,867	12,867	2%
Forest products	4,545	2,759	3,364	2,857	2,308	909	5,000	2,861	3,167	3,167	0%
Others	818	172	5,018	1,657	4,487	3,636	6,000	3,299	3,711	3,711	0%
Subtotal	68,545	146,724	95,800	175,143	72,436	177,455	299,400	130,005	126,656	126,656	15%
<b>Total</b>	<b>275,000</b>	<b>430,448</b>	<b>411,200</b>	<b>514,900</b>	<b>423,551</b>	<b>552,045</b>	<b>690,300</b>	<b>456,279</b>	<b>451,528</b>	<b>824,169</b>	<b>100%</b>
<b>B Gross Outgoing</b>											
<b>Production Cost</b>											
Paddy	40,455	48,621	65,909	68,343	69,821	85,000	92,300	66,607	66,856	66,856	8%
Other crops	364	1,138	1,927	443	795	591	200	1,017	1,350	1,350	0%
Livestock	187,273	138,621	188,400	173,715	194,359	188,545	217,800	181,234	182,689	182,689	22%
Subtotal	228,092	188,380	256,236	242,501	264,975	274,136	310,300	248,858	250,894	250,894	30%
<b>Living Expenses</b>											0%
Paddy/Rice	27,164	33,517	27,556	17,829	10,462	12,000	10,080	20,812	23,773	366,402 *5	44%
Other food	17,564	29,752	27,469	36,446	27,815	33,927	35,760	30,006	30,960	60,973 *6	7%
Health/medicine	20,727	25,903	22,582	21,566	21,600	22,036	20,040	22,406	22,187	22,187	3%
Education	14,182	22,221	21,622	34,526	26,031	31,855	56,760	27,272	26,640	26,640	3%
Clothes	14,618	15,434	16,058	14,400	14,831	16,636	13,080	15,278	15,413	15,413	2%
Fuel/electricity	2,182	3,310	5,018	7,029	3,846	5,455	3,000	4,687	5,800	5,800	1%
Transportation	14,964	21,290	21,371	23,494	18,646	22,164	22,920	21,013	22,197	22,197	3%
Housing	18,909	24,345	20,691	16,571	21,295	17,955	15,000	19,938	19,089	19,089	2%
<b>Cost/investment</b>											
of business	8,182	21,586	9,709	17,400	14,359	10,000	5,000	13,378	12,700	12,700	2%
Tax	0	1,241	2,560	1,886	1,913	2,909	2,300	2,012	2,298	2,298	0%
Others	20,600	21,510	25,027	25,060	31,000	30,209	29,880	26,251	25,040	25,040	3%
Subtotal	159,091	220,110	199,664	216,206	191,797	205,145	213,820	203,052	206,097	578,738	70%
<b>Total</b>	<b>387,183</b>	<b>408,490</b>	<b>455,899</b>	<b>458,706</b>	<b>456,772</b>	<b>479,282</b>	<b>524,120</b>	<b>451,910</b>	<b>456,991</b>	<b>829,633</b>	<b>100%</b>
<b>C Balance</b>	<b>-112,183</b>	<b>21,958</b>	<b>-44,699</b>	<b>56,194</b>	<b>-33,221</b>	<b>72,764</b>	<b>166,180</b>	<b>4,369</b>	<b>-5,463</b>	<b>-5,463</b>	

Note

\*1: Typical farmer is a median farm size farmer ( 0.8 ha farm land consisting of 0.74 ha of paddy field, 0.04ha of secondary crop field) and 0.02ha of tree crop field).

The income and outgo are shown as average of 90 respondents between 0.5 ha - 1.0 ha of farm size farmers

\*2: It is estimated on such assumption as paddy field= 0.74ha, yield=1,300 kg/ha, and price of paddy= 370 riel/kg

\*3: It is assumed that 50% of products are used for consumption of farmers and 50% for sale

\*4: It is assumed that 5% of products is consumed by farmers themselves

\*5: Actual expense for purchase of rice + Production value of paddy - Actual income from sold rice

\*6: Actual expense for other food + Self-consumed products

Source: Social environmental baseline survey conducted by JICA Study Team



表 II-2.3.1 開発阻害要因とマスタープランの計画・プログラムとの関連

**Three (3) Irrigation-Based Development Plans**

- I Upper Slakour River Irrigation Reconstruction Plan (USP)
- II Small Reservoir Rehabilitation Plan (SRP)
- III Pond Development Plan (PDP)

**Support Programs**

- IV Rural road improvement program
- V Agriculture production program
- VI Agriculture support program
- VII Institutional development program
- VIII Environmental conservation program

Constraints	Plans with Support Programs
1 Irrigation	
- Economically and environmentally suitable sites for shallow bunded reservoir are topographically limited, and the stored water for gravity irrigation is limited.	I, II, III
- The existing facilities have been considerably deteriorated.	I, II
2 Agriculture	
- About 90 % of rainfall concentrates in the rainy season.	I, II, III
- The soil in the area is of poor fertility.	V
- The farmers have difficulty of buying agricultural inputs, such as fertilizers because of short fund.	V, VI
- The farmers have hardly received agricultural extension services (paddy and cash crops) and animal husbandry extension and vaccination services.	VI
3 Agriculture Support Services	
- The number of extension workers for agriculture and animal husbandry is limited.	VI
- Agro-processing facilities is limited.	VI
- No farmers group has been organized for purchase of agricultural inputs and marketing.	VI
- The farmers have not yet been accustomed to a free-market policy of RGC.	VI
- The agricultural credit services is limited.	VI
- The road to market is poor.	VI
4 Institution of FWUC and Governmental Project Office	
- The farmers hardly have experience of FWUC .	VII
- The farmer's income is low for payment of irrigation fee.	VII
- The farmers hardly have experience of communication to the central and local government offices.	VII
- The organization of Takeo Office of MOWRAM is not appropriate for the implementation of the master plan.	VII
- The engineering capability is not appropriate for the implementation of the master plan.	VII
5 Environment	
- Cultivation is illegally undertaken inside the reservoir areas.	VIII

表 II-3.2.1 水収支計算結果 貯水池再開発代替案における灌漑可能面積

Alternative	Kpob Trobek		O Saray		Tunump Lok		20 Years after completion of reconstruction				
		Dike Top El.				Dike Top El.	Total Irri. Area	M. Paddy	S. Paddy	Upland C 1	Upland C 2
Alt. 1-1		39m	-	-	-	-	1,100	550	250	100	200
Alt. 1-2		40m	-	-	-	-	1,500	650	300	150	400
Alt. 2-1		39m	-	-	-	-	1,550	750	350	150	300
Alt. 2-2		40m	-	-	-	-	1,800	950	400	150	300
Alt. 3-1		39m	-	-	-	43m	4,550	2,400	1,100	500	550
Alt. 3-2		39m	-	-	-	44m	5,400	2,700	1,300	700	700
Alt. 3-3		40m	-	-	-	43m	5,500	2,700	1,300	700	800
Alt. 3-4		40m	-	-	-	44m	6,100	3,000	1,500	700	900
Alt. 4-1		39m	-	-	-	43m	4,800	2,500	1,200	500	600
Alt. 4-2		39m	-	-	-	44m	5,600	2,800	1,300	700	800
Alt. 4-3		40m	-	-	-	43m	5,800	2,800	1,300	800	900
Alt. 4-4		40m	-	-	-	44m	6,300	3,100	1,500	900	800
Alternative	Kpob Trobek		O Saray		Tunump Lok		50 Years after completion of reconstruction				
		Dike Top El.				Dike Top El.	Total Irri. Area	M. Paddy	S. Paddy	Upland C 1	Upland C 2
Alt. 1-1		39m	-	-	-	-	1,000	550	250	100	100
Alt. 1-2		40m	-	-	-	-	1,400	650	300	150	300
Alt. 2-1		39m	-	-	-	-	1,350	650	300	150	250
Alt. 2-2		40m	-	-	-	-	1,650	850	400	150	250
Alt. 3-1		39m	-	-	-	43m	3,750	2,100	1,000	300	350
Alt. 3-2		39m	-	-	-	44m	4,650	2,400	1,200	500	550
Alt. 3-3		40m	-	-	-	43m	4,900	2,600	1,200	500	600
Alt. 3-4		40m	-	-	-	44m	5,750	2,900	1,400	700	750
Alt. 4-1		39m	-	-	-	43m	4,150	2,300	1,100	350	400
Alt. 4-2		39m	-	-	-	44m	5,050	2,600	1,200	600	650
Alt. 4-3		40m	-	-	-	43m	5,100	2,600	1,300	550	650
Alt. 4-4		40m	-	-	-	44m	5,900	3,000	1,400	700	800

表 II-3.2.2 最大開発代替案(代替案 4-4)における3つの貯水池から下流への余剰流出量

Unit: MCM

Year	Jan.	Feb.	Mar.	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total of 2nd half a year	Order from the smallest
1966	0.0	0.0	0.0	0.0	0.7	17.1	25.8	15.1	2.8	65.9	24.2	10.0	143.8	
1967	0.5	0.0	0.0	0.0	0.0	9.0	23.3	6.0	13.3	42.6	2.9	0.0	88.0	
1968	0.0	0.0	0.0	0.0	0.0	26.9	24.7	0.9	24.2	29.0	0.0	0.0	78.7	
1969	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	47.0	68.1	17.6	1.5	148.8	
1985	0.0	0.0	0.0	7.2	24.9	8.2	0.4	0.0	24.0	43.7	16.1	0.4	84.7	
1986	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	18.3	24.6	5.9	57.4	4
1987	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	13.5	54.1	13.3	87.3	
1988	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	30.3	0.2	0.0	39.1	3
1989	0.0	0.0	0.0	0.0	2.5	3.0	0.9	0.0	45.8	47.6	17.3	2.0	113.5	
1990	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	11.2	0.5	12.3	1
1991	0.0	0.0	0.0	0.0	0.0	10.6	24.6	46.5	26.8	25.6	0.0	0.0	123.5	
1992	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.3	15.8	38.0	16.1	0.0	71.7	
1993	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	60.1	13.4	0.5	86.8	
1994	0.0	0.0	0.0	0.0	0.0	0.0	26.1	26.1	26.6	7.6	0.0	0.0	86.4	
1995	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	48.4	49.6	6.9	0.3	106.7	
1996	0.0	0.0	0.0	0.0	0.0	19.3	22.6	2.5	26.0	46.1	24.4	3.9	125.4	
1997	0.0	0.0	0.0	0.0	0.0	0.0	3.1	13.4	2.8	14.6	0.0	0.0	33.9	2
1998	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.8	43.2	40.9	30.4	6.1	138.4	
1999	0.0	0.0	0.0	2.3	38.9	11.1	8.2	30.3	7.5	65.8	30.9	5.6	148.3	
2000	0.0	0.0	0.0	0.0	0.0	8.5	10.6	13.5	41.9	118.2	50.8	23.3	258.3	

表 II-4.3.1 現地踏査において見積もった小規模溜池の規模

No.	Name	Coimmune	Result of Field Survey and Estimation										
			Length(m)	Width(m)	Height of Dike(m)	Effective Operation Water Depth(m)	Effective Water Volume(m <sup>3</sup> )	Average of Supplemental Irrigation (mm)	Irrigable Area by Effective Volume (ha)	Water Source(*)	Present Use	Remarks	
1	San Dor	Cheang Tong	-	-	-	-	-	-	-	-	-	no	completely damaged by flood
2	Tumnup Ta Oum		980	84	2.5	0.60	49,392	350	15	R			
3	Ang Khnar	Leay Bour	440	130	2.5	0.24	13,728	350	4	RF	irrigation	only wet season	
4	Ang Ongk Kcheay	Leay Bour	115	110	1.7	0.40	5,060	350	1	RF	non-irrigation	animal, domestic	
5	Tumnup Kim Sei	Nhaeng Nhang	460	350	2.0	0.45	72,450	350	21	C	irrigation		
6	Ang Rom Lech Svay	Otdam Souriya	-	-	-	-	-	-	-	R	no	completely damaged by flood	
7	Tumnup Kpob Trabek	O Saray	Upper Slakou Irrigation System										
8	Ang Boeung Sa Tong	T.T.K.Cheung	200	160	1.7	0.44	14,080	350	4	RF	irrigation	only wet season	
9	Sdok Sap	Samraong	1200	200	2.4	0.30	72,000	350	21	R	irrigation	only wet season, natural inflow	
10	Ang Srei Ronoung	Srae Ronoung	540	460	2.0	0.28	69,552	350	20	R	irrigation	domestic, animal	
11	Ang Ta Pphem	Ta Pphem	-	-	-	-	-	-	-	-	no, converted	paddy field, completely damaged	
12	Ang Vatcham Pa	Ta Pphem	-	-	-	-	-	-	-	-	non-irrigation	only for domestic, animal	
13	Ang Kol Korm	Tram Kak	420	220	4.0	0.49	45,276	350	13	C	irrigation	on Koh Kaek Main Canal	
14	Trapeang Lean	Kus	330	180	2.0	0.59	35,046	350	10	C	irrigation	wet season only, Koh Kaek	
15	Ou Romdoul	Tram Kak	688	360	2.7	0.80	198,144	350	57	R	irrigation	all season, natural stream	
16	Ang Yeay Chrong	Tram Kak	290	75	2.2	0.40	6,620	350	2	R	non-irrigation	natural stream	
17	Trapeang Svay	T.T.K.Cheung	-	-	-	-	-	-	-	-	no, converted	paddy field, completely damaged	
18	Prey Sbat	T.T.K.Cheung	130	400	3.1	0.50	26,000	350	7	C	irrigation	wet season only	
19	Prey Dok Por	T.T.K.Cheung	300	200	2.1	0.58	34,800	350	10	C	irrigation	wet season only	
20	Tumnup Lok	T. Kranhung	Upper Slakou Irrigation System										
21	O Saray	O Saray	500	300	2.0	0.50	75,000	350	21	R	irrigation	wet season only in the reservoir	
22	Prey Kdouch(North)	T. Kranhung	560	150	1.9	0.50	42,000	350	12	C	irrigation	reservoir on the upstream	
23	Prey Kdouch(South)	T. Kranhung	360	270	2.7	0.60	58,320	350	17	R	irrigation	additionally identified.	
24	Ang Prey Preal	T.T.K.Tboung	500	230	1.9	0.46	52,900	350	15	R	irrigation	wet season only	
25	Ang Prey Kdei	Samraong	690	300	3.0	0.20	41,400	350	12	R,C	irrigation	wet season only, Koh Kaek	
26	Ang 160	T.T.K.Tboung	360	400	2.6	0.50	72,000	350	21	R	irrigation	natural stream	
27	Boeung Kbalromeas	Phong	390	340	2.0	0.35	46,410	350	13	C	non-irrigation	fish pond	
28	Toul Khcheay	Basedth	900	350	3.2	0.40	126,000	350	36	R	irrigation	damaged by flood in 1991	
29	Tumnup Ta Ses	Kus	240	340	2.3	0.43	35,088	350	10	R	irrigation	wet season only	
30	Ta Moung	Kus	-	-	-	-	-	-	-	-	no	completely damaged	
31	160 Reservoir	Tram Kak	300	120	1.8	0.97	34,920	350	10	C	irrigation	additionally identified. Koh Kaek	
									Total Irrigable Area(ha)=		351		

R: river or stream  
C: canal  
RF: rainfall

表 II-4.3.2 調査対象地域の小規模溜池評価

No.	Name	Water source	Construction volume	Technical soundness	Increase of irrigation area	Possibility of participation	Location	Total Score	Total Evaluation	Estimated Irrigable Area (ha)	Remarks
1	San Dor					Deleted by preliminary screening;					
2	Tumnup Ta Oum	5	1	5	3	3	5	22	B	15	Long dike (900 m), Rehabilitated by ADE Irrigable area is too small Irrigable area is too small
3	Ang Khnai					Deleted by preliminary screening;					
4	Ang Ongk Kcheay					Deleted by preliminary screening;					
5	Tumnup Kim Se	5	3	5	5	5	3	26	A	21	
6	Ang Rom Lech Svay					Deleted by preliminary screening;					
7	Kpob Trobek					Included in Upper Slakou Irrigation System					
8	Ang Boeung Sa Tong					Deleted by preliminary screening;					Close to Slakou River (technical soundness Long dike (1,200 m))
9	Sdok Sap	5	1	3	5	3	5	22	B	21	
10	Ang Srei Ronoung	3	5	3	5	1	3	20	C	20	
11	Ang Ta Phem					Deleted by preliminary screening;					
12	Ang Vatcham Pa					Deleted by preliminary screening;					
13	Ang Kol Korrr	5	3	3	3	5	3	22	B	13	
14	Trapeang Lean	3	3	3	3	3	3	18	C	10	
15	Ou Romdoul	5	5	3	1	3	5	22	B	57	Rehabilitated in 2000 by Social Fund Too small compared with catchmen
16	Ang Yeay Chrong					Deleted by preliminary screening;					
17	Trapeang Svay					Deleted by preliminary screening;					
18	Prey Sbat					Deleted by preliminary screening;					
19	Prey Dok Por	5	3	3	3	1	1	16	C	10	
20	Tumnup Lok					Included in Upper Slakou Irrigation System					
21	O Saray					Deleted by preliminary screening;					
22	Prey Kdouch(North)	5	3	3	3	3	5	22	B	12	
23	Prey Kdouch(South)	5	3	3	3	3	5	22	B	17	
24	Ang Prey Preal	5	3	3	3	3	1	18	C	15	
25	Ang Prey Kdei	5	0	3	3	1	1	13	D	12	
26	Ang 160	5	3	5	5	5	5	28	A	21	
27	Boeung Kbalromeas	0	3	3	3	1	5	15	D	13	
28	Toul Khcheay	5	1	3	5	1	5	20	C	36	Long dike (968 m)
29	Tumnup Ta Se	5	3	3	3	3	5	22	B	10	
30	Ta Moung					Deleted by preliminary screening;					
31	160 Reservoir	3	3	3	3	3	5	20	C	10	

Note (Evaluation Criteria)

Water source No=1, some=3, stream or river=5  
 Construction volume Large=1, Fair=3, Little=5  
 Technical soundness Low=1, Fair=3, High=5  
 Increase of irrigation area Less than 15 ha=0, 15~30ha=3, over 30 ha=5  
 Possibility of participation Doubtful=1, Possible=3, High=5  
 Location Located in the Upper Slakou System=1, Located on the downstream of the Upper Slakou System=3, Outside=5  
 Total Score & Evaluation A: 26to30, B: 21to25, C: 16to20, D: 15 or less

Total Area	A	42
	B	144
	C	101
	sub-total	286
	Total	311

表 II-4.3.3 開発段階別の小規模溜池改修計画

No.	Name	Commune	Related Village	Total Evaluation	Stage	Estimated Irrigable Area (ha)
5	Tumnup Kim Sei	Nhaeng Nhang	Kim Sei	A	Stage-1	21
26	Ang 160	Trapeang Thum Khang Tboung	Trapeang Chhuk	A		21
13	Ang Kol Korm	Tram Kak	Kol Korm	B	Stage-2	13
22	Prey Kdouch(North)	Trapeang Kranhung	Prey Kdouch	B		12
23	Prey Kdouch(South)	Trapeang Kranhung	Trapeang Robang	B		17
29	Tumnup Ta Ses	Kus	Trapeang Lean	B		10
2	Tumnup Ta Oum	Kus	Leak Khang Tboung, Trapeang Thmor, Leak	B		15
9	Sdok Sap	Samraong	Pen Meas, Ta Sman	B		21
15	Ou Romdoul	Tram Kak	Trapeang Russei	B		57
31	160 Reservoir	Tram Kak	Trapeang Russei, Kol Korm	C	Stage-3	10
10	Ang Srei Ronoung	Srae Ronoung	Thmei, Samaki	C		20
14	Trapeang Lean	Kus	Trapeang Lean	C		10
28	Toul Khcheay	Basedth, Kompong Spueu		C		36
19	Prey Dok Por	Trapeang Thum Khang Cheung		C		10
24	Ang Prey Preal	Trapeang Thum Khang Tboung	Prey Preal, Prakeab	C		15
				Estimated	Stage-1	42
				Irrigable	Stage-2	144
				Area (ha)	Stage-3	101
					Total	286

表 II-4.5.1 各計画の作付面積、単位収量及び生産量

1. Upper Slakou River Irrigation Reconstruction Plan				Irrigation area:		3,500 ha			
	Present/ Without-program			With-program				Incremental	
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	Yield range	Production ton	Area ha	Production ton
Paddy (medium)	2,860	1,300	3,718	2,400	2,800	2,500 - 3,000	6,720	-460	3,002
Paddy (early)	360	1,300	468	1,100	3,300	3,000 - 3,500	3,630	740	3,162
Paddy Total	3,220		4,186	3,500			10,350	280	6,164
Maize *1	30	900	27	80	2,000	1,800 - 2,200	160	50	133
Groundnut	10	450	5	130	850	800 - 900	111	120	106
Soybean/Mung-bean	10	500	5	280	1,000	900 - 1,100	280	270	275
Sesame	0	300	0	130	800	600 - 850	104	130	104
Secondary crop Total	50			620				570	
Cucumber *2		4,000			10,000	8,000 - 12,000			
String-bean *2		3,000			6,000	5,000 - 7,000			
Tomato *2		3,000			9,000	8,000 - 10,000			
Vegetable Total/Average	50	3,333	167	430	8,333	6,000 - 10,000	3,583	380	3,417
Total	3,320			4,550				1,230	

2. Small Reservoir Rehabilitation Plan				Irrigation area:		280 ha			
	Present/ Without-program			With-program				Incremental	
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	Yield range	Production ton	Area ha	Production ton
Paddy (medium)	230	1,300	299	192	2,800	2,500 - 3,000	538	-38	239
Paddy (early)	30	1,300	39	88	3,300	3,000 - 3,500	290	58	251
Paddy Total	260		338	280			828	20	490
Maize *1	3	900	3	6.4	2,000	1,800 - 2,200	13	3	10
Groundnut	1	450	0	10.4	850	800 - 900	9	9	8
Soybean/Mung-bean	1	500	1	22.4	1,000	900 - 1,100	22	21	22
Sesame	0	300	0	10.4	800	600 - 850	8	10	8
Secondary crop Total	5			49.6				45	
Cucumber *2		4,000			10,000	8,000 - 12,000			
String-bean *2		3,000			6,000	5,000 - 7,000			
Tomato *2		3,000			9,000	8,000 - 10,000			
Vegetable Total/Average	5	3,333	17	34.4	8,333	6,000 - 10,000	287	29	270
Total	270			364.0				94	

3. Small Pond Development Plan				Irrigation area:		2,100 ha		Gross area: 38,220 ha	
	Present/ Without-program			With-program				Incremental	
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	Yield Condition	Production ton	Area ha	Production ton
Paddy (medium)	32,110	1,300	41,743	28,640	1,670	Rainfed *3	47,829	-3,470	6,086
Paddy (early)	4,010	1,300	5,213	5,380	1,670	Rainfed *3	8,985	1,370	3,772
Paddy Total	36,120		46,956	34,020	1,670	Rainfed *3	56,813	-2,100	9,857
Maize *1	320	900	288	320	900	Rainfed	288	0	0
Groundnut	60	450	27	380	680	Irrigated	258	320	231
Soybean/Mung-bean	155	500	78	755	800	Irrigated	604	600	527
Sesame	0	300	0	380	640	Irrigated	243	380	243
Secondary crop Total	535			1,835				1,300	
Cucumber *2		4,000			8,000	Irrigated			
String-bean *2		3,000			4,800	Irrigated			
Tomato *2		3,000			7,200	Irrigated			
Vegetable Total/Average	515	3,333	1,717	1,515	6,667	Irrigated	10,100	1,000	8,383
Total	37,170			37,370				200	

4. Irrigation Area Total				Irrigation area:		5,880 ha		Study area: 43,000 ha	
	Present Condition			Future Plan				Incremental	
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	Yield range	Production ton	Area ha	Production ton
Paddy (medium)	3,090	1,300	4,017	2,592			7,258	-498	3,241
Paddy (early)	390	1,300	507	1,188			3,920	798	3,413
Paddy Total	3,480		4,524	3,780			11,178	300	6,654
Maize *1	33	900	30	86			173	53	143
Groundnut	71	450	32	520			378	449	346
Soybean/Mung-bean	166	500	83	1,057			906	891	823
Sesame	0	300	0	520			356	520	356
Secondary crop Total	270			2,185				1,915	
Vegetable Total	570	2,333	1,330	1,979			13,970	1,409	12,640
Total	4,320			7,944				3,624	

5. Study Area Total				Irrigation area:		5,880 ha		Study area: 43,000 ha	
	Present Condition			Future Plan				Incremental	
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	Yield range	Production ton	Area ha	Production ton
Paddy (medium)	35,200	1,300	45,760	31,232			55,086	-3,968	9,326
Paddy (early)	4,400	1,300	5,720	6,568			12,905	2,168	7,185
Paddy Total	39,600		51,480	37,800			67,991	-1,800	16,511
Maize *1	353	900	318	406			461	53	143
Groundnut	71	450	32	520			378	449	346
Soybean/Mung-bean	166	500	83	1,057			906	891	823
Sesame	0	300	0	520			356	520	356
Secondary crop Total	590			2,505				1,915	
Vegetable Total	570	3,333	1,900	1,979			13,970	1,409	12,070
Total	40,760			42,284				1,524	

Note \*1: Maize of present/without-program includes sweet potato, cassava and sugarcane  
 \*2: Cucumber, string-bean and tomato are substitutes of all suitable vegetables in the area  
 \*3: Projected unit yield in 2010 under rainfed condition

表 II-4.5.2 各計画による増加便益 (1/2)

	Irrigated area: 3,500 ha Target area : 3,500 ha				
	Planted area (ha)	Gross Income (mill. Riel)	Production cost		Profit (mill. Riel)
			Direct (mill. Riel)	Indirect (mill. Riel)	
<b>1. Upper Slakou River Irrigation Reconstruction Plan</b>					
With-program					
Paddy (medium)	2,400	2,594	1,000	72	1,523
Paddy (early)	1,100	1,247	450	32	765
Paddy Total	3,500	3,841	1,450	104	2,288
Maize	80	99	24	2	73
Groundnut	130	145	46	4	96
Soybean/Mung-bear	280	340	102	8	231
Sesame	130	189	28	2	159
Secondary crop Total	620	774	199	15	559
Vegetable	430	2,041	223	18	1,800
Total	4,550	6,656	1,872	137	4,647
Average per ha	1.30	1.90	0.53	0.04	1.33
Median household *1	1.04	1.52	0.43	0.03	1.06
Present / Without-program					
Paddy (medium)	2,860	1,435	574	30	832
Paddy (early)	360	162	70	4	89
Paddy Total	3,220	1,597	643	34	920
Maize *2	30	17	3	0	13
Groundnut	10	6	2	0	4
Soybean/Mung-bear	10	9	2	0	7
Sesame	0	0	0	0	0
Secondary crop Total	50	32	8	1	23
Vegetable	50	97	13	1	83
Total	3,320	1,726	664	35	1,026
Average per ha	0.95	0.49	0.19	0.01	0.29
Median household *1	0.76	0.39	0.15	0.01	0.23
Increment					
Paddy (medium)	-460	1,159	426	42	691
Paddy (early)	740	1,085	381	28	676
Paddy Total	280	2,244	807	70	1,367
Maize	50	82	21	2	60
Groundnut	120	139	44	3	92
Soybean	270	331	99	8	224
Sesame	130	189	28	2	159
Secondary crop Total	570	742	191	15	536
Vegetable	380	1,944	210	17	1,717
Total	1,230	4,930	1,208	101	3,621
Average per ha	0.35	1.41	0.35	0.03	1.03
Median household *1	0.28	1.13	0.28	0.02	0.83

Note \*1: Median size farmer cultivates 0.8 ha/household

\*2: Maize of present/without program includes sweet potato, cassava and sugarcane

	Irrigated area: 280 ha Target area : 280 ha				
	Planted area (ha)	Gross Income (mill. Riel)	Production cost		Profit (mill. Riel)
			Direct (mill. Riel)	Indirect (mill. Riel)	
<b>2. Small Reservoir Rehabilitation Plan</b>					
With-program					
Paddy (medium)	192	208	80	6	122
Paddy (early)	88	100	36	3	61
Paddy Total	280	307	116	8	183
Maize	6.4	8	2	0	6
Groundnut	10.4	12	4	0	8
Soybean	22.4	27	8	1	18
Sesame	10.4	15	2	0	13
Secondary crop Total	49.6	62	16	1	45
Vegetable	34.4	163	18	1	144
Total	364.0	532	150	11	372
Average per ha	1.30	1.90	0.53	0.04	1.33
Median household *1	1.04	1.52	0.43	0.03	1.06
Present / Without-program					
Paddy (medium)	230	115	46	2	67
Paddy (early)	30	13	6	0	7
Paddy Total	260	129	52	3	74
Maize *2	3	2	0	0	1
Groundnut	1	1	0	0	0
Soybean	1	1	0	0	1
Sesame	0	0	0	0	0
Secondary crop Total	5	3	1	0	2
Vegetable	5	10	1	0	8
Total	270	142	54	3	85
Average per ha	0.96	0.51	0.19	0.01	0.30
Median household *1	0.77	0.41	0.15	0.01	0.24
Increment					
Paddy (medium)	-38	92	34	3	55
Paddy (early)	58	86	30	2	54
Paddy Total	20	178	64	6	109
Maize	3	6	2	0	5
Groundnut	9	11	3	0	7
Soybean	21	26	8	1	18
Sesame	10	15	2	0	13
Secondary crop Total	45	59	15	1	42
Vegetable	29	154	17	1	136
Total	94	391	96	8	287
Average per ha	0.34	1.40	0.34	0.03	1.02
Median household *1	0.27	1.12	0.27	0.02	0.82

Note \*1: Median size farmer cultivates 0.8 ha/household

\*2: Maize of present/without program includes sweet potato, cassava and sugarcane

表 II-4.5.2 各計画による増加便益 (2/2)

3. Small Pond Development Plan

Irrigated area: 2,100 ha  
Target Area : 39,220 ha

	Planted area (ha)	Gross Income (mill. Riel)	Production cost		Profit (mill. Riel)
			Direct (mill. Riel)	Indirect (mill. Riel)	
<b>With-program</b>					
Paddy (medium) *2	28,640	14,372	5,744	299	8,329
Paddy (early) *3	5,380	2,420	1,040	56	1,324
Paddy Total	34,020	16,791	6,784	356	9,652
Maize *3	320	178	36	2	140
Groundnut	380	340	113	9	218
Soybean	755	734	233	18	483
Sesame	380	393	60	4	329
Secondary crop Total	1,835	1,646	444	32	1,170
Vegetable	1,515	4,945	617	48	4,280
Total	37,370	23,382	7,844	436	15,103
Average per ha	0.95	0.60	0.20	0.01	0.39
Median household *1	0.76	0.48	0.16	0.01	0.31
<b>Present / Without-program</b>					
Paddy (medium)	32,110	16,113	6,440	336	9,338
Paddy (early)	4,010	1,804	775	42	987
Paddy Total	36,120	17,916	7,215	377	10,324
Maize	320	178	36	2	140
Groundnut	60	36	13	1	21
Soybean	155	141	36	3	102
Sesame	0	0	0	0	0
Secondary crop Total	535	355	86	6	263
Vegetable	515	998	136	10	853
Total	37,170	19,270	7,436	393	11,440
Average per ha	0.95	0.49	0.19	0.01	0.29
Median household *1	0.76	0.39	0.15	0.01	0.23
<b>Increment</b>					
Paddy (medium)	-3,470	-1,741	-696	-36	-1,009
Paddy (early)	1,370	616	265	14	337
Paddy Total	-2,100	-1,125	-431	-22	-672
Maize	0	0	0	0	0
Groundnut	320	305	100	8	197
Soybean	600	594	197	15	381
Sesame	380	393	60	4	329
Secondary crop Total	1,300	1,291	358	26	907
Vegetable	1,000	3,947	481	38	3,427
Total	200	4,113	408	42	3,663
Average per ha	0.01	0.10	0.01	0.00	0.09
Median household *1	0.00	0.08	0.01	0.00	0.07

Note \*1: Median size farmer cultivates 0.8 ha/household

\*2: Maize of present/without program includes sweet potato, cassava and sugarcane

\*3: Paddy and maize will be grown under rainfed condition

4. Total

Irrigated area: 5,880 ha  
Target Area : 43,000 ha

	Planted area (ha)	Gross Income (mill. Riel)	Production cost		Profit (mill. Riel)
			Direct (mill. Riel)	Indirect (mill. Riel)	
<b>With-program</b>					
Paddy (medium)	31,232	17,173	6,823	377	9,973
Paddy (early)	6,568	3,767	1,526	91	2,150
Paddy Total	37,800	20,940	8,349	467	12,123
Maize	406	285	62	4	219
Groundnut	520	497	163	12	322
Soybean	1,057	1,102	343	26	733
Sesame	520	597	90	6	501
Secondary crop Total	2,505	2,482	659	48	1,775
Vegetable	1,979	7,149	858	68	6,224
Total	42,284	30,571	9,866	583	20,122
Average per ha	0.98	0.71	0.23	0.01	0.47
Median household *1	0.79	0.57	0.18	0.01	0.37
<b>Present / Without-program</b>					
Paddy (medium)	35,200	17,663	7,059	368	10,236
Paddy (early)	4,400	1,979	850	46	1,083
Paddy Total	39,600	19,642	7,910	414	11,319
Maize	353	197	40	2	154
Groundnut	71	42	16	1	25
Soybean	166	151	39	3	109
Sesame	0	0	0	0	0
Secondary crop Total	590	389	95	6	289
Vegetable	570	1,105	150	11	944
Total	40,760	21,137	8,155	431	12,551
Average per ha	0.95	0.49	0.19	0.01	0.29
Median household *1	0.76	0.39	0.15	0.01	0.23
<b>Increment</b>					
Paddy (medium)	-3,968	-490	-236	9	-263
Paddy (early)	2,168	1,788	676	45	1,067
Paddy Total	-1,800	1,297	440	54	804
Maize	53	89	22	2	65
Groundnut	449	455	147	11	297
Soybean	891	951	305	23	624
Sesame	520	597	90	6	501
Secondary crop Total	1,915	2,092	564	42	1,486
Vegetable	1,409	6,044	707	56	5,281
Total	1,524	9,434	1,711	152	7,571
Average per ha	0.04	0.22	0.04	0.00	0.18
Median household *1	0.03	0.18	0.03	0.00	0.14

Note \*1: Median size farmer cultivates 0.8 ha/household

\*2: Maize of present/without program includes sweet potato, cassava and sugarcane



表 II-4.6.1 農道改修プログラムと優先順位

Road No.	Name	BP	EP	Length (km)	Related Commune	Coverage score	Present Condition score	Road Status score	Total	Priority						
1	District Road No.33	T.T.K.Cheung	T.Kranhung	13.0	T.Kranhung, O Saray, T.T.K.Cheung	Large	5	Very bad	5	Primary	5	15	1st			
2	T. Kranhung~Prey Kdouch	T.Kranhung	Prey Kdouch	5.2	T.Kranhung	Medium	3	Bad	3	Secondary	3	9	3rd			
3	T. Kranhung~Plov Lok	T.Kranhung	Plov Lok Village	5.0	T.Kranhung	Small	1	Bad	3	Secondary	3	7	3rd			
4	Prey Kdouch~Slakou River	Road No.2, Prey Kdouch	Slakou River	4.5	T.Kranhung	Small	1	Very bad	5	Secondary	3	9	3rd			
5	Kpob Svay~ Road 6	Kpob Svay Village	Road 6	6.0	T.Kranhung, O Saray	Small	1	Very bad	5	Secondary	3	9	3rd			
6	O Saray ~ Slakou River	O Saray	Slakou River	5.5	T.Kranhung, O Saray	Medium	3	Very bad	5	Primary	5	13	1st			
7	T.T.K.Cheung~Slakou	Road 33	Slakou River	5.0	T.T.K.Cheung	Small	1	Very bad	5	Secondary	3	9	3rd			
8	Road 7~Road 9	Road 7	Road 9	3.0	T.T.K.Cheung	Small	1	Very bad	5	Secondary	3	9	3rd			
9	Popeel~Cheang Tong North	Popeel (National Road 2)	District Road No.33 at Cheang Tong	13.5	T.T.K.Cheung, Popeel	Large	5	Very bad	5	Secondary	3	13	1st			
10	Popeel~Cheang Tong South	Popeel (National Road 2)	District Road No.33 at Cheang Tong	9.5	T.T.K.Cheung, Popeel	Large	5	Very bad	5	Secondary	3	13	1st			
11	Cheang Tong~Kus	District Road No.33	T.Ta Sok Village	8.0	Cheang Tong, Samraong	Medium	3	Very bad	5	Secondary	3	11	2nd			
12	Samraong~Route No.3	ADB R1, Samraong	National Road No.3	8.3	Samraong, Ta Phem, Angk Ta Saom	Medium	3	Very bad	5	Secondary	3	11	2nd			
13	ADB R1~Kus	ADR R1, Kus	Kus Commune Office	4.5	Kus	Small	1	Very bad	5	Secondary	3	9	3rd			
14	Route 3~Ang Ta Chan	National Road No.3	Ang Ta Chan Village, Leay	5.0	Angk Ta Saom, Leay Bour	Small	1	Bad	3	Secondary	3	7	3rd			
15	Route 22~ADB R11	District Road No.22	ADB R11, Otdam Souriya	7.3	Leay Bour, Otdam Souriya	Medium	3	Very bad	5	Secondary	3	11	2nd			
16	Srae Ronoung~Route 22	Srae Ronoung MRD Road	1 km to District Road No.22	6.5	Srae Ronoung, Leay Bour	Small	1	Very bad	5	Secondary	3	9	3rd			
17	Srae Ronoung~Roneam	Srae Ronoung	Railway	6.0	Srae Ronoung, Roneam	Small	1	Bad	3	Secondary	3	7	3rd			
18	Road 31~Khvav	Road 31, Nhaeng Nhang	Railway, Khvav	9.0	Nhaeng Nhang, Khvav, Srae Ronoung	Large	5	Very bad	5	Secondary	3	13	1st			
19	Srae Ronoung~Road 18	Srae Ronoung	Road 18	5.0	Srae Ronoung	Medium	3	Very bad	5	Secondary	3	11	2nd			
20	Route 31	National Road No.3	Province Boundary	5.0	Nhaeng Nhang	Large	5	Bad	3	Primary	5	13	1st			
21	Basedth~Pheakdei North	Preah Khae	Pheakdei	8.0	Basedth, Phong, Pheakde	Medium	3	Very bad	5	Secondary	3	11	2nd			
22	Basedth~Pheakdei South	Basedth	Pheakdei	11.5	Basedth, Phong, Pheakde	Medium	3	Bad	3	Secondary	3	9	3rd			
Note: T.= Trapeang T.T.K =Trapeang Thum Khang				1 st priority	55.5	Note (Scoring):				Large	5	Very Bad	5	Primary	5	Total score >12; 1st priority
				2nd priority	36.6					Medium	3	Bad	3	Secondary	3	Total score >9; 2nd priority
				3rd priority	62.2					Small	1	Others	1	Others	1	Total score <10; 3rd priority
				Total	154.3											

表 II-4.7.1 農民グループによる活動プログラムリスト（農産加工・流通分野）

No.	Title	Input	Activities	Expected Effect / Profit
1	Production of Edible Oil and Animal Feed	1) Introduction of equipment - Rice mill - Oil expeller - Grinder / cutter - Mixer 2) Building and storage house a) Training for - Processing - Operation of machinery - Management and marketing b) Provision of micro-credit	1) Rice milling service for farmers by reducing processing losses and procurement of husk and bran. 2) Producing ground nuts / sesame oil and procurement of oil cakes. 3) Producing feeds using by-products and additional materials to be procured. 4) Selling edible oil and animal feed.	1) Demonstration effect of better post-harvest processing method to reduce losses and improve quality on rice milling. 2) Return of profit to member farmers by supplying qualified feed at lower price. 3) Generating bargaining power of products.. 4) Generating profit by selling products 5) Possibilities of expanding activities in the fields of agro-industry such as group raising and meat processing.. 6) Absorption of labor in agricultural sector in the area
2	Group Collection and Shipping	<Stage 1> 1) Collection and shipping facility <Stage 2> 1) Trucks 2) Information center equipped with computers and telephone transmission apparatus a) Provision of market information by the agency concerned in the Province b) Training of - Management and marketing to the management staff - Information collection and analysis <Stage 3> 1) Storage house	<Stage 1> 1) Bringing the products to the facility by farmers in the surrounding area. 2) Promotion of traders' coming to the facility. 3) Carrying out the transaction between traders and farmers in the facility. 4) Exporting the local products to Phnom Penh and other provinces from the facility. <Stage 2> 1) Collection of market information. 2) Analysis of information on market needs. 3) Planning of collection schedule among members. 4) Collection and combining and / or packaging convenient unit to market requirements, and shipping to markets. <Stage 3> 1) Collection of market information. 2) Analysis of information on market needs in view of many factors such as trend of pricing, quality requirement and trend of exporting by each commodity.	1) Demonstration effect of market-oriented group activities 2) Generating bargaining power to markets 3) Generating more profit to member farmers by farming and marketing to meet market needs 4) Possibilities of expanding activities in the fields of agro-processing industry with value-added products 5) Absorption of labor in agricultural sector in the area

			<ol style="list-style-type: none"> <li>3) Forecasting markets condition based on the results of analysis</li> <li>4) Planning of the farming schedule to meet markets needs and produce more profit for all farm area of members</li> <li>5) Collection and combining and / or packaging unit to market requirements, and shipping to markets</li> <li>6) Utilizing storage house and watching daily market information to ship products on the best time and to the best destination markets by trucks</li> </ol>	
3	Activities as the Commission Agent	<ol style="list-style-type: none"> <li>1) Storage house</li> <li>2) Trucks</li> <li>a) Training of management and marketing</li> <li>b) Provision of micro-credit</li> </ol>	<ol style="list-style-type: none"> <li>1) Carrying out trading activities by member farmers as the commission agent for the producers.</li> <li>2) Gathering the products from the members in the surrounding area.</li> <li>3) Transport the products to the markets and sell.</li> <li>4) The sales income is paid back to the producers after reduction of transportation charge and commission</li> </ol>	<ol style="list-style-type: none"> <li>1) Demonstration effect of model trading activity by farmers group and traders</li> <li>2) Releasing labor in the agricultural sector to trading sector</li> <li>3) Generating income to member farmers in addition to their agricultural income.</li> </ol>
4	Processing and Marketing	<ol style="list-style-type: none"> <li>1) Introduction of processing equipment such as: <ul style="list-style-type: none"> <li>- Cocker</li> <li>- Fryer</li> <li>- Dryer</li> <li>- Roaster</li> <li>- Refrigerator</li> <li>- Oven</li> <li>- Bottling machine</li> <li>- Canning machine</li> <li>- Sealer</li> </ul> </li> <li>2) Small factory with a selling spot</li> <li>a) Training of <ul style="list-style-type: none"> <li>- Management and marketing to management staffs</li> <li>- Processing of various products to operators</li> </ul> </li> <li>b) Provision of micro-credit</li> <li>c) Local government assistance for arranging necessary land along N.R.3. for the factory</li> </ol>	<ol style="list-style-type: none"> <li>1) Organizing existing small groups (assisted by the RD-RP) into one enterprise for agro-processing activities.</li> <li>2) Processing various local agricultural products and making the product based on the market analysis and the response to the selling products.</li> <li>3) Selling the products to shops and markets in the surrounding area and promotion to expand the market especially in Phnom Penh.</li> <li>4) Researching the consumer's response while selling the various products especially new developed products sold at the selling spot attached to the factory along N.R.3 and feeding the information back to the processing.</li> </ol>	<ol style="list-style-type: none"> <li>1) Demonstration effect of agro-processing activities by farmers group and market oriented development activities of the products.</li> <li>2) Releasing labor in the agricultural sector to industrial sector</li> <li>3) Generating income to member farmers in addition to their agricultural income.</li> </ol>

表 II-4.7.2 米の需給安定化プログラム

No.	Title	Input	Activities	Expected Effect / Profit
1	Rice Marketing Activities by Water User Community	1) Introduction of storage house 2) Introduction of rice mill, if necessary a) Training of - Management and accounting - Marketing - Quality control - Processing, if necessary	1) Storing the paddy received from the members as the irrigation service fee (ISF). 2) Selling the paddy at higher price, watching the market condition. 3) Before selling the paddy may be milled if it will be feasible.	1) Demonstration effect of the economic activity for procured paddy to the other communities. 2) Expecting the various activities such as agricultural inputs procurement and other products selling that will be developed from this activity in the community. 3) Strengthening the financial base for management and maintenance of the irrigation facilities.

表 II-4.10.1 全体実施スケジュール

Plans and Program		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Physical Development	1 Upper Slakou River Irrigation Reconstruction Plan (3,500 ha)	[Master Plan and Feasibility Study]										
	Stage-1 (550 ha)		[Detail Design]	[Construction]								
	Stage-2 (2,950 ha)			[Detail Design]	[Construction]							
	2 Small Reservoir Rehabilitation Plan (14 nos.)	[Master Plan and Feasibility Study]										
	Stage-1 (2 nos.)		[Detail Design]	[Construction]								
	Stage-2 (7 nos.)			[Detail Design]	[Construction]							
	Stage-3 (5 nos.)						[Detail Design]	[Construction]				
	3 Small Pond Development Plan (72 ponds/village)	[Master Plan and Feasibility Study]										
	Stage-1 (6 ponds/village)		[Detail Design]	[Construction]								
	Stage-2 (24 ponds/village)			[Detail Design]	[Construction]							
	Stage-3 (42 ponds/village)							[Detail Design]	[Construction]			
	4 Rural Road Improvement Program (154.3 km)	[Master Plan and Feasibility Study]										
Stage-1 (24.5 km)		[Detail Design]	[Construction]									
Stage-2 (67.6 km)			[Detail Design]	[Construction]								
Stage-3 (62.2 km)							[Detail Design]	[Construction]				
Supporting Program	a Agriculture Support Program											
	Farmers Group											
	Agricultural Extension Services											
	Credit Services											
	Agro-processing and Marketing											
	b Institutional Development Program											
	Capacity Building of MOWRAM											
	FWUC											
	c Environmental Conservation Plan											
Program for Minimizing and Controlling Negative Impacts												
Program for Ensuring Environmental Sustainability												
Project Stage												
Stage-1			[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	
Stage-2				[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	
Stage-3					[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	[Support Program]	

Note: [White Box] Master Plan and Feasibility Study  
 [Vertical Lines] Detail Design  
 [Horizontal Lines] Construction  
 [Grid Pattern] Support Program

表 II-4.10.2 スラコウ川上流灌漑復興計画の実施スケジュール

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>I Upper Slakou River Irrigation Reconstruction Plan (USP)</b>	[Gantt chart for Stage-1 (800 ha) showing survey, design, and construction phases from 2002 to 2006]									
<b>Stage-1 (800 ha)</b>	[Gantt chart for Stage-1 (800 ha) showing survey, design, and construction phases from 2002 to 2006]									
(1) Survey, Basic Design, Detail Design, and Construction	[Gantt chart for Stage-1 (800 ha) showing survey, design, and construction phases from 2002 to 2006]									
(2) Agricultural Support Program	[Gantt chart for Stage-1 (800 ha) showing agricultural support programs from 2002 to 2006]									
1) Farmers Group	[Gantt chart for Stage-1 (800 ha) showing farmers group activities from 2002 to 2006]									
Organizing of Farmers Group	[Gantt chart for Stage-1 (800 ha) showing organizing of farmers group from 2002 to 2006]									
Training of Farmers Group	[Gantt chart for Stage-1 (800 ha) showing training of farmers group from 2002 to 2006]									
2) Agricultural Extension Services	[Gantt chart for Stage-1 (800 ha) showing agricultural extension services from 2002 to 2006]									
Demonstration Plot	[Gantt chart for Stage-1 (800 ha) showing demonstration plot from 2002 to 2006]									
Group Purchase of Inputs	[Gantt chart for Stage-1 (800 ha) showing group purchase of inputs from 2002 to 2006]									
Training of Village Extension Workers	[Gantt chart for Stage-1 (800 ha) showing training of village extension workers from 2002 to 2006]									
Seed Multiplication	[Gantt chart for Stage-1 (800 ha) showing seed multiplication from 2002 to 2006]									
Live Stock	[Gantt chart for Stage-1 (800 ha) showing live stock from 2002 to 2006]									
3) Credit Services	[Gantt chart for Stage-1 (800 ha) showing credit services from 2002 to 2006]									
4) Agro-processing and marketing	[Gantt chart for Stage-1 (800 ha) showing agro-processing and marketing from 2002 to 2006]									
Model Group Program for Collection and Shipping	[Gantt chart for Stage-1 (800 ha) showing model group program for collection and shipping from 2002 to 2006]									
Rice Security Program	[Gantt chart for Stage-1 (800 ha) showing rice security program from 2002 to 2006]									
Rice Marketing Program in FWUC	[Gantt chart for Stage-1 (800 ha) showing rice marketing program in FWUC from 2002 to 2006]									
(3) Institutional Development Program	[Gantt chart for Stage-1 (800 ha) showing institutional development program from 2002 to 2006]									
1) Capacity Building of MOWRAM	[Gantt chart for Stage-1 (800 ha) showing capacity building of MOWRAM from 2002 to 2006]									
2) FWUC	[Gantt chart for Stage-1 (800 ha) showing FWUC from 2002 to 2006]									
3) Local Administration (PRDC, CDC, VDC)	[Gantt chart for Stage-1 (800 ha) showing local administration from 2002 to 2006]									
(4) Environmental Conservation Program	[Gantt chart for Stage-1 (800 ha) showing environmental conservation program from 2002 to 2006]									
1) Program for Minimizing and Controlling Negative Impacts	[Gantt chart for Stage-1 (800 ha) showing program for minimizing and controlling negative impacts from 2002 to 2006]									
Water-related Hazard Prevention	[Gantt chart for Stage-1 (800 ha) showing water-related hazard prevention from 2002 to 2006]									
Affected Households Assistance	[Gantt chart for Stage-1 (800 ha) showing affected households assistance from 2002 to 2006]									
Environmental Monitoring	[Gantt chart for Stage-1 (800 ha) showing environmental monitoring from 2002 to 2006]									
2) Program for Ensuring Environmental Sustainability	[Gantt chart for Stage-1 (800 ha) showing program for ensuring environmental sustainability from 2002 to 2006]									
Watershed Management	[Gantt chart for Stage-1 (800 ha) showing watershed management from 2002 to 2006]									
<b>Stage-2 (2,700 ha)</b>	[Gantt chart for Stage-2 (2,700 ha) showing survey, design, and construction phases from 2003 to 2007]									
(1) Survey, Basic Design, Detail Design, and Construction	[Gantt chart for Stage-2 (2,700 ha) showing survey, design, and construction phases from 2003 to 2007]									
(2) Agricultural Support Program	[Gantt chart for Stage-2 (2,700 ha) showing agricultural support programs from 2003 to 2007]									
1) Farmers Group	[Gantt chart for Stage-2 (2,700 ha) showing farmers group activities from 2003 to 2007]									
Organizing of Farmers Group	[Gantt chart for Stage-2 (2,700 ha) showing organizing of farmers group from 2003 to 2007]									
Training of Farmers Group	[Gantt chart for Stage-2 (2,700 ha) showing training of farmers group from 2003 to 2007]									
2) Agricultural Extension Services	[Gantt chart for Stage-2 (2,700 ha) showing agricultural extension services from 2003 to 2007]									
Demonstration Plot	[Gantt chart for Stage-2 (2,700 ha) showing demonstration plot from 2003 to 2007]									
Group Purchase of Inputs	[Gantt chart for Stage-2 (2,700 ha) showing group purchase of inputs from 2003 to 2007]									
Training of Village Extension Workers	[Gantt chart for Stage-2 (2,700 ha) showing training of village extension workers from 2003 to 2007]									
Seed Multiplication	[Gantt chart for Stage-2 (2,700 ha) showing seed multiplication from 2003 to 2007]									
Live Stock	[Gantt chart for Stage-2 (2,700 ha) showing live stock from 2003 to 2007]									
3) Credit Services	[Gantt chart for Stage-2 (2,700 ha) showing credit services from 2003 to 2007]									
4) Agro-processing and marketing	[Gantt chart for Stage-2 (2,700 ha) showing agro-processing and marketing from 2003 to 2007]									
Model Group Program for Collection and Shipping	[Gantt chart for Stage-2 (2,700 ha) showing model group program for collection and shipping from 2003 to 2007]									
Rice Security Program	[Gantt chart for Stage-2 (2,700 ha) showing rice security program from 2003 to 2007]									
Rice Marketing Program in FWUC	[Gantt chart for Stage-2 (2,700 ha) showing rice marketing program in FWUC from 2003 to 2007]									
(3) Institutional Development Program	[Gantt chart for Stage-2 (2,700 ha) showing institutional development program from 2003 to 2007]									
1) FWUC	[Gantt chart for Stage-2 (2,700 ha) showing FWUC from 2003 to 2007]									
2) Local Administration (PRDC, CDC, VDC)	[Gantt chart for Stage-2 (2,700 ha) showing local administration from 2003 to 2007]									
(4) Environmental Conservation Program	[Gantt chart for Stage-2 (2,700 ha) showing environmental conservation program from 2003 to 2007]									
1) Program for Minimizing and Controlling Negative Impacts	[Gantt chart for Stage-2 (2,700 ha) showing program for minimizing and controlling negative impacts from 2003 to 2007]									
Water-related Hazard Prevention	[Gantt chart for Stage-2 (2,700 ha) showing water-related hazard prevention from 2003 to 2007]									
Affected Households Assistance	[Gantt chart for Stage-2 (2,700 ha) showing affected households assistance from 2003 to 2007]									
Environmental Monitoring	[Gantt chart for Stage-2 (2,700 ha) showing environmental monitoring from 2003 to 2007]									
2) Program for Ensuring Environmental Sustainability	[Gantt chart for Stage-2 (2,700 ha) showing program for ensuring environmental sustainability from 2003 to 2007]									
Watershed Management	[Gantt chart for Stage-2 (2,700 ha) showing watershed management from 2003 to 2007]									

Note: [Legend for Gantt chart symbols: Master Plan and Feasibility Study, Detail Design, Construction, Support Program]

表 II-4.10.3 小規模溜池改修計画の実施スケジュール

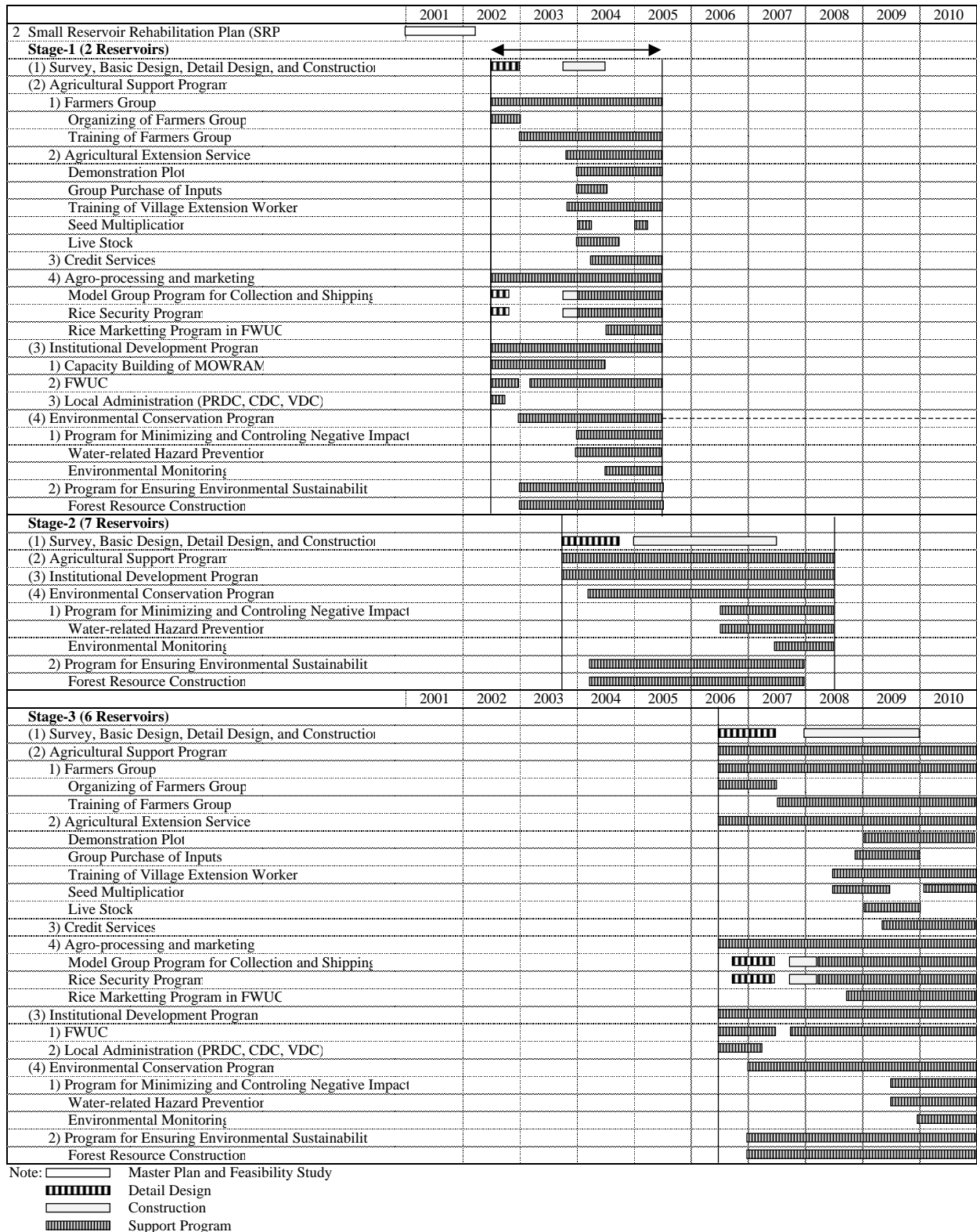


表 II-4.10.4 池建設計画の実施スケジュール

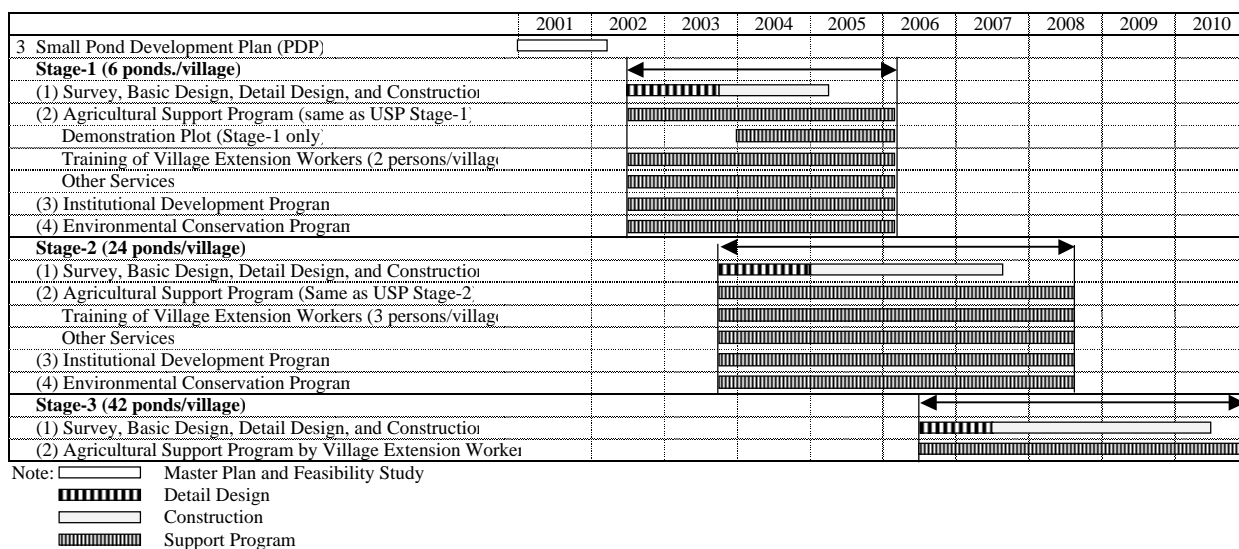




表 II-4.11.1 スラコウ川上流灌漑復興計画の事業費 (マスタープラン調査)

(Unit : Million Riel)		
Work Item	Cost (million Riel)	Remarks
I. Preparatory Work	2,425.7	(II.1-5)x5%
II. Direct Cost		
1) Tumnap Lok Reservoir	10,441.1	
2) Diversion Canal	6,953.8	
3) Kpob Trobek Reservoir	10,107.7	
4) Irrigation Canal System	17,655.1	
5) Tertiary Development	3,356.0	
Sub-total	48,513.7	
III. O&M Equipment	306.8	
IV. Institutional Development	823.8	
V. Relocation and Land Expropriation Cost		
1) Relocation Cost	46.0	
2) Land Expropriation Cost		
Sub-total		
VI. Administration Cost	2,320.5	
VII. Engineering Service	3,881.1	(II.1-5)x8%
Total	58,317.6	(I - VII)
VIII. Physical Contingency	5,831.8	(I - VII)x10%
IX. Price Contingency	7,311.3	
Grand Total	71,460.7	

表 II-4.11.2 小規模溜池改修計画の事業費 (マスタープラン調査)

(Unit : Thousand Riel)				
Work Item	Tumnup Kim Sei	Ang 160	Trapeang Lean	Remarks
Irrigable area	21ha	21ha	10ha	
I. Preparatory Work	14,670	14,010	9,360	(II.1-2)x5%
II. Direct Cost				
1) Rehabilitation Works	274,390	260,890	177,550	
2) Tertiary Development	19,170	19,170	9,600	
Sub-total	293,560	280,060	187,150	
III. O&M Equipment	2,740	2,740	2,740	
IV. Institutional Development	4,710	4,710	2,360	
V. Administration Cost	20,720	20,720	20,720	
VI. Engineering Service	23,480	22,400	14,970	(II.1-2)x8%
Total	359,880	344,640	237,300	(I-VII)
VII. Physical Contingency	35,990	34,460	23,730	(I-VII)x10%
Grand Total	395,870	379,100	261,030	

表 II-4.11.3 池建設計画の事業費 (マスタープラン調査)

(Unit : Thousand Riel)				
Work Item	(Group Management)	(Group Management)	(Individual Management)	Remarks
Nos. of Ponds	15 nos.	15 nos.	72 nos.	
Irrigable Area	around 5ha	around 5ha	around 5ha	
I. Direct Cost	107,140	80,360	128,570	
II. Institutional Development	1,190	1,190	1,190	
III. Administration Cost	710	710	710	
IV. Engineering Service	8,580	6,420	10,280	(II.1-2)x8%
Total	117,620	88,680	140,750	(I-VII)
V. Physical Contingency	960	13,120	14,080	(I-VII)x10%
Grand Total	118,580	101,800	154,830	

表 II-5.1.1 マスタープランの概要とスクリーニング結果

1. Brief Description of Master Plan

Outline of Study Area:	Existing cultivated land extending mainly on the right bank of the Slakou River in Takeo Province
Beneficiaries & Benefited Area:	65,000 ha as total Study Area, 3,500 ha covered by USP (39 villages)
Relevant Main Components:	SRP (280 ha), PDP (2,100 ha), RIP (154 km), Agriculture Support Program, Institutional Development Program
Executing Agencies:	Ministry of Water Resources and Meteorology (Ministry of Rural Development and Ministry of Agriculture, Forestry and Fishery as related agencies)
Environmental Agencies Concerned:	Ministry of Environment

2. Major Components of Master Plan and Screening for Initial Evaluation

Major Components	Type		Scale and Characteristic		Screening
	New	Rehab	Area, etc.	Characteristic	
a. Irrigation					
a-1 USP			Total: 3,500 ha	Rehabilitation of Tumnup Lok and Kpob Trobek reservoirs, rehabilitation of main and secondary canals (total 66 km)	
a-2 SRP			Total: 280 ha	Rehabilitation of 15 small reservoirs	
a-3 PDP			Total: 2,100 ha	Development or improvement of 18,000 small ponds	
b. Drainage				Improvement of drainage condition as a scheme of USP	screen out
c. Land clearing & leveling					N.A.
d. Sea/swamp reclamation					N.A.
e. Land consolidation					N.A.
f. New land settlement					N.A.
g. Dam & reservoir					
g-1 USP				Tumnup Lok: 1.0 mill. m <sup>3</sup> Kpob Trobek: 2.6 mill. m <sup>3</sup>	
g-2 SRP				Total 1 mill. m <sup>3</sup>	
g-3 PDP				Total 5.3 mill. m <sup>3</sup>	
h. Change in farming system				Improvement of secondary cropping	screen out
i. Others					
i-1 RIP			154 km	Laterite surfacing road of 5 or 6 m wide	
i-2 Fertilizer use			USP, SRP, PDP	Paddy: 3.3 times Secondary crop: 2.5 ~ 6 times	
i-3 Livestock husbandry			USP, SRP	Increment of potential productivity	
i-4 Farmers group			USP, SRP, PDP	Acting body for agriculture support	screen out
i-4 Agricultural Extension			- ditto -	Extension service on farmers group basis	screen out
i-5 Credit			- ditto -	Credit service on farmers group basis	screen out
i-6 Agro-processing & marketing			Part of USP area	Development of system for collection and shipping of agricultural product	screen out
i-7 FWUC			USP area	Acting body for O&M of irrigation system	screen out
i-8 Capacity building				Capacity building of DWRAM, Takeo	screen out

Note: "a." to "h." of main components are specified in JICA environmental guideline, whereas "i" are additionally proposed in the Master Plan.

USP: Upper Slakou Irrigation Reconstruction Plan

SRP: Small Reservoir Rehabilitation Plan

PDP: Small Pond Development Plan

RIP: Rural Road Improvement Program

表 II-5.2.1 調査対象地域及び周辺の環境概要

1. Present Socioeconomic Status of the Study Area

Land ownership and land use, etc.	Although government granted land-use right, most of the land-use ownership in the Study Area has not been legally registered yet. Farming in ruined reservoirs and canals, even illegal, can be observed in the Study Area.
Economic activities	Most of households in and around the Study Area are engaged in agriculture. Very few economic activities of other industrial sectors are observed.
Customs (water right, etc.)	In the Study Area and its lowland, water of rivers, ponds, and reservoirs is mainly used for agricultural or fishery activities. However, none of customs or systems on water use right exists, and fishery rights are limited along the Bassac river.
Host people or community	Widow-headed households of 20 % or more are recognized as vulnerable groups in the Study Area. There are no minority or indigenous groups in the Study Area.
Health and sanitation	Malaria, as water-borne diseases, is commonly seen especially near the mountain area at the upstream of the Study Area. Sanitary conditions including drinking water are considerably poor.
Population	Total population and households in the Study Area are about 165,600 persons and 33,000 households. Percentage of male/female is 89.1 %.
Others	(mentioned in "4. Other Information")

2. Natural Conditions of the Study Area

Climate	Annual mean temperature is 28.0 (Pochentong station, '91-'00). Rainfall on an annual average is about 1,200 mm in the lowland of the Study Area, and 90 % of it occurs during the wet season (May-Nov.).
Topography	The topography of the Study Area is gentle on a whole. The elevation ranges from EL 60 m to EL 6m with a slope of 1/100 to 1/1,000.
Hydrology and drainage	The Slakou river finally flows into the Bassac river through Thnot Te reservoir. Catchment area at Route No. 3 of the Slakou River is 1,200 km <sup>2</sup> , and catchment area of three ruined reservoirs sums up to 520 km <sup>2</sup> . Runoff of the Slakou river basin is very small in the late dry season.
Soil	The lessive soils are dominantly occupying 54,000 ha (83 %) of the Study Area. Fertility and productivity are low to medium.
Forest and vegetation	Most of the Study Area is covered by paddy field and secondary crop land, and forest is very limited. Scrub and abandoned field covered by scrub spread at the foot of Noreay mountain, and are observed occasionally around the O Saray reservoir.
Rare species or fragile ecology	It seems that none of rare or endangered species exists in the Study Area.
Water quality	The analytical results of water quality in dry season indicate that the both surface and ground water are highly polluted with fecal contamination from the view point of drinking water resources. For irrigation use, there are no serious problems on the water quality.
Others	(mentioned in "4. Other Information")

3. Area under Specific Designation

Items	Applicable or Not			
	in the S.A.		Vicinity of the S.A.	
	Appl.	N.A.	Appl.	N.A.
Habitat of fauna and flora in CITES				
Wetland designated in Ramsar Convention				
Heritage sites under the World Heritage Convention				
National park, nature reserve, etc.				
Others				
Forest concession area				
Reforestation project area				

Remark S.A.: Study Area

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora

4. Other Information

1) Socioeconomically sensitive issues

- Most of households in Takeo Province use firewood and charcoal for energy of daily life.
- Small swamps, ponds, and streams in the Study Area are utilized for family fishing. Fish is important resource for not only the domestic diet but income generation for local people.
- The majority of households in the Study Area mainly fetch water for drinking or other use from nearby streams and ponds in dry season.

2) Naturally sensitive issues

- Forest areas in and around the Study Area are threatened with extraction and deforestation, because of illegal logging.
- There are two (2) reforestation projects in and around the Study Area, which are directly or indirectly managed by Department of Forestry and Wildlife of MAFF.
- The geological layer in and around the Study Area is alluvium consisting of sand, silty sand, and sandy silt, which are relatively erodible.
- The nearest protected areas around the Study Area are Kirirom National Park and Phnom Bokor National Park. Since they are located at a distance of about 40 km from the boundary of the Study Area respectively, no environmental impacts are expected.
- There are no tropical forest and wetland in and around the Study Area.

表 II-5.2.2 初期環境評估結果

Environmental Element	M/P Comp. <sup>1/</sup>	Evaluation of the Main Components <sup>2/</sup>								
		a-1	a-2	a-3	g-1	g-2	g-3	i-1	i-2	i-3
1. Socioeconomic Issues										
1) Social Issues										
Planned agricultural settlement		*	*	*	*	*	*	*	*	*
Compulsory relocation of houses		-/C	-/C	*	-/C	X	*	-/C	*	*
Land expropriation		-/C	-/C	*	-/C	X	*	-/C	*	*
Changes in mode of living		X	X	X	X	X	X	+/C	*	X
Conflict among villagers		X	X	X	X	X	X	X	*	*
Immigrants, refugees and nomads		*	*	*	*	*	*	*	*	*
2) Demographic Issues										
Population increase		*	*	*	*	*	*	*	*	*
Change of population composition		*	*	*	*	*	*	*	*	*
3) Economic Activities										
Change of economic activities		X	X	X	X	X	X	X	*	+/C
Change of occupation and labor opportunity		+/C	+/C	X	+/C	+/C	X	+/C	*	X
Income disparities		X	X	X	X	X	X	*	+/C	+/C
4) Institutional and Custom Related Issues										
Water/fishing rights		*	*	*	*	*	*	*	*	*
Change of social or institutional structures		X	X	X	X	X	X	*	*	*
2. Health and Sanitary Issues										
Use of agricultural chemicals		*	*	*	*	*	*	*	*	*
Residual toxicity of agricultural chemicals		*	*	*	*	*	*	*	*	*
Water-borne diseases		-/C	-/C	-/C	-/C	-/C	-/C	*	*	*
Domestic and other wastes		X	X	X	X	X	X	*	*	-/C
3. Cultural Property Issues										
Historic and cultural assets		X	X	X	X	X	X	X	*	*
Aesthetic sites and landscape		X	X	X	X	X	X	X	*	*
4. Biological and Ecological Issues										
Change in vegetation		X	X	X	X	X	X	X	*	X
Impacts on important or indigenous species		X	X	X	X	X	X	X	X	X
Degradation of precious ecosystem		X	X	X	X	X	X	X	*	X
Encroachment on wetlands		*	*	*	*	*	*	*	*	*
Degradation of forest resource		X	X	X	-/B	-/C	X	-/B	*	X
Degradation of mangrove forest		*	*	*	*	*	*	*	*	*
Degradation of coral reef		*	*	*	*	*	*	*	*	*
Depreciation of fisheries		-/C	-/C	X	+/C	+/C	+/C	X	-/C	X
5. Soil and Land Issues										
Soil erosion and sedimentation		-/C	-/C	X	-/C	-/C	X	-/C	*	*
Soil salinization		X	X	X	*	*	*	*	*	*
Loss of soil fertility		X	X	X	X	X	X	X	+/B	+/C
Soil contamination		*	*	*	*	*	*	*	*	*
Land devastation or desertification		*	*	*	*	*	*	*	*	*
Devastation of hinterland		X	X	X	-/B	-/C	X	-/B	*	*
Ground subsidence		*	*	*	*	*	*	*	*	*
6. Hydrology, Water Quality, etc.										
Change in surface water hydrology		X	X	X	-/C	X	X	*	*	*
Change in groundwater hydrology		X	X	X	X	X	X	*	*	*
Inundation and flood		X	X	*	X	X	*	*	*	*
Riverbed degradation		X	X	*	X	X	*	*	*	*
Impediment of inland navigation		*	*	*	*	*	*	*	*	*
Contamination of water quality		-/C	-/C	X	*	*	*	*	-/B	-/C
Eutrophication		*	*	*	-/C	X	X	*	X	X
Low temperature water		*	*	*	X	X	X	*	*	*
Atmosphere pollution		*	*	*	*	*	*	-/C	*	*

<sup>1/</sup>: Major components of the Master Plan to be examined (See Table II-5.1.1)

<sup>2/</sup>: Each applicable item is marked with the following classifications.

++/A: Upper part shows the direction of impacts and lower part shows the magnitude of impacts.

A: Relatively high magnitude of impacts is anticipated.

B: Relatively medium magnitude of impacts is anticipated.

C: Relatively low magnitude of impacts is anticipated.

X: No effect is expected.

\*: No relation

+: Positive effect is expected.

-: Negative effect is anticipated.

表 IV-1.2.1 優先地区内の行政村及び村

計画	行政村	村	人口	戸数	面積(ha)	
					全面積	水田面積
USP	Trapeang Kranhung	1 Khpob Svay	512	84	374	275
	O Saray	1 Trapeang Dang Tuek	571	108	162	100
		2 Trapeang Krasang	909	197	405	290
		3 Boeng Satong	431	86	205	86
		4 Trapeang Khchau	561	107	167	90
		小計	(2,472)	(498)	(939)	(566)
	T.T.K. Cheung	1 Peak Bang'aong	1,233	241	192	162
		2 Prey Khvav	447	89	76	64
		3 Trapeang Svay	454	86	123	92
		4 Ta Suon	899	180	120	90
		5 Prey Ta Lei	292	52	72	56
		6 Pou Doh	1,254	223	300	170
		7 Prey Sbat	923	176	126	95
		8 Prey Dak Por	345	72	76	50
		9 Prey Kduoch	313	64	64	59
		小計	(6,160)	(1,183)	(1,149)	(838)
	Cheang Tong	1 Srae Khvav	927	163	175	121
2 Ta Reab		592	116	115	82	
3 Angk Kralanh		633	123	170	108	
4 Angk Baksei		580	114	125	90	
5 Trapeang Srangae		229	50	90	48	
6 Totueng Thngai		505	94	100	77	
7 Trapeang Tuek		381	73	70	51	
8 Ta Toeum		477	94	120	74	
9 Moeang Char		1,460	274	375	182	
10 Ti Pat		489	98	160	82	
11 Srae Kruo		561	99	135	75	
12 Tuol Tbaeng		836	151	300	164	
13 Nomou		799	149	149	113	
	小計	(8,469)	(1,598)	(2,084)	(1,267)	
Ta Phem	1 Mrum	645	137	181	150	
	2 Trapeang Ampil	747	141	170	142	
	3 Ta Much	462	91	128	105	
	4 Moha Sena	1,057	216	253	218	
	5 Ta Mom	642	115	186	152	
	小計	(3,550)	(700)	(918)	(767)	
	USP 合計	(21,163)	(4,063)	(5,464)	(3,713)	
SRP	T.T.K. Tboung Nhang Nhang	1 Trapeang Chhuk	992	181	421	199
		2 Kim Sei	380	77	148	130
		SRP 合計	(1,372)	(258)	(569)	(329)
PDP	Nhang Nhang	1 Trapeang Snao	583	111	298	188
合計	7 行政村	35 村	(23,118)	(4,432)	(6,331)	(4,230)

注): 地名は基本的に 1998 年発行のカンボディア国人口統計での表記に基づくが、本報告書では Ou Saray( 行政村 )は O Saray、Ta Koem 村( Cheang Tong 行政村 )は Ta Toeum、Kamsei 村( Nhang Nhang 行政村 )は Kim Sei 村とした。

出典: 村長への聞き取り調査

表 IV-1.3.1 優先地区の受益者と平均経営規模

(Unit: ha/household)

	USP	Ang160 SRP	Kim Sei SRP	PDP
Average farm size operated (ha/household) *1				
Paddy field	0.87	1.10	1.33	1.15
Secondary-crop field	0.03	0.07	0.07	0.06
Tree crop field	0.02	0.05	0.08	0.03
Total	0.92	1.22	1.48	1.24
Irrigable area (ha) by Project *2	3,500	25	27	5.8
Beneficiary households *2	4,020	130	37	88
Average irrigable area per household (ha/family) *2	0.87	0.19	0.73	0.066
No. of villages concerned *2	32	1	1	1
Population in concerned villages *3	21,163	992	380	583
Agricultural households in concerned villages *3	4,063	181	77	111
Average family size (person/family) *3	5.2	5.5	4.9	5.3

Source \*1: Social environmental baseline survey conducted by the Study Team

\*2: JICA Study Team

\*3: Information from each village

表 IV-1.3.2 優先地区の農業労働力

Priority plans	Average of household			Average labor force (person/ha)	Households of beneficiary	Total of agri. labor force in the area
	Family size	Labor force	Agricultural labor force			
USP	5.2	3.1	2.8	3.0	4,020	11,260
Ang160 SRP	5.5	3.6	3.3	2.7	130	430
Kim Sei SRP	4.9	3.0	2.3	1.6	37	85
PDP	5.3	3.1	2.8	1.9	88	250

Source: Social environmental baseline survey conducted by the Study Team

表 IV.1.3.3 優先地区の現況作付面積

(Unit: ha)

Priority plans	USP	Ang160 SRP	Kim Sei SRP	PDP
Local paddy (medi. & late)	2,800	21	20	4.95
HYV paddy (early)	460	7	6	0.58
Vegetables	50	1	-	0.05
Maize	10	1	1	0.00
Groundnut & Mung-bean	40	-	-	0.05
Total	3,360	30	27	5.63
Cropping intensity (%)	96%	120%	100%	97%

表 IV-1.3.4 優先地区の作物収量

(Unit: kg/ha)

	Average	Range of average	Range of good yield
Local Paddy	1,320	700 - 2,000	1,000 - 3,000
HYV Paddy	1,320	600 - 2,000	900 - 3,000
Vegetables	4,000	3,000 - 5,500	4,000 - 8,000
Maize	900	400 - 1,400	600 - 1,800
Groundnut	450	250 - 600	350 - 800
Mung-bean	450	250 - 600	450 - 900

Source: Interview survey with farmers and 35village chiefs

表 IV-1.3.5 優先地区の作物生産量

(Unit: ton)

Priority plans	Paddy	Vegetables	Maize	Groundnut	Mung-bean
USP	4,303	200	9	5	14
Ang 160 SRP	37	4	1	-	-
Kim Sei SRP	34	-	1	-	-
PDP	7.3	0.2	0.	0.	0.02

表 IV-1.3.6 営農資材と生産物の価格

(Unit: Riel/kg)

	Farm-gate price	Wholesale market price		Farm-gate price	Wholesale market price
<b>Outputs</b>			<b>Inputs</b>		
Paddy local	370	420	Urea	800	740
Paddy HYV	300	340	DAP	1,000	930
Maize	600	650	KCL	800	740
Groundnut	1,300	1,800	Paddy seed	400	-
Soybean	1,200	1,280			
Mung-bean	1,400	1,920			
Sesame	1,800	2,200			
Vegetables	630	920			

Note: Figures are shown with annual average prices at October 2001

表 IV-1.3.7 優先地区の家畜数

Priority plans	USP	Ang160 SRP	Kim Sei SRP	PDP	
Cattle	(a) *1	96	100	85	100
	(b) *2	2.6	3.1	2.5	3.5
	(c) *3	0.65	0.63	0.47	0.63
Pig	(a) *1	98	80	80	80
	(b) *2	1.7	2.1	1.6	2.1
Poultry	(a) *1	93	95	100	90
	(b) *2	18	24	19	16

Note \*1: % of animal raising household (%)

\*2: Average number of animals (head/household)

\*3: Estimated draft animal per ha of paddy field (pair/ha)

Source: Social Environmental Baseline Survey



表 IV-1.3.8 優先地区の農家経済状況

(Unit: Riel/Household)

	Cash Income and Expenditure				Including Home Consumption			
	USP	SRP		PDP	USP	SRP		PDP
		Ang160	Kim Sei			Ang160	Kim Sei	
No. of Respondents	46	20	20	20	46	20	20	20
<b>Average family size</b>	5.2	5.5	4.9	5.3	5.2	5.5	4.9	5.3
<b>Average Farm Size (ha)</b>	0.92	1.22	1.48	1.24	0.92	1.22	1.48	1.24
Paddy field	0.87	1.10	1.33	1.15	0.87	1.10	1.33	1.15
Secondary crop field	0.03	0.07	0.07	0.06	0.03	0.07	0.07	0.06
Tree crop land	0.02	0.05	0.08	0.03	0.02	0.05	0.08	0.03
<b>Income</b>								
Paddy/Rice	39,261	12,800	50,920	80,525	424,908	537,240	649,572	561,660
Vegetables	11,848	36,860	35,500	8,500	23,695	73,720	71,000	17,000
Fruits	1,739	23,030	17,000	11,750	3,478	46,060	34,000	23,500
Other agri. products	0	9,500	8,750	0	0	19,000	17,500	0
Subtotal of crop	52,847	82,190	112,170	100,775	452,081	676,020	772,072	602,160
Livestock	312,871	276,750	479,750	253,083	329,337	291,316	505,000	266,403
Total of Farm Income	365,718	358,940	591,920	353,858	781,419	967,336	1,277,072	868,563
Fish	0	14,000	0	0	0	14,000	0	0
Salary	26,087	61,750	311,960	126,500	26,087	61,750	311,960	126,500
On-farm wage	0	6,250	7,000	2,000	0	6,250	7,000	2,000
Off-farm wage	77,608	69,750	18,300	75,450	77,608	69,750	18,300	75,450
Business	27,826	30,000	4,000	40,300	27,826	30,000	4,000	40,300
Fire wood	0	5,000	0	0	0	5,000	0	0
Forest products	0	850	0	0	0	850	0	0
Others	6,370	6,250	0	0	6,370	6,250	0	0
Total of Off-farm Income	137,891	193,850	341,260	244,250	137,891	193,850	341,260	244,250
Total	503,609	552,790	933,180	598,108	919,309	1,161,186	1,618,332	1,112,813
<b>Expenditure</b>								
1. Production Cost								
Paddy	69,869	77,875	144,370	158,000	69,869	77,875	144,370	158,000
Other crops	892	3,100	6,720	2,350	892	3,100	6,720	2,350
Livestock	187,391	105,888	143,050	106,600	187,391	105,888	143,050	106,600
Total	258,153	186,863	294,140	266,950	258,153	186,863	294,140	266,950
2. Living Expenditure								
Rice/paddy	19,565	13,800	7,640	5,160	405,212	538,240	606,292	486,295
Other foods	49,174	41,460	74,683	63,250	79,227	125,416	161,183	96,820
Food total	68,739	55,260	82,323	68,410	484,439	663,656	767,475	583,115
Health	25,304	47,550	41,350	45,190	25,304	47,550	41,350	45,190
Education	33,835	19,872	67,660	28,044	33,835	19,872	67,660	28,044
Clothes	18,913	47,250	79,800	47,700	18,913	47,250	79,800	47,700
Fuel/Electricity	8,869	31,690	53,620	25,887	8,869	31,690	53,620	25,887
Transportation	27,983	35,710	44,896	23,440	27,983	35,710	44,896	23,440
Housing	18,087	9,525	152,963	76,625	18,087	9,525	152,963	76,625
Invest to business	24,000	25,550	31,250	6,875	24,000	25,550	31,250	6,875
Tax	3,840	0	3,800	1,120	3,840	0	3,800	1,120
Others	34,087	54,415	40,330	40,555	34,087	54,415	40,330	40,555
Total of living expenses	263,656	326,822	597,992	363,846	679,357	935,218	1,283,144	878,551
<b>Total of Expenses</b>	521,809	513,685	892,132	630,796	937,510	1,122,080	1,577,284	1,145,501
<b>Balance</b>	-18,200	39,106	41,048	-32,688	-18,200	39,106	41,048	-32,688

Note: Gross income and expenditure for "Including home consumption" is estimated as follows

Income from paddy is estimated on the assumptions that production value is 1,320 kg/ha for paddy field, and the price is 370 Riel/kg.

Income from other crops is estimated on the assumption that 50% of products is consumed by farmers and 50% of the products is sold.

Income from livestock is estimated on the assumption that 5% of products is consumed by farmers themselves.

Source: Social environmental baseline survey conducted by JICA Study Team

表 IV-1.6.1 VDCによる肥料クレジットの現況

Commune Village	No. of farm house- holds	Fund for credit					Credit for inputs			
		Donor	Year established	Original capital *1 (US\$)	Additional capital *2 (US\$)	Present *3 (US\$)	No. of users	Users ratio (%)	Average User *4 Villager *5 (US\$/hh) (US\$/hh)	
<b>USP</b>										
<b>0 Trapeang Kranhumg</b>	55	SEILA	2001 (on-going)							
1 Khpob Svay										
<b>1 O Saray</b>										
1 Trapeang Dang Tuek	108	SEILA	2001 (on-going)							
2 Trapeang Krasang	197	SEILA	2001 (on-going)							
3 Boeng Satong	86	SEILA	2001 (on-going)							
4 Trapeang Khchau	107	SEILA	2001 (on-going)							
<b>2 T.T.K. Cheung</b>										
1 Peak Bang'aong	241	UNICEF	1997	1,448		1,793	96	40%	18.7	7.4
2 Prey Khvav	89	UNICEF	1997	700		812	72	81%	11.3	9.1
3 Trapeang Svay	86	UNICEF	1997	1,260		1,561	70	81%	22.3	18.2
4 Ta Suon	180	UNICEF	1998	1,098		1,371	79	44%	17.4	7.6
5 Prey Ta Lei	52	UNICEF	1997	550		605	52	100%	11.6	11.6
6 Pou Doh	223	UNICEF	1997	2,300		2,897	190	85%	15.2	13.0
7 Prey Sbat	176	UNICEF	1997	1,290		1,654	64	36%	25.8	9.4
8 Prey Dok Por	72	UNICEF	1997	360		463	22	31%	21.0	6.4
9 Prey Kdouch	57	UNICEF	1998	450		604	30	53%	20.1	10.6
<b>3 Cheang Tong</b>										
1 Srae Khvav	163	UNICEF	1998	350	350	962	48	29%	20.0	5.9
2 Ta Reab	116	UNICEF	1998	250	250	685	54	47%	12.7	5.9
3 Angk Kralanh	123	UNICEF	1998	250	120	503	28	23%	18.0	4.1
4 Angk Baksei	114	UNICEF	1998	250	250	668	28	25%	23.9	5.9
5 Trapeang Srangae	50	UNICEF	1998	200	200	539	33	66%	16.3	10.8
6 Totueng Thngai	94	UNICEF	1998	250	250	696	45	48%	15.5	7.4
7 Trapeang Tuek	73	UNICEF	1998	250	250	669	50	68%	13.4	9.2
8 Ta Koem	94	UNICEF	1998	450		604	55	59%	11.0	6.4
9 Moeang Char	274	UNICEF	1998	530	530	1,418	106	39%	13.4	5.2
10 Ti Pat	98	UNICEF	1998	200	300	671	53	54%	12.7	6.8
11 Srae Kruo	99	UNICEF	1998	200	200	535	43	43%	12.4	5.4
12 Tuol Tbaeng	151	UNICEF	1998	600		807	62	41%	13.0	5.3
13 Nomou	149	UNICEF	1998	350	350	935	58	39%	16.1	6.3
<b>4 Ta Phem</b>										
1 Mrum	134	RD&RP	1997	400		1,011	75	56%	13.5	7.5
2 Trapeang Ampil	137	RD&RP	1997	400		893	72	53%	12.4	6.5
3 Ta Much	91	RD&RP	1997	400		961	75	82%	12.8	10.6
4 Moha Sena	216	RD&RP	1997	400		1,189	94	44%	12.6	5.5
5 Ta Mon	115	RD&RP	1997	400		843	67	58%	12.6	7.3
<b>Total</b>	4,020			15,586	3,050	26,349	1,721	43%	15.3	6.6
<b>Total of 27 villages established credit VDC</b>	<b>3,467</b>			<b>15,586</b>	<b>3,050</b>	<b>26,349</b>	<b>1,721</b>	<b>50%</b>	<b>15.3</b>	<b>7.6</b>
<b>SRP</b>										
<b>Nhaeng Nhang</b>										
1 Kim Sei	77	RD&RP	1999	500		600	77	100%	7.8	7.8
<b>TTK. Tboung</b>										
1 Trapeang Chhuk	181	UNICEF	1999	300	500	1,050	45	25%	23.3	5.8
<b>PDP</b>										
<b>Nhaeng Nhang</b>										
1 Trapeang Snao	111	RD&RP	1999	500		1,005	111	100%	9.1	9.1
<b>Total of 30 village established credit-VDC</b>	<b>3,836</b>			<b>16,886</b>	<b>3,550</b>	<b>29,004</b>	<b>1,954</b>	<b>51%</b>	<b>14.8</b>	<b>7.6</b>

Note \*1: Capital fund by donor at established year  
\*2: Additional fund by donor after established  
\*3: Including accumulated interest as of October 2001  
\*4: Average amount of credit per user  
\*5: Average amount of credit per farm household

Source: VDC of each village

表 IV-1.8.1 農民グループ活動現況

計画	行政村 / 村	参加（利用）戸数				
		農業資材 購入資金 クレジット	小口農村 金融	コメ銀行	その他*	
USP	Trapeang Kranhung Commune 1 Khpob Svay CRDC と VDC は 2001 年に SEILA プロジェクトが組織	-	-	-	-	
	O Saray Commune 1 Trapeang Dang Tuek 2 Trapeang Krasang 3 Boeng Satong 4 Trapeang Khchau CRDC と VDC は 2001 年に SEILA プロジェクトが組織	-	-	-	-	
	T.T.K. Cheung Commune 1 Peak Bang'aong 2 Prey Khvav 3 Trapeang Svay 4 Ta Suon 5 Prey Ta Lei 6 Pou Doh 7 Prey Sbat 8 Prey Dak Por 9 Prey Kduoch CRDC と VDC は 1997 年に UNICEF が組織	96 72 70 79 52 190 64 22 30	96 72 70 79 52 190 64 22 30	69 72 68 84 - 158 56 - 30	- - - - - Yes - - Yes	
	Cheang Tong Commune 1 Srae Khvav 2 Ta Reab 3 Angk Kralanh 4 Angk Baksei 5 Trapeang Srangae 6 Totueng Thngai 7 Trapeang Tuek 8 Ta Toeum 9 Moeang Char 10 Ti Pat 11 Srae Kruo 12 Tuol Tbaeng 13 Nomou CRDC と VDC は 1998/1999 年に UNICEF が組織	48 54 28 28 33 45 50 55 106 53 43 62 58	48 54 28 28 33 45 50 55 106 53 43 62 58	92 85 91 54 50 86 67 93 111 97 63 43 67	Yes - - - - - - Yes - - - Yes -	
	Ta Phem Commune 1 Mrum 2 Trapeang Ampil 3 Ta Much 4 Moha Sena 5 Ta Mom CRDC と VDC は 1997 年に RD&RP が組織	75 72 75 94 67	- - - - -	- - - - -	Yes Yes Yes Yes Yes	
	SRP	T.T.K. Tboung Commune 1 Trapeang Chuuk CRDC と VDC は 1999 年に UNICEF が組織	45	45	118	Yes - -
		Nhaeng Nhang Commune 2 Kim Sei CRDC と VDC は 1997 年に RD&RP が組織	77	-	-	- Yes
	PDP	Nhaeng Nhang Commune 1 Trapeang Snao CRDC と VDC は 1997 年に RD&RP が組織	111	35	-	Yes

注： 裁縫、植林事業、識字教育、母子保健衛生等

出典： 村長への聞き取り調査

表 IV-1.8.2 貯水池及び小規模溜池内での違法耕作の現況

行政村 \ 計画	USP			SRP	
	Tumnup Lok	O Saray	Kpob Trobek	Ang 160	Kim Sei
Phong	120.5 ha (120 戸)				
Trapeang Kranhung	9.5 ha (20 戸)	3.0 ha (3 戸)			
O Saray			140.0 ha (156 戸)		
T.T.K. Tboundg				5.0 ha (13 戸)	
Nhaeng Nhang					8.9 ha (44 戸)
合計	130.0 ha (140 戸)	3.0 ha (3 戸)	140.0 ha (156 戸)	5.0 ha (13 戸)	8.9 ha (44 戸)

出典：村長への聞き取り調査

表 IV-1.8.3 二次水路内での違法耕作の現況

行政村 \ 水路	SC No. 20	SC No. 21	SC No. 22	SC No. 23	SC No. 24
O Saray			0.93 ha (33 戸)	1.26 ha (38 戸)	1.20 ha (42 戸)
T.T.K. Cheung	0.14 ha (4 戸)	0.12 ha (12 戸)		0.24 ha (19 戸)	1.10 ha (13 戸)
Cheang Tong	0.70 ha (16 戸)			0.80 ha (37 戸)	0.36 ha (21 戸)
Ta Phem	1.19 ha (30 戸)	0.02 ha (1 戸)			
合計	2.03 ha (50 戸)	0.14 ha (13 戸)	0.93 ha (33 戸)	2.30 ha (94 戸)	2.66 ha (76 戸)

出典：村長への聞き取り調査

表 IV-4.1.1 Nhaeng Nhang コミューン、Trapeang Snao村池建設計画要約

Pond No.	Type	Status	Sub-Village	Leader	Member (nos.)	Family (nos.)	Pond Size (m)			Existing Farm Land (ha)	Total Volume (m <sup>3</sup> )	Proposed Condition			Construction Cost (US\$)	Assets of Group Leader							Remarks			
							(m)	(m)	(m2)			Effective Volume (m3)	Irrigable 1st (ha)	Irrigable 2nd (ha)		Cow	Pig	Chicken	Duck	Electric 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 cassette, Mc=motorcycle, Bi=Bicycle

Number within ( ) shows number of items,number is one for others without ( ).

表 IV-5.1.1 計画作付面積

(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%

表 IV-5.1.2 優先地区の目標収量

(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

表 IV-5.1.3 計画作物生産量

(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

表 IV-5.1.4 事業地区の食料バランス

**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 (to demand)	kg/family %	-457 -30%	-164 -10%	316 22%	-39 -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					
Irrigable area	ha	3,500	143	49	101
Paddy planted area	ha	3,500	25	27	6
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 (to demand)	kg/family %	1,047 69%	151 9%	1,277 89%	-127 -8%

Note: \*1: Based on the MAFF's indicators

表 IV-5.1.5 事業を実施した場合と実施しない場合の生産量及び純利益

Proposed Cropping Pattern (With-project)

Name of crops	Unit	Local paddy (medium)			HYV paddy (early)			Vegetables			Maize			Groundnut			Soybean			Mung-bean			Sesame		
		Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value
		(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)
<b>1 Gross Income</b>	<b>Riel</b>	<b>1,081</b>			<b>1,035</b>			<b>5,118</b>			<b>1,238</b>			<b>1,119</b>			<b>1,216</b>			<b>1,416</b>			<b>1,453</b>		
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		
<b>2 Production Cost</b>	<b>Riel</b>	<b>373</b>			<b>386</b>			<b>542</b>			<b>256</b>			<b>380</b>			<b>328</b>			<b>319</b>			<b>208</b>		
<b>2.1 Inputs</b>	<b>Riel</b>	<b>253</b>			<b>264</b>			<b>440</b>			<b>185</b>			<b>301</b>			<b>254</b>			<b>246</b>			<b>145</b>		
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	0	0	0	0	0	0	0	0
Others		10% of above			10% of above			10% of above			10% of above			10% of above			10% of above			10% of above			10% of above		
<b>2.2 Labor</b>	<b>m-d</b>	<b>90</b>			<b>90</b>			<b>110</b>			<b>80</b>			<b>65</b>			<b>60</b>			<b>60</b>			<b>50</b>		
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
<b>2.3 Draft animal</b>	<b>Riel</b>	<b>56</b>			<b>56</b>			<b>42</b>			<b>42</b>			<b>39</b>			<b>39</b>			<b>39</b>			<b>39</b>		
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
<b>2.4 Tool/Equipment</b>	<b>Riel</b>	<b>31</b>			<b>32</b>			<b>48</b>			<b>23</b>			<b>34</b>			<b>29</b>			<b>28</b>			<b>18</b>		
<b>2.5 Interest of input credit</b>	<b>Riel</b>	<b>6</b>			<b>7</b>			<b>12</b>			<b>6</b>			<b>6</b>			<b>6</b>			<b>6</b>			<b>6</b>		
<b>3 Net Return</b>	<b>Riel</b>	<b>707</b>			<b>649</b>			<b>4,576</b>			<b>983</b>			<b>739</b>			<b>888</b>			<b>1,097</b>			<b>1,245</b>		
Net Return ratio (3)/(1)	%	<b>65%</b>			<b>63%</b>			<b>89%</b>			<b>79%</b>			<b>66%</b>			<b>73%</b>			<b>77%</b>			<b>86%</b>		
Net Return ratio (3)/(2)	%	<b>189%</b>			<b>168%</b>			<b>844%</b>			<b>384%</b>			<b>195%</b>			<b>271%</b>			<b>344%</b>			<b>600%</b>		

Present Crop Budget (Without Project)

Name of crops	Unit	Local paddy (medium/late)			HYV paddy (early)			Vegetables			Maize			Groundnut			Soybean			Mung-beans			Sesame		
		Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value
		(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)	(Riel)	(1000Riel)
<b>1 Gross Income</b>	<b>Riel</b>	<b>510</b>			<b>417</b>			<b>2,766</b>			<b>557</b>			<b>592</b>			<b>608</b>			<b>637</b>			<b>636</b>		
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		
<b>2 Production Cost</b>	<b>Riel</b>	<b>203</b>			<b>195</b>			<b>296</b>			<b>150</b>			<b>264</b>			<b>212</b>			<b>203</b>			<b>83</b>		
<b>2.1 Inputs</b>	<b>Riel</b>	<b>105</b>			<b>98</b>			<b>223</b>			<b>92</b>			<b>200</b>			<b>153</b>			<b>145</b>			<b>36</b>		
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	0	0	0	0	0	0	0	0
Others		10% of above			10% of above			10% of above			10% of above			10% of above			10% of above			10% of above			10% of above		
<b>2.2 Labor</b>	<b>m-d</b>	<b>80</b>			<b>80</b>			<b>90</b>			<b>70</b>			<b>60</b>			<b>50</b>			<b>50</b>			<b>45</b>		
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
<b>2.3 Draft animal</b>	<b>Riel</b>	<b>56</b>			<b>56</b>			<b>42</b>			<b>42</b>			<b>39</b>			<b>39</b>			<b>39</b>			<b>39</b>		
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
<b>2.4 Tool/Equipment</b>	<b>Riel</b>	<b>16</b>			<b>15</b>			<b>27</b>			<b>13</b>			<b>24</b>			<b>19</b>			<b>18</b>			<b>7</b>		
<b>2.5 Interest of input credit</b>	<b>Riel</b>	<b>2</b>			<b>2</b>			<b>5</b>			<b>2</b>			<b>1</b>			<b>1</b>			<b>1</b>			<b>1</b>		
<b>3 Net Return</b>	<b>Riel</b>	<b>307</b>			<b>222</b>			<b>2,470</b>			<b>407</b>			<b>329</b>			<b>396</b>			<b>434</b>			<b>553</b>		
Net Return ratio (3)/(1)	%	<b>60%</b>			<b>53%</b>			<b>89%</b>			<b>73%</b>			<b>55%</b>			<b>65%</b>			<b>68%</b>			<b>87%</b>		
Net Return ratio (3)/(2)	%	<b>151%</b>			<b>113%</b>			<b>834%</b>			<b>271%</b>			<b>125%</b>			<b>187%</b>			<b>214%</b>			<b>666%</b>		



表 IV-5.1.6 作物生産額、生産費及び純利益 (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
<b>Proposed (With-project)</b>								
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
<b>Present (Without-project)</b>								
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
<b>Incremental</b>								
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

2 Ang160 SRP

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

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
<b>Proposed (With-project)</b>								
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
<b>Present (Without-project)</b>								
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
<b>Incremental</b>								
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

表 IV-5.1.6 作物生産額、生産費及び純利益 (2/2)

Average farm size (paddy) Total: 1.33 ha/family  
Irrigable area: 0.73 ha/family

**3 Kim Sei SRP**

	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
<b>Proposed (With-project)</b>								
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
<b>Total</b>	<b>27</b>	<b>33.0</b>	<b>10.2</b>		<b>0.73</b>	<b>893</b>	<b>277</b>	<b>616</b>
<b>Present (Without-project)</b>								
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
<b>Total</b>	<b>27</b>	<b>13.3</b>	<b>5.4</b>	<b>7.9</b>	<b>0.73</b>	<b>358</b>	<b>145</b>	<b>213</b>
<b>Incremental</b>								
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
<b>Total</b>	<b>0</b>	<b>19.8</b>	<b>4.9</b>	<b>-7.9</b>	<b>0.00</b>	<b>535</b>	<b>131</b>	<b>404</b>

Average farm size (paddy) Total: 1.15 ha/family  
Irrigable area: 0.066 ha/family

**4 Trapeang Snao PDP**

	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
<b>Proposed (With-project)</b>								
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
<b>Total</b>	<b>7.46</b>	<b>24.0</b>	<b>3.2</b>	<b>20.8</b>	<b>0.085</b>	<b>272</b>	<b>36</b>	<b>236</b>
<b>Present (Without-project)</b>								
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
<b>Total</b>	<b>5.63</b>	<b>2.9</b>	<b>1.1</b>	<b>1.8</b>	<b>0.064</b>	<b>33</b>	<b>13</b>	<b>20</b>
<b>Incremental</b>								
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
<b>Total</b>	<b>1.83</b>	<b>21.0</b>	<b>2.0</b>	<b>19.0</b>	<b>0.021</b>	<b>239</b>	<b>23</b>	<b>216</b>

表 IV-5.2.1 農民普及員と農民野外学校の必要数

	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

表 IV-5.2.2 毎年の展示圃数

	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

表 IV-5.2.3 普及活動の実施計画と経費

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)

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)

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)

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 crops	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 crops	78	7	4	6	95
Unit Cost	*3	*3	*3		
Paddy	177	177	177	*4	
Vegetables/Diversified crops	191	191	191	161	
Cost					
Paddy	14,868	1,416	1,416	0	17,700
Vegetables/Diversified crops	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 session

\*2: FFS cost includes Trainer cost and material / venue expenses

\*3: Demo-plot cost includes input and per diem for monitoring and technical guidance by DAFF

\*4: Per diem for monitoring and technical guidance by DAFF for PDP

表 IV-5.4.1 水利組合各部門の職務

本部 (Apex) 委員会

理事長・副理事長：水利組合の運営  
 幹事：水利組合の業務・総務一般

総務・会計課

会計：会計及び水利費の管理  
 守衛：本部事務所、販売施設及び市場施設の警備  
 清掃：事務所及び関連施設の清掃

販売課

販売課長：水利費として物納された米及び多様化作物の市場開拓・販売  
 会計：販売課の会計、市場開拓・販売  
 市場調整：バイヤーや仲介人との販売業務  
 検査：入荷物、出荷物の品質、数量の検査・記録  
 運転手：生産物輸送及びトラックの維持・管理  
 清掃：事務所及び市場施設の清掃

維持管理課

技術係：灌漑施設の維持  
 水路管理 (SO)：貯水池及び幹線水路の運営

問題処理課

紛争処理調整役：水争い等問題処理

2次水路組合

支部長：2次水路及びそれ以下の施設の管理  
 副支部長：2次水路及びそれ以下の施設の管理  
 会計：2次水路組合の会計及び徴収した水利費の管理  
 倉庫管理人：籾倉庫 (depot) の管理  
 水路管理 (SO)：2次水路の運営  
 清掃：事務所及び籾倉庫 (depot) の清掃

灌漑グループ (FWUG)

3次水路代表 (FO)：3次水路の運営・維持、組合員から情報・意見の収集・記録  
 展示圃場実施の支援

表 IV-5.4.2 USP の水利組合の年間運営維持管理費

Annual Personnel Expenses of FWUC

Designation	Unit	Quantity		Unit rate	Amount		Remarks	
		M	M	R. 1,000	R. 1,000			
<b>Apex. Commi.</b>	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		
	<b>Sub-total</b>			<b>12</b>	<b>114</b>		<b>10,260</b>	
	<b>6 SC FWUCs</b>	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	
<b>Sub-total</b>				<b>106</b>	<b>1095</b>		<b>88,920</b>	
<b>Total</b>						<b>99,180</b>		
<b>Marketing Unit</b>	Manager (Marketing Unit)	Person	1	12	120	1,440		
	Marketing 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	
	<b>Sub-total</b>						<b>9,360</b>	
<b>Grand Total</b>						<b>108,540</b>		

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	R.1,000	R.1,000	
<b>Apex. Commi.</b>	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			
<b>Sub-total</b>					<b>28,168</b>		
<b>6 SC FWUCs</b>	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			
<b>Sub-total</b>					<b>36,224</b>		
<b>Total</b>					<b>64,392</b>		
<b>Marketing Unit</b>	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		
	<b>Sub-total</b>					<b>20,040</b>	
<b>Grand Total</b>					<b>84,432</b>	(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.

## 表 IV-5.5.1 プロジェクト事務所職員に対する教育・訓練計画

- (1) 水利組合設立手続き
  - 研修者数：13 名
  - 研修項目
    - 灌漑計画
    - 水利組合の目的及び組織
    - 水利組合設立手続き
    - 責任、義務、権利、定款等
- (2) 末端施設開発
  - 研修者数：13 名
  - 研修項目
    - 3 次水路及び末端施設の設計・建設
    - 土地収用
    - 組合員リスト及び土地台帳
    - 末端施設の運営・維持管理
- (3) 管理者研修
  - 研修者数：13 名
  - 研修項目
    - 水利組合及びその設立手続き
    - 組織管理
    - 水利費、水利組合の収入、支出
    - 問題解決、等
    - 会計（銀行口座、現金出納帖、簿記等）
    - 予算（水利費、水利組合の収入、経費）等
- (4) 灌漑施設の維持管理
  - 研修者数：4 名
  - 研修項目
    - USP の灌漑計画
    - 貯水池、幹線水路、2 次水路、3 次水路及び末端水路までの水管理
    - 修復・維持作業
    - 年間水配分計画
    - 水利費及び維持管理費
- (5) 生産物販売
  - 研修者数：13 名
  - 研修項目
    - 水利費、水利組合の収入、経費
    - カンボジアの自由経済政策
    - 米及び多様化作物の販売
    - 作物品質、市場価格
    - 水利組合の農産物販売計画
    - 統計・データ処理等
- (6) 栽培技術
  - 研修者数：6 名
  - 研修項目
    - 多様化作物の灌漑
    - 末端施設の水管理
    - 農産物品質、市場価格、等

表 IV-5.5.2 水利組合及び農民に対する教育・訓練計画

- (1) 水利組合と設立手続き
  - 研修者数：4,020人
  - 研修期間：1日 x 64回(63人/回)
  - 研修項目：
    - 灌漑計画
    - 水利組合とその目的・組織
    - 水利組合設立手続き
    - 責任・義務・権利、定款
- (2) 末端施設
  - 研修者数：72人
  - 研修期間：2日 x 18回(4人/回)
  - 研修項目：
    - 3次水路と末端施設の建設
    - 土地収用
    - 組合員リスト・土地台帳
    - 末端施設の維持管理
- (3) 水利組合の運営
  - 研修者数：2次水路組合の委員長/副委員長、計12名、幹事1名、会計8名、問題処理調整員1名：合計22人
  - 研修期間：2日 x 5回(22人/回)
  - 研修項目：
    - 水利組合設立手続き
    - 組織管理・運営
    - 水利費、組合の収入と支出
    - 紛争解決
    - 会計(銀行口座、現金出納、簿記)
    - 予算(水利費、組合の収入と支出)
- (4) 灌漑施設の運営維持管理
  - 研修者数：8 S0s+ 72 F0s + 技術者2名、合計82人
  - 研修期間：3日 x 4回(21人/回)
  - 研修項目：
    - USPの灌漑計画
    - 貯水池、水路システムの水管理
    - 修復・修理作業
    - 年水配分スケジュール
    - 水利費・維持管理費
- (5) 市場・販売
  - 研修者数：販売課長1名、市場調整員1名、検査役2名、倉庫管理人6名：合計10人
  - 研修期間：2日 x 5回(10人/回)
  - 研修項目：
    - 水利費、水利組合の収入、経費
    - カンボジアの自由経済政策
    - 米及び多様化作物の販売
    - 作物品質、市場価格
    - 水利組合農産物販売計画
    - 統計・データ処理等
- (6) 農家研修
  - 研修者数：120人の篤農家
  - 研修期間：2日 x 6回(20人/回)
  - 研修項目：
    - 多様化作物の灌漑
    - 末端施設の水管理
    - 農産物品質、市場価格等



表 IV-5.5.3 USP地区における水利組合育成・強化計画表

ターゲットグループ: USP地区農民

実施期間: 6年

プログラムの要約	指 標	指標データ	外部条件
<b>上位目標</b> 農家収入の増加			
<b>プログラムの目標</b> ↑ 調査対象地域での農産物の増産	米生産が100%増産する。乾季畑作が500haに達する。	収量と栽培記録	作物の価格が低下しない。極端にひどい旱魃が起こらない
<b>活動の成果</b> ↑ 1 水利組合を設立する。 2-1 灌漑用水が末端まで分配される。 2-2 水利組合の管理運営がうまくいく。 2-3 施設が機能する。灌漑用水が灌漑水路網をうまく分配される。 2-4 米の販売、畑作物の販売がスムーズに行われる。 2-5 米、畑作物の生産が増える。	大部分の農家が水利組合のメンバーになる。水利組合が法的に登録される。 米の収量が高く維持される。乾季の畑作物の栽培面積が500 haに達する。 ISFが計画値に達成する。集金率が70%に達する。 実際の流量と計画流量の差が20%以内である。 米貯蔵量が、貯蔵施設容量を上回らない。畑作物取り扱い手数料が9千万リアルに達する。 米が100%増産する。乾季畑作物の植付面積が500 haに達する。	土地台帳、登録証明書、承認された定款 栽培記録 収金伝票、会計帳簿 流量観測レコードと用水分配スケジュール SC FWUCの貯蔵施設及び集出荷施設における販売記録、年会計報告書 収量測定、作付記録	
<b>活動</b> 1 <b>水利組合育成活動</b> (プロセス&スケジュールは図 IV-5.4.2 & 5.4.3参照) 1-1 啓蒙活動を行い、各3次水路区毎に調整員を選ぶ。 1-2,3 各3次水路区毎にFWUGを設立し、FOを選び、土地台帳を作成する。 1-4 FOはSC FWUCを設立し、SC FWUCの委員を選ぶ。 1-5,6 Apex 委員会を設立し、定款を作成する。農民の建設工事参加を管理する。 1-7,8 水利組合を登記する。 2 <b>水利組合及びプロジェクト事務所の活動</b> (表 IV-5.4.1 参照) 2-1 末端用水施設を計画、測量、設計、建設する。 2-2 水利組合を管理運営する。 2-3-1 灌漑計画、施設運転計画、維持管理、修理計画を作成する。 2-3-2 灌漑施設を運転する。施設を維持・修理する。 2-4 ISFとして集められた米を販売する。農産物販売についてメンバーに手助けをする。 2-5-1 メンバーと農業生産計画を作成する。 2-5-2 農業生産計画に基づいて展示圃場で改良農業を営むのを指導する。 2-6 農業生産についてM&Eを行う。	<b>専門家の活動</b> (訓練課題は表 IV-5.5.1&2参照) 水利組合設立の実施計画及びガイドラインを作成する。 現地で実地に訓練を実施する。 水利組合設立の進捗状況建設工事への農民の参加を監視し、アドバイスする。 末端施設の開発のためガイドラインを作成し、実地に訓練を実施する。 組織運営、ISFの集金、会計、予算、物品購入、販売等のマニュアルを作成する。実地に訓練を施す。 運営維持管理マニュアルを作成する。 実地訓練を実施する。 市場流通、農産物販売のマニュアルを作成し、実地に訓練を行う。 農作業と農業生産計画作成のマニュアルを作成する。 実地に訓練する。 M&Eの方法を訓練する。	<b>投入</b> 専門家: 水利組合 専門家、灌漑施設維持管理専門家、末端施設開発、会計士、法律家、流通専門家、農業専門家 プロジェクト事務所: 所長、水利組合形成スタッフ、農業普及員、水管理スタッフ、維持管理スタッフ、灌漑施設設計スタッフ、管理運営スタッフ 事務所: (i) 講義室、研修室を含むプロジェクト兼水利組合事務所、集出荷施設(図IV-6.1.1参照)、及び(ii) 6ヶ所のSC FWUC事務所と初集積所 装備: 発電機、コンピュータ、コピーマシン及びその他装備、ピックアップトラック、トラック2台、モーターバイク等	灌漑施設の復興、地区内道路の改修を本プログラムに平行して実施する。 MOWRAM, MRD and MAFF が全面的に協力する。 <b>前提条件</b> 農民が本プログラムに賛同する。 村、コミュニティの長が本プログラムに協力する。

表 IV-5.6.1 環境保全プログラム実施に係る費用見積り

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.

表 IV-6.3.1 スラコウ川上流灌漑復興計画 事業費(フィージビリティ調査)

(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) Tumnap Lok Reservoir	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 Development	666.9	1,760.8	2,427.7	604,000	173
V. Relocation and Land Compensation Cost					
1) Land Compensation	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 Cost	155.7	824.3	980.0	244,000	70
VII. Consulting Services					
1) Design & Construction Supervision	4,256.2	563.9	4,820.1	1,198,000	342
2) Institutional Development & Capacity Building	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 portion.

表 IV-6.3.2 スラコウ川上流灌漑復興計画 年次別事業費配分

(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) Tumnap Lok Reservoir	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 Reservoir	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 Facilities	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 Development	648.5	173.8	173.8	367.8	614.6	449.2	0	0	2,427.7
V. Relocation and Land Compensation Cost									
1) Land Compensation	74.0	18.5	0	0	0	0	0	0	92.5
2) House Relocation	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 Cost	173.5	173.5	188.6	207.3	84.5	53.8	53.8	45.0	980.0
VII. Consulting Services									
1) Design and Construction Supervision	964.0	1,205.1	1,446.1	1,204.9	0	0	0	0	4,820.1
2) Institutional Development & Capacity Building	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. Ground 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

表 IV-6.3.3 小規模溜池改修計画 事業費 (フィービリティ調査)

(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 Development	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

表 IV-6.3.4 小規模溜池改修計画 年次別事業費配分

(Unit : Thousand Riel)

Description	2002	2003	2004	2005	2006	Total
<b>I. Ang 160 SRP</b>						
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 Development	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
<b>II. Kim Sei SRP</b>						
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 Development	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
<b>Grand Total</b>	<b>220,276</b>	<b>249,704</b>	<b>2,151</b>	<b>1,556</b>	<b>680</b>	<b>474,367</b>

表 IV-6.3.5 池建設計画 事業費（フィージビリティ調査）

(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

表 IV-6.3.6 池建設計画 年次別事業費配分

(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

表 IV-6.3.7 農道改修計画 事業費（フィージビリティ調査）

(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

表 IV-6.3.8 農道改修計画 年次別事業費配分

(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

表 IV-8.1 環境保全対策及びモニタリング計画 (1/2)

Program: Watershed Management
Target Area: Sub-area I
<p>Mitigation Measures and Monitoring Framework:</p> <p><u>(1) Items to be managed</u></p> <p>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.</p> <p><u>(2) Activities</u></p> <p>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.</p> <p><u>(3) Indexes to be monitored</u></p> <p>a) Land use conditions and vegetation coverage in the catchment areas; and  b) Forestry activities such as logging and production.</p> <p><u>(4) Management area and monitoring stations</u>  The management and monitoring area will comprise the whole catchment areas (approx. 520km<sup>2</sup>).</p> <p><u>(5) Monitoring period and frequency</u>  Periodic monitoring, for the time being, should be conducted at least once a year by patrolling and interview to local people.</p>
<p>Remark:</p> <p>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.</p>

Program: Forest Resource Conservation
Target Area: Sub-area III, V, VI to conserve Sub-area I
<p>Mitigation Measures and Monitoring Framework:</p> <p>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.</p> <p><u>(1) Probable species to be introduced</u></p> <p>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).</p> <p><u>(2) Activities</u></p> <p>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.</p> <p><u>(3) Indexes to be monitored</u></p> <p>a) Progress of planting and nursing, and status of residential forests; and  b) Products of residential forests and utilization of products.</p> <p><u>(4) Management area and monitoring stations</u>  The monitoring stations will comprise all the planted areas as residential forests.</p> <p><u>(5) Monitoring period and frequency</u>  Periodic monitoring should be conducted at least twice a year by patrolling and interview to VDCs' staffs or local people.</p>
<p>Remark:</p> <p>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.</p>

表 IV-8.1 環境保全対策及びモニタリング計画 (2/2)

Program: Water-related Hazard Prevention
Target Area: Sub-area II, III, IV, V, VI
<p>Mitigation Measures and Monitoring Framework:</p> <p><u>(1) Items to be managed</u></p> <p>a) Reduction of a risk of such water-borne diseases as malaria;</p> <p>b) Protection of the water for drinking/domestic use from quality deterioration; and</p> <p>c) Management and enhancement of fishery resources.</p> <p><u>(2) Activities</u></p> <p>a) Procurement and stock of minimum-hazard chemicals for extermination of mosquitoes and larvae, and spraying on the reservoirs or ponds if required;</p> <p>b) Procurement and distribution of mosquito nets to households living in close proximity of reservoirs or ponds;</p> <p>c) Health education for local people; and</p> <p>d) Education for local people on proper fertilizing manner and on drainage water control.</p> <p><u>(3) Indexes to be monitored</u></p> <p>a) Condition of catching water-borne diseases and number of out-patients (*);</p> <p>b) Water quality especially from the viewpoint of drinking water (*);</p> <p>c) Condition of fertilizer utilization (*);</p> <p>d) Condition of utilization of agricultural chemicals, if any (*); and</p> <p>e) Condition of fishery activities.</p> <p><u>(4) Management area and monitoring stations</u></p> <p>a) Proximity areas to reservoirs or ponds in Sub-area II, V, and VI as monitoring of water-borne diseases;</p> <p>b) Fixed points of water bodies in Sub-area III, IV, V, and VI as monitoring of water quality;</p> <p>c) Proposed irrigation areas and beneficiaries in Sub-area III, V, and VI as monitoring of utilization of fertilizer and agricultural chemicals; and</p> <p>d) Areas in/around the water bodies in Sub-area II, IV, V, and VI as monitoring of fishery activities.</p> <p><u>(5) Monitoring period and frequency</u></p> <p>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).</p> <p>b) Other monitoring works mentioned above should be conducted at least once a year.</p>
<p>Remark:</p> <p>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.</p>

Program: Affected Households Assistance (AHA)
Target Area: Sub-area II, III, V
<p>Mitigation Measures and Monitoring Framework:</p> <p><u>(1) Items to be managed</u></p> <p>a) Minimization of the negative impacts on the households whose houses will be relocated or whose land-use status will be changed; and</p> <p>b) Support for attaining the land-affected households' former living standards.</p> <p><u>(2) Approaches of mitigation measures</u></p> <p>a) Preparation and provision of adequate compensation for land-affected households, if any, who are legal land users;</p> <p>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</p> <p>c) Establishment of a committee, in order to facilitate development of AHA scheme including above and to realize the effectiveness of the scheme.</p> <p><u>(3) Indexes to be monitored</u></p> <p>a) Actual progress of AHA scheme; and</p> <p>b) Socio-economic conditions and requirement of the land-affected households.</p> <p><u>(4) Management area and monitoring stations</u></p> <p>The management and monitoring area should include all the land-affected households.</p> <p><u>(5) Monitoring period and frequency</u></p> <p>The monitoring period should be settled until land-affected households achieve self-sustenance.</p>
<p>Remark:</p> <p>The above activities are prerequisite for implementation of the priority projects, and should be developed as the environmental conservation program for the priority projects.</p>