11.1 Participatory Approach for the Master Plan

11.1.2 Baseline Survey

February 2003

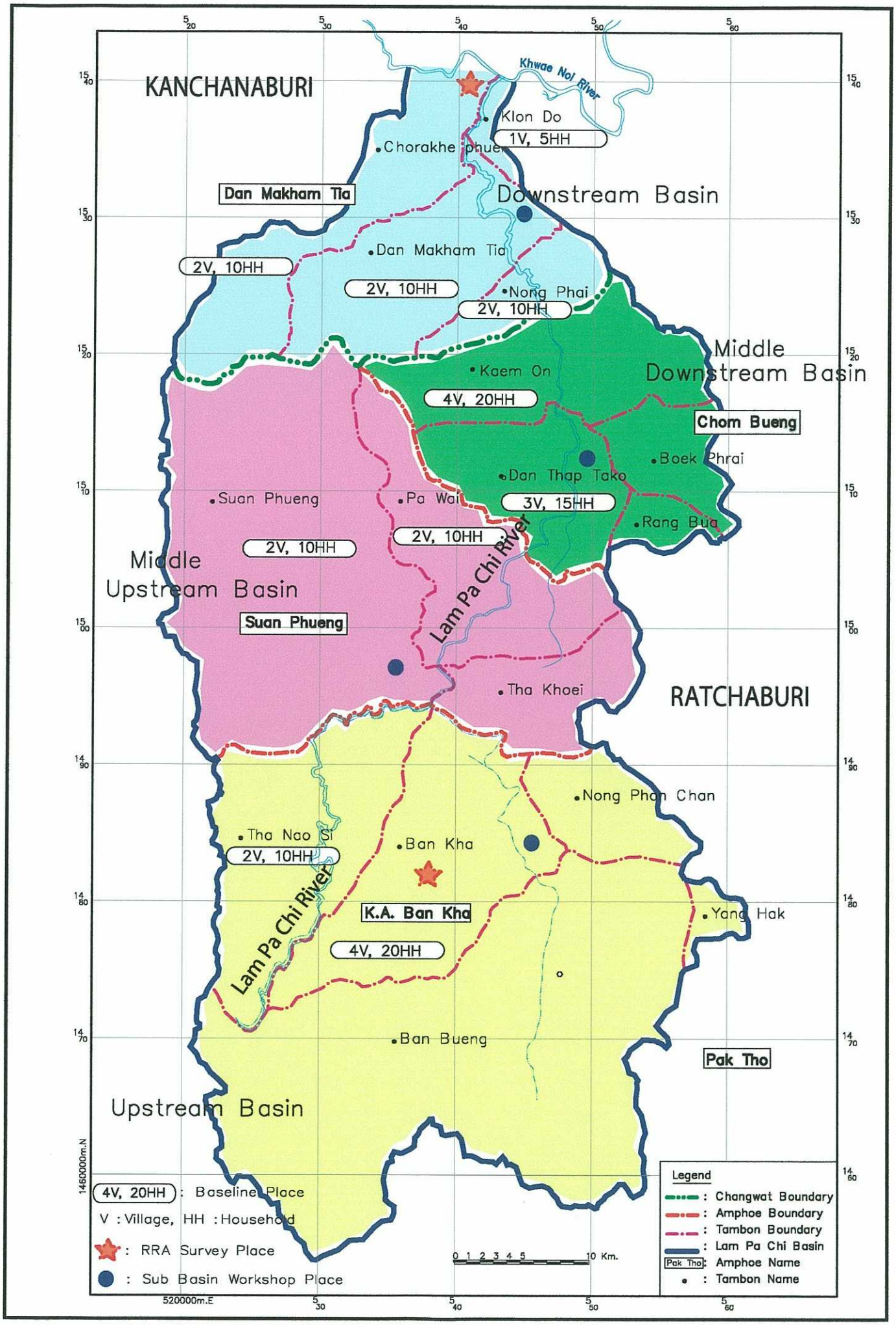
Japan International Cooperation Agency (JICA)
Royal Irrigation Department (RID)

Study on Application of Participatory Planning in Rural and Agriculture Development Project in the Lam Pa Chi River Basin

Baseline Survey

February 2003

Sanyu Consultants Inc.



Location Map of Baseline, RRA and PCM Workshop

Contents

A. Objectives

Objectives of the baseline survey consist of two overall intensions such as:

1. To grasp very-basic general condition of the Study Area, on quantitative aspect, to get set to the course of the participatory surveys
2. To know particular condition of the Study Area aiming to make use of the result to illustrate the current condition as to be one of the key indexes, which would be compared with the ones after conduction of the pilot project.

(1) Procedure of the Baseline Survey

The Study Team chiefly led the baseline survey in due course with the full corporation of the RID counterparts. Main procedure of the baseline survey was to be ordered as stated below. Firstly, the Study Team set up the original plan for necessary items such as questionnaire, subject Tambon, number of samples as well. On the same time, the Study Team was also ready to change its idea with taking the reality of the people it might concern. Having opportunities to listen to the voice of people and paid so much attention to the opinion and view of the participants from government as well as the representatives from Tambon was believed to be efficient way. As a result, procedure maintained so much opportunity to have meeting to amend the plan. Main procedure of the Baseline survey is shown in the Table below

The Main Procedure of Baseline Survey

Steps Participants	Location	Remarks
1. Making up of Draft Questionnaires		
Study Team	---	Depending upon its expertise, each member prepared questionnaires. Whole level of agricultural survey and some portions of other expertise are included.
2. Finalizing the Questionnaires		
Study Team RID counterparts	RID headquarters	RID counterparts looked through the draft questionnaire and add some amendments regarding with practical circumstances of Thailand.
3. Setting the Number of Tambon, Village and Samples		
Study Team RID counterparts	RID headquarters	Study team and RID counterparts discussed how to set the number of samples, village and Tambon. And selected tentative number in each level.
4. Selection of the Tambon		
Study Team RID counterparts RID regional officers Chief of Tambon Local consultants	RID regional office (Kanchanaburi and Ratchaburi)	Had special meeting in both provinces with the participation from each Tambon. It was suggested from the Tambon leaders from Kanchanaburi that the survey should cover all the Tambon in Kanchanaburi. Total 10 Tambon are selected.
5. Selection of the Village		
Study Team RID counterparts RID regional officers Chief of Tambon Local consultants	RID regional office (Kanchanaburi and Ratchaburi)	Highly dependent upon the advices from Tambon leader, replaced some selected villages according to the characteristics of and accessibility to the villages. Total 24 villages are selected.
6. Selection of the House Holds		
Study Team RID counterparts Local consultants	At the fields	Local consultants gathered the list of households at the every selected villages and the study team picked up the households randomly. Total 120 samples are selected.
7. Carrying Out of Interviews		
Local consultants	At the fields	Local consultants conducted the survey responsibly composed with three surveying teams. In case a household was absent, they automatically selected the other following to the list of household. They never chose by themselves according to their favor.
8. Analyzing and Tabulating of the Result		
Study Team Local consultants		Local consultants tabulated the results of the survey and the study team analyzed and brushed them up.

B. OUTCOME OF THE BASELINE HOUSEHOLD SURVEYS

(A Preliminary Summary)

1. Survey Area

The field surveys were conducted in 24 villages of 10 Tambons (Sub-Districts) of Ratchburi and Kanchanaburi provinces. The total number of samplings was 120.

2. Period of Field Survey

The surveys were conducted during 25 November and 2 December 2002.

3. Outcome of the Surveys

3.1 Profile of the interviewees

Interviewees had an average age of 47.7 years. Of the total, male constituted 73.3%. Almost all of the interviewees (95.8%) were farmers; the remainders engage in such other minor occupations as wage labors and merchants. All the interviewees were of Thai nationality and 91.2% of them was Buddhist.

3.2 Land holding and land-use

Most of the interviewees have their own lands, with the sizes of land holding varying from 1 to 60 rais. The lands are used in both wet and dy seasons. However, land productivity in the dry season was found relatively low due to the lack of irrigation water. At present, there are only small reservoirs/ponds and weirs and they are available only in some villages (about 40% of the villages under survey). Furthermore, there is neither irrigation (distribution) system nor water utilization organization in the survey area. Because of this, only the households, which are located nearby the ponds or the weirs, have an access to water by pumping or other means.

3.3 Crop grown

Most of the interviewed households grow upland crops, such as, maize, cassava, sugar-cane, pine apple and asparagus. Other crops found were fruit trees (e.g., langon, tamarind, pomelo, etc.) and vegetables (e.g., turnibs, egg plant, peas, etc.). Crop calendar in the area is shown in Figure 1.

IN addition to the lack of irrigation water, problems related to agriculture that wer found in the survey area included insects and pests, high production cost (especially the costs of fertilizers and chemicals) and the lack of funds (credit) for investment. On marketing aspect, most of the agricultural productions were produced for selling to local merchants who would come to collect them at the villages themselves. This has resulted in uncertainty of production prices which were determined basically by the merchants.

3.4 Infrastructures in community

- Potable water: General households use water from natural rain and shallow wells.
- Water for general uses: Water work in the village represents a major source.
- Hospital: Normally, there is a health care center at village level, with an average travel distance (between individual households and the center) of about 3-10 km.
- Telephone: Public telephone is available in only some villages. Some better-off households, however, have their own mobile-phones.
- Electricity: All the households have an access to electricity.

3.5 Household economy

Most of the interviewed households have income just sufficient for living. For those which do not have enough income, they will normally receive credit from such sources as the Saving Cooperatives (with annual interest rates of 2-5%) and the Agricultural Cooperatives (with annual interest rates of 7-10%) to cover their production activities and/or household expenses. Repayment will be made after harvesting. It was noted however that most of the households were capable in making their repayment in time.

3.6 Agricultural extension in community

Most of the households receive advice and guidance from the government sector/agencies, such as Kaset Tambon (Village Agriculturist/Extension Officer) and Land Development Officers who will provide the farmers with knowledge/advice on various subjects, such as:

- New farming technology;
- Appropriate uses of chemicals and fertilizers;
- New potential crops to replace the existing ones, including fruit trees;
- Land conservation methods, etc.

However, most of the farm households are still inj need of other assistance, such as, good seeds for a higher yield/production.

3.7 Irrigation system in the survey area

As stated, irrigation system is not currently available in the survey area. Most of the households use water from natural rainfall and shallow wells for their consumption as well as agriculture.

3.8 Farmers' opinion on irrigation system

Most of the interviewees shared a common view that there should be irrigation system to help improve their agricultural productivity, e.g., for about 50-100% over the existing level. They expressed their readiness to pay for management fees, although without specifying any definite rate.

However, they expected a rate that assures appropriateness and equitability which may be determined by the project/project authority.

3.9 Membership of organization

Normally, individual farmers are members of organizations/institutions that they are involving one way or another, such as the following:

- Organization of the pineapple-growers;
- Organization of the asparagus-growers;
- Organization of the cassava-growers;
- Organization of housewife farmers (to do processing of farm products, etc.)

With regard to the water user organization/association, it is not yet established in the survey area and because of this, a problem of competing for water in the dry season has been emerging during the last 2-3 years in some villages, such as, at Ban Pong-Nok of Tambon Ban Dan Makham Tia, Dan Makham Tai District, Kanchanaburi Province.

3.10 Farmers' opinion on how to increase income

Some of the interviewed households expressed their needs to have supplementary occupations/activities with a view to increase household income. Activities of interest included fish culture and livestock rearing. However, the major constraints that made them unable to implement their ideas included the lack of investment funds (credit) and the lack of knowledge required for the purpose.

TABLE 1

PERSONAL DATA OF RESPONDENTS

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Marital Status										
- Married	25	83.33	17	85.00	31	88.57	33	94.29	106	88.33
- Single	2	6.67	2	10.00	2	5.71	2	5.71	8	6.67
- Widow/Divorced	3	10.00	1	5.00	2	5.71	0	0.00	6	5.00
2. Average Age (years)	45.43		48.60		46.94		50.37		47.84	
3. Sex										
- Male	20	66.67	15	75.00	25	71.43	29	82.86	89	74.17
- Female	10	33.33	5	25.00	10	28.57	6	17.14	31	25.83
4. Occupation										
- Farmer	30	100.00	16	80.00	34	97.14	34	97.14	114	95.00
- General Employee	0	0.00	3	15.00	1	2.86	0	0.00	4	3.33
- Agricultural Laborers	0	0.00	1	5.00	0	0.00	0	0.00	1	0.83
- Commerce	0	0.00	0	0.00	0	0.00	1	2.86	1	0.83
5. Nationality										
- Thai	30	100.00	20	100.00	35	100.00	35	100.00	120	100.00
6. Religions										
- Buddhism	29	96.67	20	100.00	35	100.00	35	100.00	119	99.17
- Christianity	1	3.33	0	0.00	0	0.00	0	0.00	1	0.83
7. Education										
- No Schooling	5	16.67	1	5.00	2	5.71	1	2.86	9	7.50
- Primary School	22	73.33	16	80.00	29	82.86	28	80.00	95	79.17
- Junior High School	2	6.67	2	10.00	2	5.71	3	8.57	9	7.50
- Senior High School	0	0.00	1	5.00	1	2.86	2	5.71	4	3.33
- Diploma	1	3.33	0	0.00	0	0.00	0	0.00	1	0.83
- Higer education	0	0.00	0	0.00	1	2.86	1	2.86	2	1.67
8. Family Status										
- Head of family	25	83.33	16	80.00	28	80.00	31	88.57	100	83.33
- Spouse	2	6.67	4	20.00	3	8.57	2	5.71	11	9.17
- Son/Daughter	2	6.67	0	0.00	3	8.57	2	5.71	7	5.83
- Parents	1	3.33	0	0.00	1	2.86	0	0.00	2	1.67

TABLE 2

FAMILY PROFILE

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Number of Family Members										
- 1-2	2	6.67	2	10.00	2	5.71	3	8.57	9	7.50
- 3-4	14	46.67	10	50.00	20	57.14	16	45.71	60	50.00
- 5-6	10	33.33	5	25.00	10	28.57	14	40.00	39	32.50
- 7-8	4	13.33	3	15.00	3	8.57	2	5.71	12	10.00
ı Average Family Members (person/house)	4.63		4.15		4.26		4.34		4.36	
ı Average Family Members (male)	2.20		1.90		2.06		2.26		2.13	
ı Average Family Members (female)	2.43		2.25		2.20		2.08		2.23	
2. Average Family Members Classified by Age Level										
- < 6 year	0.50		0.40		0.34		0.31		0.38	
- 6 - 12 year	0.63		0.55		0.29		0.46		0.47	
- 13 - 20 year	0.73		0.60		0.80		0.63		0.70	
- 21 - 40 year	1.60		1.25		1.37		1.71		1.51	
- 41 - 60 year	0.90		1.00		1.17		0.83		0.98	
- > 60 year	0.27		0.35		0.29		0.40		0.32	
3. Average Family Member Classified by Education Level										
- Pre-school	0.27		0.35		0.20		0.17		0.23	
- In-school	1.50		1.00		1.11		1.00		1.16	
- No Schooling	0.30		0.15		0.14		0.26		0.22	
- Primary School	2.07		2.05		2.29		2.14		2.15	
- Junior High School	0.23		0.40		0.26		0.31		0.29	
- Senior High School	0.10		0.15		0.14		0.29		0.18	
- Diploma	0.07		0.05		0.00		0.11		0.06	
- Higher Education	0.10		0.00		0.11		0.06		0.08	
4. Average Family Member Classified by Occupation										
- Farmer	2.47		1.85		2.51		2.51		2.39	
- Agricultural Laborers	0.17		0.40		0.11		0.06		0.16	
- General Employee	0.07		0.45		0.17		0.31		0.23	
- Government Officials/State Enterprise Officials	0.03		0.05		0.03		0.03		0.03	
- Commerce	0.10		0.05		0.06		0.23		0.12	
- Company Employees	0.17		0.05		0.14		0.11		0.13	
- No occupation	1.63		1.30		1.23		1.09		1.30	
ı Schooling Age	1.60		1.20		1.23		1.06		1.27	
ı Labour Force	0.03		0.10		0.00		0.03		0.03	

TABLE 3

LAND HOLDING STATUS

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Type of Land Holding (Multiple answers)										
- Owners	30	100.00	20	100.00	31	88.57	34	97.14	115	95.83
- Tenants	12	40.00	3	15.00	11	31.43	11	31.43	37	30.83
- Partner with sharing product (Paying at fixed rate)	1	3.33	0	0.00	0	0.00	2	5.71	3	2.50
- Partner with sharing product (Receiving at fixed rate)	4	13.33	0	0.00	1	2.86	1	2.86	6	5.00
- Landlord	1	3.33	0	0.00	0	0.00	3	8.57	4	3.33
- Free use	4	13.33	2	10.00	5	14.29	3	8.57	14	11.67
2. Average Land Holding Area										
- Owners	25.95		13.86		17.97		35.36		24.35	
- Tenants	8.88		1.55		10.36		27.30		13.46	
- Partner with sharing product (Paying at fixed rate)	0.17		0.00		0.00		1.77		0.56	
- Partner with sharing product (Receiving at fixed rate)	2.57		0.00		0.14		0.37		0.79	
- Landlord	0.27		0.00		0.00		1.51		0.51	
- Free use	0.63		3.15		0.67		1.46		1.30	
Total	**38.47**		**18.56**		**29.14**		**67.78**		**40.98**	

TABLE 4
LANDUSE CONDITION

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Type of Landuse (Multiple answers)										
- Cultivated area	30	100.00	16	80.00	34	97.14	34	97.14	114	95.00
ı Rainy season	*30*	*100.00*	*16*	*100.00*	*34*	*100.00*	*34*	*100.00*	*114*	*100.00*
ı Dry season	*29*	*96.67*	*16*	*100.00*	*34*	*100.00*	*30*	*88.24*	*109*	*95.61*
- Residential Area	30	100.00	19	95.00	34	97.14	34	97.14	*117*	97.50
- Range Field	1	3.33	0	0.00	0	0.00	0	0.00	*1*	0.83
- Chicken Coop	0	0.00	0	0.00	1	2.86	0	0.00	*1*	0.83
- Well / Pond	2	6.67	1	5.00	1	2.86	2	5.71	*6*	5.00
- Idle Area	8	26.67	6	30.00	5	14.29	5	14.29	*24*	20.00
2 Average area classified by type of land use (rai)										
2.1 Cultivated Area										
- Rainy season	30.08		15.36		25.54		62.21		35.67	
- Dry Season	30.15		15.36		23.68		57.24		33.70	
Total Irrigated Area										
- Rainy season	3.28		0.90		3.69		1.71		2.55	
- Dry Season	3.28		0.90		3.69		1.65		2.53	
Partial Irrigated Area										
- Rainy season	2.07		0.85		0.86		0.00		0.91	
- Dry Season	2.07		0.85		0.94		0.00		0.93	
Rain Fed Area										
- Rainy season	24.73		13.61		20.99		60.50		32.22	
- Dry Season	24.80		13.61		19.04		55.59		30.24	
2.2 Residential Area	1.89		1.34		1.75		1.93		1.77	
2.3 Range Field	2.30		0.00		0.00		0.00		0.58	
2.4 Chicken Coop Area	0.00		0.00		0.09		0.00		0.03	
2.5 Well/Pond Area	0.52		0.20		0.09		0.19		0.24	
2.6 Idle Area	2.89		1.66		0.96		1.63		1.75	

TABLE 5
CULTIVATION INFORMATION (2001/2002)

Items	Upper Basin		UpperMiddle Basin		LowerMiddle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Rain-fed Rice (first crop)										
- Number of growers	0	0.00	0	0.00	5	14.29	6	17.14	11	9.17
- Varieties										
□ Jasmine rice	0	0.00	0	0.00	0	0.00	2	33.33	2	18.18
□ Chainat	0	0.00	0	0.00	2	40.00	1	16.67	3	27.27
□ Lueng Prathew	0	0.00	0	0.00	0	0.00	1	16.67	1	9.09
□ Kaw Hom	0	0.00	0	0.00	1	20.00	0	0.00	1	9.09
□ Mixed varieties	0	0.00	0	0.00	1	20.00	1	16.67	2	18.18
□ Unidentified	0	0.00	0	0.00	1	20.00	1	16.67	2	18.18
- Cultivation (rai/grower)	0.00		0.00		8.60		12.83		10.90	
- Harvested Area (rai/grower)	0.00		0.00		8.50		12.83		10.86	
- Crop yield (kg/rai)	0.00		0.00		1894.00		275.00		1010.00	
2. Dry Season Rice (second crop)										
- Number of growers	0	0.00	0	0.00	1	2.86	0	0.00	1	0.83
- Varieties										
□ Chainat	0	0.00	0	0.00	1	100.00	0	0.00	1	100.00
- Cultivation (rai/grower)	0.00		0.00		7.00		0.00		7.00	
- Harvested Area (rai/grower)	0.00		0.00		7.00		0.00		7.00	
- Crop yield (kg/rai)	0.00		0.00		1200.00		0.00		1200.00	
3. Corn										
- Number of growers	2	6.67	4	20.00	8	22.86	7	20.00	21	17.50
- Varieties										
□ Dok Bua	1	3.33	1	5.00	0	0.00	0	0.00	2	9.52
□ Suwan	0	0.00	0	0.00	1	12.50	0	0.00	1	4.76
□ Pacific	0	0.00	1	5.00	0	0.00	1	14.29	2	9.52
□ Haco	0	0.00	1	5.00	1	12.50	0	0.00	2	9.52
□ Chaibric	0	0.00	0	0.00	2	25.00	4	57.14	6	28.57
□ Swiss	1	3.33	0	0.00	2	25.00	0	0.00	3	14.29
□ GS	0	0.00	0	0.00	0	0.00	1	14.29	1	4.76
□ 14	0	0.00	0	0.00	2	25.00	0	0.00	2	9.52
□ BICIO	0	0.00	0	0.00	0	0.00	1	14.29	1	4.76
□ Mixed Varieties	0	0.00	1	5.00	0	0.00	0	0.00	1	4.76
- Cultivation (rai/grower)	5.00		12.75		4.59		6.28		6.75	
- Harvested Area (rai/grower)	3.75		12.37		3.97		5.57		6.08	
- Crop yield (kg/rai)	930		1052		1675		2014		1598	
4. Sugar cane										
- Number of growers	1	3.33	2	10.00	18	51.43	18	51.43	39	32.50
- Varieties										
□ K200	1	100.00	0	0.00	7	38.89	2	11.11	10	25.64
□ K92	0	0.00	0	0.00	8	44.44	9	50.00	17	43.59
□ K36	0	0.00	0	0.00	1	5.56	0	0.00	1	2.56
□ K147	0	0.00	0	0.00	0	0.00	1	5.56	1	2.56
□ K1779	0	0.00	0	0.00	0	0.00	1	5.56	1	2.56
□ No. 4	0	0.00	0	0.00	0	0.00	1	5.56	1	2.56
□ Mixed Varieties	0	0.00	1	50.00	2	11.11	3	16.67	6	15.38
□ Unidentified	0	0.00	1	50.00	0	0.00	1	5.56	2	5.13
- Cultivation (rai/grower)	60.00		21.00		34.17		59.78		45.97	
- Harvested Area (rai/grower)	60.00		21.00		32.50		56.50		43.69	
- Crop yield (kg/rai)	7000.00		9000.00		14614.00		10672.00		12311.00	
5. Cassava										
- Number of growers	1	3.33	3	15.00	7	20	12	34.29	23	19.17
- Varieties										
□ Kaset Kod	0	0.00	0	0.00	2	28.57	2	16.67	4	17.39
□ Rayong, Rayong 5, Rayong 8	1	100.00	2	66.67	3	42.86	8	66.67	14	60.87
□ Kasetsart	0	0.00	0	0.00	2	28.57	2	16.67	4	17.39
□ Unidentified	0	0.00	1	33.33	0	0.00	0	0.00	1	4.35
- Cultivation (rai/grower)	15		6.42		17.71		62.75		39.62	
- Harvested Area (rai/grower)	15		6.17		16.57		60.92		38.28	
- Crop yield (kg/rai)	1500		3000		18928		3470		8028	
6. Pineapple										
- Number of growers	14	46.67	0	0.00	0	0.00	0	0.00	14	11.67
- Varieties										
□ Ta Dum	9	64.29	0	0.00	0	0.00	0	0.00	9	7.50
□ Unidentified	5	35.71	0	0.00	0	0.00	0	0.00	5	4.17
- Cultivation (rai/grower)	27.27		0.00		0.00		0.00		27.27	
- Harvested Area (rai/grower)	25.12		0.00		0.00		0.00		25.12	
- Crop yield (kg/rai)	2970		0.00		0.00		0.00		2970	

Items	Upper Basin		UpperMiddle Basin		LowerMiddle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
7. Vegetables										
7.1 Chili										
- Number of growers	1	3.33	1	5.00	6	17.14	4	11.43	12	10.00
- Varieties										
□ Chinda	0	0.00	0	0.00	1	16.67	2	50.00	3	25.00
□ Sweet pepper	0	0.00	0	0.00	3	50.00	0	0.00	3	25.00
□ Yod Son	0	0.00	0	0.00	1	16.67	0	0.00	1	8.33
□ Prik Hom	1	100.00	0	0.00	0	0.00	0	0.00	1	8.33
□ Unidentified	0	0.00	1	100.00	1	16.67	2	50.00	4	33.33
- Cultivation (rai/grower)	3.00		3.00		2.67		3.50		3.00	
- Harvested Area (rai/grower)	3.00		3.00		2.42		2.87		2.67	
- Crop yield (kg/rai)	600.00		60.00		582.00		950.00		662.00	
7.2 Asparagus										
- Number of growers	0	0.00	1	5.00	5	14.29	6	17.14	12	10.00
- Varieties										
□ Boxin Bood	0	0.00	0	0.00	1	20.00	2	33.33	3	25.00
□ VC	0	0.00	0	0.00	0	0.00	2	33.33	2	16.67
□ Nua Yua	0	0.00	0	0.00	2	40.00	1	16.67	3	25.00
□ 309	0	0.00	0	0.00	1	20.00	0	0.00	1	8.33
□ F1	0	0.00	0	0.00	1	20.00	0	0.00	1	8.33
□ Unidentified	0	0.00	1	100.00	0	0.00	1	16.67	2	16.67
- Cultivation (rai/grower)	0.00		1.00		2.50		2.79		2.52	
- Harvested Area (rai/grower)	0.00		1.00		2.38		2.71		2.39	
- Crop yield (kg/rai)	0.00		7400.00		810.00		737.00		1322.00	
7.3 Lettuce										
- Number of growers	4	13.33	0	0.00	0	0.00	0	0.00	4	3.33
- Varieties										
□ Singtho	1	25.00	0	0.00	0	0.00	0	0.00	1	0.83
□ Violet	1	25.00	0	0.00	0	0.00	0	0.00	1	0.83
□ Unidentified	2	50.00	0	0.00	0	0.00	0	0.00	2	1.67
- Cultivation (rai/grower)	16.50		0.00		0.00		0.00		16.5	
- Harvested Area (rai/grower)	10.50		0.00		0.00		0.00		10.5	
- Crop yield (kg/rai)	3125		0.00		0.00		0.00		3125	
7.4 Green Onion										
- Number of growers	0	0.00	0	0.00	6	17.14	1	2.86	7	5.83
- Varieties										
□ Utharadit	0	0.00	0	0.00	3	50.00	1	100.00	4	57.14
□ Chiang Mai	0	0.00	0	0.00	1	16.67	0	0.00	1	14.29
□ Chainat	0	0.00	0	0.00	1	16.67	0	0.00	1	14.29
□ Unidentified	0	0.00	0	0.00	1	16.67	0	0.00	1	14.29
- Cultivation (rai/grower)	0.00		0.00		3.75		4.00		3.78	
- Harvested Area (rai/grower)	0.00		0.00		3.58		4.00		3.64	
- Crop yield (kg/rai)	0.00		0.00		1633.00		1000.00		1542.00	
7.5 Oriental Radish										
- Number of growers	1	3.33	0	0.00	0	0.00	0	0.00	1	0.83
- Varieties										
□ Unidentified	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
- Cultivation (rai/grower)	34.00		0.00		0.00		0.00		34.00	
- Harvested Area (rai/grower)	34.00		0.00		0.00		0.00		34.00	
- Crop yield (kg/rai)	200.00		0.00		0.00		0.00		200.00	
7.6 Baby Corn										
- Number of growers	0		1	5.00	1	2.86	1	2.86	3	2.50
- Varieties										
□ SG18	0	0.00	0	0.00	1	100.00	1	100.00	2	66.67
□ Zebra	0	0.00	1	100.00	0	0.00	0	0.00	1	33.33
- Cultivation (rai/grower)	0.00		10.00		5.00		10.00		8.00	
- Harvested Area (rai/grower)	0.00		8.00		4.00		10.00		7.00	
- Crop yield (kg/rai)	0.00		2000.00		900.00		1200.00		1367.00	
7.7 Eggplant										
- Number of growers	4	13.33	4	20.00	2	5.71	0	0.00	10	8.33
- Varieties										
□ Nam Yod	1	25.00	1	25.00	1	50.00	0	0.00	3	30.00
□ Chaopraya	1	25.00	0	0.00	1	50.00	0	0.00	2	20.00
□ Unidentified	2	50.00	3	75.00	0	0.00	0	0.00	5	50.00
- Cultivation (rai/grower)	3.00		7.75		2.00		0.00		4.50	
- Harvested Area (rai/grower)	3.00		7.75		2.00		0.00		4.50	
- Crop yield (kg/rai)	2200.00		5620.00		1500.00		0.00		3428.00	

Items	Upper Basin		UpperMiddle Basin		LowerMiddle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
7.8 Cucumber										
- Number of growers	1	3.33	1	5.00	0	0.00	0	0.00	2	1.67
- Varieties										
□ Unidentified	1	100.00	1	100.00	0	0.00	0	0.00	2	100.00
- Cultivation (rai/grower)	2.00		2.00		0.00		0.00		2.00	
- Harvested Area (rai/grower)	2.00		2.00		0.00		0.00		2.00	
- Crop yield (kg/rai)	100.00		250.00		0.00		0.00		175.00	
7.9 Cabbage										
- Number of growers	0	0.00	0	0.00	2	5.71	0	0.00	2	1.67
- Varieties										
□ Rod Tang	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00
□ Unidentified	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00
- Cultivation (rai/grower)	0.00		0.00		1.25		0.00		1.25	
- Harvested Area (rai/grower)	0.00		0.00		1.25		0.00		1.25	
- Crop yield (kg/rai)	0.00		0.00		2000.00		0.00		2000.00	
7.10 Winged Bean										
- Number of growers	1	3.33	0	0.00	2	5.71	0	0.00	3	2.50
- Varieties										
□ Rayong	0	0.00	0	0.00	1	50.00	0	0.00	1	33.33
□ Unidentified	1	100.00	0	0.00	1	50.00	0	0.00	2	66.67
- Cultivation (rai/grower)	1.00		0.00		1.50		0.00		1.33	
- Harvested Area (rai/grower)	1.00		0.00		1.00		0.00		1.00	
- Crop yield (kg/rai)	200.00		0.00		570.00		0.00		447.00	
7.11 Luffa										
- Number of growers	2	6.67	0	0.00	0	0.00	0	0.00	2	1.67
- Varieties										
□ Unidentified	2	100.00	0	0.00	0	0.00	0	0.00	2	100.00
- Cultivation (rai/grower)	4.50		0.00		0.00		0.00		4.50	
- Harvested Area (rai/grower)	4.50		0.00		0.00		0.00		4.50	
- Crop yield (kg/rai)	1150.00		0.00		0.00		0.00		1150.00	
7.12 Yam Bean										
- Number of growers	0	0.00	0	0.00	1	2.86	0	0.00	1	0.83
- Varieties										
□ Kradon	0	0.00	0	0.00	1	100.00	0	0.00	1	100.00
- Cultivation (rai/grower)	0.00		0.00		3.00		0.00		3.00	
- Harvested Area (rai/grower)	0.00		0.00		3.00		0.00		3.00	
- Crop yield (kg/rai)	0.00		0.00		6000.00		0.00		6000.00	
7.13 Galingle										
- Number of growers	0	0.00	0	0.00	4	11.43	0	0.00	4	3.33
- Varieties										
□ Native species	0	0.00	0	0.00	1	25.00	0	0.00	1	25.00
□ Ragkluai	0	0.00	0	0.00	1	25.00	0	0.00	1	25.00
□ Unidentified	0	0.00	0	0.00	2	50.00	0	0.00	2	50.00
- Cultivation (rai/grower)	0.00		0.00		1.50		0.00		1.50	
- Harvested Area (rai/grower)	0.00		0.00		1.37		0.00		1.37	
- Crop yield (kg/rai)	0.00		0.00		2000.00		0.00		2000.00	
7.14 Peanut										
- Number of growers	0	0.00	1	5.00	0	0.00	0	0.00	1	0.83
- Varieties										
□ Unidentified	0	0.00	1	100.00	0	0.00	0	0.00	1	100.00
- Cultivation (rai/grower)	0.00		2.00		0.00		0.00		2.00	
- Harvested Area (rai/grower)	0.00		2.00		0.00		0.00		2.00	
- Crop yield (kg/rai)	0.00		1500.00		0.00		0.00		1500.00	
7.15 Cow Pea										
- Number of growers	2	6.67	0	0.00	1	2.86	0	0.00	3	2.50
- Varieties										
□ Son Deang	1	50.00	0	0.00	0	0.00	0	0.00	1	33.33
□ Unidentified	1	50.00	0	0.00	1	100.00	0	0.00	2	66.67
- Cultivation (rai/grower)	2.25		0.00		2.00		0.00		2.17	
- Harvested Area (rai/grower)	2.50		0.00		2.00		0.00		2.17	
- Crop yield (kg/rai)	1080.00		0.00		1000.00		0.00		1053.00	
7.16 Green Pea										
- Number of growers	2	6.67	1	5.00	0	0.00	0	0.00	3	2.50
- Varieties										
□ Unidentified	2	100.00	1	100.00	0	0.00	0	0.00	3	100.00
- Cultivation (rai/grower)	2.00		21.00		0.00		0.00		8.30	
- Harvested Area (rai/grower)	2.00		21.00		0.00		0.00		8.30	
- Crop yield (kg/rai)	1015.00		120.00		0.00		0.00		717.00	

Items	Upper Basin		UpperMiddle Basin		LowerMiddle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
8. Fruit/Perennial Trees										
8.1 Mango										
- Number of growers	3	10.00	2	10.00	0	0.00	1	2.86	6	5.00
- Varieties										
□ Oak-rong	2	66.67	1	50.00	0	0.00	0	0.00	3	50.00
□ Keaw Sawoei	1	33.33	1	50.00	0	0.00	0	0.00	2	33.33
□ Chok A-nan	0	0.00	0	0.00	0	0.00	1	100.00	1	16.67
- Cultivation (rai/grower)	8.42		8.50		0.00		2.00		7.37	
- Harvested Area (rai/grower)	8.42		5.00		0.00		2.00		6.21	
- Crop yield (kg/rai)	667.00		5300.00		0.00		1000.00		2267.00	
8.2 Guava										
- Number of growers	0	0.00	1	5.00	0	0.00	0	0.00	1	0.83
- Varieties										
□ Pansithong	0	0.00	1	100.00	0	0.00	0	0.00	1	100.00
- Cultivation (rai/grower)	0.00		5.00		0.00		0.00		5.00	
- Harvested Area (rai/grower)	0.00		5.00		0.00		0.00		5.00	
- Crop yield (kg/rai)	0.00		6000.00		0.00		0.00		6000.00	
8.3 Rose Apple										
- Number of growers	0		4	20.00	0		0		4	3.33
- Varieties										
□ Petnampueng	0	0.00	1	25.00	0	0.00	0	0.00	1	25.00
□ Petsampran	0	0.00	1	25.00	0	0.00	0	0.00	1	25.00
□ Mixed Species	0	0.00	2	50.00	0	0.00	0	0.00	2	50.00
- Cultivation (rai/grower)	0.00		7.25		0.00		0.00		7.25	
- Harvested Area (rai/grower)	0.00		6.50		0.00		0.00		6.50	
- Crop yield (kg/rai)	0.00		365.00		0.00		0.00		365.00	
8.4 Pomelo										
- Number of growers	0	0.00	2	10.00	0	0.00	0	0.00	2	1.67
- Varieties										
□ Kaonampueng	0	0.00	2	100.00	0	0.00	0	0.00	2	100.00
- Cultivation (rai/grower)	0.00		16.00		0.00		0.00		16.00	
- Harvested Area (rai/grower)	0.00		7.50		0.00		0.00		7.50	
- Crop yield (kg/rai)	0.00		Unidentified		0.00		0.00		Unidentified	
8.5 Tamarind										
- Number of growers	1	3.33	1	5.00	0	0.00	0	0.00	2	1.67
- Varieties										
□ Unidentified	1	100.00	1	100.00	0	0.00	0	0.00	2	100.00
- Cultivation (rai/grower)	1.00		10.00		0.00		0.00		5.50	
- Harvested Area (rai/grower)	1.00		8.00		0.00		0.00		4.50	
- Crop yield (kg/rai)	2000.00		500.00		0.00		0.00		1250.00	
8.6 Jack Fruit										
- Number of growers	1	3.33	1	5.00	0	0.00	0	0.00	2	1.67
- Varieties										
□ Unidentified	1	100.00	1	100.00	0	0.00	0	0.00	2	100.00
- Cultivation (rai/grower)	14.00		2.00		0.00		0.00		8.00	
- Harvested Area (rai/grower)	14.00		2.00		0.00		0.00		8.00	
- Crop yield (kg/rai)	800.00		750.00		0.00		0.00		775.00	
8.7 Citrus										
- Number of growers	0	0.00	0	0.00	0	0.00	3	8.57	3	2.50
- Varieties										
□ Native Species	0	0.00	0	0.00	0	0.00	1	33.33	1	33.33
□ Unidentified	0	0.00	0	0.00	0	0.00	2	66.67	2	66.67
- Cultivation (rai/grower)	0.00		0.00		0.00		3.00		3.00	
- Harvested Area (rai/grower)	0.00		0.00		0.00		1.67		1.67	
- Crop yield (kg/rai)	0.00		0.00		0.00		4333.00		4333.00	
8.8 Banana										
- Number of growers	1	3.33	1	5.00	0	0.00	0	0.00	2	1.67
- Varieties										
□ Namwa	1	100.00	1	100.00	0	0.00	0	0.00	2	100.00
- Cultivation (rai/grower)	3.50		3.50		0.00		0.00		3.25	
- Harvested Area (rai/grower)	3.00		2.00		0.00		0.00		2.75	
- Crop yield (kg/rai)	80.00		1500.00		0.00		0.00		790.00	
8.9 Lime										
- Number of growers	0	0.00	0	0.00	0	0.00	1	2.86	1	0.83
- Varieties										
□ Kai	0	0.00	0	0.00	0	0.00	1	100.00	1	100.00
- Cultivation (rai/grower)	0.00		0.00		0.00		3.00		3.00	
- Harvested Area (rai/grower)	0.00		0.00		0.00		3.00		3.00	
- Crop yield (kg/rai)	0.00		0.00		0.00		5500.00		5500.00	

Items	Upper Basin		UpperMiddle Basi		LowerMiddle Basi		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
8.10 Orange										
- Number of growers	0	0.00	0	0.00	0	0.00	1	2.86	1	0.83
- Varieties										
□ Unidentified	0	0.00	0	0.00	0	0.00	1	100.00	1	100.00
- Cultivation (rai/grower)	0.00		0.00		0.00		1.00		1.00	
- Harvested Area (rai/grower)	0.00		0.00		0.00		1.00		1.00	
- Crop yield (kg/rai)	0.00		0.00		0.00		2500.00		2500.00	
8.11 Cashew Nut										
- Number of growers	1	3.33	0	0.00	0	0.00	0	0.00	1	0.83
- Varieties										
□ Unidentified	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
- Cultivation (rai/grower)	15.00		0.00		0.00		0.00		15.00	
- Harvested Area (rai/grower)	15.00		0.00		0.00		0.00		15.00	
- Crop yield (kg/rai)	100.00		0.00		0.00		0.00		100.00	
8.12 Indian Jujube										
- Number of growers	1	3.33	0	0.00	0	0.00	0	0.00	1	0.83
- Varieties										
□ Rean	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
- Cultivation (rai/grower)	4.00		0.00		0.00		0.00		4.00	
- Harvested Area (rai/grower)	4.00		0.00		0.00		0.00		4.00	
- Crop yield (kg/rai)	3000.00		0.00		0.00		0.00		3000.00	
8.13 Hog Plum										
- Number of growers	0	0.00	0	0.00	0	0.00	1	2.86	1	0.83
- Varieties										
□ Unidentified	0	0.00	0	0.00	0	0.00	1	100.00	1	100.00
- Cultivation (rai/grower)	0.00		0.00		0.00		0.50		0.50	
- Harvested Area (rai/grower)	0.00		0.00		0.00		0.50		0.50	
- Crop yield (kg/rai)	0.00		0.00		0.00		1600.00		1600.00	
8.14 Coconut										
- Number of growers	0	0.00	0	0.00	0	0.00	1	2.86	1	0.83
- Varieties										
□ Unidentified	0	0.00	0	0.00	0	0.00	1	100.00	1	100.00
- Cultivation (rai/grower)	0.00		0.00		0.00		0.50		0.50	
- Harvested Area (rai/grower)	0.00		0.00		0.00		0.00		0.00	
- Crop yield (kg/rai)	0.00		0.00		0.00		0.00		0.00	

TABLE 6
CROPPING CALENDAR

Crop	Month											
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1. Rice (1st crop)					P						H	
2. Rice (2nd crop)			P					H				
3. Corn	P②			H②	P③			H③	P①			H①
4. Sugar cane				P								
						H						
	* Leaving stumps for 3 years before planting them again											
5. Cassava		H		P								
6. Pineapple	Pineapple can be grown every month; after 13-15 months they will be harvested, and stumps will be left for 3 years before planting them again											
7. Chili					P		H					
8. Eggplant					P		H					
9. Vegetables	Vegetables can be grown about 3-4 times all year round; after 2-3 months they will be harvested											
10. Fruit/prennial trees												

Remarks: P = Plant
H = Harvest

1st crop: RainySeason
2nd crop: Dry Season

TABLE 7
SEEDING USE IN WHOLE BASIN AREA

Items	Average Quantity of Seeds				Average Price Per Unit (baht)
	Unit	Owner	Purchase	Total	
1. Rain-fed Rice (first crop)	kg/rai	26.05	2.73	28.78	2.36
Dry Season Rice (second crop	kg/rai	36.67	10.00	46.67	8.67
2. Farm crops					
- Sweet corn	kg/rai	0.00	1.57	1.57	528.35
- Baby corn	kg/rai	0.20	3.55	3.75	61.40
- Corn	kg/rai	5.00	4.00	9.00	16.00
- Sugar cane	rai/rai	0.42	0.28	0.70	9,000.00
	trunk/rai	1,717.01	1,850.01	3,567.02	1,901.06
	kg/rai	550.00	2,800.00	3,350.00	1,169.46
	piece/rai	1,000.00	3,833.00	4,833.00	8,666.67
- Cassava	rai/rai	0.37	0.09	0.46	354.00
	piece/rai	5,187.50	625.00	5,812.50	0.13
	kg/rai	66.50	100.00	166.50	0.25
- Asparagus	kg/rai	0.00	0.40	0.40	4,966.67
- Pineapple	sprout/rai	5,791.00	2,458.33	8,249.33	0.50
- Yam bean	kg/rai	0.00	7.00	7.00	107.00
- Peanut	kg/rai	0.00	23.00	23.00	10.00
3. Fruit/perennial trees				0.00	
- Mango	trunk/rai	0.00	28.33	28.33	36.67
- Pomelo	trunk/rai	0.00	22.50	22.50	32.50
- Grava	trunk/rai	0.00	41.00	41.00	100.00
- Rose apple	trunk/rai	0.00	113.33	113.33	24.00
- Jack Wood	trunk/rai	0.00	10.00	10.00	900.00
- Banana	trunk/rai	0.00	40.00	40.00	5.00
- Hog plum	trunk/rai	0.00	25.00	25.00	30.00
- Eucalyptus	trunk/rai	0.00	320.00	320.00	1.50
4. Vegetables					
- Chili	kg/rai	0.94	0.32	1.26	85.91
	trunk/rai	3,000.00	500.00	3,500.00	0.00
	m^2/rai	0.00	1.50	1.50	187.50
- Green onion	kg/rai	0.00	61.94	61.94	65.63
- Lettuce	kg/rai	0.63	0.35	0.98	2,270.00
- Parsnip	kg/rai	0.00	0.50	0.50	2,500.00
- Eggplant	kg/rai	2.94	171.89	174.83	294.31
- Cucumber	kg/rai	0.17	0.23	0.40	190.00
- Winged bean	kg/rai	0.00	0.75	0.75	650.00
- Luffa	kg/rai	1.00	1.50	2.50	0.00
- Galingle	kg/rai	133.33	266.67	400.00	10.00
- Cabbage	can/rai	0.00	1.00	1.00	650.00
- Green Pea	can/rai	0.00	3.75	3.75	50.00
- Cow Pea	can/rai	0.25	0.75	1.00	125.00
5. Flowering plant					
- Jasmine	trunk/rai	0.00	1,000.00	1,000.00	3.00

TABLE 7A
SEEDING USE IN UPPER BASIN AREA

Items	Average Quantity of Seeds				Average Price Per Unit (baht)
	Unit	Owner	Purchase	Total	
1. Farm crops					
- Baby corn	kg/rai	0.00	4.00	4.00	80.00
- Corn	kg/rai	0.00	0.13	0.13	12,000.00
- Cassava	piece/rai	10,000.00	0.00	10,000.00	0.00
- Asparagus	kg/rai	0.00	0.33	0.33	3,000.00
- Pineapple	sprout/rai	5,791.67	2,458.33	8,250.00	0.50
2. Fruit/perennial trees					
- Mango	trunk/rai	0.00	32.50	32.50	42.50
3. Vegetables					
- Chili	kg/rai	0.18	0.00	0.18	0.00
	m^2/rai	0.00	1.50	1.50	187.50
- Green onion	kg/rai	0.00	0.50	0.50	330.00
- Lettuce	kg/rai	0.63	0.35	0.98	2,270.00
- Parsnip	kg/rai	0.00	0.50	0.50	2,500.00
- Eggplant	kg/rai	6.80	0.00	6.80	0.00
- Cucumber	kg/rai	0.50	0.50	1.00	Unidentified
- Luffa	kg/rai	1.50	0.00	1.50	0.00
- Green pea	can/rai	0.00	3.75	3.75	50.00
- Cow pea	can/rai	0.33	0.67	1.00	110.00

TABLE 7B
SEEDING USE IN UPPER MIDDLE BASIN AREA

Items	Average Quantity of Seeds				Average Price Per Unit (baht)
	Unit	Owner	Purchase	Total	
1. Farm crops					
- Baby corn	kg/rai	0.00	4.33	4.33	64.00
- Corn	kg/rai	0.25	0.13	0.38	23.50
- Cassava	rai/rai	0.63	0.00	0.63	0.00
	piece/rai	0.00	5,000.00	5,000.00	1.00
- Asparagus	kg/rai	0.00	0.40	0.40	5,000.00
2. Fruit/perennial trees					
- Mango	trunk/rai	0.00	20.00	20.00	25.00
- Pomelo	trunk/rai	0.00	22.50	22.50	32.50
- Grava	trunk/rai	0.00	80.00	80.00	30.00
- Rose apple	trunk/rai	0.00	113.33	113.33	24.00
- Jack wood	trunk/rai	0.00	10.00	10.00	900.00
- Banana	trunk/rai	0.00	40.00	40.00	5.00
3. Vegetables					
- Chili	kg/rai	0.00	1.00	1.00	80.00
- Eggplant	kg/rai	0.00	601.50	601.50	30.10
- Cucumber	kg/rai	0.00	0.10	0.10	285.00

TABLE 7C
SEEDING USE IN LOWER MIDDLE BASIN AREA

Items	Average Quantity of Seeds				Average Price Per Unit (baht)
	Unit	Owner	Purchase	Total	
1. Rain-fed Rice (first crop)	kg/rai	33.00	6.00	39.00	5.20
Dry Season Rice (second cro	kg/rai	36.67	10.00	46.67	8.67
2. Farm crops					
- Sweet corn	kg/rai	0.00	2.02	2.02	482.81
- Baby corn	kg/rai	1.00	0.75	1.75	35.00
- Corn	kg/rai	5.00	4.00	9.00	16.00
- Sugar cane	rai/rai	0.40	0.42	0.82	7,250.00
	trunk/rai	1,833.76	1,187.51	3,021.27	1,867.32
	kg/rai	1,500.00	0.00	1,500.00	0.00
	piece/rai	3,000.00	0.00	3,000.00	8,000.00
- Cassava	rai/rai	0.00	0.26	0.26	370.00
	piece/rai	5,625.00	0.00	5,625.00	Unidentified
- Asparagus	kg/rai	0.00	0.41	0.41	6,500.00
- Yam bean	kg/rai	0.00	7.00	7.00	107.00
3. Vegetables					
- Chili	kg/rai	0.82	0.30	1.12	136.00
	trunk/rai	3,500.00	0.00	3,500.00	0.00
- Green onion	kg/rai	0.00	77.50	77.50	25.83
- Eggplant	kg/rai	0.10	0.10	0.20	1,000.00
- Winged bean	kg/rai	0.00	0.75	0.75	650.00
- Galingle	kg/rai	133.33	266.67	400.00	10.00
- Cabbage	can/rai	0.00	1.00	1.00	650.00
- Cow pea	can/rai	0.00	1.00	1.00	170.00
5. Flowering plant					
- Jasmine	trunk/rai	0.00	1,000.00	1,000.00	3.00

TABLE 7D
SEEDING USE IN LOWER BASIN AREA

Items	Average Quantity of Seeds				Average Price Per Unit (baht)
	Unit	Owner	Purchase	Total	
1. Rain-fed Rice (first crop)	kg/rai	20.25	0.00	20.25	0.00
2. Farm crops					
- Sweet corn	kg/rai	0.00	1.23	1.23	562.50
- Sugar cane	rai/rai	0.58	0.22	0.80	6,000.00
	trunk/rai	1,250.00	4,500.00	5,750.00	2,000.00
	kg/rai	360.00	3,360.00	3,720.00	1,403.35
	piece/rai	0.00	5,750.00	5,750.00	9,000.00
- Cassava	rai/rai	0.41	0.06	0.47	466.67
	piece/rai	4,500.00	0.00	4,500.00	0.00
	kg/rai	66.50	100.00	166.50	0.25
- Asparagus	kg/rai	0.00	0.41	0.41	4,428.57
- Peanut	kg/rai	0.00	23.00	23.00	10.00
3. Fruit/perennial trees					
- Grava	trunk/rai	0.00	2.00	2.00	170.00
- Hog plum	trunk/rai	0.00	25.00	25.00	30.00
- Eucalyptus	trunk/rai	0.00	320.00	320.00	1.50
4. Vegetables					
- Chili	kg/rai	1.53	0.25	1.78	Unidentified
- Green onion	kg/rai	0.00	30.00	30.00	40.00

TABLE 8

FERTILIZER AND CHEMICALS USE FOR AGRICULTURE IN WHOLE BASIN AREA

Type of Fertilizer and Chemicals	Average Quantity (kg/rai)	Average Cost (baht/rai)	Average Total Value (baht/rai)
1. Herbicide	37.00	159.19	5,890.03
2. Pesticide	10.00	66.00	660.00
3. Organic Fertilizer	20.00	8.00	160.00
4. Farmyard Manure	420.00	1.63	684.60
5. Fertilizer Formula 21-0-0	663.00	1.27	842.01
6. Fertilizer Formula 46-0-0	849.00	2.29	1,944.21
7. Fertilizer Formula 15-0-0	43.00	0.82	35.26
8. Fertilizer Formula 15-15-15	826.00	5.00	4,130.00
9. Fertilizer Formula 21-7-14	14.00	2.50	35.00
10. Fertilizer Formula 8-24-24	33.00	0.22	7.26
11. Urea Fertilizer	430.00	4.70	2,021.00
12. Fertilizer Formula 16-16-16	543.00	10.00	5,430.00
13. Compost	1,827.00	6.45	11,784.15
14. Fertilizer Formula 16-20-0	500.00	6.00	3,000.00
15. Fertilizer Formula 6-0-0	1,250.00	7.80	9,750.00
16. Fertilizer Formula 16-0-0	200.00	6.40	1,280.00
17. Fertilizer Formula 16-18-16	590.00	8.50	5,015.00
18. Fertilizer Formula 14-9-20	350.00	9.00	3,150.00
19. Fertilizer Formula 25-7-7	100.00	9.60	960.00
20. Fertilizer Formula 16-16-0	700.00	11.00	7,700.00
21. Fertilizer Formula 20-7-7	50.00	8.60	430.00
22. Fertilizer Formula 20-0-0	500.00	4.40	2,200.00
23. Fertilizer Formula 13-13-21	325.00	10.17	3,305.25
24. Fertilizer Formula 0-0-60	550.00	5.85	3,217.50
25. Fertilizer Formula 15-7-7	250.00	9.20	2,300.00
26. Fertilizer Formula 15-15-0	1,000.00	6.00	6,000.00
27. Fertilizer Formula 18-0-0	100.00	5.60	560.00
28. Fertilizer Formula 20-20-0	250.00	9.00	2,250.00
29. Hormone	17.92	104.00	1,863.68
30. Medical gas	117.00	18.00	2,106.00
31. Water gas	0.50	50.00	25.00

TABLE 8A
FERTILIZER AND CHEMICALS USE FOR AGRICULTURE IN UPPER BASIN AREA

	Type of Fertilizer and Chemicals	Average Quantity (kg/rai)	Average Cost (baht/rai)	Average Total Value (baht/rai)
1.	Herbicide	24.83	130.84	3,248.76
2.	Pesticide	6.27	121.00	758.67
3.	Organic Fertilizer	15.00	23.00	345.00
4.	Farmyard Manure	98.00	6.00	588.00
5.	Fertilizer Formula 21-0-0	830.00	1.26	1,045.80
6.	Fertilizer Formula 46-0-0	186.00	1.40	260.40
7.	Fertilizer Formula 15-0-0	25.00	0.73	18.25
8.	Fertilizer Formula 15-15-15	58.00	0.97	56.26
9.	Fertilizer Formula 21-7-14	8.00	0.31	2.48
10.	Fertilizer Formula 8-24-24	33.00	0.54	17.82
11.	Urea Fertilizer	524.00	3.00	1,572.00
12.	Fertilizer Formula 16-16-16	275.00	10.00	2,750.00
13.	Fertilizer Formula 16-18-16	580.00	8.00	4,640.00
14.	Fertilizer Formula 16-16-0	700.00	11.00	7,700.00
15.	Fertilizer Formula 13-13-21	850.00	8.20	6,970.00
16.	Fertilizer Formula 15-7-7	250.00	9.00	2,250.00
17.	Hormone	8.00	12.00	96.00
18.	Medical gas	117.00	18.00	2,106.00
19.	Water gas	0.50	50.00	25.00

TABLE 8B
FERTILIZER AND CHEMICALS USE FOR AGRICULTURE
IN UPPER MIDDLE BASIN AREA

	Type of Fertilizer and Chemicals	Average Quantity (kg/rai)	Average Cost (baht/rai)	Average Total Value (baht/rai)
1.	Herbicide	31.00	30.06	931.86
2.	Pesticide	31.00	60.00	1,860.00
3.	Organic Fertilizer	1,008.00	0.11	110.88
4.	Fertilizer Formula 21-0-0	600.00	0.23	138.00
5.	Fertilizer Formula 46-0-0	57.00	0.72	41.04
6.	Fertilizer Formula 15-0-0	175.00	1.02	178.50
7.	Fertilizer Formula 15-15-15	37.00	0.96	35.52
8.	Fertilizer Formula 8-24-24	150.00	0.50	75.00
9.	Urea Fertilizer	1,535.00	1.89	2,901.15
10.	Fertilizer Formula 16-16-16	1,000.00	11.00	11,000.00
11.	Fertilizer Formula 16-18-16	600.00	8.60	5,160.00
12.	Fertilizer Formula 13-13-21	200.00	42.50	8,500.00
13.	Hormone	42.00	150.00	6,300.00

TABLE 8C
FERTILIZER AND CHEMICALS USE FOR AGRICULTURE IN LOWER MIDDLE BASIN AREA

	Type of Fertilizer and Chemicals	Average Quantity (kg/rai)	Average Cost (baht/rai)	Average Total Value (baht/rai)
1.	Herbicide	17.17	113.66	1,951.54
2.	Pesticide	7.70	64.00	492.80
3.	Farmyard Manure	642.00	0.51	327.42
4.	Fertilizer Formula 21-0-0	306.00	1.79	547.74
5.	Fertilizer Formula 46-0-0	115.00	1.10	126.50
6.	Fertilizer Formula 15-0-0	21.00	0.46	9.66
7.	Fertilizer Formula 15-15-15	343.00	3.00	1,029.00
8.	Fertilizer Formula 21-7-14	34.00	7.80	265.20
9.	Urea Fertilizer	92.86	11.00	1,021.46
10.	Fertilizer Formula 16-16-16	412.00	10.00	4,120.00
11.	Compost	1,150.00	6.40	7,360.00
12.	Fertilizer Formula 14-9-20	350.00	9.00	3,150.00
13.	Fertilizer Formula 25-7-7	100.00	9.60	960.00
14.	Fertilizer Formula 20-7-7	50.00	8.60	430.00
15.	Fertilizer Formula 20-0-0	500.00	4.40	2,200.00
16.	Fertilizer Formula 13-13-21	150.00	8.00	1,200.00
17.	Fertilizer Formula 0-0-60	500.00	7.30	3,650.00
18.	Fertilizer Formula 15-15-0	1,000.00	6.00	6,000.00
19.	Fertilizer Formula 20-20-0	250.00	9.00	2,250.00

TABLE 8D
FERTILIZERS AND CHEMICALS USE FOR AGRICULTURE IN LOWER BASIN AREA

	Type of Fertilizer and Chemicals	Average Quantity (kg/rai)	Average Cost (baht/rai)	Average Total Value (baht/rai)
1.	Herbicide	77.00	58.26	4486.02
2.	Pesticide	1.94	26.00	50.44
3.	Organic Fertilizer	57.00	8.00	456.00
4.	Farmyard Manure	137.00	0.25	34.25
5.	Fertilizer Formula 21-0-0	913.00	1.35	1232.55
6.	Fertilizer Formula 46-0-0	2605.00	5.16	13441.80
7.	Fertilizer Formula 15-0-0	5.36	1.14	6.11
8.	Fertilizer Formula 15-15-15	2417.00	13.00	31421.00
9.	Fertilizer Formula 21-7-14	5.00	0.52	2.60
10.	Urea Fertilizer	53.90	1.03	55.52
11.	Fertilizer Formula 16-16-16	591.67	9.10	5384.20
12.	Compost	2504.00	6.50	16276.00
13.	Fertilizer Formula 16-20-0	500.00	6.00	3000.00
14.	Fertilizer Formula 6-0-0	1250.00	7.80	9750.00
15.	Fertilizer Formula 16-0-0	200.00	6.40	1280.00
16.	Fertilizer Formula 13-13-21	100.00	12.00	1200.00
17.	Fertilizer Formula 0-0-60	600.00	4.40	2640.00
18.	Fertilizer 18-0-0	100.00	5.60	560.00
19.	Hormone	3.75	150.00	562.50

TABLE 9
AGRICULTURAL PRODUCT MANAGEMENT

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Samples	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1 Agricultural product management (Response can be more than one)										
□ No agricultural occupation	0	0.00	4	20.00	1	2.86	1	2.86	6	5.00
□ Hosehold consumption	12	40.00	0	0.00	17	48.57	4	11.43	33	27.50
□ For sales	1	3.33	1	5.00	0	0.00	1	2.86	3	2.50
□ Immediate sales	29	96.67	14	70.00	34	97.14	31	88.57	108	90.00
□ Not as yet harvested	0	0.00	1	5.00	0	0.00	1	2.86	2	1.67

TABLE 9A
AGRICULTURAL PRODUCT DISTRIBUTION IN 4 BASIN GROUPS

Items	Product Distribution						Product Extension							
	Household Consumption			Seeds			Rice Mills				Merchants			
	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)
1 Rainy season rice (1st crop)	9	27.27	1,757	8	24.24	124	8	7.21	1,519	1.44	8	7.21	3,218	2.25
2 Dry season rice (2nd crop)	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	3,000	4.00
3 Corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	6	5.41	8,483	6.92
4 Sugar cane	0	0.00	0	17	51.52	2,418	0	0.00	0	0.00	36	32.43	390,008	0.72
5 Cassava	0	0.00	0	0	0.00	0	0	0.00	0	0.00	20	18.02	151,350	0.95
6 Chili	6	18.18	4	10	30.30	1	0	0.00	0	0.00	13	11.71	2,302	14.08
7 Asparagus	6	18.18	2,500	0	0.00	0	0	0.00	0	0.00	14	12.61	5,351	37.43
8 Pineapple	12	36.36	1	0	0.00	0	0	0.00	0	0.00	13	11.71	56,377	3.35
9 Guava	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	3,000	10.00
10 Rose apple	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	2.70	1,360	25.00
11 Banana	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	1.80	1,333	2.50
12 Pomelo	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	13,333	15.00
13 Mango	3	9.09	17	0	0.00	0	0	0.00	0	0.00	6	5.41	1,292	2.42
14 Jasmine	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	1,095	40.00
15 Tamarind	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	2,000	1.50
16 White greens	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	2.70	30,667	2.50
17 Jack fruit	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	2.70	1,967	1.75
18 Oriental radish	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	120,000	2.50
19 Baby corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	12	10.81	17,117	2.92
20 Eggplant	0	0.00	0	0	0.00	0	0	0.00	0	0.00	10	9.01	10,287	6.30
21 Cucumber	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	2.70	14,000	3.33
22 Winged bean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	1.80	1,500	19.00
23 Kaffir lime	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	1.80	2,000	4.00
24 Lime	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	500	4.00
25 Cashew nuts	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	1,500	25.00
26 Tangerine	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	2,000	10.00
27 Hog plum	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	800	5.00
28 Gourd	3	9.09	2	3	9.09	2	0	0.00	0	0.00	5	4.50	5,020	8.50
29 Yambean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	18,000	3.00
30 Onion	5	15.15	1	0	0.00	0	0	0.00	0	0.00	5	4.50	3,960	17.60
31 Krachai (lesser galangal rhizome	0	0.00	0	2	6.06	400	0	0.00	0	0.00	4	3.60	7,500	6.50
32 Common jujube	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	12,000	5.00
33 Common bean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	1,015	7.50
34 Cabbage	1	3.03	5	0	0.00	0	0	0.00	0	0.00	1	0.90	3,000	30.00
35 String bean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	2.70	3,500	4.33
36 Peanut	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	0.90	1,200	10.00

Rei 1: Percentages of product samples kept for household consumption in four basin groups are 12, 0, 17 and 4 respectively.
2: Percentages of product samples kept for sales in four basin groups are 30, 15, 34 and 32 respectively.

TABLE 9B
AGRICULTURAL PRODUCT DISTRIBUTION IN THE UPPER BASIN

Items	Product Distribution						Product Extension							
	Household Consumption			Seeds			Rice Mills				Merchants			
	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)
1. Rainy season rice (1st crop	1	8.33	4,550	0	0.00	0	0	0.00	0	0.00	0	0.00	0	0.00
2. Sugar cane	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	1,000,000	0.53
3. Cassava	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	22,500	0.80
4. Chili	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	6.67	5,600	11.50
5. Pineapple	12	100.00	1	0	0.00	0	0	0.00	0	0.00	12	40.00	61,000	3.42
6. Mango	3	25.00	17	0	0.00	0	0	0.00	0	0.00	3	10.00	750	1.67
7. Jasmine	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	1,095	40.00
8. Tamarind	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	2,000	1.50
9. White greens	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	10.00	30,667	2.50
10. Jack fruit	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	900	3.00
11. Oriental radish	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	120,000	2.50
12. Baby corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	7,500	3.00
13. Eggplant	0	0.00	0	0	0.00	0	0	0.00	0	0.00	4	13.33	4,410	8.00
14. Cucumber	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	3,000	4.00
15. Cashew nuts	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	1,500	25.00
16. Gourd	3	25.00	2	3	25.00	2	0	0.00	0	0.00	3	10.00	4,367	4.17
17. Common jujube	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	12,000	5.00
18. Common bean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	1,015	7.50
19. String bean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	6.67	4,250	4.00
20. Peanut	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.33	1,200	10.00

Remarks: 1/ Percentages of 12 example respondents who kept products for household consumption in the upper basin.
2/ Percentages of 30 example respondents who kept products for sales in the upper basin.

TABLE 9C
AGRICULTURAL PRODUCT DISTRIBUTION IN THE UPPER MIDDLE BASIN

Items	Product Distribution						Product Extension							
	Household Consumption			Seeds			Rice Mills				Merchants			
	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)
1. Corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	6.67	4,500	10.00
2. Sugar cane	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	13.33	250,000	0.50
3. Cassava	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	13.33	12,000	0.87
4. Chili	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	6.67	180	15.00
5. Asparagus	1	100.00	5,000	0	0.00	0	0	0.00	0	0.00	1	6.67	3,600	30.00
6. Pineapple	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	6.67	900	2.50
7. Guava	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	6.67	3,000	10.00
8. Rose apple	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	20.00	1,360	25.00
9. Banana	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	13.33	1,333	2.50
10. Pomelo	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	6.67	13,333	15.00
11. Mango	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	13.33	2,250	3.25
12. Jack fruit	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	6.67	1,000	2.00
13. Baby corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	20.00	31,900	3.00
14. Eggplant	0	0.00	0	0	0.00	0	0	0.00	0	0.00	4	26.67	19,058	4.75
15 Cucumber	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	13.33	19,500	3.00

Remark: 1/ Percentages of 0 example respondents who kept products for household consumption in the upper middle basin.
2/ Percentages of 15 example respondents who kept products for sales in the upper middle basin.

TABLE 9D
AGRICULTURAL PRODUCT DISTRIBUTION IN THE LOWER MIDDLE BASIN

Items	Product Distribution						Product Extension							
	Household Consumption			Seeds			Rice Mills				Merchants			
	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)
1. Rainy season rice (1st crop)	5	29.41	1,522	5	29.41	110	5	29.41	1,836	1.00	5	14.71	3,948	2.60
2. Dry season rice (2nd crop)	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	2.94	3,000	4.00
3. Corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	5.88	13,500	4.75
4. Sugar cane	0	0.00	0	17	100.00	2,418	0	0.00	0	0.00	17	50.00	274,429	0.71
5. Cassava	0	0.00	0	0	0.00	0	0	0.00	0	0.00	7	20.59	50,286	1.04
6. Chili	6	35.29	4	6	35.29	1	0	0.00	0	0.00	6	17.65	1,975	15.67
7. Asparagus	5	29.41	2,000	0	0.00	0	0	0.00	0	0.00	5	14.71	2,182	36.00
8. Baby corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	5	14.71	11,440	2.70
9. Eggplant	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	5.88	4,500	6.00
10. Winged bean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	5.88	1,500	19.00
11. Gourd	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	2.94	8,000	20.00
12. Yambean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	2.94	18,000	3.00
13. Onion	5	29.41	1	0	0.00	0	0	0.00	0	0.00	5	14.71	3,960	17.60
14. Krachai (lesser galangal rhizome	0	0.00	0	2	11.76	400	0	0.00	0	0.00	2	5.88	1,000	7.50
15. Cabbage	1	5.88	5	0	0.00	0	0	0.00	0	0.00	1	2.94	3,000	30.00
16. String bean	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	2.94	2,000	5.00

Remarks: 1/ Percentages of 17 example respondents who kept products for household consumption in the upper basin.
2/ Percentages of 34 example respondents who kept products for sales in the upper basin.

TABLE 9E
AGRICULTURAL PRODUCT DISTRIBUTION IN THE LOWER BASIN

Items	Product Distribution						Product Extension							
	Household Consumption			Seeds			Rice Mills				Merchants			
	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[1/]	Average Quantity (kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)	Quantity	%[2/]	Average Quantity (kg.)	Price (baht/kg.)
1. Rainy season rice (1st crop)	3	100.00	1,217	3	75.00	148	3	9.38	990	2.17	3	9.38	2,000	1.67
2. Corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	9.38	6,467	7.33
3. Sugar cane	0	0.00	0	0	0.00	0	0	0.00	0	0.00	16	50.00	492,187	0.77
4. Cassava	0	0.00	0	0	0.00	0	0	0.00	0	0.00	10	31.25	262,850	0.93
5. Chili	0	0.00	0	4	100.00	1	0	0.00	0	0.00	4	12.50	1,675	12.75
6. Asparagus	0	0.00	0	0	0.00	0	0	0.00	0	0.00	8	25.00	7,550	39.25
7. Mango	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.13	1,000	3.00
8. Jack fruit	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.13	4,000	0.25
9. Baby corn	0	0.00	0	0	0.00	0	0	0.00	0	0.00	3	9.38	15,000	3.17
10. Kaffir lime	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	6.25	2,000	4.00
11. Lime	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.13	500	4.00
12. Tangerine	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.13	2,000	10.00
13. Hog plum	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.13	800	5.00
14. Gourd	0	0.00	0	0	0.00	0	0	0.00	0	0.00	1	3.13	4,000	10.00
15. Krachai (lesser galangal rhizome)	0	0.00	0	0	0.00	0	0	0.00	0	0.00	2	6.25	14,000	5.50

Remarks: 1/ Percentages of 4 example respondents who kept products for household consumption in the lower basin.
2/ Percentages of 32 example respondents who kept products for sales in the lower basin.

TABLE 10
AGRICULTURAL PROBLEM

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
Agricultural Households	30	100.00	16	80.00	34	100.00	34	97.14	114	95.00
(Response can be more than one)										
- No problem	2	6.67	0	0.00	0	0.00	2	5.88	4	3.51
- No irrigation system	13	43.33	5	31.25	14	41.18	16	47.06	48	42.11
- Diseases and pests	15	50.00	5	31.25	19	55.88	14	41.18	53	46.49
- Lack of good marketing information and facilities	2	6.67	1	6.25	3	8.82	2	5.88	8	7.02
- Shortage of investment / loan resources	10	33.33	3	18.75	5	14.71	7	20.59	25	21.93
- Lack of labour	1	3.33	0	0.00	0	0.00	0	0.00	1	0.88
- Unsecured price of product	14	46.67	8	50.00	9	26.47	8	23.53	39	34.21
- Poor soil fertility	0	0.00	0	0.00	1	2.94	1	2.94	2	1.75
- High production cost	8	26.67	3	18.75	5	14.71	5	14.71	21	18.42
- Flood	1	3.33	2	12.50	6	17.65	5	14.71	14	12.28

TABLE 11
IRRIGATION SYSTEM

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Irrigation system										
- No	14	46.67	7	35.00	11	31.43	21	60.00	53	44.17
- Yes	16	53.33	13	65.00	24	68.57	14	40.00	67	55.83
□ With headworks & irrigation system	2	12.50	0	0.00	5	20.83	3	21.43	10	14.93
□ Reservoir of small dam	12	75.00	8	61.54	4	16.67	4	28.57	28	41.79
□ Pumping groundwater	2	12.50	4	30.77	11	45.83	4	28.57	21	31.34
□ Pumping stream water	0	0.00	1	7.69	4	16.67	2	14.29	7	10.45
□ Pumping station	0	0.00	0	0.00	0	0.00	1	7.14	1	1.49
2. Payment for irrigation water fee										
- Yes	3	18.75	1	7.69	8	33.33	5	35.71	17	25.37
- No	13	81.25	12	92.31	16	66.67	9	64.29	50	74.63
3. Water fee collecting agencies										
- Provincial Electricity Authority	2	66.67	1	100.00	5	62.50	3	60.00	11	64.71
- Village headmen	1	33.33	0	0.00	1	12.50	1	20.00	3	17.65
- Water user group	0	0.00	0	0.00	2	25.00	1	20.00	3	17.65
4. Amount of irrigation water fee										
- Not over 100 baht/period	1	33.33	0	0.00	2	25.00	1	20.00	4	23.53
- 101 - 500 baht/period	1	33.33	0	0.00	1	12.50	0	0.00	2	11.76
- 501 - 700 baht/period	0	0.00	0	0.00	1	12.50	2	40.00	3	17.65
- 400 - 500 baht/period	0	0.00	1	100.00	1	12.50	0	0.00	2	11.76
- 900 baht/period	0	0.00	0	0.00	1	12.50	0	0.00	1	5.88
- 190 baht/year	1	33.33	0	0.00	0	0.00	0	0.00	1	5.88
- 10 - 40 baht/rai	0	0.00	0	0.00	2	25.00	0	0.00	2	11.76
- 80 baht/hour	0	0.00	0	0.00	0	0.00	2	40.00	2	11.76
5. Readiness for water fee payment, in case of no irrigation water fee payment:										
- Yes	9	69.23	7	58.33	11	68.75	6	66.67	33	66.00
- No	4	30.77	3	25.00	4	25.00	1	11.11	12	24.00
- Not indicated	0	0.00	2	16.67	1	6.25	2	22.22	5	10.00

TABLE 11
IRRIGATION SYSTEM

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
6. In case of readiness, willing to pay the fee of:										
- Not over 50 baht/rai	4	44.44	5	71.43	3	27.27	3	50.00	15	45.45
- 100 - 200 baht/rai	2	22.22	0	0.00	4	36.36	1	16.67	7	21.21
- 100 baht/month	1	11.11	0	0.00	0	0.00	0	0.00	1	3.03
- 500 baht/year	0	0.00	1	14.29	0	0.00	0	0.00	1	3.03
- Paying equal to water supply rate	0	0.00	1	14.29	0	0.00	0	0.00	1	3.03
- Not indicated	2	22.22	0	0.00	4	36.36	2	33.33	8	24.24
7. Irrigation system for increase of products										
- Yes	11	68.75	9	69.23	19	79.17	13	92.86	52	77.61
- No	1	6.25	0	0.00	2	8.33	0	0.00	3	4.48
- Not indicated	4	25.00	4	30.77	3	12.50	1	7.14	12	17.91
If yes, increased products:										
□ Not over 100 kg/rai	2	18.18	3	33.33	7	36.84	3	23.08	15	28.85
□ 101 - 500 kg/rai	2	18.18	2	22.22	3	15.79	2	15.38	9	17.31
□ 501 - 1000 kg/rai	2	18.18	1	11.11	3	15.79	0	0.00	6	11.54
□ More than 1,000 kg/rai	3	27.27	0	0.00	0	0.00	0	0.00	3	5.77
□ Not indicated	2	18.18	3	33.33	6	31.58	6	46.15	17	32.69
In case of "No", problems are										
□ Unidentified	1	100.00	0	0.00	2	100.00	0	0.00	3	100.00

Table 12
WATER FOR HOUSEHOLD USES

Item	Upstream Basin		Upper Middle Basin		Lower Middle Basin		Downstream Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Sources of the Water (can choose more than 1 ans.)										
- Surface water/Reservoir	1	3.33	5	25.00	3	8.57	1	2.86	10	8.33
- Rain	25	83.33	14	70.00	20	57.14	25	71.43	84	70.00
- Shallow well	5	16.67	2	10.00	13	37.14	7	20.00	27	22.50
- Deep well	1	3.33	1	5.00	9	25.71	1	2.86	12	10.00
- Water work	16	53.33	10	50.00	15	42.86	29	82.86	70	58.33
- Bottles	2	6.67	1	5.00	1	2.86	0	0.00	4	3.33
2. How to access (can choose more than 1 ans.)										
- Using basket/can	5	16.67	7	35.00	7	20.00	6	17.14	25	20.83
- Electrical/gasoline pump	7	23.33	9	45.00	19	54.29	7	20.00	42	35.00
- Pipe	15	50.00	11	55.00	12	34.29	28	80.00	66	55.00
- Storage for rain	10	33.33	17	85.00	14	40.00	25	71.43	66	55.00
- Not indicated	5	16.67	0	0.00	3	8.57	2	5.71	10	8.33
3. Payment of Operation and maintenance (O&M) fees										
- Yes	16	53.33	6	30.00	12	34.29	4	11.43	38	31.67
- No	14	46.67	14	70.00	23	65.71	31	88.57	82	68.33
Average O&M fees (Baht/month/household)	71.43		63.93		303.26		70.65		134.88	

TABLE 13
EDUCATION AND PUBLIC HEALTH

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. School in community										
- Not available	2	6.67	1	5.00	2	5.71	2	5.71	7	5.83
- Available:	28	93.33	19	95.00	33	94.29	33	94.29	113	94.17
□ Primary school	24	85.71	19	100.00	29	87.88	30	90.91	102	90.27
□ Junior high school	17	60.71	5	26.32	5	15.15	4	12.12	31	27.43
□ Senior high school	1	3.57	3	15.79	0	0.00	1	3.03	5	4.42
2. Average distance from nearest school to house (kms)	3.72		2.82		2.44		1.95		2.72	
3. Transportation mode to school (in case of households that have schooling age members)										
- by walking	6	40.00	2	9.52	7	31.82	7	29.17	22	26.83
- by bicycle	0	0.00	2	9.52	7	31.82	3	12.50	12	14.63
- by motorcycle	6	40.00	3	14.29	5	22.73	10	41.67	24	29.27
- by car	2	13.33	1	4.76	0	0.00	3	12.50	6	7.32
- by bus	9	60.00	5	23.81	3	13.64	1	4.17	18	21.95
4. Education expenditure										
- Without any expenses	0	0.00	2	9.52	1	4.55	4	16.67	7	8.54
- With some expenses	15	100.00	19	90.48	21	95.45	20	83.33	75	91.46
□ Average expenditure (Baht/month)	1193.04		548.46		2648.86		959.58		1413.11	
5. Public health/Hospital										
- Do not have an access	4	21.05	0	0.00	4	11.43	3	8.57	11	9.17
- Having an access	26	136.84	20	64.52	31	88.57	32	91.43	109	90.83
□ Distance (km)	5.22		4.64		4.67		7.92		5.71	
□ Frequency of visit (times/month)	2.17		2.00		5.14		2.23		3.05	
6. Main disease										
- Dengue haemorrhagic fever	7	23.33	5	25.00	3	8.57	3	8.57	18	15.00
- Cold	22	73.33	14	70.00	31	88.57	32	91.43	99	82.50
- Malaria	12	40.00	11	55.00	7	20.00	6	17.14	36	30.00
- Allergic	2	6.67	0	0.00	1	2.86	0	0.00	3	2.50
- Hypertension	0	0.00	0	0.00	1	2.86	0	0.00	1	0.83
- Pain of joint and bone	1	3.33	1	5.00	1	2.86	5	14.29	8	6.67
- Diarrhea	2	6.67	2	10.00	1	2.86	2	5.71	7	5.83
- Accident	1	3.33	0	0.00	1	2.86	0	0.00	2	1.67
- Conjunctivitis.	1	3.33	0	0.00	7	20.00	5	14.29	13	10.83

TABLE 14
COMMUNICATION

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Transportation between TAO/TTC										
- Distance (km)	7.63		7.19		6.10		7.58		7.09	
- Time consuming (minute)	12.69		14.9		15.63		16.91		15.17	
- Travel modes										
□ by walking	1	3.33	0	0.00	1	2.86	2	5.71	4	3.33
□ by bicycle	0	0.00	0	0.00	0	0.00	2	5.71	2	1.67
□ by motorcycle	17	56.67	16	80.00	28	80.00	26	74.29	87	72.50
□ by car	9	30.00	2	10.00	6	17.14	5	14.29	22	18.33
□ by bus	2	6.67	2	10.00	0	0.00	0	0.00	4	3.33
□ other	1	3.33	0	0.00	0	0.00	0	0.00	1	0.83
2. Telephone services										
- Available	27	90.00	20	100.00	35	100.00	33	94.29	115	95.83
- Not available	3	10.00	0	0.00	0	0.00	2	5.71	5	4.17
3. Mode of communications with TAO/TTC										
- Using telephone	2	6.67	0	0.00	1	2.86	4	11.43	7	5.83
- Using mobile phone	2	6.67	0	0.00	4	11.43	6	17.14	12	10.00
- Direct contact	25	83.33	18	90.00	27	77.14	23	65.71	93	77.50
- No communication	1	3.33	2	10.00	3	8.57	2	5.71	8	6.67
4. Road conditions to TAO/TTC										
- Very bad	1	3.33	0	0.00	3	8.57	3	8.57	7	5.83
- Bad	2	6.67	2	10.00	8	22.86	4	11.43	16	13.33
- Fair	10	33.33	4	20.00	4	11.43	6	17.14	24	20.00
- Good	10	33.33	13	65.00	17	48.57	19	54.29	59	49.17
- Very Good	7	23.33	1	5.00	3	8.57	3	8.57	14	11.67

TABLE 15
ELECTRICITY AND FUEL

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Intrerviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Electricity										
- Have an access	30	100.00	20	100.00	34	97.14	35	100.00	119	99.17
- Do not have an access	0	0.00	0	0.00	1	2.86	0	0.00	1	0.83
Cost (Baht/month)	377.67		452		485.29		393.86		425.67	
2. Sources of energyl for cooking										
- Electricity	8	26.67	4	13.33	6	17.14	10	28.57	28	23.33
- Gas	25	83.33	18	60.00	31	88.57	32	91.43	106	88.33
- Charcoal	6	20.00	3	10.00	10	28.57	4	11.43	23	19.17
- Wood	10	33.33	4	13.33	14	40.00	13	37.14	42	35.00
Cost (Baht/month)	191.18		188.20		189.23		168.56		183.1	
3. Sources of fire-wood										
- Purchase	0	0.00	0	0.00	3	21.43	3	23.08	6	14.63
- Form forest	10	100.00	4	100.00	6	42.86	9	69.23	29	70.73
- Nearby household area	0	0.00	0	0.00	5	35.71	1	7.69	6	14.63

TABLE 16
EXTENSION SERVICES

Item	Upper Basin		Upper Middile Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Availability of Services										
- Yes	25	83.33	13	65.00	19	54.29	21	60.00	78	65.00
- No	5	16.67	7	35.00	16	45.71	14	40.00	42	35.00
2. Instiuturions that provide services										
- Office of Agricultural Extension	23	92	12	60.00	16	84.21	21	100.00	72	92.31
Types of services										
□ New seeds and cultivation practic	13	56.52	6	50.00	5	31.25	8	38.10	32	44.44
□ New seeds and seedlings	5	21.74	1	8.33	3	18.75	4	19.05	13	18.06
□ Pest/diseases control	3	13.04	1	8.33	8	50.00	3	14.29	15	20.83
□ Use of fertilizers and chemicals	5	21.74	5	41.67	4	25.00	7	33.33	21	29.17
□ Get rid of insect by using herbs	0	0.00	2	16.67	1	6.25	0	0.00	3	4.17
□ Marketing	2	8.70	1	8.33	0	0.00	0	0.00	3	4.17
□ Livestock rearing	4	17.39	1	8.33	1	6.25	1	4.76	7	9.72
□ Fish culture	1	4.35	0	0.00	0	0.00	0	0.00	1	1.39
□ Farm organization	0	0.00	0	0.00	1	6.25	0	0.00	1	1.39
□ Improvement of soils	0	0.00	0	0.00	0	0.00	1	4.76	1	1.39
□ Processing of production	0	0.00	0	0.00	0	0.00	1	4.76	1	1.39
□ Supplementary occupation	1	4.35	0	0.00	0	0.00	0	0.00	1	1.39
□ Making of fertilizers/green manu	1	4.35	0	0.00	0	0.00	0	0.00	1	1.39
- Office of Land Development	0	0.00	0	0.00	1	5.26	0	0.00	1	1.28
Types of services										
□ New seeds and seedlings	0	0.00	0	0.00	1	100.00	0	0.00	1	100.00
□ Improvement of soils	0	0.00	0	0.00	1	100.00	0	0.00	1	100.00
- Sugar mill										
Types of services										
□ New seeds and cultivation practic	0	0.00	0	0.00	1	100.00	1	100.00	2	100.00
□ Pest/diseases control	0	0.00	0	0.00	0	0.00	1	100.00	1	50.00
□ Use of fertilizers and chemicals	0	0.00	0	0.00	0	0.00	1	100.00	1	50.00
- Companies from private sector	5	20.00	2	15.38	3	15.79	2	9.52	12	15.38
Types of services										
□ New seeds and cultivation practic	0	0.00	1	50.00	1	33.33	1	50.00	3	25.00
□ Pest/diseases control	0	0.00	0	0.00	0	0.00	1	50.00	1	8.33
□ Use of fertilizers and chemicals	5	100.00	0	0.00	1	33.33	0	0.00	6	50.00
□ Livestock rearing	0	0.00	1	50.00	0	0.00	0	0.00	1	8.33
□ Processing of production	0	0.00	0	0.00	1	33.33	0	0.00	1	8.33
□ Financial mangement	0	0.00	0	0.00	1	33.33	0	0.00	1	8.33

TABLE 16
EXTENSION SERVICES

Item	Upper Basin		Upper Middile Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
3. Types of assistance needed										
- New seeds and cultivation practices	7	23.33	4	13.33	7	20.00	9	25.71	27	22.50
- New seeds for homeyard	2	6.67	0	0.00	0	0.00	4	11.43	6	5.00
- Pest/diseases control	7	23.33	3	10.00	11	31.43	9	25.71	30	25.00
- Use of fertilizers and chemicals	6	20.00	4	13.33	5	14.29	5	14.29	20	16.67
- Processing of production	1	3.33	0	0.00	0	0.00	0	0.00	1	0.83
- Marketing	10	33.33	6	20.00	6	17.14	5	14.29	27	22.50
- Forestry/Agriculture	2	6.67	0	0.00	4	11.43	1	2.86	7	5.83
- Livestock rearing	3	10.00	2	6.67	1	2.86	0	0.00	6	5.00
- Fish breeding/culture	0	0.00	0	0.00	0	0.00	2	5.71	2	1.67
- Improvement of soils fertility	1	3.33	0	0.00	4	11.43	5	14.29	10	8.33
- Irrigation system	2	6.67	3	10.00	2	5.71	3	8.57	10	8.33
- Flood protection	1	3.33	0	0.00	1	2.86	0	0.00	2	1.67
- Other infrastructure	0	0.00	0	0.00	0	0.00	1	2.86	1	0.83
- Legal aspect	0	0.00	1	3.33	2	5.71	0	0.00	3	2.50
- Financial aspect	0	0.00	0	0.00	3	8.57	2	5.71	5	4.17
- Making of fertilizers/green manure	2	6.67	0	0.00	2	5.71	0	0.00	4	3.33
- Supplementary occupation	0	0.00	0	0.00	1	2.86	0	0.00	1	0.83
- No need for any assistance	2	6.67	4	13.33	1	2.86	4	11.43	11	9.17

TABLE 17
HOUSEHOLD INCOME

Items	Upper Basin			Upper Middle Basin			Lower Middle Basin			Lower Basin			Total		
	Number	%	Average Income (Baht/year)	Number	%	Average Income (Baht/year)	Number	%	Average Income (Baht/year)	Number	%	Average Income (Baht/year)	Number	%	Average Income (Baht/year)
Number of Interviewees	**30**	**100.00**	**314,407**	**20**	**100.00**	**181,251**	**35**	**100.00**	**278,685**	**35**	**100.00**	**515,598**	**120**	**100.00**	**340,476**
1. Agriculture	30	100.00	217,513	15	75.00	145,145	34	97.14	157,176	31	88.57	377,443	110	91.67	234,766
2. Domesticated animals	4	13.33	139,250	2	10.00	61,000	5	14.29	87,080	0	0.00	0	11	9.17	101,309
3. Fishery	0	0.00	-	1	5.00	1,000	0	0.00	-	0	0.00	0	1	0.83	1,000
4. Product from forest	1	3.33	15,000	1	5.00	4,200	0	0.00	-	0	0.00	0	2	1.67	9,500
5. Farm labour	3	10.00	3,533	2	10.00	60,000	8	22.86	10,200	8	22.86	17,875	21	17.50	16,386
6. Wage labor in other sectors	9	30.00	33,380	10	50.00	39,874	7	20.00	28,714	12	34.29	27,775	38	31.67	32,159
7. Business/commerce	5	16.67	58,000	2	10.00	90,000	3	8.57	188,667	7	20.00	53,657	17	14.17	83,365
8. Working in other region	2	6.67	42,000	2	10.00	66,000	4	11.43	51,000	1	2.86	14,400	9	7.50	48,267
9. Income from loan/credit	20	66.67	57,850	11	55.00	37,273	18	51.43	86,500	21	60.00	234,048	70	58.33	114,383
10. Others	3	10.00	164,467	3	15.00	26,633	2	5.71	682,500	4	11.43	140,975	12	10.00	208,117

TABLE 18
HOUSEHOLD EXPENDITURE

Items	Upper Basin			Upper Middle Basin			Lower Middle Basin			Lower Basin			Total		
	Number	%	Average Expen-diture (Baht/year)	Number	%	Average Expen-diture (Baht/year)	Number	%	Average Expen-diture (Baht/year)	Number	%	Average Expen-diture (Baht/year)	Number	%	Average Expen-diture (Baht/year)
Number of Interviewees	**30**	**100.00**	**165,370**	**20**	**100.00**	**109,625**	**35**	**100.00**	**199,664**	**35**	**100.00**	**297,032**	**120**	**100.00**	**204,483**
1. Agriculture	29	96.67	85,281	16	80.00	67,457	35	100.00	94,308	34	97.14	160,671	114	95.00	108,036
2. Livestock rearing	6	20.00	57,410	6	30.00	19,000	6	17.14	80,750	0	0.00	0	18	15.00	52,387
3. Education	22	73.33	15,945	14	70.00	6,358	23	65.71	31,578	23	65.71	25,070	82	68.33	21,252
4. Food	30	100.00	22,923	19	95.00	24,538	35	100.00	20,861	33	94.29	18,107	117	97.50	21,210
5. Medicine	19	63.33	3,256	17	85.00	1,137	19	54.29	1,061	21	60.00	1,911	76	63.33	1,882
6. Tax and others	24	80.00	291	13	65.00	150	26	74.29	429	26	74.29	551	89	74.17	387
7. Energy	25	83.33	7,334	14	70.00	8,553	28	80.00	11,725	27	77.14	6,997	94	78.33	8,727
8. Repayment of debt	20	66.67	29,443	7	35.00	19,979	24	68.57	47,123	22	62.86	148,079	73	60.83	70,101
9. Social activities	28	93.33	5,804	18	90.00	5,456	33	94.29	4,323	29	82.86	5,055	108	90.00	5,092
10. Clothes and commodities	28	93.33	3,211	18	90.00	3,261	35	100.00	2,160	31	88.57	2,513	112	93.33	2,697
11. Fees for water use	14	46.67	826	9	45.00	687	14	40.00	2,694	16	45.71	1,538	53	44.17	1,511
12. Others	0	0.00	-	0	0.00	-	0	0.00	0	2	5.71	4,480	2	1.67	4,480

TABLE 19
DATA ON BORROWING AND SAVING

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Saving										
- Do not have any saving	14	46.67	10	50.00	20	57.14	17	48.57	61	50.83
- Have some saving	15	50.00	10	50.00	15	42.86	17	48.57	57	47.50
- Not indicated	1	3.33	0	0.00	0	0.00	1	2.86	2	1.67
Average amount of saving (Baht/househol	27947.14		7023.00		7630.00		7743.53		12225.08	
2. Borrowing										
- Have some loans/credit	27	90.00	12	60.00	31	88.57	29	82.86	99	82.50
- Do not borrow any	3	10.00	8	40.00	4	11.43	6	17.14	21	17.50
In case of do not borrowing										
□ Reasons for do not borrowing										
* No need	3	100.00	6	75.00	4	100.00	4	66.67	17	80.95
* Do not know the process	0	0.00	0	0.00	0	0.00	1	16.67	1	4.76
* Do not have collateral	0	0.00	1	12.50	0	0.00	0	0.00	1	4.76
* Inability to repay	0	0.00	1	12.50	0	0.00	0	0.00	1	4.76
* No indication	0	0.00	0	0.00	0	0.00	1	16.67	1	4.76
In case of borrowing										
□ Amount of credit at present (Baht/hh)	63485.19		39766.67		69354.84		214920.69		106808.08	
□ Objectives										
(Can be more than one reason)										
* For doing agriculture	24	88.89	9	75.00	29	93.55	27	93.10	89	89.90
* For livestock rearing	4	14.81	4	33.33	5	16.13	0	0.00	13	13.13
* For income generating activities	0	0.00	2	16.67	1	3.23	0	0.00	3	3.03
* For purchase of land	2	7.41	1	8.33	0	0.00	1	3.45	4	4.04
* For education purpose	1	3.70	0	0.00	0	0.00	0	0.00	1	1.01
* For household expenditures	0	0.00	0	0.00	0	0.00	2	6.90	2	2.02
□ Collateral of loans										
* Individual/Group collateral	23	85.19	9	75.00	27	87.10	22	75.86	81	81.82
* Fixed assets/land	4	14.81	2	16.67	4	12.90	5	17.24	15	15.15
* Other assests (vehicles)	0	0.00	0	0.00	1	3.23	1	3.45	2	2.02
* No collater	0	0.00	1	8.33	0	0.00	0	0.00	1	1.01

TABLE 19
DATA ON BORROWING AND SAVING

Items	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
□ Sources of loans										
* Bank	5	18.52	0	0.00	6	19.35	8	27.59	19	19.19
* Village Funds/Village Co-op.	19	70.37	9	75.00	24	77.42	15	51.72	67	67.68
* Development Funds	1	3.70	2	16.67	0	0.00	1	3.45	4	4.04
* Funds for Education	1	3.70	0	0.00	0	0.00	0	0.00	1	1.01
* Private company/owner of producti	3	11.11	1	8.33	3	9.68	6	20.69	13	13.13
* Other private sources	2	7.41	0	0.00	0	0.00	1	3.45	3	3.03
□ Interest (Baht/year)	9.58		3.36		5.68		6.78		6.78	
□ Capability for repayment										
* Yes	27	100.00	12	100.00	31	100.00	28	96.55	98	98.99
* No	0	0.00	0	0.00	0	0.00	1	3.45	1	1.01
□ In the case of "NO"										
* Negotiation and pay interest	0	0.00	0	0.00	0	0.00	1	100.00	1	100.00

TABLE 20
SUPPLEMENTARY ACTIVITY/OCCUPATION FOR INCOME RAISING

Item	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Livestock rearing (chiken/cow/pig)	10	33.33	4	20.00	10	28.57	10	28.57	34	28.33
2. Fish culture	1	3.33	3	15.00	3	8.57	2	5.71	9	7.50
3. Supplement cropping	3	10.00	1	5.00	0	0.00	1	2.86	5	4.17
4. Trading of non-agricultural products	0	0.00	2	10.00	4	11.43	4	11.43	10	8.33
5. Household handicrafts	1	3.33	2	10.00	0	0.00	0	0.00	3	2.50
6. Services/wage labour	0	0.00	1	5.00	2	5.71	1	2.86	4	3.33
7. Percessing of farm products	0	0.00	0	0.00	1	2.86	1	2.86	2	1.67
8. Increase of farm productivity	1	3.33	1	5.00	1	2.86	0	0.00	3	2.50
9. Expansion of farm land	3	10.00	6	30.00	7	20.00	7	20.00	23	19.17
10. Making green manure for own use	0	0.00	0	0.00	1	2.86	0	0.00	1	0.83
11. Improvement of soil fertility	0	0.00	0	0.00	0	0.00	1	2.86	1	0.83
12. Soft loan for long-term investment	5	16.67	3	15.00	4	11.43	3	8.57	15	12.50
13. Searching for new agricultural market	2	6.67	0	0.00	1	2.86	0	0.00	3	2.50
14. Secure irrigation water	9	30.00	2	10.00	6	17.14	9	25.71	26	21.67
15. Development of other infrastructures	1	3.33	0	0.00	0	0.00	0	0.00	1	0.83
16. Flood protection	0	0.00	0	0.00	1	2.86	0	0.00	1	0.83
17. Guarantee of farm products by Government	1	3.33	1	5.00	0	0.00	1	2.86	3	2.50
18. No need	4	13.33	0	0.00	1	2.86	3	8.57	8	6.67

TABLE 21
COMMUNITY GROUP/ORGANIZATION

Item	Upper Basin		Upper Middle Basin		Lower Middle Basin		Lower Basin		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Number of Interviewees	**30**	**100.00**	**20**	**100.00**	**35**	**100.00**	**35**	**100.00**	**120**	**100.00**
1. Membership of any organization										
- No	13	43.33	7	35.00	16	45.71	13	37.14	49	40.83
- Yes	17	56.67	13	65.00	19	54.29	22	62.86	71	59.17
Name of organization that belong to										
- TAO/Village Committee	0	0.00	2	15.38	0	0.00	4	18.18	6	8.45
- Basic Public Health Volunteer	1	5.88	0	0.00	3	15.79	2	9.09	6	8.45
- Village Scout	1	5.88	0	0.00	0	0.00	0	0.00	1	1.41
- Civil Self-Protection Group	1	5.88	0	0.00	0	0.00	0	0.00	1	1.41
- Old Aged Group	1	5.88	0	0.00	0	0.00	0	0.00	1	1.41
- Agri. House-wife Group/Woman Volu	2	11.76	1	7.69	4	21.05	1	4.55	8	11.27
- Village Funds	11	64.71	10	76.92	16	84.21	12	54.55	49	69.01
- Kor Khor Kho Jor Group	0	0.00	2	15.38	0	0.00	0	0.00	2	2.82
- Farming Occupational Group	3	17.65	1	7.69	4	21.05	9	40.91	17	23.94
- Household Handicrafts Group	1	5.88	0	0.00	0	0.00	1	4.55	2	2.82
- Green Manuure Making Group	1	5.88	0	0.00	0	0.00	0	0.00	1	1.41
- Cremation Group	3	17.65	1	7.69	9	47.37	1	4.55	14	19.72
Position held										
- President/Chairman	3	17.65	0	0.00	2	10.53	3	13.64	8	11.27
- Vice President/Deputy Chairman	0	0.00	0	0.00	1	5.26	1	4.55	2	2.82
- Tresury	2	11.76	0	0.00	1	5.26	0	0.00	3	4.23
- Members	17	100.00	11	84.62	19	100.00	18	81.82	65	91.55
- Director	1	5.88	7	53.85	4	21.05	8	36.36	20	28.17
Function of the members										
- Support the organization (pay membe	1	5.88	2	10.00	2	10.53	0	0.00	5	7.04
- Participate in activities	17	100.00	10	50.00	19	100.00	18	81.82	64	90.14
- Participate in making decision	2	11.76	7	35.00	5	26.32	9	40.91	23	32.39
- Not indicated	0	0.00	1	5.00	0	0.00	0	0.00	1	1.41
2. Water Users' Group (WUG)										
- No	23	76.67	16	80.00	29	82.86	25	71.43	93	77.50
- Yes	7	23.33	4	20.00	6	17.14	10	28.57	27	22.50
Functions of WUG										
□ Look after operation and services	4	57.14	2	50.00	5	83.33	6	60.00	17	62.96
□ Collection of water fees	1	14.29	1	25.00	3	50.00	6	60.00	11	40.74
□ Agricultural extension services	0	0.00	1	25.00	0	0.00	1	10.00	2	7.41
□ Not indicated	2	28.57	0	0.00	0	0.00	0	0.00	2	7.41
Views of functions of the WUG										
□ Good	4	57.14	4	100.00	5	83.33	10	100.00	23	85.19
□ Bad	0	0.00	0	0.00	1	16.67	0	0.00	1	3.70
□ Not indicated	3	42.86	0	0.00	0	0.00	0	0.00	3	11.11

11.1.3 Rapid Rural Appraisal Report

February 2003

Japan International Cooperation Agency (JICA)
Royal Irrigation Department (RID)

Study on Application of Participatory Planning in Rural and Agriculture Development Project in the Lam Pa Chi River Basin

RAPID RURAL APPRAISAL REPORT

February 2003

Sanyu Consultants Inc.

RAPID RURAL APPRAISAL REPORT

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ATTACHMENTS

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RAPID RURAL APPRAISAL REPORT

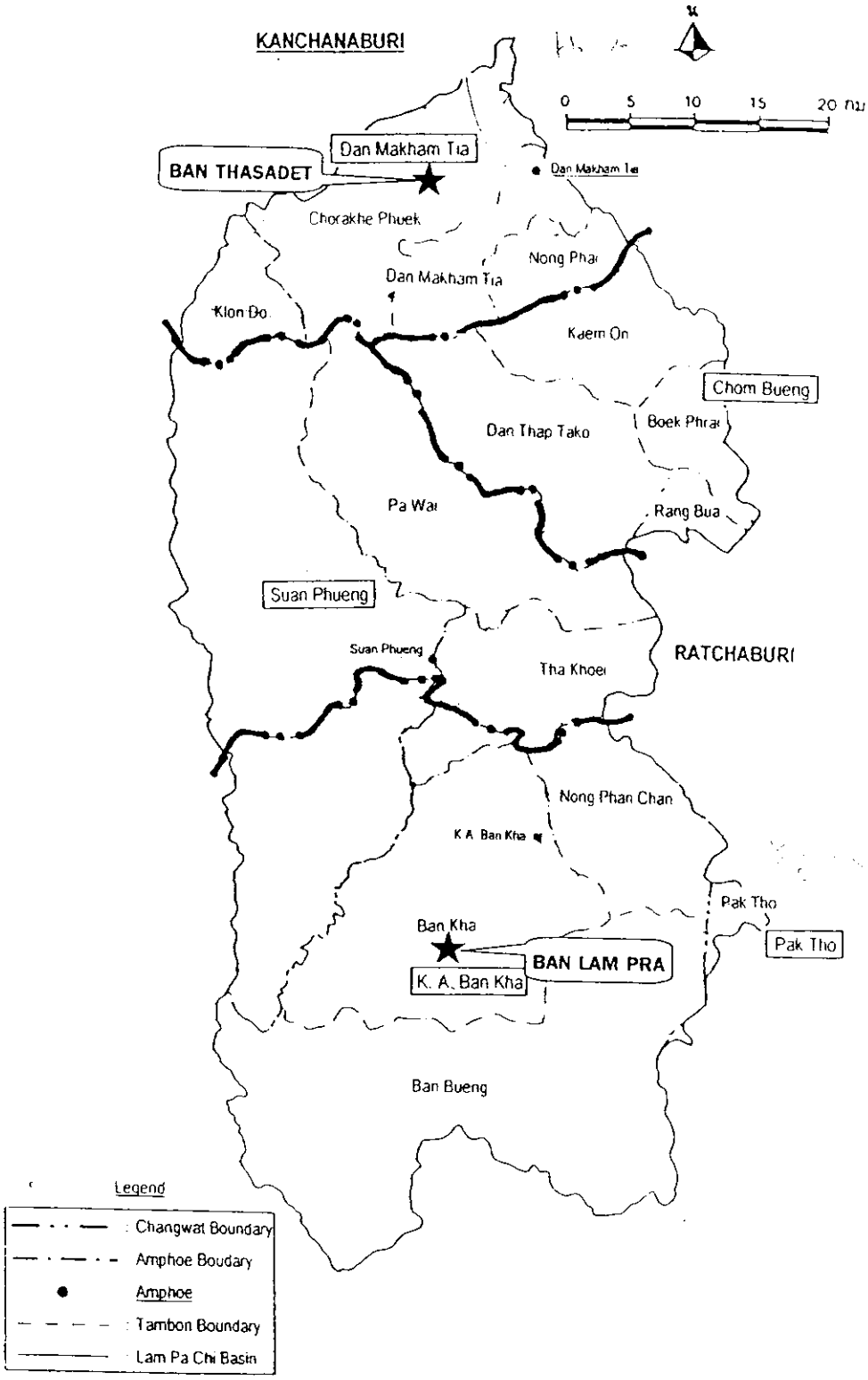
1. INTRODUCTION AND OBJECTIVE

At the initial stage of the Study on Application of Participatory Planning in Rural and Agriculture Development Project in the Lam Pa Chi River Basin (the Project), a rapid rural appraisal (RRA) was carried out by a Study Team dispatched by the Royal Irrigation Department (RID) in November 2002. Study methods included interviews with the village leaders as well as selected farmers to ensure a wide spectrum of the information to be obtained. Details of its work plan are as given in **Attachment 1**.

RRA is a method employed by RID in its efforts to gain quickly some insights on general situation/conditions of the Lam Pa Chi River Basin (the Basin or, the Project Area) and its inhabitants, in terms of the development level, living standard, constraints/problems faced, development needs and others. In view of the limited development to date, water resources of the Basin have a high potential for the development to meet anticipated demand/need of the local people, which is also expected to be very large. Outcome of this exercise is meant to serve as a basis for the next stage of planning which includes identification of project components, adjustment of project design and others related activities necessary for the most desirable Project, with adequate participation of the local people in the process.

Through close consultations between the Study Team and the local people concerned, two mooban (frequently referred to as "Ban" or "village" in this Report) in the Basin were selected for the purpose. They included Ban Thasadet and Ban Lam Phra which are located at downstream and upstream parts of the Basin, respectively (see **Figure 1-1:** the location map). Ban Thasadet is a part of Tambon (Sub-District) Chorakhe Pheuk, Amphoe (District) Dan Makham Tia and Changwat (Province) Kanchanaburi. Ban Lam Phra, on the other hand, is a part of Tambon Ban Kha, King Amphoe Ban Kha, Changwat Ratchaburi. While Ban Thasadet represents a typical type of downstream villages which is subject to flooding water from the Lam Pa Chi River (the River), Ban Lam Phra represents those upstream villages which suffer drought and others related to limitation of water. To some degree, living conditions, problems and/or needs of the people in these two villages are expected to be different but altogether, they should provide a good general impression or picture of the Basin as a whole.

Figure 1-1:Location of Ban Thasadet and Ban Lam Phra



The Study Team visited two villages during 13 and 22 November 2002, to conduct the RRA. Discussions with the farmers in those villages were then held on 9 December to feedback the information. The team has obtained and exchanged opinions on the results of the analysis the Team has made. Initial outcome of the study and findings are described in the following Sections.

2. GENERAL DESCRIPTION OF THE VILLAGES

2.1 Ban Thasadet

2.1.1 Location and Infrastructures

Ban Thasadet is located on the eastern side of the Chorakhe Pheuk Tambon Administration Office (TAO), near the confluence of the Lam Pa Chi River which flows into the Khwae Noi River from the south to north direction. The village is adjacent to the Lam Pa Chi River and Ban Thasaothong in the east, Ban Chorakhe Pheuk (Moo 2) in the west and Ban Thamafai (Moo 4) in the south. Total area of the village is about 1,500 rai (240 ha) which can be classified into the following:

- Living area 30 rai
- Wat (Temple) area 65 rai
- Public area 50 rai
- School area 10 rai
- Agricultural lands 1,300 rai
- Water resources and other areas 45 rai

There is no report of "landless farmer". Basically, the villagers hold "Sor Por Kor" as their land title deeds. In the village, there are however several pieces of communal/public areas (e.g., mountain/hilly areas) where the villagers share ownership and use them as pasture (grass) lands for feeding. Often, these lands are reserved for either conservation or reforestation.

The village is surrounded by asphalt roads. Individual households are normally connected to these roads by laterite ones. Most of the households are settled along these roads; some are however located on the banks of Khwae Noi River (see **Figure 2.1-1:** a sketch map of the village). Basic infrastructures that are available at the village include:

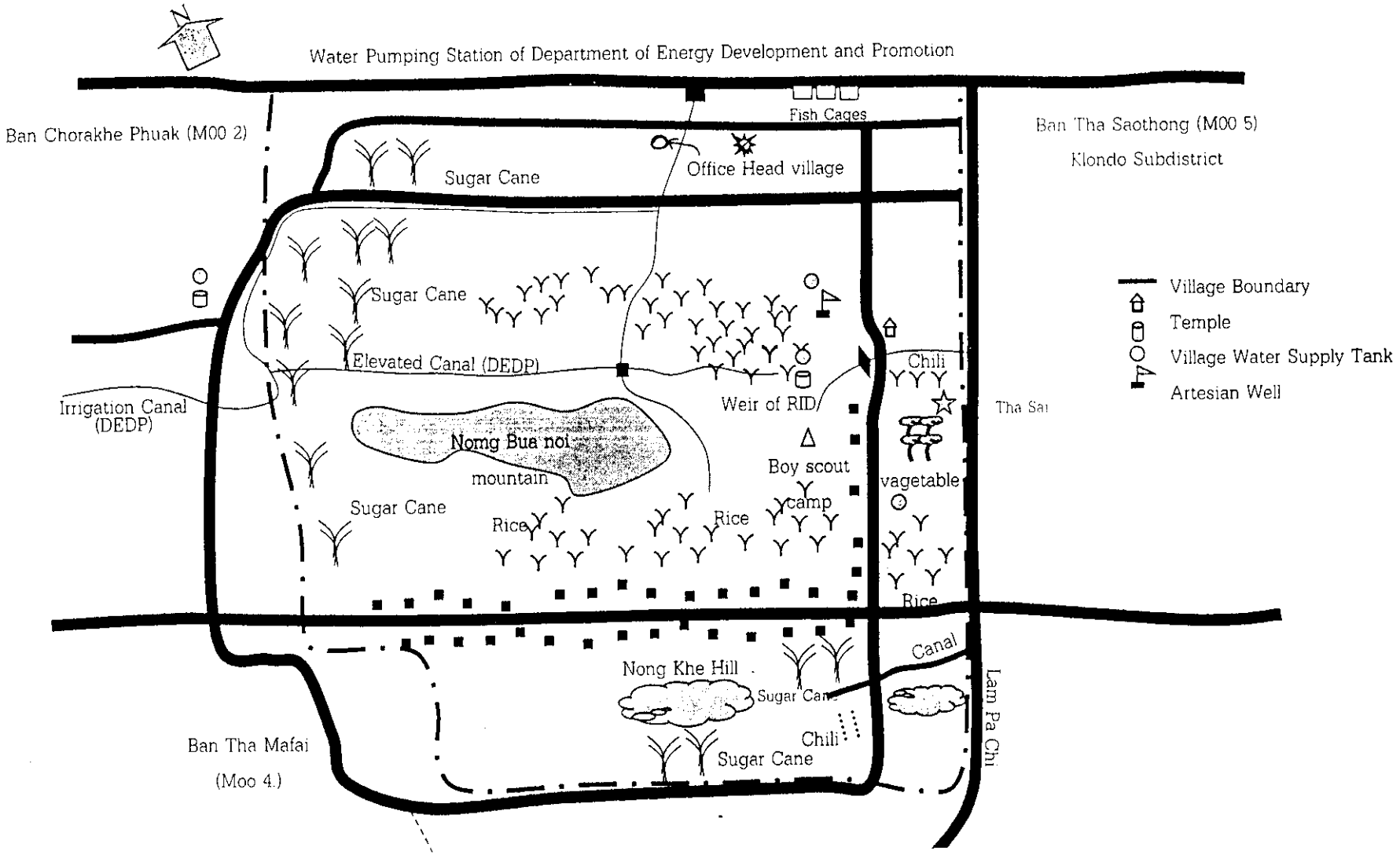


Figure 2.1-1: A sketch map of Ban Thasadet

- A school;
- A temple/Wat;
- A public well (underground, under Department of Natural Resources and Environment and the Department of Accelerated Rural Development);
- A Village Water Work;
- A weir (under RID); and
- An electrical pumping station (for agriculture, under the Department of Energy Development and Promotion).

Self-reliance is basically a way of life in this village. The village, however, shares the source of "drinking water" with Moo-2 (another village nearby).

2.1.2 Brief History of the Village

Despite being a small village, Ban Thasadet has a relatively long history that can be traced back to some 100 years ago. Important chronological events of the village that were recorded and/or conveyed by villagers of many generations are presented in **Table 2.1-1** below:

TABLE 2.1-1
HISTORICAL EVENTS AND RECORDS OF
BAN THASADET, A. DAN MAKHAM TIA, KANCHANABURI

Year	Event
Approx. 1902	King Rama V, on his way to visit the Saiyoke Waterfalls, stayed overnight at this village. Accordingly, the village was named by the King as Ban Thasadet (meaning "Boat Landing Place of the Royal Visit"). Also, there used to be many crocodiles in the area, with an interesting folk-tale on a white crocodile living in the nearby cave. The name Chorakhe Pheuk (White Crocodile) was also originated from this tale. One of the community leaders at that time was also granted with a surname of "Chalawan Kumphee (meaning the Crocodile).
1932	Establishment of the school in the village
1955	Known as a village of forest, in view of its abundance
1956	Big flood of over 3 meters deep. Flood occurred almost every year until the Mae Klong Dam was completed.
1972	The forest area was depleted due to deforestation. Lands were used more for sugarcane plantation to feed the sugar mill. Cassava became popular in the area. The Lam Pa Chi bridge was constructed. Water in the Lam Pa Chi River became scarce (in some dry seasons, water depth was only 10 cm).

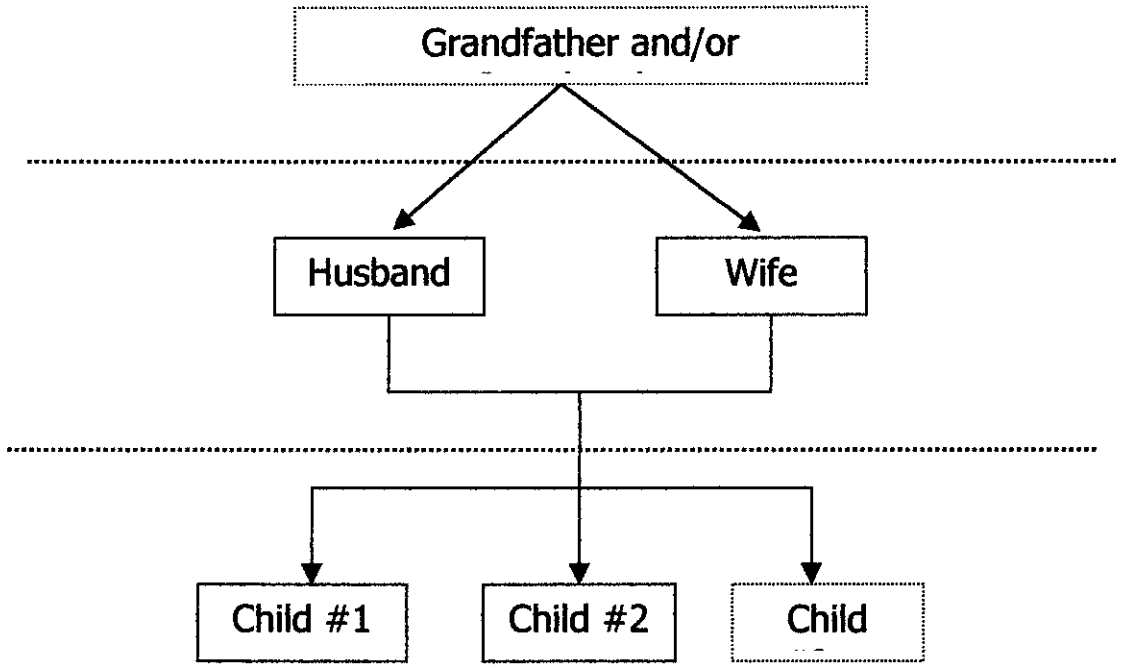
Year	Event
1975	Electricity became available in the village.
1977	No more navigation (use of boat to town) in the river.
1982	All the forest disappeared.
1989	Construction of electrical pumping station (by NEA/DEDP) at the village, operational in 1996.
1993	Water work became available in the village
1995	Problem of using toxic for fishing in the Lam Pa Chi River occurred, from Moo 9 towards downstream areas. Another big flood due to heavy rains and poor drainage. Water depth was over 50 cm.
1996-97	Severe drought, one of the worst cases in its history
1997	Asphalt roads were completed/available (by Dept. of Public Works)
1999-2000	A weir was constructed by RID.
2000	Natural crop diversification in the area/village, e.g., cassava, sugarcane, vegetables, etc.
2001	Availability of public telephone in the village

2.1.3 Present Situation

2.1.3.1 Population

Ban Thasadet has the total population of 832, comprising 429 male and 403 female. Number of the households is 130, thus giving an average size of 6 persons/household. In general, they are therefore small family with simple family-tree structure of only 2-3 generations of husband and wife, their children with/without grandfathers/mothers (see **Figure 2.1-2:** a basic type of family tree in the village). All the villagers are Thais and there is no report of any ethnic minority living in the village. Population growth of the village has been attributable mainly to two factors, i.e., natural increase of birth-rate and immigration of young lads who got married with ladies from the village. There was no other clear reason for the immigration. Pressure of population growth on lands is still not a problem.

Figure 2.1-2: A basic type of family tree at Ban Thasadet
(Consist of basically 2-3 generations)



Relationship between Ban Thasadet and its neighboring villages has been relatively smooth and good. As explained, the village shares certain resources (e.g., drinking water) with its neighbor. However, socially and quite naturally, some minor incidents sometimes occur among the villagers, particularly during festivals when people got drunk. Due partly to this, it was reported that the village stopped organizing such important festival as the Songkran (water festival marking the old Thai New Year) in recent years.

However, other type of problems emerged in the village as well in the recent years. They include, for instance, drug, poverty, minor stealing, etc. In view of their seriousness, as they became common problems to several other villages in the area, villagers get together strongly in an effort to get rid of the problems from their village.

2.1.3.2 Decision Making and Conflict Resolution

Head of the Village represents a formal and remarkable leader of the village. He was elected by the people and always entrusted by the people to take the leadership and make decisions in planning and organizing activities of the village together with the assistant Head of Village, representatives from TAO and the so-called "Village Committee" which comprises seven (7) members selected by the villagers (as their representatives; on voluntarily basis and without salary). Apart from this, the Head of the village may consult with the abbot and or school teachers in the area.

Leadership of the present Head of the Village at Ban Thasadet is strong and noticeable. This is probably due to the fact that he has inherited this position from his father who had been highly respected by the villagers for many years in the past. His words of advice are normally followed and accepted by his fellow villagers.

Although "national law" represents the only common and written rule in the village, internal conflicts/problems within and/or between the villages can usually be solved by the villagers themselves through discussions. In this connection, the Head of the Village together with the Village Committee would act as an intermediate to settle the case, following basically a compromise principle. It should be noted also that the Office of the Attorney General will normally provide the Head of the Village and the Committee Members with some relevant training for the purpose.

2.1.3.3 Occupation and Life of the People

The village may be characterized as a typical agricultural society where "farmer" is a predominant occupation of the villagers. For a number of long years in the past, agricultural lands in the village were reported to be fertile which resulted in higher land productivity, without having to use fertilizers, pesticides or herbicides. In recent years, the problems of low land productivity, high production cost and consequently low profitability have become common to most of the villagers. It was also reported that the problem of low profitability is due partly to the farmers' difficulties in dealing with the local merchants. In view of these, generally they have low income; many of them are indebted. To supplement their income, some become wage earners while the others would try to do second crops on their lands where water is available. However, when general crop prices are low, the potential for them to repay their debts is also low. Creation of new job opportunities has become an important issue for the villagers.

Other aspect to be noted is on employment structure of the villagers. At the present, most of the farmers in the village are old age people, in their 45-65 years of age. Most of the younger generation would normally try to go some where else (including to Bangkok), for a job in the plants or industries for a higher income. As a result of this phenomena, many traditional activities in the village community have disappeared. People have to work harder for higher income and consequently, have less time for leisure. Number of the villagers who can afford to participate in those activities became less and less. Society has changed and so do their ways of living.

It should be of interest to note that many villagers express their requirement for new industries in the village in order to call their children and/or relatives back to the village.

2.1.3.4 Forestry and Environmental Issues

According to senior inhabitants, forest area of the village used to be healthy in the old days. Rainfall also came quite regularly in the past many years. Since the construction of a sugar mill in the nearby area in 1972, the villagers started to destroy the forest area to get fire-wood and in particular, new lands for growing the sugarcane. Forest area decreased quickly. The remaining one on the mountains and hilly areas consists mainly of bamboo. However, to a certain degree, the villagers can still enjoy some benefits from these forest/bamboo areas, as the source of bamboo shoots, materials for bamboo produce, resources for mushroom production, though mainly for home consumption.

Bamboo forest, however, is a source of natural fire that occurs quite often, particularly during February and May. The fire often causes damage to crops and properties of the villagers. Leaders of the village seemed to understand that these phenomena must have been an outcome of destruction of the forest area and accordingly, reafforestation is required. However, no concrete action/program that actually initiated by the villagers could be observed. Formal leaders of the village, in particular, have a tendency to wait only for assistance from the Government.

Other environmental problems in the village related to soil erosion which could be observed since 1982. In the wet season, there is usually a lot of water in the Lam Pa Chi and since there is no any structure to retard the flow on the river, erosion occurs in many places, resulting in sedimentation in the river. Many river sections became shallow, causing the changes in direction of flows and accordingly, the thalwegs at various places.

On water pollution, although the problem is not severe in this village, water from the Lam Pa Chi is not suitable for drinking, due to the mal-practice of using poison to kill fish in the river, particularly in the dry season.

Soils in the village are generally infertile. To improve their land productivity, despite using organic matters, the farmers (as discussed earlier) have a tendency to apply more of fertilizers. Extension on these aspects is limited. Using of bio-technological pesticide from herbs and other local variety of trees has not been promoted in the area. It was observed that water from the Lam Pa Chi and underground water could possibly contain lots of these residues.

2.1.3.5 Agriculture

(1) General

Agriculture is still the backbone of the village economy, with the total agricultural area of 1,300 rai (86.7% of the total area of the village). The major crops grown in area include sugarcane and rice. Others include bergamot, tomato, chili and vegetables. However, it was reported that previously, farmers grew more of upland crops, such as watermelon (for seeds production), maize, cotton and some sugarcane. But, since the construction of many sugar mills in Kanchanaburi province in 1972, the farmers switched their preference to sugarcane. Rice, which is a traditional crop, is grown basically in low land areas and, only for home consumption. Only for some households that might have rice surplus for selling. Favorite rice variety is a local one, so-called Phaya-Chom.

Agricultural lands in the village are divided clearly into two different parts, i.e., paddy fields for growing rice and upland fields for growing sugarcane, bergamot and vegetables. Currently, there are several cropping patterns in the village, such as following:

	Cropping Pattern	Number of household (hh)
-	Rice + sugarcane + vegetables	about 5 hh
-	Rice + sugarcane	about 70 hh
-	Vegetables + vegetables + vegetables	about 1-2 hh
-	Vegetables +bergamot	about 20 hh
-	Jujube	about 3-5 hh
-	Rice + chili	about 10 hh

(2) Land Holding

In the old days, villagers came to settle in the village and started to exploit forest area for their living, without any "land title deed". The forest area has long been under mandatory authority of the Royal Forest Department, Ministry of Agriculture and Cooperatives. The village is under the so-called "land reform area" and at the present, all the villagers have already been granted with a certain title deed on their lands. Average size of their land holding is about 20-25 rai/hh (minimum is 5 rai and maximum one is 50 rai).

(3) Agricultural Practices

The followings are a brief description of agricultural practices, by crops and different nature of agriculture, providing much important information on number of the farmers involved, corresponding growing areas, productivity and others that help to reflect the contemporary technological level of agriculture in the area.

(a) Rice

- **Wet season rice:-**
  - Number of farmers 50-70 hh
  - Growing/planted area 300 rai

- Of which:
  - Transplanted rice 90 %
  - Broadcasted rice 10 %

- Growing period:
  - Planting in May
  - Harvesting (of non-photo sensitive rice) in November
  - Harvesting of traditional rice variety in December

- Varieties:
  - Transplanted rice Khao Dok Mali 105
  - Broadcasted rice Leung Pratew

- Traditional use of labor pool is still in practice
- Production cost 1,000-1,200 Baht/rai
- Production/output 400~800 kgs of paddy/rai
- Product price (Khao Dok Mali) 5 Baht/kg
- Distribution of products mainly for home consumption, excess quantity will then be sold for income. When new rice becomes available, remaining old rice will then be sold. Generally, local merchants would come to the village to buy the products.

- **Dry season rice:-**
  - Number of farmers 30 hh
  - Growing/planted area 150 rai
  - Growing period:
    Planting in January
    Harvesting in May
  - Varieties: Suphan 1
    Production cost 1,000 Baht/rai
    Production/output 400 kgs of paddy/rai
    Production price 5 Baht/kg

(b) Sugarcane

Two types of practices are found in the area, i.e., (i) the merchant/industrialist rent farmlands (normally a big lot) from the farmers and grow it by themselves and (ii), the farmers (normally, small farmers) grow by themselves. In the case of Ban Thasadet, the following were observed:

- Number of farmers (grow by themselves) 50-70 hh
- Growing/planted area 200 rai
- Growing period:
  (1st year)... Planting in May
  (2nd year)... Harvesting in April
- Production cost 3,500-4,000 Baht/rai
- Production/output 8~10 tons/rai
- Product price:
  Maximum 600 Baht/ton
  Minimum 450 Baht/ton
- Distribution of production... the harvested sugarcane will be sold normally to the capitalist(s) who have specific quota with certain sugar mill(s). In return, the farmers rely on production inputs, such as seeds, fertilizers and pesticides from these capitalists.

(c) Chili

A minor but an important cash crop for small farmers in the area. The following may be noted.

- Number of farmers several
- Growing/planted area limited
- Growing period:
  Planting in July and harvesting in October-November
- Production/output 200-300 kgs/rai
- Product price:
  Early season 20 Baht/kg
  Late season 12-15 Baht/kg
- Distribution of production... Excessive quantity after the reserve for seedling will be sold for income, to the merchants who normally will come into the village. However, selling price will not be known and the farmers can not receive their money until after the product was completely sold in the market.

(d) Bergamot

Another minor crop but gaining a steady popularity among the farmers. The following may be noted.

- Number of farmers: several
- Growing/planted area: limited
- Varieties:
  Traditional variety. Normally, transplanting method is used for the planting, with the density of 160 trees per rai. Some farmers prefer to buy the trees directly from their neighbors.
- Production cost: 2,000 Baht/rai
- Product:
  Leaves: 15~16 Baht/kg
  Fruit: 40~60 Baht/ 100 fruits
- Distribution of production... There are two ways of doing: (i) the farmers do all the harvesting by the farmers and the merchants come to the village to buy it and (ii), the merchants do all the harvesting, including trimming services.

(e) Jujube

Similar to the bergamot, jujube is a minor crop but gaining a steady popularity among the farmers as a cash generating income crop. The following may be noted.

- Number of farmers: 3-4 hh
- Growing/planted area: limited
- Varieties:
  A variety named "riean" can be used for both industrial processing and consumption in fresh form. Density is about 100 trees per rai.
- Production cost: 40,000 Baht/rai
- Production: 16,000~20,000 kgs/rai
- Product price (average): 3-5 Baht/kg

(f) Vegetables

As important cash crop, vegetables are grown everywhere but in small plots of lands. They include, for instance, tomato, eggplants, hairy basil (for seeds), etc. The following information may be noted.

- Number of farmers: several
- Growing/planted area: considerable
- Growing period:
  Planting is normally done in the wet season (May-July) and harvesting may be done in September-October, about 3-4 months period.

- Varieties/seeds:
  For tomato, they include Season Red and Sida.
- Production/output:
  Tomato 4,000 kgs/rai
- Product price:
  Tomato 2 Baht/kg
- Distribution of production... Normally, local merchants will come to the village to buy vegetables from the farmers/growers but, the farmers will not know their revenue until after all the vegetables were sold out in the market and the merchants inform them of the prices of their products. An exception is on the case of hairy basil that the farmers will normally bring their product directly to the "seed market" at Dan Makham Tia District.

(g) Livestock

Livestock rearing is not a significant in the area. Each household in the village normally keeps 10-20 poultry/chicken basically for home consumption. Some 6 farmers at Ban Thasadet got together in the form of a group, so-called Cattle Raising Group belongs to Chorakhe Pheuk Sub-District, to raise the cattle for industrial purpose. It was reported that there are also three other cattle traders in the village. It should be noted that cattle raising is the only economic activity in the village that the farmers seem to have an absolute power to determine the price of their own product.

(h) Fisheries

Similar to livestock rearing, fisheries are not so popular in the area. Only a small number of farmers have their ponds constructed in the fields to raise fish for consumption. It was noted however, that on the Khwae Noi River, there are about 10 farmers who have started their business on fish-cage culture. They got their loan for investment from the so-called "Village Funds" and other assistance from the Ministry of Interior. It is a kind of contract fish farming system in which the farmers will have to buy fingerings, fish food and others only from the Charoen Phokaphan (CP) Company and subsequently, sell their fish to the same. The Company, however, will guarantee the price of their product.

Seasonal calendar of the above-mentioned crops and other agricultural activities of the village can be illustrated and as shown in **Figure 2.1-3.**

(4) Water Resources for Agriculture

As briefly mentioned in 2.1.1, as a village located downstream of the Basin, Ban Thasadet has an accessibility to several kind of water resources, including:

- Pumping water from the Khwae Noi and Lam Pa Chi Rivers;

- Shallow wells that were dug by the farmers for their own uses;
- An Electrical Pumping Station constructed by DEDP
- A weir constructed by RID.

These, however, do not mean that the village and all the villagers have already adequate water for their agriculture. By and large, the majority of agricultural lands in the village are rain-fed.

(5) Funding Resources for Agriculture

As one of the most important factors for agricultural development in the area, three sources of the funding resources of the villagers could be identified, namely, the Bank of Agriculture and Agricultural Cooperatives (BAAC), Agricultural Land Reform Office (ARLO) and merchants/capitalists in town. BAAC is an official resource providing soft loan to the farmers, with an annual interest rate of 9-10 percent. ARLO has just started to perform as a lending agency, but perhaps with specific purpose related to land reform activities in the area. For the merchants/capitalists, they are normally related to plantation of sugarcane which require the resource for a long-term and large-scale investment.

(6) Key Problems and Issues on Agriculture

Agricultural development in the village faces several problems and constraints, such as, limited irrigation water, poor soil fertility, limited financial resources, marketing, etc. On the aspect of water resource, perhaps due partly to the situation already described, water shortage was not considered as the most severe problem to the villagers. Rather, the farmers referred to the problem of effective irrigation in the area, in view of the limited development of irrigation system.

FIGURE 2.1-3
SEASONAL CALENDAR (BAN THASADET)

Agricultural Activities	Cultivated Area (rai)	Planter (persons)	Jan.	Feb.	Mar.	Apl.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1. Rainy Season Rice	300	50-70					P							H
2. Dry Season Rice	150	30					H							
						H	P							
3. Sugarcane	200	10												
							P			H				
4. Chili							P		H					
5. Tomato														
6. Egg plant														
7. Kaf fir lime			H			P						H		
8. Jujube														
9. Cattle Raising														
10. Fish Culturing in Cages														

Remark: ..... Rainfall Intensity Curve

To the farmers, the following are considered constraints and/or problems of agricultural development in the village that require external assistance:

- Irrigation water specifically for agricultural uses;
- Poor soil fertility;
- Pest and insects;
- Marketing opportunity, particularly for vegetables; and
- Exploitation of the middlemen/merchants.

In relation to the above, soil condition may be one of the interesting issues that require particular attention. The villagers have expressed their concern and complaints on this matter but, there was neither a report nor a sign of their attempt to initiate activities to improve/solve the problem. Social aspect should probably need further analysis in this respect.

It was observed that the villagers prefer to do crop planning by themselves by (1) imitating progressive farmers in other nearby villages, and (2) relying the prevailing prices of the preference crops to their view. Many villagers do not want to rely on advice from extension officers in the area, with important that the advice is to hard to follow and often, the advice does not consider adequately the market aspect. One last important issue in the village was perhaps relating to the problem of weak cooperation and unity. Most villagers have their own lands, with also proper title deeds. However, their development activities are diversified and hardly coordinated. Joint actions in terms of collective production and marketing are apparently weak in the village.

2.1.3.6 Farmers' organizations

There are several farmers' organizations (FOs) in the village. Most of them were initiated/established by government agencies with the objectives basically to develop / strengthen occupational skills of the farmers and to improve quality of life of the villagers. Important FOs include the following:

Name	No. of Member	Objective(s)
BAAC Group	104	To secure agricultural credit
Water Users' Group	70	To operate and manage irrigation water
Lady Volunteer for Development	32	To develop new occupations (currently, no activities)
Cremation Group of Village	117	To help cover cremation cost and pay certain debt of member who passed away
The Village Funds	117	To provide loan for occupational development
Public Health Volunteers Group	15	To promote activities related to public welfare
Fish Cage Culture Group	10	To promote new occupation and source of household income
Cattle Raising Group	11	To promote new occupation and source of household income

The farmers/villagers enjoy certain benefits from being members of these groups, e.g., in securing soft loans from new financial resources, in increasing household securing income, etc. It was observed, however, that there is no such group as agricultural cooperative where the farmers join their hands in doing processing and marketing.

2.1.3.7 Extension Support

Currently, there are two groups of external agencies that provide technical assistance to the villagers. They are:-

(1) Private Sector Organization, such as companies that sell agricultural inputs, such as fertilizers, pesticides and insecticides; and

(2) Governmental Organization, known as Technology Transfer Center (TTC, agricultural agent for each Tambon) which is governed by Kaset Tambon.

The Private Sector Organization, as mentioned, consists of the private companies that will make periodical visits to the village to introduce their products, with a certain set of related knowledge on agriculture but on a commercial/business basis. The villagers sometimes buy fertilizers from them but, not insecticides.

For the TTC, it normally provides the farmers with knowledge/guidance on appropriate use of seeds, fertilizers and other inputs. Sometimes, it introduces/provides the farmers free of charge with new varieties of seeds, such as rice, corn and beans. It was reported, however, that growing of these new varieties are not always successful due to the lack of irrigation water. One of other problems that the villagers at Ban Thasadet have and, are in need of particular advice from the Kaset Tambon relates to the damage to vegetables that is caused by disease/insects. On the use of fertilizers, Kaset Tambon used to introduce bio-fertilizers to the farmers too but, they were considered expensive and therefore, neither popular nor effective.

In addition to above, Kaset Tambon provides the farmers with other guidance on group structure and management. However, such the opportunity is limited to only once a year for the village and accordingly, is considered not effective due to the large number of participating farmers and their diversified problems/needs. One of the farmers' need that should be specifically mentioned is the knowledge and/or skills on marketing analysis which is hardly provided by the Kaset Tambon.

To the farmers, there are at least the following three major problems related to the TTC and its work:

- Limited number of official/extension personnel (now, there is 1 person/1 Tambon);
- Provision of inappropriate guidance and/or technology; and
- Little concern over marketing issues.

These, in fact, constitute a core group of questions when discussing about the Technology Transfer Center (TTC) of the village. The problem is whether the TTC, in its transition from being previously the KT, can perform its roles and functions to satisfy all of these needs of the farmers.

2.1.3.8 Other External Organizations

Apart from the FOs to which the farmers directly belong, the villagers generally do not have many activities to do/work with others, such as, the Tambon Administration Organization (TAO), Health Care Station/Center and the TTC. It was observed that for administrative matters, the villagers would normally entrust their leaders, including the Head of the Village and the Village Committee Members, to take charge of the affairs.

2.1.3.9 Economic Activity Diagram

Major groups and/or agencies that have a strong influence on economy of the village, listed in accordance with their importance, include the following:

(1) Bank for Agriculture and Agricultural Cooperatives (BAAC). It is the major source of loans for the villagers. It was explained that 80% of the villagers are clients of BAAC;

(2) Merchants/Capitalist in town. They are informal source of loans which require a high interest rate, sometimes as high as 10% per month. They are important in many respects but, the loan system could impede seriously way of living of the farmers/villagers;

(3) Local market place (Yang-ko Market). It is the nearest market place to the village, where most of the villagers can go and buy all the necessary farm inputs and others. For certain special goods, some villagers would go to the District Market (at Dan Makham Tia District) and Muang District (Kanchanaburi). It was noted that the villagers do not prefer much mobile market of external agents that will come and visit the village occasionally;

(4) TTC. It is located nearby the village and the Kaset Tambon (KT) works at the Center about two days a week. Number of activities was reported to be very limited. A few villagers go and consult the KT from time to time and so does the KT who will make periodic visits to farmers' households in her/his area;

(5) Middlemen/Traders. Farmers in the village mostly suffer with the problem of selling their produce, particularly vegetables. They have to entrust these middlemen to take their produce to big markets further away, including Sri Muang Market in Ratchaburi province, the provincial wholesale market (Kanchanaburi) and the Market in Nakhon Pathom province. What about Si Mum Muang Market In this case, the farmers will not know the price of their product until after the middlemen have sold out their product and informed them accordingly;

(6) The Village Funds. Ninety percent of the villagers are members of this Village Funds which is run by a Committee comprising selected representatives from the village. Individual villagers may apply for the funds for developing their business by submitting the relevant proposal to the Committee for consideration;

(7) Others. They are specialized groups consisting of WUOs, Fish Culture Group, Cattle Rearing Group, etc. Many farmers rely on additional income from these groups.

Relationships between these individual groups and the villagers can be illustrated in a diagram as shown in **Figure 2.1-4.**

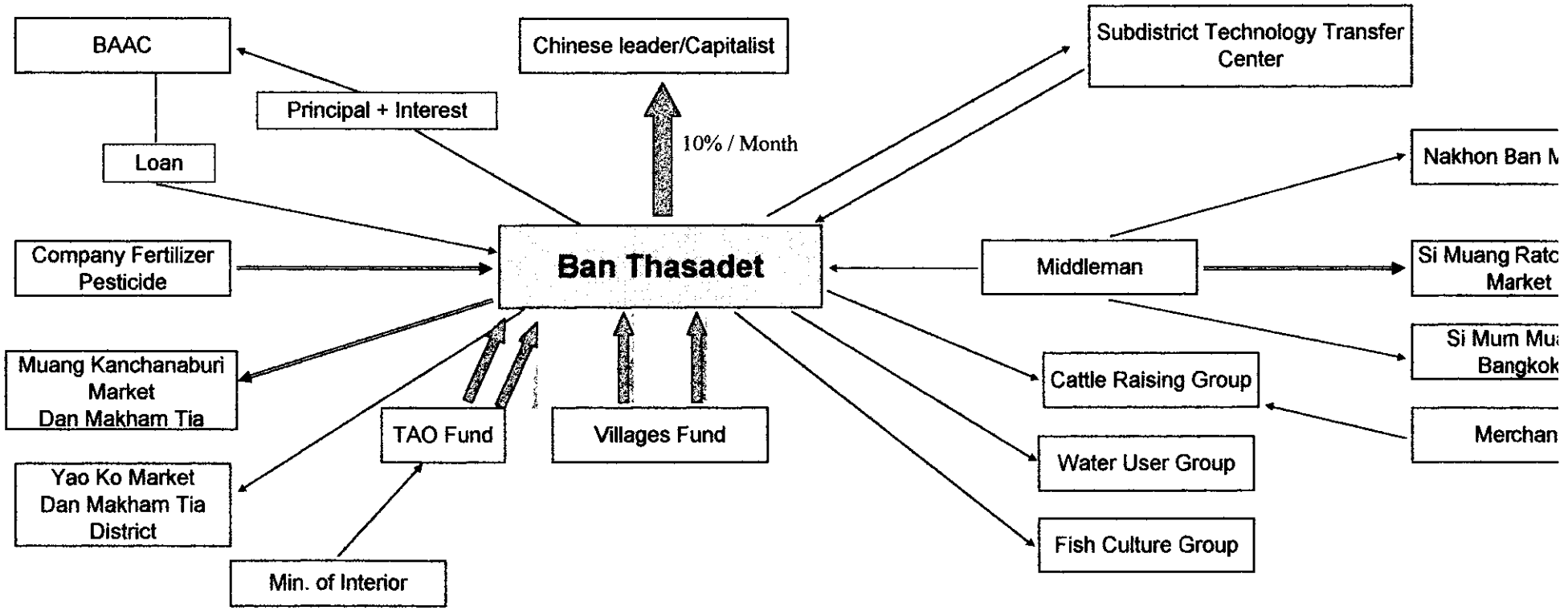
2.1.3.10 Needs of the Villagers

Needs and/or wants of the villagers can be classified into two major groups, i.e., (i) needs related to agriculture, and (ii) other needs, which can be described below.

(1) Needs related to agriculture

As explained in 5), the village is facing a number of problems, physically and institutionally. Based also on the discussion with leaders, formal and informal ones, of the village, the following needs are considered top priority to the villagers.

- Agricultural credit;
- Improvement of soil fertility;
- Water resources development; and
- Marketing development.



FIGUE 2.1-4: ECONOMIC ACTIVITY DIAGRAM OF BAN THASADET

Although the above-mentioned list is rather concise and clear, different groups of the villagers, however, tend to give different weight to the different needs. For example, informal leaders of the village considered the water resources development and marketing development as their top priority.

(2) Other needs

Other needs related to those which could help improve living standard of the people in general. They include the following:

- New industries in the village for additional income and most importantly, stopping migration problem among the youngsters;
- Education (formal and informal training);
- More intensified extension work on agriculture and new occupations; and
- Other public utilities (including telephone services).

2.1.4 Problems and Constraints in Agricultural Development

The needs just described may be relatively broad, as they cover those related to agriculture and others. For future agricultural development purpose, however, outcome of the analyses on the following aspects may be noted.

2.1.4.1 Relationship among the people within the village

Villagers normally live far from one another and do not practice things together very often. Individually, they work hard in their fields, with a rather limited labor because of the migration of youngsters. As a consequent, most of the villagers do not have much spare time for such other activities, such as meetings on the public work. Many of them neither have any access to the press or newspapers.

These altogether have become a constraint and weakness of the villagers that they cannot organize themselves in a group that is strong enough to negotiate with merchants/middlemen and on the basis of full/adequate information at hand.

2.1.4.2 The people and the government organization

Relationships between the villagers and the KT/TTC are weak. There is no limitation for the villagers/farmers to enter into these organizations but basically, the problems related more to the limited interest on the side of the villagers/farmers and other factors partly described in the previous Section, e.g., the limited number of KT/TTC officers, provision of inappropriate guidance and/or expensive technology, etc.

Compare to the merchants or private companies, the villagers/farmers found more convenient to contact and get assistance from their immediate. These however, normally come with a kind of string-attached arrangement that eventually has caused troubles to the farmers.

2.1.4.3 Geographical settings of the village

The village located in an undulating lowland area and, is subject to frequent flooding, particularly during those months of heavy rainfall in the wet season, i.e., May-June and September -October. There is no any major structure for flood control in the area.

Furthermore and as was explained, the village has a problem of poor soil fertility; the soils are generally of sandy and sandy loam types. It was observed that some farmers try to dig their own ponds to keep water but, they are hardly effective due to nature of the soils.

2.2 Ban Lam Phra

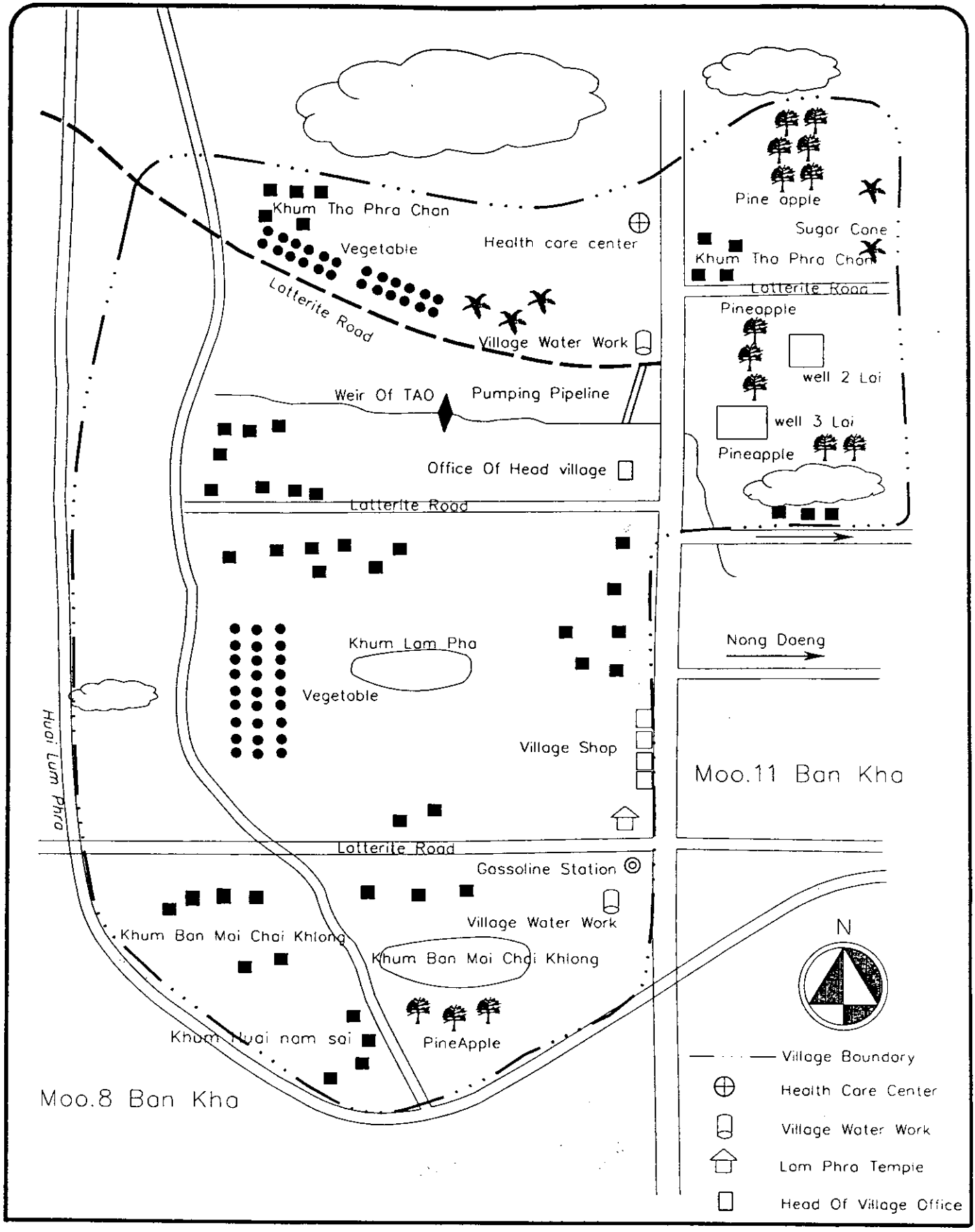
2.2.1 Location and infrastructures

Ban Lam Phra belongs to Tambon Ban Kha, King Amphoe Ban Kha, Ratchaburi province. It represents a typical type of villages located upstream of the Lam Pa Chi Basin. Geographically, the village is located on the southern side of the Ban Kha TAO. It receives water from Huai (canal) Tha Khoei which breaks into branches, one of which is a canal named Huai Lam Phra (same name as the village) in the South. Huai Lam Phra flows through the village from South to North direction. Ban Lam Phra village is closed to several other villages, particularly Moo 8 and 11 (see **Figure 2.2-1**: a sketch map of the village).

An asphalt road, connecting Pong Krathing and Shatpawai, represents the main road that runs through the village. Additionally, there are a few other laterite roads within the village that connect the main roads to individual households and other infrastructures therein. Villages settle mostly along these laterite roads and in four (4) big groups / communities as following:

- Khum (community) Lam Phra which is the oldest group of all. Villagers immigrated from Nakhon Pathom province and settled in this area some 40 years ago;
- Khum Tha Phrachan. Also, the villagers came from Nakhon Pathom and settled there some 30 years ago;
- Khum Banmai-Chaikhlong. It was established some 20 years ago by a similar group of settlers from the same origin;
- Khum Huai Namsai. Also, it was established 20 years ago but by settlers from Ratchaburi and Bang-lane.

Figure 2.2-1 A sketch map of Ban Lam Phra



Total area of the village is about 6,000 rai. Of the total, agricultural lands occupy about 60% (or, 3,500 rai). Similar to Ban Thasadet, the remaining area is of those for living, temple, public lands, school and others.

Other important infrastructures in the village include:-

- A Health Care Center;
- Two units of village water work (using raw water from Huai Khoei and a small weir); and
- Public well, three units of 2, 3 and 4 rais, respectively, excavated by TAO;

2.2.2 Brief history of the village

As mentioned, this village is relatively new compared to Ban Thasadet. It was reported that Karen, a minor ethnic group, used to be living in this area. Migrants from the provinces nearby came to settle in this village only about 40 years ago. A brief history of the village and its important events can be explained chronologically, as shown in **Table 2.2-1** below.

TABLE 2.2-1
HISTORICAL EVENTS AND RECORDS OF
BAN LAM PHRA, TAMBON BAN KHA, CHANGWAT RATCHABURI

Year	Event
1962	- Migration of new settlers into Ban Lam Phra - Purchased of lands from Karen and construction of new houses - Father of the present "Head of the Village" was among the pioneers of this village - The settlers started to encroach/occupy new lands for living
1969	Establishment of a new community named Ban Lam Phra (Moo 2, attached to Tambon Ban Beung, Amphoe Suan Phung, Changwat Ratchaburi
1971	Wat Lam Phra was constructed by the villagers
1972	- Ban Lam Phra (Moo 2) was divided into two parts: one was attached to Tambon Ban Kha and the other remained with Ban Beung - Many more new settlers came in the village, mainly from Nakhon Pathom - Lands were purchased from Karen at the price of about 70 Baht/rai - Originally, Karen peoples practice slashed and burn agriculture. They grew upland-rice and other upland crops - Lam Phra was originated from a Karen language "Rangpa", meaning overflowed water. This perhaps explains the old phenomena of flooding in this area. - Establishment of the second community named "Tha Phrachan". - There were some incidents of killing in the village due to conflicts on land occupation. However, they occurred only during the first 10 years of the establishment of this village.
1976	The villagers led by Mr. Mooan Thongkanya (a teacher) went to the Government House and made an appeal against the move by Thanom-Prapas regime, the ruling

Year	Event
	clique at that time.
1977	Villagers started to grow new crops including cassava and maize (for feeding)
1980	Tambon Ban Kha was divided into two Tambons, namely, Tambon Nong Phanchan and Tambon Ban Kha. Moo 4 of Ban Lam Phra remains with Tambon Ban Kha.
1982	- Villagers started to grow sugarcane, vegetables and pineapple - Establishment of two new communities: Khum Huai Namsai and Banmai-Chaikhlong
1983	Moo 4 Ban Lam Phra was divided into three villages, namely, Moo 3, Moo 8 and the original Moo 4 Lam Phra
1985	Big flood occurred at Ban Lam Phra
1987	Establishment of the Health Care Center in the village
1988	Villagers started to grow pineapples to supply to nearby plants
1991	Villagers started to grow vegetables including shallots, as cash crops. Products were sold to nearby market at Phocharoen village and later, to Sri Muang Market in Ratchaburi
1994	Excavation of public pond of 4 rai in size, for agricultural use
1995-96	Big flood at the village due to the typhoon (GAY)
1997	Moo 4 Ban Lam Phra was again divided into two villages, namely, Moo 11 and the original Moo 4 Ban Lam Phra
1998	- Another big flood at the village due to typhoon (LINDA) - Excavation of another public pond of 2 rai in size, for agricultural use
1999	- TTA constructed a small weir in the village, using budget from Min. of Interior - Construction of a Water Work at Khum Tha Phrachan - Another big flood caused by typhoon (EVE)
2001	Excavation of another public pond of 3 rai in size, for agricultural use, using funds obtained from Supanimit Foundation
2002	Drought occurred. Villagers employed an excavator to dig various places to keep water from rainfall. Some used sandbags to cross the canal and keep the water

2.2.3 Present Situation

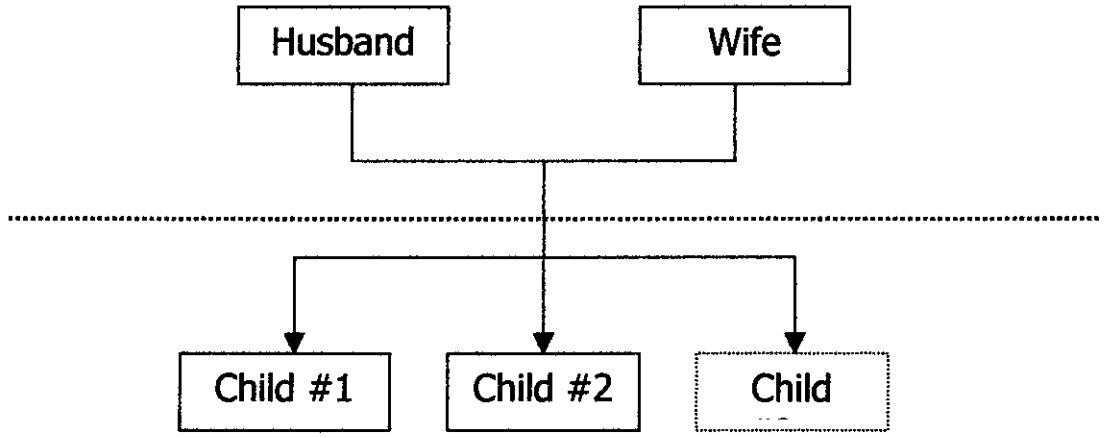
2.2.3.1 Population

Ban Lam Phra has the total population of 570 or 120 households. Number of men and women population are about the same. As may be noted, an average size of household is relatively small, i.e., with only 4.7 persons/hh. Most of the households have therefore a simple family-tree structure comprising basically of 2 generations, i.e., husband and wife and their children (see **Figure 2.2-2:** Structure of household in the Ban Lam Phra village). It was reported that about 2-3 families come to settle newly in the village every year, usually after securing/purchasing a piece of land there for their living. Most of the children have a good level of education (up to M6 or 12th Grade of high school). More than a half of the high school graduates, however, do not want to continue their higher education at a college level due partly to transportation problem. To remain in the village and help their parents to work in the farm is also another reason being quoted. These youngsters (now, in their 30-45 years

of age) apparently became a spearhead of the village in initiating development activities for their community.

Relationship between Ban Lam Phra and its neighboring villages is said to be very well, probably in view of the fact that the village has been divided into four small villages (as mentioned earlier). Most of the villagers are, therefore, from the same origin. Good transportation network enables them to communicate one another well. They respect "mutual assistance principle" and especially, in marketing of their products. In connection with this, it was explained that as most of the pioneer settlers were "Thai-Chinese" from Nakhon Pathom, the villagers have with them good skills in doing trade, growing vegetables, and a good knowledge on the corresponding agricultural market.

Figure 2.2-2 A basic structure of household at Ban Lam Phra
(A structure of basically two generations)



2.2.3.2 Decision Making and Conflict Resolution

For all the important decisions that need to be made in respect of the village affairs, Head of the Village, his deputy and the Village Committee comprising 15 members selected/elected by the villagers (2-year teams), will perform the task.

Normally, the Head of the Village/Tambon will hold a monthly meeting with their village fellows, to disseminate important information, etc. Particularly, when there is new project to be considered and decided, they will call such a meeting in which more than 75% of their villagers normally participate.

The village does not have any specific rules or regulations to be observed but, the Head of the Village and members of the Village Committee will follow the principle of mutual care and assistance with quality that eventually, make everyone happy and they do not have unnecessary conflicts among themselves.

In the case of any conflict between the villagers, however, these leaders of the village will call both the parties concerned to discuss and agree upon on a solution that will have to be initialed/signed by them. This practice has been accepted well by the villagers and normally, no incident of the same case occurs twice.

2.2.3.3 Occupation and Life of the People

In terms of its location, Ban Lam Phra may be characterized as an agricultural society in the upper part of the Basin where new resettlements could be observed. Ban Lam Phra, in particular, does not have a long history. Frequent problems related to flood and drought, reported by the villagers, however, reflect very well a general picture of low development in the area. The villagers are seen to be very active in doing their work and business and their lives were reported to be improving considerably. Many of them however became more indebted. A few were reportedly successful.

The village used to be a sensitive Malaria area but at the present, the problem seems to have been solved. The villagers have now the Health Care Center to visit when they got sick. Situation has been improved and that they do not have to go to town to see the doctor.

Regarding basic infrastructures, there is still a requirement for such public utilities as electricity, water work, roads and telephone services for some parts of the village. To improve the situation, the villagers have been trying to submit their requests/proposals through TTC but so far, not much achievement could be observed.

Traditional festivals that are organized at the temple, including the Songkran and Loi Krathong, are still very meaningful. It brings all the villagers who would bring food and others to the temple to celebrate together the occasions. Cremation ceremony is another important event in which all the villagers usually try to participate. However, some social problems, such as drugs, robbery, etc., are emerging. These problems were said to have been originated from nearby areas, but do have impacts on lives of the villagers, particularly their children.

Apart from the above, villagers have a common problem on land ownership. They generally hold the so-called Phor Bor Thor 5 or 6 (certificate of tax payment on lands) which means, ownership of the lands can not be purchased/transferred. In this connection, there is always a sense of insecurity on land properties among the villagers.

However, the village does not have such a problem that youngsters try to go elsewhere for seeking employment. This is, as a matter of fact, quite a different phenomena from other areas.

2.2.3.4 Forestry and Environmental Issues

Forest area of the village used to be abundant, with economically valuable trees like *Afzelia xylocarpa* Roxb. and *Dalbergia oliveri* Gamble. However, there is no more such area in the village, except that of the bamboo one. The Forest Regional Office of Ratchaburi province started to put some control over this forest area by fixing certain months of the years to close it down, starting from September/October to January of the following year. Outside this period, the villagers will be allowed to enter the forest to seek forest products, such as, bamboo shoot, mushroom, etc., for living.

When asked about their view regarding the present condition of deteriorated forest area, the villagers believe that climate in the area became more difficult to predict. Temperature used to be relatively lower in the area, and more rains. River courses have also been changed. Water level in the river changes rapidly, sometimes with flashfloods which are strong, but will recede within 2-3 days.

No other environmental problems were mentioned in particular, though.

2.2.3.5 Agriculture

(1) General

Similar to Ban Thasadet, agriculture is the main occupation of the villagers at Ban Lam Phra. Previously, they grew more of cassava and maize and subsequently, changed to sugarcane, pineapple and vegetables.

Major cropping patterns as practiced by the farmers in the village can be summarized as following:

Cropping Pattern	Number of household (hh)
- Pineapple	about 60 hh
- Vegetables + vegetables + vegetables (cabbage, string beans, etc.)	about 30 hh
- Vegetables + pineapple	about 15 hh
- Sugarcane + pineapple	about 10 hh
- Sugarcane	about 5 hh

(2) Distribution system/marketing

The villagers have their own marketing channels which are remarkable and, can be described hereunder.

(a) Vegetables

The production will be sent to Sri Muang Market, a wholesale market in Ratchaburi town located some 60 km. far from the village. The farmers will collect their products and then load on a pick-up truck to the Market where they will rent a lot (rental fee of 20-30 Bath a lot, and 40 Baht/pick-up truck) to sell their product. In selling the product, there are two (2) methods to be noted:

- Sell out the whole lot of the pick-up load;
- Sell by bag, e.g., cabbage at 10 kg per bag, Parsley at 5 kg per bag, etc. without having to pass through the middlemen;

Vegetables from Sri Muang Market will then be distributed to other markets, locally and regionally (i.e., to southern Thailand).

(b) Sugar-cane

The farmers follow "quota system" that will be allocated by the plants (sugar mill) in Ratchaburi, especially at Ban Pong District.

(c) Pineapple

Eighty percent of pineapple produced are sold in the form of raw pineapple, because of convenience in handling and transportation. Marketing channels are as following:

- Ripen pineapple will be sent to Sri Muang Market and partly, to pineapple factories; Raw pineapple will be sent mainly to the factories in Prachuab Kirikhan province by the "quota holder".

(d) Mango

There is a group of mango grower organized at the provincial level, aiming at mass production for export to Singapore and Malaysia. Popular varieties include Nam Dokmai, Kaew Reumrang and Nang Klangwan. This Group received support from the Department of Agricultural Extension (DOAE), in terms of materials for basic construction. It is operated in the form of "Cooperatives" by members who are mango growers in the Changwat Ratchaburi.

(e) Vegetables

In addition to the vegetables already mentioned, there used to be companies in town that try to promote the production of "clean vegetables (using only water)" in the village by means of sub-contract system and guaranteed price. However, the farmers found it difficult to achieve in terms of the quality required while the investment is expensive. The promotion ended up unsuccessfully.

Basic crop calendar of the village can be illustrated in **Figure 2.2-3.**

It may be concluded that marketing of agricultural product and the prevailing systems found at Ban Lam Phra are relatively advanced. The farmers/villagers are able to access to information of TTC Office in their own area on crop prices and other related statistics which are relevant to their lives and interest (see **Table 2.2-2**, below).

FIGURE 2.2-3
SEASONAL CALENDAR (BAN LAM PHRA)

Agricultural Activities	Cultivated Area (rai)	Planter (persons)	Jan.	Feb.	Mar.	Apl.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1. Vegetable	200	20	P			P		H	P		H	P		H
2. Sugarcane	1000	10		I		P								
3. Pipeaple	1800	70	P											
					I									
4. Fruit	300	30												
5. Tree	200	5												

Remark: ..... Rainfall Intensity Curve

TABLE 2.2-2
CROP PRICES AND RELATED STATISTICES OF TAMBON BAN KHA, 2001

Crops	Ave. price (Baht/kg)	Ave. yield (kg/rai)	Ave. production cost (Baht/rai)
Pineapple	2.50	3,000	3,300
Sugarcane	0.60	5,000	2,500
Cassava	0.78	3,500	2,800
Maize	3.50	600	2,100
Sweet corn	6.00	900	4,200
Mango	15.00	450	2,800
Jackfruit	1.50	600	830
Longan	30.00	300	2,100
Tunib	7.00	2,000	7,000
Cucumber	8.00	1,500	4,500
String bean	12.00	1,200	7,000
Asparagus	40.00	120	5,200

Source: TTC Office

(f) Livestock rearing

Livestock rearing is still not widely practiced in the village. Currently, there are about 7-10 households that raised cattle, about 100 heads altogether. Normal practices include two ways of doing. They are:

- Raising calf until they are grown up fully and sold to market; and
- Selling calf while they are still small, to the market.

For other livestock including poultry and pigs, they are normally raised in a small number, basically for home consumption. There is no any large-scale livestock industry in the village.

(4) Basic land-use

As explained, agricultural lands in this village are generally developed one. Farmers still do not have a proper ownership (land title deeds) over their lands. Forest area is also disappearing and the Agricultural Land Reform Office (ARLO) has been trying to include this area under its reform program. The villagers, however, found it difficult to understand some of the land reform concepts which do not allow people to have more than 50 rai of lands and prohibits inheritance in specific cases. Nevertheless, with the existing system, the villagers have certain security on their farmlands. The following are basic feature of land-use found in the village:

- High lands, being used for growing pineapple;
- Low lands, being used for growing sugarcane;
- Flood plain, being used for growing vegetables; and
- Hilly areas, being used for growing fruit trees.

(5) Water Resources for Agriculture

Currently, there are three (3) sources of water that the villagers use for doing their agriculture. They are:

- Natural rains;
- Water from Huai Lap Pra; and
- Ponds, 3 units as follows:-
  - Unit 1 with the size of 2 rai, excavated by TTC
  - Unit 2 with the size of 3 rai, excavated by Supanimit Foundation Fund
  - Unit 3 with the size of 4 rai, also excavated by TTA.

(6) Recent improvements to be noted

Due to the development of various infrastructures in the villages and nearby areas, the following changes could be observed:

- Transportation of agricultural product to the main market (Sri Muang Market) became more convenient to the villagers, thus facilitate bargaining power of the farmers;
- The use of fertilizers became more popular to the farmers, but the absolute quantity used did not change much. The farmers learn through their experiences about effects of residue, and therefore, they do not apply fertilizers equally in every season;
- Crop diversification became wide-spread, as an effective means to raise income;
- Irrigation method for vegetables (cash crops) has been changing, i.e., from the traditional rainfall to application of sprinkle system.

2.2.3.6 Farmers' organizations

Similarly, there are several farmers' organizations (FOs) and institutions in the village. Some of the existing and operational FOs, their respective members and objectives/functions are introduced below:

Name	No. of Member	Objective(s)
Saving Group for Agriculture	107	To promote saving among the villagers. Each farmer who receives loans from the Village Funds will be required to purchase 20 shares (200 Baht/share) and deposit his money to the Group at the rate of 50 Baht a month. Dividend will be provided to them at yearend.
The Village Funds	107	To provide loan for occupational development.
Pineapple Growers' Group	40	To strengthen marketing capacity of the members (There are 118 hh-members for whole Tambon).
BAAC Group	80	To secure loans from BAAC on the basis of mutual collateral among the members.
Cattle Raising Group	7-10	To promote new occupation and source of income.
Agricultural Cooperatives	5	To promote joint activities among members

In addition, there is a tendency that the villagers try to set up a few other new groups of those who carry out same type of activities, such as, Vegetable Growers' Group, aim basically to strengthen their marketing capacity and the corresponding bargaining power.

2.2.3.7 Extension Support

In this village, there are three groups of external agencies that provide the villagers with technical assistance. They are TTC, Mango Growers' Group (Provincial Level) and private companies. A brief description of their roles and functions are explained below.

- *TTC.* Relationship between the villagers and officials at this Office was reported to be good. In addition to information/knowledge on seed varieties and agricultural know-how, the Center provides the farmers/villagers also with knowledge on marketing. It was also pointed out that extension is the most effective means for technological transfer to the farmers. It was also reported that the farmers/villagers are most interested in the following subjects:-
  - Method to increase yield/rai;
  - Method to reduce production cost/rai; and
  - Method to market their products.
- *Private companies.* These companies are suppliers of agricultural inputs in town, and therefore, are closed to some villages/farmers who are users. The companies play a

certain role in providing the villagers/farmers with knowledge on the use of those inputs. In view of this, they represent another source of new information/knowledge to the local farmers.

- *Mango Growers' Group.* This group has been established at provincial level. All the farmer members receive information on seed varieties preferred by the market, prices and others that are related to movements of the market.

2.2.3.8 Other External Organizations

Apart from the organizations of their own (FOs), the villagers/farmers do not have many activities to do with others. Among the few, they contact the Tambon Administration Organization (TAO) on local tax and other administrative matters. TTC is becoming popular among the farmers, as a center providing technical advice.

2.2.3.9 Economic Activity Diagram

The major groups or agencies that are economically important to Ban Lam Phra village, listed in accordance with their importance, include the following:

(1) **Bank for Agriculture and Agricultural Cooperatives (BAAC).** The major source of agricultural loan/credit;

(2) **TTC.** The key center to provide technical advice and promote crop production

(3) **Sri Muang Market.** The major wholesale market for agricultural production;

(4) **Chatpawai Market.** The major market for farm inputs;

(5) **Middlemen/Pineapple Collector at Pongkating.** As a major market channel for pine apple;

(6) **Pineapple Quota Holder-Pine apple Processing Factory in Prachuab province.** As a major market channel for pine apple;

(7) **Pineapple Pealing Factory-Pineapple Canning Factory at Thamaka District.** As a major market channel for pine apple;

(8) **TAO.** As a major organization to help develop public utilities in the area; and

(9) **Development Officer.** Taking care of the Village Funds.

Relationships between these individual groups and the villagers can be illustrated in a diagram as shown in **Figure 2.2-4.**

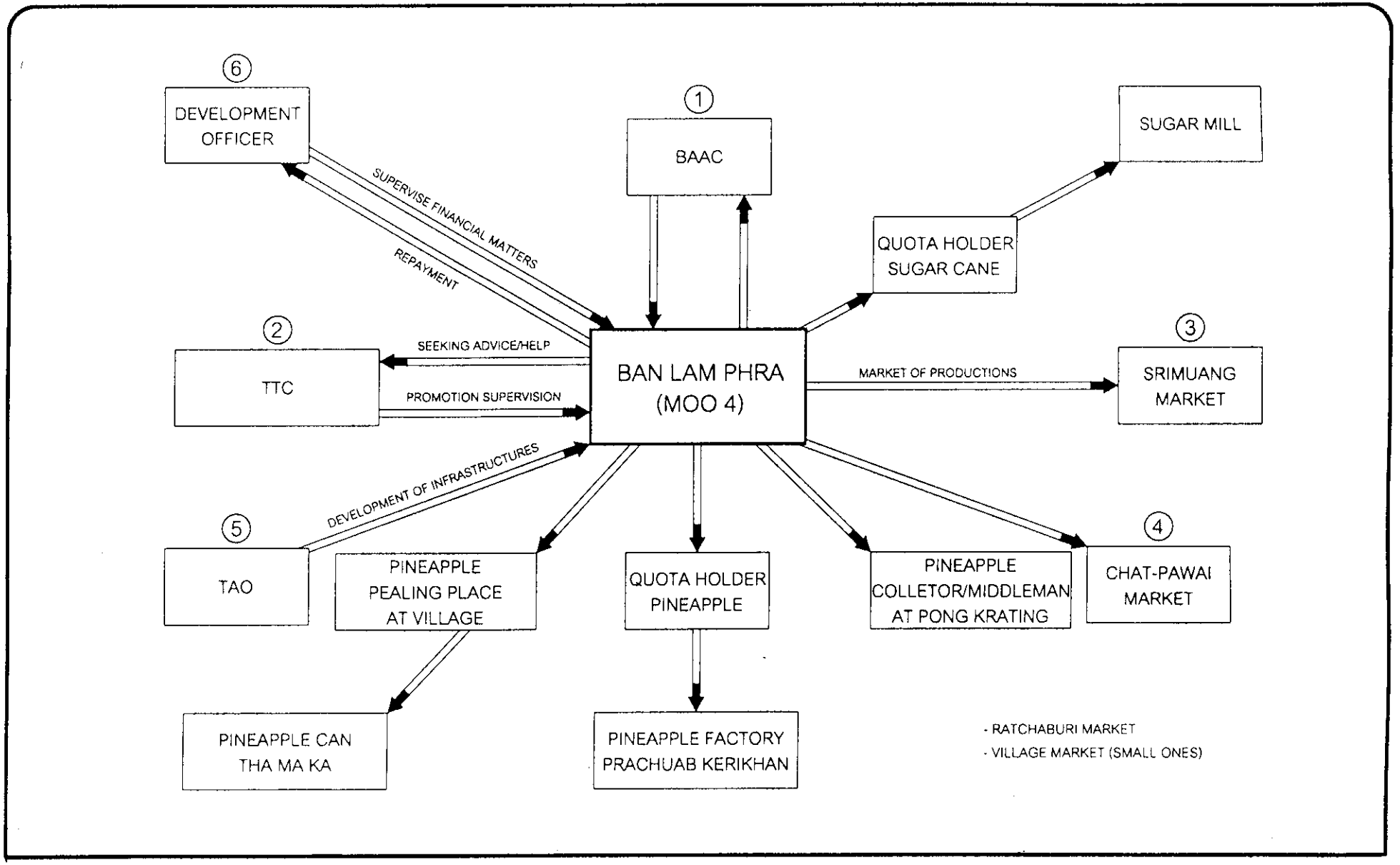


Figure 2.2-4 Economic Activity Diagram of Ban Lam Phra

2.2.4 Needs of the Villagers

Needs of the villagers at Ban Lam Phra were explained in various ways and manners as following:

(1) Needs related to agriculture

The following were quoted by the farmers as their problems and hence, their needs to have them solved/improved.

- *Proper land title deeds.* A need to have Nor Sor 3, instead of Phor Bor Thor (land tax certificate);
- *Water resources development.* A need for I) additional pond for agriculture on the 5 rai area duly donated to the village by a farmer, ii) a weir that may be constructed on the Huai Lam Phra and/or iii), excavation of the canal where there is siltation problem;
- *Crop price guarantee*;
- *Expensive agricultural inputs*;
- *Agricultural credit/loans* (which should mean to cover those for related activities).

(2) Other needs

The needs related basically to basic infrastructures and/or public utilities which still are not available/adequate in the village. They include the following:

- *Electricity;*
- *Water work/supply;*
- *Telephone services; and*
- *Village roads.*

Apart from the above, drugs were mentioned a serious problem that needs to be tackled by authorities concerned.

2.2.5 Problems and Constraints in Agricultural Development

Apart from the various problems being faced by the farmers as already mentioned, the following may be considered as constraints to agricultural development in the area:

- Inappropriate crop patterns/land use;
- Mono-cropping practice in the area;
- Poor soils and water management; and
- Lack of know-how in preparing farm budget.

It was observed that as a guiding principle, the farmers normally consider only crop prices to determine their crop planning, without adequate consideration on other factors, such as soil suitability

and water requirement which basically have problem in general. For example, soils in the area are of low fertility because of sandy nature. Furthermore, the sandy soils make it difficult to keep water in the ponds.

Mono-cropping which is practiced by many farmers can lead to another problems of high risk and uncertainty. Furthermore, the farmers need to be trained on farm budget planning and others that related to management of their farm and business, if a long-term development of agriculture in the area needs to be realized.

3. SUMMARY OF THE PROBLEMS AND CONSTRAINTS FOR AGRICULTURAL DEVELOPMENT

3.1 Problems and Constraints of the Villages under Study

The two villages provided an interesting picture of both old and new villages in the Basin both of which have a large number of problems and constraints for agricultural development. Some of them, however, may be considered as "common problems" that need to be solved at a basin-wide level, to be effective. These problems included water resources development, land-use planning (zoning), soil improvement, watershed management, etc.

Many of the problems found at **Ban Thasadet** were significant to be noted. In spite of the fact that it is a rather old village, relationship among the villagers was found relatively weak. The villagers have a big problem of marketing (for their own productions). Probably due to their specific characters, they are unable to organize themselves in a group that would be strong enough to negotiate/deal with the merchants/middlemen in their area. Relationship between the villagers and the KT/TTC was also weak. Their interest on the KT/TTC activities seem to depend on various factors, e.g., number and quality of the KT/TTC officers, appropriate guidance/technology being provided and resource inputs, particularly financial one. Geographically, Ban Thasadet is a typical type of villages located downstream of the Basin, which is subject to frequent flooding particularly in the wet season. Nevertheless, soils in the village are more of sandy and sandy loam types. Irrigation water is limited and because of this, individual villagers started to dig ponds/wells for their own use. These ponds/wells, however, are still far from effective. These actually are the major problems and constraints of agricultural development in the Ban Thasadet village.

Problems and constraints of **Ban Lam Phra**, on the other hand, were found less complicated. They, as assessed by the Study Team, included the following:

- Inappropriate land-use/crop patterns;
- A danger of mono cropping practiced by individual farms/villagers;
- Poor soils;
- Limited water resources development and management; and
- Inadequacy of knowledge on modern farming technique, including a know-how for preparing farm budget on the side of the farmers/villagers.

Ban Lam Phra is a new village (compared to Ban Thasadet), but the villagers were observed to be more of market oriented mind. They are able to organize themselves in a group to market their own products, and accordingly, in a better position to exert their influence on the market prices of their productions. Farmers in this village have a tendency to use "crop price" as a guiding principle to plan their crops. However, they have a limited knowledge on crop diversification that could be considered as another constraint at the present.

3.2 Common problems and constraints, suggestions of actions

Lam Pa Chi River Basin has a total area of over 2,500 km^2, and covers more than 160 villages in 16 Tambons of Kanchanaburi and Ratchaburi provinces. Accordingly, the problems/constraints found in the two villages discussed in the preceding Section may not reflect adequately or totally the general situation/conditions of the Basin. Nevertheless, the following findings could perhaps constitute a part of the common "problems/constraints" that should require further studies for the basin planning purpose.

(1) Limited water resources development which have resulted in a frequent flooding, drought and/or shortage of irrigation.

(2) Degradation of soil fertility. Soils within the Basin were reportedly good to poor. They are suitable for various upland and industrial crops. In addition to the general measures for improving the problem soils, there is a need for study on appropriate land-use and a planning for effective agricultural development in the Basin.

(3) Cost-effective irrigation system. Currently, the farmers have a tendency to develop irrigation water for their own uses, with limited resources, and accordingly the facilities may not be highly efficient or effective. Furthermore, as rice is not a major crop in the Basin, appropriate irrigation system(s) that are suited to the different kind of crops should be identified/developed.

(4) Quality of water. The Study disclosed an important piece of information that downstream of the Lam Pa Chi River has recently been facing with a problem of polluted water due to the release of certain poisonous chemicals by the farmers upstream for fishing purpose. Another report related

to the heavy use of pesticides and insecticides that their residues underground could cause also a problem. Further study on these aspects should perhaps be required to avoid a big problem and constraint to socio-economic and agricultural development in the Basin.

(5) Inadequacy of basic infrastructure at village level. Major infrastructures necessary for future development, such as, provincial roads that connect the different districts in the area, electricity and water work are basically available in most part of the Basin. However, important facilities required for agricultural development at the village level, such as, village/rural farm roads, market places and related information system are still limited and far from the local needs.

(6) Diversified social set up. As stated, there are both old (over a hundred years of establishment) and new (less than 50 years) villages in the Basin. These villages have different socio-economic characters, and accordingly different potential for development. Further study on this subject should facilitate an in depth understanding on this subject, (and accordingly, encourage an adequate participation of the local people in the future planning process).

(7) The farmers and external agencies. The Study has found an impressive number of development agencies duly established/existed in the villages under study. Their relationships with the farmers and effectiveness, however, vary considerably from one to another. Further study on this subject at a basin-wide level should be required for identifying effective measures / solutions on this matter.

(8) Ethnic minority groups. Although there was no report of any big issue involved, some minority groups (such as Karen) were reportedly living in the Basin. Future development initiatives should take this into consideration in the planning, to be successful.

(9) Labor force. Households in the Basin are generally small. Sizes of their land holding vary, however. Scarcity of labor could be part of the many constraints when considering the potential development of industrial crops in the future, and therefore, a study on labor market in the area should be undertaken.

(10) Asset and other resource inputs. A part of the Basin is under the land reform program executed by the Land Reform Office. The Sor Por Kor title deeds arranged/provided by this Office is just a land right issued to landless farmers. It is not transferable and can not be sold.

Future development of agriculture in the Basin could likely face with the above mentioned common problems and constraints. It is therefore necessary that the suggested studies be undertaken as resources permitted, to facilitate a deeper understanding of the matters, quantitatively and qualitatively, and in order to prepare a better project design for the maximum benefits of the local people.

4. DIRECTION OF AGRICULTURAL DEVELOPMENT

4.1 General Direction

It may be said that the two villages under study are a typical type of agrarian society that will continue to grow and attain prosperity in the future, with "agriculture" as the only backbone sector. Outcome of the rapid assessment revealed however that agriculture in the villages is still rather primitive, relying basically on water from natural rainfall and a low level of agricultural inputs. Technologies in use are generally simple and there is a big problem of marketing for both the agricultural inputs and outputs. Farmers' organizations initiated by the farmers' own initiatives hardly exist, etc. Based on the slightly different existing factor endowment that each village has at the present, a proper development plan will need to be identified and initiated for its effective agricultural development. With regard to water resource development, the following development patterns are envisaged:

- Rain-fed agriculture (present situation of most of the areas);
- Improved rain-fed agriculture, with partial supplementation of land and water resources development to the areas (initial development);
- Irrigated agriculture but with limited extension (intermediate development);
- Fully irrigated agriculture with extension and in connection with industries and other commercial purposes (highest degree of development).

4.1 Direction of Agricultural Development for the Villages

4.2.1 Land and water resources development

Problem identification discussed in the preceding Sections is a starting point of a proper project design and identification of activities for these villages. Looking at the various problems/constraints duly explained, one should realize immediately the necessity to have many projects and/or activities identified/formulated. Different villages, however, have different sets of the problems/constraints, and accordingly would need a different set of measures/projects for implementation. In other words, a problem tree analysis will need to be carried out and completed at the outset for this purpose of project identification or design.

In connection with the above, outcome of the analysis revealed that Ban Thasadet is relatively better-off than Ban Lam Phra, in terms of agricultural development. The village has good experiences in crop diversification and a high potential to develop further, with additional assistance from external agencies. However, villagers at Ban Thasadet have limited capacity in marketing.

For Ban Lam Phra, although it is a new village, the villagers had more or less the same root of origin (i.e., from Nakhon Pathom province), and are more progressive in marketing researches for their products. However, villagers at Ban Lam Phra have more problems on physical/geographical

constraints, such as the limited land and water resources development in their area, which apparently are part of the common problems being faced by both the villages. In view of this, development projects related to land and water resources should be included in one of top priorities.

4.2.2 Development directions specific to areas

As generally known, the problem tree analysis facilitates our understanding on priority of the problems and the corresponding needs specific to different areas. A selected preference will form a core part of a development direction. For Ban Thasadet, for example, on the basis of the existing problems/constraints and development needs expressed by the various leaders of the village, the following development directions may be considered:

- Promotion of agriculture-based new occupations (such as SMEs) that could help to generate more employment and encourage the young generation to return to their village.
- Identification and creation of new and reliable marketing channels for the local farmers, such as, cooperatives, wholesale market, etc.
- Strengthening the roles and functions of TAO/TTC, e.g., making these offices as a center that can provide information on prices of crops and other agricultural inputs, agricultural movements and others that related to local merchants and market. The information should be updated weekly.
- Development of various irrigation systems for different type of areas that would help stimulate effectively the required agricultural development therein, e.g., groundwater well, ponds and pipe irrigation.

Ban Lam Phra, on the contrary, does not have that many small problems but, its major ones like flood and shortage of irrigation water represent the common problems. There is therefore a great need for development of lands and water resources in the area. The second and major requirement is the defining of land-use or zoning for its agriculture.

For this particular Lam Pa Chi River Basin where a large portion of lands has just been opened for new settlers, a comprehensive study on soil characters and their suitability is more or less lacking. As stated earlier, a study to determine appropriate land-use/zoning should be useful and relevant not only to the needs of the villages under study but also the many other villages in the Basin as well.

4.3 Feedback from the villagers

To ensure that the findings were sound and, reflected most (if not all) of the local conditions and needs, the study team made another visit to the two villages on 19 December 2002, as following:

- meeting with a group of the farmers from Ban Lam Phra, at the Office of the Head of the Village, from 10:00 hrs.; and
- meeting with a group of the farmers from Ban chorakhe Pheuk, at Chorakhe Pheuk TAO, from 15:00 hrs.; and

Following a comprehensive elaboration of the study work and outcome by the study team, the farmers at each village expressed their general agreement with both the findings and the development directions as drawn up and presented by the team. Important feedback from them included verification of the various figures on production inputs and outputs, in-dept information on specific problems of land title deeds and the farmers' access to credits, etc. Many of these additional inputs have duly been incorporated in this final version of the RRA Report. However, the following comments and/or suggestions from the farmers per villages could be noted.

4.3.1 Additional comments from Ban Lam Phra

a) *On the development needs* Two other specific needs included:-

- A bridge across Huai Lam Phra to Khum Banyai-chaikhlong; and
- An irrigation system connecting the reservoir at Huai Namphu-ron located at Ban Beung. The reservoir has been completed but, there is no distribution system.

b) *On the development directions* Additional comments were obtained on the following three specific subjects:-

- New zoning for appropriate land-use. It's a good idea but, should take fully into consideration availability of water resources, labor and prices of the crops being promoted;
- Farm budget. It sounds complicated and time consumping exercise. What is the use?
- Farmers' participation in pumping construction project. There could be two possibilities, namely, (i) cost-sharing by farmers: 20-30% of the construction cost and (ii), the Government covers all the construction cost whereas the farmers pay for water fees.

4.3.2 Additional comments from Ban Thasadet

a) *On the development needs* Three other specific needs were mentioned:-

- Accessibility to new credit/financial resources. Currently, there are a few sources, including the Village Funds, Funds for Promoting New Occupations from the Ministry of Interior (through TAO, Baht100.000/village) and supplementary funds from TAO (Baht20,000/village);
- New industries/factories in the community. However, the villagers understood that no industries are allowed to be constructed in the village as it is under the Land Reform Area (prohibited by Act);
- Other infrastructures. The villagers expressed a great need for telephone services in the village, asphalt roads, quality waterworks and lights along the public roads.

b) *On the development directions* *The villagers discussed* specifically about the cost-sharing for water resources development projects. It was pointed out that depending on the total cost, such sharing could be up to 20-30%. If the project is really beneficial, they (the farmers) should be ready to accept the cost-sharing concept.

To the farmers, effectiveness in solving the problems under discussion (i.e., who will implement the projects and when?) was more of a concern than a systematic approach in solving the problems.

ATTACHMENT 1

Working Schedule of the RRA Team

A) AT BAN THASADET, TAMBON CHORAKHE-PHEUK (A. DAN MAKHAM TIA, C. KANCHANABURI)

13 November 2002

9:00-15:00 hrs Discussion with formal leaders of the village at TAO Office

14 November 2002

Whole day - Discussion with informal leaders of the village at the TAO Office
- Quick observation of conditions at the Village

15 November 2002

Whole day Interview with four farmers' household (economically poor group)

16 November 2002

Whole day - Interview with two farmers' household (average income group)
- Interview with another two farmers' household (better-off group)

17 November 2002

Sunday (holiday)

18 November 2002

Whole day - Interview with progressive farmers and occupational leaders

B) AT BAN LAM PHRA, TAMBON BAN KHA (A. BAN KHA, C. RATCHABURI)

19 November 2002

9:00-15:00 hrs Discussion with formal leaders of the village at Ban Kha TAO Office

20 November 2002

Whole day - Discussion with informal leaders of the village at the TAO Office
- Quick observation of conditions at the Village

21 November 2002

Whole day Interview with four farmers' household (economically poor group)

22 November 2002

Whole day - Interview with two farmers' household (average income group)
- Interview with another two farmers' household (better-off group)

23 November 2002

Whole day - Interview with progressive farmers and occupational leaders