

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

**Participatory Rural Appraisal in Ban Yangnoi  
Case Study 5  
(PRA Report from 2001)**

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**May 2002**

## Yang Noi 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 important that the information is generated from the primary stakeholders - the farmers/villagers.

#### *Objectives*

The main objective of the study is to have a clear picture of the livelihood activities in the village as a whole and to establish rapport with the villagers. To attain this main objective 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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Ms Noppanan Yuroong	- Biologist Udorn
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#### *Schedule of Activities*

The workshop was done in five days including the collection of secondary data for selection of village (see Table 1). During the first day collection of secondary information was conducted in two provinces close to each other. Selection of villages was done during this period. On the second day the PRA team introduced to the villagers the activities of the project and conducted preliminary exercises prior for the next day activity. Mapping and tracing the history were carried out. Well-being ranking was also conducted during the first day in the village to identified villagers for the next day activity.

The second and third day were 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.

Table 1. Schedule of Activities for PRA Workshop in Yangnoi Village

Date	Activities
18 June 2001	Collection of Secondary data
19 June 2001	Introduction of project to the village head Village profile Identification of PRA participants
20 June 2001	PRA exercises (Rich group)
21 June 2001	PRA exercises (Poor group)
22 June 2001	Processing of PRA outputs Presentation of PRA outputs

## Yasothon Province

### Description

Location: Situated in northeast Thailand with an altitude of 15<sup>o</sup> - 16<sup>o</sup> north longitude 104<sup>o</sup> - 105<sup>o</sup> East. Approximate distance from Bangkok at 552 km.

Total area: 4,161.664 km

### Boundaries:

Northern: Roi-et and Mukdahan province  
 Eastern: Ubolratchathani and Amnatecharoen  
 Southern: Srisaket province  
 Western: Roi-et province

### Administrative:

9 district  
 79 sub districts  
 838 villages

Total population : 553,982

Main occupation: Agriculture (Production depending on the climate)  
 Main crops: Rice, cassava, kenaf, water melon

Topography: Flat and highland (227 ft above sea level). Some areas are mountainous, specially in the northern part.

Soil type: Sandy soil and low water retention. Low fertile and some areas are high in salinity.

Water resources: Chi river, Lamsay by, Lampong, Tabtoo stream, Lamyung

### Yang Noi Village

Rainfall average: 1618.67 mm per year - heavy rain on July and August  
Total days of rainfall : 85 days in a year

#### Khamkeankeaw District

Location: Situated on the eastern part of Yasothon province and approximately 23 km away from the province proper.

Total area: 638.40 km<sup>2</sup>

#### Boundaries:

Northern: Muang district of Yasothon province  
Southern: Mahachanachai district  
Eastern: Muang district of Yasothon and  
Western: Phanomprai district of Roi-et province

#### Administrative:

13 sub-districts  
109 villages

Total population: 74,387

Total households: 14,810

Main source of income: Agriculture

Main crop: Rice, kenaf, cassava, etc.

Total land for Agriculture: 33564.48 hectares

Topography: Generally flat but highland. Sandy loam type of soil and low capacity to hold water.

Water resource: Chi river, Lamsayby (both traverse the district and supply most of the agriculture area), Thom stream, Kalaos stream, Phrom stream, Lekpiek stream, Kudnai stream, Sanab stream, Muangkea and Boakea stream.

Rainfall: 1600 mm per year

### **Selection Process for the Village**

The village was selected using the criteria on the distance with the water bodies and socio-economic level of the area. The group visited the commune office to get the baseline information about the district and commune. Using the map and secondary data the area was visited and performed a transect walk to see the elevation and status of the area. After doing the transect walk and an ocular inspection, the village was selected.

### **Specific Methods Used**

*Village (Resource) Map* - Mapping of the resources was done 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 grouped 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. To establish the resource context of the village, mapping (village map) exercise was done with a group of key informants in the community headed by the village headman. After setting the resource context of the community, the social context was established. 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 the next two days' 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.

The second part of the activity was conducted during the second and third day. During the second day the group of rich men and women performed the same task of describing and discussing the situations of the village in the year. The following day the

group of poor men and women performed the same group of activities carried out by the rich group. 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.

## **Setting the Context**

### ***Mapping the Current Resources Context***

**Land resource.** Generally large portions of the village's land area are devoted for agriculture, rice farming in particular. The household area is concentrated in one area in the village, which is the middle part. Surrounding the cluster of houses are the rice fields by the villagers. Higher parts of the village serve as forest where wild plants and animals can be collected.

**Water resource.** The village has a lot of water resources. Two rivers can be found near the boundaries of the village which serves as sources of aquatic animals for village consumption and for income source. Aside from natural water bodies, a lot of man-made water bodies can be found in the village. On the field several trap ponds are situated and made intentionally for collecting aquatic animals and water impoundment. As a common property the village has community pond and village pond

**Physical/social resource.** One of the biggest structures in the village is the temple. They used the temple in community-based activities such as religion and festivals. Shops that sell the basic daily needs of the villagers are also available in the village. The road is one of the most important physical resources in the village. Major development happened after the construction of the laterite road.



## Mapping the Development Context

The village was established a long time ago (1827) when some people started migrating from other villages to Yangnoi. But it was only in 1857 when the village was given a name and started with 15 households. It was in the year 1934 when the village had its first village headman. The development in the village started even before the first village headman. The first major development in the village was the construction of the school. This brought a lot of changes in the village specially to the children. The road was the second important development activity in the village. Since the construction of the road in 1941, more development was done in the village.

Although it was not mentioned during the exercise, the villagers said that the area had a lot of wild animals before. The development in agriculture and fisheries only started on the early 60's. The use of pesticides and chemical fertilizer started almost the same year in the village. In the field of fishing, the use of battery lamp started at the same period when the chemical fertilizer was introduced. There was not much significant event happened in the agriculture and fisheries in this village.

After the road was built several activities happened in the village. Improvement in the livelihood was observed after the introduction of new transport (bus), more intensive way of rice cultivation and other modern agricultural activities. Because of intensive farming and most of the villagers in the area are farmers, cooperatives were established in the village. Even up to the present a lot of developments are still happening into the village (Figure 2).

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

Year	Events happened
2370 (1827)	People started migrating to the village Village was established ( 2 - 3 HH)
2400 (1857)	Village was given a name 15 households
2460 (1917)	School was established also for other villages
2467 (1934)	First village headman Temple was built
2483 (1940)	New school for other villages
2484 (1941)	Good road was built
2493 (1950)	School moved to another area Village headman became head of sub district
2500 (1957)	2 <sup>nd</sup> village headman 1 <sup>st</sup> transistor radio School moved again
2503 (1960)	Start to use chemical fertilizer
2505 (1962)	Started planting melon Used pesticides Started using lamp in catching fish (before uses torch)
2507 (1964)	3 <sup>rd</sup> village headman



2508 (1965)	Stopped planting one variety of sticky rice First bus in the village
2510 (1967)	Started planting mushrooms
2513 (1970)	Pavillion in the temple was built
2514 (1971)	1 <sup>st</sup> two-wheeled tractor
2516 (1973)	4 <sup>th</sup> village headman
2519 (1976)	New building in temple
2521 (1978)	FLOODING 5 <sup>th</sup> village headman
2523 (1980)	New road was built
2525-26 (1982-83)	Electricity came
2526 (1983)	Built pavilion over village pillar 6 <sup>th</sup> village headman Film company came to make movie Community pond improved (deeper) 1 <sup>st</sup> women group in agriculture Some teachers came to the village for villagers cannot afford to go to school and taught sewing and engine
2527 (1984)	Road improved Started cooperative but not successful
2528 (1985)	Started rice bank Cooperative became successful
2529 (1986)	Rice bank moved (closed to temple)
2530 (1987)	Rice bank also takes buffalo/cow Loud speaker installed in the village New trading cooperative
2533 (1990)	2 <sup>nd</sup> loud speaker installed New door on temple
2534 (1991)	Rice mill built
2535 (1992)	Tap water
2537 (1994)	Crematorium in temple
2538 (1995)	Bell tower in temple City pillar pavilion improved
2540 (1997)	Asphalt road
2541 (1998)	Stop planting melon
2542 (1999)	1 <sup>st</sup> telephone box
2543 (2000)	1 <sup>st</sup> concrete road in the village More tap water FLOODING
2544 (2001)	New concrete road New road to another village We come to village to do PRA

## Mapping the Social Context

Yangnoi village is relatively poor. Most of the villagers get their income from farming. Although generally poor there are still farmers that can be classified as better-off. Using the well-being exercise the villagers were able to group the community into five (5) socio-economic groups. The villagers used different criteria in classifying household's well-being. See Table 2.

### Characteristics of socio-economic group

**Source of income.** Sources of income in the village vary widely among groups of people. In few cases, some households do not have a permanent source of income. Most of the villagers under the low income or resource-poor group are earning from working on-farm and off farm activities. Some households under this group are getting remittances from a young member of the family who works outside the village. Households under middle and high-income group have other sources of income aside from the farming activities. Most high-income earners in the village are working in the government.

**Land holding.** Land is used in this village to gauge the well-being of the villagers. Some households under the resource poor group do not own land and in most cases they have very small area of land. Middle income and rich villagers in this community generally have land for their farming activities. On the average better-off families own 50 - 80 rai of land.

**House.** Generally, resource-poor families live in small houses made of light materials like leaves and grass. Some houses from this group are not complete. Cemented and commonly big are the houses of better-off families.

**Livestock.** One of the most important criteria being used to rank the well-being in the village is the quantity of livestock they have. Livestock can be used in their farming activities and can also serve as source of income. For poor families in most cases they do not have livestock or sometimes have very few (0-1). Better-off families generally own a number of livestock like cows and buffalo (2 - 4).

**Equipment/asset.** Number of assets and appliances can also dictate the well-being of families. Better-off families have complete house appliances. They also have good equipment for farming like tractors and rice mill. For the poor group farming equipment is very important than appliances but in some cases these essential things are also lacking in them.

**Transport.** Better-off and middle group generally have transport. Families under this group have pick-up, cars and other kind of transport. Most farmers under resource-poor group do not own any kind of transport.

Table 2. Characteristics of socio-economic group in Yangnoi village

Rank	Group of women	Group of men
<b>I</b>	Old and living alone No 2-wheeled tractor Landless Disabled and cannot work Getting some remittance from children	Old, living alone Disabled Some have no land No livestock No money/capital Small house
<b>II</b>	Land holding of 10 - 20 rai Not much difference with the 1 <sup>st</sup> group	Young family Have 10 - 20 rai of land Some with home appliances Have livestock (2 - 3 cow/buffalo) Children work in the city (Bangkok)

<b>III</b>	Several sources of income ( farmer, shopkeeper, government employee, poultry etc) Land holding of 20 - 30 rai	Have 20 - 50 rai of land Have livestock ( 2 - 3 cows) Some have appliances like TV, fan, fridge, etc
<b>IV</b>	Big house Some family member work abroad Teacher/government employee Land holdings of 70 -100 rai With transport (pick-up) With tractor	Government worker Have 50 -80 rai land Have small shop Have livestock (2-4 cow/buffalo) Have appliances at home Getting remittances with children working in Bangkok
<b>V</b>		Have 100 rai of land Government worker, teacher Some family member work abroad Have appliances like TV, fan, fridge etc. Have transport (pick-up) Have rice mill and tractor for field

### Activity Profile of the Village

Generally villagers from Yangnoi are farmers. Among the four groups it's only the group of poor women who did not rank rice farming as their most important activity. Poor women ranked housekeeping as the most important activity for them. For men group, both rich and poor, their most important activities are income-gaining. For women group in both poor and rich, both productive and reproductive activities are important to them.

Fishing is also an important economic activity by all the groups in this village. The group of men, both rich and poor ranked fishing higher compared to the way the female group ranked this activity.

Table 3. Summary of the important activities in the village by gender and well-being group

Economic group	Gender	
	Men	Women
<b>Rich</b>	Livestock Rice cultivation Vegetables Fishing Fish culture Forest food Charcoal Wage labour	Rice production Housekeeping Vegetables Wage labour Livestock Fishing* Forage food* Weaving
	Livestock Vegetables Rice production Fishing Forest food	Housekeeping Rice cultivation* Vegetables* Livestock Wage labour**

<b>Poor</b>	Handicrafts	Fishing** Forage food** Weaving reed mats Weaving clothes Fish culture
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## Seasonality

**Weather.** The perception on weather in the village has some differences based on gender. For women, the start of the rainy season is in May but men think that the rainy season starts early June. The length of duration of rain are the same with both groups. For poor group both men and women they can experience rain for 6 months while richer group can only recall five months of rain. Most of the poor group normally work outside in the field and can really experience the end of the rain. The cold weather is experienced in the village for 3 - 4 months per year. Although no particular reason was given, poor women experience a very short time of cold weather. February to March is the start of the hot season in the area.

**Tradition and culture.** Tradition and festivals are being celebrated by all the villagers in the community regardless of the social group they belong to. Most of the festival in the area are religious related activities. The poor group do not have festival or celebration during the month of June, which is the peak season for agricultural activities in the village.

**Economic activities.** Most of the economic activities in the village are agriculture-related. In all groups, rice cultivation was mentioned as one of the most important economic activities. For poor men group only March and April are the months were they do not have activities on rice cultivation. Poor women do not have rice activities also from December to February. The rich group has activities for rice throughout the year (See Annex on Seasonal calendars). The economic activities of the different groups vary depending on the season of the year. From June to December, villagers are very busy doing several economic work.

Fishing is also an important economic activity in the village although it was not ranked as the highest. Poor men usually have whole year activities in collecting aquatic animals. The poor women, rich men and women group only collect aquatic animals during rainy season. For poor men, they can collect aquatic animals even during dry season. They tend to go to other places to collect aquatic animals.

Fish culture was mentioned by group of rich men and poor women as an economic activity. Among poor households, most of the time the men are out in the field and doing agricultural work while the wife is doing other activities in the house including looking after their ponds. The rich men consider fish culture as an economic activity since most of the time they are the one managing the system.

Table 4. Summary of the economic activities in Yangnoi village by gender and well-being group

Economic group	Gender	
	Men	Women

<b>Rich</b>	Rice cultivation Vegetable Fish culture Fishing Forage food Charcoal making Wage labour	Rice cultivation Vegetables Livestock Weaving clothes Fishing Forage food
<b>Poor</b>	Rice cultivation Vegetables Livestock Fishing Handicraft Forge food	Wage labour Rice cultivation Weaving mats and clothes Livestock Fishing Forage food Vegetables Fish culture

**Migration.** Both rich and poor women group do not migrate with in the year. In most cases men migrate to other places for work and additional source of family income. Poor men normally go to Bangkok and other places to work as helper of labourer. They just come back to the village during rice cultivation. Some family members do not go back to the village and just send remittances to their family.

**Health.** In general the health condition in the village is relatively good. Both groups just experience common cold and flu during the beginning of rainy season and cold season. During the period of rice cultivation, most of the poor group are very busy and tired.

### Role of Aquatic Animals

Due to each location and water resources available in this village, aquatic animals play a very important role in the village. Villagers are more familiar with the different aquatic animals available in the area. Villagers collect and consider aquatic animals very important to their livelihood.

**Source of income.** For poor men group, aquatic animals are important because they are easy to catch and have good price. Although was not scored high in other group the value of the species when sold is being considered in the village.

**Food supply.** For food consumption is another important role of AA in the village. In all groups the criteria that they used in ranking the importance of the species are all related for consumption. Among the criteria the versatility was also ranked high. Villagers prefer to collect aquatic animals that can be prepared in different ways.

### Important Aquatic Animals

All of the group were able to identify species from 38 to 57 species. Most of the important aquatic animals are similar in all groups. Like in other villages in north of Thailand snakehead, walking catfish and anabas always ranked high by the villagers. The availability and  
*Yang Noi Village*

the value of these species make it more important to the villagers. Majority of the important species identified are from the wild and not cultured.

Table 5. Summary of important aquatic animals in the village by rank

Economic group	Gender	
	Men	Women
<b>Rich</b>	Snakehead Spotted spiny eel* Swamp eel* Freshwater prawn* Walking catfish Common lowland frog** Pond snail** Silver barb** <i>Micronesia apogon</i> ** Anabas	Snakehead Walking catfish Freshwater prawn Spotted spiny eel Anabas Golden little barb
<b>Poor</b>	Snakehead Walking catfish Swamp eel Anabas Spotted spiny eel Freshwater prawn	Snakehead Walking catfish Anabas Butter catfish* Yellow mystus* Jullien mud carp* Stripped croaking gourami* Silver barb* Freshwater prawn* Pond snail* Snail*

#### Source

In the village, there are a lot of sources where they can collect and get aquatic animals. Some of the rich or even poor groups have their ponds, which is one of the sources in the village. Culture ponds are normally in the rice fields or close to their houses. Trap ponds are also another place where they can collect aquatic animals. Trap pond can be man-made or natural bodies of water. Aside from the above mention, rivers, swamp and rice fields are the other sources of aquatic animals.

#### Gear

Since most of the villagers collect aquatic animals for their own consumption, simple fishing gears are being used in the village. Both poor and rich men use cast net in collecting AA. Some rich farmers with ponds use pump in draining the system and collecting aquatic animals. For poor men, and women aside from cast net, they also use traps and scoop net in collecting aquatic animals. In paddy fields, small shovel, hook and trident are being used.

Table 6. Summary of different criteria used by different group in ranking the importance of aquatic animals.

Economic group	Gender	
	Men	Women

<b>Rich</b>	Availability Versatility Good price Taste	Availability Taste Versatility Good price
<b>Poor</b>	Easy to catch Good price Taste Versatility Preservability	Versatility Taste Availability

### *Seasonality of Aquatic Animals*

The quantity and quality of aquatic animals in the village change through the seasons. The village has three distinct seasons. The rainy season starts from June to September. Cold season starts from October to February and summer starts from March to May.

### *Trends of Aquatic Animals*

In general the trend of aquatic animals in the area is decreasing since 2500 (1957). Due to several factors most of the aquatic animals are decreasing. For rich men group's perception some aquatic animals are increasing in population like snakehead (Chana sp), Swamp eel, shrimp and climbing perch. The spiny eel and walking catfish are in decreasing trend. Perceptions of rich men are very different from poor men. For poor men most of the important aquatic animals are increasing in trend since 1999 due to rain and flooding. Even the spiny eel and walking catfish are in an increasing trend.

For the women group, both have perceptions that important aquatic animals are increasing in population. The two women group illustrated in the chart (see Annex) the most of the animals are in upward trend and only snakehead in downward trend. There are several factors that are affecting the downward and upward trend of aquatic animals in the village.

Use of chemical in the rice fields. All the groups admitted that the intensive use of chemical in the rice fields negatively affect the population of the aquatic animals in their system. Although was not mentioned in the same time by the groups the effect of the agrochemicals in the system has a great negative impact.

Natural calamities. Different calamities were mentioned by all groups that affect the trend of the species in the water bodies. The most common calamity that affects AA in the area is flooding. All the groups mentioned that the reason for the increasing trend of the AA at present is due to the flooding few years ago. Flooding bring old and new species in the area. Drought also experience in the area, which caused the declined of some of species. During 2520 (1977) snakehead started to decline when long drought was experience in the village. Most of the aquatic animals were also affected by this calamity.

Diseases. It was in the year 1996 when most of the aquatic animals in the area suffered from the EUS epidemic. The population of almost all of the aquatic animals decreased during this period. Since then the trend of AA started to decrease again.

Over fishing. The demand of AA increases as the number of fishermen in the village increases. Some farmers tend to collect breeders or even juvenile since the quantity of the species is not sufficient to match the number of fishermen in the area.

### **Farmers' meeting**

After translation and analysis of the PRA exercises the group triangulate the output and interpretation with the farmers. The group organized a meeting with all the groups together. Not all of the participants from the three-day workshop attended the presentation. Other villagers were also invited and participated during the triangulation.



**Annexes**

PRA outputs

Seasonal Calendar

Annex 1.1 Seasonal Calendar of rich men group

Activities	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Weather	Very hot	Warm	Start raining	Heavy rain	Heavy rains / Floodings	More rains Floodings	Less rain	Start of cold season	Cold	Warmer but still cold	Start of dry season	Summer (hot)
Social events	Songkran festival	Rocket festival	Village spirit festival	Buddist lent			Candle festival	Offerings to monk	King's b-day	New year	Buddist festival	Wedding
Rice cultivation	Fertilize with buffalo manure and prepare seeds		Weeding, chemical fertilizer		Weeding		Chemical fertilizer	Harvesting		Transport & storage		
Vegetables			Plant chilli, cucumber, squash	Fertilize	Take care	Harvest chilli		Plant onion				
Fish culture		Stocking	Feeding and management					Harvest	Drain pond			
Livestock	Buffalo in the field		Cut grass & feed livestock in pens					Buffalo in the field				
Fishing			Catch tadpole + anabas	Catch fish with hook in rice fields			Fish trap in ricefields					Fishing day in community pond
Forage in forest		Bamboo shoot + mushroom + red ants										
Charcoal making	Charcoal											
Wage labour		Rice activities						Rice harvest				
Income/busy months		Expenditure for fertilizer								Sell rice		Save money
Migration	Younger men goes to Bangkok for work											
Health	Good health with mild colds and fever; happy during festival and harvesting											

Annex 1.2 Seasonal Calendar of rich women

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Weather	Cold	Warmer	Sunny	Hot	Start rain	Raining	Heavy rains		Less rain	Cold	Very cold	
Social events	New Year	Buddist festival offer rice to monks	Wedding	Songkran festival	Village spirits festival	Monks ordained	Buddist lent			Candle festival	Offering to monks	
Rice cultivation	Store in barn	Selling ice		Sow seed	Weeding	Transplant			Harvest			
						Fertilize						
Vegetables												
Livestock					Cut grass to feed buffalo							
Weaving clothes + mats												
Housekeeping	Taking care of children, cooking, cleaning etc.											
Fishing			Drain ponds	Harvest fish		Tadpoles				Collect in channels		
Forage in the forest			Crickets + grasshopper + red ant eggs + bamboo shoot + mushroom									
Income/busy months	Selling rice		Busy with rice fields						Busy with rice fields			
Migration	None											
Health	Colds					None		Colds				

## Annex 1.3 Seasonal calendar of poor men group

Activities	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Weather	Sunny	Sunny Start rain	Raining	Heavy rain →		Last rain	Less rain start cool	Very cold	Cold	Cold	Sunny	Very sunny
Social events	Rocket Wedding Monk to temple		Buddist lent	Village festival	Village festival	End of buddist lent	Buddist festival Wedding		New year	Village festival	Wedding	Songkran
Rice cultivation	Plough	Seedling	Transplanting ←→			Fertilizer weeding	Harvesting ←→		Transport to storage	Sell		
Vegetables									Grow sweet corn to eat & sell ←→			
Livestock (Cow + buffalo)	Paddy		Keep in pen - feed with rice straw or cut grass ←→				In paddy field but need to take care ←→					
Fishing	Cast net Battery	Fish hook, trap, gill net ←→		Fish hook, trap, gill net, cast net ←→			Hole trap, hook, trap, cast net, gill net ←→		Hook, trap, gill net ←→		Cast net, battery for small frog ←→	
Handicraft				Make fish trap + cast net ←→								
Forage for food in forest	Red ant eggs, mushroom, insects ←→							Collect grasshopper from rice straw (dry season) ←→				
Income/busy months	Buy fertilizer, petrol, repair tractor ←→			Busy with rice cultivation, cow + buffalo (tired) ←→						Sell rice ←→		Pay BACC ←→
Migration	Young people to Bangkok		Return for rice cultivation		Back to Bangkok		Back for harvest		Back to Bangkok ←→			
Health	Happy (festivals)	Colds+ mosquito fever		Very tired for rice cultivation ←→					Good health			Very hot

**Annex 1.4 Seasonal calendar of poor women group**

Activities	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Weather	Very cold		Warm	Hot			Rainy	Lots of rain	Not too rainy	Heavy rain	Rains Flooding	No rain Flood decrease
Social events	Wedding	New year	Buddist festival Offer rice to monk		Rocket festival Songkran	Village spirit festivals Bring sand to temple		Buddist lent				Offering to monks Loi krattong festival
Wage labour	Rice harvest						← Rice transplanting →				Rice harvest	
Housekeeping	All year round											
Rice cultivation		No work ← →		Make ridge	seedling	Weeding + fertilizing	← Transplanting, take care →				Early harvest Weeding fertilizer	Harvest
Weaving Clothes Reed mats	← Weave →						← Collect reed from rice →			← Weave →		
Livestock	Harvest hay for buffalo						Keep buffalo in pens					
Fishing			← Snails + small fish shrimp →				Tadpoles		← Trap fishing →			
Forage in forest				Cricket + grasshopper		Mushroom + Bamboo shoot + Red ant eggs					Cricket + grasshopper	
Vegetables	Coriander, eggplant, onion, cucumber, chilli				Potatoes							
Fish culture			← Fish harvest →				Stock fish					
Income/busy months	Busy			No money, work, food, schl opening	Very dry	← Very busy →						Busy
Migration												
Health		← Happy/ok →			Too hot	Colds Mosquito fever	← Happy/ok →				← Colds →	

**Group activity profile****Annex 2.1 Activity profile of rich men group**

Activities	Name of farmer					Total	Rank
	Bapan	Sayan	Nu	Ga	Chelerm		
Rice cultivation	5	3	5		8	21	2
Vegetables	3	5	4	4		16	3
Fish culture	3	3	2	3		11	5
Livestock	7	3	3	4	12	29	1
Fishing	2	3	3	4		12	4
Forest food		3		3		6	6
Charcoal			3	0		3	7
Wage labour				2		2	8
<b>Total</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>100</b>	

**Annex 2.2 Activity profile of rich women group**

Activities	Name of farmer					Total	Rank
	Kongsri	Banjong	Saroisri	Dowriung	Somchai		
Rice cultivation	6	6	5	4	6	27	1
Vegetables	3	3	3	3	2	14	3
Livestock	3	2	3	2		10	5
Weaving	2					2	8
Housekeeping	2	3	4	6	2	17	2
Fishing	2	2	2	2		8	6.5
Forage in forest	2	2	3		1	8	6.5
Wage labour		2		3	8	13	4
<b>Total</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>19</b>	<b>99</b>	

**Annex 2.3 Activity profile of poor men group**

Activities	Name of farmer					Total	Rank
	Sak	Somboon	Petak	Tatwe	Pratyoorn		
Rice cultivation	7	5			6	18	3
Vegetables	3	4	14		4	25	2
Livestock	4	5		14	3	26	1
Fishing	4	3	6		4	17	4
Handicraft				6		6	6
Forest food	2	3			3	8	5
<b>Total</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>100</b>	

**Annex 2.4 Activity profile of poor women group**

Activities	Name of farmer						Total	Rank
	Kamporn	Pensri	Phang	Boonoom	Gieng	Tam		
Wage labour		3		4	2	2	11	6
House keeping	5	2	4	3	3	3	20	1
Fish culture		2			2	1	5	10
Rice cultivation	4		5		3	4	16	2.5
Weave clothes		3		3			6	9
Weave reed mats		2		4	2		8	8
Livestock	4	3			3	2	12	4
Fishing	1	1	3	2	1	3	11	6
Forage forest	2	2	3	2	2	2	11	6
Vegetables	4	2	3	2	2	3	16	2.5
<b>Total</b>	<b>20</b>	<b>20</b>	<b>18</b>	<b>20</b>	<b>20</b>	<b>20</b>		

## Role of Aquatic Animals

## Annex 3.1 Species identification and ranking of aquatic animals by group of poor men group

Aquatic Animals	Criteria					Source	Total	Rank
	Easy to catch	Versatility	Good price	Taste	Preservability			
Walking Catfish	3	4	4	4	1	Paddy; trap pond	16	2
Snakehead	4	4	5	4	2	Chi river	19	1
Anabass	4	2	2	2	2	tributaries	12	4
Spotted Spiny Eel	2	3	4	3	-		12	5
Butter Catfish	2	2	2	1	-		7	7
Iridescent Mystus	3	1	2	1	-		7	
Rasbora	3	1	1	1	-		6	
Three Spot Gourami	4	1	1	1	-		7	
Snakeskin Gourami	1	2	2	1	1		7	
Nile Tilapia	1	2	3	1	-	stocked	7	
Mrigal	1	1	1	1	-		4	
Silver Barb	1	1	1	1	-		4	
<i>Hampala dispar</i>	1	1	1	1	-		4	
Spotted Featherback	1	1	-	-	-		2	
Jullien Mud Carp	2	1	2	1	-		6	
<i>Micronesia apogon</i>	-	1	3	2	-		6	
Black eared Catfish	-	-	3	2	-		5	
Striped Catfish	-	-	-	-	-		-	
Yellow mystus	3	2	2	1	-		8	8
Twisted Jaw Sheatfish	-	-	-	-	-		-	
Barb	2	1	2	1	-		6	
Soldier River Barb	1	-	-	1	-		2	
Sand Goby	2	-	-	1	-	Chi river	3	
Striped Tiger Nandid	2	-	-	-	-		2	
Small Scale Mud Carp	-	-	-	-	-		-	
Giant Snakehead Fish	1	-	-	-	-		1	
Great Snakehead Fish	-	-	-	-	-		-	
Giant Beigarius	-	-	-	2	-		2	
Red Tail Bieta	-	-	-	1	-		1	
Tiger Loach	-	-	-	-	-		-	
Great White Sheatfish	-	-	-	1	-		1	
Spiny Eel	-	-	-	-	-		-	
Khuli Loach	1	-	-	1	-		2	
Common Lowland Frog	-	-	2	2	1		5	
Small Green Frog	2	1	2	1			6	
Black Rice Crab	-	-	-	-	1		1	
Freshwater Prawn	2	2	2	3	-		9	6
Bull Frogs	3	-	-	1	-	upland	4	
Tigerfish	-	-	-	-	-		-	
Giant Water Bug	2	-	1	-			3	
Soft Turtle	-	-	-	-	-		-	
Swamp Eel	3	1	5	3			12	3

TOTAL	57	35	52	46	8		192
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### Annex 3.2 Species identification and ranking of aquatic animals by poor women group

Aquatic Animals	Criteria			Source	Total	Rank
	Availability	Versatility	Taste			
Snakehead	5	6	5	pond	15	1
<i>Anabas</i>	4	2	2	paddy	8	3
Walking Catfish	5	4	4	paddy	13	2
Spotted Spiny Eel	1	2	2	pond	5	14.5
Butter Catfish	2	2	2	pond	6	7.5
<i>Iridescent Mystus</i>	-	1	1	pond	2	
Yellow Mystus	2	2	2	pond	6	7.5
Rasbora	2	1	1	pond	4	
Snakeskin Gourami	2	1	2	pond	5	14.5
Three-spot Gourami	1	1	1	pond	3	
Golden Little Barb	1	1	2	pond	4	
Jullien Mud Carp	2	2	2	river	6	7.5
Striped Croaking Gourami	2	2	2	river	6	7.5
Swamp Eel	1	2	2	pond	5	14.5
Siamese Glassfish						
Silver Barb	2	2	2	paddy	6	7.5
Eye Spot Barb	-	-	2	pond	2	
Nile Tilapia	2	2	1	cultured	5	14.5
Common Carp	2	1	1	cultured	4	
	-	2	2		4	
Black eared Catfish	-	2	2		4	
Giant Snakehead	-	-	2	swamp, river	2	
White lady Carp	-	2	2		4	
Greater Black Shark						
Siamese Pangasius	2	-	-	paddy	2	
Sand Goby	-	2	1	pond	3	
Striped Tiger Nandid						
Siamese Pangasius	-	-	2	Buy from market	2	
Yellow Tail Botia	-	2	-	Buy from market	2	
	-	1	-		1	
	1	-	-		1	
Freshwater Garfish	1	2	2	paddy	5	
Barb	-	-	1		2	
Hoeven's Slender Carp						
Soldier River Barb	-	2	-		2	
		2	2		4	
Spiny Eel						
Giant Bagarius						
Striped Catfish	-	2	2		4	
Freshwater Prawn	2	2	2	paddy, pond	6	7.5
Pond Snail	2	-	2	paddy, pond	6	7.5
	-	2	2	river	4	



Snail	2	2	2	river	6	7.5
	-	2	1	river	3	
	-	-	2	river	2	
Black Rice Crab	2	1	1	paddy	4	
Small Toad	-	-	2	paddy	2	
	2	2	-	paddy	4	
	2	2	-	paddy	4	
	1	1	1	paddy	3	
Common Lowland Frog	2	2	1	paddy	5	14.5
True Water Beetle	1	2	-	paddy	3	
Insect	-	-	1	paddy	1	
Giant Water Bug	1	1	1	paddy	3	
TOTAL	57	75	72		204	

### Annex 3.3 Species identification and ranking of aquatic animals by rich men group

Aquatic Animals	Criteria				Source	Total	Rank
	Versatility	Availability	Taste	Good price			
Snakehead	4	4	2	2	paddy	12	1
<i>Anabaas</i>	2	3	1	1	paddy	7	7
Walking Catfish	3	3	1	1	pond	8	5
Spotted Spiny Eel	3	1	2	3	pond; mudpond	9	3
<i>Iridescent Mystus</i>	1	1	-	-		2	
Three Spotted Gourami	1	2	-	-		3	
Snakeskin Gourami	1	2	-	-		3	
<i>Micronesia apogon</i>	2	1	2	2		7	7
Sand Goby	1	1	-	-		2	
Silver Barb	2	3	1	1		7	7
Mirigal	1	-	-	-		1	
Striped Tiger Nandid	1	2	-	-		3	
Swamp Eel	3	2	2	2	paddy; pond	9	3
Butter Catfish	2	1	-	2		5	
Spotted Featherback	1	1	-	1		3	
Golden Little Barb	1	3	-	-		4	
Rasbora	1	3	-	-		4	
Striped Croaking Gourami	-	1	-	-		1	
Silver Rasbora	1	2	-	-		3	
Eye-spot Barb	2	2	-	-		4	
Yellow Mystus	2	2	-	1		5	
Great White Sheatfish	2	1	-	1		4	

Yang Noi Village

Giant Snakehead Fish	1	-	-	-		1	
Nile Tilapia	2	2	-	-		4	
Common Carp	2	2	-	-		4	
Jullien Mud Carp	2	3	-	-		5	
Spiny Eel							
Tiger Loach	1	-	-	1		2	
Yellow Tail Botia	1	1	-	1		3	
Freshwater Garfish	1	2	-	-		3	
Siamese Glassfish							
Small Scale Mud Carp	2	1	-	-		3	
<i>Osteochilus pidocephallchthys</i>	1	2	2	-		5	
Striped Catfish	1	1	1	1		4	
Black Eared Catfish	2	-	1	2		5	
Freshwater Prawn	2	3	2	2		9	3
Pond Snail	2	3	1	1	paddy; swamp; tributaries	7	7
Apple Snail	2	2	1	1		6	
Black Rice Crab	1	2	1	-		4	
Crab							
Common Lowland Frog	3	1	1	2		7	7
Small Green Frog	2	3	-	1		6	
Turtle							
True Water Beetle	2	2	-	2		6	
Insect	1	1	-	1		3	
Giant Water Bug	1	2	1	2		6	
	1	1	-	-		2	
Bull Frog	-	1	-	-		1	
TOTAL	70	76	22	34		202	

#### Annex 3.4 Species identification and ranking of aquatic animals by rich women group

Aquatic Animals	Criteria				Source	Total	Rank
	Availability	Taste	Versatility	Good price			
Snakehead	7	6	5	6	pond; paddy	24	1
Walking Catfish	6	5	6	6	"	23	2
Rasbora	5	-	2	-	"	7	
<i>Anabas</i>	4	3	2	4	"	13	5
Three Spot Gourami	3	-	-	-	"	3	
Spotted Spiny Eel	3	3	2	6	pond	14	4
Iridescent Mystus	4	2	1	-	pond; paddy	7	
Silver Barb	3	2	1	-	cultured	6	
Spotted Featherback	3	2	2	-	pond; paddy	7	

Yang Noi Village

Snakeskin Gourami	3	3	2	3	"	11	7
Butter Catfish	3	2	1	-	pond	6	
Striped Tiger Nandid	3	-	2	-	pond; paddy	5	
Striped Croaking Gourami	1	1	1	-	"	3	
	2	2	-	-	"	4	
Freshwater Garfish	2	1	-	-	"	3	
Swamp Eel	6	1	-	-	"	7	
Nile Tilapia	1	3	-	-	culture	4	
Common Carp	1	3	-	-	"	4	
Indian Carp	-	-	-	-	-	-	-
Mrigal	-	-	-	-	-	-	-
Julliens Mud Carp	3	-	-	-	swamp; river	3	
Sand Goby	2	-	-	-	pond	2	
Yellowtail Botia	-	-	-	-	-	-	-
Golden Little Barb	5	3	5	-	pond; paddy	13	6
Spiny Eel	-	-	-	-	-	-	-
Great White Sheatfish	-	-	-	-	-	-	-
Black Eared Catfish	-	-	-	-	-	-	-
Twisted Jaw Sheatfish	-	1	-	-	buy from market	1	
Whisker Sheatfish	-	1	-	-	"	1	
Striped Catfish	-	1	-	-	"	1	
Giant Snakehead fish	-	-	-	-	-	-	-
Red Tail Botia	-	-	-	-	-	-	-
Pond Snail	4	2	2	2	pond,paddy	10	8
Apple Snail	-	-	-	-	-	-	-
Freshwater Prawn	5	4	3	4	pond,paddy	16	3
Small Toad	4	-	3	-	paddy	7	
Bull Frog	-	-	-	-	-	-	-
Common Lowland Frog	3	-	-	-	paddy	3	
TOTAL	86	49	40	31		206	

**Aquatic Animals Seasonality**

Annex 4.1 Perception of rich men group on the seasonality of important aquatic animals

Species	Summer				Rainy				Cold			
	Quantity	Gear	Who	Place	Quantity	Gear	Who	Place	Quantity	Gear	Who	Place
Snakehead	Less	Cast net Drain pond	Men	Public pond Private	Many	Hook, trap	Men & child	Private pond	Medium	Battery Trap Trident	Men	Paddy
Spiny eel	Less	Drain pond	Men	Private pond	Medium	Gill net Cast net	Men	Public pond Paddy field Private	Many	Gill net Cast net	Men	Paddy Too deep water
Swamp eel	Less	Trident, bamboo trap	Men	Private pond	Many	Bamboo trap earth worm	Men	Paddy Private ponds	Medium	Bamboo trap	Men	Pond Paddy
Shrimp	Medium	Dip net	Men	Private pond	Less	Trap (night time)	Men	Paddy Canal	Many	Fine mesh net Trap	Men	Paddy Pond Public pond
Walking catfish	Less	Drain pond Dip net	Men & children	Private pond	Many	Fish hook Gill net	Men	Paddy	Many	Traps	Men	Paddy
Climbing perch	Less	Drain pond	Men	Private pond	Many especially during flooding	Battery Trap Dip net	Men & child	Paddy	Medium	Traps	Men	Paddy

Annex 4.2 Perception of rich women group on the seasonality of important aquatic animals

Species	Summer				Rainy				Cold			
	Quantity	Gear	Who	Place	Quantity	Gear	Who	Place	Quantity	Gear	Who	Place
Snakehead	Many	Drain pond	Men & women & children	Trap pond	Less	Hook Gill net	Men & women	Trap pond Rice field	Medium	Gill net Trap	Men & women	Trap pond
Walking catfish	Many	Drain pond	Men & women & children	Trap pond	Medium	Gill net Hook	Men & women	Rice field	Less	Trap Gill net	Men	Rice fields
Shrimp	Less	Drain pond Trap net	Men	Trap pond Swamp	Medium	Bamboo trap Trap net	Men	Rice field	Many	Bamboo trap Trap net	Men	Rice fields
Spotted spiny eel	Many	Drain pond	Men & women & children	Rice fields								
Anabas	Many	Drain pond	Men & women & children	Rice fields	Medium	Gill net Hook	Men & women	Rice field	Less	Hand	Men	Rice fields
Golden little barb	Many	Drain pond	Men	Rice fields	Less	Gill net Bamboo trap Trap net	Men	Rice field	Medium	Bamboo trap Gill net	Men	Rice fields

Annex 4.3 Perception of poor men group on the seasonality of important aquatic animals

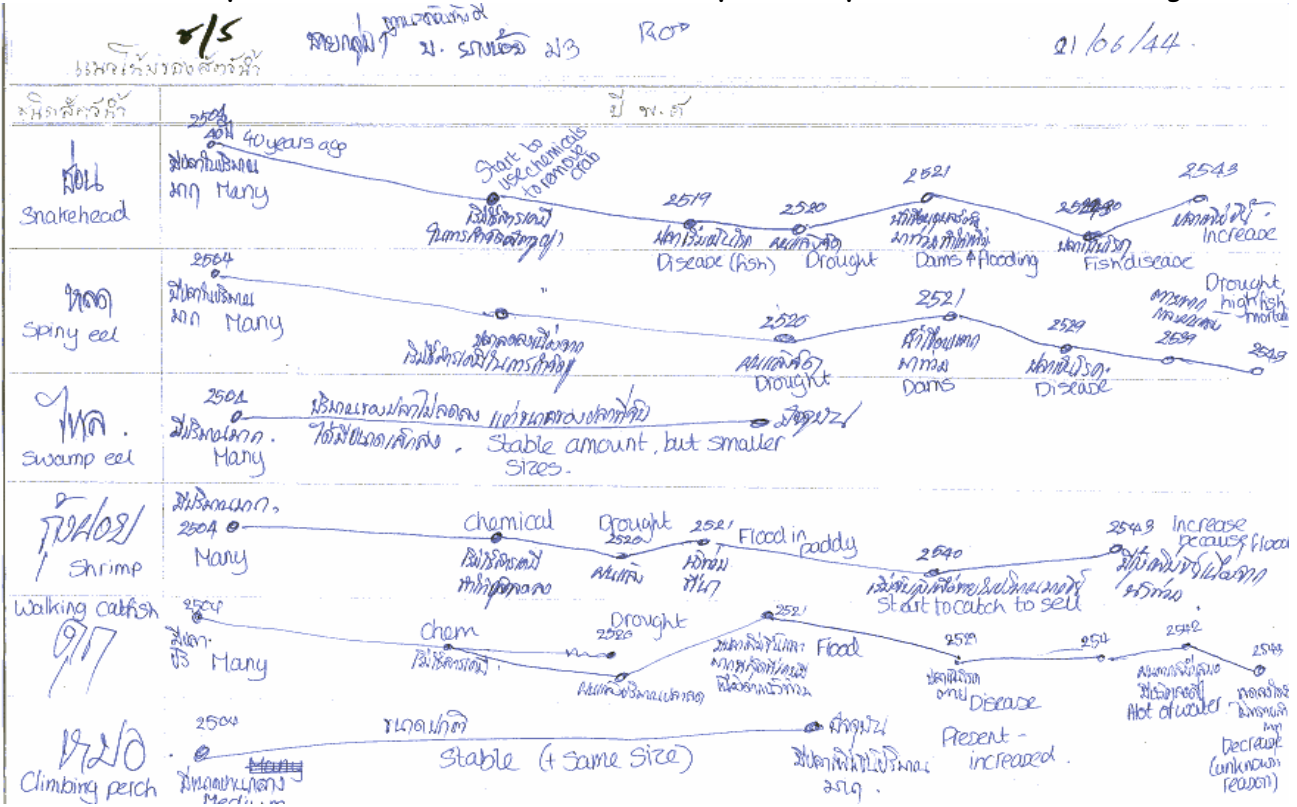
Species	Summer				Rainy				Cold			
	Quantity	Gear	Who	Place	Quantity	Gear	Who	Place	Quantity	Gear	Who	Place
Snakehead	Many	Drain pond Cast net	Men & women & son	Trap pond Chi river	Medium	Fish rod Hook Bamboo trap	Men & Son	Paddy	Less	Hook Trap	Men & son	Own paddy
Walking catfish	Medium	Drain pond Cast net	Men & women & son	Trap pond Chi river	Many	Hook Trap	Men & son	Paddy	Many	Hook Trap	Men & son	Own paddy
Swamp eel	Medium	Eel trident Eel trap	Men & women & children	Trap pond Paddy	Less	Hook	Men & son	Paddy	Many	Eel trap Hook	Men & son	Own paddy
Climbing perch	Many	Drain pond Cast net	Men & women & children	Trap pond Chi river	Medium	Hook Trap	Men & son	Paddy	Medium	Hook Trap Gill net	Men & son	Own paddy
Spiny eel	Many	Drain pond	Men & women & children	Trap pond	Less	Trap	Men	Pond	Less	Trap	Men	Own paddy
Shrimp	Many	Drain pond Dip net	Men & women & children	Trap pond	Less	Trap Shrimp trap	Men	Paddy Public pond	Less	Trap Shrimp trap	Men	Public pond

Annex 4.4 Perception of poor women group on the seasonality of important aquatic animals

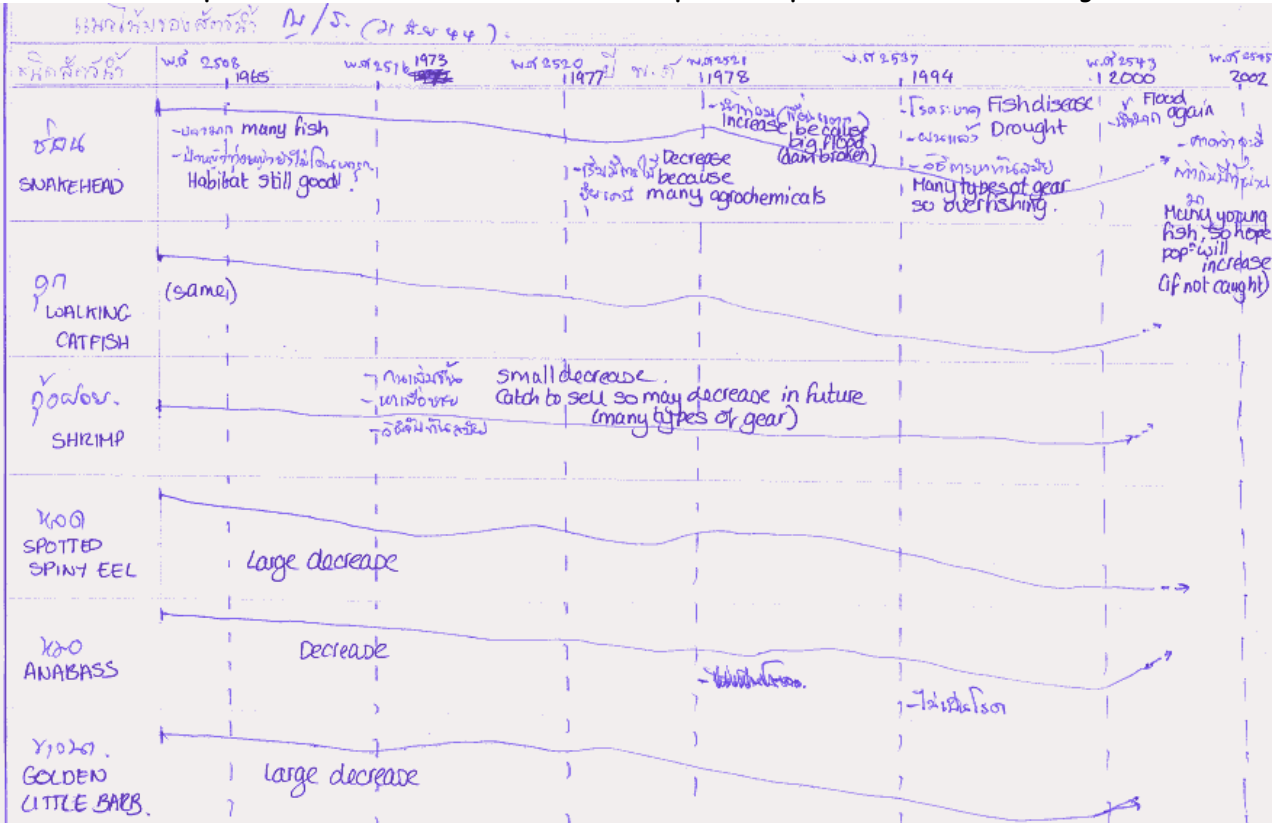
Species	Summer				Rainy				Cold			
	Quantity	Gear	Who	Place	Quantity	Gear	Who	Place	Quantity	Gear	Who	Place
Snakehead	High	Drain pond	Men & women, child	Pond	Low	Net	Men & women	Pond	Medium	Hand net	Men & women & child	Rice field
Walking catfish	High	Drain pond Hand net	Men & women, child	Pond	Medium	Trap	Men & women & child	Rice field	Low			
Anabas	Low	Drain pond Hand net	Men & women, child	Pond	High	Trap + hook	Men & women & child	Rice field	Medium	Net & hand	Men & women & child	Rice field
Shrimp	High	Hand net	Men & women	Swamp	Low	Trap net	Men & women & child	Rice field and swamp	Medium	Net Trap net	Men & women & child	Rice field
Butter catfish	High	Drain pond	Men, women, & child	Pond								
Yellow mystus	High	Drain pond	Men, women, & child	Pond								

**Aquatic Animal Trends**

**Annex 5.1 Perception of rich men on the trends of important aquatic animals in the village**

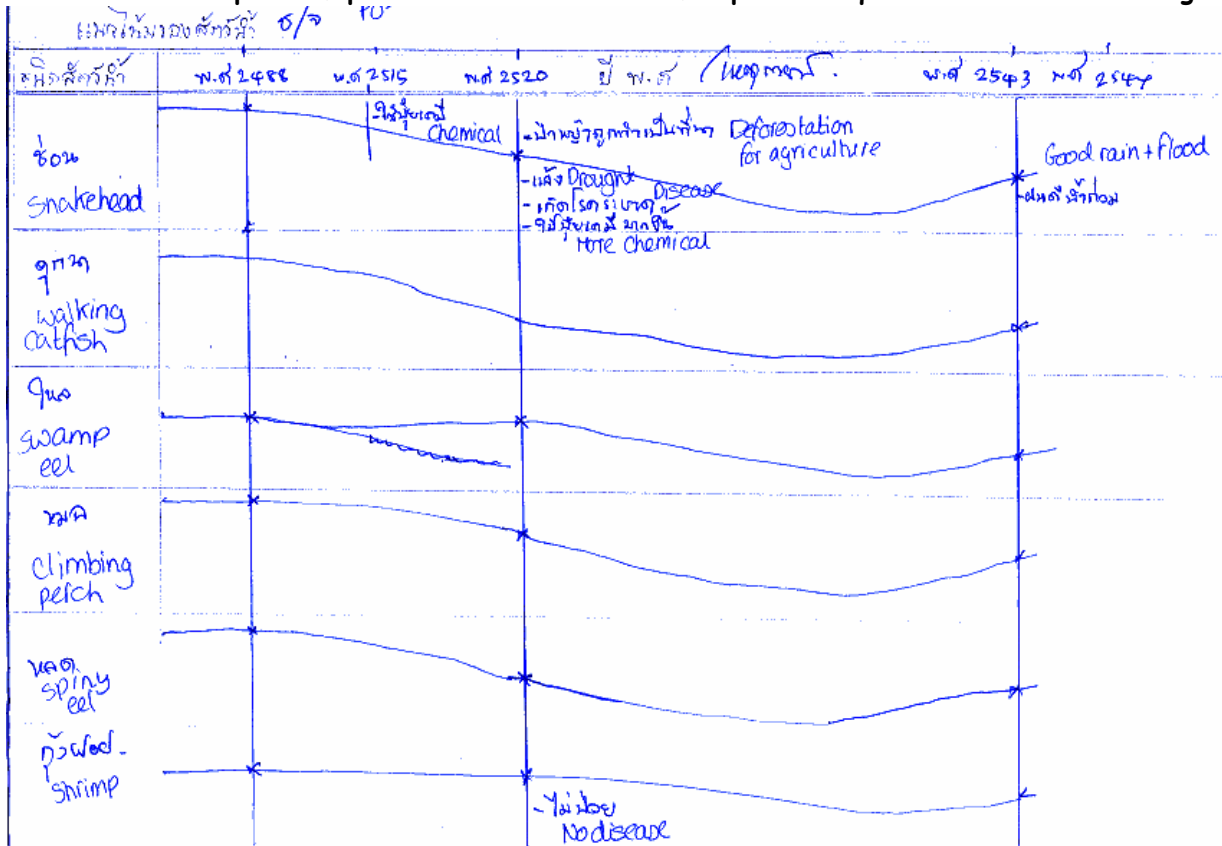


**Annex 5.2 Perception of rich women on the trends of important aquatic animals in the village**





Annex 5.3 Perception of poor men on the trends of important aquatic animals in the village



Annex 5.4 Perception of poor women on the trends of important aquatic animals in the village

