Table 3.2-6 Five-day Discharge at Lum Hach Headworks (Case 7)

CA =		735 km2		Boribo river							(m3/s)
		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Jan	1	-	0.94	5.86	5.58	1.90	6.39	8.51	3.97	-	1.16
	2	-	0.92	4.23	4.66	1.85	6.45	8.50	3.97	-	1.29
	3	-	0.94	4.13	5.28	1.57	6.10	7.78	3.97	-	1.17
	4	-	1.22	3.97	5.70	1.14	5.57	7.12	3.85	-	1.04
	5	-	2.31	3.35	4.08	6.44	5.70	4.46	3.37	-	0.94
	6	-	7.21	2.70	3.39	7.00	6.37	3.13	3.37	-	0.91
Feb	1	-	5.82	4.28	2.94	5.41	7.05	2.62	2.79	-	0.68
	2	-	4.56	4.70	2.59	5.75	6.16	2.44	2.99	-	0.68
	3	-	3.81	4.53	2.16	5.15	6.16	2.26	2.75	-	0.65
	4	-	2.09	2.42	1.93	5.98	6.26	2.18	2.77	-	0.61
	5	-	1.58	1.84	1.62	6.35	6.32	2.14	2.79	-	0.53
	6	-	1.17	1.47	1.57	6.24	6.45	2.06	2.75	-	0.47
Mar	1	-	1.40	1.47	1.55	3.40	7.05	3.50	2.77	-	0.50
	2	-	1.41	1.38	1.62	3.14	6.16	3.33	2.44	-	0.46
	3	-	1.25	1.47	4.30	5.94	6.16	2.88	2.62	-	0.59
	4	-	1.11	1.57	4.35	6.35	6.26	2.42	2.50	-	0.61
	5	-	1.14	1.54	5.85	6.68	6.35	2.28	2.46	-	0.55
	6	-	1.69	1.81	3.64	6.21	6.69	2.09	2.65	-	0.60
Apr	1	-	1.04	1.46	2.60	4.65	5.45	2.80	29.66	-	0.63
	2	-	1.18	2.31	2.42	2.83	6.20	3.47	14.65	-	0.56
	3	-	1.91	3.06	2.46	3.20	5.61	3.31	10.26	-	0.50
	4	-	1.68	3.35	1.97	4.19	5.92	3.31	5.96	-	0.58
	5	-	3.56	4.61	2.32	4.67	6.29	3.08	5.01	-	0.55
	6	-	2.68	3.85	5.72	4.24	5.85	2.72	4.23	-	0.55
May	1	-	12.85	4.07	3.19	5.17	4.46	2.82	2.87	-	1.51
	2	-	9.77	3.91	2.69	4.96	2.39	2.79	2.87	-	1.96
	3	-	9.66	3.48	2.18	6.53	2.34	3.07	3.55	-	2.66
	4	-	51.87	3.37	2.04	7.14	3.01	3.03	5.19	-	3.25
	5	-	93.45	3.37	2.02	7.44	3.75	3.46	7.16	-	3.40
	6	-	29.59	3.19	2.02	4.89	3.08	3.74	6.21	-	3.64
Jun	1	1.59	10.11	5.61	6.02	5.93	2.96	3.78	9.70	-	3.58
	2	3.15	20.45	7.54	6.91	7.29	3.42	6.88	6.23	-	3.77
	3	3.66	38.63	15.05	6.87	6.87	2.75	7.12	4.42	-	4.40
	4	3.11	62.55	20.61	6.75	6.91	2.82	8.95	3.92	-	4.77
	5	2.26	42.76	25.59	6.68	2.57	4.02	7.10	4.47	-	9.33
	6	1.56	43.93	21.43	6.31	4.89	4.86	4.86	9.19	-	16.46
Jul	1	2.99	18.88	42.40	5.14	4.26	5.09	4.79	11.87	-	6.78
	2	3.29	13.62	58.56	3.83	6.97	4.56	4.86	17.75	-	7.03
	3	3.42	18.38	10.46	5.02	5.21	5.16	5.30	21.59	-	10.63
	4	3.58	17.10	25.14	6.10	5.62	4.49	4.84	21.59	-	8.55
	5	4.11	26.03	45.38	4.66	4.60	6.43	15.19	14.16	-	11.00
	6	7.79	15.69	65.54	4.21	5.80	8.51	9.48	7.17	-	8.34
Aug	1	7.55	13.81	22.49	7.19	8.07	8.99	9.16	5.71	-	7.75
	2	10.51	8.22	72.31	13.97	11.40	5.09	8.79	5.71	-	4.61
	3	10.67	6.57	53.32	15.71	15.71	3.96	7.44	5.71	-	4.04
	4	13.93	7.90	41.00	18.72	25.21	3.62	12.11	5.71	-	10.67
	5	9.29	13.53	26.13	9.85	20.84	3.01	34.79	6.30	-	33.47
	6	11.87	24.97	18.60	13.50	16.08	2.98	20.12	8.02	-	70.54
Sep	1	42.51	92.02	18.78	43.30	20.73	4.03	75.60	11.46	-	66.16
	2	26.17	46.31	34.09	64.00	20.21	4.49	59.22	14.54	-	30.76
	3	24.65	30.31	19.07	46.05	35.02	6.08	20.77	24.14	-	37.20
	4	49.92	20.14	17.76	77.24	58.50	14.77	39.87	38.22	-	79.46
	5	46.07	42.53	17.76	40.60	87.65	34.71	19.46	55.62	-	43.69
	6	82.65	61.07	28.32	38.84	56.96	90.78	13.04	100.32	-	36.47
Oct	1	48.82	75.33	36.41	74.42	17.46	76.72	49.83	11.10	-	39.76
	2	30.06	29.73	50.20	64.22	24.38	40.40	73.70	16.42	-	64.64
	3	23.52	55.32	137.11	49.39	9.76	35.63	55.34	6.62	-	81.27
	4	41.04	35.11	95.70	30.58	9.21	34.92	23.41	7.84	-	105.49
	5	22.66	18.32	77.46	26.31	26.11	34.17	13.34	10.62	-	50.64
	6	23.90	48.10	54.31	20.91	103.63	18.97	9.78	20.25	-	27.86
Nov	1	23.76	123.70	41.67	18.99	21.13	14.12	4.76	6.65	-	19.47
	2	25.88	106.17	22.85	13.85	11.73	10.25	4.76	6.02	-	13.26
	3	32.24	38.76	14.29	12.20	30.32	7.55	4.76	6.02	-	9.27
	4	36.03	31.38	18.57	9.97	11.35	5.70	4.71	7.20	-	11.97
	5	30.41	16.87	24.98	9.31	8.59	4.81	4.38	6.16	-	12.02
	6	24.98	14.90	16.13	7.37	5.89	4.73	9.02	6.02	-	8.59
Dec	1	-	13.14	6.11	4.59	5.46	3.09	5.89	4.88	1.95	6.39
	2	-	50.25	4.48	3.78	4.25	2.87	5.62	4.88	1.95	5.55
	3	-	15.14	4.38	3.18	3.57	11.68	5.16	4.88	1.95	5.03
	4	-	12.18	4.22	2.38	3.39	9.21	4.88	4.88	1.95	4.40
	5	-	9.21	3.60	2.03	3.32	8.61	4.88	6.06	1.83	3.35
	6	-	6.72	2.95	1.73	3.26	8.60	4.88	6.35	1.58	2.84
Annual		-	23.00	19.74	12.60	12.40	10.24	11.11	9.84	-	14.23

Prepared by JICA Study Team — Annual average 14.14 m3/s

Original data at Boribo station: 1998-2005 MOWRAM & ADB, 2007 MOWRAM and the Study Team

Table 3.3-1 Land Holding Status in the Project Communes: Ream Kon 1/

Commune	No. of Households	Crop Producing Households (% to Total Households)		Wet Season Rice Producing Households (% to Crop Producing Households)		Landless Households (% to Total Households)		Households with less than 10 a (% to Total Households)		Households with more than 3ha (% to Total Households)		Cropped Area of Wet Season Rice in 2003	Cropped Area of Wet Season Rice per Crop Producing Household	Irrigated Area	Irrigated Area per Crop Producing Household
	(No.)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(ha)	(ha)	(ha)	(ha)
Prey Svay (major) 2/	2,672	2,619	98	2,582	99	53	2	1,019	38	1,600	60	7,001	2.7	20	0.0
Chrey (partly) 2/	2,210	1,869	85	1,800	96	341	15	97	4	1,772	80	4,003	2.1	275	0.1
Kear (partly) 2/	2,954	1,970	67	1,500	76	984	33	1,000	34	970	33	3,500	1.8	48	0.0
Total	*7,836*	*6,458*	*82*	*5,882*	*91*	*1,378*	*18*	*2,116*	*27*	*4,342*	*55*	*14,504*	*2.2*	*343*	*0.05*

1/: Project communes - communes located in the sub-project area

Source: Commune Survey on Crops and Livestock, 2003, MAFF

2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area

Table 3.3-2 Rice Cropped Area, Production & Yield in the Project Communes: Ream Kon 1/

Commune	Year	Wet Season						Early Wet Season		Dry Season					
		Cultivated Area (ha.)			Harvested Area	Yield	Production	Cultivated Area (ha.)	Harvested Area	Cultivated Area (ha.)			Harvested Area	Yield	Production
		Total	Rain-fed	Irrigated	(ha)	(t/ha)	(t)	(ha)	(ha)	Total	Recession	Irrigated	(ha)	(t/ha)	(t)
Prey Svay	2007	7,000			7,000			350	350						
(major) 2/	2006	7,024	7,024	0	7,024	1.2	8,429	0	0	0	0	0	0		0
	2005	7,562			7,562			0	0						
	2004	7,000			7,000			0	0						
	2003	7,001			7,001	1.4	9,541			0	0	0	0		0
	Average	7,117			7,117	1.3	8,985	88	88	0	0	0	0		0
Chrey	2007	4,830			4,830			375	375						
(partly) 2/	2006	4,988	2,997	1,991	4,988	2.0	9,976	194	194	147	100	47	147	2.5	368
	2005	4,454			4,454			320	320						
	2004	4,000			4,000			21	21						
	2003	4,003			4,003	1.4	5,690			50			50	2.0	100
	Average	4,455			4,455	1.7	7,833	228	228	99			99	2.4	234
Kear	2007	3,500			3,500			50	50						
(partly) 2/	2006	4,052	3,402	650	4,052	2.5	10,130	45	45	24	24	0	24	3.0	72
	2005	3,500			3,491			20	20						
	2004	3,500			3,500			4	4						
	2003	3,500			3,500	1.4	5,058			0	0	0	0		0
	Average	3,610			3,609	2.0	7,594	30	30	12	12	0	12	3.0	36
District	Average	64,812			64,805			667	667						

1/: Project communes - communes located in the sub-project area

2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area

Source: 2003 - Commune Survey on Crops and Livestock 2003, MAFF, 2004; 2004 - 07 DAO Moung Ruessei; dry season 2006 - Dept. of Planning, Battambang

Table 3.3-3 Rice Production Features in the Project Communes: SEILA Data Base: Ream Kon 1/

Commune	Year	Wet Season				Dry Season				Rice Area
		Cropped Area (ha)		Production	Yield	Cropped Area (ha)		Production	Yield	
		Rainfed	Irrigated	(ton)	(ton/ha)	Irrigated	Recession	(ton)	(ton/ha)	(ha)
Prey Svay	2002	7,150	-	9,167	1.3	-	-	-		7,150
(major) 2/	2003	7,762	-	6,200	0.8	-	-	-		7,762
	2004	7,662	-	3,831	0.5	-	-	-		7,662
	2005	6,592	-	6,592	1.0	-	-	-		6,592
	Average	7,292	-	6,448	0.9	-	-	-		7,292
Chrey	2002	1,395	2,242	2,182	0.6	199	52	226	0.9	7,500
(partly) 2/	2003	5,500	2,000	7,125	1.0	210	250	690	1.5	7,500
	2004	3,817	1,059	910	0.2	126	-	226	1.8	4,876
	2005	2,634	1,777	7,460	1.7	424	284	1,368	1.9	5,396
	Average	3,337	1,770	4,419	0.9	240	147	627	1.6	6,318
Kear	2002	2,555	65	574	0.2	-	-	-		3,236
(major) 2/	2003	3,806	351	3,325	0.8	25	6	62	2.0	4,157
	2004	4,000	57	1,792	0.4	27	6	62	1.9	4,090
	2005	1,754	410	4,328	2.0	711	1,215	4,815	2.5	4,090
	Average	3,029	221	2,505	0.8	191	307	1,235	2.5	3,893
District	Average	63,163	2,875	54,364	0.8	809	674	2,819	1.9	70,601

1/: Project communes - communes located in the sub-project area

2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area

Table 3.3-4 Rice Planting Areas by Plowing Method in the Project Communes: Ream Kon 1/

Commune	Plowing Method (ha. & %)				
	Cattle	Mechanical			Total
		Hand Tractor	Tractor	Sub-total	
Prey Svay	2,343	2,635	2,163	4,798	7,141
Chrey	1,332	1,667	1,181	2,848	4,179
Kear	1,461	1,094	945	2,039	3,500
Total	5,136	5,396	4,289	9,684	14,820
	35%	*36%*	*29%*	*65%*	*100%*

1/: Average of 2003 to 2006

Source: PDA Battambang

Table 3.3-5 Farm Economy under the Present Condition

Item	Ream Kon Sub-project								Por Canal Sub-project								Damnak Ampil Sub-project							
	Typical Farm								Typical Farm								Typical Farm							
	Type A (Transplanting)				Type A (Transplanting)				Type A (Transplanting)				Type A (Transplanting)				Type A (Rainfed Field)				Type B (Supplemental Irrigation			
	Cropping Intensity: 110%				Cropping Intensity: 110%				Cropping Intensity: 120%				Cropping Intensity: 120%				Cropping Intensity: 100%				Cropping Intensity: 100%			
	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)
1. Net Income				**4,569**				**3,357**				**5,263**				**3,941**				**3,592**				**4,085**
1-1. Net Farm Income				**2,509**				**1,297**				**3,283**				**1,961**				**1,676**				**2,169**
(1) Rice Production																								
Early Wet Season Rice (direct sowing)	0.2	500	1,000		0.2	500	1,000		0.5	1,250	1,000		0.5	1,250	1,000									
Gross Return				500				500				1,250				1,250								
Production Cost 1/				325				325				813				813								
Wet Season Rice	2.2	3,740	1,100		2.2	2,200	1,100		2.4	4,080	1,100		2.4	2,400	1,100		1.2	1,800	1,100		1.2	2,400	1,100	
Gross Return				4,114				2,420				4,488				2,640				1,980				2,640
Production Cost 1/				2,220				1,738				2,422				1,896				1,087				1,254
Net Return				**2,069**				**857**				**2,503**				**1,181**				**893**				**1,386**
(2) Other Farm Products 2/																								
Gross Return				630				630				1,120				1,120				1,119				1,119
Livestock				420				420				480				480				783				783
Fishery				140				140				210				210				32				32
Other Crops				70				70				430				430				304				304
Production Cost 3/				190				190				340				340				336				336
Net Return				**440**				**440**				**780**				**780**				**783**				**783**
1-2. Net Non-farm Income 2/																								
(1) Net Income				**2,060**				**2,060**				**1,980**				**1,980**				**1,916**				**1,916**
Wage & Salary				500				500				820				820				1,135				1,135
Trade				680				680				520				520								
Remittance from Family Members				220				220				260				260				115				115
Others				660				660				380				380				666				666
2. Expenditure 2, 4/				**4,000**				**3,600**				**3,670**				**3,670**			**3,060**	**3,400**				**3,400**
Food				2,360				2,124				2,050				2,050				1,837				1,837
Health/Medical				330				297				310				310				331				331
Education				440				396				400				400				196				196
Clothes				160				144				220				220				199				199
Fuel				180				162				180				180				176				176
Others				530				477				510				510				661				661
3. Net Surplus (Capacity to Pay)				**569**				**-243**				**1,593**				**271**				**192**				**685**

1/: Estimated based on the crop budget analysis by the JICA Study Team 2/: Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007; inflated 20% 3/: Assumed to be 30% of gross return

4/: Expenditure of Type B = Type A x 90% in Ream Kon Sub-project

Table 3.3-6 Results of Socio-economic Survey for Ream Kon Rehabilitation Sub-project

	Results of Socio-economic Survey
Farming Constraints (agronomic)	Major agronomic and farm management constraints responded by sample farmers are: i) **low yield of paddy**; followed by ii) insufficient extension services and iii) crop losses due to pest &
Farming Constraints (physical)	Major physical (irrigation & drainage) constraints responded are: i) **irrigation water shortage in wet season**; followed by ii) irrigation water shortage in dry season and iii) drainage problem.
Marketing Constraints	Major marketing constraints are: i) **unstable market prices of paddy/rice;** followed by ii) low market prices of paddy/rice and iii) limitation of market of paddy/rice.
Reasons for Low Yield of Rice	Major reasons reported include: i) **drought in wet season**; followed by ii) water shortage in dry season and iii) poor soil conditions.
Activities Implemented to Improve Rice Productivity in Past 3 Years	Activities implemented by respondents include: i) **increased fertilizer doses**; followed by ii) used quality seed (local variety) & iii) use of quality seed (high yielding variety).
Necessary Activities to Improve Rice Productivity	Activities necessary to improve rice productivity raised by sample farmers are: i) **improvement of farming practices**, ii) use of quality seed (local variety) and iii) use of quality seed (high yielding variety) & use of adequate doses of fertilizer.
Necessary Physical Works to Improve Rice Productivity	Activities necessary to improve rice productivity responded are: i) **irrigation water supply in wet season**; followed by ii) irrigation water supply in dry season and iii) drainage improvement.
Expectations for Improvement: Agronomy	Farmers expectations for improvement of farming conditions (agronomic & farm management) are: i) most expected: **productivity improvement of wet season rice**, ii) 2nd most expected: productivity improvement of dry season rice and iii) productivity improvement of field crops.
Expectations for Improvement: Farming System	Farmers expectations for farming system to be adopted are: i) most expected: **double cropping of rice**; ii) 2nd most expected: stable single cropping of rice.
Expectations for Improvement: Physical Works	Farmers expectations for physical works for improvement are: i) most expected: **adequate irrigation water supply in wet season**; ii) 2nd most expected: adequate irrigation water supply in dry season and iii) drainage improvement.
Expectations for Improvement: Extension Services	Agricultural support services required for improvement of agricultural productivity responded by sample farmers are: i) most required: **field extension services (demonstration/field guidance)**, ii) 2nd required: provision of quality seed and iii) farmer training (technical & post-harvest operation).

1/: Results of Socio-economic Survey, 2007, JICA Study Team

Table 3.3-7 Inventory Survey Results of Project Facilities at Ream Kon Rehabilitation Sub-Project

Description	Number or Quantity	Existing Condition	Description	Judgment
1 Irrigation area				
- Potential	4,700 Ha		Flood plain of Lake Tonle Sap seems to be included	Low elevation area is excluded
- Existing	190 Ha		Located in the upstream of the area, irrigated by farmers pump	Can be irrigated by run-of-river
2 Headworks	1 nos.			
- Type	Movable gate type		Concrete is severely deteriorated by cracks. Reinforcing bars get rusty.	To be constructed
- Width	19.2 m			
- Height	5.5 m			
- Gate	10 nos.	Not function	Size: 1.45 m x 1.20 m	To be replaced
- Fish Ladder	- nos.			
- Settling Basin	- nos.			
3 Intake	1 nos.		Concrete is severely deteriorated by cracks. Reinforcing bars get rusty.	To be constructed
(1) Gate	nos.	Poor	Size; 2(w)x1.5(h)x2(nos.). No gates at present	To be provided
(2) Measuring Device	- nos.			
(3) Trash Rack (Screen)	- nos.			
4 Irrigation and Drainage Systems				
(1) Canal				
(a) Main	12.0 km	Poor	Earth canal, downstream capacity needs to be expanded. water level is lower than ground surface.	To be rehabilitated
(b) Secondary	26.0 km	Poor	Earth canal, downstream capacity needs to be expanded. water level is lower than ground surface.	To be rehabilitated
(c) Tertiary	- km			
(2) Drainage System				
(a) Main	- km			
(b) Secondary	- km			
(c) Tertiary	- km			
(d) Collector	- km	Poor	Running along the existing dyke surrounding command area	new construction
5 Irrigation Related Structures				
(1) Syhone	- nos.			
(2) Aqueduct				
(a) Main	- nos.			
(b) Secondary	- nos.			
(3) Road Crossing Culvert				
(a) Main	- nos.			
(b) Secondary	1 nos.	Poor	The bottom is too high, clogged by soils and grass	To be reahbilitated
(4) Drop	- nos.			
(a) Main	- nos.			
(b) Secondary	- nos.			
(5) Chute				
(a) Main	- nos.			
(b) Secondary	- nos.			
(6) Diversion	nos.			
(a) Main	- nos.			
(b) Secondary	- nos.			
(7) Off-take	nos.			
(a) Main	- nos.			
(b) Secondary	- nos.			
(8) Check (Cross Regulator)	nos.			
(a) Main	1 nos.	Not function	No gates, structure is deteriorated.	To be replaced
(b) Secondary	- nos.			
(9) Measuring Device				
(a) Main	- nos.			
(b) Secondary	- nos.			
(10) Spillway/Waste Way				
(a) Main	- nos.			
(b) Secondary	- nos.			
(10) Bridge				
(a) Main	- nos.			
(b) Secondary	1 nos.	Poor		To be replaced
(11) Culvert				
(a) Main	- nos.			
(b) Secondary	- nos.			
(c) Others	- nos.			
6 Inspection road				
(1) Connection from Main Road	- km			
(2) Within the Command Area				
(a) Main	- km			
(b) Secondary	26.0 km	Poor	Not jeepable	To be rehabilitated
(c) Tertiary	- km			
7 Project Buildings and Agriculture Support Facilities				
(1) Office	- nos.			
(2) Storage	- nos.			
(3) Garage	- nos.			
(4) Dry Yard	- nos.			
(5) Sorter House	- nos.			
8 Others				
(1) Dyke	2.4 km	Not function	Surroundings the upstream of command area for flood protection and water storage	Not used in future

Prepared by JICA Study Team based on Inventory Survey 2006

Table 3.4-1 Land Holding Status in the Project Communes: Por Canal 1/

Commune	No. of Households	Crop Producing Households (% to Total Households)		Wet Season Rice Producing Households (% to Crop Producing Households)		Landless Households (% to Total Households)		Households with less than 10 a (% to Total Households)		Households with more than 3ha (% to Total Households)		Cropped Area of Wet Season Rice in 2003	Cropped Area of Wet Season Rice per Crop Producing Household	Irrigated Area	Irrigated Area per Crop Producing Household
	(No.)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(ha)	(ha)	(ha)	(ha)
Kear (major) 2/	2,954	1,970	67	1,500	76	984	33	1,000	34	970	33	3,500	1.8	48	0.02
Ta Loas (partly) 2/	1,724	1,639	95	1,122	68	85	5	90	5	1,549	90	3,503	2.1	30	0.02
Kakaoh (partly) 2/	2,286	1,754	77	1,700	97	532	23	35	2	1,719	75	5,680	3.2	10	0.01
Sub-total	*6,964*	*5,363*	*77*	*4,322*	*81*	*1,601*	*23*	*1,125*	*16*	*4,238*	*61*	*12,683*	*2.4*	*88*	*0.02*
Chrey (limited) 2/	2,210	1,869	85	1,800	96	341	15	97	4	1,772	80	4,003	2.1	275	0.1

1/: Project communes - communes located in the sub-project area
Source: Commune Survey on Crops and Livestock, 2003, MAFF
2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area; limited - the sub-project area includes limited extent of the subject commune

Table 3.4-2 Rice Cropped Area, Production & Yield in the Project Communes: Por Canal 1/

Commune	Year	Wet Season						Early Wet Season		Dry Season					
		Cultivated Area (ha.)			Harvested Area	Yield	Production	Cultivated Area	Harvested Area	Cultivated Area (ha.)			Harvested Area	Yield	Production
		Total	Rain-fed	Irrigated	(ha)	(t/ha)	(t)	(ha)	(ha)	Total	Recession	Irrigated	(ha)	(t/ha)	(t)
Kear	2007	3,500			3,500			50	50						
(major) 2/	2006	4,052	3,402	650	4,052	2.5	10,130	45	45	24	24	0	24	3.0	72
	2005	3,500			3,491			20	20						
	2004	3,500			3,500			4	4						
	2003	3,500			3,501	1.4	5,058			0	0	0	0		0
	Average	3,610			3,609	2.0	7,594	30	30	12			12	3.0	36
Ta Loas	2007	4,649			4,649			0	0						
(partly) 2/	2006	5,300	4,897	403	5,300	2.0	10,600	342	342	182	0	182	182	3.0	546
	2005	4,980			4,980			252	252						
	2004	3,500			3,500			15	15						
	2003	3,503			3,503	1.7	5,805			30			30	2.0	60
	Average	4,386			4,386	1.9	8,203	152	152	106			106	2.9	303
Kakaoh	2007	4,406			4,406										
(partly) 2/	2006	5,805	5,805	0	5,805	1.3	7,547			0	0	0	0		0
	2005	5,500			5,500			4	4						
	2004	5,500			5,500			0	0						
	2003	5,680			5,680	1.5	8,765			10			10	2.0	20
	Average	5,378			5,378	1.4	8,156	2	2	5			5	2.0	10
District	Average	64,812			64,805			667	667						

1/: Project communes - communes located in the sub-project area
2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area; limited - the sub-project area includes limited extent of the subject commune
Source: 2003 - Commune Survey on Crops and Livestock 2003, MAFF, 2004; 2004 - 07 DAO Moung Ruessei; dry season 2006 - Dept. of Planning, Battambang

Table 3.4-3 Rice Production Features in the Project Communes: SEILA Data Base: Por Canal 1/

Commune	Year	Wet Season				Dry Season				B. Rice Area	B-A
		A. Cropped Area (ha)		Production	Yield	Cropped Area (ha)		Production	Yield		
		Rainfed	Irrigated	(ton)	(ton/ha)	Irrigated	Recession	(ton)	(ton/ha)	(ha)	(ha)
Kear	2002	2,555	65	574	0.2	-	-	-		3,236	616
(major) 2/	2003	3,806	351	3,325	0.8	25	6	62	2.0	4,157	-
	2004	4,000	57	1,792	0.4	27	6	62	1.9	4,090	33
	2005	1,754	410	4,328	2.0	711	1,215	4,815	2.5	4,090	1,926
	Average	3,029	221	2,505	0.8	191	307	1,235	2.5	3,893	644
Ta Loas	2002	4,897	296	3,895	0.8	77	182	383	1.5	5,452	259
(partly) 2/	2003	3,126	414	4,793	1.4	45	55	100	1.0	3,550	10
	2004	5,452	296	2,596	0.5	77	182	91	0.4	5,452	(296)
	2005	4,897	296	12,982	2.5	77	182	777	3.0	5,452	259
	Average	4,593	326	6,066	1.2	69	150	338	1.5	4,977	58
Kakaoh	2002	5,072	-	3,043	0.6	32	-	22	0.7	6,050	978
(partly) 2/	2003	5,280	400	4,544	0.8	-	-	-		5,680	-
	2004	5,805	-	2,902	0.5	-	-	-		5,805	-
	2005	5,805	-	6,300	1.1	-	-	-		5,805	-
	Average	5,491	100	4,197	0.8	8	-	6	0.7	5,835	245
M. Ruessei District	3/	63,163	2,875	54,364	0.8	809	674	2,819	1.9	70,601	4,563

1/: Project communes - communes located in the sub-project area
Source: SEILA Data Base 2002 ~ 2005
2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area; limited - the sub-project area includes limited extent of the subject commune
3/: Average of 2002 ~ 2005

Table 3.4-4 Rice Planting Areas by Plowing Method in the Project Communes: Por Canal 1/

Commune	Plowing Method (ha.)				Total
	Cattle	Mechanical			
		Hand Tractor	Tractor	Sub-total	
Kear	1,461	1,094	945	2,039	3,500
Ta Loas	1,606	1,321	1,119	2,439	4,045
Kakaoh	1,889	1,880	1,776	3,656	5,545
Sub-total	*4,956*	*4,295*	*3,840*	*8,134*	*13,090*
	38%	*33%*	*29%*	*62%*	*100%*
Chrey	1,332	1,667	1,181	2,848	4,179

1/: Average of 2003 to 2006
Source: PDA Battambang

Table 3.4-5 Results of Socio-economic Survey for Por Canal Rehabilitation Sub-project

Results of Socio-economic Survey	
Farming Constraints (agronomic)	Major agronomic and farm management constraints responded by sample farmers are: i) **low yield of paddy**; followed by ii) weed problem.
Farming Constraints (physical)	Major physical (irrigation & drainage) constraints responded are: i) **irrigation water shortage in wet season**; followed by ii) drainage problem & iii) irrigation water shortage in dry season.
Marketing Constraints	Major marketing constraints are: i) **unstable market prices of paddy/rice;** followed by ii) low market prices of paddy/rice and iii) unstable market prices of livestock.
Reasons for Low Yield of Rice	Major reasons reported include: i) **drought in wet season**; followed by ii) water shortage in dry season and iii) poor soil conditions.
Activities Implemented to Improve Rice Productivity in Past 3 Years	Activities implemented by respondents include: i) **increased fertilizer doses**; followed by ii) applied compost/manure & iii) use of quality seed (high yielding variety).
Necessary Activities to Improve Rice Productivity	Activities necessary to improve rice productivity raised by sample farmers are: i) **improvement of farming practices**, ii) use of quality seed (local variety) & iii) use of adequate doses of fertilizer.
Necessary Physical Works to Improve Rice Productivity	Activities necessary to improve rice productivity responded are: i) **irrigation water supply in wet season**; followed by ii) irrigation water supply in dry season and iii) drainage improvement.
Expectations for Improvement: Agronomy	Farmers expectations for improvement of farming conditions (agronomic & farm management) are: i) most expected: **productivity improvement of wet season rice**, ii) 2nd most expected: productivity improvement of dry season rice and iii) productivity improvement of field crops.
Expectations for Improvement: Farming System	Farmers expectations for farming system to be adopted are: i) most expected: **double cropping of rice**; ii) multiple farming (crop + livestock etc.) & iii) 3rd most expected: stable single cropping of rice.
Expectations for Improvement: Physical Works	Farmers expectations for physical works for improvement are: i) most expected: **adequate irrigation water supply in wet season**; ii) 2nd most expected: adequate irrigation water supply in dry season and iii) drainage improvement.
Expectations for Improvement: Extension Services	Agricultural support services required for improvement of agricultural productivity responded by sample farmers are: i) most required: **field extension services (demonstration/field guidance)**, ii) 2nd required: provision of quality seed and iii) farmer training (technical & post-harvest operation).

1/: Results of Socio-economic Survey, 2007, JICA Study Team

Table 3.4-6 Inventory Survey Results of Project Facilities at Por Canal Rehabilitation Sub-Project

Description	Number or Quantity	Existing Condition	Description	Judgment
1 Irrigation area				
- Potential	2,500 Ha		Flood plain of Lake Tonle Sap seems to be included	Low elevation area is excluded
- Existing	400 Ha		Located in the upstream of the area, irrigated by farmers pump	Water level in the canal be raised
2 Headworks	1 nos.		The same Headworks of Ream Kon sub-project	
- Type	Movable gate type		Concrete is severely deteriorated by cracks. Reinforcing bars get rusty.	To be constructed
- Width	19.2 m			
- Height	5.5 m			
- Gate	10 nos.	Not function	Size: 1.45 m x 1.20 m	To be replaced
- Fish Ladder	- nos.			
- Settling Basin	- nos.			
3 Intake	1 nos.		Concrete is severely deteriorated by cracks. Reinforcing bars get rusty.	To be constructed
(1) Gate	1 nos.	None	Size: 2(w)x2(h)x1(no.), very deteriorated	To be provided
(2) Measuring Device	- nos.			
(3) Trash Rack (Screen)	- nos.			
4 Irrigation and Drainage Systems				
(1) Canal				
(a) Main-1	4.8 km	Poor	Earth canal, sedimentation, water level is lower than ground surface	To be rehabilitated
Main-2	4.7 km	Poor	Earth canal, sedimentation, water level is lower than ground surface	To be rehabilitated
(b) Secondary	8.8 km	Poor	Earth canal, sediment, lower water level is lower than ground surface	To be rehabilitated
(c) Tertiary	- km			
(2) Drainage System				
(a) Main	- km			
(b) Secondary	- km			
(c) Tertiary	- km			
(d) Collector	- km			
5 Irrigation Related Structures				
(1) Syhone	nos.			
(2) Aqueduct				
(a) Main	- nos.			
(b) Secondary	- nos.			
(3) Road Crossing Culvert				
(a) Main	- nos.			
(b) Secondary	7 nos.	Fair	The bottom is too high, clogged by soils and grass	To be rahabilitated
(4) Drop	- nos.			
(a) Main	- nos.			
(b) Secondary	- nos.			
(5) Chute				
(a) Main	- nos.			
(b) Secondary	- nos.			
(6) Diversion	nos.			
(a) Main	1 nos.	Under construction	Newly constructed, gate sill elevation is not known	To be checked during design period
(b) Secondary	- nos.			
(7) Off-take	nos.			
(a) Main	- nos.			
(b) Secondary	- nos.			
(8) Check (Cross Regulator)	nos.			
(a) Main	1 nos.	not function	No gates, structure is deterioarated.	To be replaced
(b) Secondary	- nos.			
(9) Measuring Device				
(a) Main	- nos.			
(b) Secondary	- nos.			
(10) Spillway/Waste Way				
(a) Main	- nos.			
(b) Secondary	- nos.			
(10) Bridge				
(a) Main	1 nos.	Fair		
(b) Secondary	- nos.			
(11) Culvert				
(a) Main	- nos.			
(b) Secondary	- nos.			
(c) Others	nos.			
6 Farm Road				
(1) Connection from Main Road	- km			
(2) Within the Command Area				
(a) Main	- km			
(b) Secondary	- km			
(c) Tertiary	- km			
7 Project Buildings and Agriculture Support Facilities				
(1) Office	- nos.			
(2) Storage	- nos.			-
(3) Garage	- nos.			-
(4) Dry Yard	- nos.			-
(5) Sorter House	- nos.			-
8 Others				
(1) Dyke	- km			

Prepared by JICA Study Team based on Inventory Survey 2006

Table 3.5-1 Agro-demographic Features of the Project Communes: Damnak Ampil 1/

District/Commune	No. of Households	Crop Producing Households (% to Total Households)		Wet Season Rice Producing Households (% to Crop Producing Households)		Landless Households (% to Total Households)		Households with less than 10 a (% to Total Households)		Households with more than 3ha (% to Total Households)		Cropped Area of Wet Season Rice in 2003	Cropped Area of Wet Season Rice per Crop Producing Household	Irrigated Area	Irrigated Area per Crop Producing Household
	(No.)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(ha)	(ha)	(ha)	(ha)
Bakan															
Trapeang Chong (major) 2/	3,326	2,936	88	2,936	100	390	12	498	15	396	12	2,979	1.0	0	0.0
Snam Preah (partly) 2/	3,110	2,810	90	2,810	100	300	10	0	0	562	18	3,841	1.4	0	0.0
Sub-total	*6,436*	*5,746*	*89*	*5,746*	*100*	*690*	*11*	*498*	*8*	*958*	*15*	*6,820*	*1.2*	*0*	*0.0*
District	23,699	22,261	94	22,061	99	1,438	6	683	3	6,034	25	33,986	1.5	902	0.0
Sampov Meas															
Lolok Sa (partly) 2/	1,662	1,369	82	1,329	97	293	18	37	2	132	8	915	0.7	220	0.16

1/: Project communes - communes located in the sub-project area Source: Commune Survey on Crops and Livestock, 2003, MAFF

2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area

Table 3.5-2 Rice Cropped Area, Production & Yield in the Project Communes: Damnak Ampil 1/

District/Commune	Year	Wet Season						Dry Season					
		Cultivated Area (ha.)			Harvested Area	Yield	Production	Cultivated Area (ha.)			Harvested Area	Yield	Production
		Total	Rain-fed	Irrigated	(ha)	(t/ha)	(t)	Total	Recession	Irrigated	(ha)	(t/ha)	(t)
Bakan													
Trapeang Chong	2007	4,200	4,200	0	4,200								
(major) 2/	2006	4,200	3,650	550	4,200	2.0	8,400	15	0	15	15	2.5	38
	2005	3,456	3,456	0	3,456			18	0	18	15	2.3	35
	2004	2,796	2,796	0	2,796								
	2003	2,979	2,979	0	2,979	1.1	3,334	0	0	0	0		0
	Average	3,526	3,416	110	3,526	1.6	5,867	11	0	11	10	2.4	24
Snam Prean	2007	5,714	5,714	0	5,714								
(partly) 2/	2006	6,039	6,039	0	6,039	2.0	12,078	10	0	10	10	2.0	20
	2005	5,023	5,023	0	5,023			22	0	22	18	2.8	50
	2004	3,741	3,741	0	3,741								
	2003	3,841	3,841	0	3,841	1.2	4,609	0	0	0	0		0
	Average	4,872	4,872	0	4,872	1.7	8,344	11	0	11	9	2.5	23
District (Avg. of 2003 ~ 07)		39,290	38,533	757	38,773	1.5	23,741	334	116	109	321	2.7	913
Sampov Meas													
Lolok Sa	2006	1,110	930	180	1,110	2.0	2,220	6	3	3	6	1.5	9
(partly) 2/	2003	915			915	1.1	1,032	10			10	1.6	16
	Average	1,013	930	180	1,013	1.6	1,626	8	3	3	8	1.6	13

1/: Project communes - communes located in the sub-project area

2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area

Source: 2003 - Commune Survey on Crops and Livestock 2003, MAFF, 2004; 2004, 05 & 07 - DAO Bakan; 2006 - Dept. of Planning, Pursat

Table 3.5-3 Rice Production Features in the Project Communes: SEILA Data Base: Damnak Ampil

District/Commune	Year	Wet Season				Dry Season				Rice Area (ha)
		Cropped Area (ha)		Production (ton)	Yield (ton/ha)	Cropped Area (ha)		Production (ton)	Yield (ton/ha)	
		Rainfed	Irrigated			Irrigated	Recession			
Bakan										
Trapeang Chong	2002	4,200	-	5,040	1.2	-	-	-	-	4,200
	2003	2,277	30	2,977	1.3	-	-	-	-	4,200
	2004	4,175	25	5,796	1.4	-	-	-	-	4,200
	2005	3,504	300	6,847	1.8	-	-	-	-	4,200
	Average	3,539	89	5,165	1.4	-	-	-	-	4,200
Snam Preah	2002	6,039	-	9,059	1.5	-	-	-	-	6,039
	2003	6,161	-	3,073	0.5	75	-	-	-	6,161
	2004	6,039	455	9,058	1.4	31	31	46	0.7	6,039
	2005	6,039	-	12,078	2.0	-	-	-	-	6,039
	Average	6,070	114	8,317	1.3	27	8	12	0.3	6,070
District (Avg. of 2002 ~ 2005)		40,292	2,648	82,575	1.9	724	682	2,006	1.4	46,366

Source: SEILA Data Base 2002 ~ 2005

Table 3.5-4 Rice Planting Areas by Plowing & Planting Method in the Project Communes: Damnak Ampil

District/Commune	Year	Plowing Method (ha.)			Planting Method (ha) 1/		
		Cattle	Tractor	Total	Transplanting	Direct Sowing	Total
Bakan							
Trapeang Chong	2/	3,605	644	4,249	3,684	433	4,116
Snam Preah	2/	4,332	1,435	5,767	4,850	322	5,171
Sub-total		*7,937*	*2,079*	*10,016*	*8,533*	*755*	9,288
		79%	*21%*	*100%*	*92%*	*8%*	*100%*

1/: Not including floating rice area 2/: Average of 2004 to 2007 Source: DAO Bakan & PDA Pursat

Table 3.5-5 Results of Socio-economic Survey for Damnak Ampil Rehabilitation Sub-project

	Results of Socio-economic Survey
Farming Constraints (agronomic)	Major agronomic and farm management constraints responded by sample farmers are: i) **low yield of paddy**; followed by ii) weed problem & iii) insufficient extension services.
Farming Constraints (physical)	Major physical (irrigation & drainage) constraints responded are: i) **irrigation water shortage in dry season**; followed by ii) irrigation water shortage in wet season & iii) drainage problem.
Marketing Constraints	Major marketing constraints are: i) **unstable market prices of paddy/rice;** followed by ii) low market prices of paddy/rice and iii) limitation of market of paddy.
Reasons for Low Yield of Rice	Major reasons reported include: i) **drought in wet season**; followed by ii) water shortage in dry season and iii) poor soil conditions.
Activities Implemented to Improve Rice Productivity in Past 3 Years	Activities implemented by respondents include: i) **increased fertilizer doses**; followed by ii) use of quality seed (local variety) & iii) use of quality seed (high yielding variety).
Necessary Activities to Improve Rice Productivity	Activities necessary to improve rice productivity raised by sample farmers are: i) **improvement of farming practices**, ii) use of quality seed (local variety) & iii) use of quality seed (high yielding variety).
Necessary Physical Works to Improve Rice Productivity	Activities necessary to improve rice productivity responded are: i) **irrigation water supply in wet season**; followed by ii) irrigation water supply in dry season and iii) drainage improvement.
Expectations for Improvement: Agronomy	Farmers expectations for improvement of farming conditions (agronomic & farm management) are: i) most expected: **productivity improvement of wet season rice**, ii) 2nd most expected: productivity improvement of dry season rice and iii) productivity improvement of livestock/poultry.
Expectations for Improvement: Farming System	Farmers expectations for farming system to be adopted are: i) most expected: **double cropping of rice**; ii) multiple farming (crop + livestock etc.) & iii) 3rd most expected: stable single cropping of rice.
Expectations for Improvement: Physical Works	Farmers expectations for physical works for improvement are: i) most expected: **adequate irrigation water supply in wet season**; ii) 2nd most expected: adequate irrigation water supply in dry season and iii) drainage improvement.
Expectations for Improvement: Extension Services	Agricultural support services required for improvement of agricultural productivity responded by sample farmers are: i) most required: **field extension services (demonstration/field guidance)**, ii) 2nd required: provision of quality seed and iii) farmer training (technical & post-harvest operation).

1/: Results of Socio-economic Survey, 2008, JICA Study Team

Table 3.5-6 Inventory Survey Results of Project Facilities at Damank Ampil Rehabilitation Sub-Project

Description	Number or Quantity	Existing Condition	Description	Judgment
1 Irrigation area				
- Potential	12,440 Ha			
- Existing	7050 Ha			
2 Headworks	1 nos.			
- Type	Movable gate type		Constructed in 2006	
- Width	144 m			
- Height	5.5 m			
- Gate	10 nos.		Size: 10m(B) x 5m(H) x 7(nos) Automatice gate, fall down at WL16.85m, stand up at WL 13.70m, counterweight 16.0 ton - 16.8 ton per a gate 1.7m(B) x 3.5m(H)x4(nos) Sluice gate	
- Fish Ladder	- nos.			
- Settling Basin	- nos.			
3 Intake	1 nos.		Designed intake water level=17.00m	
(1) Gate	- nos.	None	No gate, Size: 1.7(w)x2.5(h)x3(nos)	Water level is low (EL.17.0m) for gravity irrigation in all areas
(2) Measuring Device	- nos.			
(3) Trash Rack (Screen)	- nos.			
4 Irrigation and Drainage Systems				
(1) Canal				
(a) Main-1	30.0 km	Poor	Earth canal, Only the 1st 7.3km was rehabilitated in 2006. Q=8.0m3/sec	
Main-2	km			
(b) Secondary	150.0 km	Poor	10 nos. of canals are proposed. Only one at present but needs rehabilitation.	
(c) Tertiary	- km			
(2) Drainage System				
(a) Main	- km			
(b) Secondary	- km			
(c) Tertiary	- km			
(d) Collector	- km			
5 Irrigation Related Structures				
(1) Syhone	nos.			
(2) Aqueduct				
(a) Main	- nos.			
(b) Secondary	- nos.			
(3) Road Crossing Culvert				
(a) Main	- nos.			
(b) Secondary	nos.			To be rahabilitated
(4) Drop	- nos.			
(a) Main	- nos.			
(b) Secondary	- nos.			
(5) Chute				
(a) Main	1 nos.		Not identified	
(b) Secondary	- nos.			
(6) Diversion	nos.			
(a) Main	nos.			
(b) Secondary	- nos.			
(7) Off-take	nos.			
(a) Main	9 nos.		Good	
(b) Secondary	- nos.			
(8) Check (Cross Regulator)	nos.			
(a) Main	1 nos.		Good	
(b) Secondary	- nos.			
(9) Measuring Device				
(a) Main	- nos.			
(b) Secondary	- nos.			
(10) Spillway/Waste Way				
(a) Main	1 nos.		Good	
(b) Secondary	- nos.			
(10) Bridge				
(a) Main	3 nos.		Good	
(b) Secondary	- nos.			
(11) Culvert				
(a) Main	- nos.			
(b) Secondary	- nos.			
(c) Others	nos.			
6 Farm Road				
(1) Connection from Main Road	- km			
(2) Within the Command Area				
(a) Main	- km			
(b) Secondary	- km			
(c) Tertiary	- km			
7 Project Buildings and Agriculture Support Facilities				
(1) Office	- nos.			
(2) Storage	- nos.			
(3) Garage	- nos.			
(4) Dry Yard	- nos.			
(5) Sorter House	- nos.			
8 Others				
(1) Dyke	- km			

Prepared by JICA Study Team based on Inventory Survey 2006

Table 3.6-1 Agro-demographic Features of the Project Communes: Wat Loung 1/

District/Commune	No. of Households (No.)	Crop Producing Households (% to Total Households) (No.)	(%)	Wet Season Rice Producing Households (% to Crop Producing Households) (No.)	(%)	Landless Households (% to Total Households) (No.)	(%)	Households with less than 10 a (% to Total Households) (No.)	(%)	Households with more than 3ha (% to Total Households) (No.)	(%)	Cropped Area of Wet Season Rice in 2003 (ha)	Cropped Area of Wet Season Rice per Crop Producing Household (ha)	Irrigated Area (ha)	Irrigated Area per Crop Producing Household (ha)
Bakan															
Trapeang Chong (major) 2/	3,326	2,936	88	2,936	100	390	12	498	15	396	12	2,979	1.0	0	0
Snam Preah (major) 2/	3,110	2,810	90	2,810	100	300	10	0	0	562	18	3,841	1.4	0	0
Khnar Totueng (partly) 2/	1,478	1,382	94	1,382	100	96	6	0	0	290	20	2,967	2.1	15	0.01
Sub-total	*7,914*	*7,128*	*90*	*7,128*	*100*	*786*	*10*	*498*	*6*	*1,248*	*16*	*9,787*	*1.4*	*15*	*0.00*
District	23,699	22,261	94	22,061	99	1,438	6	683	3	6,034	25	33,986	1.5	902	0.04
Sampov Meas															
Lolok Sa (partly) 2/	1,662	1,369	82	1,329	97	293	18	37	2	132	8	915	0.7	220	0.16

1/: Project communes - communes located in the sub-project area
Source: Commune Survey on Crops and Livestock, 2003, MAFF
2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area

Table 3.6-2 Rice Cropped Area, Production & Yield in the Project Communes: Wat Loung 1/

District/Commune	Year	Wet-season Rice Production						Dry-season Rice Production					
		Cultivated Area (ha.)			Harvested Area (ha)	Yield (t/ha)	Production (t)	Cultivated Area (ha.)			Harvested Area (ha)	Yield (t/ha)	Production (t)
		Total	Rain-fed	Irrigated				Total	Recession	Irrigated			
Bakan													
Trapeang Chong	2007	4,200	4,200	0	4,200								
(major) 2/	2006	4,200	3,650	550	4,200	2.0	8,400	15	0	15	15	2.5	38
	2005	3,456	3,456	0	3,456			18	0	18	15	2.3	35
	2004	2,796	2,796	0	2,796								
	2003	2,979	2,979	0	2,979	1.1	3,334	0	0	0	0		0
	Average	3,526	3,416	110	3,526	1.6	5,867	11	0	11	10	2.4	24
Snam Preah	2007	5,714	5,714	0	5,714								
(major) 2/	2006	6,039	6,039	0	6,039	2.0	12,078	10	0	10	10	2.0	20
	2005	5,023	5,023	0	5,023			22	0	22	18	2.8	50
	2004	3,741	3,741	0	3,741								
	2003	3,841	3,841	0	3,841	1.2	4,609	0	0	0	0		0
	Average	4,872	4,872	0	4,872	1.7	8,344	11	0	11	9	2.5	23
Khnar Totueng	2007	3,840	3,840	0	3,840								
(partly) 2/	2006	3,840	3,515	325	3,840	1.5	5,760	12	0	12	12	1.3	16
	2005	3,609	3,609	0	3,609			14			4	2.6	10
	2004	2,817	2,817	0	2,817								
	2003	2,967	2,967	0	2,967	1.1	3,281	0	0	0	0		0
	Average	3,415	3,350	65	3,415	1.3	4,521	9	0	6	5	1.6	9
District (Avg. of 2003 ~ 07)		39,290	38,533	757	38,773	1.5	23,741	334	116	109	321	2.7	913
Sampov Meas	Average of												
Lolok Sa	2003 & 06	1,013	930	180	1,013	2	1,626	8	3	3	8	2	13

1/: Project communes - communes located in the sub-project area
2/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area
Source: 2003 - Commune Survey on Crops and Livestock 2003, MAFF, 2004; 2004, 05 & 07 - DAO Bakan; 2006 - Dept. of Planning, Pursat

Table 3.6-3 Rice Production Features in the Project Communes: SEILA Data Base: Wat Loung

District/Commune	Year	Wet Season				Dry Season				Rice Area (ha)
		Cropped Area (ha)		Production (ton)	Yield (ton/ha)	Cropped Area (ha)		Production (ton)	Yield (ton/ha)	
		Rainfed	Irrigated			Irrigated	Recession			
Bakan										
Trapeang Chong	2002	4,200	-	5,040	1.2	-	-	-	-	4,200
(major) 1/	2003	2,277	30	2,977	1.3	-	-	-	-	4,200
	2004	4,175	25	5,796	1.4	-	-	-	-	4,200
	2005	3,504	300	6,847	1.8	-	-	-	-	4,200
	Average	3,539	89	5,165	1.4	-	-	-	-	4,200
Snam Preah	2002	6,039	-	9,059	1.5	-	-	-	-	6,039
(major) 1/	2003	6,161	-	3,073	0.5	75	-	-	-	6,161
	2004	6,039	455	9,058	1.4	31	31	46	0.7	6,039
	2005	6,039	-	12,078	2.0	-	-	-	-	6,039
	Average	6,070	114	8,317	1.3	27	8	12	0.3	6,070
Khnar Totueng	2002	3,840	-	4,992	1.3	15	-			3,840
(partly) 1/	2003	2,233	38	2,702	1.2	9	10	1	0.1	3,840
	2004	2,806	-	2,525	0.9	-	-	-	-	3,840
	2005	3,118	-	5,612	1.8	-	-	-	-	3,800
	Average	2,999	10	3,958	1.3	6	3	0	0.1	3,830
District (Avg. of 2002 ~ 2005)		40,292	2,648	82,575	1.9	724	682	2,006	1.4	46,366

1/: Major - commune occupies majority of the sub-project area; partly - commune occupies part of the sub-project area
Source: SEILA Data Base 2002 ~ 2005

Table 3.6-4 Rice Planting Areas by Plowing & Planting Method in the Project Communes: Wat Loung

District/Commune	Year	Plowing Method (ha.)			Planting Method (ha) 1/		
		Cattle	Tractor	Total	Transplanting	Direct Sowing	Total
Bakan							
Trapeang Chong	1/	3,605	644	4,249	3,684	433	4,116
Snam Preah	1/	4,332	1,435	5,767	4,850	322	5,171
Khnar Totueng	1/	3,052	766	3,817	3,480	275	3,756
Total		*10,988*	*2,845*	*13,833*	*12,013*	*1,030*	*13,043*
		79%	*21%*	*100%*	*92%*	*8%*	*100%*

1/:Average of 2004 to 2007
Source: DAO Bakan & PDA Pursat

Table 3.6-5 Farm Economy under the Present Condition

Item	Wat Loung Sub-project								Wat Chre Sub-project								Lum Hach Sub-project							
	Typical Farm								Typical Farm								Typical Farm							
	Type A (Rainfed Field)				Type B (Supplemental Irrigation				Type A (Rainfed Field)				Type B (Supplemental Irrigation				Cropping Intensity: 100%				Cropping Intensity: 100%			
	Cropping Intensity: 100%				Cropping Intensity: 100%				Cropping Intensity: 100%				Cropping Intensity: 100%				Cropping Intensity: 100%				Cropping Intensity: 100%			
	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)	Cropped Area (ha)	Production (kg)	Unit Price (Riel)	Amount (Riel 1,000)
1. Net Income				**3,502**				**4,077**				**3,130**				**3,788**				**1,546**				**2,122**
1-1. Net Farm Income				**1,812**				**2,387**				**1,390**				**2,048**				**976**				**1,552**
(1) Rice Production																								
Early Wet Season Rice (direct sowing)																								
Gross Return																								
Production Cost 1/																								
Wet Season Rice	1.4	2,100	1,100		1.4	2,800	1,100		1.6	2,400	1,100		1.6	3,200	1,100		1.4	1,680	1,100		1.4	2,380	1,100	
Gross Return				2,310				3,080				2,640				3,520				1,848				2,618
Production Cost 1/				1,268				1,463				1,450				1,672				1,252				1,446
Net Return				**1,042**				**1,617**				**1,190**				**1,848**				**596**				**1,172**
(2) Other Farm Products 2/																								
Gross Return				1,100				1,100				290				290				550				550
Livestock				500				500				80				80				370				370
Fishery				430				430				50				50				10				10
Other Crops				170				170				160				160				170				170
Production Cost 3/				330				330				90				90				170				170
Net Return		1,001	924	770				770				200				200				380				380
1-2. Net Non-farm Income 2/																								
(1) Net Income		2,197	2,028	1,690				1,690				1,740				1,740				570				570
Wage & Salary				740				740				560				560				200				200
Trade				360				360				120				120				20				20
Remittance from Family Members				80				80				270				270				10				10
Others				510				510				790				790				340				340
2. Expenditure 2, 4/		3,731	3,444	**2,870**				**2,870**				**2,460**				**2,460**				**1,280**				**1,280**
Food				1,780				1,780				1,520				1,520				900				900
Health/Medical				220				220				170				170				200				200
Education				370				370				120				120				30				30
Clothes				90				90				100				100				30				30
Fuel				90				90				70				70				40				40
Others				320				320				480				480				80				80
3. Net Surplus (Capacity to Pay)		509	550	**632**				**1,207**				**670**				**1,328**				**266**				**842**

1/: Estimated based on the crop budget analysis by the JICA Study Team 2/: Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007; inflated 20% 3/: Assumed to be 30% of gross return

4/: Expenditure of Type B = Type A x 90% in Ream Kon Sub-project