

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

Participatory Rural Appraisal in Prey Srokum Case Study 7 (PRA Report from 2001)



**Institute of Aquaculture
University of Stirling, UK**

Imperial College, London, UK

**AIT-AARM-AO, Cambodia
Department of Fisheries,
Cambodia**

**AARM-SERD
Asian Institute of Technology**

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Prey Srokum Village

Introduction

Background

The present status of aquatic systems in the province as well as the effect of these aquatic systems to the people has not been established. For development organizations and even government agencies, knowing the general background of the village is very important. An outsider would not see the true and whole picture of the village unless proper baseline gathering is conducted. This information can be used to develop new programs or in designing relevant intervention activities in the area. It is also very important that the information is generated from and with the primary stakeholders themselves - the farmers/villagers.

A lot of development programs had been started in different villages and there have been some problems in sustaining these programs. 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 attributed mainly 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 just accept and accommodate the said "intervention". It is therefore necessary to listen to the villagers and to consult them first 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 the specific objectives:

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

Participatory Rural Appraisal Team

Chhan Sokha	Project Coordinator, Cambodia
John Sandall	VSO volunteer
Ernesto "Jack" Morales	RA, SRS Project
Ros Thim	Fisheries Head, Svay Rieng Province
Meas Many	AIT-ARRM- Svay Rieng -Ricefields Fisheries
Hong Chanthon	AARM-Takeo - SRS staff
Chan Houn	AARM-Svay Rieng - SRS staff
Mom Phanny	AARM-Svay Rieng - SRS staff
Lim Pharin	Student

Schedule of Activities

The workshop was done in three days which also included the collection of secondary information about the commune and the village (see Table below). 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.

Table 1. Schedule of activities during the PRA exercise in Prey Srokum Village

Date	Activities
19 June 2001	Secondary data collection
20 June 2001	Introduction to the village
21 June 2001	PRA workshop Validation

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

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

Ramdoul District**District description**

General description. Situated close to the center of the province on the eastern side. Classified also as the mid land part of the province. The district has a total land area of 28,990 hectares.

Land use. A large portion of the district is being used for agriculture particularly rice cultivation. An estimated area of 20,729 hectares of rice fields and the rest are for forest and water bodies.

Waterbodies. Some of the water bodies present in the district are small lake and trap ponds. There is one big river/stream (prek) running from the northern part of the district down to the southwest connecting to Svay Rieng district.

Source of income. Main source of income is rice production. Other sources of the farmers are sugarcane production and planting high value trees.

Fisheries. Out of the 10 communes in the district only 2 do aquaculture. Still majority of the communes depend on the collection from the wild. Trap ponds, rice fields and community ponds are the common sources of wild aquatic animals in the district. Most common wild species being caught in the area are snakehead, anabas and spiny eel. There are some farmers in the area also raised *Pangasius*.

Pong Toeuk (Tuk) Commune**Commune description**

General description. Generally the whole commune is lowland area with water all year round. Located in the southern part of the district and close to Svay Teas district. Although the water is all year round, farmers are not planting crop for two seasons. The commune has a total of 9 villages with an approximate population of 6,065. Almost 53% of the total populations are females (3258). Large portion of the land area in the commune is being use for agriculture (2769 hectares).

Administrative. Phorng Tuk Commune comprised 9 Villages as follows:

1. Prey Srokum	72 families
2. Andongkrosaing	130 families
3. Tropaing Pa ave	154 families
4. Toul Tayoune	97 families
5. Sek Yom	139 families
6. Prey Tayon	186 families
7. Toul Takeo	73 families
8. Boss Torch	165 families
9. Tropaing Pkorve	282 families

Major crops. Aside from rice, residents from this commune also cultivate other vegetables and crops as their alternative product and source of income. However majority of the residents grow crops for their own consumption only.

Sources of income. Earning from the sale of their agricultural product is the main source of income. Other residents also sell livestock. Small trading and producing medicinal plants can be additional source of income also.

Fisheries/aquaculture. Although water supply is all year round, residents do not have enough knowledge in culturing fish and mainly depending on the catch from the wild as their source of aquatic animals. There is no lake in the commune and the aquatic animals are mainly coming from rice-fields and canals.

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. This transect line passes thru three topography of the province: higher area in northwest, midland and lower area in the southeast. A district was first identified from each topography level. There were three districts identified in Svay Rieng province namely: Chantrea, Kampong Ro and Ramdoul.

From the transect line names of the communes situated close to or along the transect line were then listed down in a piece of paper. The possible communes for study were randomly selected by picking a paper from the pot with all the names of the commune. Second and third communes 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 to clarify and get more secondary data about the place 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.

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 and involving 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's

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 (gender and social strata) 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 perceptions of the different groups regarding the status of aquatic animals were also discussed during this period.

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 and had a brief meeting with the villagers to 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 was selected from the district that was classified as midland area in the province. One of the bases for selecting this village is the topography, which is low and the availability of water. However during the activity it was found out that the area does not have natural bodies of water. However, there is a canal which becomes a source of water for the rice fields.

Mapping exercise was done in the village and the resources available were identified and illustrated in the map. The village headman and other key informants completed the exercise. The map showed the most important resource in the village. Most of the resources identified are privately owned.

Land resource. This is one of the major resources available in the village and was also used as main criteria in the well-being ranking (see well being ranking table). With rice production as their main economic activity, the whole village can be considered a paddy area. Houses are situated around the village and close to the paddy fields. There is no other use of land discussed in this activity.

Figure 1 Village Map of Prey Srokum



Water resource. Although the community water bodies are limited, there are still other aquatic systems present in the village. A canal is situated in the paddy field to supply water during planting season. However how the canal is connected to the water source was not mentioned in the exercise. There are several ponds and ditches scattered in the whole village area. These aquatic systems serve as food source and also for domestic and agricultural use.

Physical resource. The road to the village is one major physical resource. Majority of the household are located close to the road for ease of transport. There are small shops available in the village. Other services like clinic and village center are lacking in the area.

Mapping the Development in the Village

The development of the village was discussed during the timeline exercise participated in by some old people in the village and also by young villagers. The discussion was focused mostly on the political situation of the village from the early years. This really means that political insurgency in the country had a very big impact on the villagers. Information about the economy, agriculture and fishery were also mentioned but not in detailed as compared to the political events that had happened.

The participants started discussing the major events in the village from the year 1950 (see

Table 2). During this period French army was still in the area and local groups were formed to fight against them. It was in 1965 when the Cambodian government won against the French. However the political situation again became bad when the Polpot regime took control of the country. During this time, a lot of people died of disease, starvation and others were killed by the Polpot. The sufferings of the villagers ended when the Vietnamese troops help the Cambodians overthrow Polpot in 1979.

In the agriculture side particularly in rice production, there were three main stages of development in the village. The first stage was before the Polpot regime, when most of the farmers cultivated rice for their own consumption only and farmers were not using intensive way of producing rice products. During the Polpot regime, villagers were forced to work in the field but the production was for the regime. When the villagers started coming back to the village after the conflict, they started cultivating rice for their consumption and for selling also. They encountered some problems in the rice production such as drought in 1970, landmines, limited animal force to cultivate the land. And then insects infested their rice from 2000 up to the present. At the moment rice production is still low.

Though this information was not included in the table, aquatic animals were abundant in aquatic systems during the early years. However, not much information was shared regarding aquatic resources.

Table 2. Historical development in Prey Srokum Village

Year	Events
1950	<ul style="list-style-type: none"> -The war between Isarak and French. The French had forced people to go to another village but there was no violence. After 3 years they came back to their own village and all the people were safe. -Livestock got disease like plague but no medicine for treatment. -People got smallpox, measles, they used traditional drugs.
1953	<ul style="list-style-type: none"> -Came back to the village, Prey Srokum.
1965	<ul style="list-style-type: none"> -The Government claimed independence from the French. At that time people used weapons make from wood (French afraid and left the village).
1970	<ul style="list-style-type: none"> -Lon Nol regime. Civil war - the village had been bombed and destroyed all the people's wealth. Also there was kidnapping of people for money. -During the civil war people stayed in the village, but the French made people leave the village. - People had enough food to eat, no flood, drought.
1976	<ul style="list-style-type: none"> -Pol Pot regime: food production is communal, people stay in the village. Have a war with VN.
1977	<ul style="list-style-type: none"> -Pol Pot forced all people to leave the village to go to Meun Chay Commune. VN soldier entered Cambodia.
1978	<ul style="list-style-type: none"> -Pol Pot forced all people to leave the village to Pursat Province and destroyed all households.
1979	<ul style="list-style-type: none"> -VN liberated and all the people returned to their own village. People have not enough food, no livestock for rice production, they used hoes instead of livestock.
1993	<ul style="list-style-type: none"> -National elections, had chief and political problems.
2000-2001	<ul style="list-style-type: none"> -People have enough food to eat and have full rights -Rice destroyed by insects -Fish reducing -People don't use pesticide -Fish like Snakehead, Catfish, eel, Rasbora, three spot gourami has diseases and fish yield reduced.

Mapping Social Context of the Village

The well being of the village in general is relatively poor. This is one of the villages that represent the backward community in the district. The exercise helped determined the different social strata in the village. Villagers used different criteria to group the people in the village. On the average there are four distinct social-economic groups in the village. Most of the villagers belong to second and third group. The criteria being used in this exercise were from the villagers themselves. Below is a list of the criteria they used in ranking the well-being of the farmers in the village.

Socio-economic characteristics

Land owned. This factor was most important and common criteria used in ranking the well-being. The village is an agricultural land and most of the farmers do own land. However there are differences in the size of the land among the poor and the better off group. Most of the poor group own less than a hectare but there are some

that own 1.5 hectare of land. The middle group normally owns land from 2 to 3 hectares on the average. Better off people have the same as the middle group but they can also get more than that.

Livestock. The number of livestock also dictates or helps farmers identify families belonging to particular socio-economic groups. Some families in the poor group can have at the most two heads of livestock but most of the farmers do not have especially those families on the extreme poor group. Families belonging to the middle group may have the same amount of livestock with the poor and the rich. The rich group can have 2 -4 livestock on the average.

Sources of income. Most of the villagers in the area are farmers, thereby getting income mostly from rice cultivation. Farmers who have small piece of land might not have income from rice cultivation but food. Aside from rice cultivation, poor group especially have other sources of income. Most of the time this group gets employed as hired labor by the rich farmers to earn income. Some farmers also do fishing and construction work. For the rich group, there are several livelihood options from renting their livestock, providing services, trading etc, (see **Table 3**).

Food supply. Availability of food in the village during lean season might be a problem with poor families but not with the middle and better off families. Some families in poor group can also have secure food for 7 - 8 months. After this period poor families need to exert more effort in hunting for food. Food production by better-off families is enough for them to have available food throughout the year.

House material. Most of the poor families use clay and leaves to build their houses. Houses of families belonging to middle and rich group commonly made of wood, weave leaves and cement tiles. For rich people houses are typically elevated.

Transport. Most of the families in the village has bicycle as their form of transport. However other families particularly those belong in better off group have motorbikes.

Other assets. This refers to other property of the family or the capacity of the farmer to own other things like appliances, equipment etc. Most of the poor families do not have appliances in their houses and the quality of the equipment they have for agriculture and fishing are either old or traditional. In the house of middle and rich/better off families, other appliances like radio and television can be seen. Some rich group also can have water pump and even rice mill.

Table 3 Well-being ranking in Prey Srokum Village

Group of women	Couple	Village Chief
<p>I</p> <ul style="list-style-type: none"> • House made from clay with leaf roof • Own land 3 ha some don't have • Food consumption enough just only 6months • Work As helper 	<p>I</p> <ul style="list-style-type: none"> • Own land around 1ha • Enough food for 7months • Rice yield production from 250kg-500kg/ha • Selling livestock(pig, chicken, duck) for food consumption 	<p>I</p> <ul style="list-style-type: none"> • Own land 1.5ha • Enough food for 8months • Livestock (2cows, 2pigs) • small house with leaf roof • Appliance like small radio • Rice yield production 1ton/year

<ul style="list-style-type: none"> (transplanting) Fishing for food consumption and selling Limit of livestock I-2 Number of children is average 6 Mostly with bicycle 	<ul style="list-style-type: none"> 1-2 livestock Small house with leaf roof Mostly have bicycle Appliance like small radio Use chemical fertilizer 1 sack /ha Number of family is 4 	<ul style="list-style-type: none"> Fishing and construction worker Mostly have bicycle
<p>II</p> <ul style="list-style-type: none"> House made from clay, bamboo with leaf roof own land 1-2ha with the low production yield 800kg/ha Have enough food to eat Use chemical fertilizer 200kg/ha Livestock (2 water buffalo, pigs 2-3 and chickens) Mostly with bicycle Number of family is 4 children 	<p>II</p> <ul style="list-style-type: none"> Own land 1-2ha Enough food for whole year Small house made from clay with leaf roof Selling fish and livestock for food consumption Mostly have bicycle 1-2 livestock 	<p>II</p> <ul style="list-style-type: none"> Own land 3ha Enough food for whole year 2-4 livestock Transportation mostly with bicycle Small house with leaf roof Operating a water pump Appliance like TV, cassette player
<p>III</p> <ul style="list-style-type: none"> House made from wood with tiles roof owns land 1.5-2ha the rice production average is 2-3ton/year Livestock (2-4 cows); pigs (2-3); and chicken With motorcycle and bike Appliances like TV, cassette player and transistor radio Operating rice mill, generator Mostly with motorbike Small business at home 	<p>III</p> <ul style="list-style-type: none"> Own land 2.5ha Enough food for whole year and selling Have motorbike 30% the less is bicycle Appliance like TV, cassette player Operating a rice mill water pump 2-4 livestock House with GI sheet or tiles Number of family is 4 	<p>III</p> <ul style="list-style-type: none"> Own land 3.5ha Enough food for whole year and selling Number of family is 4 Rice yield production 1.5ton/year 2-4 livestock House with GI sheet or tiles Transportation mostly with bicycle Operating a rice mill Appliance like TV, cassette player
<p>IV</p> <ul style="list-style-type: none"> House made from wood with tiles Owns average land 2ha Operating a rice mill Have enough food for the whole year Have livestock (cows 2-4, pigs, and chicken) Mostly motorbike Operating a rice mill, generator Rice production from 10 ton/year 	<p>IV</p> <ul style="list-style-type: none"> Own land 3-4ha Enough food for whole year and selling The rice yield production 24ton House made from wood with GI sheet or tiles 2-4livestock Mostly have motorbike Appliance like TV, cassette player Operating a rice mill, generator, water pump 	<p>IV</p> <ul style="list-style-type: none"> Own land more than 4ha House with tiles roof Mostly have motorbike 2-4livestock Enough food for whole year and can sell
<p>V</p> <ul style="list-style-type: none"> have big area of land operating a rice mill have enough food for the whole year good condition of the house have livestock (cows, pigs, and chicken) with relatives abroad that support their financial 		

Activity Profile of the village

Activities in the village are mainly related to agricultural activities, with rice cultivation as the most important. This is also the main economic activity in the village. Aside from rice cultivation, the livelihood options in the village are very diverse. A total of 13 important activities were identified and presented in **Table 4**. Among the list of important activities, only housework is non-economic. Some agricultural activities and non-farming activities were identified as important to the village.

There are some differences between the ranking of important activities between groups in the village. Although the main or the top most important activities are the same, better off families did not mention some activities that are important with the poor group. Small trading, making mats, housework and sewing are the different activities important to poor group.

Between gender, the main activities, which is rice cultivation is considered by both as the most important. However there are some arguments when it comes to collecting wood which is more important with the women than the cropping done by men. There are also activities, which are important to women but were not mentioned by the men like housework, trading and sewing.

Culturing fish was mentioned in the activities but did not rank high as compared to fishing. Fishing activity was mentioned in all four groups although it did not get a high rank while culturing fish was only mentioned by rich men.

Table 4 Summary of important activities in the village

Socio-econ group	Gender	
	Men	Women
Rich	Rice production (71)	Rice production (24)
	Livestock (41)	Livestock* (14)
	Cropping* (19)	Cropping* (14)
	Fishing* (19)	Collect wood (12)
	Culture fish (14)	Fishing (10)
	Collect wood (9)	Work as helper (6)
	Carpentry (5)	
Poor	Rice production (151)	Rice production (72)
	Cropping (68)	Livestock (36)
	Livestock (63)	Cropping (28)
	Fishing (31)	Fishing (20)
	Collect wood (23)	Collect wood* (14)
	Selling (small shop) (18)	Making mats* (14)
	Work as helper (4)	Housework (14)
	Making wine (2)	Selling (13)
	Sewer (9)	

Seasonality

(The information in the calendar was based on last year's experiences).

Weather

In general, the village experiences two seasons: dry and wet or rainy season. Apparently there is no significant difference in the temperature change. For poor men group, almost throughout the year the temperature is high and only during the month of November that the poor group experience cold weather. Month of March and April are the hottest period in the year for the poor men. All the other three groups did not mentioned about the cold weather in the village. On the average rainy months start in late May and lasting until January. The peak of the rainy season is July to October. This is also the period when flooding is expected.

Social events

Several festivals and events are being celebrated in the villages. These activities are part of the culture and tradition of the village. Most of the festivals are related to their religion and their beliefs. Farmers usually celebrate festivals describing their activities in the farm, or if they are praying for water for their land.

Economic activities. Seasonality calendars were done to illustrate the different economic activities performed by different groups in the village for the whole year. This gives a picture of the livelihoods in the village. The groups have different lists of economic activities. In terms of gender, in general men have more economic activities than women. Women economic activities include agriculture and others that are being done near the homestead or in their own farm. On the contrary, the men have other economic activities aside from farming-related ones. These may or may not be in the homestead unlike the women group.

In all groups the main economic activity related to agriculture is rice production. Fishing was also mentioned by all groups as important. Other economic activities are different between groups. The men identified other activities outside farming like carpentry, garment factory, construction, making basket and fishing gears. On the other hand, the women mentioned selling and weaving mats as their economic activities not related to food production. All the rest are related to food production.

Table 5. Summary of Economic Activities in the Village

Socio-econ group	Gender	
	Men	Women
Rich	Rice production Dig ponds Collect wood Livestock Carpenter Garments Construction worker Fish culture Fishing Wage labor	Rice production Cropping Livestock Fishing Collect wood Wage labor

Poor	Rice production Dig trap ponds Collect woods Livestock Make farm equipment Fishing Cropping Make basket	Rice production Livestock Fishing Collect wood Sewer Selling Weave mats
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Different activities by groups were discussed based on the season. The seasonal calendar shows how activities are related to the season. Aside from the number of economic activities, the timing of doing these activities also differs between groups.

In the group of men, there are differences with the seasonality of economic activities based on the income level. It's only in the livestock production that the two groups, rich and poor men, were the same. The two groups do livestock production for the whole year. Other activities being done for the whole year include fishing, digging ponds (?) and collecting wood. The poor group is doing the three (3) economic activities for the whole year while the rich group does these by season. Rich group of men usually do these said activities during summer. For cropping, both poor and rich group do it seasonally but the rich group does it at a longer period in a year. For fishing, the poor group does it for the whole year and the rich group does it only for four months (July to October).

There are also some economic activities in the village that only the rich men do and most of these are not related to food production apart from fish culture. These are carpentry, wage labor, and working in a garment factory.

For the group of women, there are five economic activities that are being done for almost the whole year. However they do not do the same economic activities. Both the rich and poor women mentioned livestock production and rice cultivation as a year-round activity. Economic activities like sewing clothes and trading are being done mostly by the group of poor women for the whole year also. However for fishing, poor women spend less time collecting aquatic animals than rich women. In the seasonal calendar poor women only collect AA beginning February to April. Other activities being done on seasonal basis are collecting woods, planting crops, weaving mats and paid workers. They do these when they have the spare time after performing the major activities

Health

The health condition of the poor women group is not so good. They tend to suffer from a variety of illnesses but not serious ones like flu, fever and colds. For poor men, they usually suffer from the common flu and fever during April and November. The rich group's health condition is a bit better than the poor group.

Migration

Moving to another place for livelihood is very common in the village. Poor men usually go to Phnom Penh to work in construction but return to the village during rice planting and harvesting season. Both rich and poor women go to Phnom Penh to work in

garment factories. Some of the women return during the planting season but most of them just stay in Phnom Penh. Some families also just move to Phnom Penh permanently.

Role of Aquatic Animals

Fishing was not considered as the most important activity in the village. However the importance of the different aquatic animals in the village was understood by ranking the different aquatic animals. Fisherman or farmers in the villages have their own reason why they are collecting aquatic animals. The role that aquatic animals is playing in the livelihood of the farmers in the village can be relate with the criteria that farmer used in ranking the importance of aquatic animals. The farmer used nine criteria to show the importance of aquatic animals. Most of the top criteria can relate to consumption and other criteria can be relate to income.

Food supply. Good processing, taste, and family consumption are some of the criteria used in ranking the importance of aquatic animals that are related to food consumption. Other criteria like meat and bones were also used. Farmers or the villagers do collect aquatic animals for their family consumption and if they have large catch, they probably process it if not sell. Processing is one strategy that farmer used to keep their supply of aquatic animals for their meal continues.

Income. Among the criteria used in ranking the importance of aquatic animals, only high value can be directly relates to the role of aquatic animals in source of income. There are some aquatic animals that have a good market value and so farmers like to collect or catch this species. In the villages especially during rainy season where aquatic animals are abundant, farmers are collecting AA not only for their consumption but also for them to sell it so that they can buy other things that they need. Income from selling AA helps the farmers particularly after planting rice when most of farmer's capital is invested in rice.

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

Socio-econ group	Gender	
	Men	Women
Rich	Abundant (41)	Taste (27)
	Good processing (40)	Family consumption (25)
	Easy to catch (34)	High value (23)
	Taste (33)	Abundant (23)
	High value (28)	Easy to catch (23)
	Family consumption (26)	Good processing (20)
		Deficit (?) (21)
	Bone (?) (17)	
Poor	Abundant (40)	Taste (42)
	Easy to catch (36)	High value (38)
	High value (36)	Abundant (37)
	Taste (31)	Meat (Much meat) (35)
	Family consumption (30)	Good processing (34)
	Good processing (26)	Family consumption (13)

The importance of aquatic animals maybe similar in some people but may also be different from other groups, which is always the case. Different group in this village ranked the importance of aquatic animals in different way although they used almost the same criteria. There were a total of 9 criteria used but most of the group only used 5 and 7 for rich women group.

Abundance, taste and good processing are the most important criteria from the poor group. Poor farmers who really rely on the natural resources would prefer aquatic animals that are always available in the system. Good processing also important to poor group since they really need to save food for lean months because they do not have enough food from their production. I bit ironical that rich group also gave more importance on the processing and easiness of catching in ranking the importance of aquatic animals.

Between men and women, there are also some differences in terms of the criteria they used. The taste of the aquatic animals is important to women but abundance for the men group. Men did not mention almost all of the criteria related to consumption, which the group of women mentioned. This is mainly because men normally responsible in earning income.

Important Aquatic Animals

Considering the limitation of aquatic systems in the village, there are still a lot of important aquatic animals identified by the villagers. A total of 16 freshwater aquatic animals were identified and considered important in the village. In general the most important aquatic animals are snakehead, catfish, climbing perch, frogs and spiny eel. Majority of the top species are fish and very few non-fish and stocked fish were never mentioned.

Table 7. Summary of important aquatic animals in the village

Socio-econ group	Gender	
	Men	Women
Rich	Snakehead (25)	Snakehead (19)
	Rasbora (23)	Catfish (19)
	Catfish (19)	Yellow mystus (18)
	Climbing perch (17)	Whisker sheatfish (16)
	Frog (17)	Climbing perch (15)
	Small shrimp (16)	Grey feather back (15)
	Spiny eel (14)	Three spot gourami (15) Spiny eel (14)
Poor	Snakehead (22)	Snakehead (30)
	Climbing perch (22)	Catfish (28)
	Catfish (20)	Climbing perch (23)
	Frogs (19)	Spiny eel (22)
	Freshwater eel (16)	Frog (18)
	Rasbora (15)	Whisker sheatfish (18) Small shrimp (16)

The total number of aquatic animals identified by different groups are almost the same and with an average of 14 species. Between rich and poor group, the only difference between the ranking of aquatic animals is the importance of frog for poor but not for rich group. Freshwater eel was not also mentioned in the rich group but was ranked middle in the poor. There are also some species that rich men gave importance but not mentioned by the poor like grey featherback, yellow mystus and three spot gourami.

The main contradicting species between men and women are rasbora, yellow mystus, and grey featherback. The group of women did not even mentioned rasbora in the list but ranked high from the group of men. Another species that was not in the list of women was freshwater eel, were mostly men like it.

Sources of Aquatic Animals

The village has a lot of aquatic resources where they can collect aquatic animals. The places of collection changes through the season as the abundance of aquatic animals also changes. During rainy season for example, most of the aquatic animals can be collected in rice-fields but not during cold and dry season. Other aquatic systems that aquatic animals are being collected are: lake, small lake, canal, forest, trap ponds, ditches and household ponds.

Gear Used

There are a lot of fishing gears being used by the villagers. The fishing gear depends on the species and the location of collection. Women can also use most of the fishing gear that men are using.

Some of common fishing gear used in the village:

Oblong trap	-	used by all groups
Drum trap	-	used by all groups
Gill net	-	used by all groups
Hook long line	-	used by all groups
Lighting	-	used by all groups
Jump trap	-	not used by rich men
Bamboo trap	-	used by poor men
Drag net	-	used by all groups
Dig hole	-	not used by rich women
Scooping net	-	not used by poor men
Screen net	-	not used by poor men

Seasonality of Aquatic Animals

Abundance of most important aquatic animals in the village is all seasonal. However the different groups have different perception on the abundance of aquatic animals. One major reason for these differences is the sources of aquatic animals in the village. For poor men some of the important aquatic animals can be scarce for short period in a year like snakehead, frogs, and rasbora. These species are abundant during rainy season but lacking during dry season.

For the rich men snakehead, small shrimp and rasbora are usually less abundant on almost month of the year however still consider important to them due to commercial and taste value. Yellow mystus and spiny eel can be scarce also in some period of the year according to rich women. For poor women most of the aquatic animals are lacking during the year but increase in population during rainy season.

Trends of Aquatic animals

During the early 70's aquatic animals are abundant in all aquatic systems in the village. There were very few fishermen collecting aquatic animals and the demand for it was not so high. However as time passed and the population increase, the abundance of the aquatic animals started to decline particularly from early 80's. One major reason that the poor women see why the population of aquatic animals is decreasing is because most of the aquatic systems are becoming shallow, the fishermen are increasing as well. In the early 90's improved fishing gear was introduced which also causes the scarcity of the aquatic animals in the village. The villagers are mainly collecting aquatic animals from the system and there was not management being done to sustain or increase the population of the important aquatic animals in the village.

Farmers' Meeting

Validating and feedbacking is one of the most important parts of this activity. After the two days' collection of different information about the village and aquatic systems in particular, the staff summarized the information and collated them. A small meeting was then held with all the participants. This time was used to clarify some information, especially the contradictory ones coming from particular groups. Both the facilitators' group and the farmers highlighted their significant experiences in doing the exercises and how the information can be used.

Annexes

Seasonal Calendar

Weather

Poormen

April -Very Hot	May -Hot, a little rain, cloudy	June -Hot -Little rain	July Warm -Little rain	August Warm -Little rain	Sept Warm -Little rain	Oct Warm, -Little rain	Nov -Cold, little rain	Dec Hot	Jan Hot	Feb Hot	Mar Very hot
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Poor women

-Hot	-Hot -Cloudy	Many cloud	-Heavy rain -Windy	-Heavy rain -Windy	Heavy rain- Windy -Flood	Heavy rain, wind, flood	Heavy rain, wind, flood	Little rain	Little rain	Hot, dry	Hot, dry
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Rich men

Very hot	Little rain	A little more rain	Dry	Light rain	Lots of rain	Moderate rain	Windy, rain	Dry	No rain	No rain	Very hot and dry
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Rich women

Hot, unseasonal rain	Rainy, strong winds early May	Rainy, hot	Heavy rain	Heavy rain	Rainy, hot	Rainy, windy	Rainy, windy, hot	Less rain, hot	Unseasonal rain, hot	Very hot	Very hot, unseasonal rain
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Social events

Poor men

April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Khmer New Year-service offering to monks ceremony	Praying celebration-for the dead Praying for water, Visakh Bochea, plowing ceremony	Wedding ceremony, Praying ceremony for rain	Celebration of rainy season		Pchum Ben ceremony	Celebration of the end rainy season	Kathanatien ceremony	Kathanatien	Wedding ceremony, flower ceremony	Wedding ceremony, flower ceremony	Wedding ceremony-flower ceremony

Poor women

Khmer New Year	Visak Bochea, Praying for asking water	Praying ceremony for rainy	Celebration of rainy season		Pchum Ben ceremony	Kathanatien,	Full moon-water festival-Kathanatien ceremony	Flower ceremony, Meak Bochea			Offering to the dead
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Rich men

Khmer New Year	Visak Bochea	Praying ceremony for rain	Celebrate start of rainy season	(An arrow with no explanation)	(As previous)	Celebration of the end rainy season	Full moon-water festival-Kathin ceremony	Flower ceremony	Flower ceremony	Flower ceremony	Flower ceremony
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Rich women

Khmer New Year	Celebration in the village		Celebration of start of rainy season		Pchum Ben Ceremony	Celebration of the end of rainy season	Kathanatien		Wedding ceremony	Wedding ceremony	Wedding ceremony
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Economic Activity

Poor men

April	May	June	July	August	September	Oct	Nov	Dec	Jan	Feb	Mar.
Rice production, Dig trap pond, find wood, livestock, make farm equipment fishing	Rice production, dig trap pond, find wood, livestock, plant crop make plow-rake, basket, fishing	Rice (dig trap pond, collect wood) production, livestock, plant crop, make plow-rake, fishing	Rice production, (dig trap pond, collect wood) livestock, fishing	Rice production, (dig trap pond, collect wood) fishing, livestock,	As previous	As previous	As previous	As previous	(Dig trap pond, collect wood) livestock, fishing	As January	As January

Poor women

Fertilizing, livestock, fishing, find wood, Sewer, seller, housewife	Plowing, rice prod, plant crop, livestock, sewer, seller, housewife	Sowing, Rice prod livestock, sewer, seller, housewife	Plowing, transplanting, Rice prod, livestock, sewer, seller, housewife	Transplanting, rice prod. livestock, sewer, seller, housewife	Transplanting, rice prod. livestock, weave mat, sewer, seller, housewife	RF maintenance, rice prod, livestock, weave mat, sewer, seller, housewife	RF maintenance, rice prod, livestock, sewer, seller, housewife	Harvesting rice, rice prod. livestock, sewer, seller, housewife	Harvesting rice, rice prod. livestock, sewer, seller, housewife	Harvesting rice, rice prod, livestock, fishing, sewer, seller, housewife	Collect fertilizer, fishing, livestock, find wood, sewer, seller, housewife
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Rich men

Dig pond, collect wood, crop prod. livestock, House builder (carpenter) worker (garment factory), construction worker	Transplanting, crop prod, livestock, fish culture, house builder, garment factory, construction	Transplanting, crop prod, livestock, fish culture, garment factory	Transplanting, fishing, livestock, fish culture, garment factory	Transplanting, fishing, livestock fish culture, garment factory	As previous	Fishing, livestock, fish culture, garment factory	Harvesting rice, plant crop, livestock, fish culture, carpenter, worker	As previous	As previous	As previous plus go to PP	Dig ponds, collect wood, livestock, fish culture, carpenter, garment factory, go to PP
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Rich women

Livestock, fishing, collect wood	RF preparation, livestock, crop production, fishing	RF preparation, sowing rice, livestock crop prod, fishing	Transplanting, livestock, crop production, worker, fishing	Transplanting, livestock, crop production, fishing, worker	Transplanting, worker, RF maintenance, livestock, crop prod, fishing,	RF maintenance, livestock, crop prod, fishing	First rice harvest, livestock, crop prod, fishing	Second rice harvest, livestock, fishing	Third rice harvest, livestock, fishing	Rice processing, livestock, fishing	Livestock, fishing, collect wood
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Income/busy months

Poor men

April	May	Jun	Jul	August	S	Oct	Nov	Dec	Jan	Feb	Ma
Income	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Income	Income

Poor women

April	May	Jun	Jul	August	Sept	Oct	Nov	Dec	Jan	Feb	Ma
	Busy transplanting	Busy transplanting	Busy transplanting	Busy transplanting	Busy transplanting		Busy – rice harvesting	Busy- rice harvesting income	Busy harvesting rice, income	Income	

Rich Men

April	May	Jun	Jul	August	S	Oct	Nov	Dec	Jan	Feb	Ma
Income from carpentry, morning glory,	Income from carpentry, morning glory Busy – RF maintenance	Busy transplanting	Busy transplanting	Busy transplanting	Busy transplanting	Busy transplanting	Busy transplanting Income from rice harvest	Busy transplanting Income from rice harvest	Busy transplanting Income from rice harvest	Income from rice harvest and morning glory	Income from carpentry and morning glory

Rich Women

April	May	Jun	Jul	August	Sept	Oct	Nov	Dec	Jan	Feb	Ma
	Busy with rice	Busy with rice	Busy with rice	Busy with rice	Busy with rice				Busy – rice harvesting, income - rice	Busy – rice harvesting, income- rice	

Health

Poor men

April	May	Jun	Jul	August	Sept	Oct	Nov	Dec	Jan	Feb	Ma
Happy, fever, flu	Normal	Normal	Normal	Normal	Normal	Normal	Flu, fever	Normal	Normal	Normal	Normal

Poor women

Fever, variety of illnesses	A variety of illnesses, but not often	A variety of illnesses, but not often	A variety of illnesses, but not often	A variety of illnesses, but not often	A variety of illnesses, but not often	A variety of illnesses, but not often	A variety of illnesses, but not often	A variety of illnesses, but not often	A variety of illnesses, but not often	A variety of illnesses, but not often	Fever, variety of illnesses
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Rich men

Fever, typhoid	Stomach problems, fever, flu, typhoid	Normal	Normal	Normal	Normal	Normal	Flu	Happy	Happy	Happy	Happy
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Rich women

Unhappy, malaria	Unhappy, malaria	normal	normal	Normal	Normal	Normal	Fever	Fever	Happy	Happy	Happy
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Migration

Poor men

April	May	June	July	August		Oct	Nov	Dec	Jan	Feb	Mar.
Come back from PP, work in garment factory, construction worker	Work in garment factory, work in construction, Go to PP As worker	Go to PP	Go to PP	Go to PP	Go to PP	Go to PP	Come back from PP, go to PP	Go to PP	Go to PP	Go to PP, construction worker	Go to PP

Poor women

Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory	Go to PP work in garment factory
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Rich men

Some families go to live in other provinces, construction worker in other provinces	Some families go to live in other provinces, construction worker in other provinces	Some families go to live in other provinces	Some families go to live in other provinces	Some families go to live in other provinces	Some families go to live in other provinces	Some families go to live in other provinces	Some families go to live in other provinces	Some families go to live in other provinces	Some families go to live in other provinces	Some families go to live in other provinces, construction worker in other province	Some families go to live in other provinces, construction worker in other province
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Rich women

<u>All year</u> , people go to work in garment factory and construction in PP											
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Activity Scoring

Poor men

Activities	Farmer																	
	Ker Sophal	Tun Pheak	Penh Sam An	Soeung Korn	Chhim Chin	Ich Saben	Brak Tha	Kai Sarun	Brak Pang	Ou Puth	Chheang Thong	In Yan	Prom Tha	Chhim Pov	Ros Sothan	Pin Mony	Reth Sam An	Koy Aun
Rice production	8	15	8	8	14	8	8	11	7	12	4	10	8	0	10	0	8	12
Plant crop	2	2	2	2	2	7	2	7	5	3	4	4	4	0	5	8	5	4
Livestock	2	1	3	5	0	5	6	2	4	2	3	5	3	4	2	12	0	4
Fishing	2	0	5	2	0	0	3	0	2	2	4	0	3	0	3	0	5	0
Work As helper	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Seller	2	0	0	0	0	0	0	0	0	0	0	1	0	15	0	0	0	0
Make wine	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Find wood	2	2	2	1	4	0	1	0	2	1	3	0	2	1	0	0	2	0

Poor women

Activities	Farmer										
	Ou Bun Thai	Saum Yesh	Khmao Tem	Ou Pha	Chhim Sokha	Pain Vimol	Heab Chham	Heab Nib	Em Sophan	Oun Yan	Nyan Sophoan
Rice production	7	7	7	6	8	6	5	8	5	7	6
Livestock	4	3	4	2	3	3	3	5	4	3	2
Planting crop	5	2	3	2	2	2	2	3	2	2	3
Find wood	0	0	0	1	2	2	3	1	2	1	2
Fishing	1	1	3	1	1	3	3	2	2	1	2
Making mats	0	0	3	2	1	2	1	1	1	2	1
Selling	1	2	0	2	1	2	2	0	1	2	0
Sewer	1	2	0	1	0	0	0	0	1	2	2
House wife	1	3	0	3	2	0	1	0	2	0	2

Rich men

Activities	Farmer								
	Net Sok	Mom Phal	Heab Houn	Pov Sareth	Chea Porn	Main Koeun	Ou Tit	Phan Vanna	Mork Phoun
Rice production	9	8	8	11	11	3	7	5	9
Livestock	5	4	5	3	3	8	4	4	5
Crops	4	3	0	2	2	0	3	3	2
House builder	0	0	0	0	3	0	0	2	0
Find wood	0	0	3	2	0	0	2	0	2
Culture fish	0	3	0	0	0	8	0	3	0
Fishing	2	2	4	2	1	1	3	2	2

Rich women

Activities	Farmer			
	Heab Chhan	Heab Vorn	Horn Lun	Brak Sarorn
Rice production	5	5	5	9
Livestock	2	4	4	4
Planting crop	4	3	4	3
Fishing	3	3	2	2
Find wood	4	3	3	2
Work As helper	2	2	2	0

Aquatic Animal Identification and Scoring

Poor Men

Species	Characteristics					
	Value	Easy to catch	Abundant	Taste	Consumption	Processing
Rasbora -in rice field, lake, small lake, canal -used oblong trap, drum trap.	2	3	4	1	3	2
Yellow mystus -in rice field, canal -used gill net, hook line	1	1	1	2	1	1
Catfish -in rice field, lake, small lake Hook line, gill net.	5	2	4	3	3	3
Spiny eel -in rice field Oblong trap, drum trap, hook long line	3	1	3	2	2	2
Snakehead -in rice field, lake, small lake -used hook line, lighting, jump trap	5	4	4	4	2	3
Whisker sheatfish -in trap pond -used gill net	1	2	1	2	1	1
Small shrimp -in rice field, ditch, canal, lake, small lake -used oblong trap, drum trap.	1	3	3	1	2	1
Climbing perch -in rice field, lake, small lake, canal, ditch -used gill net, hook line	5	4	4	3	3	3
Grey feather back in trap pond -used gill net	1	2	1	2	2	1
Freshwater eel -in trap pond, Small lake -used oblong trap, lighting, bamboo	4	2	3	4	2	1
Crab -in rice field, lake, small lake -used oblong trap, drum trap, dig	0	3	2	0	1	0
Snake in rice field, forest -used dig, gill net, hook line	3	1	1	2	1	2
Mystus -in rice field, ditch, canal, lake, small lake -used oblong trap, gill net, drum trap	1	1	2	1	2	2
Frog -in rice field -used dig, hook line	3	4	4	3	3	2
Three-spot gourami -in trap pond, rice field -used gill net, drag net	1	3	3	1	2	2

Poor women

Species	Characteristics					
	Taste	Abundant	Meat	Value	Processing	Consumption
Snakehead -in rice field, lake, small lake, canal -used hook line, lighting, jump trap	7	6	4	7	5	1
Climbing perch -in rice field used scooping, drag net	6	5	4	4	3	1
Catfish -in rice field, trap pond, ditch -used lighting, oblong trap	7	4	5	5	6	1
Mystus -in rice field, canal, ditch -used drag net, net, canal, lake, small lake	2	2	2	2	2	1
Whisker sheatfish -in rice field, canal, ditch -used gill net, net	3	3	3	4	4	1
Crab -in rice field used scooping, drag net	1	1	1	1	1	1
Rasbora -in rice field, lake, small lake, ditch, canal -used drag net, drum trap	2	2	2	2	2	2
Small shrimp -in rice field -used scooping, dry up, screen	3	3	3	3	3	1
Spiny eel -in rice field, trap pond -used drum trap, oblong trap, scooping	4	4	4	4	4	2
Frog -in rice field, trap pond -used lighting, hook line, dig	4	3	4	4	2	1
Pygmy gourami -in rice field -used screen, net, sap(khmer)	2	3	1	2	1	1
Three-spot gourami -in rice field, trap pond, lake, small lake -used oblong trap, drum trap	0	0	0	0	1	0
Freshwater eel in rice field, trap pond -used bamboo	1	1	2	0	0	0

Rich men

Activities	Criteria					
	Abundant	Value	Easy to catch	Processing	Taste	Family consumption
Snakehead -in rice field, lake, small lake -used gill net, lighting, hook line, net	6	5	3	5	4	2
Catfish in rice field, trap pond -used lighting, pumping, hook line	4	4	2	4	3	2
Climbing perch -in rice field, lake -used gill net, hook line	4	2	2	3	3	3
Spiny eel -in rice field, trap pond -used scooping, oblong trap, drum trap	2	1	3	4	2	2
Freshwater eel -in rice field, trap pond -used oblong trap, drum trap	2	2	1	3	2	1
Frog -in rice field, trap pond, lake, small lake -used hook line, lighting, dig	4	3	2	3	3	2
Three-spot gourami -in rice field, lake, small lake, trap pond -used drag net, oblong trap, drum trap	2	1	2	3	1	1
Mystus -in rice field, lake, small lake -used drag net, oblong trap	1	1	1	1	1	1
Crab -in rice field, lake, small lake, canal, trap pond -used dig, oblong trap, scooping	5	0	5	1	1	1
Small shrimp -in rice field, lake, small lake, trap pond -used scooping, net, screen net	3	2	2	4	3	2
Rasbora -in rice field, trap pond, lake, small lake -used drag net, screen net, scooping, drum trap, dry up	4	2	5	5	2	5
Whisker sheatfish -in rice field, trap pond -used dry up, oblong trap, drum trap	0	2	2	1	3	1
Yellow mystus -in rice field, trap pond -used oblong trap, hook line	2	1	2	1	2	1
Snake -in rice field, forest -used dig, gill net	1	1	2	2	1	1
Bronze featherback	1	1	0	0	2	1

Rich women

Species	Criteria							
	Taste	Value	Families consumption	Abundance	Easy to catch	Processing	Deficit	Bones
Snakehead -in rice field, lake, small lake, trap pond -used jump trap, hook long line, hook line, oblong trap	3	3	2	3	2	2	3	1
Catfish -in rice field, , trap pond -used lighting, gill net, hook long line	3	3	3	2	2	2	2	2
Climbing perch -in rice field, trap pond -used jump trap, hook long line, net	2	2	2	2	3	2	1	1
Yellow mystus -in rice field, trap pond -used net	4	2	3	2	2	1	2	2
Grey feather back -in rice field, trap pond used hook long line, net	2	1	3	1	2	2	2	2
Whisker sheatfish -in rice field, trap pond -used oblong trap, drum trap, gill net	2	2	2	2	2	2	2	2
Three-spot gourami -in rice field, trap pond -used drag net, oblong trap, drum trap	1	2	2	2	2	2	2	2
Spiny eel -in rice field, trap pond, ditch, canal -used oblong trap, drum trap	2	2	2	2	2	1	1	2
Mystus -in rice field, trap pond -used drag net, net, gill net	2	1	1	2	1	1	1	1
Small shrimp -in rice field, trap pond -used oblong trap, drum trap, drag net, sap(Khmer)	1	1	1	1	1	1	1	0
Rasbora -in rice field, trap pond, lake, small lake -used oblong trap, drag net, scooping, screen net	1	1	1	1	1	1	1	0
Frog -in rice field, trap pond -used dig, hook line, lighting	1	1	1	1	1	1	1	1
Freshwater eel in rice field, trap pond -used dry up, lighting, drum trap, oblong trap	2	1	1	1	1	1	1	1
Snake -in rice field, forest -used dig, lighting	1	1	1	1	1	1	1	0

Seasonality of Aquatic Animals

Poor men

Species	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Scarce Hard trap, gill net, trap net, Scoop net, RF, ditch	As April	As April	As April	Moderate Hook long line, lighting, line, RF, ditch, spawning in RF, ditch and trap pond	As August	As August	Abundant Jump trap, trap pond, trap net, lighting, hook long line, line	As November	As November	As November	As November
Climbing perch	Moderate Scoop net, draining trap pond, bamboo net	Abundant Gill net, hook, long line, line, lighting, small oblong trap, oblong trap, in RF, ditch	As May	As for May	As for May	As for May	As for May	As for May	As for May	As for May	As for May	As for May
Catfish	Moderate Drain trap pond, hard trap, two pointed spear, RF, ditch	Abundant Gill net, bamboo net, fine mesh net, hook long line, line, spawning in RF, ditch	As for May	As for May	As for May	As for May	As for May	As for May	As for May	As for May	As for May	As for May
Frog	Moderate Dig, hook, RF	Abundant Hook, drum trap, hook long line, lighting, in RF	As for May	Scarce Hook long line, lighting RF	As for July	No fishing	No fishing	No fishing	Moderate Dig, hook Rice field	As December	As December	As December
Freshwater eel	Abundant, spear, slashing, dig, dig trap pond in village	Moderate Hook long line, lighting	As for May	As for May	As for May	As for May	As for May	As for May	As for May	Abundant, spear, slashing, dig, dig trap pond in village	As for January	As for January
Rasbora	Moderate Draining trap pond, scoop net, in trap pond in village	As for April	Nothing	Nothing	Nothing	Abundant Oblong trap, trough bamboo trap, in RF, canal, small stream	As for October	Moderate Draining trap pond, scoop net trap pond in village	As for November	As for November	As for November	As for November

Rich men

Species	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Scarce Drain trap pond, rice field	As for April	As for April	As for April	Moderate Lighting, hook long line, line, gill net, Scoop net, rice field	As for August	As for August	Abundant Drain trap pond, lighting, spear, rice field	Abundant, Draining trap pond	Scarce Draining trap pond and household pond	As for January	As for January
Rasbora	Nothing	Nothing	Nothing	Nothing	Nothing	Abundant, RF, oblong trap, drum trap, bamboo fence trap,	Scarce Drain canal	Nothing	Nothing	Nothing	Nothing	Nothing
Catfish	Scarce -dry trap pond -rice field	As for April	As for April	As for April	moderate -lighting, hook long line, line, gill net, scoop net -rice field	As for August	As for August	Abundant, draining trap pond, lighting, spear, -rice field	As for November	Scarce Drain trap pond and household pond	As for January	As for January
Climbing perch	Abundant drain trap pond and household pond	Scarce, scooping, Scoop net	As for May	As for May	Moderate Scoop net, RF, bamboo net	As August	As August	As August	Abundant jump trap, less water rice field	As for December	As for December	As for December
Frog	Nothing	Abundant Lighting, hook long line, RF	As for May	As for May	Moderate Hook, dig in RF	As for August	As for August	As for August	As for August	As for August	As for August	Nothing
Small shrimp	Scarce	As for April	As for April	As for April	As for April	Abundant Drum trap, oblong trap, scoop net, in canal, ditch, RF	As for September	As for September	Scarce Draining trap pond, RF	As for December	As for December	As for December

Rich women

Species	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Abundant In trap pond, lake, draining, trap net	Scarce Lighting, catch by hand, canal, trap pond	Moderate RF, lighting, trap net	Moderate, RF, Hook long line, lighting	Less abundant, in RF, hook long line, line, lighting	Less abundant, RF, lighting, hook long line, line, gill net	Abundant, in RF, line, hook long line, trough bamboo trap, lighting	Abundant, in RF, line, hook long line, gill net, trough bamboo trap, jump trap, lighting	Scarce Drain RF	As for December	Abundant, drain trap pond	As for February
Catfish	Abundant Drain trap pond	Scarce Lighting, in trap pond	Moderate RF	As for June	As for June	As for June	As for June	As for June	As for June	As for June	As for June	As for June
Yellow mystus	Scarce Trap pond, lake RF, draining and trap net	As for April	As for April	As for April	As for April	As for April	As for April	As for April	As for April	As for April	Moderate Drain trap pond	As for February
Whisker sheatfish	Abundant Drain trap pond	May, scarce, RF, bamboo net, scoop net	As for May	Moderate RF, gill net, scoop net, trough bamboo trap	As for July	As for July	As for July	As for July	Scarce in RF, abundant in trap pond	As for December	Less abundant, drain trap pond	As for February
Climbing perch	Abundant RF, drain trap pond	Scarce RF, bamboo net, scoop net	As for May	Moderate Hook long line, lighting, in RF	As for July	As for July	As for July	Less abundant, in RF, jump trap, lighting, small oblong trap	As for November	Scarce RF, abundant in trap pond	As for January	As for January
Spiny eel	Moderate Draining trap pond	Scarce RF	As for May	Moderate In RF, oblong trap, hook long line	As for July	As for July	Less abundant RF, trough bamboo trap, gill net, oblong trap, jump trap	Scarce In RF, abundant in trap pond	As for November	As for November	As for November	As for November

Poor women

Species	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Snakehead	Scarce -hook long line, gill net, lighting, jump trap, small oblong trap, trap pond, ditch, pond, rice field	As for April	As for April	As for April	Abundant	Abundant	Scarce	As for October	As for October	Moderate	As for January	As for January
Catfish	As above	As for April	As for April	As for April	As above	As for August	scarce As above	As for October	As for October	Moderate	As for January	As for January
Climbing perch	Scarce As above	As above	As above	As above	As above	As above	As above	As above	As above	As above	As above	As above
Spiny eel	Scarce drum trap, spear, rice field, canal, trap pond	As for April	As for April	As for April	Abundant	As for August	As for August	As for August	Scarce	As December	As December	As December
Frog	Scarce Hook long line, lighting, shrub, rice field	Abundant Hook long line, lighting, shrub, RF	As for April	As for April	As for April	As for April	As for April	As for April	As for April	As for April	As for April	As for April
Whisker sheatfish	Scarce	Scarce	Scarce	Scarce	Scarce	Scarce	Scarce	Scarce	Scarce	Scarce	Moderate	Moderate

Trends of Aquatic Animals

Poor woman

Species	1970	1979	1981	1990	2001
Snakehead	Abundant Canal, RF, trap pond, pond, ditch, few fishermen, trap net, feed trap, bombing, deep water	Abundant RF, trap pond, many fishermen, scoop net, hard trap, trap net, hook long line, water becoming shallow	Less abundant, As previous	Less abundant, As previous	Moderate, As previous
Catfish	As above	As above	As above	As above	As above
Climbing perch	As above	As above	As above	As above	As above
Spiny eel	Very abundant, RF, hook, catch by hand, drum trap, bamboo net, few fishermen, deep water	Abundant As previous, shallow water	Moderate As previous	As previous	As previous
Frog	Abundant Lighting, hook, dig, hook long line, drum trap, few fishermen, water deep	As above	As above	As above	As above
Whisker sheatfish	Abundant Canal, trap pond, draining trap pond, drum trap, oblong trap, trap net	As previous	Moderate As previous	Moderate As previous	Scarce As previous

Rich women

Species	1950	1975	1979	1993-2001
Snakehead	Abundant Low human population, lake deep	Abundant, Pol Pot Regime, no fishing allowed.	Abundant, people return after Pol Pot Regime, deep water, water plants for fish spawning	Scarce Many fishermen, modern fishing gear, shallow water, no floating plants for fish spawning
Catfish	As above	As previous	As above	As above
Yellow mystus	As above	As previous	As above	As above
Whisker sheatfish	As above	As previous	As above	As above
Climbing perch	As above	As previous	As above	As above
Spiny eel	As above	As previous	As above	As above

Poor man

Species	1950	1960	1970	1975	1979	1993 -2001
Snakehead	Abundant rice field drum trap, oblong trap, small oblong trap, hook long line	As previous	As previous	Abundant -Pol Pot regime no fishermen to allow fishing	Abundant trap pond, ditch, all these were deep water -spawning in canal and other waters	Moderate many fishermen fish spawning in canal, ditch, RF
Climbing perch	As above	As above	As above	As above	As above	As above
Catfish	As above	As above	As above	As above	As above	As above
Frog	Abundant Many canals, low human population, traditional fishing gear, spawning in RF,	As previous	As previous	As previous	As previous	Moderate High population, many fishermen, modern fishing gear, RF
Freshwater Eel	Moderate Few canals and lake for fish spawning,	As previous	As previous	As previous	As previous	As previous
Rasbora	Abundant Had a lot of fish refuges for spawning, water deep, low human population, traditional gear, spawning in RF, lake, canal, ditch	As previous	As previous	As previous	As previous	Moderate Not enough water plants for spawning, many fishermen, modern fishing gear, human population higher than fish population

Rich man

Species	1960	1970	1975	1979	2001
Snakehead	Abundant in RF, draining trap pond, hook long line, lighting, lots of water plants, few fishermen	As previous	Moderate Draining trap pond, hook long line, lighting, less water plant, more fishermen, fish spawning in RF	Abundant Draining trap pond, oblong trap, a few fishermen allowed to fish	Scarce Draining trap pond, lighting, line, hook long line, gill net, trough bamboo trap, fence trap
Rasbora	Abundant In RF, scoop net, oblong trap, trough bamboo trap, few fishermen	As previous	Moderate Scoop net, oblong trap, trough bamboo trap, many fishermen, in RF	As above	Moderate Oblong trap, scoop net, drum trap, bamboo fence trap, many fishermen, in RF
Catfish	Abundant Draining trap pond, oblong trap, lighting, lots of water plants, in RF and trap pond	As previous	Moderate Draining trap pond, hook long line, lighting, fewer water plants, fish spawning in RF, more fishermen, more fish caught in RF	As above	Scarce Draining trap pond, lighting, hook long line, gill net, oblong trap, small oblong trap, drum trap, trough bamboo trap, RF
Climbing perch	As above	As previous	As above	As above	As above
Frog	Abundant Lighting, hook long line, hook, in RF, many water plants, few fishermen	As previous	Abundant Lighting, hook long line, no water plants, more fishermen, catch in RF	As above	Abundant Lighting, line, hook long line, RF
Small shrimp	Abundant Oblong trap, trough bamboo trap, drum trap, scoop net, in trap pond, few fishermen	As previous	Abundant Oblong trap, trough bamboo trap, drum trap, draining trap pond, scoop net, fish spawning in RF, trap pond and household pond	As above	Abundant Oblong trap, scoop net, drum trap, trough bamboo trap, bamboo fence trap, RF, many fishermen, fish spawning in RF and trap pond

