Appendix-III

IRRIGATED AGRICULTURE IMPROVEMENT MODEL PROJECT

Appendix-IIIA

SOCIO-ECONOMY

THE STUDY
ON
COMPREHENSIVE AGRICULTURAL DEVELOPMENT
OF
PREK THNOT RIVER BASIN
IN
THE KINGDOM OF CAMBODIA

FINAL REPORT

Volume-VII: Appendixes for Feasibility Studies for Priority/Urgent Projects

Appendix-IIIA

Socio-economy

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APPENDIX-IIIA: SOCIO-ECONOMY

Chapter IIIA-1 Socio-economic Survey

IIIA-1.1 Purpose of Socio-Economic Survey

The Socio-Economic Survey (a questionnaire interview survey) was conducted as one of the study activities to gather socio-economic information and to grasp the features of the Feasibility Study Area consisting of 18 Villages, 3 Communes, and 2 Districts.

IIIA-1.2 Survey Team

The actual field implementation of the questionnaire survey was carried out by a team consist of a scholar and three students from the Post Graduate School of Royal University of Agriculture (RUA), in the form of research assistant arrangement under the supervision of the Study Team. The survey was conducted during November 7 to 30 for 16 days for the field work, and the total days required from execution of research assistant arrangement to the data completion and report submission was 31 days, from November 6 to December 6, 2006. The Survey Team consists of 3 enumerators with one leader. Enumerators were trained prior to the field dispatch, in order to unify the question methods and response recording, and for the quality control of the survey results as a whole.

IIIA-1.3 Survey Design, Area and Sample Distribution

IIIA-1.3.1 Survey Design

(1) Survey Questionnaire

The survey questionnaire was modified from the one applied in the socio-economic survey for the Master Plan formulation, to be suitable for the Feasibility Study implementation. The modified survey questionnaire is attached to this report as Attachment.

(2) Sampling Process

The survey covers 13 out of 18 villages in the Feasibility Study Area. Five villages are subtracted from sample villages because their spatial proportion in the Feasibility Study Area is relatively small. Sample households are selected randomly from the farm households who hold irrigated paddy fields in 13 villages.

(3) Sample Size

The questionnaire survey was designed to cover 100 HH in total.

IIIA-1.3.2 Survey Area and Sample Distribution

The information of administrative distribution of sample HH and the locations of sampled villages in the Feasibility Study Area are shown in the Table below.

Table: Socio-Economic Survey Sample Distributions

Province	District	Commune	Village	No. of HH
KAMPONG SPEU	CHBAR MON	KANDAOL DOM	KANDAOL DOM	7
			Rumleang	12
			Nhor	6
			PONGRO	10
			TRAPEANG PREAH	7
			KAB TUK	8
			SRAE THNAL	7
		SVAY KRAVAN	SVAY KRAVAN	8
			THNAL BAMBAEK	6
			PREY KDEI	5
			TRAS	10
	SAMRAONG TONG	KAHAENG	BOS TA NEY	8
			OU VEAENG	6
Total				**100**

Chapter IIIA-2 General Social Information

IIIA-2.1 General Information

IIIA-2.1.1 General Household Characteristics

(1) Household Size

The survey respondents are mostly the male and female heads of households (58% and 40% respectively) with their average age 46 years old. Of these households, the average household member population is 5.5person/HH for all samples, with the range of minimum 2 to maximum 11 household members.

(2) Male-Female Balance

Male-Female balance of the sampled household members is male 46.5% and female 53.5%.

(3) Working-age Population

The average number of working-age population (between 15 to 64 yrs old) per household is 3.7 person/HH.

(4) Levels of Formal Education of the Interviewees

The education levels of the interviewees are shown below.

Table: Education Levels of Interviewees

Education Levels	n	%
No formal education	15	15
Drop-out at primary school	22	22
Graduate from primary School	25	25
Drop-out at junior high school	22	22
Graduate from junior high school	7	7
Drop-out at high school	6	6
Graduate from high school	3	3
Total	100	100

Only 38% of interviewees received the education higher than primary school level.

(5) Main Occupation of Sampled Households

The main occupations of sampled households are predominantly farmer (83%), followed by salaried worker (10%) and private business (7%).

(6) Main Occupations of Household Members

By looking at main occupations of individual household members, more detailed picture of sampled households' economic activities of will be seen.

Table: Main Occupations of Sampled Household Members

Occupations	n	%
Farmer	108	43.54
On-farm labor	2	0.86
Non-farm labor	11	4.43
Salary Worker	26	10.48
Private business	9	3.62
Housekeeping (cooking, washing, child, etc)	5	2.01
No job	2	0.8
Student	61	24.59
Child	22	8.87
Others	2	0.8
Total	248	100

According to above table, nearly half of all household members are engaged in farming as owner farmer, while only a fraction (2 persons) works as on-farm laborers. Salaried

workers have some significance and consists nearly 10% of all sampled household members. Unemployment (no job) rate is quite low with being 0.8% of all sampled household members.

(7) Membership to Village-level Organizations

The village-level organizations that the household members (husband and wife) are belonging are as follows.

Table: Village-level Organizations the Husbands and Wives are belonging

Type of Organizations	Husbands	Wives
	n	n
Farmer water user's community	52	62
Drinking water user's group	1	0
Veteran group	1	0
Credit group by government	0	1
Micro-credit group by NGO	0	0
Production group	0	0
Religion Group	0	0
Marketing group	0	0
Youth group	0	0
Woman Group	0	0
Other	11	17
Total	65	80

As it can be seen from above Table, the number of respondents answered they are belonging any kind of village-level organizations are somewhat limited.
Two tendencies observed from above Table are that (1) FWUC membership is outstanding among others, and (2) FWUC membership is more with wives than husbands.

IIIA-2.1.2 Water for Drinking

(1) Sources and Sufficiency of Drinking Water in Dry Season

The sources of drinking water in dry season are as follows.

Table: Drinking Water Sources (Dry Season)

Water Sources	n (%)
Piped	19
Tube pipe well	14
Dug well	19
Reservoir/pond	7
Spring/River	12
Bought	24
Rain	5
Total	100

Drinking water sources in dry season are diverse, as shown in the Table. 33% of the sampled households are relying on groundwater sources (tube pipe well and dug well), while 19% relying on perennial surface water (reservoir/pond and spring/river). Somewhat surprising is that 24% rely on purchased drinking water. The distance to water sources from residence is in average 161m while in median 50m.

The sufficiency of the drinking water in dry season is as follows.

Table: Drinking Water Sufficiency (Dry Season)

Water Sufficiencies	n (%)
Sufficient	92
Just enough	8
Short	0
Total	100

There is no drinking water shortage among sampled households.

(2) Sources and Sufficiency of Drinking Water in Wet Season

The sources and sufficiency of drinking water in wet season are as follows.

Tables: Drinking Water Sources (Wet Season)

Water Sources	n (%)
Piped	6
Tube pipe well	2
Dug well	3
Reservoir/pond	1
Spring/River	5
Bought	1
Rain	82
Total	100

Drinking Water Sufficiency (Wet Season)

Water Sufficiencies	n (%)
Sufficient	94
Just enough	6
Short	0
Total	100

In contrast to dry season, rainwater is utilized as the main resource for drinking water, and no water shortage is reported among sampled households. The distance to water sources from residence in wet season in average become 132m while in median 0m (since majority utilizes rainwater).

The data on sources and sufficiency of the water for domestic use are similar to that of drinking water, except the increase of surface waters (reservoir/pond and spring/river) as its source.

IIIA-2.1.3 Fuel Sources for Cooking and Lighting

(1) Fuel Sources for Cooking

Most households (94%) rely on firewood for main cooking fuel, with charcoal as secondly important alternative cooking fuel. On the availability (easiness to obtain) of the firewood, approx. 95% of all samples responded as it is easy to obtain.

(2) Fuel Sources for Lighting

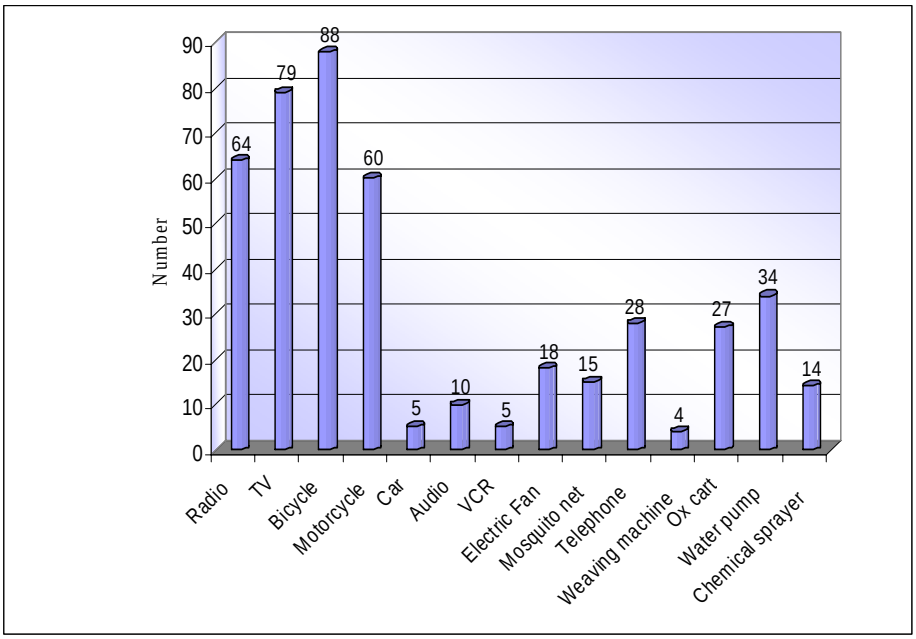
For lighting purpose, 40% of samples use electricity supply, while 21% uses kerosene lamp and the rest rely on other sources (details unavailable).

IIIA-2.2 Material Abundance

IIIA-2.2.1 Consumer Goods

The ownerships of the consumer goods such as radio, TV, bicycle, motorcycle, etc. are plotted in the Figure shown below.

Figure: Abundance of Consumer Goods



Above figure indicates relative material affluence of the sampled households, with the prevalence of radio, TV, bicycle and motorcycle (i.e. in the survey conducted for Master Plan Study, figures of all these items were about half in their numbers).

IIIA-2.2.2 Residence and Utilities

(1) Residence

Almost all houses the respondents are living are the owned houses except one renting. 85% of houses are one-storied traditional wooden type with 1 to 3 rooms (average 1.8). 6% of the houses are made of brick/cement while 9 % are made of palm leaves. 14% of the houses are 2-storied. 41% of all houses have toilet facility while the rest rely on pit latrines or other forms.

(2) Utilities

With regard to utilities, 40% of the sampled households have electricity connection supplied from grid, 20% have connection with piped water supply, 3% gas line supply, and no houses have land telephone line.

IIIA-2.3 Medical Services

To the question “Where do you go when you get sick?” the respondent answered as follows.

Table: Medical Service Facility

Medical Service Facility	n (%)
Hospital	9
Clinic	50
Health center	40
other	1
Total	100

90% of the sampled households go to clinic and/or health center for when they get sick, while 9% go to hospital. Approx 70% of them uses their own motorbike to get these medical services, while others go on foot, bike taxi and bicycle. The traveling times to get these medical service facilities range from 3 minutes to 60 minutes, with average 14 minutes.

For the child bearing, formal medical services are popular among samples, while TBA, traditional doctors and midwives are not very popular, as shown in right.

Additional but important information in relation to the medical service facility is that no respondents are covered by any kind of formal social security service, nor insurance scheme.

Table: Places to go for Child Bearing

Medical Service Facility	n (%)
Hospital	29
Clinic	20
Health center	35
TBA	6
Traditional Dr.	1
Midwife	8
Other	1
Total	100

Chapter IIIA-3 Gender Aspect

IIIA-3.1 Female's and Male's Main Activities

Female's and male's main activities are as follows.

Some observations made from these Tables are; 1) housekeeping, cooking and care of children/elders are considered as female's main activities, while 2) farming is undertaken by both sexes. 3) Care of livestock seems as male's activity.

"Other" category for female and male did not show much variance, though their contents would differ since in this area it is known that the certain numbers of females work in garment factory.

Female main activities

Activities	n	%
Housekeeping	43	22.1
Cooking	32	16.4
Farming	75	38.5
Handy crafting	0	0.0
Care of children/elders	11	5.6
Care of livestock	4	2.1
Making Palm sugar	0	0.0
Other (Garment worker, run small business)	30	15.4
Total	195	100

Male Main activities

ctivities A	n	%
Housekeeping	10	6.6
Cooking	4	2.6
Farming	82	53.9
Handy crafting	2	1.3
Care of children/elders	2	1.3
Care of livestock	21	13.8
Making Palm sugar	0	0.0
Other (Constructor, salary worker and run business)	31	20.4
Total	152	100

IIIA-3.2 Female's and Male's Main Cash Incomes

Main cash income sources for female and male are as follows.

In between female and male, a notable difference was observed in the answer "working for weaving factory." Considerable number of females (5.4% in weaving factory added by part of "other" category as they are working as garment worker) are working and earning from weaving factory or as garment worker, while no males do. The male's employment opportunity for the weaving factory is assumed to be limited since usually for this type of industry, males from locality are employed as security guard or other kind of ancillary works.

Apart from above, no significant difference is observed in between female and male.

Female's Main Cash Income Source

Income Sources	n	%
Selling paddy	67	45.0
Working for other's field	37	24.8
Selling palm sugar	1	0.7
Selling handy craft	1	0.7
Working for weaving factory	8	5.4
Working for bricks factory	3	2.0
Selling cotton/silk	3	2.0
Other (Garment worker, business)	29	19.5
Total	149	100.0

Male's Main Cash Income Source

Income Sources	n	%
Selling paddy	71	50.0
Working for other's field	32	22.5
Selling palm sugar	4	2.8
Selling handy craft	1	0.7
Working for weaving factory	0	0.0
Working for bricks factory	1	0.7
Selling cotton/silk	0	0.0
Other (Salary worker, business)	33	23.2
Total	142	100.0

IIIA-3.3 Female's Access to Resources

To the questions of whether females have "accesses" and have "controls" over resources such as water, residential land, farmland and livestock, 100% responded as females have "accesses" over these resources but "controls" are limited to some extent. For example, 17.5% of response indicated that females control over residential land is limited, while it was 14.4% for farmland.

Finally, to the question "whether you think there are discrimination against women or not," 96% of all responses answered there are no discrimination.

Chapter IIIA -4 Household Incomes and Expenditure

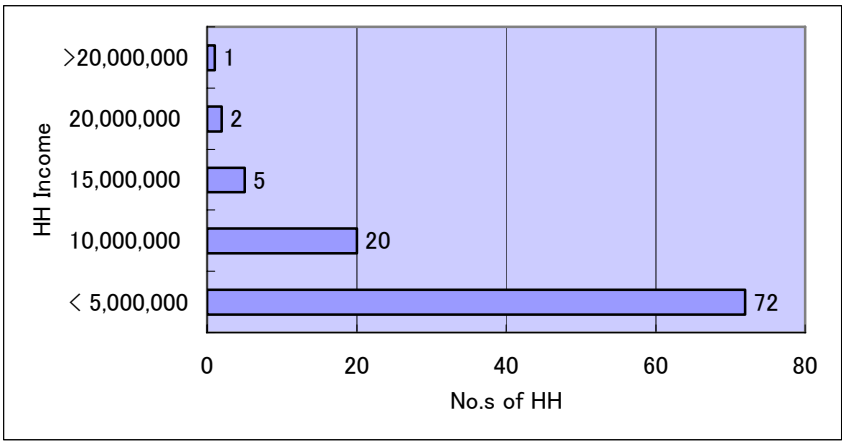
IIIA-4.1 Household Income

The household income and its sources during year 2005 are inquired. The results are compiled in attached Table-1 and the details are discussed in the following.

IIIA-4.1.1 Distribution of Household Incomes among Sample Households

The distribution of household incomes among sampled households is shown below.

Figure: Distribution of Household Incomes



The distribution of household incomes among 100 samples is skewed, as majority (72%) lies in less than 5,000,000 Riel/year income strata, while 20% lies between 5,000,000 to 10,000,000, 5% lies between 10,000,000 to 15,000,000, and 3% in more than 20,000,000 income strata, respectively.

The household income of sampled households is in average 4,404,991 Riel/year and median 2,910,000 Riel/year, with maximum 22,768,000 Riel and minimum 875,000 Riel.

Per capita annual income is also calculated based on obtained data. As the result, average per capita income/year in the sampled households is 816,174 Riel (median value 600,000 Riel), with maximum 3,930,000 Riel and minimum 130,000 Riel.

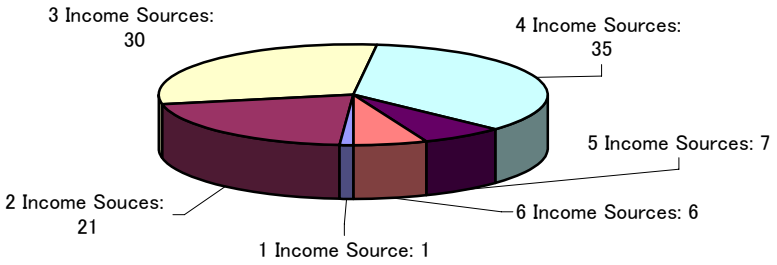
IIIA-4.1.2 Variety of Income Sources

Household income sources are quite diversified. In average, they earn from 3.4 different income sources (median value 3.0), with maximum 6 and minimum 1.

Table: Number of Income Sources per Household

No.s of Income Sources	1	2	3	4	5	6	Total
No.s of HH	1	21	30	35	7	6	100

Figure: Composition of HHs earning from Different Income Sources (%)



As shown in the above, there is only 1 (1%) single-income source HH among 100 samples, which earning from temporary off-farm wage, while the rest earn from multiple income sources. [1]

The number of households earning "only" from agricultural income sources and "only" from non-agricultural income sources, are as follows.

Table: No. of Households Earning only from Agricultural and Non-Agricultural Incomes

Agricultural Income Only	8 HH
Non-Agricultural Income Only	7 HH

Note 1: On-farm labor is classified in non-agricultural income
Note 2: Selling forest vegetable/crops is classified in non-agricultural income

In the above Table, both agricultural-income-only (8% of all sample) and non-agricultural-income-only (7% of all sample) households are small in number and rest of sampled households (85%) are earning from both, though its composition highly vary.

Agricultural income includes sales from paddy, vegetable, fruits, palm sugar, livestock/poultry and fishes, while non-agricultural income includes permanent based salary, on-farm labor, off-farm labor, private business, remittance, selling of firewood/charcoal, handicraft/cottage industry products, forest vegetable/crop, and others.

It should be noted that all sample households are practicing some degree of rice cultivation on their land and there are households not selling (self-consuming) their products, including the "non-agricultural-income-only" households listed above.

The numbers of households earning from respective income sources (without regard to earned values) are shown below.

Table: Number of Households Earning from Respective Income Sources

Agricultural Income Sources	1	2	3	4	5	6
	Selling paddy/rice	Selling vegetables	Selling fruits	Selling palm sugar	Selling livestock/ poultry products	Selling fishes
No.s (=%)	64	20	21	2	75	10

Non-Agricultural Income Sources	7	8	9	10	11	12	13	14	15
	Salary from permanent job	Wage from temporary job on farm	Wage from temporary job out of farm	Private business	Remittance from family members	Selling firewood/ charcoal	Selling handicraft/ cottage industry products	Selling forest vegetable/ crop	Others
No.s (=%)	45	19	48	20	16	2	1	0	1

It is noticeable that among agricultural income sources, "Selling livestock/ poultry products" is most popularly practiced (75% of sampled households), followed by "Selling paddy/rice" (64%).

As for non-agricultural income, "Salary from permanent job" and "Wage from temporary job off-farm" are quite popular, with 45% and 48% of the sample households earning from these income sources.

IIIA-4.1.3 Proportional Volumes from Different Income Sources

The proportional income volumes from various income sources are calculated for the composite of all sampled households and shown in the Table and Figure in next page. Please note that this is not the analysis of individual household income structure but treating all incomes from various sources earned by sample households in "composite" manner and comparing their proportion, as if treating aggregate of 100 sample households as one household.

The balance of agricultural and non-agricultural incomes is 37% and 63% respectively,

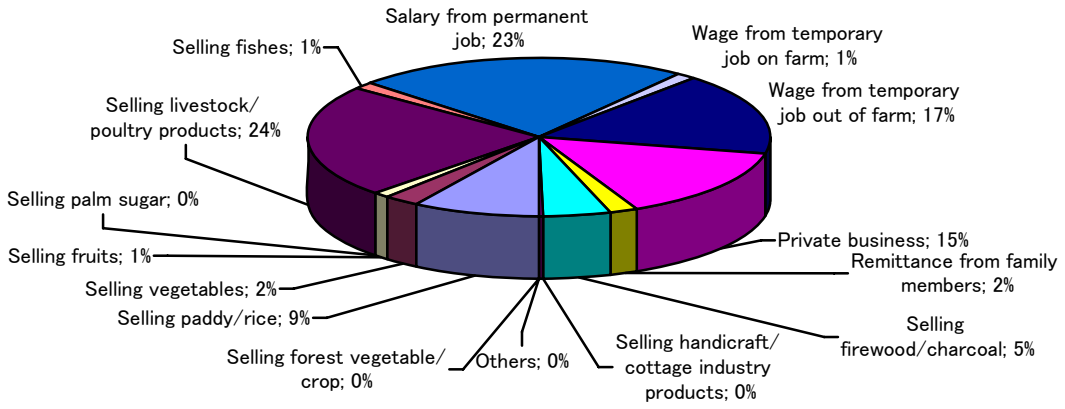
[1] Note that all sampled HH are practicing cultivation. Thereby no income from agriculture means that the products are self-consumed.

and non-agricultural income is obviously outweighing that of agricultural. This indicates that the rural economy in the F/S area is under the influence of urbanization and in the process of income diversification, though all these households keep practicing cultivation and more than 80% of them recognize themselves as their main household activity is farming (as stated in IIIA 2.1.1 (5)).

Table: Proportional Volumes from Different Income Sources (%)

Income Sources			Value (Riel) and Proportion in Total (%)		
			Average per HH	Total	%
Agricultural Income	1	Selling paddy/rice	617,330	39,509,110	9.0
	2	Selling vegetables	527,500	10,550,000	2.4
	3	Selling fruits	236,429	4,965,000	1.1
	4	Selling palm sugar	125,000	250,000	0.1
	5	Selling livestock/ poultry products	1,356,293	101,722,000	23.1
	6	Selling fishes	562,000	5,620,000	1.3
		SUB TOTAL of Agricultural Income		*162,616,110*	*36.9*
Non-Agricultural Income	7	Salary from permanent job	2,278,667	102,540,000	23.3
	8	Wage from temporary job on farm	339,316	6,447,000	1.5
	9	Wage from temporary job out of farm	1,542,833	74,056,000	16.8
	10	Private business	3,203,000	64,060,000	14.5
	11	Remittance from family members	545,625	8,730,000	2.0
	12	Selling firewood/charcoal	10,500,000	21,000,000	4.8
	13	Selling handicraft/ cottage industry products	550,000	550,000	0.1
	14	Selling forest vegetable/ crop	0	0	0.0
	15	Others	500,000	500,000	0.1
		SUB TOTAL of Non-Agricultural Income		*277,883,000*	*63.1*
		TOTAL		**440,499,110**	100

Figure: Proportional Volumes from Different Income Sources (%)



Other characteristics observed from above Table are:

(1) "Selling Livestock/Poultry Products" stands out among all other agricultural income sources, both in gross value (23% of total income and 63% of agricultural income) as well as in average household income, i.e. average income derived for those households practicing this particular activity. This activity is no doubt the most lucrative agricultural income earning practice among sampled households.

(2) Although "Selling Paddy/Rice" is popular earning practice (among 64% of sample households), its gross value (9% of total income and 24% of agricultural income) thereby average household earning from this activity is modest. However, its importance should be emphasized not as source of cash income but as source of

self-consumed staple food.

(3) Agricultural income sources other than livestock/poultry and paddy/rice, are less popularly practiced and producing modest average household earning.

(4) "Salary from permanent job" is bearing high gross income value (23% of total income and 37% of non-agricultural income) as equal to selling of livestock/poultry. These salaried workers are mostly not household heads but their daughters and sons (especially the former) who ensure the stable income flow into their households. Average earning per household by this activity is also high (higher than averages of all agricultural income sources).

(5) "Wage from Temporary Job out of Farm" and "Private Business" are also producing sizeable gross value and average incomes. Again, average earning per household by these activities are higher than averages of any agricultural income sources. "Selling Firewood/Charcoal" which is also producing relatively high household income is practiced only by 2 households and it is not difficult to include this activity into private business.

IIIA-4.1.4 Income Structures Based on Income Strata

In order to grasp the picture of income structure against income classes, an attempt was made to arbitrary divide the samples into 5 different income strata, based on household income level.

The stratification was made to divide total 100 samples into 5 different strata by counting them with 20 household intervals from richest to poorest.

Table: HH Income Range of 5 Strata

('000 Riel)

Strata	No.s of HH	Income Range			Interval
		Highiest		Lowest	
1st	20	22,768	–	6,350	16,418
2nd	20	6,300	–	3,950	2,350
3rd	20	3,838	–	2,500	1,338
4th	20	2,500	–	1,700	800
5th	20	1,620	–	875	745

As the result, the income structures of 5 strata for all samples turned out as shown in the following.

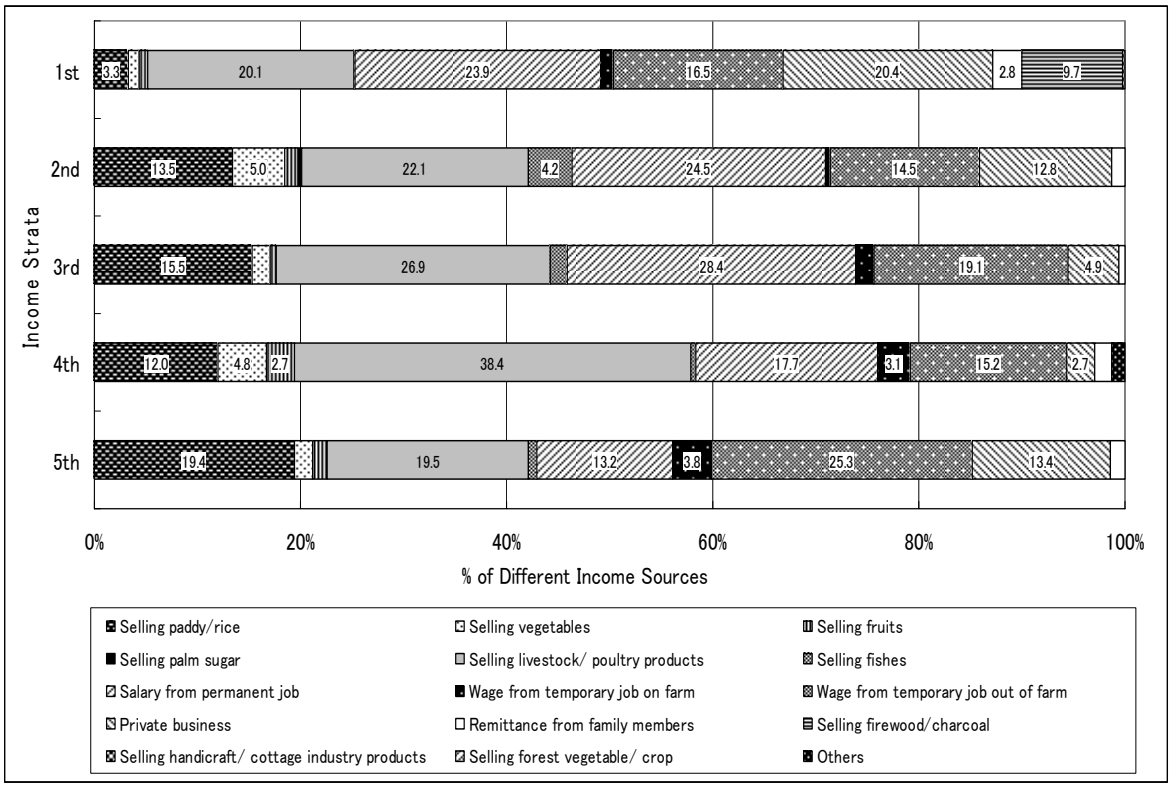
Table: Income Structures of 5 Income Strata (Value: '000 Riel)

INCOME STRATA	AVERAGE HH INCOME	INCOME STRUCTURE ('000 Riel)														
		AGRICULTURAL INCOME						NON-AGRICULTURAL INCOME								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Selling paddy/rice	Selling vegetables	Selling fruits	Selling palm sugar	Selling livestock/ poultry products	Selling fishes	Salary from permanent job	Wage from temporary job on farm	Wage from temporary job out of farm	Private business	Remittance from family members	Selling firewood/charcoal	Selling handicraft/ cottage industry products	Selling forest vegetable/ crop	Others
1st	10,809	356	109	92	0	2,167	6	2,587	129	1,781	2,201	304	1,050	28	0	0
2nd	4,838	651	244	63	13	1,067	205	1,187	25	700	622	61	0	0	0	0
3rd	3,050	473	55	20	0	820	50	866	55	584	150	20	0	0	0	0
4th	2,018	241	97	55	0	775	10	357	63	307	55	34	0	0	0	25
5th	1,311	254	23	19	0	256	10	173	50	332	176	18	0	0	0	0

Table: Income Structure of 5 Income Strata (Composition: %)

INCOME STRATA	AVERAGE HH INCOME	INCOME STRUCTURE (%)														
		AGRICULTURAL INCOME						NON-AGRICULTURAL INCOME								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Selling paddy/rice	Selling vegetables	Selling fruits	Selling palm sugar	Selling livestock/ poultry products	Selling fishes	Salary from permanent job	Wage from temporary job on farm	Wage from temporary job out of farm	Private business	Remittance from family members	Selling firewood/charcoal	Selling handicraft/ cottage industry products	Selling forest vegetable/ crop	Others
1st	10,809	3.3	1.0	0.9	0.0	20.1	0.1	23.9	1.2	16.5	20.4	2.8	9.7	0.3	0.0	0.0
2nd	4,838	13.5	5.0	1.3	0.3	22.1	4.2	24.5	0.5	14.5	12.8	1.3	0.0	0.0	0.0	0.0
3rd	3,050	15.5	1.8	0.7	0.0	26.9	1.6	28.4	1.8	19.1	4.9	0.7	0.0	0.0	0.0	0.0
4th	2,018	12.0	4.8	2.7	0.0	38.4	0.5	17.7	3.1	15.2	2.7	1.7	0.0	0.0	0.0	1.2
5th	1,311	19.4	1.8	1.4	0.0	19.5	0.8	13.2	3.8	25.3	13.4	1.4	0.0	0.0	0.0	0.0

Figure: Income Structure of 5 Income Strata (Composition: %)



Of the above Tables, the average value of each income sources are calculated through dividing the total income value derived from particular income source for a stratum by the number of sample (20HH for each stratum). Therefore, the value indicated in above Table are the value "if all 20 households in particular stratum practiced and earned from such and such income sources," and are not the average income of the households in particular stratum actually practicing and earning from particular income source.

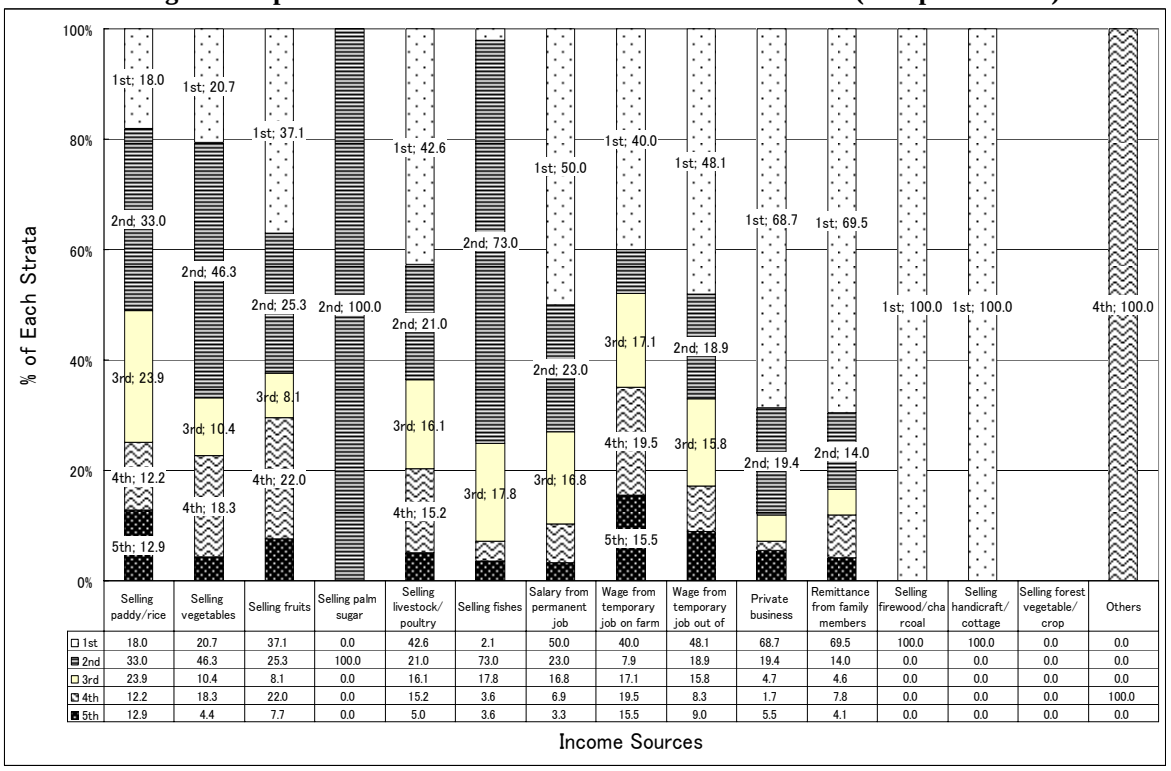
The followings are observed from above Tables and Figure.

1) The income difference between richest 20% (1st stratum) and the poorest 20% (5th stratum) are 8.2 times.
2) Income from "Selling paddy/rice" is proportionally largest for the poorest 20% (5th stratum) with occupying 19.4% of this stratum's income. The proportion (%) of this income for other stratum unevenly reduces as their income level increases. However, the value that each stratum earns from this income source also unevenly increases as the income level become higher. More or less similar tendency can also be observed for the income sources "selling vegetables" and "selling fruits."
3) Among agricultural income sources, "selling livestock/poultry products" is outstanding for all strata though relatively more in second poorest 20% (4th stratum). However, in its value 1st stratum earns 8.5 times more than 5th stratum, and the values earned by other strata lie in between them.
4) Among all non-agricultural income sources, "salary from permanent job" is the most outstanding, especially for 1st to 3rd strata. Whether a household has this income source or not highly influences their income levels.
5) Wages from temporary job out of farm is contributing to all strata into certain extent but relatively more important for 5th stratum than others, since it consist of considerable proportion to the income of 5th stratum despite its small value.
6) "Private business" contributes to the 1st stratum more than others, both in value and proportion. This could mean that there are sizeable private business owners existing in 1st stratum. 5th stratum also has some extent of private business income, though as its income value indicates, the business type run by 5th stratum would be different from 1st stratum.

IIIA-4.1.5 Proportion of Different Income Strata to each Income Sources

By putting obtained data the other way around, the proportional contribution of the different income strata to each income sources are worked out, as shown below.

Figure: Proportion of 5 Income Strata for each Income Source (Composition: %)



	Selling paddy/rice	Selling vegetables	Selling fruits	Selling palm sugar	Selling livestock/ poultry	Selling fishes	Salary from permanent job	Wage from temporary job on farm	Wage from temporary job out of	Private business	Remittance from family members	Selling firewood/charcoal	Selling handicraft/ cottage	Selling forest vegetable/ crop	Others
1st	18.0	20.7	37.1	0.0	42.6	2.1	50.0	40.0	48.1	68.7	69.5	100.0	100.0	0.0	0.0
2nd	33.0	46.3	25.3	100.0	21.0	73.0	23.0	7.9	18.9	19.4	14.0	0.0	0.0	0.0	0.0
3rd	23.9	10.4	8.1	0.0	16.1	17.8	16.8	17.1	15.8	4.7	4.6	0.0	0.0	0.0	0.0
4th	12.2	18.3	22.0	0.0	15.2	3.6	6.9	19.5	8.3	1.7	7.8	0.0	0.0	0.0	100.0
5th	12.9	4.4	7.7	0.0	5.0	3.6	3.3	15.5	9.0	5.5	4.1	0.0	0.0	0.0	0.0

Of the above Figure, the income sources selling "palm sugar," "firewood/charcoal," "handicraft/cottage products," and "others" are all practiced by one or a few household(s) and thereby 100% contributions of particular stratum does not mean anything. However, by looking at other income sources, the following observations can be made.

1) The 1st stratum is the single winner in non-agricultural activities, in "permanent salary," "temporary job on-and-off farm," "private business," and even in "remittance," while all other strata contribute insignificantly to non-agricultural activities.
2) The 2nd stratum can be regarded as the winner in agriculture activities, though in "selling livestock/poultry," it is overwhelmed by 1st stratum.
3) Selling "paddy/rice," "vegetables," and "fruits" requires certain endowments of land and water, added by capital and labor, thus the income from these sources would be the function of these endowments and input, while "livestock/poultry" requires comparably more capital than cultivation. The significance of 1st strata in livestock/poultry income is considered to have strong relation with its non-agricultural income source situation. A conjecture is that for the 1st stratum, non-agricultural income could have enabled them to invest in livestock/poultry income activity.

IIIA-4.1.6 Correlations between Income Level and Income Source Variety, Number of Working Aged Family Members

Some basic correlations between household income and household attributes are analyzed. They are between;

(a) "Household income level" and "variety (number) of income sources per household," and
(b) "Household income level" and "number of working aged family members."

The results of the correlation analyses conducted for above two sets of variables on all samples indicated that there are no correlation (r=0.0) for above (a), and medium positive correlation (r=0.5) for above (b). Therefore, as far as the sampled households are concerned, the income levels and variety (number) of income sources have almost no correlation, and with number of working aged family members have certain positive correlation, i.e. the more the working aged family member, the higher the household incomes.

However, when looking at these correlations in income strata, somewhat different pictures surfaces up. For above (a), weak (-0.39 for strata 2 and -0.31 for 5) and medium (-0.45 for strata 4) negative correlations appeared. This indicates that in lower income strata, there exist a weak trend i.e. the more the income sources, the lower the household incomes.

IIIA-4.2 Expenditure

IIIA-4.2.1 Expenditure Levels

The household expenditure and expenditure items during year 2005 are inquired. The results are compiled in attached Table-2 and the details are discussed in the following.

The average and median expenditure for all samples are shown in the table in right. The balance (total HH income minus total HH expenditure) is in average 1,877,325 Riel and in median 921,800 Riel.

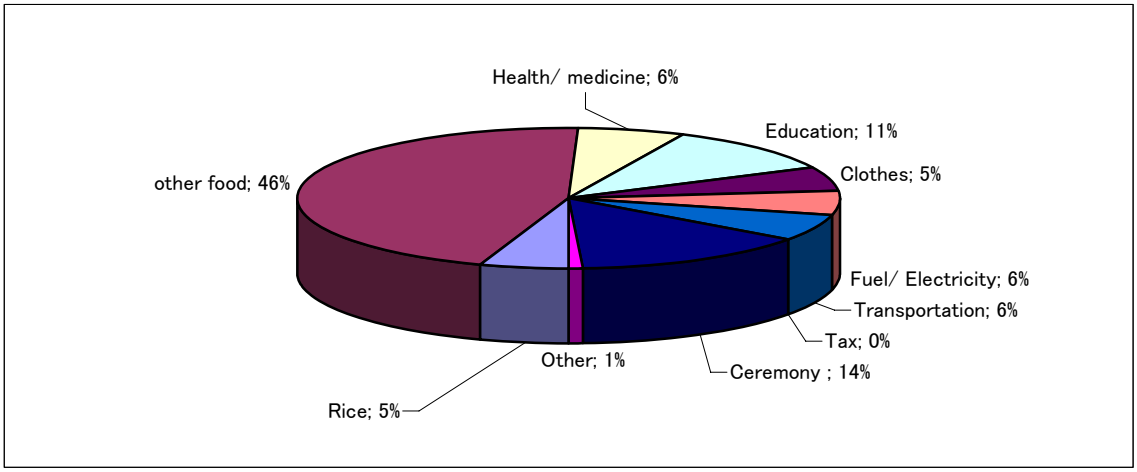
(Riel '000)

Average	2,528
Median	1,988
Maximum	10,470
Minimum	490

IIIA-4.2.2 Expenditure Structure for All Samples

The proportional expenditure volumes of all samples for the different purposes are shown in the Figure below.

Figure: Proportional Expenditure Volumes for Different Purposes



The Table in below shows the numbers of households answered as they spend on particular expenditure items.

Table: No.s of Households Answered as They Spend on Particular Expenditure Category

Expenditures	1	2	3	4	5	6	7	8	9	10
	Rice	Other food	Health/ medicine	Education	Clothes	Fuel/ele-ctricity	Transpor-tation	Tax	Ceremony	Other
No.s (=%)	31	100	97	74	99	79	70	5	92	10

Some notable features observed from above Figure and Table are;

(1) Engel's Coefficient (aggregate proportion of food expenditures in total expenditure) is approx. 51%.

(2) 31 households answered as they purchase rice, while the rest are considered as self sufficient in rice.
(3) Only 5 households answered as they paid very small amounts of tax (approx. 5,000 Riel/HH), which in proportion ignorable 0.01%.
(4) Expenditure for "ceremony" comprises considerable proportion.

IIIA-4.2.3 Expenditure Structures Based on Income Strata

Expenditure structures for the different income strata divided in previous section are compiled as follows.

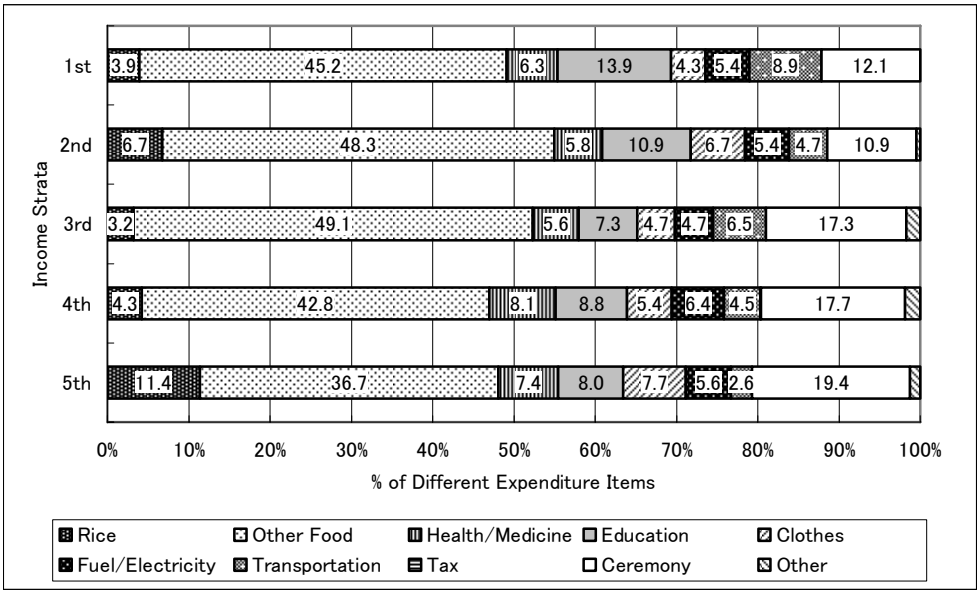
Table: Expenditure Structure against Income Strata (Value: '000 Riel)

INCOME STRATA	AVERAGE HH INCOME	EXPENDITURE STRUCTURE ('000 Riel)										TOTAL
		1	2	3	4	5	6	7	8	9	10	
		Rice	Other Food	Health/ Medicine	Education	Clothes	Fuel/ Electricity	Transpor-tation	Tax	Ceremony	Other	
1st	10,809	175	2,002	279	618	189	238	394	0	538	0	4,434
2nd	4,838	208	1,490	181	337	206	168	145	1	338	15	3,087
3rd	3,050	70	1,071	122	158	102	102	142	0	376	38	2,179
4th	2,018	75	751	143	155	96	113	79	0	312	34	1,756
5th	1,311	135	434	88	94	91	66	31	0	230	15	1,184

Table: Expenditure Structure against Income Strata (Composition: %)

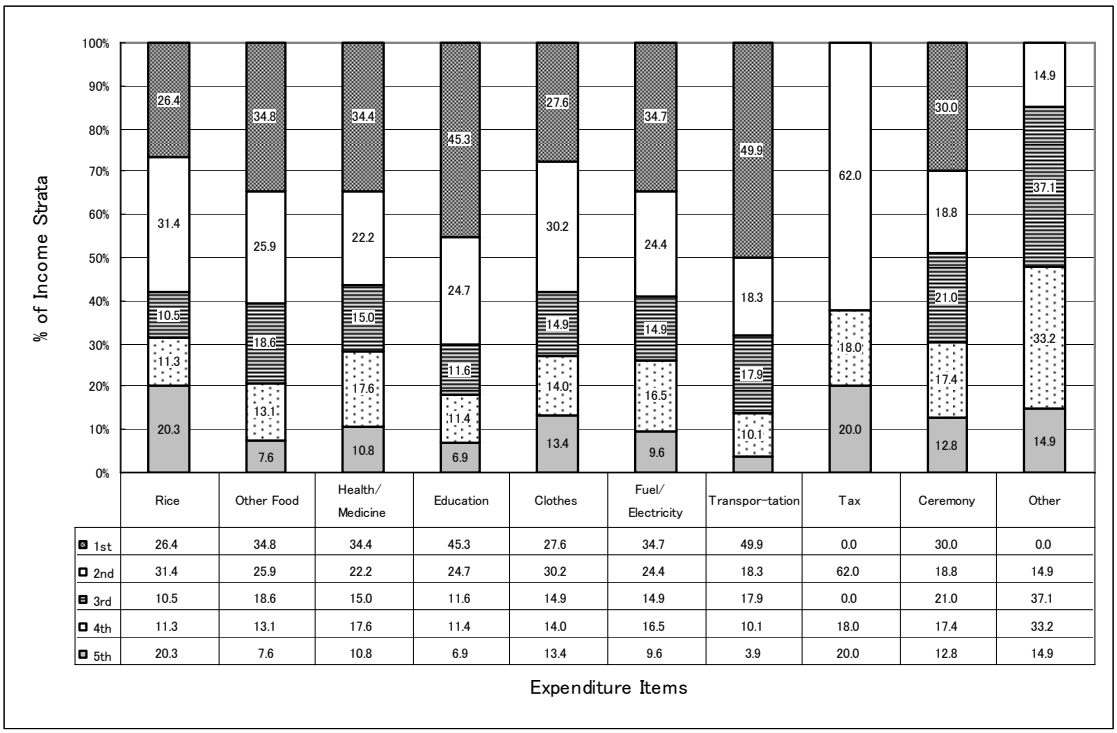
INCOME STRATA	AVERAGE HH INCOME	EXPENDITURE STRUCTURE (%)										TOTAL
		1	2	3	4	5	6	7	8	9	10	
		Rice	Other Food	Health/ Medicine	Education	Clothes	Fuel/ Electricity	Transpor-tation	Tax	Ceremony	Other	
1st	10,809	3.9	45.2	6.3	13.9	4.3	5.4	8.9	0.0	12.1	0.0	100
2nd	4,838	6.7	48.3	5.8	10.9	6.7	5.4	4.7	0.0	10.9	0.5	100
3rd	3,050	3.2	49.1	5.6	7.3	4.7	4.7	6.5	0.0	17.3	1.7	100
4th	2,018	4.3	42.8	8.1	8.8	5.4	6.4	4.5	0.0	17.7	1.9	100
5th	1,311	11.4	36.7	7.4	8.0	7.7	5.6	2.6	0.0	19.4	1.3	100

Figure: Expenditure Structure of 5 Income Strata (Composition: %)



In addition to above Tables and Figure, another figure putting the expenditure data the other way around and showing the proportional values for each expenditure item by 5 income strata, is created.

Figure: Proportional Values for each Expenditure Item by 5 Income Strata (%)



	Rice	Other Food	Health/ Medicine	Education	Clothes	Fuel/ Electricity	Transpor-tation	Tax	Ceremony	Other
1st	26.4	34.8	34.4	45.3	27.6	34.7	49.9	0.0	30.0	0.0
2nd	31.4	25.9	22.2	24.7	30.2	24.4	18.3	62.0	18.8	14.9
3rd	10.5	18.6	15.0	11.6	14.9	14.9	17.9	0.0	21.0	37.1
4th	11.3	13.1	17.6	11.4	14.0	16.5	10.1	18.0	17.4	33.2
5th	20.3	7.6	10.8	6.9	13.4	9.6	3.9	20.0	12.8	14.9

The followings are observed from above Tables and Figures.

1) The volumes (and values) of "Rice" 1st and 5th strata purchase are not very different, though expenditure proportion for this item is as a matter of course pretty high (11.4%) for 5th strata and fraction (3.9%) for 1st strata.
2) For "other food," the higher the income, the more they purchase (five folds difference between 1st and 5th strata). However, proportional (%) expenditures for the income of all strata are not varying much.
3) Expenditure for "health/medicine," "clothes" and "fuel/electricity" in income proportion (%) not so vary among strata, while in value (Riel) they vary.
4) Expenditure for "education" is high especially in 1st and 2nd strata for both value (Riel) and proportion (%).
5) Expenditure on "transportation" is significantly high in 1st strata both in value (Riel) and proportion (%).
6) Tax is paid only in fractional volumes and is negligible in expenditure structure. It should be noted that no household in 1st and 3rd strata paid tax.
7) Expenditures on "other" item is considered to be not reflecting the expenditures on consumer goods, since both in value and proportion only very small figures are recorded (esp. no expenditure in 1st stratum).

Chapter IIIA-5 Investment, Saving and Loan

IIIA-5.1 Investment

Investments during last 2 years (2004-2005) were inquired.

IIIA-5.1.1 Investment for Livestock

In terms of household numbers invested for livestock, the most popular livestock is chicken (49HH), followed by pig (42HH), cattle (38HH) and ducks (16HH). No investment was made on water buffalo, horse and goat, among respondents.

Table: Investment on Different Livestock during Last 2 Years, for All Samples

	Chicken	Ducks	Cattle	Water baffalo	Pig	Horse	Goat	Others
Heads	627	244	99	0	302	0	0	0
No. HH	49	16	38	0	42	0	0	0
Ave. per invested HH	12.8	15.3	2.6	-	7.2	-	-	-

The breakdown of livestock investments in accordance with 5 income strata set in previous chapter is also attempted, as shown below.

Table: Investment on Different Livestock during Last 2 Years, for 5 Income Strata

	Strata	Chicken	Ducks	Cattle	Water baffalo	Pig	Horse	Goat	Others
No. HH Invested	1st	5	3	7	0	12	0	0	0
	2nd	11	4	7	0	8	0	0	0
	3rd	10	3	5	0	10	0	0	0
	4th	11	3	14	0	9	0	0	0
	5th	12	3	5	0	3	0	0	0
Total Heads	1st	116	70	16	0	186	0	0	0
	2nd	104	62	20	0	47	0	0	0
	3rd	198	51	14	0	39	0	0	0
	4th	68	45	34	0	21	0	0	0
	5th	141	16	15	0	9	0	0	0
Average Heads per Invested HH	1st	23.2	23.3	2.3	-	15.5	-	-	-
	2nd	9.5	15.5	2.9	-	5.9	-	-	-
	3rd	19.8	17.0	2.8	-	3.9	-	-	-
	4th	6.2	15.0	2.4	-	2.3	-	-	-
	5th	11.8	5.3	3.0	-	3.0	-	-	-

As shown in above Table, investment on “cattle” per household is rather uniform in its sizes, while others, especially “pig,” the households in 1st stratum made outstanding investments. This indicates that those households in 1st stratum are able to run pig raising activity in entrepreneurial base.

IIIA-5.1.2 Investment for House, Private Business and Land

(1) House (building/maintenance)

Housing investment during 2004-2005 was made as follows.

Investment on House during Last 2 Years	
No. HH	18
TTL value ('000 Riel)	3,810
Average investment per HH ('000 Riel)	212

Among 100 sample households, 18 households made investments on their houses. As in the case of livestock, the breakdown of this figure in accordance with 5 different income strata was conducted.

The size of housing investment made by the households in 1st stratum is outstanding in its values, while in other strata accordingly decrease and for the 5th stratum no investment was made.

(2) Private Business

Private business investment during 2004-2005 was made as follows.

Table: Investment on House during Last 2 Years, for 5 Income Strata

No. HH Invested	1st	5
	2nd	7
	3rd	3
	4th	3
	5th	0
TTL value invested ('000 Riel)	1st	2,180
	2nd	1,080
	3rd	370
	4th	180
	5th	0
Average value invested per HH ('000 Riel)	1st	436
	2nd	154
	3rd	123
	4th	60
	5th	-

Investment on Private Business during Last 2 Years

No. HH	15
TTL value ('000 Riel)	45,307
Average investment per HH ('000 Riel)	3,020

Among 100 sample households, 15 households made investments on private businesses. The breakdown of this figure in accordance with 5 different income strata is in the right side Table.

As in the case of housing investment, the investment values in private business by 1st stratum is outstanding, followed by 2nd stratum. The figures generally decrease accordingly towards the lower strata.

Table: Investment on Private Business during Last 2 Years, for 5 Income Strata

No. HH Invested	1st	5
	2nd	5
	3rd	2
	4th	1
	5th	2
TTL value invested ('000 Riel)	1st	30,400
	2nd	11,820
	3rd	2,840
	4th	24
	5th	223
Average value invested per HH ('000 Riel)	1st	6,080
	2nd	2,364
	3rd	1,420
	4th	24
	5th	112

(3) Land

No Land investment was made during 2004-2005, among sampled households.

IIIA-5.2 Savings and Loans

IIIA-5.2.1 Saving

To the inquiry for saving, only 10 among 100 sample households answered as they do saving. Those savings are made in following forms.

Table: Saving in any Forms

Forms of Saving	No. of HH
Money in Bank	0
Land	0
Livestock	3
Cash	5
Other	2
Total	10

Any sample household saves their money in bank, while they tend to save their money in cash form with no interests. To the inquiry for the reasons why they do not do saving, majority (86 among total 87 responses) answered as they do not have any idle money for saving.

IIIA-5.2.2 Loan

To the inquiry of loans and debts, 25 households (i.e. 25% of all sample) responded as they have loan or debt, with one household utilizing 2 different loan schemes.

The detail is shown as follows.

Table: Loans and Debts

Source of Loans/Debts	No. of HH	Average loan amount ('000)	Average Interest Rate (%/year)
Money Lender	0	-	-
Friends/Relatives	9	1,150	120 *
Trader	0	-	-
NGO	2	200	90
Commercial Bank	13	816	42
Rice Miller	1	600	42
Credit Scheme/Project	1	560	90
Others	0	-	-
Total or Average	26	(Average) 733	(Weighted Average) 59.4

* Average of the cases with interests (3 out of 9 cases charged interest).

The most popular source of loan is commercial bank (50% of all loan schemes utilized by respondents), followed by friends/relatives (35%). Traders and money lenders often looked as binding farmers in debts are not engaged in loans among respondents.

The amounts of loan/debts the respondents owe ranging from 100,000 Riels up to 4,000,000 Riels, with average 733,000 Riels.

The levels of interest rates vary from lowest 36% up to highest 120%, with weighted average 59%. The highest interest rate is recorded in the cases of loans from friends/relatives, though such cases are only 3 among 9 cases and for the rest (6 cases) no interests were charged. Commercial bank with 13 cases sets uniform 42% interest, while rice miller is also setting same rate though only one case recorded. Loans by NGO (2 cases) and credit scheme/project (1 case) charge 90% which seems to be the interest rate charged through donor projects.

With regard to collateral, 19 among 25 respondents returned the information, as 12 respondents (63%) said collateral is not required. When it is required, land is common form (6 cases or 31%).

The purpose of loan/debt is shown in the Table in right.

Among the specified purposes for loans/debts, agricultural inputs is most popular (5 cases), followed by livestock animals (4 cases), assets and business (2 cases, respectively), while 4 other purposes also recorded a case of each. The purpose "others" counted 6 cases, though its contents not recorded.

Table: Purposes of Loans and Debts

Purpose of Loans/Debts	No. HH
Seeds/fertilizers/agrochemicals	5
Farm equipments/tools	1
Livestock animals	4
Food	0
Assets	2
Land	1
Children's education	0
Debt repayment	0
Ceremonial occasions	1
Business	2
Reclamation/rehabilitation of farm land	0
Building/repair of house	1
Others	6
Total	23

Chapter IIIA-6 Agricultural Land Use and Water Resources

IIIA-6.1 Land Holding Status

All the sampled households are the owner cultivator, except one household which is owner cum sharecropper.

IIIA-6.2 Agricultural Land Use

Agricultural land use information is compiled as the Table below.

Table: Agricultural Land Use

Land Use	Paddy Fields					Upland Fields		Total
	Irrigated (Gravity)	Irrigated (Pump)	Irrigated (Gravity+ Pump)	Rainfed	TTL Paddy Fields	Field Crop	Tree Crop	
Area (Ha)	27	16	18	22	83	2.6	0	85.6
No. HH	59	31	39	36	-	4	0	-
Average Per responded HH (Ha)	0.5	0.5	0.5	0.6	-	0.7	-	-
AveragePer Sample (100 HH)(Ha)	0.27	0.16	0.18	0.22	0.83	0.03	0.00	0.86

As it can be seem from above Table, average land size for paddy cultivation is approx. 0.8 ha for all samples. Since Feasibility Study area is predominantly rice cultivating area, only a fraction of upland exists.

IIIA-6.3 Farming Practice, Production, Marketing Etc.

Information with regard to farming practice, cropped area, intensity, production, livestock ownership, post-harvest and marketing activities, and agricultural support services based on Socio-Economic Survey results are compiled and analyzed in detail in another volume (Appendix IIIB Agriculture).

IIIA-6.4 Food Self-Sufficiency

Household self-sufficiencies of main food items were inquired.

Table: Food Self-Sufficiency (%)

Food Self-Sufficiency		Rice	Cereals	Roots & tuber crop	Beans	Vegetables	Meat	Fish
Self-sufficient	Own harvest/product exceed the HH Demand	71	1	4	0	6	11	3
	Own harvest/product just enough to meet HH demand	20	0	0	0	3	2	10
Not self-sufficient	Purchased (or exchanged) to meet HH demand	9	88	85	86	84	80	78
	Insufficient	0	10	11	14	7	7	9
Total		100	100	100	100	100	100	100

Although the volumes vary, 71 % of the responded households have excess of rice, while additional 20% have just enough supply to meet the household consumption. Remaining 9% is the households purchasing rice for their consumption, though there are no households utter facing a rice shortage.

Other foods (i.e. other cereals, roots and tuber crops, beans, vegetables, meat, and fish) are generally not self-sufficient and approx. 80 to 90% of the responded households purchase those food items, while the rest either having excesses or facing the shortages, as shown in above Table.

IIIA-6.5 Irrigation, Water Management, SRI Technology and Farmers Water Users Community (FWUC)

IIIA-6.5.1 Source, Method and Timing of Watering the Paddy Field

(1) Sources of Water for Paddy Fields

The sources of the water for the paddy field whether the respondents utilize the; 1) rainwater only, 2) mainly rainwater but sometimes from canal, or 3) mainly from canal but sometimes rainwater, are inquired.

Table: Water Sources for Paddy Field

Sources of Water	No. HH
1) Rain water only	2
2) Mainly rainwater but sometimes from canal	18
3) Mainly from canal but sometimes rainwater	78
Total responded HH	98

As shown in above Table, 78 among 98 responded households mainly utilize the canal water. The water availability from canal is quite high in Feasibility Study area. On the contrary though, 58 households among 97 answered they think they have sufficient quantity of water to grow their paddy, while 39 answered it is insufficient.

(2) Methods of Watering Paddy Fields

On how they water their paddy fields, 1) by gravity, 2) by pump, and 3) by both gravity and pump, were inquired.

Table: Methods of Watering Paddy Field

Methods of Watering	No. HH
1) by Gravity	20
2) by Pump	23
3) by both Gravity and Pump	55
Total responded HH	98

20 households among 98 responded households answered as they rely solely on gravity, while 23 solely on pump and 55 on both gravity and pump.

To the inquiry whether they irrigate their paddy fields intermittently or continuously, 82 among 95 responded households answered as they intermittently irrigate their fields. The reasons why they adopt intermittent watering are as follows.

Table: Reasons for Intermittent Watering

Reasons	%
1) The canals have water only in limited period	14
2) Continuous irrigation not necessary since rainfall is enough	52
3) Operation cost of pump is high	19
4) Saving irrigation water for more production	6
5) A rule of FWUC/community/government agency	9

(4) Timing to Water Paddy Fields

In which step(s) of paddy cultivation process they water the paddy fields were inquired. 97 households responded to this inquiry with total 193 multiple choice answers, as shown in the right Table.

Table: Timing to Water Paddy Fields

Methods of Watering	No. HH
1) Throughout the growing season	32
2) Land preparation	47
3) Transplanting	54
4) Initial tillering stage	24
5) Flowering stage	33
6) Maturing stage	3

IIIA-6.5.2 Knowledge and Interests on SRI Technology

The respondents were asked whether they know or do not know about System of Rice Intensification (SRI) technology as well as whether they are interested in it or not.

Table: Knowledge and Interests on SRI

As shown in the left Table, SRI is well known (86 out of 99HH knew) among respondents. To the inquiry whether they are interested to adopt SRI in near future, 49 among 93 responded households answered they are interested, while 44 households answered they are not interested.

Table: Knowledge and Interests on SRI

	No. HH
1) Know about it and interested	65
2) Know about it but not interested	21
3) Do not know	13
Total responded HH	99

Table: Reasons for not Interested in SRI

Reasons	%
1) Never seen a farmer applying SRI	6
2) Not yet received technical guidance on SRI	51
3) Not have a canal to control water by myself	27
4) Other reasons	16

To those who answered as they are not interested to adopt SRI, its reasons were also inquired and the result is shown in right Table.

It can be generally said that, for if the technical guidance on SRI is carried out and once its effects exhibited, its adoption can be high among respondents.

IIIA-6.5.3 Farmers Water Users Community (FWUC)

In this section the information gathered on FWUC in the Socio-Economic survey in Feasibility Study area will be discussed.

The memberships of existing FWUC among sampled households are as follows.

Table: Membership of Existing FWUC

	No. HH
1) Already a member of FWUC	71
2) Not belonging to FWUC	21
3) Do not know	6
Total responded HH	98

Among 98 responded households, 71 answered as they are already belonging to FWUC, while 21 answered not and 6 not clear on their position.

In order to probe their knowledge or commitments on FWUC, inquiries on whether they know the name, chairman, and the functions of the FWUC they are belonging or should belong, were made.

Table: Knowledge on FWUC (No. HH)

Do you know the:	Name of FWUC?	Name of FWUC Chairman?	FWUC's Functions?
Yes	57	61	63
No	34	34	32
No name	4	-	-
Total No.	95	95	95

Judgment on whether they know well or not, about the FWUC they belong or should belong won't be made here.

To the inquiry whether FWUC member households have attended the last Annual General Member Meeting or not, 61 (86%) among 71 FWUC member households responded as they have attended.

The FWUC activities the sampled households attended in previous year are as follows.

Table: FWUC Activities the Respondents Attended in Previous Year

Category	Descriptions (No. of response)	No.	%
Infra O&M-related	Protection (14), Maintenance (4), Deepen the tank (4), Desilting canal (4), Repair (4), Rebuild (3), Weeding (2)	35	81
Management-related	Setting of regulation (4), Extension of FWUC (2), Meeting (1), Fund raising (1)	8	19
Total		43	100

Although not much response were obtained (total 43 responses), their contents vary widely. Those activities can be broadly categorized into (1) infra O&M-related and (2) management-related activities, as shown in above Table.

It is evident that the FWUC activities the members attended during last year were mostly the infra O&M-related activities.
To the inquiry with regard to irrigation fee payment, 50 households responded.

Table: Irrigation Fee Payment in Previous Year

	No. HH
1) Paid	27
2) Did not pay	11
3) Fee not charged	12
Total responded HH	50

As far as the survey answers are concerned, the financial sustainability of the FWUC in the surveyed area is in doubt.
The amount of irrigation fees above respondents paid are as follows.

Table: Amount of Irrigation Fees Paid

Irrigation Fees	Riel/ha
Average	18,681
Median	20,000
Maximum	50,000
Minimum	2,000

The amounts of irrigation fees paid by respondents vary widely from 2,000 to 50,000 per Ha. Since information on how irrigation fees are decided for each water user households are lacking in this survey, further investigation on this aspect will be required.
To the inquiry with regard to the expectations they have towards the FWUC, as in the case for FWUC activities discussed previously, various words were returned as against limited number of response.

Table: Expectations for FWUC

Category	Descriptions (No. of response)	No.	%
General	More water (6), Better than now (1)	7	30
Infra O&M-related	Construct pipes to deliver water to the field (3), Enlarge/extend canals for other areas (2), Built water block to retain water during dry season (2), Repair pond (2), Improve drainage (1), Drain mud (1)	11	48
Management-related	Share benefit more equally (1), More cooperation with other irrigation schemes (1), More active (1), Improve management (1), Better rules and regulations (1)	5	22
Total		23	100

Total 23 responses were categorized into (1) general, (2) infra O&M-related and (3) management-related. As in the case of FWUC activities, for the expectations, too, infra O&M-related expectations outnumbered that of management-related.
An interesting finding which foreshadows the needs of improved management is that within the infra O&M-related category, contradicting expectations coexist together, e.g. enlarge/extend canals for other areas, and built water block to retain water during dry season. Here lies the necessity to strengthen the FWUC as coordinating body of conflicting interests, in order to realize their general expectations, i.e. better future with more water.

IIIA-6.6 Flood Damage

Majority of the sampled households have been suffering the flood damage, as approx 80% (79 HH) responded as they suffer from floods. The frequency of floods the sampled households have been experiencing is as follows.

Table: Frequency of Floods

Times/Year	HH
Once	71
Twice	4
Three times	3
Four times or more	1
Total	79

Most households only suffer once in a year during wet season, while some others suffer more.

The duration of the flood (the days the flood water stay in their field or residence) is also

inquired, as follows.

Table: Duration of Floods

Days Flooding Lasts	HH
1 day	1
2 days	0
3 days	21
4 days or more	57
Total	79

In most cases the flood water stays more than 3 days until it drains or dries.

With regard to the damages caused by floods, the majority is the field crops consist of paddy (64%) and vegetables (26%), as shown below.

Table: Types of Flood Damage

Types of flood damage	No. HH	%
1) Paddy	81	64
2) Vegetable field	33	26
3) Large Livestock (e.g. buffalo, cow)	1	1
4) Poultry	0	0
5) Fish	4	3
6) Household goods (e.g. house, motorcycle)	6	5
7) Family members' life	0	0
8) Others	1	1
Total	126	100

Tables

Table 1 : Cash Income Source During Year 2005 ('000 riel/year)

Sample No. in Strata	Age	No. of HH Member	Agricultural Income Sources						Non-Agricultural Income Sources									No. of income variety	Total	Per capita income
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)			
			Selling paddy /rice	Selling vege-talbes	Selling fruits	Selling palm sugar	Selling livestock	Selling fishes	Salary from permanet job	Wage from temporary job on farm	Wage from temporary job out of farm	Private business	Remittance from family menbers	Selling firewood	Selling handicraft	Selling forest products	Others			
1-1	29	6	0	1,200	0	0	448	0	6,720	0	14,400	0	0	0	0	0	0	4	22,768	3,795
1-2	60	5	1,650	0	0	0	0	0	0	0	18,000	0	0	0	0	0	0	2	19,650	3,930
1-3	52	9	0	0	0	0	15,000	0	0	0	300	0	0	0	0	0	0	2	15,300	1,700
1-4	52	7	0	0	0	0	0	0	0	160	0	0	1,200	12,000	550	0	0	4	13,910	1,987
1-5	42	10	0	960	0	0	0	0	1,440	0	180	11,250	0	0	0	0	0	4	13,830	1,383
1-6	52	7	0	0	1,000	0	2,400	0	9,600	0	0	0	0	0	0	0	0	3	13,000	1,857
1-7	35	9	500	0	0	0	500	0	0	20	0	10,800	0	0	0	0	0	4	11,820	1,313
1-8	66	6	600	0	0	0	6,000	0	1,080	0	2,400	0	0	0	0	0	0	4	10,080	1,680
1-9	36	5	0	0	0	0	1,000	0	0	0	0	0	0	9,000	0	0	0	2	10,000	2,000
1-10	25	4	270	0	0	0	0	0	0	0	0	9,000	0	0	0	0	0	2	9,270	2,318
1-11	38	5	0	0	0	0	3,600	0	1,440	0	0	4,000	0	0	0	0	0	3	9,040	1,808
1-12	50	6	300	0	500	0	1,000	0	7,200	0	0	0	0	0	0	0	0	4	9,000	1,500
1-13	52	9	500	0	0	0	0	0	7,680	0	0	0	0	0	0	0	0	2	8,180	909
1-14	52	7	450	0	0	0	900	0	0	2,400	0	0	4,320	0	0	0	0	4	8,070	1,153
1-15	65	5	200	0	100	0	2,000	0	4,800	0	240	0	150	0	0	0	0	6	7,490	1,498
1-16	59	11	1,300	0	240	0	0	0	5,760	0	96	0	0	0	0	0	0	4	7,396	672
1-17	49	8	1,000	0	0	0	2,500	120	264	0	0	3,200	200	0	0	0	0	6	7,284	911
1-18	42	8	0	0	0	0	1,200	0	5,760	0	0	0	0	0	0	0	0	2	6,960	870
1-19	58	2	0	20	0	0	800	0	0	0	0	5,760	200	0	0	0	0	4	6,780	3,390
1-20	64	6	350	0	0	0	6,000	0	0	0	0	0	0	0	0	0	0	2	6,350	1,058
2-1	35	4	4,000	0	0	0	2,000	0	0	300	0	0	0	0	0	0	0	3	6,300	1,575
2-2	50	6	1,000	0	0	0	1,200	0	3,600	0	0	0	0	0	0	0	0	3	5,800	967
2-3	57	8	125	0	0	0	80	0	0	0	0	5,400	0	0	0	0	0	3	5,605	701
2-4	42	5	0	0	0	0	5,300	0	0	200	0	0	0	0	0	0	0	2	5,500	1,100
2-5	45	6	0	0	195	0	4,000	0	1,200	0	0	0	0	0	0	0	0	3	5,395	899
2-6	44	6	250	480	0	0	320	0	4,320	0	0	0	0	0	0	0	0	4	5,370	895
2-7	35	6	0	3,600	30	0	120	1,050	0	7	420	0	0	0	0	0	0	6	5,227	871
2-8	54	7	1,500	0	0	0	2,000	0	1,560	0	0	0	0	0	0	0	0	3	5,060	723
2-9	56	7	1,400	500	0	0	2,400	0	0	0	600	0	0	0	0	0	0	4	4,900	700
2-10	61	10	250	0	0	0	150	0	4,320	0	0	0	120	0	0	0	0	4	4,840	484
2-11	54	8	700	0	0	0	40	0	0	0	0	3,000	1,000	0	0	0	0	4	4,740	593
2-12	57	6	0	0	0	0	0	0	0	0	1,800	2,880	0	0	0	0	0	2	4,680	780
2-13	50	6	0	0	0	200	550	0	216	0	3,360	0	0	0	0	0	0	4	4,326	721
2-14	48	5	150	0	0	50	200	3,000	0	0	800	0	50	0	0	0	0	6	4,250	850
2-15	48	6	500	0	30	0	88	0	0	0	3,600	0	0	0	0	0	0	4	4,218	703
2-16	56	6	1,250	0	0	0	0	50	2,880	0	0	0	0	0	0	0	0	3	4,180	697
2-17	65	5	900	300	0	0	100	0	1,680	0	1,200	0	0	0	0	0	0	5	4,180	836
2-18	30	4	0	0	0	0	1,400	0	1,440	0	300	1,000	0	0	0	0	0	4	4,140	1,035
2-19	30	5	250	0	1,000	0	0	0	720	0	1,920	150	50	0	0	0	0	6	4,090	818
2-20	75	6	750	0	0	0	1,400	0	1,800	0	0	0	0	0	0	0	0	3	3,950	658
3-1	37	5	468	0	0	0	370	0	0	0	0	3,000	0	0	0	0	0	3	3,838	768
3-2	42	6	0	300	0	0	1,000	100	1,200	0	1,000	0	0	0	0	0	0	5	3,600	600
3-3	35	3	400	0	0	0	1,000	0	1,200	0	1,000	0	0	0	0	0	0	4	3,600	1,200
3-4	75	6	300	100	0	0	2,000	0	0	0	1,200	0	0	0	0	0	0	4	3,600	600
3-5	63	11	0	0	0	0	160	0	1,800	0	1,500	0	0	0	0	0	0	3	3,460	315
3-6	53	8	1,000	200	0	0	1,000	0	1,200	0	0	0	0	0	0	0	0	4	3,400	425
3-7	42	3	0	0	0	0	2,000	0	0	0	1,200	0	0	0	0	0	0	2	3,200	1,067
3-8	28	3	0	0	0	0	912	600	1,680	0	0	0	0	0	0	0	0	3	3,192	1,064
3-9	65	5	1,000	0	0	0	2,000	0	0	0	0	0	0	0	0	0	0	2	3,000	600
3-10	48	7	2,500	0	0	0	120	0	300	0	0	0	0	0	0	0	0	3	2,920	417
3-11	41	6	400	500	0	0	1,500	0	0	0	500	0	0	0	0	0	0	4	2,900	483
3-12	43	7	0	0	0	0	0	0	1,920	0	960	0	0	0	0	0	0	2	2,880	411
3-13	64	4	160	0	0	0	200	0	1,200	200	960	0	100	0	0	0	0	6	2,820	705
3-14	24	4	240	0	0	0	0	0	2,520	0	0	0	0	0	0	0	0	2	2,760	690
3-15	45	5	810	0	0	0	1,700	0	0	100	100	0	0	0	0	0	0	4	2,710	542
3-16	42	5	0	0	400	0	44	100	0	0	2,160	0	0	0	0	0	0	4	2,704	541
3-17	45	9	300	0	0	0	400	0	2,000	0	0	0	0	0	0	0	0	3	2,700	300
3-18	49	7	375	0	0	0	2,000	0	0	200	0	0	100	0	0	0	0	4	2,675	382
3-19	25	3	500	0	0	0	0	0	1,440	200	400	0	0	0	0	0	0	4	2,540	847
3-20	65	5	1,000	0	0	0	0	200		400	700	0	200	0	0	0	0	5	2,500	500
4-1	51	5	1,000	0	0	0	0	0	800	700	0	0	0	0	0	0	0	3	2,500	500
4-2	35	5	0	0	0	0	0	0	1,440	0	1,000	0	0	0	0	0	0	2	2,440	488
4-3	45	4	600	0	300	0	1,500	0	0	0	0	0	0	0	0	0	0	3	2,400	600
4-4	31	5	0	480	0	0	1,872	0	0	0	0	0	0	0	0	0	0	2	2,352	470
4-5	48	4	0	0	30	0	1,500	0	0	0	180	0	0	0	0	0	500	4	2,210	553
4-6	56	4	300	0	0	0	1,500	0	100	0	300	0	0	0	0	0	0	4	2,200	550
4-7	51	3	0	0	0	0	0	0	1,200	60	400	0	480	0	0	0	0	4	2,140	713
4-8	51	7	500	0	0	0	728	0	0	0	0	800	0	0	0	0	0	3	2,028	290
4-9	45	7	1,000	200	300	0	500	0	0	0	0	0	0	0	0	0	0	4	2,000	286
4-10	21	7	300	0	0	0	1,500	0	0	200	0	0	0	0	0	0	0	3	2,000	286
4-11	66	2	200	250	300	0	850	0	0	0	0	300	0	0	0	0	0	5	1,900	950
4-12	35	2	205	0	10	0	0	0	1,680	0	0	0	0	0	0	0	0	3	1,895	948
4-13	37	8	120	600	0	0	450	0	720	0	0	0	0	0	0	0	0	4	1,890	236
4-14	68	4	0	0	0	0	1,300	0	400	0	150	0	0	0	0	0	0	3	1,850	463
4-15	41	4	0	0	0	0	1,000	0	0	300	500	0	0	0	0	0	0	3	1,800	450
4-16	26	4	200	0	0	0	600	0	0	0	1,000	0	0	0	0	0	0	3	1,800	450
4-17	45	3	300	0	0	0	800	0	0	0	700	0	0	0	0	0	0	3	1,800	600
4-18	60	4	0	200	150	0	700	0	0	0	700	0	0	0	0	0	0	4	1,750	438
4-19	65	5	100	0	0	0	0	200	800	0	400	0	200	0	0	0	0	5	1,700	340
4-20	53	6	0	200	0	0	700	0	0	0	800	0	0	0	0	0	0	3	1,700	283
5-1	21	9	500	0	0	0	600	0	0	0	520	0	0	0	0	0	0	3	1,620	180
5-2	52	5	0	0	100	0	70	0	1,320	0	0	120	0	0	0	0	0	4	1,610	322
5-3	71	6	0	0	0	0	100	0	1,000	300	200	0	0	0	0	0	0	4	1,600	267
5-4	42	5	1,500	0	0	0	0	0	0	0	50	0	0	0	0	0	0	2	1,550	310
5-5	40	3	0	0	0	0	0	0	0	0	1,000	500	0	0	0	0	0	2	1,500	500
5-6	24	4	0	0	0	0	0	0	0	0	1,500	0	0	0	0	0	0	1	1,500	375
5-7	46	3	300	0	0	0	0	0	0	0	0	1,200	0	0	0	0	0	2	1,500	500
5-8	36	4	200	0	50	0	400	0	840	0	0	0	0	0	0	0	0	4	1,490	373
5-9	29	5	60	200	20	0	0	0	0	0	1,200	0	0	0	0	0	0	4	1,480	296
5-10	31	4	0	0	0	0	500	0	0	0	900	0	0	0	0	0	0	2	1,400	350
5-11	59	10	600	0	0	0	0	0	0	0	0	700	0	0	0	0	0	2	1,300	130
5-12	18	4	700	0	0	0	500	0	0	0	0	0	0	0	0	0	0	2	1,200	300
5-13	44	2	100	0	0	0	800	0	0	300	0	0	0	0	0	0	0	3	1,200	600
5-14	25	5	0	0	0	0	400	0	300	0	0	500	0	0	0	0	0	3	1,200	240
5-15	50	2	51	0	0	0	0	0	0	0	960	0	120	0	0	0	0	3	1,131	566
5-16	58	3	250	0	50	0	800	0	0	0	0	0	0	0	0	0	0	3	1,100	367
5-17	50	3	0	60	60	0	500	0	0	200	0	0	240	0	0	0	0	5	1,060	353
5-18	37	6	200	200	0	0	100	200	0	0	300	0	0	0	0	0	0	5	1,000	167
5-19	24	3	500	0	100	0	300	0	0	0	0	0	0	0	0	0	0	3	900	300
5-20	30	2	125	0	0	0	50	0	0	200	0	500	0	0	0	0	0	4	875	438
No. HH earning from this source			64	20	21	2	75	10	45	19	48	20	16	2	1	0	1	344		
Total Value			39,509	10,550	4,965	250	101,722	5,620	102,540	6,447	74,056	64,060	8,730	21,000	550	0	500		440,499	
% in total value			9.0	2.4	1.1	0.1	23.1	1.3	23.3	1.5	16.8	14.5	2.0	4.8	0.1	0.0	0.1		100	
Average Value per HH			617	528	236	125	1,356	562	2,279	339	1,543	3,203	546	10,500	550	-	500	3.44	4,405	816
Median Value per HH			202.5	0	0	0	500	0	0	0	0	0	0	0	0	0	0	3	2,910	600

Table 2 : Expenditure During Year 2005 ('000 riel/year)

Sample No. in Strata	Age	No. of HH Member	Total Income	Per capita income	Expenditure Items										Total Expenditure	Balance (income - expenditure)	Per Capita Expenditure
					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)			
					Rice	Other food	Health/ medicine	Education	Clothes	Fuel/ Electricity	Transpor-tation	Tax	Ceremony	Other			
1-1	29	6	22,768	3,795	150	1,800	600	150	80	216	0	0	100	0	3,096	19,672	516
1-2	60	5	19,650	3,930	0	3,600	400	1,800	480	168	0	0	0	0	6,448	13,202	1,290
1-3	52	9	15,300	1,700	500	500	1,000	500	100	300	2,100	0	2,300	0	7,300	8,000	811
1-4	52	7	13,910	1,987	300	3,600	400	300	200	0	200	0	400	0	5,400	8,510	771
1-5	42	10	13,830	1,383	50	2,520	250	1,800	200	360	0	0	500	0	5,680	8,150	568
1-6	52	7	13,000	1,857	720	5,400	10	1,500	200	200	1,440	0	1,000	0	10,470	2,530	1,496
1-7	35	9	11,820	1,313	360	1,800	100	600	100	180	0	0	500	0	3,640	8,180	404
1-8	66	6	10,080	1,680	0	1,080	200	0	200	14	0	0	500	0	1,994	8,086	332
1-9	36	5	10,000	2,000	160	1,800	50	200	80	648		0	240	0	3,178	6,822	636
1-10	25	4	9,270	2,318	225	900	300	0	100	60	100	0	250	0	1,935	7,335	484
1-11	38	5	9,040	1,808	0	3,600	400	1,080	400	480	1,440	0	600	0	8,000	1,040	1,600
1-12	50	6	9,000	1,500	1,000	1,200	300	1,054	370	360	400	0	400	0	5,084	3,916	847
1-13	52	9	8,180	909	0	1,080	30	48	60	180	0	0	96	0	1,494	6,686	166
1-14	52	7	8,070	1,153	0	1,080	120	720	500	240	400	0	500	0	3,560	4,510	509
1-15	65	5	7,490	1,498	0	1,800	300	720	50	120	200	0	400	0	3,590	3,900	718
1-16	59	11	7,396	672	0	2,160	240	960	400	420	0	0	1,080	0	5,260	2,136	478
1-17	49	8	7,284	911	0	2,520	400	180	80	120	500	0	700	0	4,500	2,784	563
1-18	42	8	6,960	870	0	2,160	100	540	108	0	480	0	500	0	3,888	3,072	486
1-19	58	2	6,780	3,390	0	1,080	200	0	50	100	150	0	200	0	1,780	5,000	890
1-20	64	6	6,350	1,058	36	365	180	200	21	600	80	0	500	0	1,982	4,368	330
2-1	35	4	6,300	1,575	0	3,000	250	500	450	650	300	0	700	300	6,150	150	1,538
2-2	50	6	5,800	967	1,250	1,825	150	548	400	240	150	6	0	0	4,568	1,232	761
2-3	57	8	5,605	701	420	1,800	50	60	100	0	50	0	100	0	2,580	3,025	323
2-4	42	5	5,500	1,100	0	1,080	200	250	100	0	50	0	200	0	1,880	3,620	376
2-5	45	6	5,395	899	0	1,800	0	300	4	240	50	0	300	0	2,694	2,701	449
2-6	44	6	5,370	895	120	1,800	100	288	120	0	0	0	192	0	2,620	2,750	437
2-7	35	6	5,227	871	0	1,800	200	360	100	0	20	0	300	0	2,780	2,447	463
2-8	54	7	5,060	723	1,000	183	130	200	400	360	50	5	0	0	2,328	2,733	333
2-9	56	7	4,900	700	0	1,800	50	8	120	180	0	0	240	0	2,398	2,502	343
2-10	61	10	4,840	484	0	1,800	400	600	400	120	200	0	600	0	4,120	720	412
2-11	54	8	4,740	593	0	1,440	10	0	200	96	200	0	200	0	2,146	2,594	268
2-12	57	6	4,680	780	120	180	50	180	400		200	0	500	0	1,630	3,050	272
2-13	50	6	4,326	721	0	1,000	1,000	150	50	600	150	0	1,000	0	3,950	376	658
2-14	48	5	4,250	850	0	1,800	10	150	100	0	400	0	300	0	2,760	1,490	552
2-15	48	6	4,218	703	1,250	180	200	400	400	0	0	5	0	0	2,435	1,783	406
2-16	56	6	4,180	697	0	1,800	100	0	200	200	320	0	400	0	3,020	1,160	503
2-17	65	5	4,180	836	0	1,825	500	548	100	200	50	0	100	0	3,323	858	665
2-18	30	4	4,140	1,035	0	1,800	30	400	200	120	200	0	400	0	3,150	990	788
2-19	30	5	4,090	818	0	1,800	40	360	200	180	500	0	500	0	3,580	510	716
2-20	75	6	3,950	658	0	1,080	140	1,440	80	0	0	0	720	0	3,460	490	577
3-1	37	5	3,838	768	0	1,080	100	300	50	0	50	0	600	0	2,180	1,658	436
3-2	42	6	3,600	600	0	2,000	100	300	100	100	200	0	300	0	3,100	500	517
3-3	35	3	3,600	1,200	0	150	100	150	100	150	180	0	450	0	1,280	2,320	427
3-4	75	6	3,600	600	0	2,500	200	300	150	100	100	0	200	0	3,550	50	592
3-5	63	11	3,460	315	1,000	180	200	0	100	0	0	0	700	300	2,480	980	225
3-6	53	8	3,400	425	0	1,500	100	150	50	70	200	0	300	0	2,370	1,030	296
3-7	42	3	3,200	1,067	0	1,000	200	300	200	100	200	0	700	450	3,150	50	1,050
3-8	28	3	3,192	1,064	0	720	170	0	40	180	0	0	120	0	1,230	1,962	410
3-9	65	5	3,000	600	0	1,500	100	300	300	200	100	0	450	0	2,950	50	590
3-10	48	7	2,920	417	0	1,500	150	200	100	200	50	0	600	0	2,800	120	400
3-11	41	6	2,900	483	0	1,000	100	200	100	120	50	0	400	0	1,970	930	328
3-12	43	7	2,880	411	100	720	400	150	100	0	200	0	100	0	1,770	1,110	253
3-13	64	4	2,820	705		1,440	20	60	70	24	200	0	200	0	2,014	806	504
3-14	24	4	2,760	690	0	1,080	0	0	100	144	300	0	400	0	2,024	736	506
3-15	45	5	2,710	542	0	720	200	200	40	0	100	0	400	0	1,660	1,050	332
3-16	42	5	2,704	541	75	720	100	150	100	240	100	0	300	0	1,785	919	357
3-17	45	9	2,700	300	0	1,000	100	300	100	120	100	0	500	0	2,220	480	247
3-18	49	7	2,675	382	25	1,800	20	0	100	0	200	0	300	0	2,445	230	349
3-19	25	3	2,540	847	0	720	20	100	80	250	400	0	200	0	1,770	770	590
3-20	65	5	2,500	500	125	90	50	0	50	50	100	0	300	0	765	1,735	153
4-1	51	5	2,500	500	0	1,000	100	500	100	50	200	0	450	0	2,400	100	480
4-2	35	5	2,440	488	0	720	20	120	20	84	10	0	400	0	1,374	1,066	275
4-3	45	4	2,400	600	0	800	150	0	200	100	150	0	600	200	2,200	200	550
4-4	31	5	2,352	470	0	1,440	400	0	100	72	0	0	240	0	2,252	100	450
4-5	48	4	2,210	553	1,000	180	300	30	200	36	0	5	0	0	1,751	460	438
4-6	56	4	2,200	550	0	700	100	250	100	200	100	0	500	0	1,950	250	488
4-7	51	3	2,140	713	0	1,080	200	0	100	80	60	0	200	0	1,720	420	573
4-8	51	7	2,028	290	0	1,440	100	100	100	60	0	0	200	0	2,000	28	286
4-9	45	7	2,000	286	0	1,000	100	300	0	0	0	0	300	0	1,700	300	243
4-10	21	7	2,000	286	0	1,000	150	0	100	120	50	0	400	120	1,940	60	277
4-11	66	2	1,900	950	0	300	50	0	100	70	150	0	500	0	1,170	730	585
4-12	35	2	1,895	948	120	108	80	0	180	1,000	200	0	100	0	1,788	107	894
4-13	37	8	1,890	236	0	1,000	200	201	20	0		0	100	0	1,521	369	190
4-14	68	4	1,850	463	250	500	300	200	100	80	120	0	250	0	1,800	50	450
4-15	41	4	1,800	450	0	800	30	200	40	70	120	0	300	0	1,560	240	390
4-16	26	4	1,800	450	0	700	100	200	100	50	50	0	400	100	1,700	100	425
4-17	45	3	1,800	600	0	600	120	100	100	50	100	0	450	150	1,670	130	557
4-18	60	4	1,750	438	0	800	200	300	150	70	30	0	40	100	1,690	60	423
4-19	65	5	1,700	340	125	150	50	300	50	50	150	0	300	0	1,175	525	235
4-20	53	6	1,700	283	0	700	100	300	50	20	20	0	500	0	1,690	10	282
5-1	21	9	1,620	180	0	300	100	400	100	150	100	0	400	0	1,550	70	172
5-2	52	5	1,610	322	60	900	20	150	100	0	200	0	100	0	1,530	80	306
5-3	71	6	1,600	267	0	800	150	0	70	30	50	0	300	0	1,400	200	233
5-4	42	5	1,550	310	850	180	100	0	50	100	50	0	0	0	1,330	220	266
5-5	40	3	1,500	500	0	300	100	200	100	50	0	0	500	100	1,350	150	450
5-6	24	4	1,500	375	0	500	200	0	100	50	0	0	500	0	1,350	150	338
5-7	46	3	1,500	500	0	800	100	0	100	80	50	0	350	0	1,480	20	493
5-8	36	4	1,490	373	300	547	50	72	25	0	0	5	0	0	999	491	250
5-9	29	5	1,480	296	250	200	36	365	400	72	0	0	0	0	1,323	157	265
5-10	31	4	1,400	350	0	700	50	150	50	100	0	0	250	0	1,300	100	325
5-11	59	10	1,300	130	0	300	100	200	150	70	80	0	300	0	1,200	100	120
5-12	18	4	1,200	300	600	100	0	100	150	100	0	0	150	0	1,200	-	300
5-13	44	2	1,200	600	0	400	50	100	70	20	30	0	300	0	970	230	485
5-14	25	5	1,200	240	0	500	100	0	50	20	30	0	250	200	1,150	50	230
5-15	50	2	1,131	566	0	360	250	0	20	96	0	0	300	0	1,026	105	513
5-16	58	3	1,100	367	500	200	100	0	60	0	0	0	200	0	1,060	40	353
5-17	50	3	1,060	353	0	540	15	0	40	180	0	0	200	0	975	85	325
5-18	37	6	1,000	167	0	200	150	150	100	120	0	0	250	0	970	30	162
5-19	24	3	900	300	0	500	50	0	70	80	0	0	200	0	900	-	300
5-20	30	2	875	438		360	40	0	20	0	20	0	50	0	490	385	245
No. HH spending for this item					31	100	97	74	99	79	70	5	92	10			
Total Value			440,499		13,041	114,963	16,231	27,241	13,668	13,580	15,330	25	35,868	2,020	251,967	188,532	
% in total value			100		5	46	6	11	5	5	6	0	14	1	100		
Average Value per HH			4,405	816	133	1,150	162	272	137	137	156	0	359	20	2,520	1,885	479
Median Value per HH			2,910	600	0	1,000	100	190	100	96	70	0	300	0	1,988	725	431

Attachment

Survey Questionnaire

Questionnaire (FS Area)

Sample No. ____

Date (M/D/Y):	/ /		Enumerator:	
Commune:			Village:	
FWUC		Q-1	FWUG	Q-2

Date (M/D/Y): Data format shall be written as "11/22/06" (Month: November /Date: 22nd /Year: 2006).

PART 1 SOCIO-ECONOMY

SECTION I GENERAL INFORMATION

I-1 Name and age of interviewee
- Name ____ Q-3
- Age ____ Q-4

I-2 Who is it? ____ Q-5
1 Male head of the household
2 Female head of the household
3 Oldest son of the household
4 Oldest daughter of the household
5 Other ( )

Note 1-1. Write interviewee's name (full name in block letters). This item is not necessarily given in the data summary.
I-2 Circle a code number.

I-3 Total number of household members ____ Q-6
I-4 Number of male household members ____ Q-7
I-5 Number of female household members ____ Q-8
I-6 Number of working aged members in the household (Household members of age 15 – 64)
- Male ____ Q-9
- Female ____ Q-10
- Total ____ Q-11

I-7 Main activity of this household ____ Q-12

Note: Choose main activity of this household from codes below.

Main activity	Code	Remarks
Farmer	1	Own/rented land, and agricultural income is more than other one.
On-farm labor	2	Wage for labor work on farm is more than other income.
Non-farm labor	3	Wage for non-farm labor work is more than other income.
Salary worker	4	Salary is more than other work.
Private business	5	Income from private business is more than other work.
Others	6	Specify.

I-8 Education Carrier of Interviewee ____ Q-13

Education: Education background shall be chosen from codes below.

for adult (>18 yr)	Code
No formal education	1
Drop-out at primary school	2
Graduate from primary school	3
Drop-out at junior high school	4
Graduate from junior high school	5
Drop-out at high school	6
Graduate from high school	7
More than high school	8

I-9 Occupation of Household Members Other Than Respondent
- ( ) please specify as wife, husband, child etc ____ Q-14
- ( ) ____ Q-15
- ( ) ____ Q-16
- ( ) ____ Q-17

Main occupation: Main occupation shall be chosen from codes below.

Main occupation	Code	Main occupation	Code
Farmer	1	Housekeeping (cooking, washing, child care, etc.)	6
On-farm labor	2	No job	7
Non-farm labor	3	Student	8
Salary worker	4	Child (below school age)	9
Private business	5	Others	10

* Definition of Main Occupation: "A person who has more than 1 job, the work that most of his/ her working time is spent is regarded as a main occupation. In case, he/ she engages in only 1 job, it is regarded as a main occupation" (NIS, 1995)

I-10 Member of village organization (husband)

1 [ ] Q-18 2 [ ] Q-19 3 [ ] Q-20 4 [ ] Q-21 5 [ ] Q-22

Note: Choose village organization codes below which head of the family belong to. If there are other organizations, fill in the name.

Village organization	Code	Village organization	Code
Farmer's water users' community	1	Marketing group	7
Credit group by government	2	Youth group	8
Micro-credit group by NGO	3	Veteran group	9
Production group	4	Women's group	10
Religion group	5	Others ( )	11
Drinking water users' group	6		

I-11 Member of village organization (wife)

1 [ ] Q-23 2 [ ] Q-24 3 [ ] Q-25 4 [ ] Q-26 5 [ ] Q-27

Note: Choose village organizations codes below which housewife belong to. If there are other organizations, fill in the name.

Village organization	Code	Village organization	Code
Farmer's water users' community	1	Marketing group	7
Credit group by government	2	Youth group	8
Micro-credit group by NGO	3	Veteran group	9
Production group	4	Women's group	10
Religion group	5	Others ( )	11
Drinking water users' group	6		

SECTION II LIVING CONDITION

II-1 Drinking water source

	Main source		Distance from your house		Sufficiency	
Dry season		Q-28	m	Q-29		Q-30
Wet season		Q-31	m	Q-32		Q-33

Note: Choose water source for drinking water and its availability.

Water source	Code	Water source	Code
Piped	1	Spring/River	5
Tube pipe well	2	Bought	6
Dug well	3	Rain	7
Reservoir/ Pond	4	Others	8

Availability	Code	Availability	Code
Easy to obtain	1	Very difficult to obtain	3
Difficult to obtain	2		

II-2 Water source for domestic use

	Main source		Distance from your house		Sufficiency	
Dry season		Q-34	m	Q-35		Q-36
Wet season		Q-37	m	Q-38		Q-39

Note: Choose water source for domestic use and its availability.

Water source	Code	Water source	Code
Piped	1	Spring/River	5
Tube pipe well	2	Bought	6
Dug well	3	Rain	7
Reservoir/ Pond	4	Others	8

Availability	Code	Availability	Code
Easy to obtain	1	Very difficult to obtain	3
Difficult to obtain	2		

II-3 Fuel source for cooking

Importance	Source		Availability	
1 Most important		Q-40		Q-41
2 Secondary importance		Q-42		Q-43

Note: Choose fuel source primary and secondary (supplemental), and its availability.

Fuel source	Code	Fuel source	Code
Firewood	1	Gas cylinder (LPG)	4
Kerosene	2	Electricity	5
Charcoal	3	Others	6

Availability	Code	Availability	Code
Easy to obtain	1	Very difficult to obtain	3
Difficult to obtain	2		

II-4 Fuel source for lightening

Importance	Source		Availability	
1 Most important		Q-44		Q-45
2 Secondary importance		Q-46		Q-47

Note: Choose fuel source primary and secondary (supplemental), and its availability.

Fuel source	Code	Fuel source	Code
Firewood	1	Gas cylinder (LPG)	4
Kerosene	2	Electricity	5
Charcoal	3	Others	6

Availability	Code	Availability	Code
Easy to obtain	1	Very difficult to obtain	3
Difficult to obtain	2		

II-5 Facilities/machinery/equipment in your household (1 Yes / 2 No)

		No.				No.	
1	Radio		Q-48	12	Electric Fan		Q-59
2	TV		Q-49	13	Refrigerator		Q-60
3	Bicycle		Q-50	14	Mosquito net		Q-61
4	Motorcycle		Q-51	15	Cellular Telephone		Q-62
5	Car		Q-52	16	Telephone		Q-63
6	Audio (CD/ cassette player)		Q-53	17	Weaving machine		Q-64
7	VCR		Q-54	18	Ox cart		Q-65
8	Row boat		Q-55	19	Water pump		Q-66
9	Boat with motor		Q-56	20	Chemical sprayer		Q-67
10	Tractor		Q-57	21	Others ( )		Q-68
11	Power generator		Q-58	22	Others ( )		Q-69

II-6 Residence

Q-70	Ownership		1 Owned (already paid) 2 Owned (under payment) 3 Lent 4 Borrowed
Q-71	Material		1 Cement and bricks 2 Palm leaves 3 Wood 4 Others ( )
Q-72	Type of Hose		1 Traditional 2 One-storied 3 Two-storied 4 Others ( )
Q-73	Number of rooms		
Q-74	Toilet		1 Yes 2 No
Q-75	Electrical Supply		1 Yes 2 No
Q-76	Piped Water Supply		1 Yes 2 No
Q-77	Gas Line Supply		1 Yes 2 No
Q-78	Land telephone line		1 Yes 2 No

II-7 Social Service

1. Health and medical service

When you/ your family get/gets sick,

Q-79 Where do you go?		1 Hospital 2 Clinic 3 Health center 4 Others ( )
Q-80 How do you go there?		By 1 Walk 2 Bike taxi 3 Owned motor bike 4 Bicycle 5 Others ( )
Q-81 How long does it take to be there?		Minutes

2. Reproductive Health

When you/ your wife delivers a baby,

Q-82 where do you go?		1 Hospital 2 Clinic 3 Health center 4 TBA 5 Traditional Dr. 6 Midwife 7 Others( )
Q-83 how do you go there?		By 1 Walk 2 Bike taxi 3 Owned motor bike 4 Bicycle 5 Others ( )
Q-84 how long does it take to be there?		Minutes

2. Social security service

Q-85 Do you have any social security service/ insurance?		1 Yes 2 No

II-8 Gender in Development

1. Marriage

Q-86 How old usually do women get married in your village?,		1 15-17 2 18-20 3 21-23 4 24-26 5 27-29 6 Older than 30

2. Daily activities

Q-87 What are FEMALE's main activities in your village? (plural answers)		1 Housekeeping 2 Cooking 3 Farming 4 Handy crafting 5 Care of children/ elders 6 Care of livestock 7 Making Palm sugar 8 Others ( )
Q-88 What are MALE's main activities in your village? (plural answers)		1 Housekeeping 2 Cooking 3 Farming 4 Handy crafting 5 Care of children/ elders 6 Care of livestock 7 Making Palm sugar 8 Others ( )

3. Income source

Q-89 What are FEMALE's main cash income sources in your village? (plural answers)		1 Selling paddy 2 Working for other's field 3 Selling palm sugar 4 Selling handy craft 5 Working for a weaving factory 6 Working for bricks factory 7 Selling straw mat 8 Selling cotton/ silk 9 Others ( )
Q-90 What are MALE's main cash income sources in your village? (plural answers)		1 Selling paddy 2 Working for other's field 3 Selling palm sugar 4 Selling handy craft 5 Working for a weaving factory 6 Working for bricks factory 7 Selling straw mat 8 Selling cotton/ silk 9 Others ( )

4. Discrimination

Q-91 Is there any social discrimination against women?		1 Yes 2 No

5. Women's Access/ Control on resources (Write 1 if it is accessible/ controllable & 2 if it is not accessible/ controllable)

	Water Source		Land		Farm land		Livestock	
Access		Q-92		Q-94		Q-96		Q-98
Control		Q-93		Q-95		Q-97		Q-99

* Accessible: You have a right to work on. Controllable: You have a right to buy or rent.

SECTION III INCOME AND EXPENDITURE

III-1 Cash income sources in last year (Last year: January 2005 – December 2005)

1	Selling paddy/rice	riel/Yr	Q-100	9	Wage from temporary job out of farm	riel/Yr	Q-108
2	Selling vegetables	riel/Yr	Q-101	10	Private business (transportation, trading, shop, etc.)	riel/Yr	Q-109
3	Selling fruits	riel/Yr	Q-102	11	Remittance from family members	riel/Yr	Q-110
4	Selling palm sugar	riel/Yr	Q-103	12	Selling firewood/charcoal	riel/Yr	Q-111
5	Selling livestock, poultry & their products	riel/Yr	Q-104	13	Selling handicraft/ cottage industry products	riel/Yr	Q-112
6	Selling fishes	riel/Yr	Q-105	14	Selling forest products	riel/Yr	Q-113
7	Salary from permanent job	riel/Yr	Q-106	15	Others (Specify:)	riel/Yr	Q-114
8	Wage from temporary job on farm	riel/Yr	Q-107	16	Total	riel/Yr	Q-115

Note: Write cash income of this household in 2004 (total of one year). If the interviewee answer in US$, convert to riel (US$ = 4,000 riel).

III-2 Expenditure for consumption (Last year: January 2005 – December 2005)

1	Rice	riel/Yr	Q-116
2	Other foods	riel/Yr	Q-117
3	Health/ medicine	riel/Yr	Q-118
4	Education	riel/Yr	Q-119
5	Clothes	riel/Yr	Q-120
6	Fuel/Electricity	riel/Yr	Q-121
7	Transportation	riel/Yr	Q-122
8	Tax	riel/Yr	Q-123
9	Ceremony & ritual	riel/Yr	Q-124
10	Others	riel/Yr	Q-125
11	Total	riel/Yr	Q-126

Note Write expenditure for consumption of this household in 2004. Total of expenditure should be less than total of income.
If the interviewee answer in US$, convert to riel l (US$ = 4,000 riel).

III-3 Investment on productive and fixed assets in the last two year (January 2004 – December 2005)

1	Livestock		
1-1	Chicken	Head(s)	Q-127
1-2	Ducks	Head(s)	Q-128
1-3	Cattle	Head(s)	Q-129
1-4	Water buffalo	Head(s)	Q-130
1-5	Pig	Head(s)	Q-131
1-6	Horse	Head(s)	Q-132
1-7	Goat	Head(s)	Q-133
1-8	Others ( )	Head(s)	Q-134
2	Housing (building/ maintenance)	Riel	Q-135
3	Private business	Riel	Q-136
4	Land	Riel	Q-137

SECTION IV SAVINGS AND LOAN

IV-1 Savings of any type at present

If family member(s) have savings, choose "Y" and choose type of the savings and purposes from the codes below. If the family member(s) do not have saving, choose "2" and fill in Q-190.

	Source	Amount	Interest rate	Purpose	Reason for no Saving Q-147
1 Yes 2 No Q-138	Q-139	Q-140	Q-141	Q-142	
	Q-143	Q-144	Q-145	Q-146	

Source of savings	Code
Money in bank	1
Land	2
Livestock	3
Cash	4
Others	5

Purpose for savings	Code
For safety	1
Saving for future expenditure	2
Saving for emergency needs	3

Reason of no savings	Code
No idle money	1
Credit is available at anytime	2
Others	3

IV-2 Loans and debts at present

Note If the family member(s) have loan(s) and debt(s), choose "Yes" and choose the source of loan(s) and debt(s), write interest rate (per year, %), choose purpose for loan(s) and debt(s) and Collateral from code below and write amount of repayment per year. If the family member(s) do not have loan(s), choose "No".

1 Yes 2 No Q-148

Source	Amount	Interest rate	Purpose	Collateral	Amount repaid
Q-149	Q-150	%/yr Q-151	Q-152	Q-153	Riel/yr Q-154
Q-155	Q-156	%/yr Q-157	Q-158	Q-159	Riel/yr Q-160

Source of loans/debts	Code
Money lender	1
Friend/Relatives	2
Trader	3
NGO	4
Commercial bank	5
Rice miller	6
Credit scheme/project	7
Others (specify)	8

Purpose for loans/debts	Code	Purpose for loans/debts	Code
Seeds/fertilizers/agro-chemicals	1	Debt repayment	8
Farm equipment/tools	2	Ceremonial occasions	9
Animals	3	Business	10
Food	4	Reclamation/Rehabilitation of farm land	11
Assets	5	Building/repair of house	12
Land	6	Others	13
Children's education	7		

Collateral for loans/debts	Code	Collateral for loans/debts	Code
Nothing	1	Jewelry/gold	4
Land	2	Others	5
Crop products	3		

PART 2 AGRICULTURE

SECTION I LIVESTOCK AND FRUITS TREES

I-1 LIVESTOCK

Write number of each livestock possessed currently and choose codes for feed sufficiency from answer code.

		Number				Food sufficiency			
		Adult		Calf		Wet season		Dry season	
1	Cows/ Oxen		Q-200		Q-201		Q-202		Q-203
2	Water buffalo		Q-204		Q-205				
3	Goat/ Sheep		Q-206		Q-207		Q-208		Q-209
4	Swine		Q-210		Q-211				
5	Chicken		Q-212		Q-213				
6	Duck		Q-214		Q-215				

Answer code & answer for food sufficiency

1. Sufficient	3. Short
2. Just enough	4. Very short

I-2 FRUITS TREES

Indicate estimated numbers of sugar palm and major three fruit trees possessed by the interviewee.

		No. of trees					No. of trees	
1	Sugar palm		Q-216	4	(specify	)		Q-219
2	Banana		Q-217	5	(specify	)		Q-220
3	Mango		Q-218	6	(specify	)		Q-221

SECTION II LAND HOLDING

II-1 Land holding (only for farm land) by a family

Write area of farmland by item. “Land owned” + “Land rented from others” – “Land leased to others” = “Land operated”. If the household is categorized as complete landless labor farmer, all the items must be “0 ha”. Please differentiate irrigated paddy field by gravity (irrigation canal) from irrigated paddy field by pumping. If both gravity and pumping irrigation are employed, please answer to 3.

		Land owned		Land rented from others		Land leased to others		Land operated	
1	Irrigated paddy field (gravity only)	ha	Q-222	ha	Q-223	ha	Q-224	ha	Q-225
2	Irrigated paddy field (pump irrigation only)	ha	Q-226	ha	Q-227	ha	Q-228	ha	Q-229
3	Irrigated paddy field (gravity + pump irrigated)	ha	Q-230		Q-231		Q-232		Q-233
4	Rainfed paddy field	ha	Q-234	ha	Q-235	ha	Q-236	ha	Q-237
5	Upland for field crop	ha	Q-238	ha	Q-239	ha	Q-240	ha	Q-241
6	Upland for tree crop	ha	Q-242	ha	Q-243	ha	Q-244	ha	Q-245
7	Total	ha	Q-246	ha	Q-247	ha	Q-248	ha	Q-249

II-2 Land holding status (fill in answer code)

The categorization of the land holding status shall be chosen from the codes shown in Questionnaire. The evaluation of the land holding status shall be chosen from the codes below.

Q-250

1	Owner cultivator	2	Owner cum sharecropper	3	Sharecropper
4	Owner cum tenant	5	Tenant	6	Not operating any farm land

II-3 Condition for land tenure

Write land rental charge and choose the codes for responsibility to pay production cost.

1. Land rental charge

			Rental charge		Production cost born by	
1	In cash	Irrigated paddy field	riel/ha/season	Q-251		Q-252
		Rainfed paddy field	riel/ha/season	Q-253		Q-254
2	In kind	Irrigated paddy field	% of harvest	Q-255		Q-256
		Rainfed paddy field	% of harvest	Q-257		Q-258
4	Others	Specify:				Q-259

Note: Answer and answer code: for "production cost born by" & "decision maker"

1	Land owner	2	Tenant/share cropper	3	Both	4	Other

SECTION III CROPPED AREA & PRODUCTION (Crop Year 2005/2006)

III-1 Cropped Area & Production

Write cropped area & production by land use category for last cropping season (2005/2006).

Crop		Early wet season		Wet season		Dry season	
Paddy Field							
1 Irrigated paddy	Cropped area	ha	Q-260	ha	Q-262	ha	Q-264
	Production	kg	Q-261	kg	Q-263	kg	Q-265
2 Rainfed paddy	Cropped area			ha	Q-266		
	Production			kg	Q-267		
3 Q-268 (specify)	Cropped area	ha	Q-269	ha	Q-270	ha	Q-271
4 Q-272 (specify)	Cropped area	ha	Q-273	ha	Q-274	ha	Q-275
Upland Field							
1 Q-276 (specify)	Cropped area	ha	Q-277	ha	Q-278	ha	Q-279
3 Q-280 (specify)	Cropped area	ha	Q-281	ha	Q-282	ha	Q-283

III-2 Cropping pattern (from sowing to harvest in crop year 2005/2006): nursery ---- ; planting ○ ; harvest X

Illustrate cropping pattern in a spread sheet indicate as follows:

Land Use Category	Crop	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Irrigated paddy field (Q-284)	1st rice												
	2nd rice												
	3rd rice												
	Others (specify)												
Rainfed paddy field (Q-285)	rice												
	Others (specify)												
Upland field (Q-286)	(specify)												
	(specify)												

III-3 Reason for fallow

If the household leave his farmland fallow for some period, please choose reasons by the answer code given.

1 Wet Season [ ] Q-287 2 Dry season [ ] Q-288

1	Labor shortage (busy for other works, owner became sick, etc.)	4	Flood/inundation
2	Working capital shortage	5	Others (specify)
3	Water shortage		

SECTION IV FARMING PRACTICES (practices adopted by interviewee in last year)

Write responses of interviewee by specifying or by answer code. Please ask reasons for selection of rice varieties.

IV-1 Rice

Variety

Early wet season	Q-289 (specify)	Wet season	Q-290 (specify)
Dry season	Q-291 (specify)		

Reasons for selection of the variety (specify) [ ] Q-292

Seed source [ ] Q-293 (fill in answer code)

Answering code

1. Own products	2. Exchange with others	3. Procured at local market	4. Certified seed purchased	5. Other (specify)

Seed replacement [ ] Q-294 (fill in answer code)

Answering code	1. once per 3 croppings	2. once 4 ~ 6 croppings	3. once > 6 croppings

Land preparation [ ] Q-295 (fill in answer code)

Answering code	1. Draft animal	2. Machinery	3. Manual

Fertilizer doses per season

Urea (kg/ha)		Q-296	Manure/compost (kg/ha)		Q-299
DAP (kg/ha)		Q-297	Others (specify;kg/ha)		Q-300
15-15-15 (kg/ha)		Q-298	Others (specify;kg/ha)		Q-301

No. of plants per hill in transplant in wet season		Q-302	No. of plants per hill in transplant in dry season		Q-303
Age of seedlings for transplanting in wet season		Q-304	Age of seedlings for transplanting in dry season		Q-305
Transplanting method in wet season		Q-306	Transplanting method in dry season		Q-307

Answering code for Q-306 & 307

1. Regular planting	2. Random planting

IV-2 Other crops

Seed source/upland crops, if cultivated [ ] Q-308 (Please select from answer code below)

1. Own products	2. Exchange with others	3. Procured at local market	4. Certified seed purchased	5. Other (specify)

Seed source/vegetables, if cultivated [ ] Q-309 (Please select from answer code below)

1. Own products	2. Exchange with others	3. Procured at local market	4. Certified seed purchased	5. Other (specify)

SECTION V PRODUCTION (crop year 2005/2006)

V-1 Crop Production

Note: "Production" – self-consumption = "Sold Production". The "Price" shall be average of the year.

	Commodity	Production		Sold product		Price	
1	Irrigated paddy (early wet season)	kg	Q-310	Kind: kg	Q-311 Q-312	riel/kg	Q-313
2	Irrigated paddy (wet season)	kg	Q-314	Kind: kg	Q-315 Q-316	riel/kg	Q-317
3	Irrigated paddy (dry season)	kg	Q-318	Kind: kg	Q-319 Q-320	riel/kg	Q-321
4	Rainfed paddy	kg	Q-322	Kind: kg	Q-323 Q-324	riel/kg	Q-325
5	Fruits	kg	Q-326	kg	Q-327	riel/kg	Q-328
6	Sugar Palm	kg	Q-329	Kind: kg	Q-330 Q-331	riel/kg	Q-332
7	Others (Q-324; specify)	kg	Q-333	kg	Q-334	riel/kg	Q-335
8	Others (Q-328; specify)	kg	Q-336	kg	Q-337	riel/kg	Q-338
9	Others (Q-332; specify)	kg	Q-339	kg	Q-340	riel/kg	Q-341

V-2 Livestock & Fish

Note: Write number of livestock/poultry sold in last year, unit prices and income.

	Livestock/Fish	Sold product in last year		Price (riel/unit)		Income	
1	Cow	(no.)	Q-342	riel	Q-343	riel	Q-344
2	Cattle	(no.)	Q-345	riel	Q-346	riel	Q-347
3	Water Buffalo	(no.)	Q-348	riel	Q-349	riel	Q-350
4	Swine/Pig	(no.)	Q-351	riel	Q-352	riel	Q-353
5	Poultry	(no.)	Q-354	riel	Q-355	riel	Q-356
6	Egg	kg	Q-357	riel/kg	Q-358	riel	Q-359
7	Fish	kg	Q-360	riel/kg	Q-361	riel	Q-362

V-3 Food condition/ availability

Note: The food condition/ availability shall be chosen from the codes given in Questionnaire.

		Condition				Condition	
1	Rice		Q-363	5	Vegetables		Q-367
2	Other cereals		Q-364	6	Meat		Q-368
3	Roots and tuber crops		Q-365	7	Fish		Q-369
4	Beans		Q-366	Others(	)		Q-370
Volume of rice purchased in last one year (kg)							Q-371

Note: Answer & answer code

1. Own harvest/ product exceed the household demand	3. Purchased (or exchanged) to meet the household demand
2. Own harvest/ product is just enough to the household demand	4. Insufficient

SECTION VI POST-HARVEST, PROCESSING AND MARKETING

VI-1 Post-harvest operation of rice

Note: Write method and its ownership (Own/ Borrow/ Cooperative) if interviewee uses it, and its charge for borrowing. The codes indicated in Questionnaire shall be chosen for each processing. Write unit for borrowing charges, e.g. riel/ time, riel/hour or riel/day. In case of rice milling cost, indicate who receive rice bran.

Operation	Method		Ownership		Charge in case of borrowing	
Threshing		Q-372		Q-373		Q-374
Drying		Q-375		Q-376		Q-377
Cleaning		Q-378		Q-379		Q-380
Rice milling cost	In case rice bran received by miller				riel/ton	Q-381
	In case rice bran received by interviewee				riel/ton	Q-382

Method						Ownership	
Threshing	Code	Drying	Code	Cleaning	Code	Ownership	Code
Engine thresher	1	Dryer (machine)	1	Engine winnower	1	Own	1
Pedal thresher	2	Sun drying	2	Manual winnower	2	Borrowed	2
Manual threshing	3		3	Manual without winnower	3	Cooperative	3

VI-2 Storage and post-harvest losses of rice

Write means of storage of rice. The kind of container shall be chosen from the codes given in Questionnaire. Use of fumigant answer by code for yes or no.

Product	Kind of container		Maximum storage period	
Paddy		Q-383	months	Q-384
Rice		Q-385	months	Q-386
Use of fumigant	1. Yes 2. No	Q-387		

Bag	Code 1	Bamboo basket	Code 2	Wooden box	Code 3	Others	Code 4

VI-3 Post-harvest losses of rice

Choose the two (2) dominant post-harvest losses on the processing from the codes given in Questionnaire and write roughly estimated total post-harvest losses in % of total products.

Most dominant loss Q-388 2nd dominant losses Q-389 Total losses % Q-390

During harvesting	Code 1	At threshing	Code 2	At drying	Code 3
At Cleaning	Code 4	At storage	Code 5	At other time (specify)	Code 6

VI-4 Marketing of rice

Indicate marketing timing of rice and roughly estimated proportion (%) to the total volumes of rice sold in according to the question. Forms of sold products (dry unhusked rice/paddy; milled rice etc) and marketing destination (to whom sell products) by the codes given in Questionnaire.

Timing	1. Just after harvest	2. When cash is needed	3. When price is high	
	% of total sold	% of total sold	% of total sold	
	% Q-391	% Q-392	% Q-393	
Sold product	1. Field dried paddy	2. Sun dried paddy	3. Milled rice	Q-394
Destination	1. Rice miller in village	2. Rice miller in commune center	3. Rice miller in district center	Q-395
	4. Collector/middleman	5. Local market	6. Others (specify)	Q-396

VI-5 Marketing of other products

Indicate marketing destination of other products by choosing the codes given in Questionnaire.

Crop	Fill in answer code		Answer code & answer
Vegetable		Q-397	1. Market in village
Field Crops		Q-398	2. Market in commune center
Vegetables		Q-399	3. Market in district center
Livestock		Q-400	4. Collector/middleman
Fish		Q-401	5. Other (specify)

SECTION VII AGRICULTURAL SUPPORT SERVICES

Reponses shall be chosen from the codes given in Questionnaire.

VII-1 Extension services

Question	Answer code & answer				
Visit of extension worker	1. once per < 2 weeks	2. once per 2 weeks~1 month	3. Seldom visited		Q-402
Technical capability of extension workers	1. Sufficient	2. Not sufficient	3. No services provided		Q-403
Are you satisfied with current extension services	1. Satisfied	2. Not satisfied	3. No services provided		Q-404
What kind of extension services are needed ? (specify)					Q-405

VII-2 Rice seed supply

Question	Answer code & answer				
Procurement of wanted seeds	1. Easy	2. Difficult	3. Not possible		Q-406
Procurement of certified/quality seeds	1. Easy	2. Difficult	3. Not possible		Q-407
Seed supply timing	1. In time	2. Delayed	3. Not obtained		Q-408
Quality seed prices	1. Too expensive	2. Acceptable	3. Not purchased		Q-409

VII-3 Farm inputs supply

Question	Answer code & answer				
Procurement of wanted fertilizer	1. Easy	2. Difficult	3. Not possible		Q-410
Fertilizer supply timing	1. In time	2. Delayed	3. Not obtained		Q-411
Fertilizer prices	1. Too expensive	2. Acceptable	3. Not purchased		Q-412

VII-4 Farm credit scheme by bank, project & NGO

Question	Answer code & answer				
Access to farm credit scheme	1. Easy	2. Difficult	3. Not possible		Q-413
Timing of provision	1. In time	2. Delayed	3. Not provided		Q-414
Amount of credit	1. Sufficient	2. Not sufficient	3. Not provided		Q-415
Procedures for credit application	1. Easy	2. Difficult	3. Not possible		Q-416

SECTION VIII FARMING CONSTRAINTS AND IMPROVEMENT

VIII-1 Farming constraints (agronomic & farm management)

Ask about agronomic and farming constraints to the interviewee and indicate up to 4 constraints (maximum) in order of seriousness by consulting the answer codes given in Questionnaire.

What are serious agronomic & farm management constraints for farming ? (select plural answer)

1. Most serious Q-417 2. 2nd serious Q-418 3rd serious Q-419 4th serious Q-420

Note

Answer and answer code

1	Low yield of crops (paddy)	9	Difficulty for obtaining quality seeds
2	Crop losses due to pest & disease	10	Difficulty for purchasing fertilizers
3	Weed problem	11	Expensive farm inputs
4	Crop losses due to wild animal	12	Poor soil conditions
5	Difficulty for hiring draft animal/machinery	13	Marketing problems of products
6	Labor shortage	14	Lack of farm credit
7	Insufficient extension services	15	Others (specify)
8	Shortage of farming capital	16	Others (specify)

VIII-2 Farming constraints (physical)

Ask about physical constraints for farming to the interviewee and indicate up to 3 constraints (maximum) in order of seriousness by consulting the answer codes given in Questionnaire.

What are serious physical constraints for farming ? (select plural answer)

1. Most serious constraints Q-421 2. 2nd serious constraints Q-422 3rd serious constraints Q-423

Note

Answer and answer code

1	Irrigation water shortage in wet season	6	Lack of transportation means
2	Irrigation water shortage in dry season	7	Leveling problem of paddy field
3	Inundation/flooding	8	Others (specify)
4	Drainage problem	9	Others (specify)
5	Lack of farm road	10	Others (specify)

VIII-3 Marketing constraints

Ask about marketing constraints to the interviewee and indicate up to 3 constraints (maximum) in order of seriousness by consulting the answer codes given in Questionnaire.

1. Most serious constraints Q-424 2. 2nd serious constraints Q-425 3rd serious constraints Q-426

Answer and answer code

1	Unstable market prices of paddy/rice	7	Unstable market prices of livestock
2	Low market prices of paddy/rice	8	Low market prices of livestock
3	Limitation of market of paddy/rice	9	Limitation of market of livestock
4	Unstable market prices of other crops	10	Lack of or poor farm to market road
5	Low market prices of other crops	11	Others (specify)
6	Limitation of market of other crops	12	Others (specify)

VIII-4 Reasons for limited productivity of crops in the rice field of interviewee (not specific to last year)

Ask reasons for limited (low) productivity of crops in the rice fields of the interviewee and indicate up to 3 constraints (maximum) in order of seriousness by consulting the answer codes given in Questionnaire. Reasons should not be specific to last year but general problems faced by the interviewee.

1. Most serious constraints Q-427 2. 2nd serious constraints Q-428 3rd serious constraints Q-429

Answer and answer code

1	Drought in wet season	7	Damages caused by wild animal (rat)
2	Water shortage in dry season	8	Poor drainage
3	Shortage of farming capital	9	Flooding/inundation
4	Poor seed quality	10	Inadequate farming technologies
5	Poor soil	11	Damages caused by pest & disease
6	Limited application of fertilizer	12	Others (specify)

VIII-5 Activities/practices to improve rice productivity implemented by the interviewee in the past 3 years (plural answer)

Ask activities or practices carried out to improve rice productivity by the interviewee in the past 3 years by consulting the answer codes given in Questionnaire. Indicate all activities/practices implemented.

1.	Q-430	2.	Q-431	3.	Q-432	4.	Q-433

Answer and answer code

1	Increased fertilization doses	6	Started to use water pump for irrigation
2	Applied of compost/manure	7	Improved farming practices
3	Used quality seed (local variety)	8	Improved post-harvest practices
4	Used quality seed (high yielding variety)	9	Changed marketing methods
5	Constructed of farm pond	10	Others (specify)

VIII-6 Necessary activities to improve rice productivity in the field of the interviewee (farming & farm management; plural answer)

Ask farming or farm management activities or practices necessary for the improvement of rice productivity in the field of interviewee by consulting the answer codes given in Questionnaire. Indicate up to 4 activities/practices required (maximum) in order of degree of necessity.

1. Most required Q-434 2. 2nd required Q-435 3rd required Q-436 4th required Q-437

Answer and answer code

1	Improvement of farming practices	7	Intensive weeding
2	Use of quality seed (local variety)	8	Formation/strengthening of farmers organization
3	Use of quality seed (high yielding variety)	9	Others (specify:)
4	Use of adequate doses of fertilizer	10	Others (specify:)
5	Improved leveling of paddy field	11	Others (specify:)
6	Planting at proper time	12	Others (specify:)

VIII-7 Necessary physical works to improve rice productivity in the field of the interviewee (plural answer)

Note: Ask physical works necessary for the improvement of rice productivity in the field of interviewee by consulting the answer codes given in Questionnaire. Indicate up to 3 works required (maximum) in order of degree of necessity.

1. Most required Q-438 2. 2nd required Q-439 3rd required Q-440 4th required Q-441

Answer and answer code

1	Irrigation water supply for wet season	7	Others (specify)
2	Irrigation water supply for dry season	8	Others (specify)
3	Mitigation of inundation/flooding	9	Others (specify)
4	Drainage improvement	10	Others (specify)

SECTION IX LIVESTOCK CONSTRAINTS

Ask livestock constraints to the interviewee by consulting the answer codes given in Questionnaire. Indicate up to 3 constraints in order of degree of seriousness.

1. Most serious constraints Q-442 2. 2nd serious constraints Q-443 3rd serious constraints Q-444

Answer and answer code

1	Low productivity	6	Insufficient veterinary services
2	Shortage of feed	7	Insufficient extension services
3	Low or unstable market prices	8	Difficulty in obtaining good breed
4	Market availability	9	Others (specify)
5	Losses due to diseases	10	Others (specify)

SECTION X EXPECTATIONS

Ask expectations of the interviewee on agronomic & farm management, farming system, physical aspects. And agricultural support services by consulting the answer codes given in Questionnaire. Indicate up to 3 responses in order of degree of expectation or requirement.

X-1 Farming (agronomic & farm management)

1. Most required Q-445 2. 2nd required Q-446 3rd required Q-447

Answer and answer code

1	Productivity improvement of wet season rice	6	Increasing livestock holding size & production
2	Productivity improvement of dry season rice	7	Increasing poultry holding size & production
3	Productivity improvement of field crops	8	Strengthening or formation of farmers organizations
4	Productivity improvement of vegetables	9	Improvement of post-harvest operation
5	Productivity improvement of livestock/poultry	10	Others (specify)

X-2 Farming (farming system)

1. Primarily intended Q-448 2. 2nd intended Q-449 3rd intended Q-450

1	Double cropping of rice	3	Multiple farming (crop + livestock etc.)
2	Stable single cropping of rice	4	Crop diversification

X-3 Farming (physical)

1. Most required Q-451 2. 2nd required Q-452 3rd required Q-453

Answer and answer code

1	Adequate (volume/timing) irrigation water supply in wet season	6	Drainage improvement
2	Adequate (volume/timing) irrigation water supply in dry season	7	Leveling of paddy field
3	Mitigation of inundation & flooding	8	Others (specify)
4	Construction/rehabilitation of farm road	9	Others (specify)
5	Construction/rehabilitation of farm to market road	10	Others (specify)

X-4 Agricultural support services

1. Most required Q-454 2. 2nd required Q-455 3rd required Q-456

Answer and answer code

1	Field Extension services (demonstration / field guidance)	6	Provision of market information
2	Provision of quality seed	7	Provision of farm credit
3	Farmer training (technical & host-harvest operation)	8	Provision of fertilizer
4	Farmer training (organization, marketing, farm management)	9	Others (specify)
5	Support to organize farmers	10	Others (specify)

SECTION XI PARTICIPATION IN AGRICULTURAL SUPPORT/PROJECT ACTIVITIES IN THE PAST

Please tell us about your participation or involvement in agricultural support or project activities in the past 3 years

Activities/Project/Program	Year	Implementation/Support Organization	
1.			Q-457
2.			Q-458
3.			Q-459
4.			Q-460
5.			Q-461
6.			Q-462

PART 3 IRRIGATION/DRAINAGE & WATER MANAGEMENT

SECTION I PARTICIPATORY AWARENESS LEVEL FOR THIS PROJECT

Note: Choose or write about participatory awareness level for this project. If the interviewee chooses "No", write its reason.

1	To participate to construction of on-farm irrigation facilities		
	Construction works (Earthworks, concreting-works: small bridge, lining of canal, etc.)	Y / N	Q-500
	If "No", what is the reason?		Q-501
	Carrying works of construction materials	Y / N	Q-502
	If "No", what is the reason?		Q-503
	Assistance works (measurement, etc.)	Y / N	Q-504
	If "No", what is the reason?		Q-505
	Sharing the construction cost (payment by installments in long term)	Y / N	Q-506
	If "No", what is the reason?		Q-507
	Donation of local materials for construction (gravel, ballast, sand, etc.)	Y / N	Q-508
	If "No", what is the reason?		Q-509
	Donation of equipment for construction works (spade, shovel, etc.)	Y / N	Q-510
	If "No", what is the reason?		Q-511
	Donation of draft animals (cow, horse, etc.)	Y / N	Q-512
	If "No", what is the reason?		Q-513
2	To be a member of FWUC	Y / N	Q-514
	If "No", what is the reason?		Q-515
3	To participate in FWUC meeting	Y / N	Q-516
	If "No", what is the reason?		Q-517
4	To pay water charge by cash		Q-518
	If "Yes", how much can you pay per year?	riel/year	Q-519
	If "No", could you pay it by crops (rice, vegetable, fruit, etc)	Y / N	Q-520
	If "No", what is the reason?		Q-521
5	To pay member fee of FWUC	Y / N	Q-522
	If Yes, how much can you pay per year?	riel/year	Q-523
	If "No", could you pay it by crops (rice, vegetable, fruit, etc)	Y / N	Q-524
	If "No", what is the reason?		Q-525
6	To participate to maintenance of irrigation facilities		
	Desilting	Y / N	Q-526
	If "No", what is the reason?		Q-527
	Weeding	Y / N	Q-528
	If "No", what is the reason?		Q-529
	Repairing	Y / N	Q-530
	If "No", what is the reason?		Q-531
7	To participate to operation of irrigation facilities		
	Gate operation	Y / N	Q-532
	If "No", what is the reason?		Q-533
	Water distribution	Y / N	Q-534
	If "No", what is the reason?		Q-535

SECTION II NEGATIVE EFFECT

Note: Choose negative effect specified by the interviewee. The question XIII-1 is only for farmer who cultivate land on reservoir. As the project can't promise to compensate at this moment, do not explain to farmer to compensate for their loss.

Note: 1-3: If interviewee chooses "Not accept", write its reason. If interviewee chooses "Need compensation", choose their request for compensation. 4: If interviewee chooses "Not accept", write its reason.

1	To a deeper inundation depth (If this farmer plant on reservoir area)	1 Not accept	2 Need compensation	3 No choice	4 No problem	Q-536
	If he/she chooses "1 Not accepts", write reason of it.	Reason:				Q-537
	If he/she chooses "2 Need compensation", what does he/she want to compensation?	1 Money	2 Other land	3 Both	4 Others	Q-538
2	To loss of present cultivation on reservoir area and/or canal	1 Not accept	2 Need compensation	3 No choice	4 No problem	Q-539
	If he/she chooses "1 Not accept", write reason of it.	Reason:				Q-540
	If he/she chooses "2 Need compensation", what does he/she want to compensation?	1 Money	2 Other land	3 Both	4 Others	Q-541
3	To loss of your land for irrigation facilities	1 Not accept	2 Need compensation	3 No choice	4 No problem	Q-542
	If he/she chooses "1 Not accept", write reason of it.	Reason:				Q-543
	If he/she chooses "2 Need compensation", what does he/she want to compensation?	1 Money	2 Other land	3 Both	4 Others	Q-544
	Do you think illegal to cultivate on reservoir and/or canal?	1 Yes	2 No			Q-545
4	To a lower drinking water quality by application of fertilizer and chemicals	1 Not accept	2 Need other drinking water source	3 No choice	4 No problem	Q-546
	If he/she chooses "1 Not accept", write reason of it.	Reason:				Q-547

SECTION III IRRIGATION, WATER MANAGEMENT & FARMERS WATER USERS COMMUNITY (FWUC)

Note: Fill in Questionnaire Sheet according to the instructions given in the Sheet

III-1 Source of irrigation water and method of irrigation to your paddy field

1. What is the source of water for your paddy field? (Please choose from answer code below) [ ] Q- 548

1. Only rainfall	2. Mainly rainfall but sometime canal water	3. Mainly from canal but rainfall too

2. Do you take water from canal for rice cultivation by gravity or pumping ? (Please choose from answer code below) [ ] Q- 549

1. Take water by gravity	2. Take water by pumping	3. Take water by both gravity & pumping

3. Irrigation method you apply [ ] Q- 550

1. Intermittent irrigation	2. Continuous flow/irrigation

4. When do you take water for irrigation ? (select from below, plural answer is allowed) [ ] Q- 551

1. Throughout the growing season	2. For land preparation	3. For transplanting
4. Initial tillering stage	5. During flowering stage	6. At maturing stage

5. If you irrigate water intermittently, what is the reason? (select from below) [ ] Q- 552

1. The canal has water only some time	2. Not necessary continuous irrigation because rainfall is enough
3. Operation cost of pump is too high to operate pump frequently	4. Saving irrigation water for obtaining more production.
5. A rule of FWUC or requested by community or government agency	

7. Do you think you can take water from canal enough for paddy? (select from below) [ ] Q- 553

1. Enough for one season paddy growing, because supported by canal & rainfall	2. Not enough

8. Do you know the recent rice cultivation system "SRI (System for Rice Intensification)" [ ] Q- 554

1. Yes, very well and interested	2. Yes, but not interested	3. No

9. “SRI” is a newly introduced program in Cambodia to get more paddy production by saving water and chemical fertilizer. Are you interested “SRI”? Answer by (1. Yes 2. No) [ ] Q- 555

10. If you answer "No", why you are not interested with? (plural answer is allowed) [ ] Q- 556

1. Never seen a farmer applying “SRI”	2. Not receive technical guidance about “SRI” yet
3. Not have a canal to control water by yourself. (SRI requires frequent water control in the paddy field)	
4. Other reasons, please specify	

III-II About FWUC

	Question	Answer code & answer				
1	Are you a member of FWUC	1. Yes	2. No	3. Not know		Q-557
2	Do you know the name of FWUC you belong	1. Yes	2. Not know	3. No name		Q-558
3	Do you know the name of FWUC chairman you belong	1. Yes	2. Not know			Q-559
4	Do you know the intended functions of FWUC	1. Yes	2. Not know			Q-560
5	Do you know the FWUC activities carried out in the last 1 year	1. Yes	2. Not know			Q-561
6	Did you attend the FWUC general members meeting of last year	1. Yes	2. No	3. Not held		Q-562
7	In what FWUC activities did you attend last year; please specify	1.	2.	3.		Q-563
8	Did you pay irrigation fee in last year; if yes how much	1. Yes	2. No	3. No fee charged		Q-564
		riel/ha				Q-565
9	Expectations for FWUC					Q-566

SECTION IV FLOOD DAMAGE

Note: Fill in Questionnaire Sheet according to the instructions given in the Sheet

1. Do you suffer from flood damage? Q- 567

1. YES	2. No

If you select 'Yes',

2. How often do you suffer from flood in a year Q- 568

1. Once a year	2. Twice a year	3. 3 times a year	4. 4 times or more a year

3. How many days does one flood continues on average? Q- 569

1. 1 day	2. 2 days	3. 3 days	4. 4 days or more

4. How do the floods damage you? (multiple answers are allowed) Q- 570

1. Paddy	2. Vegetable Field	6. Large Livestock e.g. Buffalo, Cow	5. Poultry	4. Fish
3. Household Goods e.g. House, Motorcycle	7. Family's Life	8. Others ( )		

Questionnaire (Crop Budget)

PART IV CROP BUDGET ANALYSIS ON RICE PRODUCTION

Note: To collect information for crop budget analyses on rice production from 60 representative farmers selected from the sample farmers of this Questionnaire Survey, by using the survey sheet on next page. No. of samples for each cropping season are as follows;

Cropping Season	Sample No.
Wet season rice	30 samples
Early wet season rice	15 samples
Dry season rice	15 samples

Sample No.	Commune:	Village:	Enumerator:
Land Use Category	1. Roleng Chrey (sufficient)	2. Roleng Chrey (insufficient)	3. Small Scale Irrigation
	4. Rainfed Paddy Field	Serial sample No. in a subject land use category:	/ 15 samples
Commodity	1. Irrigated Rice/Wet Season	2. Irrigated Rice/Dry Season	3. Rainfed Rice

I. Gross Return

Items	Per Farm				Per Ha			Remarks
	Unit	Unit Price (riel)	Quantity	Amount (1000riel)	Unit	Quantity	Amount (1000riel)	
Planted Area	ha	—		—	ha	1.0	—	
Harvested Area	ha	—		—	ha	1.0	—	
Production								
- Dry unhusked rice	kg				kg/ha			
- Milled rice	kg				kg/ha			
Gross Return	—	—	—		—	—		

II. Production Costs - 1/2

Items	Per Farm				Per Ha			Remarks
	Unit	Unit Price (riel)	Quantity	Amount (1000riel)	Unit	Quantity	Amount (1000riel)	
1. Farm Inputs	—	—	—		—	—		Variety:
Seed	kg				kg/ha			Seed source:
Fertilizer	—	—	—		—	—		
1st Dressing								
Urea	kg				kg/ha			
DAP	kg				kg/ha			
KCl	kg				kg/ha			
Compost	kg				kg/ha			
Others	kg				kg/ha			
2nd Dressing								
Urea	kg				kg/ha			
( )								
( )	kg				kg/ha			
3rd Dressing								
Urea	kg				kg/ha			
( )	kg				kg/ha			
( )	kg				kg/ha			
Agro-chemicals	—	—	—		—	—		
( )	kg				kg/ha			
( )	kg				kg/ha			
( )	lit				lit/ha			
( )	lit				lit/ha			
2. Land Preparation	—	—	—		—	—		
Draft Animal	animal day			—	animal day		—	a pair of animal day
Tractor	tractor day			—	tractor day		—	Working hours/day:
3. Pumping Irrigation Costs	times				times/ha			times/season
4. Other Materials	—	—	—		—	—		
( )					/ha			
( )					/ha			
( )					/ha			

Sample No.	Commune:	Village:	Enumerator:
Land Use Category	1. Roleng Chrey (sufficient)	2. Roleng Chrey (insufficient)	3. Small Scale Irrigation
	4. Rainfed Paddy Field	Serial sample No. in a subject land use category:	/ 15 samples

II. Production Costs - 2/2

Items	Per Farm				Per Ha			Remarks
	Unit	Unit Price (riel)	Quantity	Amount (1000riel)	Unit	Quantity	Amount (riel)	
5. Other Costs								
Land Rent	riel				riel/ha			
Land Tax	riel				riel/ha			
Irrigation Fee	riel				riel/ha			
Interest	riel				riel/ha			
6. Hired Labor Costs								
Male	man-day							Working hours/day:
Female	man-day							Working hours/day:
Production Costs	—	—	—		—	—		

III. Net Return

Net Return	**Per Farm**		**Per Ha**		

Labor Requirements & Costs

Farming Activities	Unit	Hired Labor			Family Labor (man-day)	Total Requirement (man-day)	Remarks
		Quantity (man-day)	Unit Price (riel)	Amount (1000riel)			
Nursery	Male						
	Female						
Land Preparation	Male						
	Female						
Transplanting	Male						
	Female						
Fertilization	Male						
	Female						
Chemical Spray	Male						
	Female						
Weeding	Male						
	Female						
Water Management	Male						
	Female						
Harvesting	Male						
	Female						
Threshing	Male						
	Female						
Transportation	Male						
	Female						
Drying	Male						
	Female						
Other Works	Male						
	Female						
Labor Requirements & Costs	Male						
	Female						
	Total						

Appendix-IIIB

AGRICULTURE

THE STUDY
ON
COMPREHENSIVE AGRICULTURAL DEVELOPMENT
OF
PREK THNOT RIVER BASIN
IN
THE KINGDOM OF CAMBODIA

FINAL REPORT

Volume-VII: Appendixes for Feasibility Studies for Priority/Urgent Projects

Appendix-IIIB

Agriculture

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APPENDIX-IIIB: AGRICULTURE

Chapter IIIB-1 Present Condition of Agriculture

IIIB-1.1 Soils

(1) General

The Project Area is the command area of the upper south main canal irrigation system of the Rorean Chery headwork and is situated close to the headwork in the right bank of the Prek Thnot River. The Area is rice fields in the command area of the system and the area extent is 600 ha in gross.

Administratively, the Area is located in Kahaeng Commune of Samraong Tong District and Kandal Dom and Svay Kravan Commune of Chbar Mon District. The numbers of project villages[1] are 6 in Kahaeng Commune, 7 in Kandal Dom Commune, 5 in Svay Kravan Commune and 18 villages in total.

The soil investigations in the Project Area of 600 ha of rice fields were made by using the topographic map (scale: 1/10,000) prepared by the Master Plan Study as a base map. The field observations and descriptions of soil profiles were carried out at 41 sites by way of auger boring because all the rice fields in the Area were inundated for rice cultivation.

(2) Soil Distribution and Characteristics

The soils distributed in the Area are classified following the FAO classification system applied in the CNMC (Cambodian National Mekong Committee) soil map and classified at soil phase level by considering soil properties important for agriculture such as surface soil texture and effective soil depth as the method applied in the Master Plan Study. The soils in the Area are classified into four soil types of Gleyic Acrisol Coarse to Medium Textured Phase (Soil Taxonomy: Ultisols), Gleyic Acrisol Coarse to Medium Textured Phase, Gleyic Acrisols Medium to Fine Textured Phase and Gleyic Acrisol Coarse Textured Phase as shown in Figure IIIB-1.1.1. The distributions of the soils in the Area are shown in the following table.

Soil Distribution in the Project Area

Soil Type	Distribution (ha)	Distribution (%)
Gleyic Acrisol Coarse to Medium Textured Phase (GAm1)	327	54.5
Gleyic Acrisol Medium Textured Phase (GAm2)	129	21.5
Gleyic Acrisol Medium to Fine Textured Phase (GAf)	143	23.9
Gleyic Acrisol Coarse Textured Phase (GAc)	1	0.2
Total	600	100

Source: JICA Study Team

Soils found in the Area are almost exclusively having medium textured (SL) surface layers underlain with finer textured sub-soils, however, the distribution of limited extent of soils with medium to fine or coarse textured surface soils are also identified. The distributions and characteristics of the soils are discussed in the following sub-clauses.

(a) Gleyic Acrisol Coarse to Medium Textured Phase (mapping symbol: GAm1)

The soils are distributed most extensively in the Area. Their distribution accounts for 327 ha or 54.5 % of the Area. The soils correspond to Prey Khmer Soil according to the classification system of CARDI.

The soils are developed on the old and recent alluvial terraces and have coarse to medium

[1] Villages having their lands in the Project Area

textured surface layer (LS~SL) underlain with finer sub-surface layer (SL to SCL) and fine textured sub soils (SCL to SC). The surface soils are highly weathered and have weak cohesion capacity because of leaching out of cementing materials as base, organic matter and silica. Accordingly, the soils are very friable when moist and quite easy to crash by fingers. The effective depth of the soils is deep and plinthite concretions are found in sub-soils at different depth. The descriptions of the typical soil profiles are presented in Attachment IIIB-1.

(b) Gleyic Acrisol Medium Textured Phase (mapping symbol: GAm2)

The soils are distributed to the extent of 129 ha or 21.5 % of the Area. The soils correspond to Prey Khmer Soil according to the classification system of CARDI.

The soils have similar soil profiles to Gleyic Acrisol Coarse to Medium Textured Phase and difference between the two soil types is surface soil texture. GAm2 has finer sandy loam (SL) to sandy clay loam (SCL) compared with loamy sand (LS) to sandy loam (SL) texture of surface soil of GAm1. The sub-soils have finer sub-surface soils (SCL~SC) and fine textured sub soils (SC). The surface soils are highly weathered and have weak cohesion capacity because of leaching out of cementing materials as base, organic matter and silica. Accordingly, the soils are very friable when moist and quite easy to crash by fingers. The effective depth of the soils is deep and plinthite concretions are found in sub-soils at different depth. The descriptions of the typical soil profiles are presented in Attachment IIIB-1.

(c) Gleyic Acrisol Medium to Fine Textured Phase (mapping symbol: GAf)

The soils are distributed to the extent of 143 ha or 23.9 % of the Area. The soils correspond to Prey Khmer Soil (fine textured phase) according to the classification system of CARDI.

The soils have medium to fine textured surface layer (SiL~SiCL) underlain with finer sub-surface layer (SiCL~C) and fine textured sub soils (SiC to C). The surface soils are highly weathered and have weak cohesion capacity because of leaching out of cementing materials as base, organic matter and silica. Accordingly, the soils are friable when moist and easy to crash by fingers. The effective depth of the soils is deep and plinthite concretions are found in sub-soils at different depth. The descriptions of the typical soil profiles are presented in Attachment IIIB-1.

(d) Gleyic Acrisol Coarse Textured Phase (mapping symbol: GAc)

The distribution of the soils is negligibly limited to the southern end of the Project Area and is in 1 ha or 0.2 % of the Area.

The soils have coarse textured (S~LS) surface and sub-surface layer. The soils may correspond to Prey Khmer Soil (fine textured phase) according to the classification system of CARDI. The descriptions of the typical soil profiles are presented in Attachment IIIB-1.

(3) Soil Chemical Properties

Aiming at examining chemical properties of the major soils, soil chemical analyses were conducted on 12 samples taken at sites distributed with the major soils as shown in the following table.

Soil Sampling for Analysis

Soil Type	Soil Depth	
	0 – 10 cm	10 – 20 cm
Gleyic Acrisol Coarse to Medium Textured Phase (GAm1)	2 samples	2 samples
Gleyic Acrisol Medium Textured Phase (GAm2)	2 samples	2 samples
Gleyic Acrisol Medium to Fine Textured Phase (GAf)	2 samples	2 samples
Total	6 samples	6 samples

The results of the analyses are presented in Table IIIB-1.1.1 and summarized in the following table.

Chemical Properties of Surface Soils 1/

Soil Type	pH (H_2O)	Total N (%)	Total P_2O_5 (%)	Available P_2O_5 (ppm)	CEC (meq/ 100g soil)	Exchangeable Cation (meq/100g soil)		
						Ca	Mg	K
GAm1	5.8	0.07	0.03	17	8.5	2.9	1.9	0.1
GAm2	5.1	0.04	0.01	21	9.0	3.4	2.4	0.1
GAf	5.9	0.04	0.01	44	10.3	1.8	1.3	0.4

1/: Soil depth 0 – 10cm; Average of 2 samples *Source: JICA Study Team*

As shown in the tables, the surface layers of the major soils have: i) slight acid reaction, ii) very low content of N & C, iii) low CEC & dystric exchangeable bases saturation and iv) low content of exchangeable Ca, Mg & K. However, the soil analyses indicate high content of available P_2O_5 in both surface and sub-surface layers of all the soils.

(4) Land Suitability

The land suitability classification of the Project Area for annual crop production has been made by applying simplified method of the system proposed in the Framework for Land Evaluation (FAO, 1976) as employed in the Master Plan Study. The results of the land suitability classification of the soils in the Area are summarized in the following table.

Land Suitability Classification of the Soils in the Project Area

Soil Type	Land Suitability Classes	Distribution	
		(ha)	(%)
Gleyic Acrisol Coarse to Medium Textured Phase (GAm1)	S3	327	54.5
Gleyic Acrisol Medium Textured Phase (GAm2)	S2	129	21.5
Gleyic Acrisol Medium to Fine Textured Phase (GAf)	S2	143	23.9
Gleyic Acrisol Coarse Textured Phase (GAc)	S3C	1	0.2
Total		600	100

Source: JICA Study Team

As shown in the table, 45.5% of the Project Area (distributed with Gleyic Acrisol Medium Textured Phase and Gleyic Acrisol Medium to Fine Textured Phase) are classified as moderately suitable (S2) for crop production, 54.5% of the Area (distributed with Gleyic Acrisol Coarse to Medium Textured Phase) as marginally suitable (S3) and 0.2% of the Area (distributed with Gleyic Acrisol Coarse Textured Phase) as critical (S3C).

IIIB-1.2 Land Use

The land use of the project villages shown in Table IIIB-1.2.1 indicates that rice field of 785 ha is almost exclusive farm land in the villages as follows;

Present Land Use in Project Villages

	Rice Field		Upland Area 1/		Others 2/		Total	
	Area (ha)	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**
Project Villages	785	66	20	2	378	32	1,183	100

1/: Not including villages in Kahaeng commune, 2/: Including village yard & others

Source: DAO ChbarMon/Kahaeng Commune

The Project Area is irrigated rice fields with a gross area of 600 ha and a net area of 580 ha. On the basis of the detail irrigation survey conducted by the Study Team, the Area can be classified based on current irrigation status into 2 categories of irrigated rice fields of: i) fields irrigable for only a single cropping of rice and ii) fields irrigable for double cropping of rice as shown in the table below.

Present Land Use (irrigation Status)

Category	Area (ha)	Proportion (%)	
		To Net	To Gross
Fields irrigable for single cropping of rice	377	65	63
Fields irrigable for double cropping of rice 1/	203	35	34
Sub-total (net area)	580	100	97
Right of ways	20	-	3
Total	600 ha	-	100

1/: Including negligible extent of triple cropped area of 2ha *Source: JICA Study Team*

IIIB-1.3 Agro-demography and Land Tenure and Holding

(1) Agro-demographic Features

The agro-demographic features of the project villages examined based on the secondary data provided by the commune offices and village-wise data of SEILA Commune Data Base 2005 are presented in Table IIIB-1.3.1 and summarized in the following table.

Agro-demographic Features of the Project Villages

Items	Features
No. of Households (total)	1,982
No. of Farm Households	1,202
% of Farm Households to Total Households	61
%. of None Farm Households	39
Total Population	10,205
Average Family Size	5.1
Working Population (15 ~ 64 years old)	6,111
Working Population/ Household (15 ~ 64 years old)	3.1

Source: Project commune offices & SEILA Commune Data Base, 2004

As shown, farm households in the project villages account only for 61% of the total households and none-farm households are estimated at 31% of the total as the 2 communes in Chbar Mon, Kandal Dom and Svay Kravan, are categorized as “urban” in SEILA data base. Average family size is 5.3 members and working population is estimated at 3.1 persons/ household.

(2) Land Tenure and Land Holding in the Target Area

The access to data/information on land tenure was rather limited in the present Study. However, on the basis of the land use and agro-demographic data (Table IIIB-1.2.1 & 1.3.1) land holding status of the project villages are estimated as follows;

Holding Features of the Project Villages

Indicator	Features
No. of Households (total)	1,982
No. of Farm Households (No. of crop producing households)	1,202
Total Paddy Field in Project Communes	785
Average Paddy Field Holding Size per Farm Household	0.65 ha

Source: Project commune offices

As shown in the table, an average holding size of rice fields of farm families in the project villages is estimated at 0.65 ha. Holding size of upland field is estimated to be negligibly limited from the land use features of the project villages.

While, the results of the Socio-economic Survey conducted by the JICA Study Team indicate the land holding status in the Project Area as follows;

Holding Status of Rice Field of Sample Farmers 1/

Land Type	No. of Respondent		Total Area (ha)	Average (ha) per		Range (ha)
	No.	%		Respondent	Sample	
Irrigated Rice Field.	100	100	61.2	0.60	0.60	0 - 4.5
Rainfed Rice Field	36	36	24.0	0.63	0.24	0 - 2.5
Total	-	-	85.2	-	0.84	-

1/: Socio-economic Survey by the JICA Study team, 2006; sample No. 100

As shown in the table, an average holding sizes of irrigated rice field and total rice field are roughly estimated at around 0.60 ha and 0.84 ha in the Area, respectively. The results show about 30% larger holding size of rice field compared with the average of the project villages.

Holding size of upland field is estimated to be negligibly limited to an average of 0.01 ha per farm in the Area based on the results of the Survey as follows;

Holding Status of Upland Field of Sample Farmers 1/

Land Type	No. of Respondent		Total Area	Average per	
	No.	%		Respondent	Sample
Upland Field for Field Crop Prod.	2	2%	0.7	0.33	0.01
Upland Field for Fruit Production	1	1%	0.01	0.01	0.00
Total	-	-	0.71	-	0.01

1/: Socio-economic Survey by the JICA Study team, 2006; sample No. 100

The same results indicate that 98% of the sample farmers in the Area are owner operator and tenancy arrangement of farm land is seldom practiced as shown below.

Land Tenure Status of Sample Farmers

Land Tenure Status	No. of respondent	Proportion
Owner Operator	98	98 %
Owner-cum-tenant or -sharecropper	2	2 %
Total	100	100 %

Source: Socio-economic Survey by the JICA Study team, 2006

IIIB-1.4 Crop Production in Rice Fields (Project Area)

(1) General

Rice production is the exclusive crop production activities in the Project Area and 100% of rice fields are utilized for the rainy season rice cultivation. However, rice cultivation in the early rainy season is rather limited due to limitation of irrigation water availability. The same in the dry season is further limited and mainly practiced using residual water in canals or drains and poorly drained areas. The rice production in the Area could be characterized by rather low productivity even in irrigated fields and prolonged rainy season rice cultivation period continuing form May to January with the cultivation of rice varieties of different growth durations of early to late. Further, traditional farming practices adapted to the agro-climatic conditions is another characteristic of the rice production in the Area

(2) Cropping Season and Rice Variety

Cropping seasons in Cambodia are generally defined into two seasons of rainy season and dry season. The rainy season, predominant cropping season, lasts from May to October and the dry season is from November to April. However, the rice cropping seasons in the Project Area could better be differentiated into: i) early rainy season rice planted in May, ii) rainy season rice planted from July to August and iii) very limited dry season rice planted from January to February.

Rice varieties in the country are classified into photosensitive early rice, medium rice and late rice cultivated in rainy season and non-photo sensitive rice cultivated both in dry and rainy season. Current predominant rice variety grown in the Area is medium rice in the rainy season and non-photosensitive early rice in the dry or early rainy season. A number of photosensitive local varieties with growth duration of 4 to 5 months are cultivated in the rainy season. Major varieties in the Area include Riang Chey (medium improved local variety or late medium variety), Phka Mulis (medium local variety) and Neang Ming (late local variety). The predominant early variety cultivated in the dry and early rainy season is IR 66 and other early rice varieties grown include IR 36 and Sen Pidao, promising early variety recently released by CARDI.

As stated earlier, a number of rice varieties are cultivated in and around the Area and cropping seasons vary depending on varieties grown. Local varieties other than those selected by CARDI are called by local names and same varieties might be named differently depending on locations. Currently cultivated traditional local varieties appear to have been selected by farmers in the past and have some characteristics suited to local agro-climatic conditions such as drought tolerance and tolerance to inundation.

(3) Cropping Calendar and Pattern

Cropping calendars in the Area are diversified depending on locations affected by the seasonal availability of irrigation water supply and divided into three seasons of early rainy season cropping (May to June/July), rainy season cropping (July/August to December) and limited dry season cropping (January/February to March/April). The prevailing cropping patterns in the Area are depending on irrigation water availability and categorized into a single cropping of rice and double cropping of rice as illustrated in Figure IIIB-1.4.1 and as shown below.

Prevailing Cropping Patterns in the Project Area

Cropping Pattern		Area (%)
Rice single cropping	Rainy season rice – fallow	377 ha (65)
Rice double cropping	Early rainy season rice - rainy season rice - fallow	203 ha (35)
Total	-	580 ha (100)

Source: JICA Study Team

Cultivation of vegetables in rice fields is practiced to a negligible extent in the dry season from December to April. Major vegetable grown include string beans, gourd and taro.

(4) Cropped Area and Cropping Intensity

The current cropped area and cropping intensity of rice in the Project Area have been estimated on the basis of the detail irrigation survey and the results of the Socio-economic Survey conducted by the Study Team and the secondary data collected at the project commune offices as shown in Table IIIB-1.4.1 and summarized in the following table.

Estimated Cropped Area and Cropping Intensity of Rice in the Project Area

Land Use Category	Area (ha) (net)	Indicator	Cropped Area & Intensity		
			ERS	RS	Annual
Fields irrigable for single cropping of rice	377	Cropped Area (ha)	0	377	377
		Cropping Intensity (%)	-	100	100
Fields irrigable for double cropping of rice	203	Cropped Area (ha)	203	203	406
		Cropping Intensity (%)	100	100	200
Project Area	580	Cropped Area (ha)	203	580	783
		Cropping Intensity (%)	35	100	135

As shown in the table, the current annual cropped area and cropping intensity of rice in the Area is respectively estimated at 783 ha and 135%. The seasonal features are respectively estimated at 203 ha and 35% in the early rainy season and 580ha and 100% in the rainy season.

(5) Paddy Yield and Production

Unit yields of paddy in the Project Area are estimated based on the Socio-economic Survey, the secondary data collected at the project commune offices and the statistic data of MAFF and PDA as shown in Table IIIB-1.4.2 and as summarized in the table below.

Estimated Present Paddy Yields in the Project Area

Season	Variety	Estimated Yield
Early rainy season rice	Early variety of rice	2.4 ton/ha
Rainy season rice	Medium/late variety of rice	2.3 ton/ha
Dry season rice	Early variety of rice	2.4 ton/ha

Source: Shown in Table IIIB-1.4.2.

Paddy yield levels in the Area are estimated at 2.4 ton/ha for the early rainy and dry season rice and 2.3 ton/ha for the rainy season rice as shown in the tables.

Annual production of paddy in the Area is estimated at 1,821 tons applying the estimated cropped area and yields as follows;

Estimated Annual Paddy Production in the Project Area

Season	Cropped Area (ha)	Yield (ton/ha)	Estimated Production (ton)
Early rainy season rice	203	2.4	487
Rainy season rice	580	2.3	1,334
Annual	783	-	1,821

Source: JICA Study Team

(6) Cropped Area and Production of Paddy by Irrigation Category

The cropped area and production of paddy by irrigation category is shown in Table IIIB-1.4.3 and summarized below.

Cropped Area and Production of Paddy by Irrigation Category

Irrigation Category	Area (ha)	Season	Cropped Area (ha)	Estimated Production
Gravity Irrigation Area	306	Early Rainy	107	257
		Rainy	306	703
Gravity/Pumping Irrigation	190	Early Rainy	67	161
		Rainy	190	437
Pumping Irrigation	84	Early Rainy	29	70
		Rainy	84	193
Total	580	-	783	1,821

Source: JICA Study Team

(7) Crop Losses

Because of unstable rainfall distribution and limitation of water resources for irrigation, rice production in the Project Area remains at low level and unstable. The information on crop losses in the rainy season from 2003 to 2006 in the Area are presented in Table IIIB-1.4.4 and summarized in the following table.

Rice Crop Losses in the Rainy Season in the Project Area

Causes	2004 Rainy Season		Average of 2003 – 2006	
	Area Completely Destroyed	Proportion to Cropped Area	Area Completely Destroyed	Proportion to Cropped Area
Drought	111 ha	15 %	47 ha	6 %
Flood	0 ha	-	1 ha	0.1 %
Pest & Disease	12 ha	2 %	8 ha	1 %
Total	123 ha	17 %	55 ha	7 %

Source: Project Commune Offices

As shown in the tables, complete crop losses in 2004 (2004/05 rainy season crop) due to drought were reported to be at around 15 % in the project villages.

Further, according to the results of the Socio-economic Survey, about 80 % of sample farmers reported the occurrence of seasonal inundation in the rainy season, which bring about adverse effects to rice production in the season. However, the information on crop losses indicates that the seasonal inundation might not result in serious damage to rice production in the Area.

IIIB-1.5 Prevailing Farming Practices

Prevailing farming practices in the Project Area have been studied through the Socio-economic Survey, the operation of verification cum demonstration plots (Pilot Project) in the Area and the information provided by PDA. The identified prevailing farming practices by cropping season are presented in Table IIIB-1.5.1 and Attachment IIIB-2 (results of the Socio-economic Survey) and are explained in the following

sub-clauses.

(1) Land Preparation

Land preparation is mostly done by a pair of draft animal. However, the use of a hand tractor is also introduced and will be expanded in the future. Prevailing practices are 2 plowing & 1 harrowing, however, performance of land leveling appears to be insufficient.

(2) Variety, Seed Sources & Replacement, Nursery

Cultivation of photosensitive local varieties is prevailing in the rainy season while cultivation of non-photosensitive improved early varieties is almost exclusively carried out in the early rainy and dry season. Major varieties in the rainy season include Riang Chey, Phka Mulis and Neang Ming and the same in dry season is IR 66, IR 36 and Sen Pidao. Primary seed sources are own products of a previous season and use of quality or certified seed is very limited. Frequency of seed replacement is depending on farmers but once per 3 seasons of cropping appears to be the most common practice according to the Socio-economic Survey.

Seeding rate is high at around 70 kg/ha on average (range: 23 ~ 133 kg/ha) in rainy season and 60 kg/ha (25 ~ 88 kg/ha) in early rainy season, however, substantial differences in seeding rate among farmers are noticed

Age of seedlings for transplanting is 1 to 1.5 months for local varieties and 20 days to 1 month for early variety.

(3) Transplanting

Random transplanting is almost exclusive transplanting method. Planting distance of 25x 25 or less is a common practice for local varieties and 20 x 20 cm or more is a prevailing practice for early varieties. 4 to 5 plants/hill is for local varieties in the rainy season and 2 to 3 plants/hill for early variety in the dry season is prevailing practices. Labor exchange is common practices employed in transplanting works.

(4) Fertilization

Application of manure or compost is a common practice in the Area and an average dosage of 1.8 ton/ha is reported in the Socio-economic Survey. However, qualities of such organic fertilizers are unknown and application timing is sometimes not appropriate. Fertilization of Urea and DAP is commonly practiced. DAP is for basal dressing and urea is for basal and top dressing. Potassium fertilizer is not available in the project district and seldom applied. The results of the Socio-economic Survey indicate a total dosage per season of about 60 kg/ha of DAP, 60 ~ 70 kg/ha of Urea and in total of 130 to 140 kg/ha. Top dressing of urea at around the panicle initiation stage is a common practice. However, substantial differences in fertilization volume among farmers are noticed

(5) Irrigation & Field Management

Continuous flooding is a prevailing practice for irrigation or on-farm water management. However, rice field is usually kept at saturated moisture content or at shallow water depth up to taking root of rice plants, 7 to 10 days after transplanting, partly in order to mitigate damages caused by crab. Field is kept flooding to the harvesting time or late maturing stage. Weeding is manually practiced for 2 times per a season. Chemical spray for pest & disease control is seldom practiced.

(6) Harvesting

Harvesting is carried out manually with sickle. In case of rainy season cropping, threshing is done at home yard after sun drying in a field, while in case of early rainy and dry season cropping threshing is done at home yard without drying in a field due to wet

climatic conditions at harvesting time. Threshing is mostly done manually by using threshing board or table, however, the use of engine or pedal thresher is also common. Transportation of rice plants from field to home yard is mostly carried out by an ox-cart, which is one of causes of post-harvest losses. Labor exchange is common practices employed in harvesting works.

(7) Straw

Cattle raising mainly for draft power is commonly practiced by farmers. Rice plants after harvest usually transported to home yard before threshing and rice straw is piled in home yard and fed to cattle. Preparation of manure is also common practices.

IIIB-1.6 Crop Production in Upland Fields

Compared with rice production, productions of other crops such as upland crops, vegetables and fruits in upland fields (outside of the Project Area) are extremely limited in the project villages. Major such crops grown in the project villages, although very limited in extent, are as shown below.

Major Crops Grown in Upland Fields 1/

Item	Crops
Crops grown in rainy season	Mungbeans, corn, groundnut, morning glory, pumpkin, gourd, water melon, string beans, squash
Crops grown in dry season	Greens, morning glory, cucumber, string beans
Perennial crops (fruit etc.)	Sugar palm, banana, mango, coconut palm, jack fruit, papaya

Source: Chbar Mon & Samaraong Tong District Agriculture Office

IIIB-1.7 Livestock

Livestock sub-sector is an important agricultural activity for farm economy and provides an essential source of draft power and manure for farming in the Project Area. Accordingly, a substantial number of animals and poultry are raised in the project villages and majority of farm families hold some kind of animals as shown in Table IIIB-1.7.1 and as summarized below.

Families Hold Animals in the Project Villages 1/

Item	Project Villages in			
	Kahaeng	Kandal Dom	Svay Kravan	Overall
Total Families in Villages	574	805	603	1,982
%. of Families Holding Cattle	64	64	44	58
% of Families Raising Pig	34	48	45	43

1/: Proportion of families holding subject animal to total households
Source: Project commune offices & SEILA Commune Data Base, 2005

As shown, families having livestock to total families are rather limited and cattle and pigs are raised by 58% and 43% of families, respectively. However, rates of farm families having animals to total farm families will be over 90%

The population of livestock and average holding size of livestock per family in the project villages are estimated as shown below.

Livestock Population & Holding Status in the Project Villages

Item	Cattle Total	Cow	Draft Cattle	Pig
Population	2,737	1,096	834	1,368
Holding Size/Farm	2.4	1.0	0.7	1.6

Source: Cabar Mon and Samraong Tong District Offices

From the table, an average holding size of total cattle, cow, draft cattle and pig is calculated at 2.4, 1.0, 0.7 and 1.6 heads per family, respectively, equivalent to animal units of 2.9 in total. The holding size of poultry is calculated at 5.5 per family. However, as the statistic figures include livestock & poultry hold by commercial farms, an actual holding size per farm is lower the said estimates. The number of pig farms in the project villages is 5 and the same of poultry farm is 2. Similarly, the poultry holding

size per household in the Area could be roughly estimated at 3.4 per family.

Production figures of livestock in the Area were not available since the transaction of live animals and poultry is common. There exist a slaughter house in Chbar Mon District.

Land preparation for paddy cultivation is mostly done by draft animals in the Area and as a whole number of draft animals appear to be enough to carry out such works as shown in the following table.

Work Capability of Draft Animals in the Project Villages

Subject Area	Rice Field 1/	No. of Draft Animals	Capability 2/
Project Villages	785 ha	834	.> 834 ha

1/: Chbar Mon & Saran Tong District Agriculture Office & Kahaeng Commune
2/: Land preparation capability: > 1.0 ha per season per head

IIIB-1.8 Farm Machinery and Equipment

The inventory on farm machinery and equipment in the Project Area is presented in Table IIIB-1.8.1 and major ones are shown in the following table.

Inventory of Farm Machinery & Equipment in the Project Villages

Hand Tractor	Water Pump	Thresher		Rice Mill		Plow	Ox-cart
		Engine	Pedal	Small	Medium		
26	78	4	26	38	8	455	274

1/: Chbar Mon & Saran Tong District Agriculture Office & Kahaeng Commune

The number of tractor is still limited and land preparation works by draft animals is predominant practice, however, the works by hand tractor will expand in the future because there are many used hand tractor dealers in Kampung Speu town. The number of rice mills appears to be more than sufficient for milling demand in the Area because marketing of paddy is commonly carried out in the form of unhusked rice.

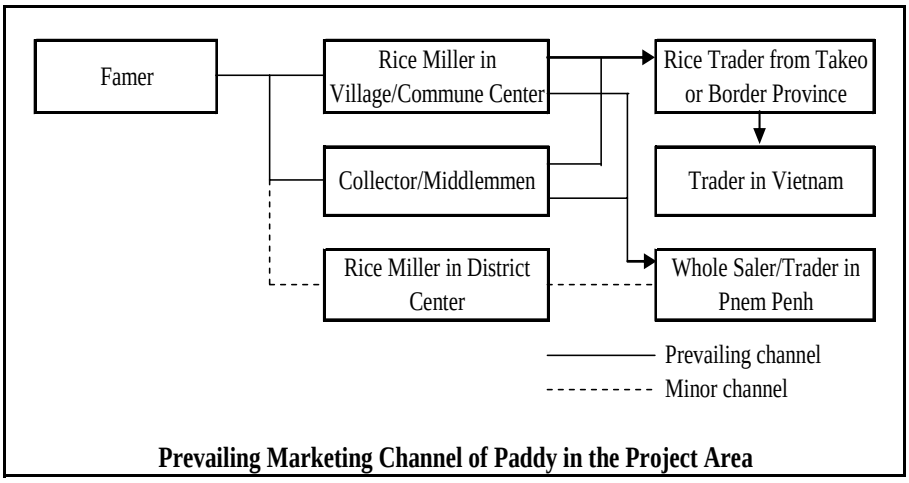
IIIB-1.9 Marketing

IIB-1.9.1 Rice Marketing

(1) Marketing Volume and Channel

As the holding size of rice field in the Project Area is estimated at around 0.8 ha per farm, marketing volumes of rice in the Area appear to be limited. The result of the Socio-economic Survey indicates that an average volume of paddy marketed is calculated at 1,258 kg per those marketed and 847 kg per a sample farmer (Attachment IIIB-7). The same result also indicates that the marketed volumes of paddy account for 37% of total products and 67% of the sample farmers reported marketing of paddy. Marketing of rice in the Area is carried out almost exclusively in the form of paddy (dry unhuksed rice). Marketing timing appears to be depending on individual farmers. However, common timing is when cash is needed followed by at time when price is high.

The prevailing marketing channels of paddy in the Area identified through the Socio-economic Survey, information provided by PDAs and rice millers and field survey by the Study Team are illustrated in the following figure.



Prevailing Marketing Channel of Paddy in the Project Area

Paddies collected by rice millers or collectors from farmer are temporally stored at open places along the route No. 4 and transaction between those and large traders are carried out. All transactions involved in rice marketing are done in cash basis.

(2) Market Prices

Seasonal fluctuations of market prices of paddy are common phenomenon in the Area and in Cambodia as well since cultivations of photosensitive varieties of rice prevail. Generally, paddy prices are lowest in around late November to December just after the peak harvesting season and highest from September to early November before the harvesting season. Price differences between lowest and highest peak is around 100 riel/kg. Further, price differences of about 50~100 riel/kg between local medium/late varieties and improved early varieties (IR varieties) are also reported in the Area. Seasonal and varietal differences of paddy prices in the Target Area are reported as follows;

Seasonal Differences of Paddy Prices in the Project Area in 2006 (unit: riel/kg) 1/

Variety	a. Dec.	b. Sep.	Differences (b – a)
Local Mixed (medium/late)	550	680	130
Chma Prom (local)	600	700	100

1/: Farm gate prices of local varieties of paddy *Source: Rice millers in the Project Area*

Such price differences between varieties reflect consumers' preference for local varieties to improved varieties. Consumers' preference for local varieties is because of favorable taste and aroma of those compared with improved high yielding varieties (HYV). As common practices in the Area, farmers grow local varieties in the rainy season for family consumption and improved varieties for marketing in the early rainy season.

Because of limited market volume by individual farmers and purchase prices of paddy determined by buyers (rice miller or their agent collector/middleman), farmers have little bargaining power in price setting.

Major constraints for paddy marketing identified in the present Study through the Socio-economic Survey are low market price of paddy and unstable market price of paddy (Attachment IIIB-3).

Kampung Speu Province is one of the 15 target provinces of the on-going Agricultural Market Information System (AMIS) Project financed by ADB.

IIIB-1.9.2 Marketing of Other Agricultural Products

Both production and, therefore, marketing volumes of other crops are rather limited in the Project Area. Common marketing destinations of upland crops and vegetables are local markets at commune center followed by markets in villages.

In stead, substantial number of animals and poultry are marketed as estimated from the

population of those in the Area. Common market destinations of animal and poultry are collector/middleman followed by village markets and markets in commune centers. There is a slaughter house in Chbar Mon District.

IIIB-1.9.3 Marketing Facilities and Agro-processing

Distributions of 2 commune level markets and 1 district level markets in and around the Area are reported as shown in the following table.

Market Facilities in and around the Project Area

Commune	Commune Level Market	District Market	Total
Kahaeng	1		1
Svay Kravan	0		0
Kandal Dom	1		1
Chbar Mon		1	1
Project Commune	2	1	3

Source: Project commune offices & PDA Kampung Speu

Among such markets, the district level market in Chbar Mon (provincial capital) is having important functions as marketing places of farm inputs and vegetables distributed. The commune level markets are functioning as destination markets of agricultural products in the Project Area as stated earlier. Wholesale market of rice, vegetables and upland crops are established in Phnom Penh.

A noticeable agro-processing in the Area is palm sugar production operated at a household level. Although, any data on production volumes was inaccessible palm sugar production is one of important income sources in the Area and 9 palm sugar processors in Kendal Dome villages is reported.

IIIB-1.10 Food Supply Conditions

From the current features on land use, cropping pattern and land holding status, surplus production of rice and self-supply shortage of other food crops could be predicted. The rice balance of the Project Area has been examined by way of examining the same of an average farm family based on the Socio-economic Survey result as shown in the following table

Rice Balance of an Average Family in the Project Area

Average Family Size	Paddy Requirement (kg)			Paddy Production (kg) Season				Surplus (kg)
	/capita	/family (net)	/family (gross)	Rainy	Early Rainy	Rainfed	Annual	
5.1	223	1,137	1,307	1,380	504	456	2,340	1,033

As shown, the surplus paddy production of 1,033 kg/farm family or the paddy surplus of about 44% of total production are estimated in the average farm family in the Area.

The results of the Socio-economic Survey also indicate such situations in the food supply condition in the Project Area as shown below.

Food Supply Conditions in the Project Area

Food	Proportion of Responses		
	a. Surplus	b. Sufficient	c. Insufficient
Rice	72%	20%	9%
Beans	-	-	100%
Other cereals	1%	-	99%
Vegetables	5%	3%	92%

Response: a: own harvest/product exceeds the household demand

b: own harvest/product is just enough for the household demand

c purchased to meet the household demand or insufficient

As shown, over 90% of the sample farmers (100 samples) reported surplus or sufficient production of rice. However, production of cereals, beans and vegetables is extremely limited compared with household demands for them. The promotion of food crops other than rice primarily aiming at sufficing family consumption and secondary to market surplus through the introduction of such crops in the early rainy season or after rice (dry season) should better be envisaged.

IIIB-1.11 Farm Household's Economy

(1) Typical Farms

For defining typical farms, the sample farmers for the Socio-economic Survey have been categorized into farm families having double cropped rice field (Type A) and having only a single cropped rice field (Type B)[2]. Such categorization was done by excluding samples having income from non-farm activities far greater than incomes from farm activities in order to facilitate the farm economic analysis under the with and without project condition of the Project. The farm economic characteristics of those farm families are shown in Table IIIB-1.11.1. The average features of individual category of farm families are defined as the typical farms under the present Study as shown below.

Typical Farms & Their Farm Economic Conditions

Farmers Having	Land Holding Size (ha)		Incomes (1000 riel) 1/	Expenditures (1000 riel) 1/
	Irrigated Field	Rainfed Field		
Double Cropped Rice Field (Type A)	0.57	0.22	3,104	3,017
Only Single Cropped Rice Field (Type B)	0.41	0.10	3,333	2,483

1/: Not including income from rice production and production cost of farm products

As shown in the tables, the average holding size of rice field of farm families having only single cropped field is substantially limited compared with the same of farm families having double cropped field.

(2) Present Farm Economy

The present farm economies of the typical farms are estimated as shown Table IIIB-1.11.2 and as summarized in the following table.

Present Farm Economy (unit: Riel)

		Type A	Type B	Difference (A-B)
Gross Incomes	Rice Production	1,302	680	622
	Other Farm Income	1,066	1,145	- 79
	Non-farm Income	2,267	1,959	308
	Total Income	4,635	3,784	851
Expenditures	Production Costs of Farm Products	1,076	797	279
	Other Expenditures	3,017	2,483	534
	Total Expenditures	4,093	3,280	813
Net Surplus (Capacity to Pay)		542	504	38

Source: JICA Study Team

As shown in the tables, the net surplus (capacity to pay) of the typical farm is estimated at Riel 542,000 or 12% of the total gross incomes for Type A and Riel 504,000 or 13% of the same for Type B. Both the representative farm families appear to be economically at marginal level and there is only minor difference in the net surplus between the two types.

[2] Assuming that both are in gravity irrigation area

Chapter IIIB-2 Agriculture Support Services

IIIB-2.1 Agricultural Support Institutions

(1) PDA (Provincial Department of Agriculture), Kampung Speu

PDA is a provincial level agricultural agency under the provincial government and is an agency responsible for agricultural development and provision of agricultural supporting services at province, district, commune and village levels. As shown in Figure IIIB-2.1.1, PDA is composed of six technical offices and three planning/administrative offices. Total number of staffs including district level staffs is 264.

Major functions of Agronomy Office of PDA include technology development, seed production and plant protection and the same of Extension Office are provision of extension services and human resources development. Animal Health Office has functions of provision of veterinary services, technology development and extension services and the same of Fishery Office are fish fry and fingering production, technology development and extension services. Major functions of technical offices of PDA are explained in Table IIIB-2.1.1.

(2) DAO (District Agriculture Office)

PDA has its branch offices at district level called District Agricultural Office (DAO) as illustrated in Figure IIIB-2.1.1. The offices covering the Project Area are DAO Samraong Tong and Chbar Mon. The staff deployments in the DAOs are as follows;

Staff Deployment in Project Related DAOs

Staffs	Samaraong Tong	Chbar Mon
DAO Staffs	13	9
Technical Staffs	10	8

Source: DAO Samraong Tong & Chbar Mon

Major functions of DAO are as listed below.

- Statistic data collection on crop production & livestock
- Extension activities (project activities in collaboration with PDA)
- Animal vaccination

(3) International Organizations and NGOs

A number of international and bilateral cooperation organizations are involved in agricultural sector support activities in and around the Project Area. Some of important activities or programs closely related with the present study include extension system development activities of CAEEP II, livestock activities of SLPP and ASDP (Agriculture Sector Development Project) are as shown in Table IIIB-2.1.2. ASDP is the project financed by ADB with 18 target districts in the 4 provinces and with the project period from 2005 to 2009. Kampung Speu province is one of 4 provinces and 8 districts including Chbar Mon and Samraong Tong are selected as the project target district. The project aims at promoting sustainable growth of market based agriculture. Activities envisaged under the project cover agronomy, livestock, fishery, agro-processing and marketing sub-sectors.

Similarly, a number of NGOs are involved in agricultural sector support activities in and around the Area as shown in Table IIIB-2.1.2. Among the NGOs, the activities of CEDAC for SRI extension and Asia URB for vegetable cultivation are closely related with the present project.

IIIB-2.2 Research and Technical Development

The institutional set-up of the agricultural research and technology development activities in Cambodia is composed of the central institute for crop sector research (Cambodian Agricultural Research and Development Institute/CARDI) and the state farms and

experimental stations belong to DAALI of MAFF.

(1) CARDI

CARDI is a semi-autonomous, leading agricultural research and technology development public institute under the jurisdiction of MAFF and its core purpose is to improve the living standards of Cambodian farmers through agricultural research, technology development and technology transfer.

To meet the national mandates, CARDI currently establishes six research programs or units of: i) plant breeding, ii) agronomy & farming system, iii) soil & water sciences, iv) plant protection, v) agricultural engineering. In addition, the institute has Training & Information Center for training and technology transfer purposes.

One of the important functions of CARDI has been rice seed development and production and the Institute has been established as a national provider of rice genetic resources, breeder seed and foundation seed. A number of quality rice seeds developed or selected by CARDI have been released by the Varietal Recommendation Committee of Cambodia. Among the same, promising rice varieties of Sen Pidao (non-photosensitive early rice) and Riang Chey (photo sensitive medium variety) for the Project Area are included.

The institute should be placed as a technical resource agency for the present project and close collaboration and cooperation should be sought during the project operation.

(2) Prey Pdao Experimental Station

Other agricultural research and technology development institutes under DAALI of MAFF include Prey Pdao and Kbal Koh Experimental Stations and Toul Samroang Rice Seed Farm and Chamkaleu Seed Production Farms. The major mandate of the Stations and Farms are adaptive technology development and seed production.

The Prey Pdao Station is located in Samraong Tong District. The organization set-up of the Station is composed of production, research and administration sections and major functions are rice seed production, adaptive research and demonstration activities. The staffing and facilities of the Station are shown in the following table.

Staffing and Major Facilities of Prey Pdao Station

Position	No.	Facilities	No./Area
Staff		Facilities/land	
Director (acting)	1	Irrigated rice field	7 ha
Deputy Director	1	Office	1
Section Chief	2	Accommodation	1
Staffs	4	Storehouse	1
Total	8	Tractor	1

Source: Prey Pdao Experimental Station

Seed production and major activities of the Station in 2006 are as follows;

Seed Production & Major Activities of Prey Pdao Station

Seed Production (2006)	Rainy season 15 ton Dry season 6 ton
Small scale adaptability trial on rice Demonstration Plots	Pilot Project (JICA) Rice variety demonstration

Source: Prey Pdao Experimental Station

The Station is positively participated in the execution of the Pilot Project of the present Study as a technical support institute and members of the Implementation Team of the Project. The small scale adaptability trial on early varieties of rice for irrigated area (Zone 1) under the project is quite successfully implemented by the Station.

IIIB-2.3 Extension Services

(1) Institutional Set-up for Agricultural Extension

The national mandate for agricultural extension in Cambodia is placed with Department of Agricultural Extension (DAE) and Agricultural Extension Offices (AEO) of PDA in provinces. Although extension staffs in provinces and districts and district level Agricultural Offices (DAOs) for extension have been deployed and financial and reporting systems are in place to an insufficient degree, the establishment of the extension system is yet to be envisaged and the provision of extension services to farming communities are extremely limited due primarily to financial constraints of the institutions. In other words, the delivery system of extension services to farmers are still in their infancy and a fully functioning national extension system does not exist.

The establishment of the national agricultural extension system was envisaged under CAAEP I (1998-2000). Some key components or concepts envisaged in the system are as follows;

- The system aims to apply Farming System Research & Development (FSRD) approaches to identify priority needs for extension programs through Agro-Ecosystems Analysis (AEA) or other processes and to create close links between research and extension,
- Extension activities at provincial and district level and farmer to farmer transfer of information and extension are envisaged in the system and much of transferring of information to all farmers are to be achieved through farmer to farmer links,
- Formation of multidisciplinary or holistic teams at district level to provide extension services, and
- Links at the field operational level between extension, research and farmers are to be formed.

The target province of the present Study, Kampong Speu, is among 14 provinces where CAAEP II activities were introduced up to 2006, however, the envisaged extension system has not been fully introduced and applied yet in the target provinces. In the proposed extension system, district level staffs have essential functions on field level extension activities.

(2) Extension Method

The approaches for the provision of agricultural extension services or the extension method envisaged in the extension system discussed in the preceding sub-clause include AEA at the commune level as a participatory needs assessment methodology for planning agricultural extension and development programs for implementation under the Commune Agricultural Plan (CAP) with SEILA funding. AEA has been implemented in over 200 communes in 14 provinces, and its use is now endorsed under the current MAFF policy. AEA is conducted by multidisciplinary teams from relevant government departments and local stakeholders such as commune councils and farmers.

The final output of AEA is the formulation of EPP (Extension Programs Package; currently called as TIP/Technical Implementation Procedures) to be implemented in a target commune. In the project district, AEA under CAAEP II were implemented in 8 communes, 1 in Chbar Mon and 7 in Samraong Tong including 1 project commune of Kahaeng.

(3) Provincial and District Extension Agencies

Within the agencies mandated to provide agricultural extension services, those actually involved in such services are PDAs, their district level offices of DAOs and their staffs. Those practical extension agencies are weakly established in various meanings.

(a) Staffing and Deployment of Agricultural Extension Staffs

Staffing of Agricultural Extension Workers (AEWs) of Agricultural Extension Office (AEO) of PDA and technical staffs of DAO in the project districts are as follows;

Deployment of Extension & Technical Staffs of AEO & DAOs

Office	Field of Activity/Unit					Total
	Extension	Crop	Livestock	Fishery	Farmer Org.	
AEWs of AEO	5	3	3	-	5	16
DAO Chbar Mon	2	5	1	-	-	8
DAO Samraong Tong	5	2	2	1	-	10
Total	12	10	6	1	5	34

1/: Subject Matter Specialist *Source: PDA Kampong Speu & project DAOs*

Among the AEWs, those involved in fulltime project activities are 7 for ASDP in 2007.

(b) Activities of AEWs

The envisaged extension activities of AEWs are reported to be;

- Demonstration activities on crops & livestock, and
- Farmer training through meeting/course, field day & field visit.

However, because of constraints on operational funds for extension activities, the provision of extension services through the implementation of projects of donors and NGOs are primary activities of AEWs.

Major Project Extension Activities of AEO in 2006

Project	Extension Activities
CAAEP II	Staff & farmer training, demonstration activities (crop, livestock, etc.)
SEILA	Farmer training, demonstration activities (crop, livestock, etc.)

(4) Village Livestock Agent (VLA)

In the Project Area, farmer veterinary & extension services providers called Village Livestock Agent (VLA) are deployed. VLAs are trained for about a month before qualification under support programs of donors/NGOs and SEILA. The number of VLAs deployed in the project communes is as follows;

VLAs Deployed in the Project Communes

Kahaeng	Svay Kravan	Kandal Dom	Total
4	1	6	11

Source: PDA Kampong Speu & Kandal

(5) Farmers Opinions on Current Extension Services

The results of the Socio-economic Survey indicate sample farmers responses to current extension services are as follows;

Farmers Responses to Current Extension Services

Enquiry	Proportion by Reponses
Technical capability of extension workers	Sufficient 33%; insufficient 15%; no service received 52%
Satisfied with current extension services	Satisfied 34%; not satisfied 15%; no service received 52%
Extension services needed	Rice farming 40%; compost 16%; livestock & agr. technique 12%

Source: Socio-economic Survey by the JICA Study team, 2006; details in Attachment IIIB-2

As shown, over 50% of the sample farmers reported no access to extension services..

IIIB-2.4 Seed Production and Supply

Current predominant rice seed production and supply system in Cambodia consists of: i) production of breeder seed (B/S) by CARDI, ii) production of foundation seed (F/S) by State Farms, CARDI and Agricultural Experimental Station and iii) commercial seed (certified seed) production by seed producers and seed growers. However, because of the limitation of demand for quality seed, it could not be assessed that quality seed production and supply system has been established in the country as a whole. Further, due to lack of the national seed policy and seed production and certification system, seed

inspection and certification is implemented arbitrary by individual seed producers and quality seeds produced usually called commercial seed (C/S).

Major quality seed producers in the country include: i) CARDI, ii) State Farms and Agricultural Experimental Stations of DAALI, iii) AQIP Seed Company newly established as a business entity in 2006 by merging of the 4 Seed Companies inaugurated under AQIP (Agricultural Quality Improvement Project) of AusAID, iv) seed growers/seed growers groups. In and around the Project Area, Prey Pdao Agricultural Experimental Station in Samraong Tong District to a limited extent and a branch of AQIP Seed Company in Kandal Stueng (formerly operated as Super Seed Company) to a large extent are producing certified seed for distribution to dealers, farmers or else. Certified seed production of the Station in 2006 was about 21 tons. Major varieties produced by the Company are Pkha Rumduoul, Riang Chey, Pkha Rumchang, IR 66 and Sen Pidao and major distribution destinations are seed dealers, NGOs, government projects and individual farmers. Commercial seed prices of the Seed Company are Riel 1,500/kg irrespective of varieties in 2006 (retail price of seeds of the Seed Company is Riel 1,600/kg).

Common channel of quality seed supply in and around the Project Area is through provision of seed under support programs of donors or others. Commercial seed suppliers in the Area are farm inputs suppliers in district centers but their supply volume are limited.

According to the Socio-economic Survey, predominant seed source of rice is self-multiplied seeds (products of previous season) followed by seeds exchange with other farmers. Seed replacement frequency with quality seeds is also low and demand for quality seeds is negligibly low at present. In contrast to such situation, the results of the Survey (Attachment IIIB-2) indicate no serious constraints for quality seed procurement in the Area as follows;

Seed Supply Conditions in the Project Area

Enquiry	Proportion by Reponses
Seed source of rice	Own products: 44%; exchange with others: 47%
Frequency of seed replacement	Once per 3 cropping: 72%; once per over 4 cropping: 28%
Procurement of wanted seed	Easy: 92%; difficult/not possible: 8%
Procurement of quality seed	Easy: 49%; difficult/not possible: 51%
Price of quality seed	Too expensive: 39%; acceptable: 14%; not purchased 47%

Source: Osco-economic Survey in the Project Area by the JICA Study team, 2006

In upland crops production, quality seeds are seldom used and major seed sources are: i) seeds procured at local markets and ii) own products. Prevailing seed sources of vegetables are also seeds procured at local markets and own products. However, vegetable seeds imported from Thailand and Vietnamese are commonly used for vegetable production under irrigation.

Upland crops seed production is carried out by Chamkaleu Seed Production Farm and Kbal Koh Experimental Station and CARDI started to produce upland crops seed. Main upland crops seeds produced by the farms are beans and the same of CARDI are beans and maize.

IIIB-2.5 Farm Inputs Supply

Supply sources of chemical fertilizers and agro-chemicals in Cambodia solely depend on import commodities since no fertilizer and agro-chemical industries have been established. Since the introduction of privatization of farm inputs import, major role in the same is undertaken by a private sector. Major importers and distributors of farm inputs in the country include a government public institution, Agriculture Input Company (AIC; fertilizer). Major origins of such commodities are Thailand and Vietnamese.

Farm input supplies in the Project Area are mostly carried out by dealers in district centers

and local markets at commune or district level. Group purchasing of fertilizer is seldom practiced in the Area, however, introduction of such purchasing arrangement by 2 farmer cooperatives in the province is reported.

The results of the Socio-economic Survey (Attachment IIIB-2) indicate the existing of no serious constraints for procurement of fertilizer except for price as follows;

Fertilizer Supply Conditions in the Project Area

Enquiry	Proportion by Reponses
Procurement of Wanted Fertilizer	Easy: 98%; difficult: 2%
Supply Timing of Fertilizer	In time: 99%; delayed: 1%
Fertilizer Price	Too expensive: 95%; acceptable: 4%

Source: Socio-economic Survey in the Project Area by the JICA Study team, 2006

IIIB-2.6 Farm Credit

Formal banking financial system for farm credit is limited in Cambodia and some institutions called, "Micro Finance Institute (FMI)", having credit services are operating farm credit services to farmers or rural people. Such institutes operating in and around the Project Area include ACLEDA (Association of Cambodian Local Economic Development Agency) Bank (NGO involved in rural credit established as a commercial bank in 2003), PRASAC Micro Finance Institute, AMRET and Vision Fund. Further, several NGOs providing micro credit services in the project province include FLD (Farmer Livelihood Development), Enfant & Development and Asia URB. However, non-institutional credit providers such as rice miller, farm input suppliers and relatives or friends might be having a certain role in financing in the Area.

ACLEDA Bank and AMRET have their sub-branch offices in the province as follows;

Deployment of District & Commune Level Offices of ACLEDA Bank and AMRET

Institute	Sub-branch Offices (district level)	Service Post (commune level)
ACLEDA	3 Kong Pisei, Phnum Srouch, Ou Dhung	3
AMRET	3 Chbar Mon, Samraong Tong, Phnum Srouch	-

Source: ACLEDA Blankly & AMRET, Kampung Speu Branch Office

Some terms and conditions of the institutes for farm credit or micro credit for individual are as follows;

Terms & Conditions for Farm Credit for Individual of ACLEDA Bank and AMRET

Institute	Credit period & interest rate		Conditions
ACLEDA	6 months < R.400,000; 3.25%/month	12 months R.400,000 – 6million; 3.5%/month	Provision of collateral & guarantee
AMRET	3 – 12 months; 3.5%/month R. 600,000 – 1,000,000	3 – 18 months; 3.5%/month R. 1,000,000 – 2.,500,000	

Source: ACLEDA Bank Plc & AMRET, Kampung Speu Branch Office

AMRET is also providing a group lending scheme covering beneficiaries of about 700 groups in Kampung Speu. ACLEDA Bank is providing credit services for crop production purposes as shown in the following table.

Credit Services of ACLEDA Bank, provided by Kampung Speu Branch

No. of crop production credits	Credit in Riel: 452	Credit in US$: 50

Source: ACLEDA Bank Plc, Kampung Speu Branch Office

The results of the Socio-economic Survey on farm credit indicate some coverage of institutional credit services in the Area as follows;

Results of Socio-economic Survey on Farm Credit

No. of farmers receive Loan/credit by source	Commercial bank: 13; Friend/relatives: 8; NGO: 2; Rice miller: 1
Enquiry	**Proportion by Reponses**
Access to farm credit	Easy: 35%; difficult: 44%, not received: 12%
Amount of credit	Sufficient: 54%; not sufficient: 34%; not received: 12%
Procedures for credit application	Easy: 41%; difficult: 47%, not received: 12%

Source: Socio-economic Survey in the Project Area by the JICA Study team, 2006

Chapter IIIB-3 Constraints and Problems for Agricultural Development

IIIB-3.1 Results of Socio-economic Survey

Under the present Study, the agro-economic survey aiming at identifying current status of agricultural support services, problems and constraints for irrigated farming, activities implemented for improvement of rice productivity by farmers and expectations for improvement of farming activities have been carried out under the Socio-economic Survey conducted in the Study. The major findings obtained through the survey are presented in Table IIIB-3.1.1 and IIIB-3.1.2 and in Attachment IIIB-2 and IIIB-3 in detail. Major issues are discussed in the followings.

(1) Current Status of Agricultural Support Services

As issues to identify current status of agricultural services in the Project Area, farmer interview on the subjects of farm input supply, extension services and farm credit was carried out in the survey. Major findings on the farmer's responses are as follows;

Predominant seed source of rice is self-multiplied seeds (products of previous season) in the Area and seed replacement frequency with quality seed is limited. The results of the Survey on seed supply condition indicate that the most serious constraints for quality seed procurement appears to be prices of such seeds as follows;

Rice Seed Supply Conditions in the Project Area

Enquiry	No. of Respondents	Proportion by Reponses
Procurement of Wanted Seed	98	Easy: 92%; difficult: 7%; not possible 1%
Procurement of Quality Seed	87	Easy: 49%; difficult: 47%; not possible: 3%
Price of Quality Seed	52	Too expensive: 73%; acceptable: 27%

Source: Socio-economic Survey by the JICA Study team, 2006

Farm input supplies in the Area are mostly carried out by dealers in district centers and local markets at commune level. The results of the Survey indicate the existence of no serious constraints for fertilizer procurement except for price as follows;

Fertilizer Supply Conditions in the Project Area

Enquiry	No. of Respondents	Proportion by Reponses
Procurement of Wanted Fertilizer	97	Easy: 98%; difficult: 2%
Supply Timing of Fertilizer	97	In time: 99%; delayed: 1%
Fertilizer Price	95	Too expensive: 96%; acceptable: 4%

Source: Socio-economic Survey by the JICA Study team, 2006

The availability of institutional farm credits in the Area is considered to be limited. However, according to the Survey, the provision of farm credits appears to be fairly well introduced in the Area. The results of the Survey on farm credit are as follows;

Results of Socio-economic Survey on Farm Credit

Enquiry	No. of Respondents	Proportion by Reponses
Access to Farm Credit	78	Easy: 45%; difficult: 44%, not provided: 12%
Timing of Provision	77	In time: 64%, delayed: 25%; not provided: 12%
Amount of Credit	76	Sufficient:54%; insufficient:34%;not provided: 12%
Procedures for credit application	75	Easy: 41%; difficult: 47%; not provided: 12%

Source: Socio-economic Survey by the JICA Study team, 2006

The poor or extremely limited coverage of extension services is one of the most serious constraints for agricultural development in the Area and no accessibility to extension services is reported by over 50% of sample farmers in the Survey. Subject selected as most required for extension services is rice farming followed by compost fertilizer. Farmers' responses toward current extension services are identified as follows;

Results of Socio-economic Survey on Extension Services

Enquiry	Proportion by Reponses
Visit of Extension Worker	Once/week:15%; once/2 weeks–1 month:26%; seldom visited: 59%
Technical Capability of Extension Workers	Sufficient: 33%; insufficient: 15%; no service provided: 52%
Satisfied with Extension services	Satisfied: 34%; not satisfied: 15%; no service provided: 52%
Extension Services Required	Rice farming: 40%; compost fertilizer: 16%; others: 46%

Source: Socio-economic Survey by the JICA Study team, 2006

(2) Farming Constraints and Improvement Measures

Major agronomic and farm management constraints responded by sample farmers and assessed by weighted scoring method are crop losses due to pest & disease followed by expensive farm inputs and low yield of paddy as follows;

Farming Constraints (agronomy & farm management) in Order of Seriousness

Agronomic & Farm Management Constraints	Total Score	Rating 1/	
Crop losses due to pest & disease	237	1	Most serious
Expensive farm inputs	137	2	2nd serious
Low yield of crops (paddy)	132	3	3rd serious

1/: See Table IIIB-3.1.2 *Source: Socio-economic Survey by the JICA Study team, 2006*

Major physical constraints responded by sample farmers assessed similarly are irrigation water shortage in dry season followed by irrigation water shortage even in wet season as follows;

Farming Constraints (physical) in Order of Seriousness

Physical Constraints	Total Score	Rating 1/	
Irrigation water shortage in dry season	217	1	Most serious
Irrigation water shortage in wet season	139	2	2nd serious
Inundation/flooding	51	3	3rd serious

1/: See Table IIIB-3.1.2. *Source: Socio-economic Survey by the JICA Study team, 2006*

Major marketing constraints responded by sample farmers are assessed similarly are unstable market prices of paddy/rice followed by low market prices of paddy/rice as follows;

Marketing Constraints in Order of Seriousness

Marketing Constraints	Total Score	Rating 1/	
Unstable market prices of paddy/rice	180	1	Most serious
Low market prices of paddy/rice	170	2	2nd serious
Low market prices of livestock	47	3	3rd serious
Inundation/flooding	51	3	3rd serious

1/: See Table IIIB-3.1.2 *Source: Socio-economic Survey by the JICA Study team, 2006*

Activities or practices to improve rice productivity implemented in the past 3 years by sample farmers include application of compost/manure, increasing fertilization doses and use water pump for irrigation as follows;

Activities/Practices to Improve Rice Productivity Implemented

Activities/Practices Implemented	No. of Respondents	Proportion (%)
Applied of compost/manure	62	23
Increased fertilization doses	52	19
Started to use water pump for irrigation	48	18

Source: Socio-economic Survey by the JICA Study team, 2006

Activities necessary to improve rice productivity raised by sample farmers and assessed by weighted scoring method are: i) improvement of farming practices, ii) use of quality seed (high yielding variety) and iii) use of adequate doses of fertilizer as follows;

Necessary Activities to Improve Rice Productivity

Activities/Practices Required	Total Score	Rating 1/	
Improvement of farming practices	155	1	Most required
Use of quality seed (high yielding variety)	151	2	2nd required
Use of adequate doses of fertilizer	148	3	3rd required

1/: See Table IIIB-3.1.2 *Source: Socio-economic Survey by the JICA Study team, 2006*

Physical works necessary to improve rice productivity raised by sample farmers and assessed similarly are: i) most required: irrigation water supply for dry season, ii) 2nd most required: irrigation water supply for wet season and iii) 3rd most required: drainage improvement as follows;

Necessary Physical Works to Improve Rice Productivity

Activities/Practices Required	Total Score	Rating 1/
Irrigation water supply for dry season	194	1 Most required
Irrigation water supply for wet season	139	2 2nd required
Drainage improvement	103	3 3rd required

1/: See Table IIIB-3.1.2 *Source: Socio-economic Survey by the JICA Study team, 2006*

(3) Expectations for Improvement of Farming

Farmers expectations for improvement of farming conditions (agronomic & farm management) raised by the respondents and assessed similarly are: i) most expected: productivity improvement of dry season rice, ii) 2nd most expected: productivity improvement of wet season rice and iii) 3rd most expected: productivity increase of livestock/poultry as follows;

Expectations for Improvement: Farming (agronomic & farm management)

Expectation for Improvement	Total Score	Rating 1/
Productivity improvement of dry season rice	188	1 Most expected
Productivity improvement of wet season rice	147	2 2nd expected
Productivity increase of livestock/poultry	86	3 3rd expected

1/: See Table IIIB-3.1.2 *Source: Socio-economic Survey by the JICA Study team, 2006*

Farmers expectations for farming system to be adopted assessed similarly are: i) most expected: multiple farming composed of crop & livestock, ii) 2nd most expected: double cropping of rice and iii) 3rd most expected: crop diversification as follows;

Expectations for Improvement: Farming System

Expectation for Improvement	Total Score	Rating 1/
Multiple farming (crop + livestock etc.)	178	1 Most expected
Double cropping of rice	170	2 2nd expected
Crop diversification	79	3 3rd expected

1/: See Table IIIB-3.1.2 *Source: Socio-economic Survey by the JICA Study team, 2006*

Farmers expectations for physical works to be implemented assessed similarly are: i) most expected: adequate irrigation water supply in dry season, ii) 2nd most expected: adequate irrigation water supply in wet season and iii) 3rd most expected: mitigation of inundation & flooding as follows;

Expectations for Improvement: Physical Works

Expectation for Improvement	Total Score	Rating 1/
Adequate irrigation water supply in dry season	216	1 Most expected
Adequate irrigation water supply in wet season	133	2 2nd expected
Mitigation of inundation & flooding	47	3 3rd expected

1/: See Table IIIB-3.1.2 *Source: Socio-economic Survey by the JICA Study team, 2006*

Agricultural support services required for improvement of agricultural productivity responded by sample farmers and assessed similarly are: i) most required: field extension services (demonstration/field guidance), ii) 2nd required: provision of quality seed and iii) 3rd required: provision of fertilizer as follows;

Expectations for Agricultural Support Services

Expectation for Improvement	Total Score	Rating 1/
Field Extension services (demonstration / field guidance)	140	1 Most required
Provision of quality seed	137	2 2nd required
Provision of fertilizer	93	3 3rd required

1/: See Table IIIB-3.1.2 *Source: Socio-economic Survey by the JICA Study team, 2006*

IIIB-3.2 Practical Constraints/Problems Identified through Pilot Project

Constraints and problems of practical nature for agricultural development identified through the implementation of the agricultural pilot project activities are enumerated as follows;

- Practical skills (such as seed bed preparation, seeding density, regular planting, preparation & application timing of manure, pest & disease control, etc.) of extension staffs appear to be still limited; might be attributed to limited chances for them to be involved in practical extension activities or for them to operate extension activities individually. The empowerment of extension staffs by way of learning through doing and enhancement of confident of them should be seriously sought,
- Farmers anticipation and motivation toward the improvement of farming practices appears to be high. Current extension services supported by donors and with weak ownership of PDA appear to be less responding to such need. To meet such farmers' attitude, the deployment of extension staffs having sufficient practical skills should be envisaged,
- There is room for improving farmers' rice farming capability (practices) in various meanings. The primary target of extension activities should better be placed on improvement of rice productivity, current exclusive crop, and
- Field activities of extension staffs are restricted due partly to financial constraint of extension agencies. However, problems and hints for solutions are often found in fields. Field activities of the staffs should be intensified to an extent possible.

IIIB-3.3 Constraints/Problems for Agricultural Development and Proposed Development Directions

On the basis of the findings discussed in the preceding chapters, the results of the Socio-economic Survey on farming constraints, improvement measures taken and constraints/problems identified through the implementation of the Pilot Project explained in the preceding clauses, major problems and constraints in agricultural development in the Project Area, which should duly be addressed in the present Study in an integrated manner, have been studied by categorizing issues into: i) agronomic or technical issue, ii) agro-economic and farm economic issues, iii) marketing issues and iv) agricultural support services and institutional issues.

(1) Agronomic or Technical Issues

The captioned issues in this text include the aspects of production and post-harvest. The primary agronomic constraint in the Area is the unstable and low productivity of rice adversely affected by various factors. Major problems or constraints and proposed development directions to be taken are discussed as follows;

- Primary constraint that is attributed to the unstable and low productivity of rice is the prevailing farming practices characterized by use of traditional varieties, continuous use of self produced seeds, aged seedlings, random planting, limited application of fertilizer, inadequate post-harvest practices. However, a number of factors are involved in circumstances where such practices prevail;
  which should be addressed through the strengthening of agricultural support services introduced in a well integrated manner and implemented in a farmer participatory manner (because of financial constraints of government institutions). Further, such situations will be improved through the introduction of contract growing or partnership arrangement between farmers and a commercial sector.
- Constraint that is attributed to the unstable and low productivity of rice is limited and unstable availability of water because of limitation of available water resources. Further, 65% of the total rice fields in the Area are fields with rainy season supplemental irrigation where only a single cropping of rice is ensured;
  which should be addressed through the development and efficient utilization of available water resources to an extent possible. The priority target of the present Study will be the stabilization and enhancement of rice production by way of water resources efficient use; water saving rice cultivation in agronomic aspect.
- Rice cultivation is almost exclusive cropping pattern in the Area and annual land use intensity or cropping intensity as a whole is estimated at 135%. Production of

upland crops is extremely limited in the Area;
which should be addressed by envisaging crop diversification in the Area to an extent possible. Chances for introduction of upland crops or vegetables appear to exist in the early rainy season by shifting current cropping season of rice toward the middle of rainy season by growing early or medium variety of rice as the hydrological study indicates the availability of no irrigation water in the dry season.

- Farmers preference for medium or late traditional varieties brings about prolonged cropping season and higher water requirements. The release of promising early and medium varieties by CARDI is providing chances to improve such situations, but the realization of curtailing cropping season is still limited;
  which should be addressed through the strengthening of agricultural support services introduced in a well integrated manner, although a number of factors to be tackled are involved in circumstances where such practices prevail.

(2) Agro-economic and Farm Economic Issues

Problems on the captioned issues are closely related with low and unstable productivity of rice, therefore, with agronomic or technical issues as follows;

- Because of limited land holding size and irrigation water resources availability, farm economic situations of many farm households are at marginal level;
  which should be addressed through the intervention for productivity improvement as discussed earlier in agronomic or technical issue.
- However, such situations might be most serious with women headed households and farm households with small land holding size;
  which should better be addressed through the income generating approaches introduced by a farmer group basis in other development interventions as proposed in the Master Plan as such approaches are out of the scope of the present Project.

(3) Marketing Issues

Production volume of paddy by most of individual farmers is limited due to limited holding size and productivity and marketing volumes of paddy appears to be limited. However, the result of the Socio-economic Survey indicate about 67% of the respondents marketed paddy in the past one year and the total marketed volume was about 37% of the total products.

- Major paddy marketing constraints identified in the present Study are low market price of paddy and unstable market price of paddy as discussed in the Clause IIIB-1.9; which could be addressed by ways of: i) production of quality products through improvement of farming practices, ii) formation of farmer groups and seeking for possibilities to introduce contract growing or partnership arrangement as an economic activity of the groups and iii) provision of market information to farmer groups as an activity of extension services; although interventions in marketing issues under the scope of the present Project will be limited.

(4) Agricultural Support Services and Institutional Issues

Major constraints on the agricultural support issues discussed earlier in the preceding clause IIIB-3.2 appears to be related with financial constraints, implementation of support activities in less coordinated manner and lack of ownership by PDAs on such activities carried out by donors and NGOs. The strengthening of agricultural support services introduced in a well integrated manner and implemented in a farmer participatory manner should be sought as stated earlier. The same on the institutional issues is an insufficient coordination and collaboration among institutions concerned, especially MAFF and MOWRAM and PDA and PDOWRAM.

- Farmers anticipation and motivation toward the improvement of farming practices appears to be high. Current extension services supported by donors and with weak

ownership of PDA appear to be less responding to such need,
To meet such farmers' attitude and responding well toward actual beneficiaries needs, the deployment of extension staffs having sufficient practical skills should be envisaged,

- Practical skills of extension staffs appear to be still limited; might be attributed to limited chances for them to be involved in practical extension activities or chances for them to operate extension activities individually,
  which should be addressed through the empowerment of extension staffs by way of learning through doing. Enhancement of confident of them should be seriously sought.
- In the Area, agricultural support activities have been implemented by a number of donor agencies and NGOs or by the support of them and current agricultural extension or support services are basically limited to those programs because of financial constraints of PDAs for development activities. Further, efficient utilization of available human resources is yet to be seriously sought;
  which to be addressed through further promotion of farmers participatory approach (farmer-to-farmer extension and farmer-led trial) and empowerment of extension personnel and their fielding for the efficient use of such resources.
- Coordination and collaboration among institutions concerned, especially MAFF and MOWRAM and PDA and PDOWRAM, is weakly established;
  which should be addressed through the establishment of a project office participated by those agencies as the model case for the future irrigated agriculture development as the present project is defined as the irrigated agriculture improvement model project in the Master Plan.

Chapter IIIB-4 Agricultural Development Plan

IIIB-4.1 Development Concepts

In accordance with the basic development directions discussed in the Clause IIIB-3.3, the development concepts have been established as follows;

(1) Development Objectives

The proposed development approach is the irrigated agriculture development aiming at: i) improvement of productivity and increased production of rice through the improvement of farming practices and rational utilization of water resources, ii) improvement of land use intensity by introducing double cropping of irrigated rice to an extent possible with available irrigation water supply and iii) improvement of land use intensity through envisaging introduction of upland crop cultivation.

(2) Development Strategies

The strategies established for the attainment of the said development objectives include:

- Improvement of productivity and increased production of rice is envisaged through the introduction of: i) a double cropping of rice in the early rainy and rainy season in area where irrigation water supply ensured for the both seasons and a single cropping of medium rice in rainy season in the rest of the Project Area, ii) double cropping of early rice aiming at rationalizing irrigation water use by growing rice varieties of shorter growth duration and iii) improved farming practices on the basis of experiences obtained through the implementation of pilot project by paying due consideration to current farming practices which representing to a certain extent capabilities of farming communities, farming constraints and farmers expectations,
- Improvement of productivity and increased production of rice supported by the strengthening of agricultural support services of farmer participatory concept,
- Introduction of water saving rice cultivation availing expansion of irrigation beneficiary areas to an extent possible through the rational utilization of valuable water resources, and
- Introduction of a cropping pattern envisaging production of upland crops/vegetable in the early rainy season aiming at improving self-supply of beans/vegetables, increasing land use intensity and also promoting crop diversification is to be planned.

IIIB-4.2 Land Use Plan

The results of the irrigation study indicates that double cropped area in the Project Area will be expanded under the Project and, therefore, the land use will also change because of increase in irrigated area. The study also indicates no irrigation water availability in the dry season. Accordingly, the present and with-project land use and irrigation status in the Area are estimated as shown below.

Land Use & Irrigation Status under Present & Without-Project Condition (ha)

Land Use	Present/ Without-Project	With-Project	Increment
Fields irrigable for single cropping of rice	377	285	- 92
Fields irrigable for double cropping of rice	203	285	+ 82
Sub-total (net area)	580	570	- 10
Right of ways	20	30	+ 10
Total (gross area)	600	600	0

As shown, an increase of 82 ha of rice fields irrigable for double cropping of rice and a conversion of rice fields of 10 ha to right of ways are planned under the Project. The net rice field under the Project will become 570 ha from the present 580 ha.

IIIB-4.3 Proposed Cropping Pattern and Cropped Area

(1) Crop Selection

As discussed earlier in the development concepts, the exclusive primary crop for the present plan is rice considering farmers' strong intention for rice production and the Master Plan development target of centering on rice production. However, the introduction of a limited extent of upland crops/vegetables is also envisaged as discussed in the concepts. Candidate upland crops include leguminous crops as mungbeans, groundnut and soybeans and variety of vegetables as morning glory, gourd, string beans and tomato could be introduced.

(2) Proposed Cropping Pattern and Cropped Area

The introduction of a double cropping of early rice in the early rainy and rainy season is proposed in areas where irrigation water supply in the early rainy season is ensured aiming at introduction of rationalized use of irrigation water by growing rice varieties of shorter growth duration. However, a single cropping of medium rice is planned in areas where irrigation water supply avails only a single cropping of rice in the rainy season.

Further, the introduction of upland crop and vegetable in 5% of the Area in the early rainy season is targeted as discussed earlier. The proposed cropping pattern formulated is illustrated in Figure IIIB-4.3.1 and as shown in Table IIIB-4.3.1. The planned cropped area and cropping intensity are shown in the following table.

Proposed Cropping Pattern, Cropped Area & Cropping Intensity (unit: ha & %)

Crop	Early Rainy Season		Rainy Season		Annual		Present		Increment	
	Area	Intensity	Area	Intensity	Area	Intensity	Area	Intensity	Area	Intensity
Early Rice	285	50	285	50	570	100	203	35	+367	+65
Medium Rice	-	-	285	50	285	50	580	100	-295	-50
Rice Total	285	55	570	100	855	150	783	135	+72	+15
Upland Crops 1/	30	5	-	-	30	5	-	-	+30	+5
Total	315	55	570	100	885	155	783	135	+102	+20

1/: including vegetable

As shown in the table, the incremental cropped area of 72 ha of rice, 30 ha of upland crops/vegetables and 102 ha in total are planned. Similarly, the cropping intensity of 55% in the early rainy season, 100% in the rainy season and an annual intensity of 155 % are planned. The increase of annual rice cropping intensity of 15% and the same of overall annual intensity of 20% are anticipated under the Project.

IIIB-4.4 Target Crop Yield and Production

(1) Results of Verification Tests under the Pilot Project

Verification tests and adaptability tests of the improved farming practices on improved early and medium varies were implemented in the Project Area in 2006 as follows;

Verification and Small Scale Adaptability Tests Implemented in 2006

Activity	Variety	No. of Plots	Location
Verification Test	Early Rice	2	Project Area (RT2)
	Medium Rice	3	Project Area (RT2)
Small Scale Adaptability Test	Early Rice	1	Prey Pdao Station
	Medium Rice	1	Project Area (RT2)

The verification tests were conducted under moderate input levels (fertilizer), while the simple trials were carried out under high input levels to examine potential yield levels of varieties. The results of the verification tests are presented in Table IIIB-4.4.1 and summarized below.

Results of Verification and Small Scale Adaptability Tests

Activity	Variety	Yield (ton/ha) 1/	
		Range	Average
Verification Test	Early Rice (Sen Pidao)	4.0	4.0 2/
	Medium Rice (Riang Chey)	3.9 ~ 4.8	4.2

1/: Yield levels of a whole plot & not crop cut yields 2/: Estimated yield

The results of the simple trials indicated higher potential yields of both early and medium varieties (Sen Pidao, IR 66 & Riang Chey).

(2) Target Crop Yield and Production

The target crop yields under the development plan are set based on the results of the verification tests under the Pilot Project on early and medium rice in the Project Area and other relevant information as shown in Table IIIB-4.4.2 and the following table in comparison with the present yield levels.

Target Yields and Present Yield Levels

Crop	Early Rainy Season			Rainy Season		
	Yield (t/ha)			Yield (t/ha)		
	Target	Present	Increment	Target	Present	Increment
Early Rice 1/	3.8	2.4	1.4	3.8	-	--
Medium Rice	-	-	-	3.3	2.3	1.0
Upland Crops 2/	0.7	0.45	0.25	-	-	-

1/: Average yield of IR 66 & Sen Pidao
2/: Upland crops represented by mungbeans; present yield estimated in the Master Plan

Yield increases of 1.4 ton/ha in early rice in the early rainy season, 1.0 ton/ha in medium rice in the rainy season and 0.25 ton/ha in upland crops are envisaged under the plan.

On the basis of the planned cropped area and target yields of crops, crop production under the present and with-project are estimated as shown in the following table.

Annual Cropped Area & Crop Production under Present & With-project Conditions

Crop	Item	Present	With Project	Increment 1/	
				Area/Prod.	%
1. Early Rainy Season Rice (early rice)	- Cropped Area (ha)	203	285	+ 82	+ 40
	- Production (ton) 2/	487	1,083	+ 596	+ 122
2. Rainy Season Rice (early rice)	- Cropped Area (ha)	-	285	+ 285	-
	- Production (ton) 2/	-	1,083	+ 1,083	-
2. Rainy Season Rice (medium rice)	- Cropped Area (ha)	580	285	- 295	- 51
	- Production (ton) 2/	1,334	941	- 393	- 29
3. Rice Total	- Cropped Area (ha)	783	855	+ 72	+ 9
	- Production (ton) 2/	1,821	3,107	+1,286	+ 71
4. Upland Crops 3/	- Cropped Area (ha)	-	30	+30	-
	- Production (ton)	-	21	+21	-

1/(present/with project) x 100 2/: Paddy production 3/: represented by mungbeans

Production increase of some 1,290 tons of paddy from the present 1,820 tons or the paddy production of 171% of the present level at full development is envisaged under the project.

IIIB-4.5 Proposed Farming Practices

The introduction of water saving rice cultivation is the essential assumption in the irrigation plan of the Project and, therefore, the agricultural development plan. The results of the simple trials on on-farm water management in which comparisons of paddy yields between intermittent irrigation and continuous flooding were examined indicated paddy yields in intermittent irrigation treatments comparable to those in continuous flooding as shown in Table IIIB-4.4.1.

The improved rice farming practices adopted in the said verification tests were formulated in consultation with PDA and CARDI. However, in the course of the implementation of the tests, it was found that several practices should be improved or revised to increase adoptability of such practices at farmers' level.

The proposed rice farming practices under the Project formulated taking into such lessons learned in the Pilot Project are presented in Table IIIB-4.4.3. Major improvements envisaged from the prevailing practices are: i) proper land leveling & preparation, ii) use of quality seed, iii) raised semi-dry nursery bed, iv) planting of young seedling, v) regular planting, vi) reduced number of plants per hill, vii) fertilization (increased & timely application including manure or compost), viii) introduction of proper on-farm water management & water saving culture (intermittent irrigation), ix) intensified weeding and x) improvement of post-harvesting practices. Major proposed practices are as follows;

(1) Seed Bed Preparation & Seed

Preparation of raised semi-dry seed bed for nursing stout and healthy seedlings is proposed. Seed replacement with commercial seed is also preferable practices.

(2) Transplanting

Introduction of regular planting with younger stout & healthy seedlings, proper planting density and reduced number of plants/hill (2~3 plants/hill in order to mitigate damages caused by crab) is proposed practices. However, efficiency of regular planting is essential for it to be adopted by farmers.

(3) Fertilization

From chemical properties of soils in the Project Area, application of potassium (K) fertilizer is judged essential. Application of manure/compost as basal dressing is recommended though depending on their availability.

(4) Intermittent Irrigation

The introduction of water saving rice cultivation through the introduction of intermittent irrigation is essential assumption in the irrigation water balance study of the present Project. Accordingly, the introduction of intermittent irrigation after taking-root stage to before panicle initiation stage is proposed as the on-farm water management practice.

IIIB-4.6 Labor Balance

The labor balance on an average farm family under the with-project condition was examined with the following assumptions set based on the proposed cropping pattern and agro-demographic features stated in the Clause IIIB-1.3.

Assumptions for Labor Balance

Farm Land Holding Size	0.8 ha per family
Cropping Pattern	Early rainy season rice: 50%, 0.4 ha
	Rainy season rice (medium variety): 50%, 0.4 ha
	Rainy season rice (early variety): 50%, 0.4 ha
	Upland crops (early rainy season): 5%, 0.04 ha
Family Labor Force & Working Day/Month	3.1/family & 22 working days/month
Family labor Force for Farming	60% of family labors

The result of labor balance study is indicated in Table IIIB-4.6.1. As shown in the table, basically no labor shortage will be encountered under the with-project condition except for minor shortage at harvesting times of rainy season, which will be solved by labor exchange arrangement as currently practiced in the Project Area.

IIIB-4.7 Farm Household's Economy

The results of farm economic analyses of typical farms {farm families having double cropped rice field (Type A) and having only a single cropped rice field (Type B)}[1] defined in the Clause IIIB-1.11.1 are presented in Table IIIB-4.7.1 and summarized in the following table.

Farm Economy under With-project Condition (unit: Riel)

		Type A	Type B	Balance
Gross Incomes	Rice Production	1,986	1,385	
	Other Farm Income	1,066	1,145	- 79
	Non-farm Income	2,267	1,959	308
	Total Income	5,319	4,489	
Expenditures	Production Costs of Farm Products	1,291	1,054	199
	Other Expenditures	3,017	2,483	534
	Total Expenditures	4,308	3,537	733
Net Surplus (Capacity to Pay)		1,011	952	

Source: JICA Study Team

As shown in the tables, the farm economic statuses of both the typical farms under the with-project condition will be improved to a certain extent and the net surplus or capacity to pay are estimated at Riel. 1,011,000 or 19% of total income for Type A and Riel. 952,000 or 21% of total income for Type B. The incremental net surpluses account for 87% and 89% of the present level, respectively for Type A and Type B as shown below.

Incremental Income & Net Surplus under With-project Condition (unit: Riel)

Factor	Type A			Type B		
	Present	With-project	Increment	Present	With-project	Increment
Gross Incomes	4,635	5,319	684	3,784	4,489	705
Net Income	3,559	4,028	469	2,987	3,435	448
Net Surplus	542	1,011	469	504	952	448
(increment in %)	(100)	(187)	(87)	(100)	(189)	(89)

Source: JICA Study Team

for minor shortage at harvesting times of rainy season, which will be solved by labor exchange arrangement as currently practiced in the Project Area.

IIIB-4.8 Proposed Approaches for Improvement of Marketing

Major paddy marketing constraints identified in the present Study are low market price of paddy and unstable market price. However, production increase expected under the with-project condition might invite other constraints in marketing such as limited market destination.

The basic demand of markets for agricultural products is supply of a constant (given) volume and quality of products at a given timing. Therefore, the prerequisite condition for market development of agricultural products is to meet such basic market demand.

The proposed approaches to cope with the slated constraints will be time series or stepwise approaches of: i) improvement productivity and quality of products through improvement of farming practices, ii) formation of farmer groups and introduction of group economic activities such as group purchasing of farm inputs and technology transfer within a group and among groups, iii) introduction of contract growing or partnership arrangement, iv) intensification of group economic activities toward cooperative shipment and cooperative marketing followed and v) formation of cooperatives by uniting groups. The government support activities toward such approaches will be guidance/extension and farmer/farmer group training activities and provision of market information to farmer groups. The proposed approaches is illustrated in Figure IIIB-4.8.1 and explained in the followings;

[1] Assuming that both are in gravity irrigation area

(1) Improvement of Productivity and Quality of Products

The 1st and essential step to take in the proposed approaches is to improve farming practices and technologies of target groups (farmers) and to improve productivity and quality of subject crops or commodities through the extension activities and by way of efforts of target groups themselves. In the proposed approaches, priority should be placed on productivity improvement through the improvement of farming practices and quality improvement of products should better be envisaged after the attainment of productivity improvement.

(2) Formation of Groups of Interested Farmers

In parallel with the activities for the said improvement of productivity and quality of products, formation of a group with interested farmers will be the 2nd step. As market demand is a given volume, a group formation is an essential approach because of the limitation of land holding size in the Project Area.

As marketing is a business activity, marketing skills or business mind of individual farmers or groups are be enhanced through extension activities. Further, within a group or among groups, technology transfer among members or farmer-to-farmer extension is to be institutionalized. Such technology improvement activities should better be promoted by advanced or key farmers in a group or groups. The external guidance or extension services are to be directed to those key farmers intensively and technologies, knowledge and experiences received by the key farmers are to be disseminated to fellow members through farmer-to-farmer extension. The technology transfer to those key farmers should cover both technical and business & marketing skills aspects essential for improvement of marketing.

(3) Initial Group Economic Activity

The initial group economic activity will be group purchasing of farm inputs aiming at improvement of productivity and quality of products and also saving farming costs. The introduction of contract growing or partnership arrangement could also be attempted at this stage as an initial group economic activity.

(4) Improvement of Farmers Access to Market Information

Provision of market information will be a government intervention. However, efforts of groups for market development are also necessary activities toward the introduction of advanced group economic activities.

(5) Advanced Group Economic Activity

The advanced group economic activities include cooperative shipment of products followed by cooperative marketing when product quality of members become uniform. Processing of products or expansion of contract growing or partnership arrangement are also potential activities of those groups.

(6) Formation of Cooperatives

The formation of cooperatives to establish groups as a legal entity will be the final step in the proposed approaches for improvement of marketing by uniting interested groups having economic activities.

Chapter IIIB-5 Agricultural Support Services Strengthening Plan

IIIB-5.1 Basic Approaches

The results of the Socio-economic Survey and the findings of the Pilot Project indicate that farmers are well aware of potentials and needs for productivity improvement of rice, however, their current accessibilities to measures, knowledge and technologies to improve productivity appear to be limited because of restricted extension coverage.

The primary objective of the Project is productivity improvement of irrigated rice. To tackle development constraints faced in the Area, strengthening of agricultural support services will be essential in order to ensure the attainment of project targets at an early stage. Further, the Project is defined as the irrigated agriculture improvement model project in the Master Plan, therefore, the establishment of coordination and collaboration among project institutions, especially between MAFF and MOWRAM and PDA and PDOWRAM, is an essential goal of the Project.

Accordingly, the present development intervention is proposed with the objectives of: i) development and extension of improved and sustainable farming technologies on rice production to enhance productivity of the primary agriculture activity in the Area, ii) empowerment of extension personnel by way of learning through doing, iii) promotion of farmer-to-farmer technology transfer and iv) development and dissemination of technologies for upland crops/vegetable farming practices and v) establishment of an institutional set-up responsible for the promotion of agricultural productivity improvement in and around the Project Area at an initial stage of the Project.

IIIB-5.2 Development Strategies and Scope of Intervention

(1) Development Strategies

For the attainment of the objectives stated above, the development strategies of the present plan are set as follows;

- Intensive introduction of agricultural support services is to be envisioned with the aim of attaining the project target at an early stage as possible,
- Insufficient coordination and collaboration between MAFF and MOWRAM appears to be one of essential constraints for the irrigated agricultural development in the Area. As the execution of the model project, the development intervention aims at the establishment of coordination and collaboration body at central and project level to tackle with such sustained constraint for the development, and
- Establishing the Project Office for the project implementation organized by staffs of MAFF/PDA and MOWRAM/ PDOWRAM in the Area as an institute responsible for the integrated & collaborative activities of the agencies.

(2) Scope of the Intervention

The plan is formulated for the period of 4 years from 2010 to 2013 aiming at strengthening agricultural support services. Such services should be provided through the establishment of an institution responsible for the provision of the services as stated earlier. The envisioned major activities under the plan include: i) field extension and technology development programs and farmer/farmer group training programs aiming at improvement of irrigated agriculture farming practices and production system with farmers participation, ii) empowerment of extension personnel and their fielding, iii) establishment of village extension agents (VEAs).

IIIB-5.3 Agricultural Support Services Strengthening Plan

The agricultural support services required for the promotion of adoption of proposed farming practices and for attaining the project target cropping pattern, cropping intensity and crop yields at an earlier stage are as shown in the following table.

Proposed Agricultural Support Services

Activity	Program Required
Field Extension Programs	Plot & area demonstration, adaptability test, seed multiplication
Farmer/Farmer Group Training Programs	Training program, farmer field school, study tour, village extension agent training & deployment
Mass Guidance/Workshop	Mass guidance/workshop
Farmer-to-farmer Extension Support 1/	Farmer-to-farmer extension support
Staff Empowerment	Staff training, logistic strengthening

1/: Provision of support for farmer-to-farmer extension by village extension agents

For the attainment of the project target at an earlier stage, the intensive provision of agricultural support services is proposed. The implementation and cost schedule of the proposed agricultural support services strengthening plan formulated taken into account of experiences and lesson learned from the implementation of the Pilot Project are shown in Table IIIB-5.3.1. The total estimated direct costs for such programs are estimated at about US$ 46,400 as follows;

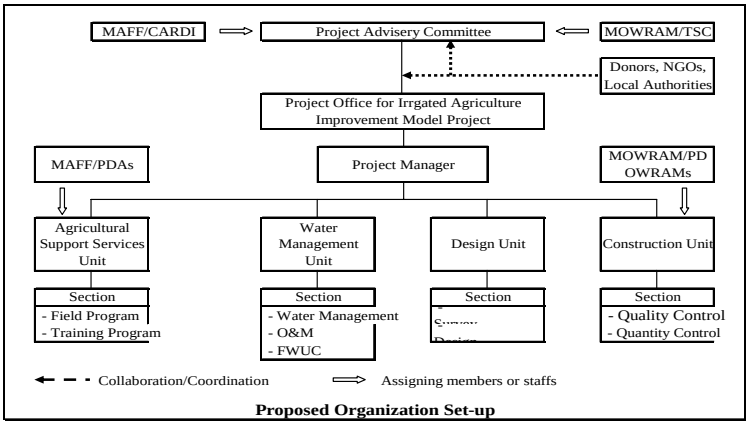
Estimated Direct Costs for Support Programs

Activity	Estimated Cost (US$)
Field Extension Programs	18,480
Farmer/Farmer Group Training Programs	12,740
Mass Guidance/Workshop	880
Support Fund for Extension Staff 1/	10,800
Staff Empowerment	2,000
Logistic Strengthening	1,500
Total	46,400

1/: Provision of support for farmer- to-farmer extension & field staff

IIIB-5.4 Proposed Institutional Set-up for Implementation

As stated earlier, the establishment of the Project Office for the project implementation organized by staffs of MAFF/PDA and MOWRAM/ PDOWRAM as an institute responsible for the integrated & collaborative activities of the agencies is proposed. The formation and operation of the Project Office is to be envisioned so that it will become a model for the future irrigated agriculture development in the country. The proposed institutional set-up for the project organization is as illustrated below.



Proposed Organization Set-up

Tables

Table IIIB-1.1.1 Chemical Properties of the Major Soils Distributed in the Project Area

Soil Type	Location (Auger Site)	Sample No.	Depth (cm)	pH (H_2O)	pH (KCl)	EC (1:5) (µs/cm)	Total Carbon (%)	Total Nitrogen (%)	C/N Ratio	Organic Matter (%)	Total P_2O_5 (%)	Available P_2O_5 (ppm)	CEC (meq /100g soil)	Exchangeable Cation (meq/100g soil) Ca	Mg	K	Na	Total	Base Saturation (%)
Gleyic Acrisol Medium to Fine Textured Phase (GAf)	P31	S1A	0-10	5.8	4.1	13.7	0.98	0.105	9.3	1.68	0.048	491	8.50	2.50	2.00	0.12	0.43	5.05	59
		S1B	10 - 20	5.9	4.2	29.2	0.78	0.077	10.1	1.34	0.065	489	9.00	3.25	1.75	0.19	0.65	5.84	65
Gleyic Acrisol Coarse to Medium Textured Phase (GAm1)	P25	S2A	0-10	5.2	4.0	13.2	0.29	0.035	8.3	0.50	0.010	27	8.00	1.75	1.25	0.12	0.32	3.44	43
		S2B	10 - 20	6.0	4.8	18.5	0.20	0.042	4.8	0.33	0.011	39	6.50	2.25	1.50	0.19	0.32	4.26	66
Gleyic Acrisol Medium to Fine Textured Phase (GAf)	P38	S3A	0-10	5.7	4.1	9.7	0.43	0.042	10.2	0.73	0.012	17	8.50	3.25	1.75	0.12	0.43	5.55	65
		S3B	10 - 20	6.3	4.9	9.0	0.39	0.049	8.0	0.67	0.007	18	10.50	4.25	2.25	0.19	0.43	7.12	68
Gleyic Acrisol Medium Textured Phase (GAm2)	P19	S4A	0-10	6.0	4.5	11.7	0.49	0.049	10.0	0.83	0.013	44	13.00	4.50	3.00	0.12	0.65	8.27	64
		S4B	10 - 20	7.2	5.6	16.4	0.70	0.091	7.7	1.19	0.011	27	8.50	3.75	2.50	0.06	0.87	7.18	84
Gleyic Acrisol Medium Textured Phase (GAm2)	P7	S5A	0-10	5.7	4.1	6.3	0.29	0.028	10.4	0.50	0.015	44	7.50	2.25	1.75	0.06	0.32	4.38	58
		S5B	10 - 20	6.8	5.1	10.1	0.20	0.035	5.7	0.33	0.010	30	5.00	3.75	1.50	0.06	0.54	5.85	117
Gleyic Acrisol Coarse to Medium Textured Phase (GAm1)	P4	S6A	0-10	4.9	3.6	24.9	0.78	0.049	15.9	1.34	0.012	15	10.00	1.75	1.25	0.65	0.12	3.77	38
		S6B	10 - 20	5.9	4.5	20.1	0.39	0.056	7.0	0.67	0.011	19.0	10.00	3.25	2.25	0.12	0.76	6.38	64

Methods of soil analysis:

Total C --- Black

Total N --- Kjeldalh method

Organic matter --- ignition loss

Total P_2O_5 --- Murphy method

Available P_2O_5 --- Olsen method

CEC --- 1M $CaCl_2.2H_2O$

Exchangeable cations: 1M Ammonium Acetate pH 7

Table IIIB-1.2.1 Land Use of the Project Villages 1/

Unit: ha

District/Commune/Village	Land Use Category												
	Rice Field												
	Rainy Season				Dry Season								
	Irrigated Field		Rainfed		Irrigated Field		Upland						
	Area	% 2/	Field	Total	Area	% 2/	Area	Hills	Forest	Grass Land	Free Land	Village	Total
Chbar Mon													
Kandaol Dom in 2003													
1. Rumleang	18	*36*	32	50	18	*36*	2	0	0	0	0	6	58
2. Pongro	46	*75*	15	61	15	*25*	5	0	1	0	0	5	72
3. Nhor	10	*34*	19	29	5	*17*	0	0	0	0	0	12	41
4. Kandaol Dom	10	*21*	37	47	8	*17*	1	0	0	0	0	6	54
5. Trapeang Preah	0	*0*	55	55	12	*22*	0	0	0	0	0	7	62
6. Kab Tuk	15	*83*	3	18	15	*83*	0	0	1	0	0	7	26
7. Srae Thnal	20	*39*	31	51	7	*14*	1	0	0	0	0	7	59
Project Villages	**119**	***38***	**192**	**311**	**80**	***26***	**9**	**0**	**2**	**0**	**0**	**50**	**372**
Commune Total	212	*39*	335	547	164	*30*	34	0	8	0	0	65	654
Svay Kravan in 2003													
1. Svay Kravan	40	89	5	45	35	*78*	0	0	0	0	0	7	52
5. Phsar Chas	14	50	14	28	14	*50*	3	0	0	0	0	8	39
6. Thnal Bambaek	7	10	66	73	7	*10*	5	0	0	0	0	8	86
7. Prey Kdei	12	30	28	40	12	*30*	1	0	0	0	0	17	58
8. Tras	8	20	32	40	6	*15*	2	0	0	0	0	4	46
Project Villages	**81**	**198**	**145**	**226**	**74**	**182**	**11**	**0**	**0**	**0**	**0**	**44**	**281**
Commune Total	252	48	269	521	218	*42*	28	0	0	0	0	109	658
Samraong Tong							Others						
Kahaeng in 2006							3/						
1. Tumpung	0	*0*	47	47	6	*13*	47	0	0	0	0	16	110
2. Roleang Chrey	20	*87*	3	23	6	*26*	37	0	0	0	0	9	69
3. Kouk Rumlich	20	*91*	2	22	0	*0*	30	0	0	0	0	5	57
4. Kahaeng	25	*48*	27	52	0	*0*	30	0	0	0	0	15	97
5. Bos Ta Ney	16	*33*	33	49	10	*20*	42	0	0	0	0	5	96
6. Ou Veaeng	8	*15*	47	55	0	*0*	39	0	0	0	0	7.5	101
Project Villages	**89**	***36***	**159**	**248**	**22**	***9***	225	**0**	**0**	**0**	**0**	**58**	**530**
Commune Total	95	*13*	638	733	22	*3*	484	0	0	0	0	132	1,349
Project Villages Total	**289**	***37***	**496**	**785**	**176**	***22***	**245**	**0**	**2**	**0**	**0**	**152**	**1,183**

1/: Villages located in the Project Area 2/: % of to total paddy field 3/: Total area - (paddy field + village area)

Source: Kandal Dom & Svay Kravan --- Chbar Mon District Agriculture Office; Kahaeng --- commune office

Table IIIB-1.3.1 Agro-demographic Features of the Project Villages 1/

District/Commune/Village	Village Type 2/	No. of Families 3/	Population			Family Size (person) 2/	Working Population (age 15-64)			Farm Family		Non-farm Family	Paddy Field (ha) 3/	Holding Size per Farm Family (ha) 3/
			Female 2/	Male 2/	Total 2/		Female 2/	Male 2/	Total 2/	(No.) 3/, 4/	% 3/	(No.) 3/		
Chbar Mon														
Kandaol Dom														
Rumleang	Urban	140	386	334	720	5.1	216	195	411	105	75	35	50	0.5
Pongro	Urban	106	319	274	593	5.6	158	135	293	62	58	44	61	1.0
Nhor	Urban	165	471	424	895	5.4	279	259	538	39	24	126	29	0.7
Kandaol Dom	Urban	126	328	281	609	4.8	209	213	422	68	54	58	47	0.7
Trapeang Preah	Urban	115	277	252	529	4.6	181	149	330	51	44	64	55	1.1
Kab Tuk	Urban	75	180	164	344	4.6	120	100	220	31	41	44	18	0.6
Srae Thnal	Urban	78	205	186	391	5.0	116	111	227	44	56	34	51	1.2
Project Villages		**805**	**2,166**	**1,915**	**4,081**	**5.1**	**1,279**	**1,162**	**2,441**	**400**	**50**	**405**	**311**	**0.8**
Commune Total		1,411	3,766	3,419	7,185	5.1	2,239	2,085	4,324	603	43	808	568	0.9
Svay Kravan														
Svay Kravan	Urban	123	390	297	687	5.6	223	166	389	74	60	49	45	0.6
Phsar Chas	Urban	172	502	482	984	5.7	360	331	691	87	51	85	28	0.3
Thnal Bambaek	Urban	130	360	300	660	5.1	225	177	402	74	57	56	73	1.0
Prey Kdei	Urban	113	299	295	594	5.3	200	167	367	65	58	48	40	0.6
Tras	Urban	65	171	179	350	5.4	116	108	224	36	55	29	40	1.1
Project Villages		**603**	**1,722**	**1,553**	**3,275**	5.4	**1,124**	**949**	**2,073**	**336**	**56**	**267**	**226**	**0.7**
Commune Total		1,420	3,903	3,514	7,417	5.2	2,476	2,148	4,624	857	60	563	226	0.3
District Total		8,069	22,314	20,928	43,242	5.4	13,916	13,031	26,947					
Samraong Tong														
Kahaeng		3/												
Tumpung	Rural	135	344	361	705	5.2	158	194	352	113	84	22	47	0.42
Roleang Chrey	Rural	104	253	239	492	4.7	144	153	297	94	90	10	23	0.24
Kouk Rumlich	Rural	48	120	115	235	4.9	85	71	156	40	83	8	22	0.55
Kahaeng	Rural	94	216	220	436	4.6	139	136	275	47	50	47	52	1.11
Bos Ta Ney	Rural	94	252	224	476	5.1	110	96	206	86	91	8	49	0.57
Ou Veaeng	Rural	99	255	250	505	5.1	149	162	311	86	87	13	55	0.64
Project Villages		**574**	**1,440**	**1,409**	**2,849**	**5.0**	**785**	**812**	**1,597**	**466**	**81**	**108**	**248**	**0.53**
Commune Total		1,364	3,496	3,325	6,821	5.0	2,116	1,983	4,099	1,072	79	292	399	0.37
District Total		25,914	71,739	67,712	139,451	5.4	42,472	39,095	81,567					
Overall Project Villages		**1,982**	**5,328**	**4,877**	**10,205**	**5.1**	**3,188**	**2,923**	**6,111**	**1,202**	**61**	**780**	**785**	

1/: Villages located in the Project Area

2/: Source: SEILA Commune Data Base 2005

3/: Source: Commune Offices

4/: No. of families occupation of family head is farmer

Table IIIB-1.4.1 Estimation of Present Cropped Area and Cropping Intensity in the Project Area

1. Results of Detail Investigation on Irrigation Status 1/

Category of Rice Field	Cropping Pattern & Intensity Assumed 2/				
	Indicator	ERS	RS	DS	Annual
Fields irrigable for single cropping of rice	Cropping Pattern	Fallow	Rice	Fallow	-
	Cropping Intensity	-	100%	-	100%
Fields irrigable for double cropping of rice 3/	Cropping Pattern	Rice	Rice	Fallow	-
	Cropping Intensity	100%	100%	-	200%
Project Area	Cropping Pattern	Rice	Rice	Fallow	-
	Cropping Intensity	35%	100%	-	135%

1/: Results of the detail inventory survey by JICA Study Team, 2006

2/: ERS: early rainy season; RS: rainy season; DS: dry season

3/: Including 0.3% (2 ha) of triple cropped rice field

2. Results of Socio-economic Survey 3/

Cropping Season	Crop	Cropping Intensity	No. Respondent	
Early Rainy Season	Rice	38%	69	Max. 2.5ha; Min. 0
Rainy Season	Rice	98%	99	Max. 4.5ha; Min. 0.1ha
Dry Season	Rice	5%	3	Max. 0.6ha; Min. 0
Annual	Rice	140%		

3/: Results of Socio-economic Survey by JICA Study Team, 2006;

Sample n Sample numbers 100 rice farmers in FS Area Details are presented in Attachment IIIB-5

3. Secondary Data: Cropping Intensity in the Project Villages 4/

Subject Area	Overall Cropping Intensity of Rice in the Subject Villages
Project Villages in Kahaeng Commune 5/	Rainy season 98%; dry season 15%; annual 112%
Project Villages in Kandal Dom Commune 5/	Rainy season 103%; dry season 9%; annual 112%
Project Villages in Svay Kravan Commune	Rainy season 85%; dry season 1%; annual 85%
All Project Villages	Rainy season 96%; dry season 8%; annual 104%

4/: Secondary Data Provided collected at the Project Communes; average of 4 years from 2003 to 2006

Details are presented in Attachment IIIB-6

5/: Most of dry season cropping might be categorized into early rainy season cropping

4. Estimated Cropped Area and Cropping Intensity of Rice in the Project Area 5/

Category of Rice Field	Estimated Cropped Area & Cropping Intensity of Rice 6/				
	Indicator	ERS	RS	DS	Annual
Fields irrigable for single cropping of rice	Cropped Area	ha	377 ha	ha	377 ha
	Cropping Intensity	-	100 %	-	100 %
Fields irrigable for double cropping of rice	Cropped Area	203 ha	203 ha	ha	406 ha
	Cropping Intensity	100 %	100 %	-	200 %
Project Area	Cropped Area	ha	580 ha	ha	783 ha
	Cropping Intensity	35%	100 %		135%

5/: Estimated present cropped area and cropping intensity of rice in the Project Area for the present study

6/: ERS: early rainy season; RS: rainy season; DS: dry season

Table IIIB-1.4.2 Estimation of Present Yield Levels of Paddy in the Project Area

1. Results of Socio-economic Survey in the Project Area: Average yield of paddy 1/

Item	Early Rainy Season	Rainy Season	Dry Season	No. of Respondents
Variety	IR 66	medium variety	IR 66	Early rainy season: 69;
Average Yield	2.4 ton/ha	2.3 ton/ha	2.5 ton/ha	rainy season: :99; dry season: 8

1/: Results of Socio-economic Survey conducted in the Project Area by the JICA Study Team, 200

2. Secondary Data: Paddy yields in the Project Villages 2/

Subject Area	Dry Season		Rainy Season	
	Average	Range	Average	Range
Project Villages in Kahaeng Commune (average yield)	2.0	1.8 - 2.1	2.0	1.8 - 2.5
Project Villages in Kandal Dom Commune (average yiel	2.5	1.8 - 3.0	2.5	1.8 - 3.0
Project Villages in Svay Kravan Commune (average yiel	-	-	2.0	-
All Project Villages	2.2	1.9 - 2.3	2.2	2.1 - 2.2

2/: Secondary Data Provided Collected at the Project Communes; average of 4 years from 2003 to 2004
Details are presented in Attachment 6

3. Results of Socio-economic Survey: Average yield 3/

Irrigation Category	Paddy Yield (ton/ha)		Irrigation Status	Remarks
	Rainy Season Local Variety 2/	Dry Season Improved Variety		
Zone-1	2.13	2.40	Irrigated field	No. of respondents: 46

3/: Results of Socio-economic Survey conducted by the JICA Study Team, 2005

4. Results of Socio-economic Survey: Yield Distribution 4/

Irrigation Category	Paddy Yield (ton/ha)		Irrigation Status	Remarks
	Rainy Season Local Variety	Dry Season Improved Variety		
Zone-1	0.7 ~ 6.0	0 ~ 6.0	Fully irrigated field	No. of respondents: 46

4/: Results of Socio-economic Survey conducted by the JICA Study Team, 2005

5. Statistic Data: Paddy Yields in Province 5/

Province	Average Paddy Yield (ton/ha)			
	To Cropped Area		To Harvested Area	
	Rainy Season	Dry Season	Rainy Season	Dry Season
Kampong Speu	1.4	2.4	1.7	2.6

5/: Average of 2003/04 - 2004/05
Source: 2003-04: Commune Survey on Crops & Livestock, 2003, Statistic Office, MAFF; 2004-05: PDA

6. Estimated Present Yield Levels of Paddy in the Project Area

On the basis of the results of the Socio-economic Survey, the statistic data and information collected during the present study and information provided by PDA, the present yield levels of paddy in the Project Area estimated

Estimated Present Yield Levels in the Project Area

Item	Cropping Season			Remarks
	Early Rainy Season	Rainy Season	Dry Season	
Prevailing Variety	IR66	Medium/Local	IR66	Major local varieties: Riang Chey,
Yield Level	2.4 ton/ha	2.3 ton/ha	2.4 ton/ha	Phka Mulis, Neang Ming

Table IIIB-1.4.3 Present Cropped Area and Production by Irrigation Category

1. Gravity Irrigation Area (306 ha)

Crops/Cropping Season	Gravity Irrigation Area (306 ha)								
	Early Rainy Season			Rainy Season			Total		
	Cropped Area (ha)	Yield (ton)	Production (ton)	Cropped Area (ha)	Yield (ton)	Production (ton)	Cropped Area (ha)	Yield (ton)	Production (ton)
Early Rainy Season Rice									
- Early Variety (HYV)	107	2.40	257				107	2.40	257
Rainy Season Rice									
- Early Variety (HYV)									
- Medium Variety				306	2.30	704	306	2.30	703
Sub-total				306	2.30	704	306	2.30	703
Total	107	2.40	257	306	2.30	704	413	2.32	960

2. Gravity/Pumping Irrigation Area (190 ha)

Crops/Cropping Season	Gravity/Pumping Irrigation Area (190 ha)								
	Early Rainy Season			Rainy Season			Total		
	Cropped Area (ha)	Yield (ton)	Production (ton)	Cropped Area (ha)	Yield (ton)	Production (ton)	Cropped Area (ha)	Yield (ton)	Production (ton)
Early Rainy Season Rice									
- Early Variety (HYV)	67	2.40	161				67	2.40	161
Rainy Season Rice									
- Early Variety (HYV)									
- Medium Variety				190	2.30	437	190	2.30	437
Sub-total				190	2.30	437	190	2.30	437
Total	67	2.40	161	190	2.30	437	257	2.33	598

3. Pumping Irrigation Area (84 ha)

Crops/Cropping Season	Pumping Irrigation Area (84 ha)								
	Early Rainy Season			Rainy Season			Total		
	Cropped Area (ha)	Yield (ton)	Production (ton)	Cropped Area (ha)	Yield (ton)	Production (ton)	Cropped Area (ha)	Yield (ton)	Production (ton)
Early Rainy Season Rice									
- Early Variety (HYV)	29	2.40	70				29	2.4	70
Rainy Season Rice									
- Early Variety (HYV)									
- Medium Variety				84	2.30	193	84	2.3	193
Sub-total				84	2.30	193	84	2.3	193
Total	29	2.40	70	84	2.30	193	113	2.33	263

4. Project Area (580 ha)

Crops/Cropping Season	Project Area (580 ha)								
	Early Rainy Season			Rainy Season			Total		
	Cropped Area (ha)	Yield (ton)	Production (ton)	Cropped Area (ha)	Yield (ton)	Production (ton)	Cropped Area (ha)	Yield (ton)	Production (ton)
Early Rainy Season Rice									
- Early Variety (HYV)	203	2.40	487				203	2.40	487
Rainy Season Rice									
- Early Variety (HYV)									
- Medium Variety				580	2.30	1,334	580	2.30	1,334
Sub-total				580	2.30	1,334	580	2.30	1,334
Total	203	2.40	487	580	2.30	1,334	783	2.33	1,821

Source: JICA Study Team

Table IIIB-1.4.4 Crop Losses of Rice in Rainy Season in the Project Area by Village from 2003 to 2006 (1/2)

Commune/Village	Year	Rice Field (ha)	Planted Area (ha)	Completely Destroyed Area				Proportion to Planted Area (%)
				Flood (ha)	Drought (ha)	Pest (ha)	Total (ha)	
Kahaeng Commune								
1. Tumpung	2003		54	0	0	0	0	0
	2004		54	0	0	0	0	0
	2005	54	49	0	5	0	5	10
	2006		54	0	0	0	0	0
	Average 1/		53	0	1	0	1	2
2. Roleang Chrey	2003		23	0	0	0	0	0
	2004		23	0	0	0	0	0
	2005	23	23	0	0	0	0	0
	2006		23	0	0	0	0	0
	Average 1/		23	0	0	0	0	0
3. Kouk Rumlich	2003		22	0	0	0	0	0
	2004		22	0	0	0	0	0
	2005	22	22	0	0	0	0	0
	2006		22	0	0	0	0	0
	Average 1/		22	0	0	0	0	0
4. Kahaeng	2003		52	0	0	0	0	0
	2004		52	0	0	0	0	0
	2005	52	52	0	0	0	0	0
	2006		52	0	0	0	0	0
	Average 1/		52	0	0	0	0	0
5. Bos Ta Ney	2003		46	0	0	0	0	0
	2004		40	0	4	0	4	10
	2005	46	40	0	4	0	4	10
	2006		46	0	0	0	0	0
	Average 1/		43	0	2	0	2	5
6. Ou Veaeng	2003		55	0	0	0	0	0
	2004		55	0	5	0	5	9
	2005	55	49	0	6	0	6	12
	2006		55	0	0	0	0	0
	Average 1/		54	0	3	0	3	5
Project Village Total	2003		252	0	0	0	0	0
	2004		246	0	9	0	9	4
	2005	252	235	0	15	0	15	6
	2006		252	0	0	0	0	0
	Average 1/		246	0	6	0	6	2
Kandal Dom Commune								
1. Rumleang	2003		60		1		1	2
	2004		58		2		2	3
	2005	50	55				0	0
	2006		57				0	0
	Average 1/		58	0	1	0	1	1
2. Pongro	2003		77		2		2	3
	2004		77		5		5	6
	2005	61	72				0	0
	2006		80	2			2	3
	Average 1/		77	1	2	0	2	3
3. Nhor	2003		36				0	0
	2004		25		10		10	40
	2005	27	24				0	0
	2006		24				0	0
	Average 1/		27	0	3	0	3	9
4. Kandaol Dom	2003		52		3		3	6
	2004		52		10		10	19
	2005	46.5	46				0	0
	2006		47				0	0
	Average 1/		49	0	3	0	3	7
5. Trapeang Preah	2003		60		3		3	5
	2004		51		38		38	75
	2005	54.5	37				0	0
	2006		40				0	0
	Average 1/		47	0	10	0	10	22
6. Kab Tuk	2003		21				0	0
	2004		21				0	0
	2005	21	21				0	0
	2006		23				0	0
	Average 1/		22	0	0	0	0	0
7. Srae Thnal	2003		49				0	0
	2004		31		10		10	32
	2005	45	29				0	0
	2006		29				0	0
	Average 1/		35	0	3	0	3	7
Project Village Total	2003		355	0	9	0	9	3
	2004		315	0	75	0	75	24
	2005	305	284	0	0	0	0	0
	2006		300	2	0	0	2	1
	Average 1/		314	1	21	0	22	7

1/: Average of 3 or 4 seasons
Source: Project Commune Offices

Table IIIB-1.4.4 Crop Losses of Rice in Rainy Season in the Project Area by Village from 2003 to 2006 (2/2)

Village	Year	Rice Field (ha)	Planted Area (ha)	Completely Destroyed Area				Proportion to Planted Area (%)
				Flood (ha)	Drought (ha)	Pest (ha)	Total (ha)	
Svay Kravan Commune								
1. Svay Kravan	2003		45		0	3	3	7
	2004		45		0	2	2	4
	2005	45	45		0	1	1	2
	2006		45		0	1	1	2
	Average 1/		45		0	2	2	4
2. Phsar Chas	2003		23		5	1	6	26
	2004		25		3	2	5	20
	2005	25	28		0	0	0	0
	2006		28		0	0	0	0
	Average 1/		26		2	1	3	11
3. Thnal Bambaek	2003		51		7	3	10	20
	2004		57		7	4	11	19
	2005	73	60		4	0	4	7
	2006		60		4	0	4	7
	Average 1/		57		6	2	7	13
4. Prey Kdei	2003		28		5	3	8	29
	2004		26		7	2	9	35
	2005	40	33		0	0	0	0
	2006		33		0	0	0	0
	Average 1/		30		3	1	4	14
5. Tras	2003		30		10	6	16	53
	2004		30		10	2	12	40
	2005	40	32		8	1	9	28
	2006		32		8	0	8	25
	Average 1/		31		9	2	11	36
Project Village Total	2003		177	0	27	16	43	24
	2004		183	0	27	12	39	21
	2005	223	198	0	12	2	14	7
	2006		198	0	12	1	13	7
	Average 1/		189	0	20	8	27	14
Project Village Overall Total	2003		784	0	36	16	52	7
	2004		744	0	111	12	123	17
	2005	780	717	0	27	2	29	4
	2006		750	2	12	1	15	2
	Average 1/		749	1	47	8	55	7

1/: Average of 3 or 4 seasons

Source: Project Commune Offices

Table IIIB-1.5.1 Prevailing Farming Practices of Rice

Farming Practices	Rainy Season	Early Rainy & Dry Season
Major rice varieties	Medium Variety: Riang Chey, Phka Mulis, Kamping Puoy Late Variety: Neang Ming	Early Variety: IR 66, IR 36, Sen Pidao
Land preparation		
- Method	Mainly by a pair of draft animal & partly by a hand tractor	Mainly by a pair of draft animal & partly by a hand tractor
- Practices	1 plowing & 1 plowing + harrowing/leveling (1 to 2 plow + 1 harrowing)	1 plowing & 1 plowing + harrowing/leveling (1 to 2 plow + 1 harrowing)
Nursery		
- Seeding rate (kg/ha) 1/	Average: 72 kg/ha (23 ~ 133kg)	Average: 62 kg/ha (25 ~ 88 kg)
- Seed bed	Flat semi-wet to wet bed	Flat semi-wet to wet bed
- Seeding rate	Depending (> 60 g/m^2)	Depending (> 60 g/m^2)
- Uprooting seedling	Hand picking (not using a shovel)	Hand picking (not using a shovel)
Transplanting		
- Method	Random planting	Random planting
- Planting distance	Depending (mostly ≦ 25 cm interval)	Depending (mostly ≧ 20 cm interval)
- Age of seedling	45 days (most prevailing) 30 - < 45 days (2nd prevailing) > 45 days or < 30 days (3rd prevailing)	21 - 25 days (most prevailing) < 20 days (2nd prevailing) > 25 days (3rd prevailing)
- No. of plants/hill	4-5 plants/hill (most prevailing) 2-3 plants/hill (2nd prevailing)	2-3 plants/hill (most prevailing) 4-5 plants/hill (2nd prevailing)
Manure (cow dung/compost)		
- Timing	Before land preparation	Before land preparation
- Manure (kg/ha)	About 90% of farmers apply Average dosage: 1.8 ton/ha	About 90% of farmers apply Average dosage: 1.8 ton/ha
Basal Fertilizer		
- Timing	At the time of final land preparation	At the time of final land preparation
- Urea (kg/ha) 1/	Average dosage: 51 kg/ha	Average dosage: 27 kg/ha
- DAP (kg/ha) 1/	Average dosage: 43 kg/ha	Average dosage: 27 kg/ha
- KCl (kg/ha)	Not applied (not available at market)	Not applied (not available at market)
1st Top dressing		
- Applied or not	Common practice with Urea	Common practice with Urea
- Timing	Panicle initiation stage or 1 ~ 1.5 month after planting	Panicle initiation stage
- Urea (kg/ha) 1/	35 kg/ha	65 kg/ha
- DAP (kg/ha) 1/	30 kg/ha	45 kg/ha
2nd Top dressing	Not common; some farmers apply Urea at flowering stage	Seldom practiced
Total Doses (kg/ha)	Urea 70, DAP 60, total 130 kg/ha	Urea 80, DAP 60, total 140 kg/ha
Agro-chemical spray	Seldom applied	Seldom applied
Weeding	2 times per a cropping season	2 times per a cropping season
Harvesting	Manual; cutting at middle of plants	Manual; cutting at base of plants
Threshing		
- Place	Home yard	Home yard
- Method	Manual with threshing board/table Engine or pedal thresher (2nd common)	Manual with threshing board/table Engine or pedal thresher (2nd common)
Drying	Field drying prevailing Sun drying after threshing at home yard, if required	Drying at home yard prevailing Sun drying after threshing at home yard
Cleaning/winnowing	Engine winnower (most common) Manual winnower (2nd common) Manual winnowing (3rd common)	Engine winnower (most common) Manual winnower (2nd common) Manual winnowing (3rd common)
Transportation	Ox-cart (from field to home yard)	Ox-cart (from field to home yard)

Source: Socio-economic Survey by JICA Study Team, 2006 & field survey
1/: Source --- Crop budget survey in Socio-economic Survey, 2006
Source: JICA Study Team

Table IIIB-1.7.1 Livestock Population in the Project Villages 1/

Unit: head, birds & number

District/Commune/Village	Cattle									Pig				Goat/ Sheep 3/	Chicken 3/	Duck 3/	Pig Farm 2/ 3/	Poultry farm		Families with Cattle 4/	No. of with with Pig 4/
	Older than 3 Years			Younger than 3 Years			Bull 3/	Total 3/	Draft Cattle 3/	Breeding		Meat 3/	Total 3/					Meat 3/	Egg 3/		
	Male 3/	Female 3/	Total 3/	Male 3/	Female 3/	Total 3/				Male 3/	Female 3/										
Chbar Mon																					
Kandaol Dom in 2003																					
1. Rumleang	55	30	85	75	62	137	3	225	62	3	0	47	50	0	500	12	0	0	0	120	100
2. Pongro	53	47	100	195	80	275	0	375	60	7	0	40	47	0	300	20	0	0	0	86	90
3. Nhor	31	16	47	71	58	129	0	176	36	5	0	50	55	0	540	35	0	0	0	39	40
4. Kandaol Dom	54	28	82	64	40	104	1	187	64	6	3	123	132	0	250	20	0	0	0	96	50
5. Trapeang Preah	79	38	117	128	72	200	1	318	84	4	0	108	112	0	210	30	1	0	0	100	40
6. Kab Tuk	25	10	35	22	16	38	0	73	10	3	0	18	21	0	150	30	0	0	0	10	30
7. Srae Thnal	38	22	60	58	26	84	2	146	40	6	0	15	21	0	350	10	0	0	0	68	35
Project Villages	**335**	**191**	**526**	**613**	**354**	**967**	**7**	**1,500**	**356**	**34**	**3**	**401**	**438**	**0**	**2,300**	**157**	**1**	**0**	**0**	**519**	**385**
Commune Total	736	392	1,128	1,133	622	1,755	12	2,895	628	39	4	671	714	0	3,965	167	1	0	0	818	831
Svay Kravan in 2003																					
1. Svay Kravan	12	18	30	40	26	66	0	96	30	6	2	120	128	0	250	50	0	0	0	40	55
5. Phsar Chas	3	4	7	10	7	17	0	24	12	2	0	80	82	0	355	100	0	0	0	24	55
6. Thnal Bambaek	24	21	45	52	35	87	0	132	84	5	0	85	90	0	425	50	0	0	0	64	57
7. Prey Kdei	20	10	30	50	24	74	1	105	60	2	0	45	47	0	315	20	1	0	0	100	90
8. Tras	5	7	12	28	15	43	0	55	34	0	0	25	25	0	250	20	0	0	0	37	15
Project Villages	**64**	**60**	**124**	**180**	**107**	**287**	**1**	**412**	**220**	**15**	**2**	**355**	**372**	**0**	**1,595**	**240**	**1**	**0**	**0**	**265**	**272**
Commune Total	142	137	279	493	279	772	2	1,053	532	42	2	892	936	0	4,031	505	1	1	0	758	635
Samraong Tong																					
Kahaeng in 2006																					
1. Tumpung	28	32	60	48	30	78	0	138	50	8	0	50	58	0	230	25	1	0	2	63	20
2. Roleang Chrey	26	17	43	64	43	107	0	150	40	0	0	170	170	100	450	30	0	0	0	63	27
3. Kouk Rumlich	25	33	58	15	20	35	1	94	26	13	7	75	95	0	206	0	0	0	0	34	16
4. Kahaeng	35	42	77	69	68	137	1	215	80	2	0	90	92	0	500	60	0	0	0	91	71
5. Bos Ta Ney	40	38	78	29	25	54	0	132	38	2	0	35	37	0	250	40	2	0	0	65	42
6. Ou Veaeng	20	15	35	39	21	60	1	96	24	5	0	101	106	0	502	60	0	0	0	50	21
Project Villages	**174**	**177**	**351**	**264**	**207**	**471**	**3**	**825**	**258**	**30**	**7**	**521**	**558**	**100**	**2,138**	**215**	**3**	**0**	**2**	**366**	**197**
Commune Total	718	672	1,390	609	514	1,123	5	2,518	818	76	8	1,189	1,274	100	7,839	753	5	0	4	975	541
Project Villages Total	**573**	**428**	**1,001**	**1,057**	**668**	**1,725**	**11**	**2,737**	**834**	**79**	**12**	**1,277**	**1,368**	**100**	**6,033**	**612**	**5**	**0**	**2**	**1,150**	**854**

1/: Villages located in the Project Area 2/: Pig farm raising more than 50 heads 3/: Source: Kandal Dom & Svay Kravan --- Chbar Mon District Agriculture Office; Kahaeng --- Commune Office

4/: Source: Kandal Dom & Svay Kravan --- Chbar Mon District Agriculture Office; Kahaeng ---SEILA Commune Data Base 2005

Table IIIB-1.8.1 Inventory on Farm Machinery & Equipment in the Project Villages 1/

Unit: number

District/Commune/Village	4 Wheel Tractor	Hand-Tractor	Water Pump	Thresher		Harvester	Rice Mill				Plow	Harrow	Ox Cart		
				Engine	Pedal		Small	Medium	Large	Total			Tire Wheel	Traditional Wheel	Total
Chbar Mon															
Kandaol Dom in 2003															
1. Rumleang	0	0	11	0	6	0	4	0	0	4	31	27	10	14	24
2. Pongro	0	1	14	0	3	0	2	0	0	2	35	35	15	15	30
3. Nhor	0	0	5	0	3	0	1	0	0	1	23	23	6	6	12
4. Kandaol Dom	0	0	6	0	0	0	1	2	0	3	32	15	1	1	2
5. Trapeang Preah	0	0	4	0	7	0	3	1	0	4	43	40	0	23	23
6. Kab Tuk	0	0	1	0	0	0	1	0	0	1	5	5	0	2	2
7. Srae Thnal	0	0	7	0	0	0	1	0	0	1	20	20	2	6	8
Project Villages	**0**	**1**	**48**	**0**	**19**	**0**	**13**	**3**	**0**	**16**	**189**	**165**	**34**	**67**	**101**
Commune Total	0	4	77	0	22	0	20	5	1	26	327	303	64	175	239
Svay Kravan in 2003															
1. Svay Kravan	0	0	5	0	0	0	0	2	0	2	15	15	2	4	6
2. Phsar Chas	0	0	6	0	0	0	0	0	0	0	6	6	1	2	3
3. Thnal Bambaek	0	2	5	0	1	0	3	1	0	4	42	42	5	37	42
4. Prey Kdei	0	0	6	0	3	0	4	0	0	4	30	30	2	4	6
5. Tras	0	0	4	0	1	0	0	2	0	2	17	17	2	9	11
Project Villages	**0**	**2**	**26**	**0**	**5**	**0**	**7**	**5**	**0**	**12**	**110**	**110**	**12**	**56**	**68**
Commune Total	0	2	82	0	9	0	24	8	4	36	264	264	22	102	124
Samraong Tong															
Kahaeng in 2006															
1. Tumpung	0	6	15	0	0	0	3	0	0	3	50	50	5	6	11
2. Roleang Chrey	0	5	15	3	0	0	2	0	0	2	25	25	15	10	25
3. Kouk Rumlich	0	3	18	0	0	0	3	0	0	3	13	13	3	10	13
4. Kahaeng	0	1	42	1	0	0	6	0	0	6	40	40	17	15	32
5. Bos Ta Ney	0	3	8	0	0	0	2	0	0	2	16	16	3	13	16
6. Ou Veaeng	0	5	16	0	2	0	2	0	0	2	12	12	5	3	8
Project Villages	**0**	**23**	**4**	**4**	**2**	**0**	**18**	**0**	**0**	**18**	**156**	**156**	**48**	**57**	**105**
Commune Total	0	27	102	4	5	0	40	3	0	43	436	436	135	181	316
Project Villages Total	**0**	**26**	**78**	**4**	**26**	**0**	**38**	**8**	**0**	**46**	**455**	**431**	**94**	**180**	**274**

1/: Villages located in the Project Area

Source: Kandal Dom & Svay Kravan --- Chbar Mon District Agriculture Office; Kahaeng: commune office

Table IIIB-1.11.1 Family Incomes & Expenditures of Farm Families (1/2): Family Incomes 1/

Farm Families with Single Cropped Field Unit: ha & 1000 riel

Sample No.	Irrigated Rice Field (ha)	Rainfed Rice Field (ha)	Total Rice Field (ha)	Farm Income from (1000 riel; Except for Paddy)						Non-farm Income (1000 riel)								Total Incomes
				Vegetable Production	Fruit Production	Palm Sugar Production	Livestock Production	Fishery	Sub-total	Salary from Permanent Job	Wage from Temporary Job on Farm	Wage from Temporary Non-Farm Job	Private Business	Remittance from Family Members	Selling Firewood	Others	Sub-total	
2	0.20		0.20	0	0	0	0	200	200	800	0	400	0	200	0	0	1,400	1,600
7	0.10	1.5	1.60	0	100	0	70	0	170	1,320	0	0	120	0	0	0	1,440	1,610
20	0.30		0.30	0	0	0	0	0	0	0	0	1,800	2,880	0	0	0	4,680	4,680
22	0.20		0.20	0	0	0	5,300	0	5,300	0	200	0	0	0	0	0	200	5,500
27	0.20		0.20	0	0	0	912	600	1,512	1,680	0	0	0	0	0	0	1,680	3,192
30	0.17	0.37	0.54	0	0	0	50	0	50	0	200	0	500	0	0	0	700	750
32	0.80		0.80	0	195	0	4,000	0	4,195	1,200	0	0	0	0	0	0	1,200	5,395
46	0.10	0.15	0.25	0	0	0	1,000	0	1,000	0	0	0	0	0	9,000	0	9,000	10,000
48	1.00		1.00	0	500	0	1,000	0	1,500	7,200	0	0	0	0	0	0	7,200	8,700
50	0.45		0.45	480	0	0	320	0	800	4,320	0	0	0	0	0	0	4,320	5,120
51	0.50		0.50	0	0	0	1,400	0	1,400	1,440	0	300	1,000	0	0	0	2,740	4,140
58	0.50		0.50	0	0	0	500	0	500	0	0	900	0	0	0	0	900	1,400
64	0.20		0.20	300	0	0	1,000	100	1,400	1,200	0	1,000	0	0	0	0	2,200	3,600
68	0.70	0	1.00	200	300	0	500	0	1,000	0	0	0	0	0	0	0	0	1,000
78	0.20		0.20	200	0	0	700	0	900	0	0	800	0	0	0	0	800	1,700
79	0.40		0.40	0	0	0	2,000	0	2,000	0	0	1,200	0	0	0	0	1,200	3,200
80	0.30		0.30	0	0	0	0	0	0	0	0	1,500	0	0	0	0	1,500	1,500
82	0.30		0.30	0	0	0	400	0	400	300	0	0	500	0	0	0	800	1,200
87	1.20		1.20	0	0	0	600	0	600	0	0	520	0	0	0	0	520	1,120
89	0.60		0.60	0	0	0	800	0	800	0	0	700	0	0	0	0	700	1,500
97	0.50		0.50	0	30	0	1,500	0	1,530	0	0	180	0	0	0	500	680	2,210
99	0.20		0.20	200	20	0	0	0	220	0	0	1,200	0	0	0	0	1,200	1,420
100	0.36		0.36	0	50	0	800	0	850	0	0	0	0	0	0	0	0	850
Average per Family	**0.41**	**0.10**	**0.51**	**60**	**52**	**0**	**994**	**39**	**1,145**	**846**	**17**	**457**	**217**	**9**	**391**	**22**	**1,959**	**3,104**
Farm Families with Double Cropped Field																		
4	0.50		0.50	0	0	0	150	0	150	4,320	0	0	0	120	0	0	4,440	4,590
5	0.16	0.2	0.36	0	0	0	0	0	0	1,440	0	1,000	0	0	0	0	2,440	2,440
6	0.40	0.2	0.60	0	0	0	0	200	200	0	400	700	0	200	0	0	1,300	1,500
8	0.30	1.0	1.30	0	0	0	40	0	40	0	0	0	3,000	1,000	0	0	4,000	4,040
9	0.30	0.7	1.00	0	0	0	6,000	0	6,000	1,080	0	2,400	0	0	0	0	3,480	9,480
10	0.50	0.5	1.00	0	100	0	2,000	0	2,100	4,800	0	240	0	150	0	0	5,190	7,290
11	1.00	0.5	1.50	0	0	0	3,600	0	3,600	1,440	0	0	4,000	0	0	0	5,440	9,040
12	0.70	1.5	2.20	0	400	0	44	100	544	0	0	2,160	0	0	0	0	2,160	2,704
16	0.90		0.90	0	0	0	0	0	0	7,680	0	0	0	0	0	0	7,680	7,680
17	0.32	0.4	0.72	0	0	200	550	0	750	216	0	3,360	0	0	0	0	3,576	4,326
18	0.50	1.5	2.00	0	0	0	900	0	900	0	2,400	0	0	4,320	0	0	6,720	7,620
19	0.25	0.25	0.50	0	0	50	200	3,000	3,250	0	0	800	0	50	0	0	850	4,100
21	0.60		0.60	0	0	0	728	0	728	0	0	0	800	0	0	0	800	1,528
23	0.25		0.25	20	0	0	800	0	820	0	0	0	5,760	200	0	0	5,960	6,780
24	0.30	0.3	0.60	0	1,000	0	0	0	1,000	720	0	1,920	150	50	0	0	2,840	3,840
25	0.30		0.30	60	60	0	500	0	620	0	200	0	0	240	0	0	440	1,060
26	2.00		2.00	0	240	0	0	0	240	5,760	0	96	0	0	0	0	5,856	6,096
28	0.17		0.17	0	0	0	0	0	0	1,920	0	960	0	0	0	0	2,880	2,880
29	0.20		0.20	3,600	30	0	120	1,050	4,800	0	7	420	0	0	0	0	427	5,227
31	0.30	0.2	0.50	0	0	0	0	0	0	2,520	0	0	0	0	0	0	2,520	2,520
33	0.20	0.8	1.00	0	0	0	200	0	200	1,200	200	960	0	100	0	0	2,460	2,660
34	0.50		0.50	0	1,000	0	2,400	0	3,400	9,600	0	0	0	0	0	0	9,600	13,000
35	0.90		0.90	0	0	0	2,000	0	2,000	0	200	0	0	100	0	0	300	2,300
36	0.14	0.16	0.30	0	0	0	0	0	0	1,200	60	400	0	480	0	0	2,140	2,140
37	0.50		0.50	0	0	0	80	0	80	0	0	0	5,400	0	0	0	5,400	5,480
39	0.35	0.2	0.55	0	0	0	0	0	0	0	0	960	0	120	0	0	1,080	1,080
40	0.50	0.3	0.80	0	0	0	2,500	120	2,620	264	0	0	3,200	200	0	0	3,664	6,284
42	0.32	0.2	0.52	0	0	0	0	0	0	0	0	0	9,000	0	0	0	9,000	9,000
43	0.20	0.2	0.40	0	0	0	370	0	370	0	0	0	3,000	0	0	0	3,000	3,370
45	0.40		0.40	0	0	0	1,200	0	1,200	5,760	0	0	0	0	0	0	5,760	6,960
47	0.36		0.36	600	0	0	450	0	1,050	720	0	0	0	0	0	0	720	1,770
49	0.80		0.80	0	0	0	6,000	0	6,000	0	0	0	0	0	0	0	0	6,000
52	1.00		1.00	0	0	0	1,700	0	1,700	0	100	100	0	0	0	0	200	1,900
53	0.50		0.50	0	0	0	0	0	0	1,440	200	400	0	0	0	0	2,040	2,040
54	0.50	0.04	0.54	480	0	0	1,872	0	2,352	0	0	0	0	0	0	0	0	2,352
55	1.10		1.10	300	0	0	100	0	400	1,680	0	1,200	0	0	0	0	2,880	3,280
56	0.60		0.60	200	0	0	100	200	500	0	0	300	0	0	0	0	300	800
57	0.25		0.25	200	0	0	1,000	0	1,200	1,200	0	0	0	0	0	0	1,200	2,400
60	0.65	0.4	1.05	500	0	0	1,500	0	2,000	0	0	500	0	0	0	0	500	2,500
61	1.00	1.0	2.00	0	0	0	1,500	0	1,500	100	0	300	0	0	0	0	400	1,900
62	1.00	1.0	2.00	0	0	0	120	0	120	300	0	0	0	0	0	0	300	420
63	0.50		0.50	0	0	0	400	0	400	2,000	0	0	0	0	0	0	2,000	2,400
65	0.20		0.20	250	300	0	850	0	1,400	0	0	0	300	0	0	0	300	1,700
66	1.20	0.7	1.90	0	0	0	1,300	0	1,300	400	0	150	0	0	0	0	550	1,850
67	0.70		0.70	0	0	0	0	0	0	0	0	0	700	0	0	0	700	700
69	0.70		0.70	0	100	0	300	0	400	0	0	0	0	0	0	0	0	400
70	1.00		1.00	0	0	0	500	0	500	0	0	0	0	0	0	0	0	500
71	0.32		0.32	0	0	0	1,000	0	1,000	1,200	0	1,000	0	0	0	0	2,200	3,200
72	0.20		0.20	0	0	0	1,000	0	1,000	0	300	500	0	0	0	0	800	1,800
73	0.20		0.20	0	0	0	100	0	100	1,000	300	200	0	0	0	0	1,500	1,600
74	0.20		0.20	0	0	0	800	0	800	0	300	0	0	0	0	0	300	1,100
75	3.00		3.00	0	0	0	0	0	0	800	700	0	0	0	0	0	1,500	1,500
76	0.10		0.10	200	150	0	700	0	1,050	0	0	700	0	0	0	0	700	1,750
77	0.20		0.20	0	0	0	0	0	0	0	0	1,000	500	0	0	0	1,500	1,500
81	0.90		0.90	100	0	0	2,000	0	2,100	0	0	1,200	0	0	0	0	1,200	3,300
84	0.50		0.50	0	0	0	0	0	0	0	0	0	1,200	0	0	0	1,200	1,200
85	0.00	0.3	0.30	0	0	0	600	0	600	0	0	1,000	0	0	0	0	1,000	1,600
88	1.00		1.00	0	300	0	1,500	0	1,800	0	0	0	0	0	0	0	0	1,800
90	0.60		0.60	0	0	0	1,500	0	1,500	0	200	0	0	0	0	0	200	1,700
91	0.80	1.0	1.80	0	0	0	1,200	0	1,200	3,600	0	0	0	0	0	0	3,600	4,800
94	0.15	0.08	0.23	0	10	0	0	0	10	1,680	0	0	0	0	0	0	1,680	1,690
95	0.10	0.2	0.30	0	50	0	400	0	450	840	0	0	0	0	0	0	840	1,290
96	1.20		1.20	0	0	0	0	0	0	0	0	50	0	0	0	0	50	50
98	1.00		1.00	0	0	0	160	0	160	1,800	0	1,500	0	0	0	0	3,300	3,460
Average per Family	**0.57**	**0.22**	**0.79**	**102**	**58**	**4**	**829**	**73**	**1,066**	**1,073**	**87**	**414**	**578**	**115**	**0**	**0**	**2,267**	**3,332**

1/: Estimates not including gross income from rice production and production cost of paddy

Table IIIB-1.11.1 Family Incomes & Expenditures of Farm Families (2/2): Family Expenditures 1/

Farm Families with Single Cropped Field Unit: 1000 riel

Sample No.	Expenditures (1000 riel; not including production costs of farm products)								
	Paddy consumption 2/	Paddy Price 3/	Other Food	Health/Medical	Education	Clothes	Fuel/ Electricity	Other	Total Expenditure
2	1,115	669	150	50	300	50	50	450	1,719
7	1,115	669	900	20	150	100	0	300	2,139
20	1,338	803	180	50	180	400	0	700	2,313
22	1,115	669	1,080	200	250	100	0	250	2,549
27	669	401	720	170	0	40	180	120	1,631
30	446	268	360	40	0	20	0	70	758
32	1,338	803	1,800	0	300	4	240	350	3,497
46	1,115	669	1,800	50	200	80	648	240	3,687
48	1,338	803	1,200	300	1,054	370	360	800	4,887
50	1,338	803	1,800	100	288	120	0	192	3,303
51	892	535	1,800	30	400	200	120	600	3,685
58	892	535	700	50	150	50	100	250	1,835
64	1,338	803	2,000	100	300	100	100	500	3,903
68	1,561	937	1,000	100	300	0	0	300	2,637
78	1,338	803	700	100	300	50	20	520	2,493
79	669	401	1,000	200	300	200	100	1,350	3,551
80	892	535	500	200	0	100	50	500	1,885
82	1,115	669	500	100	0	50	20	480	1,819
87	2,007	1,204	300	100	400	100	150	500	2,754
89	669	401	600	120	100	100	50	700	2,071
97	892	535	180	300	30	200	36	5	1,286
99	1,115	669	200	36	365	400	72	0	1,742
100	669	401	200	100	0	60	0	200	961
Average per Family	**1,086**	**652**	**855**	**109**	**233**	**126**	**100**	**408**	**2,483**
Farm Families with Double Cropped Field									
4	2,230	1,338	1,800	400	600	400	120	800	5,458
5	1,115	669	720	20	120	20	84	410	2,043
6	1,115	669	90	50	0	50	50	400	1,309
8	1,784	1,070	1,440	10	0	200	96	400	3,216
9	1,338	803	1,080	200	0	200	14	500	2,797
10	1,115	669	1,800	300	720	50	120	600	4,259
11	1,115	669	3,600	400	1,080	400	480	2,040	8,669
12	1,115	669	720	100	150	100	240	400	2,379
16	2,007	1,204	1,080	30	48	60	180	96	2,698
17	1,338	803	1,000	1,000	150	50	600	1,150	4,753
18	1,561	937	1,080	120	720	500	240	900	4,497
19	1,115	669	1,800	10	150	100	0	700	3,429
21	1,561	937	1,440	100	100	100	60	200	2,937
23	446	268	1,080	200	0	50	100	350	2,048
24	1,115	669	1,800	40	360	200	180	1,000	4,249
25	669	401	540	15	0	40	180	200	1,376
26	2,453	1,472	2,160	240	960	400	420	1,080	6,732
28	1,561	937	720	400	150	100	0	300	2,607
29	1,338	803	1,800	200	360	100	0	320	3,583
31	892	535	1,080	0	0	100	144	700	2,559
33	892	535	1,440	20	60	70	24	400	2,549
34	1,561	937	5,400	10	1,500	200	200	2,440	10,687
35	1,561	937	1,800	20	0	100	0	500	3,357
36	669	401	1,080	200	0	100	80	260	2,121
37	1,784	1,070	1,800	50	60	100	0	150	3,230
39	446	268	360	250	0	20	96	300	1,294
40	1,784	1,070	2,520	400	180	80	120	1,200	5,570
42	892	535	900	300	0	100	60	350	2,245
43	1,115	669	1,080	100	300	50	0	650	2,849
45	1,784	1,070	2,160	100	540	108	0	980	4,958
47	1,784	1,070	1,000	200	201	20	0	100	2,591
49	1,338	803	365	180	200	21	600	580	2,749
52	1,115	669	720	200	200	40	0	500	2,329
53	669	401	720	20	100	80	250	600	2,171
54	1,115	669	1,440	400	0	100	72	240	2,921
55	1,115	669	1,825	500	548	100	200	150	3,992
56	1,338	803	200	150	150	100	120	250	1,773
57	1,784	1,070	1,500	100	150	50	70	500	3,440
60	1,338	803	1,000	100	200	100	120	450	2,773
61	892	535	700	100	250	100	200	600	2,485
62	1,561	937	1,500	150	200	100	200	650	3,737
63	2,007	1,204	1,000	100	300	100	120	600	3,424
65	446	268	300	50	0	100	70	650	1,438
66	892	535	500	300	200	100	80	370	2,085
67	2,230	1,338	300	100	200	150	70	380	2,538
69	669	401	500	50	0	70	80	200	1,301
70	892	535	100	0	100	150	100	150	1,135
71	669	401	150	100	150	100	150	630	1,681
72	892	535	800	30	200	40	70	420	2,095
73	1,338	803	800	150	0	70	30	350	2,203
74	446	268	400	50	100	70	20	330	1,238
75	1,115	669	1,000	100	500	100	50	650	3,069
76	892	535	800	200	300	150	70	170	2,225
77	669	401	300	100	200	100	50	600	1,751
81	1,338	803	2,500	200	300	150	100	300	4,353
84	669	401	800	100	0	100	80	400	1,881
85	892	535	700	100	200	100	50	550	2,235
88	892	535	800	150	0	200	100	950	2,735
90	1,561	937	1,000	150	0	100	120	570	2,877
91	1,338	803	1,825	150	548	400	240	156	4,121
94	446	268	108	80	0	180	1,000	300	1,936
95	892	535	547	50	72	25	0	5	1,234
96	1,115	669	180	100	0	50	100	50	1,149
98	2,453	1,472	180	200	0	100	0	1,000	2,952
Average per Family	**1,223**	**734**	**1,124**	**156**	**217**	**120**	**132**	**534**	**3,017**

1/: Estimates not including gross income from rice production and production cost of paddy

2/: Annual per capita consumption of rice = 143 kg = 223 kg paddy (milled rice = 64% x paddy)

3/: Paddy consumption x 600 riel/kg

Table IIIB-1.11.2 Farm Economy under the Present Conditions

Unit: 1000 riel

Item	Typical Farm									Remarks
	Type A (Family with Double Cropped Rice Field) 1/					Type B (Family with Only Single Cropped Rice Field) 2/				
	Cropping Intensity: 135%					Cropping Intensity: 100%				
	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				**3,559**	**868**				**2,987**	**729**	
1-1. Net Farm Income				**1,292**	**315**				**1,028**	**251**	
(1) Rice Production											
Rainy Season Irrigated Rice	0.57	1,311	600	787		0.41	943	600	566		yield: 2.3 t/ha
Early Rainy Season Irrigated Rice	0.20	480	550	264							yield: 2.4 t/ha
Rainfed Rice	0.22	418	600	251		0.10	190	600	114		yield: 1.5 t/ha
Gross Return				1,302					680		
Production Cost 3/				650					339		
Net Return				**652**					**341**		
(2) Other Farm Products 4/											
Gross Return				1,066					1,145		
Livestock				829					994		
Fishery				73					39		
Other Crops				164					112		
Production Cost 5/				426					458		
Net Return				**640**	**156**				**687**	**168**	
1-2. Net Non-farm Income 4/											
(1) Net Income				**2,267**	**553**				**1,959**	**478**	
Wage & Salary				1574					1320		
Trade				578					217		
Remittance from Family Members				115					9		
Selling Firewood				0					391		
Others				0					22		
2. Expenditure 4/				**3,017**	**736**				**2,483**	**606**	
Food				1858					1508		
Health/Medical				156					109		
Education				217					233		
Clothes				120					126		
Fuel				132					100		
Others				534					407		
3. Net Surplus (Capacity to Pay)				**542**	**132**				**504**	**123**	

1/: Land holding size: Type A --- irrigated rice field 0.57ha & rainfed rice field 0.22ha, total 0.79ha
2/: Land holding size: Type B --- irrigated rice field 0.40ha & rainfed rice field 0.10ha, total 0.51ha
3/: Early rainy season rice: 49%; rainy season rice: 49%; rainfed rice: 54% (see Table IIIB-1.11.3)
4/: See Table IIIB-1.11.1
5/: Assumed to be 40% of gross return
6/: Estimated by applying conversion rate of 1US$ = Riel 4,100.-

Table IIIB-1.11.3 Financial Crop Budget per Ha under the Present Conditions

Items	Unit	Unit Price (Rp000)	Irrigated Paddy: Gravity Irrigation				Irrigated Paddy: Pump Irrigation				Irrigated Paddy: Gravity/Pump Irrigation				Rainfed Paddy	
			Early Rainy Season/ Dry Season/HYV		Rainy Season/ Medium		Early Rainy Season/ Dry Season/HYV		Rainy Season/ Medium		Early Rainy Season/ Dry Season/HYV		Rainy Season/ Medium			
			Q'ty	Value (Riel000)	Q'ty	Value (Riel000)	Q'ty	Value (Riel000)	Q'ty	Value (Riel000)	Q'ty	Value (Riel000)	Q'ty	Value (Riel000)	Q'ty	Value (Riel000)
1. Gross Return																
Unit Yield	(ton/ha)		2.40		2.30		2.40		2.30		2.40		2.30		1.90	
Unit Price	(Riel.000/t)			550		600		550		600		550		600		600
Gross Return of Paddy	(Riel.000)			1,320		1,380		1,320		1,380		1,320		1,380		1,140
By Product (straw) 1/	(Riel.000)			66		69		66		69		66		69		23
Gross Return	(Riel.000)			**1,386**		**1,449**		**1,386**		**1,449**		**1,386**		**1,449**		**1,163**
2. Production cost				**682**		**709**		**944**		**919**		**813**		**814**		**625**
2-1. Farm Inputs				259		283		259		283		259		283		274
Seed 2/	(kg)		40	25	50	36	40	25	50	36	40	25	50	36	80	57
Fertilizers				228		243		228		243		228		243		213
- Urea	(kg)	1.50	70	105	80	120	70	105	80	120	70	105	80	120	60	90
- DAP	(kg)	1.60	60	96	60	96	60	96	60	96	60	96	60	96	60	96
- KCl	(kg)	1.40		0		0		0		0		0		0		0
- 15-15-15	(kg)	1.50		0		0		0		0		0		0		0
- Compost	(ton)	15.0	1.8	27	1.8	27	1.8	27	1.8	27	1.8	27	1.8	27	1.8	27
Agro-chemicals				6		4		6		4		6		4		4
- Agro-chemicals	(lit)	10.0	0.6	6	0.4	4	0.6	6	0.4	4	0.6	6	0.4	4	0.4	4
- Agro-chemicals	(kg)			0		0		0		0		0		0		0
2-2. Labor Costs				138		144		138		144		138		144		120
Labor Requirements 3/																
- Hired Labor	(man-day)	6.0	23	138	24	144	23	138	24	144	23	138	24	144	20	120
- Family Labor	(man-day)		92		96		92		96		92		96		80	
Total	(man-day)		115		120		115		120		115		120		100	
2-3. Land Preparation																
- Draft Animal 4/	(animal day)		18	180	18	180	18	180	18	180	18	180	18	180	18	144
2-4. Pumping Cost	(Riel.000)							250		200		125		100		
2-5. Transportation	(Riel.000/t)	30	2.40	72	2.30	69	2.40	72	2.30	69	2.40	72	2.30	69	1.90	57
- By Ox Cart																
2-6. Miscellaneous Expenses (2-1 ~ 2-5 x 5~10%)	(L.S.)		5%	32	5%	34	5%	45	5%	44	5%	39	5%	39	5%	30
3. Net Return	Riel.000			**704**		**740**		**442**		**530**		**573**		**635**		**538**
	%			***51***		***51***		***32***		***37***		***41***		***44***		***46***

1/: By products/straw: assumed to be 5% of gross return of paddy & 2% of gross return in mungbeans & 5% of gross return in maize

2/: Seed price: paddy R.630/kg in dry season; R.710/kg in rainy season; mungbeans R.1400/kg & maize R.2,000/kg

3/: Hired Labor Requirements --- assumed to be 20% of total labor requirements in paddy & 30% in other crops

4/: Draft animal cost = 10,000/day for paddy & 8,000/day for upland crop

Table IIIB-2.1.1 Current Functions of Technical Offices of PDA

Office	Functions	Major Projects by Donors
Agronomy Office	- Trial & technical development activities - Demonstration activities - Plant protection (implementation of IPM program) - Seed production (currently not implemented) - Production statistics	- SEILA - JICA Pilot Project - CDA (RFV) - WVC (IPM) - LWF (IPM)
Agricultural Extension	- Field extension activities through AEWs - Farmer training activities - Demonstration activities - Farmer group strengthening - Pilot operation of EPP (TIP)	- ASDP - SEILA - SLPP - JICA Pilot Project - CAAEP II (completed) - LWS - World Vision
Animal Health & Production	- Technology development/improvement - Extension & farmer training (livestock sub-sector) - Animal health, quarantine & veterinary activities	- UNICEF - SEILA - SLPP - LWS - World Vision
Fisheries	- Production of fish fries & fingerings - Fish culture - Organization of fishery community - Control of fishing season & lots - Release fingerings in natural water areas	- JICA - SEILA
Agricultural Machinery	- No activities being taken in principle, no farm machinery possessed	
Agro-industry	- Newly established office, inventory activities started	
Planning & Finance	- Planning & agricultural statistic - Accounting	
DAO	- Statistic data collection - Extension activities (project activities in collaboration with PDA) - Animal vaccination	- PDA project activities

Source: PDA Kampong Speu

Table IIIB-2.1.2 Donors and NGO Agricultural Projects/Activities in and around the Project Area

1. Donors' Agricultural Projects in and around the Project Area

Donor Agency	Project	Executing Agency	Major Objectives/Scope of Works	Project Period
AusAID	Cambodia Australia Agricultural Extension Project Phase II (CAAEP II)	MAFF	- To assist the RGC to achieve its development goals by improving access to agricultural knowledge. - To increase household cash incomes by further developing a sustainable direct-oriented extension system with the DAE.	2002-2006
AusAID	CARDI Assistance Project (CARDI AP)	MAFF, CARDI	- To assist CARDI in achieving sustainable management of its personnel, finances and physical resources to deliver its mandate according to national priorities for food security, poverty reduction and natural resource management.	2002-2006
EU	Smallholder Livestock Production Programme (SLPP)	MAFF	- To reduce poverty and food insecurity in rural areas by increasing the rate of growth of livestock GDP.	2005-2010
JICA	Freshwater Aquaculture Improvement and Extension Project	MAFF	- To achieve the increase in aquaculture production in target areas including Kampong Speu	2005-2009
JICA	Technical Service for Irrigation System Project (Phase II)	MOWRAM	- To improve the technical capacity of the engineers and technicians of MOWRAM and PDOWARAM in the fields of irrigation	2006 - 2008
ADB	Agriculture Sector Development Project (ASDP)	MAFF	- To Promote sustainable growth of market based agriculture to contribute to overall economic growth and poverty reduction - Target provinces 4 including Kampung Speu - Target district in Kampung Speu 4 including a project district of Samraong Tong	2005 - 2009

2. NGOs Agricultural Activities in and around the Project Area

	Working Site	Projects/Major Activities
IPM	Whole Province	- Implementation of integrated agricultural development - Dissemination of rice production technique - Extension of fish culture - Organization of farmer association
World Vision	Samraong Tong	- Execution of community development (Farmers agriculture school)
CEDAC	Samraong Tong Kong Pisei	- Organization of farmers' association - Dissemination of System for Rice Intensification (SRI) - Dissemination of ecological farming vegetable cultivation
Asia URB	Samraong Tong Chbar Mon	- Execution of community development (pig bank, credit & saving, fish culture, home garden, SRI) - Introduction of foreign vegetables to farmers - Marketing arrangement of foreign vegetables
NAPA	Samraong Tong Kong Pisei	- Execution of farmer livelihood development consisting of animal raising, SRI, home garden, organization of farmers' association, credit and introduction organic farming..

Source: Interview survey and Directory of International Development Assistance2003-04 and Directory of Cambodian NGOs 2004-05

Table IIIB-3.1.1 Summary Results of Agro-economic Survey on Current Agricultural Support Services 1/

1. Farm Input Supply

1-1. Procurement of certified seed

Response (one alternative)	n	%
Easy	43	49
Difficult	41	47
Not possible	3	3
Total	87	100

1-2. Procurement of wanted seed

Response (one alternative)	n	%
Easy	90	92
Difficult	7	7
Not possible	1	1
Total	98	100

1-3. Quality seed price

Response (one alternative)	n	%
Too expensive	38	39
Acceptable	14	14
Not purchased	46	47
Total	98	100

1-4. Procurement of wanted fertilizer

Response (one alternative)	n	%
Easy	95	98
Difficult	2	2
Not possible	0	0
Total	97	100

1-5. Fertilizer price

Response (one alternative)	n	%
Too expensive	91	95
Acceptable	4	4
Not purchased	1	1
Total	96	100

1-6. Fertilizer supply timing

Response (one alternative)	n	%
In time	96	99
Delayed	1	1
Not obtained	0	0
Total	97	100

2. Extension Services

2-1. Visit of extension worker

Response (one alternative)	n	%
One per < week	14	15
Once per 2 weeks-1 month	25	26
Seldom visited	57	59
Total	96	100

2-2. Technical capability of extension workers

Response (one alternative)	n	%
Sufficient	32	33
Not sufficient	14	15
No service provided	50	52
Total	96	100

2-3. Are you satisfied with current extension services

Response (one alternative)	n	%
Satisfied	32	34
Not satisfied	14	15
No service provided	49	52
Total	95	100

2-4. What kind of extension services are you needed

Response (specified)	n	%
Rice farming	23	40
Compost fertilizer	9	16
Others	27	46
Total	59	102

Totals exceed 100% due to multiple responses

3. Farm Credit

3-1. Access to farm credit

Response (one alternative)	n	%
Easy	35	45
Difficult	34	44
Not provided	9	12
Total	78	100

3-2. Timing of provision

Response (one alternative)	n	%
In time	49	64
Delayed	19	25
Not provided	9	12
Total	77	100

3-3. Amount of credit

Response (one alternative)	n	%
Sufficient	41	54
Not sufficient	26	34
Not provided	9	12
Total	76	100

3-4. Procedures for credit application

Response (one alternative)	n	%
Easy	31	41
Difficult	35	47
Not provided	9	12
Total	75	100

1/: Summary results of Socio-economic Survey in 2006 by JICA Study Team; details shown in Attachment IIIB-2

Table IIIB-3.1.2 Summary Results of Socio-economic Survey on Farming Constraints, Improvement Measures & Expectations (1/2)

1. Farming Constraints and Improvement

1-1. Farming Constraints (agronomic & farm management)

Question	What are serious agronomic & farm management constraints for farming ? (select plural answer)

Farming constraint (agronomic/farm management)	Degree of Constraints: Most Serious Score: 4			2nd Serious Score: 3			3rd Serious Score: 2			4th Serious Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score	No.	%	Score		
Low yield of crops (paddy)	18	18	72	13	13	39	9	10	18	3	6	3	132	**3**
Crop losses due to pest & disease	34	35	136	28	29	84	7	8	14	3	6	3	237	**1**
Expensive farm inputs	23	23	92	10	10	30	5	6	10	5	10	5	137	**2**
Others	23	23	92	47	48	141	65	76	130	40	78	40	403	
Total	98	100	392	98	100	294	86	100	172	51	100	51	909	

1-2. Farming Constraints (physical)

Question	What are serious physical constraints for farming ? (select plural answer)

Faming Constraints/Physical (Answer)	Degree of Constraints: Most Serious Score: 3			2nd Serious Score: 2			3rd Serious Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Irrigation water shortage in wet season	33	34	99	18	21	36	4	7	4	139	**2**
Irrigation water shortage in dry season	52	53	156	29	34	58	3	6	3	217	**1**
Inundation/flooding	5	5	15	13	15	26	10	19	10	51	**3**
Others	8	8	24	25	29	18	37	69	28	70	
Total	98	100	294	85	100	138	54	100	45	477	

1-3. Marketing constraints

Marketing Constraints (Answer)	Degree of Constraints: Most Serious Score: 3			2nd Serious Score: 2			3rd Serious Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Unstable market prices of paddy/rice	42	43	126	24	29	48	6	13	6	180	**1**
Low market prices of paddy/rice	39	40	117	24	29	48	5	11	5	170	**2**
Low market prices of livestock	6	6	18	10	12	20	9	19	9	47	**3**
Others	10	10	30	26	31	52	27	57		82	
Total	97	100	291	84	100	168	47	100	47	506	

1-4. Reasons for limited productivity of crops in the rice field of interviewee (not specific to last year)

Reasons for Limited Productivity (Answer)	Degree of Constraints: Most Serious Score: 3			2nd Serious Score: 2			3rd Serious Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Drought in wet season	36	40	108	6	7	12	1	1.389	1	121	**1**
Water shortage in dry season	19	21	57	21	24	42	4	5.556	4	103	**2**
Poor soil	7	8	21	11	13	22	12	16.67	12	55	**3**
Others	29	32	87	50	57	100	55	76		187	
Total	91	100	273	88	100	176	72	100	72	521	

1-5. Activities/practices to improve rice productivity implemented by the interviewee in the past 3 years (plural answer)

Activities Implemented	No. & Proportion of Respondents Implemented Activities/Practices		Remarks
	No.	%	
Increased fertilization doses	52	19	No. of respondents : 94
Applied of compost/manure	62	23	
Used quality seed (local variety)	34	13	Maximum 4 activities selected/respondent
Started to use water pump for irrigation	48	18	
Improved farming practices	27	10	
Others	46	17	
Total	269	100	

1-6. Necessary activities to improve rice productivity in the field of the interviewee (farming & farm management; plural answer)

Necessary Activities	Degree of Necessity of Activity: Most Required Score: 4			2nd Most Required Score: 3			3rd Most Required Score: 2			4th Most Required Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score	No.	%	Score		
Improvement of farming practices	13	14	52	22	23	66	16	20	32	5	16	5	155	**1**
Use of quality seed (high yielding variety)	24	25	96	11	12	33	10	13	20	2	6	2	151	**2**
Use of adequate doses of fertilizer	17	18	68	15	16	45	15	19	30	5	16	5	148	**3**
Others	42	44	168	46	49	138	38	48	76	19	61	19	401	
Total	96	100	384	94	100	282	79	100	158	31	100	31	855	

Table IIIB-3.1.2 Summary Results of Socio-economic Survey on Farming Constraints, Improvement Measures & Expectations (2/2)

1. Farming Constraints and Improvement - continued

1-7. Necessary physical works to improve rice productivity in the field of the interviewee (plural answer)

Necessary Physical Works	Degree of Necessity of Activity: Most Required Score: 3			2nd Most Required Score: 2			3rd Most Required Score: 1			4th Most Required Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score	No.	%	Score		
Irrigation water supply for wet season	29	30	87	25	28	50	2	6	2	0	0	0	139	**2**
Irrigation water supply for dry season	39	40	117	36	40	72	5	14	5	0	0	0	194	**1**
Drainage improvement	20	21	60	14	16	28	8	22	8	7	64	7	103	**3**
Others	9	9	27	15	17	30	21	58	21	4	36	4	82	
Total	97	100	291	90	100	180	36	100	36	11	100	11	518	

2. Expectations for Improvement

2-1. Farming (agronomic & farm management)

Expectations for Improvement	Degree of Expectation: Most Expected Score: 3			2nd Most Expected Score: 2			3rd Most Expected Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Productivity improvement of wet season rice	29	31	87	27	29	54	6	8	6	147	**2**
Productivity improvement of dry season rice	40	42	120	31	33	62	6	8	6	188	**1**
Productivity improvement of livestock/poultry	11	12	33	15	16	30	23	31	23	86	**3**
Others	15	16	45	20	22	40	40	53	40	125	
Total	95	100	285	93	100	186	75	100	75	546	

2-2. Farming (farming system)

Farming System	Degree of Expectation: Primarily Intended Score: 3			Secondary Intended Score: 2			Thirdly Intended Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Double cropping of rice	44	45	132	17	20	34	4	10	4	170	**2**
Multiple farming (crop + livestock etc.)	31	32	93	39	47	78	7	18	7	178	**1**
Crop diversification	13	13	39	9	11	18	22	55	22	79	**3**
Others	9	9	27	18	22	36	7	18	7	70	
Total	97	100	291	83	100	166	40	100	40	497	

2-3. Farming (physical)

Farming (physical)	Degree of Expectation: Primarily Expected Score: 3			Secondary Expected Score: 2			Thirdly Expected Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Adequate irrigation water supply in wet season	29	30	87	22	24	44	2	4	2	133	**2**
Adequate irrigation water supply in dry season	48	50	144	32	36	64	8	14	8	216	**1**
Mitigation of inundation & flooding	5	5		13	14	26	21	38	21	47	**3**
Others	14	15	12	23	26	46	25	45	25	83	
Total	96	100	243	90	100	180	56	100	56	479	

2-4. Agricultural support services

Agricultural Support Required	Degree of Necessity of Support: Most Required Score: 3			2nd Most Required Score: 2			3rd Most Required Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Field Extension services (demonstration / field guidance)	27	28	81	16	17	32	27	35	27	140	**1**
Provision of quality seed	22	23	66	33	35	66	5	6	5	137	**2**
Provision of fertilizer	18	19	54	12	13	24	15	19	15	93	**3**
Others	29	30	87	32	34	157	30	39	184	428	
Total	96	100	288	93	100	279	77	100	231	693	

1/: Summary results of Socio-economic Survey in 2006 by JICA Study Team; details shown in Attachment 3

Table IIIB-4.3.1 Proposed Agricultural Development Plan

Crops/Cropping Season	I. Present				II. With Project				Increment (II - I)			
	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton)	Production (ton)	Cropped Area (ha)	Cropping Intensity (%)	Yield (ton)	Production (ton)
Early Rainy Season Rice												
- Early Variety (HYV)	203	35	2.40	487	285	50	3.8	1,083	82	15	1.4	596
Rainy Season Rice												
- Early Variety (HYV)					285	50	3.8	1,083	285	50		1,083
- Medium Variety	580	100	2.30	1,334	285	50	3.3	941	-295	-50	1.0	-394
Sub-total	580	100	2.30	1,334	570	100	3.55	2,024	-10	0	1.3	690
Annual Paddy	783	135	2.33	1,821	855	150	3.63	3,107	72	15	1.31	1,285
Upland Crop					27	4.7	0.7	19	27	5		19
Vegetable					3	0.5	9.25	28	3	1		28
Upland Crops/Vegetables Total	0	0		0	30	5		47	30	5		47
Total	783	135	-	-	885	155	-	-	102	20	-	-

Table IIIB-4.4.1 Results of Verification Tests and Adaptability Tests

Plot	Variety/ Treatment	Planting Method (plants/hill)	Crop Cut Survey									Field Yield	Remarks
			Tiller No. per Hill	Panicle No. per Hill	Effective Tiller %	Panicle No. per m2	% of Ripened Grains	Grain Weight per Panicle (g)	1000 Grain Weight (g)	Yield Range (ton/ha) 1/	Average Yield/Ha (ton) 1/	Yield/Ha (ton) 2/	
Plot 1	Riang Chey	2 - 3 plants	9	9	97	138	80	3.5	22.5	4.1 ~ 5.0	4.5	**3.9**	- Inundation at tillering stage
		1 plant	8	8	97	124	79	4.5	26.8	5.0 ~ 5.1	5.0		- Infested with stem borer
Plot 2	Riang Chey	2 - 3 plants	10	10	95	158	87	3.4	23.2	4.3 ~ 5.8	5.2	**4.8**	
		1 plant	10	9	92	146	87	3.2	22.7	4.1 ~ 4.9	4.5		
Plot 3	Riang Chey	2 - 3 plants	11	11	98	124	86	3.5	22.4	3.6 ~ 4.6	4.1	**3.9**	
		1 plant	11	11	95	118	87	4.2	22.7	4.5 ~ 4.9	4.7		
Plot 4	Neang Meng	2 - 3 plants	10	9	92	104	74	3.4	18.9	3.1 ~ 3.5	3.3	**3.2**	- Inundation after transplanting
		1 plant	10	10	93	108	80	3.0	18.6	2.8 ~ 3.1	3.0		- Infested with stem borer
Plot 5	Sen Pidao	2 - 3 plants	10	9	91	236	81	2.0	26.0	3.7 ~ 5.2	4.4	**4 3/**	- Crop loss caused by rat serious
		1 plant	11	9	76	215	86	2.3	25.9	3.9 ~ 5.3	4.6		
Plot 6	Sen Pidao	2 - 3 plants	10	10	96	240	83	2.1	26.9	4.1 ~ 5.0	4.6	**4 3/**	- Crop loss caused by rat
		1 plant	9	8	92	189	79	2.2	26.0	3.9 ~ 4.2	4.0		
Medium Variety Simple Trial 4/													
Variety Trial	Phka Rumchang	2 - 3 plants	11	11	99	179	58	2.2	26.7	-	3.6	-	- Inundation just after transplanting
	Phka Rumduol	2 - 3 plants	11	11	98	170	71	2.5	27.2	-	3.9	**3.8**	- Excellent initial growth up to at
	CAR 4	2 - 3 plants	9	9	95	143	75	4.2	21.8	-	5.6	**3.2**	around panicle initiation stage
	Riang Chey	2 - 3 plants	12	11	95	178	81	3.4	21.5	-	5.9	**3.9**	- After panicle initiation, damages
On-farm	C. Intermittent	2 - 3 plants	12	10	84	165	86	3.0	23.5	-	4.7	**3.7**	caused by stem borer became
Water	V. Intermittent	2 - 3 plants	13	12	86	185	78	3.3	20.8	-	5.9	**4.4**	
Management	C. Flooding	2 - 3 plants	11	10	89	160	75	3.2	22.0	-	5.1	**3.2**	
Seeding Rate	25 g/m2	1 plant	11	10	88	152	80	3.3	23.4	-	49	**3.2**	
	40 g/m2	2 - 3 plants	12	11	92	179	78	3.4	21.6	-	5.5	**5.4**	
	60 g/m2	2 - 3 plants	12	11	90	172	75	3.3	22.3	-	5.8	**5.7**	
Early Variety Simple Trial 4/, 5													
Variety Trial	IR 66	2 - 3 plants	11	11	97	276	83	2.2	22.0	-	5.4	**5.9**	- Excellent growth throughout
	Sen Pidao	2 - 3 plants	14	13	89	320	73	2.1	24.0	-	5.9	**4.5**	growth period
	IR Kesar	2 - 3 plants	10	9	93	222	71	2.7	25.0	-	5.2	**4.5**	
	Chul Sar	2 - 3 plants	13	12	88	296	72	2.0	23.0	-	5.3	**4.6**	
On-farm	C. Intermittent	2 - 3 plants	15	13	92	336	82	1.7	24.0	-	5.2	**4.1**	
Water	V. Intermittent	2 - 3 plants	15	14	94	346	78	1.9	22.0	-	6.1	**4.4**	
Management	C. Flooding	2 - 3 plants	12	12	94	292	84	2.1	25.0	-	5.6	**4.9**	
Seeding Rate	25 g/m2	1 plant	10	10	95	243	77	2.4	24.0	-	5.5	**4.9**	
	40 g/m2	1 plant	12	11	93	282	83	2.4	23.0	-	6.1	**5.1**	
	60 g/m2	2 - 3 plants	14	13	94	317	77	2	24.0	-	5.7	**4.6**	
Farmers Field	Riang Chey	Per Hill	7.4	6.8	97	97		2.9			2.6		Poor field
	Riang Chey	Per Hill	7.2	6.9	96	157		3.2			4.7		Field of Plot 5 demonstrator
	Riang Chey	Per Hill	6.8	6.6	98	126		3.0			3.6		Field of Plot 2 & 3 demonstrator

1/: Yield of a whole plot of 2-3 plants/hill 2/: Whole plot yield (having border effects in case of simple trial plot) 5/: Trial at Prey Pdao Station

3/: Both plots suffered from rat attacks; estimated yield assuming that rat damages are kept at ordinal level 4/: Crop cut survey: Sampled at spot showing normal growth & indicating potential or reference yield

Table IIIB-4.4.2 Yield Estimation for With-Project Conditions

1. Results of Verification Tests Implemented in the Project Area (Zone 1) 1/

Variety	No. of Plots	Whole Plot Yield (ton/ha)		Crop Cut Survey Results (ton/ha)
		Range	Average	
Early Variety (Sen Pidao)	2	4.0	4.0	Avg.: 4.5; range: 3.7 ~ 5.2 (6 samples)
Medium Variety (Riang Chey)	3	3.9 - 4.8	4.2	Avg.: 5.2; range: 4.3 ~ 5.8 (13 samples)

1/: Details given in Table IIIB-4.4.1

2. Results of Adaptability Trial (Simple Trial) Implemented in the Project Area (Zone 1) 1/

Variety	Treatment	Whole Plot Yield (ton/ha) 2/
Early Variety (Sen Pidao)	Variety Trial	IR 66: 5.9; Sen Pidao: 4.5; IR Kesar 4.4.5 ton/ha
Medium Variety (Riang Che	Seeding Rate	Riang Chey: 40 g/m2: 5.4 ton/ha; 60 g/m2: 5.7 ton/ha

1/: Details given in Table IIIB-4.4.1 2/: Potential or reference yields; samples taken at point showing good growth

3. Results of Socio-economic Survey: Yield Distribution 1/

Irrigation Category	Paddy Yield (ton/ha)		Irrigation Status	Remarks
	Rainy Season Local Variety	Dry Season Improved Variety		
Category 1	0.7 ~ 6.0	0 ~ 6.0	Fully irrigated field	No. of respondents: 46

1/: Results of Socio-economic Survey conducted in 2005 by the JICA Study Team

4. Yield Estimated by PDAs

Province	Management Condition	Irrigated Paddy		Rainfed Paddy
		Rainy Season	Dry Season	Rainy Season
Kampong Speu	Well managed paddy field	5.0	6.0	2.5
	Poorly managed paddy field	2.0	3.0	1.5
	Average of the two	2.0 ~ 5.0	4.5	1.5 ~ 2.5
Kandal	Well managed paddy field	4.0	5.5	4.0
	Poorly managed paddy field	1.8	2.0	1.8
	Average of the two	2.5	3.0	2.5

5. Estimated Yield Levels of Paddy in the Project Area under With-Project

On the basis of the results of the verification tests and simple trials conducted in 2006 under the Pilot Project by the JICA Team and PDA/MAFF, the With-Project paddy yield level in the Area estimated as follows;

Estimated Anticipated/Target Yield Levels under the Project

	Early Rainy Season	Rainy Season
Early Variety (IR 66 & Sen Pidao)	3.8 ton/ha (average of IR 66 & Sen Pidao)	3.8 ton/ha (average of IR 66 & Sen Pidao)
Medium Variety (Riang Chey)	3.3 ton/ha	

1/: Yield improvement assumed through the improvement of irrigation conditions & intensive agricultural support services planned under the Project

Table IIIB-4.4.3 Proposed Farming Practices of Rice

Farming Practices	Medium Variety	Early Variety
Varieties	Variety: Riang Chey (replacement per 3 croppings)	Variety: IR 66, Sen Pidao, IR 36 (replacement per 3 croppings)
Land preparation		
- Method	Draft animal or hand tractor	Draft animal or hand tractor
- Practices	1 plowing & 1 plowing + harrowing/leveling	1 plowing & 1 plowing + harrowing/leveling
Nursery		
- Seeding rate (kg/ha)	25 ~ 30 kg/ha	25 ~ 30 kg/ha
- Seed bed	Raised semi-dry seed bed	Raised semi-dry seed bed
- Seeding rate	40 g/m2	40 ~ 50 g/m2
- Uprooting seedling	Avoid damages to seedlings	Avoid damages to seedlings
Transplanting		
- Method	Regular Planting	Regular Planting
- Planting distance	25 x 25 cm	20 x 20 cm
- Age of seedling	15 ~ 20 days	10 ~ 20 days
- No. of plants/hill	2-3 plants/hill (to mitigate damage caused by crab)	2-3 plants/hill (to mitigate damage caused by crab)
- Quality of seedling	Stout & health seedlings	Stout & health seedlings
Manure (cow dung/compost)		
- Timing	At least 1 month before 1st plowing	At least 1 month before 1st plowing
- Manure (kg/ha)	Depending on availability (recommendation 3t/ha)	Depending on availability (recommendation 3t/ha)
Basal Fertilizer		
- Timing	At the time of final land preparation	At the time of final land preparation
- N:P:K	N : P_2O_5 : K2O = 20 : 27 : 15 kg/ha (15-15-15 = 100kg/ha & DAP = 25 kg/ha)	N : P_2O_5 : K2O = 20 : 27 : 15 kg/ha (15-15-15 = 100kg/ha & DAP = 25 kg/ha)
1st Top dressing		
- Timing	30 days after transplanting	30 days after transplanting
- Urea (kg/ha)	50 kg/ha	40 ~ 50kg/ha
2nd Top dressing		
- Timing	After panicle initiation	After panicle initiation
- Urea (kg/ha)	40 kg/ha	Not for moderate yield; 20 ~ 30 kg/ha for higher yield
Agro-chemical spray	Last option for pest & disease control	Last option for pest & disease control
Irrigation	Intermittent irrigation: Taking-root stage to before panicle initiation stage or up to booting stage	Intermittent irrigation: Taking-root stage to before panicle initiation stage or up to booting stage
Weeding	2 times per a cropping season	2 times per a cropping season
Harvesting	Manual	Manual
Threshing		
- Place	Home yard or field (preferable)	Home yard or field (preferable)
- Method	Manual with threshing board/table Engine or pedal thresher (2nd common)	Manual with threshing board/table Engine or pedal thresher (2nd common)
Drying	Field drying Sun drying after threshing at home yard, if required	Drying at home yard Sun drying after threshing at home yard, if required
Cleaning/winnowing	Engine or manual winnower	Engine or manual winnower
Transportation	Ox-cart (from field to home yard)	Ox-cart (from field to home yard)

Table IIIB-4.6.1 Labor Balance under With-project Conditions

Labor Requirements of Average Farm Family: Rice Field Holding Size: 0.8 ha Labor Force/Family: 3.1
Cropping Pattern Assumed: early rainy season rice 50% (0.4 ha); rainy season rice 100% (0.8ha); upland crops 5% (0.04ha)

Farming Practices	Apr			May			June			July			Aug.			Sept.			Oct			Nov			Dec.			Jan			Total
Early Variety (0.4 ha x 2 crops)	Farming Calendar																														
Nursery				—	—											—	—														
Land Preparation		—			—											—															
Transplanting						—												—													
Field Management						—	—	—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—						
Harvesting															—												—				
Pos-harvesting															—	—												—			
	Labor Requirements per Decade																														
Nursery				1.5	0.5											1.5	0.5														
Land Preparation		1			3											4															
Transplanting						12												12													
Field Management						0.5	1	1	4	1	3	0.5	0.5	0.5				0.5	1	1	4	1	3	0.5	0.5	0.5					
Harvesting															12												12				
Pos-harvesting															1	3											1	3			
Sub-total		1		1.5	3.5	12.5	1	1	4	1	3	0.5	0.5	0.5	13	8.5	0.5	12.5	1	1	4	1	3	0.5	0.5	0.5	13	3			92
Medium variety (0.4ha)	Farming Calendar																														
Nursery												—	—																		
Land Preparation										—			—																		
Transplanting														—																	
Field Management														—	—	—	—	—	—	—	—	—	—	—	—	—	—				
Harvesting																										—					
Pos-harvesting																											—				
	Labor Requirements per Decade																														
Nursery												1.5	0.5																		
Land Preparation										1			3																		
Transplanting														12																	
Field Management															1	1	4	1	3	0.5	1	0.5	0.5	0.5	0.5	0.5					
Harvesting																										12					
Pos-harvesting																										1	3				
Sub-total										1		1.5	3.5	12	1	1	4	1	3	0.5	1	0.5	0.5	0.5	0.5	13.5	3				48
Upland Crops (0.04ha) 1/	Farming Calendar																														
Land Preparation			—																												
Sowing				—																											
Field Management				—	—	—	—	—	—	—	—	—																				
Harvesting												—																				
Pos-harvesting													—																			
	Labor Requirements per Decade																														
Land Preparation			0.2																												
Sowing				0.6																											
Field Management				0.1	0.4	0.1	0.4		0.1		0.1																				
Harvesting												0.8																			
Pos-harvesting													0.4																		
Sub-total			0.2	0.7	0.4	0.1	0.4		0.1		0.1	0.8	0.4																		3
Total Labor Requirements	0.0	1.0	0.2	2.2	3.9	12.6	1.4	1.0	4.1	2.0	3.1	2.8	4.4	12.5	14.0	9.5	4.5	13.5	4.0	1.5	5.0	1.5	3.5	1.0	1.0	14.0	16.0	3.0	0.0	0.0	143
Labor Availability/Family 2/	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	690
Family Labor for Farming 3/	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	414
Labor Balance	13.8	12.8	13.6	11.6	9.9	1.2	12.4	12.8	9.7	11.8	10.7	11.0	9.4	1.3	**-0.2**	4.3	9.3	0.3	9.8	12.3	8.8	12.3	10.3	12.8	12.8	**-0.2**	**-2.2**	10.8	13.8	13.8	271

1/: Mungbeans assumed 2/: Average labor force per family 3.1 x 22 days = 68.2 labor days; 23 labor days per decade 3/: Assumed to be 60% of total labor force

Table IIIB-4.7.1 Farm Economy under With-project Conditions

Unit: 1000 riel

Item	Typical Farm									Remarks
	Type A (Family with Double Cropped Rice Field)					Type B (Family with Only Single Cropped Rice Field)				
	Cropping Intensity: 150%					Cropping Intensity: 150%				
	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				**4,028**	**982**				**3,435**	**838**	
1-1. Net Farm Income				**1,761**	**429**				**1,476**	**360**	
(1) Rice Production											
Rainy Season Irrigated Rice	0.57	1,881	600	1,129		0.42	1,386	600	832		yield: 3.3 t/ha
Early Rainy Season Irrigated Rice	0.29	1,102	550	606		0.21	798	550	439		yield: 3.8 t/ha
Rainfed Rice	0.22	418	600	250.8		0.10	190	600	114		yield: 1.5 t/ha
Gross Return				1,986					1,385		
Production Cost 3/				865					596		
Net Return				**1,121**	**273**				**789**	**192**	
(2) Other Farm Products 4/											
Gross Return				1,066					1,145		
Livestock				829					994		
Fishery				73					39		
Other Crops				164					112		
Production Cost 5/				426					458		
Net Return				**640**	**156**				**687**	**168**	
1-2. Net Non-farm Income 4/											
(1) Net Income				**2,267**	**553**				**1,959**	**478**	
Wage & Salary				1,574					1,320		
Trade				578					217		
Remittance from Family Members				115					9		
Selling Firewood				0					391		
Others				0					22		
2. Expenditure 4/				**3,017**	**736**				**2,483**	**606**	
Food				1,858					1,508		
Health/Medical				156					109		
Education				217					233		
Clothes				120					126		
Fuel				132					100		
Others				534					407		
3. Net Surplus (Capacity to Pay)				**1,011**	**247**				**952**	**232**	

1/: Land holding size: Type A --- irrigated rice field 0.57ha & rainfed rice field 0.22ha, total 0.79ha 2/: Land holding size: Type B --- irrigated rice field 0.40ha & rainfed rice field 0.10ha, total 0.51ha

3/: Early rainy season rice: 41%; rainy season rice: 44%; rainfed rice: 54% (see Table III-1.11.3 & IIIB-4.7.2) 4/: See Table IIIB-1.11.1 5/: Assumed to be 40% of gross return

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

Table 4.7.2 Financial Crop Budget per Ha under With-project Conditions

Items	Unit	Unit Price (Rp000)	Paddy: Early Rainy Season/ Dry Season/HYV Q'ty	Paddy: Early Rainy Season/ Dry Season/HYV Value (Riel000)	Paddy: Rainy Season/ Medium Q'ty	Paddy: Rainy Season/ Medium Value (Riel000)	Upland Crop: Mungbeans 1 Q'ty	Upland Crop: Mungbeans 1 Value (Riel000)	Upland Crop: Maize Q'ty	Upland Crop: Maize Value (Riel000)	Vegetables: Morning Glory Q'ty	Vegetables: Morning Glory Value (Riel000)	Vegetables: Cucumber Q'ty	Vegetables: Cucumber Value (Riel000)	Vegetables (Avg.) 4/ Present/Without /With Q'ty	Vegetables (Avg.) 4/ Present/Without /With Value (Riel000)
1. Gross Return																
Unit Yield	(ton/ha)		3.80		3.30		0.70		2.0		14.0		4.5		9.25	
Unit Price	(Riel.000/t)			550		600		1,500		600		300		1,200		519
Gross Return of Paddy	(Riel.000)			2,090		1,980		1,050		1,200		4,200		5,400		4,800
By Product (straw) 1/	(Riel.000)		5%	105	5%	99	2%	21	5%	60						
Gross Return	(Riel.000)			**2,195**		**2,079**		**1,071**		**1,260**		**4,200**		**5,400**		**4,800**
2. Production cost				**895**		**917**		**498**		**575**		**1,683**		**2,120**		**1,902**
2-1. Farm Inputs				355		385		298		296		744		1,336		1,040
Seed 2/	(kg)		25	23	25	23	50	70	20	40	20.0	120	13.3	213		166
Fertilizers				322		352		228		256		624		1,043		834
- Urea	(kg)	1.50	50	75	90	135	55	83	80	120	153	230	200	300		265
- DAP	(kg)	1.60	25	40	25	40	50	80	40	64	153	245	277	443		344
- KCl	(kg)	1.40		0		0	25	35	30	42		0		0		0
- 15-15-15	(kg)	1.50	120	180	100	150		0		0		0		0		0
- Compost	(ton)	15.0	1.8	27	1.8	27	2	30	2	30	10	150	20	300		225
Agro-chemicals				10		10		0		0		0		80		40
- Agro-chemicals	(lit)	10.0	1.0	10	1.0	10		0		0		0	8.0	80		40
- Agro-chemicals	(kg)			0		0		0		0		0		0		0
2-2. Labor Costs				144		150		108		144		270		360		315
Labor Requirements 3/																
- Hired Labor	(man-day)	6.0	24	144	25	150	18	108	24	144	45	270	60	360		315
- Family Labor	(man-day)		96		100		42		56		105		140			
Total	(man-day)		120		125		60		80		150		200			
2-3. Land Preparation																
- Draft Animal	(animal day)		24	240	24	240	6	48	6	48	12	96	12	96		96
2-4. Transportation	(Riel.000/t)	30	3.80	114	3.30	99	0.7	21	2.0	60	14.0	420	4.5	135		278
- By Ox Cart																
2-5. Miscellaneous Expenses (2-1 ~ 2-4 x 5~10%)	(L.S.)		5%	43	5%	44	5%	24	5%	27	10%	153	10%	193	10%	173
3. Net Return	Riel.000			**1,299**		**1,162**		**573**		**685**		**2,517**		**3,280**		**2,898**
	%			***59***		***56***		***53***		***54***		***60***		***61***		***60***

1/: By products/straw: assumed to be 5% of gross return of paddy & 2% of gross return in mungbeans & 5% of gross return in maize

2/: Seed price: paddy R.900/kg--- seed replacement in every 3 croppings assumed; mungbeans R.1400/kg & maize R.2,000/kg

3/: Hired Labor Requirements --- assumed to be 20% of total labor requirements in paddy & 30% in other crops

4/: Draft animal cost = 10,000/day for paddy & 8,000/day for upland crop

5/: Average of morning glory & cucumber

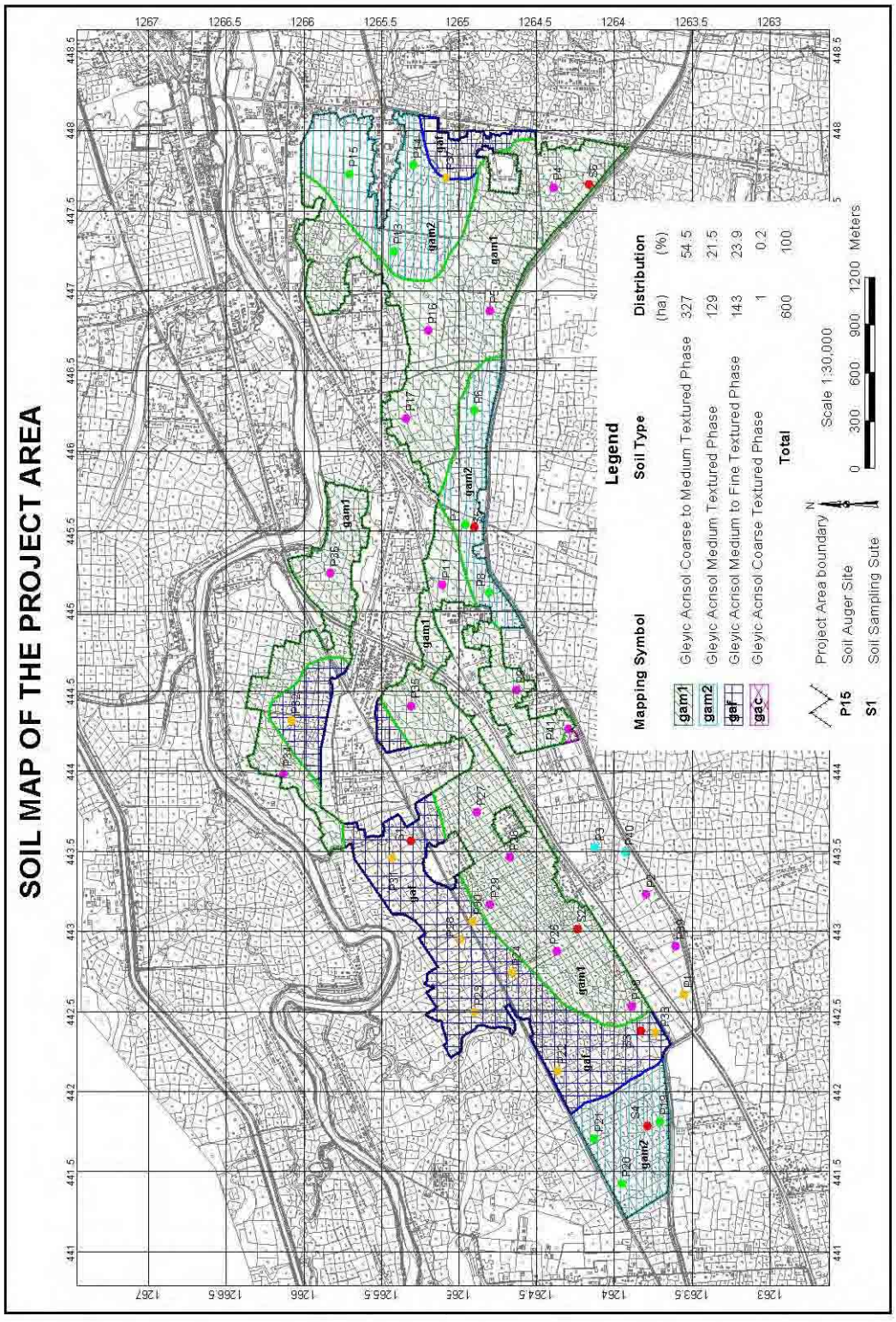
Table IIIB-5.3.1 Implementation and Cost Schedules for Agricultural Support Services 1/

Activities	Unit	Unit Program Cost (US$) 2/	2010 Volume Early Rainy Season	2010 Volume Rainy Season	2010 Volume Annual	2010 Amount (US$)	2011 Volume Early Rainy Season	2011 Volume Rainy Season	2011 Volume Annual	2011 Amount (US$)	2012 Volume Early Rainy Season	2012 Volume Rainy Season	2012 Volume Annual	2012 Amount (US$)	2013 Volume Early Rainy Season	2013 Volume Rainy Season	2013 Volume Annual	2013 Amount (US$)	Overall Volume Early Rainy Season	Overall Volume Rainy Season	Overall Volume Annual	Overall Amount (US$)
1. Field Programs																						
1.1 Field Adaptability Test	unit	500	1	1	2	1,000	1	1	2	1,000		1	1	500				0	2	3	5	2,500
1.2 Demonstration Plot (0.1ha)																						
- Irrigated Rice	unit	40	3	5	8	320	5	5	10	400	5	3	8	320					13	13	26	1,040
- Upland Crops	unit	30	2		2	60	2		2	60	2		2	60	3		3	90	9	0	9	270
- Vegetables	unit	50					1		1	50	1		1	50	1		1	50	3	0	3	150
1.3 Demonstration Plot (1.0ha)																						
- Irrigated Rice	unit	370	1	2	3	1,110	1	2	3	1,110	1	2	3	1,110			0	0	3	6	9	3,330
- Upland Crops	unit	330			0	0	1		1	330	1		1	330	1		1	330	3	0	3	990
1.4 Demonstration Farm (5.0ha)																						
- Irrigated Rice	unit	910			0	0	1	1	2	1,820	1	1	2	1,820		1	1	910	2	3	5	4,550
1.5 Demonstration Area (20ha)																						
- Irrigated Rice	unit	2,330			0	0			0	0	1		1	2,330	1		1	2,330	2	0	2	4,660
1.6 Seed Multiplication	unit	330		1	1	330		1	1	330		1	1	330			0	0	0	3	3	990
Sub-total			7	9	16	2,820	12	10	22	5,100	12	8	20	6,850	6	1	7	3,710	37	28	65	18,480
2. Farmer/Farmer Group Training Programs																						
2.1 Training Course																						
- 5 Days (30 participants)	unit	340	1	1	2	680	2	2	4	1,360	1	1	2	680	1	1	2	680	5	5	10	3,400
2.2 FFS/IPM (50 participants)	unit	770			0	0	1	1	2	1,540			0	0			0	0	1	1	2	1,540
2.3 Study Tour	unit	300		1	1	300	1		1	300			0	0			0	0	1	1	2	600
2.4 VEA Training																						
- 10 Participants	unit	1,800	1		1	1,800	1		1	1,800	1		1	1,800	1		1	1,800	4	0	4	7,200
Sub-total			2	2	4	2,780	5	3	8	5,000	2	1	3	2,480	2	1	3	2,480	11	7	18	12,740
3. Mass Guidance/Workshop																						
3.1 50 Participants		110	1	1	2	220	1	1	2	220	1	1	2	220	1	1	2	220	4	4	8	880
4. Support Fund for Extension Staff																						
Farmer-to-farmer Extension Support	VEA	360			5	1,800			5	1,800			5	1,800			5	1,800	0	0	20	7,200
Field Guidance Staff	staff	600			2	1,200			2	1,200			1	600			1	600	0	0	6	3,600
Sub-total					7	3,000			7	3,000			6	2,400			6	2,400	0	0	26	10,800
5. Staff Empowerment	unit	500			1	500			1	500			1	500			1	500	0	0	4	2,000
6. Logistic Strengthening 3/																						
- Bicycle (VEA)	unit	100			5	500													0	0	5	500
- Motorcycle (field guidance staff)	unit	1,000			1	1,000													0	0	1	1,000
Sub-total					6	1500			0	0			0	0			0	0	0	0	6	1,500
Total						**10,820**				**13,820**				**12,450**				**9,310**				**46,400**

1/: Program direct cost 2/: Based on Base Costs for Extension Programs, 2006, DAE, MAFF; which are estimated in US$ and no changes in costs in dollar bases assumed for estimation

3/: Provision of transportation means to VEA & field guidance staff

Figures



The Study on Comprehensive Agricultural Development of Prek Thnot River Basin, The Kingdom of Cambodia	**Figure IIIB-1.1.1** **Soil Map of the Project Area**
Japan International Cooperation Agency	

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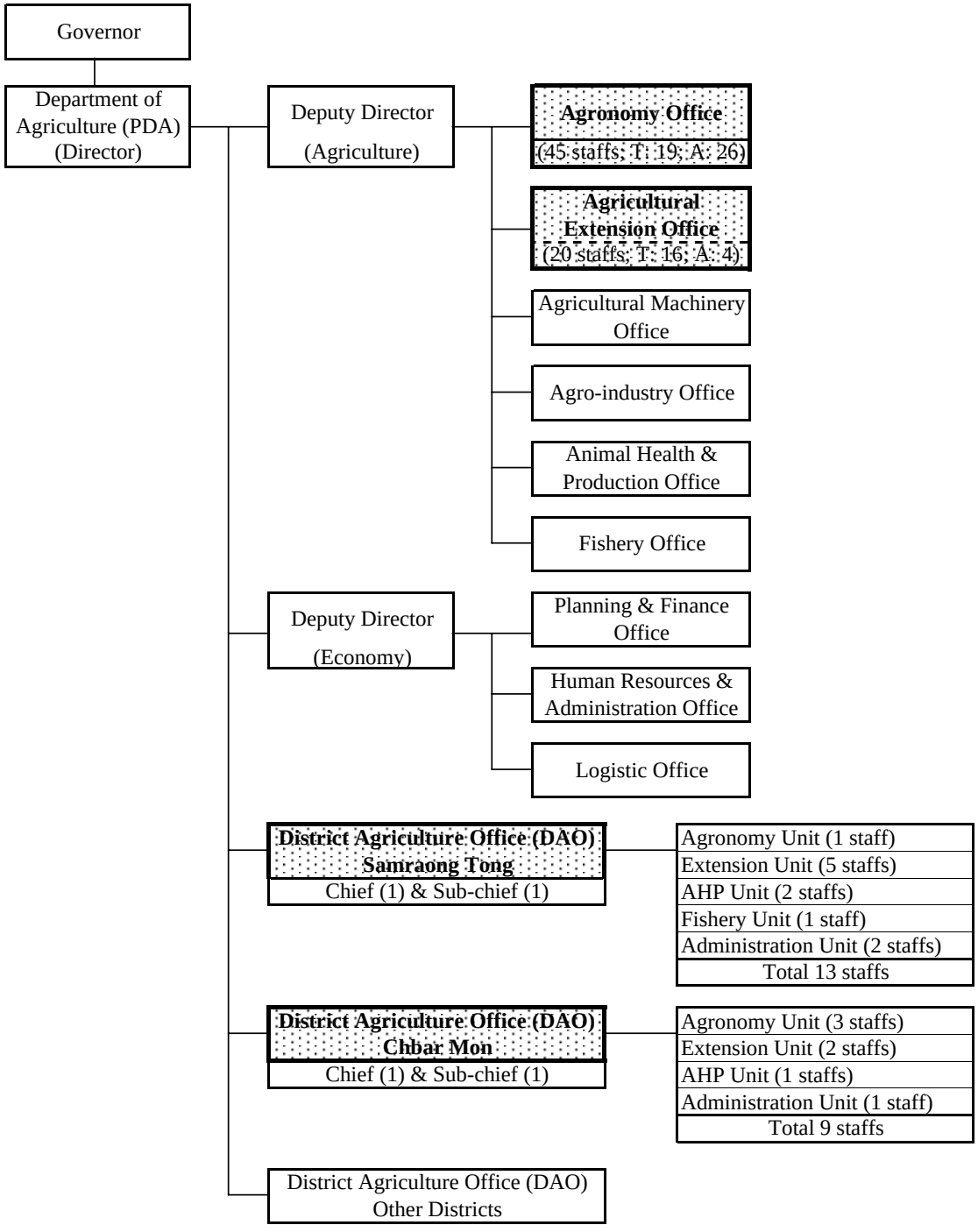
Japan International Cooperation Agency

Figure IIIB-1.4.1
Present Cropping Pattern



Staffing of PDA

Technical Offices 1/	137
Administrative offic	45
District Office	82
Total	264

1/: including director & deputies

Project related Offices

T: technical staffs
A: administrative & other staffs

AHP Unit: Animal Health & Production Unit

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Figure IIIB-2.1.1
Organization Structure of PDA and Project DAOs

Rainfall: mean monthly rainfall at Kampong Speu from 1901~2004 except for 1973~1980 & 1991~1994

Probable discharge: At Roleng Chrey Headwork, Prek Khnot River

Sunshine hour/maximum temperature: 1995 to 2005, source Department of Meteorology

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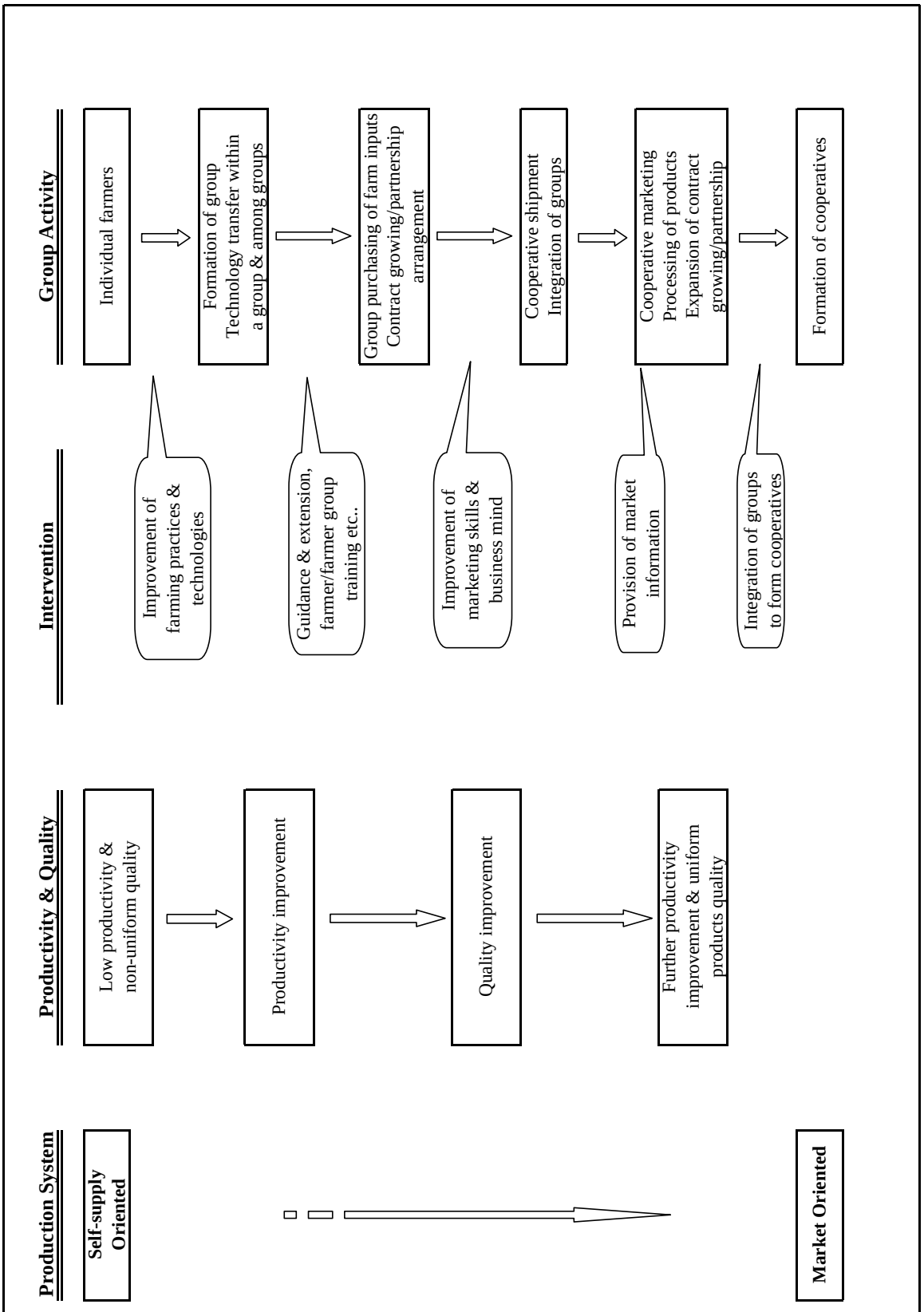
Figure IIIB-4.3.1
Proposed Cropping Pattern



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Japan International Cooperation Agency

Figure III-4.8.1
Proposed Approaches for Improving Marketing

Attachments

Attachment IIIB-1

Description of Typical Soil Profile

Attachment IIIB-1 Description of Typical Soil Profile (1/2)

Soil Unit : Gleyic Acrisols Coarse to Medium Textured Phase (GAm1)
Distribution : 327 ha (54.5 %) :

Typical Soil Profile

Location : Prey Kdei Village, Svay Kravan Commune, Chbar Mon District
Pit Number : P 5 Land Use : Irrigated rice field
Topography : Flat
Groundwater : Inundated due to irrigation

Soil depth (cm)

0	-	10	7.5YR 5/3, fine size mottling common (7.5YR 5/2), sandy loam (SL) ~ loamy sand (LS), none sticky, none plastic, firm when moist, hard when dry, gradual wavy boundary
10	-	25	7.5YR 7/8, medium size mottling common (7.5YR 5/3), sandy loam (SL) ~ sandy clay loam (SCL), slightly sticky, slightly plastic, firm when moist, hard when dry, gradual wavy boundary
25	-	40	7.5YR 7/8, medium size mottling common (7.5YR 4/1), sandy clay loam (SCL), plinthite concretion common, slightly sticky, slightly plastic, firm when moist, hard when dry, gradual wavy boundary
40	-	60	7.5YR 6/8, medium size mottling common (7.5YR 4/6), sandy clay loam (SCL) ~ sandy clay (SC), rich in plinthite concretion, sticky, plastic, very firm when moist, very hard when dry

Soil Unit : Gleyic Acrisols Medium Textured Phase (GAm2)
Distribution : 129 ha (21.5 %) :

Typical Soil Profile

Location Kandal Dom Village, Svay Kravan Commune, Chbar Mon District
Pit Number : P 7 Land Use : Irrigated rice field
Topography : Flat
Groundwater : Inundated due to irrigation

Soil depth (cm)

0	-	10	7.5YR 7/1, fine size mottling common (7.5YR 6/4), sandy loam (SL) , slightly sticky, slightly plastic, firm when moist, hard when dry, gradual wavy boundary
10	-	25	7.5YR 6/2, few medium size mottling (7.5YR 5/6 + 8/1), sandy clay loam (SCL) ~ sandy clay (SC), few plinthite concretion, sticky, plastic, firm when moist, very hard when dry, gradual wavy boundary
25	-	40	7.5YR 6/6, medium size mottling common (7.5YR 6/1), sandy clay (SC) ~ clay (C), plinthite concretion common, sticky, plastic, very firm when moist, hard when dry, gradual wavy boundary
> 40			7.5YR 6/6, medium size mottling common (7.5YR 6/1), sandy clay (SC) ~ clay (C), plinthite concretion common, sticky, plastic, very firm when moist, hard when dry

Attachment IIIB-1 Description of Typical Soil Profile (2/2)

Soil Unit : Gleyic Acrisols Medium to Fine Textured Phase (GAf)
Distribution : 143 ha (23.9 %)

Typical Soil Profile

Location : Ou Veaeng Village, Kahaeng Commune, Samraong Tong District
Pit Number : P 22 Land Use : Irrigated rice field
Topography : Flat Elevation : 27 m
Groundwater : inundated due to irrigation

Soil depth (cm)

0 - 10	5GY 6/1, few fine mottling (7.5YR 6/4), silty loam (SiL), slightly sticky, slightly plastic, very friable when moist, slightly hard when dry, gradual wavy boundary
10 - 25	7.5YR 7/4, medium size mottling common (7.5YR 7/1 + 4/1), silty clay (SiC), sticky, plastic, very firm when moist, very hard when dry, gradual wavy boundary
25 - 40	7.5YR 6/4, medium size mottling common (7.5YR 7/1), silty clay (SiC), sticky, plastic, very firm when moist, very hard when dry, gradual wavy boundary
> 40	7.5YR 6/6, medium size mottling common (7.5YR 7/1), silty clay (SiC), sticky, plastic, very firm when moist, very hard when dry,

Soil Unit : Gleyic Acrisols Coarse Textured Phase (GAc)
Distribution : 1 ha (0.2 %)

Typical Soil Profile

Location : Bos Ta Ney Village, Kahaeng Commune, Samraong Tong District
Pit Number : P 3 Land Use : Irrigated rice field
Topography : Flat
Groundwater : Inundated due to irrigation

Soil depth (cm)

0 - 15	7.5YR 7/6, few mottling (7.5YR 5/8), coarse sand (S) ~ coarse loamy sand (LS), none sticky, none plastic, very friable when moist, loose when dry, gradual wavy boundary
15 - 30	7.5YR 6/6, medium size distinct mottling common (7.5YR 4/8), coarse sand (S) ~ coarse loamy sand (LS), none sticky, nine plastic, very friable when moist, loose when dry, gradual wavy boundary
30 50	7.5YR 6/8, coarse distinct mottling common (5YR 5/8), coarse sand (S) ~ coarse loamy sand (LS), none sticky, nine plastic, very friable when moist, loose when dry, gradual wavy boundary
> 50	7.5YR 6/8, coarse distinct mottling common (5YR 5/8), coarse sand (S) ~ coarse loamy sand (LS), none sticky, nine plastic, very friable when moist, loose when dry, gradual wavy boundary

Attachment IIIB-2

Results of Questionnaire Survey on Farming Practices, Farm Inputs Supply and Marketing

Attachment IIIB-2 Results of Questionnaire Survey on Farming Practices, Farm Inputs Supply and Marketing (1/4)

A. Farming Practices

A-1. Reason for fallow of rice field in Dry Season

Response (plural alternatives)	n	%
Labor shortage	4	9
Working capital shortage	1	2
Water shortage	42	89
Total	47	100

A-2. Rice variety: rainy season

Response (plural alternative)	n	%
Riang Chey	32	26
Phka Mulis	28	23
Neang Ming	21	17
Kamping Puoy	6	5
Srov Krohorm	4	3
Prambei Kour	4	3
Katom	3	2
Red rice	3	2
Kragoung Pon	3	2
CAR 9	3	2
Somali	2	2
IR 66	2	2
White rice	2	2
Others	8	7
Total	121	100

A-3. Rice variety: early rainy season

Response (one alternative)	n	%
IR 66	23	77
Sen Pidao	3	10
Others	4	13
Total	30	100

A-4. Rice variety: dry season

Response (one alternative)	n	%
IR 66	24	63
IR 36	6	16
Others	8	21
Total	38	100

A-5. Reasons for selection of rice variety

Response (plural alternatives)	n	%
productivity (higher yield)	12	27
Depending on season	9	20
Depending on water availability	8	18
Tradition	7	16
Land condition	2	4
Resistance	1	2
Resistance to poor drainage	1	2
Higher price	1	2
Provided	1	2
Following neighboring farmer	1	2
Others	2	4
Total	45	100

Totals exceed 100% due to multiple responses

A-6. Seed sources: rice

Response (one alternative)	n	%
Own products	42	44
Exchange with others	45	47
Certified seed purchased	1	1
Others	8	8
Total	96	100

A-7. Seed sources: upland crops

Response (one alternative)	n	%
Own products	33	89
Exchange with others	4	11
Certified seed purchased	0	0
Total	37	100

A-8. Seed sources: vegetables

Response (one alternative)	n	%
Own products	0	0
Exchange with others	2	5
Commercial seed procured at local market	36	95
Total	38	100

A-9. Seed replacement of rice

Response (one alternative)	n	%
Once per 3 croppings	63	72
Once per 4 - 6 croppings	15	17
Once > 6 croppings	10	11
Total	88	100

A-10. Land preparation method

Response (one alternative)	n	%
Draft animal	83	88
Machinery	9	10
Manual	2	2
Total	94	100

A-11. Fertilization Volume: Urea (unit: kg/ha)

Item	Kg/ha
N	95
Mean	70
STD	45
Minimum	225
Maximum	0

A-12. Fertilization Volume: DAP (unit: kg/ha)

Item	Kg/ha
N	85
Mean	58
STD	43
Minimum	280
Maximum	0

A-13. Fertilizer (Compost/Manure)

Item	Kg/ha
N	97
Mean	1,759
STD	2,891
Minimum	20,000
Maximum	0

A-14 No. of plants per hill: rainy season

Response (one alternative)	n	%
1 plant/hill	6	6
2 - 3 plants/hill	42	43
4 - 5 plants/hill	45	46
> 5 plants/hill	4	4
Total	97	100

A-15. No. of plants per hill: dry season

Response (one alternative)	n	%
1 plant/hill	6	10
2 - 3 plants/hill	38	60
4 - 5 plants/hill	19	30
Total	63	100

A-16. Age of seedlings: rainy season

Response (one alternative)	n	%
< 30 days	12	12
30 days	19	20
35 - 44 days	16	16
45 days	40	41
> 45 days	10	10
Total	97	100

A-17. Age of seedlings: dry season

Response (one alternative)	n	%
< 20 days	21	33
21 - 25 days	38	59
> 25 days	5	8
Total	64	100

Attachment IIIB-2 Results of Questionnaire Survey on Farming Practices, Farm Inputs Supply and Marketing (2/4)

A-18. Transplanting method: rainy season

Response (one alternative)	n	%
Regular planting	1	1
Random planting	95	99
Total	96	100

A-19. Transplanting method: dry season

Response (one alternative)	n	%
Regular planting	0	0
Random planting	62	100
Total	62	100

A-20. Threshing (method)

Response	n	%
Engine thresher	28	29
Pedal thresher	28	29
Manual threshing	41	42
Total	97	100

A-21. Drying (method)

Response	n	%
Sun drying	95	99
Dryer	1	1
Total	96	100

A-22. Cleaning (method)

Response	n	%
Engine winnower	61	65
Manual winnower	24	26
Manual without winnower	9	10
Total	94	100

B. Farm Input Supply

B-1. Procurement of certified seed

Response (one alternative)	n	%
Easy	43	49
Difficult	41	47
Not possible	3	3
Total	87	100

B-2. Procurement of wanted seed

Response (one alternative)	n	%
Easy	90	92
Difficult	7	7
Not possible	1	1
Total	98	100

B-3. Seed supply timing

Response (one alternative)	n	%
In time	92	94
Delayed	2	2
Not obtained	4	4
Total	98	100

B-4. Quality seed price

Response (one alternative)	n	%
Too expensive	38	39
Acceptable	14	14
Not purchased	46	47
Total	98	100

B-5. Procurement of wanted fertilizer

Response (one alternative)	n	%
Easy	95	98
Difficult	2	2
Not possible	0	0
Total	97	100

B-6. Fertilizer supply timing

Response (one alternative)	n	%
In time	96	99
Delayed	1	1
Not obtained	0	0
Total	97	100

B-7. Fertilizer price

Response (one alternative)	n	%
Too expensive	91	95
Acceptable	4	4
Not purchased	1	1
Total	96	100

C. Post-harvest

C-1. Rice milling cost (bran received by interviewee)

Item	Riel/ton
N	74
Mean	66,358
STD	14,960
Minimum	10,000
Maximum	35,000

C-2. Paddy storage (king of container used)

Response (one alternative)	n	%
Bag	45	47
Bamboo basket	19	20
Wooden box	28	29
Others	3	3
Total	95	100

C-3. Paddy (Maximum storage period; month)

Item	Month
N	96
Mean	9.3
STD	3.2
Minimum	12.0
Maximum	1.0

C-4. Rice (kind of container)

Response (one alternative)	n	%
Bag	74	80
Bamboo basket	11	12
Wooden box	2	2
Others	6	6
Total	93	100

C-6. Rice (Maximum storage period; month)

Item	Month
N	91
Mean	3.6
STD	3.3
Minimum	12.0
Maximum	1.0

C-7. Use of fumigant

Response (one alternative)	n	%
Not used	67	75
Used	22	25
Total	89	100

Attachment IIIB-2 Results of Questionnaire Survey on Farming Practices, Farm Inputs Supply and Marketing (3/4)

C-8. Most dominant loss of paddy

Response (one alternative)	n	%
During harvesting	37	39
At threshing,	32	34
At drying	1	1
At cleaning	5	5
At storage	13	14
At other time	7	7
Total	95	100

C-9. Second dominant loss

Response (one alternative)	n	%
During harvesting	27	31
At threshing,	32	37
At drying	6	7
At cleaning	8	9
At storage	10	11
At other time	4	5
Total	87	100

C-10. Roughly estimated total losses (% of production)

	%
N	93
Mean	5.6
Minimum	30
Maximum	0

D. Marketing

D-1. Farm gate price of irrigated paddy in wet season

	Riel/kg
N	46
Median	535
Mean	558
Minimum	400
Maximum	780

D-2. Farm gate price of irrigated paddy in dry season

	Riel/kg	
N		25
Median		500
Mean		485
Minimum		400
Maximum		650

D-3. Marketing time of rice: just after harvest

	% of sold
N	40
Mean	28
Minimum	10
Maximum	100

proportion to total marketing volume

D-4. Marketing time of rice: when cash is needed

	% of sold
N	54
Mean	37
Minimum	10
Maximum	100

proportion to total marketing volume

D-5. Marketing time of rice: when price is high

	% of sold
N	44
Mean	35
Minimum	15
Maximum	100

proportion to total marketing volume

D-6. Sold product

Response (one alternative)	n	%
Field dried paddy	10	15
Sun dried paddy	54	83
Milled rice	1	2
Total	65	100

D-7. Market Destination

Response	n	%
Rice miller in village	13	20
Rice miller in commune center	35	54
Rice miller in district center	6	9
Collector/middleman	9	14
Local market	2	3
Total	65	100

D-8. Marketing of vegetable

Response	n	%
Market in village	21	53
Market in commune center	18	45
Market in district center	1	3
Collector/middleman	0	0
Other (specify)	0	0
Total	40	100

D-9. Marketing of field crops

Response	n	%
Market in village	9	23
Market in commune center	22	56
Market in district center	2	5
Collector/middleman	6	15
Other (specify)	0	0
Total	39	100

D-10. Marketing of livestock

Response	n	%
Market in village	24	32
Market in commune center	20	26
Market in district center	6	8
Collector/middleman	26	34
Other (specify)	0	0
Total	76	100

D-11. Marketing of other product (fish)

Response	n	%
Market in village	14	39
Market in commune center	22	61
Market in district center	0	0
Other (specify)	0	0
Total	36	100

Attachment IIIB-2 Results of Questionnaire Survey on Farming Practices, Farm Inputs Supply and Marketing (4/4)

E. Food Supply Conditions

E-1. Food supply condition (rice)

Response (one alternative)	n	%
Own harvest/ product exceed the household demand	66	72
Own harvest/ product is just enough to the household	18	20
Purchased (or exchanged) to meet the household	8	9
Insufficient	0	0
Total	92	100

E-2. Food supply condition (vegetables)

Response (one alternative)	n	%
Own harvest/ product exceed the household demand	5	5
Own harvest/ product is just enough to the household	3	3
Purchased (or exchanged) to meet the household	78	85
Insufficient	6	7
Total	92	100

E-3. Food supply condition (other cereals)

Response (one alternative)	n	%
Own harvest/ product exceed the household demand	1	1
Own harvest/ product is just enough to the household demand	0	0
Purchased (or exchanged) to meet the household demand	70	89
Insufficient	8	10
Total	79	100

E-4. Food supply condition (meat)

Response (one alternative)	n	%
Own harvest/ product exceed the household demand	10	11
Own harvest/ product is just enough to the household demand	2	2
Purchased (or exchanged) to meet the household demand	73	80
Insufficient	6	7
Total	91	100

E-5. Food supply condition (roots and tuber crops)

Response (one alternative)	n	%
Own harvest/ product exceed the household demand	2	4
Own harvest/ product is just enough to the household	0	0
Purchased (or exchanged) to meet the household	49	86
Insufficient	6	11
Total	57	100

E-6. Food condition (fish)

Response (one alternative)	n	%
Own harvest/ product exceed the household demand	3	3
Own harvest/ product is just enough to the household	9	10
Purchased (or exchanged) to meet the household	71	78
Insufficient	8	9
Total	91	100

E-7. Food supply condition (beans)

Response (one alternative)	n	%
Own harvest/ product exceed the household demand	0	0
Own harvest/ product is just enough to the household	0	0
Purchased (or exchanged) to meet the household	50	86
Insufficient	8	14
Total	58	100

E-8. Rice purchased in last year (riel)

	riel/farm
N	100
Proportion to sample farmers (100)	31%
Mean (per respondent)	130,410
Minimum	25,000
Maximum	1,250,000

F. Extension Services

F-1. Visit of extension worker

Response (one alternative)	n	%
One per < week	14	15
Once per 2 weeks-1 month	25	26
Seldom visited	57	59
Total	96	100

F-2. Technical capability of extension workers

Response (one alternative)	n	%
Sufficient	32	33
Not sufficient	14	15
No service provided	50	52
Total	96	100

F-3. Are you satisfied with current extension services

Response (one alternative)	n	%
Satisfied	32	34
Not satisfied	14	15
No service provided	49	52
Total	95	100

F-4. What kind of extension services are you needed

Response (specified)	n	%
Rice farming	23	40
Compost fertilizer	9	16
Agriculture technique	7	12
Livestock	7	12
Others	13	22
Total	59	102

Totals exceed 100% due to multiple responses

G. Farm Credit

G-1. Access to farm credit

Response (one alternative)	n	%
Easy	35	45
Difficult	34	44
Not provided	9	12
Total	78	100

G-2. Timing of provision

Response (one alternative)	n	%
In time	49	64
Delayed	19	25
Not provided	9	12
Total	77	100

G-3. Amount of credit

Response (one alternative)	n	%
Sufficient	41	54
Not sufficient	26	34
Not provided	9	12
Total	76	100

G-4. Procedures for credit application

Response (one alternative)	n	%
Easy	31	41
Difficult	35	47
Not provided	9	12
Total	75	100

Attachment IIIB-3

Results of Socio-economic Survey on Farming Constraints, Improvement Measures and Expectations

Attachment IIIB-3 Results of Socio-economic Survey on Farming Constraints, Improvement Measures and Expectations (1/3)

1. Design of Sample Survey

Sample Number 100 farmers in FS area	No. of villages	Survey method Interview survey by enumerators

2. Farming Constraints and Improvement

2-1. Farming Constraints (agronomic & farm management)

Question What are serious agronomic & farm management constraints for farming ? (select plural answer)

Farming constraint (agronomic/farm management)	Degree of Constraints: Most Serious Score: 4			2nd Serious Score: 3			3rd Serious Score: 2			4th Serious Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score	No.	%	Score		
Low yield of crops (paddy)	18	18	72	13	13	39	9	10	18	3	6	3	132	**3**
Crop losses due to pest & disease	34	35	136	28	29	84	7	8	14	3	6	3	237	**1**
Weed problem	3	3	12	11	11	33	7	8	14	5	10	5	64	
Crop losses due to wild animal	0	0	0	1	1	3	3	3	6	2	4	2	11	
Difficulty for hiring draft animal/machinery	2	2	8	5	5	15	1	1	2	2	4	2	27	
Labor shortage	8	8	32	9	9	27	15	17	30	4	8	4	93	
Insufficient extension services	0	0	0	4	4	12	7	8	14	8	16	8	34	
Shortage of farming capital	1	1	4	6	6	18	11	13	22	2	4	2	46	
Difficulty for obtaining quality seeds	0	0	0	1	1	3	5	6	10	6	12	6	19	
Difficulty for purchasing fertilizers	1	1	4	7	7	21	5	6	10	3	6	3	38	
Expensive farm inputs	23	23	92	10	10	30	5	6	10	5	10	5	137	**2**
Poor soil conditions	5	5	20	2	2	6	8	9	16	8	16	8	50	
Marketing problems of products	2	2	8	1	1	3	2	2	4	0	0	0	15	
Lack of farm credit	1	1	4	0	0	0	1	1	2	0	0	0	6	
Total	98	100	392	98	100	294	86	100	172	51	100	51	909	

2-2. Farming Constraints (physical)

Question What are serious physical constraints for farming ? (select plural answer)

Faming Constraints/Physical (Answer)	Degree of Constraints: Most Serious Score: 3			2nd Serious Score: 2			3rd Serious Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Irrigation water shortage in wet season	33	34	99	18	21	36	4	7	4	139	**2**
Irrigation water shortage in dry season	52	53	156	29	34	58	3	6	3	217	**1**
Inundation/flooding	5	5	15	13	15	26	10	19	10	51	**3**
Drainage problem	3	3	9	16	19		9	17		9	
Lack of farm road	0	0	0	2	2	4	4	7	4	8	
Lack of transportation means	0	0	0	4	5	8	8	15	8	16	
Leveling problem of paddy field	5	5	15	3	4	6	16	30	16	37	
Insufficient irrigation system	0	0	0	0	0	0	0	0	0	0	
Others	0	0	0	0	0	0	0	0	0	0	
Total	98	100	294	85	100	138	54	100	45	477	

2-3. Marketing constraints

Marketing Constraints (Answer)	Degree of Constraints: Most Serious Score: 3			2nd Serious Score: 2			3rd Serious Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Unstable market prices of paddy/rice	42	43	126	24	29	48	6	13	6	180	**1**
Low market prices of paddy/rice	39	40	117	24	29	48	5	11	5	170	**2**
Limitation of market of paddy/rice	1	1	3	5	6	10	4	9	4	17	
Unstable market prices of other crops	3	3	9	4	5	8	6	13	6	23	
Low market prices of other crops	0	0	0	2	2	4	4	9	4	8	
Limitation of market of other crops	0	0	0	0	0	0	1	2	1	1	
Unstable market prices of livestock	0	0	0	13	15	26	11	23	11	37	
Low market prices of livestock	6	6	18	10	12	20	9	19	9	47	**3**
Limitation of market of livestock	5	5	15	2	2	4	1	2	1	20	
Lack of or poor farm to market road	1	1	3	0	0	0	0	0	0	3	
Total	97	100	291	84	100	168	47	100	47	506	

2-4. Reasons for limited productivity of crops in the rice field of interviewee (not specific to last year)

Reasons for Limited Productivity (Answer)	Degree of Constraints: Most Serious Score: 3			2nd Serious Score: 2			3rd Serious Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Drought in wet season	36	40	108	6	7	12	1	1.389	1	121	**1**
Water shortage in dry season	19	21	57	21	24	42	4	5.556	4	103	**2**
Shortage of farming capital	3	3	9	7	8	14	9	12.5	9	32	
Poor seed quality	0	0	0	6	7	12	10	13.89	10	22	
Poor soil	7	8	21	11	13	22	12	16.67	12	55	**3**
Limited application of fertilizer	6	7	18	10	11	20	4	5.556	4	42	
Damages caused by wild animal (rat)	11	12	33	6	7	12	2	2.778	2	47	
Poor drainage	1	1	3	2	2	4	3	4.167	3	10	
Flooding/inundation	3	3	9	2	2	4	3	4.167	3	16	
Inadequate farming technologies	4	4	12	2	2	4	10	13.89	10	26	
Damages caused by pest & disease	1	1	3	15	17	30	14	19.44	14	47	
Others	0	0	0	0	0	0	0	0	0	0	
Total	91	100	273	88	100	176	72	100	72	521	

Attachment IIIB-3 Results of Socio-economic Survey on Farming Constraints, Improvement Measures and Expectations (2/3)

2-5. Activities/practices to improve rice productivity implemented by the interviewee in the past 3 years (plural answer)

Activities Implemented	No. & Proportion of Respondents Implemented Activities/Practices		Remarks
	No.	%	
Increased fertilization doses	52	19	No. of respondents : 94
Applied of compost/manure	62	23	
Used quality seed (local variety)	34	13	Maximum 4 activities selected/respondent
Used quality seed (high yielding variety)	16	6	
Constructed of farm pond	10	4	Total answers: 269
Started to use water pump for irrigation	48	18	
Improved farming practices	27	10	
Improved post-harvest practices	11	4	
Changed marketing methods	7	3	
Others	2	1	
Total	269	100	

2-6. Necessary activities to improve rice productivity in the field of the interviewee (farming & farm management; plural answer)

Necessary Activities	Degree of Necessity of Activity												Total Score	Rating
	Most Required Score: 4			2nd Most Required Score: 3			3rd Most Required Score: 2			4th Most Required Score: 1				
	No.	%	Score	No.	%	Score	No.	%	Score	No.	%	Score		
Improvement of farming practices	13	14	52	22	23	66	16	20	32	5	16	5	155	**1**
Use of quality seed (local variety)	21	22	84	15	16	45	6	8	12	1	3	1	142	
Use of quality seed (high yielding variety)	24	25	96	11	12	33	10	13	20	2	6	2	151	**2**
Use of adequate doses of fertilizer	17	18	68	15	16	45	15	19	30	5	16	5	148	**3**
Improved leveling of paddy field	2	2	8	9	10	27	12	15	24	7	23	7	66	
Planting at proper time	3	3	12	9	10	27	7	9	14	4	13	4	57	
Intensive weeding	8	8	32	8	9	24	8	10	16	4	13	4	76	
Formation/strengthening of farmers organization	8	8	32	5	5	15	4	5	8	2	6	2	57	
Others	0	0	0	0	0	0	1	1	2	1	3	1	3	
Total	96	100	384	94	100	282	79	100	158	31	100	31	855	

2-7. Necessary physical works to improve rice productivity in the field of the interviewee (plural answer)

Necessary Physical Works	Degree of Necessity of Activity												Total Score	Rating
	Most Required Score: 3			2nd Most Required Score: 2			3rd Most Required Score: 1			4th Most Required Score: 1				
	No.	%	Score	No.	%	Score	No.	%	Score	No.	%	Score		
Irrigation water supply for wet season	29	30	87	25	28	50	2	6	2	0	0	0	139	**2**
Irrigation water supply for dry season	39	40	117	36	40	72	5	14	5	0	0	0	194	**1**
Mitigation of inundation/flooding	7	7	21	12	13	24	20	56	20	2	18	2	67	
Drainage improvement	20	21	60	14	16	28	8	22	8	7	64	7	103	**3**
Others	2	2	6	3	3	6	1	3	1	2	18	2	15	
Total	97	100	291	90	100	180	36	100	36	11	100	11	518	

3. Livestock Constraints

Livestock Constraints	Degree of Constraints									Total Score	Rating
	Most Serious Score: 3			2nd Serious Score: 2			3rd Serious Score: 1				
	No.	%	Score	No.	%	Score	No.	%	Score		
Low productivity	12	13	36	28	31	56	10	17	10	102	**2**
Shortage of feed	5	5	15	11	12	22	3	5	3	40	
Low or unstable market prices	4	4	12	7	8	14	11	19	11	37	
Market availability	0	0	0	3	3	6	0	0	0	6	
Losses due to diseases	62	67	186	17	19	34	3	5	3	223	**1**
Insufficient veterinary services	2	2	6	17	19	34	19	32	19	59	**3**
Insufficient extension services	0	0	0	1	1	2	10	17	10	12	
Difficulty in obtaining good breed	1	1	3	3	3	6	0	0	0	9	
Others	6	7	18	2	2	4	3	5	3	25	
Total	92	100	276	89	100	178	59	100	59	513	

4. Expectations for Improvement
4-1. Farming (agronomic & farm management)

Expectations for Improvement	Degree of Expectation									Total Score	Rating
	Most Expected Score: 3			2nd Most Expected Score: 2			3rd Most Expected Score: 1				
	No.	%	Score	No.	%	Score	No.	%	Score		
Productivity improvement of wet season rice	29	31	87	27	29	54	6	8	6	147	**2**
Productivity improvement of dry season rice	40	42	120	31	33	62	6	8	6	188	**1**
Productivity improvement of field crops	1	1	3	9	10	18	10	13	10	31	
Productivity improvement of vegetables	0	0	0	1	1	2	5	7	5	7	
Productivity improvement of livestock/poultry	11	12	33	15	16	30	23	31	23	86	**3**
Increasing livestock holding size & production	6	6	18	7	8	14	8	11	8	40	
Increasing poultry holding size & production	1	1	3	2	2	4	9	12	9	16	
Strengthening/formation of farmers organizations	6	6	18	1	1	2	6	8	6	26	
Improvement of post-harvest operation	0	0	0	0	0	0	1	1	1	1	
Others	1	1	3	0	0	0	1	1	1	4	
Total	95	100	285	93	100	186	75	100	75	546	

Attachment IIIB-3 Results of Socio-economic Survey on Farming Constraints, Improvement Measures and Expectations (3/3)

4-2. Farming (farming system)

Farming System	Degree of Expectation: Primarily Intended Score: 3			Secondary Intended Score: 2			Thirdly Intended Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Double cropping of rice	44	45	132	17	20	34	4	10	4	170	**2**
Stable single cropping of rice	9	9	27	18	22	36	7	18	7	70	
Multiple farming (crop + livestock etc.)	31	32	93	39	47	78	7	18	7	178	**1**
Crop diversification	13	13	39	9	11	18	22	55	22	79	
Total	97	100	291	83	100	166	40	100	40	497	

4-3. Farming (physical)

Farming (physical)	Degree of Expectation: Primarily Expected Score: 3			Secondary Expected Score: 2			Thirdly Expected Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Adequate irrigation water supply in wet season	29	30	87	22	24	44	2	4	2	133	**2**
Adequate irrigation water supply in dry season	48	50	144	32	36	64	8	14	8	216	**1**
Mitigation of inundation & flooding	5	5		13	14	26	21	38	21	47	**3**
Construction/rehabilitation of farm road	2	2		3	3	6	6	11	6	12	
Construction/rehabilitation of farm to market road	1	1		1	1	2	0	0	0	2	
Drainage improvement	4	4	12	11	12	22	7	13	7	41	
Leveling of paddy field	5	5		8	9	16	11	20	11	27	
Others (specify)	2	2		0	0	0	1	2	1	1	
Total	96	100	243	90	100	180	56	100	56	479	

4-4. Agricultural support services

Agricultural Support Required	Degree of Necessity of Support: Most Required Score: 3			2nd Most Required Score: 2			3rd Most Required Score: 1			Total Score	Rating
	No.	%	Score	No.	%	Score	No.	%	Score		
Field Extension services (demonstration / field guidance)	27	28	81	16	17	32	27	35	27	140	**1**
Provision of quality seed	22	23	66	33	35	66	5	6	5	137	**2**
Farmer training (technical & host-harvest operation)	8	8	24	13	14	26	10	13	10	60	
Farmer training (organization, marketing, farm management)	1	1		5	5	10	2	3	2	12	
Support to organize farmers	10	10		9	10	18	7	9	7	25	
Provision of market information	6	6	18	2	2	4	9	12	9	31	
Provision of farm credit	3	3		2	2	4	2	3	2	6	
Provision of fertilizer	18	19	54	12	13	24	15	19	15	93	**3**
Others (specify)	1	1		1	1	2	0	0	0	2	
Total	96	100	288	93	100	279	77	100	231	693	

Attachment IIIB-4

Results of Socio-economic Survey: Land Holding

Attachment IIIB-4 Results of Socio-economic Survey: Land Holding (1/2)

	1.Irrigated paddy field (gravity)			2. Irrigated paddy field (pump irrigated only)			3. Irrigated paddy field (gravity+pump irrigated)			**Irrigated paddy field total**			4. Rainfed paddy field		
Sample No.	Land owned	Land rented from other	Land operated	Land owned	Land rented from other	Land operated	Land owned	Land rented from other	Land operated	Land owned	Land rented from other	Land operated	Land owned	Land leased to others	Land operated
1			0			0	1.0		1	1.0		1.0			0
2	0.2		0.2			0			0	0.2		0.2			0
3	0.2	0.77	0.97			0			0	0.2	0.77	1.0			0
4	0.5		0.5			0			0	0.5		0.5			0
5			0			0	0.16		0.16	0.16		0.2	0.2		0.2
6			0	0.4		0.4			0	0.4		0.4	0.2		0.2
7	0.1		0.1			0			0	0.1		0.1	1.5		1.5
8			0			0	0.3		0.3	0.3		0.3	1.0		1
9	0.3		0.3			0			0	0.3		0.3	0.7		0.7
10	0.3		0.3	0.2		0.2			0	0.5		0.5	0.5		0.5
11	1.0		1			0			0	1.0		1.0	0.5	0.5	1
12	0.7		0.7			0			0	0.7		0.7	1.5		1.5
13	0.3		0.3	0.3		0.3			0	0.6		0.6	2.5		2.5
14	2.0		2	2.5		2.5			0	4.5		4.5			0
15	0.1		0.1	1.0		1			0	1.1		1.1	0.7		0.7
16			0	0.9		0.9			0	0.9		0.9			0
17	0.24		0.24	0.08		0.08			0	0.32		0.3	0.4		0.4
18			0	0.5		0.5			0	0.5		0.5	1.5		1.5
19			0			0	0.25		0.25	0.25		0.25	0.25		0.25
20			0	0.3		0.3			0	0.3		0.3			0
21	0.6		0.6			0			0	0.6		0.6			0
22			0	0.2		0.2			0	0.2		0.2			0
23			0	0.25		0.25			0	0.25		0.3			0
24			0			0	0.3		0.3	0.3		0.3	0.3		0.3
25	0.15		0.15	0.15		0.15			0	0.3		0.3			0
26			0	2.0		2			0	2.0		2.0			0
27			0	0.2		0.2			0	0.2		0.2			0
28			0			0	0.17		0.17	0.17		0.17			0
29	0.2		0.2			0			0	0.2		0.2			0
30	0.17		0.17			0			0	0.17		0.2	0.37		0.37
31			0	0.3		0.3			0	0.3		0.3	0.2		0.2
32	0.8		0.8			0			0	0.8		0.8			0
33			0	0.2		0.2			0	0.2		0.2	0.8		0.8
34	0.4		0.4	0.1		0.1			0	0.5		0.5			0
35			0			0	0.9		0.9	0.9		0.9			0
36			0			0	0.14		0.14	0.14		0.14	0.16		0.16
37	0.5		0.5			0			0	0.5		0.5			0
38	1.0		1			0			0	1.0		1.0	1.0		1
39	0.2		0.2			0	0.15		0.15	0.35		0.35	0.2		0.2
40	0.5		0.5			0			0	0.5		0.5	0.3		0.3
41	0.5		0.5			0			0	0.5		0.5	0.3		0.3
42	0.12		0.12			0	0.2		0.2	0.32		0.3	0.2		0.2
43	0.2		0.2			0			0	0.2		0.2	0.2		0.2
44			0			0	0.15		0.15	0.15		0.15	0.3		0.3
45	0.1		0.1			0	0.3		0.3	0.4		0.4			0
46			0	0.1		0.1			0	0.1		0.1	0.15		0.15
47			0			0	0.36		0.36	0.36		0.36			0
48	0.5		0.5	0.5		0.5			0	1.0		1.0			0
49			0	0.55		0.55	0.25		0.25	0.8		0.80			0
50	0.45		0.45			0			0	0.45		0.5			0
51			0			0	0.5		0.5	0.5		0.5			0
52			0			0	1.0		1	1.0		1.0			0
53			0			0	0.5		0.5	0.5		0.5			0
54	0.4		0.4	0.1		0.1			0	0.5		0.5	0.04		0.04
55	1.0		1	0.1		0.1			0	1.1		1.1			0
56	0.1		0.1	0.5	0.1	0.6			0	0.6	0.1	0.7			0
57	0.25		0.25			0			0	0.25		0.25			0
58			0			0	0.5		0.5	0.5		0.5			0
59			0			0	0.5		0.5	0.5		0.5			0
60	0.15		0.15			0	0.5		0.5	0.65		0.7	0.4		0.4
61	1.0		1			0			0	1.0		1.0	1.0		1
62	0.7		0.7			0	0.3		0.3	1.0		1.0	1.0		1
63	0.5		0.5			0			0	0.5		0.5			0
64			0			0	0.2		0.2	0.2		0.2			0
65	0.2		0.2			0			0	0.2		0.2			0
66	0.2		0.2	1.0		1			0	1.2		1.2	0.7		0.7
67	0.2		0.2			0	0.5		0.5	0.7		0.7			0
68	0.5		0.5	0.2		0.2			0	0.7		0.7	0.3		0.3
69	0.2		0.2			0	0.5		0.5	0.7		0.7			0
70	0.25		0.25			0	0.75		0.75	1.0		1.0			0
71	0.32		0.32			0			0	0.32		0.3			0
72	0.2		0.2			0			0	0.2		0.2			0
73	0.2		0.2			0			0	0.2		0.2			0
74	0.2		0.2			0			0	0.2		0.2			0
75	1.5		1.5			0	1.5		1.5	3.0		3.0			0
76			0			0	0.1		0.1	0.1		0.1			0
77			0			0	0.2		0.2	0.2		0.2			0
78			0			0	0.2		0.2	0.2		0.2			0
79			0			0	0.4		0.4	0.4		0.4			0
80			0			0	0.3		0.3	0.3		0.3			0
81	0.45		0.45			0	0.45		0.45	0.9		0.90			0
82	0.3		0.3			0			0	0.3		0.3			0
83			0			0	1.2		1.2	1.2		1.2			0
84			0			0	0.5		0.5	0.5		0.5			0
85			0			0			0	0.0		0.0	0.3		0.3
86	1.0		1			0	0.5		0.5	1.5		1.5			0
87			0			0	1.2		1.2	1.2		1.2			0
88	0.4		0.4			0	0.6		0.6	1.0		1.0			0
89	0.6		0.6			0			0	0.6		0.6			0
90	0.6		0.6			0			0	0.6		0.6			0
91	0.4		0.4	0.4		0.4			0	0.8		0.8	1.0		1
92	1.0		1	1.0		1			0	2.0		2.0	1.0		1
93	0.2		0.2			0			0	0.2		0.2	2.0		2
94	0.15		0.15			0			0	0.15		0.2	0.08		0.08
95			0	0.1		0.1			0	0.1		0.1	0.2		0.2
96			0	1.2		1.2			0	1.2		1.2			0
97	0.5		0.5			0			0	0.5		0.5			0
98	1.0		1			0			0	1.0		1.0			0
99	0.2		0.2			0			0	0.2		0.2			0
100			0	0.36		0.36			0	0.36		0.4			0
Count	60	1	100	30	1	100	37	0	100	100	2	100	38	1	100
Total	27.2	0.8	28.0	15.7	0.1	15.8	17.5		17.5	60.4	0.9	61.3	24.0	0.5	24.5
Average (per resp)	**0.45**		**0.28**	**0.52**		**0.16**	**0.47**		**0.18**	**0.60**		**0.61**	**0.63**	**0.01**	**0.24**
Average (per farm)	**0.27**		**0.28**	**0.16**		**0.16**	**0.18**		**0.18**	**0.60**		**0.61**	**0.24**		**0.24**
Max	**2.0**		**2.0**	**2.5**		**2.5**	**1.5**		**1.5**	**4.5**	**0.8**	**4.5**	**2.5**	**0.5**	**2.5**
Min	**0**		**0**	**0**		**0**	**0**		**0**	**0**		**0**	**0**	**1**	**0**

Attachment IIIB-4 Results of Socio-economic Survey: Land Holding (2/2)

	Paddy field total				5. Upland for field crop		6. Upland for tree crop		7. Total				
Sample No.	Land owned	Land rented from other	Land leased to others	Land operated	Land owned	Land operated	Land owned	Land operated	Land owned	Land rented from other	Land leased to others	Land operated	8. Land holding status
1	1.0			1.0				0	1.0			1.00	1
2	0.2			0.2			0.01	0	0.21			0.20	1
3	0.2	0.77		0.97				0	0.2	0.77		0.97	2
4	0.5			0.5				0	0.5			0.50	1
5	0.4			0.4				0	0.36			0.36	1
6	0.6			0.6				0	0.6			0.60	1
7	1.6			1.6				0	1.6			1.60	1
8	1.3			1.3				0	1.3			1.30	1
9	1.0			1.0				0	1.0			1.00	1
10	1.0			1.0				0	1.0			1.00	1
11	1.5		0.5	2.0				0	1.5		0.50	2.00	1
12	2.2			2.2				0	2.2			2.20	1
13	3.1			3.1				0	3.1			3.10	1
14	4.5			4.5				0	4.5			4.50	1
15	1.8			1.8				0	1.8			1.80	1
16	0.9			0.9				0	0.9			0.90	1
17	0.7			0.7				0	0.72			0.72	1
18	2.0			2.0				0	2.0			2.00	1
19	0.5			0.5				0	0.5			0.50	1
20	0.3			0.3				0	0.3			0.30	1
21	0.6			0.6				0	0.6			0.60	1
22	0.2			0.2				0	0.2			0.20	1
23	0.3			0.3				0	0.25			0.25	1
24	0.6			0.6				0	0.6			0.60	1
25	0.3			0.3				0	0.3			0.30	1
26	2.0			2.0				0	2.0			2.00	1
27	0.2			0.2				0	0.2			0.20	1
28	0.2			0.2				0	0.17			0.17	1
29	0.2			0.2				0	0.2			0.20	1
30	0.5			0.5				0	0.54			0.54	1
31	0.5			0.5				0	0.5			0.50	1
32	0.8			0.8				0	0.8			0.80	1
33	1.0			1.0				0	1.0			1.00	1
34	0.5			0.5				0	0.5			0.50	1
35	0.9			0.9				0	0.9			0.90	1
36	0.3			0.3				0	0.3			0.30	1
37	0.5			0.5				0	0.5			0.50	1
38	2.0			2.0				0	2.0			2.00	1
39	0.6			0.6				0	0.55			0.55	1
40	0.8			0.8				0	0.8			0.80	1
41	0.8			0.8				0	0.8			0.80	1
42	0.5			0.5				0	0.52			0.52	1
43	0.4			0.4				0	0.4			0.40	1
44	0.5			0.5				0	0.45			0.45	1
45	0.4			0.4				0	0.4			0.40	1
46	0.25			0.3				0	0.25			0.25	1
47	0.4			0.4				0	0.36			0.36	1
48	1.0			1.0	0.5			0	1.5			1.00	1
49	0.8			0.8				0	0.8			0.80	1
50	0.5			0.5				0	0.45			0.45	1
51	0.5			0.5				0	0.5			0.50	1
52	1.0			1.0				0	1.0			1.00	1
53	0.5			0.5				0	0.5			0.50	1
54	0.5			0.5				0	0.54			0.54	1
55	1.1			1.1				0	1.1			1.10	1
56	0.6	0.10		0.7				0	0.6	0.10		0.70	2
57	0.3			0.3	0.15	0.15		0	0.45			0.40	1
58	0.5			0.5				0	0.5			0.50	1
59	0.5			0.5				0	0.5			0.50	1
60	1.1			1.1				0	1.05			1.05	1
61	2.0			2.0				0	2.0			2.00	1
62	2.0			2.0				0	2.0			2.00	1
63	0.5			0.5				0	0.5			0.50	1
64	0.2			0.2				0	0.2			0.20	1
65	0.2			0.2				0	0.2			0.20	1
66	1.9			1.9				0	1.9			1.90	1
67	0.7			0.7				0	0.7			0.70	1
68	1.0			1.0				0	1.0			1.00	1
69	0.7			0.7				0	0.7			0.70	1
70	1.0			1.0				0	1.0			1.00	1
71	0.32			0.32				0	0.32			0.32	1
72	0.2			0.2				0	0.2			0.20	1
73	0.2			0.2				0	0.2			0.20	1
74	0.2			0.2				0	0.2			0.20	1
75	3.0			3.0				0	3.0			3.00	1
76	0.1			0.1				0	0.1			0.10	1
77	0.2			0.2				0	0.2			0.20	1
78	0.2			0.2				0	0.2			0.20	1
79	0.4			0.4				0	0.4			0.40	1
80	0.3			0.3				0	0.3			0.30	1
81	0.9			0.9				0	0.9			0.90	1
82	0.3			0.3				0	0.3			0.30	1
83	1.2			1.2				0	1.2			1.20	1
84	0.5			0.5				0	0.5			0.50	1
85	0.3			0.3				0	0.3			0.30	1
86	1.5			1.5				0	1.5			1.50	1
87	1.2			1.2				0	1.2			1.20	1
88	1.0			1.0				0	1.0			1.00	1
89	0.6			0.6				0	0.6			0.60	1
90	0.6			0.6				0	0.6			0.60	1
91	1.8			1.8				0	1.8			1.80	1
92	3.0			3.0				0	3.0			3.00	1
93	2.2			2.2				0	2.2			2.20	1
94	0.2			0.2				0	0.23			0.23	1
95	0.3			0.3				0	0.3			0.30	1
96	1.2			1.2				0	1.2			1.20	1
97	0.5			0.5				0	0.5			0.50	1
98	1.0			1.0				0	1.0			1.00	1
99	0.2			0.2				0	0.2			0.20	1
100	0.4			0.4				0	0.36				
Count	100	2	1	100	2	1	1	100	100	2	1	100	100
Total	84.4	0.9	0.5	85.7	0.7	0.2	0.01	0.0	85.0	0.9	0.5	85.9	**Owner**
Average (per resp)	**0.84**			**0.86**	**0.33**	**0.00**	**0.00**	**0.00**	**0.85**	**0.01**	**0.01**	**0.86**	**98**
Average (per farm)	**0.84**			**0.86**	**0.01**			**0.00**	**0.85**			**0.86**	**Owner+tenant**
Max	**4.5**	**0.8**	**0.5**	**4.5**	**0.5**	**0.2**	**0.0**	**0.0**	**4.5**	**0.8**	**0.5**	**4.5**	**2**
Min	**0**			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	

Attachment IIIB-5

Results of Socio-economic Survey: Cropped Area, Production and Yield

Attachment IIIB-5 Results of Socio-economic Survey: Cropped Area, Production and Yield (1/2)

	1. Paddy Field (Irrigated paddy)													
	Early wet season				Wet season				Dry season				Annual	
Sample No.	Cropped area (ha)	Cropping intensity (%)	Production (kg)	Yield (ton/ha)	Cropped area (ha)	Cropping intensity (%)	Production (kg)	Yield (ton/ha)	Cropped area (ha)	Cropping intensity (%)	Production (kg)	Yield (ton/ha)	Cropped area (ha)	Cropping intensity (%)
1					1.0	100	1,500	1.5					1.0	100
2					0.2	100			0.2	100			0.4	200
3					1.0	100	2,300	2.4	0.2	21	720	3.6	1.2	121
4	0.15	30	400	2.7	0.5	100	1,500	3.0					0.7	130
5					0.2	100	350	2.2	0.16	100	500	3.1	0.3	200
6	0.4	100	800	2.0	0.4	100	600	1.5					0.8	200
7					0.1	100	300	3.0					0.1	100
8	0.3	100	1,000	3.3	0.3	100	900	3.0					0.6	200
9					0.3	100	1,000	3.3	0.3	100	1,000	3.3	0.6	200
10					0.5	100	1,000	2.0	0.5	100	1,500	3.0	1.0	200
11					1.0	100	235	0.2	0.5	50	1,000	2.0	1.5	150
12					0.7	100	190	0.3	0.7	100	235	0.3	1.4	200
13					0.6	100	1,200	2.0	0.3	50	500	1.7	0.9	150
14					4.5	100	9,000	2.0	2.5	56	5,000	2.0	7.0	156
15					1.1	100	2,400	2.2	1.1	100	3,200	2.9	2.2	200
16					0.9	100	2,000	2.2	0.3	33	800	2.7	1.2	133
17	0.08	25	250	3.1	0.32	100	900	2.8					0.4	125
18	0.4	80	800	2.0	0.5	100	1,200	2.4	0.4	80	800	2.0	1.3	260
19	0.1	40	220	2.2	0.25	100	750	3.0					0.4	140
20					0.3	100	1,000	3.3					0.3	100
21	0.6	100	1,500	2.5	0.6	100	1,200	2.0					1.2	200
22					0.2	100	640	3.2					0.2	100
23					0.25	100	600	2.4	0.13	52	300	2.3	0.4	152
24					0.3	100	650	2.2	0.3	100	700	2.3	0.6	200
25					0.3	100	720	2.4	0.3	100	720	2.4	0.6	200
26					2.0	100	3,000	1.5	0.5	25	1,000	2.0	2.5	125
27					0.2	100	400	2.0					0.2	100
28					0.17	100	500	2.9	0.1	59	300	3.0	0.3	159
29	0.2	100	750	3.8	0.2	100	700	3.5					0.4	200
30					0.17	100	600	3.5					0.2	100
31					0.3	100	500	1.7	0.3	100	650	2.2	0.6	200
32					0.8	100	900	1.1					0.8	100
33					0.2	100	300	1.5	0.2	100	320	1.6	0.4	200
34					0.4	80	1,000	2.5	0.4	80	1,200	3.0	0.8	160
35	0.1	11	230	2.3	0.9	100	2,300	2.6	0.2	22	750	3.8	1.2	133
36					0.14	100	500	3.6	0.07	50	140	2.0	0.21	150
37					0.5	100	1,500	3.0	0.5	100	1,740	3.5	1.0	200
38	0.7	70	2,500	3.6	1.0	100	3,000	3.0					1.7	170
39					0.35	100	700	2.0	0.35	100	960	2.7	0.7	200
40	0.5	100	1,200	2.4	0.5	100	1,600	3.2					1.0	200
41					0.5	100	1,600	3.2	0.5	100	1,800	3.6	1.0	200
42					0.32	100	576	1.8	0.12	38	400	3.3	0.4	138
43					0.2	100	600	3.0	0.2	100	500	2.5	0.4	200
44					0.15	100	300	2.0					0.2	100
45	0.1	33	230	2.3	0.4	100	1,080	2.7	0.1	25	360	3.6	0.6	150
46					0.1	100	360	3.6					0.1	100
47	0.35	97	900	2.6	0.36	100	1,200	3.3					0.7	197
48					1.0	100	2,800	2.8					1.0	100
49	0.7	88	1,200	1.7	0.80	100	2,400	3.0					1.5	188
50					0.45	100	1,300	2.9					0.5	100
51					0.5	100	1,400	2.8					0.5	100
52	0.5	50	1,200	2.4	1.0	100	2,800	2.8					1.5	150
53	0.5	100	1,200	2.4	0.5	100	1,200	2.4					1.0	200
54					0.4	80	880	2.2	0.2	40	654	3.3	0.6	120
55	0.15	14	500	3.3	1.1	100	2,750	2.5					1.3	114
56	0.15	21	500	3.3	0.5	71	500	1.0					0.7	93
57	0.1	40	250	2.5	0.25	100	900	3.6					0.4	140
58					0.5	100	800	1.6					0.5	100
59					0.5	100	700	1.4					0.5	100
60	0.15	23	500	3.3	0.5	77	1,000	2.0					0.7	100
61	0.25	25	600	2.4	1.0	100	2,000	2.0					1.3	125
62	0.3	30	600	2.0	0.7	70	1,600	2.3					1.0	100
63					0.5	100	700	1.4	0.3	60	500	1.7	0.8	160
64					0.2	100	400	2.0					0.2	100
65					0.2	100	700	3.5	0.2	100	750	3.8	0.4	200
66					1.0	83	2,100	2.1	0.2	17	500	2.5	1.2	100
67					0.5	71	1,000	2.0	0.2	29	700	3.5	0.7	100
68					0.7	100	1,400	2.0					0.7	100
69					0.7	100	2,000	2.9	0.2	29	500	2.5	0.9	129
70	0.12	12	230	1.9	1.0	100	1,500	1.5					1.1	112
71					0.32	100	500	1.6	0.32	100	680	2.1	0.6	200
72					0.2	100	450	2.3	0.2	100	500	2.5	0.4	200
73					0.2	100	450	2.3	0.2	100	500	2.5	0.4	200
74					0.2	100	600	3.0	0.2	100	500	2.5	0.4	200
75	0.17	6	250	1.5	2.7	90	6,000	2.2					2.9	96
76	0.1	100	240	2.4	0.1	100	300	3.0					0.2	200
77	0.1	50	220	2.2	0.2	100	600	3.0					0.3	150
78					0.2	100	700	3.5					0.2	100
79					0.4	100	1,700	4.3					0.4	100
80					0.3	100	800	2.7					0.3	100
81					0.9	100	1,200	1.3	0.45	50	2,500	5.6	1.4	150
82					0.3	100	700	2.3					0.3	100
83					1.2	100	3,500	2.9					1.2	100
84					0.5	100	1,500	3.0	0.15	30	230	1.5	0.7	130
85														
86					1.5	100	5,000	3.3	1.0	67	3,200	3.2	2.5	167
87					1.2	100	3,500	2.9					1.2	100
88					1.0	100	3,000	3.0	0.1	10	200	2.0	1.1	110
89					0.6	100	1,300	2.2					0.6	100
90					0.6	100	800	1.3	0.3	50	350	1.2	0.9	150
91	0.2	25	500	2.5	0.8	100	2,000	2.5					1.0	125
92	0.26	13	350	1.3	2.0	100	6,000	3.0					2.3	113
93	0.2	100	310	1.6	0.2	100	650	3.3					0.4	200
94	0.15	100	220	1.5	0.15	100	432	2.9					0.3	200
95	0.1	100	200	2.0	0.1	100	300	3.0					0.2	200
96	1.2	100	2,000	1.7	1.2	100	3,700	3.1					2.4	200
97					0.5	100	1,600	3.2					0.5	100
98	0.6	60	1,000	1.7	1.0	100	2,000	2.0	0.5	50	160	0.3	2.1	210
99					0.2	100	600	3.0					0.2	100
100					0.36	100	1,200	3.3					0.4	100
Count	33	33	33	33	99	99	98	98	44	44	43	43	99	99
Total	10.0	1,913.5	22,850		59.7	9,599	139,263		16	2,971	39,519		85.9	14,628.3
Average (per resp)	**0.30**	**57.98**	**692**	**2.3**	**0.60**	**97**	**1,421**	**2.3**	**0.37**	**68**	**919**	**2.4**	**0.87**	**148**
Average (per farm)	**0.10**	**16**	**229**		**0.60**	**98**	**1,393**		**0.16**	**26**	**395**		**0.86**	**146**
Max	**1.20**	**100**	**2,500**	**3.8**	**4.50**	**100**	**9,000**	**4.3**	**2.50**	**100**	**5,000**	**5.6**	**7.00**	**260**
Min	**0.08**	**0**	**200**	**1.3**	**0.10**	**0**	**190**	**0.2**	**0.07**	**0**	**140**	**0.3**	**0.10**	**93**

Attachment IIIB-5 Results of Socio-economic Survey: Cropped Area, Production and Yield (2/2)

Sample No.	2.Paddy (Rained paddy) Wet season Cropped area (ha)	Cropping intensity (%)	Production (kg)	Yield (ton/ha)	3. Other Crops in Paddy field Annual Cropped area (ha)	Upland Field Annual Cropped area (ha)	Reason for Fallow Wet season	Dry season
1								1,3
2								
3								
4								3
5								3
6	0.2	100	300	1.5				3
7	1.5	100	3,500	2.3				3
8	1.0	100	1,200	1.2				3
9	0.7	100	1,900	2.7				3
10	0.5	100	1,000	2.0				3
11								
12	1.5	100	3,500	2.3				
13	2.5	100	4,200	1.7				3
14								3
15								
16								3
17	0.4	100	650	1.6				3
18	1.0	67	1,500	1.5				
19	0.25	100	700	2.8				3
20								3
21								3
22								3
23								
24	0.3	100	500	1.7				
25								1
26								3
27								3
28								3
29								1,2
30	0.37	100	1,000	2.7				1,3
31	0.2	100	480	2.4				3
32								3
33	0.8	100	1,800	2.3				
34								3
35								
36	0.16	100	490	3.1				3
37								
38	1.0	100	2,500	2.5				
39	0.2	100	400	2.0				
40	0.3	100	300	1.0				
41	0.3	100	400	1.3				3
42	0.2	100	312	1.6				
43								3
44	0.3	100	300	1.0				3
45								
46	0.15	100	480	3.2				3
47								3
48								3
49								
50								3
51								3
52								
53								
54							3	3
55								
56								
57								
58								
59								
60	0.4	100	1,500	3.8				
61								
62	1.0	100	2,000	2.0				
63								
64								
65								
66	0.7	100	600	0.9				
67								
68	0.3	100	600	2.0				
69								
70								
71								
72								
73								
74								
75								
76								
77								
78								
79								
80								
81								
82								
83								
84								
85	0.3	100	800	2.7				
86								
87								
88								
89								
90								
91								3
92	1.0	100	2,000	2.0				3
93	2.0	100	2,500	1.3				3
94	0.08	100	130	1.6				3
95	0.2	100	480	2.4				3
96								3
97								3
98								
99								3
100								3
Count	31	31	31	31	-	-	1	44
Total	20	3,067	38,022				Water shortage: 1	Water shortage: 42
verage (per resp)	**0.64**	**99**	**1,227**	**1.9**				Labor shortage: 4
erage (per farm)	**0.20**	**31**	**380**					Capital Shortage: 1
Max	**3**	**100**	**4,200**	**3.8**				
Min	**0**	**0**	**130**	**0.9**				

Attachment IIIB-6

Annual Planted Area, Harvested Area, Yield and Production of Rice in Rainy and Dry Season in the Project Area by Village form 2003 to 2006

Attachment IIIB-6 Annual Planted Area, Harvested Area, Yield and Production of Rice in Rainy and Dry Season in the Project Area by Village from 2003 to 2006 (1/2)

			Rainy Season Rice					Dry Season Rice					Annual	
Commune/Village	Year	Rice Field (ha)	Planted Area (ha)	Cropping Intensity (%)	Harvested Area (ha)	Yield (ton/ha)	Production (Kg)	Planted Area (ha)	Cropping Intensity (%)	Harvested Area (ha)	Yield (ton/ha)	Production (Kg)	Planted Area (ha)	Cropping Intensity (%)
Kahaeng Commune														
1. Tumpung	2003		54	100	54	2.0	108,000	10	19	10	2.0	20,000	64	119
	2004		54	100	54	2.0	108,000	7	13	7	2.0	14,000	61	113
	2005	54	49	91	49	1.5	73,500	7	13	7	2.0	14,000	56	104
	2006		54	100	54	2.0	108,000	7	13	7	2.0	14,000	61	113
	Average 1/		53	98	53	1.9	99,375	8	14	8	1.8	14,000	61	112
2. Roleang Chrey	2003		23	100	23	2.0	46,000	4	17	4	2.1	8,400	27	117
	2004		23	100	23	2.0	46,000	4	17	4	2.1	8,400	27	117
	2005	23	23	100	23	2.0	46,000	4	17	4	2.1	8,400	27	117
	2006		23	100	23	2.0	46,000	4	17	4	2.1	8,400	27	117
	Average 1/		23	100	23	2.0	46,000	4	17	4	2.1	8,400	27	117
3. Kouk Rumlich	2003		22	100	22	2.0	44,000	4	18	4	2.1	8,400	26	118
	2004		22	100	22	2.0	44,000	4	18	4	2.1	8,400	26	118
	2005	22	22	100	22	2.0	44,000	4	18	4	2.1	8,400	26	118
	2006		22	100	22	2.0	44,000	4	18	4	2.1	8,400	26	118
	Average 1/		22	100	22	2.0	44,000	4	18	4	2.1	8,400	26	118
4. Kahaeng	2003		52	100	52	2.0	104,000	10	19	10	2.0	20,000	62	119
	2004		52	100	52	2.2	114,400	10	19	10	2.0	20,000	62	119
	2005	52	52	100	52	2.5	130,000	10	19	10	2.0	20,000	62	119
	2006		52	100	52	2.5	130,000	10	19	10	2.0	20,000	62	119
	Average 1/		52	100	52	2.3	119,600	10	19	10	2.0	20,000	62	119
5. Bos Ta Ney	2003		46	100	46	2.0	92,000	6	13	6	2.0	12,000	52	113
	2004		40	87	40	2.0	80,000	6	13	6	2.0	12,000	46	100
	2005	46	40	87	40	2.0	80,000	6	13	6	2.0	12,000	46	100
	2006		46	100	46	2.0	92,000	6	13	6	2.0	12,000	52	113
	Average 1/		43	93	43	2.0	86,000	6	13	6	2.0	12,000	49	107
6. Ou Veaeng	2003		55	100	55	2.0	110,000	5	9	5	2.0	10,000	60	109
	2004		55	100	55	1.8	100,000	5	9	5	2.0	10,000	60	109
	2005	55	49	89	49	2.0	98,000	5	9	5	2.0	10,000	54	98
	2006		55	100	55	2.0	110,000	5	9	5	2.0	10,000	60	109
	Average 1/		54	97	54	2.0	104,500	5	9	5	2.0	10,000	59	106
Project Village Total	2003		252	100	252	2.0	504,000	39	15	39	2.0	78,800	291	115
	2004		246	98	246	2.0	492,400	36	14	36	2.0	72,800	282	112
	2005	252	235	93	235	2.0	471,500	36	14	36	2.0	72,800	271	108
	2006		252	100	252	2.1	530,000	36	14	36	2.0	72,800	288	114
	Average 1/		246	98	246	2.0	499,475	37	15	37	2.0	72,800	283	112
Commune Total	2003		384	96	384	1.9	724,000	43	11	43	2.0	86,800	427	107
	2004		380	95	280	1.9	543,400	40	10	40	2.0	80,800	420	105
	2005	399	342	86	255	2.0	501,500	40	10	40	2.0	80,800	382	96
	2006		388	97	296	2.1	618,000	40	10	40	2.0	80,800	428	107
	Average 1/		374	94	304	2.0	596,725	41	10	41	2.0	82,300	414	104
Kandal Dom Commune														
1. Rumleang	2003		60	120	59	2.6	155,987	8	16	8	1.8	14,000	68	136
	2004		58	116	56	2.0	112,600	3	6	3	1.7	5,000	61	122
	2005	50	55	110	55	2.5	137,500	5	10	5	2.5	12,500	60	120
	2006		57	114				6	12	6	2.5	15,000	63	126
	Average 1/		58	115	57	2.4	135,362	6	11	6	2.1	11,625	63	126
2. Pongro	2003		77	126	75	2.6	191,987	8	13	8	2.0	16,000	85	139
	2004		77	126	72	2.5	178,750	5	8	5	3.0	15,000	82	134
	2005	61	72	118	72	3.0	216,000	5.5	9	6	3.0	16,500	78	127
	2006		80	131				8.5	14	9	3.0	25,500	89	145
	Average 1/		77	125	73	2.7	195,579	7	11	7	2.7	18,250	83	136
3. Nhor	2003		36	133	36	2.2	80,375	4	15	4	2.0	8,000	40	148
	2004		25	93	15	2.5	37,500	0	0	0			25	93
	2005	27	24	89	24	2.5	60,000	2.5	9	3	3.0	7,500	27	98
	2006		24	89				3	11	3	2.5	7,500	27	100
	Average 1/		27	101	25	2.4	59,292	2	9	2	2.4	5,750	30	110
4. Kandaol Dom	2003		52	112	49	2.3	114,650	5.5	12	6	1.4	7,500	58	124
	2004		52	112	42	2.5	105,000	0	0	0			52	112
	2005	46.5	46	99	46	2.5	115,000	0.5	1	0.5	2.0	1,000	47	100
	2006		47	101				5	11	5	2.5	12,500	52	112
	Average 1/		49	106	46	2.4	111,550	3	6	3	1.9	5,250	52	112
5. Trapeang Preah	2003		60	110	57	2.4	137,312	18	33	17	1.8	30,000	78	143
	2004		51	94	13	1.8	23,940	0	0	0			51	94
	2005	54.5	37	68	37	2.0	74,600	0	0	0			37	68
	2006		40	73				1.2	2	1.2	2.5	3,000	41	76
	Average 1/		47	86	36	2.2	78,617	5	9	5	1.8	8,250	52	95
6. Kab Tuk	2003		21	100	21	2.6	54,690	2	10	2	3.0	6,000	23	110
	2004		21	100	21	2.5	52,500	3	14	3	3.0	9,000	24	114
	2005	21	21	100	21	3.0	63,000	5	24	5	3.0	15,000	26	124
	2006		23	110				8	38	8	3.0	24,000	31	148
	Average 1/		22	102	21	2.7	56,730	5	21	5	3.0	13,500	26	124
7. Srae Thnal	2003		49	109	49	2.6	127,200	2	4	2	2.0	3,500	51	113
	2004		31	69	21	2.0	42,000	0.3	1	0.3	2.5	750	31	70
	2005	45	29	64	29	2.5	72,500	0.5	1	0.5	3.0	1,500	30	66
	2006		29	64				1	2	1			30	67
	Average 1/		35	77	33	2.4	80,567	1	2	1	2.2	1,917	35	79
Project Village Total	2003		355	116	346	2.5	862,201	47	15	46	1.8	85,000	402	132
	2004		315	103	240	2.3	552,290	11	4	11	2.6	29,750	326	107
	2005	305	284	93	284	2.6	738,600	19	6	19	2.8	54,000	303	99
	2006		300	98				33	11	33	2.7	87,500	333	109
	Average 1/		314	103	290	2.5	717697	28	9	27	2.5	64542	341	112
Commune Total	2003		570	100	554	2.6	1,422,688	66	12	64	2.0	130,000	636	112
	2004		508	89	406	2.4	967,290	20	4	20	2.6	53,750	528	93
	2005	568	557	98	557	2.8	1,557,600	34	6	34	2.7	93,000	591	104
	2006		584	103				159	28	159	2.9	459,500	743	131
	Average 1/		555	98	506	2.6	1,315,859	70	12	69	2.7	184,063	625	110

1/: Average of 3 or 4 seasons

Source: Project Commune Offices

Attachment IIIB-6 Annual Planted Area, Harvested Area, Yield and Production of Rice in Rainy and Dry Season in the Project Area by Village from 2003 to 2006 (2/2)

			Rainy Season Rice					Dry Season Rice					Annual	
Commune/Village	Year	Rice Field (ha)	Planted Area (ha)	Cropping Intensity (%)	Harvested Area (ha)	Yield (ton/ha)	Production (Kg)	Planted Area (ha)	Cropping Intensity (%)	Harvested Area (ha)	Yield (ton/ha)	Production (Kg)	Planted Area (ha)	Cropping Intensity (%)
Svay Kravan Commune														
1. Svay Kravan	2003		45	100	45	2.0	90,000	1	2.2				46	102
	2004		45	100	45	2.0	90,000	0.3	0.7				45.3	101
	2005	45	45	100	45	2.0	90,000	0	0				45	100
	2006		45	100	45	2.0	90,000	0	0				45	100
	Average 1/		45	100	45	2.0	90,000	0.3	0.7				45.325	101
2. Phsar Chas	2003		23	92	22	2.0	44,000						23	92
	2004		25	100	22	2.0	44,000						25	100
	2005	25	28	112	28	2.0	56,000						28	112
	2006		28	112	28	2.0	56,000						28	112
	Average 1/		26	104	25	2.0	50,000	0					26	104
3. Thnal Bambaek	2003		51	70	44	2.0	88,000	1	2.2				52	71
	2004		57	78	50	2.0	100,000	0	0.0				57	78
	2005	73	60	82	54	2.0	108,000	0	0				60	82
	2006		60	82	64	2.0	128,000	1	2				61	84
	Average 1/		57	78	53	2.0	106,000	0.5	1.1				57.5	79
4. Prey Kdei	2003		28	70	23	2.0	46,000	1	3				29	73
	2004		26	65	19	2.0	38,000	0.2	1				26.2	66
	2005	40	33	83	33	2.0	66,000	0	0				33	83
	2006		33	83	33	2.0	66,000	0	0				33	83
	Average 1/		30	75	27	2.0	54,000	0.3	1				30.3	76
5. Tras	2003		30	75	20	2.0	40,000						30	75
	2004		30	75	20	2.0	40,000						30	75
	2005	40	32	80	24	2.0	48,000						32	80
	2006		32	80	24	2.0	48,000						32	80
	Average 1/		31	78	22	2.0	44,000	0					31	78
Project Village Total	2003		177	79	154	2.0	308000	3	1				180	81
	2004		183	82	156	2.0	312000	0.5	0				183.5	82
	2005	223	198	89	184	2.0	368000	0	0				198	89
	2006		198	89	194	2.0	388000	1	0				199	89
	Average 1/		189	85	172	2.0	344000	1	1				190.125	85
Commune Total	2003	248	197	79	169	2.0	338,000	7	3				204	82
	2004	248	203	82	179	2.0	358,000	1	0				204	82
	2005	251	223	89	209	2.0	418,000	5	2				228	91
	2006	251	223	89	219	2.0	438,000	2	1				225	90
	Average 1/	250	212	85	194	2.0	388,000	3	1				215	86
Project Village Overall	2003		784	101	752	2.2	1,674,201	89	11	85	1.9	163,800	873	112
	2004		744	95	642	2.1	1,356,690	48	6	47	2.2	102,550	792	102
	2005	780	717	92	703	2.2	1,578,100	55	7	55	2.3	126,800	772	99
	2006		750	96	446	2.1	918,000	70	9	69	2.3	160,300	820	105
	Average 1/		749	96	708	2.2	1,561,172	65	8	64	2.1	137,342	814	104

1/: Average of 3 or 4 seasons

Source: Project Commune Office; dry season data of Svay Kravan: Chbar Mon District Agriculture Office

Attachment IIIB-7

Results of Socio-economic Survey: Production

Attachment IIIB-7 Results of Socio-economic Survey: Production (1/3)

	1. Crop production														
	1. irrigated paddy (early wet season)					2. irrigated paddy (wet season)					3. irrigated paddy (dry season)				
Sample No.	Production	Sold product (kind)	Sold product (kg)	Sold product (%)	Unit price	Production	Sold product (kind)	Sold product (kg)	Sold product (%)	Unit price	Production	Sold product (kind)	Sold product (kg)	Sold product (%)	Unit price
1	1,500	IR66	300	20	500										
2	900		0	0		1,500		0	0						
3	970	IR66				480									
4	400	IR66	250	63	500	1,500	Smar Leeat	200	13	500					
5	500	IR66				250									
6	500	Sen Pidao	200	40	800	600	Kragoung pon	0	0						
7						300		0	0						
8	1,000	IR66	140	14	500										
9						1,000	Srove Krohourm	500	50	600	1,000		0	0	
10	1,500	IR66	1,500	100	500	1,000	Phkar Malis	0	0						
11	250	IR66	0	0		235	Srove Krohourm	0	0						
12	235	IR66	0	0		190	Srove Krohourm, Kmor Mom	0	0						
13	500		0	0		1,200		0	0						
14	2,000		0	0		2,000		0	0						
15						2,700		0	0						
16	800		150	19		3,000		750	25	650					
17	250	IR36	250	100	520	900		0	0						
18	800	IR66	500	63	500	800	IR66	400	50	520	1,200		0	0	520
19	500	IR66	50	10	500	750	Neang Ming	250	33	600					
20						1,000		0	0						
21						1,200	Rang Chei	1,000	83	500	1,500		0	0	
22						1,620	Rang Chei	0	0						
23	300	Sen Pidao	0	0		600	Rang Chei	0	0						
24	700	IR66	300	43	500	650	Phkar Malis	0	0						
25	720		0	0		600		0	0						
26	1,000	IR64	0	0		3,000	Phkar Malis	2,000	67	650					
27						400	Rang Chei	0	0						
28	300	IR36	0	0		500		0	0						
29	750		0	0		700		0	0						
30	600	Rang chie	250	42	600										
31	480	IR66	400	83	500	650	Phkar Malis	0	0						
32						900		0	0						
33	320	IR66	320	100	500	300		0	0						
34	1,200	IR66	0	0		1,000	Rang Chei	0	0						
35						2,300		0	0		750	IR66	750	100	500
36	140		0	0		500		0	0						
37						1,500	Rang Chei	100	7	450	1,740	IR66	150	9	400
38	2,500	IR66	2,500	100	500	3,000		0	0						
39						700	Neang Ming	150	21	500	960	IR66	960	100	540
40	2,000	IR66	2,000	100	500	1,800	Smar Chamkraum	0	0						
41	1,800	IR66	1,800	100	400	1,600		0	0						
42	300	IR66	300	100	450	576	Phkar Malis	150	26	600					
43						600	Phkar Malis	600	100	780					
44	300	Srove learng lan	0	0		300	Srove learng lan	0	0						
45	230		0	0		1,080		0	0		360		0	0	
46						360		0	0						
47	900	IR66	900	100	400	1,200	Rang Chei	300	25	500					
48						2,800		800	29	550					
49	1,800		800	44	400	300		160	53	450					
50						1,300		0	0						
51						1,400		0	0						
52	1,800	IR66	1,800	100	450	2,800	Rang chie	0	0						
53	1,500	IR66	1,000	67	500	1,200		0	0						
54	300	Bak Rot	300	100	650	880	Chmar Kom	200	23	500					
55	500	Sen Pidao	400	80	600	3,000	Khar 9	2,000	67	500					
56	500	IR66	500	100	500	2,000	Khar 9	300	15	500					
57	250	IR66	200	80	480	1,200	Khar 9	300	25	500					
58						800	Phkar Mlist	200	25	600					
59						700	Phkar Mlist	0	0						
60	500	IR36,42	300	60	500	2,500	Phkar Mlist	500	20	400					
61	600	IR36	600	100	500	2,000	Phkar Mlist	1,700	85	600					
62	600	IR66	400	67	550	1,600	Phkar Mlist	1,000	63	600					
63	500	IR66	400	80	500	700	Prambei Kour	200	29	700					
64						400		0	0						
65	1,000	Bak Rot	900	90	550	700	Phkar Knhei	600	86	700					
66	500	IR66	500	100	500	2,100	Phkar Mlist	1,000	48	600					
67	700	IR66	100	14	450	1,000	Phkar Mlist	200	20	650					
68						2,000	Katom	1,000	50	500					
69	500	IR66	500	100	400	2,000	Rang Chhey	1,000	50	600					
70	300	IR66	300	100	450	1,500	Neang Minh	400	27	500					
71	600	IR66	600	100	520	700	Prambei Kour	0	0	550					
72	500	IR66				450	Riang Chey								
73	500	IR66				450	Rang Chhey	0	0						
74	500	IR66	300	60	400	600	Katom	300	50	500					
75	500	IR66	500	100	400	6,000	Prambei Kour	4,000	67	500					
76	500	IR66	0	0		300	Rang Chhey	0	0						
77	500		0	0		600		0	0						
78						700		0	0						
79						1,700	Rang Chhey	0	0						
80						800	Phkar Mlist	0	0						
81	1,000	IR36	500	50	500	1,200	white rice	300	25	500					
82						700	white rice	0	0						
83						3,500	Rang Chhey	2,000	57	650					
84	600	IR66	600	100	400	700	Rang Chhey	700	100	500					
85															
86	4,000	IR66	4,000	100	450	5,000	Rang Chhey	3,000	60	650					
87						3,500	Neang Minh	1,000	29	500					
88	200	IR66	200	100	400	3,000	Neang Minh	2,000	67	500					
89						1,300	Prambei Kour	500	38	600					
90	300	IR42	300	100	500	800	Rang Chhey	100	13	600					
91						4,000	Neang Minh	2,500	63	500					
92	1,000	IR66	1,000	100	500	6,000	Komping Poy	3,000	50	600					
93	800	IR66	800	100	480	2,000	Komping Poy	1,000	50	640					
94	730	IR66	410	56	500										
95	1,380		960	70	600										
96	2,000		2,000	100	450	3,700		2,700	73	500					
97						2,000	Riang Chey								
98	1,000	IR66				2,000	Riang Chey				1,000	IR66			
99						600		100	17	600					
100						1,500		500	33	500					
Count	68		63	63	46	94		89	89	46	8		7	7	4
Total	55,605		33,280	**60%**	22,750	135,721		41,660	**31%**	25,690	8,510		1,860	**22%**	1,960
Average (per resp.)	818		528		495	1,444		468		558	1,064		266		490
Average (per farm.)	585		350			1,429		439			90		20		
Max	4,000		4,000		800	6,000		4,000		780	1,740		960		540
Min	140		0		400	190		0		400	360		0		400

Attachment IIIB-7 Results of Socio-economic Survey: Production (2/3)

		1. Crop production										
		4. Rianfed paddy					Paddy Total			5. Fruit		
Sample No.	Sample No.	Production	Sold product (kind)	Sold product (kg)	Sold product (%)	Unit price	Total Production	Total sold product (kg)	Total sold product (%)	Production	Sold product (Kg)	Unit price
1	1						1,500	300	20			
2	2						2,400	0	0			
3	3											
4	4						1,900	450	24			
5	5											
6	6	300	Kragoung pon	0	0		1,400	200	14			
7	7	1,000		0	0		1,300	0	0			
8	8	1,200	Kragoung pon	0	0		2,200	140	6			
9	9	1,900	Kragoung pon	0	0		3,900	500	13			
10	10	1,000	Red Rice	0	0		3,500	1,500	43			
11	11						485	0	0			
12	12	450	Red Rice	0	0		875	0	0			
13	13	1,700		0	0		3,400	0	0			
14	14						4,000	0	0			
15	15						2,700	0	0			
16	16						3,800	900	24			
17	17	650		0	0		1,800	250	14			
18	18	1,500		0	0		4,300	900	21			
19	19	700		0	0		1,950	300	15			
20	20						1,000	0	0			
21	21						2,700	1,000	37			
22	22						1,620	0	0			
23	23						900	0	0			
24	24						1,350	300	22			
25	25						1,320	0	0			
26	26						4,000	2,000	50			
27	27						400	0	0			
28	28						800	0	0			
29	29						1,450	0	0			
30	30	1,000		0	0		1,600	250	16			
31	31	500		0	0		1,630	400	25			
32	32						900	0	0			
33	33	1,800		0	0		2,420	320	13			
34	34						2,200	0	0			
35	35						3,050	750	25			
36	36	490		0	0		1,130	0	0			
37	37						3,240	250	8			
38	38						5,500	2,500	45			
39	39						1,660	1,110	67			
40	40						3,800	2,000	53			
41	41						3,400	1,800	53			
42	42	312		0	0		1,188	450	38			
43	43	500		0	0		1,100	600	55			
44	44						600	0	0			
45	45	1,080		0	0		2,750	0	0			
46	46	480		0	0		840	0	0			
47	47						2,100	1,200	57			
48	48						2,800	800	29			
49	49						2,100	960	46			
50	50						1,300	0	0			
51	51						1,400	0	0			
52	52						4,600	1,800	39			
53	53						2,700	1,000	37			
54	54						1,180	500	42			
55	55						3,500	2,400	69			
56	56						2,500	800	32			
57	57						1,450	500	34			
58	58						800	200	25			
59	59						700	0	0			
60	60						3,000	800	27			
61	61						2,600	2,300	88			
62	62	2,000	Phkar Mlist	1,200	60	600	4,200	2,600	62			
63	63						1,200	600	50			
64	64						400	0	0			
65	65						1,700	1,500	88			
66	66						2,600	1,500	58			
67	67						1,700	300	18			
68	68						2,000	1,000	50			
69	69						2,500	1,500	60			
70	70						1,800	700	39			
71	71						1,300	600	46			
72	72						950	0				
73	73						950	0	0			
74	74						1,100	600	55			
75	75						6,500	4,500	69			
76	76						800	0	0			
77	77						1,100	0	0			
78	78						700	0	0			
79	79						1,700	0	0			
80	80						800	0	0			
81	81						2,200	800	36			
82	82						700	0	0			
83	83						3,500	2,000	57			
84	84						1,300	1,300	100			
85	85	800	Neang Minh	200	25	550	800	200	25			
86	86						9,000	7,000	78			
87	87						3,500	1,000	29			
88	88						3,200	2,200	69			
89	89						1,300	500	38			
90	90						1,100	400	36			
91	91						4,000	2,500	63			
92	92						7,000	4,000	57			
93	93						2,800	1,800	64			
94	94	300		0	0		1,030	410	40			
95	95						1,380	960	70	10		50,000
96	96						5,700	4,700	82			
97	97											
98	98											
99	99						600	100	17			
100	100						1,500	500	33			
Count	Count	21		21	21	2	96	96	95	1		1
Total	Total	19,662		1,400	**7%**	1,150	211,298	78,200	**37%**	10		50,000
Average (per resp.)	Average (per resp.)	936		67		575	2,201	815		10		50,000
Average (per farm.)	Average (per farm.)	207		15			2,224	823		0.1		
Max	Max	2,000		1,200		600	9,000	7,000		10		50,000
Min	Min	300		0		550	400	0		10		50,000

Attachment IIIB-7 Results of Socio-economic Survey: Production (3/3)

Sample No.	Sample No.	2. Livestock and Fish														
		1. Cow			2. Cattle			4. Swine			5 Poultry			6. Fish		
		Sold product	Unit price	Income	Sold product	Unit price	Income	Sold product	Unit price	Income	Sold product	Unit price	Income	Sold product (Kg)	Unit price	Income
1	1															
2	2							2	300,000	600,000						
3	3							2	300,000	600,000						
4	4				1	1,500,000	1,500,000	1	300,000	300,000						
5	5										13	8,000	100,000			
6	6							1	200,000	200,000						
7	7										5	10,000	50,000			
8	8										6	8,000	48,000			
9	9				1	6,000,000	6,000,000				30	8,500	255,000			
10	10				1	2,000,000	2,000,000				5	7,000	35,000			
11	11				1	1,200,000	1,200,000	10	240,000	2,400,000						
12	12				1	1,500,000	1,500,000	2	230,000	460,000	4	8,000	32,000			
13	13				1	1,400,000	1,400,000									
14	14				1	2,400,000	2,400,000									
15	15															
16	16															
17	17				1	1,400,000	1,400,000	3	316,667	950,000						
18	18							2	250,000	500,000	10	10,000	100,000			
19	19							1	230,000	230,000					300	300,000
20	20										7	7,000	49,000			
21	21							3	200,000	600,000	16	8,000	128,000			
22	22				2	1,850,000	3,700,000	5	230,000	1,200,000	50	8,000	400,000			
23	23										10	8,000	80,000			
24	24															
25	25															
26	26															
27	27							2	200,000	400,000						
28	28															
29	29							1	200,000	200,000	5	6,000	30,000	1,050	5,000	5,250,000
30	30										7	7,000	50,000			
31	31										10	7,000	70,000			
32	32							20	200,000	4,000,000	10	8,000	80,000			
33	33							6	7,000	42,000						
34	34				1	2,000,000	2,000,000	2	150,000	300,000						
35	35															
36	36															
37	37										10	8,000	80,000			
38	38				1	2,000,000	2,000,000				4	10,000	40,000			
39	39							1	300,000	300,000						
40	40							10	250,000	2,500,000						
41	41							2	200,000	400,000						
42	42															
43	43										3	8,000	24,000			
44	44															
45	45							3	300,000	900,000						
46	46	2	1,500,000	3,000,000				10	100,000	1,000,000						
47	47				1	1,200,000	1,200,000				2	7,500	15,000			
48	48							2	35,000	70,000	30	7,000	210,000			
49	49				2			14	200,000	2,800,000	90	7,000	630,000			
50	50															
51	51							4	300,000	1,200,000	29	7,000	200,000			
52	52				1	150,000	150,000	2	200,000	400,000	33	6,000	200,000			
53	53															
54	54															
55	55	3	1,300,000	3,900,000							10	12,000	1,000			
56	56	2	80,000	160,000							10	14,000	50,000			
57	57	6	1,200,000	7,200,000							25	10,000	250,000			
58	58							10	200,000	2,000,000	10	10,000	100,000			
59	59	3	1,000,000	3,000,000				50	120,000	6,000,000						
60	60	1	1,500,000	1,500,000												
61	61	1	1,200,000	1,200,000							30	10,000	300,000			
62	62	1	1,300,000	1,300,000							10	12,000	120,000			
63	63							1	300,000	300,000						
64	64	1	1,200,000	1,200,000												
65	65	1	850,000	850,000												
66	66															
67	67															
68	68															
69	69	1	150,000	150,000												
70	70										3	12,000	36,000			
71	71										8	12,000	96,000			
72	72	2	700,000	1,400,000												
73	73										6	12,000	72,000			
74	74										12	10,000	120,000			
75	75	5	1,000,000	5,000,000												
76	76	1						3			5					
77	77															
78	78							2	200,000	400,000	5	10,000	50,000			
79	79							3	150,000	450,000	20	8,000	160,000			
80	80															
81	81							10	200,000	2,000,000						
82	82										10	12,000	120,000			
83	83	1	1,500,000	1,500,000				10	120,000	1,200,000						
84	84															
85	85															
86	86	2	800,000	1,600,000												
87	87															
88	88															
89	89	2	1,000,000	2,000,000												
90	90															
91	91							8	147,500	1,180,000	15	8,000	120,000			
92	92				2	1,000,000	2,000,000				24	8,000	192,000			
93	93				4						11	8,000	88,000			
94	94															
95	95										50	8,000	40,000			
96	96															
97	97	1	1,500,000													
98	98										20	8,000	40,000			
99	99															
100	100	1	600,000	600,000							28	8,000	224,000			
Count	Count	19	18	17	16	14	14	34	33	33	43	42	42	1	2	2
Total	Total	37	18,380,000	35,560,000	22	25,600,000	28,450,000	208	6,876,167	36,082,000	700	371,000	5,085,000	1,050	5,300	5,550,000
Average (per resp.)	Average (per resp.)	1.9	1,021,111	2,091,765	1.4	1,828,571	2,032,143	6	208,369	1,093,394	16	8,833	121,071	1,050	2,650	2,775,000
Average (per farm.)	Average (per farm.)	0.4		355,600	0.2		284,500	2.1		360,820	7.0		50,850	10.5		55,500
Max	Max	6	1,500,000	7,200,000	4	6,000,000	6,000,000	50	316,667	6,000,000	90	14,000	630,000	1,050	5,000	5,250,000
Min	Min	1	80,000	150,000	1	150,000	150,000	1	7,000	42,000	2	6,000	1,000	1,050	300	300,000