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

Participatory Rural Appraisal in Ban Samoe chai

Case Study 1

(PRA Report from 2001)

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Samoe chai Village

Introduction

Background

The status of aquatic systems in this province particularly in this village has not been established. For the outsider to know 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 of the Study

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

Participatory Rural Appraisal Team

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Schedule of Activities

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

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

Table 1 Schedule of Activites in Samoe chai village

21 June 2001	Collection of secondary data Verification of secondary data Introduction of activity and team with the village head
22 June 2001	Village mapping (Resources and Development) Identification of PRA participants
23 June 2001	PRA Exercises (between social groups and gender)
24 June 2001	Processing of PRA output Preparation for presentation of output to the village Village workshop – Presentation of PRA outputs

Srisaket Province

Description

Location and Boundary

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

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

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

Administration and Population

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

Main Occupation:

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

Topography

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

Average rainfall per year: 1, 172.5 MM

Water resources:

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

Communication and transportation:

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

District/Commune Description

Location and Boundary. Phayu district is located in the southern part of Srisaket Province. From the town proper, Phayu district is 23 km away from the center of Srisaket. The total land area of the district is about 225.450 sq km (22,545 hectares). The district has four boundaries: Muang district in the north, Namklieng and Kantrarom district in the east, Srirattana and Praibueng in the west, and in the south border is Wanghin district.

Administration and Population. The district is divided into five sub-districts. A total of 63 villages comprise the whole district. It has a total population of 38,168 persons with an average of 605 persons per village. The average population density is approximately 169 persons per sq. km.

Topography. Phayu district is one of the plain areas of Srisaket province. This district slopes down to the southern part, resulting to the formation of natural water bodies like *Huay Had* and *Huay Thar.*

Resources. The district is rich in water resources especially during the rainy season. However due to the problem of siltation most of the water bodies dry up during the dry season. The different water bodies present in this district are Huay had, Huay Thar and swamps.

Monthly Rainfall. The rainfall in the district has no distinct pattern. However during September the district experiences heavy rainfall.

Occupation. Due to the availability of large tracks of land for cultivation, most of the people in this district are into land cultivation. However, some villagers from this district migrate to other places for work. Most of them go to Bangkok or other cities in the country for wage labor.

Selection Process for the Village

The village was selected according to its topography and its relative distance from a perennial body of water (river). During the selection the team made a visit to the commune station and acquired general information from the village. It was categorized as one of the low resource villages and represents an upland area.

Specific methods used

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

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

Well-being Ranking. Mapping of the socio-economic context of the village was done. This activity determined the different social groupings in the village and how villagers naturally 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. The mapping (village map) exercise was done with a group of key informants in the village headed by the village headman. The list of all households in the village was obtained from the village headman. This was used in the well being ranking

activity. Names were written down in cards and farmers or informants grouped the different names according to what they think is the well being of the farmer/villager.

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

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

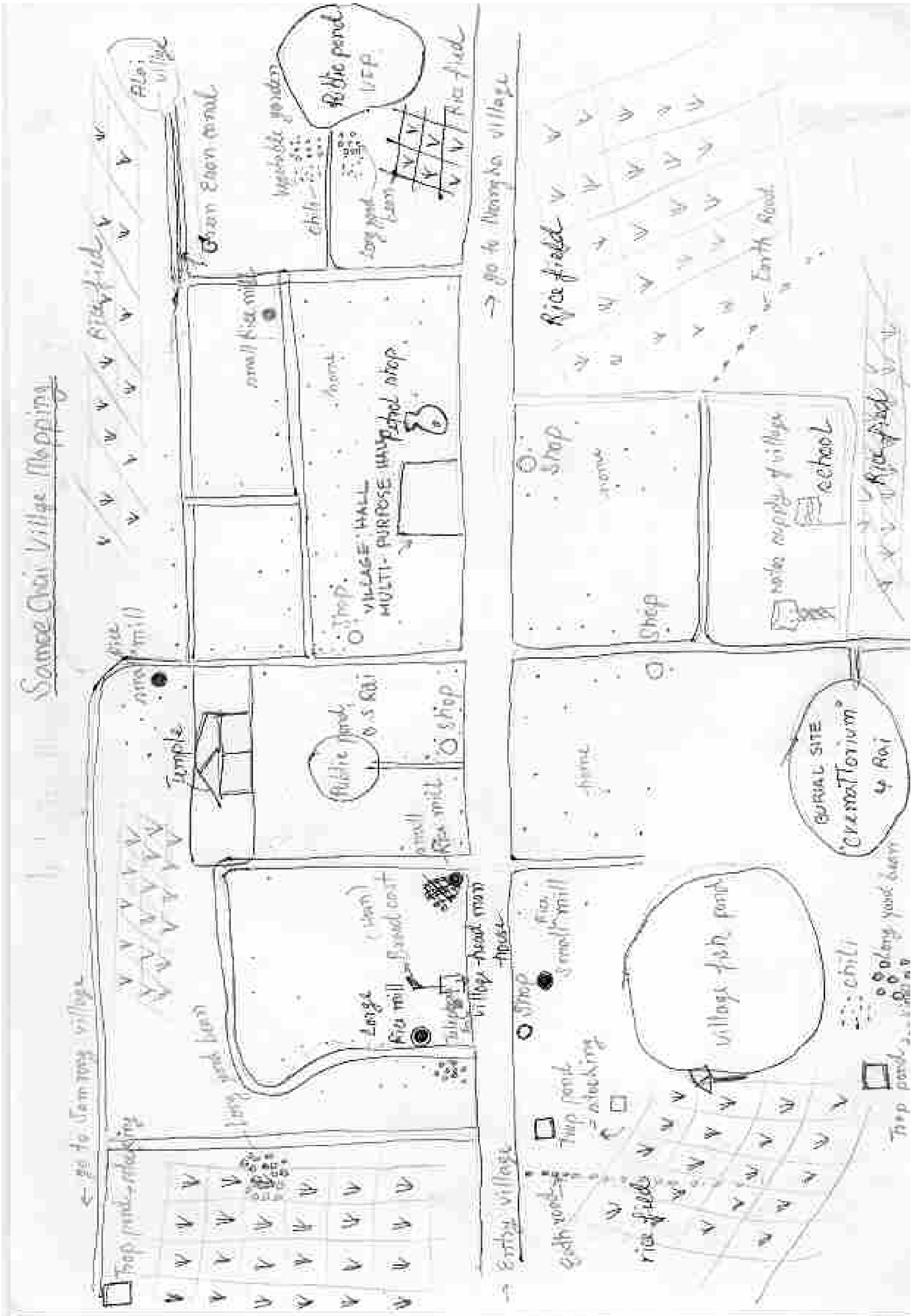


Figure 1. Village map of Samoe chai

Setting the Context

Mapping the Current Resource Context

Land resource. Land is used mainly for agriculture in this village. The whole village is actually surrounded by rice-fields. In some areas land is being used to grow vegetables like chilli and long yard bean.

Water resource. Water resource is limited in the village. A river is located far from the village so the main source of water for agriculture is rain. Farmers stock water during the rainy season using their trap ponds or public ponds. There are three public/village ponds in the village that people can access. Some farmers have trap ponds in their own field to impound water and also to collect aquatic animals.

Physical/social resource. The road is the major physical resource in this village. Major developments happened after the road was constructed (see Figure 2). There is a multi-purpose hall which the villagers can use to hold their gatherings and meetings. There are also shops for their day-to-day needs. Some farmers have their own rice mill where other farmers can rent for milling their rice harvest. Communication is not a problem now in the village since public phones and radios are available.

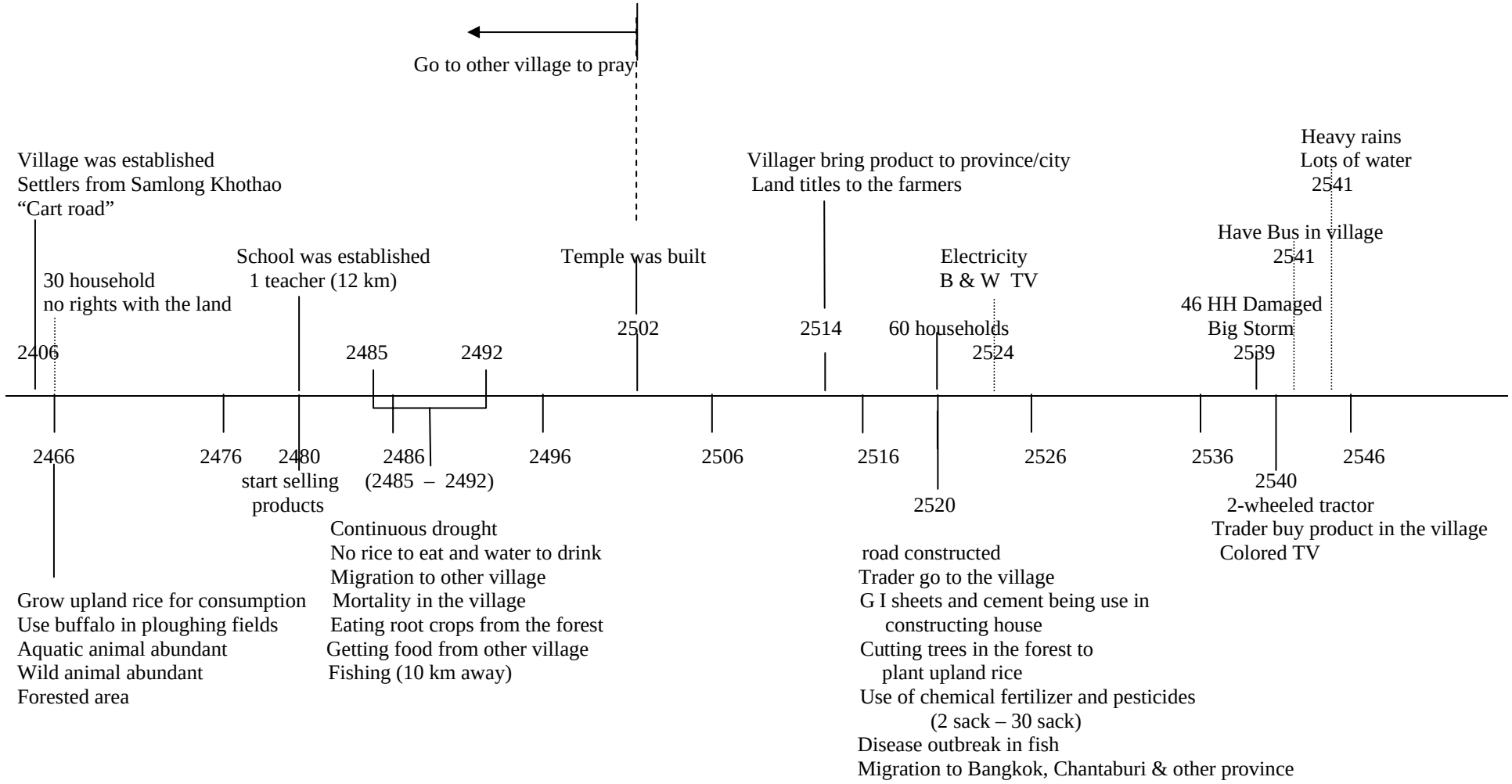
Mapping the Development Context

Samoe chai village started with few households who migrated from nearby villages. During this period natural resources were abundant. Large tracts of forest land and lots of aquatic animals were available in the village. Farmers were using traditional methods of cultivating land and capturing aquatic animals. It was in the year 2480 when villagers started selling their products. They experienced a major drought in the year 2485. Water supply then was very limited forcing villagers to migrate to other villages. A lot of villagers died during this period which was caused mainly by the very limited food supply.

It was in the year 2514 when the villagers got their land titles and when construction of the road was started. Villagers began producing large quantities of their products and bringing it to the nearby provinces and cities. Other merchants also came to the village and started trading. After the construction of the road more development activities happened in the village and materials for cultivating land improved. Appliances and other items were also introduced during this period.

The use of chemicals improved the production of farmers. However, their income became smaller and smaller since they needed to add more and more inputs to their system. Farmers also believed that chemicals caused the outbreak of diseases for aquatic animals in the village (see Figure 2).

Figure 2 Mapping the development of the village (Timeline)



Mapping the Current Social Context

Generally the village is one of the poor villages in the district, mainly due to the limited water supply. However the composition of the village is not entirely homogenous or not all villagers are poor. There are different economic levels identified by the villagers. People were grouped according to their social status, their income and their assets. The village has four (4) social/economic groups: the poorest; poor; middle and rich group. The following are the characteristics of each group set by the villagers.

Socio-economic Characteristics

Source of income. Most of the lowest-income group get their income from off farm activities. Some work at construction sites while others migrate to cities and other provinces for work. The middle income group is composed mainly by the farmers in the village. Households belonging to the rich or better off group generate income either from their profession, trading, farming, and renting their land to other villagers.

Household size. Size of the family varies per group or even within the group. It was noted however that households coming from the rich group are generally small in size while large-sized households are common among the poor group. On the other hand, there are some cases of small-sized households in the poor group. These are the ones who are newly-married, or old people who normally live alone or with a relative.

Education. The levels of education of households belonging to a particular group also varies. Most farmers from the poorest group did not go to school or was unable to finish even the primary level. Lower income groups also do not have the capacity or means to send their children to school. On the other hand, middle and better off groups can send their children to higher education and to good schools.

Land holding. Land is one of the major criteria used by the villagers in identifying the well being of an individual. Most households belonging to the poorest and poor groups have a small piece of land and some do not have at all. Middle income and rich people possess large areas of land and are renting them out to poor households in the community.

Livestock. Cows and buffalos are the common livestock that farmers used in determining the well being of farmers. Most farmers under the worse off group do not own or have just one livestock. Some farmers need to borrow/rent livestock from other farmers and use it in their farm.

Food supply. Shortage of food especially at the end summer is a common problem among poor households. The production from the farm is not enough for the whole year so they need to work for others or to ask for help from other for them to buy or get food. In some cases rich households lend or sell their produce to other villagers.

Assets. The condition of the house and appliances also dictated the well being of farmer in this village. Unfinished, small, bad conditions are some of the qualities of houses in the lower income group. Household belonging to rich/better off commonly have big, concrete houses and complete with appliances.

Transport. Rich and middle income groups mostly have transport. There are farmers who have cars and other simple transport like bicycle and motor. Poor farmers mostly do not have any transport or some have simple transport.

Table 2 Well-being ranking in Samoe chai village

Rank	Trial 1 Assistant of Village Chief	Trial 2 Group of women
I	Landless Off-farm income e.g. construction Older ones Disabled (blind, deaf) No livestock Small house, grass roof Children only primary education Younger people migrate to work (e.g. Bangkok) Simple life Buy rice for consumption Hunt wild animals to exchange with other villagers for rice (red ant egg) Income from handicrafts	Landless Simple living (Collect AA and vegetables for consumption) Wage labor (transplanting/harvesting) Young girls migrates to other provinces to work Land leasing from other rich villagers No access to formal credit Expert in catching fish (selling/consumption) Small house (old)
II	Can loan money but can't pay back No 2-wheeled tractor- must borrow from richer family or use buffalo 7 – 10 rai land Can't hire labour to transplant rice Few can graduate secondarily school but most only primary school No savings Like to buy things Most have no facilities (TV, ref) Rice for consumption only	Have land (5-6 rai) Most of them use buffalo in ploughing field Some can hire 2 wheeled tractor Loan rice from other for consumption Some have television Wage labour Simple living Collect red ant egg, small frogs Lot of debt, most cannot pay
III	Most have 2-wheeled tractor Children graduate secondary school 30 rai land can pay debts Livestock Similar house to group IV No government employee Some savings Can loan money Facilities in house (TV, ref)	Have land (Ave. 15 rai) Enough rice for consumption Have house appliances Can send children to elementary school Average of 3 cattle per household Less debt (able to pay) Can buy from shop basic needs

IV	Have car Less debt Some teachers, shop owner 50 rai land TV, ref Petron seller Children go to higher education 2-wheeled tractor	Have land (Ave. 25 rai) Average of 3 cattle per household Can lend rice to other villagers Have farm equipment (2 wheeled tractor) Big houses and good condition No debt Some are government officers Can send children to secondary level Young group (30 – 40 years old)

Activity Profile of the Village

Different groups of people in this village have varied activities. Although majority of the area is devoted to rice fields, some farmers/household do not take rice farming as their major activity, especially the group of poor women (see Table 3). For both the rich men and women, who mostly own big tracts of land, the most important activity is rice farming which is also their main source of income. The poor men identified farming as the most important although they have limited land. They also earn from working in others' land. In all groups productive activities are more important than reproductive. Although not mentioned as the most important activity, fishing was cited by all groups as a major activity.

Table 3 Summary of important activities of the villagers in Samoe chai

Economic group	Gender	
	Men	**Women**
Rich	Rice farming Livestock Vegetable gardening Household work Fishing Taking care of children	Rice farming Household work Chilli planting Livestock Fishing Silk
Poor	Rice farming/livestock raising Poultry Gardening Fishing	Household work Livestock Wage labour Vegetable gardening Rice farming Fishing

Seasonality

Weather. The experiences of different groups regarding weather differ. The start of the cold season for the rich group is later than that of the poor group. For both poor men and women, they experience the cold season beginning in the month of

October and ends in February. The rich group only experiences the cold period from December to February. Women in both the rich and poor groups claim to experience a longer rainy season than that of the male group. Differences with the weather may not be determined by the location of each group but is mainly influenced by the condition of the house or the work environment of the individual. Those from the poor group might experience a longer cold season because their houses are not good enough to keep them warm.

Tradition/culture. Tradition and culture are the same in all groups except in some months. Almost every month festivals are being held in the village and mostly connected to Buddhist activities. In the month of June, all groups do not have any social activity since this is the peak season for rice cultivation. The end of the year also is not the month for festivals in the village. (Please refer to appendix on the PRA outputs)

Economic activities. Being the most important activity in the village, rice cultivation is also one of the most important economic activities by all groups. Rich men have limited economic activities mainly because they have lots of land to manage and have no time for other activities. This is not the case with the poor men and women, who aside from working in their farm, are also working in other farms to get additional income. Fishing is an additional source of income for the villagers. Excluded from this activity is the group of rich women who only do silk- weaving and chilli production.

Table 4 Common economic activities in the village

Economic activities	Gender	
	Men	Women
Rich	Rice cultivation Vegetable gardening Fishing	Rice cultivation Silk weaving Chilli Livestock
Poor	Rice cultivation Vegetable gardening Fishing Fish culture	Rice cultivation Vegetable gardening Livestock Fishing

Migration. Leaving the village for a certain period of time is what other villagers do to earn additional income. For the rich group only young members of the family migrate to other provinces or city for work. During festivals and for main activities in the rice-fields, some return to the village to work in the field. In the poor group, both young and old members of the household migrate to other provinces or city to work as wage laborers after finishing the main activities in the field. Some young members have migrated permanently and send remittances to their respective families.

Health. The health condition in the village is generally satisfactory. Some household members specifically children get colds and fever at the beginning of the rainy and/or cold seasons. Both rich and poor groups in both sexes experience tiredness and back pain during planting and harvesting seasons (see Annex 1 - Annex 4).

Role of Aquatic Animals

Inspite of the limited water resource, aquatic animals still play an important role in the village. There are some fishermen in the village that fish during the rainy season and move to other places during dry season. A community pond also serves as common area in the village to collect aquatic animals for village consumption.

Source of income. Though not the major source of income, the catch from aquatic animals also meet some financial needs of the household in this village. For the poor men group, the main criteria for selecting the importance of the species is its high demand and value (see Table 6). In all four groups, the price of the species was used as a criteria which means they sell it and gain some income from the aquatic animals.

Food supply. Another important role of aquatic animals in the village is its contribution to food security. All four groups collect aquatic animals for their consumption. During the rainy season, the collected aquatic animals are sold and consumed. However, during the dry season majority of the catch is set aside for the consumption of the family. During a big catch or even during ordinary collection, the poor group of men and women tend to preserve their catch. These groups make dried or fermented aquatic animals for them to consume when they need it and when there is not enough fresh food available.

Important Aquatic Animals

In all groups, the snakehead (*Chana sp*), walking catfish (*Clarias sp*), and climbing perch (*Anabas*) are commonly known as the most important species (see Table 5). These species were identified as most important due to several reasons (see Table 6) . Different group have different reasons why these aquatic animals are considered important. Although all of them mentioned the taste of the species, poor men did not rank this aspect as the top reason. Aside from big fishes and high price, non-fish species like frogs and prawn are also considered important in this village.

Table 5 Summary of important aquatic animals in the village

Aquatic animals	Gender	
	Men	Women
Rich	Snakehead Walking catfish Climbing perch Common lowland frog Rasbora Freshwater prawn	*Gunther* walking catfish Snakehead Silver barb Common lowland frog African catfish Rasbora
Poor	Walking catfish Snakehead Rasbora Small toad Climbing perch Freshwater prawn	Snakehead Walking catfish Climbing perch Silver barb Rasbora Tilapia, FW prawn, pond snail

Table 6 Summary of the criteria used in ranking important aquatic animals

Criteria	Gender	
	Men	Women
Rich	Taste Easy to catch Easy to breed Good price Versatile Thrive in Trap ponds	Taste Good price Easy to breed Versatile Hardiness
Poor	High demand Easy to catch Taste Preserve Versatile Few Bone	Taste Easy to catch Preserve Good Price Versatile

Source

Although water resources are limited in this village, aquatic animals can still be collected in some areas. In some cases, aquatic animals are collected from nearby or outside aquatic systems. Community pond and trap ponds are commonly the areas for collection in the village. It is mostly the rich group, which has access to this since they have rice-fields with trap ponds. For the poor group, normally they catch aquatic animals from paddy fields and from nearby stream and canal.

Gear/Method Used

Most of the important aquatic animals identified by the four groups can be collected using simple gear. In most cases, cast net is used by villagers specially when they are catching the aquatic animals from streams and community ponds. Women commonly use trap holes and bamboo traps in collecting small aquatic animals. In trap ponds, rich farmers usually use pumps and seine net. Poor men and women use simple gear like trident, spear, trap hole, cast net, battery and light in collecting aquatic animals both for consumption and selling.

Seasonality of Aquatic Animals

The quantity/population of aquatic animals are also affected or are directly related to the season. During the hot season, most AAs are limited or low in quantity. They can only be collected in particular areas where water has not been dried up. During the rainy season most of the aquatic animals are available in all places or systems in this village especially in paddy fields. Fishermen and villagers can easily collect aquatic animals from their own paddy or nearby places where there is water flowing. All of the four groups in the PRA collect aquatic animals from the rice fields during the rainy season. (see Annex)

Trends of Aquatic Animals

At present the status of most of the important aquatic animals in the village are at a decreasing state. There are lots of factors affecting the increase and decrease of these aquatic animals. In the past where people in the village were very few and the consumption level was low, aquatic animals were abundant and available most of the time. But as time went on and the population increased, with the introduction of new technologies in agriculture and other political and social developments, these aquatic animals started to decrease and in some cases now nearly in extinction. (see Annex)

Factors Determining the Trends

Environmental degradation

The quality of the aquatic system affected the decrease in the population of aquatic animals in this area. Main cause of environment degradation is the extensive use of agrochemicals in the field in order to boost production of crops. From the trends presented in the PRA (See Appendix. Trends of Aquatic animals), occurrence of diseases came after the increase in the use of agrochemicals and eventually causing the population of aquatic animals to decline.

Population

Due to the increasing population, the number of fishermen in the village increased so the demand for aquatic animals is also increasing. Since management of wild aquatic animals is minimal or non-existent in this area, the population of the aquatic animals seems to be affected negatively by the increasing population.

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Natural calamities

Even in the past, natural calamities played an important role in the abundance of aquatic animals in the village. Flooding causes loss of aquatic animals but at the same time can also increase the population of the wild varities/species. The most serious calamity which affected the village was the continuous drought. The rains can also positively affect the abundance of aquatic animals. Frogs and snail started appearing during the first days of the rainy season.

Farmers' Meeting

After translating and making a copy of all the outputs a simple analysis was done by the PRA team. The results of the analysis were brought back to the farmers for validation. During the presentation, villagers agreed to the analysis/interpretation and mentioned that they also learned a lot from the exercises. Some villagers do not know much about the village but after the presentation they gained a lot of information and became aware of the different issues in their village.

Annexes

PRA outpus

Seasonal Calendar

Annex 1. Seasonal calendar of rich men group

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Weather	Cold season		Start summer	Sunny	End of summer	Start rain	Rainy	Heavy rain	Rain	End of rain	Start cold	Cold
Social events	New year	Temple festival	Festival	Buddist lent Wedding Songkran	Rocket festival			Buddist lent			End of buddist lent	Offering to monks
Rice cultivation	Harvest					Preparation of seed	Ploughing	Transplanting		Fertilizer		Harvest
Vegetables		Chilli, sweet corn, string beans										
Fishing				Fishing by cast net				Gill net		Lee net	Trap hole	
Income Expenses Busy	Harvesting rice	Income from rice	Expenses for festival		rocket	Earn income Very busy		Less busy		Not busy		Less busy
Health	Tired	Sad	Happy	Not happy	Colds	Diarrhea	Hard work					Tired
Migration		Young people to Bangkok		Back home for festival	Stay for rice transplanting				Go to Bangkok			

Annex 2 Seasonal calendar of rich women group

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Weather	Warm →		Summer start	Very hot	Start rain	Rain	Rain	Heavy rain →		Less rain	Cold	Very cold
Social event	New year festival	Buddist festival		Songkran	Rocket festival	Buddist lent Wedding ceremony		Rice festival	End of buddist lent	Offering to monks		
Rice cultivation	Transport rice	Selling ↔			Ploughing Seed preparation	Transplant →					Harvest	
Silk weaving			weaving ↔		Grow silk worm ↔							
Chilli	Grow ↔											
Livestock	Pasture to paddy field							In pen		Paddy field		
Income Expenses Busy		High expenses, debt, collection ↔			Expenses for student → Busy ↔			Spend on fertilizer	Student Fertilizer	Busy harvesting ↔		
Health	Good health ↔		diarrhea ↔		Serious/children back to school				Back pain, colds ↔			
Migration	Wage labour for construction in Bangkok, Chon buri, Roi-et →											

Annex 3 Seasonal calendar of poor men group

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Weather	Cold		Start summer	Hot	Less sunny	Start of rain	Rainy season		Start to cold	Cold	Cooler	Very cold
Social event	New year	Buddist ceremony	Buddist festival	Songkran	Rocket festival		Buddist lent		Buddist ceremony	End of buddist lent	Offering to monk	
Rice cultivation	Harvesting				Ploughing	Seed preparation		Transplanting			Harvesting selling	
Gardening			Chilli String beans									
Fishing				Catching snakehead, catfish (Big line), frogs (hook)			Rasbora & anabas in paddy field					
Fish culture			Stocking of fingerlings (Tilapia, gourami)					Harvesting				
Health	Anti-polio vaccine		Mosquito prevcention Colds								Blanket donation	Vaccine for children
Migration	Harvesting of rice		Go to Bangkok		Back for festival	Transplant rice				Wage labour		Harvest

Annex 4 Seasonal calendar of poor women group

	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Weather	Less rain; little sunny	Raining	Heavy rains + floods		Rain + flood	Rain + windy (cooler)	Cold	Very cold		Sunny and cool	Hot	Very hot
Social event	Rocket festival Wedding		Buddist lent		Religious activity	End of buddist lent			New year	Religious activity	Buddist ceremony	Songkran
Rice cultivation	Broadcasting of seed	Preparation of seed	Transplanting →			Harvesting →		Transporting		Selling →		
Vegetables										Growing chilli, string beans and corn		
Livestock	← Animals keep in pens →						← Pasturing of animals in the field →					
Fishing						Collect aquatic animals from paddy (Hole)						
Health	Happy	Common colds				Leptospirosis	Tired, busy at work Colds			Happy, less work, harvesting ↔		
Migration	Back for rice cultivation (others do not)									Go to Bangkok →		

Group activity profile

Annex 5 Activity profile of rich men

Activities	Name of farmers					Total	Rank
	Touan	Sunkiet	Gait	Suwai	Sutee		
Rice cultivation	7	9	7	6	6	35	1
Vegetable growing	1	3	3	3	3	13	3
Charcoal		2	2	3	1	8	7
Fishing	4	1	2	1	2	10	5
Housework	4	1	1	2	3	11	4
Animal raising	1	2	5	2	4	14	2
Looking after children	3	2		3	1	9	6
Total	20	20	20	20	20	100	

Annex 6 Activity profile of rich women

Activities	Name of farmers						Total	Rank
	Aroonwang	Kasi	Yothi	Katthip	Ponpalad	Kasi		
Rice cultivation	5	6	8	7	6	7	39	1
Silk	2	2	2	2		2	10	6
Chilli	2	4	2	2	4	2	16	3
Livestock	3	3	2	2	3	2	15	4
Fishing	2	1	2	2	2	2	11	5
Housework	6	4	4	5	5	5	29	2
Total	20	20	20	20	20	20	120	

Annex 7 Activity profile of poor men

Activities	Name of farmer					Total	Rank
	Masi	Mongkondi	Casi	Casi	Onsi		
Livestock	7	3	7	9	3	29	1.5
Fishing	1	3	3		3	10	5
Poultry	4	5	3	2	6	20	3
Gardening	1	2	3	4	2	12	4
Rice cultivation	7	7	4	5	6	29	1.5
Total	20	20	20	20	20	100	

Annex 8 Activity profile of poor women

Activities	Name of farmers						Total	Rank
	Sai	Buntha	Duan	Buason	Tongchan	Thongdiel		
Rice cultivation				5	6	5	16	5
Vegetable gardening	2	2	5	3	3	4	19	4
Animal raising	2	4	4	4	4	5	23	2
Silk production						3	3	7
Household activities	6	6	4	4	3	3	26	1
Fishing	2	2	3	2	2		11	6
Wage labour	8	6	4	2	2		22	3
Total	20	20	20	20	20	20	120	

Role of Aquatic Animals

Annex 9 Identification and ranking of aquatic animals by rich men group

Aquatic animals	Criteria						Source	Total	Rank
	Easy to catch	Taste	Versatili-ty	Catch in TP	Good price	Easy to breed			
Walking catfish	6	6	5	5	6	5	Buy/catch	33	2
Snakehead	8	6	5	5	5	5	Buy/catch	34	1
Ompok krattensis							Catch		
Greater black shark							Catch		
Climbing perch	5	3	2	8		6	Buy/catch	24	3.5
Spiny eel	1	5					Catch	6	9
Wallago attu							Catch		
3 spot gourami							Catch		
Stripped tiger nandid							Catch		
Swamp eel	1	3					Buy/catch	4	15
Spotted featherback							Buy/catch		
Irredescent mystus							Catch		
Hemibagus							Buy/catch		
Sand goby							Catch		
Golden little barb							Buy/catch		
Rasbora	5	5	3	5	0	5	Catch	23	5
Half beak							Catch		
Channa micropeltes									
Hampata dispar							Buy/catch		
Lepidocephalichthys							Catch		
Acanthopis							Catch		
Nile tilapia									
Snakeskin gourami							Buy/catch		
African catfish							Buy		
Tetraudon									
Silver barb							Buy/catch		
FW prawn	3	5	5		5		Buy/catch	18	6
Common lowland frog	3	5	5		5	6	Buy/catch	24	3.5
Rana	2	3						5	12.5
Rana									
Rana	2	4					Catch	6	9
Rana									
Small frog	2	3					Buy/catch	5	12.5
Clam	3	2					Catch	5	12.5
Pond snail	4	2					Buy/catch	6	9
Snail							Catch		
Clack rice crab	3	2					Catch	5	12.5
Apple snail							Buy/catch		
Giant water bug	1	3			5		Buy/catch	9	7
Back swimmer							Catch		
True water beetle							Catch		
Insect							Catch		
Common skimmer							Catch		
Total	49	57	25	23	26	27		207	

Annex 10 Identification and ranking of aquatic animals by rich women

Aquatic animals	Criteria					Total	Rank
	Taste	Easy to breed	Good price	Hardiness	Versatility		
Gunther walking catfish	12	4	10	8	8	42	1
Lowland frog	5		3	3	3	14	4
Bull frog							
Silver barb	8	4	3			15	3
Armed spiny eel							
Wallago attu							
Trichogaster pectoralis							
Anabas	3	2		2		7	7
Ompok krattensis							
Greater black shark							
Chana	10	3	6		4	23	2
Frog	3					3	19.5
Frog							
Frog	2					2	
Frog							
Common skimmer	2					2	
Insect	2					2	
True water bug	2					2	
Back swimmer	2					2	
Frog	3					3	19.5
Clam	2					2	
Pond snail							
Spotted feather back	2					2	
Fluta	5					5	9
Stripped tiger nandid							
Clam	3					3	19.5
Apple snail							
FW prawn	4					4	14
Black rice crab	2					2	
African catfish	5	4	3			12	5
Giant water bug	4					4	14
Snakeskin gourami	3					3	19.5
Nile tilapia	4					4	14
Lepidocephalichthys sp	4					4	14
Hampala dispar							
Acanthopsis	4					4	14
Giant snakehead							
Armed spiny eel							
Xenentodon							
Rasbora	11					11	6
Golden little barb	4					4	14
Sand goby	2					2	
Spotted spiny eel	5					5	9
Yellow mystus	4					4	14
Irredescent mystus	5					5	9
Total	127	17	25	13	15	197	

Annex 11 Identification and ranking of aquatic animals by poor men

Aquatic animals	Criteria						Total	Rank
	Bones	Versatility	High demand	Can be preserve	Taste	Easy to catch		
Snakehead	4	4	4	2	2	2	18	2
Walking catfish	4	4	4	2	3	2	19	1
Climbing perch	2	3	2	2	1	2	12	5
Rasbora	3	2	1	4	1	3	14	3
Puntius (Golden little barb)		2	1	2	3	2	10	7.5
Swamp eel	2	1	2	1	1	2	9	9.5
Spiny eel	3		2		1	1	7	12.5
Silver barb	1	2	1	1			5	16.5
Trichopsis sp	1	2		2	1	1	7	12.5
3 spot gourami				2		1	3	23
Sand goby			3		2		5	16.5
Freshwater prawn	1		2	3	3	2	11	6
Irredescent mystus	1		2			1	4	19.5
Spotted featherback			2		1		3	23
Hemibagus				1	2		3	23
Channa micropeltes	2	1	2	1	1		7	12.5
Tetraodon						4	4	19.5
Siamese glassfish						2	2	26.5
Mrigal	1	2	2	1	1		7	12.5
Small toad	1	1	3	3	3	2	13	4
Lowland frog		2	2	2	1	2	9	9.5
True water bug								
Mole cricket					2	3	5	16.5
Back swimmer						2	2	26.5
Giant water bug		1	3	3	2	1	10	7.5
Freshwater snail					1	2	3	23
Rohu			1	1	2	1	5	16.5
Armed spiny eel			1				1	28
Wallago attu			2		1		3	23
Total	26	27	42	33	35	38	201	

Annex 12 Identification and ranking of aquatic animals by poor women

Aquatic animals	Criteria					Source	Total	Rank
	Taste	Easy to catch	Can be preserve	Versati-lity	Good price			
Snakehead	5	4	4	3	4	Buy/catch/sell	20	1
Silver barb	2	2	3	1	2	Buy	10	4.5
Walking catfish	5	4	3	3	3	Buy/catch/sell	18	2
Sand goby	2	2			1		5	18.5
Climbing perch	3	5	2		1		11	3
Rasbora	2	4	3		1	Catch	10	4.5
Golden little barb	2	2	2		1		7	13
Tilapia	2	2	3		2	buy	9	7.5
Channa micropeltes								
Trichogaster pectoralis	2	1	3		1		7	13
Swamp eel	2	2	1				5	18.5
Spiny eel	2	2	1				5	18.5
Trichogaster tricopterus	2	3	3				8	11
Ompok krattensis	3	2	1				6	14.5
Pangasius suchi								
Rohu	2	1	2				5	18.5
Common carp	2	1	1				4	22.5
Mystus	2	1	1				4	22.5
Hemibagus	2	1					3	24.5
Spotted featherback	2	1					3	24.5
Freshwater prawn	3	2	4				9	7.5
Pond snail	3	3	1		2		9	7.5
Black rice crab	2	2	1				5	18.5
Lowland frog	3	2	1		2		8	11
Small toad	3	2	1		2		8	11
Giant water bug	3	1	2		3		9	7.5
True water beetle	2	2	1		1		6	14.5
Pristolepis sp (stripped tiger nandid)	3		2				5	18.5
Total	66	54	46	7	26		199	

Aquatic Animals Seasonality

Annex 13 Seasonality of important aquatic animals by rich men

Aquatic animals	Hot				Rainy					Winter		
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
	quantity	Who	Gear	Place	quantity	Who	Gear	Place		Quantity		
Walking catfish	1	Men	Cast net	Trap pond, stream, canal	3	Men	Spear; rod; trap hole; bamboo trap	Trap pond, rice fields		1	Men; women; & children	
Snakehead	1	Men	Cast net	Trap pond, stream, canal	3	Men	Spear; rod, trap hole	Trap pond, rice fields		1	Men; women; & children	
Frog					4 (Tadpole)	Men & women	Cast net; dip net; rod	Rice fields		6	Collect by men	
Anabas	3	Men & women	Cast net	Trap pond, stream, canal	1 (small fish)	Men & women	Cast net; dip net; trap hole	Rice fields		1		
Rasbora	3	Men & women	Nylon net	Trap pond, stream, canal	3		Small bamboo trap					
Shrimp	3	Men & women	Nylon net	Trap pond, stream, canal						2	Collect in canal and trap pond by both men and women	

Annex 14 Seasonality of important aquatic animals by rich women

Aquatic animals	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan
Clarias macrocephalus		Gear: cast net Place : trap pond; paddy field Who: men Qty: 10 kg					Gear: hook; trap Place: paddy field Who: men & women Qty: 20 kg		Gear: trap hole Place: rice field Who: Men & women Qty: 50 kg			
Snakehead		Gear: cast net Place: trap pond in paddy field Who: Men Qty: 15 kg					Gear: trap; hook Place: paddy field Who: Men & women Qty: 10 kg		Gear: trap hole; pump Place: rice fields Who: Men & women Qty: 55 kg			
Puntius		Gear: cast net Place: trap pond in paddy Who: Men Qty: 5 kg			Gear: net; rod Place: rice field Who: Men Qty: 10 kg			Gear: pump Place: rice field, pond Who: Women Qty: 10 kg				
Frog				Gear: battery and light Place: rice fields Who: Men & women Qty: 30 kg			Gear: hook & bamboo trap Place: in the rice fields Who: Men and women Qty: 40 kg					
Clarias batracus				Gear: cast net Place: near the rice field Who: Men and women Qty: 30 kg								
Rasbora		Gear: blue net Place: pond Who: Men and Women Qty: 8 kg					Gear: blue net, trap, pump Place: in the rice fields Who: Men & women Qty: 60 kg					

Annex 15 Seasonality of important aquatic animals by poor men

Aquatic animals	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
	Cold					Summer				Rainy		
	Qty	Gear	Place		Who	Qty	Gear	Place	Who	Qty	Gear/who	Place
Walking catfish	2	Cast net; fish rod;	Paddy fields		Adult men	1	Cast net; gill net	Trap pond; stream	Men (night & day)	3	Fish net; bamboo trap; rod (Men)	Trap pond; stream
Snakehead	3	Trap hole	Trap ponds; paddy fields		Men	1	Cast net; gill net, net	Trap pond; community pond	Adult men	2	Trap; rod, trident; (Men)	Paddy
Rasbora	2	Blue net; bamboo trap; dip net;	In the field		Adult men	1	Gill net; cast net;	Community pond; canal	Adult	3	Blue net; dip net; (Adult men)	Paddy
Shrimp	2	Bamboo traps; trap;	Canal; paddy field		Adult men	1	Gill net, trap	Community pond; canal	Adult	3	Blue net; bamboo trap; (Adult)	Paddy
Small frog	1	Battery; lamp; dig	Paddy field;		Adult	2	Light	Paddy field		3	Torch; battery; (adult men)	Paddy field
Giant water bug	2	Flash light	Fields, around the village		Men	1		none		3	Dip net; blue net (Adult men)	Paddy

Poor women

Annex 16 Seasonality of important aquatic animals by poor women

Aquatic animals	Rainy					Cold				Summer		
	May	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**
	Quantity of catch		Gear		Who	Quantity of catch	Gear		Who	Quantity of catch	Gear	Who
Snakehead	Lots of catch in the rice fields		Fish rod Spear		Male Female	Less catch from the field	Dip net Hole (trap)		Male Female	Trap ponds	Cast net	Male
Clarias	Lots of catch in the rice fields		Fish rod Spear		Male Female	Less catch from paddy field	Hole (trap) Dip net			Trap ponds	Cast net	Male
Anabas	Lots of catch in the rice fields		Fish rod Gill net		Male Female	Lots of catch from paddy	Hole trap Dip net		Male Female	Trap ponds	Cast net	Male
Puntius										Buy a lot from the merchant coming into the village		
Rasbora	Lots of catch in the rice fields		Lee net Trap net		Male Female	Less catch from paddy	Dip net		Female	Catch less in canals	Nylon net	Male Female
Tilapia										Buy a lot from the merchant coming into the village		

Aquatic Animal Trends

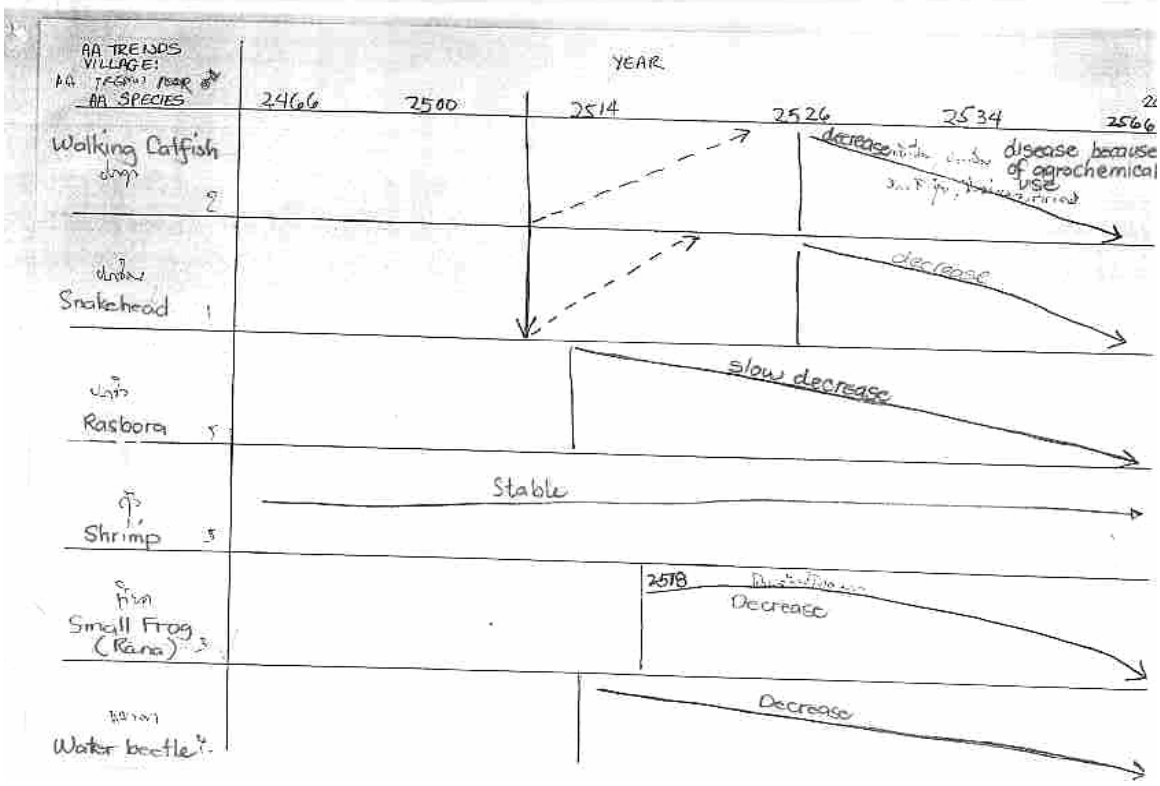
Annex 17 Perception of rich men group on the trend of important aquatic animals

Aquatic animals	
Walking catfish	30 years ago, many wilds aquatic animals because lots of forests and less population, no agrochemicals, no disease, can catch in every water body e.g. paddy; swamp; wet land areas 15 years ago, aquatic animals decrease because of the increasing population and other villages come to catch aquatic animals for selling. Agrochemicals where also used.
Snakehead	10 years ago, started trap pond in paddy – number of species decreased especially broodstock (die) due to the use of chemicals Before there are lots of forest and less population and peole only use fish hook and they catch for consumption only.
Common lowland frog	Before no agro chemicals 8 years ago species decreased because use hook to catch for sale and dip net to catch tadpole for sale 3 years ago decrease to only 4 – 5 broodstock. Expect extinction (local)
Anabas	Same as snakehead and walking catfish but no extinction because good climbers, so easy to escape disease and agrochemicals effect.
Rasbora	30 years ago same as catfish/snakehead because easy to breed. Catch for consumption only. They ferment fish also. No disease 10 years ago decrease because of trap pond in paddy field. Predated on by catfish and snakehead. But stable population.
Freshwater prawn	30 years ago many easy to catch for consumption only. Five years ago species decrease because other villages come to catch and uses new gear 10 years ago decrease because trap pond (same as rasbora)

Annex 18 Perception of rich women on the trends of important aquatic animals

Aquatic animals		**Cause**
Walking catfish	2499 – a lot of catch – 50 kg/time 2509 – 20 kg/ time – preserve (ferment) 2520 – decrease – 2 kg/ time 2544 – 0.5 – 1 kg time	Agrochemicals Increased population Less rain and water from trap ponds decreased Some catching for consumption and others for selling
Snakehead	Decreased same as catfish but a little slower (2522) In the past 15 kg/ time now only 2 kg/ time	Same as catfish Quantity decreased less than catfish as easy wild breeding
Puntius	Quantity decreased (same as catfish) but faster. 2520 – 5 kg/ time Now cannot catch at all. Must b stocked	Same as catfish Less water
Common lowland frog	Quantity decreased faster then catfish 2524 – 5 – 10 kg/time Now only 1 kg/ time	Same as catfish All catching for sell
Clarias garipinus	In past no stocking but start to raised in 2538	
Rasbora	2520 - Lots to catch – 100 kg/ time Now only 2 kg/ time Now stable as easy to breed and hardy	Same as catfish

Annex 19 Perception on the trend of important aquatic animals by poor men



Annex 20 Perception on the trend of important aquatic animals by poor women