

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

## **Participatory Rural Appraisal in Trapiang Deackrom Case Study 4 (PRA Report from 2001)**



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# Trapiang Deackrom Village

## Introduction

## Background

At present the status of aquatic systems in the province as well as the effect of these aquatic systems to the people are yet to be determined. In any development organization and also government agencies, knowing the general background of the village is very important. An outsider would not see the "true" picture of the village unless proper baseline gathering be conducted. The information in baseline gathering 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.

A lot of development programs have been done in different villages and there are some problems in sustaining these programs. Most common reason for the low success of development projects is the lack of appreciation and sense of need for the project by the primary stakeholders. Most of development projects are coming from the top and being offered to the bottom and not being asked by the villagers. It is therefore necessary to listen to the villagers themselves on what is the status of their area now rather than telling them the status.

## Objectives

The main objective of the study is to assess the general livelihood activities in the village and to establish rapport with the villagers. To achieve this main objective the following are the specific objectives:

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

## Participatory Rural Appraisal Team

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Pol Mimosa	- AO, Svay Rieng Adviser
Chhy Savry	- AO-DOF - Database
Tun Ketputhearith	- AO-DOF
Khong Sophoan	- AARM-Svay Rieng Head
Hong Chanthon	- AARM-Takeo - SRS staff
Chan Houn	- AARM-Svay Rieng - SRS staff
Mom Phanny	- AARM-Svay Rieng - SRS staff

## Schedule of Activities

The workshop was done in three days, which also included the collection of secondary information about the commune and the village on the first day (see Table 1). During the first day the commune office was visited. Secondary information was gathered from the office that helped the team identify the village for this study. Before the village was finally selected validation and additional information were asked from the head of the commune. A staff was sent to set appointment with village for the two days activity.

On the second day, the village profile was generated and participants for the next day's activity were identified. The last day of the workshop was used for collation and processing of outputs from the two days' activities. The last important activity that was done in the village was the validation of the information and getting feedback from the villagers. This last activity was done in the afternoon on the last day of the PRA when all the PRA outputs have been summarized.

**Table 1 Schedule of Activities during the PRA workshop in Svay Cheak Village**

Dates	Activities
22 May 2001	Secondary information
23 May 2001	Introduction to the village Village profile
24 May 2001	PRA workshops Validation

## Svay Rieng Province

### Province Description

**Location.** Svay Rieng is situated 124 km away from Phnom Penh in the southeast part of Cambodia. It covers a land area of 2,966 km<sup>2</sup>.

#### Boundaries:

- North - Kampong Cham province
- South - Long Anh province of Vietnam
- East - Tha Ninh province of Vietnam
- West - Prey Veng province

**Administration and population.** The province is composed of seven (7) districts with 80 communes and 690 villages. In 1998, the estimated population of the province is 442, 000 with an average 149 persons per sq. km. (Census, 1998)

**Land use.** A large portion of the land is being used for rice production. Based on information from the office of the Provincial Department of Agriculture, Forestry and Fisheries, 68% of the land area is used for rice cultivation, 5% for the settlement, 3% for streams or *pre,k* and only 4% is flooded area. In areas close to the water bodies, farmers can grow dry season rice. Below is a table showing the different uses of land in the different districts of the province.

**Table 2 Distribution of Land use in Svay Rieng province**

District	Total area (Ha)	Land use (Ha)							
		Riceland	Cropland	Hill area	Forest area	Homestead	Water area	Flooded area(Free)	Road area
-Romeas Hek	78,460	35,460	315	929	37,776	2,160	670	-	1,150
Svay Chrum	57,570	48,889.87	111.75	1,359.94	45.69	4,037.68	1,483.88	141	1,500.19
-Romduol	28,990	22,262.98	-	2,153.88	2,038	1,505	468.85	267.85	297
-Svay Teap	46,467.44	39,170.93	857.60	590	73	1,728.91	2,396	1,412.40	238.60
-Chan Trea	42,777	20,036.31	-	1,171.17	865	4,937.12	3,527.90	10,386.78	1,852.73
-Kampong Ro	40,980	33,509.04	141.77	2,179.10	-	1,759.77	536.40	2,528.88	325.04
-Svay Rieng	1,395.56	748.97	19.36	40.74	182.19	185.19	121.85	2	95.26
Total	296,640	200,078.10	1,445.48	8,423.83	40,979.88	16,313.67	9,204.88	14,738.34	5,455.82

Source: Provincial Department of Agriculture, forestry and fisheries.

Although the total land area for rice cultivation is large, the production level in the province is still low. One of the reasons for this is that the soil quality in this province is poor, as reported by Tana in 1993. There are four different types of soil in the province: infertile sandy soil, sandy, silty, and acidic soil. However the quality of the soil in the province is now deteriorating, resulting to the low production of rice.

**Livelihoods.** In general, the livelihood options in Svay Rieng province is not so varied. In spite of the poor soil quality and the existing water problem, majority of the residents in this province still depend on rice production. However the trend of migration in the province to the capital is increasing particularly among the young men and women. Majority of those who migrate to the capital would work in construction sites (for men) and in garment factories (women).

**Sources of income.** According to the Planning office of the Provincial Department of Agriculture, Forestry and Fisheries, the sources of income of the residents in the province can be classified into three type/categories:

Economic source 1: Income from agricultural production (90%)

Economic source 2: Income from general service (7%)

Economic source 3: Income from industry and handicraft (3%)

**Resources.** The water resources in the whole province are abundant particularly during the rainy season. However, the aquatic animals or wild fisheries are still limited in the area since there is no permanent water source or body. During the early years, the size of catch from capture fisheries would be enough for the requirements of the province. But at present, this quantity is no longer meeting the demand in the province. The following are the main factors causing the decline of capture fisheries in the province:

- Over fishing
- Use of destructive fishing gear or method
- Environment changes
- Loss of habitat

The main water bodies in Svay Rieng Province are the following:

Tonle Tyko - situated in Svay Rieng and Romdoul districts

Tonle Kampong Trach	-	situated in Romeas Hek district
Beung Tathat	-	situated in Svay Chrum district
Prek Prasout	-	situated in Svay Teap district
Beung Doun Toy	-	situated in Chan Trea district
Beung Khset	-	situated in Kampong Ro district
Beung Bekchan	-	situated in Kampong Ro district
Beung Prek Thnot	-	situated in Svay Chrum district

Aside from the different water bodies mentioned above, there are still smaller water bodies that also provide aquatic animals to the people in the province. Moreover the different aquatic systems in the province have multiple purposes to the farmers. Some farmers use water from the small lake for their crop and their livestock. Other households use the water for domestic use. Below are the small water bodies in the province:

Small lake	-	<i>Trapiang</i>
Streams	-	<i>Oo</i>
Canals	-	<i>Pralai</i>
Refuges	-	<i>Sra chumrok trai</i>
Pond	-	<i>Sra</i>
Ditches	-	<i>Hao</i>
Trap ponds	-	<i>Beir/Deir</i>

## Chantrea District

### District description

**Location.** Chantrea district is located 40 km away from the provincial center on the eastern part. It covers a total area of approximately 42,777 ha.

Boundaries.		
Northern	-	Svay Teap and Vietnam
Southern	-	Vietnam
Western	-	Kampong Ro district
Eastern	-	Vietnam

**Administration and population.** Chantrea district is composed of 10 communes with the total 49 villages. The total population is approximately 45,971 people in which 23,782 (51.73%) people are female. The total number of households is 9072 with average size of 5.06 people/family (source: Department of Agriculture *Svay Rieng* province).

**Land use.** Big portion of the land in this district is devoted for rice production and other agriculture related activities. However other areas are being used in different purposes. The district area is divided into as follows:

Rice land	-	20,036.3 ha
Hill (High land)	-	1,171.17 ha
Forest area	-	865 ha
Settlement area	-	4,937.12 ha
Water area	-	3,527.9 ha
Flooded area	-	10,386.78 ha

Road area - 1,852.73 ha

**Resources.** The district is considered as medium rich area of wild fisheries compared to other district in the province. It is reported that the wild fisheries are now in the decline due to the much destructive fishing gear use, over fishing, high population, and loss of habitat and environmental change. The following are the most common resources found in the district:

*Beoung* (lake), *Prek* (Stream), *Srai* (rice fields), *Beer* (trap ponds), refuges

Three main water bodies:

Beoung Dountouy	-	Chrok Mchoul commune
Beoung Svay year	-	Som Rong commune
Prek Tapao	-	Ma Sokthgnok commune

**Income.** In general the whole province get their main income from rice cultivation and this district is not an exemption. Most of the people in this district are earning income from cultivating rice and also from other agricultural activities. Other sources of income in the district are: wage labor; fishing; handicraft; providing services, and small trading.

## **Chreas Commune**

### **Commune description**

Chreas Commune comprised 8 villages as follows:

- |                    |              |
|--------------------|--------------|
| 1. Tropaingdirlorl | 152 families |
| 2. Tropaingdirkrom | 167 families |
| 3. Tropaing Rong   | 240 families |
| 4. Tropaing Tlork  | 149 families |
| 5. Done Noy        | 227 families |
| 6. Bonla Sa at     | 120 families |
| 7. Toul Spen       | 98 families  |
| 8. Toul Anpil      | 175 families |

## **Selection Process for the Village**

The selection of the village was done by drawing a transect line for the whole province from the northwest down to the southeast. By doing this transect line the line is passing the three topography of the province; higher area in northwest; midland and lower area in the southeast. A district first was identified from each topography level. There were three district identified in this province namely; *Chantrea, Kampong Ro* and *Ramdoul*.

Names of the communes situated close to or along the transect line were then listed down in a piece of paper. The staff then randomly selected the possible commune for study by randomly picking a paper from the pot with all the names of the commune. Second and third commune were also picked for possible replacement if the first commune is not possible.

After the commune had already been identified, the team visited the commune and clarified and got more secondary data about the commune and the different villages in the commune. The village was then identified using the criteria of the aquatic resource in the area, economic level of the village and also the number of the villagers. During the process the village was selected as a representative of low area and closeness to the lake (*Beoung Dountouy*).

## **Specific Method 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 activity was divided into three parts. The first part was done with the village headman with the key informants. During this activity the profile of the village was established. The information about the present resources in the village was generated using the village mapping exercises, which was done by the village headman with the help of other key informants present in the meeting.

For the purpose of getting the social context of the village, the list of households was used by the team in the well being activity. The individual names were written down in cards and farmers/key informants identified the different social groups in the village. Using the results of this activity the participants for the next day activity were selected. Two groups of farmers representing the poor group and the better off group were identified. The team set an appointment with the selected people to participate in the activity for the next day.

The second part of the activity generated more detailed information about the activities in the village and how different social groups differ in their ideas. During this day men and women from poor and better off groups were separated into two. Seasonal calendars and activity ranking matrices were produced during this period. Information about aquatic animals and their importance were also generated during this day. The seasonality and trends of aquatic animals were the last activity done before the summary and validation.

The last part of the workshop was the validation. After the team collated all the information generated from the first two days, the team made summaries of the important issues. The team returned to the village and had a brief meeting with the villagers to also validate some information. The follow-up discussion focused on clarifying the contradictory information and the vague ones.

## Setting the Context

### Mapping the Current Resources in the Village

The village map that was drawn during the mapping exercise illustrates the present resources in the village. It also shows which resource is more important to them by looking at the resource that they first draw and during the discussion. In this activity particularly in this village, two main resources were identified, the lake which belongs to water resource and the paddy field for land resource. There are other resources identified during the exercise and great discussion.

**Land resource.** The whole village can be considered as paddy field area. Since houses are scattered in the village and there is no really distinct area for residential although most of the houses are close to the road. Paddy fields are everywhere in the villages. This is the main land resource for the village. Paddy field area is also being used for growing other crops, which can be another source of income for the villagers.

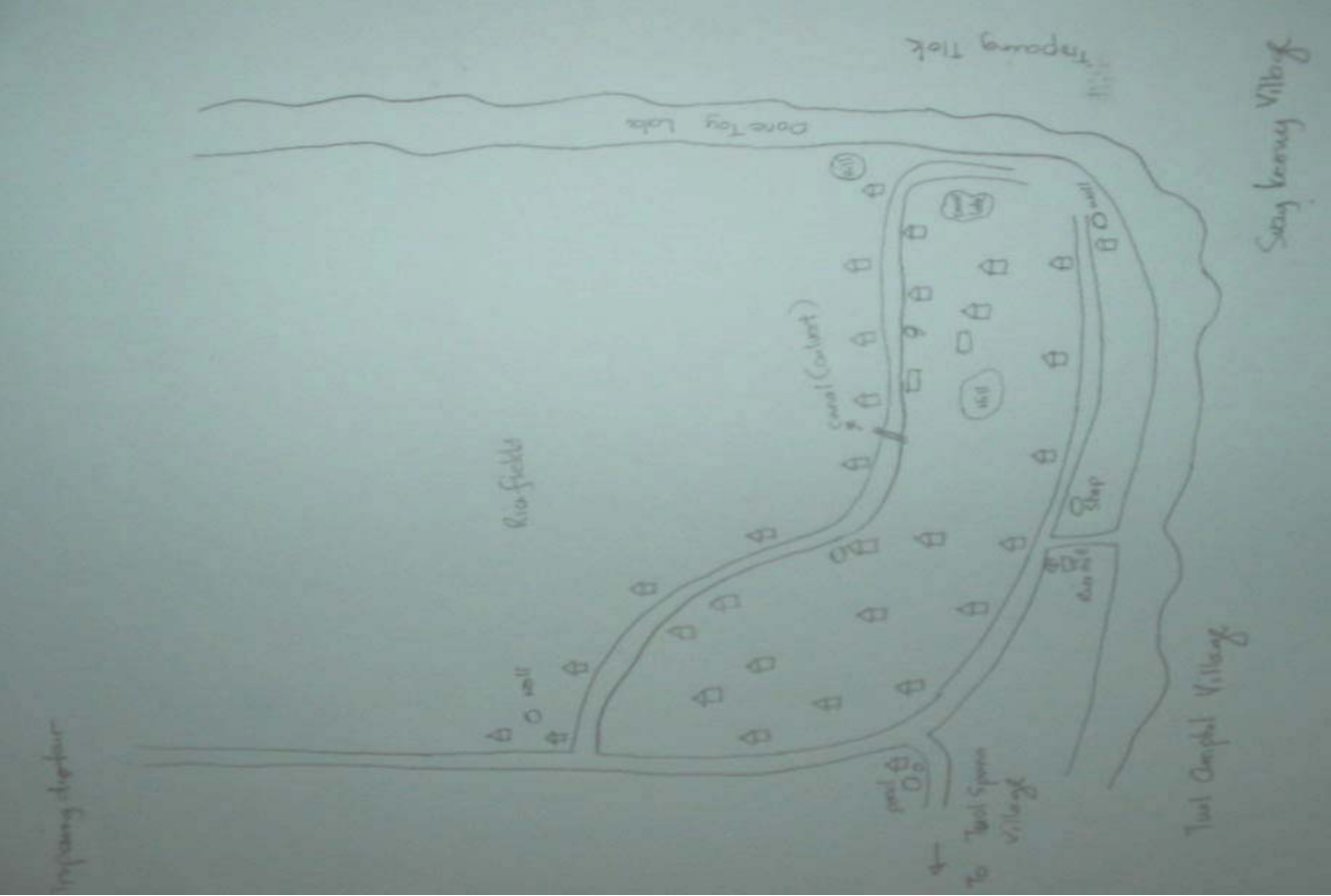
**Water resource.** A big lake is surrounding almost half of the village. Thus this lake plays a very important role to the villagers. It is being considered by the villagers as one of the most important aquatic systems in the village. Aside from this lake there are also ponds, ditches, and canals that are present in the area and where villagers collect their aquatic animals.

Aside from the land and water resource, the village also has some services available. Rice mills are present for milling their rice and therefore they do not need to go to other village to mill their rice. Small shops are also available in the village and villagers can get their basic day-to-day needs without traveling long distances. Places for spiritual and religious activities are also present in the village.

### Mapping the development in the village

The development of the village was discussed during the timeline exercise participated in by some old people from the village and also with young villagers. The discussion started with the date when the Isarak left the village in 1952. The information in the village history were mainly focused in three issues; political, economical and natural/resource issues. Like any other villages in the area of study most of the people when they discuss history, they would always remember their experiences during the time the country was "under siege" (Polpot regime). The discussion was based on Table 3 below.

Figure 1 Village Map of Trapiang Deackrom





Since 1952 the village had not experienced a good political condition. During this period the village was still called *Korktakeo*. It was the time when the French did violent things in the village including robbing farmers' property like livestock and farming products. The situation in the village became worse when the Americans started bombing and the people living situation became very difficult. The bombing stopped in the year 1970 but another political problem arose when the Polpot regime began in 1975 after a coup d'etat. During this period people from the village were moving out and tried to escape from the Polpot people. It was in 1979 when people started coming back again when the Vietnamese troops helped the Cambodian people to overthrow the Polpot regime. It was also in 1979 when the village changed its name to its present name - *Trapiangdeakrom*.

During the period of 1952 to 1979, the economic and political situation in the village was again not good. Most of the people suffered from hunger since they could not work in the farm because they were scared of the mines planted in the field. The Polpot people also stole their livestock. After the year 1979, the government started distributing rice in exchange for mouse traps(?). The economic status and the standard of living in the village since then changed and improved.

There was not enough information on how fishing and agriculture developed in the village, unlike in other timeline result of other communities. It was only in 1970 when the participants started putting information about the resources available in the village. During this period the lake was big and the living aquatic resources were abundant. In 1979 wild fish was still abundant and the villagers were using simple gears and their bare hands in collecting aquatic animals. Collection was done for food consumption only. Participants were able to recall that in 1985 villagers started selling portions of the aquatic animals they collected from the wild. In 1993 fishing became one of the major sources of income in the village and even up to the present. There was no information on when aquaculture started in the village although cultured species like tilapia had been seen in lakes since 1993.

For rice production, some development started only in 1993 when farmers started using chemical fertilizer and water pumps. Rice yield started to increase during this period also.

**Table 3. Timeline of the Development in Trapiang Deackrom**

Year	Events
<b>1952</b>	French colonial that time also came Isarak and Geakong to the Village and they has been violence leave people in the Village and they robbery livestock. -Isarak leave from 1952 -At first this Village small on Small oblong trap 4-5 households -This Village named Korktakeo
<b>1958</b>	-American has been bombed and destroyed all the household -People lived very poor
<b>1970</b>	-American still bombed has been killed 100 people also livestock and that time this Village still kept the same name Korktakeo -Have one big lake, a lot water plant and fish
<b>1975</b>	-Revolution from Lonol to Polpot regime, people eat and worked in community that time people checked mutual, and all the wealth and livestock were in community.

<b>1975-79</b>	-Escape people to another Village they afraid. People seascap to VN also this Village mix with Khmer Rouge.
<b>1979</b>	-People came back to home land and that time the Village has been changed from Korktakeo to Trapaingdearkrom Village. All the household has been destroyed also forest and bamboo, trees Abundance of more fishing and go to exchanged on rice in Svay Rieng Province Northern Svay Chrum district. Fishing by using line, pointed spear , Handled pick out Not enough food Government distribute rice by exchange with mouse ties.
<b>1985</b>	-Standard living is moderate people can do the rice field but not enough . -People do small business in VN -Fish is abundance, Fishing can selling.
<b>1993</b>	-Election all the people in the Village go to election. -The majorities occupation are rice production also making mats, cropping, fishing(the main sources of income is fishing)
<b>1993-2001</b>	-Population increased reduce the number of fishing. -In the Lake have more species of fish like Tilapia, Gian snakehead, Big snakehead. -In the present appear difference species of fish because Hun Sen Dam, people used water for livestock, rice production. -More wells, flooded in 2000 destroyed rice and killed some of livestock. -Rice production by using livestock, water pump, chemical, fertilizer, each household use from 3-4bag -Rice yield increase 1-1.5/tonne.

### Mapping social context of the village

Based on the secondary information collected from the commune office, Trapiang Deackrom is a good representative of a backward village. Among the eight (8) villages it is one of the poorest and fourth in terms of the biggest number of households or families. Although the village was considered poor there are still some differences in strata within the village. The well-being ranking activity was conducted to understand how farmers group other farmers in the village using their own set of criteria. Most people would say that villagers can be divided only into three or two: the poorest, the richest and those in between. During the exercise, one of the couple identified 7 unique groups from the village, at the most. The different characteristics of each group are presented in Table 4. Below are the common characteristics of the different social strata in the village.

#### Socio-economic characteristics

**Land ownership.** The major criterion used by farmers in the village in grouping the villagers into different strata is the area of land they own. Since the major source of income in the area is rice production therefore the area of land can relate to the amount of money or production the farmers can get. For poor farmers the average land ownership ranges from 0 - 2 hectares. Some families have small land but forced to give up later on after not able to pay loans from better off families. Better off families can own land at least 1.5 hectares to 5 hectares.

**Source of income.** Majority of the families in the village are farmers and would get their income from planting rice and other crops in the field. However the different strata has differences with other sources of income. For the lower income group, the common other source of income is working as a helper. There are some families also that works in the construction and factory worker. Fishing can be also source of income sometimes in some families in this group. Most of the additional sources of income of poor families require their human capital. For the better off group aside from farming they also gain income form providing services to other farmers like rice milling, transport. Selling of livestock can be also additional source of income and major in some families. Even better off families in the village can work as helper particularly in Phnom Penh.

**House.** A very good indicator of the well-being in this village is the condition of the house. In general however, most houses here are small to moderate in size. The group of poor families usually has a small house with no rooms or partition. The walling and roof are made of light materials like palm leaves and thatch. Other houses are made of clay, which usually melts or erode during rainy season because of the water. The middle and the better-off group have big houses. Usually the houses of better off families are elevated, wallings are made of wood and roofing is made of tiles or tin sheets.

**Food supply.** Majority of the families belong to the poor group and even up to the middle group do not have enough food for the whole year. On the average poor families do not have problem with food for four months but after that particularly during dry season, most of the families in the poor group have shortage of food. Some of the middle group also have problems with food supply but not for a prolonged period. The rich group does not have problem with the quantity of food for the whole year as presented in the table below.

**Livestock.** The number of livestock also relates to the well-being of the family. Most of the poor families do not have livestock but some have at least 1 or two heads of buffalo or cow. In this village the highest number of livestock of the rich family is 5 cows. Some families use their livestock in transporting and most of the time for agricultural activities. Rich families can also gain income from the cow by renting it to families that do not have livestock to use in ploughing their rice fields.

**Transport.** Most common type of transport in the village is bicycle and motor taxi. For poor families, transportation equipment is not so important and that is why very few among the poor group has a bicycle. Food is more important to them. Middle and rich people in the village use motor taxi in moving around the village and going to the town and districts.

Other things that are lacking in the group of poor families are the appliances in the house. These are not so important to them as the food and money for their daily basic needs. Although the information was not included in the Table 4, access to credit was also used in identifying the different strata. Most of the families in the poor group cannot access formal credit available in the area. However some families give loans to poor families like in the form of rice.

Table 4 Well-being Characteristics of the different social strata in the village

Group of women	Couple	Village Chief
<p>I</p> <ul style="list-style-type: none"> <li>• House made from clay with leaf roof</li> <li>• Small land limited from 1ha</li> <li>• Food consumption enough just only 3-4 months</li> <li>• used their land as collateral</li> <li>• Work as helper</li> <li>• Selling livestock and fishing for food</li> </ul> <p>Consumption Limit of livestock I-2 but mostly don't have</p>	<p>I</p> <ul style="list-style-type: none"> <li>• House made from clay with leaf roof</li> <li>• Not enough food for the whole year just only 3 months</li> <li>• Own average land 0.5-1ha</li> <li>• Access the fish selling</li> <li>• With bicycle</li> <li>• Work as helper with other farmer</li> </ul>	<p>I (4)</p> <ul style="list-style-type: none"> <li>• No livestock</li> <li>• Own land only 0.5ha</li> <li>• No enough food to eat just only 6- 7 months</li> <li>• Work as helper from rich people outside/inside the village</li> <li>• used their land as collateral</li> <li>• No livestock (pig &amp; cow)</li> <li>• Number of family is big (6)</li> <li>• Bicycle 30%</li> <li>• The rice yield is lower</li> <li>• Fishing as a income for their families</li> </ul>
<p>II</p> <ul style="list-style-type: none"> <li>• House made of clay with leaf roof</li> <li>• Own small land 1-2 ha</li> <li>• Food consumption enough just only 3-4 months</li> <li>• Livestock from 2-3heads</li> <li>• Selling livestock</li> <li>• Work as helper (construction worker, garment factory)</li> <li>• have access the fish for selling</li> <li>• have livestock (chickens, ducks) to sell</li> <li>• Have abilities to use chemicals fertilizer 0.5-1 bag/ha</li> </ul>	<p>II</p> <ul style="list-style-type: none"> <li>• House made of clay with leaf roof</li> <li>• Not enough food for the whole year just only 3 months</li> <li>• Own average land 1-2ha</li> <li>• Access the fish selling</li> <li>• With bicycle</li> <li>• Work as helper with other farmer</li> <li>• Average 5 children</li> </ul>	<p>II (16)</p> <ul style="list-style-type: none"> <li>• Small land for ricefield 0.5-2ha</li> <li>• Food consumption enough just only 9months</li> <li>• have limited number of livestock (1 - 2)</li> <li>• Transport is bicycle 90%</li> <li>• Fishing for selling</li> <li>• Number of family is big (6)</li> <li>• Operate water pump</li> <li>• Have appliance TV cassette player</li> <li>• Work as helper in PP</li> </ul>
<p>III</p> <ul style="list-style-type: none"> <li>• House made of wood with metal roof</li> <li>• owns small land 1-2ha</li> <li>• Food consumption enough just only 7-8 months</li> <li>• with motorcycle and bike</li> <li>• Appliances like TV and transistor radio</li> <li>• Can plant other crops</li> <li>• Have access the fish for selling</li> <li>• Work as helper in PP (construction worker, Garment factory)</li> <li>• Able to use chemicals fertilizer 1-3 bag/ha</li> </ul>	<p>III</p> <ul style="list-style-type: none"> <li>• House made of clay with leaf and metal land</li> <li>• Have appliances like TV, cassette player and radio</li> <li>• Livestock 2-3heads</li> <li>• Own land 1-2ha</li> <li>• Food enough just only 10months</li> <li>• Work as helper</li> <li>• selling fish and mats</li> </ul>	<p>III (15)</p> <ul style="list-style-type: none"> <li>• not enough food for three months</li> <li>• owned land with average area of 5ha</li> <li>• average number of family member (7)</li> <li>• have livestock can leave to other farmer</li> <li>• have motor cycle</li> <li>• Have appliance TV, cassette player</li> <li>• Have rice mill, water pump</li> <li>• House made from wood with metal and tiles</li> <li>• Sell rice and livestock as income for family</li> <li>• Can use chemical fertilizer</li> </ul>



		4-5 sack/ha
<p>IV</p> <ul style="list-style-type: none"> <li>• House made of wood with metal roof</li> <li>• Number of family 2-7 people</li> <li>• Have appliances like TV, cassette player</li> <li>• With bicycle motorcycle</li> <li>• Operate rice mill</li> <li>• Have enough food for the whole year</li> <li>• Able to use chemical fertil</li> <li>• have livestock (cows, pigs, and chicken)</li> </ul>	<p>IV</p> <ul style="list-style-type: none"> <li>• House made of wood with leaf, metal and tiles</li> <li>• Average land of 1-2.5 hectare</li> <li>• Have TV, cassette player</li> <li>• livestock (cow) 3-4</li> <li>• have transportation-bicycle, motorcycle</li> <li>• Work as helper in the village</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
<p>V</p> <ul style="list-style-type: none"> <li>• House made of wood with metal and tie</li> <li>• have big area of land</li> <li>• operating a rice mill</li> <li>• have enough food for the whole year and selling</li> <li>• Number of family 4-8 people</li> <li>• have livestock (cows, pigs, and chicken)</li> </ul>	<p>V</p> <ul style="list-style-type: none"> <li>• House made of wood with metal and tiles</li> <li>• Can sell product for their income</li> <li>• Average land of 2-3 hectare</li> <li>• Have TV, cassette player</li> <li>• livestock (cow) 4-5</li> <li>• have transportation-bicycle, motorcycle</li> <li>• Have enough food for the whole year</li> <li>• Can use chemical fertilizer 1 sack/ha</li> </ul>	
<p>VI</p> <ul style="list-style-type: none"> <li>• House made of wood with tie roof</li> <li>• Have appliance like TV, cassette player</li> <li>• Operate rice mill and water pump</li> <li>• Own land 2-5ha</li> <li>• Leave their farm to other farmer( group 1 and 2)</li> <li>• Have enough food for the whole year and selling</li> </ul>	<p>VI</p> <ul style="list-style-type: none"> <li>• House made of wood with metal and tiles</li> <li>• average land of 2-3 hectare</li> <li>• Have TV, cassette player</li> <li>• livestock (cow) 3-5</li> <li>• have transportation-bicycle, motorcycle</li> <li>• Can use chemical fertilizer 2-3 sack/ha</li> </ul>	
	<p>VII</p> <ul style="list-style-type: none"> <li>• House made of wood with metal and tiles</li> <li>• Have enough food for the whole year</li> <li>• Average land of 3-4 hectare</li> <li>• Have TV, cassette player, Video Player</li> <li>• Livestock (cow) 3-5</li> <li>• Have transportation motorcycle</li> </ul>	

## Activity Profile of the village

The village in general has a lot of activities that play an important role in their livelihood. Some of the activities are related to food production, some are income oriented and some for social and household functions. There were 11 major or important activities identified by the groups during the PRA. Four of the major activities are related to food, which are rice cultivation (364 beans), livestock raising (171 beans), fishing (122 beans), and planting other crops (116 beans). Six of the remaining activities are related to income source: making mats (86 beans), trading or selling at home (39 beans), work as helper and construction worker (20 and 18 respectively), making wine (14 beans) and making fishing gear (7 beans). The remaining major activity which ranked 6<sup>th</sup> in the list is household work but most of the beans came from the group of rich women because the rest of the group did not put any bean on this activity.

The list and composition of the activities did not have much difference between the groups, however the ranking of the activities differ from each group. The most important activity in all groups is rice cultivation but other activities reflect some differences (see Table 5).

Comparing the ranking of activities between the social strata there are also some differences. Again both rich and poor mentioned that rice production is the most important which supports the earlier discussion. The only difference that is clearly shown in the table is the composition of the most important activities. In the rich group, household work was included as most important whereas in poor group household work was not even mentioned at all. In the ranking of fishing activities, poor group ranked fishing higher than how the rich group ranked it. There are also some activities that the two groups are not doing like the fishing gear making and wine making from the group of poor. Construction work is being done by the rich group only, both men and women.

Table 5 Summary of important activities in the village by gender and social strata

Socio-econ group	Gender	
	Men	Women
<b>Rich</b>	Rice production (80)	Rice production (92)
	Livestock (52)	Housework (68)
	Cropping (37)	Livestock (61)
	Fishing (13)	Fishing (55)
	Construction worker (9)	Cropping (45)
	Selling (at home) (6)	Making mats (37)
	Work as helper (5)	Selling (14)
	Construction (9)	
<b>Poor</b>	Rice production (37)	Rice production (155)
	Fishing (20)	Making mats (49)
	Livestock (19)	Livestock (39)
	Cropping (18)	Fishing (34)
	Working as helper (9)	Cropping (16)
	Making fishing gears (7)	Trading (14)
	Making wine (5)	Making wine (9)

	Selling	(5)	Wage labor	(6)
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Between gender, the list of activities are almost the same with some differences on some minor activities. Like in the group of men the four major activities that scored significantly high from other activities are rice production, livestock raising, growing crops, and fishing (in order). While in the female group making mats is part of the most important activities in the village. Again the men group identified major activities relating to food production and minor activities for income. For the women, major activities include food and income. Household work might be included also as one of their major activities, which is lacking from the group of men.

## Seasonality

The seasonal calendar was done in the village by the four groups, rich and poor, men and women. This was conducted and illustrated the situation of the village using different perceptions during the whole year. In this activity the four groups showed how the groups differ during the year. Details on the seasonality are presented in the annexes (Seasonal calendar).

### Weather

The climate or the weather in the village is divided into three seasons: hot, cold and rainy season. Among the seasons, hot season is the one experienced most often in the village. However the groups experience differently. Both rich and poor groups experience hot weather almost for the whole year and even during the rainy season. For the women group, they do not experience hot weather during the month of October to February from the poor women group. It is from September to November for the rich women group. Hot season is the longest season in the village.

The rainy season starts in the month of May according to most of the groups, except for the poor women who recalled that little rain could be experienced starting late April. Rainy season is the most awaited season in the village since most of the agricultural activities start during this period. In the calendar the group did not mention when is the peak of the rainy season.

For the cold season as shown in the four seasonal calendars in the annexes, it is only the poor women who experience a long cold season, which is more than two months (January to February). Rich men did not mention that they experience cold season during the year.

### Tradition

The culture/tradition or any social events are practiced or celebrated in the village. Most of these social events are related to religion and some to agricultural activities. The rich group, both men and women celebrate more activities than the poor group. For the women group, no social events are observed from December to March when all the harvesting and wedding ceremonies are going on and being celebrated by rich group.

### Economic activities

The seasonality of activities in the village is different from each group. Men group have different list of economic activities and women also. The different activities change regarding the time of the year. There are activities that are being carried out the whole year and there were some being done in certain period of the year. In the group of men, both the rich and the poor mentioned that livestock production and fishing are being carried out the whole year. However rice cultivation is only being done during rainy season. But the time of activities in rice cultivation between rich men and poor men is slightly different. Poor men start their activity in the field during April while rich men group start during the month of June. Other activities like making basket, weaving making wine, and trading are being done during the period when farmers are not busy in agricultural works. Another main activity in the village is making fishing gear and for the poor men, it's another source of income in which they can do it for 9 months.

Table 6 Summary of different economic activities in the village by gender and social strata

Socio-econ group	Gender	
	Men	Women
<b>Rich</b>	Rice production Cropping Livestock Fishing Farming tools	Rice production Cropping Livestock Fishing Factory work Construction
<b>Poor</b>	Rice production Cropping Livestock Fishing Collect wood Trading Make basket Make fishing gear Make farming tools Make wine	Rice production Cropping Livestock Fishing Making mats Making wine Factory worker Construction Trading Wage labour

The seasonality of economic activities of women different from group of men although both gender group identified fishing and livestock production as whole year activity. Aside from fishing and livestock, working in the factory is another economic activity that is not seasonal and being done almost the whole year. Croppings, making wine construction and trading are some economic activities in the village that are seasonal. Most of these seasonal activities are being done during their free time from rice production and fishing. Making mats and wine are activities for poor women in the village while factory working and construction were mention by rich group of women (see annexes, Seasonal Calendars).

## Health

In general the situation of the health of the villagers are normal. There was no major illness identified by any of the group. The situation of the poor group, both men and women are almost the same. Poor group experience fever and unhappy during April and November. The unhappy of the poor group relates to the harvesting and other activities happening during this month. Most of the poor groups are tired working in the field during this period. Even rich group also experience simple flu and fever in the village and mainly brought by change of the weather.

## Migration

Migration is also happening in the village in all the group or social strata. From the calendars, it shows that social strata have no difference in terms of moving from other place to work. Most of the young villagers go to other places or the capital (Phnom Penh) to work in garments for women and construction for men. During planting season or major festival in the village some people go back to help their families but others do not and they just send remittances to their families.

## Role of Aquatic Animals

The role of different aquatic animals in the livelihood of the villagers can be determined based on the different criteria used by villagers in ranking the importance of aquatic animals. In general, aquatic animals provide income to the farmers while at the same time contribute to food security in the village. The importance of aquatic animals differs among the various economic groups and also in terms of gender groupings.

In general, the criteria that were used by the farmers can be classified into two major criteria, which are food security contribution and additional income source. There were only seven (7) criteria used and five of them could fall under the food security category. The remaining two can be under the category of additional source of income. One of the major criteria used was availability, which all the group ranked it high or as most important. The availability of the most important aquatic animals in the area would ensure food security among different groups.

Comparing the role of aquatic animals between social strata, if we are going to based it from the data presented in Table 7, rich group value the fish because its available and also because it has value. The poor group on the other hand value the aquatic animals not because they dictates good price in the market, which they ranked low, but because it is easy to catch and the taste is good for their family consumption. There was no significant difference between the men and the women group in terms of the importance of the aquatic animals. Both groups value the species for its availability and taste.

Table 7 Summary of criteria for ranking the importance of aquatic animals

Socio-econ group	Gender	
	Men	Women
	Availability (71)	Availability (45)
	Taste (39)	Taste (31)

<b>Rich</b>	Family consumption	(21)	High value	(26)
	High value	(21)	Easy to catch	(22)
	Easy to catch	(16)	Good processing	(21)
	Good processing	(16)	Family consumption	(18)
	Bony (?)	(11)	Bony (?)	(15)
<b>Poor</b>	Availability	(53)	Availability	(42)
	Taste	(31)	Taste	(38)
	Easy to catch	(28)	Easy to catch	(34)
	Family consumption	(27)	Bony (?)	(27)
	Bony (?)	(24)	Family consumption	(22)
	Good processing	(23)	High value	(21)
	High value	(22)	Good processing	(18)

### Important aquatic animals

There is a huge list provided by the different groups on the different aquatic animals present in the village, which they know and they are utilizing. Table 8 shows the most important aquatic animals in each group. Each group identified different species of aquatic animals. Most of the identified species belong to the group of big fish or fish and some non-fish species. The selection of poor and rich group differs and only about seven (7) species, which are common to both group (rich and poor). On top of the most important species identified by both group is snakehead (*Chana*), with a total of 51 beans. However poor women did not ranked snakehead as one of the most important. Other aquatic animals that were ranked by both poor and rich group are: snake (45), catfish (43), climbing perch (43), rasbora (40), frog (38), and three spot gouramy (24). From Table 8, which is the summary of most important aquatic animals, there were only four non-fish that were identified and the rest (12) were all fish species. Among the non-fish species both snake and frogs were ranked one of the highest and both rich and poor group identified the two species.

Table 8 Summary of important aquatic animals in the village by gender and social strata

Socio-econ group	Gender			
	Men	Women		
<b>Rich</b>	Snakehead	(21)	Snakehead	(15)
	Catfish	(18)	Grey featherback	(13)
	Climbing perch	(14)	Mud barb	(13)
	Grey featherback	(13)	Catfish	(12)
	Frog	(13)	Climbing perch	(13)
	Whisker sheatfish	(12)	Three spot gouramy	(11)
	Snake	(12)		
	Rasbora	(11)		
	Small shrimp	(11)		
	Climbing perch	(16)	Snake	(18)
	Brown featherback	(16)	Rasbora	(15)
	Snake	(15)	Bronze featherback	(14)

<b>Poor</b>	Snakehead	(15)	Catopra	(14)
	Rasbora	(14)	Mystus	(14)
	Yellow Catfish	(14)	Three spot gourami	(13)
	Frog	(12)	Catfish	(13)
	Freshwater eel	(12)	Frog	(13)

Comparing the selection of most important aquatic animals in the village by social strata, there are also some differences between the two groups. The rich group has a total of 11 important aquatic animals but only four species are the same between men and women, which are the most important in the rich group. The most important to the rich group are: snakehead (*Chana*), catfish (*clarias*), climbing perch and featherback. There were also non-fish aquatic animals that were identified by the rich group such as frogs, snakes, and small shrimp. For the poor group the selection of most important aquatic animals is very different from the rich group. There were 12 aquatic animals that were identified and ranked, however only four species were ranked by both men and women group. These four species were the most important from the poor group. The poor group identified a non-fish as the most important, which is the snake (33 beans). Other important aquatic fish species from the poor group are Bronze featherback (30) and rasbora (29). Another non-fish aquatic animals that was identified and ranked high by the poor families was frog. Most of these species do not dictate high value in the market nor good taste. However the nutritional role was not yet established from this species but because these are the species that poor families can access within the systems in the village.

The preference of aquatic animals and its importance not only differ from the social strata but also from the gender group. Even within same gender, the differences in the selection of important aquatic animals are obviously seen. In the group of men, although there were 12 species identified and ranked high in general, there were only five (5) species that both group are similar. Climbing perch is the most important to the poor in general. Snake and frogs again, are considered in the most important species from the poor. For the women side, they also identified the same number of aquatic animals and most of it are similar with the men group. However the most important species from women is different from men. In women Catfish and three spot gourami are the most important species in general. One of the reasons why the two species get high in ranked, is because both rich and poor group identified the species. The rest of the species were identified either by rich or poor group of women. Most of the species identified by women have good taste and most of the times in the year are available, these are the reasons why these aquatic animals are important.

### **Sources of aquatic animals**

Most of the aquatic animals being collected by the villages are coming from wild aquatic environments. However the season also affects the places where aquatic animals can be collected. Lake or *beoung* is the most common place for collection of aquatic animals even if during dry season. During rainy season rice fields are the main source of aquatic animals. Ditches and household ponds serve as holding area for small aquatic animals collected from the wild, rice fields usually. Trap ponds in the river or lake are also common to every group as collecting place for aquatic animals.

## **Gear used**

The gear being used by the villagers varies from simple to "advanced" gear. From the beginning farmers are using simple gears in collecting aquatic animals. Some are using their bare hands to collect aquatic animals, though some still uses this technique in collecting AA. Particularly poor men and women and rich women are using majority of the local fishing gear in the village. Rich men uses limited fishing gear. Some of the common fishing gear being used are: gill net; scoop net, line, long line, hook, and traps.

There are several traps in the village also that can be used in collecting AA. Trap like jump tramp, oblong trap, hard trap and drum trap are being used during rainy season or when aquatic animals are moving from one place to another following the water movement.

## **Seasonality of Aquatic Animals**

Most of the important aquatic animals in the village are seasonal. However, most of the aquatic animals are available in the village the whole year but in very small amount. For poor men the abundance of most of the aquatic animals is the same, the only difference is the location and the gear that they are using. In summer, most of the collection is being down in permanent water bodies like lake but in rainy days, most of the aquatic systems can be a place for collecting aquatic animals. Most of the aquatic animals have time of the year that is abundant and there are parts of the year that are limited. On the average some aquatic animals can be scarce for 4 months in a year especially during summer but there are some that are scarce for a long time. One *mystus* species is scarce for 6 months but still important to poor women. For rich women, catfish is scarce for 8 months but still important due to it's commercial value and taste. In general during rainy season, most of aquatic animals are abundant especially to those farmers who have access to the different aquatic systems.

## **Trends of Aquatic animals**

The situation of aquatic animals was looked at during the PRA exercise. Since 1960 most of the aquatic animals are abundant and this is because of several factors like the population, fishing practices and condition of the environment. The situation of the aquatic animals started changing from 1970 to 1979. The most significant changes that had happened to the status of aquatic animals in the village was during 1993 up to present. Since this period the aquatic animals started to decreasing and continually decreasing at this stage. There are several factors contributing to this trend.

The increasing population is the most important factor since because of the increasing population, the demand for aquatic animals for food increases also. The introduction of destructive fishing gear, degradation of the environment due to agriculture intensification was also causing the decreasing population of aquatic animals in the village.



## **Farmers' meeting**

After all the outlined activities for the workshop were accomplished, the team made a brief summary of the information. The outputs from each exercise were presented again to the big group for clarification and to get any additional information. The villagers verified the information presented. After the presentation the villagers expressed their thanks to the team and vice versa. It was a great learning experience for both groups who did the PRA.

## **Annexes**

**Seasonal Calendar**

**Weather**

Poor men

April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Hot,	Hot, rain	Hot, rain	Hot, rain	Hot, rain	Hot, rain	Hot	Hot, cold	Hot, rainy	Hot	Hot	Hot

Poor women

Hot, little rain	Rain	Hot, rain	Hot, rain	Hot, rain	Hot, rain	Rain	Rain	Rain	Cold	Cold, windy	Hot
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Rich men

Hot	Hot, rain	Hot, rain	Hot, heavy rain	Hot, heavy rain	Hot, flood	Hot, flood	Hot, flood	Hot, little rain, water recedes	Hot, water recedes	Hot, water recedes	Hot, water recedes
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Rich women

Hot	Hot, windy	Hot, windy	Rainy, windy	Hot, transplanting season	Flood	Doing first rice	Cold, flood, windy	Hot, harvesting	Hot	Hot	Hot
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**Social events**

**Poor men**

April Khmer New Year	May Praying ceremony, wedding	June	JuSmall oblong trap Celebration of start of rainy season	August End of rainy season	Sep	Oct	Nov Katiannatien, full moon ceremony,	Dec	Jan	Feb Wedding, harvesting ceremony	Mar Wedding ceremony
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**Poor women**

Khmer New Year	Visa Bochea, praying ceremony for rain	Praying ceremony			Pchum Ben ceremony	Start of School	Kathanatiene, Full moon				
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**Rich men**

Khmer New Year Ceremony	Visa Bochea, praying ceremony for rain	Royal Plowing ceremony			Pchum Ben ceremony	Pchum Ben Ceremony	Full moon Water festival	Flower Ceremony	Ceremony to honour the dead	Ceremony to honour the dead	Ceremony to honour the dead
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**Rich women**

Khmer new year- Praying ceremony, Ceremony for blessing dead people	Praying ceremony, wedding	Opening ceremony for newSmall oblong trap built roads etc. Praying ceremony			Pchum Ben ceremony		Kathanatiene, flower ceremony, full moon ceremony	Flower ceremony	Harvesting ceremony	Harvesting ceremony and wedding ceremony	Harvesting ceremony and wedding ceremony
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## Economic Activity

### Poor men

April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Fishing, Selling, Crop production, livestock, RF prep. (collect manure for fertilizing rice and crop) make basket, make fishing gear	RF prep. Crop prod, livestock, fishing, make farming and fishing tools	RF prep. Collect wood, fishing, crop production, livestock, make wine, sowing first rice, make fishing and farming tools (baskets included)	RF prep, RF maintain, crop prod, fishing, collect wood, livestock, making wine, making farming and fishing tools	RF prep. Transplanting, RF maintain, fishing, collect wood, livestock, make wine, make farm and fishing tools (and gear)	Transplanting, RF prep, RF maintain, fishing, collect wood, livestock, harvest first rice, rice processing, make farm and fishing gear.	Harvest first rice, fishing, livestock, RF maintain, crop prod, make fishing and farm gear/tools.	Fishing, crop prod. Livestock, make fishing and farm tools.	As November	Harvest third rice, rice processing, storing, livestock, fishing, crop prod. Make fishing and farm gear/tools.	Fishing, seller, livestock, making wine, crop prod.	As February

### Poor women

make mat, make wine, fishing, make cake, livestock, construction and garment worker	crop production, RF preparation, fishing, making wine	RF prep. Sowing rice, fishing	Fishing, worker, weave mat, livestock, make wine	Worker	Fishing, make wine, seller, weave mat, transplanting	Fishing, make wine, seller, making mats, transplanting	Crop production, mats, fishing, making wine, seller	First rice harvesting, making mats, fishing	Harvesting rice, weave mat, fishing, crop production	Harvesting rice, making mats, fishing	Making mats, making wine, fishing, worker
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### Rich men

crop production, fishing, livestock	crop production, fishing, make farming tools, livestock	RF preparation, sowing, fishing, livestock	transplanting, RF prep, RF maintenance, fishing, livestock	Transplanting, RF prep. Maintain, fishing, livestock	fishing, livestock	Fishing, livestock, RF maintenance	Fishing, livestock, First harvest of rice	Harvesting, livestock, crop production	Harvesting, livestock, crop production, fishing	Harvesting, livestock, crop production, fishing	Fishing, livestock and crop production
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### Rich women

crop production, fishing, construction worker, livestock	RF preparation fishing, livestock, garment factory worker	RF preparation, fishing, livestock, construction worker, crop production	Sowing rice, fishing, worker – construction and garment, livestock	Transplanting, fishing, garment worker, livestock	Fishing, construction worker, livestock, garment worker	Fishing, construction worker, garment worker, livestock	Fishing, construction and garment worker, livestock (flooding)	Fishing, construction and garment worker, livestock	Fishing, rice harvest, livestock, garment worker	Fishing, threshing, livestock, crop production, garment worker	Husking, livestock, crop production, garment and construction worker
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**Health**

Poor men

April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Unhappy, fever (for children)	Normal	Normal	Normal	Normal	Happy	Normal	Unhappy, flu	Normal	Normal	Normal	Quite happy, rice harvest

Poor women

Unhappy, normal, happy	Normal	Happy, normal	Happy	Normal	Normal	Normal	Normal, unhappy, fever, flu	Normal	Normal, fever	Unhappy, fever	Unhappy, fever, Stomach problems
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Rich men

Normal,	Unhappy, stomach problem	Happy	Happy	Happy	Unhappy	Unhappy	Unhappy	Happy	Happy	Happy	Happy
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Rich women

Flu, fever	Fever, flu	Unhappy	Unhappy, livestock sick	Happy	Unhappy	Unhappy	Happy	Unhappy	Unhappy	Unhappy	Happy
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**Migration**

**Poor men**

April	May	June	JuSmall oblong trap	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Come back						Go to Pauy Pait And Kok Kong to earn money					

**Poor women**

Work in garment factory and construction Worker in Phnom Penh					Some go, some come back from Phnom Penh						
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**Rich men**

Come back from Phnom Penh	Come back from Phnom Penh	Come back from Phnom Penh	Come back from Phnom Penh	Come back from Phnom Penh	Come back from Phnom Penh	Come back from Phnom Penh	Come back from Phnom Penh	Come back from Phnom Penh	Go to work in garment factory and as construction worker in Phnom Penh	Go to work in garment factory and as construction worker in Phnom Penh	Go to work in garment factory and as construction worker in Phnom Penh
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**Rich women**

Came back from Phnom Penh						Work in garment factory and construction until march	As previous	As previous	As previous	As previous	As previous
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## Economic Activity Scoring

### Rich men group

Activity	Tep Phon	Khoun Phak	Thaung Kea	Svay Sam Ol	Rith Khem	Ten Mao	Sar Saroeun	Khim Sachoeun	Chin Savy	Svay Mao	Thaung Ry
Rice	9	5	9	8	9	10	11	7	7	8	7
Fishing	2	3	0	1	2	1	1	1	1	1	0
Crop production	4	3	5	6	0	6	4	6	5	3	5
Selling at home	0	0	0	2	4	0	0	0	0	0	0
Construction worker	0	3	0	0	0	0	0	0	3	3	0
Livestock	5	4	6	3	3	3	5	6	4	4	9
Work as helper	0	3	0	0	2	0	0	0	0	0	0

### Rich women

Activities	So Vorn	Ouch chamroeun	Thaung Ke	Hun Chivan	Thaung Samorn	Svay Phea	Ma Nhorn	In Sare	Chhun Sambath	Tom Tou	Has Kou	Ma Thy	Khoun Sabun	Vorng Lach	Ma Dy	Cheab Oum	Vorng Nit	Chin Lok	Sok Kheng
Make mats	4	0	3	0	3	0	4	2	0	0	3	3	0	0	4	6	0	2	3
Fishing	3	0	3	6	3	3	4	3	0	5	0	4	4	5	4	0	2	3	3
Construction	1	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Livestock	4	2	3	4	4	4	3	3	5	4	3	0	3	5	0	4	3	3	3
Selling	0	2	0	0	0	1	0	4	0	0	0	0	0	0	0	0	5	0	2
Crop production	0	3	4	0	0	3	5	0	4	2	4	2	4	3	3	2	0	3	3
Rice field	4	4	6	5	5	6	4	4	7	6	5	5	5	4	5	4	5	4	4
Housework	4	4	0	5	5	3	0	4	4	3	5	6	4	3	4	4	5	3	2



Poor Women

Activities	Tom Hout	Kao ry	Sak Sabath	Kim Gnyear	Ros Seam	Sous Sorn	Neang sitha	Keo Pin	Seng You	Vorng La	Sous Ren	Prom Saboeun	Thaung Saben	Yan Sean	Svay Tha	Neang hin
Rice	10	11	7	8	11	11	10	11	11	10	8	11	7	9	10	10
Make mats	3	0	3	6	3	4	0	2	4	4	3	3	5	6	3	0
Fishing	3	0	3	2	3	2	2	0	2	3	0	3	3	4	4	0
Livestock	4	0	3	2	3	2	5	2	3	3	0	3	3	3	3	0
Trade/sell	0	0	4	0	0	0	3	0	0	0	3	0	0	0	0	4
Make wine	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Worker	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0
Crop production	0	0	0	0	0	0	0	5	0	0	0	0	2	0	0	9

Poor men

V4pm	Prom Khea	So Sa Aim	Keo Khean	Tom Poeun	Khoun Phet	Thaung Saban
Rice	6	5	7	5	6	8
Fishing	4	2	5	4	3	2
Crop production	0	2	3	3	3	7
Make fishing gear	0	2	0	4	1	0
Make wine	0	2	0	2	1	0
Livestock	4	3	3	2	4	3
Selling	2	2	0	0	1	0
Work as helper	4	2	2	0	1	0

## Aquatic Animal Identification and Scoring

Poor men

Species	Characteristics						
	Availability	Tasty	Easy to catch	Processing	Bones	Value	Consumption
Snakehead	4	2	2	2	1	2	2
Yellow Catfish	4	1	2	2	1	2	2
Freshwater eel	2	2	1	2	1	2	2
Big snakehead	1	2	2	2	1	0	2
Bronze featherback	4	2	2	2	2	2	2
Snake	4	2	2	1	2	2	2
Rasbora	4	2	2	1	2	1	2
Climbing perch	4	2	2	2	2	2	2
Spiny eel	3	2	1	1	1	1	1
Whisker sheatfish	3	2	2	1	1	1	1
Three spot gourami	3	1	1	2	1	1	1
Mystus	3	1	1	1	2	1	1
Catopra	2	1	1	1	2	1	1
Mud carp (rasbora?)	2	1	1	1	2	1	1
Frog	3	2	2	1	1	2	1
Rough skin frog	3	2	2	1	2	0	2
Rice field frog	3	2	2	0	0	0	2
Yellow mystus	1	2	0	0	0	1	0

Poor women

Species	Availability	Tasty	Easy to catch	Good processing	Bony	Value	Family consumption
Snakehead	2	3	1	0	1	3	2
Climbing Perch	2	3	1	0	1	2	2
Catfish	2	3	1	2	2	2	1
Three spot gourami	3	1	3	1	2	2	1
Mystus	3	1	3	2	2	1	2
Whisker sheatfish	3	3	1	0	1	1	2
Catopra	3	2	3	2	2	1	1
Blotched snake head fish	1	1	1	0	0	0	0
Grey feather fish	3	1	2	2	3	1	2
Eyespot barb	1	2	2	2	2	0	1
Spiny eel	3	2	2	0	2	1	1
Rasbora	3	2	3	2	2	1	2
Snake	3	3	3	2	3	2	2
Freshwater eel	2	2	1	1	1	2	0
Frog	2	3	2	1	2	2	1
Pigmy gourami	3	3	1	1	1	0	2
Crab	2	2	3	0	0	0	0
Giant snakehead	1	1	1	0	0	0	0

### Rich men

Species	Availability	Tasty	Value	Easy to catch	Processing	Bony	Consumption
Snakehead	7	4	4	3	2	0	1
Catfish	7	4	3	2	1	0	1
Climbing perch	5	2	1	1	1	2	2
Giant snakehead	1	2	0	0	1	0	1
Spiny eel	4	3	1	0	1	0	1
Bronze featherback	4	2	1	1	2	2	1
Three spot gourami	4	1	1	0	0	0	1
Rasbora	7	1	1	1	0	0	1
Small shrimp	5	2	1	1	1	0	1
Catopra	4	1	0	1	0	2	1
Whisker sheatfish	4	2	1	1	2	0	2
k'choun = Channa lucius	2	2	0	0	1	0	1
Snakeskin gourami	3	2	0	1	0	1	1
Wrestling half beak	3	1	0	0	0	0	1
Frog	4	3	2	2	1	0	1
Freshwater eel	2	2	2	1	1	0	1
Snake	2	2	3	1	1	2	1
Pygmy gourami	2	2	0	0	1	0	1
Mystus	1	1	0	0	0	2	1

### Rich women

Species	Availability	Tasty	High value	Easy to catch	Processing	Bony	Consumption
Snakehead	4	2	4	3	1	0	1
Catfish	4	2	2	2	1	0	1
Climbing perch	4	2	1	2	1	2	1
Bronze featherback	4	2	2	1	1	2	1
Whisker sheatfish	3	2	1	1	2	0	1
Mystus	1	1	1	1	1	1	1
Spiny eel	2	2	1	1	1	1	1
Three spot gourami	4	2	1	1	1	1	1
Catopra	2	1	1	1	1	1	1
Mad barb	3	2	2	2	2	1	1
Spot barb	1	1	1	1	1	1	1
Rasbora	3	1	1	1	2	1	1
Wrestling Half beak	2	2	1	1	1	1	1
Blotched Snakeheadfish	1	1	1	1	1	1	1
Giant snakehead	1	1	1	1	1	0	1
Frog	2	1	1	1	1	1	1
Small shrimp	3	2	2	1	1	0	1
Freshwater eel	1	4	2	0	1	1	1





## Seasonality of Aquatic Animals

### Poor men

Species	April	May	June	JuSmall oblong trap	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Climbing perch	Drain trap pond, gill net, trap net, in lake	Lighting, scoop net, gill net, line, lake	As May	As May	As May	As May	Lighting, line, gill net, in lake, RF	Jump trap, oblong trap, small oblong trap, gill net, line, rice field, lake	As November	Line, gill net, scoop net, in lake	As January	Draining trap pond, trap net, gill net, hard trap, hook long line, in lake
Brown feather back	Fence trap, gill net, drain trap pond, trap net, in lake	Line, gill net, hook long line, in lake	As May	As May	As May	Gill net, hook line, hook long line, line, oblong trap, in lake	Gill net, lighting, oblong trap, drum trap, lake, line	As October	As October	Line, gill net, oblong trap, in lake	As January	Draining trap pond, trap net, fence trap, hard trap, line, in lake
Snake	Gill net, lake	Gill net, lighting, in lake	As May	As May	As May	As May	Dig, gill net, in lake and rice field	As October	As October	As October	As October	As October
Snakehead	Drain trap pond, trap net, hard trap, gill net, lake	Lighting, line, gill net, hook long line, hard trap, in lake, RF	As May	As May	As May	As May	Lighting, jump trap, small oblong trap, hook long line, in lake and RF	As October	Gill net, line, hard trap, hook long line, small oblong trap, in RF	As December	As December	Drain trap pond, trap net, hard trap, line, gill net, in lake
Rasbora	Scoop net, drain trap pond, gill net, trap net, in lake	Gill net, oblong trap, scoop net, in lake	As May	Gill net, oblong trap, lake	As JuSmall oblong trap	As JuSmall oblong trap	As JuSmall oblong trap	As JuSmall oblong trap	As JuSmall oblong trap	As JuSmall oblong trap	As JuSmall oblong trap	Draining trap pond, trap net, gill net, oblong trap, in lake
Catfish	Drain trap pond, gill net, fence trap, line, trap net, in lake	Gill net, trap net, line, hook long line, in lake	As May	As May	As May	Oblong trap, lighting, gill net, line, lake	As September	Jump trap, small oblong trap, line, lighting, gill net, lake and RF	As November	Hard trap, trap net, line, gill net, trap net, lighting, in lake and RF	As January	Draining trap pond, gill net, line, hard trap, in lake

Poor women

Species	April	May	June	JuSmall oblong trap	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snake	Gill net -lake	Lighting, gill net, line -lake	Scarce, lighting, gill net, line, lake	As June	As June	As June	Moderate Lighting, gill net, line, lake	Abundant Lighting, rice field,	Moderate, lighting, rice field	As December	As December	As December
Rasbora	Oblong trap, gill net, drain trap pond, lake, RF	Moderate, gill net, oblong trap, lake,	As May	Moderate, lake, gill net, oblong trap, line, hook long line	As JuSmall oblong trap	Moderate, Gill net, oblong trap, line, lake	As September	Abundant, oblong trap, line, gill net, lake	Moderate, oblong trap, line, gill net, lake	As December	Scarce, gill net, line	as for February
Bronze featherback	Abundant gill net, hard trap, kone	Moderate, gill net, hard trap, kone	Scarce, hook long line, line, gill net, lake	Moderate, hook long line, line gill net, lake	Moderate, gill net, oblong trap, hook long line, line lake, RF	Abundant, gill net, oblong trap, hook long line, line, lake, RF	Abundant, gill net, oblong trap, hook long line, line, lake, RF	As October	as for October	as for October	Moderate, gill net, line, hook long line, kone	As February
Catopra	Abundant Draining, jump trap, bamboo net, hard trap, lake	Moderate, gill net, line,	Scarce gill net	As June	Moderate, gill net	Moderate, gill net, lake	Moderate, gill net, 3-4kg in lake	Oblong trap, gill net, lake, RF	Abundant, gill net, oblong trap, 10-15kg	Moderate, gill net, 1-2 kg, in lake	Scarce, gill net 4-5 kg, lake	Abundant, draining lake, kone, lake, 7-10 kg
Mystus	Scarce, draining small stream, and lake, gill net, lake	As April	As April	Scarce, bamboo net, gill net, lake	Scarce, bamboo net, gill net, lake	Moderate, gill net, oblong trap, screens in current water (DAI) in lake	Moderate Line, dai, lake	Abundant Oblong trap, dai, lake, 20-30kg	Moderate, gill net, lake, small stream	As December	Scarce, gill net, line	Draining small stream, dai, lake
Three spot gourami	Moderate, draining small stream	Scarce, gill net	Moderate, gill net	Moderate, gill net	Moderate, gill net	Abundant, oblong trap, gill net, dai, lake	Abundant, oblong trap, gill net, dai, lake	Abundant, oblong trap, gil net, dain, lake	Abundant, oblong trap, gill net, dai, lake	Moderate, gill net, dai, lake	Moderate, oblong trap, gill net, dai, lake	Moderate, oblong trap, gill net, dai, lake

Rich men

Species	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Abundant -Drain trap pond -lake	Scarce	Moderate -gill net, long line lake	Moderate, gill net, long line, lake	As for June	As for June	As for June	As for June	Moderate gill net, long line, trap net rice field, lake	As for December	As for December	As for December
Catfish	abundant -drain trap pond -lake	scarce	Moderate, gill net, line, lake	As June	As June	As June	As June	As June	Moderate gill net, long line, trap net rice field, lake	As for December	As for December	As for December
Climbing perch	Abundant, line, gill net, in lake	Scarce	Moderate, gill net, line, in lake	As June	As June	As June	As June	As June	Moderate, gill net, line, trap net, rice field, lake	As previous	As previous	As previous
Grey featherback	Abundant, gill net, in lake	Scarce	Moderate, in lake, gill net, line	As June	As June	As June	As June	As June	Moderate, gill net, hook long line, line, lake, rice field	As previous	As previous	As previous
Whisker sheatfish	Abundant, gill net, lake	Scarce	Moderate, in lake, gill net, line	As June	As June	As June	As June	As June	as above	as previous	as previous	as previous
Rasbora	Abundant, trap net, lake	Scarce	As above	As June	As June	As June	As June	As June	as above	as previous	as previous	as previous



Rich women (kone is bamboo fish exciter)

Species	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Less abundant, lake, pond, "kone", hook long line, gill net, hard trap	Scarce, lake, pond, kone, hook long line, gill net, hard trap	As May	Scarce, lake, line, gill net, lighting	Abundant, lake, rice field, ditch, jump trap, gill net, hard trap, line	As August	Abundant, lake, rice field, jump trap, gill net, hook long line, kone	As October	Less abundant, lake, rice field, gill net, line, kone	As December	As December	Scarce, lake, gill net, line
Grey feather fish	Scarce, lake, gill net, long line	Abundant gill net, long line lake	As May	Moderate As May	As JuSmall oblong trap	Scarce As JuSmall oblong trap	Abundant gill net, line, kone, lake	As October	Moderate gill net lake, line	Scarce Lake, hard trap, gill net, kone	As January	As January
Mad barb	Abundant gill net, scoop net, hard trap lake	As April	Less abundant As April	Moderate	Scarce	Less abundant	Abundant, in lake, gill net, line, hard trap	As October	Moderate, in lake, gill net, line, hard trap	As December	As December	Abundant Lake, gill net, line
Catfish	Scarce Lake, gill net, line	As April	As April	As April	As April	Abundant Lake, gill net, line, hard trap	As September	As September	Moderate, Lake, gill net, line	Scarce, lake, gill net, line, hard trap	As January	As January
Climbing perch	Moderate Lake, gill net, hard trap, line	Abundant Lake, gill net, line, hard trap, lighting	Moderate As May	As June	As June	Less abundant, gill net, line, (Small oblong trap)	Abundant jump trap, (Small oblong trap)	Abundant	Moderate	Moderate	Moderate	Moderate
Mystus	Scarce	Abundant gill net, scoop net	Abundant, gill net, scoop net	Less abundant	Moderate	Moderate	Abundant, lake	As October	As October	Moderate gill net, line	As January	As January

## Trends of Aquatic Animals

Poor woman

Species	1960	1970	1975	1979	1993	2001
Snake	Abundant, lake was deep, lots of floating plants, oblong trap, use stick to kill fish in water, lighting, lake	Abundant, few fishermen, low human population, simple gear, lake was deep, people don't use water from the lake for their rice fields	As previous	As previous	Declining year after year, high human population, more fishermen, lake was shallow, no floating plants, use modern gear	Scarce, high human population, more fishermen, use modern gear, lake shallow, no floating plants
Rasbora	Abundant Lots of water in the lake, scoop net, hard trap, bamboo net, lake is deep, lots of floating plants, plenty of rain, low human population	As previous	Abundant Few fishermen, Pol Pot regime, lake is deep, lots of floating plants, nobody allowed to fish	Very abundant Few fishermen, high species diversity, lake is deep, plenty of floating plants, low human population, simple gear, dig trap ponds	Abundant Plenty of water in the lake, fish can spawn below the dam, high human population, use more technical gear	Moderate, high human population, more fishermen, use modern gear, lake was shallow, no floating plants
Bronze featherback	Abundant Low human population, plenty of water in the lake, fish spawning in floating plants, used simple gear, eg. Oblong trap and drum trap	As previous	Very abundant Nobody allowed to fish, lake was deep, plenty of floating plants	Very abundant Low human population, use simple gear	Moderate Lots of fishermen, modern gear, lake was shallow, no floating plants	Scarce, high human population, use modern gear, lake was shallow, no floating plants
Catopra	Abundant Draining ditch, low human population, lake is deep, use simple gear	As previous	Very abundant, as previous	As previous	Abundant, on Small oblong trap collect big fish, leave small fish (plus as previous??)	As 1979, flooding also
Mystus	Abundant Plenty of water in lake, low human population, use simple gear, fish spawn in lake,	As previous	As previous	As previous	As previous	Very abundant Flood from the river
Three spot gourami	Abundant Fish spawn at the first opportunity, ie. As soon as the rains come. Spawn in ditch in floating plants	As previous	As previous	Very abundant, limited fishermen, Pol Pot Regime	Moderate, lots of fishermen, use more gear	As previous

## Rich man

Species	1960	1970	1975	1979	1993	2001
Snakehead	Abundant, water source from Waiko river, and Don toy lake, lake shallow, lots of floating plants, used line, hook long line, lake area is 2500m <sup>2</sup> .	As previous	Less abundant, use trap net, lake is shallow, a lot of floating plants, few fishermen, use line, hook long line.	Less abundant, fishing for community, drain trap pond in lake,	Moderate, more fishermen, lake shallower than 1979, lots of floating plants, use gill net, line, hook long line, trap net, (Kone = bamboo fish scaring device- excites fish to make them jump	Lake more shallow, people cut floating plants for agricultural purposes. People use every method to catch fish, including illegal ones. Use gill net, line, hook long line, trap net, and "Kone"
Catfish	as above	as previous	as above	as previous	as above	as above
Climbing perch	as above	as previous	as above	as previous	as above	as above
Brown featherback	as above	as previous	as above	as previous	as above	as above
Whisker sheatfish	as above	as previous	as above	as previous	as above	as above
Rasbora	as above	as previous	as above	as previous	as above	as above

## Poor man

Species	1960	1970	1975	1979	1993	2001
Climbing perch	Abundant Lake, rice field, gill net, line, hook long line, scoop net, black and white climbing perch, spawning in lake	Abundant Lake, rice field, gill net, line, hook long line, scoop net, spawning in lake	Abundant Limited fishing, hard trap, lake was deep	Abundant Deep water, had floating plant, lighting, gill net, trap net, hook long line, line	Moderate Many fishermen High human population, gill net, lighting, hook long line, trap net, lake shallow, people clear lake edge for rice production	Scarce, water shallow, Lake shrinking, gill net, hard trap, trap net, lots of floating plants, spawning in lake
Brown featherback	Moderate Lighting, line, hook long line Deep water, had floating plant, draining trap pond	As previous	As previous, spawning in lake	Abundant Deep water, had floating plant Lighting, gill net, trap net, line, hook long line, oblong trap, drain trap pond	As previous	Scarce Lake shallow, floating plants, lots of fishermen, lots of fishing gear
Snake	Abundant Rice field, lake, few fishermen-deep water, had floating plant -gill net, hook	As previous	Moderate Many fishermen Deep water, had floating plant, lighting, hook	Abundant Deep water, floating plants, gill net, dig/hook, rice field	As previous	As previous

Snakehead	Abundant Deep water and big, few fishermen Lighting, line, hook long line, jump trap, drain trap pond	Abundant Fish spawn in lake and rice field (plus previous info??)	As previous	As previous	Moderate Shallow water and small, had floating plant, many fishermen Gill net, line, hard trap, trap net, lighting, draining trap pond	As previous
Rasbora	Abundant, rice field, lake, few fishermen, deep water oblong trap, drum trap, scoop net	As previous	As previous	As previous	Moderate, lake is shallow, lots of floating plants, but more fishermen, oblong trap, drum trap, fish spawn in trap pond and lake	As previous
Catfish	Abundant, deep water, lots of floating plants, few fishermen, lighting, drain trap pond	As previous	As previous	As previous	Moderate, lake is shallow, no floating plants, jump trap, line, gill net, lighting, drain trap pond, hard trap, spawning in lake	As previous

Rich woman

Species	1960	1970	1975	1979	1993	2001
Snakehead	Moderate, deep water, oblong trap	Abundant, deep water	Abundant, deep water, people afraid to go fishing = few fishermen	Abundant, deep water, a lot of floating plants	Abundant, deep water	Abundant shallow water, erosion around the lake
Grey featherback	Abundant	Abundant, bombing	Scarce, floating plants	Moderate, floating plants	Moderate, floating plants	Moderate, floating plants
Mad barb	Abundant, deep water	Scarce, rain, fish disease, lake becomes filled up with soil from erosion	Moderate, floating plants	Moderate, floating plants	Moderate, floating plants	Moderate, floating plants
Catfish	As above	As above	Moderate	Moderate	Moderate	Moderate
Climbing perch	Abundant, spawns easy Small oblong trap, disease resistant	As previous, disease resistant	as previous, disease resistant	as previous, disease resistant	as previous, disease resistant	as previous, disease resistant
Mystus	Abundant, deep water	as previous	as previous	Moderate	Moderate	Moderate shallow water