

**UNDERSTANDING LIVELIHOODS
DEPENDENT ON INLAND FISHERIES
IN BANGLADESH AND
SOUTHEAST ASIA**
(DFID/FMSP Project R8118)



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**CAMBODIA PRA
REPORT**

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Country PRA REPORT

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ON INLAND FISHERIES**

IN

CAMBODIA

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I GENERAL

1. Methodology

PRA tool was used to gather the information and data for the study research. Examples of PRA tools used are includes village and resource map, trend line, wealth ranking, seasonal calendar, opportunity and problem analysis (problem tree, webs and ranking). There were three teams that went to the field at the same time. Each team worked at different study sites. Each team consists of three persons, one from CFDO and the other two from provinces who have experiences in conducting PRA exercises. All of them were trained by the STREAM initiative and used to carry out PRA for STREAM on the livelihood study at different site.

2. Site Selection

Three main ecosystems in the country were selected as study sites: main stream of Mekong river province (Kampong Cham province), great lake where have rice of fisheries resources (Pursat province), and down stream of Mekong river province (Prey Veng province). A poor village was selected from each province where the villages greatly depend on fisheries resources for their livelihoods.

3. Stakeholder definition

There are four main stakeholders: full time fisher, part time fisher, fish trader and fish processor, who are poor in general. For full time fishers, who depend on fisheries resources, fishing is their main occupation for their livelihoods and they do fishing almost every day for year round. Part time fishers depend on fisheries resource as well but fishing is their part time job or as their secondary occupation. Part time fisher in this study includes seasonal fishing (by time by fishing gear), subsistent fishing for household consumption and those who do fishing when they are free from their first occupation. Fish traders are those who engage in selling either in or outside the village. They buy fish from fishers and sell at the market. They earn income from this activity and consider it as their first occupation for livelihood. Similarly, fish processors are those who earn income from fish processing and consider it as their first occupation for livelihoods.

II. ENVIRONMENT LIVELIHOOD CHARACTERIZATION

2.1. Environment 1: Kampong Cham Province (Main river)

2.1.1. Background of the study area

Kampong Cham Province is located at the North-East of Phnom Penh, which is regarded as a fisheries province, representing the main river in Cambodia. The main fishing area in the province includes the Mekong River flowing through the province from north to south and across the Kampong Cham city, flooded area, lake, etc. According to the census in 1998, the total population in the province is 1,608,914, about 37 percent out of the total is in the fishing commune. The average proportion of annual fish catch from the province is about 9 percent of the total inland fish catch production.

Kampong Samnanh village is one of the 19 villages of the Mean commune selected as a study area, representing for the main river, Kampong Cham Province. The village is located near the productive fishing lot in the province, i.e. fishing lot number 2 of Kampong Cham province. Some parts of the lot was released t and is given to the people in the village. The

fisheries environment in the village includes big lake flooded area, inundated forest, etc. The number of households in the village is 179 with the population of 930 (470 women). The villagers depend mainly on fishing as their main income, whereas farming and other occupations such as dry rice cultivation (with only 30 households for 40 ha of rice land), animal raising and working as wage labor, for their secondary income source for their livelihood.

2.1.2. Livelihood Background

Wealth/poverty criteria

The living standards of the villagers are different from one household to another, but in general, they are categorized into 3 classes: very poor, poor and medium. The categorization is based on the indicators of wealth ranking as presented in the table 1, Annex 1.

The group categorized as very poor comprise of 30 % of the total number of households in the village (Figure 1). They are the most vulnerable group because most of them are widow, old person and have many children. They are defined as those with neither farmland nor education. They usually work for others in areas like farming, harvesting, seine net fishing or and at fishing lots. Normally they often lack food. Some households in this group had dry season rice land, but were sold to others family they had no ability to plow, irrigate or pay back the debt. If they are sick, they have to borrow money from others or they have to owe the doctor and pay back with the additional interest after they earn income from fishing or from selling their family labor to other groups.

Poor households comprise of 49 % of the total number of households in the village (Figure 1). This group possess little or no agricultural land ranging from 0 to 300 m², producing rice 600 kg per year which can supply households for 2-3 months only. Apart from farming, this group depends mainly on fishing as their main income. However, both fishing and farming are not enough for the household to survive, thus they need to sell labor in farming, harvesting, fishing, and working in fishing lot. This group also borrows money from local moneylender to buy fishing gears and other inputs but they have more ability to pay back the debt than the first group (poor group).

There are 37 medium households in this village comprising of 21 per cent of the total households in the village. They have rice land ranging from 0 to 2 hectares, producing 4 tones of rice crop annually that can supply to households' consumption for 10 to 12 months. Apart from rice farming, some households need to rely on fishing; some rely on doing small business, selling fish and some raising cow, pig and poultry for their livelihoods. In general, the living conditions of the households in this group are better than the poor and very poor households. Some households can save some money and lend to other households to buy input for fishing with no interest but they must arrange an agreement to sell the fish to the lender.

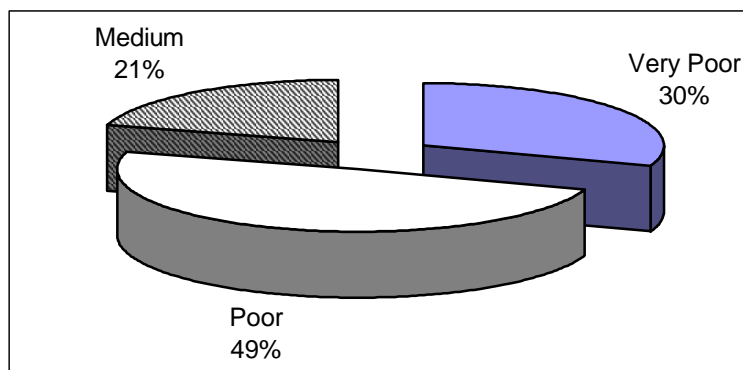


Figure 1: Wealth Ranking of Kampong Cham Province

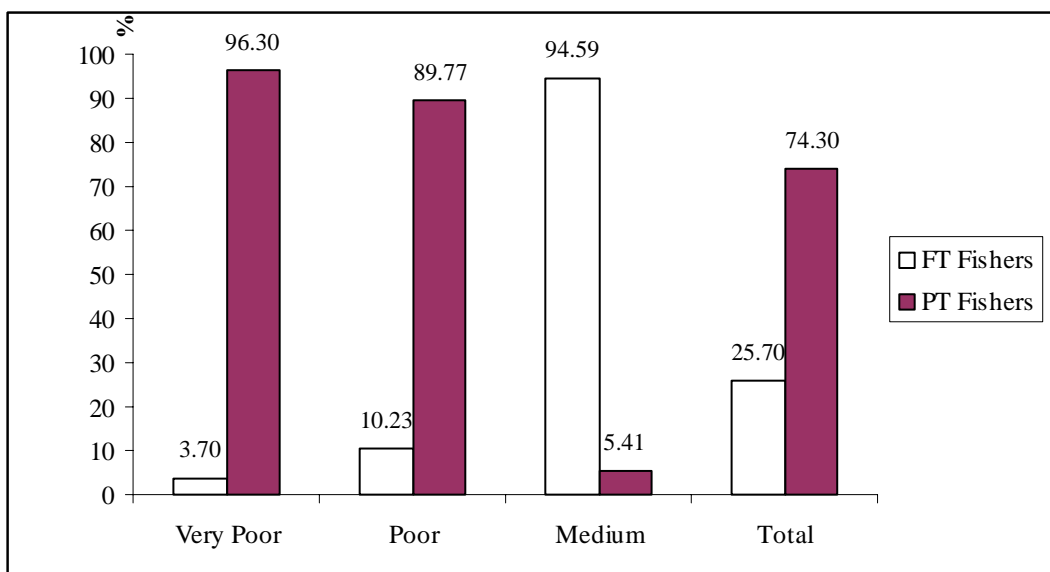


Figure 2: Wealth Ranking by Stakeholders of Kampong Cham Province

There are only two main stakeholders in the study area of Kampong Cham province (Main river) - full time and part time fishers. Based on the information given by stakeholders, most of the part time fishers are very poor with the highest percentage of 96.30%, while the medium households have the highest percentage (94.59%) of FT fishers (Figure 2 and Table 2 in Annex 1). The reason is that most of part time fishers operate small scale fishing activities and they do not have enough and appropriate fishing gears for all kinds of fish and fishing seasons. Moreover, most of people in this study have no land to do other farming activities too. They have sold their land for fishing activities. Most of them borrow money from the middlemen with high interest. Most of their catches have to sell to the middlemen with limited choices of fish price. So, they get very low income, just for daily survival. Some of them have been in debt for several years. Therefore, they become poorer and poorer

FT fishers in this study area are better off than PT fishers, because most of them have all kinds of fishing gears, which can allow them to catch fish for all season throughout the year. Most of them operate middle scale fishing activities and they have private fishing areas that they buy from fishing lot owners for certain period and contract for fishing. Moreover, most of them have enough capital inputs for their livelihoods activities and they also have farmland either managed by other persons or they work on the farms themselves, but hire labors.

Livelihood source/strategies

The livelihood sources and strategies of villagers in this study have changed from time/regime to time/other regimes. The changes are illustrated in Table 3, Annex 1.

Fishing is presently the main occupation for most of the villagers in Kampong Samnanh. All households in this village are fishermen. Only 25.7% of the total households in this area are full time fishers, who can fish for all seasons throughout the year. There are a high percentage of part time fishers, 74.3%, who fish at certain times only, because they do not have enough fishing equipment for year round. However, their livelihoods are dependent mainly on fishing as the main occupation in the household, which can be considered by seasonal fishing activities. Apart from fishing, most of them offer labor to other groups when they are free from fishing.

The next important occupation is animal raising, comprising 67.04% of total stakeholders, with the high percentage of FT fishers (67.39%) and PT fishers (66.92%). The third livelihood source is wage labor, comprising 37.99% of total stakeholders, which involve only the PT fishers (Table 1), since there is no other chance for them to get income for their family. The fourth source of livelihood strategy, 34.67%, is firewood collection with a high percentage of PT fishers (38.35%) involved. However, this activity is mainly for household consumption. Only 22.35% stakeholders are engaged in dry rice cultivation, with more than half (56.52%) as FT fishers. This is because most of the FT fishers have their own farmland. Other than that, it was found 6.15 percent of stakeholders have been engaging with other activities such as small-scale business or small traders, planting grass for weaving mat and fish cage culture in the village.

In conclusion, most of the very poor and poor groups are the PT fishers who depend mainly on fishing and wage labor, whereas medium households have more opportunity to do rice farming since they have some land and have many chances to derive the benefit from different sources for their livelihood such as larger scale of fishing operation compared to the very poor and poor households or PT fishers.

Table 1: Livelihood Sources/Strategies of Kampong Cham Province

Livelihood strategy	FT Fishers		PT Fishers		Total	
	No.	%	No.	%	No.	%
Fishing	46	100.00	133	100.00	179	100.00
Animal raising (pig/chicken/cow)	31	67.39	89	66.92	120	67.04
Labor	0		68	51.13	68	37.99
Dry season rice	26	56.52	14	10.53	40	22.35
Firewood collection	11	23.91	51	38.35	62	34.64
Other	3	6.52	8	6.02	11	6.15

Seasonal Activities

Table 4 and 5 in Annex 1, shows the seasonal activities calendar of men and women in Kampong Samnanh village respectively. These two groups selected the calendar based on the lunar month and selected October as a starting month of villager activities. The team ranked activities for each month from most, more to less busy as 5 points = most busy month, 3-4 = more busy, 1-2 = less busy, and blank = no activities.

Fishing and raising animal are the main activities that both men and women do throughout the year. However, FT fishers are the busiest people with fishing activities for year round. The busiest fishing period started from October to November for both FT and PT fishers. During these months villagers are able to catch a lot of fish because majority of fish species migrate from the lake to the main river and along the Mekong River. Not only men go fishing during these months, women also actively engage in fishing activity and fish processing for household consumption. The wife or the daughter helps the husband or the father in fishing. Normally she helps the husband or father row the boat when he is setting up the net, getting the fish from net, packaging and looking to the baits. In March and April, men need to repair and make fishing nets for next season, while women help to tie and mend the net etc.

Women play an important role in selling their fish catch throughout the year. When the husband or father comes back from fishing, the wife or daughter will bring the catch to the local market or sell to the fish traders/middlemen.

Pig rearing is also done throughout the year for both FT and PT fishers. Women are always involved with pig feeding and men are involved in transporting the rice bran or pigs to the upland during the floods. They consider this work as an important source of income for household as well. They earn high income once they sell their pigs at once in a year.

People who have land for agriculture start to prepare for dry season rice farming in October and harvest in May. The main responsibility for men is clearing and blowing land and taking care of rice from the period of planting until harvesting, whereas women are involved mainly in sowing, planting and harvesting. Collecting firewood is done regularly by men when they go fishing, whereas women also help when the households need to collect more firewood to be stocked before the flood season.

Very poor and poor household members or FT fishers spend their time working as wage labor within or outside the village. Men work as wage labor for the lot owner during the plowing period, whereas women work as the wage labor during the rice plating and harvesting period. Women also spend time on other activities such as planting grass for weaving/making mat.

A very important ceremony for the Cambodian people is Khmer New Year and Phchom Ben. However the villagers consider boat racing during the water festival as an important ceremony (Oum Touk) because most of them are boat racers. On the other hand the villagers tend to celebrate wedding ceremonies in December, January and February because those are the months that they are not so busy in fishing. At the wedding and the others ceremonies, the villagers spend their money according to their ability. Most women are concerned about shortage of time and money and go for a loan. In addition, they would also highlight their shortage in the family especially when they buy fishing gears like seine net, hook gill net or lease any part of the fishing lot that start fishing at January and February.

In general the social work are mostly done by women both in the ceremonies that is a tradition of the villager or related to finance.

2.1.3. Capital Assets

i) Human Capital

Health

In general people get sick due to different kinds of diseases throughout the year, but October or November is the peak period because the weather starts to turn cold. Reasons for people getting sick are lack of sanitation/no toilet, lack of clean water, no village nurse/medical center in the village and a lot of mosquitoes. Children are the highest group who suffer from illness. Therefore, people generally have poor health in this study area.

Education and Skill

Households in Kampong Samnanh village have very limited education opportunities and about 75 % of them are illiterate because there are no schools in the village and the villages had to flee from war. Only people who stay in pagoda have chance to study especially men. Women have no chance to study because they are busy in helping their family. Early 2001, the government provided a school with 5 rooms for primary education. This will help to overcome the literacy problem for the next generation.

In Kampong Samnanh village, fishermen have learnt fishing skills from their old generation. Besides fishing, the villagers have other skills to earn additional income for their living, such as dry rice cultivation, animal raising, weave mats.

The representatives and human resources of the village consist of 2 monks, 5 pagoda committees, 3 laymen, a commune adviser, a commune leader, a commune vice leader, 7 village development committees (To monitor inundated forest in the community), 3 Emergency rescue community committees, 2 contracted teachers, 6 players of classical music, 5 persons working at home, 12 working at garment factory (wage labor), a repair bikes, 3 dressmakers at home, 2 barbers, 2 repairer boat, 2 persons know how to operate and repair the small rice mill, 3 rice bank committees, an experience person know how to use medicine for treating pig, making trap and bamboo fences (comprise of 80% of men in the village), and mat weaving (comprise of 90% women in the villages).

Access to information

Very poor households have very limited access to information since they don't have any means of communication (radio or TV). They can get information only through the authority, or through other households who have access to information. In general the important source of information for the villagers is radio and television. During their free time, households who have no radio can visit the neighbors and watch the television or listen to the radio.

As for household assets, more than half of the households have a radio. Some of the middle households have a television.

ii) Financial Capital

The main source of income for the villagers is from fishing, fishing cage raising, working as wage labor and animal raising. Due to the fact that wild fish production is declining, income from fish is not enough to support the need for the family especially the poor and very poor households or PT fishers. Therefore, they need to work as a wage labor within or outside the village to earn extra income for the family.

In case their cash income from their own occupation is not enough to buy inputs for fishing, farming or to use in the emergency cases, very poor and poor households need to borrow money from local money lenders or from the Inventory and Management of Cambodian Wetland Project even though the interest rate is high.

iii) Physical Capital

Land

Since the village is located on fishing grounds therefore the agricultural land is very limited for the household in the village. Not every household in Kampong Samnanh has land. Very poor households have no agricultural land at all and most of them are PT fishers. Poor households have little agricultural land ranging from 0 to 200 m². Only middle households have more than a hectare of land for dry season rice, and most of them are FT fishers.

Boat

Almost every household has boats, some households have more than one boat. Most of the middle households or FT fishers have engine boats. Households consider boats as a very important means for transportation, fishing and collecting firewood. Thus boat is very important for their livelihood, every households need to have at least one boat even they are very poor or poor households. Some households need to borrow money from local moneylender in order to buy a boat.

Fishing gear

Gillnet is the main and necessary fishing gear for the Kampong Samnanh village. For the past 50 decades, gillnets have been used as a traditional fishing gear for the villagers. In 1979 the villagers report that in average, one household have 5 set of gillnets that is about 300m long. But the number of gillnets increase rapidly from 1995 due to the declining fish production and also the cost of the gear is cheaper than before. Now one household has an average of 25 sets of gillnet which is about 1500m long (Figure 5, Annex 1) and the number of fishing boats are also increasing (Figure 4, Annex 1).

Road and School

There is no proper road connecting Kampong Samnanh to other villages or to the main road. There is mud road about 1800 meters long. That village can travel during dry season for about 5 to 6 months (December- May) from the village to another. During flooded season, the villagers travel by boat and spend a lot of money.

There is a primary school with 5 classrooms, which can accommodate more than 200. The learning time divided into 2, one is in the morning and the other one is in the afternoon. . There are 4 grades: grade 1, 2, 3 and 4. At present the total number of students are 264 (143 are female students).

iv) Social Capital

Most villagers in the Kampong Samnanh village are relatives and have very good relationship and help each other when they make fishing gears or when they have ceremonies such as building a house, wedding, Buddhism ceremony, sick or funeral etc. During flooding, the villagers help each other to bring people, property and animal from the village to a higher and safer place. The idea of cooperation in farming activities do not apply because the villagers who have no means for farming need to hire the service for plowing

the land paying 6000 Riel/day/person and for planting, harvesting paying 3000Riel/day/person. However, the villagers established an emergency rescue community committee that they contribute 500 Riel per month for supporting the funeral.

iv). Natural Capital

The area of the Kampong Samnanh village is rich in fisheries because there is a big lake and 10ha of inundated forest area that is managed by the Kampong Samnanh community. These natural habitats harbor wild animals and serves as fish spawning grounds during the rainy season. These natural resources play a very important role to support the livelihood of the villagers. The full time fisher can go fishing throughout the year. The peak period of fishing activities is about 3 months starting from the end of October and ends at the end of January involving y both FT and PT fishers.

2.1.4 Trend in Natural Resources

Access and exploitation

Access to fisheries resource and other common properties such as inundated forest, wild vegetables, various fish species, fresh water shrimp and other aquatic resources (shellfish for household consumption) are free for all villagers.

From day to day fisheries resources have declined dramatically. This problem is cause by the increasing population and number of fishermen (Figure 2, Annex 1),conversion of the inundated forest area to dry season rice and illegal fishing activities in the area.

Fish production caught by gillnet

Fishing has been the main traditional occupation for the villagers for a long time.. The villagers recognize that the decline of fish is caused by the increase of average gill net used per day (figure 3, Annex 1), number of gill nets used (figure 5, Annex 1) and increasing number of fishermen in the area from year to year.

In 1979 fish is abundant, thus 300 meters of gill net with mesh size 7-8cm can catch about 15 kg on average per day while mesh size of 2-5-3 cm can catch 10kg.

In 1991, 300 meters of gill net with mesh size 7-8cm can catch about 6 kg of fish on average per day and the mesh size of 2-5-3 cm can catch approximately 8kg on average per day.

From 1991 the catch by gillnet dramatically decline due to the loss of inundated forest, decreasing water levels in the lakes during the dry season, and increasing fishing efforts. Moreover, illegal fishing gears are used such as electro fishing, mosquito net, seine net, mosquito net trap, mosquito net arrow shape trap (Saiyeun Sbaimong).

Area of inundated forest

The area of inundated forest in the Kampong Samnanh village changed over 3 main stages (Figure 6, Annex 1). From 1990 to1993 the area of flooded forest was reduced because people converted this area into dry season rice field; from 1993 to1996 the inundated forest increased because some villagers give up their rice field as their crop was completely destroyed by rats and insects; and the last stage from 1996 to 2002 where these areas decreased again as the inundated forests were cleared to plant rice. So far the inundated forest area that remains is only 10ha and managed by the Kampong Samnah community.

Dry season rice area

Dry season rice is a secondary job for the villagers that farm at the low lands around the lake near to the village. The villagers reported that in 1983 only 20 households were farmer of the dry season rice after the fisheries on the area of 10ha. From 1983 up to 2002 the number of farmers make up 40 households in the area of 40ha (Figure 7, Annex 1).

2.1.5 Problem Analysis

Classification of the problem is the main issue considered by the villagers for both FT and PT fishers. The problem they face are: lack of road, lack of irrigation dam, lack of clean water well, fish production decline, lack of land for farming the dry season rice, small fishing ground, rat destroy the crop, population increase, no toilet and increasing use of illegal fishing gear.

Thirty three villagers (19 women) participated in identifying and selecting the core problems as the priority through voting. Then our facilitator gave them 20 small stones as a ballot and explained to them how to score the problems in the village by giving 5 stones as a highest score for most serious problem and 4 stone as less serious problem and so on.

The results of the vote by villagers for the core and priority problem are listed in the table 6, Annex 1.

There are four core problems that were priorities of both FT and PT fishers as follow:

1) Lack of Road Infrastructure

Road infrastructure is very important for villagers to travel and transport the product to exchange with the outsiders. Without roads, the village could not be developed and the livelihood of the villager could not upgraded because the product being produced in the village is cheap or if they need to transport to other places they need to spend a lot of money, while the import commodities from outside is expensive. There is imbalance between the expenditure and income (income always lower than expenditure). Thus, poor and very poor households or PT fishers need to borrow money from local moneylender to fulfill the gap. Subsequently the poor becomes poorer and poorer. There are two main routes of the problem which can be described; firstly the villagers have no ability to build roads themselves and secondly they lack communication and contact with outsiders such government institution and NGOs. The analysis of the causes and effects of the problem is shown in figure 9, Annex 1.

2) Small Fishing Ground

Fishing areas are very important for households in Kampong Samnanh village because their livelihood depend mainly on fisheries resource. Due to the small sizes of fishing areas, problems such as conflict between fishermen and conflict between fishermen and fishing lot owners arise. These conflicts sometimes end up in violence. In addition, the villagers need to go fishing far away from the village, so they need to spend a lot of times money. Thus the income will be low causing their livelihood (not enough food to eat, could not sent the children to school, borrow money to fulfill the gap). These causes lead to poverty (Figure 10, Annex 1).

The 2 main root problems are - cutting of inundated forest and installing the brush park that caused erosion and hence making the lake shallower; and the increase of fishing efforts due to increasing of population.

3) Lack of Clean Water/well

Clean water is also a main issue and identified as a important for supporting the health and livelihood of the villagers. Without clean water well, the villagers face problems during the dry season because they need clean water for drinking. In the village there is only one clean water well that cannot provide enough water for the households in the village. When they need clean water the villagers have to spend 1-2 hours or more to have 2 tins of clean water. Sometimes conflict arises between the villagers. Moreover the villagers have to use dirty water from the lake causing many diseases that result in them not being able to go to work and spending more money for treatment.

The root of the problems are: people are poor, no ability to make deep wells and lack of communication and contact with government institution, local and international organizations to make the clean water well (Figure 11, Annex 1).

4) Fish Catch Decline

Fish yield decline is one of the core problems for the villagers, because most of them depend very much on fisheries resources, especially poor and very poor households. When fish catch decreases, the villagers need to increase fishing efforts and spend more time fishing. Thus they spend a lot of money and when each household increase fishing efforts (length and number of fishing gear) the fishing ground becomes crowded leading to fish stock decline. Thus they catch less fish from year to year, income from fishing becomes less. As a result, they could not support their family needs, hence they need to borrow money to fulfill their needs. Finally their livelihood reaches poverty level due to their debts and reduction in assets.

The root of the problems are the use of illegal fishing gears consisting of mosquito traps, brush park, electro fishing gear and arrow shape mosquito net and also clearing the inundated forest for dry season rice, firewood and brush park make loss of fish spawning ground (Figure12, Annex 1).

2.1.6 Vulnerability

There are several problems and constraints that lead to vulnerability identified by both FT and PT fishers as follow:

Natural disaster: Storm and lightning that cause danger to villagers every year. During floods villagers have to flee and transport their property and animal to the security on higher grounds.

Human diseases: diarrhea, cold, fever, typhoid and blood fever, which happens with most on children.

Animal diseases: especially with Pig such as swollen face disease, diarrhea and cough swollen face.

The human and animal diseases happened mainly during the dry season (March, April, May and June).

Lack of road: It is very difficulty to communicate with outsiders to exchange produce and other services.

Lack of clean water: During dry seasons villagers have to use water from the lake, which is not clean, hence causing diseases like fever, typhoid and diarrhea.

Population increase: the increase in population numbers is causing natural resources decline.

Small fishing ground: Most villagers can fish only from July to August but some households who can lease any part of fishing lot can continue their activities. For the poor households they need to work for the other people or borrow money from the rich to support their family. As the fishing ground is very small, conflict always take place between fishermen or between lot owners and fishermen to use the common property or lot boundary. Violence does occur between the fishermen and lot owner.

Low of fish catch: It has a bad effect to the livelihood of the villagers because they need to increase fishing effort but production is very low from year to year.

Lack of toilet: Epidemic diseases commonly happen to the villagers because due to the lack of toilet and hence human wastes are left everywhere in the open area.

Raising animal: The villagers' education levels are very low and they do not know how to use vaccines to treat their animals properly. Most of the villagers they follow instructions from the dealers who sell animal medicine.

High interest rate for loan: It happens when the villagers need to borrow money with high interest rate for buying fishing gears or other needs for their livelihood.

Fisheries law: The law is very strict for villagers who use legal fishing gear that cannot give them the facility for their livelihood. For example the family fishing gear such as gillnet allow only 10m long, trap of 0.8 m high with diameter 0.3m and cast net that is of 5 m long etc.

Increase in the use of illegal fishing gear: Illegal fishing gears destroys fisheries resources and has bad effects on villagers' livelihoods as they rely on these resources.

Rat destroyed the crop: Agricultural production of villagers is low or totally destroyed by rats.

2.1.7 Conclusion

Given the important role of fisheries resource, the current decline of fisheries resource has threatened the livelihood of the people in Kampong Samnanh village, especially the poor and very poor households without agricultural land. The conversion of inundated forest into rice fields and the use of destructive fishing gears by villagers are causing serious problems in fisheries. Thus it is important to have consensuses of all classes of people and relevant stakeholders to better conserve and manage the fisheries resource.

Alternatively, the livelihoods of Kampong Samnanh could be improved through the improvement of the road, sanitation, school, hospital, and development of skills through training and extension works.

2.1.8 Recommendations

The following recommendations are proposed:

There should be interventions from relevant institutions or organizations to build roads and clean water wells.

There should be interventions for capacity building and extension technology to villagers so that they could apply management strategies and benefit from fisheries resources in the village through sustainable use.

More fishing lots should be to villagers, so that they have more appropriate fishing grounds for fishing and should amend/revise some points of the fisheries law for poverty alleviation of villagers who depend on fisheries resources.

Fishery agencies need to curb the use of illegal fishing gears especially during the dry season. A fishing management community needs to be created, so that they can participate to manage and protect their resources for sustainable use.

There should be interventions to train and provide extension on how to raise livestock so that they have capacity to raise success.

The concerned institutions/organizations or development program/projects should provide local credit services with lower interest rates in order to reduce loans with higher interest rate from the dealer.

2.2. Environment 2: Pursat Province (Great Lake)

2.2.1. Background of the study area

Pursat province is located on the West of Cambodia. It borders Thailand to the West, Kampong Chhnang province to the East, Koh Kong and Kampong Speu province to the South, and, Batom Bang province and Tonle Sap Great Lake to the North. Due to the proximity to the Tonle Sap Great Lake, the area also receives water from the Mekong River and other river tributaries. The province consists of 6 districts with 49 communes, and 41 villages. Based on the 1998 census, the population of the province is 360,445 people .

The PRA was carried out in the Sreycheuk area of Prek Trawbek village, Kamthor commune in the Kandeang district. Kandeang is one of six sites located approximately 8 kilometers from the Pursat Municipal building to the Northern part of the province. The Kandeang lies along Steung (stream) Pursat. About 17 kilometers far from the center of Kandeang District, one commune is located along the Steung Pursat stream called as Kanthor commune.

Prek Trawbek village is in the Kanthor commune, which is 7 kilometers from the commune center. This village was selected as the study area. Prek Trawbek is a floating village. The residents of Prek Trawbek move seasonally along the stream and to the other sites. For example, during the wet season, the villagers reside in Sreycheuk area and Prek Takham. In the dry season, the residents move to Prek Tachan to reach the boundary of fishing lot No 7.

Prek Trawbek village is surrounded by Phlov lourng village to the East, Pur Andet to the West, Koh Ka Ek village to the North, and, south stream of Phlov Lourng village to the South. The total population of Prek Trawbek village is 120 households including 11 households who are Viet Names. Due to the nature of the floating village, people seasonally move from place to place according to the water flow.

There are many streams, channels, lakes, ponds within the territory of Prek Trawbek village such as, Steung Sreycheuk , Steung Chas , Steung Reussey Moyroy Kom , Prek (channel) Teuk Chhou , Prek Takoy , Prek Bomnekkhel , Prek A Seung , Prek Tachan , Prek Kandevek , Prek Tabrawhoung , Prek Somre , Prek Antong vor , Prek Ksach , Prek Takham , Beong (lake) Sleng , Beong Veng , Beong Dachsomrek , and, Beong Kompheanh . The Prek Trawbek village lacks land for gardening due to the abundant wetland forest, which are approximately 720 ha at the surrounding areas. However, land is available outside the village for dry rice cultivation and fishing lots (See *Figure 1. Village Map in Annex 2*).

2.2.2. Livelihood Background

Wealth/poverty criteria

In the Sreycheuk area people live on floating houses and/or floating huts. These houses and huts are able to move seasonally according to rising and receding water season. Most of the floating houses and huts are made from bamboo while the roofs are made from leaves. The household patterns are mainly individual cluster. Based on wealth ranking, the livelihood of people here can be classified into two categories, which are poor and very poor households (in local language are Kroursa Kror and Kroursa Titorl Kror). It indicates that the standard living of people in this area is poor. There are 41 (34.2%) households categorized as very poor and 79 (65.8%) households categorized as poor (Figure 3). The proportion of very poor and poor stakeholders is illustrated in Annex 2, Table 1. Wealth ranking.

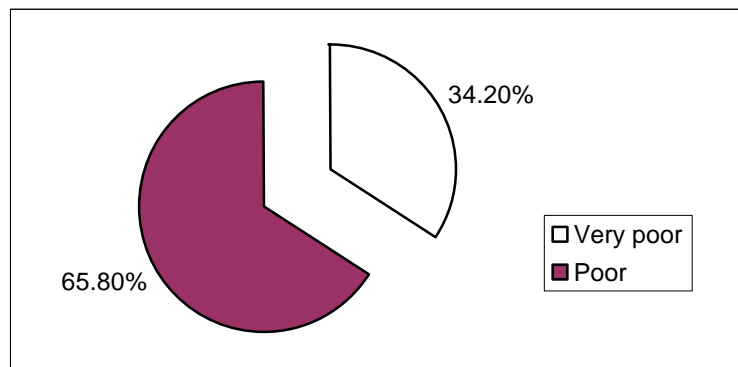


Figure 3: Wealth categories of Pursat Province

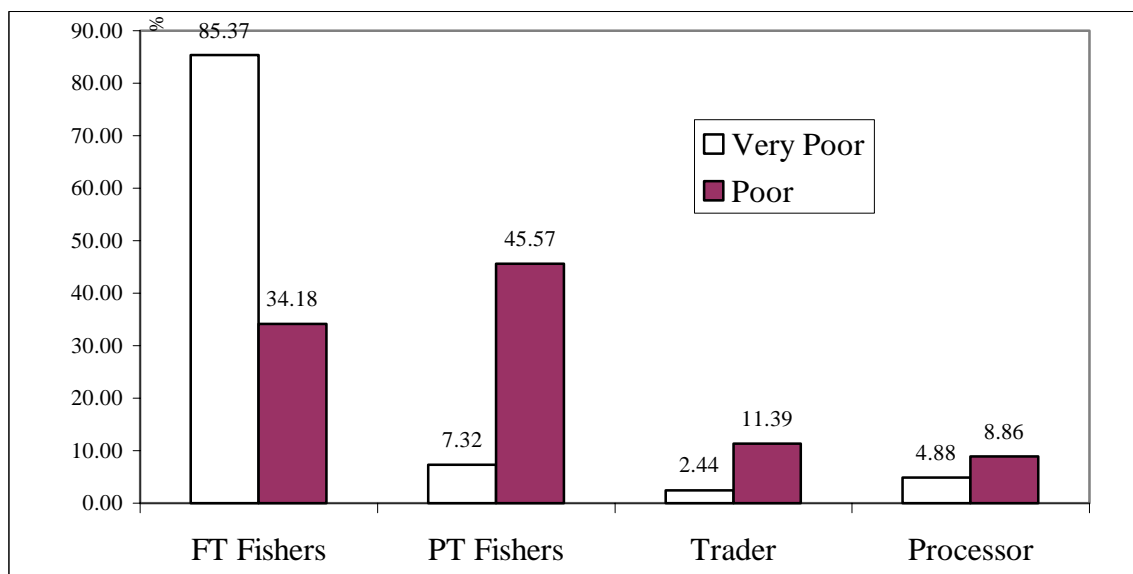


Figure 4: Wealth Ranking by Stakeholder of Pursat Province

Based on the information given by stakeholders, Figure 4 shows that most of full time fishers are very poor with the highest percentage of 85.37%. This indicates that the poorest in the study area are the full time fishers. This is because most fishermen in this study area operate small scale fishing activities, so they cannot catch more fish. The reason for small scale fishing is because they do not have money to buy or operate larger fishing gears and fishing activities. Most of the part time fishers are poor (45.57%), followed by full time fishers 34.18%. This shows that part time fishers are better off than full time fishers. This is because for part time fishers; they have more than one livelihood strategy. Most of them

undertake rice cultivation, fish cage culture etc, while most of full time fishers depend only on fishing for their livelihood. If we compare traders with other stakeholders, it shows that traders are better off than the other three stakeholders in this study area, followed by PT fishers and fish processors. This is because traders earn higher daily incomes than others (Figure 4).

Livelihood source/strategies

Fishing is the main occupation of people living in the study area. There are more than half (69.2%) of the stakeholders that have been engaging in fishing activities. Only 30 percent of the total traders are involved in fishing activities.. The next livelihood activity is fish cage culture comprising 38.3% of the total households living the area. A high percentage of the households are FT fishers (62.9%) and PT fishers (46.2%). Most of them expressed that fish cage culture does not provide high income. In fact they sometimes did not made any profit in these investments. In general, fish culture production provides higher returns compare to daily income from fishing. The third main livelihood activity is firewood collection that makes up 32.5 percent of the total stakeholders. However, this activity is only for household consumption and not for income. The fourth important livelihood strategy is fish processing that accounts for 23.3 percent of the total households (Table 2). This is a common activity that almost all households carry out for household consumption all year round such fermented fish (Prohok, Pha Ork in Khmer word). The remaining is sold for additional household income. Smoke fish is made mostly for selling by fish processors. These stakeholders buy fresh fish from fishers and smoke the fish to be sold for profit.

Table 2: Livelihoods Sources/Strategies of Pursat Province

Livelihoods strategy	FT Fishers		PT Fishers		Traders		Fish Processors		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
	Fishing	35	100	39	100	3	30	6	66.6	83
Floating rice cultivation			21	53.8	2	20	3	33.3	26	21.7
Wet rice cultivation			25	64.1			5	55.5	30	25
Fish cage culture	22	62.9	18	46.2	4	40	2	22.2	46	38.3
Fish processing	8	22.9	4	10.2	7	70	9	100	28	23.3
Fish buying and selling					10	100			10	8.3
Firewood collection	11	31.4	22	56.4	5	50	1	11.1	39	32.5

Seasonal activities

The seasonal calendar illustrates the livelihood strategies of stakeholders by time/month (Table 3, Annex 2).

Fishing activities by type of fishing gears:

- Gillnet: It is mainly used from November to May, but less frequently used from June to August and commonly used from September to October. Both FT and PT fishers utilize gillnets. PT fishers only fish when they have free time from other activities.
- Long line: Fishers mostly use long line from July to September. This type of fishing gear is not difficult to use and does not require much time to operate. Hence, it is suitable for women.

- Cast net are mainly used from March to April and from June to July. It is moderately used in October and also highly used again from November to December. It becomes less used from January to February.
- Lop (Bamboo horizontal cylinder trap): It is used a lot in June and moderately used in May and from July to August. It is less utilized from October to December. Besides those months, fishers do not use Lop for fishing because the gear easily gets caught onto shrubs and bushes when the water level is low.
- Handle Scooping net: This fishing gear is used from May to June.
- Surrounding gill net (Mong Hum): This gear is used only three months in a year from March to April and moderately used in May.

These fishing gears are used by all FT fishers. The gear is also popular among PT fishers but it depends on when they are free from other jobs or seasonal fishing.

Fish processing:

Smoke fish: Fish processors are busy with fish smoking activities from March to April. This activity is carried out by both men and females.

Fermented fish (Prohok): It is mostly made during the peak season from October to May. Another kind of fermented fish, Khmer call Pha Ork, is mostly made from May to June. Fermented fish is mainly used only for home consumption-not for sale. This activity is done by women, while men help with transportation of the product.

Housing movement:

In March, households move their floating houses to Prek Tachan channel. In May, they move their floating houses from Prek Tachan to Sreycheuk and to Prek Chlorn in June. They reside in Prek Chlorn and Sreycheuk from June to February.

Boat/engine boat repair:

The activity of boat mending makes the households moderately busy in April. In May they increase their boat mending activity while in June they are most occupied with boat/engine repair.

Fish Culture:

In June the stakeholders start fish culture in cages. This activity does not demand much time. They spend more time on fish culture only in July (Table 3. Seasonal calendar, Annex 2) when they feed and nurse the fish. They harvest their fish within June and July.

Floating rice cultivation:

The farmers start to plough their land and sow seeds in May and June. At this time the farmers are very quite busy with this activities (Table 1). The activity becomes less demanding from July to December. Within this duration farmers are involved with nursing the land such as grassing and spraying insecticide. Harvesting of floating rice cultivation starts from January to February. In March to April farmers are engaged in weeding out small plant and root of plants (such as Rang '*Brringtonia acutangula*', Tho our '*Terminalia cambodiana*', and Anh Chanh '*Gmelina asiatica*').

Wet rice cultivation:

Land preparation starts in April during the rainy season. In May the activity of land preparation is completed while sowing of seeds begin. In June the farmers nurse seedlings and start transplanting from July to September. From October to November the nursing of wet rice is undertaken followed by harvesting that begins from December. The final storage activity is undertaken until February.

The amount of rice production is small and it is just only for household consumption.

2.2.3. Capital Assets

i). Human Capital

All stakeholders in Sreycheuk area defined themselves according to their major job task, most of them are illiterate and of poor health due to the lack of schools and health care centers in the area. There is also less access for information delivery to the area. The access for information delivery to the area is also lacking.. There is no any NGO assistance or development project in the area. Knowledge and skills in fishing and farming are based on traditional methods. The human resource is in general is poor. Thus it is difficult for the village to develop while the villagers are also vulnerable.

ii). Physical Capital

Traveling by boats is the only means of transportation because the area is a flood prone area. Most of the stakeholders are landless people, especially for FT fishers. The land of those who acquire land for rice cultivation is less than 1 ha. In general houses are in poor conditions and have to be moved according to the seasons from one to other places (See Table 3. Seasonal calendar, Annex 2). There is no sanitation facility, no clean water and no toilet. The waste is mainly channeled into the streams Water from the stream is used for drinking and cleaning. Most of them use small wooden boats for fishing and transportation. There are some engine boats mostly used by better-off fishers. Most of FT and PT fishers have fishing gears, but most of them have few and small gears that lead to catch small amount of fish. Most FT fishers have their own kinds of fishing gears for fishing seasonally, but the fishing gears are small, with poor quality and insufficient to meet requirements for their fishing activities.

iii). Natural Capital

The study area covers two streams (Steung Sreycheuk and Reussey Moyroy Kom), ten channels (Prek Tachhou, Prek Taseung, Prek Takoy, Prek Bombek Khel, Prek Tachan, Prek Kandevek, Prek Ta Prawhoung, Prek Antong vor, Prek Ksach, Prek Takham), and four permanent lakes (Beong Sleng, Beong Veng, Beong Dachsomrek, and, Beong Kompheanh), which are rich water bodies to conduct fishing activities. In addition, there are up to 720 ha of flooded forest such as bushes and shrubs, which also allows fishing activities to be carried out.

iv). Social Capital

There is only one indigenous elder living within the area. Therefore, there is a lack of literate person and indigenous elder in Sreycheuk. There has no NGO or development project engaged in this area, leading to poor social relationship or communication with outsiders.

v). Financial Capital

Most household income is generated from freshwater fisheries (sales of fresh fish, processed fish and other aquatic products), off-farm activities (3 young ladies work outside as garment workers, engine boat maker, small-scale machine repairer and small business operators), fish trading and money lending (usually wealthier villagers). In general, most stakeholders have low income in this study area, most of them would have only sufficient income for daily survival.

2.2.5 Trend and Changes in the Study Area

All stakeholders expressed that they have free access to fishing ground because most of them do small-scale fishing that is tax-free. Fishery resources have declined dramatically due to the increase in population (Figure 2, Annex 2), fishers (include migrant fishers) and illegal fishing activities that have led to the loss of some fish and aquatic species.

In 1982 there are 50 households resided within the area. This figure remains unchanged until 1985. But the population has increased to 70 households in 1990 when neighboring villagers migrated into the village. From 1995 to 2002, population has increased due to two factors, higher birth delivery and migration of outsiders into the area (Chikreng, Rangtil, Kandeang, and Kampong Lourng). Migrated fishers conduct seasonal fishing in dry season and get back to their residence in wet season. For example, there are 150 households who are outside fishers that have come to fish in the area in 1995, this number has increased to 160 households in 2000, and 400 in 2002. Fishers who fish in dry season and return to their home in wet season include villagers from Chikreng and Kampong Thom, comparatively, lesser migrant fishers were from Rangtil, Kandeang, and Kampong Lourng village. All of them fished with gillnet, bamboo horizontal cylinder trap (Lop), cast net, handle scooping net (thnorng), etc.

Cage culture is conducted by villagers at the study area with fish species such as snakehead and *pangasius species*. The fish culture has started since 2000 with 50 cages throughout the area with fingerlings stocking around 2000 heads per cage. The current number of fish cages has since increased to 86 (Figure 5, Annex 2) but the capacity of fish stock in each cage has reduced to 1000 heads per cage. This figure is less than year 2001 due to shortage and high price of fish fingerlings, and increasing number of fish cage rearing by the villagers. Most of the amount of fish cage culture in this area belongs to migrant fishers.

Smoke fish products also have been decreasing from year to year (Figure 4, Annex 2). In 1982, 10,000 skewers were involved in smoke fish production and in 1985 this has decreased to 9,000 skewers a year. Comparison between 1990, 2000, and 2002, smoke fish products fell by 4,000 skewers/yr; 2,000 skewers/yr, and 500 skewers/yr respectively. The decline of smoke fish production was caused by decreasing fish catch.

Fermented fish (Prohok) products have decreased considerably from year to year too (Figure 7, Annex 2). The production of fermented fish per household has declined. For example in 1981, 1985, 1990, 1995, 2000, and 2002 the fermented fish products were 180 kg/yr, 150 kg/yr, 50 kg/yr, 30 kg/yr, and 10/yr respectively. The decrease of fermented fish production is generally associated with the decline in natural fisheries (Figure 6, Annex 2), increasing fisher population, blocking of fish way by fine barrage fence by fishing lot (No. 7) owners, which disturbs fish migration and kills juvenile fish.

The consumption of fish production has increased over the years due to the increase in population. The natural fishery resources were heavily exploited to meet the supply of increased consumption and to fulfill livelihood needs. Lack of proper management of natural fishery resources will gradually lead to decline of the supplies.

Change of Fish Catch

In 1982, the household catch was 300 kg/day by using traditional fishing gears with small fisher population. In 1985 the catch has dropped to 150 kg/day/household by traditional fishing gears with higher fisher population. However, the household catch could be 80 kg/day more than previous year with modern fishing gear (fisher population increased, more fishing gear used, and fishing lot owners invaded into the public fishing ground) (Figure 6, Annex 2).

In 1995 fish catch was decreased by 30 kg/day/household. The decrease of catch was caused by the use of modern fishing equipment such as, one-engine boat trawl 'Yang Kav', Bush park 'Somras', Scissors pushing net 'Chheup', and, electrocuting 'Chork'(only a small number using this method).

In 2000, electrocuting was widely used by all fishers. This fishing equipment was developed when wetland forest encroachment was abundant. This has resulted in the catch decreased by 10 kg/day/ household.

The catch in 2002 has declined to 2-4 kg/day/ household. This is due to increased demand, therefore led to more intensive extraction with modern fishing gears. High population growth, more clearing of inundated forest have caused the loss of fish habitat. This situation is worsened by exploitation using electric fishing gear and fine mess size net (mosquito net).

Change of Fish price

The price of fish changes according to the demand and supply of fish, and it varies across the years. The villagers value the price of the catch over the years by converting to the current gold prices.

In 1982, the average fish price was 5000 riels/kg, cost at the current value of gold . This price applies to all type of fish (include fish class 1, 2, and 3). In 1985 fish price was 3000 riels/kg, cost at the current value of gold. However, in 1990, 1995, 2000 and 2002, fish prices worth only 1500 riels/kg, 700 riels/kg, and 500 riels/kg respectively (Figure 3&4, Annex 2).

Change of Rice Production

Wet rice production

Changes in wet rice production are as follows (Figure 9, Annex 2):

In 1982, rice production is estimated at 2.5 tones/ha

In 1985, this production has reduced to approximately 2 tones/ha

In 1990, the production has further reduced to 1.5 tones/ha due to the loss of wetland forest.

In 1995, the rice production was only 1.3 tones/ha due to flood disaster.

In 2000, the rice production was further reduced to 1 tone/ha because of water shortage.

Floating rice production (Figure 8, Annex 2):

In 1982, the rice production was 2.5 tones/ha

In 1985, the production was estimated at 2 tones/ha

In 1990, the production was reduced to 0.5 tones/ha due to flood

In 1995 to 2001, there was no floating rice production because of natural calamity (such as flood by rain and by water from Mekong river.)

The main reasons for decreasing rice production include natural disasters, insufficient water/ rainfall, drought, rodents, poor quality of soil, etc.

2.2.6 Institutional/Stakeholders Analysis

The institutional analysis is provide a better understanding on who are the secondary stakeholders, what are they doing, how are they involved in the process and how institutions affect local people in the study area (Table 3 and Table 4). The secondary stakeholders include government officers and private people who are related to primary stakeholders, deal with and obtain benefits from the primary stakeholders/ villagers.

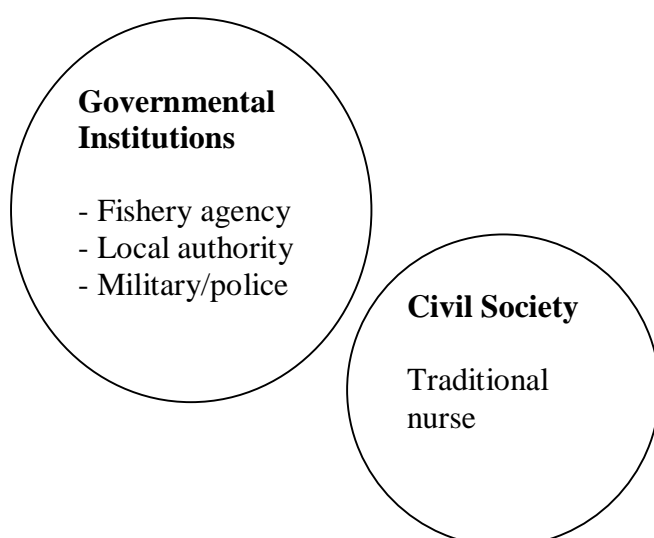


Figure 5: Institution Relationship and Involvement of Pursat Province

In Figure 5 shows that the private institution does not have more involvement or interaction, that would create more impact and influence on local villagers as compared to the government agency.

Table 3: Stakeholder Analysis in Sreycheuk PRA site

		Positive	Neutral	Negative
<ul style="list-style-type: none"> ▪ Governmental institutions 	<ul style="list-style-type: none"> ▪ Fisheries ▪ Local authority (village and commune chief and district major) ▪ Military police ▪ Inspector (Army) 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ 		
<ul style="list-style-type: none"> ▪ Civil society 	<ul style="list-style-type: none"> ▪ Traditional nurse 	<ul style="list-style-type: none"> ✓ 		
<ul style="list-style-type: none"> ▪ Businessmen 	<ul style="list-style-type: none"> ▪ Middlemen fishing equipment lender and fisheries product purchaser) ▪ Fishing lot 	<ul style="list-style-type: none"> ✓ 	<ul style="list-style-type: none"> ✓ 	<ul style="list-style-type: none"> ✓ ✓

Governmental Institutions

- Fisheries Agency: it plays a role in natural fisheries resource conservation and control against illegal fishing activities.
- Local authority plays a role in communicating and coordinating with outsiders and authorities at national levels. However, the local authority has a low priority in the communication, and coordination roles in this area.
- Military police plays a role in the social security and to prevent illegal fishing activities in cooperation with fisheries agency.
- Inspector (Army) from fisheries agency has a role investigate illegal fishers.

Civil Society

- Traditional nurse: There is only one traditional nurse in Sreycheuk and she plays an important role in helping pregnant women during baby deliveries.

Businessmen

- Middlemen or merchandise: These people are very important to villagers because certain fishing equipment such as gillnet, cast net, etc. were supplied by them. Moreover, the merchandise also helps local fishers to purchase their fishery products and the fish price was set according to the market price.
- Fishing lot: There is a lack of cooperation between local people and fishing lot owners. Fishing lot owners illegally blocked the fish ways using barrage fence in February before fishing operation mandate that usually happens in April. Fishing lot owner also warned local fishers not to fish in this period. They also put fine barrage fence to block fish migration into streams.

Table 4: Negative and Positive Impacts of Institutions to Rural Livelihoods

Positive Impact	Negative Impact
<p>Fisheries Agency:</p> <ul style="list-style-type: none"> ▪ Prevent and control against illegal fishing activities ▪ Plan to develop fishing community <p>Military Police:</p> <ul style="list-style-type: none"> ▪ Serve as social security agent and prevent illegal fishing by cooperation with fisheries institution <p>Inspector (Army):</p> <ul style="list-style-type: none"> ▪ Investigate on illegal fishers <p>Fishing lot:</p> <ul style="list-style-type: none"> ▪ Release 200 m fishing lot territory for local people use or public use. 	<p>Military Police:</p> <ul style="list-style-type: none"> ▪ Collect illegal fee from fish culture <p>Inspector (Army)</p> <ul style="list-style-type: none"> ▪ Collect illegal fee from fish culture <p>Fishing lot:</p> <p>Block the river mouth or down stream, to block fish migrate in (put barrage in February)</p> <ul style="list-style-type: none"> ▪ Prevent local people from fishing after final harvest of fishing lot. ▪ Use fine mess size barrage fence that caused death of juvenile fish.

2.2.7 Problem Analysis

There are eleven problems mentioned by stakeholders in Sreycheuk area. Six problems were selected after they identified the issues within their village. The villagers then ranked the problems by hand counts. The eleven issues mentioned by Sreycheuk villagers are as bellows:

- Food shortage - 100 votes
- Not enough fishing equipment - 96 votes
- No school - 92 votes
- No health center - 51 votes
- Not having enough boat, engine boat - 51 votes
- Not enough draft power - 44 votes
- Not enough shelter - 38 votes
- Shallow stream waterway - 23 votes
- Insufficient cultivated land - 13 votes
- High number of dependents/ children - 3 votes
- Not enough pumping - 0 vote

Six issues chosen for comparisons were as follows:

- Food shortage
- Not enough fishing equipment
- No school
- No health center
- No enough boat, or engine boat
- Not enough draft power

After comparing all of six issues, three main issues were prioritized:

- Not enough fishing equipment is the first priority issue,
- No school is the second priority issue, and
- No health center is the third priority issue.

The three major problems in Sreycheuk must be solved in advance.

1). Not enough fishing equipment

This problem was caused by lack of fund due to low or no profit from fish catch and agricultural production. Moreover, the village also does not have any external assistance such as development projects or NGO, and the lack of good communication with outsiders also contribute to low supply of fishing equipment. Lack of fishing gears also led to low fish catch. Low income from fish catch also led to insufficient income to buy food. As a consequence villagers faced the problems of food shortage and illness. Please refer to Figure 10, Annex 2 for more illustrations.

2). No School

This problem is caused by the negligence of the local Government, and lack of initiative from the villagers since the literacy rates among them are low in general, although the fishing community is developed in the village. This issue has also caused high mobility among villagers moving from one location to another. Lack of school also caused other social problems such as violation of laws and domestic violence or social violence. The lack of human resources development also causes poverty among the villagers. It became a vicious cycle since poverty lead to lack of financial ability to build school for their children, and lack of education lead to more serious problem of poverty. Only villagers with relatives living near to some schools at neighboring villages could send their children to school, by having their children staying with their relatives. Most of the children in Sreycheuk do not go to school, even to schools outside the village. Therefore, most Sreycheuk villagers are illiterate. This problem needs to be looked into by relevant institutions and local authorities immediately. Assistance from both national and international NGOs and development projects/program would help to solve the problem considerably. Figure 11, Annex 2 provides more illustrations.

3). No Health Care Center

The lack of health center in this area is due to the negligence of the government on the health care service to rural population in the country. Villagers in this area have been living without any health care service for a long time. It appears that low literacy rates also contribute to this issue, in addition to lack of good community leader, and lack of communication facilities between the area and the district or provincial municipal. This study area is a flooded area, with neither health care center, nor treatment. Thus, villagers are under great threats from various diseases. For example, children in the area do not have vaccination for disease prevention such as *Tuberculose*, *Polios*, *Diphtherie*, *Tetanos*, *Coqueluthe*, *Rougeole*. There have no maternal infantile protection (PMI) either. There have no health care agent disseminates information about epidemic and other diseases in the village. Due to lack of transportation the villagers do not go to hospital because health centers or hospitals were located far from the area. However, the villagers do have knowledge on health and sanitation, and the importance of vaccination to children for the precaution of the six diseases (such as *Tuberculose*, *Polios*, *Diphtherie*, *Tetanos*, *Coqueluthe*, *Rougeole*), and school education, and maternal infantile prevention. Figure 12, Annex 2 provides more illustrations on this problem. It is believed that only with immediate actions from national or international NGOs or assistance from development programs that may ensure early provision of health care services at the village.

2.2.8 Vulnerability

There are several problems that have led to livelihoods vulnerability and that impact upon livelihood strategies of the stakeholders in the study area. These include:

- Drought: People in Sreycheuk area faced natural calamity in 1998 such as drought and rodent, which caused decrease in rice production.
- Flood: In 1995 villagers faced one natural calamity (flood) and abundance of *Mimosa pigra*. These two cases caused loss of land for rice cultivation. As a consequence, the floating rice production reduced considerably, for example there was no rice production in 2001. It caused shortage of food for household consumption.
- Population growth: The population has increased from 50 households in 1982 to 120 in 2002. The increase is due to migration from Kandeang, Kanthor, and Kampong Lourn. They are residence. However, the population in fishing season is even higher. Fishers come from Chikreng, Rangtil, Kandeang, and Kampong Lourn for fisheries extraction and business. The population at this time of the year can be as high as 400 households (in 2002).
- Natural fish decline: Fish catch decreased considerably each year. This is reflected in the catch in 1982, which is 300 kg/day/household, and fish catch in 2002, which is only 4 kg/day/household. Reasons of fish decline are, increase in fishers and modern fishing gears (such as one engine boat trawl 'Yang Kav', Bush park 'somras', electrocuting 'Chork', Scissors pushing net 'Chheup'), and, decrease in flooded forest.
- Low fish price: In 1982 fish price was high up to 5000 riels/kg (for class 1, 2 and 3) but the price of fresh fish currently is only 500 riel/kg. As for processing fish, one household could produce 10,000 skewers of smoke fish a season and 200 kg of fermented fish (prohok) a year. In contrast, the processing fish production has, recently decreased, for example, only 1500 skewers smoke fish are produced and 10 kg of fermented fish being produced a year. This has affected the household income of those who are involved in the activities.

Local people of Sreycheuk area have encountered other problems such as unlawful payment for fish culture to police and inspector, invading of fishing lot owner into common area, fishing lot owner blocks the fish way which can disturb the fish migration from lake and stream, the shallow stream mouth, and lack of human resources. All of these problems have impacts on the livelihoods of the people in Sreycheuk.

2.2.9 Solutions for Sustainable Livelihoods Strategy

All stakeholders strongly requested to address on three immediate needs, namely, increase the number of fishing gears per household (especially by FT and PT fishers), building school and health care center in the village, with assistance from related institutions such as NGOs and development programs. Table 5 presents the proposed interventions and outcomes of these three issues. After these three problems have been solved, the other needs and problems should be addressed.

Figure 6 presents the summary analysis of livelihoods framework in the study area. The proposed intervention, solutions and outcomes of livelihoods strategy are also illustrated in this diagram. Once the outcomes have been achieved, all five capital assets in this area would be improved and the living standard of people would be better.

Table 5: Outcomes of Proposed Intervention

No.	Proposed intervention	Outcomes				
		Increase d Income	Improve d Health	Reduced vulnerability	Increase d Food security	Sustainable natural resource management
1	Provision of fishing equipment	✓	✓	✓	✓	
2	Building school		✓	✓		✓
3	Provision of health care center	✓	✓	✓		

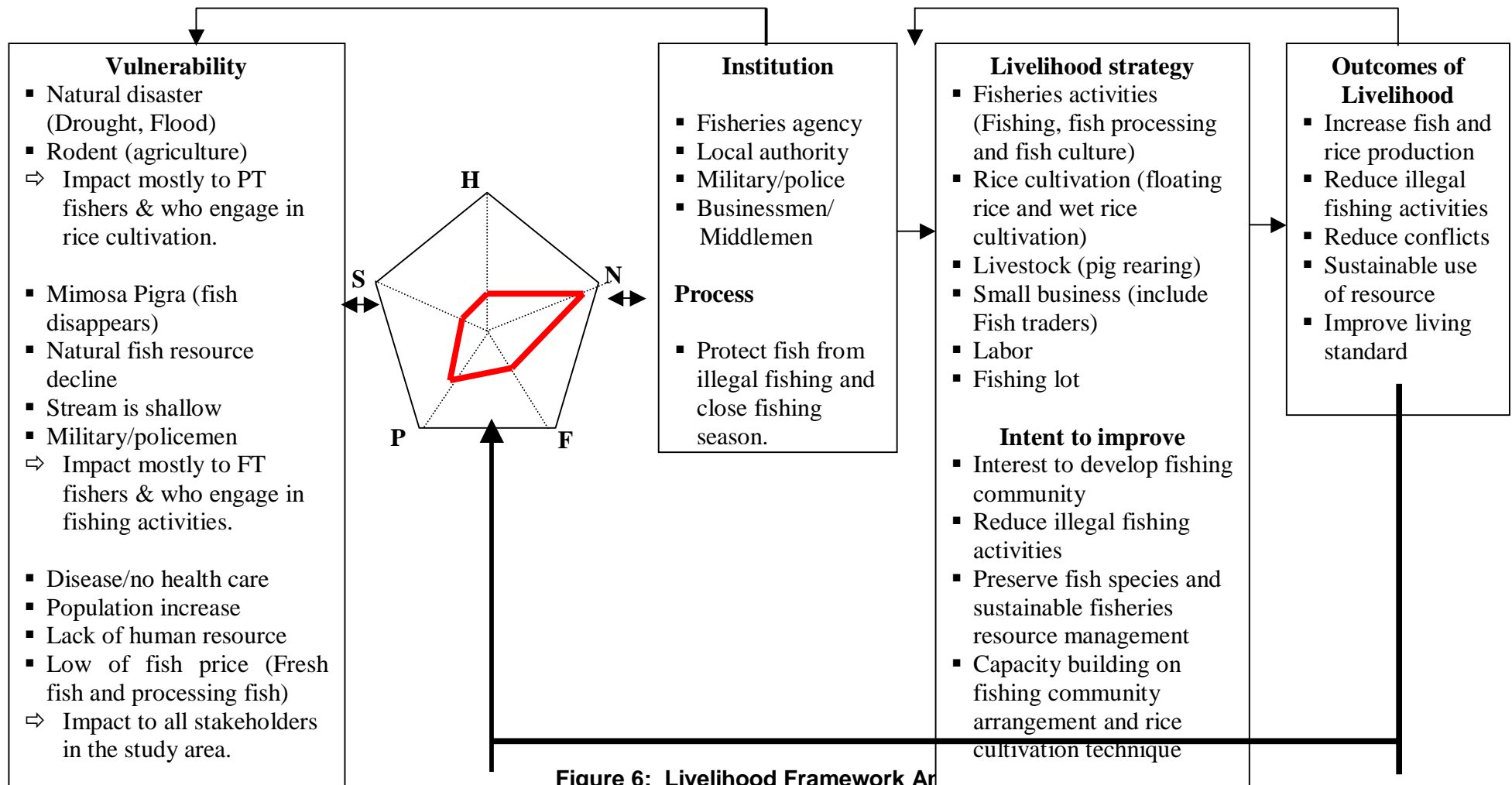


Figure 6: Livelihood Framework Ar

2.2.9. Conclusion and Recommendation

Conclusion

The Sreycheuk village is rich in natural resources, freshwater fish and water body such as stream, channel, lake, and wetland forests. However, fish catch has been declining from year to year. Therefore, the management of fisheries resources in this area should be adopted as soon as possible to protect and manage the sustainable use of resources in the future. Community based-fisheries management is an appropriate way to cope with this issue, in particular involving the local community to participate in managing their resources. Due to the flood prone area, villagers travel by boat and engine boat. Since the area has no school and the head of households are not be able to enroll their children at schools situated outside the village, the children of Sreycheuk village do not receive formal education. . Most of the human resource in the area is generally illiterate. Thus they are vulnerable. In additional, the social and financial asset of the village is low. This points to the need for development programs in the area.

Recommendations

All of the stakeholders have made the following recommendations:

- National and international NGOs, and concerned institutions must provide fishing equipments to villagers through appropriate means such credit with low interest and development projects or program.
- National and international NGOs, and concerned institutions must provide school and health care service to local people
- Concerned institutions must organize fishing community in order to conserve and develop fisheries resource.
- Concerned organizations and institutions must assist to rehabilitate the mouth of the streams that are increasingly becoming shallow.

2.3 Environment 3: Prey Veng Province (Down Stream)

2.3.1 Background

Prey Veng province is located in the southwestern of the country. The province is, in Cambodia, considered as downstream area and as an under-developed province. Its borders Viet Nam to the East, Kandal province to the West, Kampong Cham province to the North, and to the South and closes to Svay Rieng Province. The province area covers 4,883 km² consisting of 12 districts, 116 communes with 1,138 villages and over one million people (Census 2001). The province is however considered as the richest zone in terms of natural resources, water and fertile land resources. In terms of water resources, the province contains a huge river, which is lower Mekong River/down stream and many of its tributary rivers. It provides a lot of functions and opportunities to the livelihoods of local people such as means of transportation, sources of water for agricultural development and fish for food. Fish also acts as a source of livelihood to the locals. Fish extraction plays a more important role than aquaculture production in terms of food provision. For example, throughout the province, there are 19 fishing concessions including five released to be a common fishing ground for local people; 13 dai fisheries for *shrimp* harvest; and 7 dai fisheries for *Trey Lenh* harvest (DoF Statistic 2000).

Doung Village is among one of the villages in Prey Veng province. The village is along national road No. 1, approximately 17 km to the South of the provincial municipality. The area also connects to the capital city of Cambodia, Phnom Penh, by national road No. 1, approximately 110 km away. This village is closed to Baphnom District, Lvea Em district of Kandal province, Chhork Chhay and Ponlay village at its east, west, north and south sides respectively. The administrative area of the village covers 217 ha, with 205 ha of dry rice field and 12 ha of homeland. There are 172 households, with a population of 826, out of which more than half (430) are females. The village is located near a small river, known as Touch River, which provides fishing opportunities to dwellers around it as alternative livelihood strategy other than dry rice cultivation. Most of the local residents are engaged in rice cultivation and fishing activities. Besides the two main sources of income others are involved in livestock rearing such as cattle, poultry, and swine.

Although the catchment area is rich in fishery resources, which provide ample opportunities to local dwellers to improve their livelihoods, the area still lacks skilled workers to develop and manage their resources sustainably. As a consequence, fishery resources have degraded considerably. The main cause of fisheries degradation is over exploitation (illegal fishing operation and increasing number of fishers), and, lack of spawning and feeding ground which was treated by sedimentation from upstream and inundated forest clearance. The root causes of the problem include population growth, poverty, low agricultural production, lack of enforcement, lack of sustainable management, and lack of public participation in conservation.

Understanding fisheries ecology and social behaviour of this local community is the basic socio-economic knowledge relating the interaction between natural fisheries resources and resource users. Grass root level and government line agencies are considered to be important agents in strengthening fisheries management through community based fisheries management (CBFM) emphasizing on food security and livelihood of watershed dwellers.

2.3.2. Livelihood Background

Wealth/Poverty Criteria

Although communication means (such as waterway and national roads) are available between the village and municipal provinces, the social status of the area is still considered as low according to the PRA exercise with the villagers conducted in 2002. Based on the survey, villagers can be grouped under four categories, namely very poor, poor, average and rich. Only 1.7 percent were categorized as rich while the poor category accounted for 43 percent and 19.7 percent were classified as very poor category (Figure 7 and Table 1 in Annex 3). The indicators of those categorized people are illustrated in Table 2, Annex 3.

Households defined as very poor were those landless with no household assets. They are living under small leaf-wall cottage with torn leaf-roof. Their main source of income comes from manual work such as massage, cutting firewood, or other agricultural activities. Without any collaterals (such as agricultural land or cattle) they are unable to borrow from any credit agencies. Therefore they cannot afford to own fishing gear and boat for fishing.

The poor households were defined by those who have small houses with leaf/zinc-roof and leaf-wall. This group owns agricultural land between 0.5 and 1 ha, which is usually insufficient for rice cultivation. Although some of them have rented cultivated land from other villagers, their rice production is still marginal and insufficient for own consumption of the family for the year. They also fish although they do not have enough fishing mean. For example, they have only 50 m gillnet, long-line with 200 hooks, and small-palm tree boat. They purchased fishing gears with their own money and loan. As a consequence, some of them are in debt hence forcing them to sell their products to local merchant at low prices.

People in the average class were defined as those who have wooden/concrete house with tile/zinc roof. They are land owners of 1 to 2 ha with cattle for draft power and a water pumping machine. The land area is sufficient for rice cultivation and the rice production is insufficient. This group has access to moneylender/credit agencies for loan facilities. They own fishing equipment, such as gillnet with sizes between 150 m to 300 m, 3 to 4 Lops (bamboo horizontal cylinder trap), 3 to 5 long-lines with 600 to 1000 hooks, and palm tree boats. They also have household assets such as bike cycle, motorbike, radio, television, and private well.

Rich class refers to those who have a huge wooden/concrete house with tile roof and nice protecting house fence. They have 3 to 5 ha of agricultural land with many cattle, vehicle for carrying products, milling machine, and rice strain machine. They have agricultural tools for hire to other villagers, and also excess money for loans, which will be paid back with interest as cash or rice. Their household assets include motorbike, color television and electric generator.

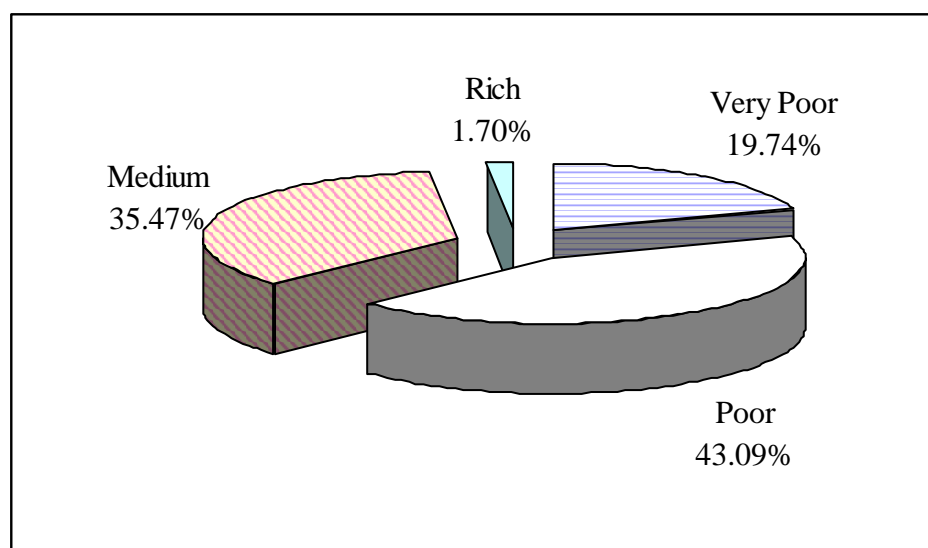


Figure 7: Wealth Ranking of Prey Veng Province

Livelihood Sources/Strategies

Most of the watershed dwellers in Doung village are involved in farming system and fisheries operation.

Farming activities is the primary occupation of local people which accounts of almost 80 percent of population occupied rice cultivation (Table 2, Annex 3). These villagers have cropping either on their own land or they have shared cropping in land for cultivation. Since the majority of area is a lowland area with poorly drained clay soils and floodwaters, therefore, two kinds of rice, i.e. dry and wet rice are cultivated in this area. However, vegetation farming is not undertaken by farmers in the area. Land preparation starts from mid-April through the end of August. The land is ploughed from mid of November through mid of March. Rice plantation starts from mid-November through mid-February. Both rice type cultivation starts at the same time but differ at the end of rice harvest i.e. the dry rice harvest time ends in April and wet rice harvest time ends in mid-March.

Fishing is a major occupation accounting for 75 percent of the population (Table 2, Annex 3). Fishing is the major source of income for most of fishing farmers and they undertake rice cultivation mainly for household consumption. Fishing activities start from the end of May through early of July. The fishing activities intensify from end of July through early of February. Fish extraction puts heavy pressure on open fishing season during moon period. The fishing gears used by local fishers are gillnet, long-line (for fish and shrimp harvest), bamboo horizontal cylinder trap, cast-net and plunge basket and so on.

The fishermen in the study area can be classified into two groups. First, the full time fishers, 5 percent (Table 1, Annex 3), who are professional fishermen with fishing as their main occupation throughout the year. Most of the professional fishermen have enough fishing equipment to cope with fishing activities throughout the year. A big part of their household income is generated from fisheries resource collection and most of them are very poor householders, because most of them have only one choice of livelihood source. Second, the part time fishers, 70 percent of total villagers (Table 1, Annex 3), who are subsistence fishermen, fish mainly for their own consumption and sometimes they sell their surplus. They use a simple gear and often it is the children or the elders who catch fish. And the occasional fishermen also are those who fish not often but according to the peak catch of the season are classified as part time fishers. A comparison between these two groups show

that there are not much differences in wealth because both groups of fishermen are in both poor and medium groups.

Fish processing (fermented fish) is carried out by the villagers besides fishing operation. 45.93 percent of total households (Table 2, Annex 3) receive supplement income from processing fish. This activity takes place during the mid of January through mid of February when the fish catch is abundant. Local people have fermented fish, which called as Prohok, Phor Ork and Mam in local name. They are conventionally processed for sale and home consumption.

Fish Culture: The water levels are prone to changes according to the wet and dry seasons. Hence the villagers of Doung are not interested in aquaculture. Though, only a small number of villagers are involved in aquaculture, some residents culture fish during the dry season. 18 percent of total stakeholders have been involving in fish culture (Table 2, Annex 3). The fish species cultured are mostly *pangisis sp and tilapia*. The purpose of fish culture is for food only and sold if there are any surplus.. The fish harvesting must be completed when the wet season approach as income generation from fish culture is only a marginal source.

In addition to income generation from farming and fisheries activities, some of the local farmers, who are non fishers, 25 percent (Table 2, annex 3) generate income from using their skill/knowledge such as mending boats, repairing machine of engine boats, doing small business, doing traditional nurse, conducting blacksmith. Only very poor group are largely depended upon wage laboring, while the poor group have enough labor to do agricultural production and sharecropping.

The seasonal activity calender is planned by the villagers (Table 4, Annex 3) together with all stakeholders. The involvement of villagers change based on the seasons. This means that local people conduct their activities depending on natural conditions because their living depends solely depend on extraction of natural resources such as land and water resource. To find out the seasonal activities calendar of the local villagers, the group discussion created a ranking mechanism. The group was asked to indicate what they do and when they undertake the activities. The group would decide to using mongbeans as an indicator to indicate their work load. For example 5 mongbean nuts indicate that very strong involvement, 4 nuts indicate strong involvement, 3 nuts is moderate, 2 nuts is less and 1 nut is very less. In this paper however the number of mongbean was replaced by color (Table 4, Annex 3).

2.3.3 Capital Assets

i) Human Capital

Health

Fishers and farmers have to work in water most of the time. The regular contacts with water of their feet and hands cause serious ulcers development on their feet and hands. This disease is often being diagnosed as inflammatory and suppurating lesion on the skin or an internal mucous resulting in necrosis of tissue. It causes loss of nails and sometime resulted in loss of working time and income generation, in addition to extra expenditure on medication or treatment.

The rich and average categories of stakeholders have sufficient food and health care service and they are not suffering from the problem of malnutrition. However, for the groups of very poor and poor people in the village, they faced with insufficient food supply and have little or no access to health services. As a consequence, these stakeholders suffered from malnutrition and are vulnerable to illness. Among the four groups of stakeholders, the very

poor and poor stakeholders are easily susceptible to diseases as compared to their average and rich counterparts.

Education/Training

In general, the population in this area has limited education due to the lack of access to schools. Only primary schools are available near the vicinity while secondary school is far away from the village. In the whole area there are only two teachers with 87 students, one private physician and one traditional nurse. There are 35 garment workers, who have been informally trained with tailoring skills, and five fishing community committees who are unofficially trained by line governmental department on fisheries awareness, such as fisheries domain development and conservation while the village headman and commune leader were informal trained on rural development, administration system, and environmental awareness by related government institutions.

Information Accessibility

Information is accessible through media in the village. Most villagers have radio, except for the very poor farmers who could not even afford it. For average and rich stakeholders, they have radio, cassette player and black/white and color television. Radio and television provide more channels of information to the locals as compared to other information sources such as newspapers since most of them could not read and had difficulty understanding the information. Watershed dwellers listen to radio when they are at work or otherwise. Information disseminated through the media are mostly on social security, and relatively less on agricultural or fisheries development and conservation.

ii) Financial Capital

Crop production is the major economic activities within the area, although rice production is more for home consumption. Apart from rice production, livestock and fishing are the other source of financial capitals found. Local residents also involved in other activities such as small trading and labor as source of income. Other activities that generated cash income and food for home consumption include rice farming, livestock husbandry, money lending, small trading, fishing and wage labor.

On average, the cash income generated from fisheries product sales amounted to 700 - 2000 Riels¹ a day. The income of the very poor and poor stakeholders are supplemented by income from selling livestock (pig, poultry) and wage earned from labor work estimated at 2,500 to 3,500 Riels a day. Other households have supplementary income from household's member working at garment factory in Phnom Penh amounted to 156,000 Riels a month.

¹ Exchange rate is approximately 3,900 Riels to a US dollar

iii) Physical Capital

Housing and Sanitation

More than one-third (35 percent) of the population is living under small palm leaf-wall cottages with torn palm leaf-roof while approximately a quarter (27 percent) of the population at the village lives under zinc-roof houses with palm leaf-wall. There are more than 35 percent of the population owned houses made from wood or concrete with tile/zinc roof while less than 2 percent have houses made from wood or concrete with tile roof with fencing. Only a few households afford to have single room for all family members while most households have members sharing a room since they have only one room in the house.

On sanitation, only a few rural families have latrines while majority of the farmers have to rely on fields and forests. However, there are 29 tube wells and a public 5-room latrine in the village. Source of drinking and domestic water is a major problem for most villagers, especially during the dry season. Most villagers rely on shallow wells and water pond in the dry season. Approximately 65 percent of the households have no sanitary latrine. For the poor and very poor households they have lower sanitary standard comparing to the other two groups of villagers, rich and average class. Inadequate and malnutrition diet in addition to use of unhygienic drinking water leads to health issues such as physical weakness and fatigue, and intestinal troubles among the poor people.

Land

Agricultural land plays a significant role in the socioeconomic status of the rural people. Land-owners rent out their land to the other farmers or use it for crop cultivation themselves. Although the land area for cropping is reduced in wet season due to flooding, villagers use the land for cash crop cultivation after at dry season.

Some households owned as much as 5 ha of land while others have no land for cropping. Nearly 20 percent have encountered landless issue while up to 35.4 percent have 1 - 2 ha of arable land for rice cultivation. Only 1.7 percent of local residents owned 3 - 5 ha agricultural land while 43 percent of local residents owned 0.5 to 1 ha cultivated land.

Boats

Most fishers use small boat for fishing and transportation. Approximately 78.4 percent of local people has a palm tree boat for fisheries activities and only 1.7 percent has wooden engine boat use for transportation.

Fishing Gears

Virtually all rice farmers in the study harvest some form of aquatic life from rice paddies, rivers, and lakes including herbivorous and carnivorous fish species, paddy crabs, shrimps and frogs. Some farmers also have small trap pond in or at peripheral of their fields where fish are collected as water level recede.

Different kinds of fishing gears were used by full- and part-time fishermen within the fishing ground of the study area. But the common fishing gears used were gill net, hooks long-line and cast net. Table 6 illustrates the types of fishing gears commonly used by both full-and part-time fishers.

Table 6: Use of Different Type of Fishing Gears of Prey Veng Province

Fishing gears used		No of fishing gears	No of HH used
Local name	English name		
1. Mong (Mong Bandet and Mong kang)	▪ Gill net (Drift gill net & Stationary gill net)	110 units	39
2. Anlong	▪ Pond Trap	20 units	19
3. Lop	▪ Bamboo horizontal cylinder trap	173 units	9
4. Tom	▪ Vertical vase trap with funnel entrance	147 units	7
5. Samnanh	▪ Cast net	18 units	17
6. Kangva Trey chlonh	▪ Handle ell one hook	3 units	3
7. Santouch Ronong	▪ Hooks long-line	194 line	22
8. Santouch Bankai	▪ Set pole hook and Line	340	6
9. Leon Antong	▪ Bamboo tube eel trap	hooks	6
10. Angrot	▪ Plunge basket	185 units	7
		7 units	

Infrastructure and Services

All government ministries are represented at the provincial level and provide some form of services to the people. Government administration extended down to the commune and village level but with the exception of education and health, very few government services reached the village level. Within the area there are certain services provided by governmental institutions, local NGOs, and private sector. As for the service provision by private sector, there are 12 small trading stores and 2 blacksmith places, while the public sector provides the education service such as one primary school with six class rooms, and one pagoda. Besides, the Prasak program that has provided credit to grass root to develop agriculture production and the development project of Red Cross Program has provided sanitary project such as grand well and latrines to the villagers.

With regards to the networking between urban and rural areas, the national road Number 1 and water way have linked this area to municipal provincial town. Within the area there are seven rural roads, however, most of the major routes are in poor condition. Most of these roads are often impassable for short or occasionally extended periods in the wet season. Communication links to provincial centers are good. Agricultural inputs and products are transported by pony cart, motor trailer, pick-ups or large trucks depending on the location and condition of middlemen.

iv) Social capital

The population in the study area speaks Khmer language and most of them are Buddhist. There is a village headman responsible for implementation of public works, including agricultural production, extension services, health care and maintenance of road and irrigation schemes, and other similar services.. The primary objective of the village is to control access to village resources by regulating utilization based on private ownership principles, and to stop outsiders to cultivate new plots there. There are five fisheries community committees responsible for fisheries conservation. Local leaders also act as arbitrators when there are conflicts between households in the village and between nearby villagers, including fisheries resource conflicts. Conflicts are solved at the village level with the group of village/fisheries community committee if the magnitude of conflict is small. Three-person in village committees including the village leader have done arbitration in times of conflicts. For bigger conflicts, the village committee would file the case to the commune council.

Doung village has only 7 households in 1907 and it has increased to 16 households in 1937. The village population has gradually increased, from 50 households in 1957, to 172 households currently. The villagers have good relationship within the village and with neighboring villagers. The villagers are interested to work together for agricultural production or hiring labor from neighboring villages at a wage rate range from 2,500 to 3,500 riel a day according to the condition of work and time. About 1.1 percent of the households are government employees (primary school teacher) while about 20.4 percent worked at the garment factory at Phnom Penh.

2.3.4 Natural Capital

Out of the 217 ha land area in the village, 205 ha is used for rice cultivation by the locals. In addition, there are also 9 natural ponds, natural channel and one lake with size 8 ha. The water resources provide fish to local people. The water system benefits all watershed dwellers equally regardless of their financial background. Both rich and poor fish farmers are allowed to fish within the boundary of the village.

Fish consumption of households involved in fisheries collection depends on the amount of their fish catch a day. For example, during the peak fishing season, 15 October through 15 December, they eat consume more fish every day due to surplus in catch. Fish prices are cheaper and fresh fish is abundant during this period too, therefore, all stakeholders consume more fresh fish.

The villagers also expressed their views in the PRA exercise that natural fisheries resource has depleted and deteriorated considerably. They considered inundated forest land encroachment and over fishing as the main cause to the decline, , in addition to increasing fishers and illegal fishing using illegal fishing gears (such as electrocuting, strain by pumping, poison, mosquito net). Tana (2001) also reported that the decline of fish resources has been ongoing since early 20th century. The high population growth, inappropriate resource extraction practices, and incompatible legislation, which created social conflicts, have led to the decline of natural resource.

2.3.5 Trends in Natural Resources

Changes in the condition of natural resources could be caused by different sources of stress such as natural, users, or governance. Fisheries resources in Cambodia have been degrading for years due to high population growth, more complex fishery management methods (e.g. all institutions in management of fisheries sovereignty), and the natural causes such as prolonged drought season that reduce flood plain potential.

The population growth in Doung village in the past was caused by higher birth rate and emigration from outside. Figure 1 in Annex 3 shows the population trend of Doung Village. It also reflects the high population growth from 2001 to 2002 that is more than 12 households. The villagers argued that the high population growth was caused by the change in the government policy over fisheries management, which has converted fishing lots to common fishing ground in recent years to open the access of fishery resources to local community. This has resulted outsiders to emigrate into the village in order to have access to the fishery resources.

The population increase in Doung village has caused the natural resource become scarce, as a result from increased pressure on fisheries resource extraction for subsistence of dwellers and their livelihood. Not only over exploitation that caused the resource to decline but also the fish habitat destruction, due to the change of wetland potential (such as flooded forest land was encroached for agricultural land and sedimentation from upstream river).

This creates negative impact on the reproduction of fishery resources. The villagers revealed in the PRA exercise that the fishery resource had declined from 1979 through 2002. They reported that fish catch in 1985 had reduced to approximately 30% of that in 1979, which was 10 - 20 kg/day using gill net 50 m long. The participants in the PRA also mentioned that fish catch in the year 1995, 2000 and 2002 had gradually reduced by 50 %, 70% and 80 % respectively as compared to the catch in the year 1979. That is: they can catch only 2 - 4 kg/day currently with simple fishing gear as they did before. Local people considered illegal fishing activities (such as electrocuting, mosquito net, dai fingerling, poison, and pumping) that was practiced widely in the region have caused the fast decline of fishery resources. At the same time inundated forests were heavily encroached for arable land for other agricultural activities.

The price of fish is related to the catch such as fish species, size and abundance. The price of the fish is inversely proportional to its abundance. The highest price usually happens at the beginning of the catch after the closed season. In the closed season only family fishing gears allowed to be used, which resulted in limited stock available for sales at the market. The price of fish begins to drop at the end of October till January because fish supplies increased over this period. The catch is highest at this period of the year. The price of the fish increases gradually when the catch drops. However, the price of the fish stabilizes for many months in a year.

In addition, fish prices also differ for live or dead fish. In 1985, the price of small fish (white fish) ranged between 300 Riel and 500 Riel/kg, and for snakehead, the price ranged between 1,000 Riel to 1,800 Riel/kg. In 1990 these prices has increased three folds and in 2002 the prices were more than five times of that in 1985 (PRA- 2002).

2.3.6 Constraints and Opportunities

Although there are constraints encountered by the villagers of Doung village, there are also opportunities for them to improve their livelihoods Table 7.

Table 7: Constraints and Opportunities

Constraints	Opportunities
<ul style="list-style-type: none"> ▪ Most of local people are illiterate ▪ High fee for health treatment because no health center is available in the village ▪ Women are household heads because they are widows ▪ Corruption in job opportunities outside the village (e.g. to be garment factory worker must bribe 50 to 150 dollars) ▪ Lack of fishing gear ▪ Rice is cheap during harvesting period, at 210-230 riel per kg ▪ Money lender provides high-interest loan, 20 percent as compared to loans at 4 percent interest provided by PRASAK ▪ Loans from credit agencies (supported by NGOs) require guarantee/collateral. 	<ul style="list-style-type: none"> ▪ Have fishing community ▪ Credit available for local people ▪ Increasing job opportunities for resource poor farmers from garment industry ▪ Labor sharing in agricultural production ▪ Loans can be redeemed with labor (loan of 10,000 riel can be redeemed with 5 days labor) ▪ Government provides rice seedlings ▪ Open access to fishing lots released as common fishing grounds ▪ Loan facilities from fish traders who trade with fish farmers occasionally. But fish farmers have to sell fish to them in lower price.

2.3.7 Problems Analysis

The problem analysis aims to find out the root causes of the problem to stakeholders in the study area. The cause and effect of the problem would surface through the problem analysis within the group discussion of PRA exercise. Based on the group discussion with 52 participants, including 31 females, many problems were mentioned, such as lack of rice seedlings, insect and pest attacks on agricultural products, lack of irrigation system, natural calamity, low rice pricing, lack of fertilizer, lack of health center, and migration of fish to lower fishing sphere outside the village. In this exercise, only two major problems were looked into, these include: low agricultural production and fish migration.

Problem on Agricultural Production

As most local people involved in agricultural production, the agricultural production problem is a hot issue and agricultural development has been raised as the core problem faced by the villagers. Shortages in water supply and rice seeds were considered as the main constraint for agricultural production by the villagers. For example, water shortages have resulted in lack of suitable rice seeds for agricultural production in the environment; or the insufficient rice seeds were produced for use in following years. Reduced profit margin due to low selling price of rice also resulted in reduced or no benefits for the crop cultivation. Expenditure on chemical fertilizer, insecticide, gasoline for irrigation and/or rice seeds sometimes could not be compensated. There is a high need for agricultural production in the village. Resource poor farmers have to take loans from moneylender at 20% interest rate (with no difficulty) or from credit agencies (NGOs) at 4% interest rate (difficult to get a loan, need collateral as guarantee). As a consequence, they must sell their land/products at a low price to middlemen in order to pay back the principal and interest of the loan. This leads them to be poorer. The causal relationship of agriculture production problem is illustrated in Figure 2, Annex 3.

Fish Migration to Lower Channels

Fish is a mobile resource that moves from one habitat to another according to its biology. However, local fishermen believe and have mentioned that fish migration downstream is the

one of the major problems because this reduce the fish catch. This leads to reduce in income from fishing activities and household consumption for the villagers. Therefore, the villagers suggested that the fencing should be barraged within the village boundaries in order to block the fish waterway and reserve water for dry rice field. However, this suggestion does not agree with the fish biology requirements and the community based fisheries management principles being promoted in Cambodia. This suggestion also reflects the limited awareness of local people on fisheries management laws, conservation, and fisheries environment. The illustration of this problem is presented in Figure 3, Annex3.

2.3.8 Vulnerability

In 1995, the Doung villagers have faced the rodent problem. Almost all rice products were damaged then. Three-quarters of the agriculture production Farmers only harvested 25% of the rice production. The villagers believed that the rodent problem was caused by forest clearing for agricultural activities. These land clearing activities have resulted in loss of shelter to other animals such as snake, polecat and other mammals. This increased the rodent or insects that damaged the agricultural products.

Natural calamity: Doung villagers did not encounter serious prolonged drought problem. However, the villagers experienced short drought period in 1998 that had caused damage to rice production due to water shortages. The village also suffered from flood from Mekong River frequently. Although the flood has created an opportunity, (what is the opportunity?) it also caused serious destructions such as damaging rice production, causing homeless and food shortages, and outbreak of diseases. Doung villagers have experienced several serious floods in the past that also worsened the conditions of their livelihoods.

2.3.9 Conclusion and Recommendation

It is found that although the community fisheries (CF) have been established in this study area, it needs further development. The discussion also showed that local fishers do not understand the concept of community based fisheries management. There is a potential of fisheries resources in this area, the authority needs to strengthen the management through fisheries community committees and members, so that the importance of managing and protecting the resources for sustainable use is promoted. Fisheries can also contribute to poverty alleviation in this village for next generation.