Self-Recruiting Species in Aquaculture: Their Role in Rural Livelihoods

Participatory Rural Appraisal in Ban Lumphu

Case Study 2

(PRA Report from 2001)

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Ban Lumphu

Lumphu Village

Introduction

Background

The status of aquatic systems in this province particularly in this village has not been established. For an outsider, knowing the general background of the village is very important. The information to be gathered can be used to develop new programs or development activities in the area. It is also very crucial that the information is generated from and with the primary stakeholders – the farmers/villagers.

Objectives

The main objectives of the study are to have a clear picture of the livelihood activities in the village as a whole and to establish rapport with the villagers. To attain these main objectives the following are the specific objectives:

1. To assess the local conditions in the village;
2. To gather baseline information on the status of aquatic animals in the area;
3. To work with the villagers and facilitate the identification of issues in the community.

Participatory Rural Appraisal Team

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Schedule of Activities

The workshop was held for four days, with the first day devoted to getting general information about the commune and the village. During this time, a visit to the village was done to set an appointment with the villagers. Mapping exercises were also conducted during the first day.

The second day was spent in generating more information about the village and its different activities. The last day of the workshop was used for the presentation and validation of information. (see Table 1)

Table 1 Schedule of Activities in Lumphu Village

Date	Activity
15 May 2001	Collection of secondary data Introduction of the project to the village head Village profile Identification of PRA participants
16 May 2001	PRA exercises (Between social group and gender)
17 May 2001	Processing of PRA outputs
18 May 2001	Presentation of PRA outputs

Srisaket Province

Description

Location and Boundary

Situated in the southern part of northeast Thailand and an approximate distance of 571 km from Bangkok. The total area is approximately 8,839.976 sq. km (883,997.6 hectares). The province has the following boundaries:

Northern boundary : Roi-et province
Eastern boundary : Ubon Ratchathani province
Southern boundary: Cambodia
Western boundary: Surin province

14-15^0 latitude; 104 – 105^0 east longitude

Administration and Population

The whole province is composed of 20 districts. The district has 206 sub districts and with a total number of 2,411 villages. The population is about 1,445,356.

Main Occupation:

Rice cultivation, crop, vegetables, corn, onion, garlic, and livestock raising. In some areas, villagers grow rubber tree, rambutan, durian in Kantrararak, Kunharn and Pushing district.

Topography

The area is basically a plateau which is alternated with rice fields. Some areas have mountains and forest in the southern part of the province. The area is sloping down to the northern and west side. The area has streams, swamp and marshes.

Average rainfall per year: 1, 172.5 MM

Water resources:

Chi river, moon river, Huay Samran, Huay Khayoong, Huay Nya, Huay Tabtan, swamp and marsh land.

Communication and transportation:

Travel by car – 600 km to Bangkok
Travel by train – 515 km to Bangkok

Ban Lumphu

District Commune Description

Namklieng District

Location and Boundary

The district is located at the southeast of Srisaket province with an approximate distance of 30 km. from the province proper. The total land area of the district is approximately 257.82 sq. km (25,782 hectares).

The district has the following boundaries:

Northern – Muang Srisaket and Kantrarom
Southern – Srirattana district
East - Nonkoon district
West - Pha Yu district

Topography

Generally plain area but sloping on the southern part thereby creating water bodies like swamps (Huay Kha Yoong, Huay thar, Huay rawee etc.)

Administration and Population

Sub districts : 6
Number of villages: 66 villages
Number of household: 7,825 HH
Population : 41,589

Occupation

Main occupation is cultivating rice and other crops (cassava, corn, kenafs)

Water Resources

Huay Kha Yoong, Huay Tarmaid, Huay Thar, Huay Rawee

Village Description

Ban Lumphu
Srisaket province
Namklieng sub district

Main Occupation

Rice cultivation, crop and livestock raising

Migration:

Most of the young people migrate to Bangkok to work in factories, while middle age villagers go to Bangkok to work in construction sites. However, most of them return to their village during rice cultivation.

Topography : Plain with water bodies

Resources:

Forest: The area used to have a resource-rich forest but due to massive cutting of trees, these resources were diminished. Boundaries are also set by the government to manage and control people's access to resources.

Water Resources:

Huay Kha yong on the eastern side of the village with an approximate distance of 1.5 km
Rong Khating (Channel) 1.5 km away on the east side
OO yor (swamp) 0.5 km on the west side of the village
Distance form the district : 6 km

Selection Process for the Village

The village was selected after visiting the district office and getting background information about the villages in the district and commune. During the visit a brief interview was conducted with the district personnel and several questions were asked specifically regarding the agricultural as well as socio-economic background. Information about the status of fisheries and aquaculture were also inquired during the visit. The village was selected according to its topography and its relative distance from the perennial water (Moon river). The village is situated between two rivers. Aside from the topography, the available water resource and economic status of the village were also considered.

Specific Methods Used

Village (Resource) Map – Mapping of the resources was conducted to generate information about the different resources present in the village and how these resources impact the villagers.

Timeline – This activity was conducted to trace the development trends in the village. This activity also showed the different "shocks" the village encountered from past to present.

Well-being Ranking. Mapping of the socio-economic context of the village was done. This activity determined the different social groupings in the village and how villagers naturally group themselves.

Seasonal calendar. This illustrates the different situations in the village during the year. Information about the weather, traditions and festivals, economic activities, when people migrate and the health conditions were included in the calendar.

Activity profile. This activity was meant to identify the common activities in the village and to differentiate the priorities of each group.

Aquatic animals identification/ranking. This was accomplished to find out the available and unavailable aquatic species in the area. This activity also determined how important each aquatic animal is to the villagers

Aquatic animals' seasonality. This activity showed the status of each aquatic animal during the year. The location where aquatic animals can be caught and the gear that can be used were also included in the seasonality diagram.

Aquatic animals' trend. This activity showed the perception of the different groups on the status and condition of the different aquatic animals in the village. The causes of the increase as well as the decrease of a particular aquatic animal were also understood.

Transect. Established "ground truths" to cross check the map.

Process

The workshop was divided into three parts. The first part was done with the key informants during the first day. The mapping (village map) exercise was done with a group of key informants in the village headed by the village headman. The list of all households in the village was obtained from the village headman. This was used in the well being ranking activity. Names were written down in cards and farmers or informants grouped the different names according to what they think is the well being of the farmer/villager.

Using the results of the well being ranking, participants for next day's activity were identified. Representatives from the poor and rich groups were listed down. A total of four groups were identified: two groups representing the poor men and women, and another two groups of rich men and women.

During the second day the four groups performed the same task of describing and discussing the situations of the village in the year. Four seasonal calendars were done showing the complete picture of the village in the whole year: agricultural activities, migration, health status, weather and traditions. The major activities in the village and its importance were also discussed. Beans were used to rank the different activities according to its importance. Beans were also used in identifying and ranking the important aquatic animals in the village. Each group has different sets of aquatic animals identified and ranked using their own criteria.

Workshop/PRA outputs were collated and analysed during the fourth day. Preparation of materials for validation was also done during this day. The final part of the workshop which is one of the most important activities was the validation which was done during the last day.

Setting the Context

Mapping the Current Resource Context

During the mapping exercise conducted with the village headman and some key informants, different resources in the village were identified (see Figure 1). During the discussion farmers and outsiders were able to understand the current situation of the

different resources available and no longer available in the village. The following are the major resources in the village:

Land resource. Large portion of the land in the village is being used as area for rice cultivation. The whole village is surrounded by rice paddies but mostly concentrated on the southern part of the village. Aside from rice paddyies, another land resource in the village is the forest. This area is a public place where villagers can pasture their livestock and even plant some vegetables. This is also the place where they collect some food.

Water resource. The village has access to the big rivers in the province. There is one river (*Huay Kayong*) passing to the boundary on the western part of the village. This river is one of the sources of water for agricultural activities in the village and nearby villages. On the southern part of the village during rainy season the area is flooded and there is a canal connecting from the river to the flood plain area of the village. Public swamp is also another resource which the villagers has full access.

Physical/social resource. The road is considered as one of the physical resources in the village. During the mapping exercise villagers pointed out the importance of the road in their livelihood. Infrastructure like schools, temples, shop, rice mill and water tanks are available in the village. Sources for the villager's basic needs are not limited.

Mapping the Development of the Village

Ban Lumphu started with 7 households who migrated from other villages. There was no information about the situation of the resources in the village as reflected in the diagram (see Figure 2) but during the discussion all resources were abundant at the beginning. Development started in the village in 1963 when the school was established. The village was officially established when they had their first headman in 1967. The road was constructed only in the early 80's and was rebuilt again in 1998. At present the village is considered a semi-developed village.

Aside from infrastructure that brought development in the village, climate changes also brought corresponding changes in the village. Major drought was experienced by the village in 1971. In 1978 and 2000, major floods occurred in the village which directly affected the agricultural production in the village.

There were some events which had negative impact on the village. In the year 1973 when kenaf planting started, wild animals started to decrease. This was due to the clearing of certain areas in the forest for planting. Extensive use of agrochemicals which started way back 1981 adversely affected the aquatic environment and the villagers believe that the occurrence of EUS in 1992 was due to the pesticide use in rice-fields.

Figure 1 Village/resource map of Lumphu village

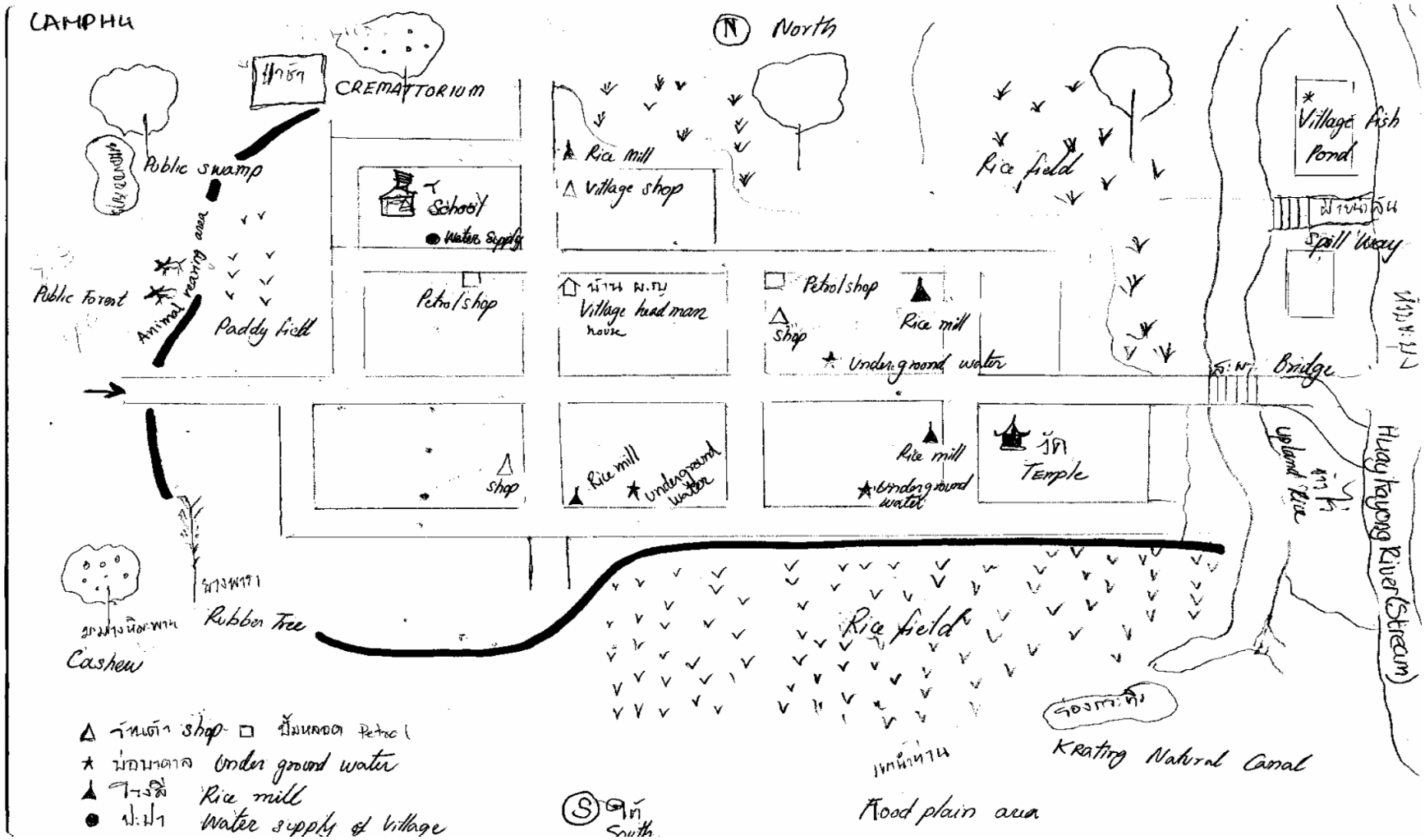
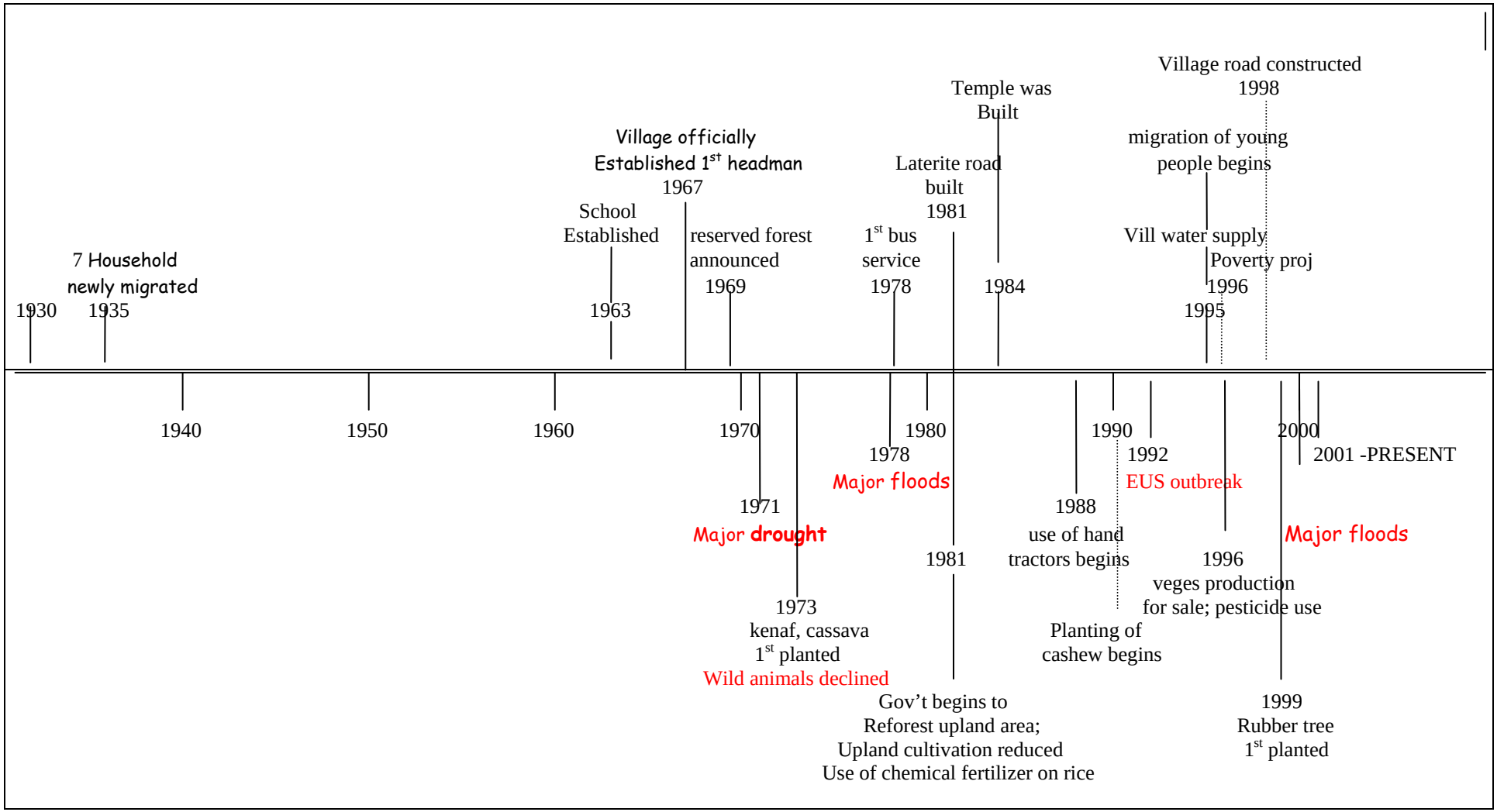


Figure 2 Mapping the development of the village (Timeline)



Mapping the Social Context

Based on the secondary information gathered from the district office, this village is relatively poor. The village is situated near the country's boundary towards Laos. However, there are some groups in the village which can be considered better off and there are also groups of villagers which are resource-poor. During the PRA, villagers or informants identified four social groups in the village. Each group was described by the villagers (see Table 2).

Socio-economic Characteristics

Source of income. Most of the low-income group has no regular source of income. Some from this group get income from wages as labourer in the farm or some migrate to other places or cities for work. From the middle and high-income group, they are mostly gaining income from their farm. Few member of this group have other source of income. Shops or trading and other non-farm sources.

Household size. There is no real trend on the size of household in each group. From the well being ranking household under the lower group are newly separated families and old people living alone. Better off families has few number of members are working.

Education. Majority from the lower group had no good education and they cannot send their children to higher education. Unlike with the better-off group that they can send their children even in university.

Land ownership. This is the major criteria used by the villagers in determining the well being of household/farmer. Resource-poor or the lower in rank generally have small land and some are landless. This is very common if the household is old individual because they have given it to their children. Better-off group has bigger area of land, generally 30 – 40 rai. Middle rank has 10 – 20 rai.

Transport. Low-ranked household, generally do not have any kind of transport. In some cases some farmer have simple type of transport like bicycle. Middle and high-ranked household have good transport. Some household has car/pick up truck. Households belonging to better-off also have two wheel tractor which serve for multi-purpose.

Livestock. Poor households do not own big livestock like cows and buffalo. During planting season or cultivation in the field they normally borrowed or rent buffalo or even tractor to plough their land. For better-off families, on the average they have a number of livestock that they use in their farm and they even sell it as additional income.

House. Condition of the house is also use to determine the well-being rank of families in this village. Families belonging to resource-poor have small house and made from light materials like *cogon* grasses as their roofings. They also used leaves as wallings for their houses. A big difference with better-off families can be observed regarding house construction. In this village better-off families typically have bigger house made from either wood or concrete.

Assets. Household and farm equipment were also used to determine household well-being. Some families in the low-ranked group do not have any appliances in their house apart from their cooking utensils. Other families have small transistor radio. For better-off families, some have expensive appliances and some have ordinary like television, radio, and refrigerator. Equipment in farming also dictates the well-being. Better-off families can afford to buy tractor, rice milling and other farming related equipment. Generally better-off families have complete household and farm equipment.

Access to credit/other services. Access to credit is one limitation for poor households. They can only get loans from informal sources and from their relatives. Better-off families have access to formal credit because they have the capacity to re pay their loans.

Table 2 Well-being ranking of Lumphu village

Rank	Trial 1 Khun Pluang Pankampa	Trial 2 Group of women
I	Land less House is small, old, used grass as roofing No livestock Usually old people No relatives to take care of them No appliances in the house Getting support to some relatives working in the city Gettings loans from relatives Children cannot go to higher education (secondary school)	Old people living alone No land Young families Occasional laborers One mad person
II	Landless or owning land not more than 10 rai House made of wood No livestock (or only enough for subsistence) Some have bicycle Some have loans Some have appliances like TV Rice production for subsistence only Sell their labor Have access to credit Children cannot go to school	Land with small holdings (2 – 5 rai) Young families
III	10 – 20rai (majority have 12 – 14 rai) Some have livestock (up to 10 cow, 2 – 3 buffalo) Good relatives to take care of them All have appliances like TV and refrigerator Income in rice and off farm work Some have 2 wheel tractor Children go to secondary school and university	Land with small holdings (2 – 5 rai) Young families
IV	20 – 70 rai (majority have 30 – 40 rai) House has cement walls All have two wheel tractor Some have motorcycle or small truck All have appliances like TV and refrigerator Children go to secondary schools and university	Some own big lands Have other business Have pick up truck, rice mill Children with good jobs Lawyer

Activity Profile of the Village

Different groups of farmer/individual in this village have various activities. As presented in Table 3, activities differ among sexes and economic groupings. However the most important activity in this village is rice cultivation which is also one of the major sources of income in this village (see Table 4). All activities being prioritised by men in both economic groups are income-generating activities. Although fishing may also be just for food consumption, in most cases especially when harvest/collection is big, households/farmers tend to sell the product.

Women in both economic groups have different sets of important activities compared to men. Non-income earning activities are included in the list, although rich women still have a lot of economic activities. Poor women give more priority to preparing food for the household. Collection of aquatic animals or fishing is also part of the activity of women from the poor group.

Table 3 Summary of important activities in the village

Economic group	Gender	
	Men	Women
Rich	Rice cultivation Chilli/vegetable gardening Tree planting Fishing Wage labour Trading	Rice cultivation Growing kenaf Planting tree Chilli/ vegetable gardening Weaving Wage labour
Poor	Rice cultivation Sugar cane cutting Fishing Collection of red ants' egg Sawing woods	Cooking Rice cultivation Looking after the children Household choirs Collecting wood Fishing/sugar cane

Seasonality

Weather. Weather condition in this village is normal and experiences among groups are the same. November is the start of the cold season and in the month of January villagers start to experience a little bit of hot weather. Rainy season is the longest season in the area. It starts in mid-May and become heavy from September to October. Summer or hot season is only be experienced in mid-January to April. April is the month where rain is minimal or zero. (Please see Annex 1 – 2)

Tradition/culture. Generally Thailand celebrates many festivals. However, the manner of celebration of these festivals differs among economic groups. In this village better-off families celebrate more festivals than the resource-poor group. Both better-off and resource-poor families do not have festivals during August. August is the month in which most of them are busy in the field.

Economic activities. Better-off families have a lot of sources of income (see Table 4). Most of the economic activities of rich group involve the use of land. This explains why better-off farmers have many income generating activities since they have big tracts of land to cultivate rice, vegetables and for growing trees. For the poor group, although they did not rank the economic activities, wage labour was mentioned first before rice cultivation. Since most farmers from the resource poor have no land, their major source of income is rendering wage labour for other farmers or from non-farm activities.

In both economic groups fishing was mentioned/considered as one of the economic activities in the village. Water resources are available in the village and people have full access in some resources like swamp, river and public ponds.

Table 4 Summary of Economic activities in the village

Economic group	Economic activities
Rich	Vegetable growing Chilli cultivation Upland rice Kenaf growing Rice cultivation Tree planting Livestock Fishing Sewing
Poor	Wage labour Rice cultivation Vegetable growing Livestock Fishing

Migration. Moving to other places for a certain period of time is what other villagers do to earn additional income. For both economic groups, they move to places where they can work as sugarcane cutters during the dry season. During this period there's not much activity going on in their field since rice were already harvested. Some young members from the rich group move to Bangkok for work.

Health. Health condition in the village is generally satisfactory. There are no major occurrence of illnesses or epidemic in the village. Mostly people get sick during the start of the season like beginning of the rainy season and beginning of the cold season.

Role of Aquatic Animals

The location of the village and the nearness of the water resource provide a great opportunity to the villagers to benefit from the resources. As mentioned in previous entries in this report, fishing plays a very important role to the community.

Source of income. As presented in Table 4, fishing is considered as one of the economic activities of the villagers, both among the rich and poor groups. For the rich group collecting aquatic animals is a yearly activity while for poor group, there are only certain periods of the year when they can collect aquatic animals due to limited resources. In all groups the good price of the species is being considered important in ranking aquatic animals. Especially with the poor men group, good price was ranked second to availability.

Food security. Most of the criteria used by all groups in ranking the importance of the aquatic animals are related to their consumption. Taste is the most important criterion. Rich men and poor women considered this as most important. This means that when rich and poor women collect aquatic animals their main purpose is to find species which they can eat and which also taste good. Versatility in cooking and ability to be preserve them were also related to consumption.

Important Aquatic animals

The wild fish or aquatic species identified and were ranked important are snakehead species and walking catfish. There are several species of catfish identified as important also. Aside from the big fish there are also small fish and non-fish species that are very important with the villagers. All groups mentioned frog, crab, and shrimp although these did not rank high in the exercise. These aquatic animals are being collected mainly for consumption and also as additional source of income.

Table 5 Summary of Important Aquatic Animals in the village

Economic group	Gender	
	Men	Women
Rich	Snakehead Walking catfish Catfish *Kryptopterus* *Ompok bimaculatus* Yellow catfish	Walking catfish Snakehead Yellow catfish Frog Small toad Blue-stripped catfish
Poor	Snakehead Walking catfish Freshwater prawn Pond snail Featherback Barb	Walking catfish Barb FW Prawn Rasbora Frog, climbing perch, carb

Source

Most of the aquatic animals can be collected from the same place. All the water bodies in the village have aquatic animals thriving in it which the villager can collect and consume. The men collect mainly from streams, river and swamp. During the rainy season, rice fields are very good places for collecting aquatic animals. Women and children usually collect aquatic animals from the rice fields and from shallow areas of big water bodies. In the rice fields during farming activities, women and children collect aquatic animals especially the non-fish variety.

Ban Lumphu

Gear

There are some differences on the use of gears between gender in the village. Cast net and gill nets are some of the gearsused by men in the village. In collecting frogs they use battery and light and sometimes they also use traps. For women and children, they usually use small seine net, handled dip net, long dip net, basket and hooks. Collecting aquatic non-fish varieties in the field is also done using a small shovel or sometimes with bare hands. Traps like bamboo traps are also used by both groups.

Table 6 Summary of Different Criteria used in Ranking Aquatic Animals

Economic group	Gender	
	Men	Women
Rich	Taste Versatility Availability Good price	Available Price Taste Versatility
Poor	Availability Good price Taste Versatility	Taste Easy to catch Availability Versatility Preservability Good price

Aquatic Animals Seasonality

In the table presented by the rich group (Annex 11), it shows that aquatic animals move through the seasons. Although the quantity was not mentioned, some species are little in quantity in certain periods of time. Generally the aquatic animals are abundant in rivers and streams during the rainy season. This is may be due to flooding and sometimes to migration. During dry season, most farmers harvest their trap ponds and collect aquatic animals.

For the poor group (Annex 12-13), the situation of the species during a particular season was presented. The catch of most of the species is on a declining trend during dry season (March to April). The men group do not collect aquatic animals during peak periods in farming, which is July to August and December. During rainy season the quantity of aquatic animals in the rice fields increases and collection is very easy.

Aquatic Animals Trends

In early years aquatic animals and wild species are abundant in any water bodies. Nowadays the quality and quantity of these aquatic animals are changing. Most of the aquatic animals especially the wild species are now declining. However, some species are now increasing in population. These are the species that can be mass produced in hatcheries or breeding centers.

The trend of aquatic animals in the village is affected by several factors:

Floods/Drought. Flooding may result to two impacts to the species in the village's water bodies. In most cases this contributes to an increase in the population of the species like what happened in 1978 and 1983 (see Annex 14) as presented by poor men. The quantity of fish increased after the flooding. But it can also cause the decreased of aquatic animals which happened in 2000 when flood washed away aquatic animals in the village.

Pond construction. As claimed by poor women, the construction of ponds that was started 20 years ago had brought negative effects on the wild life population. They believed that the catch decreased because fishes were being trapped in ponds, thereby inhibiting their reproduction.

Disease. Fish disease was experienced in the village since early 90's. The ulcer syndrome affected a lot of aquatic animals. Species in rivers and lake decreased badly after this epidemic.

Collection of juveniles. Due to decrease in population of species, some villagers are now collecting juveniles of aquatic animals. They collect these to stock them into their own system or sometimes for consumption. Juveniles are normally being preserved. Due to this practice, some species are now nearly instinct.

Population. Because of limited off-farm activities or alternative livelihoods in the province or city, the people return back to the village. Most of them become fishermen thereby increasing the demand for supply of aquatic animals. The high number of fishermen is affecting the quantity of catch negatively.

Farmer's Meeting

After a day of processing the data generated from the two-day workshop in the village, the whole team returned to the village and presented the results of the workshop. The information generated and the staff's analyses were accepted by the farmers/villagers. Lessons by both outsiders and villagers were shared during the presentation.

Annexes
PRA outputs

Seasonal Calendar

Annex 1 Seasonal calendar of rich group

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Weather	Cold season / Start warm		Hot season			Rainy season				.....	Cold season	
Social events	New year Weeding	Kao Jee Bun	Fang Tet Bun	Songkran	Lieng Poo-Ta Bun	Ban Bun	Kao-Pansa Buch		Kaosart bun	Ork pansa bun	Krattin loy kattong	New year
Vegetable growing	Growing →											
Chilli	Harvesting →		Growing →							Growing period ↔		
Upland rice					ploughing	Growing	Take care		Harvesting			
Kenaf			Ploughing	Growing ↔					Harvest and put in water ↔			
Rice					Transplanting, fertilization →			Fertilization Pesticide	Management →		Harvesting →	
Tree	Harvest cashew nuts →				Grow cashew nuts			Grow rubber tree				
Livestock	Raising in the field around the village ↔						Raising in the forest ↔					
Fishing	Catch in trap ponds; natural bodies of water ↔				Fish catch decreased mainly in the rice fields →							Pump trap ponds
Sewing			Start sewing									
Migration	Cutting sugar in central plain Young people go to Bangkok							Harvesting pineapple, construction				Sugar cane
Health				diahrrea		Changing period Fever						

Ban Lumphu

Annex 2 Seasonal calendar of poor group

	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Weather	Cold	Sunny →		Sunny with little rain	Sunny	Rain	Rain	Rain	Rain	Heavy rain → Floods		Cold
Custom/tradition			Buddist ceremony		Songkran	Rocket festival	Village ceremony			Rice ceremony		Offering to monk Loi kattong
Wage labour	← Sugarcane cutting →											
Rice cultivation								Rice transplant →			Rice harvesting →	
Vegetables		Growing →				Chilli harvesting ↔						
Livestock	Poultry (duck & chicken)											
Fishing		Can catch fish a lot ↔			Catching AA ↔							
Income	**	**	**	**				Lots of income ****** ↔			***	***
Migration	← Migrate for sugarcane cutting →											
Health	Cough			Pink eye		Diarrhea	Common cold					Cough

Ban Lumphu

Group activity profile

Annex 3 Activity profile of rich men

Activity	Farmer Name						Total	Rank
Growing rice	5	6	6	6	7	6	36	1
Chili and vegetables growing	4	2	5	4	5	3	23	2
Growing trees	3	3	3	3	2	3	17	3
Growing kenaf	0	0	0	0	0	3	3	8.5
Raising animals	3	6	0	0	0	0	9	7
Fishing	1	2	3	3	4	1	12	4
Weaving	0	0	0	0	0	3	3	8.5
Trading	2	0	0	4	2	2	10	5.5
Wage labour	2	1	3	0	2	2	10	5.5
Total	20	20	20	20	22	23	125	

Annex 4 Activity profile of rich women

Activity	Farmer Name						Total	Rank
Growing Rice	4	7	6	7	4	5	33	1
Chili; vegetables growing	2	3	3	3		2	13	4
Growing tree	5	1	2		5	2	15	3
	3		2				5	8
Growing kenaf	2	4	3	3	6	3	21	2
Fishing	4		1	2			7	7
Weaving		2		2	5	3	12	5.5
Daily wage		3	3	3		3	12	5.5
Trading						2	2	9
Total	20	20	20	20	20	20	120	

Annex 5 Activity profile of poor men

Activity	Farmer Name						Total	Rank
	Psi	Mand	Pin	Chut	Sanga	Sih		
Sugarcane cutting	2	3	7	5	4	4	25	3
Rice harvesting	6	5	5	3	5	5	29	1
Rice transplanting	6	5	4	3	5	5	28	2
Fishing	4	5	4	3	4	4	24	4
Tree lizard catching	1	0	0	0	0	0	1	8.5
Sawing wood	0	0	0	0	2	2	4	6
Cashew nuts harvesting	0	0	0	0	0	0	0	
Net making	0	2	0	0	0	0	2	7
Planting tree	1	0	0	0	0	0	1	
Red ant eggs gathering	0	0	0	5	0	0	5	5
Chili harvesting	0	0	0	1	0	0	1	8.5
Total	20	20	20	20	20	20	120	

Annex 6 Activity profile of poor women

Activities	Name of farmers					Total	Rank
	Suan	Mon	Pong	Pernpit	Pien		
Cooking	4	4	4	3	4	19	1
Gathering food in backyard	3	3	2	3	0	11	5
Household duty	2	3	3	3	2	13	4
Taking care of children	1	5	5	3	0	14	3
Ricefields activity	4	2	3	3	4	16	2
Collecting food in the forest	0	3	0	2	0	5	9
Fishing	0	0	0	2	4	6	7.5
Livestock	0	0	0	1	0	1	10
Sugar cane cutting	3	0	3	0	0	6	7.5
Chilli harvesting	3	0	0	0	4	7	6
Total	20	20	20	20	18	98	

Role of Aquatic Animals

Annex 7 Species identification and ranking of aquatic animals by rich men group

Aquatic Animals	Buy/catch or culture	Sources	Criteria				Total	Rank
			Taste	Price	Availability	Cook versatility		
Snakehead	Catch	Streams	3	3	2	3	11	2
Loach	Catch	Kayung streams	2	0	0	0	2	31
Walking catfish	Catch	Streams Canal Swamp	3	3	2	3	11	2
?	Catch	Kayung stream	2	0	1	1	4	24
Prawn	Catch	Streams Canal Swamp	1	1	0	1	3	29.5
Striped tiger nandid	Catch	Streams Canal Swamp	1	0	2	1	4	24
Rasbora	Catch	Streams Canal Swamp	1	0	2	1	4	24
Parambassis siamensis	Catch	Streams Canal Swamp	1	0	2	1	4	24
Henicorhynchus siamensis	Catch	Streams Canal Swamp	2	2	0	0	4	24
Silver barb	Catch	Swamp Culture pond	2	2	2	2	8	8.5
Croaking gourami	Catch	Swamp Canal	0	0	0	0	0	
Hard lipped barb	Catch	Streams Canal Swamp	2	2	2	2	8	8.5
Bumble bee catfish	Catch	Kayung stream	1	0	1	1	3	29.5
Climbing perch	Catch	Streams Canal Swamp	2	0	3	1	6	13.5
Thynnichthys thynnoides	Catch	Streams Canal Swamp	0	0	0	0	0	
Blue gourami	Catch	Streams Canal Swamp Ricefields	1	0	2	1	4	24
Catfish(Ompok bimaculatus)	Catch	Streams Canal Swamp	3	2	2	2	9	5.5
Spiny eel	Catch	Canal Swamps	2	0	2	2	6	13.5

Kryptopterus	Catch	Streams Canals Swamps	4	3	1	2	10	4
Swamp eel	Catch	Canal Swamp	2	3	2	1	8	8.5
Catfish (Pangasius)	Catch	Kayung streams	4	4	1	2	11	2
Yellow catfish	Catch	Streams Canal Swamp	2	3	2	2	9	5.5
Mackerel	Catch		0	0	0	0	0	
Blu stripped catfish (Mystus)	Catch	Streams Canals Swamps	1	0	3	1	5	17.5
Pangasius	Market	Fish traders	0	0	0	0	0	
Pond snail	Catch	Ricefields Floodplain	2	1	3	1	4	24
Clupeichthys aesarnensis	Catch	Streams Swamps	1	0	0	0	1	32
Frog	Catch	Ricefields Streams Floodplain	2	2	2	2	8	8.5
Small Toad	Catch	Ricefields	1	1	2	1	5	17.5
Crab	Catch	Ricefields	1	0	2	1	4	24
Ribbed clam	Catch	Streams Canals Swamps Ricefields	1	0	2	1	4	24
Sand Goby	Catch	Streams Canal Swamps	2	2	2	1	7	11.5
Feather back	Catch	Streams Canal Swamps	1	1	2	1	5	17.5
Wallago attu	Catch	Streams	2	3	1	1	7	11.5
Tilapia	Catch	Culture pond Canal	1	1	2	1	5	17.5
Snakeskin gourami	Catch	Canal	0	0	0	0	0	
Common carp	Catch	Streams Canals Swamps	2	2	1	1	6	13.5
Long nose loach	Catch	Kayung streams	2	2	1	1	6	13.5
Total			60	45	54	48	207	

Annex 8 Species identification and ranking of aquatic animals by rich women

Species	Criteria				Total	Rank
	Taste	Price	Availability	Versatility in cooking		
Snakehead	7	13	11	4	35	3.5
Loach	5	2	8	2	17	27
Walking catfish	10	15	10	5	40	1
	5	13	9	4	31	7
Prawn	1	6	13	2	22	15.5
Striped tiger nandid	3	0	16	4	21	18.5
Rasbora	1	0	16	3	22	15.5
Parambassis siamensis	0	0	13	0	13	34
Henicorhynchus siamensis	2	0	15	4	21	18.5
Silver barb	7	10	11	3	20	20.5
Croaking gourami	1	0	15	2	18	24
Hard lipped barb	4	0	9	3	16	30.5
Bumble bee catfish	8	4	0	7	13	34
Climbing perch	4	0	10	3	17	27
Thynnichthys thynnoides	2	2	10	3	17	27
Blue gourami	2	1	14	2	19	22.5
Catfish (Ompok bimaculatus)	8	0	12	3	23	13
Spiny eel	5	8	11	4	28	9
Kryptopterus	8	15	0	4	26	10
Swamp eel	5	12	8	4	29	8
Catfish Pangasius	8	17	0	2	27	10
Yellow catfish (Mystus nemurus)	7	15	11	2	35	3.5
Mackerel	4	3	0	3	10	37.5
Blue-stripped catfish (Mystus sp)	8	11	12	2	33	6
Pangasius	7	12	0	3	22	15.5
Pond snail	0	0	17	3	20	20.5
Clupeichthys aesarnensis	1	0	13	2	16	30.5
Frog	6	12	12	5	35	3.5
Small toad	6	11	13	5	35	3.5
Crab	0	0	16	3	19	22.5
Ribbed clam	0	0	15	2	17	27
Sand Goby	4	0	12	1	17	27
Featherback	4	7	13	1	25	12
Wallagu attu (Catfish)	10	0	0	3	13	34
Tilapia	4	6	0	3	13	34
Snakeskin gourami	3	5	0	2	10	37.5
Common carp	4	6	0	3	13	34
Long-nose loach	4	8	8	2	22	15.5
Total	168	214	353	113		

Annex 9 Species identification and ranking of aquatic animals by poor men

Species	Criteria				Total	Rank
	Taste	Price	Availability	Cooking versatility		
Snakehead (Chana sp)	8	8	9	4	29	1
Prawn	4	13	2	2	21	3
Walking catfish	8	11	5	4	28	2
Striped tiger naudid (Pristoiepis sp)	2	0	10	1	13	9
Barb	3	3	8	4	18	6
Spotted spiny eel	5	8	1	2	16	7
Pond snail	1	0	16	2	19	4.5
Rasbora	1	0	2	2	5	11.5
Catfish (Mystus sp)	3	2	8	2	15	8
Sand Goby	3	8	1	1	5	11.5
Featherback	7	0	1	1	19	4.5
Crab	1	0	9	1	11	10
Total	46	53	72	26	199	

Annex 10 Species identification and ranking of aquatic animals by poor women

Species	Criteria						Total	Rank
	Easy to catch	Availability	Taste	Price	Preserve	Cooking versatility		
Crab	5	5	4	1	3	4	22	6
Walking catfish	5	6	5	4	4	4	28	1
Tadpole	5	0	5	0	0	0	10	9
Snail	4	5	5	2	0	4	20	8
Climbing perch	4	3	4	2	5	4	22	6
Barb	5	5	5	4	4	4	27	2
Rasbora	5	5	5	0	5	4	24	4
Prawn	4	4	5	5	3	4	25	3
Frog	4	0	5	4	5	4	22	6
Total	41	33	43	22	29	32	200	

Aquatic Animals Seasonality

Annex 11 Perception on the seasonality of aquatic animals by rich men

Aquatic animals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Catfish	Stream, swamp, canal by cast net and gill net									Trap pond in paddy fields Fish rod, trap and gill net		
Tepo	*Pangasius larnaudii*										Huay kayong (cast net, gill net, rod)	
Snakehead	Stream; swamp; canal; pond; fish refuge; Catch by cast net; gill net								Paddy field, catch by traps, rod, and hole trap			
Featherback	*Kryptopterus bleekeri*										Huay Kayong (gill net)	
Ompok bimiculatus	Canal, swamp, by cast net, gill net			Stream, big pond, canal, swamp								
Eel	Harpoon (spear), dig (swamp) *Fluta alba*					Baited						
Mystus	Cast net, gill net *Mystus nemurus*										Huay Kayong	
Silver barb	Swamp, canal by cast net, gill net				Early to release the fish					Trap pond Cast net, gill net		In paddy
Barb	Streams, swamp			Stream, swamp, cast net, gill net								Cast net, gill net
Frog					Paddy field (gill net, light)						Harpoon, hibernate	
Snail	Stream, swamp, canal		Catch by hand from stream, swamp, paddy field, canal							Catch by hand		
Goby	Cast net, gill net		Swamp, canal, stream (l i t t l e)								Swamp, canal, stream	
Wallago attu	Cast net, gill net										Swamp, canal, stream	

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Annex 12 Perception on the seasonality of aquatic animals by poor men

Aquatic animals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Snakehead Catfish			Catched by cast net at Huai kayung chuak and Mek. 0.5 kg/time, if catch for 2-3 days and get 1 kg, will sell in village market, 50 baht/kg, by Man				Too busy transplanting			Catch by fish rod in the field 4 – 5 times/week 1 kg/time-sell in market lots of fish this period		Too busy
Shrimp					Catch from stream by seine net by 4 person/time (m/f) 2 times/wk for consumption		Too busy transplanting				Too busy harvesting rice	
Silver barb Wild fish			Catch by gill net and cast net (2 cm mesh size) in stream 3 times/week. Catch 1 kg/time for fermented fish because species easy to die and have low price value					Too busy		Catch by gill net only because have a lot of water. No change in the qty of catch		
Snails			Can catch whole year period if they want to eat (but not regularly). 1 time per month by man/women because collect from water resources mainly man.									
Featherback				Difficult to catch, available only during April. Farmer just made refuge by wood and catch in dry season. They also catch in streams. Estimated catch 2 kg/time/area. For consumption only. Man catches								

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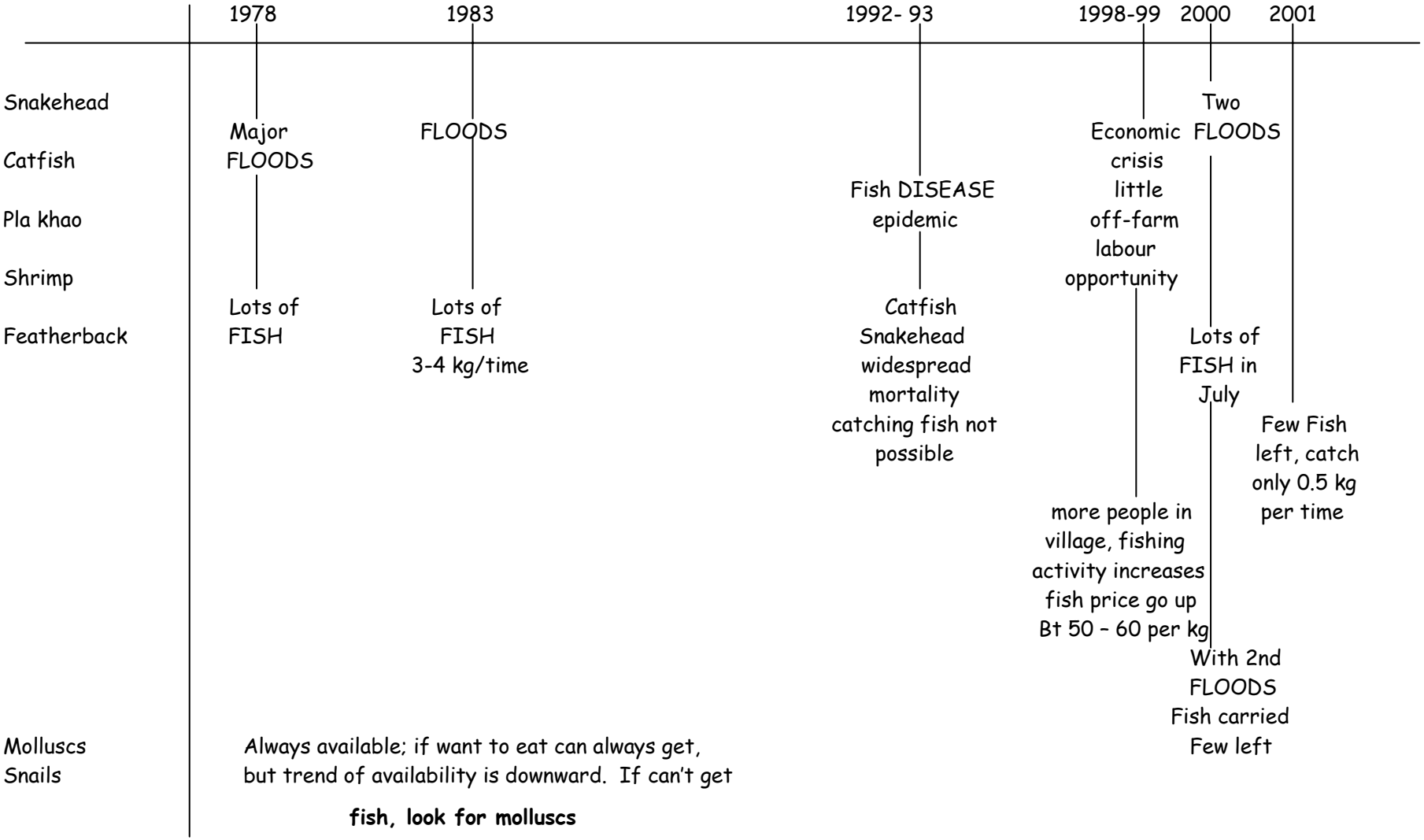
Annex 13 Perception on the seasonality of aquatic animals by poor women

Aquatic animals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Catfish	Catched from /huai kayung by cast net (by man), 50 –60 kg/day						kid use fish rod in rice fields; man use gill net in canal 1-2 kg/day, sell low price 25-30 baht/kg					
Silver barb Wild fish	Cast net		Gill net		Cast net					Fish price 10 – 15 baht/kg Some fisherman catched 20-30 kg		Cast net
FW shrimp	Catched in swamp, canal by green seine net. Catches by both men and women									Rice field, swamp by fish trap 10-15 kg/time (M/F)		
Rasbora	Catch in swamp ("KA"), canal by green seine net 1 – 2 kg/time by men and women									Canal in paddy fields by trap, 10-15 kg/time		
Frogs						Catch in the ricefield 2-10 kg/time in rainy night by men, women and children		Catch by fish rod in paddy field in night time. Using earth worm as bait (men & women)				Catch 3 – 4 kg/day from rice field by hand
Climbing perch	Catch in stream, swamp, 0.2 kg/time for whole year round for household consumption										Catch from rice field by swing net 10-15 kg/time (few water in rice fields)	

Aquatic Animal Trends

Annex 14 Perception of poor men on the trends of aquatic animals



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Annex 15 Perception of poor women on the trends of aquatic animals

Aquatic animals	
Catfish	Formerly lots; could catch by using knife in water bodies; in the last 20 years, amount started to decline, because the fish have moved to private ponds; poor women group can't catch (mainly in trap ponds). Eight years ago there was a disease outbreak. Also in the last 2-3 years. People from other villages came to catch (migrated from streams- paddy-trap ponds)
Barbs	In the past, used a wicker scoop to catch. At present comparatively little change in availability. Some disease problems as the catfish. Normally live in stream and came into paddy field during floods. Do not go into the traps. (Migrate from stream to paddy to stream again)
Shrimps	In the past also used a wicker scoop, each time securing 0.1 – 0.2 kg. Now can't even get one handful. Have disease – ulcers, broken tail. Formerly did not eat whole but fermented. (Streams, public ponds – paddy – streams)
Minnows (Rasbora)	Still plentiful and don't worry about disappearing. Formerly nobody ate, only started in last 30 years (Streams, pons – paddy – streams, ponds)
Frogs	In the past, plentiful. No need to catch tadpoles. Now have to catch and eat and are worried that they will disappear. People from other villages in Nam Kuang came to catch because short in their own villages
Climbing perch	Formerly could catch by hand in ditches. Today small catch fish to eat at the same time as tadpoles. Worry that they will disappear. In May-June eat 2 – 3 cm fish because they breed in paddy field (stream – paddy – trap ponds and streams