

A Publication of the Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme

Participatory Poverty Assessment (PPA)

Stung Treng Province, Cambodia



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CHAPTER 1: INTRODUCTION

1.1 General Situation in Stung Treng Province

Cambodia is a developing country of 181 035 square kilometres and a population of 13 099 472¹. The average growth rate at the time of the study was 2.4 percent with a population density 72 persons/km². Wetlands cover more than 30 percent of the country, providing more than 95 percent of the population with food and other natural resources. In a country where 85 percent of the population is dependent on agriculture, wetlands form an important part of rural livelihoods.

Stung Treng is located 481 km from Phnom Penh in Cambodia's northeast. Its 12 016 sq. km is divided into five districts, 34 communes and 128 villages (Provincial Department of Land Management, Urbanisation, Construction and Land Title of Stung Treng, 2002). The population of Stung Treng is 89 264 with 17 008 families (Provincial Department of Planning of Stung Treng, 2002). The population in the province includes Khmer, Lao, Chinese, Vietnamese, Kuoy, Khek, Kavet, Phnong, Tumpuon, Lun, Stieng and Prov with Khmer forming the majority. Population density in the province is 13 persons/km².

The majority practice swidden agriculture (slash and burn), fishing, animal raising, hunting and NTFP collection. A few are employed as civil servants, in the armed forces, as traders, businesspersons, porters and labourers. About 48 percent of the province's population is in the labour force including 20 155 women (49.9 percent). Well over of two-thirds of provincial land and forest is under concession, effectively inaccessible to individuals.

National Vireak Chey Park	99 791 ha
King Wood Forest Concession Company	130 976 ha
Pheapimex Forest Concession Company in Thalaborivat District	217 766 ha
Pheapimex Forest Concession Company in Sesan District	265 636 ha
Everbright Forest Concession Company*	87 528 ha
Forest lands not under concession	126 303 ha
Total	928 000 ha

Table 1: Forestland Concessions

*The total Everbright forest concession is 136 376 ha with 35 percent in Sambo District of Kratie Province and 65 percent Siembok District of Stung Treng.(Source: Everbright Forest Concession Management Plan 2002)

Rice fields	19 000 ha
Fruit tree farm lands	2 193 ha
Town and residential lands	5 265 ha
Green Sea Industry Land Concession Company	100 852 ha
Flour Land Concession Company	7 400 ha
Roads	2 496 ha
Rivers, streams	30 794 ha
Fallow lands	13 200 ha
Total	162 200 ha

Table 2: Other Lands (Source: PDAFF 28 December 2001, this figure not include Ramsar site 14 600 hectares)

Fishery resources in Stung Treng Province

Stung Treng is rich in natural resources. The Mekong and Sekong Rivers meet in Stung Treng. The Mekong River flows through Stung Treng Province from north to south.

¹ Source: Cambodia Diary 2003-2004

Differing from other provinces in the south, the rivers in Stung Treng are upland rivers characterised by rocky beds and sandy islands. There are many large fish spawning grounds and many species. There is a unique type of open forest growing on the sandy and rocky islands within the channels of the Mekong. These flooded open forests are a very rare habitat, occurring in very few places in Asia.

The flooded forests, although open, provide a very structured environment and are important refuge areas at times of high water for young fishes. The area is a rich source of food for fish moving into the area to feed on fruits, leaves and detritus as well as for fish fed by the export of detritus downstream.

As a diversified ecosystem, Stung Treng is believed to be a habitat for many fish species. It is a breeding ground and important habitat for a local fish species known as *Pa Se Y*, which is an endangered species not found in other provinces. Recently, a new species of giant gourami has been found in the area and it is probable that many other species occurring here have yet to be described. Approximately 100 species of fish are found in the area, at least 50 of which are of important to the fishing industry.

About 90 percent of the population live along the rivers and streams and rely on fish for food security and livelihoods. Fish is the major source of protein and food security for people in Stung Treng. Some fish species spawn in Stung Treng and then migrate to the Great Lake before returning to spawn. Reducing the fish stock in Stung Treng also affects the stock in the Great Lake. Fresh fish production in Stung Treng accounts for about 0.2 percent of the national fresh water fish production.

Wetlands in Stung Treng Province

Stung Treng is rich in seasonal wetlands. Some locations are flooded in the wet season along the Mekong, Sesan, Srepok and Sekong Rivers (Wetlands Inventory 1999). The wetlands extend into five districts of Stung Treng Province: Stung Treng and Sesan Districts, about 35 km from Ratanakiri, southwest of Vireak Chey National Park; Thalaborivath and Siembouk Districts, along the Mekong River to the north and south of Stung Treng and Siem Pang District, about 10 km northeast of Stung Treng.

The 37-kilometer stretch of the Mekong River from the north of Stung Treng to the Laos border is one of three government designated Ramsar sites. It is located in two districts, Talaboriwat and Stung Treng, extending 500 meters along both sides of the Mekong River to the Cambodian-Laos border. It is characterised by strong flow with numerous channels between rocky and sandy islands that are completely inundated during high water, and higher islands that are not. This area has an abundance of flooded forests with large and medium size trees standing in the middle of the Mekong River, extending from the north of Talaboriwat District to the Cambodian-Laos border.

1.2 Social, Economic And Physical Conditions

Living conditions

Cambodia is an agrarian country with 85 percent of people living in rural areas. The number living below the poverty level in rural areas is 43 percent, higher than the national level of 38 percent. Agriculture provides more than 40 percent of the GDP. About 86 percent of the country lies within the catchment area of the Mekong and 90 percent of the population lives in the Mekong Basin.

Water sources, dams and water resource schemes

Since the 1950s, nearly 6 000 large and small dams have been built in the Lower Mekong Basin.

Lao PDR plans to build 23 dams by 2010 and China reportedly has plans to build 12 more power projects on the Mekong main stream, including two large reservoir projects that will have significant impacts on downstream flow.

Vietnam completed the Yali Dam on the Se San and is constructing Se San 3. These dams have negative impacts on the downstream communities, including the Tonle Sap water flow as well as the Mekong Delta. The Chinese dams, when completed, will further intensify the impacts on the Tonle Sap. The blasting of the rapids in the upstream Mekong to deepen the river for navigation will also have downstream impacts. So far, only Yali Dam has created clear impacts on the downstream. The other projects have not been assessed for their degree of impact.

Agricultural concessions

Nearly 70 percent of Cambodia's land is under concession including timber concessions of 39 percent (7 million ha), protected areas 18.8 percent (3.3 million ha), agriculture, military and fishing concessions 12 percent (0.7-0.8 million ha) and approximately 0.8 million ha of agricultural concessions.

Forestry and fishing concessions

From 1994 to 1997, 6.5 million ha were awarded to more than 30 forest concessions. In 1999, about 2 million ha of forest concession were cancelled. In 2002, 19 concessions covering about 4.2 million ha remained valid. From 1980 to 1988, there were 307 fishing lots, dropping to 279 in 1998-99 covering 852 to 922 ha. By 1991, only 362 000 ha of flooded forest remained around the Tonle Sap. Forest and fishing concessions contributed to environmental degradation.

Deforestation

Forest cover declined from 73 percent in 1969 to 58 percent in 1997. Some observers put the forest cover as low as 30-35 percent. From 1973 to 1993, the average deforestation rate was 70 000 to 90 000 ha per year. From 1993 to 1997, data indicates an average level of deforestation ranging from 55 000 to 190 000 ha per year. At the national level, it is estimated that rural communities use 5 million tons of wood and 8 000 tons of charcoal every year (ADB 2000). Loss of forest cover increases erosion and impacts the wetlands ecosystem.

Over fishing

The illegal collection of fingerlings for aquaculture and pumping disrupts the ecological balance by removing virtually all aquatic life from ponds. It also caused problems for communities who lost their water access which was essential for crop irrigation. Electroshock fishing is now common and remains a destructive practice throughout the country resulting in a loss of species. Enforcement of fishing regulations has been hampered by a lack of resources and training. Conflicts between small fishers and commercial fishers are increasing.

Water pollution

There has been an increase in domestic waste, untreated industrial effluent, agrochemicals and discharges of oil and fuel. In 2000, 1.3 million liters of pesticide were used in the catchment areas of the Great Lake, including highly hazardous chemicals such as DDT, methyl parathion and monocrotophos. It was recently reported that 10 tons of DDT and Folidol (Methyl Parathion) had run off 2 000 ha of mangle bean crops into the Tonle Sap. The widespread uses of fertilizers in the dry season could also affect the ecology of the Lake, causing localised temporary eutrophication and even kill fish. In early 2002, many fish died in the Lake and some experts linked the death to eutrophication and the low water level.

Threats to the wetland ecosystem in the Great Lake

Csavas (1990) suggested that the rate of sedimentation in the Great Lake was as high as 4 cm/year. The Carbonnel/Guiscafre study suggested that the rate of the sedimentation was less than 0.3 mm/year. French geographers estimated in 1923 that the Tonle Sap Lake would exist for another two years, after which the Lake would only exist during the rainy season. Other researchers have suggested that in tropical climates new vegetation established quickly in deforested areas, reducing erosion. Others suggest that a large proportion of sediments settle close to exposed areas rather than flow into the Lake and National Road 5 and 6 surrounding the Lake intercept a large amount of the sediment. Currently, some believe that new development projects and deforestation in the Mekong Region have increased erosion. One researcher suggested that the Lake would be full of silt by 2023. The Tonle Sap is rich in oil and gas and this may result in future exploration.

1.3 Poverty

Poverty in the fisheries and forestry resource rich areas

With an annual catch of 200 000 to 430 000 tons (estimated value US\$500 million), local communities are living in poverty. About 36 percent of Cambodia's 11.4 million people live below the poverty line and in Tonle Sap it is about 38 percent.

The decline in forest resources has put pressure on local communities forcing the villagers to travel long distances to collect non-timber forest products. Limited access to forest resources results in increased poverty. Twenty-two percent of the people living in mountainous areas where there is good forest cover live below the poverty line. Conflicts commonly occur.

1.4 Food Insecurity And Migration

Food insecurity

Rice provides 75 percent of people's calorie requirements. About 70 percent of households produce less than 50 percent of their rice requirement. People eat 67 kg of rice per person per year in fishing communities compared to a national average of 151 kg. Poor households face a food shortage for about 3 to 6 months of the year. Middle-income households generally face food shortage from 1 to 3 months.

Migration

The majority of the poor depend on agriculture and poverty remains higher than other occupational groups. Eighty-four percent of Cambodia's population and 90 percent of the poor are living in rural areas. Protection of wetlands and forest resources are important to ensure livelihoods. Increasingly, the poor having limited access to resources and land are forced to move to urban areas in search of paid employment. Unfortunately, most are farmers with few skills suited to the urban environment. Among those who migrate, only a few are absorbed into the service industry sector with many joining informal sectors with the result they have little job security and low pay.

CHAPTER 2: VILLAGE SELECTION

2.1 ICLARM's Selection Criteria

The criteria developed by ICLARM were used to select districts, communes and villages. They included multiple use of wetlands and direct use by villagers and outsiders (often by ethnic groups with differing socioeconomic status), resource conflicts and resource management responsibility vested with various organisations at different administrative levels, available baseline data for the first assessment and available information about the interaction and mechanisms that form the legal frameworks and institutions in defining the wetland resources and environment and targets to be selected could represent all wetlands

management issues within the country to compare the economic value and options for development.

Three districts with large wetlands were selected, then a commune from each district: Preah Romkel Commune in Thalaborivath District, O'Mareah Commune in Siem Bouk District and Sekong Commune in Siem Pang District.

2.2 Village Selection

The ICLARM project was implemented by a coalition of provincial government departments. A national workshop was held from 11 to 13 November 2002 to review findings of the ICLARM study that investigated wetland management activities in Cambodia. The PPA study benefited from the national workshop as wetland issues including legal and institutional mechanisms that regulate wetlands use were discussed. The PPA team met with the ICLARM working group to discuss village selection criteria. A few additional villages were selected to facilitate replacement if any village was found inappropriate. The final selection included: Krala Peas Village in Romkel Commune, Thalaborivath District; Koh Chrim Village in O'Mareah Commune, Siem Bouk District; and Ban Huoy Village in Sekong Commune, Siem Pang District

In addition to the criteria identified by the ICLARM study, the final selection of the study villages was facilitated by including villages with different ethnic groups, poverty levels, size and accessibility. The three selected villages represent all the wetlands in Stung Treng Province.

2.3 Koh Chrim Village

Koh Chrim Village is situated along the Mekong River about 35 km from the provincial town of Stung Treng. With a population of 567 (297 females) there are 120 families (all Khmer). Koh Chrim has 55 ha of paddy land, 25 ha of farmland, 24 buffalo and 39 cows and oxen.

There are 86 houses, one school with two classrooms, one rice storehouse, four rice mills, two traveler houses and 39 latrines (20 supported by CAA and 19 by CRC), 86 hygiene water jars, five video sets, five bridges (only one in good condition), 79 boats (41 motorised, from 3.5 cc to 13 cc). A small number of villagers farm lands on the surrounding islands. The main livelihoods are paddy cultivation and fishing.

Village Structure

Inner circles are organisational structures that were established at the village level to maintain administrative, socioeconomic development and other sectors (Figure 1). NGOs and government projects have supported these groups through training and capacity building. Outer circles are donor agencies, NGOs and government agencies that have supported village projects. Closer distance shows regular visits and involvement by the NGOs and GOs with the village.

CAA has supported communities on fishery conservation, health, hygiene and sanitation including latrines, water filtration and an Integrated Pest Management Farmer Field School on rice crops. PASEC has supported communities on education sector and CRC on disaster relief, health sector and latrine construction.

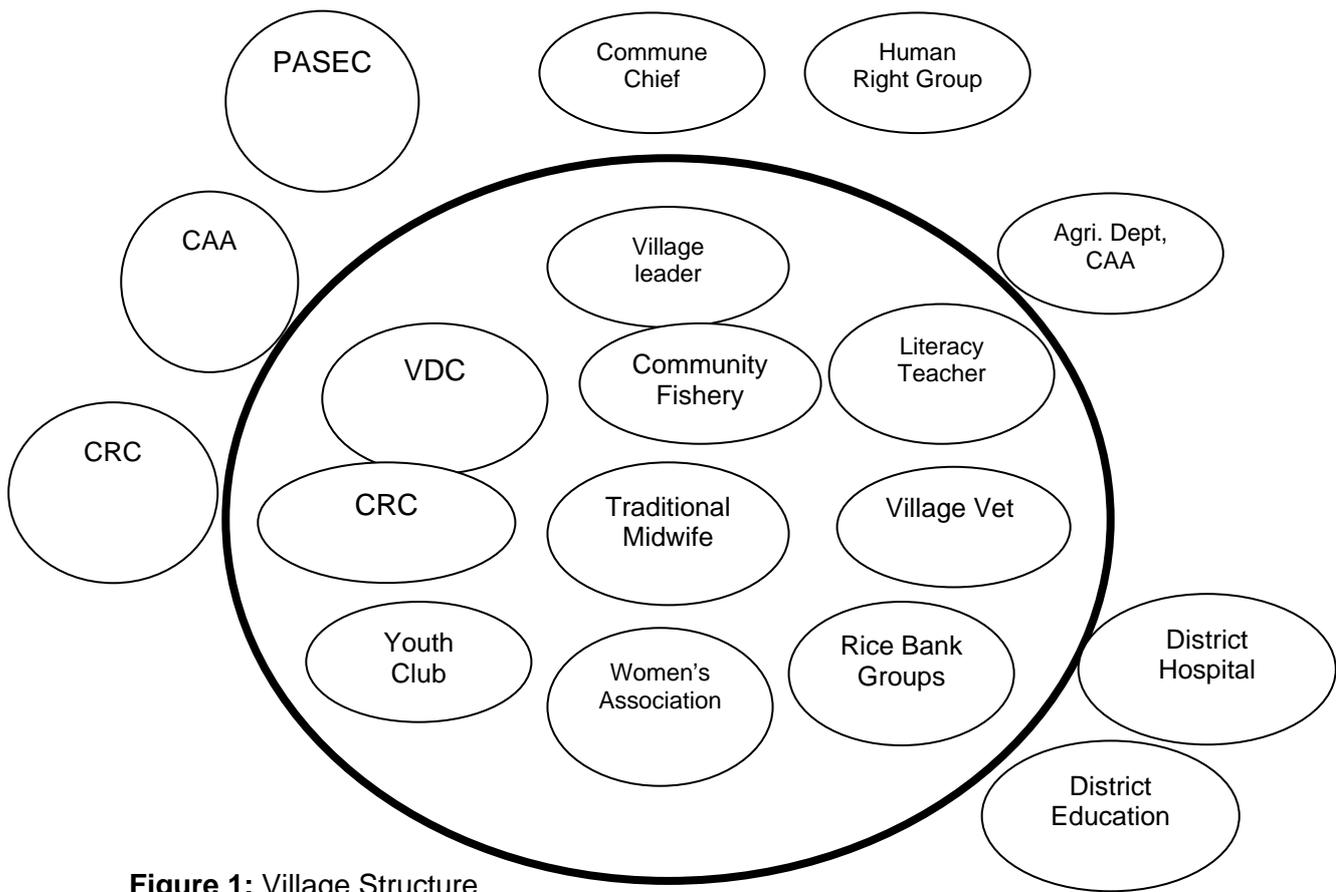
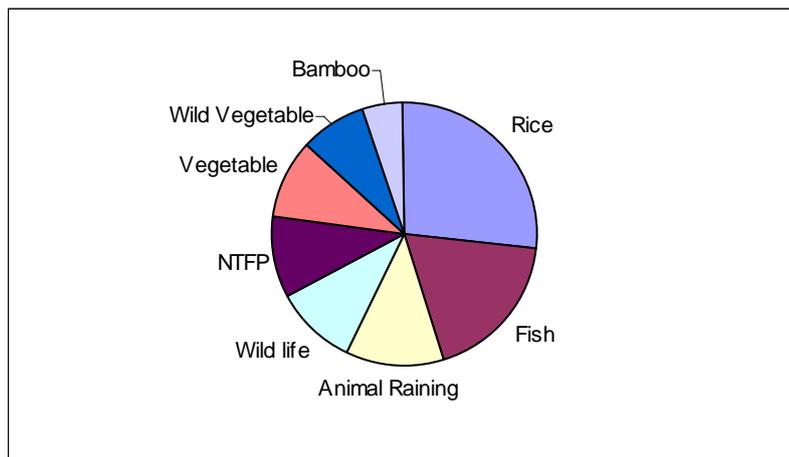


Figure 1: Village Structure

Village Occupations



Rice farming is a long-standing occupation while fishing is family scale for both consumption and sale in markets. Animal raising is a supplemental occupation for consumption, sale and as drought animals.

All families raised chicken, often sold in the market when the family needed cash to buy essentials or to pay for medical care or school fees. NTFP collection and hunting are other supplemental occupations for selling and household consumption.

Villagers usually collected wild vegetables from the forest during rainy season for daily food and sale. Bamboo is used as construction material for houses and to sell to other villagers.

Major village problems

People identified and ranked problems occurring in the village during group discussion at PPA exercises. Below is a prioritised problem tabulation.

Problems	Score	Ranking
Rice yield decrease	20	1
Forests decline	18	2
Fish decline	17	3
Wildlife decline	8	4
NTFPs decline	6	5
Bamboo decline	4	6
Riverbank erosion	3	7
Bird decline	2	8

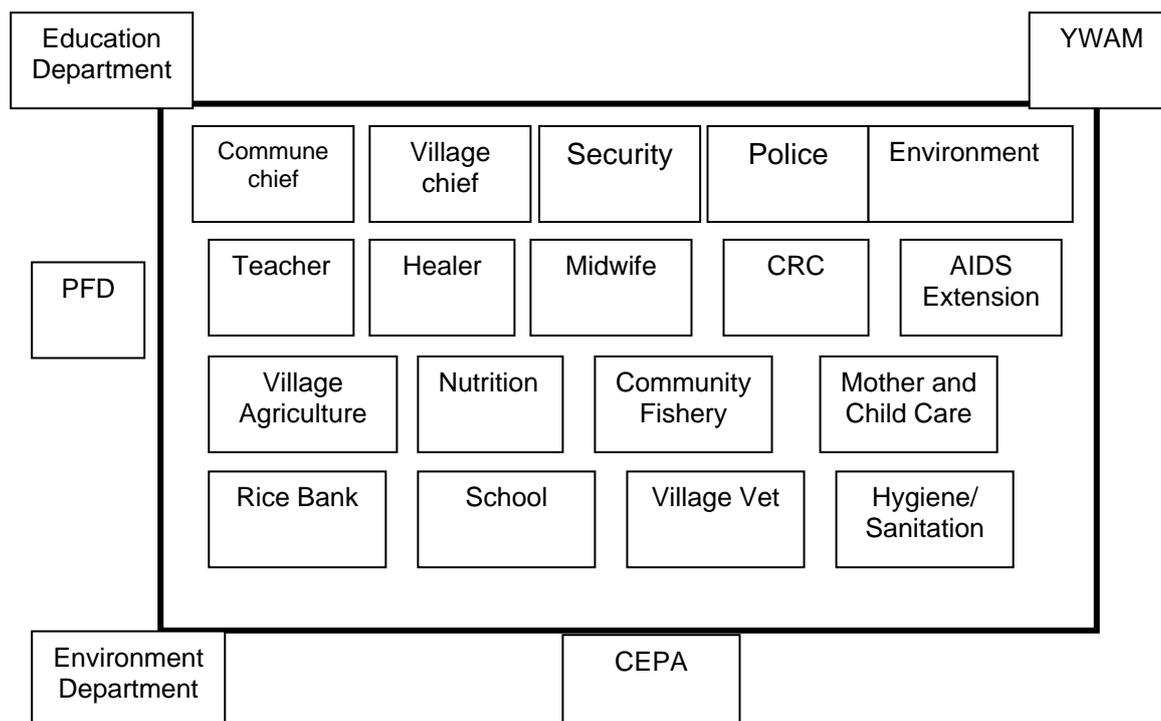
Table 3: Major Village Problems In Koh Chrim

2.4 Krala Peas Village

Krala Peas is one of the eight villages in Preah Romkel Commune, Thalaborivath District, located 48 km north of Stung Treng. The population is 574 with 307 females (24 widows) and 112 families in 104 houses. The language is 100 percent Khmer.

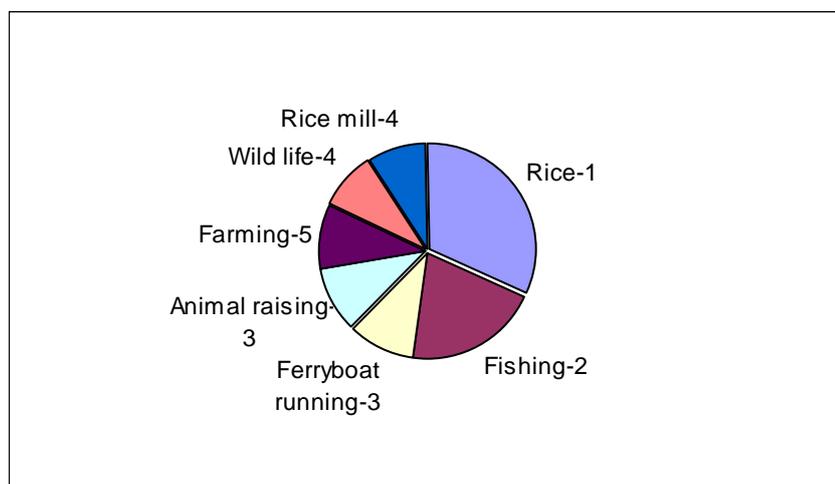
Village Structure

PFD supported the communities on water sanitation, well drilling, backyard gardening and primary school construction, completing their projects at the end of 2002. YWAM has supported the communities on, latrine construction, hygiene, sanitation, birth spacing, and child and mother health. CEPA has supported the communities on establishment and training of community fishery and forestry and facilitating villagers to deal with several conflict issues related environment and traditional culture with local authorities and relevant agencies. The Cambodian Red Cross is an integral part of peoples' lives as this agency provides relief during the annual flood.



Economic activities

Market places for exchanging products include Stung Treng, Voen Kham and border areas of Laos. The following is a chart of livelihoods in the village. (Number 1 - most important occupation and 5 – less important).



Rice farming is a long-standing occupation. Fishing is family-scale for both consumption and sale in markets. Animal raising is a supplemental occupation for consumption, sale and as drought animals. Ferryboat running is another income source by picking up villagers and goods within the village/commune or Voeun Kham Village (Laos border) to Stung Treng Town. Hunting is another supplementary occupation. This is done during free time for household consumption, selling in the village and to Laos. A rice-milling machine in the village is as occupation for a small group of villagers. Multi crop farming are supplementary occupations (e.g. banana, beans and corn)

Material Resources	Number	Natural Resources	Size	Human Resources
Motorboats	23	Paddy land	170 ha	Health workers
Row boats	48	Farm land	22 ha	Teachers
Rice mills	4	Swamp	425 ha	Ramsar Rangers
Water pumps	2	Rivers, lakes, ponds, streams and forest		
Bicycles	15	Birds, fish and other wildlife		
Cow and ox	111			
Buffalo	232			
Pigs	156			

Table 4: Material, Natural And Human Resources In Krala Peas

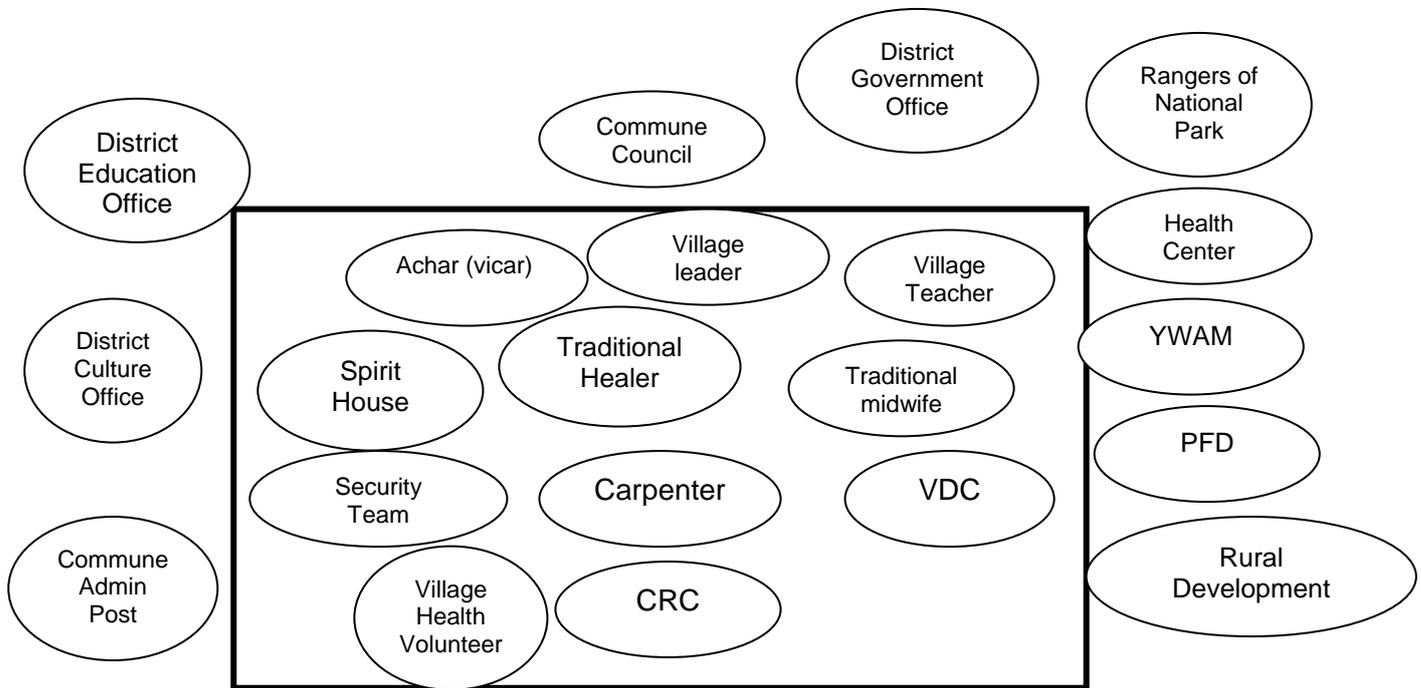
2.5 Ban Huoy Village

Ban Huoy Village (name changed from Meat Ou in 2000) is one of seven villages in Sekong Commune, Siem Pang District. It is located 84 km from the provincial town of Stung Treng on the east side of the Sekong River. It lies north of Donlong Village and borders on the south with the forest linking Nheoun, east with the Pheapimex concession and on the west with the Sekong River.

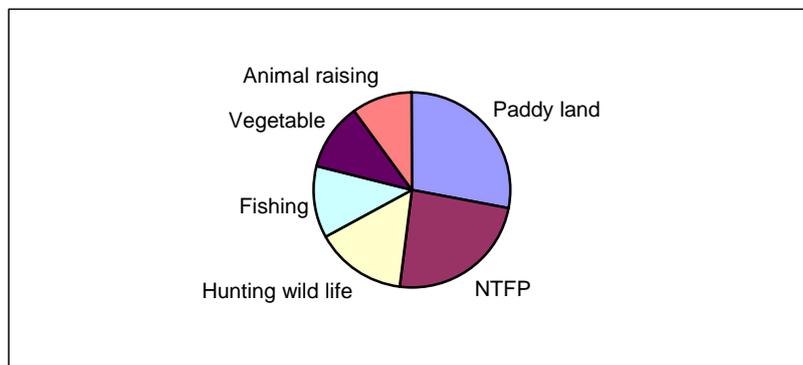
All the villagers are farmers and their primary occupations are rice cultivation, vegetable growing, animal raising, fishing, hunting and NTFP collection. The population includes a small number of Khmer (many came as businesspersons and married), a large number of Lao and a very small number of Lun. Ban Huoy has a population

of 269 (125 females, 144 males) with 55 families living in 54 houses. One hundred and sixty-one are under 14 years of age, thirty-one 15 to 25 and eighty-seven 25 to 80.

Institutions important to people of Ban Huoy Village



Village Occupations



The larger spaces in the chart represent the more important occupations

Material Resources	Number	Natural Resources		Human Resources	Number
Motorboats (5 to 8 cc)	11	Paddy land	60 ha	Teachers	1
Bicycles	13	Forest		Village leaders (male/female)	2
Chainsaws	1	Streams, ponds		VDC members	7
Ox carts	1			Village health volunteers	2
Cassette players	1			Security team members	5
Thatched single room school	1				
Zinc roofed traveller house	1				
Rural road					
Motor way (far from village)					

Table 5: Material Resources Available In The Village

CHAPTER 3: WETLAND RESOURCES

3.1 Wetland Resources In The Villages

Koh Chrim	Dolphin, sand, stone, river, island, stream, pond, forest, wildlife, farmland, animal raising, fish, rattan, crab, frog, water, shell
Krala Peas	Island, paddy land, fish, wildlife, wild fruits, vegetables, swam forest, stream, river, ponds, canal and mountains
Ban Huoy	River, stream, pond, paddy land, forest, wildlife, malva nuts, resin, animal raising, fish, riverbanks, swam forest, stones, sand, water and islands

Table 6: Village Wetland Resources

3.2 Changes To Wetland Resources And Their Causes

Table 7 suggests that wetland resources declined from 1985 to 2002 while dolphins, paddy land, farmland and resin increased since 1980. The reasons that led to the decline of wetland resources include over exploitation of the forest, over exploitation of the fishery and over exploitation of the wildlife.

A combination of factors is putting pressure on wetlands in Stung Treng Province. Forest, land and water concessions reduced the resources available and access. Concessions meant out-migration from those areas to areas where resources were still accessible. According to the 1998 census, 19.4 percent of the province's population migrated, of which males accounted for 55 percent. The most commonly stated reason for in-migration was livelihoods. Since 1980, a natural population increase created further demands for additional paddy lands. A combination of factors also reduced availability of fish for local people: too many people fishing in a reduced area and those with resources are employing modern techniques to maximise fish catch. Local people suffer due to their inability to compete with outsiders.

3.3 Benefits of the Wetland Resources

The extracted wetland resources are used for food (e.g. crab, snail, shell, frog, wild vegetables), for use (e.g. firewood, charcoal, traditional medicine, resin and rattan) and for sale (e.g. fish, wood, wildlife, resin, traditional medicine and wild vegetables and fruits).

Forest	Fish	Dolphin	Wildlife	Paddy land	NTPF	River
Causes 1980						
10	10	5	10	2	10	
Forest was thick and accessible No merchants profiting from forest Fewer people	Used traditional fishing equipment No merchants Fewer people No markets No fishing with electroshock or poisoning	No merchants No hunters	No buyers Not many hunters No markets Plenty of forest	Land was sufficient for newly settled Fewer people Lack of draught animals	Fewer people No merchants Far from markets People seldom went into forest Afraid of Khmer Rouge	Riverbanks were not broken Infrequent flooding Minimal deforestation along riverbanks

Causes 1990						
5	8	8	7	6	6	
Logging concessions and timber trucks Use of chainsaws Wood cut and left in the forest Swidden cultivation by indigenous farmers and expansion of paddy land	Use of grenades Markets available Merchants want to buy Blocking of streams Use of long fishing net	Number of dolphins increased between 1980 and 1990 as there was no market and no merchants No hunters	Increase in number of hunters More merchants Loss of sanctuary Increased population	Increased population due to natural increase and in-migration and thus pressure on land and the need for new paddy lands Availability of draft animal	Merchants Increased population Clearing for farmland Immigration	Increased frequency of floods Cutting forests next to riverbanks Large motor boat cruising Crop cultivation on the riverbanks

Causes 1995						
3	5	8	4	9	4	
Availability of trucks, several concessions Use of chainsaws Existence of laws	Destructive fishing practices by outsiders: - Electroshock -Grenades -Blocking streams - Use of modern fishing equipment	No hunters No merchants so dolphin population increased	Increase pressure on the forest hindered wildlife More people Loss of sanctuary Merchants wanted to buy more	Large number of families More clearing and land preparation Insufficient food consumption	Extracting by people from outside village Availability of markets but exploitative pricing forced people to collect more Concessions refusing access for NTFP collection Clearing for farmland and bush fires	Floods Speedboats Loss of forest on both sides of the river Broken riverbanks

Causes 2002						
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2	2	9	2	10	3	
Increased illegal logging Use of chainsaws New laws: Prakas No. 01 on control of forest sector anarchy (but little enforcement)	Several destructive fishing practices like electroshock Fishing for export by outsiders putting pressure on local livelihoods	No hunters No merchants Effectiveness of extension	More boats Stopped using weapons in 2002 because of new laws: Sub-Degree No. 38 More merchants Existence of laws	Large number of families cultivating on riverbanks, cleared forestlands New migrants trying to get patch for cultivation Insufficient food consumption	Clearing for farmland Many merchants wanting to buy Bush fire Extracting NTFP by people from outside village	Increased frequency of floods Speedboats Loss of forest on both sides of the river Broken riverbanks

Table 7: Changes In The Wetland Resources (Score 10 Is Highest)

3.4 Changes In Food Availability And Their Causes

Resource	1980	Causes	1990	Causes	2002	Causes
Fish	5	1. Fewer people 2. Use of traditional fishing gear 3. No markets	3	1. Many fishers from inside and outside village 2. Use of hand grenades 3. Markets available 4. Merchants wanted to buy 5. Blocking streams with wooden nets	2	1. Increased population 2. Merchants buying 3. Use illegal equipment
Crab, snail and frogs	5	1. Few consumers 2. Plenty of fish 3. No pumping and draining to catch fish	5	1. Not many catchers 2. Not many people ate	3	1. More catchers and consumers 2. Markets available 3. Catch and use as fishing hook bet
Rice	4	1. Plenty of farmland and paddy available 2. Fewer people 3. Fertile soil	3	1. Increased population 2. Low crop yield 3. No maintenance	3	1. More people 2. Infertility of soil 3. Floods 4. Insufficient food for consumption 5. Few draught animals
Domestic vegetables and fruit	2	1. Newly settled 2. Not many cropping	3	1. Additional planting 2. Increase number of people	4	1. Vegetable gardening 2. Expansion of cropping areas 3. Little market needs 4. No processing of the products
Wild vegetables and fruit	5	1. Plenty of forest 2. Not many people extracting 3. Far from market 4. Small population 5. Household consumption	4	1. Extracting by people from outside the village 2. Availability of markets 3. Clearing for farmland 4. Increased paddy land	3	1. Logging concession 2. Availability of market 3. Clearing for paddy and farm land 4. Bush fires
River water	5	1. Good water quality	4	1. More floods damaged crops	3	1. Quality of water got worse

		2. Deep water 3. Narrow river 4. Riverbanks not yet broken 5. Fewer floods		2. River became wider and broke riverbanks 3. Water got shallow 4. Planting crops on riverbanks		2. Floods 3. Cutting forest on the riverbanks 4. Many speedboats 5. Shallow river
Wildlife	5	1. Few hunters 2. No market 3. Plenty of forest	3	1. More hunters 2. Loss of wildlife sanctuary 3. Markets available 4. Loss of certain species	2	1. More boats 2. Seized guns 3. Extension of law 4. Illegal hunting/exploitation

Table 8: Village Level Changes In Wetland Food Availability

Note 1: Maximum 5, Minimum 1: Note 2: Rice Field: (1) Ban Huoy and Koh Chrim were new villages in 1980, and there was little paddy land available. (2) Krala Peas was an old village in 1980 and there was a lot of paddy land available.

Household level

Each household extracted and made use of wetland resources to satisfy their needs and sustain their livelihood. The resources were used as food, other day-to-day uses and for sale. The resources have changed and gradually degraded and that has caused difficulty for the people. The reason for changes were identified and are described in the table below:

	Causes 1989	Causes 1998	Causes 2002
Paddy land	1. No paddy land 2. Floods 3. New settlements	1. Good rain 2. High rice yields	1. Drought 2. New paddy land still needed to increase yields 3. Flood
Fishing	1. Easy to find 2. Use of traditional equipment	1. Catch for household consumption and sale	1. Only available for household consumption 2. Good species are disappearing
Forest	1. Cut for sale 2. Merchants wanted to buy	1. Logging and export to other countries 2. Sold labor to logging companies	1. Remain little 2. Hard and time consuming to find
NTFPs	1. Exchanged for rice 2. Saved money	1. Good availability	1. Scarce and hard to find 2. Yield decreasing
Wildlife	1. Still available and not difficult to find	1. Some remain available 2. Could be hunted for food 3. Many merchants 4. Loss of sanctuary	1. Loss of forest 2. Loss of wildlife sanctuary 3. Wildlife moved to other places 4. Time consuming to find 5. Protection laws established

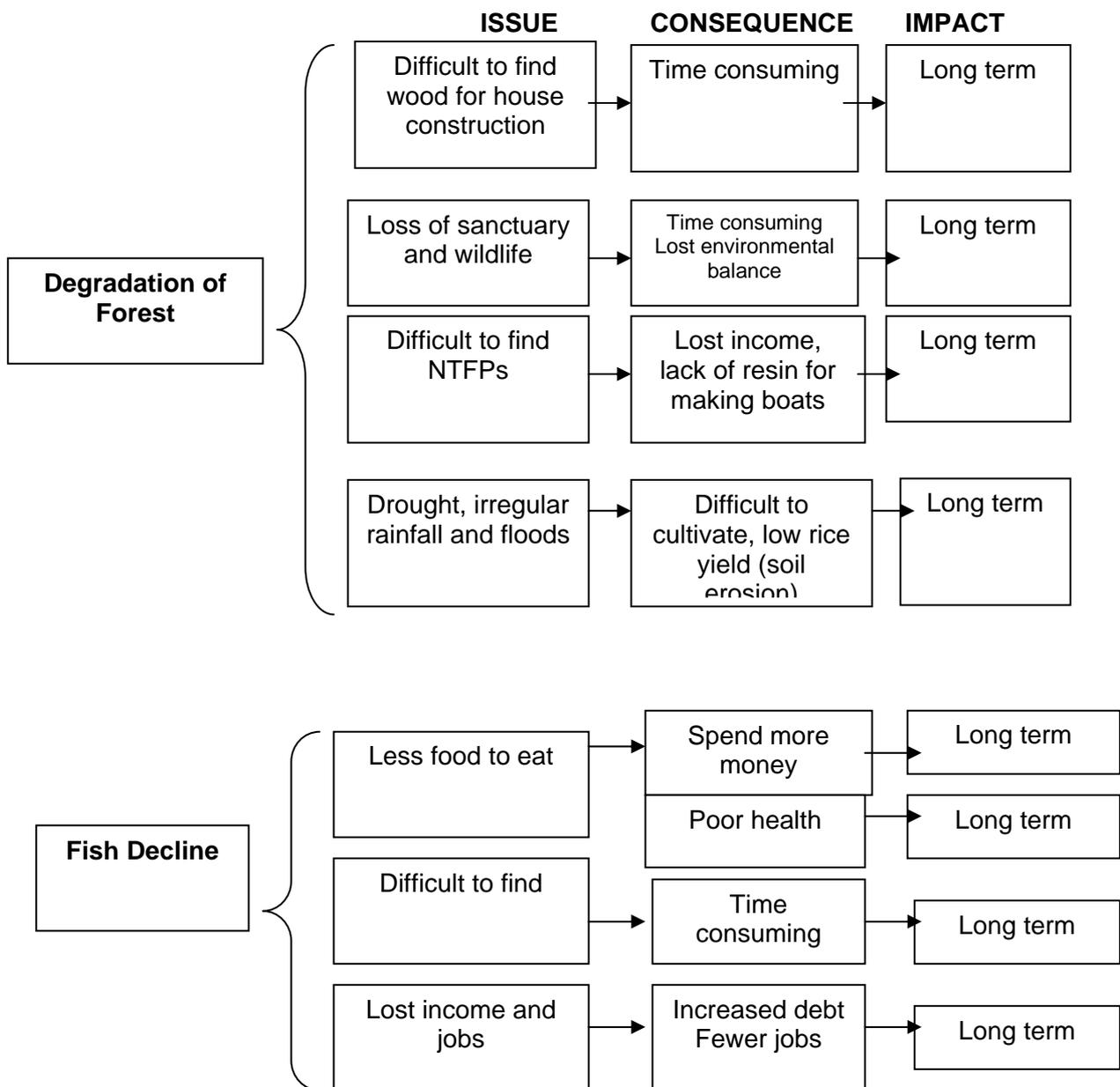
Table 9: Household Level Changes In Wetland Food Availability

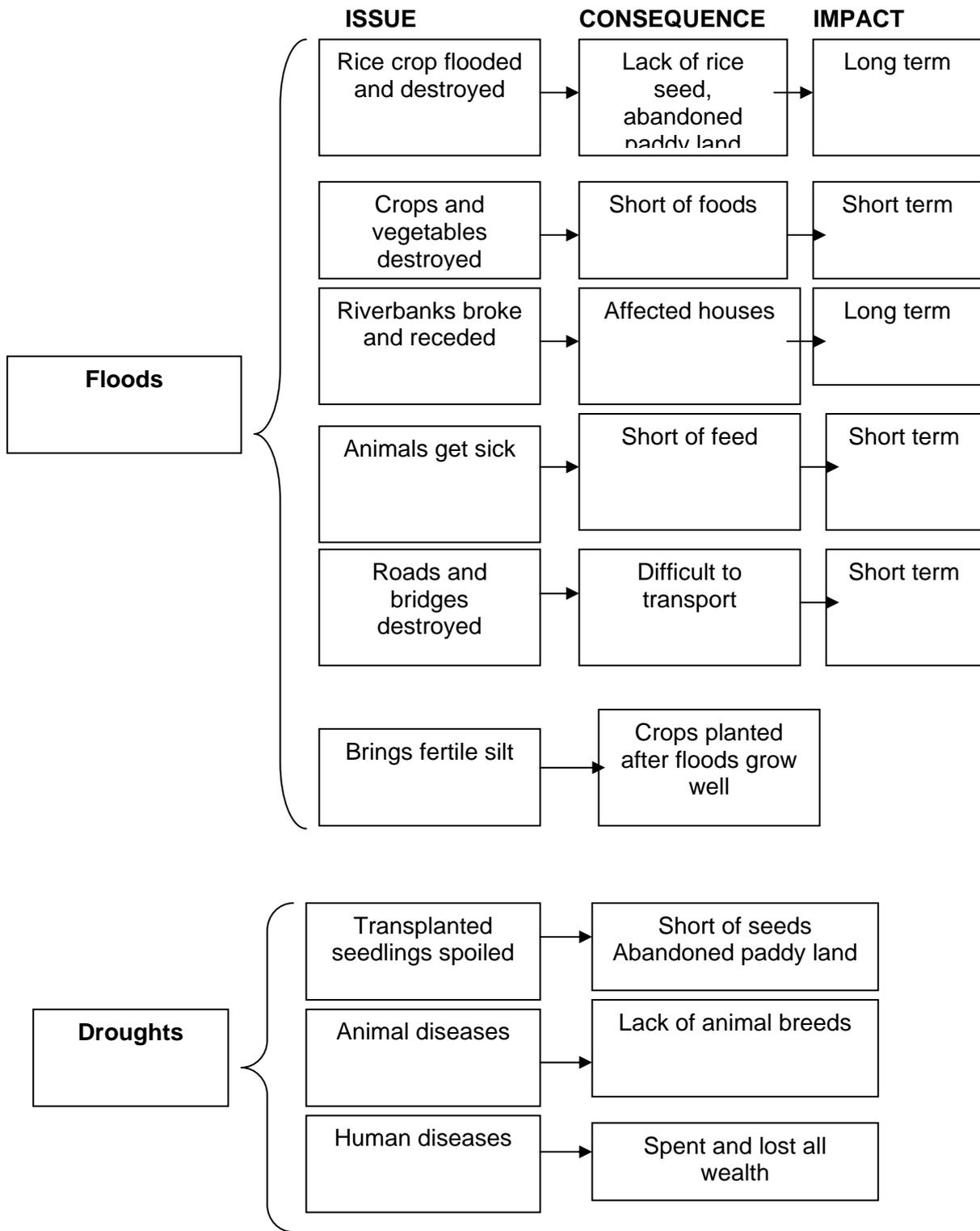
3.5 Suggestions And Recommendations From Households

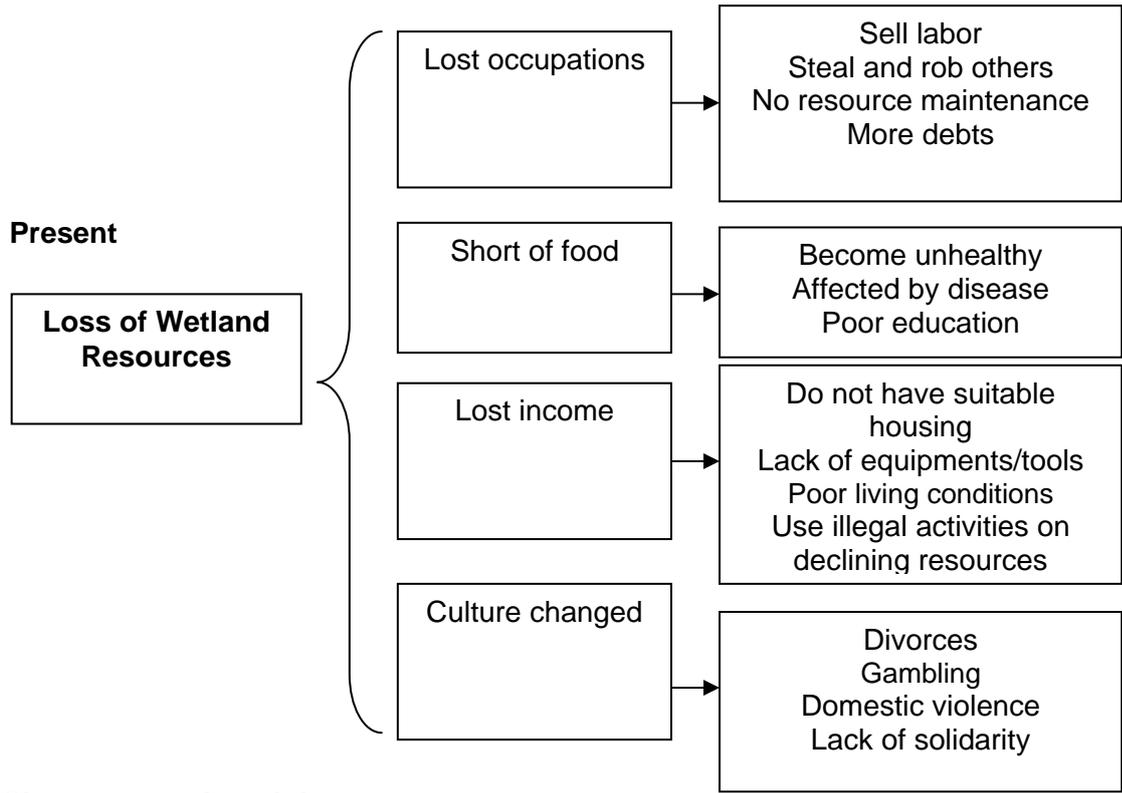
- Help restore and improve the quality of wetlands
- Immediate steps should be taken to increase access to forest and lands under concession in order to reduce pressure on available resources
- Help increase awareness by outsiders of the laws and how to manage and use wetland resources
- Help strengthen community associations like Community Fishery and Village Development Committee

CHAPTER 4: VULNERABILITY

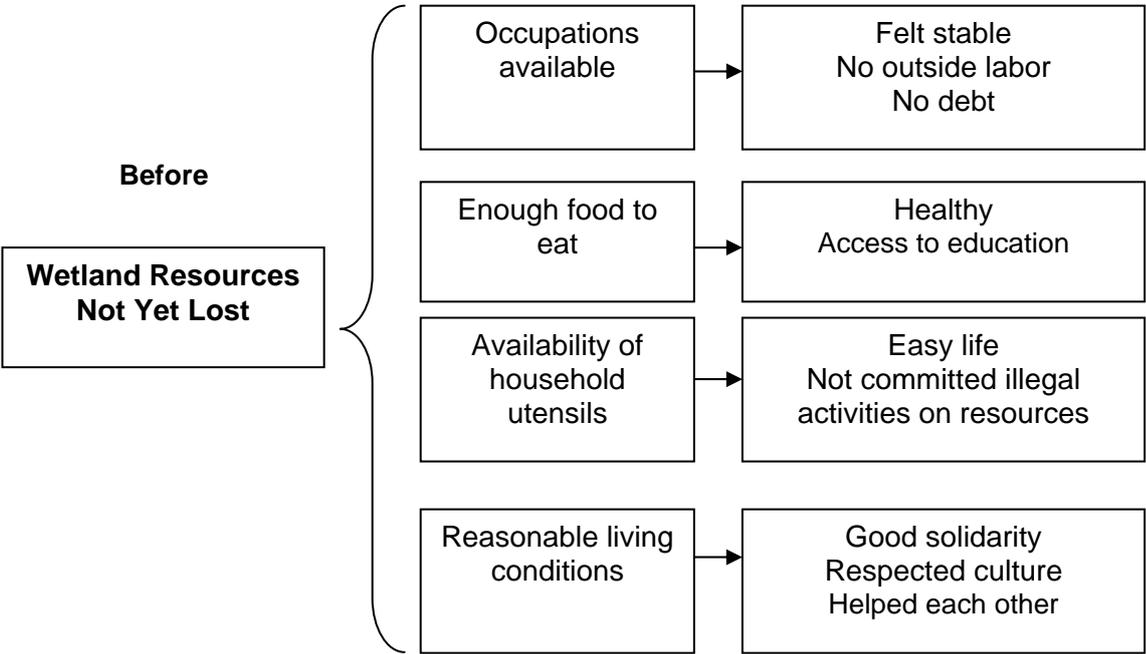
4.1 Village Vulnerability Analysis







Changes in vulnerability over time



4.2 Household Vulnerability Level

In the three study villages, all types of households were selected for the PPA (from 8 to 10 households for case studies). According to household interviews, vulnerability was reflected in the following categories:

- Changes in the resources over time with causes similar to the village level
- Basic needs of households are very high and poor households are vulnerable
- Loss of livelihoods from natural resources so were forced to look for new occupations

- Careers have changed because of lost income. Some households have little while others do not have sufficient rice for consumption so eventually sell their labor and perhaps go into debt

The poor, the poorest and the widows are among the most vulnerable in the villages. Their situation deteriorated in the 1990s, and they became more vulnerable. The poor depended on natural resources for livelihoods and food security and their vulnerability increased with the loss of natural resources. In the competition to benefit from depleted natural resources, poor families lacked resources such as motorboats, buffalo and cows.

Type of Household	Forest Degradation	Fish Decline	Wildlife Decline	Drought and Floods
Rich households	- Can afford wood for house building	- Can afford to buy fish	- Can afford to buy wildlife	- Can survive impact on income
Not poor households	- Not enough wood to build house - Loss of income	- Spend lots of money to buy fish	- Spend a lot of money	- Short of food supply - Short of rice and other crops
Poor households	- No wood for building houses	- Cannot afford to buy fish - No fishing tools so cannot fish	- Difficult to find	- Short of food - House damage - Loss of property
Poorest households	- Cannot build house - Loss of profession	- Loss of career - Short of food	- Loss of career - Short of food	- Short of food supply - Sell labor - Theft occurred
Widows	- Short of firewood - Loss of NTFPs	- Short of food	- Short of foods	- Difficult to prepare, cook and to find food

Table 11: Analysis Of Vulnerability

4.3 Causes of increased vulnerability

Village Level	Household Level
<ol style="list-style-type: none"> 1. Frequent drought and floods affecting crops 2. Over extracting wetland resources and logging, over extracting and destruction of NTFPs, wildlife hunting, wildlife smuggling, large-scale forest cutting and slash and burn agriculture 3. Increased pressure from people outside the village 4. Inability to compete with outsiders in catching fish 5. Lack of support from government and other agencies 	<ol style="list-style-type: none"> 1. Loss of wetland resources because of over exploitation 2. Natural phenomena like floods and draught 3. Lack of resources to compete with people having motorboats and other modern means to catch fish 4. Limited law enforcement by relevant institution and communities affect the poor due to their inability to compete with those with resources

Table 12: Major Causes Identified For Village Level Vulnerability

4.4 Main Strategies For Reducing Vulnerability

At the village level, the main strategies used to cope with vulnerability include arrangements to extract wetland resources by establishing community forestry and fishery development projects (e.g. rice bank, credit projects for cash loans as well as animal bank). In order to cope with vulnerability, the villagers requested support from NGOs and other institutions.

At the household level, people tried to cope with poverty by expanding paddy and farmland, raising animals, extracting wetland resources (e.g. fishing and NTFP collection). However, households lacking human resources and female-headed households find it difficult to find human and financial resources to overcome vulnerability imposed by degraded natural resources and reduced wetlands. Vulnerable families need support to diversify livelihoods.

In the past, Cambodian Red Cross (CRC) provided filter water jars, Community Aid Abroad (CAA) provided training on IPM for rice cultivation and the government provided emergency rice to flood victims. Increased flooding put pressure on groups providing support. In order to restore and improve their living condition, the villagers believe that NGOs in cooperation with the government could help them manage and preserve the resources for the benefit of their livelihoods and future generations.

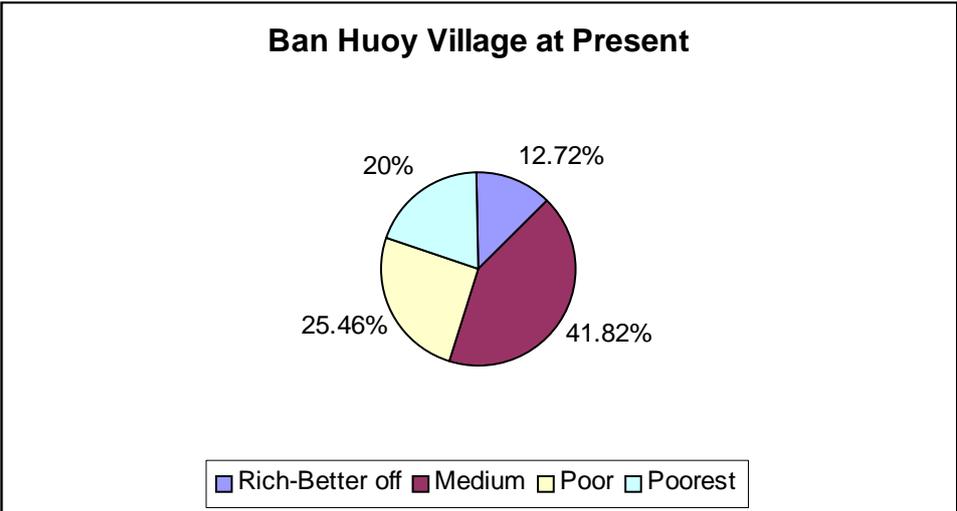
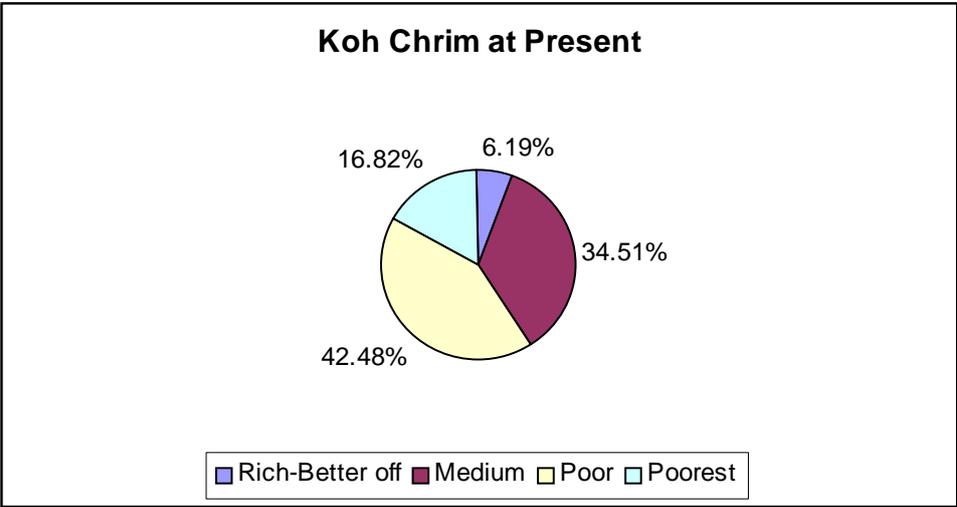
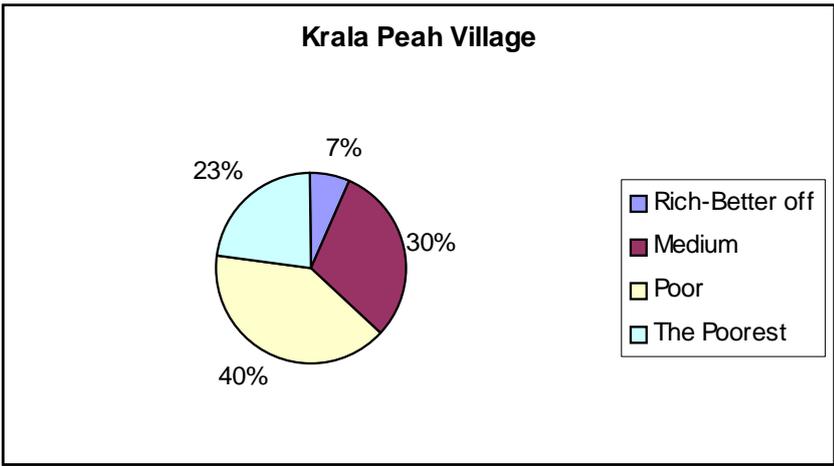
CHAPTER 5: EXTENT, CAUSES AND NATURE OF CHANGES IN POVERTY

5.1 Extent Of Poverty

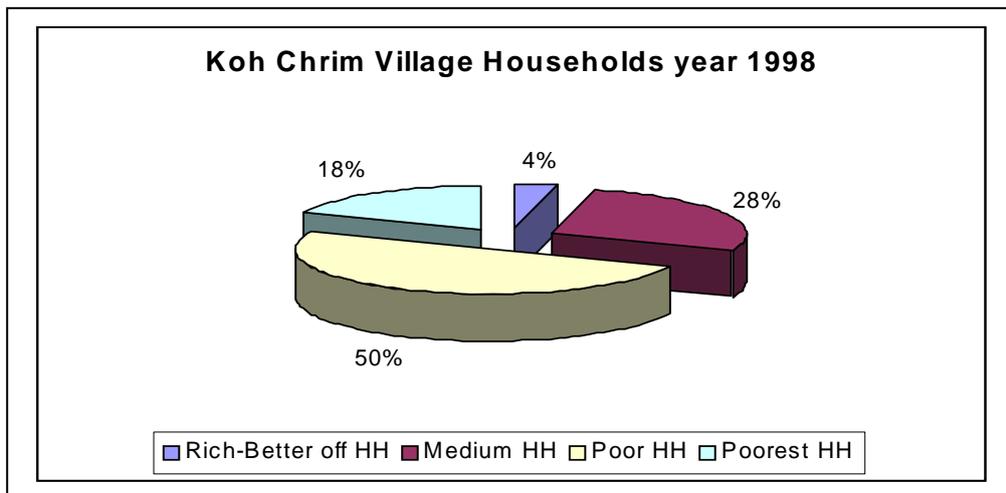
People consider those families with houses, paddy land, farmland, animals, boats, household utensils, production tools such as rice mills, sawmills, wells, gold and cash as wealthy whereas the poor family is one with little property.

Better Off	Medium	Poor	Poorest
Own big house with tiled or zinc roof	Own big house with tiled or zinc roof	Own house with zinc roof	Own small cottage
Own at least 2 hectares of paddy land	Own 1 ha of paddy land	Own half ha of paddy land	No paddy land or a small plot
Own at least 1 hectare of farmland	Own maximum 2 cattle	Own 1 cow or buffalo	Rent draught animals
Own at least 9 cattle	Own 1 boat and 1 motorboat	Own 1 boat	Sell labour
Own 1 or 2 boats	Own 2 pigs and 20 chickens and ducks	Own 1 pig	Borrow from others
Own a rice mill	Own 1 cassette player and a bicycle	Own 5 chickens or ducks	
Own a water pump	Own small business in market and catch fish	Fishing and NTFP collection	
Own 5 to 6 pigs		Have little cash	
Own 40 to 60 chickens and ducks			
Own a video set, sewing machine, cassette player, bicycle, gold, money			
Own business for cash or rice loans			

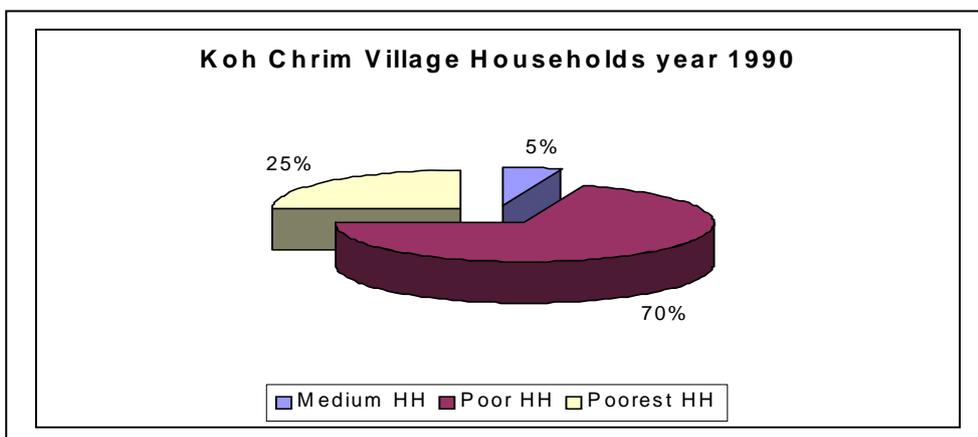
Table 13: Village Wealth Ranking



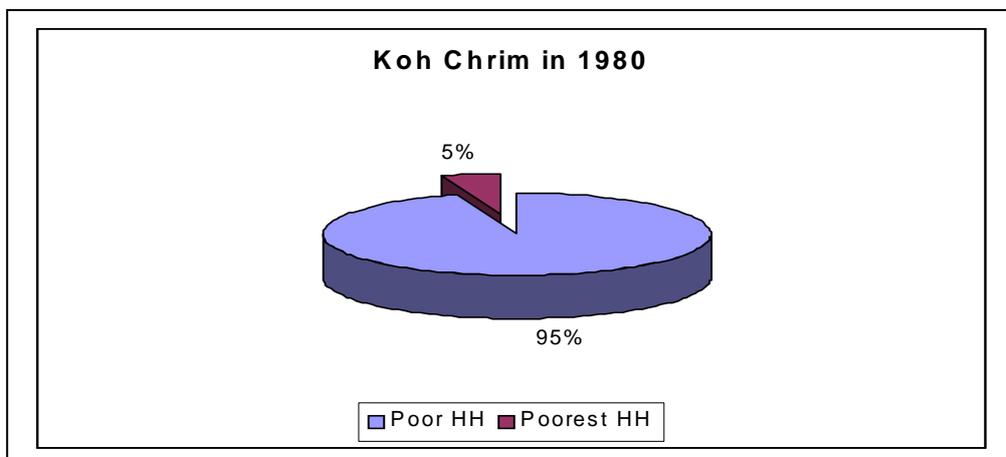
5.2 Changes And Causes Of Poverty Over Time



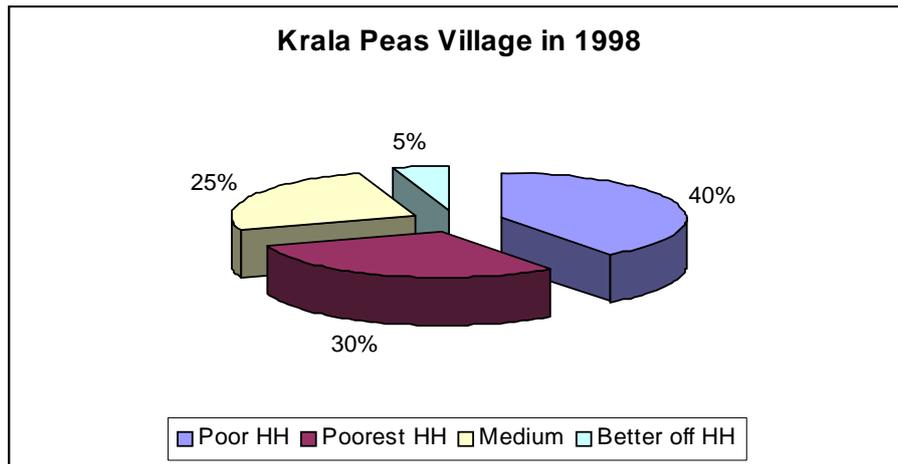
Causes - Diseases in the village (human and animal), villagers do not work hard



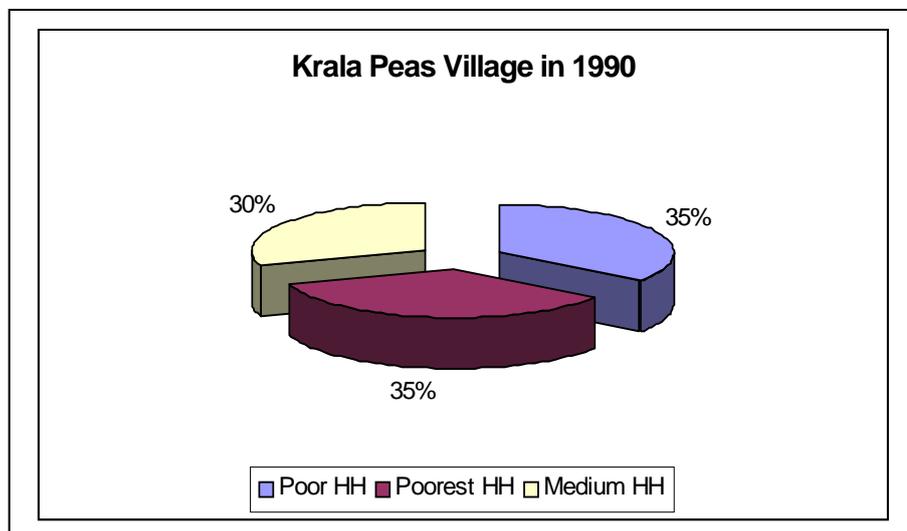
Causes - War, little labor for paddy and farm work, paddy and farm land not yet expanded, little support from NGOs



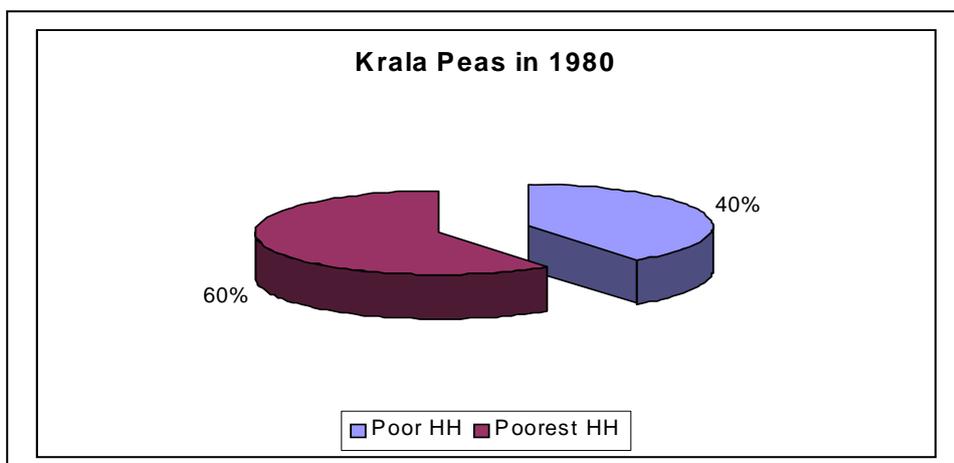
Causes - Newly settled, war, small plot of communal paddy land, no agriculture farm or fishing tools, no markets, no NGOs



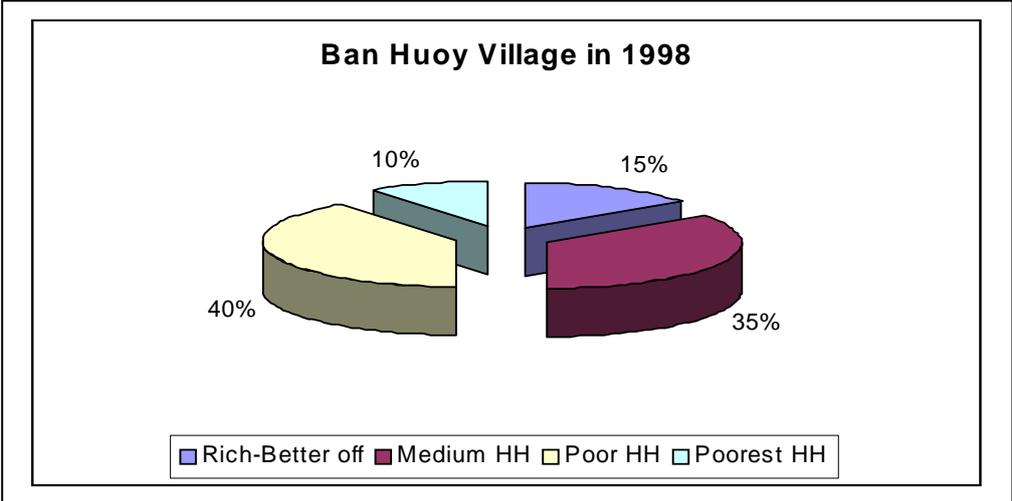
Causes - No farm tools or draught animals, debts and chronic diseases, paddy rice often flooded, cattle theft



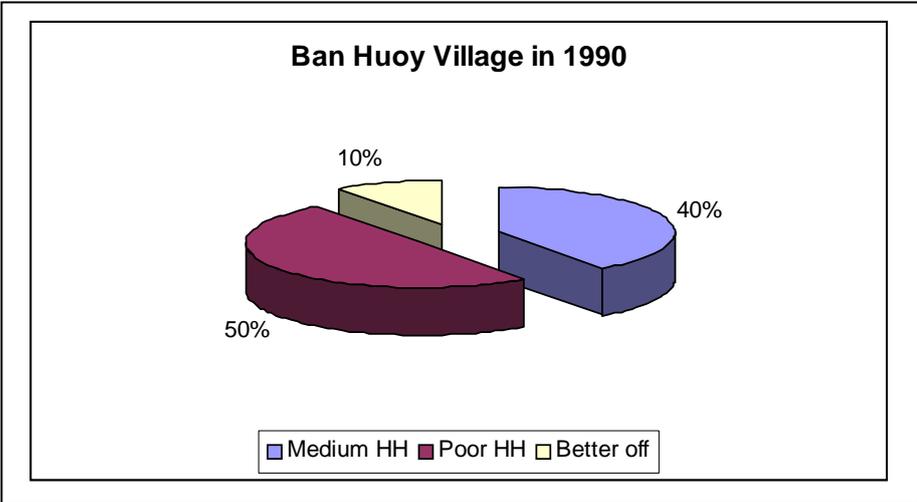
Causes - War, few draught animals, little expansion of paddy land, debt (100 kg of borrowed husked rice is paid back at 600 kg within one season)



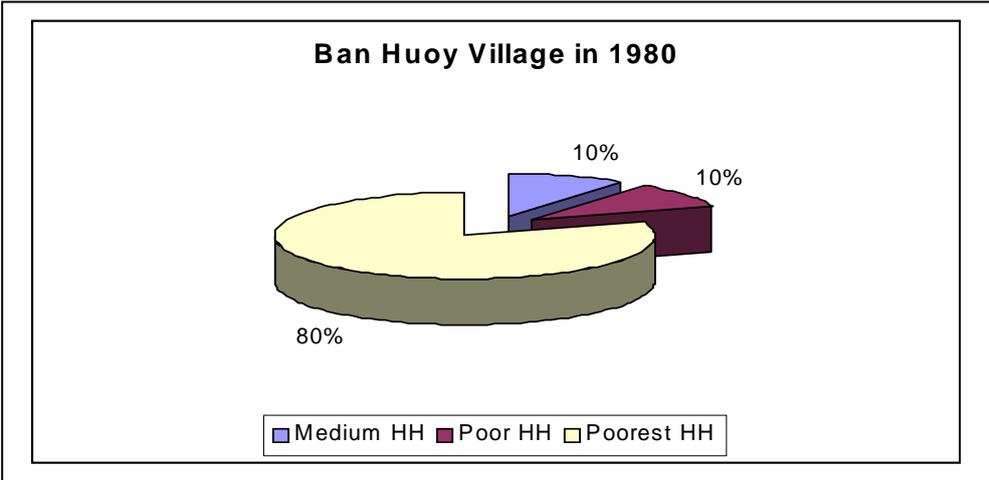
Causes - Paddy land not yet available, not many cattle, labour shortage because of war, no agriculture tools, returned from the expelled areas



Causes – Extracted much of the available resources, considerable cattle theft and floods



Causes - Could not access paddy land that was far away because afraid of Khmer Rouge, resources still available and accessible, outsiders came to look for resources, newly expanded paddy land



Causes – War, newly settled, no draught animal, no market for products

5.3 Neighbouring Villages And Compared Poverty

Date	Name of Neighboring Village	Comparison with other villages	Causes
1998	Koh Preah Village	Richer than Koh Chrim	People preferred paddy rice cultivation to logging
	Thbong Klar Village	Richer than Koh Chrim	Lots of paddy and good for animal raising
	O'Mareas Village	Similar	Less people but more paddy land, animal raising and fishing
	O'Chrolong Village	Poorer than Koh Chrim	Lots of paddy land but not much fishing; little extended knowledge but have experience with farming
1990	Koh Preah Village	Richer than Koh Chrim	Lots of paddy land, logging, NTFP collection (resin, wildlife)
	Thbong Klar Village	Richer than Koh Chrim	Lots of paddy land available and animal raising, logging and NTFP collection
	O'Mareas Village	Similar	Less people but more paddy land
	O'Chrolong Village	Poorer than Koh Chrim	Many indigenous people practice farming but not paddy rice cultivation, NTFP collection, poor knowledge and skills
1980	Koh Preah Village	Richer than Koh Chrim	Old village with large paddy and farm lands
	Thbong Klar Village	Richer than Koh Chrim	Big village areas with lots of animal available, lots of paddy land available
	O'Mareas Village	Richer than Koh Chrim	Lots of paddy land and animal available, lots of fish could be caught
	O'Chrolong Village	Poorer than Koh Chrim	People like farming and hunting wildlife

Table 14:Koh Chrim Village

	Name of Neighbouring Village	Comparison	Causes
1998	Peam Kheh Village	Richer than Ban Huoy	Old village with big houses and lots of paddy land
	Don Long Village	Richer than Ban Huoy	Availability of cows, buffalos and heritages
	Ket Moeung Village	Richer than Ban Huoy	Old village with many paddy farmer
	Kanchanh Teuk Village	Richer than Ban Huoy	Old village with lots of paddy land
1990	Peam Kheh Village	Richer than Ban Huoy	Old village with big houses and lots of paddy land
	Don Long Village	Richer than Ban Huoy	Lots of cows, buffalos and farm land
	Ket Moeung Village	Richer than Ban Huoy	Lots of cows, buffalos and paddy land
	Kanchanh Teuk Village	Richer than Ban Huoy	Old village with lots of houses and paddy land
1980	Peam Kheh Village	Richer than Ban Huoy	Old village with big houses and lots of paddy land
	Don Long Village	Richer than Ban Huoy	Enough draught animals
	Ket Moeung Village	Richer than Ban Huoy	Old village with enough draught animal for farm land
	Kanchanh Teuk Village	Richer than Ban Huoy	Old village with lots of people and enough draught animals for farm land

Table 15: Ban Huoy Village

Date	Name of Neighbouring Village	Comparison	Causes
1998	Kroum Village	Richer than Krala Peas	Productive paddy rice cultivation and additional business
	Koh Chheurteal Touch Village	Poorer than Krala Peas	Lack of farm and paddy land
	Koh Chheurteal Thom Village	Poorer than Krala Peas	Lack of farm and paddy lands, flooding, a number of villagers work in Laos, little extended knowledge
1990	Kroum Village	Richer than Krala Peas	Property remains from former times, no resettlement, villagers exploit forest, wildlife and NTFP
	Koh Chheurteal Touch Village	Poorer than Krala Peas	Lack of farm and paddy land, villagers grow tobacco
	Koh Chheurteal Thom Village	Similar to Krala Peas	Lack of farm and paddy lands, flooding, a number of villagers work in Laos
1980	Kroum Village	Richer than Krala Peas	Property remains from former times, lend rice at high rates
	Koh Chheurteal Touch Village	Poorer than Krala Peas	Lack of farm and paddy land, villagers work in Laos (paddy rice cultivation)
	Koh Chheurteal Thom Village	Poorer than Krala Peas	Lack of farm and paddy lands, few draught animal and fishing gear

Table 16: Krala Peas Village

Koh Chrim Village	Krala Peas Village	Ban Huoy Village
<ol style="list-style-type: none"> 1. Inequity in extracting wetland resources. The rich have more access than the poor 2. Increased family size. The poor have many children, and need more land 3. Cost of products are not equal to the labor input 4. Limited and slow development support from various sectors 	<ol style="list-style-type: none"> 1. Lack of draught animal 2. Small areas of low-yield paddy land 3. Paddy land flooded 4. Infertile paddy land 5. Drought 6. Pests problems 7. Chronic diseases 8. Few salable skills 9. Loss of forest 10. Decline of natural resources 11. No markets for NTFP and secondary crop products 	<ol style="list-style-type: none"> 1. Lack of human resources 2. Many widows and female-headed households 3. Lack of draught animals 4. No boats for transportation or fishing 5. No equipment or skills for extracting forest products and NTFPs 6. No modern fishing gear 7. Often affected by natural disasters such as floods, drought and boars eating crops 8. Lack of health centers, and people often affected by epidemic diseases 9. Spending a lot of money on medical treatment

Table 17: Causes Of Poverty

5.4 Changing Nature Of Poverty Over Time

According to the study, the people used to have similar living conditions, but comparing the past to the present indicates many people are still in poverty because of increased vulnerability. The poor households are among those who cannot generate cash income, especially to extract benefits from the wetland resources within their village areas. They do not have enough labor for income generation, some affected by chronicle diseases, lack of production tools and so on. The loss of the resources and lack of knowledge are the main causes that led them to poverty.

Poor Households	Not Poor Households	Aspects Contributing to Poverty
<p>Have many children and they are often sick</p> <p>Often have conflict within households and with neighbors</p> <p>Children do not have higher education</p> <p>Poor participation in village ceremonies</p> <p>Cannot achieve their aspirations</p>	<p>Have enough housing space, good hygiene, good clothes and with household utensils</p> <p>Have enough food to eat</p> <p>Have money to spend and jewelry</p> <p>Having knowledge in doing business</p> <p>Involved in social activities</p> <p>Family life is happy</p> <p>Respect and friendship with neighbors</p> <p>Can afford higher education for children</p> <p>Usually achieve their aspiration</p>	<p>Loss of forest resources</p> <p>Natural disasters</p> <p>Lack of labour and draught animals for agriculture production</p> <p>Chronic diseases</p> <p>Domestic violence</p> <p>Large families, few salable skills</p> <p>Loss of business, heavily in debt</p> <p>No support from outside or institutions within the society</p> <p>No inheritance left</p> <p>May commit illegal acts</p>

Table 18: Conditions In Poor And Not Poor Households

Before	Now	Causes
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Before	Now	Causes
<p>Medium</p> <p>Wife still alive</p> <p>Mr Sao Ra family in Koh Chrim Village</p>	<p>Poor</p> <p>After wife died</p>	<p>Before: Could catch 10 kg of fish in two nights, produce 20 to 30 B (1 000 to 15 000 kg, earn 30 000 Riels from 3-day hunting wildlife</p> <p>Now: produces 70 baskets (expanded rice fields), does not earn much from hunting, has to take care of his widow sister and one child and his older blind sister with chronic disease</p>
<p>Medium</p> <p>Before his wife died</p> <p>Pat Phoy family in Krala Peas Village</p>	<p>Poor</p> <p>After married second and third wife</p>	<p>Before: Income used to be 200 000 Riels per season, income from chicken raising used to be 300 000 Riels per year. Income from mung bean cultivation used to be 200 000 Riels per year.</p> <p>Now: Can catch enough fish only for daily household consumption. Can produce only 15 hab of paddy rice per year, and has to pay 5 hab for renting draft animal. 100 000 Riels income from small-scale chicken raising per year. He used to have a lot of property such as a boat, motorboat, paddy land, etc. but he distributed them to his children and sold the rest for the funeral ceremony of his former late wife.</p>
<p>Medium</p> <p>Mr Sipon Si family in Ban Huoy Village</p>	<p>Poor</p>	<p>Before: There used to be a lot of resin available. Used to access malva nut for sale, but they now have almost disappeared. A lot of wildlife available. They could hunt wildlife for family consumption and sale by spending one or two days hunting. Paddy rice cultivation used to be productive and they had draught animals available.</p> <p>Now: Resin (from Chabos tree) is very scarce, hard to find wildlife; pangolin and snake are almost not available. Malva nut is very scarce and only available for household consumption. Wife often gets sick, a lot spending. Many dependant children but lack of labour.</p>

Table 19: Causes For Not Poor To Become Poor

B Rice sack of 50 kg, 1 basket = 15 kg, 1 Hab = 60 kg

Causes of poor to become not poor

Before	Now	Causes
<p>Poor</p> <p>Len Vannie family in Koh Chrim Village</p>	<p>Rich</p>	<p>How: No inheritance from parents, after marriage started small business buying and selling vegetables. After saving some money, the family started buying other products like fish, wildlife and NTFPs for sale in the provincial town market. He was successful and then bought groceries from the town and sold them in his village. He also engaged in rice loans. His family is the richest in the village. He has a lot of property like motorboats, rice mills and he also raises animals like cows, buffalos, goats, pigs, chickens and duck. If he did not gamble so much, he could have become richer than he is.</p>

<p>Poor</p> <p>Siphan Chanthou family in Krala Peas Village</p>	<p>Rich</p>	<p>How: Got married in 1979. First stayed and started paddy rice cultivation with parents. After 3 years, his family left parents to build a house. Continued paddy rice cultivation (rented draught animals). Raised animals and bought ½ ha of paddy land. Bought a pair of buffalos. Cleared another 1 ½ ha of paddy land and could produce 30 hab of rice per year. After paddy rice season, the husband bought cattle and sold them to Thai merchants. He earned 800 baht each. Sometimes he earned 3 000 to 4 000 baht per day. With the money he bought one rice mill and one motorboat. He bought 9 more buffalos and 7 cows. He sold 25 hab of rice per year. One hab cost 15 000 Riels. His rice mill processed 500 kg of rice per day. He charged 50 Riels per kilo. He kept the rice bran (he used that to make rice wine). He raised about 10 pigs He sold the pigs and bought a water pump.</p>
<p>Poor</p> <p>So Bin family in Ban Huoy village (Member of VDC)</p>	<p>Rich</p>	<p>How: In 1979 he had only one buffalo, and after many years his buffalo produced several offspring. He rented buffalos as draught animal by receiving 2 to 3 hab of rice from one buffalo. He had only half ha of paddy land, but could produce rice both for consumption and for sale because he had 6 buffalos for rent. He did other businesses as well such as collecting resin and malva nuts. He was successful and then he bought a boat and motor (7 cc) for expanding his fishing business. He planned to sell 2 or 3 buffalos in order to build a bigger house.</p>

CHAPTER 6: SOCIAL NETWORKS AND IMPLICATIONS FOR THE POOR

6.1 Village Networks

From the social interaction analysis, there was excellent communication among households. Women and men came together on a number of occasions to celebrate and support each other. The occasions included birth and death ceremonies, weddings, village meetings, labor exchange, providing help in house construction, and several other formal and informal activities. Relations and communication is very limited to families that have conflicts with others, are arrogant, or accused of being evil.

Family support usually happens when members of a family get sick, die or are pregnant. They support each other by giving cash and material as well as giving labor and encouragement/motivation. The poorest are not much involved in weddings and ceremonies. The villagers could organise; if they think appropriate, to request justice when there are allegations by legal institutions. The rich usually provide support to the poor in the following ways:

Support among families	Support among villages
<ul style="list-style-type: none">- Provide loans in cash, rice or husked rice- Rent draught animals and lease paddy land- Hire labor to make fences, saw wood, cut and make pillars or build houses- Establish cow and buffalo banks	<ul style="list-style-type: none">- Barter system, exchange resources like fish and rice- Actively participate in ceremonies of one another- Exchange experiences with each other- Borrow and lend rice seeds after natural disasters- Share certain village resources

6.2 Social Exclusion And Implications For The Poor

People generally felt that there is no single household and individual who was totally excluded or prevented from participating in activities, especially on issues related to village level decision-making. However, work on decision diagrams during group discussions at villages showed that the poor couldn't fully participate in some cases such as formulation of development programs (attend, but offer no opinions) and high profile events. In addition, the poor are not selected to be representatives of any village level institutions like the VDC the CRC committee.

Widows also have the rights and responsibilities like other women in the village with regard to decision-making for the village. If the widows are well educated and are reasonably rich, they would be selected to be representatives and/or be responsible for certain tasks. However, in practice widows find less opportunity to participate in village decision-making processes.

6.3 Role Of Women In Economic Activities

In rich families, women play very important roles in managing house and farm work as well as income generation activities (e.g. selling, animal raising). In poor families, they have the responsibility for housework and work on other's rice fields. In woman-headed households they often are the sole contributors to the family economy. Husbands mainly make decisions.

Women of Rich Family	Women of Poor Family
Have suitable clothing and jewelry Good relation and respect from other people Have some education Work less hard and can meet family food needs Have time for relax and entertainment Involve in many social activities	Do not have suitable clothing Not very healthy, children also in poor health Have many children Work very hard and worry about meeting basic food needs Not outstanding involved in society Have low education Not much involved in community decision-making

Table 20: Differences Between Rich And Poor

CHAPTER 7: COPING STRATEGIES AND WETLANDS IMPROVEMENT

7.1 People's Participation

In recent years, the villagers played very important roles in improving the quality and productivity of the wetlands. They have participated in the following activities:

- the protection of fishery products by establishing a 'fishing community'
- the protection of forests by reducing swidden agriculture (slashes and burn)
- the protection of wildlife by reducing hunting for selling
- the protection of the environment by not using chemical fertilizers and pesticides that could affect wetland quality
- the protest to the concession company for illegal exploitation in Krala Peas Village
- the protest to stop the blocking of the fishing stream in Krala Peas village.
- claiming back the forestland (with finger prints on claim paper) from the concession company in Ban Huoy Village
- the protest to stop indigenous ethnic groups from cutting forest along the river (in Ban Huoy)

Limits to the people's participation to improve the quality and productivity of wetlands were a result of limited support from institutions, only some limited support from NGOs and the Royal Government of Cambodia. Some officials of the relevant institutions were involved in reducing the quality and productivity of the wetlands.

7.2 Government, NGO And Other Agency Participation

Steps that could be taken by the Government, NGOs and other institutions to improve the quality and productivity of the wetlands are:

Government: make conservation laws for relevant/responsible institutions to ensure smooth implementation. Develop village infrastructure such as roads, health centers, schools, wells and markets for selling products.

NGOs: work as Government partners by providing financial and technical support to the conservation and development components.

Other institutions: involved in support of various activities, participate in facilitation mechanisms of their respective sectors, involve the officials from line departments or sectors in fieldwork as much as possible.

7.3 Urgent Steps To Improve Quality And Productivity Of Wetlands

Urgent steps to be taken to improve wetlands quality and productivity could include these objectives:

- Raise people's awareness on the use of fishing tools
- Stop illegal fishing (shocking, poisoning and using explosive devices)
- Establish community forestry and community fishery committees
- Improve the production of paddy rice cultivation through applying IPM
- Establish an agriculture focal persons

Roles that the villagers think they could play to improve quality and productivity of wetlands are:

- Provide awareness raising extension to all villagers on the importance of the resources, the problems they are facing and possible measures to protect the resources.
- Report on all types of illegal activities over the resources to relevant institutions that they think they could help provide intervention.
- Participate in all programs/projects implemented by relevant institutions and organisations with the villagers.

7.4 Urgent Steps To Improve Conditions Of The Poor

- Establish rice banks and cash credit to provide low interest loans to the poor
- Establish animal banks (for draught animal)
- Provide training to community members on resources exploitation and training to create opportunities for other businesses and jobs
- Look for markets to sell their products.
- Stop all illegal exploitation of the resources in order to restore and improve the quality of the resources upon which the people rely for livelihoods

7.5 Strategies To Move Out Of Poverty

In order to move out of poverty the villagers themselves could do their best for income generation by:

- Paddy rice and farm cultivation
- Fishing
- Animal raising
- Growing vegetable and other crops
- Collect other NTFP like resin, rattan, malva nuts, bamboo, etc.
- Investment on buying and selling goods
- Rent ferryboat for business (transport passengers)
- Provide labor for rice (for people who do not have paddy land)
- Processing business such as making Prahok and Pha Ak, dried fish, etc for selling after fishing season (when fish price goes up).

To improve wetlands quality and productivity wetlands, the villagers can play an important role in ensuring sustainable use of the wetland resources to provide long-term livelihoods. At the same time the government should consider people's recommendations to solve problems and difficulties they are facing with declining quality and extent of wetlands. The local people are dealing with groups from outside that are well equipped to fish and market.

The NGOs too have a role to play, such as provision of technical and financial support in conservation and development of the wetland resources. Because of the status of poverty, steps should be taken to deal with immediate conditions of deprivation.

CHAPTER 8: CONCLUSIONS

8.1 Current Status Of Wetlands, Poverty And Vulnerabilities

Through their experience in deriving livelihoods from wetlands, people are aware that they used to have many types of resources available near the places where they lived, and they could easily access them. People said that competition to access wetlands resources has intensified in recent years and people are also aware of some of the causes for wetlands degradation. Because of over exploitation, wetlands resources have gradually declined.

According to the people, the poverty and vulnerabilities were caused by lack of conservation of the wetland resources and lack of support from relevant institutions (e.g. education, health, access to markets, poor road communication and other problems happened to them and to the society).

This study generated discussions about problems and issues with regard to the benefits of wetlands resources. The change and decline of the resources impact their livelihood and well being.

Koh Chrim Village	Ban Huoy Village	Krala Peas Village
<ul style="list-style-type: none"> - Loss of forest - Fish decline - Loss of wildlife - Rice yield decreased - Poultry decline - NTFP decline - Bamboo decline - Broken riverbanks 	<ul style="list-style-type: none"> - Fish decline - Rice yield decrease - NTFP decline - Infertile paddy lands - Degradation of forest - Decline of wild vegetable - Rice destroyed by boars - Sand decline - Wildlife decline 	<ul style="list-style-type: none"> - Loss of forest - Loss of fish - Wildlife decline - Broken riverbanks - Holes at the bottom of the river where fish like to live becoming shallow

Table 21: Group Discussion Identified The Following Factors

	Causes	Consequences
Fish decline	Caused by shocking, poisoning, grenades, fishing nets, loss of fish sanctuary (flooded forest, swamp forests), availability of markets, export of fish to other countries, population increase and more fishers.	- resulted in loss of income and source of protein resulting in health problems, more debt forcing adults and children to sell labor.
Wildlife decline	Caused by forest loss, loss of sanctuary, logging, use of weapons for hunting, burning of forest/bush in order to catch wildlife, availability of markets, more hunters and high price for wildlife.	- meant loss of food, poor health, loss of income, living getting worse, sell labor, more debt, loss of wildlife species, loss of tourists.
Forest degradation	Caused by forest exploitation (by using trucks and chainsaws), clearing of forest for paddy and farmlands (slash and burn agriculture), illegal logging, smuggling of timber abroad and bush fires.	- meant increased frequency of drought, flood, soil erosion affecting agriculture resulting in loss of income. Further, loss of wildlife sanctuary and other traditional wetlands based occupation also contributed to poverty.
Rice yield decrease	Caused by drought, floods, diseases, pests, loss of fertility and poor quality rice seeds.	- insufficient rice for consumption resulting in loss of income forcing people to borrow. Rice yield declines deprived people of staple food resulting in poor health and inability to afford education for children, forcing children and adults to sell labor.
NTFP	Caused by increased logging and	

decline	NTFP exploitation, market demand, degradation of village forest, bush fires, concession companies cutting resin trees	
Broken riverbanks	Caused by speedboats and other large ships, floods and the loss of forest on both sides of the river.	- affected people's houses and crops, river became shallow, loss of fish sanctuary.

Table 22: Causes Of Poverty And Their Consequences

8.2 Conclusions

1. The end of Khmers Rouge rule is a baseline to assess impact of further developments. It provided an environment for people to return to their original settlements or settle at places of their choice. Of three villages selected for the study, two were new villages established in 1980 (Ban Huoy and Koh Chrim). This is true of many settlements and communes in Stung Treng province.
2. The UN Administration and later elected governments provided a sense of stability for the people to engage in production and have families. Population grew around 2.5 percent per annum.
3. Population density in Stung Treng Province is 7 persons/km², much lower than the national average of 64 persons/km². In the 1980s the density was much lower.
4. Cambodian and provincial governments leased natural resources to private parties from within and outside Cambodia. In 2000, over two-thirds of Cambodia's and Stung Treng's lands were under concession. Cultivable lands, forests and water bodies were under concession.
5. Leasing access and control of natural resources to private parties meant a loss of access for local people. The concession process and subsequent felling of trees for export, fencing of water bodies and cultivable lands propelled another round of migration of people to places where they could have access to natural resources. The 1998 Census of Cambodia showed that nearly one-fifth of Stung Treng's population composed of recent migrants to the province.
6. Establishment of elected governments and leasing natural resources meant increased penetration by companies, contractors, merchants and individuals to all parts of Cambodia (except those areas still laden with land mines), including Stung Treng Province. By 1990, companies and contractors engaged in felling forest timber, commercial fishing using advanced technologies. Migration of people evicted from natural resource base from outside to the Stung Treng Province added to the pressure on natural resources still left in control of local people. The natural resource base accessible to local people was considerably reduced after large tracts were given as concessions.
7. Loss of forest cover due to extensive logging and change in species planted, sedimentation, several dams and infrastructure development upstream of Sesan River, increased frequency and intensity of floods, claiming forest lands for cultivation, and destructive fishing practices by contractors, concession holders and outsiders substantially undermined the quality and extent of wetlands in Stung Treng.
8. In 1980 all three villages were equally poor. Based on criteria for wealth, people assessed that most households in all these villages were either poor or very poor, and a few households were 'not poor'. However, by 1998, 55 percent and 20 percent of the households in Koh Chrim village, 40 percent and 30 percent of the families in

Krala Peas, and 40 percent and 10 percent of the households in Ban Huoy village were assessed as poor and very poor respectively. That is, villagers respectively considered 25 percent, 30 percent and 50 percent of the households in Koh Chrim, Krala Peas and Ban Huoy 'not poor'.

9. Those households that settled in productive paddy lands not affected by floods; owned boats, particularly motorboats, buffaloes, cows and ox, engaged in business of some kind were considered as wealthy. Thus households with motorboats, rice mill and small business at the Stung Treng market in addition to lands, cattle, and fishing gear had better incomes. Such households were not vulnerable to poverty primarily because of their diversified livelihood base.
10. Female-headed households and those with many small children without many adult males/females to contribute to the income were poor and highly vulnerable to hunger, marginalisation and exclusion. Koh Chrim and Krala Peas had several poor and vulnerable households.
11. In the context of depleted and degraded natural resource base, households required several adults, particularly men, and instruments to successfully catch enough fish for household use and sale, collect NTFP, do business of some kind. It was repeatedly stated that households with many children and sick people were in acute poverty. Sickness and death imposed crippling costs on the households – to seek medical help for the sick outside the village and funeral costs. In the context of intense competition to access natural resources, local people were in a disadvantageous situation unable to compete with concession holders and outsiders.
12. Since the outsiders and concession holders had very little stake in safeguarding livelihoods and biodiversity, they employed several destructive practices to exploit natural resources. The rich in study villages had necessary resources to exploit the natural resources, which the resource poor could not do.

8.3 Safeguarding Wetlands Livelihoods And Biodiversity

1. Profit seeking concession holders are not the best group to safeguard and enhance wetlands livelihoods and biodiversity. Their activities are fuelled by the desire to maximise the profit irrespective of cost to the natural resources and the local people. The control of the natural resources must revert back to the State and the Cambodian people. Long-term solutions will emerge from this process.
2. Understanding downstream impact of completed Yali Dam and under construction Sesan 3 Dam on Sesan River is required. Dams on Sesan may impact safeguarding wetlands biodiversity.
3. Curbs on illegal fishing and fishing with damaging means will protect and facilitate abundance of fish species. At this stage, very little is being done to deal with harmful practices. Further, the fish spawning and breeding grounds and the wetlands resources are under threat. The blocking of the streams is destructive to the fisheries and wetlands and should be subject to law.
4. The experience in Stung Treng shows that local villagers have been successful in organising fishery communities and protecting the fishery resources. This experience could be useful in other parts of Stung Treng. Fishery Communities can also monitor illegal and harmful fishing practices to enable the authorities to take action. Further, several other initiatives would include: establish rice bank for the poor with low

interest; establish cash credit for providing loan with low interest; establish animal bank; and organise training to community on the sustainable use of the resources.

5. Clear legal and institutional norms must be established and implemented to protect interests of the local people and safeguard wetlands.

8.4 Recommendations

Specifically, people recommended the following steps to safeguard and improve wetlands quality and livelihoods:

- Resources must be drawn from the plan and in accordance with the laws
- Development must ensure that there is no impact on the wetlands resources
- Involve local people in decision-making on transformation of wetlands resources, water resources development. Develop long-term plan with full participation of local people
- Involve local people in the protection of resources from destructive exploitations such as the use of illegal fishing equipments, fishing in the restriction season, anarchic logging, cutting of malva trees and other fruit trees, hunting and smuggling of wildlife, etc.

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Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme

The Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme (MWBP) is a joint programme of the four riparian governments of the Lower Mekong Basin – Cambodia, Lao PDR, Thailand and Viet Nam – managed by the United Nations Development Programme (UNDP), IUCN – The World Conservation Union (IUCN) and the Mekong River Commission (MRC), in collaboration with other key stakeholders. With funding from the Global Environment Facility (GEF), UNDP, the Royal Netherlands Government, MRCS, the Water and Nature Initiative (WANI) and other donors, the programme addresses the most critical issues for the conservation and sustainable use of natural resources in the Mekong wetlands. MWBP aims to strengthen the capacity of organisations and people to develop sustainable livelihoods and manage wetland biodiversity resources wisely. It is a five-year (2004-2009) intervention at three levels – regional, national and local – with demonstration wetland areas in each of the four countries: in the Songkhram river basin, Thailand; in Attapeu province in southern Lao PDR; in Stung Treng, Cambodia; and in the Plain of Reeds in the Mekong Delta, Viet Nam. The programme aims to:

- Improve coordination for wetland planning from regional to local levels
- Strengthen policy and economic environments for wetland conservation
- Generate and share information
- Train and build capacity for the wise use of wetlands
- Create alternative options for sustainable natural resource use and improve livelihoods

MWBP is a partnership between governments, aid agencies and NGOs, and provides a framework for complementary work for wetland conservation and sustainable livelihoods in the Lower Mekong Basin.

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