

Tables

Table B1.1-1 Land Holding Statuses 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 B1.1-2 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 (ha)	Yield (t/ha)	Production (t)	Cultivated Area (ha)	Harvested Area (ha)	Cultivated Area (ha.)			Harvested Area (ha)	Yield (t/ha)	Production (t)	
		Total	Rain-fed	Irrigated						Total	Recession	Irrigated				
Prey Svay (major) 2/	2007	7,000			7,000			350	350							
	2006	7,024	7,024	0	7,024	1.2	8,429	0	0	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	0	0
	Average	7,117			7,117	1.3	8,985	88	88	0	0	0	0	0	0	0
Chrey (partly) 2/	2007	4,830			4,830			375	375							
	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 (partly) 2/	2007	3,500			3,500			50	50							
	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	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 B1.1-3 Rice Production Features in the Project Communes: SEILA Data Base: Ream Kon 1/

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			
Prey Svay (major) 2/	2002	7,150	-	9,167	1.3	-	-	-	-	7,150
	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 (partly) 2/	2002	1,395	2,242	2,182	0.6	199	52	226	0.9	7,500
	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 (major) 2/	2002	2,555	65	574	0.2	-	-	-	-	3,236
	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 B1.1-4 Estimation of Current Cropped Area of Rice & Other Crops: Ream Kon

1. Estimation of Cropped Area of Wet Season Rice in the Sub-project Area

(1) Cropping intensity of wet season rice in major communes & villages in the sub-project area

Commune	Prey Svay Commune		Chrey Commune			Kear C.	Sub-project Area 1/
	-	Kor Village	-	Angkrong V.	Poul Muoy V.		
Cropping Intensity (%)	100	100	100	100	100	100	-
Planting Transplanting (%)	10	50	80	70	50	60	40
Method Direct Sowing (%)	90	50	20	30	50	40	60

1/: Planting method in the sub-project area was estimated to be: transplanting 40% & direct sowing 60%

Source: results of interview survey in the commune offices & villages

(2) Cropping intensity of wet season rice reported by DAO Moung Ruessei

100% cropping intensity of wet season rice in the sub-project area

(3) Estimated cropping intensity of wet season rice

Cropping intensity of 100% of wet season rice is estimated in the sub-project area based on the information provided by the commune offices, village & DAO.

2. Estimation of Cropped Area of Early Wet Season Rice in the Sub-project Area

(1) Cropped area of early wet season rice in 2008 in major communes & villages in the sub-project area

Commune/Village	Prey Svay C.	Kor Village 1/	Chery C.	Angkrong V.	Poul Muoy V.	Kear C.
Cropped Area (ha)	80 -120	30	840	270	82	400 - 600
Total Paddy Fields (ha)	8,000		4,200			4,000
Estimation by Commune	1-2% of total		± 20% of total			10-15% of total

1/: Village occupying xx% of the sub-project area

Source: rough estimates; results of interview survey in the commune offices & village

(2) Cropped area of early wet season rice in major villages in the sub-project area

Major Villages in Chrey Commune in 2006 & 2007							
Village	Year	Chrey Mouy	Chrey Pir	Chrey Cheung	Toul Tathon	Angkrong	Total
Cropped Area (ha)	2006	15	28	12	18	125	198
	2007	16	32	30	18	178	274
	Avg.	16	30	21	18	152	236

Source: Chrey Commune Office

(2) Result of Inventory Survey by JICA, 2006

Early wet season rice cropped area reported to be 190ha in the sub-project area.

(3) Findings of field survey by JICA Study Team

Cultivation of early wet season rice in Chrey and Kear commune areas located within the sub-project area are extensive in 2008 due to abundant rain in the season. While, the same in Prey Svay commune area is rather limited.

(4) Estimated cropped area of early wet season rice

The cropped area of early wet season rice in the sub-project area is roughly estimated to be 10% of the area (200ha) based on the data and information presented above.

3. Estimation of Cropped Area of Dry Season Rice in the Sub-project Area

(1) Cropped Area of dry season rice in major communes & villages in the sub-project area 1/

Commune/Village	Prey Svay C.	Kor Village 1/	Chery C.	Angkrong V.	Poul Muoy V.	Kear C.
Cropped Area (ha)	0	0	0	0	0	0

1/: Cropped area of dry season rice in the commune/village territory within the sub-project area

Source: results of interview survey in the commune offices & villages

(2) Result of Inventory Survey by JICA, 2006

Dry season rice cropped area of 10ha under recession system reported. However, no such area exists in the sub-project area.

(2) Estimated cropped area in dry season rice

No cropping of dry season rice estimated based on the information provided by the commune offices & villages and the result of the field survey by the JICA Study Team.

4. Cropped Areas of Other Crops in Paddy Fields in the Sub-project Area

(1) Cropped area of other crops in paddy fields in major communes & villages in the sub-project area 1/

Commune	Prey Svay Commune		Chrey Commune			Kear C.	Crops: mungbeans Season: E. Wet Season
	-	Kor Village	-	Angkrong V.	Poul Muoy V.		
Cropping Area (ha)	0	0	0	0	0	4	

1/: Cropped area of other crops in the commune/village territory within the sub-project area

Source: results of interview survey in the communes office & villages

(2) Estimated cropped area of other crops in paddy fields in the sub-project area

Estimated to be 10ha of other crops grown in paddy fields

5. Estimated cropped area in paddy fields in the sub-project area

On the basis of the findings presented above, the estimated cropped area in paddy fields in the sub-project is estimated as follows;

Paddy Fields in Sub-project Area	Crops	Early Wet Season		Wet Season		Dry Season		Annual	
		Area (ha)	C.I. (%)	Area (ha)	C.I. (%)	Area (ha)	C.I. (%)	Area (ha)	C.I. (%)
2,020 ha	Rice	200	10	2,020	100	0	0	2,220	110
	Other Crops	10	0.5			0	0	10	0.5
	Total	210	10	2,020	100	0	0	2,230	110

Table B.1.1-5 Rice Planting Areas by Plowing Method in the Project Communes: Ream Kon 1/

Commune	Plowing Method (ha. & %)					
	Cattle	Mechanical			Sub-total	Total
		Hand Tractor	Tractor			
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 35%	5,396 36%	4,289 29%	9,684 65%	14,820 100%	

1/: Average of 2003 to 2006

Source: PDA Battambang

Table B1.1-6 Upland Crops Cropped Area in the Project Communes: Ream Kon 1/

Commune	Corn		Mungbeans		groundnut		Cassava		Sweet Potato		Sesame		Vegetable		Total Production (tons)
	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	
Prey Svay	4	2.5	3	0.8	5	0.7	4	12.2	12	6.4	1	1.2	38	4.6	67
Chrey	1	2.8	1	0.6	0		0		0		0		28	1.9	30
Kear	2	2.9	8	0.7	8	0.6	8	9.2	6	5.3	1	0.4	70	1.6	103
Total	7	2.8	12	0.7	13	0.6	12	10.2	18	6.0	2	0.7	136	3.5	200
District Total	618	7.6	141	0.9	66	0.8	57	12.5	58	5.8	6	0.7	810	1.7	1,755

1/: Average figures of 2 years of 2003 & 2006

Source: Commune Survey on Crops & Livestock, MAFF (2003) & PDA Battambang (2006)

Table B1.1-7 Fruit Tree Planted Area in the Project Communes: Ream Kon

Commune	Planted Areas of Fruit Trees (ha)													
	Banana	Cashew	Coconut	Longan	Mango	Milk Fruit	Sapodilla	Jack fruit	Custard	Orange	Guava	Pineapple	Total	
Prey Svay	5	0	2	0	0	0	0	0	0	0	1	1	9	
Chrey	0	0	0	0	0	0	0	0	0	0	0	0	0	
Kear	12	0	16	0	10	0	7	2	0	4	2	20	73	

Source: Commune Survey on Crops and Livestock, 2003, Battambang, MAFF, 2004

Table B1.1-8 Inventory on Farm Machinery in the Project Communes in 2007: Ream Kon

Unit: No.

Commune	Tractor	Hand Tractor	Water Pump	Engine Thresher	Attachment					
					Tractor			Hand Tractor		
					Plough	Harrow	Trailer	Plough	Harrow	Trailer
Prey Svay	8	195	32	8	6	4	1	191	168	73
Chrey	1	178	112	2	1	1	-	175	114	68
Kear	12	105	69	10	11	7	2	103	64	37
Total	21	478	213	20	18	12	3	469	346	178

Source: DAO Moug Ruessci, Battambang

Table B.1.1-9 Livestock Population in the Project Communes: Ream Kon

Commune	Cattle		Draft Cattle	Buffalo Total	Buffalo Female	Draft Buffalo	Pig Total	Pig Female	Animal Units (A.U.) 1/	Poultry	No. of Farm Families 2/
	Total	Cow									
Prey Svay	6,459	1,369	2,253	167	56	50	330	93	6,029	42,890	2,619
Chrey	2,076	916	1,157	516	172	343	961	35	2,525	2,788	1,869
Kear	1,976	273	836	106	46	60	1,066	69	2,087	2,109	1,970
Total	10,511	2,558	4,246	789	274	453	2,357	197	10,641	47,787	6,458
Holding Size/Family	1.6	0.4	0.7	0.1	0.0	0.1	0.4	0.0	1.6	7.4	-

1/: Animal units (AU) assumed as follows: cattle total & buffalo total x 0.9; pig total x 0.2

2/: Assuming crop production families as farm families

Source: Commune Survey on Crops and Livestock, 2003, Battambang, MAFF, 2004

Table B1.1-10 Estimation of Current Yield Level of Paddy: Ream Kon

1. Statistic Data: Paddy Yields in Major Project Communes/District

Commune/District	Average Paddy Yield (ton/ha)				Remarks
	DAO/PDA 1/		SEILA Data Base 2/		
	Wet Season	Dry Season	Wet Season	Dry Season	
Prey Svay	1.3	-	0.9	-	Mostly 3/
Chrey	1.7	2.4	0.9	1.6	Partly 3/
Kear	2.0	3.0	0.8	2.5	Partly 3/
Moung Ruessei District	1.4	2.6	0.8	1.9	4/

1/: Statistic data of DAO Boribo/PDA Prusat; average of 2003 & 2006,

2/: SEILA Data Base, average of 2002 - 2005

3/: Mostly - commune paddy fields mostly located in sub-project area; partly - the same partly located in sub-project area

4/: Dry season yield data of SEILA include recession rice grown in dry season.

2. Yield Estimation by Project Commune Office & Village

Commune/Village	Early Wet Season Rice (paddy ton/ha)		Wet Season Rice (paddy ton/ha)		Dry Season Rice (paddy ton/ha)		Remarks
	Transplant	Direct Sow.	Transplant	Direct Sow.	Transplant	Direct Sow.	
Prey Svay	-	-	-	2.0	-	-	
Chrey	-	-	2.5 - 2.7	-	-	-	
Kear	-	2.7 - 3.6	1.5 - 2.5	-	-	-	
Angkrong Village	-	2.0 - 2.5	2.0 - 2.5	-	-	2.2	Dry season: recession rice
Kor Village	-	2.5 - 3.0	2.5 - 3.0	1.5	-	-	Village in sub-project area
Poul Muoy Village	-	3.0	3.0	1.5 - 2.0	-	-	Village in sub-project area
Average		2.6 - 3.0	2.4 - 2.7	1.7 - 1.8			
Sun Dried Paddy 1/		2.3 - 2.7	2.1 - 2.4	1.5 - 1.6			
Moung Ruessei DAO		2.5 - 3.0	2.5 - 3.0	1.5	-	-	

Source: Interview survey with subject commune offices, village chief & DAO

1/: Conversion to sun-dried paddy: 90% x estimated yields

3. Results of Socio-economic Survey 1/

Irrigation Scheme	Season	Paddy Yield (ton/ha)		Irrigation Status	Remarks
		Average	Range		
Dammak Ampil	Wet 2/	2.2	0.8 - 4.6	Under rainfed conditions	No. of respondents: 34
	Early Wet	3.4	2.5 - 4.0	Irrigated field	No. of respondents: 3
	Wet	2.5	1.8 - 3.0	Irrigated field	No. of respondents: 3
	Dry	2.7	2.3 - 3.5	Irrigated field	No. of respondents: 3

1/: Results of Socio-economic Survey conducted by the JICA Study Tea 2/: Sun dried paddy yield: 2.0 t/ha

4. Estimated Current Yield Levels of Paddy in the Sub-project Area

On the basis of the statistic data, information provided by communes and the results of the Inventory Survey & Socio-economic Survey, current yield levels of paddy in the sub-project area are estimated as follows;

Irrigation Status	Estimated Current Yield Level						Remarks
	Early Wet Season		Wet Season		Dry Season		
	Transplant	Direct Sow.	Transplant	Direct Sow.	Transplant	Direct Sow.	
Under rainfed conditions	-	-	1.7	1.0	-	-	No dry season cropping
Supplemental Irrigation	-	-	2.2	1.5	-	-	
Pumping Irrigation	-	2.5	-	-	-	-	
Normal Irrigation	-	-	-	-	-	-	

Table B1.1-11 Present/Without-project Crop Production: Ream Kom Sub-project Area

Crop/Land Use Sub-category		Early Wet Season (Direct Sowing)			Wet Season (Transplanting)			Wet Season (Direct Sowing)			Dry Season			Annual		
		Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)
Rice:																
Normal Irrigation Paddy Field		0														
Supplemental Irrigation Paddy Field		50	2	2.5	125	20	1	2.2	44	30	1	1.5	45	100	5	214
Rainfed Paddy Field 1/		1,970	150	7	2.5	375	788	39	1.7	1,340	1,182	59	1.0	1,182	105	2,897
Rice Total		2,020	200	10	2.5	500	808	40	1.7	1,384	1,212	60	1.0	1,227	110	3,111
Upland Crops/Vegetables:																
Upland Crops (mungbeans)		-	10	1	0.5	5								10	0.5	5
Vegetables		-														
Upland Crops/Vegetables Total		10	0	-	5	-	-	-	-	-	-	-	-	10	0	5
Overall		2,110	210	10	-	-	808	40	-	1,212	60	-	-	2,230	110	-

1/: Rice production under pumping irrigation in early wet season

Table B1.1-12 Financial Crop Budget of Paddy under Present/Without-project Conditions

Items	Unit	Unit Price (Riel 000)	Ream Kon/Por Canal												Dannak Ampil/Wat Loung/Wat Chre						Lum Hach																
			Wet Season Rice						Dry Season Rice						Wet Season Rice			Dry Season Rice			Wet Season Rice			Dry Season Rice													
			Supplemental Irrigation			Direct Sowing			Raafed Transplanting			Supplemental Irrigation			Raafed Transplanting			Pump Irrigation			Supplemental Irrigation			Raafed Transplanting			Pump Irrigation			Supplemental Irrigation							
			Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)	Value	Q/ty	(Riel 000)		
1. Gross Return Paddy	(ton/ha)																																				
Unit Yield	(Riel 000/t)																																				
Unit Price	(Riel 000)																																				
Gross Return of Paddy	(Riel 000)																																				
By Product (straw) 1/	(Riel 000)																																				
Gross Return	(Riel 000)																																				
2. Production cost																																					
2-1. Farm Inputs	(kg)																																				
Seed 2/	1.0 & 1.1																																				
Fertilizers	(kg)																																				
- Urea	3.5																																				
- DAP	5.0																																				
- 20-20-15	3.4																																				
- Compost	100																																				
Agro-chemicals	(lit)																																				
- Agro-chemicals	20.0																																				
- Agro-chemicals	10.0																																				
2-2. Labor Costs																																					
Labor Requirements 3/	(man-day)																																				
- Hired Labor	10																																				
- Family Labor	(man-day)																																				
Total	(man-day)																																				
2-3. Land Preparation	(Riel 000)																																				
- Draft Animal/Tractor																																					
2-4. Pumping Cost	(Riel 000)																																				
2-6. Transportation	(Riel 000/t)																																				
- By Ox Cart/VH, Tractor																																					
2-6. Miscellaneous Expenses	(L.S.)																																				
(2-1 ~ 2-5 x 5%)																																					
3. Net Return	(Riel 000)																																				
	%																																				

1/ By products/straw: assumed to be 5% of gross return of paddy
 2/ Commercial seed price R. 2,100; assuming seed replacement in every 3 croppings; (R. 2100 + R. 1000-1100)/3 ~ R. 1,700 ~ 1,430 = R. 1,400/kg
 3/ Hired Labor Requirements --- assumed to be 20% of total labor requirements in other sub-projects

Table B1.1-13 Financial Crop Budget of Upland Crops/Vegetables

Items	Unit	Present/Without-project Conditions										With-project Conditions									
		Vegetables					Upland Crops					Upland Crops					Vegetables				
		Water Melon	Cucumber	Average 4/	Value (Riel/000)	Q'ty	Mungbeans	Soybeans	Average 5/	Value (Riel/000)	Q'ty	Groundnut	Average 6/	Value (Riel/000)	Q'ty	Watermelon	Cucumber	Average 4/	Value (Riel/000)	Q'ty	
1. Gross Return Product	(ton/ha)	5.5	6.0	5.8	370	0.5	0.9	1.0	2,900	1.1	1.3	1.1	2,200	9.0	10.0	9.5	370				
Unit Yield (Riel.000/h)		400	340	370	2,900	2,900	2,600	2,750	2,610	2,860	2,860	2,805	2,805	3,600	3,400	3,400	3,515				
Gross Return of Product	(Riel.000/h)	2,200	2,040	2,040	1,450	29	57	2,805	2,860	2,860	2,860	2,805	2,805	3,600	3,400	3,400	3,515				
By Product (2%) 1/	(Riel.000/h)	2,200	2,040	2,040	1,450	29	57	2,805	2,860	2,860	2,860	2,805	2,805	3,600	3,400	3,400	3,515				
Gross Return	(Riel.000)	499	929	929	887	1,209	2,662	2,805	2,917	2,917	2,917	2,861	2,861	3,600	3,400	3,400	3,585				
2. Production cost		295	445	445	370	675	966	1,245	1,280	1,280	1,236	1,223	1,223	924	1,480	1,480	1,202				
2-1. Farm Inputs	(kg)	1.0	2.2	53	39	60	360	70	420	390	90	25	2.2	1.0	2.5	53	39				
Seed 2/		2.55	336	296	315	546	546	546	546	546	546	546	546	610	661	636	636				
Fertilizers	(kg)	3.5	10	35	35	40	140	35	123	123	35	123	123	50	175	50	175				
- Urea	(kg)	5.0	0	200	100	25	75	15	75	75	15	75	75	0	0	0	0				
- DAP	(kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
- KCl	(kg)	3.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
- 16-20-0	(kg)	3.4	0	51	26	0	0	0	0	0	0	0	0	0	0	0	0				
- 20-20-15	(kg)	3.4	50	170	50	1.0	50	100	100	100	2.0	100	100	2.5	125	125	125				
- 15-15-15	(kg)	50	1.0	50	50	1.0	50	100	100	100	2.0	100	100	2.5	125	125	125				
- Compost	(ton)	15	56	36	0	0	0	0	0	0	0	0	0	0	0	0	0				
Agro-chemicals	(lit)	15.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
- Agro-chemicals	(kg)	8.0	1.9	15	7.0	36	0	0	0	0	0	0	0	1.9	1.5	7.0	56				
- Agro-chemicals		60	80	80	70	50	60	60	60	60	70	70	65	80	80	90	85				
2-2. Labor Costs		60	80	80	70	50	60	60	60	60	70	70	65	80	80	90	85				
Labor Requirements 2/	(man-day)	60	80	80	70	50	60	60	60	60	70	70	65	80	80	90	85				
- Hired Labor	(man-day)	54	67	61	61	40	52	55	57	57	61	61	57	72	72	81	77				
- Family Labor	(man-day)	60	75	68	45	45	58	61	63	63	68	68	63	80	80	90	85				
Total		120	120	120	120	100	150	150	150	150	150	150	150	150	150	150	150				
2-3. Land Preparation	(Riel.000)	120	120	120	120	100	150	150	150	150	150	150	150	150	150	150	150				
- Draft Animal/Tractor		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
2-4. Transportation	(Riel.000/h)	40	0	240	120	0.5	20	0.9	36	1.1	1.3	52	44	44	400	400	200				
- By Ox Cart		24	44	44	34	42	58	59	61	59	59	58	58	44	44	70	57				
2-5. Miscellaneous Expenses (2.1 - 2.4 x 5%)	(L.S.)	1,701	1,111	1,456	1,456	592	1,453	1,637	1,637	1,637	1,631	1,638	1,638	2,676	1,920	2,383					
3. Net Return	Riel.000 %	77	54	54	67	40	55	56	56	56	58	57	57	74	56	66	66				

1/ By products/straw: assumed to be 2% of gross return

2/ Seed price: mungbeans & soybeans R. 6,000; groundnut R. 4,000; watermelon R. 25,000; cucumber R. 24,000.-

3/ Hired Labor Requirements --- assumed to be 10% of total labor requirements

4/ Average of watermelon & cucumber

5/ Average of mungbeans & soybeans for Ream Kon & Por Canal

6/ Average of mungbeans & groundnut for Damnak Ampil, Wat Loung, Wat Chre & Lum Hach

Table B1.1-14 Farm Economy under the Present Condition (1/2)

Item	Ream Kon Sub-project						Per Canal Sub-project						Dannak Ampil Sub-project							
	Typical Farm			Typical Farm			Typical Farm			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)				
	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																				
1-1. Net Farm Income																				
(1) Rice Production																				
Early Wet Season Rice (direct sowing)	0.2	500	1,000	500	0.2	500	1,000	500	0.5	1,250	1,000	1,250	0.5	1,250	1,000	1,250	1.2	2,400	1,100	2,640
Gross Return				325				813				813					813			
Production Cost 1/				500				1,250				1,250					1,250			
Wet Season Rice	2.2	3,740	1,100	4,114	2.2	2,200	1,100	2,420	2.4	4,080	1,100	2,640	2.4	4,080	1,100	2,640	1.2	1,800	1,100	1,980
Gross Return				325				2,420				2,420					2,640			
Production Cost 1/				2,220				1,738				2,422					1,896			
Net Return				<u>2,069</u>				<u>857</u>				<u>1,181</u>					<u>893</u>			
(2) Other Farm Products 2/																				
Gross Return				630				630				1,120					1,120			
Livestock				420				420				480					480			
Fishery				140				140				210					210			
Other Crops				70				70				430					430			
Production Cost 3/				190				190				340					340			
Net Return				<u>440</u>				<u>440</u>				<u>780</u>					<u>780</u>			
1-2. Net Non-farm Income 2/																				
(1) Net Income																				
Wage & Salary				2,060				2,060				1,980					1,980			
Trade				500				500				820					820			
Remittance from Family Members				680				680				520					520			
Others				220				220				260					260			
Net Return				<u>660</u>				<u>660</u>				<u>380</u>					<u>380</u>			
2. Expenditure 2, 4/																				
Food				4,000				4,000				3,670					3,670			
Health/Medical				2,360				2,360				2,050					2,050			
Education				330				330				310					310			
Clothes				440				440				400					400			
Fuel				160				144				220					199			
Others				180				162				180					176			
Net Return				<u>530</u>				<u>477</u>				<u>510</u>					<u>661</u>			
3. Net Surplus (Capacity to Pay)																				
Net Return				569				569				1,593					1,593			
Net Surplus				<u>-243</u>				<u>-243</u>				<u>271</u>					<u>271</u>			
3. Net Surplus (Capacity to Pay)																				
Net Return				569				569				1,593					1,593			
Net Surplus				<u>-243</u>				<u>-243</u>				<u>271</u>					<u>271</u>			

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 B1.1-14 Farm Economy under the Present Condition (2/2)

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

Table B1.1-15 Results of Socio-economic Survey: Ream Kon

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 B1.2-1 Land Holding Statuses 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.)	(%)	(No.)	(%)	(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 B1.2-2 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 (ha)	Yield (t/ha)	Production (t)	Cultivated Area (ha)	Harvested Area (ha)	Cultivated Area (ha.)			Harvested Area (ha)	Yield (t/ha)	Production (t)	
		Total	Rain-fed	Irrigated						Total	Recession	Irrigated				
Kear (major) 2/	2007	3,500			3,500			50	50							
	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				
Average	3,610			3,609	2.0	7,594	30	30	12			12	3.0	36		
Ta Loas (partly) 2/	2007	4,649			4,649			0	0							
	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 (partly) 2/	2007	4,406			4,406											
	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		
Chrey (limited) 2/	2007	4,830			4,830			375	375							
	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		
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 B1.2-3 Rice Production Features in the Project Communes: SEILA Data Base: Por Canal 1/

Commune	Year	Wet Season				Dry Season				B. Rice Area (ha)	B-A (ha)
		A. Cropped Area (ha)		Production (ton)	Yield (ton/ha)	Cropped Area (ha)		Production (ton)	Yield (ton/ha)		
		Rainfed	Irrigated			Irrigated	Recession				
Kear (major) 2/	2002	2,555	65	574	0.2	-	-	-	-	3,236	616
	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 (partly) 2/	2002	4,897	296	3,895	0.8	77	182	383	1.5	5,452	259
	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 (partly) 2/	2002	5,072	-	3,043	0.6	32	-	22	0.7	6,050	978
	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
Chrey (limited) 2/	2002	1,395	2,242	2,182	0.6	199	52	226	0.9	7,500	3,863
	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	985
	Average	3,337	1,770	4,419	0.9	240	147	627	1.6	6,318	1,212
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 B1.2-4 Estimation of Current Cropped Area of Rice and Other Crops: Por Canal

1. Estimation of Cropped Area of Wet Season Rice in the Sub-project Area

(1) Cropping intensity of wet season rice in major communes & villages in the sub-project area

Commune	Kear C.		Ta Loas C.	Chrey C.	Sub-project Area 1/
Village	-	Pour Pir village	-	-	-
Cropping Intensity (%)	100	100	100	100	-
Planting Transplanting (%)	60	70	40	80	50
Method Direct Sowing (%)	40	30	60	20	50

1/: Planting method in the sub-project area was estimated to be: transplanting & direct sowing 50%

Source: results of interview survey in the commune offices & villages

(2) Cropping intensity of wet season rice reported by DAO Moug Ruessei

100% cropping intensity of wet season rice in the sub-project area

(3) Estimated cropping intensity of wet season rice

Cropping intensity of 100% of wet season rice is estimated in the sub-project area based on the information provided by the commune offices, village & DAO.

2. Estimation of Cropped Area of Early Wet Season Rice in the Sub-project Area

(1) Cropped area of early wet season rice in 2008 in major communes & village in the sub-project area

Commune/Village	Kear C.	Kear Commune		Ta Loas C.	Chrey C.
		Pour Mouy v.	Pour Pir village		
Cropped Area (ha)	400 - 600	82	100	573	840
Total Paddy Fields (ha)	4,000	-	-	4,111	4,200
Estimation by Commune	10-15% of total	-	-	-	± 20% of total

Source: rough estimates; results of interview survey in the commune offices & village

(2) Cropped area of early wet season rice in major villages in the sub-project area

Major Villages in Ta Loas Commune in 2006

Village	Tras	Pralay Sdau	Chong Pralay	Veal	Stueng Thmei	Sdei Stueng	Total
Cropped Area (ha)	100	25	93	10	62	40	330

Source: Ta Loas Commune Office

(2) Result of Inventory Survey by JICA, 2006

Early wet season rice cropped area reported to be 400ha in the sub-project area.

(3) Findings of field survey by JICA Study Team

Cultivation of early wet season rice in the sub-project area exceed 50% of the area in 2008 due to abundant rain in the season. Majority of the sub-project area are located in Kear Commune.

(4) Estimated cropped area of early wet season rice

In 2008, the area under early wet season rice in the sub-project area is estimated to be more than double of a normal year because of abundant rainfall. The cropped area of early wet season rice in the sub-project area is roughly estimated to be 20% of the area (410ha) based on the data and information presented above.

3. Estimation of Cropped Area of Dry Season Rice in the Sub-project Area

(1) Cropped Area of dry season rice in major communes & villages in the sub-project area 1/

Commune/Village	Kear C.	Pour Pir village	Ta Loas C.	Chery C.
Cropped Area (ha)	0	0	0	0

1/: Cropped area of dry season rice in the commune/village territory within the sub-project area

Source: results of interview survey in the commune offices & village

(2) Result of Inventory Survey by JICA, 2006

No cropping of dry season rice reported.

(2) Estimated cropped area in dry season rice

No cropping of dry season rice estimated based on the information provided by the commune offices & villages and the result of the Inventory Survey.

4. Cropped Areas of Other Crops in Paddy Fields in the Sub-project Area

(1) Cropped area of other crops in paddy fields in major communes & village in the sub-project area 1/

Commune/Village	Kear C.	Pour Pir village	Ta Loas C.	Chery C.
Cropping Area (ha)	0	0	0	0

1/: Cropped area of other crops in the commune/village territory within the sub-project area

Source: results of interview survey in the communes office & villages

(2) Estimated cropped area of other crops in paddy fields in the sub-project area

No other crops than rice are grown in paddy fields

5. Estimated cropped area in paddy fields in the sub-project area

On the basis of the findings presented above, the estimated cropped area in paddy fields in the sub-project is estimated as follows;

Paddy Fields in Sub-project Area	Crops	Early Wet Season		Wet Season		Dry Season		Annual	
		Area (ha)	C.I. 1/	Area (ha)	C.I.	Area (ha)	C.I.	Area (ha)	C.I.
2,070 ha	Rice	410	20	2,070	100	0	0	2,480	120
	Other Crops	0	0	0	0	0	0	0	0
	Total	410	20	2,070	100	0	0	2,480	120

1/: Cropping intensity (%)

Table B1.2-5 Rice Planting Areas by Plowing Method in the Project Communes: Por Canal 1/

Commune	Plowing Method (ha.)				Total
	Cattle	Mechanical		Sub-total	
		Hand Tractor	Tractor		
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 B1.2-6 Upland Crops Cropped Area in the Project Communes: Por Canal 1/

Commune	Corn		Soybeans		Mungbeans		Groundnut		Cassava		Sweet Potato		Sesame		Vegetables		Total
	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	Cultivated Area (ha.)	Yield (tons/ha.)	
Kear	3	2.9	0		8	0.7	8	0.6	8	9.2	6	5.3	1	0.4	70	1.7	104
Ta Loas	1	2.5	0		1	0.5	0		0		0		0		18	1.9	20
Kakaoh	2	2.1	0		1	0.7	0		1	10.0	4	9.1	0		19	1.9	27
Sub-total	6	2.5	0		10	0.7	8	0.6	9	9.3	10	6.7	1	0.4	107	1.8	151
Chrey	1	2.8	0		1	0.6	0		0		0		0		28	2.0	30
District Total	618	7.6	46	2.8	141	0.9	66	0.8	57	12.5	58	5.8	6	0.7	810	1.7	1,755

1/: Average figures of 2 years of 2003 & 2006

Source: Commune Survey on Crops & Livestock, MAFF (2003) & PDA Battambang (2006)

Table B1.2-7 Fruit Tree Planted Area in the Project Communes: Por Canal

Commune	Planted Areas of Fruit Trees (ha)													Total
	Banana	Cashew	Coconut	Longan	Mango	Milk Fruit	Sapodilla	Jack fruit	Custard	Orange	Guava	Pineapple		
Major Communes	32	0	18	0	11	2	9	3	1	8	5	22	111	

Source: Commune Survey on Crops and Livestock, 2003, Battambang, MAFF, 2004

Table B1.2-8 Inventory on Farm Machinery in the Project Communes in 2007: Por Canal

Unit: No.

Commune	Tractor	Hand Tractor	Water Pump	Engine Thresher	Tractor Taachment			Hand Tractor Attachment		
					Plough	Harrow	Trailer	Plough	Harrow	Trailer
Kear	12	105	69	10	11	7	2	103	64	37
Ta Loas	5	113	34	13	5	3	1	110	78	48
Kakaoh	15	86	6	17	12	9	5	84	53	29
Sub-total	32	304	109	40	28	19	8	297	195	114
Chrey (limited)	1	178	112	2	1	1	-	175	114	68

Source: DAO Moung Ruessei, Battambang

Table B1.2-9 Livestock Population in the Project Communes: Por Canal

Commune	Cattle Total	Cow	Draft Cattle	Buffalo Total	Buffalo Female	Draft Buffalo	Pig Total	Pig Female	Animal Units (A.U.) 1/	Poultry	No. of Farm Families 2/
Kear	1,976	273	836	106	46	60	1,066	69	2,087	2,109	1,970
Ta Loas	951	343	716	36	15	35	69	34	902	16,940	1,639
Kakaoh	4,367	1,180	2,290	189	85	95	888	87	4,278	2,658	1,754
Chrey	2,076	916	1,157	516	172	343	961	35	2,525	2,788	1,869
Total	9,370	2,712	4,999	847	318	533	2,984	225	9,792	24,495	7,232
Holding Size/Family	1.3	0.4	0.7	0.1	0.0	0.1	0.4	0.0	1.4	3.4	-

1/: Animal units (AU) assumed as follows: cattle total & buffalo total x 0.9; pig total x 0.2

2/: Assuming crop production families as farm families

Source: Commune Survey on Crops and Livestock, 2003, Battambang, MAFF, 2004

Table B1.2-10 Estimation of Current Yield Level of Paddy: Por Canal

1. Statistic Data: Paddy Yields in Major Project Communes/District

Commune/District	Average Paddy Yield (ton/ha)				Remarks
	DAO/PDA 1/		SEILA Data Base 2/		
	Wet Season	Dry Season	Wet Season	Dry Season	
Kear	2.0	3.0	0.8	2.5	Mostly 3/
Ta Loas	1.9	2.9	1.2	1.5	Partly 3/
Chrey	1.7	2.4	0.9	1.6	Partly 3/
Moung Ruessei District	1.4	2.6	0.8	1.9	4/

1/: Statistic data of DAO Boribo/PDA Prusat; average of 2003 & 2006,

2/: SEILA Data Base, average of 2002 - 2005

3/: Mostly - commune paddy fields mostly located in sub-project area; partly - the same partly located in sub-project area

4/: Dry season yield data of SEILA include recession rice grown in dry season.

2. Yield Estimation by Project Commune Office & Village

Commune/Village	Early Wet Season Rice		Wet Season Rice		Dry Season Rice		Remarks
	(paddy ton/ha)		(paddy ton/ha)		(paddy ton/ha)		
	Transplant	Direct Sow.	Transplant	Direct Sow.	Transplant	Direct Sow.	
Kear	-	2.7 - 3.6	1.5 - 2.5	-	-	-	
Ta Loas	-	2.0 - 3.0	2.0 - 3.0	-	-	-	
Chrey	-	-	2.5 - 2.7	-	-	-	
Pou Pir Village	-	3.0	3.0	1.5 - 2.0	-	-	Village in sub-project area
Average		2.6 - 3.2	2.3 - 2.8	1.5 - 2.0			
Sun Dried Paddy 1/		2.3 - 2.9	2.1 - 2.5	1.4 - 1.8			
Moung Ruessei DAO		3.5 - 4.0	2.5 - 3.0	2.0	-	-	

Source: Interview survey with subject commune offices, village chief & DAO

1/: Conversion to sun-dried paddy: 90% x estimated yields

3. Results of Socio-economic Survey 1/

Irrigation Scheme	Season	Paddy Yield (ton/ha)		Irrigation Status	Remarks
		Average	Range		
Por Canal	Wet 2/	2.3	0.4 - 4.4	Under rainfed conditions	No. of respondents: 37
	Early Wet	1.8	1.0 - 2.0	Irrigated field	No. of respondents: 2
	Wet	2.2	2.0 - 3.0	Irrigated field	No. of respondents: 2
	Dry	2.6	2.0 - 3.0	Irrigated field	No. of respondents: 5

1/: Results of Socio-economic Survey conducted by the JICA Study Tea 2/: Sun dried paddy yield: 2.1 t/ha

5. Estimated Current Yield Levels of Paddy in the Sub-project Area

On the basis of the statistic data, information provided by communes and the results of the Inventory Survey & Socio-economic Survey, current yield levels of paddy in the sub-project area are estimated as follows;

Irrigation Status	Estimated Current Yield Level						Remarks
	Early Wet Season		Wet Season		Dry Season		
	Transplant	Direct Sow.	Transplant	Direct Sow.	Transplant	Direct Sow.	
Under rainfed conditions	-	-	1.7	1.0	-	-	No dry season cropping
Supplemental Irrigation	-	-	2.2	1.5	-	-	
Pumping Irrigation	-	2.5	-	-	-	-	
Normal Irrigation	-	-	-	-	-	-	

Table B1.2-11 Present/Without-project Crop Production: Por Canal Sub-project Area

Crop/Land Use Sub-category	Early Wet Season (Direct Sowing)			Wet Season (Transplanting)			Wet Season (Direct Sowing)			Dry Season			Annual	
	Area (ha)	Cropped Area (ha)	Cropping Intensity (%)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)
Rice:														
Normal Irrigation Paddy Field	0													
Supplemental Irrigation Paddy Field	100	100	5	50	2	2.2	110	50	2	1.5	75	200	10	435
Rainfed Paddy Field 1/	1,970	310	15	985	48	1.7	1,675	985	48	1.0	985	2,280	110	3,435
Rice Total	2,070	410	20	1,035	50	1.7	1,785	1,035	50	1.0	1,060	2,480	120	3,870
Upland Crops/Vegetables:														
Upland Crops	-													0
Vegetables	-													0
Upland Crops/Vegetables Total														0
Overall		410	20	1,035	50			1,035	50			0	120	2,480

1/: Rice production under pumping irrigation in early wet season

Table B1.2-12 Results of Socio-economic Survey: Por Canal

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 B1.3-1 Land Holding Statuses in 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.)	(%)	(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 B1.3-2 Rice Cropped Area, Production & Yield in the Project Communes: Damnak Ampil 1/

District/Commune	Year	Wet Season						Dry Season									
		Cultivated Area (ha)			Harvested Area (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 (major) 2/	2007	4,200	4,200	0	4,200												
	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 (partly) 2/	2007	5,714	5,714	0	5,714												
	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 (partly) 2/	2006	1,110	930	180	1,110	2.0	2,220	6	3	3	6	1.5	9				
	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 B1.3-3 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
Sampov Meas										
Lolok Sa	2002	1,438	270	834	0.5	-	100	52	0.5	1,704
	2003	582	160	594	0.8	-	12	14	1.2	1,579
	2004	750	259	504	0.5	10	9	11	0.6	1,009
	2005	259	504	504	0.7	10	9	11	0.6	1,009
	Average	757	298	609	0.6	5	33	22	0.6	1,325

Source: SEILA Data Base 2002 ~ 2005

Table B1.3-4 Estimation of Current Cropped Area of Rice and Other Crops: Damnak Ampil

1. Estimation of Cropped Area of Wet Season Rice in the Sub-project Area

(1) Cropping intensity of wet season rice in major communes & village in the sub-project area

Commune/Village	Tr. Chong C.	Snam Preah C.	D. Ampil V.
Cropping Intensity (%)	100		100

Note: Planting method: transplanting 90% in Tropeang Chong, & Snam Preah & 100% in Damnak Ampil
Source: results of interview survey in the commune offices & village

(2) Cropping intensity of wet season rice reported by DAO Bakan
 100% cropping intensity of wet season rice in the sub-project area

(3) Result of Inventory Survey by JICA, 2006
 100% cropping intensity of wet season rice in the sub-project area reported

(4) Estimated cropping intensity of wet season rice
Cropping intensity of 100% of wet season rice is estimated in the sub-project area based on the information provided by the commune offices, village & DAO and the result of the Inventory Survey.

2. Estimation of Cropped Area of Early Wet Season Rice in the Sub-project Area

(1) Cropped area of early wet season rice in major communes & village in the sub-project area

Commune	Tr. Chong C.	Snam Preah C.	D. Ampil V.
Cropped Area (ha)	0		0

Source: results of interview survey in the commune offices & village

(2) Result of Inventory Survey by JICA, 2006
 No rice cultivation in early wet season reported.

(3) Findings of field survey by JICA Study Team
 Cultivation of early wet season rice in extremely limited extent observed in the field survey carried out by the Team.

(4) Estimated cropped area of early wet season rice
No Cropping of early wet season rice is estimated in the sub-project area based on the information provided by the commune & village and the result of the Inventory Survey and the findings of the field survey by the JICA Study Team.

3. Estimation of Cropped Area of Dry Season Rice in the Sub-project Area

(1) Cropped Area of dry season rice in major communes & village in the sub-project area

Commune/Village	Tr. Chong C.	Snam Preah C.	D. Ampil V.
Cropped Area (ha)	55		0

Source: results of interview survey in the commune offices & village

(2) Estimated cropped area in dry season rice
Estimated to be 60ha based on the result of the information provided by the commune office & village.

4. Cropped Areas of Other Crops in Paddy Fields in the Sub-project Area

(1) Cropped area of other crops in paddy fields in major communes & village in the sub-project area

Commune/Village	Tr. Chong C.	Snam Preah C.	D. Ampil V.
Cropping Area (ha)	0		0

Source: results of interview survey in the communes office & village

(2) Estimated cropped area of other crops in paddy fields in the sub-project area
Estimated to be no other crops grown in paddy fields

5. Estimated cropped area in paddy fields in the sub-project area

On the basis of the findings presented above, the estimated cropped area in paddy fields in the sub-project is estimated as follows:

Paddy Fields in Sub-project Area	Crops	Early Wet Season		Wet Season		Dry Season		Annual	
		Area (ha)	C.I. 1/	Area (ha)	C.I.	Area (ha)	C.I.	Area (ha)	C.I.
2,430 ha	Rice	0	0	2,430	100	60	2	2,490	102
	Other Crops	0	0	0	0	0	0	0	0
	Total	0	0	2,430	100	60	2	2,490	102

1/: Cropping intensity (%)

Table B1.3-5 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%
Sampov Meas							
Lolok Sa	2/	949	1,213	2,162	900	1,209	2,109

1/: Not including floating rice area 2/: Average of 2004 to 2007

Source: DAO Bakan & PDA Pursat

Table B1.3-6 Upland Crops Cropped Area in the Project Communes: Damnak Ampil 1/

District/Commune	Corn (ha)	Cassava	Sweet Potato	Mungbeans	Groundnut	Sesame	Sugar Cane	Vegetable	Total
Bakan									
Trapeang Chong	19	6	6	6	6	1	86	8	164
Snam Preah	17	6	5	6	7	1	77	7	154
Sub-total	36	12	11	12	13	2	163	15	318
District	81	46	40	44	35	9	204	41	816
Sampov Meas									
Lolok Sa	11	2	5	9	3	2	-	16	47

1/: Average of 2003 to 2007 for Bakan; average of 2003 & 2006 for Lolok Sa

Source: DAO Bakan, Prusat & PDA Prusat (Lolok Sa)

Table B1.3-7 Fruit Tree Planted Area in the Project-communes: Damnak Ampil

Commune	Planted Areas of Fruit Trees (ha)												Total
	Banana	Cashew	Coconut	Longan	Mango	Milk Fruit	Sapodilla	Jack fruit	Custard	Orange	Guava	Pineapple	
Major Communes	26	0	9	0	7	0	4	4	0	15	0	0	65

Source: Commune Survey on Crops and Livestock, 2003, Purast, MAFF, 2004

Table B1.3-8 Inventory on Farm Machinery & Facilities in the Project Communes in 2007: Damnak Ampil

Unit: No.

District/Commune	Tractor		Hand Tractor		Pumping Machine		Reaper		Thresher		Rice Mill		Dryer
	Public	Private	Public	Private	Public	Private	small	Big	Pedal	Engine	Small	Big	
Bakan													
Trapeang Chong	0	5	0	41	0	306	0	0	0	16	112	4	0
Snam Preah	0	6	0	29	3	136	0	0	0	13	135	3	0
Total	0	11	0	70	3	442	0	0	0	29	247	7	0

Source: PDA Prusat

Table B1.3-9 Livestock Population in the Project Communes: Damnak Ampil

District/Commune	Cattle Total	Cow	Draft Cattle	Buffalo Total	Buffalo Female	Draft Buffalo	Pig Total	Pig Female	Animal Units (A.U.) 1/	Poultry	No. of Farm Families 2/
Bakan											
Trapeang Chong	4,730	1,136	2,853	2,203	1,079	1,078	5,587	450	7,357	13,130	2,936
Snam Preah	2,210	722	1,128	766	596	766	1,371	80	2,953	7,280	2,810
Sampov Meas											
Lolok Sa	2,496	596	963	571	233	378	674	33	2,895	156,802	1,369
Total	9,436	2,454	4,944	3,540	1,908	2,222	7,632	563	13,205	177,212	7,115
Holding Size/Family	1.3	0.3	0.7	0.5	0.3	0.3	1.1	0.1	1.9	24.9	-

1/: Animal units (AU) assumed as follows: cattle total & buffalo total x 0.9; pig total x 0.2

2/: Assuming crop production families as farm families

Source: Commune Survey on Crops and Livestock, 2003, Purast, MAFF, 2004

Table B1.3-10 Estimation of Current Yield Level of Paddy: Damnak Ampil

1. Statistic Data: Paddy Yields in Major Project Communes/District

Commune/District	Average Paddy Yield (ton/ha)				Remarks
	DAO/PDA 1/		SEILA Data Base 2/		
	Wet Season	Dry Season	Wet Season	Dry Season	
Tropeng Chong	1.4	2.4	1.4		- Mostly 3/
Snam Preah	1.7	2.5	1.3		- Partly 3/
Rumlech	1.4	2.9	1.0		- Outside 3/
Khnar Totueng	1.3	1.6	1.3		- Outside 3/
Bakan District	1.6	2.1	1.9	1.4	4/

1/: Statistic data of DAO Boribo/PDA Prusat; average of 2003 & 2006 for Snam Preah, Khnar Totueng & district, data in 2006 for Tropeang Chong & Rumlech

2/: SEILA Data Base, average of 2002 - 2005

3/: Mostly - commune paddy fields mostly located in sub-project area; partly - the same partly located in sub-project area outside - outside of the sub-project area

4/: Dry season yield data of SEILA include recession rice grown in dry season.

2. Yield Estimation by Project Commune Office & Village

Commune/Village	Wet Season Rice (paddy ton/ha)	Dry Season Rice (paddy ton/ha)	Remarks
Tropeng Chong	1.5	3.0	
Snam Preah			
Rumlech	2.0 - 2.5	2.0 - 3.0	
Khnar Totueng	2.5	2.0	
Damnak Ampil Village	2.0	-	
Average	2.2 - 2.3	2.8 - 3.0	
Sun Dried Paddy 1/	2.0 - 2.1	2.5 - 2.7	

Source: Interview survey with subject commune offices & village chief

1/: Conversion to sun-dried paddy: 90% x estimated yields

3. Results of the Inventory Survey by JICA, 2006

Irrigation Scheme	Paddy Yield (ton/ha)				Remark
	Transplanting		Direct Sowing 1/		
	Wet Season 2/	Dry Season	Wet Season	Dry Season	
Damnak Ampil	Supplemental Irrigation 2.2	3.9	0.8 - 0.9		-

1/: Direct sowing of rice is negligibly limited in the sub-project area 2/: Sun dried paddy yield: 2.0 t/ha

4. Results of Socio-economic Survey 1/

Irrigation Scheme	Paddy Yield (ton/ha) Wet Season		Irrigation Status	Remarks
	Average	Range		
Damnak Ampil	1.5	0.8 - 2.5	Under rainfed conditions	No. of respondents: 21

1/: Results of Socio-economic Survey conducted by the JICA Study Team

2/: All the respondent reported their fields as rainfed field

5. Estimated Current Yield Levels of Paddy in the Sub-project Area

On the basis of the statistic data, information provided by communes and the results of the Inventory Survey & Socio-economic Survey, current yield levels of paddy in the sub-project area are estimated as follows;

Irrigation Status	Estimated Current Yield Level		Remarks
	Wet Season	Dry Season	
Under rainfed conditions	1.5	-	No early wet season cropping
Supplemental Irrigation	2.0	-	
Pumping Irrigation	-	2.5	
Normal Irrigation	-	-	

Table B1.3-11 Present/Without-project Crop Production: Damnak Ampil Sub-project Area

Crop/Land Use Sub-category	Area (ha)	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual		
		Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)
Rice:													
Normal Irrigation Paddy Field	0												
Supplemental Irrigation Paddy Field	500				500	21	2.0	1,000	60	2	2.5	150	23
Rainfed Paddy Field	1,930				1,930	79	1.5	2,895					79
Rice Total	2,430				2,430	100	1.6	3,895	60	2	2.5	150	102
Upland Crops/Vegetables:													
Upland Crops	-												0
Vegetables	-												0
Upland Crops/Vegetables Total													0
Overall		0	0	-	2,430	100	-	-	60	2	-	-	102

Table B1.3-12 Results of Socio-economic Survey: Damnak Ampil

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 B1.4-1 Land Holding Statuses in the Project Communes: Wat Loung 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 1ha (% 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)	(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					
Snam Preah (major) 2/	3,110	2,810	90	2,810	100	300	10	0	0	562	18	3,841	1.4	0	0					
Khmar 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 B1.4-2 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 (major) 2/	2007	4,200	4,200	0	4,200															
	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	0							
	Average	3,526	3,416	110	3,526	1.6	5,867	11	0	11	10	2.4	24							
Snam Preah (major) 2/	2007	5,714	5,714	0	5,714															
	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	0							
	Average	4,872	4,872	0	4,872	1.7	8,344	11	0	11	9	2.5	23							
Khmar Totueng (partly) 2/	2007	3,840	3,840	0	3,840															
	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	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																				
Lolok Sa	Average of 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 B1.4-3 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 (major) 1/	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 (major) 1/	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
Khmar Totueng (partly) 1/	2002	3,840	-	4,992	1.3	15	-	-	-	3,840
	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
Sampov Meas										
Lolok Sa (partly) 1/	2002	1,438	270	834	0.5	-	100	52	0.5	1,704
	2003	582	160	594	0.8	-	12	14	1.2	1,579
	2004	750	259	504	0.5	10	9	11	0.6	1,009
	2005	259	504	504	0.7	10	9	11	0.6	1,009
	Average	757	298	609	0.6	5	33	22	0.6	1,325

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 B1.4-4 Estimation of Current Cropped Area of Rice and Other Crops: Wat Loung

1. Estimation of Cropped Area of Wet Season Rice in the Sub-project Area

(1) Cropping intensity of wet season rice in major communes & village in the sub-project area

Commune/Village	Tr. Chong C.	Snam Preah C.	Wat Loung V.	Note: Planting method: transplanting 90% in Tropeang Chong & Snam Preah and 100% in Wat Loung
Cropping Intensity (%)	100	100	100	

Source: results of interview survey in the commune office & village

(2) Cropping intensity of wet season rice reported by DAO Bakan
100% cropping intensity of wet season rice in the sub-project area

(3) Result of Inventory Survey by JICA, 2006
100% cropping intensity of wet season rice in the sub-project area reported

(4) Estimated cropping intensity of wet season rice
Cropping intensity of 100% of wet season rice is estimated in the sub-project area based on the information provided by the commune office, village & DAO and the result of the Inventory Survey.

2. Estimation of Cropped Area of Early Wet Season Rice in the Sub-project Area

(1) Cropped area of early wet season rice in major communes & village in the sub-project area

Commune	Tr. Chong C.	Snam Preah C.	Wat Loung V.	Source: results of interview survey in the commune office & village
Cropped Area (ha)	0	0	0	

(2) Cropped area of early wet season rice reported by DAO Bakan
No rice crop grown in early wet season in the sub-project area.

(3) Findings of field survey by JICA Study Team
No early wet season rice observed in the field survey carried out by the Team.

(4) Estimated cropped area of early wet season rice
No cropping of early wet season rice is estimated in the sub-project area based on the information provided by the commune, village & DAO and the result of the Inventory Survey and the findings of the field survey by the JICA Study Team.

3. Estimation of Cropped Area of Dry Season Rice in the Sub-project Area

(1) Cropping intensity of dry season rice in major communes & village in the sub-project area

Commune/Village	Tr. Chong C.	Snam Preah C.	Wat Loung V.	Source: results of interview survey in the commune office & village
Cropped Area (ha)	0	10	0	

(2) Result of Inventory Survey by JICA, 2006
Cropped area of **45ha** of dry season rice reported.

(3) Estimated cropped area in dry season rice
Estimated to be 45ha based on the result of the Inventory Survey.

4. Cropped Areas of Other Crops in Paddy Fields in the Sub-project Area

(1) Cropped area of other crops in paddy fields in major communes & village in the sub-project area

Commune/Village	Tr. Chong C.	Snam Preah C.	Wat Loung V.	Crops: watermelon, cucumber, gourd & pumpkin
Cropping Area in Commune/Village (ha)	0	60	0	

Source: results of interview survey in the commune office & village

(2) Estimated cropped area of other crops in paddy fields in the sub-project area
Cropped area of other crops grown in paddy fields in the sub-project area is estimated to be 30ha in dry season.

5. Estimated cropped area in paddy fields in the sub-project area

On the basis of the findings presented above, the estimated cropped area in paddy fields in the sub-project is estimated as follows:

Paddy Fields in Sub-project Area	Crops	Early Wet Season		Wet Season		Dry Season		Annual	
		Area (ha)	C.I. 1/	Area (ha)	C.I.	Area (ha)	C.I.	Area (ha)	C.I.
2,720 ha	Rice	0	0	2,720	100	45	2	2,765	102
	Other Crops	0	0	0	0	30	1	30	1
	Total	0	0	2,720	100	75	3	2,795	103

1/: Cropping intensity (%)

Table B1.4-5 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	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
Khnr Totueng	2/	3,052	766	3,817	3,480	275	3,756
Sub-total		10,988	2,845	13,833	12,013	1,030	13,043
		79%	21%	100%	92%	8%	100%
Sampov Meas							
Lolok Sa	1/	949	1,213	2,162	900	1,209	2,109

1/: Not including floating rice area 2/: Average of 2004 to 2007

Source: DAO Bakan & PDA Pursat

Table B1.4-6 Upland Crops Cropped Area in the Project Communes: Wat Loung 1/

District/Commune	Unit: ha								
	Corn	Cassava	Sweet Potato	Mungbeans	Groundnut	Sesame	Sugar Cane	Vegetable	Total
Bakan									
Tropeang Chong	19	6	6	6	6	6	86	8	143
Snam Preah	17	6	5	6	7	1	77	7	126
Khnr Toteung	4	3	4	3	3	1	2	-	20
Sub-total	40	15	15	15	16	8	165	15	289
District	81	46	40	44	35	9	204	41	500
Sampov Meas									
Lolok Sa	11	2	5	9	3	2	-	16	48

1/: Average of 2003 to 2007 for Bakan; average of 2003 & 2006 for Lolok Sa

Source: DAO Bakan, Pursat & PDA Pursat (Lolok Sa)

Table B1.4-7 Fruit Tree Planted Area in the Project-communes: Wat Loung

District/Commune	Planted Areas of Fruit Trees (ha)												
	Banana	Cashew	Coconut	Longan	Mango	Milk Fruit	Sapodilla	Jack fruit	Custard	Orange	Guava	Pineapple	Total
Major Communes Total	26	0	14	0	10	0	5	4	0	19	0	0	78

Source: Commune Survey on Crops and Livestock, 2003, Pursat, MAFF, 2004

Table B1.4-8 Inventory on Farm Machinery & Facilities in the Project Communes in 2007: Wat Loung

Unit: No.

District/Commune	Tractor		Hand Tractor		Pumping Machine		Reaper		Thresher		Rice Mill		Dryer
	Public	Private	Public	Private	Public	Private	small	Big	Pedal	Engine	Small	Big	
Bakan													
Trapeang Chong	0	5	0	41	0	306	0	0	0	16	112	4	0
Snam Preah	0	6	0	29	3	136	0	0	0	13	135	3	0
Khnr Totueng	0	2	0	48	2	153	0	0	0	9	27	2	0
Sub-total	0	13	0	118	5	595	0	0	0	38	274	9	0
Sampov Meas													
Lolok Sa	0	2	0	21	0	118	0	0	0	8	32	1	0

Source: PDA Pursat

Table B1.4-9 Livestock Population in the Project Communes: Wat Loung

District/Commune	Cattle	Cow	Draft	Buffalo	Buffalo	Draft	Pig	Pig	Animal	Poultry	No. of Farm Families 2/
	Total		Cattle	Total	Female	Buffalo	Total	Female	Units (A.U.) 1/		
Bakan											
Trapeang Chong	4,730	1,136	2,853	2,203	1,079	1,078	5,587	450	7,357	13,130	2,936
Snam Preah	2,210	722	1,128	766	596	766	1,371	80	2,953	7,280	2,810
Khnr Totueng	1,908	565	1,029	853	384	627	1,496	109	2,784	28,020	1,382
Sampov Meas											
Lolok Sa	2,496	596	963	571	233	378	674	33	2,895	156,802	1,369
Project Communes Total	11,344	3,019	5,973	4,393	2,292	2,849	9,128	672	15,989	205,232	8,497
Holding Size/Family	1.3	0.4	0.7	0.5	0.3	0.3	1.1	0.1	1.9	24.2	-

1/: Animal units (AU) assumed as follows: cattle total & buffalo total x 0.9; pig total x 0.2

2/: Assuming crop production families as farm families

Source: Commune Survey on Crops and Livestock, 2003, Pursat, MAFF, 2004

Table B1.4-10 Estimation of Current Yield Level of Paddy : Wat Loung

1. Statistic Data: Paddy Yields in Major Project Communes/District

Commune/District	Average Paddy Yield (ton/ha)				Remarks
	DAO/PDA 1/		SEILA Data Base 2/		
	Wet Season	Dry Season	Wet Season	Dry Season	
Tropeng Chong	1.4	2.4	1.4	-	Mostly 3/
Snam Preah	1.7	2.5	1.3	-	Partly 3/
Bakan District	1.6	2.1	1.9	1.4	4/

1/: Statistic data of DAO Boribo/PDA Prusat; average of 2003 & 2006 for Snam Preah & district, data in 2006 for Tropeang Chong

2/: SEILA Data Base, average of 2002 - 2005

3/: Mostly - commune paddy fields mostly located in sub-project area; partly - the same partly located in sub-project area

4/: Dry season yield data of SEILA include recession rice grown in dry season.

2. Yield Estimation by Project Commune Office & Village

Commune/Village	Wet Season Rice (paddy ton/ha)	Remarks
Tropeng Chong	1.5	
Wat Loung Village	2.0	
Average	1.8	
Sun Dried Paddy 1/	1.6	

Source: Interview survey with subject commune offices & village chief

1/: Conversion to sun-dried paddy: 90% x estimated yields

3. Results of the Inventory Survey by JICA, 2006

Irrigation Scheme	Paddy Yield (ton/ha)				Remark
	Transplanting		Direct Sowing 1/		
	Wet Season 2/	Dry Season	Wet Season	Dry Season	
Supplemental Irrigation			Rainfed Field	Dry Season	
Wat Loung	2.2	-	0.8 - 0.9	-	

1/: Direct sowing of rice is negligibly limited in the sub-project area 2/: Sun dried paddy yield: 2.0 t/ha

4. Results of Socio-economic Survey 1/

Irrigation Scheme	Paddy Yield (ton/ha)		Irrigation Status	Remarks
	Wet Season			
	Average	Range		
Wat Loung	2.0	0.6 - 4.0	Under rainfed conditions	No. of respondents: 38

1/: Results of Socio-economic Survey conducted by the JICA Study Team

2/: All the respondent reported their fields as rainfed field

5. Estimated Current Yield Levels of Paddy in the Sub-project Area

On the basis of the statistic data, information provided by communes and the results of the Inventory Survey & Socio-economic Survey, current yield levels of paddy in the sub-project area are estimated as follows;

Irrigation Status	Estimated Current Yield Level		Remarks
	Wet Season	Dry Season	
Under rainfed conditions	1.5	-	No early wet season cropping
Supplemental Irrigation	2.0	-	
Pumping Irrigation	-	2.5	
Normal Irrigation	-	-	

Table B1.4-11 Present/Without-project Crop Production: Wat Loung Sub-project Area

Crop/Land Use Sub-category	Area (ha)	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual		
		Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)
Rice:													
Normal Irrigation Paddy Field	0												
Supplemental Irrigation Paddy Field	130				130	5	2.0	260		45	2	2.5	113
Rainfed Paddy Field	2,590				2,590	95	1.5	3,885					
Rice Total	2,720				2,720	100	1.5	4,145		45	2	2.5	113
Upland Crops/Vegetables:													
Upland Crops	-												
Vegetables 1/	-									30	1	5.8	174
Upland Crops/Vegetables Total										30	1		174
Overall		0	0		2,720	100				75	3		-
													2,795
													103
													0
													174
													174
													-

1/: Average of watermelon & cucumber

Table B1.4-12 Results of Socio-economic Survey: Wat Loung

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) poor soil conditions & iii) crop losses due to pest & disease & difficulty in purchasing fertilizers..
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 & 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) unstable market prices of livestock.
Reasons for Low Yield of Rice	Major reasons reported include: i) drought in wet season ; followed by ii) poor soil conditions and iii) water shortage in dry season.
Activities Implemented to Improve Rice Productivity in Past 3 Years	Activities implemented by respondents include: i) increased fertilizer doses ; followed by ii) applied manure/composts & iii) of quality seed (local variety).
Necessary Activities to Improve Rice Productivity	Activities necessary to improve rice productivity raised by sample farmers are: i) use of adequate doses of fertilizers, ii) improvement of farming practices & iii) use of quality seed (local 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 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 B1.5-1 Land Holding Statuses in the Project Communes: Wat Chre 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																
Boeng Khnar (major) 2/	2,344	2,092	89	2,092	100	252	11	0	0	198	8	2,564	1.2	0	0.0	
Me Tuek (partly) 2/	2,443	2,326	95	2,126	91	117	5	120	5	320	13	3,411	1.5	250	0.1	
Ou Ta Paong (partly) 2/	2,877	2,708	94	2,708	100	169	6	65	2	825	29	5,115	1.9	350	0.1	
Sub-total	7,664	7,126	93	6,926	97	538	7	185	2	1,343	18	11,090	1.6	600	0.1	
District	23,699	22,261	94	22,061	99	1,438	6	683	3	6,034	25	33,986	1.5	902	0.0	

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 B1.5-2 Rice Cropped Area, Production & Yield in the Project Communes: Wat Chre 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														
Boeng Khnar (major) 2/	2007	5,400	5,400	0	5,400									
	2006	3,401	3,401	0	3,401	1.5	5,102	0	0	0	0	0	0	0
	2005	2,988	2,988	0	2,988			17	0	17	7	2.4	17	
	2004	2,346	2,346	0	2,346									
	2003	2,564	2,564	0	2,564	1.3	3,386	0	0	0	0	0	0	
	Average	3,340	3,340	0	3,340	1.4	4,244	6	0	6	2	2.4	6	
Me Tuek (partly) 2/	2007	4,200	4,200	0	4,200									
	2006	4,110	4,110	0	4,110	1.3	5,343	235	0	235	235	2.0	470	
	2005	2,101	2,101	0	2,101			90			85	2.5	213	
	2004	3,365	3,365	0	3,365									
	2003	3,411	3,411	0	3,411	1.1	3,721	0	0	0	0	0	0	
	Average	3,437	3,437	0	3,237	1.2	4,532	108	0	118	107	2.1	228	
Ou Ta Paong (partly) 2/	2007	6,400	6,400	0	6,400									
	2006	6,000	4,500	1,500	6,000	1.5	9,000	250	50	200	250	2.5	625	
	2005	3,713	3,713	0	3,713			210			206	3.7	762	
	2004	5,060	5,060	0	4,037									
	2003	5,115	5,115	0	5,115	1.1	5,760	0	0	0	0	0	0	
	Average	5,258	4,958	300	5,053	1.3	7,380	153	25	100	152	3.0	462	
District (Avg. of 2003 ~ 07)		39,290	38,533	757	38,773	1.5	23,741	334	116	109	321	2.7	913	

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 B1.5-3 Rice Production Features in the Project Communes: SEILA Data Base: Wat Chre

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										
Boeng Khnar (major) 1/	2002	4,350	175	4,595	1.0	25	25	62	1.2	4,525
	2003	3,140	80	2,503	0.8	-	-	-	-	3,220
	2004	3,321	80			-	-	-	-	3,401
	2005	3,401	-	3,630	1.1	-	-	-	-	3,401
	Average	3,553	84	3,576	1.0	6	6	16	1.2	3,637
Me Tuek (partly) 1/	2002	4,150	250	6,600	1.5	250	250	250	0.5	4,400
	2003	3,000	1,400	4,400	1.0	263	-	789	3.0	4,400
	2004	3,870	530	7,740	1.8	250	320	800	1.4	4,400
	2005	4,000	212	9,688	2.3	200	200	800	2.0	4,412
	Average	3,755	598	7,107	1.6	241	193	660	1.5	4,403
Ou Ta Paong (partly) 1/	2002	6,344	-	76,128	12.0	300	1,065	450	0.3	6,344
	2003	4,320	2,024	475	0.1	317	-	63	0.2	6,344
	2004	4,320	2,024	475	0.1	317	-	63	0.2	6,344
	2005	5,994	250	12,600	2.0	250	-	875	3.5	6,344
	Average	5,245	1,075	22,420	3.5	296	266	363	0.6	6,344
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

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

Table B1.5-4 Estimation of Current Cropped Area of Rice and Other Crops: Wat Chre

1. Estimation of Cropped Area of Wet Season Rice in the Sub-project Area

(1) Cropping intensity of wet season rice in a major commune in the sub-project area (results of interview survey in commune office)

Commune	Boeung Khnar	Note: Planting method: transplanting 100%
Cropping Intensity (%)	100	

(2) Cropping intensity of wet season rice reported by DAO Bakan
100% cropping intensity of wet season rice in the sub-project area

(3) Result of Inventory Survey by JICA, 2006
100% cropping intensity of wet season rice in the sub-project area reported

(4) Estimated cropping intensity of wet season rice
Cropping intensity of 100% of wet season rice is estimated in the sub-project area based on the information provided by the commune offices & DAO and the result of the Inventory Survey.

2. Estimation of Cropped Area of Early Wet Season Rice in the Sub-project Area

(1) Cropped area of early wet season rice in a major commune in the sub-project area (interview survey in commune office)

Commune	Boeung Khnar
Cropped Area (ha)	0

(2) Cropped area of early wet season rice reported by DAO Bakan
No rice crop grown in early wet season in the sub-project area.

(3) Findings of field survey by JICA Study Team
No early wet season rice observed in the field survey carried out by the Team.

(4) Estimated cropped area of early wet season rice
No cropping of early wet season rice is estimated in the sub-project area based on the information provided by the commune offices and DAO and the findings of the field survey by the JICA Study Team.

3. Estimation of Cropped Area of Dry Season Rice in the Sub-project Area

(1) Cropping intensity of dry season rice in a major commune in the sub-project area (interview survey in commune office)

Commune	Boeung Khnar
Cropped Area (ha)	0

(2) Result of Inventory Survey by JICA, 2006
Cropped area of **20ha** of dry season rice reported.

(3) Estimated cropped area in dry season rice
No cropping of dry season rice in the sub-project area estimated. Cropped area reported in the Inventory Survey appears to be under recession rice outside of the area.

4. Cropped Areas of Other Crops in Paddy Fields in the Sub-project Area

(1) Cropped area of other crops in paddy fields in a major commune in the sub-project area (interview survey in commune office)

Commune	Boeung Khnar		Crops: cucumber, water melon & pumpkin in both seasons
Cropping Season	Early W. Season	Dry Season	
Cropping Area (ha)	15	15	

Note: area cropped with other crops mostly located in the sub-project area

(2) Estimated cropped area of other crops in paddy fields in the sub-project area
Estimated to be 15ha in both dry & early wet season

5. Estimated cropped area in paddy fields in the sub-project area

On the basis of the findings presented above, the estimated cropped area in paddy fields in the sub-project is estimated as follows;

Paddy Fields in Sub-project Area	Crops	Early Wet Season		Wet Season		Dry Season		Annual	
		Area (ha)	C.I. 1/	Area (ha)	C.I.	Area (ha)	C.I.	Area (ha)	C.I.
1,090 ha	Rice	0	0	1,090	100	0	0	1,090	100
	Other Crops	15	1.4	0	0	15	1.4	30	3
	Total	15	1	1,090	100	15	1	1,120	103

1/: Cropping intensity (%)

Table B1.5-5 Rice Planting Areas by Plowing & Planting Method in the Project Communes: Wat Chre

District/Commune	Year	Plowing Method (ha.)			Planting Method (ha) 1/		
		Cattle	Tractor	Total	Transplanting	Direct Sowing	Total
Bakan							
Boeng Khnar	2/	2,727	531	3,258	2,825	305	3,129
Me Tuek	2/	2,050	2,249	4,299	1,669	405	2,073
Ou Ta Paong	2/	3,566	2,708	6,274	2,398	1,040	3,438
Sub-total		8,343	5,487	13,830	6,892	1,749	8,640
		60%	40%	100%	80%	20%	100%

1/: Not including floating rice area 2/: Average of 2004 to 2007

Source: DAO Bakan & PDA Pursat

Table B1.5-6 Upland Crops Cropped Area in the Project Communes: Wat Chre 1/

District/Commune	Corn	Cassava	Sweet Potato	Mungbeans	Groundnut	Sesame	Sugar Cane	Vegetable	Watermelon	Total
Bakan										
Boeng Khnar	3	3	3	2	2	-	1	9	5	28
Meteuk	4	2	2	3	1	2	1	6	5	26
Ou Tapong	4	3	4	4	3	2	2	19	14	55
Total	11	8	9	9	6	4	4	34	24	109
District	81	46	40	44	35	9	204	131	185	775

1/: Average of 2003 to 2007 for Bakan; average of 2003 & 2006 for Lolok Sa

Source: DAO Bakan, Pursat

Table B1.5-7 Fruit Tree Planted Area in the Project-communes: Wat Chre

District/Commune	Planted Areas of Fruit Trees (ha)												
	Banana	Cashew	Coconut	Longan	Mango	Milk Fruit	Sapodilla	Jack fruit	Custard	Orange	Guava	Pineapple	Total
Project Communes	11	0	3	0	3	0	0	0	0	0	0	0	17

Source: Commune Survey on Crops and Livestock, 2003, Pursat, MAFF, 2004

Table B1.5-8 Inventory on Farm Machinery & Facilities in the Project Communes in 2007: Wat Chre

Unit: No.

District/Commune	Tractor		Hand Tractor		Pumping Machine		Reaper		Thresher		Rice Mill		Dryer
	Public	Private	Public	Private	Public	Private	Small	Big	Pedal	Engine	Small	Big	
Bakan													
Boeng Khnar	0	21	0	73	0	90	0	0	0	33	58	5	0
Me Tuek	0	2	0	45	0	152	0	0	0	6	100	1	0
Ou Ta Paong	0	19	0	59	6	206	0	0	0	26	89	4	0
Total	0	42	0	177	6	448	0	0	0	65	247	10	0

Source: PDA Pursat

Table B1.5-9 Livestock Population in the Project Communes: Wat Chre

District/Commune	Cattle Total	Cow	Draft Cattle	Buffalo Total	Buffalo Female	Draft Buffalo	Pig Total	Pig Female	Animal Units (A.U.) 1/	Poultry	No. of Farm Families 2/
Bakan											
Boeng Khnar	2,257	840	1,027	1,917	572	734	1,379	125	4,032	14,640	2,092
Me Tuek	3,403	1,675	806	1,743	884	871	4,505	310	5,532	22,900	2,326
Ou Ta Paong	3,887	2,498	1,369	1,389	91	1,298	2,576	341	5,264	14,385	2,708
Project Communes Total	9,547	5,013	3,202	5,049	1,547	2,903	8,460	776	14,828	51,925	7,126
Holding Size/Family	1.3	0.7	0.4	0.7	0.2	0.4	1.2	0.1	2.1	7.3	-

1/: Animal units (AU) assumed as follows: cattle total & buffalo total x 0.9; pig total x 0.2

2/: Assuming crop production families as farm families

Source: Commune Survey on Crops and Livestock, 2003, Pursat, MAFF, 2004

Table B1.5-10 Estimation of Current Yield Level of Paddy: Wat Chre

1. Statistic Data: Paddy Yields in Major Project Communes/District

Commune/District	Average Paddy Yield (ton/ha)				Remarks
	DAO/PDA 1/		SEILA Data Base 2/		
	Wet Season	Dry Season	Wet Season	Dry Season	
Boeung Khnar	1.3	2.4	1.0	1.2	Mostly 3/
Metuk	1.2	2.1	1.6	1.5	Partly 3/
Bakan District	1.6	2.1	1.9	1.4	4/

1/: Statistic data of DAO Boribo/PDA Prusat; average of 2003 & 2006 for Metuk & district, data in 2006 for Boeung Khnar

2/: SEILA Data Base, average of 2002 - 2005

3/: Mostly - commune paddy fields mostly located in sub-project area; partly - the same partly located in sub-project area

4/: Dry season yield data of SEILA include recession rice grown in dry season.

2. Yield Estimation by Project Commune Office

Commune	Wet Season Rice (paddy ton/ha)	Remarks
Boeung Khnar	1.2	
Sun Dried Paddy 1/	1.1	

Source: Interview survey with subject commune office

1/: Conversion to sun-dried paddy: 90% x estimated yields

3. Results of the Inventory Survey by JICA, 2006

Irrigation Scheme	Paddy Yield (ton/ha)				Remark
	Transplanting		Direct Sowing 1/		
	Wet Season 2/ Supplemental Irrigation	Dry Season	Wet Season Rainfed Field	Dry Season	
Wat Chre	2.2	-	0.8 - 0.9	-	

1/: Direct sowing of rice is negligibly limited in the sub-project area 2/: Sun dried paddy yield: 2.0 t/ha

4. Results of Socio-economic Survey 1/

Irrigation Scheme	Paddy Yield (ton/ha) Wet Season		Irrigation Status	Remarks
	Average	Range		
Wat Chre	1.7	0.5 - 2.8	Under rainfed conditions	No. of respondents: 40

1/: Results of Socio-economic Survey conducted by the JICA Study Team

2/: All the respondent reported their fields as rainfed field

5. Estimated Current Yield Levels of Paddy in the Sub-project Area

On the basis of the statistic data, information provided by communes and the results of the Inventory Survey & Socio-economic Survey, current yield levels of paddy in the sub-project area are estimated as follows;

Irrigation Status	Estimated Current Yield Level		Remarks
	Wet Season	Dry Season	
Under rainfed conditions	1.5	-	No early wet & dry season cropping
Supplemental Irrigation	2.0	-	
Pumping Irrigation	-	-	
Normal Irrigation	-	-	

Table B1.5-11 Present/Without-project Crop Production: Wat Chre Sub-project Area

Crop/Land Use Sub-category	Area (ha)	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual		
		Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)
Rice:													
Normal Irrigation Paddy Field	0												
Supplemental Irrigation Paddy Field	60				60	6	2.0	120				6	120
Rainfed Paddy Field	1,030				1,030	94	1.5	1,545				94	1,545
Rice Total	1,090				1,090	100	1.5	1,665				100	1,665
Upland Crops/Vegetables:													
Upland Crops	-												0
Vegetables 1/		15	1	5.8					15	1	5.8	3	174
Upland Crops/Vegetables Total		15	1	87					15	1	87	3	174
Overall		15	1	-	1,090	100	-	-	15	1	-	103	-

1/: Average of watermelon & cucumber

Table B1.5-12 Results of Socio-economic Survey: Wat Chre

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) poor soil conditions.
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) unstable market prices of livestock./poultry.
Reasons for Low Yield of Rice	Major reasons reported include: i) drought in wet season ; followed by ii) poor soil conditions & iii) water shortage in dry season.
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 (local 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 (high yielding variety) & iii) use of adequate doses of
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 B1.6-1 Land Holding Statuses in the Project Communes: Lum Hach 1/

District/Commune	No. of Households (No.)	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 (ha)	Cropped Area of Wet Season Rice per Rice Producing Household 2/ (ha)	Irrigated Area (ha)	Irrigated Area per Crop Producing Household (ha)	
		(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)					
Boribo																
Anhchanh Rung (major) 3/	1,037	1,037	100	1,037	100	0	0	0	0	26	3	-	-	0	0	0
Phsar (Major) 3/	1,109	1,054	95	331	30	55	5	0	0	0	0	1,565	-	0	0	0
Tuek Phos																
Krang Skear (limited) 3/	2,246	2,096	93	2,096	93	150	7	0	0	80	4	3,337	1.6	155	0.07	0.07
<i>Sub-total</i>	<i>4,392</i>	<i>4,187</i>	<i>95</i>	<i>3,464</i>	<i>79</i>	<i>205</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>106</i>	<i>2</i>	<i>4,902</i>	-	<i>155</i>	<i>0</i>	<i>0</i>
Pech Changvar	700	660	94	660	94	40	6	0	0	6	1	1,145	1.7	0	0	0
Popel	922	899	98	899	98	23	2	33	4	0	0	1,065	1.2	0	0	0

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

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

2/: Average cropped area of wet season rice per farm is estimated to be 1.4 ha/farm from data of neighboring communes

3/: Major - commune occupies majority of the sub-project area; limited - the sub-project area includes limited extent of the subject commune

Table B1.6-2 Rice Cropped Area, Production & Yield in the Project Communes: Lum Hach 1/

District/Commune	Year	Wet Season Rice Production				Dry Season Rice Production				Annual Rice Production						
		Cultivated Area (ha.)	Harvested Area (ha)	Yield (t/ha) 2/	Production (t)	Cultivated Area (ha.)	Harvested Area (ha)	Yield (t/ha) 2/	Production (t)	Cultivated Area (ha.)	Harvested Area (ha)	Yield (t/ha) 1/	Production (t)			
Boribo																
Anhchanh Rung (major) 3/	2007	4,172	4,172	1.9	7,905	0	0	0	0	4,172	4,172	1.9	7,905			
	2006	4,460	4,460	1.7	7,595	0	0	0	0	4,460	4,460	1.7	7,595			
	2005	4,075	4,075	1.2	5,037	0	0	0	0	4,075	4,075	1.2	5,037			
	2004	4,141	4,112	1.2	5,017	0	0	0	0	4,141	4,112	1.2	5,017			
	2003	3,540	3,484	1.3	4,540	0	0	0	0	3,540	3,484	1.3	4,540			
	Average	4,078	4,061	1.5	6,019	0	0	0	0	4,078	4,061	1.5	6,019			
Pech Changvar (major) 3/	2007	1,454	1,454	1.8	2,683	0	0	0	0	1,454	1,454	1.8	2,683			
	2006	1,503	1,503	1.8	2,711	0	0	0	0	1,503	1,503	1.8	2,711			
	2005	1,458	1,458	1.0	1,397	0	0	0	0	1,458	1,458	1.0	1,397			
	2004	1,495	1,480	0.9	1,379	0	0	0	0	1,495	1,480	0.9	1,379			
	2003	1,145	1,092	1.4	1,653	0	0	0	0	1,145	1,092	1.4	1,653			
	Average	1,411	1,397	1.4	1,965	0	0	0	0	1,411	1,397	1.4	1,965			
Popel (partly) 3/	2007	1,215	1,215	2.3	2,843	0	0	0	0	1,215	1,215	2.3	2,843			
	2006	1,215	1,215	1.9	2,367	0	0	0	0	1,215	1,215	1.9	2,367			
	2005	1,215	1,215	1.0	1,244	0	0	0	0	1,215	1,215	1.0	1,244			
	2004	1,214	1,194	1.0	1,227	0	0	0	0	1,214	1,194	1.0	1,227			
	2003	1,065	1,008	1.4	1,515	0	0	0	0	1,065	1,008	1.4	1,515			
	Average	1,185	1,169	1.6	1,839	0	0	0	0	1,185	1,169	1.6	1,839			
Phsar (limited) 3/	Average	1,858	1,843	1.5	2,854	233	222	2.8	656	2,091	2,065	1.7	3,510			
Tuek Phos																
Krang Skear	Average	3,442	3,311	1.7	5,794	0	0	0	0	3,442	3,311	1.7	5,794			

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

2/: Yield to cropped area

Source: 2003 - 2006 PDA Kampung Chhnang, 2007 DAO Boribo

3/: 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 B1.6-3 Rice Production Features in the Project Communes: SEILA Data Base: Lum Hach

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			
Boribo										
Anhchanh Rung 8major) 1/	2002	3,981	-	5,175	1.3	0	0	0	3,981	
	2003	3,540	-	1,584	0.4	0	0	0	1,981	
	2004	4,000	-	4,800	1.2	0	0	0	4,646	
	2005	4,646	-	3,252	0.7	0	0	0	4,646	
	Average	4,042	-	3,703	0.9	0	0	0	3,814	
Pech Changvar (partly) 1/	2002	1,650	-	2,145	1.3	0	0	0	1,650	
	2003	1,650	-	1,980	1.2	0	0	0	1,650	
	2004	1,650	-	2,145	1.3	0	0	0	1,650	
	2005	1,650	-	2,145	1.3	0	0	0	1,650	
	Average	1,650	-	2,104	1.3	0	0	0	1,650	
Popel (partly) 1/	2002	1,215	-	1,823	1.5	0	0	0	1,215	
	2003	1,065	57	1,387	1.2	0	0	0	1,215	
	2004	1,215	-	2,430	2.0	0	0	0	1,215	
	2005	1,215	-	1,762	1.5	0	0	0	1,215	
	Average	1,178	14	1,850	1.6	0	0	0	1,215	
Phsar (limited) 1/	Average	1,304	-	1,240	1.0	210	210	424	2,599	
District Total (Avg. of 2002 - 2005)		15,264	619	16,621	1.0	1,723	1,291	4,962	22,696	
Tuek Phos (limited) 1/										
Krang Skear (Avg. of 2002 - 2005)		2,837	5	4,033	1.4	0	0	0	2,933	

1/: 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: SEILA Data Base 2002 - 2005

Table B1.6-4 Estimation of Current Cropped Area of Rice and Other Crops: Lum Hach

1. Estimation of Cropped Area of Wet Season Rice in the Sub-project Area

(1) Cropping intensity of wet season rice in major communes in the sub-project area (results of interview survey in commune offices)

Commune	Phsar	A. Roung	Note: Planting method: transplanting 100%
Cropping Intensity (%)	100	100	

(2) Cropping intensity of wet season rice reported by DAO Boribo
100% cropping intensity of wet season rice in the sub-project area

(3) Estimated cropping intensity of wet season rice
Cropping intensity of 100% of wet season rice is estimated in the sub-project area based on the information provided by the commune offices and DAO.

2. Estimation of Cropped Area of Early Wet Season Rice in the Sub-project Area

(1) Cropped area of early wet season rice in major communes in the sub-project area (interview survey in commune offices)

Commune	Phsar	A. Roung
Cropped Area (ha)	0	0

(2) Cropped area of early wet season rice reported by DAO Boribo
No rice crop grown in early wet season in the sub-project area.

(3) Findings of field survey by JICA Study Team
No early wet season rice observed in the field survey carried out by the Team.

(4) Estimated cropped area of early wet season rice
No cropping of early wet season rice is estimated in the sub-project area based on the information provided by the commune offices and DAO and the findings of the field survey by the JICA Study Team.

3. Estimation of Cropped Area of Dry Season Rice in the Sub-project Area

(1) Cropped area of dry season rice in major communes in the sub-project area (interview survey in commune offices)

Commune	Phsar	A. Roung
Cropped Area (ha)	0	0

(2) Estimated cropped area in dry season rice under the without project condition
No cropping of dry season rice is estimated in the sub-project area based on the information provided by the commune offices and DAO and the findings of the field survey by the JICA Study Team.

4. Cropped Areas of Other Crops in Paddy Fields in the Sub-project Area

(1) Cropped area of other crops in paddy fields in major communes in the sub-project area (interview survey in commune offices)

Commune	Phsar	A. Roung	Major crops: cucumber & watermelon
Cropping Season	-	Dry Season	
Cropped Area (ha)	0	30 - 40	

Note: all & part of paddy fields are in the sub-project area, respectively for A. Roung & Popel

(2) Estimated cropped area of other crops in paddy fields in the sub-project area
Estimated to be 40ha in dry season. Represented by cucumber.

5. Estimated cropped area in paddy fields in the sub-project area

On the basis of the findings presented above, the estimated cropped area in paddy fields in the sub-project is estimated as follows;

Paddy Fields in Sub-project Area	Crops	Early Wet Season		Wet Season		Dry Season 1/		Annual	
		Area (ha)	C.I. 1/	Area (ha)	C.I.	Area (ha)	C.I.	Area (ha)	C.I.
3,320 ha	Rice	0	0	3,320	100	0	0	3,320	100
	Cucumber/watermelon	0	0	0	0	40	1	40	1
	Total	0	0	3,320	100	40	1	3,360	101

1/: Cropping intensity (%)

Table B1.6-5 Upland Crops Cropped Area in the Project Communes: Lum Hach

Unit: ha

District/Commune	Year	Crop									Total
		Corn	Cassava	Sweet Potato	Vegetables	Mungbeans	Groundnut	Sesame	Sugar cane	Tobacco	
Boribo											
Anhchanh Rung	1/	-	9	8	30	4	4	3	2	0.3	58
Pech Changvar	1/	0	9	7	23	2	5	4	2	-	52
Popel	1/	-	2	4	33	1	3	1	2	0.4	46
Sub-total		-	20	19	86	7	12	8	6	1	156
Phsar	1/	-	4	5	27	1	4	1	2	0.2	46
District		205	56	60	241	21	39	35	17	3	687

1/ Average of 2003 to 2007

Source: DAO Boribo, Kampong Chhnang

Table B1.6-6 Fruit Tree Planted Area in the Project Communes: Lum Hach

District/Commune	Planted Areas of Fruit Trees (ha)											Total
	Banana	Cashew	Coconut	Longan	Mango	Milk Fruit	Jack Fruit	Custard	Orange	Guava	Pineapple	
Boribo												
Anhchanh Rung	6	1.5	7	0	1.3	1.1	0	0	0	0	1.5	18
Pech Changvar	2.5	3	1	0	0.5	0.5	0.5	1	0	1.5	1	12
Popel	2	2	1	0	5	1	1	0.5	0.6	1	0	14
Phsar	17	0	15	0	2	1.5	0	0	0	0	0	36
Tuek Phos												
Krang Skear	6.5	5	1.5	0	7	0.5	3	2	0	4	0	30

Source: Commune Survey on Crops and Livestock, 2003, Kampong Chhnang, MAFF, 2004

Table B1.6-7 Inventory on Farm Machinery & Facilities in the Project Communes in 2007: Lum Hach

District/Commune	Tractor		Hand Tractor		Pumping Machine		Reaper		Thresher		Rice Mill		Dryer
	Public	Private	Public	Private	Public	Private	small	Big	Pedal	Engine	Small	Big	
Boribo													
Anhchanh Rung	0	0	0	15	0	18	0	0	0	3	93	0	0
Pech Changvar	0	0	0	20	0	10	0	0	0	5	34	0	0
Popel	0	0	0	22	0	40	0	0	0	5	53	0	0
Sub-total	0	0	0	57	0	68	0	0	0	13	180	0	0
Phsar	0	1	0	26	0	128	0	0	0	7	54	0	0
District Total	0	2	0	262	0	909	0	0	0	61	472	1	0
Tuek Phos													
Krang Skear	0	0	0	15	0	84	0	0	0	0	62	0	0

Source: PDA Kampong Chhunang

Table B1.6-8 Livestock Population in the Project Communes: Lum Hach

District/Commune	Cattle Total	Cow	Draft Cattle	Buffalo Total	Buffalo Female	Draft Buffalo	Pig Total	Pig Female	Animal Units (A.U.) 1/	Poultry	No. of Farm Families 2/
Boribo											
Anhchanh Rung	563	165	93	1,866	621	1,270	1,728	49	2,532	16,568	981
Pech Changvar	563	122	139	1,765	677	1,166	2,934	58	2,682	10,925	660
Popel	1,540	740	491	1,733	607	1,239	2,136	40	3,373	10,741	899
Phsar	1,082	306	348	1,735	561	1,127	2,257	42	2,987	11,163	1,054
Tuek Phos											
Krang Skear	3,806	1,272	1,337	1,002	325	630	2,313	527	4,790	13,419	2,096
Total	7,554	2,605	2,408	8,101	2,791	5,432	11,368	716	16,363	62,816	5,690
Holding Size/Family	1.3	0.5	0.4	1.4	0.5	1.0	2.0	0.1	2.9	11.0	-

1/: Animal units (A.U.) assumed as follows: cattle total & buffalo total x 0.9; pig total x 0.2/ Assuming crop production families as farm families

Source: Commune Survey on Crops and Livestock, 2003, Kampong Chhunang, , MAFF, 2004

Table B1.6-9 Estimation of Current Yield Level of Paddy: Lum Hach

1. Statistic Data: Paddy Yields in Major Project Communes/District

Commune/District	Average Paddy Yield (ton/ha)				Remarks
	DAO/PDA 1/		SEILA Data Base 2/		
	Wet Season	Dry Season	Wet Season	Dry Season	
Anchanh Rung	1.5	-	0.9	-	Mostly 3/
Phsar	1.5	2.8	1.0	1.0	Mostly 3/
Boribo District	1.2	3.0	1.0	1.6	4/

1/: Statistic data of DAO Boribo/PDA Kg. Chhnang; average of 2003 - 2007 2/: SEILA Data Base, average of 2002 - 2005
 3/: Mostly - commune paddy fields mostly located in sub-project area; partly - the same partly located in sub-project area
 4/: Dry season yield data of SEILA include recession rice grown in dry season.

2. Yield Estimation by Project Commune Offices & DAO

Commune	Estimated Yield of Wet Season Rice (paddy ton/ha)		Remarks
	By Commune Offices	By DAO	
Anchanh Rung	0.8 - 0.9	Lum Hach area: 1.9	Reported that low yield due to sandy soils
Phsar	1.5		
Average	1.15 - 1.20		
Sun Dried Paddy 1/	1.0 - 1.1		

Source: Interview survey with subject commune offices & DAO
 1/: Conversion to sun-dried paddy: 90% x estimated yields

3. Results of the Inventory Survey by JICA, 2006

Irrigation Scheme	Paddy Yield (ton/ha)				Remark
	Transplanting		Direct Sowing 1/		
	Wet Season 2/ Supplemental Irrigation	Dry Season	Wet Season Rainfed Field	Dry Season	
Lum Hach	2.2	-	1.0	-	

1/: Direct sowing of rice is negligibly limited in the sub-project area 2/: Sun dried paddy yield: 2.0 t/ha

4. Results of Socio-economic Survey 1/

Irrigation Scheme	Paddy Yield (ton/ha) Wet Season		Irrigation Status	Remarks
	Average	Range		
Lum Hach	0.8	0.5 - 2.5	Under rainfed conditions	No. of respondents: 50

1/: Results of Socio-economic Survey conducted by the JICA Study Team
 2/: All the respondent reported their fields as rainfed field

5. Estimated Current Yield Levels of Paddy in the Sub-project Area

On the basis of the statistic data, information provided by communes & DAO and the results of the Inventory Survey & the Socio-economic Survey, current yield levels of paddy in the sub-project area are estimated as follows;

Irrigation Status	Estimated Current Yield Level		Remarks
	Wet Season	Dry Season	
Under rainfed conditions	1.2	-	No early wet & dry season cropping
Supplemental Irrigation	1.7	-	
Pumping Irrigation	-	-	
Normal Irrigation	-	-	

Table B1.6-10 Present/Without-project Crop Production: Lum Hach Sub-project Area

Crop/Land Use Sub-category	Area (ha)	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual	
		Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)
Rice:												
Normal Irrigation Paddy Field	0											
Supplemental Irrigation Paddy Field	200	200	6	1.7	340						6	340
Rainfed Paddy Field	3,120	3,120	94	1.2	3,744						94	3,744
Rice Total	3,320	3,320	100	1.2	4,084						100	4,084
Upland Crops/Vegetables:												
Upland Crops	-											0
Vegetables I/	-								40	1	5.8	232
Upland Crops/Vegetables Total									40	1	-	232
Overall		0	0	-	-	3,320	100	-	40	1	-	101

I/: Average of watermelon & cucumber

Table B1.6-11 Results of Socio-economic Survey: Lum Hach

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) poor soil conditions & iii) labor shortage.
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) low market prices of livestock.
Reasons for Low Yield of Rice	Major reasons reported include: i) drought in wet season ; followed by ii) poor soil conditions & iii) water shortage in dry season.
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 (high yielding variety) & iii) use of quality seed (local 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 field crops and iii) 3rd most expected: productivity improvement of dry season rice.
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 B3.1-2 Financial Crop Budget of Paddy under With-project Conditions (2/2)

Items	Unit	Unit Price (Riel.000)	Luum Hach															
			Early Wet Season Rice				Wet Season Rice				Dry Season Rice							
			Normal Irrigation		Pump Irrigation		Normal Irrigation		Pump Irrigation		Normal Irrigation		Pump Irrigation					
			Qty	Value (Riel.000)	Qty	Value (Riel.000)	Qty	Value (Riel.000)	Qty	Value (Riel.000)	Qty	Value (Riel.000)	Qty	Value (Riel.000)				
1. Gross Return Paddy																		
Unit Yield (ton/ha)																		
Unit Price (Riel.000/t)																		
Gross Return of Paddy (Riel.000)																		
By Product (straw) 1/																		
Gross Return (Riel.000)																		
2. Production cost																		
2-1. Farm Inputs																		
Seed 2/	(kg)	1.4	841	25	35	25	35	25	35	25	35	25	35	25	35	25	35	25
Fertilizers	(kg)	3.5	806	80	280	80	280	80	280	80	280	80	280	80	280	80	280	80
- Urea	(kg)	5.0	3.4	140	476	140	476	140	476	140	476	140	476	140	476	140	476	140
- DAP	(kg)	3.4	50	1.0	50	1.0	50	1.0	50	1.0	50	1.0	50	1.0	50	1.0	50	1.0
- 20-20-15	(kg)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Compost	(ton)	20.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agro-chemicals	(lit)	10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Agro-chemicals	(kg)																	
2-2. Labor Costs																		
Labor Requirements 2/																		
- Hired Labor (man-day)		10	110	11	110	11	110	11	110	11	110	11	110	11	110	11	110	11
- Family Labor (man-day)				100	111	100	111	100	111	100	111	100	111	100	111	100	111	100
- Family Labor (man-day)				111	111	111	111	111	111	111	111	111	111	111	111	111	111	111
Total																		
2-3. Land Preparation																		
- Draft Animal/Tractor (Riel.000)																		
2-4. Pumping Cost (Riel.000)																		
2-5. Transportation - By Ox Cart/H. Tractor																		
2-6. Miscellaneous Expenses (L.S.)																		
(2-1 ~ 2-6 x 5%)																		
3. Net Return (Riel.000)																		
%																		

1/: By products/straw: assumed to be 5% of gross return of paddy

2/: Commercial seed price R. 2,100; assuming seed replacement in every 3 croppings: $(R.2100 + R.1000-1100)/3 = R.1,700 \sim 1,430 = R.1,400/kg$

3/: Hired Labor Requirements --- assumed to be 20% of total labor requirements in Ream Kon & Por Canal; 10% of total labor requirements in other sub-projects

Table B3.1-3 Farm Economy under the Present/Without-project & With-project Condition: Ream Kon Sub-project (1/2)

Item	Typical Farm											
	Type A			Type A - 1			Type A - 2			Type A - 2		
	I. Present/Without-project			II. With-project			III. With-project			III. With-project		
	Irrigation Status: Rainfed Field			Irrigation Status: Normal Irrigation			Irrigation Status: Pump Irrigation			Irrigation Status: Pump Irrigation		
	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 6/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 6/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 6/
1. Net Income												
1-1. Net Farm Income												
(1) Rice Production												
Early Wet Season Rice (direct sowing)	0.2	500	1,000									
Gross Return			500				3,900				3,900	
Production Cost 2/			325				2,003				2,549	
Wet Season Rice	2.2	3,740	1,100									
Gross Return			4,114				5,390				5,390	
Production Cost 2/			2,220				2,295				2,589	
Wet Season Rice: Rainfed Rice												
Gross Return							1,496				1,496	
Production Cost 2/							807				807	
Net Return			2,069				5,681				4,841	
(2) Upland Crops/Vegetables Production												
Upland Crops												
Gross Return							633					
Production Cost 2/							286					
Vegetables												
Gross Return							352					
Production Cost 2/							120					
Net Return							579					
(3) Other Farm Products 3/												
Gross Return							630				630	
Livestock							420				420	
Fishery							140				140	
Other Crops							70				70	
Production Cost 4/							190				190	
Net Return							440				107	
1-2. Net Non-farm Income 3/												
(1) Net Income												
Wage & Salary							2,060				2,060	
Trade							500				500	
Remittance from Family Members							680				680	
Others							220				220	
							660				660	
2. Expenditure 3, 5/												
Food							4,000				4,820	
Health/Medical							2,360				2,830	
Education							330				400	
Clothes							440				530	
Fuel							160				200	
Others							180				220	
							569				640	
3. Net Surplus (Capacity to Pay)												
1-1. Net Farm Income							2,069				5,681	
1-2. Net Non-farm Income							107				107	
2. Expenditure							976				1,176	
Net Surplus							139				961	
Balance (II - I)							4,191				4,191	
Balance (III - I)							4,191				4,191	

1/: No cropping of upland crops/vegetables assumed under pump irrigation
 2/: Estimated based on the crop budget analysis by the JICA Study Team
 3/: Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007; inflated by 20%
 4/: Assumed to be 30% of gross return
 5/: Assuming increase of expenditures by 20% from the present level in the with-project condition
 6/: Estimated by applying conversion rate of 1US\$ = Riel 4,100.-

Table B3.1-3 Farm Economy under the Present/Without-project & With-project Condition: Ream Kon Sub-project (2/2)

Item	Typical Farm											
	Type B. Holding Size of Paddy Field: 2.2 ha; Direct Sowing in Wet Season											
	Type B				Type B - 1				Type B - 2			
	I. Present/Without-project				II. With-project				III. With-project			
	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 7/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 7/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 7/
1. Net Income												
1-1. Net Farm Income												
(1) Rice Production												
Early Wet Season Rice (direct sowing)	0.2	500	1,000	1.3	3,900	1,000	3,900	1.3	3,900	1,000	3,900	
Gross Return			500				3,900				3,900	
Production Cost 2/			325				2,003				2,549	
Wet Season Rice	2.2	2,200	1,100	1.4	3,920	1,100	4,312	1.4	3,920	1,100	4,312	
Gross Return			2,420				2,146				1,743	
Production Cost 2/			1,738				880				880	
Wet Season Rice: Rainfed Rice				0.8	800	1,100	880	0.8	800	1,100	880	
Gross Return							632				632	
Production Cost 2/							4,311				4,168	
Net Return			857									
(2) Upland Crops/Vegetables Production												
Gross Return				0.23	230	2,750	633				633	
Production Cost 2/							286					
Vegetables				0.10	950	370	352				352	
Gross Return							120				120	
Production Cost 2/							579				579	
Net Return												
(3) Other Farm Products 3/												
Gross Return							630				630	
Livestock							420				420	
Fishery							140				140	
Other Crops							70				70	
Production Cost 4/							190				190	
Net Return							440				107	
1-2. Net Non-farm Income 3/												
(1) Net Income							2,060				2,060	
Wage & Salary							500				500	
Trade							680				680	
Remittance from Family Members							220				220	
Others							660				660	
2. Expenditure 3, 5, 6/												
Food							3,600				3,600	
Health/Medical							2,124				2,124	
Education							297				297	
Clothes							396				396	
Fuel							144				144	
Others							477				477	
3. Net Surplus (Capacity to Pay)							-243				-59	
Balance (III - I)							4,033				4,033	
Balance (III - I)							4,033				4,033	
Balance (III - I)							6,668				6,668	
Balance (III - I)							4,608				4,608	
Balance (III - I)							1,626				1,626	
Balance (III - I)							1,124				1,124	
Balance (III - I)							3,311				3,311	
Balance (III - I)							3,311				3,311	

1/: Land holding size: Type A --- holding of 2.2 ha of rainfed paddy field & transplanting in wet season
 2/: Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007; inflated by 20%
 3/: Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007; inflated by 20% from the present level in the with-project condition
 4/: Assumed to be 30% of gross return
 5/: Assumed increase of expenditures by 20% from the present level in the with-project condition
 6/: Expenditure of Type B = Type A x 90%
 7/: Estimated by applying conversion rate of US\$ = Riel 4,100.-

Table B3.1-4 Cost Estimates for Agricultural Support Program for Ream Kon Sub-project 1/

Activities		Unit	Program Cost (US\$)	1st			2nd			3rd			4th			Overall						
				Volume			Volume			Volume			Volume			Volume						
				Dry Season	Wet Season	Annual	Dry Season	Wet Season	Annual	Dry Season	Wet Season	Annual	Dry Season	Wet Season	Annual	Dry Season	Wet Season	Annual	Dry Season	Wet Season	Annual	
1. Field Programs																						
1.1. Field Adequacy Test																						
- Irrigated Rice	unit	800	2	2	4	3,200	1	1	2	1,600	0	0	0	0	0	0	0	0	0	0	0	
- Upland Crops	unit	800	3	3	3	2,400	3	3	3	2,400	0	0	0	0	0	0	0	0	0	0	0	
- Vegetables	unit	800	3	3	3	2,400	3	3	3	2,400	0	0	0	0	0	0	0	0	0	0	0	
1.2. Demonstration Plot (0.1ha)																						
- Irrigated Rice	unit	400	2	2	4	1,600	2	2	4	1,600	1	1	2	800	0	0	0	0	0	0	0	
- Upland Crops	unit	400	2	2	4	800	3	3	3	1,200	4	4	4	1,600	3	3	3	1,200	0	0	0	0
- Vegetables	unit	400	2	2	4	800	3	3	3	1,200	4	4	4	1,600	3	3	3	1,200	0	0	0	0
1.2. Demonstration Plot (1.0ha)																						
- Irrigated Rice	unit	700	0	0	0	0	1	1	2	1,400	2	2	4	2,800	2	2	4	2,800	5	5	10	4,000
- Upland Crops	unit	650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Vegetables	unit	750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3. Demonstration Farm (5.0ha)																						
- Irrigated Rice	unit	2,000	0	0	0	0	1	1	1	2,000	1	1	1	2,000	1	1	1	2,000	1	1	3	4,000
1.4. Demonstration Area (10ha)																						
- Irrigated Rice	unit	3,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Irrigated Rice	unit	750	3	3	3	2,250	4	4	5	3,750	5	5	6	4,500	5	5	6	4,500	17	17	20	15,000
1.5. Seed Multiplication																						
- Sub-total			17	4	21	13,450	20	6	26	17,550	19	6	25	18,850	17	5	22	19,350	73	21	94	69,200
2. Farmer/Farmer Group Training																						
2.1 Training Course																						
- 5 Days (30 participants)	unit	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2 FFS/TPM (50 participants)	unit	1,100	0	0	0	0	1	1	1	1,100	1	1	1	1,100	1	1	1	1,100	1	1	3	4,400
2.3 Study Tour	unit	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4 VAA Training 2/	unit	2,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- 10 Participants	unit	2,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Mass Guidance/Workshop																						
3.1. 50 Participants																						
- 2000	unit	200	1	1	2	400	1	1	2	400	1	1	2	400	1	1	2	400	1	1	4	1,600
4. Support Fund for Extension Staff																						
Farmer-to-farmer Extension Support	VAA	480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Field Guidance Staff	staff	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Staff Empowerment																						
- 800	unit	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6. Provision of Transportation Means																						
- Bicycle	unit	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Motorcycle	unit	1,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			17	4	21	13,450	20	6	26	17,550	19	6	25	18,850	17	5	22	19,350	73	21	94	69,200
1/ Program direct cost																						
2/ VAA --- Village Agriculture Extension Agent																						
- Total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Sub-total			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Per ha																						
- Total																						

Table B3.2-1 Present/Without-project & With-project Crop Production: Por Canal Sub-project

Crop/Land Use Sub-category	A. Present/Without-project Crop Production						B. With-project Crop Production									
	Early Wet Season (Direct Sowing)			Wet Season (Transplanting)			Wet Season (Direct Sowing)			Dry Season			Annual			
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)
Rice:	0															
Normal Irrigation Paddy Field	100	100	5	2.5	250	50	2.2	110	50	2	1.5	75	200	10	10	435
Supplemental Irrigation Paddy Field	1,970	310	15	2.5	775	985	1.7	1,675	985	48	1.0	985	2,280	110	110	3,435
Rained Paddy Field 1/	2,070	410	20	2.5	1,025	1,035	1.7	1,785	1,035	50	1.0	1,060	2,480	120	120	3,870
Rice Total																
Upland Crops/Vegetables:	-															
Upland Crops	-															
Vegetables	-															
Upland Crops/Vegetables Total	-															
Overall	-	410	20	-	-	1,035	-	-	-	1,035	50	-	-	0	-	2,480

1/: Rice production under pumping irrigation in early wet season

Crop/Land Use Sub-category	A. Present/Without-project Crop Production						B. With-project Crop Production									
	Early Wet Season (Direct Sowing)			Wet Season (Transplanting)			Wet Season (Direct Sowing)			Dry Season			Annual			
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)
Rice:	1,940	1,120	58	3.0	3,360	610	31	3.5	2,135	610	31	2.8	1,708	2,340	121	7,203
Normal Irrigation Paddy Field	-	130	7	1.0	130											
Supplemental Irrigation Paddy Field	-	60	3	9.5	570											
Rained Paddy Field 1/	1,940	1,120	58	3.0	3,360	360	19	1.7	612	360	19	1.0	360	720	37	972
Rice Total																
Upland Crops/Vegetables:	-															
Upland Crops (= 70%) 2/	-	190	10	-	700									70	4	1.0
Vegetables (= 30%) 3/	-	1,310	68	-	-	970	50	-	-	970	50	-	-	30	2	9.5
Upland Crops/Vegetables Total	-	1,310	68	-	-	970	50	-	-	970	50	-	-	100	5	-
Overall	-	1,310	68	-	-	970	50	-	-	970	50	-	-	100	5	-

1/: Cultivation of wet season rice under rainfed conditions

2/: Average of mungbeans & soybeans

3/: Average of watermelon & cucumber

Crop/Land Use Sub-category	C. Increment (With-project - Without-project)						D. Increment (With-project - Without-project)									
	Early Wet Season (Direct Sowing)			Wet Season (Transplanting)			Wet Season (Direct Sowing)			Dry Season			Annual			
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)
Rice:	1,940	1,120	58	3.360	610	31	2.135	2,135	610	31	2.8	1,708	2,340	121	7,203	
Normal Irrigation Paddy Field	-100	-100	-5	-250	-50	-2	-110	-75	-50	-2	-10	-435	-200	-10	-435	
Supplemental Irrigation Paddy Field	-1,970	-310	-15	-775	-985	-48	-1,675	-985	-985	-48	-1.0	-985	-2,280	-110	-3,435	
Rained Paddy Field 1/	-130	-130	-7	-130	-625	-29	-1,063	-625	-625	-29	-73	-2,463	-1,560	-73	-2,463	
Rice Total	-130	710	38	0.5	2,335	-65	0	1.1	963	-65	0	1.1	1,008	0	580	4,306
Upland Crops/Vegetables:																
Upland Crops	-	130	7	130										70	4	1.0
Vegetables	-	60	3	570										30	2	9.5
Upland Crops/Vegetables Total	-	190	10	700	0	-	-	0	0	0	-	-	0	100	5	355
Overall	-	900	48	-	-	-65	0	-	-65	0	-	-	-65	100	5	-

Table B3.2-2 Farm Economy under the Present/Without-project & With-project Condition: Por Canal Sub-project

Item	Typical Farm 1/											
	Type A: Holding Size of Paddy Field: 2.4 ha; Transplanting in Wet Season						Type B: Holding Size of Paddy Field: 2.4 ha; Direct Sowing in Wet Season					
	I. Present/Without-project			II. With-project			I. Present/Without-project			II. With-project		
	Cropped Area (ha)	Production (t/ha)	Unit Price (t/ha)	Amount (R.1000) (US\$) 6/	Amount (R.1000) (US\$) 6/	Balance (II-I)	Cropped Area (ha)	Production (t/ha)	Unit Price (t/ha)	Amount (R.1000) (US\$) 6/	Amount (R.1000) (US\$) 6/	Balance (II-I)
1. Net Income												
1-1. Net Farm Income												
(1) Rice Production												
Early Wet Season Rice (direct sowing)	0.5	1,250	1,000	<u>1,250</u>	<u>1,284</u>	<u>801</u>	1.4	4,200	1,000	4,200	4,200	4,200
Gross Return				1,250						4,200		4,200
Production Cost 2/				813						2,157		2,157
Wet Season Rice	2.4	4,080	1,100	<u>4,488</u>	<u>4,775</u>	<u>2,459</u>	1.5	5,250	1,100	5,775	4,620	4,620
Gross Return				4,488						5,775		5,775
Production Cost 2/				2,422						2,459		2,459
Wet Season Rice: Rainfed Rice							0.9	1,530	1,100	1,683	990	990
Gross Return										1,683		1,683
Production Cost 2/										908		908
Net Return				<u>2,503</u>						<u>6,134</u>		<u>4,642</u>
(2) Upland Crops/Vegetables Production												
Upland Crops							0.25	250	2,750	688	688	688
Gross Return										688		688
Production Cost 2/										311		311
Vegetables							0.11	1,045	370	387	387	387
Gross Return										387		387
Production Cost 2/										132		132
Net Return										<u>632</u>		<u>632</u>
(3) Other Farm Products 3/												
Gross Return										1,120		1,120
Livestock										480		480
Fishery										210		210
Other Crops										430		430
Production Cost 4/										340		340
Net Return										<u>780</u>		<u>190</u>
1-2. Net Non-farm Income 3/												
(1) Net Income										1,980		1,980
Wage & Salary										820		820
Trade										520		520
Remittance from Family Members										260		260
Others										380		380
2. Expenditure 3, 5/												
Food										4,400		4,400
Health/Medical										2,050		2,050
Education										370		370
Clothes										480		480
Fuel										220		220
Others										180		180
3. Net Surplus (Capacity to Pay)												
1/: Land holding size. Type A --- holding of 2.4 ha of rainfed paddy field & transplanting in wet season; Type B --- holding of 2.4 ha of rainfed paddy field & direct sowing in wet season												
2/: Estimated based on the crop budget analysis by the JICA Study Team												
3/: Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007, inflated by 20%												
4/: Assumed to be 30% of gross return												
5/: Assuming increase of expenditures by 20% from the present level in the with-project condition												
6/												
7/												
Estimated by applying conversion rate of 1US\$ = Riel 4,100 -												

Table B3.2-3 Cost Estimates for Agricultural Support Program for Por Canal Sub-project 1/

Por Canal Rehabilitation Sub-project: 1,940 ha		1st			2nd			3rd			4th			Overall					
		Volume			Volume			Volume			Volume			Volume					
		Dry Early Wet Season	Wet Season	Annual	Dry Early Wet Season	Wet Season	Annual	Dry Early Wet Season	Wet Season	Annual	Dry Early Wet Season	Wet Season	Annual	Dry Early Wet Season	Wet Season	Annual	Amount (US\$)		
Unit	Unit Program Cost (US\$)																		
1. Field Programs																			
1.1 Field Adaptability Test																			
- Irrigated Rice	unit	800	2	2	4	3,200	1	1	2	1,600	0	0	0	0	0	0	4,800		
- Upland Crops	unit	800	3	3	2,400	2,400	3	3	2,400	0	0	0	0	0	0	0	4,800		
- Vegetables	unit	800	3	3	2,400	2,400	3	3	2,400	0	0	0	0	0	0	0	4,800		
1.2 Demonstration Plot (0.1ha)																			
- Irrigated Rice	unit	400	2	2	4	1,600	2	2	4	1,600	1	1	2	800	5	5	4,000		
- Upland Crops	unit	400	2	2	800	800	3	3	1,200	3	3	4	1,200	4	4	4	4,800		
- Vegetables	unit	400	2	2	800	800	3	3	1,200	3	3	4	1,200	4	4	4	4,800		
1.2 Demonstration Plot (1.0ha)																			
- Irrigated Rice	unit	700			0	0	1	1	2	1,400	2	2	4	2,800	5	5	7,000		
- Upland Crops	unit	650			0	0	0	1	1	650	2	2	2	1,300	3	3	1,950		
- Vegetables	unit	750			0	0	0	1	1	750	2	2	2	1,500	3	3	2,250		
1.3 Demonstration Farm (5.0ha)																			
- Irrigated Rice	unit	2,000			0	0	0	1	1	2,000	1	1	2	4,000	1	3	8,000		
1.4 Demonstration Area (10ha)																			
- Irrigated Rice	unit	3,500			0	0	0	0	0	0	0	0	0	0	1	1	7,000		
1.5 Seed Multiplication	unit	750	3	3	2,250	2,250	4	4	1	5	3,750	5	5	1	6	4,500	15,000		
Sub-total			17	4	21	13,450	20	6	26	17,550	16	5	21	13,900	21	5	26	24,300	
2. Farmer/Farmer Group Training Programs																			
2.1 Training Course																			
- 5 Days (30 participants)	unit	500			2	1,000			2	1,000			2	1,000			8	4,000	
2.2 FFS/PPM (50 participants)	unit	1,100			0	0	1	1	1	1,100	1	1	1	1,100	1	1	2,200	4,400	
2.3 Study Tour	unit	600			0	0	1	1	1	600	0	0	0	0	1	1	600	1,200	
2.4 VAA Training 2/																			
- 10 Participants	unit	2,000			2	4,000			1	2,000	1	1	1	2,000	1	2,000	1	10,000	
Sub-total			0	0	4	5,000	0	2	5	4,700	0	1	4	4,100	1	6	5,800	19,600	
3. Mass Guidance/Workshop																			
3.1 50 Participants																			
- 50 Participants	unit	200	1	1	2	400	1	1	2	400	1	1	2	400	1	2	400	1,600	
4. Support Fund for Extension Staff																			
Farmer-to-farmer Extension Support	VAA	480			8	3,840			8	3,840			8	3,840			8	15,360	
Field Guidance Staff	staff	800			2	1,600			2	1,600			2	1,600			2	6,400	
Sub-total																			
5. Staff Empowerment	unit	800			2	1,600			1	800			1	800			1	800	4,000
6. Provision of Transportation Means																			
- Bicycle	unit	150			8	1,200												8	1,200
- Motorcycle	unit	1,500			2	3,000												2	3,000
Sub-total																		0	4,200
Total																		24,640	36,740
1/: Program direct cost																		28,890	30,090
2/: VAA --- Village Agriculture Extension Agent																		0	0
Per ha																		0	62

Table B3.3-1 Present/Without-project & With-project Crop Production: Damnak Ampil Sub-project

A. Present/Without-project Crop Production												
Crop/Land Use Sub-category	Area (ha)	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual	
		Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)
Rice:												
Normal Irrigation Paddy Field	0											
Supplemental Irrigation Paddy Field	500				500	21	2.0	1,000	60	2	2.5	150
Rained Paddy Field	1,930				1,930	79	1.5	2,895				
Rice Total	2,430				2,430	100	1.6	3,895	60	2	2.5	150
Upland Crops/Vegetables:												
Upland Crops	-											
Vegetables	-											
Upland Crops/Vegetables Total	-											
Overall	-	0	0	-	2,430	100	-	-	60	2	-	-

B. With-project Crop Production												
Crop/Land Use Sub-category	Area (ha)	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual	
		Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)
Rice:												
Normal Irrigation Paddy Field	1,770				1,770	78	3.3	5,841				
Pump Irrigation Field	500				500	22	3.3	1,650				
Rained Paddy Field												
Rice Total	2,270				2,270	100	3.3	7,491				
Upland Crops/Vegetables:												
Upland Crops (= 70% I/		240	11	1.1				264				264
Vegetables (= 30% I/		100	4	9.5				950				950
Upland Crops/Vegetables Total	-	340	15	-	-	-	-	1,214	0	0	-	1,214
Overall	-	340	15	-	2,270	100	-	-	0	0	-	-

I/: Average of moonbeans & groundnut 2/: Average of watermelon & cucumber

C. Increment (With-project - Without-project)												
Crop/Land Use Sub-category	Area (ha)	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual	
		Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)
Rice:												
Normal Irrigation Paddy Field	1,770				1,770	78		5,841				
Pump Irrigation Field	500				500	22		1,650				
Supplemental Irrigation Paddy Field	-500				-500	-21		-1,000	-60	-2		-150
Rained Paddy Field I/	-1,930				-1,930	-79		-2,895				
Rice Total	-160	0	-	-	-160	0	1.7	3,596	-60	-2	-	-150
Upland Crops/Vegetables:												
Upland Crops		240	11					264				264
Vegetables		100	4					950				950
Upland Crops/Vegetables Total	-	340	15	-	0	-	-	1,214	0	-	0	1,214
Overall	-	340	15	-	-160	0	-	-	-60	-2	-	13

Table B3.3-2 Farm Economy under the Present/Without-project & With-project Condition: Damnak Ampil Sub-project (1/2)

Item	Typical Farm																
	Type A: Holding Size of Paddy Field: 1.2 ha				Type A - I: Normal Irrigation				Type A - 2: Pump Irrigation								
	I. Present/Without-project		II. With-project		I. Present/Without-project		II. With-project		I. Present/Without-project		II. With-project						
	Irrigation Status: Rainfed Field Cropping Intensity: 100%		Irrigation Status: Rainfed Field Cropping Intensity: 100%		Irrigation Status: Normal Irrigation Cropping Intensity: 115%		Irrigation Status: Normal Irrigation Cropping Intensity: 115%		Irrigation Status: Pump Irrigation Cropping Intensity: 100% 1/		Irrigation Status: Pump Irrigation Cropping Intensity: 100% 1/						
Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 6/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 6/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 6/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (US\$) 6/	Balance (III - I)	
1. Net Income																	
1-1. Net Farm Income																	
(1) Rice Production																	
Early Wet Season Rice																	
Gross Return																	
Production Cost 2/																	
Net Return																	
Wet Season Rice																	
Gross Return																	
Production Cost 2/																	
Net Return																	
(2) Upland Crops/Vegetables Production																	
Upland Crops																	
Gross Return																	
Production Cost 2/																	
Net Return																	
(3) Other Farm Products 3/																	
Gross Return																	
Livestock																	
Fishery																	
Other Crops																	
Production Cost 4/																	
Net Return																	
1-2. Net Non-farm Income 3/																	
(1) Net Income																	
Wage & Salary																	
Trade																	
Remittance from Family Members																	
Others																	
2. Expenditure 3, 5/																	
Food																	
Health/Medical																	
Education																	
Clothes																	
Fuel																	
Others																	
3. Net Surplus (Capacity to Pay)																	
1/ No cropping of upland crops/vegetables assumed under pump irrigation																	
2/ Estimated based on the crop budget analysis by the JICA Study Team																	
3/ Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2008																	
4/ Assumed to be 30% of gross return																	
5/ Assuming increase of expenditures by 20% from the present level in the with-project condition																	
6/ Estimated by applying conversion rate of 1US\$ = Riel 4,100 -																	

Table B3.3-2 Farm Economy under the Present/Without-project & With-project Condition: Damnak Ampil Sub-project (2/2)

Item	Typical Farm									
	I. Present/Without-project					II. With-project				
	Type B: Holding Size of Paddy Field: 1.2 ha					Irrigation Status: Normal Irrigation				
	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (R.1000)	Amount (US\$ 5/)	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (R.1000)	Amount (US\$ 5/)
1. Net Income										
1-1. Net Farm Income										
(1) Rice Production										
Early Wet Season Rice										
Gross Return				<u>4,085</u>	<u>996</u>				<u>5,571</u>	<u>1,359</u>
Production Cost 2/				<u>2,169</u>	<u>529</u>				<u>2,655</u>	<u>891</u>
Net Return										
Wet Season Rice	1.2	2,400	1,100	2,640		1.2	3,960	1,100	4,356	
Gross Return				<u>1,254</u>					<u>1,806</u>	
Production Cost 2/				<u>1,386</u>					<u>2,550</u>	
Net Return										
(2) Upland Crops/Vegetables Production										
Upland Crops						0.13	143	2,550	365	
Gross Return									159	
Production Cost 2/										
Vegetables						0.05	475	370	176	
Gross Return									60	
Production Cost 2/									<u>322</u>	
Net Return										
(3) Other Farm Products 3/										
Gross Return				<u>1,119</u>					<u>1,119</u>	
Livestock				783					783	
Fishery				32					32	
Other Crops				304					304	
Production Cost 4/				336					336	
Net Return				<u>783</u>	<u>191</u>				<u>783</u>	<u>191</u>
1-2. Net Non-farm Income 3/										
(1) Net Income				<u>1,916</u>	<u>467</u>				<u>1,916</u>	<u>467</u>
Wage & Salary				1,135					1,135	
Trade				115					115	
Remittance from Family Members				666					666	
Others										
2. Expenditure 2, 4/										
Food				<u>3,400</u>	<u>829</u>				<u>4,080</u>	<u>995</u>
Health/Medical				1,837					2,200	
Education				331					400	
Clothes				196					240	
Fuel				199					240	
Others				661					790	
3. Net Surplus (Capacity to Pay)				685	167				1,491	364

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 2008

3/: Assumed to be 30% of gross return

4/: Estimated by applying conversion rate of 1US\$ = Riel 4,100.-

5/: Assuming increase of expenditures by 20% from the present level in the with-project condition

Table B3.4-1 Present/Without-project & With-project Crop Production: Wat Loung Sub-project

Crop/Land Use Sub-category	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual			
	Area (ha)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)
Rice:													
Normal Irrigation Paddy Field	0												
Supplemental Irrigation Paddy Field	130	130	5	2.0	260	130	5	2.0	260	130	5	2.0	260
Rainfed Paddy Field	2,590	2,590	95	1.5	3,885	2,590	95	1.5	3,885	2,590	95	1.5	3,885
Rice Total	2,720	2,720	100	1.5	4,145	2,720	100	1.5	4,145	2,720	100	1.5	4,145
Upland Crops/Vegetables:													
Upland Crops	-												
Vegetables 1/	-												
Upland Crops/Vegetables Total	-	-	0	-	-	-	0	-	-	-	0	-	-
Overall	-	2,720	100	-	-	2,720	100	-	-	2,720	100	-	-
1/: Average of watermelon & cucumber													
B. With-project Crop Production													
Rice:													
Normal Irrigation Paddy Field	1,740	1,740	69	3.3	5,742	1,740	69	3.3	5,742	1,740	69	3.3	5,742
Pump Irrigation Field	800	800	31	3.3	2,640	800	31	3.3	2,640	800	31	3.3	2,640
Rainfed Paddy Field													
Rice Total	2,540	2,540	100	3.3	8,382	2,540	100	3.3	8,382	2,540	100	3.3	8,382
Upland Crops/Vegetables:													
Upland Crops (=70%) 1/	-	270	11	1.1	297								
Vegetables (=30%) 2/	-	110	4	9.5	1,045								
Upland Crops/Vegetables Total	-	380	15	-	1,342	-	-	-	-	-	-	-	-
Overall	-	380	15	-	-	2,540	100	-	-	2,540	100	-	-
1/: Average of mungbeans & groundnut 2/: Average of watermelon & cucumber													
C. Increment (With-project - Without-project)													
Rice:													
Normal Irrigation Paddy Field	1,740	1,740	69		5,742	1,740	69		5,742	1,740	69		5,742
Pump Irrigation Field	800	800	31		2,640	800	31		2,640	800	31		2,640
Supplemental Irrigation Paddy Field	-130	-130	-5		-260	-130	-5		-260	-130	-5		-373
Rainfed Paddy Field 1/	-2,590	-2,590	-95		-3,885	-2,590	-95		-3,885	-2,590	-95		-3,885
Rice Total	-180	0	0	1.8	4,237	-180	0	1.8	4,237	-180	0	1.8	4,125
Upland Crops/Vegetables:													
Upland Crops	-	270	11		297								297
Vegetables	-	110	4		1,045								871
Upland Crops/Vegetables Total	-	380	15	-	1,342	0	-1	-	-174	380	14	-	1,168
Overall	-	380	15	-	-	-180	0	-	-75	-180	-3	-	125

Table B3.4-2 Farm Economy under the Present/Without-project & With-project Condition: Wat Loung Sub-project

Item	Typical Farm																				
	Type A. Holding Size of Paddy Field: 1.4 ha							Type A-1: Normal Irrigation							Type A-2: Pump Irrigation						
	I. Present/Without-project							II. With-project							Irrigation Status: Pump Irrigation						
	Irrigation Status: Rainfed Field							Irrigation Status: Normal Irrigation							Irrigation Status: Pump Irrigation						
	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (R.1000) (US\$) 6/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (R.1000) (US\$) 6/	Balance (II-I)	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (R.1000) (US\$) 6/	Balance (III-I)							
	Cropping Intensity: 100%							Cropping Intensity: 115%							Cropping Intensity: 100% 1/						
1. Net Income																					
1-1. Net Farm Income																					
(1) Rice Production																					
Early Wet Season Rice				854																	
Gross Return				3,502				5,812	1,418					5,141	1,639						
Production Cost 2/				1,812				4,122	1,005					3,451	1,639						
Net Return																					
Wet Season Rice	1.4	2,100	1,100																		
Gross Return				2,310				5,082						5,082							
Production Cost 2/				1,268				2,107						2,401							
Net Return				1,042				2,975						2,681							
(2) Upland Crops/Vegetables Production																					
Upland Crops																					
Gross Return								421													
Production Cost 2/								183													
Net Return								238													
Vegetables																					
Gross Return								211													
Production Cost 2/								72													
Net Return								139													
(3) Other Farm Products 3/																					
Gross Return				1,100				1,100						1,100							
Livestock				500				500						500							
Fishery				430				430						430							
Other Crops				170				170						170							
Production Cost 4/				330				330						330							
Net Return				770				770						770							
1-2. Net Non-farm Income 3/																					
(1) Net Income				1,690				1,690						1,690							
Wage & Salary				740				740						740							
Trade				360				360						360							
Remittance from Family Members				80				80						80							
Others				510				510						510							
2. Expenditure 3, 5/																					
Food				2,870				3,440						3,440							
Health/Medical				1,780				2,140						2,140							
Education				370				260						260							
Clothes				90				440						440							
Fuel				90				110						110							
Others				320				380						380							
3. Net Surplus (Capacity to Pay)				632				2,372	579					1,791	415						

1/ No cropping of upland crops/vegetables assumed under pump irrigation 2/ Estimated based on the crop budget analysis by the JICA Study Team
 3/ Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007, inflated by 20% 4/ Assumed to be 30% of gross return
 5/ Assuming increase of expenditures by 20% from the present level in the with-project condition 6/ Estimated by applying conversion rate of 1US\$ = Riel 4,100.-

Table B3.4-3 Cost Estimates for Agricultural Support Program for Wat Loung Sub-project 1/

Wat Loung Rehabilitation Sub-project: 2,540 ha			1st			2nd			3rd			4th			Overall		
Activities	Unit	Program Cost (US\$)	Volume			Amount (US\$)	Volume			Amount (US\$)	Volume			Amount (US\$)	Volume		
			Early Season	Wet Season	Annual		Early Season	Wet Season	Annual		Early Season	Wet Season	Annual		Early Season	Wet Season	Annual
1. Field Programs																	
1.1 Field Adaptability Test	unit	800															
- Irrigated Rice	unit	800	4		2	1,600	4		2	3,200	1		1	800	0		5
- Upland Crops	unit	800	4		4	3,200	4		4	3,200	0		0	0	8		8
- Vegetables	unit	800	4		4	3,200	4		4	3,200	0		0	0	8		8
1.2 Demonstration Plot (0.1ha)	unit	400															
- Irrigated Rice	unit	400	3		4	1,200	4		4	1,600	4		4	1,600	1		13
- Upland Crops	unit	400	3		4	1,200	4		4	1,600	4		4	1,600	1		12
- Vegetables	unit	400	3		4	1,200	4		4	1,600	4		4	1,600	1		15
1.2 Demonstration Plot (1.0ha)	unit	700															
- Irrigated Rice	unit	700	2		2	1,400	3		3	2,100	4		4	2,800	0		13
- Upland Crops	unit	650	1		1	650	1		1	650	1		1	650	4		4
- Vegetables	unit	750	1		1	750	1		1	750	1		1	750	4		4
1.3 Demonstration Farm (5.0ha)	unit	2,000															
- Irrigated Rice	unit	3,500	3		3	2,250	5		5	4,500	2		2	7,000	0		3
- Irrigated Rice	unit	750	17		8	15,650	23		11	4,500	15		14	5,250	19		25
- Seed Multiplication	unit																
Sub-total																	
2. Farmer/Farmer Group Training Programs																	
2.1 Training Course	unit	500															
- 5 Days (30 participants)	unit	1,100	1		1	1,100	1		1	1,100	2		2	2,200	0		5
- 2.2 FFSS/PM (50 participants)	unit	600															2
- 2.3 Study Tour	unit	2,000															2
- 2.4 VAA Training 2/	unit																5
- 10 Participants	unit																10,000
Sub-total																	21,700
3. Mass Guidance/Workshop																	
3.1 50 Participants	unit	200															
- Support Fund for Extension Staff	VAA	480															40
- Farmer-to-farmer Extension Support	staff	800															12
- Field Guidance Staff	unit	800															5
- Staff Empowerment	unit	1,500															10
- Bicycle	unit	4,500															3
- Motorcycle	unit	1,500															4,500
Sub-total																	150,050
6. Provision of Transportation Means																	
- Bicycle	unit	1,500															10
- Motorcycle	unit	1,500															3
Sub-total																	13
Total																	
1/ Program direct cost																	36,600
2/ VAA --- Village Agriculture Extension Agent																	36,150
Total																	99,650
																	Per ha 59

Table B3.5-1 Present/Without-project & With-project Crop Production: Wat Chre Sub-project

Crop/Land Use Sub-category	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual					
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)
Rice:															
Normal Irrigation Paddy Field	0														
Supplemental Irrigation Paddy Field	60				60	6	2.0	120					60	6	120
Rainfed Paddy Field	1,030				1,030	94	1.5	1,545					1,030	94	1,545
Rice Total	1,090				1,090	100	1.5	1,665					1,090	100	1,665
Upland Crops/Vegetables:															
Upland Crops	-														
Vegetables 1/	-	15	1	5.8	87					15	1	5.8	87		30
Upland Crops/Vegetables Total	-	15	1	5.8	87					15	1	5.8	87		30
Overall	-	15	1	-	-	100	-	-	-	15	1	-	-	103	-

1/: Average of watermelon & cucumber

Crop/Land Use Sub-category	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual					
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)
Rice:															
Normal Irrigation Paddy Field	620				620	61	3.3	2,046					620	61	2,046
Pump Irrigation Field	400				400	39	3.3	1,320					400	39	1,320
Rainfed Paddy Field															
Rice Total	1,020				1,020	100	3.3	3,366					1,020	100	3,366
Upland Crops/Vegetables:															
Upland Crops (≅ 70%) 1/	-	100	10	1.1	110								100	10	110
Vegetables (≅ 30%) 2/	-	50	5	9.5	475								50	5	475
Upland Crops/Vegetables Total	-	150	15	-	585								150	15	585
Overall	-	150	15	-	-	100	-	-	-	0	0	-	-	115	-

1/: Average of mungbeans & groundnut 2/: Average of watermelon & cucumber

Crop/Land Use Sub-category	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual					
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)
Rice:															
Normal Irrigation Paddy Field	620				620	61		2,046					620	61	2,046
Pump Irrigation Field	400				400	39		1,320					400	39	1,320
Supplemental Irrigation Paddy Field	-60				-60	-6		-120					-60	-6	-120
Rainfed Paddy Field 1/	-1,030				-1,030	-94		-1,545					-1,030	-94	-1,545
Rice Total	-70				-70	0	1.8	1,701					-70	0	1,701
Upland Crops/Vegetables:															
Upland Crops	-	100	10	110						0	0		100	10	110
Vegetables	-	35	4	388						-15	-1		-87	-1	-87
Upland Crops/Vegetables Total	-	135	13	498	0	-	-	0	-	-15	-1	-	-87	-1	12
Overall	-	135	13	-	-	100	-	-	-	-15	-1	-	-87	12	411

1/: Average of mungbeans & groundnut 2/: Average of watermelon & cucumber

Table B3.5-2 Farm Economy under the Present/Without-project & With-project Condition: Wat Chre Sub-project

Item	Typical Farm											
	Type A: Holding Size of Paddy Field: 1.6 ha				Type A-1: Normal Irrigation				Type A-2: Pump Irrigation			
	I. Present/Without-project				II. With-project				III. With-project			
	Irrigation Status: Rainfed Field				Irrigation Status: Normal Irrigation				Irrigation Status: Pump Irrigation			
	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (1000 riel) (US\$/6)	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (1000 riel) (US\$/6)	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (1000 riel) (US\$/6)
1. Net Income												
1-1. Net Farm Income												
(1) Rice Production			3,130	763			5,771	1,408			5,004	1,220
Early Wet Season Rice			1,320	329			4,031	983			3,264	796
Gross Return												
Production Cost 2/												
Wet Season Rice	1.6	2,400	1,100		1.6	5,280	1,100		1.6	5,280	1,100	
Gross Return			2,640				5,808				5,808	
Production Cost 2/			1,450				2,408				2,744	
Net Return			1,190				3,400				3,064	
(2) Upland Crops/Vegetables Production												
Upland Crops												
Gross Return					0.17	187	2,550					
Production Cost 2/							477					
Vegetables					0.07	665	370					
Gross Return							246					
Production Cost 2/							84					
Net Return							431					
(3) Other Farm Products 3/												
Gross Return			220				220				220	
Livestock			80				80				80	
Fishery			50				50				50	
Other Crops			160				160				160	
Production Cost 4/			90				90				90	
Net Return			200	49			200	49			200	49
1-2. Net Non-farm Income 3/												
(1) Net Income			1,740	424			1,740	424			1,740	424
Wage & Salary			560				560				560	
Trade			120				120				120	
Remittance from Family Members			270				270				270	
Others			790				790				790	
2. Expenditure 3, 5/												
Food			2,460	600			2,940	717			2,940	717
Health/Medical			1,520				1,820				1,820	
Education			170				200				200	
Clothes			120				140				140	
Fuel			100				120				120	
Others			480				580				580	
3. Net Surplus (Capacity to Pay)			670	163			2,831	690			2,064	503
1/: No cropping of upland crops/vegetables assumed under pump irrigation												
2/: Estimated based on the crop budget analysis by the JICA Study Team												
3/: Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007; inflated by 20%												
4/: Assumed to be 30% of gross return												
5/: Assuming expenditures increase 20% from the present level in the with-project condition												
6/: Estimated by applying conversion rate of 1US\$ = Riel 4,100.-												

Table B3.6-1 Present/Without-project & With-project Crop Production: Lum Hach Sub-project

Crop/Land Use Sub-category	A. Present/Without-project Crop Production						B. With-project Crop Production									
	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual						
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)	
Rice:																
Normal Irrigation Paddy Field	0															
Supplemental Irrigation Paddy Field	200				200	6	1.7	340					200		6	340
Rainfed Paddy Field	3,120				3,120	94	1.2	3,744					3,120		94	3,744
Rice Total	3,320				3,320	100	1.2	4,084					3,320		100	4,084
Upland Crops/Vegetables:																
Upland Crops	-															
Vegetables 1/	-															
Upland Crops/Vegetables Total	-				-				40	1	5.8	232	40		1	232
Overall	-	0	0	-	-	100	-	-	-	40	-	-	-	40	-	-

1/: Average of watermelon & cucumber

Crop/Land Use Sub-category	A. Present/Without-project Crop Production						B. With-project Crop Production									
	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual						
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)	
Rice:																
Normal Irrigation Paddy Field	2,690	33	3.0	3,090	2,690	87	3.0	8,070	100	3	3.0	300	3,820	123	11,460	
Pump Irrigation Field	410	5	3.0	510	410	13	3.0	1,230					580	19	1,740	
Rainfed Paddy Field																
Rice Total	3,100	39	3.0	3,600	3,100	100	3.0	9,300	100	3	3.0	300	4,400	142	13,200	
Upland Crops/Vegetables:																
Upland Crops (= 70% 1/	-	150	5	1.1	165				290	9	1.1	319	440	14	484	
Vegetables (= 30% 2/	-	60	2	9.5	570				120	4	9.5	1,140	180	6	1,710	
Upland Crops/Vegetables Total	-	210	7	735	-	-	-	-	410	13	-	1,459	620	20	2,194	
Overall	-	1,410	45	-	-	100	-	-	-	510	16	-	-	5,020	162	-

1/: Average of mungbeans & groundnut 2/: Average of watermelon & cucumber

Crop/Land Use Sub-category	C. Increment (With-project - Without-project)															
	Early Wet Season (Transplanting)			Wet Season (Transplanting)			Dry Season (Transplanting)			Annual						
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Production (ton)	
Rice:																
Normal Irrigation Paddy Field	2,690	33	3.0	3,090	2,690	87	3.0	8,070	100	3	3.0	300	3,820	123	11,460	
Pump Irrigation Field	410	5	3.0	510	410	13	3.0	1,230					580	19	1,740	
Supplemental Irrigation Paddy Field	-200	0	-3.40	-340	-200	-6	-3.40	-340	0	0	-200	-340	0	-6	-340	
Rainfed Paddy Field	-3,120	0	-3.744	-3,744	-3,120	-94	-3.744	-3,744	0	0	-3,120	-3,744	0	-94	-3,744	
Rice Total	-220	39	1.8	3,600	-220	0	1.8	5,216	100	3	-	300	1,080	42	9,116	
Upland Crops/Vegetables:																
Upland Crops	-	150	5	165					290	9	1.1	319	440	14	484	
Vegetables	-	60	2	570					80	3	9.5	908	140	5	1,478	
Upland Crops/Vegetables Total	-	210	7	735	0	-	-	0	370	12	-	1,227	580	19	1,962	
Overall	-	1,410	45	-	-	0	-	-	-	470	15	-	-	1,660	61	-

Table B3.6-2 Farm Economy under the Present/Without-project & With-project Condition: Lum Hach Sub-project

Item	Typical Farm																	
	Type A: Holding Size of Paddy Field: 1.4 ha						Type A-1: Normal Irrigation						Type A-2: Pump Irrigation					
	I. Present/Without-project						II. With-project						III. With-project					
	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (1000 riel) (US\$) 6/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (1000 riel) (US\$) 6/	Cropped Area (ha)	Production (kg)	Unit Price (riel)	Amount (1000 riel) (US\$) 6/	Balance (II - I)	Balance (III - I)				
1. Net Income																		
1-1. Net Farm Income																		
(1) Rice Production																		
Early Wet Season Rice																		
Gross Return																		
Production Cost 2/																		
Wet Season Rice																		
Gross Return																		
Production Cost 2/																		
Dry Season Rice																		
Gross Return																		
Production Cost 2/																		
Net Return																		
(2) Upland Crops/Vegetables Production																		
Upland Crops																		
Gross Return																		
Production Cost 2/																		
Vegetables																		
Gross Return																		
Production Cost 2/																		
Net Return																		
(3) Other Farm Products 3/																		
Gross Return																		
Livestock																		
Fishery																		
Other Crops																		
Production Cost 4/																		
Net Return																		
1-2. Net Non-farm Income 3/																		
(1) Net Income																		
Wage & Salary																		
Trade																		
Remittance from Family Members																		
Others																		
2. Expenditure 3, 5/																		
Food																		
Health/Medical																		
Education																		
Clothes																		
Fuel																		
Others																		
3. Net Surplus (Capacity to Pay)																		

1/: No cropping of dry season rice & upland crops/vegetables assumed under pump irrigation

2/: Estimated based on the crop budget analysis by the JICA Study Team

3/: Estimated based on the results of the Socio-economic Survey conducted by JICA Study Team in 2007; inflated by 20%

4/: Assumed to be 30% of gross return

5/: Assuming expenditures increase 20% from the present level in the with-project condition

6/: Estimated by applying conversion rate of 1 US\$ = Riel 4,100.-

Table B3.7-1 Present/Without-project & With-project Crop Production: Overall 6 Sub-projects

Crop/Land Use Sub-category	A. Present/Without-project Crop Production																																																																																																																																																																									
	Early Wet Season			Wet Season			Dry Season			Annual																																																																																																																																																																
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)																																																																																																																																																														
Rice:													Normal Irrigation Paddy Field	0	0		0	0	0		0	0	0		0	Supplemental Irrigation Paddy Field	1,040	150	1	2.5	375	1,040	8	1.9	1,994	105	1	2.5	263	1,295	9.5	2.0	2,632	Rainfed Paddy Field	12,610	460	3	2.5	1,150	12,610	92	1.4	17,250	0	0		0	13,070	95.8	1.4	18,400	Rice Total	13,650	610	4	2.5	1,525	13,650	100	1.4	19,244	105	1	2.5	263	14,365	105	1.5	21,032	Upland Crops/Vegetables:																		Upland Crops	-	10	0.1	0.5	5	0	0	0	0	0	0	0	0	10	0.1	0.1	0.5	5	Vegetables	-	15	0.1	5.8	87	0	0	0	0	85	1	5.8	493	100	0.7	5.8	580	Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-
Normal Irrigation Paddy Field	0	0		0	0	0		0	0	0		0	Supplemental Irrigation Paddy Field	1,040	150	1	2.5	375	1,040	8	1.9	1,994	105	1	2.5	263	1,295	9.5	2.0	2,632	Rainfed Paddy Field	12,610	460	3	2.5	1,150	12,610	92	1.4	17,250	0	0		0	13,070	95.8	1.4	18,400	Rice Total	13,650	610	4	2.5	1,525	13,650	100	1.4	19,244	105	1	2.5	263	14,365	105	1.5	21,032	Upland Crops/Vegetables:																		Upland Crops	-	10	0.1	0.5	5	0	0	0	0	0	0	0	0	10	0.1	0.1	0.5	5	Vegetables	-	15	0.1	5.8	87	0	0	0	0	85	1	5.8	493	100	0.7	5.8	580	Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-													
Supplemental Irrigation Paddy Field	1,040	150	1	2.5	375	1,040	8	1.9	1,994	105	1	2.5	263	1,295	9.5	2.0	2,632	Rainfed Paddy Field	12,610	460	3	2.5	1,150	12,610	92	1.4	17,250	0	0		0	13,070	95.8	1.4	18,400	Rice Total	13,650	610	4	2.5	1,525	13,650	100	1.4	19,244	105	1	2.5	263	14,365	105	1.5	21,032	Upland Crops/Vegetables:																		Upland Crops	-	10	0.1	0.5	5	0	0	0	0	0	0	0	0	10	0.1	0.1	0.5	5	Vegetables	-	15	0.1	5.8	87	0	0	0	0	85	1	5.8	493	100	0.7	5.8	580	Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-																										
Rainfed Paddy Field	12,610	460	3	2.5	1,150	12,610	92	1.4	17,250	0	0		0	13,070	95.8	1.4	18,400	Rice Total	13,650	610	4	2.5	1,525	13,650	100	1.4	19,244	105	1	2.5	263	14,365	105	1.5	21,032	Upland Crops/Vegetables:																		Upland Crops	-	10	0.1	0.5	5	0	0	0	0	0	0	0	0	10	0.1	0.1	0.5	5	Vegetables	-	15	0.1	5.8	87	0	0	0	0	85	1	5.8	493	100	0.7	5.8	580	Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-																																												
Rice Total	13,650	610	4	2.5	1,525	13,650	100	1.4	19,244	105	1	2.5	263	14,365	105	1.5	21,032	Upland Crops/Vegetables:																		Upland Crops	-	10	0.1	0.5	5	0	0	0	0	0	0	0	0	10	0.1	0.1	0.5	5	Vegetables	-	15	0.1	5.8	87	0	0	0	0	85	1	5.8	493	100	0.7	5.8	580	Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-																																																														
Upland Crops/Vegetables:																		Upland Crops	-	10	0.1	0.5	5	0	0	0	0	0	0	0	0	10	0.1	0.1	0.5	5	Vegetables	-	15	0.1	5.8	87	0	0	0	0	85	1	5.8	493	100	0.7	5.8	580	Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-																																																																																
Upland Crops	-	10	0.1	0.5	5	0	0	0	0	0	0	0	0	10	0.1	0.1	0.5	5	Vegetables	-	15	0.1	5.8	87	0	0	0	0	85	1	5.8	493	100	0.7	5.8	580	Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-																																																																																																		
Vegetables	-	15	0.1	5.8	87	0	0	0	0	85	1	5.8	493	100	0.7	5.8	580	Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-																																																																																																																					
Upland Crops/Vegetables Total	-	25	0.2	3.7	92	0	0	0	0	85	1	5.8	493	110	1	5.8	585	Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-																																																																																																																																							
Overall	-	635	4.7	-	-	13,650	100	-	-	196	1	-	-	14,475	106	-	-																																																																																																																																																									

Crop/Land Use Sub-category	B. With-project Crop Production																																																																																																																																																																													
	Early Wet Season			Wet Season			Dry Season			Annual																																																																																																																																																																				
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)																																																																																																																																																																		
Rice:													Normal Irrigation Paddy Field	10,370	3,055	24	3.0	9,165	9,045	71	3.2	28,636	100	1	3.0	300	12,200	96	3.1	38,101	Pump Irrigation Field	2,390	345	3	3.0	1,035	2,285	18	3.2	7,379	0	0		0	2,650	21	3.2	8,414	Rainfed Paddy Field	0	0	0	0	0	1,430	11	1.3	1,885	0	0		0	1,430	11	1.3	1,885	Rice Total	12,760	3,400	27	3.0	10,200	12,760	100	3.0	37,900	100	1	3.0	300	16,260	127.4	3.0	48,400	Upland Crops/Vegetables:																		Upland Crops (≠70%)	-	1,018	8	1.1	1,094	0	0	0	0	430	3	1.1	459	1,448	11	1.1	1,553	Vegetables (≠30%)	-	436	3	9.5	4,142	0	0	0	0	180	1	9.5	1,710	616	5	9.5	5,852	Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-
Normal Irrigation Paddy Field	10,370	3,055	24	3.0	9,165	9,045	71	3.2	28,636	100	1	3.0	300	12,200	96	3.1	38,101	Pump Irrigation Field	2,390	345	3	3.0	1,035	2,285	18	3.2	7,379	0	0		0	2,650	21	3.2	8,414	Rainfed Paddy Field	0	0	0	0	0	1,430	11	1.3	1,885	0	0		0	1,430	11	1.3	1,885	Rice Total	12,760	3,400	27	3.0	10,200	12,760	100	3.0	37,900	100	1	3.0	300	16,260	127.4	3.0	48,400	Upland Crops/Vegetables:																		Upland Crops (≠70%)	-	1,018	8	1.1	1,094	0	0	0	0	430	3	1.1	459	1,448	11	1.1	1,553	Vegetables (≠30%)	-	436	3	9.5	4,142	0	0	0	0	180	1	9.5	1,710	616	5	9.5	5,852	Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-													
Pump Irrigation Field	2,390	345	3	3.0	1,035	2,285	18	3.2	7,379	0	0		0	2,650	21	3.2	8,414	Rainfed Paddy Field	0	0	0	0	0	1,430	11	1.3	1,885	0	0		0	1,430	11	1.3	1,885	Rice Total	12,760	3,400	27	3.0	10,200	12,760	100	3.0	37,900	100	1	3.0	300	16,260	127.4	3.0	48,400	Upland Crops/Vegetables:																		Upland Crops (≠70%)	-	1,018	8	1.1	1,094	0	0	0	0	430	3	1.1	459	1,448	11	1.1	1,553	Vegetables (≠30%)	-	436	3	9.5	4,142	0	0	0	0	180	1	9.5	1,710	616	5	9.5	5,852	Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-																															
Rainfed Paddy Field	0	0	0	0	0	1,430	11	1.3	1,885	0	0		0	1,430	11	1.3	1,885	Rice Total	12,760	3,400	27	3.0	10,200	12,760	100	3.0	37,900	100	1	3.0	300	16,260	127.4	3.0	48,400	Upland Crops/Vegetables:																		Upland Crops (≠70%)	-	1,018	8	1.1	1,094	0	0	0	0	430	3	1.1	459	1,448	11	1.1	1,553	Vegetables (≠30%)	-	436	3	9.5	4,142	0	0	0	0	180	1	9.5	1,710	616	5	9.5	5,852	Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-																																																	
Rice Total	12,760	3,400	27	3.0	10,200	12,760	100	3.0	37,900	100	1	3.0	300	16,260	127.4	3.0	48,400	Upland Crops/Vegetables:																		Upland Crops (≠70%)	-	1,018	8	1.1	1,094	0	0	0	0	430	3	1.1	459	1,448	11	1.1	1,553	Vegetables (≠30%)	-	436	3	9.5	4,142	0	0	0	0	180	1	9.5	1,710	616	5	9.5	5,852	Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-																																																																			
Upland Crops/Vegetables:																		Upland Crops (≠70%)	-	1,018	8	1.1	1,094	0	0	0	0	430	3	1.1	459	1,448	11	1.1	1,553	Vegetables (≠30%)	-	436	3	9.5	4,142	0	0	0	0	180	1	9.5	1,710	616	5	9.5	5,852	Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-																																																																																					
Upland Crops (≠70%)	-	1,018	8	1.1	1,094	0	0	0	0	430	3	1.1	459	1,448	11	1.1	1,553	Vegetables (≠30%)	-	436	3	9.5	4,142	0	0	0	0	180	1	9.5	1,710	616	5	9.5	5,852	Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-																																																																																																							
Vegetables (≠30%)	-	436	3	9.5	4,142	0	0	0	0	180	1	9.5	1,710	616	5	9.5	5,852	Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-																																																																																																																									
Upland Crops/Vegetables Total	-	1,454	11	-	5,236	0	0	0	0	610	5	-	2,169	2,064	16.2	-	7,405	Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-																																																																																																																																											
Overall	-	4,854	38	-	-	12,760	100	-	-	710	6	-	-	18,324	144	-	-																																																																																																																																																													

Crop/Land Use Sub-category	C. Increment (With-project - Without-project)																																																																																																																																
	Early Wet Season			Wet Season			Dry Season			Annual																																																																																																																							
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton/ha)	Production (ton)																																																																																																																					
Rice:													Normal Irrigation Paddy Field	10,370	3,055		9,165	9,045		28,636	300	12,200			38,101	Pump Irrigation Field	1,350	195		660	1,245		5,385	-263	1,335			5,783	Rainfed Paddy Field	-12,610	-460		-1,150	-11,180		-15,365	0	-1,640			-16,515	Rice Total	-990	2,790	22	3,675	-890	0	18,656	38	1,895	22.2	1.5	27,368	Upland Crops/Vegetables:													Upland Crops (≠70%)	-	1,008		1,089	0		0	459	1,438			1,548	Vegetables (≠30%)	-	421		4,055	0		0	1,217	516			5,272	Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-
Normal Irrigation Paddy Field	10,370	3,055		9,165	9,045		28,636	300	12,200			38,101	Pump Irrigation Field	1,350	195		660	1,245		5,385	-263	1,335			5,783	Rainfed Paddy Field	-12,610	-460		-1,150	-11,180		-15,365	0	-1,640			-16,515	Rice Total	-990	2,790	22	3,675	-890	0	18,656	38	1,895	22.2	1.5	27,368	Upland Crops/Vegetables:													Upland Crops (≠70%)	-	1,008		1,089	0		0	459	1,438			1,548	Vegetables (≠30%)	-	421		4,055	0		0	1,217	516			5,272	Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-													
Pump Irrigation Field	1,350	195		660	1,245		5,385	-263	1,335			5,783	Rainfed Paddy Field	-12,610	-460		-1,150	-11,180		-15,365	0	-1,640			-16,515	Rice Total	-990	2,790	22	3,675	-890	0	18,656	38	1,895	22.2	1.5	27,368	Upland Crops/Vegetables:													Upland Crops (≠70%)	-	1,008		1,089	0		0	459	1,438			1,548	Vegetables (≠30%)	-	421		4,055	0		0	1,217	516			5,272	Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-																										
Rainfed Paddy Field	-12,610	-460		-1,150	-11,180		-15,365	0	-1,640			-16,515	Rice Total	-990	2,790	22	3,675	-890	0	18,656	38	1,895	22.2	1.5	27,368	Upland Crops/Vegetables:													Upland Crops (≠70%)	-	1,008		1,089	0		0	459	1,438			1,548	Vegetables (≠30%)	-	421		4,055	0		0	1,217	516			5,272	Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-																																							
Rice Total	-990	2,790	22	3,675	-890	0	18,656	38	1,895	22.2	1.5	27,368	Upland Crops/Vegetables:													Upland Crops (≠70%)	-	1,008		1,089	0		0	459	1,438			1,548	Vegetables (≠30%)	-	421		4,055	0		0	1,217	516			5,272	Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-																																																				
Upland Crops/Vegetables:													Upland Crops (≠70%)	-	1,008		1,089	0		0	459	1,438			1,548	Vegetables (≠30%)	-	421		4,055	0		0	1,217	516			5,272	Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-																																																																	
Upland Crops (≠70%)	-	1,008		1,089	0		0	459	1,438			1,548	Vegetables (≠30%)	-	421		4,055	0		0	1,217	516			5,272	Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-																																																																														
Vegetables (≠30%)	-	421		4,055	0		0	1,217	516			5,272	Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-																																																																																											
Upland Crops/Vegetables Total	-	1,429	11	5,144	0	0	0	1,676	1,954	15.4	-	6,820	Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-																																																																																																								
Overall	-	4,219	33	-	-890	0	-	-	3,849	38	-	-																																																																																																																					

Table B3.8-1 Labor Balance under With-project Condition: Ream Kon Sub-project

Labor Requirements of Typical Farm Family: Holding Size: Normal Irrigation Fields 2.2 ha Labor Force/Family: 3.0
Cropping Pattern Assumed:
 Early wet season: rice 42% (1.3 ha) & upland crops/vegetables 10% (0.22ha) ; wet season: irrigated rice 62% (1.4ha); rainfed rice 38% (0.8ha);
 dry season: upland crops/vegetable 5% (0.11ha); annual cropping area: rice 3.5 ha & upland crops/vegetables 0.33 ha

	Farming Calendar												Total	
	Apr	May	June	July	Aug.	Sept.	Oct	Nov	Dec.	Jan	Feb	Mar		
Early Wet Season (early rice 1.3 ha)														
Land Preparation														
Sowing (direct sowing)														
Field Management														
Harvesting/Post-harvesting														
Sub-total	13												13	
Wet Season (irrigated rice 1.4ha)														
Nursery														
Land Preparation														
Transplanting														
Field Management														
Harvesting/Post-harvesting														
Sub-total	15	7	8	8	4	3	1	0	0	0	0	0	0	59
Wet Season (rainfed rice 0.8ha)														
Nursery														
Land Preparation														
Transplanting														
Field Management														
Harvesting/Post-harvesting														
Sub-total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upland Crops/Vegetables (0.33 ha) 1/														
Land Preparation														
Sowing														
Field Management														
Harvesting/Post-harvesting														
Sub-total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Labor Requirements														
Labor Availability/Family 2/														
Labor Balance														
1	1	1	2	1	1	6								
2	2	2	1	1	0	0	0	0	0	0	0	0	0	0
3	10	10	9	5	3	1	6	0	39	24	19	41	35	16
4	25	25	25	25	25	25	25	25	25	25	25	25	25	25
5	16	15	15	16	20	22	24	19	25	-14	1	6	-16	-10
Sub-total													32	
Total Labor Requirements													378	
Labor Availability/Family 2/													900	
Labor Balance													522	

2/: Average labor force per family 3.0 x 25 days =75 labor days; 25 labor days per decade
 1/: Represented by mungbeans & soybeans

Table B3.8-2 Labor Balance under With-project Condition: Por Canal Sub-project

Labor Requirements of Typical Farm Family: Holding Size: Normal Irrigation Fields 2.4 ha Labor Force/Family: 3.2
 Early wet season: rice 42% (1.4 ha) & upland crops/vegetables 10% (0.24ha) ; wet season: irrigated rice 63% (1.5ha) ; rainfed rice 37% (0.9ha) ;
 Cropping Pattern Assumed: dry season: upland crops/vegetable 5% (0.12ha); annual cropping area: rice 3.8 ha & upland crops/vegetables 0.36 ha

Farming Practices	Farming Calendar												Total	
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar		
Early Wet Season (early rice 1.4ha)														
Land Preparation														
Sowing (direct sowing)														
Field Management														
Harvesting/Post-harvesting														
Sub-total	14	2	8	8	4	3	2	42	21				14	
Wet Season (irrigated rice 1.5ha)														
Nursery														
Land Preparation														
Transplanting														
Field Management														
Harvesting/Post-harvesting														
Sub-total	16	8	8	8	4	3	2	0	42	21	0	0	0	120
Wet Season (rainfed rice 0.9ha)														
Nursery														
Land Preparation														
Transplanting														
Field Management														
Harvesting/Post-harvesting														
Sub-total	0	0	0	0	0	0	0	4	18	33	22	7	7	172
Upland Crops/Vegetables (0.36 ha) 1/														
Nursery														
Land Preparation														
Transplanting														
Field Management														
Harvesting/Post-harvesting														
Sub-total	0	0	0	0	0	0	0	2	11	15	10	2	2	77
Total Labor Requirements	18	10	10	10	5	3	2	6	42	25	20	44	37	17
Labor Availability/Family 2/	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Labor Balance	9	17	17	17	22	24	25	21	27	-15	2	7	-10	10

1/: Represented by mungbeans & soybeans
 2/: Average labor force per family 3.2 x 25 days = 80 labor days; 27 labor days per decade

Table B4.1-1 Production of Major Upland Crops and Vegetables from 1997/98 - 2006/07 (1/2)

Year	Item	Crop: maize				Crop: soybeans				Crop: groundnut				Crop: mungbeans				Country
		Province		Country	Province		Country	Province		Country	Province		Country	Province		Country		
		Largest	2nd largest		3rd Largest	Largest		2nd largest	3rd Largest		Largest	2nd largest		3rd Largest	Largest		2nd largest	
1997/98	Province	Kandal	K. Cham	Prey Veng	-	K. Cham	K. Thom	Battambang	-	Battambang	K. Cham	Preahvihea	-	K. Cham	K. Chhnang	Kandal	-	-
	Cropped Area (ha)	15,521	13,607	3,242	49,447	28,761	3,169	454	32,881	1,335	2,065	1,160	9,608	10,203	3,731	4,085	27,511	
	Production (ton)	15,524	9,170	2,736	42,423	51,515	3,800	545	56,342	1,466	1,200	731	6,956	6,165	2,368	2,045	15,312	
1998/99	Province	Kandal	K. Cham	Bantey M.	-	K. Cham	K. Thom	Kandal	-	K. Cham	Kandal	Battambang	-	K. Cham	K. Chhnang	Kandal	-	-
	Cropped Area (ha)	13,668	11,235	4,483	44,915	26,436	3,863	216	30,981	3,836	1,579	719	9,695	13,420	2,938	2,424	25,163	
	Production (ton)	13,375	11,459	5,370	48,510	23,792	3,415	190	27,709	2,283	1,820	430	6,612	3,353	1,439	1,340	9,160	
1999/00	Province	Kandal	Battambang	K. Cham	-	K. Cham	Battambang	K. Thom	-	K. Cham	Battambang	Kandal	-	K. Cham	Battambang	Kandal	-	-
	Cropped Area (ha)	14,282	14,036	13,217	59,835	33,010	1,550	279	35,085	5,681	1,275	373	10,587	12,133	4,962	2,063	26,812	
	Production (ton)	26,676	24,077	21,296	95,274	33,000	1,560	268	35,063	5,883	646	405	9,244	7,268	2,971	1,238	15,913	
2000/01	Province	Battambang	Prey Veng	Kampot	-	K. Cham	Battambang	Rattanakiri	-	K. Cham	Battambang	Kandal	-	K. Cham	Bantey M.	Battambang	-	-
	Cropped Area (ha)	22,935	2,868	1,994	71,462	31,734	1,265	173	33,256	4,285	1,406	1,207	10,370	12,310	2,872	2,011	24,991	
	Production (ton)	99,885	2,952	2,521	156,972	26,340	1,500	173	28,111	2,948	1,130	865	7,490	6,131	2,253	1,212	15,100	
2001/02	Province	Battambang	Kandal	Bantey M.	-	K. Cham	Battambang	K. Thom	-	K. Cham	Preahvihea	Battambang	-	K. Cham	Kandal	Battambang	-	-
	Cropped Area (ha)	31,305	12,670	7,536	75,299	21,594	6,148	3,243	31,997	4,959	1,229	1,243	11,913	10,003	4,134	5,820	29,431	
	Production (ton)	137,032	11,466	8,603	179,088	14,349	5,469	3,471	24,658	3,351	1,586	734	8,913	4,812	3,211	2,905	17,153	
2002/03	Province	Battambang	Kandal	Bantey M.	-	K. Cham	Battambang	K. Thom	-	Battambang	K. Cham	Preahvihea	-	Battambang	K. Cham	Kandal	-	-
	Cropped Area (ha)	32,592	14,086	8,435	80,468	23,577	6,336	2,030	33,613	2,110	5,408	1,198	13,840	9,041	12,422	3,720	39,802	
	Production (ton)	92,778	14,854	9,329	148,897	27,872	7,816	1,688	38,801	2,299	1,736	1,507	9,738	6,422	4,669	3,039	23,925	
2003/04	Province	Battambang	Palin	Bantey M.	-	K. Cham	Battambang	K. Thom	-	K. Cham	Battambang	Kandal	-	Battambang	K. Cham	Bantey M.	-	-
	Cropped Area (ha)	44,173	4,613	7,804	93,362	28,898	12,549	2,678	53,164	4,513	2,957	1,152	14,563	6,456	9,434	7,118	44,940	
	Production (ton)	236,295	17,204	15,133	314,601	26,242	23,056	4,221	63,188	5,171	4,459	1,816	18,483	5,405	4,365	3,568	31,815	
2004/05	Province	Battambang	Palin	Bantey M.	-	K. Cham	Battambang	Palin	-	Battambang	K. Cham	Kandal	-	Siemreap	K. Cham	Battambang	-	-
	Cropped Area (ha)	44,975	9,880	44,975	91,203	34,490	23,657	11,365	84,886	4,965	6,020	1,620	19,213	3,262	9,044	9,904	39,089	
	Production (ton)	155,030	43,254	155,030	256,665	41,388	32,430	16,950	110,305	7,659	4,504	2,511	21,543	10,090	9,822	7,598	45,253	
2005/06	Province	Battambang	Palin	Kandal	-	Battambang	K. Cham	Palin	-	K. Cham	Battambang	Kandal	-	Battambang	Bantey M.	K. Cham	-	-
	Cropped Area (ha)	39,233	16,653	12,758	90,732	48,760	33,712	16,861	118,760	5,434	4,715	1,767	17,237	22,704	9,085	11,074	60,570	
	Production (ton)	108,018	66,606	16,584	247,760	76,003	60,676	25,292	179,096	8,576	5,245	2,774	22,629	18,227	7,121	4,239	45,041	
2006/07	Province	Battambang	Palin	K. Cham	-	Battambang	K. Cham	Prey Veng	-	K. Cham	Battambang	Montulikki	-	Battambang	Bantey M.	Kandal	-	-
	Cropped Area (ha)	42,160	24,649	12,431	108,836	38,917	22,446	4,289	75,053	5,654	3,830	521	13,946	36,889	20,966	5,720	85,140	
	Production (ton)	179,603	98,476	34,019	367,169	45,810	402,215	5,146	100,100	7,224	7,004	729	18,373	24,243	16,942	4,675	60,954	

Source: Agricultural Statistics, 1997/98 to 2006/2007, MAFF

Table B4.1-1 Production of Major Upland Crops and Vegetables from 1997/98 - 2006/07 (2/2)

Year	Province	Crop: sesame					Crop: vegetables					Rice					
		Province			Country	Province			Country	Province			Country	Province			
		Largest	2nd largest	3rd Largest		Largest	2nd largest	3rd Largest		Largest	2nd largest	3rd Largest					
1997/98	Province	Rattanakiri	Prey Veng	K. Cham	-	K. Cham	K. Chhnang	Kandal	-	Takeo	Prey Veng	K. Cham	-	Takeo	Prey Veng	K. Cham	-
	Cropped Area (ha)	1,171	1,456	10,814	16,373	7,185	6,958	4,599	34,494	231,648	237,652	176,937	2,076,011	585,559	435,060	326,873	3,414,918
	Production (ton)	640	588	576	3,143	43,548	36,000	12,692	176,788	585,559	435,060	326,873	3,414,918	585,559	435,060	326,873	3,414,918
1998/99	Province	K. Cham	Siemreap	Prey Veng	-	K. Cham	Siemreap	Kandal	-	Takeo	K. Cham	Prey Veng	-	Takeo	K. Cham	Prey Veng	-
	Cropped Area (ha)	9,799	1,755	1,043	14,787	3,395	1,120	1,721	22,662	228,973	188,877	261,785	2,104,013	443,680	438,600	425,945	3,509,871
	Production (ton)	2,740	1,052	518	5,087	23,765	13,619	12,000	127,646	443,680	438,600	425,945	3,509,871	443,680	438,600	425,945	3,509,871
1999/00	Province	K. Cham	Prey Veng	K. Thom	-	Battambang	K. Cham	Kandal	-	Prey Veng	Takeo	K. Cham	-	Prey Veng	Takeo	K. Cham	-
	Cropped Area (ha)	11,513	1,207	820	16,462	3,503	5,262	3,910	31,450	300,308	235,102	200,374	2,157,592	577,380	554,890	460,935	4,040,900
	Production (ton)	5,174	544	450	7,385	27,810	27,800	19,698	181,851	577,380	554,890	460,935	4,040,900	577,380	554,890	460,935	4,040,900
2000/01	Province	K. Cham	Kratie	Prey Veng	-	K. Cham	Kandal	Takeo	-	Takeo	Prey Veng	K. Cham	-	Takeo	Prey Veng	K. Cham	-
	Cropped Area (ha)	13,132	1,235	1,650	19,222	6,198	4,802	1,841	33,755	231,400	305,843	220,867	2,318,495	466,360	461,315	465,733	4,026,092
	Production (ton)	6,562	740	710	9,855	38,942	26,644	22,683	195,894	466,360	461,315	465,733	4,026,092	466,360	461,315	465,733	4,026,092
2001/02	Province	K. Cham	Prey Veng	K. Thom	-	K. Cham	Kandal	K. Chhnang	-	Prey Veng	K. Cham	Takeo	-	Prey Veng	K. Cham	Takeo	-
	Cropped Area (ha)	13,577	2,013	1,230	20,158	7,241	5,198	2,780	35,311	275,605	204,880	222,371	2,240,917	483,444	443,444	397,629	4,099,016
	Production (ton)	5,311	1,100	781	8,957	41,356	25,897	15,428	184,640	483,444	443,444	397,629	4,099,016	483,444	443,444	397,629	4,099,016
2002/03	Province	K. Cham	Kratie	Prey Veng	-	K. Cham	Kandal	K. Chhnang	-	K. Cham	Prey Veng	Takeo	-	K. Cham	Prey Veng	Takeo	-
	Cropped Area (ha)	13,250	1,966	1,819	20,852	5,821	4,677	3,573	34,433	149,616	180,514	153,912	1,821,225	333,479	315,843	310,204	2,915,900
	Production (ton)	6,036	1,068	950	10,157	24,852	19,674	19,542	143,175	333,479	315,843	310,204	2,915,900	333,479	315,843	310,204	2,915,900
2003/04	Province	K. Cham	Prey Veng	Kratie	-	Kandal	K. Cham	K. Chhnang	-	Prey Veng	Takeo	K. Cham	-	Prey Veng	Takeo	K. Cham	-
	Cropped Area (ha)	17,002	3,760	2,936	33,991	4,824	6,036	2,903	36,090	295,311	234,025	207,157	2,315,853	639,452	616,757	484,551	4,710,957
	Production (ton)	9,735	3,117	2,174	21,957	23,424	15,779	14,149	243,858	639,452	616,757	484,551	4,710,957	639,452	616,757	484,551	4,710,957
2004/05	Province	Pailin	K. Cham	Battambang	-	K. Cham	Kandal	Siemreap	-	Takeo	Prey Veng	Battambang	-	Takeo	Prey Veng	Battambang	-
	Cropped Area (ha)	11,013	18,796	13,579	64,470	7,498	4,915	2,571	32,604	233,405	276,899	235,730	2,374,175	633,936	517,350	467,635	4,170,284
	Production (ton)	13,439	18,783	7,687	54,954	50,054	24,130	19,755	179,050	633,936	517,350	467,635	4,170,284	633,936	517,350	467,635	4,170,284
2005/06	Province	Pailin	K. Cham	Preahvitha	-	K. Cham	Kandal	K. Chhnang	-	Prey Veng	Takeo	K. Cham	-	Prey Veng	Takeo	K. Cham	-
	Cropped Area (ha)	18,150	20,810	6,816	79,250	8,145	5,238	4,085	35,762	309,977	251,737	219,512	2,443,530	897,854	781,895	633,720	5,986,179
	Production (ton)	23,595	8,287	7,634	56,711	33,887	27,953	22,450	172,399	897,854	781,895	633,720	5,986,179	897,854	781,895	633,720	5,986,179
2006/07	Province	Pailin	K. Cham	Prey Veng	-	Pailin	K. Cham	Prey Veng	-	Prey Veng	Takeo	K. Cham	-	Prey Veng	Takeo	K. Cham	-
	Cropped Area (ha)	15,021	18,521	3,461	56,263	12,322	3,111	5,123	43,327	320,299	247,307	218,796	2,548,388	320,299	247,307	218,796	2,548,388
	Production (ton)	11,266	7,670	3,911	34,946	58,620	34,970	31,803	243,858	820,528	787,280	643,782	6,264,123	820,528	787,280	643,782	6,264,123

Source: Agricultural Statistics, 1997/98 to 2006/2007, MAFF