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

Participatory Rural Appraisal in Ban Nong Lom

Case Study 8

(PRA Report from 2001)

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NongLom 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 design new programs or for planning other development interventions in the area. It is also necessary that the information is generated from and with the primary stakeholders themselves – the farmers/villagers.

Objectives

The main objectives of the study are to establish a clear picture of the livelihood activities in the village as a whole and to build rapport with the villagers. To attain this main objective, the following are the more 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 in facilitating the identification of issues in the community.

Participatory Rural Appraisal Team

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Schedule of Activities

The workshop was held for five 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 and mapping exercises were conducted.

The third and fourth days were spent for generating more information about the differences of perceptions in terms of various gender and social groupings in village. Different groups presented their activities in the village and their knowledge about the situation in the area. The last day of the workshop was used for the processing of outputs and for presentation andvalidation of information with the villagers. (see Table 1)

Table 1 Schedule of Activities during the PRA in Ban Nong Lom

Date	Activities
04 June 2001	Collection of secondary data
05 June 2001	Introduction of project with the village head Village profile Identification of PRA participants
06 June 2001	PRA exercises (Rich group)
07 June 2001	PRA exercises (Poor group)
08 June 2001	Processing of PRA outputs Presentation of PRA outputs

Ubon Ratchathani Province

Province Description

General condition

The province is located between 16^0 10-$16^0 15^1$ latitude north and $104^0 52^1$ – $105^0 24^1$ longitude east. A large part of the area is 68 meters above sea level. Land is sandy loam and with a total area of 15700 km^2 and is 630 km from Bangkok. The province can be reached by car, train and domestic plane.

In terms of boundaries, this province shares its border in the north with Yasothon, Amnatcharoen and Mukdahan provinces. The province of Srisaket and part of Cambodia are located at the southern part of this province. The Lao People's Democratic Republic is situated on its eastern side and Yasothon and Srisaket on the west. The province has a total of 18 districts and 5 sub-districts, with a total of 2,243 villages with a population of 1,679,867 people. The province has a total of 262,208 households. Located at the Basin of Korat, the main sources of income are rice production, crops and other gardening activities.

Water resources:

Kong river, Chi river, Moon river, Lamsay By, Lamsay Bok, Lamdom Noi, Lamdom Yai.
2 large irrigation (Sirithon Dam and Pakmoon Dam)
11 sub irrigation system
100 small irrigation (spillway 63, reservoir 63 projects that pump water for 37 electric projects.

Rainfall: 1980.7 mm per year
Rain: 146 days (Data source 1994)

District Description

Muangsamsib District

The district is located towards the north of Ubolratchathani province which is 34 km away from the main province. The district shares its boundaries with several provinces. On the northern side, it's connected to Muang and Huataphan districts of Amnatcharean

province. Amphue Muang of Ubol province and Khangnai district of Amnatcharoan province are located at the southern border. Amphue Muang of Ubol province and Phana district of Amnatcharoan province are the boundaries in the east. In the west, Khuangnai of Ubol province and Hua Thaphan of Amnatchareon are the boundaries.

Total land area: 927.587 km2
Subdistrict : 14
Villages : 154 villages
Total number of households: 14399
Total population: 82927

Main sources of income: Rice farming, crop, vegetable gardening (Chilli), and livestock
Topography: plain and flat 0-2% slope

Natural water bodies: Lamsay bok, Lamsay by, Phrarode stream, under ground water (60 meter depth) – cannot go deeper because of saline water.
Rainfall: 1600 mm per year

Village Description

This village is 8 km away from the urban area. Composed of 82 households. The main sources of income are rice cultivation, gardening (chilli), handicraft and wage labour.

Topography: plain nearby Lamsayby
Land type: sandy and low fertility

Natural water bodies:

Lamsayby (2 km away east of the village)
Thaikour stream, Dondaeng swamp o.5 km on the southern part of the village
Green ISAN swamp and Nonglom swamp

Selection Process for the Village

The village was selected after visiting the district office and assessing the information given about the area. During the visit, aside from introducing the team to the commune/district office a brief interview was done with the officers in the station. The interview focused on general information about the area, topography, agriculture situation and aquatic resources. After the interview the group selected the village and visited the area to be acquainted with the place and its people. The bases for selection were the following: the village represented a backward village, the number of households, the distance from the river and the abundance of water resources.

Specific Methods Used

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

Timeline – This activity was done to trace the development trends in the village. This 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 grouped themselves.

Seasonal calendar. This illustrated the different situations in the village during a typical 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 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 the importance of each aquatic animal 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 showed the perception of the different groups about the status and condition of the different aquatic animals in the village. The causes of the increase as well as the decrease in numberof 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 who provided a list of all households in the village. 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 thought was the well being of the farmer/villager.

Using the results of the well being ranking, participants for next day's activities 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.

The group of better-off household was invited first and carried out the exercises. The next day, the group of poor household was then invited and did the same activities that the rich group conducted the previous day.

For each group, the team separated the men from the women and asked them to perform the same activities. At the end of the exercises, the facilitators compared the results from those of the different groups. All the outputs from the first to the third day activities were then collated and summarised by the team. On the last day of the visit, validation and presentation of outputs was done with the villagers.

Setting the Context

Mapping the Current Resource Context

Land resource. General topography of the village is plain, which is very much suitable for agricultural activities. The main use of land in the village is for rice cultivation, which is also the main source of income. Rice paddies are situated around the village surrounding the houses concentrated at the center of the village.

Water resource. Water is not a limited resource in the village. The village is situated adjacent to a big river. Aside from the river the village is also getting benefits from the Don Dueng Reservoir which is connected to Lamsaybai by Huaykang stream. Another community water body is the Nonglom swamp which also provides resources to the villagers. For privately-owned water bodies, trap ponds and culture ponds are constructed almost all over the village. In the rice fields, several trap ponds provide aquatic resources to the villagers. For rice cultivation, a small irrigation canal helps the farmers get water from the river.

Physical and other services. At the moment, meeting basic needs is not a problem to the villagers since basic services are now available to them. A school had been constructed so that children would not need to travel far to avail of basic education. A temple was also built for village religious activities. Shops where villagers can buy their daily needs are also available. A water supply source was also constructed to supply household with their water needs.

Mapping the Development Context

The timeline or historical development in the village was established to illustrate how the changes in the village happened and how it affected the community. This activity was performed by some elders in the village with the help of younger villagers as well. The historical time line began with the year when the village was first established or started.

The village started with only few households who migrated from another village in the year 2344. From that period development already begun. Some developments that happened during this period were the establishment of temples and schools. Aside from these, there was no other development mentioned in the exercise, not until in 2500 (1957) when the first shop was built in the village. Most of the villagers get their daily needs from this shop. A few years after that, development in transport happened with the introduction of the first bus in the village. The work of farmers in milling their rice was also minimised when the first rice mill was established. This saved time and effort for the farmers. More development happened after electricity was introduced. This brought a lot of changes in the village as well as to their lifestyles. Another major event that took place during this period was the provision of water supply for the villagers in 2536.

At the beginning, resources in the village were abundant. Many aquatic animals were present and wildlife was also available. Some development activities adversely affected the situation of this wildlife. When the dam was established in 2521, the same time the kenaf tree was introduced, forest food decreased. Wild animals also decreased and the forest area itself was diminished.

The village is traditionally a rice farming community, although no information was given on the agricultural situation during the early years of the village. Thus, this may mean that there was minimal or no such significant agricultural development that happened. In 2523, villagers started growing cashew for cash crop. In the field of rice farming, the use of chemicals was introduced in 2524 (1981). Although there were farmers already using chemicals a long time ago, this was the time when more villagers adopted this practice. Developments and increased productions in rice farming took place after that. Hand tractors for faster and easier cultivation of paddy fields was introduced in the year 2533. No other developments in agriculture occurred after that. Introduction of new fertilizers, chemicals and different varieties of rice came later on in the village.

Capture fisheries and culture were not mentioned during the earlier stages of development in the village. Changes happened in fishing when farmers started re-digging the village pond in the year 2534 (1991). The date when the village fishpond was constructed was not discussed in the activities. Beginning in 2535, the supply of fish or aquatic animals started to decrease. It continues until now and for reasons that the villagers still do not know. Only one calamity affected the status of aquatic systems in the village. This was flooding that occurred several times in the village (see Figure 2).

Figure 1. Mapping the Current Resource Context (Village Map)

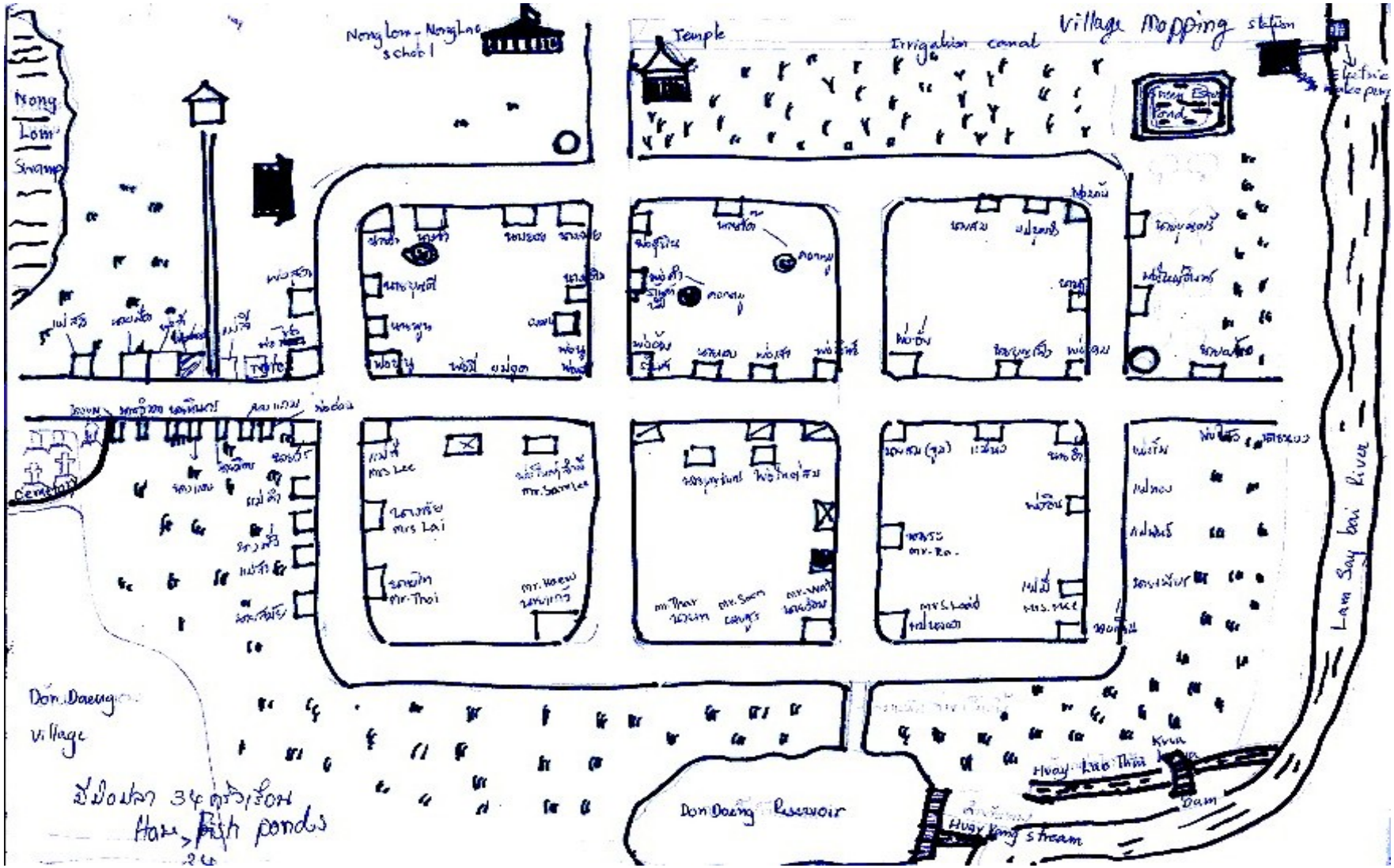
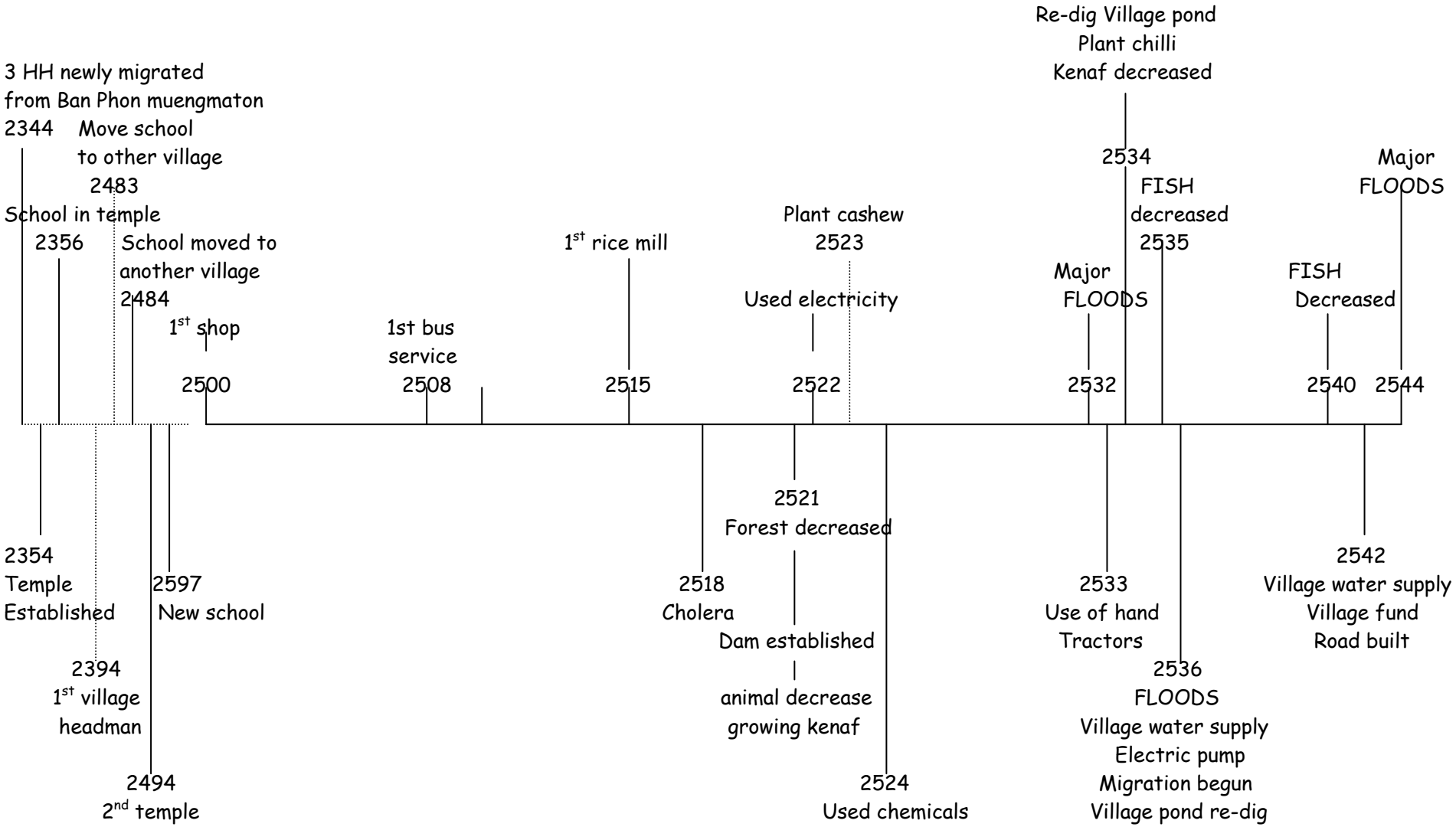


Figure 2. Mapping the Development of the village (Timeline)



Mapping the Social Context

One of the reasons why Ban Nonglom was selected is that it represents one of the low income or low development level village. The main source of income here is rice farming so villagers are fully dependent on land and water resources. Although most of the villagers are farmers, they can still be grouped according to their level of well being. Villagers have their own set of criteria in grouping themselves. During this activity villagers identified five well being groupings. The criteria or characteristics for each level are presented in Table 2.

Socio-Economic Characteristics

Sources of income. As mentioned earlier the main source of income in this village is rice farming and majority of the villagers are rice farmers. Aside from rice farming, other villagers have other sources of income. The lowest level in the group gets income from working as labourers for other farmers, but these are a few cases only. Majority of the villagers belong to the second, middle and fourth groups whose main source of income is farming in their own land. The better-off in this village get income from their permanent job, from rice and from other businesses.

Education. The information about the level of education of household heads was not clearly established. However, in most cases the farmers belonging to the poorest and second to the poorest groups did not reach and complete a higher education. Most of the better-off household members are generally bachelor degree holders and some completed secondary level only. The ability of the household head to send their children to school is one basis for well being ranking. Most of the children belonging to middle group families can afford to have good education and even can avail of higher education. For the low-income level families, some of them cannot send their children to school while others can send their children up to primary level.

Land ownership. One of the major criteria in ranking the well being of families in the village is the size of their land and their status of land ownership. Most of the people here have at least a small piece of land that they can use for their farming activities. However, there are still a few who do not have any land at all, especially those families belonging to the poorest group. Usually, families under the lowest income level have a land area of 0 – 5 rai. Middle and better-off families own huge tracts of land for their own cultivation and are also rented out to other farmers. In table 2, the average land owned by each group is presented. The better-off families own 20 to 30 rai of land and the group between the extremes owns 5 – 20 rai.

Livestock. Like the issue of land, the number of livestock owned can also dictate the level of the well being of a family in this village. For poorest group, aside from land livestock is also lacking. For poor families that have livestock, on the average they have 1 – 3 heads of livestock. The better-off families do not have livestock. Families belong to the middle or less poor and less better-off have livestock ranging from 3 – 5.

House. For houses, villagers use the size, materials and the condition in gauging the well-being level of the families in the community. Most of the poor families have small houses and are made of light materials like leaves and grass. Some families also

have houses in poor condition (as in old and nearly dilapidated). The condition of the houses of the majority of villagers, which belongs to the three groups in the middle are good. Some made from concrete and some semi-concrete. There are also some families have unfinished houses but good enough to live in. Better-off families own big houses in the village and made from good materials like wood and concrete.

Access to credit. Getting loans from formal lending organization is sometimes difficult for the poorest group. Some can get from BACC but most of the time they can only get a loan from private individuals in another village. Most of the farmers belonging to second poor to second better-off groups can access credit from formal lending groups like BACC, cooperatives and other unions in the village. Better-off families can get loans from the bank and other lenders which they often use as capital for their business.

Food availability. Due to the limited area for cultivation, most of the poor families do not have enough food for the year. Some farmers buy rice since the production is not enough. The middle and better-off families do not have problem with the food since they have the capacity to buy if the food is not available and their farm production is more than enough for their needs. Thus, they can sell some of their products.

Assets. Their assets include farming and house equipment or appliances. The most common equipment for farming is the tractor. Families from the better-off or all the four levels apart from the poorest have their own tractor for ploughing rice fields, transporting farm inputs, as transport, and also as engine in pumping water. Most of the time, the poor families do not have much equipment in the house. The better-off normally have complete appliances and also the middle group.

Transport. One common form of transport in the village is the two-wheeled tractor. Middle-income group and the better-off families normally have this kind of transport. Aside from this, better-off families also have cars and motorcycles.

Table 2. Well-being Ranking in Ban Nong Lom

Rank	Village chief & group of men	Group of women
I	Mainly rice grower Hire labour to transport rice No household head Some are landless Land holding not more than 3-5 rai Sharing land with parents Getting income from: chilli, handicraft Small house or incomplete, some are made of bamboo Can send children to lower education (primary level) Can loan money from BACC Production not enough for consumption No two wheel tractor Majority no livestock (1 –3) Majority no appliances in the house No toilet No transport Mostly migrating to Bangkok	Land holding of 2 – 3 rai Some are landless Small house and made of light materials Some family without household head (dead) Have 2 – 3 children Hired labour for income Migrating for work Can loan money only with other villagers Mostly buy rice for consumption Getting income also from handicrafts
II	Farming as main source of income Land holding of 5-10 rai Have rights in land Livestock 1 –2 head Can loan money from BACC and cooperatives Enough rice for consumption Can send children to primary school Better house condition Can buy inputs for farm like agrochem Some have pump Some have home appliances Few have transport Migrating to Bangkok	Small houses using tin roofings Own land Have 2-3 cattle Growing chilli for cash crop Hired labour as source of income Can loan money from BACC Some buy rice for consumption Handi craft Migrating to Bangkok
III	Rice farming as main source of income Have land holding of 10 – 20 rai Livestock 3 – 4 per household Can loan money (15,000-30,000 bt) Can send children to secondary level Can afford to lend land to other villagers Can sell rice production (15,000-30,000) per year Other source of income :Chilli Have two wheeled tractor House appliances Good condition of the house Go to Bangkok sometimes	Own land Have two wheel tractor Have motorcycle Growing chilli for income Enough production for consumption and selling Have capital for other investment

IV	Farming and trading as sources of income Have rice mill, some have engine fuel shop Loan money more than 300,000 bt Can let children graduate from secondary level Can lend rice to other villagers Livestock – 4 – 5 heads Have two wheel tractor Have other investments	Have lots of land holding Merchant Growing chilli as cash crop Have two wheeled tractor Have motorcycle Raising pigs "Original people" Village committee, ABO Enough rice for consumption and selling Can lend rice to other villagers More capital for investment
V	Land holding of 20 – 30 rai Merchant in Bangkok Rice farming as source of income Complete in agri- equipment With car Have shops Can loan money for trading Higher rice production Good house condition Complete with appliances New generation	

Activity Profile

This activity shows how gender influences activities as presented in table 3 that shows a summary of the important activities in the village. In general women do more things compared to men and the priority of women is also different from that of the men. However, the most important activity in this village is rice farming and other agriculture-related activities.

For men, all of the activities listed are somewhat for earning income, from farming to non-farming activities. While women include reproductive activities as important also. The rich women even ranked household work as most important above all the other activities. Farming activities listed were all the same in all groups but do not have the same importance.

For fishing, only three groups included fishing as important activities. For women fishing was ranked low compared to agricultural and household activities. With the poor men group, fishing is the same level of importance as growing vegetables.

Table 3. Summary of Important Activities by Socio-Economic and Gender Groups

Economic group	Gender	
	Men	Women
Rich	Rice farming Livestock Wickerwork* Orchard work* Trading Hired labour Charcoal making	Household duty Rice farming Orchard (Chilli) Needlework* Livestock* Hired labour** Collect food** Fishing Charcoal
Poor	Rice farming Livestock Chilli Wickerwork Fishing* Vegetables* Collect food Hired labour	Rice farming Household duty Orchard* Hired labour* Needlework Collect food in the forest Fishing Livestock** Charcoal**

Seasonality

The seasonal calendar illustrates the situation of the village in a year. It also shows the different activities happening in the village in a certain period of time. The four groups view the seasonality of the village in slightly different ways but in most situations, all the groups have the same perception or idea about the village.

Weather. Like in any other village in this province, Nonglom has three distinct seasons in a year as shown in annexes 1.1 to 1.4. Summer or dry season starts from February or March and ends in April to May. The rainy season sometimes starts also in May. But in general rainy season starts late in May and finishes September to early October. Cold season can be experienced for four months in the village. Temperature starts to go down in the month of October-November. Peak of the cold season is in December to January. Temperature again starts to get high mid of February.

Tradition and culture. Festivals and celebrations are some ways of knowing the culture in an area. In this village there are a lot of activities going on related to their festival. Majority of the celebration are relayed to their religion and other beliefs. Association with socio-economic groups somewhat affects the celebration of the different festivals in this village. As presented in Annex 1.1 – Annex 1.4, the poor group knows more festivals than the rich group. The rich group only listed the New Year celebration but for the poor group, all the celebrations in the village were included. In the months of May to June, no celebration goes on as this is the month when people are very busy working in their fields.

Economic activities. As mentioned earlier, the main source of income in the village is rice farming or agricultural activities. The summary of common economic activities in the village is presented in table 4. Both rich and poor men have the same economic activities and it's the same case with the women. All of the activities listed were farming activities. Other minor sources where not included in the diagram.

The different agriculture-related economic activities are being done in different seasons. Rice cultivation is during the rainy season since it needs more water. Other activities like chilli and vegetable growing are done during summer or after the rice cultivation.

Fishing and livestock were not included in this activity although in succeeding discussions, fishing is also considered an income-earning activity.

Table 4. Summary of Economic Activities by Socio-Economic and Gender Group

Economic group	Gender	
	Men	Women
Rich	Rice cultivation Chilli cultivation Vegetable crop	Rice cultivation Chilli/vegetables
Poor	Rice cultivation Chilli cultivation Vegetable crop	Rice cultivation Orchard farming

Migration. Migration is happening in all groups just like in other villages. There are two types of migration in this village. Some members of the household leave the area and would usually go to Bangkok. They would work there as labourers during the end of the farming season and only return to the village when farming starts. Other villagers migrate to other places for permanent work and would just send remittances to their family.

Health. Generally the health condition of the village is normal. Villagers can get ordinary colds and fever regardless of the socio-economic group. Sickness normally occurs during the end of season or changes in the weather. During the farming season most of the villagers are tired especially poor families since they need to work more in the field than the rich group.

Role of Aquatic animals

The role of aquatic animals was not clearly shown in the seasonality calendar of the village. In table 3 however, it shows that fishing or collecting aquatic animals is a very important activity for poor and better-off families in the village. Based on the criteria used by all groups in ranking the importance of aquatic animals, the aquatic animals are playing a role that is mainly to provide food supply to the village and also as

an additional source of income. Although this role was not supported in the list of economic activities presented earlier. Majority of the criteria and the one that even ranked high all pertained to consumption. The taste, that always gets a high rank and the versatility in cooking makes the species very important to the villagers. The value or good price of the species, which the rich men considered as the most important criteria support the conclusion that aquatic animals also has a role in generating income for poor households. The value of fish was used by all groups as a factor in ranking the importance of aquatic animals but not given much importance by the three groups (rich women and the poor group).

Important Aquatic Animals

As mentioned that aquatic animals play an important role as a food source of villagers in this community, the four groups identified several aquatic animals present in the village (see annexes 3.1 to 3.4). There are a lot of similarities in the list of important aquatic animals by four groups but they gave different ranking for each specie. The selection of species between social groups and gender had no significant difference also. Based on the summary, the villagers do not eat so much non-fish species. It was only the poor men group who highly ranked frogs as important species. Other groups identified frogs but did not rank it as one of the most important ones.

The species that ranked high in all groups were the snakehead and catfishes but for the women group, both of these species did not rank high. Majority of the species identified as important come from the wild. Species like bard represents the cultured ones.

Table 5. Summary of Important Aquatic Animals by Socio-Economic and Gender Groups

Economic group	Gender	
	Men	Women
Rich	Snakehead Walking catfish *Micronesia apogon* Sand goby Whiskersheatfish* Spotted feather back* Yellow mystus* Silver barb*	*Micronesia apogon* *Wallago attu** Twisted jawfish* *Bacmong*** Yellow mystus** Catfish
Poor	Walking catfish Climbing perch Snakehead Barb Snakeskin gourami* Frog*	Walking catfish* *Micronesia apogon** Yellow mystus** Sand goby** Featherback** Snakehead**

Sources

In the map presented in Figure 1, a lot of water bodies are available in the village that serve as main sources of aquatic animals in the village. One of the main sources is the river located near the boundaries. A number of community water bodies like swamps, public pond and reservoir also provide places for the aquatic animals to live. Aside from these resources private systems like ponds and trap ponds in the rice fields can be a good source. During the rainy season, rice fields are the best places to collect AA.

Gear

Just like in other villages, fishermen or villagers use simple and common gears in collecting aquatic animals. However, there are some differences in gears depending on who is using it and what is being collected. The most common gear used by both rich and poor men is the cast net. Aside from the cast net, other gears like bamboo traps, gill nets and lift nets are also used by the villagers. For farmers with capital, they even use pump to drain the trap ponds to collect AA. In collecting AA from the rice fields or shallow areas, villagers only use simple gears, traps and sometimes their bare hands.

Table 6. Summary of Criteria Used in Ranking the Importance of Aquatic Animals

Economic group	Gender	
	Men	Women
Rich	Good price Taste Availability Versatility	Taste Availability Good price Versatility Preservability
Poor	Taste Availability Good price Versatility	Taste Availability Can reproduce Preservability Versatility* Price* Thrive in trap ponds

Seasonality of Aquatic Animals

Like the seasonal calendar of this village that showed and discussed the different situations in a year, aquatic animals also have their seasonality. The seasonal calendar for important aquatic animals shows the species' condition and where they are located in a particular time of the year. The details of this activity are presented in Annexes 4.1 to 4.4. In this village, the participants used the seasons as their reference in doing the seasonality of the important aquatic animals. The village has three distinct seasons: summer during February to May, rainy season from May to September and cold season from November to February.

In summer, most of the important aquatic animals are low in population especially when the rice fields get dry. The rice field is the biggest area for collecting aquatic animals during the rainy season. Most of the aquatic animals are in rivers and trap ponds. During this period, owners of trap ponds drain and/or harvest their ponds and sell most of the stocks or collection. Swamps and public ponds are dry or shallow during that time so most of the AAs are limited.

Beginning in May, the important aquatic animals start to increase due to the rain and increasing water in the river and swamp. Farmers would use traps and gill nets during this period. Most of the aquatic systems have water during this period and villagers can easily get aquatic animals especially in rice fields.

During cold season the species population again starts to decrease but the population in the stream increases as claimed by the rich women group. The men's catch of catfish during this period has an average of 5 kg, which is much higher than their catch during summer (0.5 kg).

Trends of Aquatic Animals

At present most of the aquatic animals are on an increasing trend as shown in the different diagrams done by the men group. However, this contradicts the perception of women in which they show in their diagram that species are declining. From the women's perception it's only barb and gourami that are increasing in number because of the rain and the introduction of culture species. From the period of 2524 to 2535, most of the important aquatic animals have been really low in population. The increase and decrease in population of these important AA is brought about by several factors.

Factors Affecting the Trend of Aquatic Animals

Use of chemicals in agriculture. The introduction of chemicals in rice fields badly affected the population of aquatic animals. Some important species use rice fields as their breeding ground because of the shallow water. But because of the presence of chemicals and strong fertiliser, these species have now become limited.

Lack of rain. In the trends, it showed a lot of incidents that there was very little rain. Thus, this also caused a decrease in the population of aquatic animals because most of the aquatic systems are dependent on rain for its water supply.

Increased population. The increasing number of fishermen and the increasing demand for aquatic animals also threaten the population of the species. Because of too many fishermen, collection practice is now shifting into more hazardous ways. Some farmers are now collecting species without selection and some are even catching the juveniles.

Construction of dam. The construction of the dam also affected the population of the wild aquatic animals because it blocks the way to these aquatic animals' breed places.

Farmers' Meeting

The last important activity of the PRA was the meeting with the farmers and some of the villagers. Although not all the participants attended the meeting, the activity was successful. This meeting was done after the group had translated all the outputs and collated the information. The team also made a simple summary of the outputs to show the differences in results as influenced by gender and well being factors. During the meeting some unclear issues were clarified with the farmers and participants checked and verified the interpretation done by the team. The villagers acknowledged that they also learned a lot during the exercises and they intend to use the data collected to plan for the village development.

Annexes

PRA Outputs

Seasonal Calendar

Annex 1.1 Seasonal calendar of rich men group

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Weather	Cold ← →		Sunny	Sunny	Sunny but start raining	Raining	Heavy rains ← →			Little rain and sunny	Cold ← →	
Tradition/cultures	New year			Songkran								End of year
Rice cultivation							Transplant ← →				Rice harvesting ← →	
Chilli	Harvesting ← →		Lease harvesting ← →						Transplant		Chilli harvesting ← →	
Vegetables										Planting	Harvesting	
Income/ expenses	Buy rice product		Pay BACC					Confusing work			Confusing work ← →	
Migration	Come back from Bangkok								Go to Bangkok			
Health				Changing climate (fever)		Diarrhea					Common colds	

Annex 1.2 Seasonal calendar of rich women group

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Weather	Cold ↔		Sunny	Summer	Sunny	Start raining	Heavy rains ↔				Cold	
Tradition/cultures	New year			Songkran								
Rice cultivation	Rice straw collection			Sow rice seed	Seedling	Transplanting ↔			Gestation period ↔		Harvesting	Threshing
Chilli/vegetables	Transplanting	Growing	Harvesting								Seeding	Transplant
Income/ expenses	Income from selling rice	Payment of loans		Selling chilli ↔			Buy fertilizer ↔					
Migration	Go to Bangkok ↔				Come back home		Come back for transplanting ↔			Go to Bangkok ↔		
Health					diarrhea						Common colds ↔	

Annex 1.3 Seasonal calendar of poor men group

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Weather	Cold	Sunny	Sunny	Summer	Start raining	Raining	Raining			Raining & cold	Cold	
Tradition/cultures	New year	Rice festival	Buddist lent	Songkran			Buddist lent	Rice festival		End of Buddist lent	Loikatong Katin	
Rice cultivation	Harvesting			Plough to sow seed	Transplant			Take care		Harvesting		
Chilli	Harvesting					Seedling	Growing			Harvesting and tend		
Vegetables	Growing	Harvesting				Growing	Harvesting and growing					
Income/ expenses/ "confusing"	Sold farm products (rice, chilli, corn, pomelo) Confusing					Payment of loans		Confusing				
Migration	Back home	Go to Bangkok			Come back to transplat			Go to Bangkok				
Health	Fever		Red eye	Common colds		Diarrhea						

Annex 1.4 Seasonal calendar of poor women group

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Weather	Cold	Sunny	Summer	Sunny	Raining	Raining ⟷				Cold ⟷		
Culture/tradition	New year	Rice festival	Wedding	Songkran			Buddist lent	Rice ceremony ⟷		Buddist festival ⟷		End of year
Rice farming	Harvesting	Stock rice			Seedling	Ploughing	seedling	transplant	Growing ⟷		Harvesting ⟷	
Orchard work	Harvesting ⟷							Seeding	Bed for plant	Transplant	Fertilizer & pesticide application ⟷	
Income/outcome	Sells of product	Pay loans				Confusing						Confusing
Migration	Come back home	Go to Bangkok							Go to Bangkok		Come back for harvesting rice	
Health			Common colds ⟷			Colds					Common colds ⟷	

Group activity profile

Annex 2.1 Activity matrix of rich men group

Activities	Name of Farmer					Total	Rank
	Pramote	Am	Sawat	Lein	Om		
Wickerwork	2	5	2	3	3	15	3.5
Rice farming	5	5	6	6	5	27	1
Orchard work	2	3	4	3	3	15	3.5
Livestock	5	3	2	2	4	16	2
Trading	6	0	3	2	3	14	5
Hired labour	0	2	3	2	0	7	6
Charcoal making	0	2	0	2	2	6	7
Total	20	20	20	20	20	100	

Annex 2.2 Activity matrix of rich women group

Activities	Name of Farmer					Total	Rank
	Sa	Warn	Sri	Sawang	Nooyard		
Rice farming	3	4	3	3	3	16	2
Orchard (chilli)	3	3	3	3	3	15	3
Needle work	0	3	0	3	4	10	4.5
Household duty	6	3	3	3	6	21	1
Livestock	4	0	4	2	0	10	4.5
Charcoal	0	3	0	2	0	5	10
Fishing	0	4	3	0	0	7	9
Hired labour	4	0	2	2	0	8	7.5
Collect food in the forest	0	0	2	2	4	8	7.5
Total							

Annex 2.3 Activity matrix of poor men group

Activities	Name of Farmer					Total	Rank
	Noo	Sawai	Samlee	Som	Mee		
Rice farming	4	4	5	5	4	22	1
Chilli	2	4	2	3	3	14	3
Livestock	2	3	4	3	3	15	2
Fishing	3	2	1	2	3	11	5.5
Vegetables	2	2	3	2	2	11	5.5
Wickerwork	3	2	3	2	2	12	4
Collect food in forest	2	2	1	2	2	9	7
Hired labour	2	1	1	1	2	7	8
Total							

Annex 2.4 Activity matrix of poor women group

Activities	Name of Farmer					Total	Rank
	Boonyang	Praivan	Arun	Sompong	Sarkorn		
Rice farming	0	6	7	6	5	24	1

Orchard work	3	2	2	4	5	16	3.5
Livestock	0	0	2	0	0	2	8.5
Needle work	0	4	2	3	3	12	5
Household duty	2	3	3	4	5	17	2
Collect food in forest	2	2	0	0	2	6	6
Fishing	0	0	2	3	0	5	7
Charcoal	0	0	2	0	0	2	8.5
Hired labour	13	3	0	0	0	16	3.5
Total							

Role of Aquatic Animals

Annex 3.1 Identification and ranking of important aquatic animals by rich men group

Aquatic Animals	Rank	Criteria				Total
		Price	Taste	Versatility	Availability	
Snakehead	1	3	4	3	3	13
Walking Catfish	2	3	3	3	3	12
Climbing Perch	15.5	1	0	2	2	5
Silverbarb	6.5	1	4	1	2	8
Small scale Mud Carp	44.5	1	0	0	0	1
Rohu	32	0	2	0	0	2
Nile Tilapia	44.5	1	0	0	0	1
Common Carp	21.5	4	0	0	0	4
Channa micropeltes	*9.5*	4	3	0	0	7
Yellow Mystus	6.5	4	2	0	2	8
	44.5	1	0	0	0	1
Greater Black Shark	44.5	1	0	0	0	1
Spotted Featherback	6.5	4	4	0	0	8
Barb	21.5	2	0	0	2	4
Jullien Mud Carp	12	4	0	0	2	6
Thynnichthys	15.5	2	1	0	2	5
	32	0	2	0	0	2
Sand Goby	4	3	2	2	2	9
Armed Spiny Eel	44.5	0	0	0	1	1
Spotted Spiny Eel	15.5	4	1	0	0	5
Siver Rasbora	21.5	1	0	1	2	4
Micronesia apogon	*3*	4	4	2	0	10
Wallago attu	*9.5*	3	2	2	0	7
Twisted Jaw Sheatfish	12	2	2	2	0	6
Whisker Sheatfish	6.5	4	2	2	0	8
Swamp Eel	21.5	1	2	0	1	4
Golden Little Barb	32	1	0	0	1	2
Acanthop	12	2	2	0	2	6
Tiger Loach	21.5	2	0	0	2	4
Yellow tail botia	21.5	2	0	0	2	4
Bocourt River Catfish	32	1	1	0	0	2

	26	2	0	0	1	3
Common Lowland Frog	15.5	1	2	1	1	5
	44.5	0	0	0	1	1
	32	1	1	0	0	2
	32	2	0	0	0	2
	32	2	0	0	0	2
	21.5	2	2	0	0	4
	21.5	1	2	1	0	4
Mole Cricket	32	2	0	0	0	2
Giant water beetle	44.5	1	0	0	0	1
Water bug	44.5	1	0	0	0	1
Insect	44.5	1	0	0	0	1
Freshwater Prawn	32	1	1	0	0	2
Pond Snail	32	1	1	0	0	2
Black Rice Crab	44.5	1	0	0	0	1
Krptopterus chueyi	*32*	1	1	0	0	2
Snakeskin Gourami	44.5	1	0	0	0	1
Three Spot Gourami	44.5	1	0	0	0	1
Trichopsis vittatus	*44.5*	1	0	0	0	1
	44.5	1	0	0	0	1
TOTAL		**90**	**53**	**22**	**34**	**199**

Annex 3.2 Identification and ranking of important aquatic animals by rich women group

Aquatic Animals	Criteria					Source	Rank	Total
	Taste	Availability	Price	Versatility	Preserva-bility			
Catfish	3	2	2	1	1		6	9
Snakehead	2	0	0	0	0		40	2
Climbing Perch	0				1		45	1
Sand Goby	2				0		40	2
Jullien Mud Crab	2				1		26.5	3
Osteochillus pidocephalichthys	2	1					26.5	3
Silver Rasbora	2				1		26.5	3
Smith Barb	3	1			1		11	5
Tiger Loach	3		1				15.5	4
Bocourt River Catfish	3						26.5	3
Yellow Mystus	3	1					15.5	4
Armed Spiny Eel	2						40	2
Wallago Attu	5	3	3	2			2.5	13
Twisted Jawfish	5	3	3	2			2.5	13
Micronesia apogon	5	4	3	2			1	14
Mystus	3	2	3				7	8
Greater Black Shark	3						26.5	3
Bony lipped Barb	3						26.5	3
Rasbora	4				1		11	5
Tiger Loach	3		3				8	6

Siamese Glass	0				2		40	2
Spotted Featherback	3			1			15.5	4
Silverbarb	3						26.5	3
Snakeskin Gourami	3	2					11	5
Bacmong	3	2	3	2			4.5	10
Golden Little Barb	2						40	2
Barb	1				2		26.5	3
	2						40	2
	2						40	2
Bagridae	3	2					11	5
	3						26.5	3
Tigerfish	3						26.5	3
	3	2					11	5
Yellow mystus	3	4	3				4.5	10
Common Lowland Frog	3						26.5	3
	3						26.5	3
Bull frog	3						26.5	3
Small frog	3						26.5	3
Small frog	3						26.5	3
Pond snail/River Snail	4						15.5	4
Giant Water Bug	3						26.5	3
Freshwater Prawn	3						26.5	3
Water Beetle	3						26.5	3
Insect	2						40	2
Apple Snail	2						40	2
TOTAL	**124**	**29**	**24**	**13**	**13**			**203**

Annex 3.3 Identification and ranking of important aquatic animals by poor women group

Aquatic animals	Criteria							Source	Rank	Total
	Taste	Availability	Versatility	Preserva-bility	Good price	Thrive in trap ponds	Can reproduce			
Walking catfish	5	2	3	4	3	2	3		1	22
Snakehead	5	3	0	0	0	2	3		3	13
Micronesia apogon	3	0	0	0	0	0	0		21.5	3
Barb	3	3	3	3	0	0	0		4	12
Spotted Featherback	0	0	0	0	0	0	0			0
Yellow Mystus	2	0	0	0	0	0	0		29.5	2
Jullien Mud Carp	2	0	0	3	0	0	0		15	5
Snakeskin Gourami	3	3	2	0	0	0	3		5.5	11

Thynnichthys	2	0	3	0	0	0	3		9	8
Puntius Silver Barb	3	0	0	2	0	0	0		15	5
Acanthop	3	0	0	0	0	2	2		11	7
Climbing Perch	3	0	4	3	0	3	2		2	15
Sand Goby	3	0	0	0	0	0	0		21.5	3
Common Carp	3	0	3	0	0	0	0		12	6
Wallago Attu	2	0	0	0	0	0	3		15	5
Swamp Eel	2	0	0	0	0	0	0		30.5	2
Freshwater Prawn	2	0	0	0	0	0	0		30.5	2
Striped Tiger Nandid	0	0	0	4	0	0	0		18	4
Armed Spiny Eel	2	0	0	0	0	0	0		30.5	2
Tiger Loach	2	0	0	0	0	0	0		30.5	2
Silver Rasbora	3	0	0	0	0	0	0		22.5	3
African Catfish	2	0	0	0	0	0	0		30.5	2
Great Black Shark	3	0	0	0	0	0	0		22.5	3
Round-tail Garfish	3	0	0	0	0	0	0		22.5	3
Trichopsis Vittatus	0	0	0	0	0	0	0			0
Black Rice Crab	0	3	0	0	0	0	0		22.5	3
Frog	2	2	0	0	5	0	2		5.5	11
Small Frog	2	0	0	0	0	0	0		30.5	2
	2	2	0	0	3	0	3		7	10
	3	2	0	0	0	0	0		15	5
	3	2	0	0	3	0	0		9	8
Gold Snail	0	0	0	0	0	0	0			0
Apple Snail	3	0	0	0	0	0	0		22.5	3
Pond Snail/ River Snail	0	0	0	0	0	0	0			0
Giant Water Bug	2	2	0	0	4	0	0		9	8
Mole Cricket	3	2	0	0	0	0	0		15	5
Common Skimmer	0	0	0	0	0	0	0			0

Water Beetle	2	0	0	0	0	0	0		30.5	2
Insect	3	0	0	0	0	0	0		22.5	3
TOTAL	**88**	**26**	**18**	**19**	**18**	**9**	**24**			**202**

Annex 3.4 Identification and ranking of important aquatic animals by poor men group

Aquatic Animals	Rank	Criteria				Total
		Taste	Availability	Price	Versatility	
Snake head	5	2	2	2	1	7
Walking Catfish	1.5	3	2	2	1	8
Featherback	5	2	2	2	1	7
Sand Goby	5	2	2	2	1	7
	14.5	2	1	2	0	5
Osteochilus Pidocephailchthys	*14.5*	2	1	1	1	5
Barb	9	2	2	1	1	6
Thynnichthys	*14.5*	1	2	1	1	5
Jullien Mud Carp	9	2	2	1	1	6
Silver Barb	14.5	2	1	2	0	5
	27.5	1	1	1	0	3
Hampala Dispar	38.5	1	1	0	0	2
Smith Barb	27.5	2	0	1	0	3
Greater Bony Dipped Barb	21	2	2	0	0	4
	21	2	2	0	0	4
Chanaa Micropeltes	38.5	2	0	0	0	2
Tiger fish		0	0	0	0	0
		0	0	0	0	0
Golden Little Barb	27.5	2	1	0	0	3
Swamp Eel	21	2	1	1	0	4
Pond Snail	38.5	1	1	0	0	2
Bocourt River Catfish	38.5	2	0	0	0	2
Yellow Mystus	5	2	2	2	1	7
Twisted Jawfish	9	2	2	0	2	6
Micronesia Apogon	1.5	2	2	3	1	8
Chaophaya Giant Catfish	14.5	1	0	3	1	5
Wallago attu	*7*	1	2	2	2	7
Black ear	14.5	2	0	3	0	5
Mystus	27.5	1	0	2	0	3
Kryptopterus Cheveyi	*21*	2	1	1	0	4
Tiger Loach	14.5	2	1	2	0	5
Siamese Giant Carp	38.5	2	0	0	0	2
Bagridae	14.5	1	2	2	0	5
Climbing Perch	50	1	0	0	0	1
Soft Shell Turtle	50	1	0	0	0	1
Tiger Loach						
Spotted Spiny Eel	21	2	1	1	0	4
Silver Rasbora	38.5	2	0	0	0	2

Three Spot Gourami	38.5	1	1	0	0	2
Round Tail Garfish	50	1	0	0	0	1
Striped Tiger Nandid	50	1	0	0	0	1
Red-tailed Snakehead	38.5	1	1	0	0	2
Trichopsis vittatus	*50*	1	0	0	0	1
Small frog	27.5	1	1	1		3
	50	0	1			1
	38.5	1	1			2
	50	0	1			1
	50	1	0			1
	38.5	1	1			2
	38.5	1	1			2
Frog (Common LowLand)	38.5	1	1	0	0	2
Freshwater Prawn	27.5	1	1	1	0	3
Snail	27.5	2	1	0	0	3
Crab	38.5	1	1	0	0	2
Waterbug	27.5	1	1	1	0	3
Water beetle	38.5	1	1	0	0	2
Insect	50	1	0	0	0	1
TOTAL		79	54	43	15	191

Aquatic Animals Seasonality

Annex 4.1 Rich men

Aquatic animals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Snakehead		Catch in the field and from trap ponds			Gill net Fish trap (Bamboo) Trident 3kg/time; male usually catch from the field also			Fish hook Cast net 1 – 2 kg/time Catch from the rice field			Pumping the trap pond 24 kg/time children and elders	
Catfish		Catch in the field and from trap ponds			Gill net Fish trap (Bamboo) Trident 3kg/time; male usually catch from the field also			Fish hook Cast net 1 – 2 kg/time Catch from the rice field			Pumping the trap pond 24 kg/time children and elders	
Kryptopterus											Cast net, gill net 3 kg / time catch from Lam say (Stream)	
Sand Goby											Cast net, gill net 3 kg / time catch from Lam say (Stream)	
Whisker sheatfish												
Gold catfish												

Annex 4.2 Rich women

Aquatic animals	Summer					Rainy					Cold	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Kryptopterus	40% Catch from Lam say stream Fish hook, gill net (men & women), cast net (Men)					Not convenient to fish					60% Catch from the stream String hook & gill net by men;	
Greatwhite sheatfish	40% Catch from Lam say stream Fish hook, gill net (men & women), cast net (Men)					Not convenient to fish					60% Catch from the stream String hook & gill net by men;	
Twisted jaw shetfish	40% Catch from Lam say stream Fish hook, gill net (men & women), cast net (Men)					Not convenient to fish					60% Catch from the stream String hook & gill net by men;	
Yellow mystus	40% Catch from Lam say stream Fish hook, gill net (men & women), cast net (Men)					Not convenient to fish					60% Catch from the stream String hook & gill net by men;	
Bacmong	40% Catch from Lam say stream Fish hook, gill net (men & women), cast net (Men)					Not convenient to fish					60% Catch from the stream String hook & gill net by men;	
Catfish	30 % Catch in the rice field, trap ponds, streams Fish hook, cast net, trident Mostly men carching					40 % Catch in the ricefields Gear : Fish hook, trident, bamboo trap Both men and women catching					30% Catch in the field Gear: Fish hook, trident	

Annex 4.3 Poor men

Aquatic animals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Kryptopterus											Fish hook, cast net, gill net 1 kg/time Catches by men	
Catfish			Pump trap pond both by men and women Uses: trident, knife, flash light by men 0.5 kg/time (every season , two times)						Fish hook, cast net 5 kg/day Catch from the field by Men			
Snakehead	Fish hook, flashlight, trident Catch from the stream by Men								Fish hook, cast net, trap 1 – 4 kg/time Catches by Men in the field			
Wallago Attu		Trap, fish hook Catches from the stream by men 10 kg/time										
Yellow catfish			Trap Catch by men 1 kg/time			Trap from the stream by men 2 kg/time				Fish hook, cast net Catch from the stream by Men 1 kg/ time		
Feather back			Trap Catches by men and women 2 kg / time									

Annex 4.4 Poor women

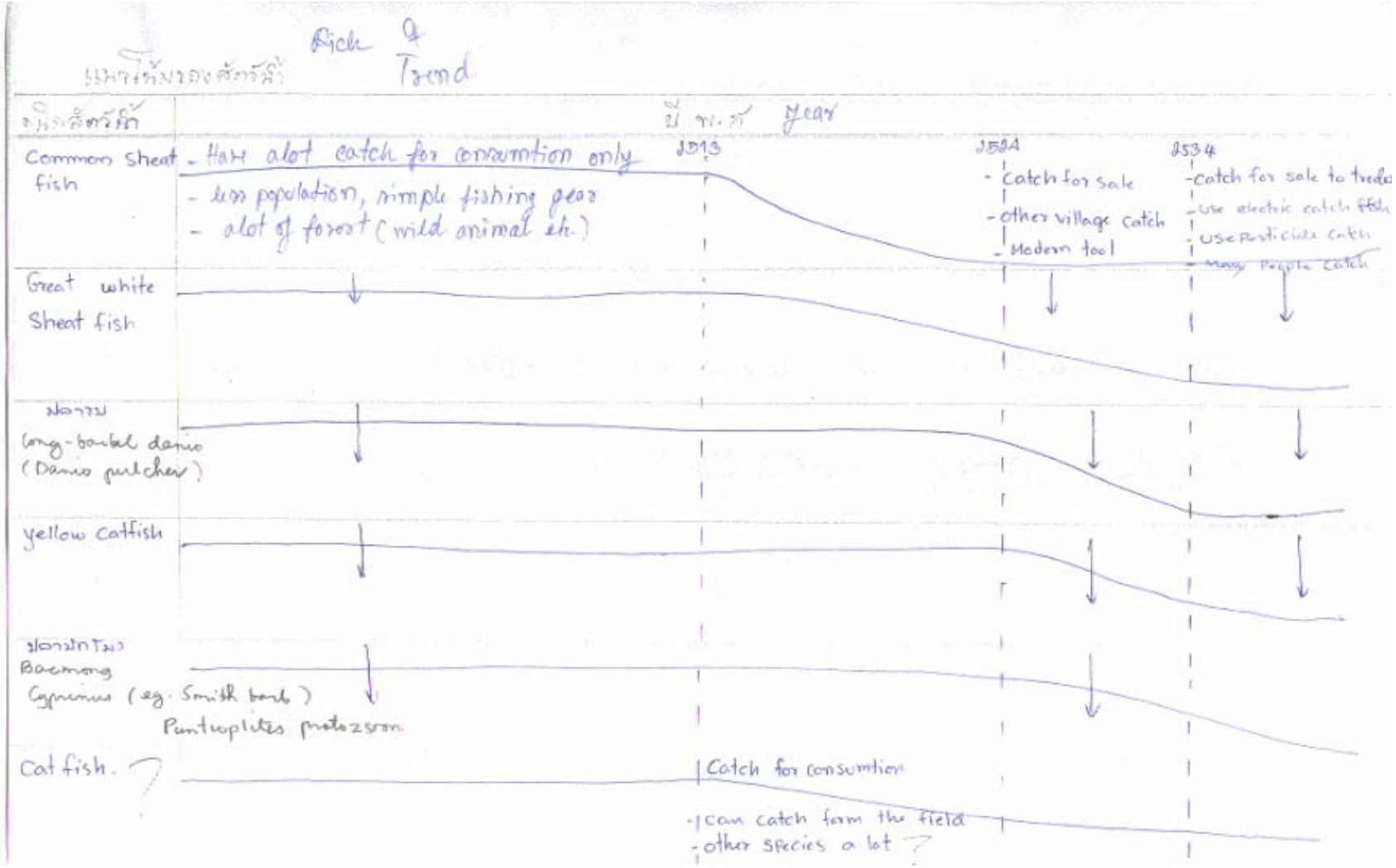
Aquatic animals	Summer				Rainy				Cold			
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Catfish	20% Uses cast net, gill net, trap net Catches in village pond				50% ; Use trident, fish hook, and gill net Catches in stream and paddy field				30% Uses basket, fish hole and trap Catches in paddy fields			
Snakehead	20% Uses cast net, gill net, trap net Catches in village pond				50% ; Use trident, fish hook, and gill net Catches in stream and paddy field				30% Uses basket, fish hole and trap Catches in paddy fields			
Climbing perch	10% Uses cast net, gill net, trap net Catches in village pond				70% ; Use trident, fish hook, and gill net Catches in stream and paddy field				20% Uses basket, fish hole and trap Catches in paddy fields			
Barb	20% Uses cast net, gill net Catch in Lam sey bai stream				50% Uses cast net, gill net Catch in Lam sey bai stream				30% Uses cast net, gill net Catch in Lam sey bai stream			
Frog	20% Uses spade and catches in the field				60% Uses scoop net in the field by men				Fish hook, line, frog traps Catches by men and women in the field			
Gouramy	10 %; trap pond by men and women uses pump and dip net				70% Uses gill net, dip men Both men and women catches in the field				20% Uses dip net Catches by women in the field			

Aquatic Animal Trends

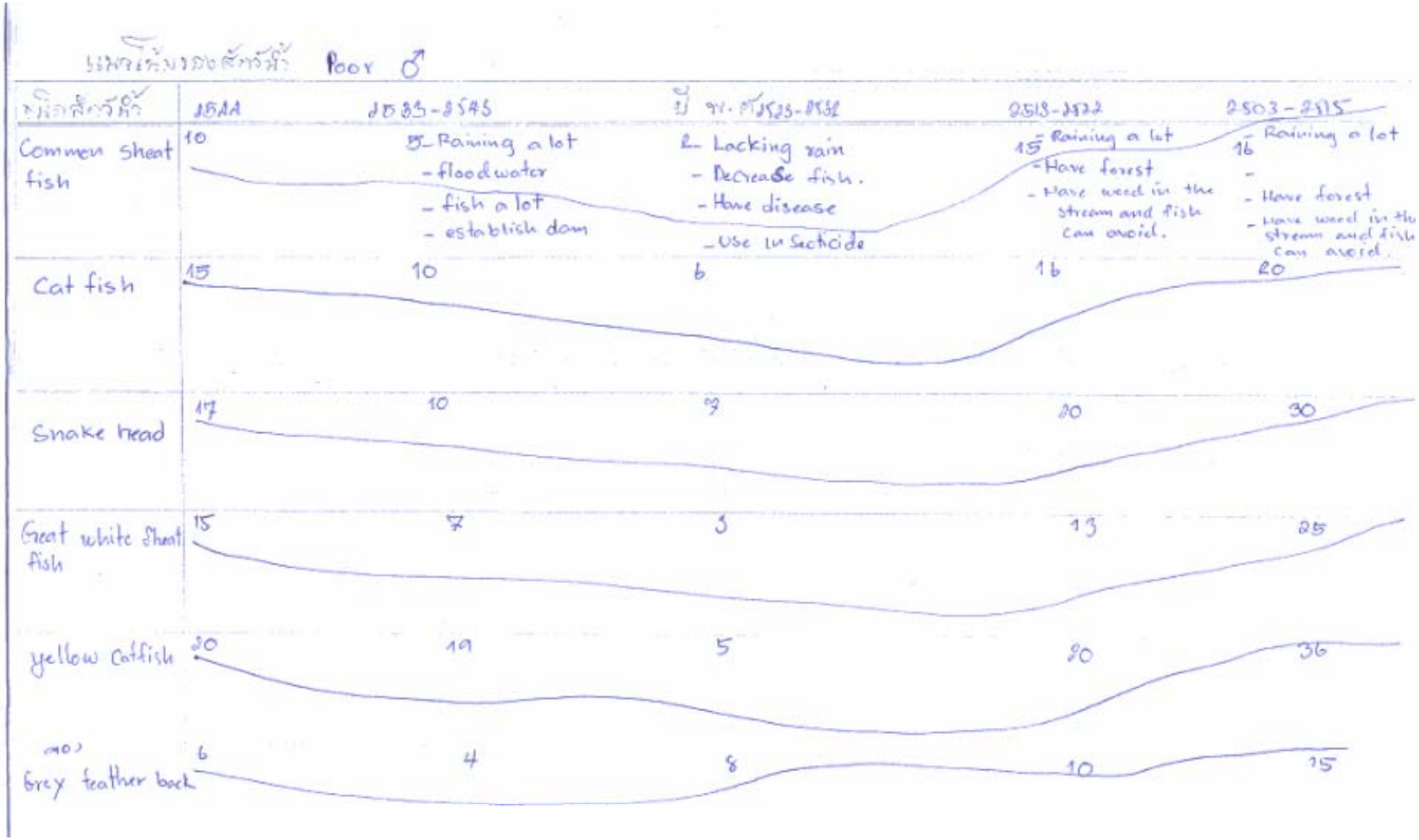
Annex 5.1 Rich men

Aquatic animals	2544	2533-2543	2523-2532	2513-2522	2503-2512
Snakehead	**6**	Chemical 100% **5**	Chemicals Lack rains **6**	Chemicals A lot of people Modern tool for catch **8**	No chemicals No Lease of people Tools for catch not up to date Fish not decrease **10**
Catfish	**6**	**5**	**6**	**8**	**10**
Common sheatfish	**7**	**4**	**6**	**10**	**10**
Sand goby	**4**	**5**	**7**	**10**	**10**
Whisker sheatfish	**9**	**5**	**6**	**9**	**10**
Yellow catfish	**5**	**6**	**8**	**9**	**10**

Annex 5.2 Rich women



Annex 5.3 Poor men



Annex 5.4 Poor women