

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

Participatory Rural Appraisal in Kbal Krapeu:
Case Study 5 (PRA Report from 2001)

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Kbal Krapeu Village

Introduction

Background

The present status of aquatic systems in the province as well as the effect of these aquatic systems to the people had not been established. For any development organization and even for government agencies, knowing the general background of the village is very important. An outsider would not see the true, representative picture of the village unless proper baseline gathering is conducted. This information can be used to develop new programs or to design other relevant development interventions in the area. It is also very important that the information is generated from and with the primary stakeholders themselves – the farmers or villagers.

A lot of development programs had been started in different villages. In most cases, sustaining these programs has been a challenge. Most common reason for the low success of development projects is the passive, “disengaged attitude” of the supposed primary stakeholders towards the project or program. This can be usually attributed to the way the project or program was conceived and the planning process used. Frequently, development interventions are designed and managed using the top-down approach. Projects are initiated and planned at the top, with no prior consultation with the other stakeholders and no involvement of the intended beneficiaries in the planning process. Thus, the communities are left to accept and accommodate the said “intervention”. It is therefore necessary to listen to the villagers and to consult them regarding the status of their area prior to starting any activity, rather than just thrusting information and expectations on them.

Objectives

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

1. To assess the local conditions at the village;
2. To gather baseline information about the status of aquatic animals in the area using participatory tools;
3. To work with the villagers in facilitating the identification of issues in the community.

Participatory Rural Appraisal Team

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Schedule of Activities

The workshop was conducted in three days, which also included the collection of secondary information about the province and the commune (see table below). On the first day, offices like the provincial office and commune office were visited. Secondary information was gathered from these offices 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. Visitation of the village was also done during the first day and introduced the team to the villagers. Appointment was also set during this visit.

The village profile was generated on the second day and participants for the next day's activity were identified. The last day of the workshop was used for collating and processing of outputs from the past two days' activities. The last activity that was done in the village was the validation of the information and getting feedback from the villagers.

Table 1. Schedule of Activities During the PRA Workshop in the Village

Date	Activities
07 June 2001	Collection of secondary data Visitation of offices
08 June 2001	Introduction with the village
09 June 2001	PRA exercises Processing of output Feedbacking

Svay Rieng Province Province Description

Location. Svay Rieng is situated 124 km away from Phnom Penh on the southeast part of Cambodia. It covers a land area of 2970 km².

Boundaries:

North	-	Kampong Cham province
South	-	Long An 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. Since 1998, the estimated population of the province is 442, 000 with an average of 149 persons per sq. km. (Census, 1998)

Romeas Hek Distict

District description

Location. The district is located at the northern part of Svay Rieng. It is situated 42 km away from the center of the province.

Boundaries:

- North - Kamchay Mea district (Prey Veng) and Porgnear Kretch district (Kampong cham)
- South - Svay Chrum and Romdoul district
- East - Vietnam
- West - Kamchay Mea and May Sang district (Prey Veng)

Administration and population. The district is comprised of 16 communes and 204 villages. It has a total population of 112,526 with 21,365 households. The average family size is 5.26 persons. The district has an estimated female population of 52.5%.

Topography. Considered as one of the low land areas of the province. The difference of water depth between dry season and rainy season ranges from 1 – 1.5 m in Kampong Trach river (Tonle Kampong Trach).

Resource. One of the main water resources of the district is Tonle Kampong Trach which flows from Vietnam to Kamchaymea district of Prey Veng Province. Aside from the Tonle Kampong trach, other water bodies present in the area are Boeung Mram, Beoung Khtom, Prek Chikdorpo. These water bodies are the main sources of fisheries product for local communities especially during the wet season. Ricefields during the rainy season is also considered a main fishing place.

Rainfall. Usually the rains start in April, lasting until November. Average rainfall of the district is 1300 mm – 19000 mm. Tonle Kampong Trach starts flooding into the district area at the end of September and starts to recede at the end of November.

Occupation. Rice cultivation is the main economic activity in the district (95%). Due to its location which has a large forest area, farmers also get by-products from the forest for additional source of income. Fishing in the rice fields and other water bodies is also important.

Commune Description

Ang Prosrail Commune is comprised of 16 villages as follows:

- | | |
|---------------------|--------------|
| 1. Kbal Kroupeu | 111 families |
| 2. Tropaing Raing | 143 families |
| 3. Tropaing Romdeng | 155 families |
| 4. Samrong | 175 families |

5. Tropaing Pring	97 families
6. Kha Arm	165 families
7. Kring Banthay	63 families
8. Tropaing Chouk	39 families
9. Ta Som	74 families
10. Kok Ngay	50 families
11. Tropaing Chiang	50 families
12. Chan Teap	114 families
13. Sam Bour	96 families
14. Ta Phain	74 families
15. Tropaing Thor	52 families
16. Krobay Prey	67 families

Selection Process for the Village

The selection of the village was done by drawing a transect line through the whole province, cutting from the northwest down to the southeast. By doing this, the line is passing three topographies of the province: higher area in the northwest, the midland, and lower areas in the southeast. A district was identified first from each topography level. Three districts were identified 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 possible commune for study was then selected by randomly picking a paper from the pot with all the names of the commune. A 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 place to clarify and get more secondary data about the commune and the different villages in the commune. The village was then identified using the criteria of the aquatic resources in the area, the economic level of the village and also the number of the villagers.

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 on cards and farmers/key informants identified the different social groups in the village. Using the result of this activity, the participants for the next day's activity were selected. Farmers representing the poor group and the better off group were identified. The team set an appointment with the selected people for them to participate in next day's activity.

The next day's exercise generated more detailed information about the activities in the village and how different social groups differ in their ideas. During this exercise, men and women from poor and better off groups were separated into two. Seasonal calendars and activity ranking matrixes were produced during this period. Information about aquatic animals and their importance were also generated.

The last part of the workshop was the validation. After the team collated all the information generated from the previous days, the team made a summary of the important issues. The team went back to the village and had a small meeting with the villagers. This time was also used to validated and clarify some information.

Setting the Context

Mapping the Current Resources in the Village

The mapping exercise was done which illustrated the different resources present in the village. This activity was done by the village headman with the help of some key informants in the village. Three main resources were identified and drawn in the map. These three main resources obviously affect their livelihood.

Land resource. A large portion or majority of the village is used for agriculture particularly rice cultivation. It can be seen in the village map that the whole village has rice paddies. Other than rice, the land is also being used for residential area, which is located at the center of the village and close to the road. There are also hills in the village that people use for praying and for collecting other wild food. Wood can be collected also from the hill.

Water resource. One of the main resources identified in this activity is the river that runs from the northeast boundary to the southern boundary of the village. The water from this resource is very important to the village for their agricultural activities. The system itself serves as source of livelihood particularly food for the village. Aside from the river which is a common water resource there are also ponds and ditches in the village that serve the same purpose.

Aside from the resources mentioned above the village also have other resources like physical and social resources. The road is also a very important resource in the village. For their basic needs, village shops are also available. The water for domestic use is also available since open well and pump wells are installed in the village.

Figure 1 Village Map of Kbal Krapeu



Mapping the Development in the Village

Mapping of development activities was done to describe the different important events that happened in the village and had a big impact to the villagers. This activity was done with a group of key informants from the village. The participants were asked first to recall the earliest year that they can remember and the major events that happened during that year.

The historical events that the villagers could recall were in the year 1955 when Sihanouk started promoting anti-French campaign by educating women's group. A civilian army was also created during this period. During the period of 1960 – 1970 the villagers were living peacefully until another political problem came when the Polpot regime began.

The life of the villagers was very difficult during the Polpot regime since villagers were forced to work in the field. There was not enough food during that time and people died of starvation (Table 2). Some people escaped from the village and some were forced to leave. It was only in 1979 when survivors from the revolution started returning to the village to work again in the fields. After this event the life of the villagers in the area started to improve.

The condition of the natural resources was also described in the historical development of the village. During the period of 1960-1970 fish resources and resources in the forest were abundant. Very few people in the village collected aquatic animals because they were afraid of Polpot's army. It was in 1983 when the collection of aquatic animals increased in the village. Villagers started using other collecting gear. The following year, aquaculture started in the village when the people started digging community ponds. At present the situation of the aquatic resources in the village is decreasing due to several factors. The change in the environment like low water supply and soil erosion were mentioned in the historical development in the village.

Table 2. Historical Development of Kbal Krapeu Village.

Year	Events
1955	-Men and women became informal soldiers armed with wooden weapons. -Sihanouk created the loyalist women's groups to educate and promote anti-French ideas.
1956-57	- Loyalist women's groups education stopped
1959	-Heavy rain flooded the village and some of the rice production was destroyed in the lowland area
1960-70	-People lived peacefully; fish resources and forests were abundant.
1972-73	-Giakong entered the village and gathered people together to carry army equipment; cows, buffalos, chickens, ducks and most of livestock were killed. Americans bombed. Rice production became irregular because people frightened of Thive group.
1975	-Giakong barricaded the road to prevent Thive tanks. That year the village was flooded and bamboo fence used as traps in small lake.
1976	-Pol Pot forced people to leave the village and go to Chantrey, Trapaing sduok Mony Da an Chray Commune in Romeas Hek District.
1978	-People left from Romeas Hek to go to Battambang in Mong Ressey District. Most families slowly died of starvation.
1979	-Revolution January 7. Survivors returned to the village.
1980	-Did rice production as a community.
1983	-People did rice production by household, no longer as a community. Families fished on a small scale, they use many different gears such as gill net, oblong trap, angle, and the fish resources were abundant.
1984	-People tried dry-season rice on small lake, this idea came from provincial agriculture office, but after one year they stopped because of water source. Food for work provided rice to people to dig the community pond (size 20m x 30m)

1993	-National election
1998	-National election
2001	-Fish resources and aquatic animals got reduced because of low vegetation, destruction of natural habitat and soil erosion.

Mapping Social Context of the Village

The site was selected because it represents one of the backward communities in the district. The well being ranking activity was done to determine the social context in the village and how villagers view the well-being of the families in their community. Different people have their own criteria to determine how families differ from another. During this exercise the villagers were able to describe the different social levels (see Table 3).

Socioeconomic Characteristics

Land ownership. This was the most important criteria used by the farmers in grouping the villagers according to their well-being. Most of the families belonging into the lowest group have at the most 0.5 hectare of land. However there are some families in this group that do not own any land. Maximum land area for the better off families ranges from 3 to 5 hectares. The middle group also has almost the same number of hectares with the better off.

Livestock. Like land, livestock is also another important criterion because it is also related to agriculture, their main source of income. The maximum livestock that a poor family owns in this village ranges from 1 – 2 heads. Middle to better-off families have as many as 5 heads of livestock.

Sources of income. Most of the poor families work as helpers or laborers for the better-off families. Other poor families make baskets and sell them or sometimes exchange them for food. Some better-off families let other people rent and use their land because they have other businesses. Small trading and selling woven materials are the common sources of income of middle and better-off families.

Transport. Bicycle is the most common form of transport in the village by the poor and middle groups. But not all of the poor families have a bicycle. Some do not have anything to use and would just walk or borrow transport from other households. The better off families tend to have both a bicycle and a motorbike which they use when transporting goods or buying things from the market.

House material. House material may not be so distinct between better-off and poor families. However during the exercise villagers mentioned that the houses of poor families are typically small and made of light materials like leaves, clay and grass. For better-off and middle group families in the village the most common distinction is the material used for roofing. Typically the better off uses cement tiles for their houses as compared to leaves and grass used by the poor families.

Food supply. Generally most of the villagers have a problem with the food supply particularly during the lean season. However the duration is different between the poor and better off families. Better off families have higher production that they can keep the extra food for the family during the lean season. On the other hand, the average poor family have a problem with food shortage for three to five months in a year.

Table 3. Well-being Characteristics

Group of Women	Couple	Village Chief
<p>I</p> <ul style="list-style-type: none"> • House made of clay with leaf roof • Small land 0.5ha • Food consumption enough for only 2-3 months • No livestock • Work as helper • With bicycle • Make baskets to exchange for rice 	<p>I</p> <ul style="list-style-type: none"> • House made of clay with leaf roof • Own land 0.5-1ha • Food consumption enough for only 3-4months • Have a debt to group 5 • Have 2 livestock • Fishing for families consumption • Used chemical fertilizer 1 sack/ha 	<p>I</p> <ul style="list-style-type: none"> • House made of clay with leaf roof • Small land 0.5ha • Food consumption enough for only 7 months • 1-2 livestock • Work as helper • With bicycle • Make baskets to exchange for rice
<p>II</p> <ul style="list-style-type: none"> • own small land 0.5-1ha • Food consumption enough just only 4-5months • Maximum livestock is two • Make basket for selling • Cultivate vegetable for family consumption 	<p>II</p> <ul style="list-style-type: none"> • House made of wood with metal and tiled roofs • Limited number of livestock (1-2) • Own land 1-2ha • food consumption enough just only 70% of hole year • With bicycle and motorcycle 	<ul style="list-style-type: none"> • House made of wood with metal and tiled roofs • Limited number of livestock (1-2) • Own land 1-2ha • Have food for whole year • With bicycle and motorcycle • 3-4livestock • Average of 6 children • fishing for family consumption • Work as helper
<p>III</p> <ul style="list-style-type: none"> • House made of wood with leaf roof • Owns small land 2-3ha • Minimal number of livestock (2 cows); pigs (2); and chicken • With motorcycle and bike • Appliances like TV and transistor radio • Fishing for family's consumption 	<p>III</p> <ul style="list-style-type: none"> • House made of wood with metal and tiled roofs • Limited number of livestock (1-2) • Own land 1-2ha • Have enough food to eat • With bicycle and motorcycle 	<p>III</p> <ul style="list-style-type: none"> • House made of wood with metal and tiled roofs • Limited number of livestock (3-4) • Own land 1.5-2.5ha • Have enough food to eat for whole year and selling • With bicycle and motorcycle • Work as helper • Average of 5 children
<p>IV</p> <ul style="list-style-type: none"> • House made of wood with metal roof • Have livestock (cows 3-4) • Fishing for selling • Have appliance like TV, cassette player • Have bicycle and motorcycle 	<p>IV</p> <ul style="list-style-type: none"> • House made of wood with metal and tiled roofs • Limited number of livestock (1-2) • Own land 2-2.5ha • Have enough food to eat • With bicycle and motorcycle 	
<p>V</p> <ul style="list-style-type: none"> • Have big area of land (3ha) • House made of wood with tiles • Operates a rice mill 	<p>V</p> <ul style="list-style-type: none"> • House made of wood with tiles roofs • Number of livestock (cows 2-3) • Own land 2-2.5ha 	

<ul style="list-style-type: none"> • Have enough food for the whole year • Have livestock (cows 4-5) • Have appliance like TV, cassette player • Making mats, basket for selling • Cultivate vegetable for selling 	<ul style="list-style-type: none"> • Have enough food to eat • With bicycle and motorcycle • Have money to buy chemical fertilizer 	
<p>VI</p> <ul style="list-style-type: none"> • House made of wood with tiles • Own average land 3-3.5ha • Livestock (water buffalo 4-5) • Have enough food to eat • transport: mostly motorcycle • Have appliance like TV, cassette player 	<p>VI</p> <ul style="list-style-type: none"> • have relatives abroad that support their needs • have appliances • have motorcycle • good condition of house • large number of livestock • lease their farm to other farmer (group 1) 	
<p>VII</p> <ul style="list-style-type: none"> • House made of wood with tiles • Own average land 4-5 ha • leave their farm to other farmer • Livestock (water buffalo 4-5) • Have enough food to eat • transport : mostly motorcycle • Have appliance like TV, cassette player 		

Activity Profile of the Village

The village is an agricultural area and majority of the people are into rice cultivation. In the activity ranking of important activities rice production topped the ranking with a total number of 347 beans. There were four major activities identified by all the groups: rice production, livestock with 192 beans, cropping and collecting woods with 161 and 118 total beans respectively.

The importance of each activity differs among the groups, except for rice cultivation. For rich people livestock is the second most important activity, followed by cropping, fishing and collecting wood (according to importance). However for the poor group, cropping follows rice cultivation since majority of the poor group do not have their own livestock. Housework also was given more importance by the poor group than fishing.

Among the men, the ranking in terms of importance of the activities is almost the same in the general list, with rice production being the first and followed by livestock, cropping, collecting wood and fishing. The women group has a different list of important activities from men. Although their list is also topped by rice production, housework is the main distinction from the other group. For women housework is more important than fishing, collecting wood and other income generating activities. See **Table 4**.

Table 4. Summary of Important Activities in the Village

Socioecon Group	Men	Women
Rich	Rice production (97) Livestock (59) Vegetable growing (47) Crops (30) Collecting wood (28) Fishing (27) Construction (26) Make sugar palm (24)	Rice production (84) Livestock (48) Housework (41) Fishing (38) Cropping (35) Making basket (32) Collect wood (32) Wage labor (29)
Poor	Rice production (60) Cropping (33) Livestock (31) Fishing (23) Collect wood (23) Sugar palm production (15) Selling (10) Wage labor (6)	Rice production (106) Cropping (63) Livestock (54) Housework (49) Collect wood (35) Making basket (31) Wage labor (23) Fishing (20)

Seasonality

Weather

Like any other village in this province Kbal Krapeu has two distinct seasons, rainy season and dry season. However the perceptions of the four groups differ regarding the duration of each season. Among the four groups, poor men mentioned that rain is only for three months. For the other groups they also mentioned the month when there are occasional rains. In general the peak of the rainy season in this village is from August to September but in some cases it lasts until November. The hot weather in the village is almost throughout the year. The cold weather can only be experienced in the months of November to January.

Social Events

Festivals and social gatherings are also very important to the villagers. These activities are part of their culture and most of the people in the village still continue the tradition regardless of the group they belong to. Most of the activities or festivals in the village are related to their religion and to agricultural seasons or field activities. During summer, one of the activities performed by all the groups is to pray for water. Among the four groups, the rich women have the highest number of festivals being celebrated, almost for 11 months. Poor men have the least number of social activities and this is due to the food and income related activities of the poor group.

Economic Activities

The seasonality of economic activities among the socio-economic groups has not much difference. However when it comes to gender groups, there are some differences with the seasonality of the economic activities as presented in annexes on seasonal calendars.

Table 5. Summary of Important Economic Activities in the Village.

Socio-econ group	Gender	
	Men	Women
Rich	Rice production Livestock Cropping Fishing Collect wood Collect palm juice Carpentry	Rice production Cropping Livestock Fishing Collect wood Making basket Sell vegetables
Poor	Rice production Cropping Livestock Fishing Digging ponds Making farm equipment Collect wood Weave mat Sugar palm Construction Garments Selling Wage labor	Rice production Livestock Fishing Making farm equipment Collect wood Processing fish Selling

Both the rich and poor men have identified five major economic activities being done almost the whole year. Among the economic activities only fishing was identified by both groups that is performed the whole year. For cropping only rich men group are doing it for the whole year while the poor group of men only do this during summer or after rice cultivation. For wood collection, however it's the poor group who is doing it for the whole year and rich men do not usually do it. In some cases rich men collect wood during summer. Both groups do rice production at the same time from April to January. Other economic activities being done seasonally by the poor group of men are weaving mats, construction work, trading, wage labor, factory work, making farming tools and digging ponds.

Most of the economic activities of the women are seasonal. Activities related to rice production starts from April for the rich women group and May for the poor women group. Season for livestock is the only activity, which is almost the same between the two groups and the rest of the economic activities are not the same.

Health

Generally the health condition of the villages is average. There are no serious health problems identified and no occurrences of epidemic. Most of the groups experience common minor illnesses like flu, stomach problem and fever during the months of April and May. This is the time of year when the climate tends to change abruptly, like from a very hot day to a rainy nighttime.

Migration

Moving to another area is another livelihood-related option for the villagers. Particularly during the dry season or end of rice cultivation, villagers tend to look for additional sources of income. For the poor men group, most of them go to Phnom Penh to work in construction from March to April. For poor women, some return to their village during the rice cultivation season but some also just stay in Phnom Penh to work in garment factories or in better-off families as helpers. They just send remittances to their families. The rich men and women seldom move to another place to earn during summer. Most of them would just stay in the village and wait for the next cropping.

Role of Aquatic Animals

The importance of collected aquatic animals in the village may play different roles among the different groups in the village. Based on different criteria used in ranking the importance of aquatic animals, there are two distinct roles aquatic animals play to the villagers although they were not directly mentioned. These are their nutritional value or as food supply, and as additional source of income.

Food supply. Some of the criteria used that relates to food consumption are taste and good processing. Taste ranked the highest among the criteria used by the villagers to show the importance of aquatic animals. Aquatic animals collected particularly by children from shallow rivers, lake and rice fields usually go directly to their home for their own consumption. In some cases, these are processed for future consumption.

Source of income. Collection of big aquatic animals provides income to families in this village. Such aquatic animals like snakehead have a high market value so people like to catch this specie for income generation. Some villagers that collect excess aquatic animals sell their catch to other families in the village. If it's too many, farmers can even go to the market to sell.

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

Socio-econ group	Gender	
	Men	Women
Rich	Taste (62) High value (44) Availability (29) Easy to catch (26) Consumption (24) Good processing (17)	Availability (33) Consumption (30) Easy to catch (27) Good processing (26) High value (24) Taste (19)
Poor	Availability (44) Taste (40) Easy to catch (37) High value (32) Good processing (28) Consumption (19)	Taste (61) High value (38) Consumption (36) Easy to catch (30) Availability (25) Good processing (19)

The different criteria used by farmers are almost the same although there are some differences in their rank. This clearly shows that aquatic animals have different roles depending on the group using it. In general the most important criteria is taste, which was ranked number 1 by both rich and poor groups, and by both the men and women groups. Good processing however came to be the least important criterion in the village.

The importance of aquatic animals also has a different basis among the men and women although they both value aquatic animals because of their good taste. For men, AA is important because of its high value and availability while the women group give more weight on the criteria of frequency of consumption by the family, and the easiness of collection.

Among the social strata, there is not much difference in terms of the importance of aquatic animals. However, the poor group favored the ease of catching. Easiness of collection is not so important to the rich group for several reasons. Normally they do not collect aquatic animals and if they do, they use more developed collecting gears unlike the poor group, which do not have the capacity to buy improved fishing gears.

Important Aquatic Animals

The diversity of aquatic animals in the village is still wide. There are still a lot of different aquatic animals present in the village and are considered

important to the village's livelihood. The villagers identified a total of 21 non-stocked species that they consider very important to them. In terms of the number identified by each group, the poor women has cited the most number of species (16 species) although not much difference from the poor men and rich men (15 species). The rich women have the lowest number of important aquatic animals (11 species) mainly because rich women do not usually go to the field to collect aquatic animals.

Among the aquatic animals that were identified as important to the villagers are presented in Table 7 below. Most of the important aquatic animals are fishes and only three non-fish were identified. Snakehead was identified as the most important specie in the village although it was only ranked third by the group of poor women which considered small shrimp as more important than other larger aquatic animals.

The top four species (snakehead, catfish, climbing perch, and rasbora) were identified by all four groups although have different ranking. There are other aquatic animals that were identified either only by two of the four groups or just by one group, like the species of snake, which was identified by rich women as important. Spiny eel and frog were identified by poor women as important also although it did not rank high.

Table 7 Summary of Important Aquatic Animals in the Village

Socio-econ group	Gender	
	Men	Women
Rich	Snakehead (22) Catfish (20) Climbing perch (20) Yellow mystus (16) Small shrimp (15) Pygmy gourami (14)	Snakehead (20) Climbing perch (19) Rasbora (18) Catfish (17) Three spot gourami (15) Snake (11)
Poor	Snakehead (16) Rasbora (15) Climbing perch (14) Catfish (13) Three spot gouramy (13) Spiny eel (12) Frog (12)	Small shrimp (28) Rasbora (20) Snakehead (19) Climbing perch (15) Catfish (13) Common sheatfish (13) Three spot gouramy (13)

Sources of Aquatic Animals

Aquatic animals in the village can be collected from several aquatic systems. There are farmer-managed systems like rice fields, household ponds and ditches. Open access or community water bodies can be also sources of aquatic animals like the lake, small stream, canal and trap ponds. When water subsides, the trap pond becomes private property. Abundance of aquatic animals from the different aquatic systems depends on the season.

Gear used

Various fishing gears are available in the village. Different groups have different fishing gear but the most common are the gill net, screen net, trap net and bamboo net. Long line hook is also common in the village. In some areas traps are used. The most common trap used by the villagers are bamboo trap, oblong trap, drum trap and jump trap.

Seasonality of Aquatic Animals

The season or the weather directly affects the abundance of aquatic animals in the village. Most of the aquatic animals are available in high number during the rainy season and during the start and end of the season. There are species that are moderately available for almost 8 to 10 months while some are scarce for two to seven months. For the rich men group, they consider yellow *mystus* as scarce for 10 months but is still important to them. Some of the species that are moderately abundant for a long period are snakehead, catfish, climbing perch, small shrimp, and rasbora. Common sheatfish is scarce for a longer period but poor women consider it as an important specie.

Trends of Aquatic animals

The trends of aquatic animals are the same for all groups. All agree that the present population of aquatic resources is declining. For the poor women group, most of what they considered as important aquatic animals were abundant from 1960 to 1975. Other groups thought that the aquatic animals decreased in 1993. However, the availability of aquatic animals changed due to some factors. In 1979, most of the important aquatic animals started to decline. Human and environmental factors were identified as the main causes of this trend.

Human-related causes of depletion of aquatic animals involve increasing population, the use of destructive fishing gear, and increasing demand for aquatic animals for food. Environmental degradation also resulted to deteriorating aquatic systems. Most of the aquatic systems become shallow and unproductive. The soil becomes acidic because of the intensification of agriculture.

Farmers' Meeting

Immediately after the two days of workshops, the staff summarized and collated the information they have gathered from the villagers. A small meeting was held involving all the participants to get feedback and to validate and clarify information. The facilitating team and the farmers both expressed their thoughts and experiences in doing the exercises and how the information can be used.

Annexes

Seasonal Calendar- Weather

Poor men

Apr Hot	May Hot	June warm	July Hot, rainy	August Heavy rainy	Sept Heavy rain	Oct Hot	Nov Hot	Dec Warm	Jan Very cold	Feb Medium cold	Mar Medium hot
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Poor women

-Hot, rainy	Hot, rainy windy	Hot, drought, windy	Hot, drought, windy	Drought, little rainy	Heavy rain, windy, hot	Rainy, windy	Heavy rain, windy	Occasional rain, cold, windy	Occasional rain, windy, drought	Drought, occasional rain, wind	Occasional rain
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Rich men (from here, distinguish two types of trap nets...)

Hot, unseasonal rain	Rainy, hot, windy	Rain, hot, windy	Short drought	Little rain	A little rain, flood	Rain, flood	Cold, a little rain, occasional thunder	Hot, unseasonal rain	Hot	Hot	Hot
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Rich women

Hot, windy	A little rain	Hot, windy, a little rain	No rain, strong wind, hot	A lot of rain, strong wind, hot	Warm	Gentle rain, a little wind	Windy, gentle rain, not hot	Warm, windy, gentle rain every day	Warm, windy, gentle rain, everyday	No rain, very hot, a little wind	No rain, very hot, a little wind
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Social events

Poor men

April Khmer New year, praying for asking water	May Meakh Bochea	June	July Celebration of rainy season	Aug	Sep End of rainy season, Pchom Ben	Oct	Nov Full moon, Katiannatien	Dec	Jan	Feb Meakh Bochea	Mar Flower ceremony
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Poor women

Khmer New year, praying for asking water	Visa Bochea		Celebration of rainy season		Pchom Ben	End of rainy season, start of Katanatien	Kathanatien ceremony	Flower, ceremony	Flower ceremony, wedding ceremony	Flower ceremony, wedding ceremony	Flower ceremony
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Rich men

Khmer New year	praying Ceremony		Celebration of start of rainy season		Pchom Bun	Full moon	Kathanatien ceremony	Flower ceremony			
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Rich women

Khmer New year, praying ceremony	Meakh Bochea	praying for asking water, the monk ceremony, flower ceremony	Celebration of rainy season		Pchom Ben festival	End of rainy season	Full moon, Water festival ceremony	Kathanatien, Praying ceremony, Ceremony for the dead	Wedding ceremony, praying ceremony, Ceremony for the dead	Meakh Bochea	Meakh Bochea
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Economic Activity

Poor men (Crop production = crop production) (Three periods of rice production, so three harvests, first harvest is 3 months after planting, (normally three months), second crop takes more than three months before harvesting, and the third crop takes about 6 months. Each rice is different, they are used according to the weather and rainfall etc.)

April Fishing, find wood, livestock, construction worker, weave mat, Crop production	May RF prep, Fishing, find wood, selling livestock, livestock worker, weave mat, garment and construction factory	June Sowing rice, RF prep, Fishing, find wood, livestock, weave mat, farm material making	July transplanting, RF preparation Fishing, find wood, make farm tools, RF maintain, livestock	August RF prep, transplanting, Fishing, find wood, rice field maintenance, livestock	September RF prep, transplanting, fishing, find wood, RF maintain, livestock	Oct As September	Nov Fishing, first rice harvest, collect wood	Dec Rice harvesting, rice processing, fishing, collect wood	Jan Rice harvesting, rice processing, fishing, produce sugar palm, collect wood	Feb Sugar palm, crop prod, collect wood, fishing	Mar Produce sugar palm, crop prod, fishing, collect wood, digging pond
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Poor women

Make farm materials, fishing, making mats, collect wood, livestock	RF prep, crop prod, fishing, livestock	RF prep, sowing rice, RF maintain, make fishing gear, fishing	RF prep, transplanting, fishing, collect wood, pounding and grilling rice for festivals	Transplanting, collect wood, fishing, livestock, RF maintain	RF maintain, first rice harvest, collect wood, fishing, livestock	Fishing, seller, processing fish	Harvest third rice, process rice, collect wood, make farm tools	Rice harvesting	Collect wood, make farm tools, make mats	Collect wood, make farm equipment	Collect wood, make farm equipment
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Rich men (dry rice production = growing rice during the dry season using any available water)

Collect palm juice, crop production, collect wood, housebuilding, livestock, fishing, dry rice production	RF prep, crop production, livestock, fishing, harvesting dry rice, collect palm juice	RF prep, sowing rice, crop production RF maintenance, livestock fishing	Transplanting, fishing, livestock, crop prod.	Transplanting, Fishing, rice field maintenance, crop prod, livestock	Fishing, RF maintenance, livestock, Crop prod	Harvesting first rice, livestock, fishing, crop production	As October	As October	As October	Find wood, crop production, fishing, livestock	As February
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Rich women (May, June may be the same as April – not clear if all or partial)(But arrows not clear)

Crop prod, find wood, fishing, prepare plow, RF prep, collect fertilizer, make baskets and brushes livestock	Crop prod, find wood, RF prep. make brush and baskets, livestock, collect fertilizer, fishing	As previous	Sowing rice, worker - transplanting, sell vegetables	Transplanting	Transplanting	Transplanting	Harvesting first rice	Harvesting first rice	Harvesting, storing,	Finish harvesting,	Transport wood, sell baskets and brushes, and vegetables
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Health

Poor men

April Happy and unhappy, fever	May Unhappy, fever	Jun Normal	Jul Normal	August Normal	Sep Normal	Oct Normal	Nov Happy	Dec Normal	Jan Normal	Feb Normal	Mar Normal
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Poor women

Fever, cold, (local people think it 's a disease, but it isn't)	Fever, cold	Normal	Normal	Normal	Fever	Flu	Flu	Normal	Normal	Happy, cough	Fever. cough
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Rich men (blank space = normal?)

Measles, Stomach problem	Normal	Normal	Normal	Normal	Normal	Normal	Flu	Normal	Normal	Normal	Normal
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Rich women

Stomach problems, typhoid, flu, fever,	Stomach problems, typhoid, flu, fever	Stomach problems, fever, typhoid	Stomach problems, fever, typhoid	Stomach problems, fever, typhoid	A little fever, flu	Flu	Flu	Flu	Flu	Flu	Flu
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Migration

Poor men

Came back from PP												Go to PP to work in garment factory and construction
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Poor women

Go to PP to work in garment factory and construction	Some go, some come back from PP	Some go, some come back from PP	Come back, and help other people in the village (rice/crops)	Come back, own rice/crops			Some go	Come back	Go to Phnom Penh and province	Go to PP and province	Go to PP and province
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Rich men

	Come back from PP									-Went to fishing lot, construction worker in PP		
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Rich women

Came back from PP					Go to earn money in province and PP							
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Activity Scoring

Poor men

Activities	Keo Chhat	Meas Thai	Oung Vuth	Chhim Ly	Sok	Gan Keut	Tep	Saum Chhan	Meas Chhan	Chin Savin
Rice production	7	8	6	5	6	7	4	6	3	8
Palm maker	0	0	4	3	0	3	0	0	5	0
Plant crop	4	3	3	3	3	2	3	5	2	5
Fishing	0	3	3	3	3	2	3	3	2	1
Find wood	3	3	3	2	3	2	3	1	2	1
Seller	0	0	0	3	2	0	0	2	2	1
Worker	0	0	0	0	0	0	3	0	2	1
Livestock	6	3	1	2	3	4	4	3	2	3

Poor women

Activities	Nhanh Chantha	Phauk Van	Keo Puth	Prom Vai	Spk Ny	Nhanh Vanak	Meas Eng	Tho Thai	Tep Soku n	Prak Soph y	In Van ny	Srey Neang	Meas Sam At	Mao Sam On	Brach h	Srey Thim	Chin Hai	Prom Neang	Meas Soph at
Rice production	5	5	9	7	6	6	5	7	6	5	7	4	5	4	6	5	3	5	6
Plan crop	3	3	4	4	5	3	5	3	4	3	5	2	2	3	3	2	3	3	3
Livestock	3	3	3	3	0	3	3	4	3	4	4	3	2	2	2	2	3	2	5
Find wood	2	1	2	2	0	2	2	0	3	3	2	2	2	2	2	2	3	2	1
Fishing	0	1	0	0	0	2	1	3	0	0	0	2	2	1	2	2	2	1	1
Worker	1	3	2	0	0	1	1	0	0	0	2	2	2	1	1	2	3	2	0
Make basket	0	2	0	2	5	1	1	0	0	2	0	2	2	1	4	2	3	2	2
House worker	6	2	1	2	4	2	2	3	4	3	0	3	3	6	0	2	0	3	3

Rich women

Activities	Mom Roen	Mom Sok	Tit Samin	Ma Sokhom	Brak Born	Taueh Yoeun	Sok Yat	Srey Yun	Srey Lun	Meas Thim	Meas Nhim	Dok Yan	I Chnthy	Lau Lai	Prom Yuth	Ouk	Van San
Rice production	5	6	4	6	5	5	5	5	4	5	5	5	5	4	5	6	4
Livestock	3	2	4	3	3	3	2	4	3	2	3	4	3	3	2	2	2
Fishing	3	2	2	2	3	3	2	2	2	4	2	1	2	3	2	2	1

Find wood	2	2	2	2	1	2	1	3	1	3	2	1	2	2	2	2	2
Plan crop	1	2	2	2	3	2	3	2	2	1	2	3	2	2	2	2	2
Worker	2	3	1	2	1	2	1	1	2	1	3	1	2	1	2	1	3
House worker	2	2	2	2	3	2	3	2	4	2	2	4	2	2	2	2	3
Make basket	2	2	3	1	1	1	3	1	2	2	1	2	2	2	2	2	3

Rich men

Activities	Brach Chhon	Brach Chea	Meas Rim	Koy Yan	Brak Ny	Ouk Pak	Khy Phean	Prom	Brak Yoeun	Douk Sokha	Ouk Sat	Tep Sat	Va Sok	Neang Khan	Brak Soth	Pech Theam	Brak Sophal
Make sugar palm	1	1	0	2	2	3	1	2	2	0	3	0	0	1	2	2	2
Rice production	5	5	5	4	5	7	6	5	6	5	5	5	9	7	6	6	6
Vegetables	2	2	2	2	3	3	2	2	2	3	3	3	6	3	3	3	3
Livestock	4	5	5	3	3	3	2	4	3	3	4	3	5	5	2	3	2
Water melon	2	1	2	3	2	1	2	2	2	2	2	1	0	1	2	2	3
Construction Worker	2	2	2	3	1	1	2	2	1	5	0	3	0	1	0	1	0
Find wood	2	2	2	1	2	1	2	2	1	1	2	2	0	1	3	2	2
Fishing	2	1	2	2	2	1	3	1	1	1	2	3	0	1	2	2	1

3-Aquatic Animal Identification and Scoring

Poor men

Species	Taste	Value	Availability	Easy to catch	Processing	Family Consumption
Snakehead	4	4	4	4	3	1
Climbing perch	3	3	5	4	1	1
Catfish	3	4	3	2	3	1
Three-spot gourami	1	1	5	3	2	2
Rasbora	2	1	5	4	3	2
Catopra	1	1	1	2	1	1
Whisker sheatfish	2	2	1	2	2	1
Yellow Mystus	3	2	1	1	2	1
Common Sheatfish	4	3	1	2	2	1
Grey featherback	3	2	1	2	2	1
Spiny eel	3	2	4	3	2	1
Small shrimp	2	1	3	2	2	2
Frog	3	2	3	3	2	2
Eel	4	3	4	1	1	0
Rough skin frog	2	1	3	2	0	2

Poor women

Species	Taste	High value	Easy to catch	Available	Processing	Family consumption
Snakehead	9	4	2	2	1	1
Catfish	4	4	1	1	1	2
Climbing perch	4	2	3	2	2	2
Spiny eel	4	2	2	1	1	2
Mystus	2	1	1	1	1	3
Rasbora	2	1	3	4	5	5
Three spot gourami	2	0	2	1	4	4
Catopra	3	1	1	1	0	2
Grey featherback	2	2	1	1	0	2
Yellow mystus	3	2	2	1	0	2
Whisker sheatfish	3	2	2	1	0	3
Bony tongue	4	3	2	1	0	1
Common sheatfish	6	4	1	1	0	1
Smith barb	4	4	1	1	0	1
Silver barb	3	2	1	1	0	1
Shrimp	6	4	5	5	4	4

Rich men

Species	Taste	Value	Easy to catch	Availability	Processing	Family consumption
Catfish	8	4	2	2	2	2
Snakehead	7	5	3	2	2	3
Climbing perch	6	5	2	3	2	2
Rasbora	3	4	1	2	1	2
Three-spot gourami	3	2	1	1	1	2
Pygmy gourami	3	3	2	3	1	2
Yellow Mystus	5	3	1	3	2	2
Small shrimp	4	3	1	2	2	3
Frog	4	3	1	2	1	1
Crab	2		1	1		2
Mystus	2	3	3	2	1	1
Catopra	4	2	2	1		
Whisker sheatfish	3	3	1	2		1
Grey featherback	4	3	3	1	1	
Spiny eel	4	1	2	2	1	1

Rich women

Species	Taste	Value	Easy to catch	Availability	Processing	Family consumption
Catfish	3	2	1	3	4	4
Snakehead	3	4	3	2	4	4
Rasbora	1	1	4	5	4	3
Small shrimp	1	1	3	2	2	3
Frog	1	2	2	2	1	1
Climbing perch	4	2	2	3	4	4
Three-spot gourami	1	1	3	5	2	3
Mystus	1	1	1	3	1	2
Siamese river abramine	1	1	3	2	1	2
Catopra	1	1	2	2	1	2
Eel	1	3	2	2	1	1
Snake	1	5	1	2	1	1

Seasonality of Aquatic Animals

Rich men bamboo fence trap = bamboo fencing used as trap

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Less abundant, draining trap pond, trap net, in stream, canal	Moderate, jump net, draining, line, in ditch, small stream	Abundant Spawning season, line, scoop net, RF, ditch,	Moderate, hook long line, gill net, line, RF	Moderate, line, RF	Abundant Jump trap, oblong trap, small oblong trap, drum trap, RF	Abundant, Jump trap, oblong trap, RF	Abundant, oblong trap, jump trap, in trap pond, RF	Less abundant, trap net, draining, lighting, in canal, stream	Moderate, trap net, draining, in canal, stream	Declining, trap net, draining, in canal, stream	As February
Catfish	Less abundant, draining, trap net, in canal, stream, household pond	Moderate, line, draining, ditch, small stream, stream	As above	As above	As above	As above	As above	As above	As above	As above	nothing	nothing
Climbing perch	Scarce, trap net, draining, canal, pond	Less abundant, bamboo net, scoop net, hook long line, RF, lake, small stream	Moderate, scoop net, bamboo net, gill net, in rice field	Declining, scoop net, bamboo net, gill net, oblong trap -in the rice field	Moderate, hook long line, line in the rice field	As August	As August	Abundant jump trap, oblong trap, lighting, (bamboo fence trap-khmer) -in rice the rice field	Abundant Lighting, draining, in RF	Moderate Draining trap pond, trap net, in pond and canal	Less abundant, draining trap pond, , pond, canal	As February
Yellow mystus	Scarce, trap net, hook long line, in canal, stream	As April	Moderate Canal and stream, trap net and hook long line, line	As June	Scarce, in canal and stream, hook long line	As August	As August	As August	As August	As August	nothing	nothing
Small shrimp	Less abundant, scoop net, in canal and stream	As April	Moderate In canal, scoop net	Moderate Scoop net, oblong trap, canal, RF	Moderate, scoop net, oblong trap, bamboo net, in canal, RF	Abundant trap net, scoop net, in canal, stream, small stream, ditch	As September	As September	Moderate Trap net, scoop net, in canal, stream	Declining, scoop net, in canal, stream, small stream, in ditch	As January	As January
Pygmy gourami	"nothing"	As previous	As previous	As previous	As previous	Moderate used screen net, in ditch, rice field, small stream	As September	Abundant, as for September	Moderate, screen net, RF, ditch and small stream and canal	nothing	As previous	As previous

Rich women (Screen net is a mosquito net as people use. Box shaped, dragged by two people)

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Less abundant, no water, fish disease, hook long line, gill net, in RF, canal, trap pond	As previous	As previous	Scarce, as previous	Abundant In RF, canal, trap pond, hook long line, gill net	As Previous	As previous	As Previous	As previous	Moderate As previous?	As previous?	Scarce, as previous?
Climbing perch	Abundant trap pond, lake, canal, draining trap pond , by pump or by hand	Scarce, trap net, as previous	As previous	More scarce, as pre	Moderate, RF, ditch, canal	Abundant Hook long line, gill net, oblong trap, scoop net, screen net, in RF, ditch, canal	Moderate rice field (as previous?)	As previous	As previous	Moderate in RF, trap pond, lake, canal	Scarce, in trap pond, ditch, canal	As previous
Rasbora	Scarce, catch by hand, mosquito net (as for people), in canal, trap pond	As previous	As previous	Moderate, screen net, in RF, ditch, canal	As previous	Moderate, oblong trap, screen net, in RF, lake, ditch	As previous	Abundant screen net, oblong trap, dai, RF	Moderate, in RF, lake, ditch, canal	Moderate As previous, RF, ditch, canal	Scarce, trap pond, ditch, canal, screen net, catch by hand	Nothing (blank)
Catfish	Scarce, in lake, trap pond, canal, scoop net, catch by hand	As previous	As previous	As previous	Abundant -in rice field, canal, trap pond, scoop net, catch by hand	As previous	As previous	As previous	As previous	Moderate In trap pond, canal, scoop net, catch by hand	As previous	As previous, fish disease
Three spot gourami	Scarce, in trap pond, canal, fish disease, screen net, catch by hand	As previous	As previous, trap pond, RF, canal	As previous	As previous	Abundant in canal, trap pond, RF, ditch, hook long line, lighting, oblong trap, drum trap, screen net	As previous but not in RF	As previous	As previous	Moderate As previous	Scarce, as previous	Scarce, fish disease, in trap pond, pumping (machine), catch by hand, screen net
Snake	Abundant rice field, canal, forest and shrub, spear, lighting	As previous	As previous	Scarce, in RF, canal, trap pond, spear, lighting	Moderate-used spear, lighting Same location as previous	Scarce, as previous	As previous	As previous	As previous	Nothing, blank!	As previous	As previous

Poor men

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Moderate, drain trap pond, ditch, trap net, cast net, in the lake	More than April, lighting, hook long line, line	As May	As May	As May	As May	Moderate, small stream, ditch, RF, jump trap, lighting, hook long line, line,	Abundant RF, small stream, jump trap, line, hook long line, gill net, lighting,	As November	Draining trap pond, ditch, trap net, line, hook long line, lake, ditch	As January	As January
Climbing perch	Moderate Drain trap pond and ditch, trap net, gill net, lake	Moderate Lighting, gill net, , scien net, in RF	Abundant, RF and lake, use line, trap net, hook long line, gill net, lighting	As June	As June	As June	As June	Moderate in RF, use jump trap, oblong trap, Small bamboo trap, drum trap, line	As November	As November	Draining trap pond, ditch, trap net, gill net, lake	As February
Rasbora	Scarce, drain trap pond, scien net, lake	As April	Moderate, drum trap, Small bamboo trap, oblong trap, cast net, scoop net in current water	As June	As June	Abundant oblong trap, Small bamboo trap, drum trap, scien net, put net in current water	As September	As September	Moderate in lake, use scien net	As December	As December	As December
Catfish	Scarce in lake, drain trap pond and ditch	As April	Scien net, gill net	As June	Moderate, scien net, gill net	Abundant, hook long line, gill net, lighting, in RF, fish spawning in trap pond and ditch	As September	As September	As September	Moderate, drain trap pond, use trap net, drain ditch, in lake and small stream	As January	As January
Spiny eel	Scien net, hook, lake, small stream	Moderate, oblong trap, drum trap, Small bamboo trap, small stream	Scarce, oblong trap, Small bamboo trap, drum trap, lake and rice field	As June	As June	As June	Moderate, line, gill net, scien net, RF and small stream	Abundant, gill net, line, small stream	As November	Moderate, scien net, hook, lake, small stream	As January	As January
Frog	Hook, RF,	Abundant, used line, hook long line, lighting in rice field	Moderate, lighting, hook long line, line, RF	As June	As June	Abundant, lighting, line, hook long line, RF	Drum trap, line, RF	Abundant, drum trap, line, RF	Moderate, hook	As December	Hook, RF	Hook, RF

Poor women (Banboo fance trap=sar) sang = spear

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Dmall shrimp	Scarce, ditch, trap pond, canal, RF	As April	As April	Abundant, ditch, canal, small stream, trap net, Small bamboo trap, cast net	Abundant, ditch, canal, RF, trap pond, trap net, oblong trap	Abundant RF, small stream, Small bamboo trap, oblong trap, (bamboo fence trap)	Abundant Canal, small stream, trap net, cast net	As October	Less abundant, draining trap pond, pond, ditch	As December	As December	As December
Snakehead	Scarce, canal, trap pond, use trap net, cast net, hook long line	As April	As April	Abundant Trap pond, ditch, canal, scoop net, cast net, trap net	Abundant RF, canal, ditch, hook long line, oblong trap, bamboo fence trap, lighting	Abundant As August	Abundant, canal, ditch, trap pond, pond, Hook long line, cast net, scoop net	Very abundant In ditch and trap pond, drain trap pond, jump trap, scoop net	Moderate, RF, sang	Scarce, in canal, ditch , trap pond, drain trap pond, pond and ditch	As January	As January
Rasbora	Scarce, in canal,	As April	As April	Moderate, trap pond, canal, trap net, Small bamboo trap, scoop net	Abundant, RF, in ditch , trap pond, trap net, scoop net, oblong trap, Small bamboo trap	Abundant Small stream, canal, RF, oblong trap, Small bamboo trap, net in current water (screen net)	As September	Moderate, in RF, small stream, ditch, use trap net, and cast net	Scarce, trap pond, ditch, canal, catch by hand, use trap net, scoop net	As December	As December	As December
Climbing perch	Scarce, canal, use trap net	As April	Moderate, trap pond, ditch, canal, trap net, cast net. Spawning season	Abundant, RF, trap pond, ditch, use hook long line, bamboo net in current water	Abundant in RF, ditch, trap net, cast net, catch by hand	Abundant, in RF, hook long line, trap net, cast net, lighting	Moderate, in canal, rice field, oblong trap, line, hook long line, net in current water, gill net	Abundant, canal, hook long line, gill net, oblong trap	Abundant, canal, trap pond, ditch, trap net, cast net, scoop net	Scarce, ditch, trap pond, pond, canal, scoop net, gill net	As January	As January
Catfish	Moderate, trap pond, pond, scoop net, trap net.	Moderate, canal, trap net, scoop net	As May	Abundant RF, canal, bamboo net, cast net	Abundant RF, ditch, canal, scoop net, trap net	Abundant, hook long line, line, trap net, gill net, in canal	As September	Very abundant, in canal, use gill net, trap net, hook long line, line	Less abundant, ditch, trap pond, canal, trap net, gill net	Less abundant, ditch, trap pond, canal, trap net, gill net, scoop net	Scarce, draining trap pond, ditch, pond	Scarce, canal, trap net, gill net
Common sheatfish	Scarce, trap net, gill net, in canal	Scarce, in canal, trap net, gill net	Moderate, in canal, trap net, gill net	As June	Scarce	Scarce	Scarce	Scarce	Scarce	Scarce	Scarce	Scarce

Trends of Aquatic Animals

Poor woman

	1960	1970	1975	1979	1993	2001
Small shrimp	Abundant In canal, floating plants, water deep, low human population, use bamboo net, feed trap	Very abundant, in canal, floating plants, deep water, low human population, use bamboo net, feeding trap	Abundant, in canal, deep water, use bamboo net, feed trap	Very abundant Water shallow, no water plants, bamboo net, trap net	Less abundant, water shallow, more human population, use trap net, bamboo net	Scarce, shallow water, high human population, cast net, bamboo net
Snakehead	Abundant Deep water, use fence trap, drum trap, low human population	As previous	Scarce, fish disease, in canal	Abundant, no disease, bombing to catch fish, gill net	Scarce, canal, RF, trap net, gill net, cast net	Scarce, fish disease, in canal, trap pond, ditch, trap net, gill net, cast net
Rasbora	Abundant In canal, ditch, deep water, inundated forest, feed trap, trap net, bamboo net	As previous	As previous	Declining yearly, in canal, high human population, use more kinds of gear, gill net, cast net, oblong trap, small oblong trap	As previous	As previous
Climbing perch	Abundant Canal, ditch, trap pond, jump trap, oblong trap, small oblong trap	As previous	As previous	Declining yearly, in canal, ditch, RF, gill net, cast net, small oblong trap, bamboo net.	As previous	As previous
Catfish	Abundant Water deep, use line, drum trap, oblong trap in ditch and trap pond	As previous	As previous	Very abundant, in canal, ditch, bombing	Moderate, water shallow, use trap net, cast net	Scarce, water is shallow, trap net, line, oblong trap
Common sheatfish	Abundant Water deep, drum trap	As previous	As previous	As previous	Nothing (depleted!)	As previous

Poor men

Species	1960	1970	1975	1979	1993	2001
Snakehead	Abundant Low human population, simple gear, water plants in lake, lake is deep, fish spawning in small stream, trap pond, ditch	Abundant, few fishermen, lake deep, forest around lake, not allowed to fish,	Abundant, few fishermen, civil war, people leave the village, a lot of fish,	Abundant, low human population, Pol Pot regime finishes, use simple gear, water is deep	Scarce, high human population, lake is shallow, no more water plants, use modern gear, people clear floating plants to use water and lake area for rice production	As previous
Climbing perch	Abundant Simple gear, water is deep, water plants	Abundant, civil war, lake was deep	Abundant Nobody allowed to fish, fish population increasing, civil war, people leave homeland	Abundant, people come back to their homeland, people fishing by hand, low human population	Scarce, high human population, lake shallow, no water plants	As previous
Rasbora	Abundant Low human population, use simple gear, water is deep, fish have places for spawning	Abundant Civil war, no fishing allowed, lake is deep, water plants, low human population	Abundant, No fishing allowed, people leave the village, fish have places to spawn	Abundant People return, low human population, simple gear, lake still deep	Scarce, high human population, no water plants, water shallow, no place for spawning, people clear the land for rice production	As previous
Catfish	Abundant Low human population, no gear, lake was deep, water plants for fish spawning	Abundant Low human population, no gear, lake was deep, water plants for fish spawning, civil war	Abundant, not allowed to fish, people leave the village	Abundant People return, low human population, use simple gear, lake still deep and still has water plants	Scarce, High human population, use modern gear, water is shallow, no water plants	As previous
Spiny eel	Abundant Low human population, simple gear, lake deep, water plants	Abundant Civil war, not allowed to fish, water plants for fish spawning	Abundant No fishing allowed, low human population, lake deep, water plants for fish spawning	Abundant People come back home, high fish population, water deep, water plants	Scarce High human population, use modern gear, water is shallow, no water plants	As previous
Frog	As above	As above	As above	As above	As above	As above

Rich women

Species	1960	1970	1975	1979	1993	2001
Snakehead	Abundant In trap pond, ditch, canal, RF, a lot of water, lighting, hook long line, thnous (fence trap), screen net, gill net, oblong trap, hard trap, connected to Vietnam by river	As previous	As previous	As previous	Moderate As previous	Scarce, little water, many fishermen, as previous
Climbing perch	Abundant Lots of water, in trap pond, canal, RF, dai, oblong trap, scoop net, trap net, gill net	As previous	As previous	As previous	Moderate, shallow water, many fishermen, as previous	Scarce, little water, many fishermen, shallow water, as previous (gear and location)
Rasbora	Abundant A lot of water, RF, trap pond, ditch, oblong trap, drum trap, gill net, small oblong trap	As previous	As previous, no fishermen	As previous	As above	Scarce, many fishermen, shallow water, as above
Catfish	Abundant, in canal, trap pond, RF, hook long line, lighting, drum trap, oblong trap	As previous	No fishermen, as previous	As previous	As above	Scarce, use electro fishing, bombing (illegal gear), little water, as above
Three spot gourami	Abundant, in trap pond, ditch, canal, RF, gill net, bamboo net, oblong trap, hard trap	As previous	As previous	As previous	Moderate, as previous	Scarce, electro fishing, little water, as previous
Snake	Abundant, in canal, forest, RF, trap pond, ditch, screen net, bamboo net, hard trap, trap net, oblong trap, drum trap	As previous	As previous	Nothing blank! (as previous?)	Moderate	Scarce, many fishermen, electro fishing, a little water (as previous?) illegal gear

Rich men

Species	1960	1970	1975	1979	1993	2001
Snakehead	Abundant, fence net, hard trap, drum trap, oblong trap, draining, hook long line, line, canal, stream, RF	As previous	Abundant Fence, oblong trap, drum trap, hook long line, hard trap, line, feed trap, rice field, stream	Moderate Gill net, trap net, hook long line, bombing, draining, common fishing gear, RF, canal, stream	Moderate (declining), modern fishing gear, many fishermen, gill net, trap net, oblong trap, jump trap, in RF, canal	Declining, fish disease (lots of it), trap net, hook long line, line, lighting, oblong trap, draining, in RF and canal
Catfish	As above	As previous	As above	As above	As above	As above
Climbing perch	As above	As previous	As above	As above	As above	As above
Yellow mystus	As above	As previous	As above	Abundant Trap net, hook long line, in canal, stream	Declining, modern fishing gear, fine mesh net, hook long line, in canal, stream	Badly declining, almost depleted, trap net, hook long line, canal, stream
Small shrimp	Abundant oblong trap, Scoop net, RF, lake, canal	As previous	As previous	Abundant Scoop net, oblong trap, in RF, and canal	Declining, oblong trap, scoop net, in RF, canal	As previous
Pygmy gourami	Moderate oblong trap, screen net, in rice field	As previous	As previous	Moderate screen net, scoop net oblong trap, in rice field	Badly declining screen net, oblong trap, in rice field	As previous