

Tables

Table I-1.1 Member List of JICA Study Team and Working Group

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. 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 Uowsereyvuth	Environment Expert, Takeo Office, MOE

Table I-2.1 Socio-Economic Indicators of Cambodia

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 ²) (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

Table II-1.1.1 Communes and Villages in the Study Area

No.	Province	District	Commune	Nos of Villages in the Study Area	
				Total	
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 Tbound	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	

Table II-1.4.1 Soils in the Study Area and Land Suitability

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

Table II-1.5.1 Land Use in the Study Area

(Unit: ha)

Province and District	Total Area	Cultivated Land			Other Land							
		Paddy land	Secondary crop land	Total	Resident area	Land for buildings	Road	Canal / Stream land	Reservoir / Pond	Bush / Shrub land	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									0			
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

Table II-1.5.2 Planted Area of Tram Kak Distric

(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

Table II-1.5.3 Estimated Planted Area, Yield and Production in the Study Are

Crop category and name	Estimated planted area		Average yield (ton/ha)	Range of yield (ton/ha)	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 farmer.

Table II-1.5.4 Farm Household Economy by Operating Farm Sizes

(Unit: Riel/household)

	Actual Cash Income and Expenses								Average		Typical Farmer *1		Income & Outgo considering self-consumed products of typical farm household	
	Farm Size Class (ha/household)													
	< 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	%			
A Gross Income														
Farm Income														
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 crops	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%		
Off-farm Income														
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%		
Business/ 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%		
Total	275,000	430,448	411,200	514,900	423,551	552,045	690,300	456,279	451,528	824,169		100%		
B Gross Outgoing														
Production Cost														
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%		
Living Expenses														
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%		
Cost/investment 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%		
Total	387,183	408,490	455,899	458,706	456,772	479,282	524,120	451,910	456,991	829,633		100%		
C Balance	(112,183)	21,958	(44,699)	56,194	(33,221)	72,764	166,180	4,369	(5,463)	(5,463)				

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 farmer

*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 are 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

Table II-2.3.1 Relationship between the Plans with Support Programs and the Constraints

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 banded 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

Table II-3.2.1 Water Balance Calculation Results - Irrigable Area
in Each of Reservoir System Alternatives

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

Table II-3.2.2 Runoff Flowing from the Three Reservoirs to the Downstream in the
Biggest Development Alternative (Alt. 4-4)

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	

Table II-4.3.1 Estimation of Physical Parameters on Small Reservoirs through Field Inspection

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 ³)	Average of Supplementa l 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 Phem	Ta Phem	-	-	-	-	-	-	-	-	no, converted	paddy field, completely damaged	
12	Ang Vatcham Pa	Ta Phem	-	-	-	-	-	-	-	-	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

Table II-4.3.2 Evaluation of Small Reservoirs in the Study Area

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 ADB Irrigable area is too small Irrigable area is too small
3	Ang Khnar				Deleted by preliminary screening						
4	Ang Ongk Kcheay				Deleted by preliminary screening						
5	Tumnup Kim Sei	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 Korm	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 catchment
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 Ses	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

Table II-4.3.3 Small Reservoir Rehabilitation Plan by Stage

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 Tboundg	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 Tboundg, Trapeang Thmor, Leak Khang Cheung	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 Tboundg	Prey Preal, Prakeab	C		15
				Estimated	Stage-1	42
				Irrigable	Stage-2	144
				Area (ha)	Stage-3	101
					Total	286

Table II-4.5.1 Planted Area, Yield and Crop Production of Each Plan

1. Upper Slakou River Irrigation Reconstruction Plan			Irrigation area: 3,500 ha					Incremental	
	Present/ Without-program			With-program			Production ton	Area ha	Production ton
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	range			
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					Incremental	
	Present/ Without-program			With-program			Production ton	Area ha	Production ton
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	range			
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			Incremental	
	Present/ Without-program			With-program			Production ton	Area ha	Production ton
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	Condition			
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			Incremental	
	Present Condition			Future Plan			Production ton	Area ha	Production ton
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	range			
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			Incremental	
	Present Condition			Future Plan			Production ton	Area ha	Production ton
	Planted area ha	Yield kg/ha	Production ton	Planted area ha	Yield kg/ha	range			
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

Table II-4.5.2 Incremental Benefit of Each Plan (1/2)

1. Upper Slakou River Irrigation Reconstruction Plan

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)	
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-bean	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-bean	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

2. Small Reservoir Rehabilitation Plan

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)	
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

Table II-4.5.2 Incremental Benefit of Each Plan (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)	
With-program					
Paddy (medium) *3	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
Present / Without-program					
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
Increment					
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)	
With-program					
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
Present / Without-program					
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
Increment					
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

Table II-4.6.1 Proposed Road Improvement Plan and Priority

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 River	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, Kus	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 Pthem, 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 Bour	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, Pheakdei	Medium	3	Very bad	5	Secondary	3	11	2nd
22	Basedth~Pheakdei South	Basedth	Pheakdei	11.5	Basedth, Phong, Pheakdei	Medium	3	Bad	3	Secondary	3	9	3rd
Note:	T = Trapeang			1st priority	55.5	Note (Scoring):	Large	5	Very Bad	5	Primary	5	Total score >12; 1st priority
	T.T.K =Trapeang Thum Khang			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								

Table II-4.7.1 Details of Expected Activities by Farmers Group

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

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

Table II-4.7.2 Rice Marketing Activities by Farmers Water User Community

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.

Table II-4.10.1 Overall Implementation Schedule

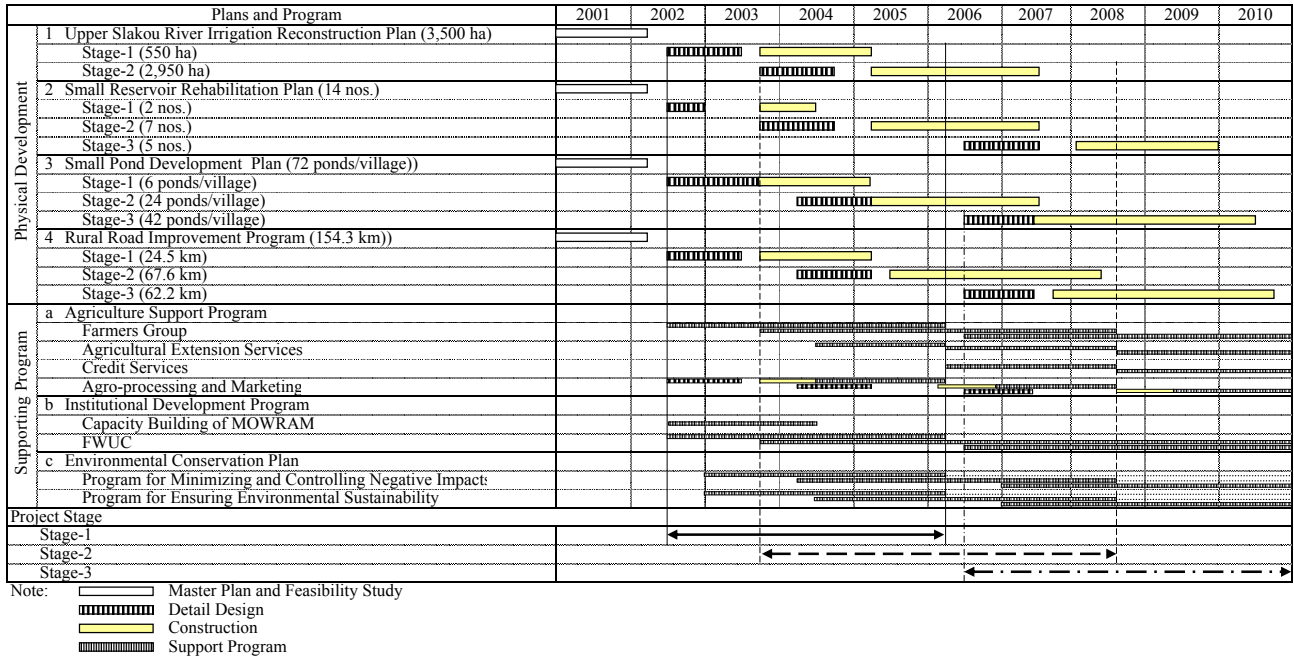


Table II-4.10.2 Implementation Schedule of Upper Slakou River Irrigation Reconstruction Plan

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Upper Slakou River Irrigation Reconstruction Plan (USP)	←-----→									
Stage-1 (800 ha)	←-----→									
(1) Survey, Basic Design, Detail Design, and Construction	[Master Plan and Feasibility Study] [Detail Design] [Construction]									
(2) Agricultural Support Program	[Support Program]									
1) Farmers Group	[Support Program]									
Organizing of Farmers Group	[Support Program]									
Training of Farmers Group	[Support Program]									
2) Agricultural Extension Services	[Support Program]									
Demonstration Plot	[Support Program]									
Group Purchase of Inputs	[Support Program]									
Training of Village Extension Workers	[Support Program]									
Seed Multiplication	[Support Program]									
Live Stock	[Support Program]									
3) Credit Services	[Support Program]									
4) Agro-processing and marketing	[Support Program]									
Model Group Program for Collection and Shipping	[Support Program]									
Rice Security Program	[Support Program]									
Rice Marketing Program in FWUC	[Support Program]									
(3) Institutional Development Program	[Support Program]									
1) Capacity Building of MOWRAM	[Support Program]									
2) FWUC	[Support Program]									
3) Local Administration (PRDC, CDC, VDC)	[Support Program]									
(4) Environmental Conservation Program	[Support Program]									
1) Program for Minimizing and Controlling Negative Impacts	[Support Program]									
Water-related Hazard Prevention	[Support Program]									
Affected Households Assistance	[Support Program]									
Environmental Monitoring	[Support Program]									
2) Program for Ensuring Environmental Sustainability	[Support Program]									
Watershed Management	[Support Program]									
Stage-2 (2,700 ha)	←-----→									
(1) Survey, Basic Design, Detail Design, and Construction	[Master Plan and Feasibility Study] [Detail Design] [Construction]									
(2) Agricultural Support Program	[Support Program]									
1) Farmers Group	[Support Program]									
Organizing of Farmers Group	[Support Program]									
Training of Farmers Group	[Support Program]									
2) Agricultural Extension Services	[Support Program]									
Demonstration Plot	[Support Program]									
Group Purchase of Inputs	[Support Program]									
Training of Village Extension Workers	[Support Program]									
Seed Multiplication	[Support Program]									
Live Stock	[Support Program]									
3) Credit Services	[Support Program]									
4) Agro-processing and marketing	[Support Program]									
Model Group Program for Collection and Shipping	[Support Program]									
Rice Security Program	[Support Program]									
Rice Marketing Program in FWUC	[Support Program]									
(3) Institutional Development Program	[Support Program]									
1) FWUC	[Support Program]									
2) Local Administration (PRDC, CDC, VDC)	[Support Program]									
(4) Environmental Conservation Program	[Support Program]									
1) Program for Minimizing and Controlling Negative Impacts	[Support Program]									
Water-related Hazard Prevention	[Support Program]									
Affected Households Assistance	[Support Program]									
Environmental Monitoring	[Support Program]									
2) Program for Ensuring Environmental Sustainability	[Support Program]									
Watershed Management	[Support Program]									

Note: [White Box] Master Plan and Feasibility Study
 [Hatched Box] Detail Design
 [Yellow Box] Construction
 [Dotted Box] Support Program

Table II-4.10.3 Implementation Schedule of Small Reservoir Rehabilitation Plan

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
2 Small Reservoir Rehabilitation Plan (SRP)	←-----→									
Stage-1 (2 Reservoirs)										
(1) Survey, Basic Design, Detail Design, and Construction		■■■■■	■■■■■	■■■■■	■■■■■					
(2) Agricultural Support Program		■■■■■	■■■■■	■■■■■	■■■■■					
1) Farmers Group		■■■■■	■■■■■	■■■■■	■■■■■					
Organizing of Farmers Group		■■■■■	■■■■■	■■■■■	■■■■■					
Training of Farmers Group		■■■■■	■■■■■	■■■■■	■■■■■					
2) Agricultural Extension Services		■■■■■	■■■■■	■■■■■	■■■■■					
Demonstration Plot		■■■■■	■■■■■	■■■■■	■■■■■					
Group Purchase of Inputs		■■■■■	■■■■■	■■■■■	■■■■■					
Training of Village Extension Workers		■■■■■	■■■■■	■■■■■	■■■■■					
Seed Multiplication		■■■■■	■■■■■	■■■■■	■■■■■					
Live Stock		■■■■■	■■■■■	■■■■■	■■■■■					
3) Credit Services		■■■■■	■■■■■	■■■■■	■■■■■					
4) Agro-processing and marketing		■■■■■	■■■■■	■■■■■	■■■■■					
Model Group Program for Collection and Shipping		■■■■■	■■■■■	■■■■■	■■■■■					
Rice Security Program		■■■■■	■■■■■	■■■■■	■■■■■					
Rice Marketing Program in FWUC		■■■■■	■■■■■	■■■■■	■■■■■					
(3) Institutional Development Program		■■■■■	■■■■■	■■■■■	■■■■■					
1) Capacity Building of MOWRAM		■■■■■	■■■■■	■■■■■	■■■■■					
2) FWUC		■■■■■	■■■■■	■■■■■	■■■■■					
3) Local Administration (PRDC, CDC, VDC)		■■■■■	■■■■■	■■■■■	■■■■■					
(4) Environmental Conservation Program		■■■■■	■■■■■	■■■■■	■■■■■					
1) Program for Minimizing and Controlling Negative Impact:		■■■■■	■■■■■	■■■■■	■■■■■					
Water-related Hazard Prevention		■■■■■	■■■■■	■■■■■	■■■■■					
Environmental Monitoring		■■■■■	■■■■■	■■■■■	■■■■■					
2) Program for Ensuring Environmental Sustainability		■■■■■	■■■■■	■■■■■	■■■■■					
Forest Resource Construction		■■■■■	■■■■■	■■■■■	■■■■■					
Stage-2 (7 Reservoirs)										
(1) Survey, Basic Design, Detail Design, and Construction			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
(2) Agricultural Support Program			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
(3) Institutional Development Program			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
(4) Environmental Conservation Program			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
1) Program for Minimizing and Controlling Negative Impact:			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Water-related Hazard Prevention			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Environmental Monitoring			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
2) Program for Ensuring Environmental Sustainability			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Forest Resource Construction			■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Stage-3 (6 Reservoirs)										
(1) Survey, Basic Design, Detail Design, and Construction						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
(2) Agricultural Support Program						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
1) Farmers Group						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Organizing of Farmers Group						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Training of Farmers Group						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
2) Agricultural Extension Services						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Demonstration Plot						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Group Purchase of Inputs						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Training of Village Extension Workers						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Seed Multiplication						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Live Stock						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
3) Credit Services						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
4) Agro-processing and marketing						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Model Group Program for Collection and Shipping						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Rice Security Program						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Rice Marketing Program in FWUC						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
(3) Institutional Development Program						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
1) FWUC						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
2) Local Administration (PRDC, CDC, VDC)						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
(4) Environmental Conservation Program						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
1) Program for Minimizing and Controlling Negative Impact:						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Water-related Hazard Prevention						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Environmental Monitoring						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
2) Program for Ensuring Environmental Sustainability						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Forest Resource Construction						■■■■■	■■■■■	■■■■■	■■■■■	■■■■■

Note: ■■■■■ Master Plan and Feasibility Study
 ■■■■■ Detail Design
 ■■■■■ Construction
 ■■■■■ Support Program

Table II-4.10.4 Implementation Schedule of Small Pond Development Plan

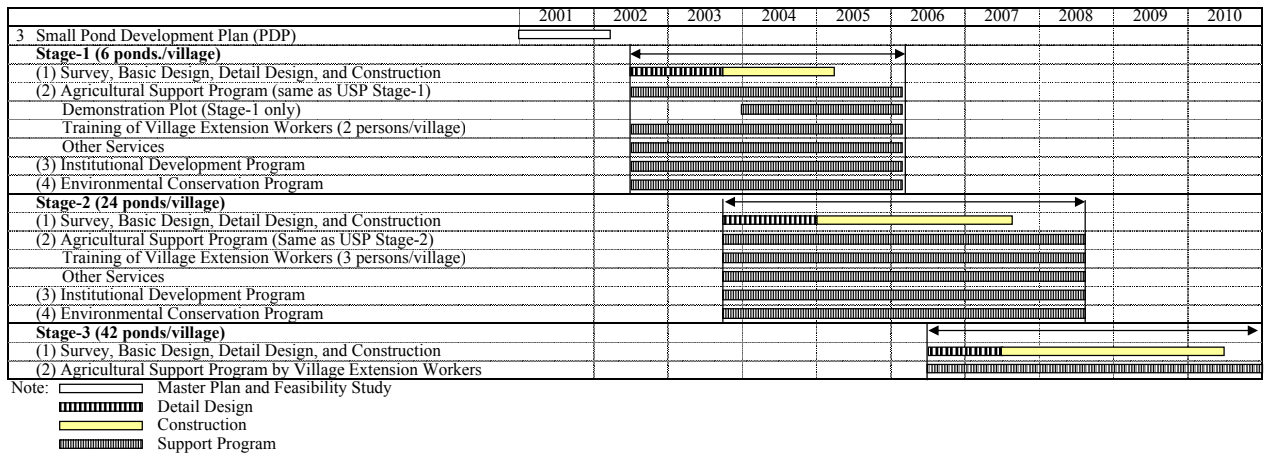


Table II-4.11.1 Project Cost for Upper Slakou River Irrigation Reconstruction Pla
(Mater Plan)

		(Unit : Million Riel)	
Work Item	Cost (million Riel)	Remarks	
I. Preparatory Work	2,425.7	$\Sigma(\text{II.1-5}) \times 5\%$	
II. Direct Cost			
1) Tumnup 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	$\Sigma(\text{II.1-5}) \times 8\%$	
Total	58,317.6	$\Sigma(\text{I - VII})$	
VIII. Physical Contingency	5,831.8	$\Sigma(\text{I - VII}) \times 10\%$	
IX. Price Contingency	7,311.3		
Grand Total	71,460.7		

Table II-4.11.2 Project Cost for Small Reservoir Rehabilitation Plan (Master Plan)

(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	$\Sigma(\text{II.1-2}) \times 5\%$
II. Direct Cost				
1) Rehabilitation Works	274,390	260,890	177,550	
2) Tertiary Developmen	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	$\Sigma(\text{II.1-2}) \times 8\%$
Total	359,880	344,640	237,300	$\Sigma(\text{I-VII})$
VII. Physical Contingency	35,990	34,460	23,730	$\Sigma(\text{I-VII}) \times 10\%$
Grand Total	395,870	379,100	261,030	

Table II-4.11.3 Project Cost for Pond Development Plan (Master Plan)

(Unit : Thousand Riel)				
Work Item	Pond (Group Management)	Canal Pond (Group Management)	Pond (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	$\Sigma(\text{II.1-2}) \times 8\%$
Total	117,620	88,680	140,750	$\Sigma(\text{I-VII})$
V. Physical Contingency	960	13,120	14,080	$\Sigma(\text{I-VII}) \times 10\%$
Grand Total	118,580	101,800	154,830	

Table II-5.1.1 Summarized Description of Components and Screening

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 ³ Kpob Trobek: 2.6 mill. m ³	
g-2 SRP		○		Total 1 mill. m ³	
g-3 PDP	○	○		Total 5.3 mill. m ³	
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

Table II-5.2.1 Summarized Site Description

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°C (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 ² , and catchment area of three ruined reservoirs sums up to 520 km ² . 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.

Table II-5.2.2 Initial Evaluation

Environmental Element	Evaluation of the Main Components ^{2/}									
	M/P Comp. ^{1/}	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	*	*

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

2/: 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.

Table IV-1.2.1 Related Communes and Villages in the Priority Areas

Plans	Commune	Village	Population	Household	Area (ha)	
					Total	Paddy Field
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
		Sub-total	(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
	Sub-total	(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	
Sub-total	(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	
Sub-total	(3,550)	(700)	(918)	(767)		
		Sub-total of USP	(21,163)	(4,063)	(5,464)	(3,713)
SRP	T.T.K. Tboung Nhang	1 Trapeang Chhuk	992	181	421	199
		2 Kim Sei	380	77	148	130
	Sub-total of SRP	(1,372)	(258)	(569)	(329)	
PDP	Nhang Nhang	1 Trapeang Snao	583	111	298	188
Total	7 Commune	35 Villages	(23,118)	(4,432)	(6,331)	(4,230)

Note: Although names of the Communes and Villages are the same as those of the 1998 Population Census of Cambodia, Ou Saray (Commune) was changed to O Saray, Ta Koem (Cheang Tong Commune) to Ta Toeum and Kamsei (Nhang Nhang Commune) to Kim Sei.

Source: Hearing Survey to Village Chiefs

Table IV-1.3.1 Average Farm Size and Beneficiaries in Priority Areas

(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

Table IV-1.3.2 Agricultural Labor Force in Priority Areas

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

Table IV.1.3.3 Planted Area of the Priority Areas

(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%

Table IV-1.3.4 Unit yield of the Priority Areas

(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

Table IV-1.3.5 Crop Production of the Priority Areas

(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

Table IV-1.3.6 Prices of Input and Output

(Unit: Riel/kg)

	Farm-gate price	Wholesale market price		Farm-gate price	Wholesale market price
Outputs			Inputs		
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

Table IV-1.3.7 Livestock Animals of the Priority Areas

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

Table IV-1.3.8 Farm Household Economy of the Priority Area

(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
Average family size	5.2	5.5	4.9	5.3	5.2	5.5	4.9	5.3
Average Farm Size (ha)	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
Income								
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. product	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
Expenditure								
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
Total of Expenses	521,809	513,685	892,132	630,796	937,510	1,122,080	1,577,284	1,145,501
Balance	(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 follow

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

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

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

Table IV-1.6.1 Present Situation of Fertilizer Credit Operated by VDC

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 (US\$/hh)	Villager *5 (US\$/hh)
USP										
0 Trapeang Kranhung	55	SEILA	2001 (on-going)							
1 Khpob Svay										
1 O Saray										
1 Trapeang Dang Tuel	108	SEILA	2001 (on-going)							
2 Trapeang Krasan	197	SEILA	2001 (on-going)							
3 Boeng Satong	86	SEILA	2001 (on-going)							
4 Trapeang Khchai	107	SEILA	2001 (on-going)							
2 T.T.K. Cheung										
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 Kdoucl	57	UNICEF	1998	450		604	30	53%	20.1	10.6
3 Cheang Tong										
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 Kralanl	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 Srang	50	UNICEF	1998	200	200	539	33	66%	16.3	10.8
6 Totueng Thnga	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 Kruc	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
4 Ta Phem										
1 Mrum	134	RD&RP	1997	400		1,011	75	56%	13.5	7.5
2 Trapeang Ampii	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
Total	4,020			15,586	3,050	26,349	1,721	43%	15.3	6.6
Total of 27 villages established credit VDC	3,467			15,586	3,050	26,349	1,721	50%	15.3	7.6
SRP										
Nhaeng Nhang										
1 Kim Sei	77	RD&RP	1999	500		600	77	100%	7.8	7.8
TTK. Tbound										
1 Trapeang Chhuk	181	UNICEF	1999	300	500	1,050	45	25%	23.3	5.8
PDP										
Nhaeng Nhang										
1 Trapeang Snac	111	RD&RP	1999	500		1,005	111	100%	9.1	9.1
Total of 30 village established credit-VDC	3,836			16,886	3,550	29,004	1,954	51%	14.8	7.6

Note *1: Capital fund by donor at established year
*2: Additional fund by donor after establishment
*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

Table IV-1.8.1 CRDCs, VDCs and FGs

Plans	Communes and Villages	Nos. of FGs Member (HHs)			
		Fertilizer Credit	Cash Credit	Rice Bank	Others*
USP	Trapeang Kranhung Commune 1 Khpob Svay CRDC and VDC were established by SEILA in 2001	-	-	-	-
	O Saray Commune 1 Trapeang Dang Tuek 2 Trapeang Krasang 3 Boeng Satong 4 Trapeang Khchau CRDC and VDC were established by SEILA in 2001	-	-	-	-
	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 and VDC were established by UNICEF in 1997	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 and VDC were established by UNICEF in 1998/1999	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 and VDC were established by RD&RP in 1997	75 72 75 94 67	- - - - -	- - - - -	Yes Yes Yes Yes Yes
	T.T.K. Tbound Commune 1 Trapeang Chuuk CRDC and VDC were established by UNICEF in 1999	45	45	118	Yes - -
	Nhaeng Nhang Commune 2 Kim Sei CRDC and VDC were established by RD&RP in 1997	77	-	-	- Yes
	PDP Nhaeng Nhang Commune 1 Trapeang Snao CRDC and VDC were established by RD&RP in 1997	111	35	-	Yes

Notes: * Dress making, tree planting, literacy training and primary health care

Table IV-1.8.2 Illegal Cultivation in the Reservoirs

Commune \ Plan	USP			SRP	
	Tumnup Lok	O Saray	Kpob Trobek	Ang 160	Kim Sei
Phong	120.5 ha (120 HH)				
Trapeang Kranhung	9.5 ha (20 HH)	3.0 ha (3 HH)			
O Saray			140.0 ha (156 HH)		
T.T.K. Tboung				5.0 ha (13 HH)	
Nhaeng Nhang					8.9 ha (44 HH)
Total	130.0 ha (140 HH)	3.0 ha (3 HH)	140.0 ha (156 HH)	5.0 ha (13 HH)	8.9 ha (44 HH)

Source: Hearing Survey to Village Chiefs

Table IV-1.8.3 Illegal Cultivation in the Canals

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

Source: Hearing Survey to Village Chiefs