



STREAM



Report on

Sustainable livelihoods
study of Farmer and Fisher

in

Dong Kom village, Kampong Osh commune, Pognear
Leu District, Kandal Province

Supported by

STREAM Initiative in Cooperation
with CFDO and SCALE

August 2002

Acknowledgement

The group of SL study team of Kandal Province would like to thank:

- STREAM Initiative, who provide fund and technical support to our team .
- Community Development Office of Department of Fisheires, facilitating in the SL study
- SCALE team, who provide training on PRA and good consultation.
- Local authorities of Dong Kom village, Kampong Osh commune, Pognear Leu District, Dong Kom community fisheries who allow us to conduct the study in their village.
- Monks and priests,who provide space to conduct village's meeting.
- People in Dong Kom village, who provide accommodation and reserve their valuable time to participate in the study.

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SUMMARY

The main objectives of this study, which is based on the current population census (1998) and key informant interviews (10 to 50 villagers voluntarily represented the 253 families of Dong Kom village, Kampong Osh commune, Pognear Leu District, Kandal Province) is to build capacity of CFDO and provincial staff to conduct sustainable livelihood (SL) study using a more participatory approach. The SL study team, comprised of 1 from CFDO, 4 and 2 from Kandal Provincial Fisheries office and Kandal Department of Women's Affairs respectively.

Before conducting the field study, they were trained for three days in how to use various PRA tools and techniques. They spent five days in the village to investigate the people's livelihood and resources available in the village.

There were 253 families with a total population of 1192 persons (611 female and 581 male) of which they were classified as follows: 17% - very poor, 29% - poor, 35% - fair, 15% - fairly rich and 4% - rich family. The primary occupation of villagers was farmers, growing dry season rice on 1900 ha, besides that they grow other vegetable such as corn, pumpkin, chilies, wax gourd...etc on 200 ha. The secondary occupation was fishers, teachers, traditional medical practitioner, doctor, barbers...etc.

The majority of fairly rich and rich families have agricultural machineries such as tractors, plowing machines, threshing machines and milling machines and have more land while the poor and fair have to hire those agricultural machineries and have less land.

The main infrastructure and resources available in the village were two lines of rural road, one primary school, 19 reservoirs, 2 big lakes, one river, three canals and 450 ha of flood forest.

Traditionally people help each other, especially in the special occasions such as weddings, village ceremonies and they exchange labor during dry rice season. In addition they formed a community fishery, a water usage committee and they charitably contribute to restore the village road and dam.

However there was a growing concern with the increasing population, destruction of flood forest, reduction of soil quality due to the increased use of inorganic fertilizer. In addition this village floods every year, which seriously effects village infrastructure and agriculture produce. Lack of communication with outsiders restrains them from access to a health care center, getting a good price for their agricultural produce and to getting low interest rates, as result more and more villagers are getting poorer.

The villagers request assistance from related institutions to provide them food for labor so that they can use the labor to restore the reservoir, credit for buying inorganic fertilizer and other needs as required improving their livelihood.

There were some issues threatening their livelihood such as some reservoirs already lost their structure and need to be restored, community fishery's by-law were not fully followed which in turn meant some villagers were not satisfied. Conservation of flooded forest has impaired some people from expanding their dry season rice field and cutting for wood. The number of very poor people will increase unless there is intervention from other related institutions since most of the means of production belongs to the rich so the poor need to hire. Traditional use of organic fertilizer was disappearing as the number of animals has declined, subsequently people turn to use inorganic fertilizer instead which is believed to reduce soil quality

1. INTRODUCTION

1.1 Location

Kandal is one of the 24 provinces of Kingdom of Cambodia, surrounded Phnom Penh, border north with Kampong Cham and Kampong Chhnang provinces, south with Takeo province, east with Prey Veng Province and west with Kampong Speu with total area 3,555.42 km².

Kandal province consists of 11 districts with total of 147 communes, 1,087 villages. The total population in the province is 1,099,149. Majority of them are farmer and fishers.

Pognear Leu District is one of the 11 district of Kandal Province which border:

- North with Kampong Chhnang and Kampong Cham Province
- West with Kampong Speu Province
- South with Ang Snoul district, Reusey Kev district and Dang kor district
- East with Mokampoul district, Kandal Province

The district cover area of 31,654.72 ha which total population of 94,668 (Men: 45,661). It consists of 14 communes, 141 villages.

- North with Kampong Cheng commune Pognear Leu district and Bathey district, Kampong Cham Province
- West with Reusey Kev district
- East with Mokampul district



Figure 1: Map of Kandal Province

1.2 History of Dong Kom Village

The history of village took place in 19th century and the name of village was kept unchanged until now. The old people ages 70-80 years old tell the story as follow:

- First story: King in Uthdong era had celebrated water festival by determining the starting point in Kampong Loung village and the end point at Dong Kom canal. The King order to set up a pole to hold lantern and as remark for the final. At the end of the boat competition lantern was hoist up as the symbol of finishing ceremony. Therefore, the village and canal was called “Dong Kom” (Lantern pole) and “Prek Dambangkol” (set up pole canal) respectively.
- Second story: Tadong and Yeay Chhey had ordered King in Uthdong era, who fall in loved their daughter to make a road from Tep Pronom to Louise Khangchheung village over night in order to bring gift. In case the king can not complete the road within over night, he has to crawl from start of village to the end of village or they will have disengaged. At night time Tadong and Yeay Chhey had set up pole and hoist up the lantern at midnight to dup the militia to stop making road because militia assumed that the sun was rising and they will disengage. At that time the King accepted his fail and agreed to crawl. Tadong and Yeay Chhey agreed to marry their daughter to the king as he committed to his promise. The village where King crawled was called “Kampong Chhos Vear village” (step down and crawl village) and village where Tadong and Yeay Chhey set up pole to hoist up lantern was called “Dong Kom village” (Lantern Pole village) until now.

Brief events of Dong Kom Village

1900	Dong kom village was established at the end of 19 th century.
1920-1930	There was 20 families settled along Dong Kom canal and they grew rice and crop and fishing.
1930-1940	There were 30 families. They grew rice, crop and red corn and fishing.
1940-45	There were new migrants from Chhrey lors, Phnom bat and Psa dek communes which increased to 50 families in village. The main occupation was growing red corn. At that time all people in the village, especially men bound by duty to make national road No.5 4 months/person/year. On the other hand, Mr.Searp Isarak militarys’ sergeant, who camps at Veal Prin Saray had demand money from villagers
1945-53	There were 70 families when Mr. Chheng was chief of commune and Mr. Moung was chief of district. The villagers had abandoned their red corn fields due to rats and other insects destroyed and they moved their village to live along the river and did fishing.
1953-60	Cambodia got independence from France. Number of families in village increase to 100 and villagers clear inundated forest to grow red corn.
1960-1970	Number of families in the village was 170. The villagers abandoned their red corn fields again due to wild animal such as tigers, elephants attacked on villagers who look after their crop at night time.
1970-1975	Some villagers escape from battle between Lon Nol and Khmer rouge military. The number of families in village had only 150.
1975-1979	There were 100 families lived in collective and 10-20 families were forced to live in other areas especially in Battambang province in early 1976.
1979	There was 70 families (5 new families) lived in “ Kromsamaky” (solidarity group).
1985	Number of families increased to 200. Land was distributed and titled according to labor force in family. 0.15 ha/person.

2002	There are 253 families (data on July, 2002). They cultivate dry season rice, crop, cut wood and fishing during flooding season. Some villagers work outside village to earn more money to support their families.
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2. Result

2.1 Wealth ranking

Villagers have close relationship and they realize the status of their neighbors. The team invited 11 villagers to classify the villagers' wealth. They classify into 5 groups of household as follow:

- Very poor : 35 households equal to 17%
- Poor : 59 households equal to 29%
- Fair : 71 households equal to 35%
- Fairly rich : 32 households equal to 15%
- Rich : 8 households equal to 4%

- Very poor household

There are 35 out of 205 households are very poor and vulnerable. They are characterized by widow head of family, old people, shortage of labor, many children and most of them are laborers. They are hired to transplant, clear dry season rice fields, weight lift etc... This group of household have no or have little 0.15 to 0.3 ha of paddy field. They get only 600-800 kg of rice per year, which can consume only during harvest season and pay the debt. The old people in the village reported that before they had dry season rice fields as they got sick or some other demand, they had to borrow money from other and the debt increased which force them to sell land to pay the debt.

- Poor household

There are 59 poor households in the village. They have 0.3 to 0.6 ha of paddy field and 0-0.06 ha of secondary crop field and get 1200-1800 kg of rice per year, which can consume only 3-4 months. The rest of the year they have to work for other to make living.

-Fair household

There are 71 fair households in the village. They do not have any serious issues in making living. They have 1-3 ha of paddy field and 0.06-0.25 ha and get more than 2,700 kg of rice per year. In addition they also have boat, cows, buffaloes and some other have pumping machine. Some families have their daughter work in garment factory, who can earn some money to support their families.

-Fairly rich household

There are 32 fairly rich households in village. They have 3-10 ha of paddy land and 0.06-0.25 ha of crop land and get more than 12,000 kg of rice per year. They also have motorized boat, cows, buffaloes, plowing machine and some households have tractors. . Some families have their daughter work in garment factory.

-Rich household

There are 8 rich households. They have more than 10 ha of dry season rice fields (one household has 47 ha) and 0.25-1 ha of crop land and get more than 36,000 kg of rice per year. They have motorized boat, pumping machine, plowing machine, tractor some households have threshing machine and rice mill.

Table1: Wealth ranking of villagers in Dong Kom village

Item	Very poor household	Poor household	Fair	Fairly rich	Rich
Rice production	600-800kg/year	800-1800 kg/year	more than 2,700 kg/year	more than 12,000kg/year	more than 36,000 kg/year
Paddy field	0-0.3 ha	0.3-0.6 ha	1-3 ha	3-10 ha	more than 10 ha
Secondary crop field	no	0-0.06 ha	0.06-0.25 ha	0.06-0.25 ha	0.25-1 ha
Animal	no	pig, chicken, duck 1-2 heads	cow, buffalo, pig, chicken, duck 2-3 heads	cow, buffalo, pig, chicken, duck 2-3 heads	co, buffalo, pig, chicken, duck
Credit	Borrow money and rice with high interest rate	Borrow money and rice with 20%/month interest rate	few households borrow few money	no debt, can lend some money or rice to relatives	no debt, can lend some money or rice to relatives
Agricultural facilities	no	no	plowing machine	tractor and plowing machine	tractor, plowing machine, threshing machine, rice mill
Motorize boat	no	few households have	many households have 1	1-2	
Number of children	3-7	3-7	2-5	2-5	3-4
Radio, TV	no	few households	many households	every households	every households

2.2 Resources

Table2: Main resources available in Dong kom village

Human resource	Infrastructure	Natural resource	Social structure	Income source
<ul style="list-style-type: none"> -9 monks -Pagoda's committee and priest - 15 teachers -Chief of village -3 house construction workers - 3 traditional medical practitioners -know how to make fence and trap -40 garment workers - Two persons who charge battery -6 tailors -2 barbers -1 photographer -1 traditional birth attendant -1village health care person - 3 carpenters -3 boat repairers -3 motor repairer - Know how to drive tractor, plowing machine, threshing machine and rice mill 	<ul style="list-style-type: none"> - Primary school -1 kindergarten - 2 rural roads -1 pagoda -19 dams -1 temporary community fishery office -1 village port -1 private water pumping station 	<ul style="list-style-type: none"> - 450 ha of flooded forest - 2 big lakes - 1900 ha of dry season rice - 200 ha of secondary crop field - 1 river -3 canals -Fish and wild animals 	<ul style="list-style-type: none"> - Community fishery - agricultural production facilities service - Tradition and culture of helping each other - Charitable contribution to construct village's road and dike 	<ul style="list-style-type: none"> -Selling agricultural produce - Fishing - Garment factory -Laborers -credit service -Collecting wood -Battery charge - Village shop

2.2.1 Human Resource

Most of villagers in Dong Kom village are dual occupation farmer and fisher. The village locate in lower level so it flood during flooding season. Most of them know how to make fence, trap from generation to generation. Nowadays garment sector provide 40 jobs for women in the village and they can get US\$ 40/month/person. Beside that there are 15 teachers, 3 traditional herbal practitioners, 3 house construction workers, Two persons who charge battery,6 tailors, 2 barbers,1 photographer,1 traditional birth attendant,1village health care person, 3 carpenters,3 boat repairers,3 motor repairer and know how to drive tractor, plowing machine, threshing machine and rice mill. Most of them can read and write. Majority of illiterate are women.

2.2.2 Infrastructure

There are two lines of rural road. One is using for local traveling and other for transporting agricultural produce. Local traveling road is important and it is restored with participation of villagers. There is 1 primary school which has 3 buildings, one building is under construction and the other two buildings have 4 rooms, which can accommodate 250 students. Village's port is very important because village locates the other side of national road. There is one pagoda and one temporary community fishery office. There are 19 dams which can store water to irrigate rice fields. These dams were constructed long time ago and need to repair. There is one private water pumping station which provides pumping water service in exchange for rice...../ha.

2.2.3 Natural resource

Most of agriculture land is appropriate for dry season rice and crop. So far there are 1900 ha of dry season rice field and 200 ha of crop field (village report). There is 450 ha of flooded forest which serve as spawning area, wood and wild animal sanctuary, 2 big lakes, 3 canals, one river. These natural resources play an important role in supporting their livelihoods.

At present, these natural resources are threatening due to population increase and clearance of flooded forest for dry season rice. It is reported that the villagers is intensifying use of inorganic fertilizer which lead to unfertile and hard soil. In addition, this village is flooded every year and in some instance it seriously floods and dry which effected their cultivation.

Land Use Map of Dang Kom Village

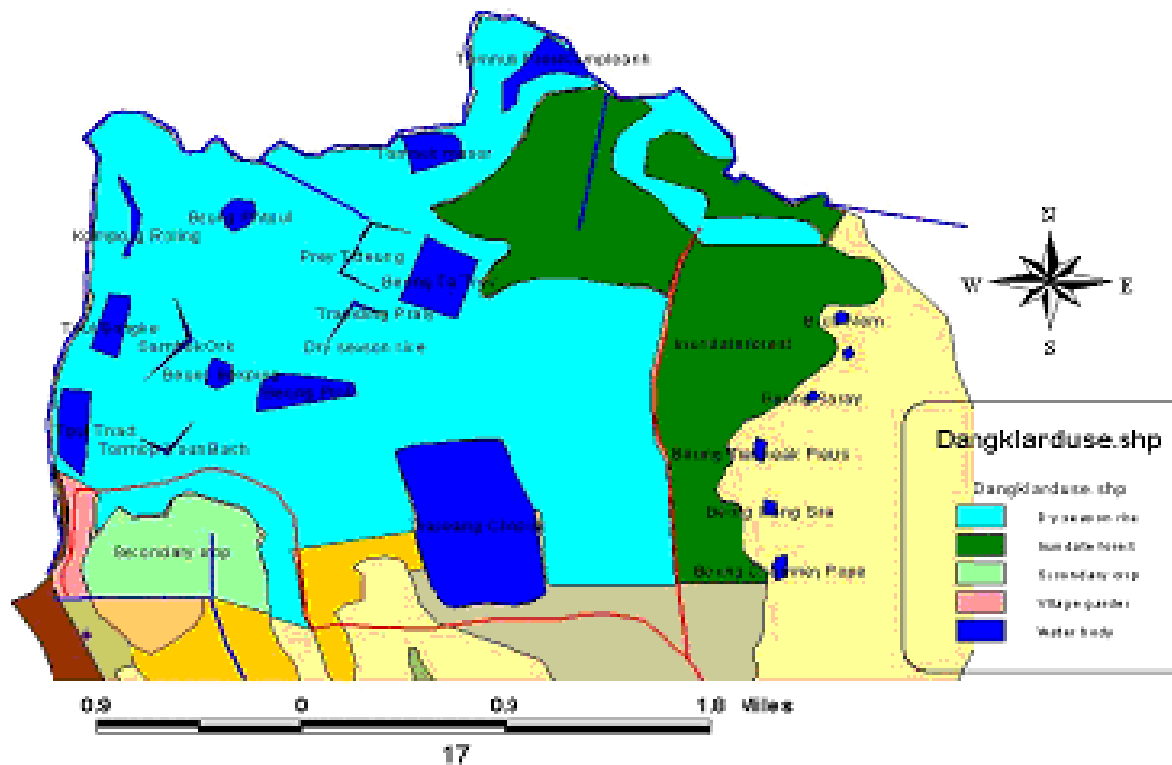
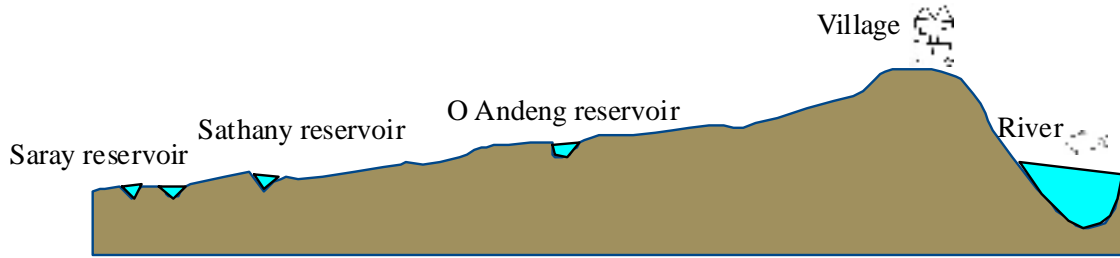


Figure 2: Land Use Map of Dong Kom Village

Topography transect of Dang Kom Village



Soil type and main crop	Soil grade 3 Sandy -clay	Soil grade 3 Sandy -clay	Soil grade 2 Silty -clay	Soil grade 2 Silty -clay	Soil grad 1 Alluvial soil	Soil grade 1 Alluvial soil	River
Rice	 Conflict is still unsolve between villagers and villagers over land tenure Rice yield 3.6t/ha	 Dry season rice 1 crop/year 3 t/ha	 Dry season rice 1 crop/year 3.6-4.2 t/ha	 Dry season rice 1 crop/year 4.2 t/ha	 Dry season rice Jan-June 6 t/ha	 Houses Cow Pig	
Other crops					 Corn, chillies, mung bean, pumpkin cucumber	 Loofah, courgette, pumpkin, cucumber	
Rainy season	Fishing during rainy season 	Small-scale fishing 	Fishing during rainy season 	Fishing during flooding season 	Fishing during flooding season 	Fishing year round 	Source of water
Domestic and wild animals	Cutting firewood Obey community fishery's by-law Water lily Moring glory	Growing lotus Fishing, catch wild animals Collect crabs, snails Hunting water birds, monkeys, turtle during receding season	Collect snails Water lily Catch mouse destroy grass Look after cows after harvesting	Cutting firewood Transplanting... during dry season look after cows Crabs Snails Water lily Moring glory Destroy grass Catch mouse	Look after cows during dry season 	Transportation	

Figure 3: Topographical transect of Dong Kom village

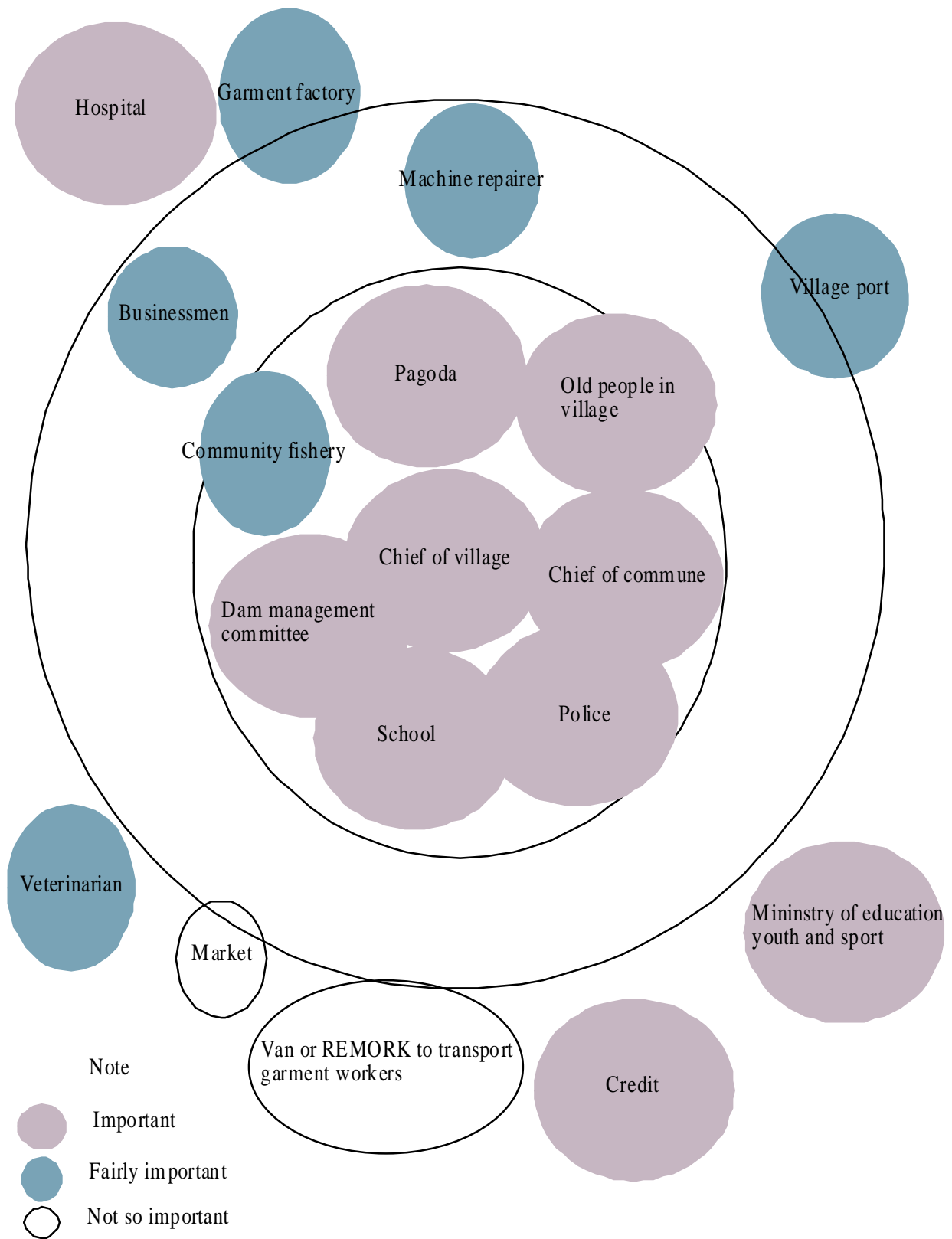
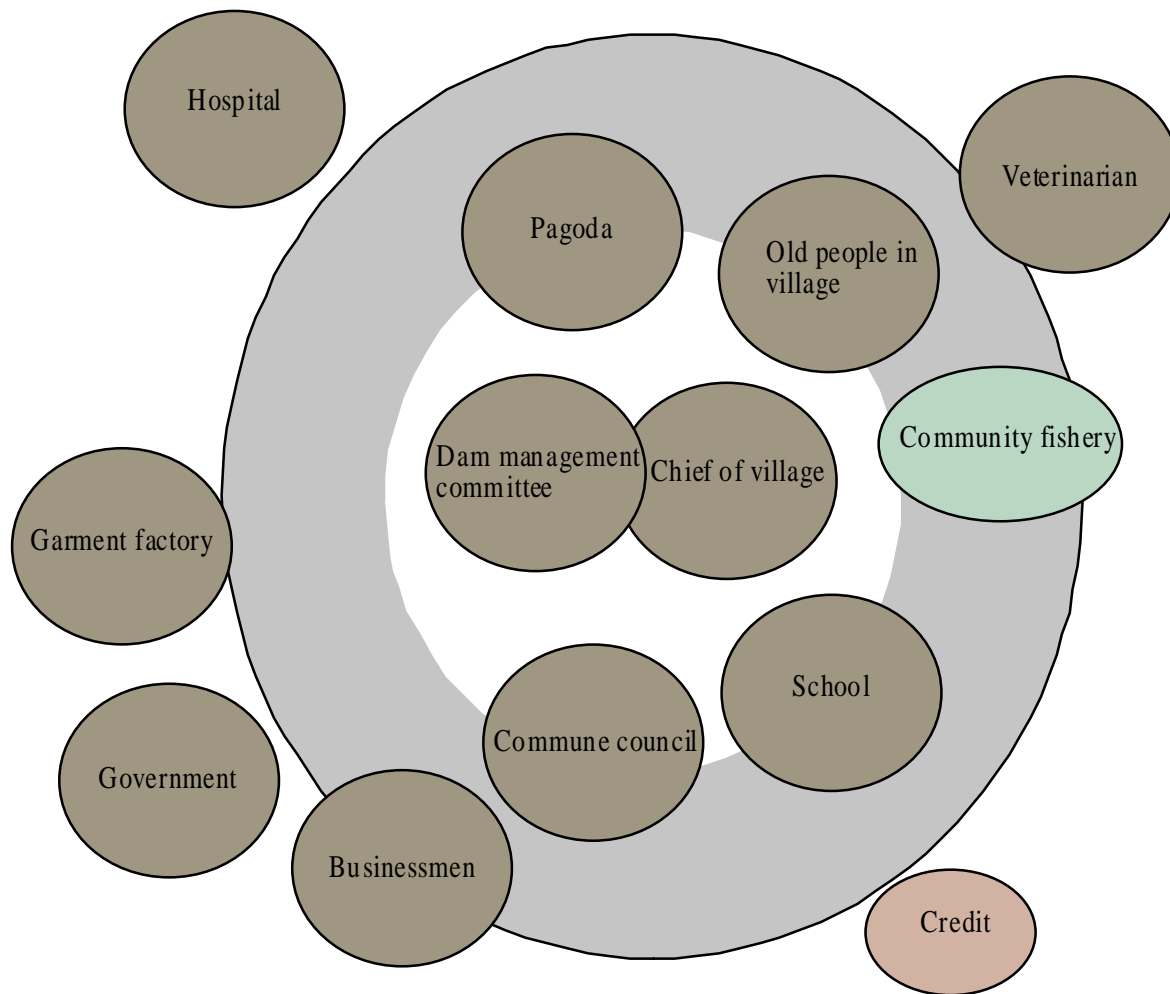


Figure 4: Men's Venn diagram



Note

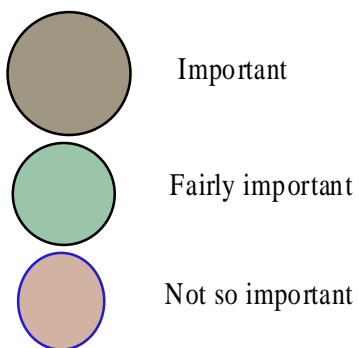


Figure 5: Women's Venn diagram

2.2.4 Social structure

Most of villagers are relative. They have good consolidation and help each other in the occasion such as house construction, wedding, ceremony, someone sick etc... Community fishery is a tool to manage natural resources in the village. Exchange labor was not practiced in the village for whom do not have agricultural production facilities (plowing machine or draft animal) need to hire 80,000 riel/ha. The villagers charitably contribute to trust fund for building rural road and forms group to manage dams. However, there are few number of villagers who are selfish and they do not want to contribute and often have conflict in competing for dry season rice field.

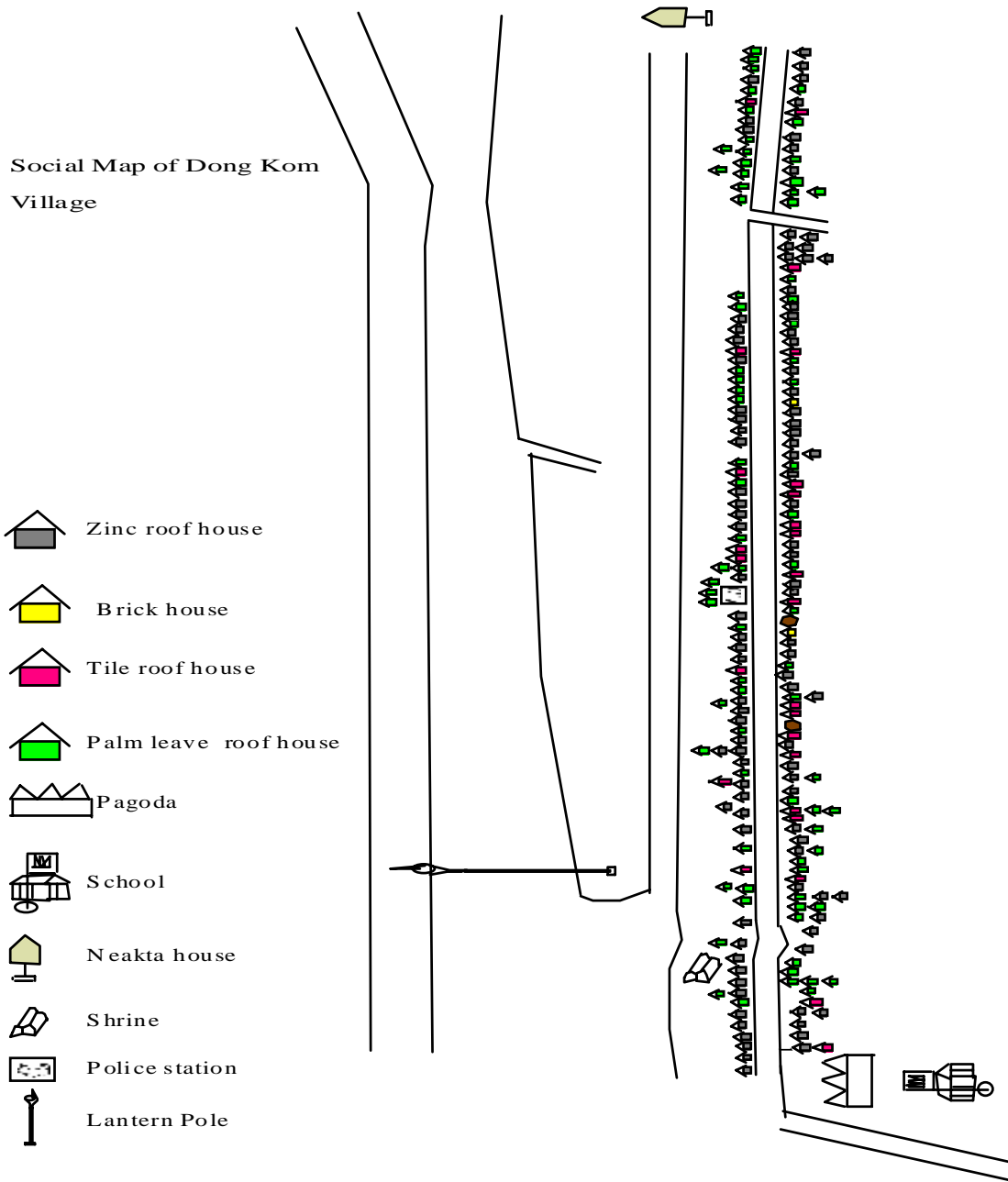


Figure 6: Social Map of Dang Kom Village

To get insight into social communication the study team has separately interviewed men and women (see diagram...). In both diagrams show that they have close relationship with chief of village, dam management committee, old people, commune council, pagoda committee and school. Each of these persons and organizations has the following role and responsibilities:

- Chief of village helps in general activities in the village.
- Dam management committee is responsible for repairing dams and irrigation system.
- Old people and pagoda committee help to solve problem, raising fund and villagers can borrow various facilities from pagoda.
- Commune council is responsible for protecting the benefit of villagers.

Hospital and government officers was considered two institutions which are not so close to them since there is no hospital in the village and it is difficult to communicate with government officers. Men and women have difference idea on how important of middle men, creditor, community fisheries, garment factories and veterinary. Man group rank middlemen are not so important while women group rank them very important even though interest rate is quite high but it serves for routine need. For ACLEDA (credit provider), men rank it very important, while women rank it fairly important as women can borrow money from it, but they have to pay debt in short period and confiscate asset in case the debtor can not pay on time. Women group rank community is not important for them while men rank it fairly important. As women did not know the objectives and roles of community fisheries and community fisheries itself is not clearly set out. Women rank garment factory and veterinary is very important while men rank is not so important.

2.2.5 Income source

There are 253 families in the village. The main sources of income are come from selling rice which average price is 350,000 riel/t. Some families have sent their daughters to work at garment factories getting US\$ 40/ month or more. Those who have tractor, plowing machine can plow for the villagers pricing 80,000 riel/ha. Some service providers such as person who charge battery, barbers, boat repairers, motor repairers, carpenters and tailors can earn 7,000 to 10,000 riels/day. However, this earning is unpredictable. For women who have young child can transplant rice for other can earn 3,500 riel/day. The poor who go fishing and cutting wood during flood season can earn 4,000 riels/day. Generally, they can earn money from selling pigs, chickens, ducks and other crops. Even though they can earn from various sources, the poor and very poor still face a number issues leading them to borrow money from money lender in or outside village

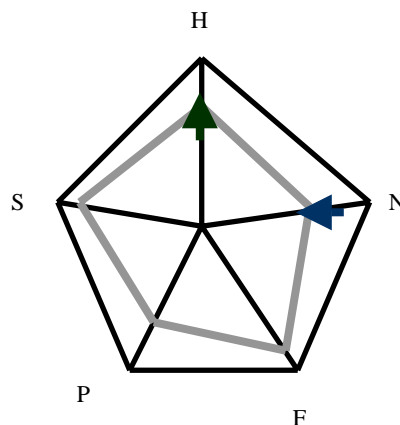


Figure 7: Five resources available in Dongkom village

2-3 Vulnerabilities

2-3-1 seasonal calendar

Villagers and SL study team have taken number of candies they put in each month to represent the level of activities. They put 0 to 5 candies to represent no activities to the busiest activities. Men group selected lunar calendar starting from the 12th month of lunar calendar while women select solar calendar starting from January. However, both calendar systems were used to compare the activities of men and women in each month.

Cultivation of dry season rice is the main activity of the villagers. The villagers engage in various activities such as plowing, harrowing, nurse seed bed, transplanting seedling follow water receding. Men engage in these activities more than women. Women tend to work in spraying seed, transplanting and harvesting while men engage in all activities from clearing plants to harvesting.

Main secondary crops being cultivated include corn, chili, pumpkin, courgette, loofah etc... Villagers cultivate corn in clearance forest without plowing. Women engage in seedling, nursing and harvesting while men engage in all activities of cultivation.

Men engage in fishing activities from July to December whereas women sell fish come from their spouse or son's caught. Women group reported that most of families in the village have husband or son go fishing for daily consumption and some families have extra for selling. Men do not care so much about small amount of income.

After harvesting rice, men go cutting wood from June to July and left it in the forest until September then they will transport to village or sell some firewood to support their living.

Some works are exclusively for women such as husbandry and garment factory. In term of social affair such as ceremony, celebration, New Year or Phchom Ben day women seem to get involve more than men.

Villagers reported they are lack of money from December to March and they need to borrow money to spend on agricultural material and facilities.

Seasonal calendar

Men

Months*	Mid-Nov	Mid-Dec	Mid-Jan	Mid-Feb	Mid-Mar	Mid-Apr	Mid-May	Mid-Jun	Mid-Jul	Mid-Aug	Mid-Sept	Mid-Oct
Activities												
Dry season rice	○ ○ ○ ○ Harrowing	○ ○ ○ ○ Seedling	○ ○ ○ ○ Maintenance	○ ○ ○ ○ Maintenance	○ ○ ○ ○ Maintenance	○ ○ ○ ○ ○ ○ Harvesting	○ ○ ○ ○ ○ ○ Harvesting	○ ○ ○ ○ ○ ○ Harvesting	○ ○ ○ ○ ○ ○ Plowing			
Growing vegetable			○ ○ ○ ○ Growing	○ ○ ○ ○ Maintenance	○ ○ ○ ○ Maintenance	○ ○ ○ ○ ○ ○ Harvesting	○ ○ ○ ○ ○ ○ Harvesting	○ ○ ○ ○ ○ ○ Harvesting				
Growing corn						○ ○ ○ ○ Growing	○ ○ ○ ○ ○ ○ Harvesting	○ ○ ○ ○ ○ ○ Harvesting				
Cutting firewood								○ ○ ○ ○ ○ ○ Cutting and collecting	○ ○ ○ ○ ○ ○ transporting			
Fishing								○ ○ ○ ○ ○ ○ Cutting and collecting	○ ○ ○ ○ ○ ○ transporting	○ ○ ○ ○ ○ ○ transporting	○ ○ ○ ○ ○ ○ transporting	○ ○ ○ ○ ○ ○ transporting
Animal disease	○ ○ ○ ○ Cows and buffaloes have disease	○ ○ ○ ○ Cows and buffaloes have disease				○ ○ ○ ○ ○ ○ Pigs, chickens and ducks have disease	○ ○ ○ ○ ○ ○ Pigs, chickens and ducks have disease					
Ceremony								○ ○ ○ ○ ○ ○ Pchom Ben	○ ○ ○ ○ ○ ○ Pchom Ben	○ ○ ○ ○ ○ ○ Pchom Ben	○ ○ ○ ○ ○ ○ Pchom Ben	○ ○ ○ ○ ○ ○ Pchom Ben
Married					○ ○ ○ ○ ○ ○ Pchom Ben	○ ○ ○ ○ ○ ○ Pchom Ben	○ ○ ○ ○ ○ ○ Pchom Ben					
Borrow money	○ ○ ○ ○ ○ ○ Buy agricultural facilities	○ ○ ○ ○ ○ ○ Buy agricultural facilities	○ ○ ○ ○ ○ ○ Buy agricultural facilities									
Selling rice						○ ○ ○ ○ ○ ○ Paying debt	○ ○ ○ ○ ○ ○ Paying debt	○ ○ ○ ○ ○ ○ Paying debt	○ ○ ○ ○ ○ ○ Paying debt			
repair roads							○ ○ ○ ○ ○ ○ Paying debt	○ ○ ○ ○ ○ ○ Paying debt				

Figure 8: Seasonal calendar of men

Seasonal calendar

Women













Months	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
 Dry season rice transplanting Maintenance Harvesting	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○							
 Cultivating crops Growing Maintenance Harvesting	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○					
 Feeding animal	○	○	○	○	○	○	○	○	○	○	○	○
 Collecting firewood						○	○					
 Selling fish	○	○	○	○	○	○	○	○	○	○	○	○
 Working at garment factory	○	○	○	○	○	○	○	○	○	○	○	○
 Ceremony New Year Pchom Ben	○	○	○	○ ○ ○ ○	○	○	○	○	○	○ ○ ○ ○	○	○
 Married			○		○ ○	○	○					
 Human disease Children have itch catch cold dengue fever	○			○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○				○ ○ ○ ○	○ ○ ○ ○
 Borrowing money	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○									○ ○ ○ ○
 Borrowing rice	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○								○ ○ ○ ○
 Animals disease Chicken disease Pig get diarrhea Cow disease				○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	

Figure 9: Seasonal calendar of women

2.3.2 Trend line

Villagers have drawn the incident and resources change on diagram. There are 7 diagrams showing the number of families, area of flooded forest, area of dry season rice, number of cattle, usage of inorganic fertilizer, rice yield and number of tractor and plowing machine.

Due to civil war, people have to move to other place for safety reasons so there is not much incident to be remembered.

Number of families

The old people in the village remembered that in the 1930s there were only 20 families. In the 1950-1970s the number of people increased as Cambodia gained independence from the French. In 1970-79 the number of people decreased due to civil war and the massacre in the Pol Pot regime. From 1980 up to now the number of people has increased as some people return to their village. The team observed that there is no family planning service in the village and villagers are concerned about the increasing number of people while areas of cultivation remain unchanged and resources are depleted.

Area of flooded forest

It was noted that the area of flooded forest changes in the following period.

- 1940-45 and 1950-60 area of flooded forest decreased as people cleared for red corn cultivation.
- 1945-50 and 1960-70 area of flooded forest increased as pests destroyed their crops and wild animals such as tigers and elephants came out at night and attacked the villagers.
- 1970-75 area of flooded forest continued to increase as a result of civil war.
- 1975 up to now people cleared flooded forest for dry season rice cultivation.

Area of dry season rice

Traditionally, villagers cultivated dry season rice on areas around their village. However, since 1975 villagers started to extend their dry season rice area into flooded forest areas. This act adversely impacted on natural resources in the village. The current establishment of a community fishery had drafted a by-law in order to protect the remaining flooded forest. Consequently, some villagers resist the by-law as they thought they had lost their benefit.

Cattle

The main purpose of growing cattle is to plow and sell. The number of cattle in the village is closely related to the civil war and economy situation. Between 1973-75 the number of cattle in the village decreased as villagers moved to safety places and they were forced to sell their cattle. Between 1975-1980 the number of cattle increased as they were needed for agriculture production. The number of cattle has decreased since then as villagers have changed to use tractors or plowing machines instead. They also provide some reasons such as village floods, there is no place to locate cattle, it is difficult to look after (disease during rainy season) and difficult to collect grass during dry season.

Usage of tractor and plowing machine

Villagers started to change the pattern of using agriculture facilities from using cattle to tractor or plowing machine. Usage of light plowing machine is increased subsequently. This change provides positive impact on mean of production. However it also provide negative in term of soil fertility as there are no cattle to provide manure.

Inorganic fertilizer usage

It is recognized that use of inorganic fertilizer make soil hard and infertile however there is no sign of decreased usage. Villagers claimed that if inorganic fertilizer was not used, rice yield will drop as result they will loss.

Rice yield

Villagers recognized that rice yield considerably associate with 4 main factors: rice variety, fertilizer, soil and water. Obviously, between 1953-79 villagers did not use inorganic fertilizer and cultivated local variety rice yield was not so much fluctuated. In between 1979-80 rice yield was increased as soil was fertile, taken from new clearance of flooded forest and they used local variety and IR36. Rice yield did not increase in between 1980-85 as soil gradually become infertile and they used small amount of inorganic fertilizer. Rice yield have increased since 1985 up to now as people intensify use of inorganic fertilizer and introduce of IR66, IR69 and recent flood from the main river bring the fertile soil.

2.3.3 Vulnerabilities

Base on our study we identify the vulnerabilities of villagers in Dong Kom village as follow:

- Flood: when water level in the river raises too high it may flood village destroy crops, infrastructure and cattle. However if water level in river too low make soil infertile (no water current to bring fertile soil to rice field), lack of water to irrigate and pest destroy crop.
- Clearance of flooded forest: lost of flooded forest mean lost fish spawning areas, water birds, make soil infertile, lack of firewood, strong wind and wave during rainy season.
- Soil fertility decrease: rice yield decrease which in turn increase use of inorganic fertilizer.
- Population increase: population increase but agricultural land area keep unchanged, the need to extract natural resources increase.
- Number of very poor and poor families: 46% of family in village.
- Irrigation system damaged and was unable to restore
- High interest rate
- Cattle which are the source of organic fertilizer and income decrease and increase use of inorganic fertilizer.
- Villagers commonly have stomach problem and dengue fever.

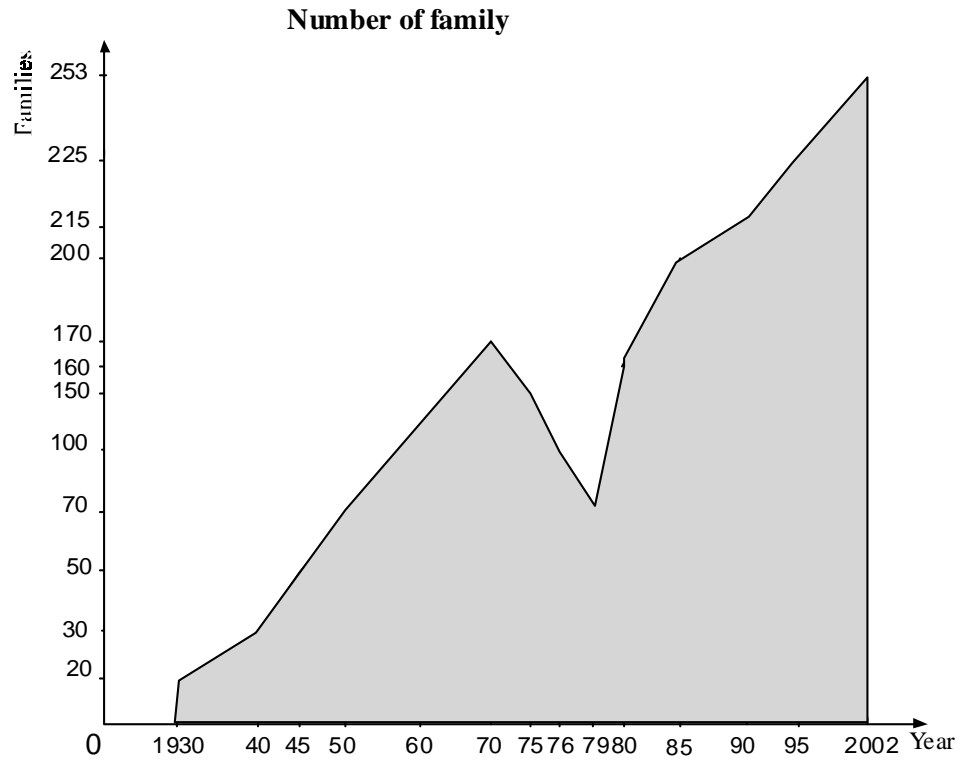


Figure 10: Population trend in Dong Kom village

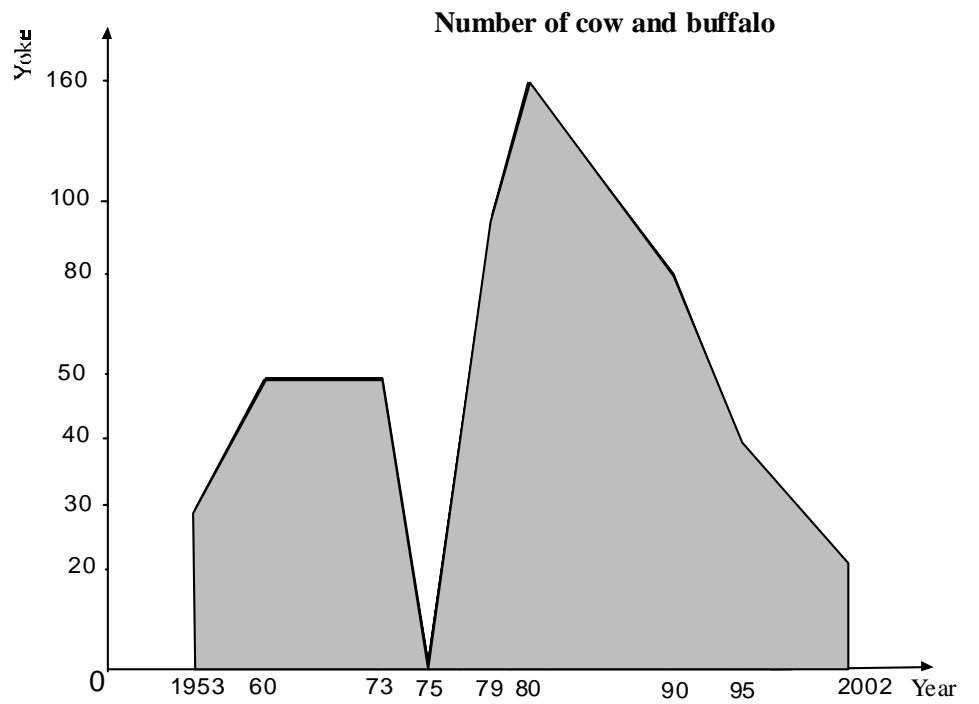
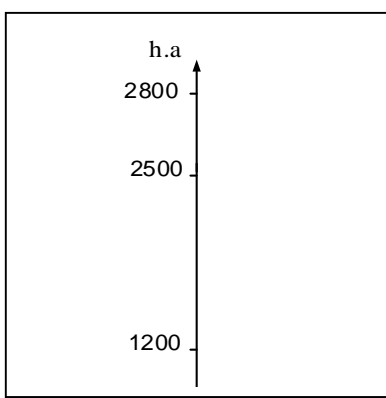


Figure 11: Number of yokes of cow and buffalo



Inorganic fertilizer usage

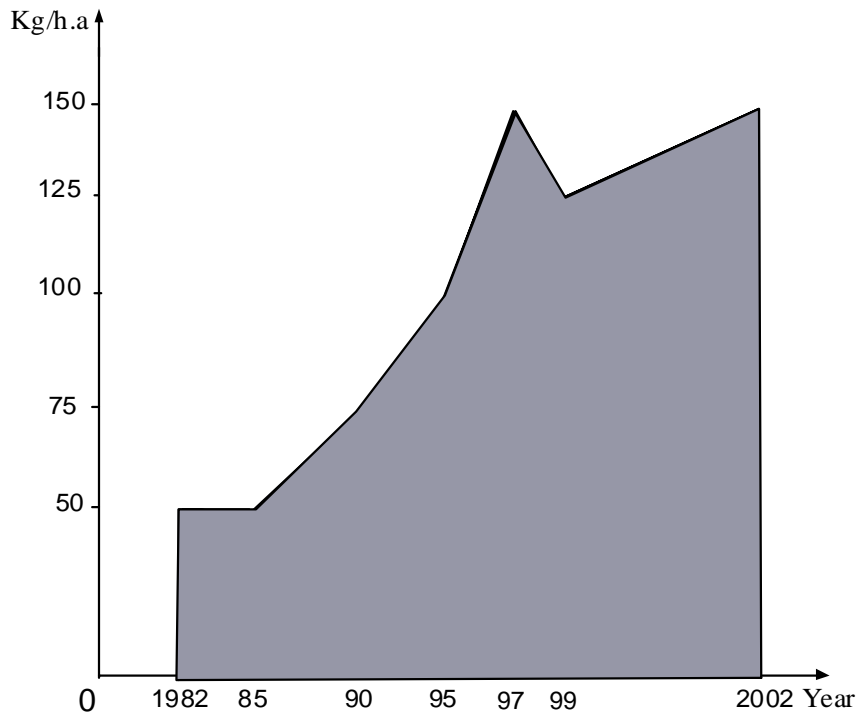


Figure 14: Amount of inorganic fertilizer use

Rice yield

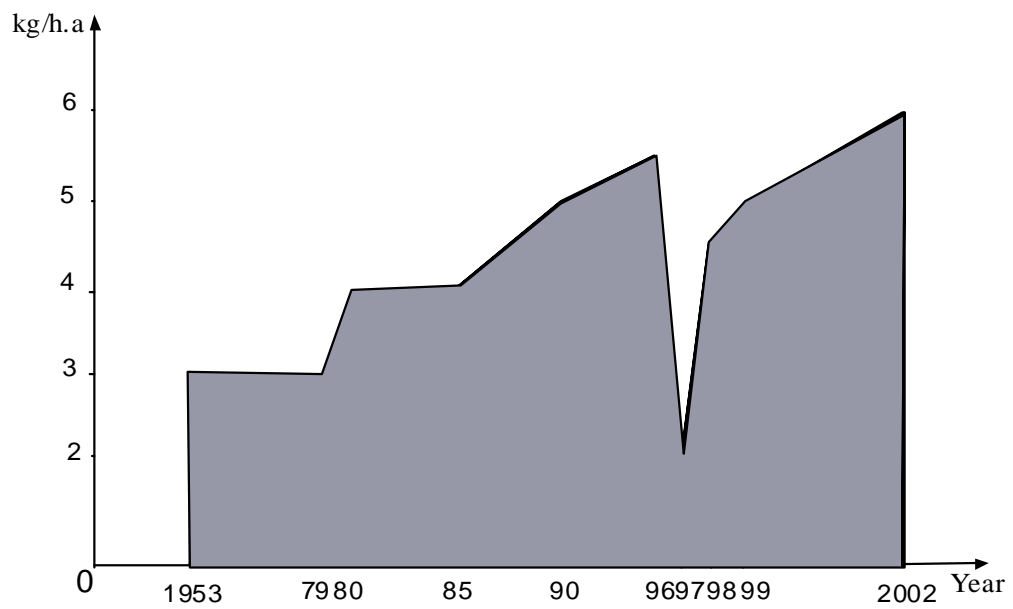


Figure 15: Trend of rice yield
Number of tractors and plowing machines

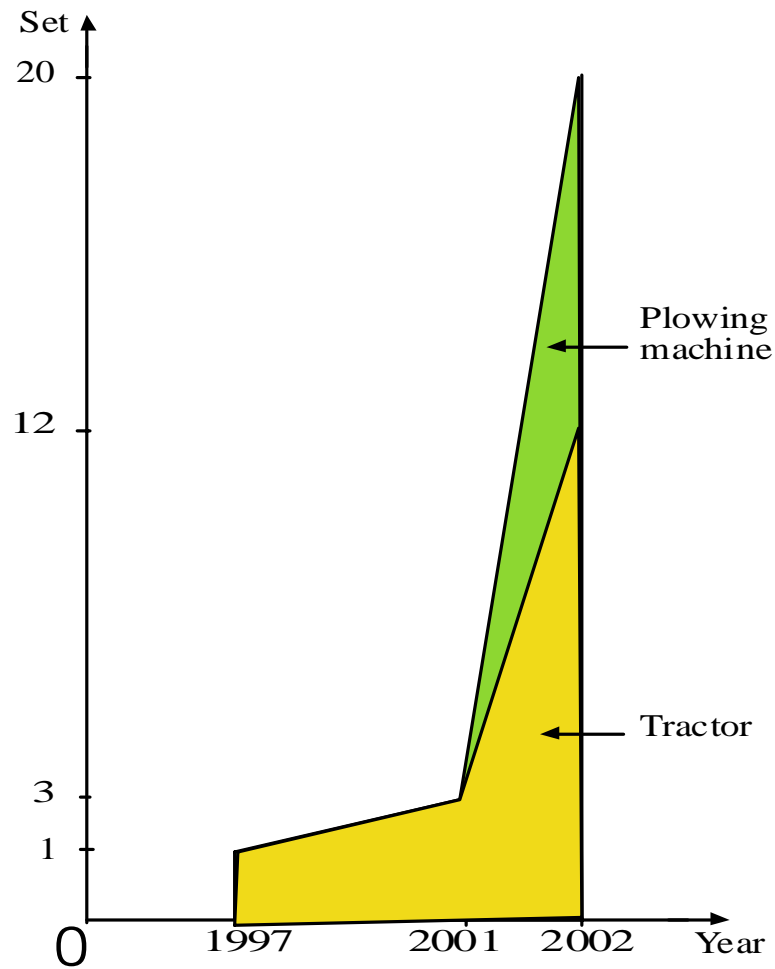


Figure 16: Trend in use of plowing machine and tractor

2.4 Institutions and process

Government institutions, Businessmen and civil society are the three main institutions which may affect their daily livelihood.

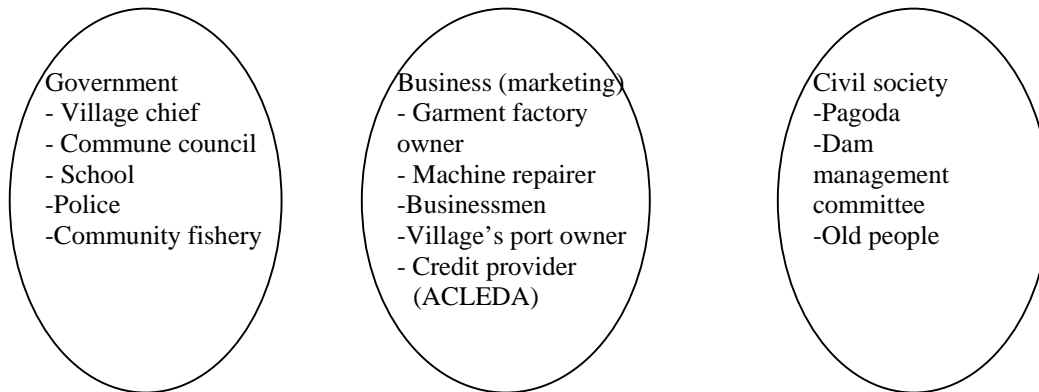


Table 3: Analysis of institutions in Dong Kom village

Institution		Positive	Neutral	Negative
Government	Village chief	√		
	Commune council		√	
	School	√		
	Police		√	
	Community fishery			√
	Ministry of education youth and sport	√		
Businessmen (marketing)	Garment factory owner		√	
	Machine repairer	√		
	Middlemen			√
	Village's port owner			√
	Credit provider (ACLEDA)			√
	Car's owner	√		
Civil society	Pagoda	√		
	Old people	√		
	Dam management committee	√		

Government

As shown in diagram, in Dong Kom village governmental institutions closely link to villagers are:

- Chief of village help to solve any problems the villagers faced and guide and communicate with outside institution.
- Commune council and police was considered as mid-authority, look for intervention upon requested by villagers.
- Community fishery, so far did not do anything which benefit villagers yet so they rank negative.

- Ministry of Education Youth and Sport built one building made of brick and tile roof which have four class rooms.

Government institutions provide positive impact on villagers' livelihood even though some villagers are not fond of management of community fishery.

Businessmen (marketing)

Even though work in garment factory provide salary to villagers they rank garment factory owners have no positive impact on them as they think the salary is low and work over time. Machine repairers are very important for them since 75% of villagers use motor. Middlemen (lend money, buy agricultural produce) get high interest rate and give cheap price of agricultural produce. Village's port owner gets the ferry price high. Van's owner or remork motor transport their daughter to garment factory. Credit provider (ACLEDA) get very high interest rate. However, villagers recognize the role of businessmen on their livelihood such as the determination of agricultural price, interest rate and supply of materials.

Civil society

Pagoda is a place for celebrating any ceremonies in the village. Old people are the coordinator and facilitator in solving any problems at village level and request for donation. Dam management committee was elected by villagers to build, repair and maintenance dams.

Civil society does not have much influence and have few activities in the village.

2.5 Livelihood strategy

The villagers in Dong Kom village mainly depend upon agriculture such as dry season rice cultivation, grow crops and fishing. Majority of very poor and poor families do fishing, collect firewood, work as labor and rear few chickens or ducks. Some other have special skill such as engine repair, hair cut, sewing or working at garment factory.

To earn for living they face a number of issues and SL team have classified and analyzed the effect and root of problems in order to solve the problems.

Villagers especially very poor, poor and fair families are interested in problem classification. The problems they faced include: lack of access road to market, water to irrigate, pumping machine, inorganic fertilizer, pesticide, rice seed, low rice yield, low rice price, few dam,...etc. As there are several problems villagers were asked to give the priority.

2.5.1 Problems faced and classification

Table 4: Problems ranking

No	Problems	Score	Percentage (%)
1	Dam	53	12.04
2	Low rice price	43	9.77
3	Lack of access road to market	38	8.63
4	Dry season rice	35	7.95
5	Lack of inorganic fertilizer	34	7.73
6	Build Prek Anlongtreypo canal	34	7.73
7	Lack of pumping machine	32	7.30
8	No bridge to pass Taduong canal	32	7.30
9	Lack of rice seed	32	7.30
10	Credit	29	6.60
11	Speed boat drive very fast during rainy season	23	5.23
12	Lack of water to irrigate	18	4.10
13	Lack of boat to travel	17	3.86
14	Lack of pesticide	12	2.73
15	Low rice yield	8	1.80
	Total	440	100

There are 22 participants of who 7 are women and 15 are men. They were given 20 bullet stones to represent their priority. 5 bullet stones (score) was the highest priority issue. Three main problems are taken for analysis.

2.5.2 Problem analysis

Dams

Dry season rice cultivation totally depends upon the water from reservoir. Due to natural disaster some reservoirs was damaged and it was prioritized the first problem. When dams damage

the villagers are very difficult to cultivate as they have to borrow money from middlemen to buy pumping machine or hire pumping machine. In case serious situation they do not have water to irrigate. The roots of problems are: short dam, lack of money to repair and lack of communication with outsider. Among these three root of problems villagers agree to select lack of money to repair dam as the major problem to address.

Low price of rice

Base on result from the vote, low rice price is the second priority problem. There are three roots of problems: no intervention from government, borrow money from middlemen and can not access to market. Villagers aware that can not access to market is the main problem lead to low rice price. SL team thinks it is the competence of government to find the market for the farmers

Road to transport agricultural produce

Road to transport agricultural produce is the third problem. This road was built long time ago, currently some people take some part of road for their rice paddy. This problem raise the conflict among the villagers and SL team thought this should be addressed by local authority.

Dry season rice field

It is the conflict between the villagers and it is in the process of complaining. So SL team is unable to study any further.

Lack of inorganic fertilizer

As villagers do not have enough money to buy inorganic fertilizer they have to borrow money or advance inorganic fertilizer and pay rice later with high interest rate. Intensive use of inorganic fertilizer and no credit provider with low interest rate are the two root of problems which SL team and villagers address by establishing inorganic fertilizer credit and they need support from outsider.

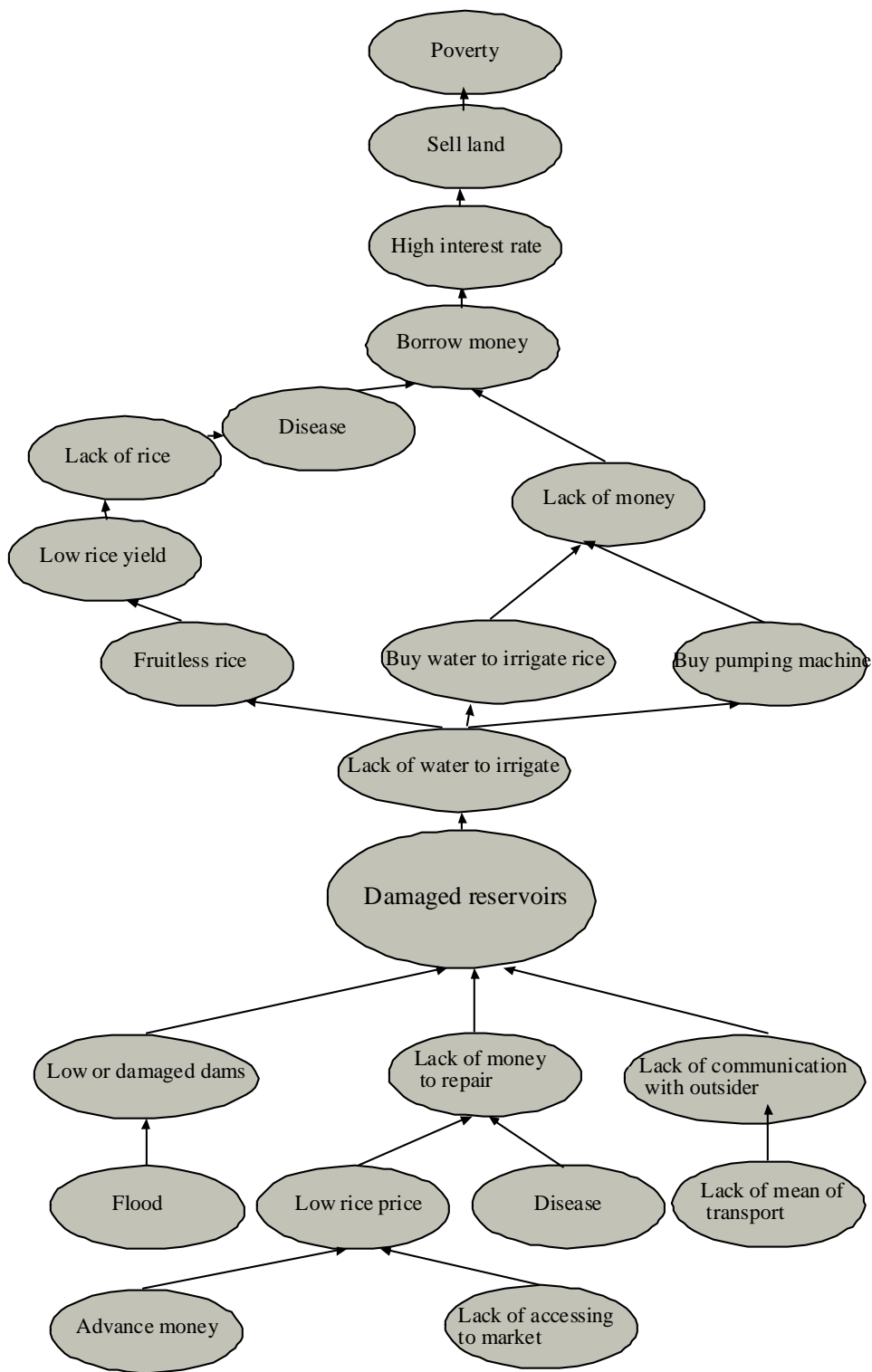


Figure 17: Problem trees of damaged reservoir

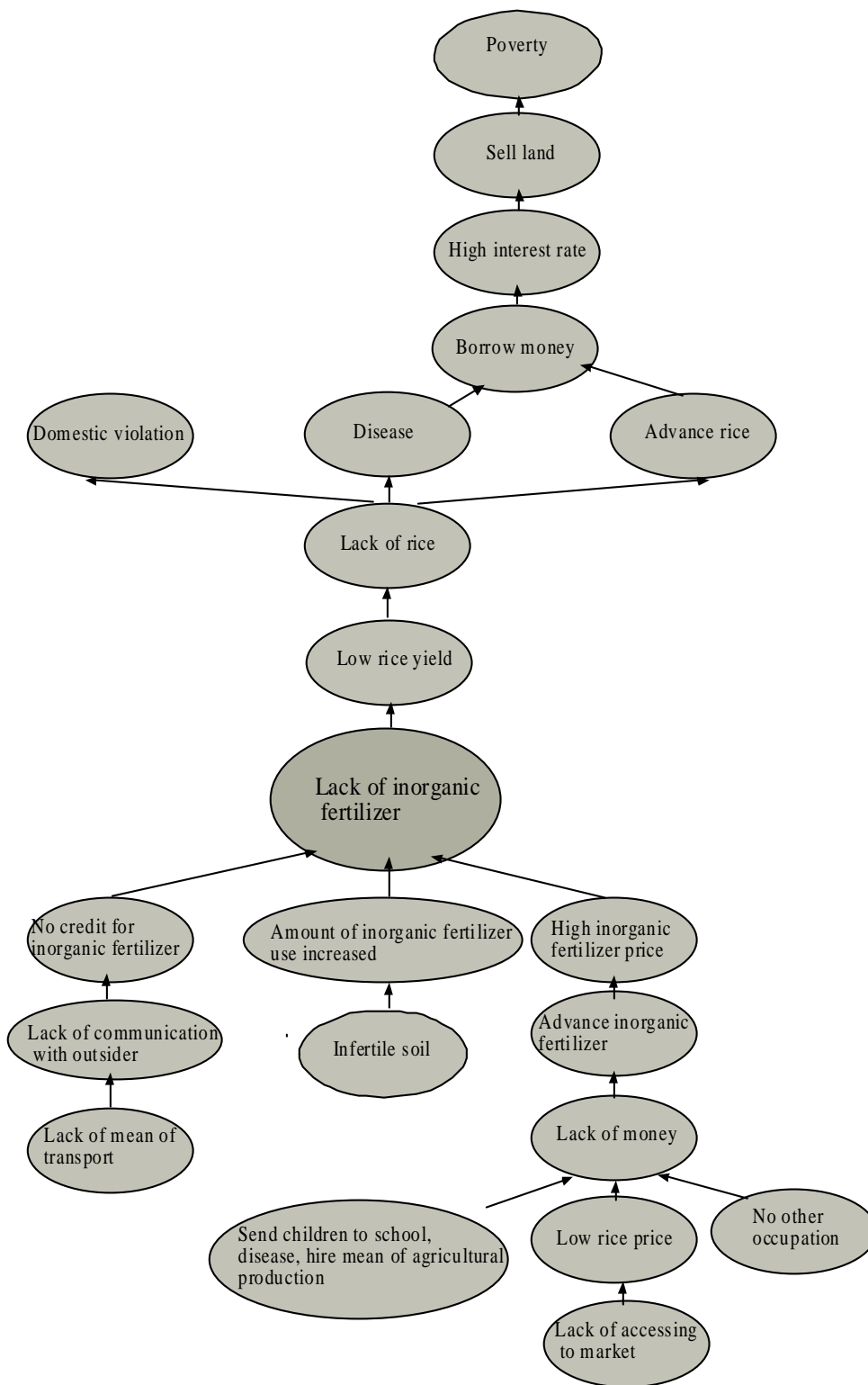


Figure 18: Problem tree of lacking inorganic fertilizer

2.5.3 Action plan

After classifying and analyzing problems villagers actively participated in doing work plan. The villagers selected dams reparation as the first priority to do work plan. Since most of dams was damaged and could not store water. If dams are repaired they will have enough water to irrigate their dry season rice and do not have to buy water from other.

There are 19 dams in Dong Kom Village:

- Boeung Phtolkhangtbong dam
- Boeung Phtolkhangtchheung dam
- Kampong roign dam
- Bek Pign dam
- Chhoung San dam
- Toteung Tgney dam
- Prey Toteung dam
- Toul Antears dam
- Anlong Treypo dam
- Mesor dam
- Youn Bach dam
- Ta Tragn dam
- O Andegn dam
- Sambok Ork dam
- Prek Kampleagnleu dam
- Toul Thnot dam
- Ta Oung dam
- Trapang Chouk dam

Each dam have one group chief to take responsible the dam and manage the group members who have dry season rice field close to the dam or use water from the dam to irrigate. Each group chief was elected by villagers since 1979.

In the work plan villagers selected Boeung Phtolkhantbong to repair. This dam has 800 m long, 4 m width and 1 to 1.5height. There are two chiefs namely Prak Pheng and Sum Song and 32 families as members. This dam was considered as the model for other dams reparation.

The last work plan was inorganic fertilizer credit. Most of villagers use inorganic fertilizer. They use UREA and DAP 2 to 3 bags/ha. If they do not use inorganic fertilizer, they will get low yield. There are 95% of families in the village joint inorganic fertilizer credit. Inorganic fertilizer credit committee will take responsible to manage and distribute. Each group has 15 families and group chief will take responsible to manage. Each family need 6 bags of inorganic fertilizer and they need before seed nursing (mid-November) and pay back after harvesting (July). They will be in cash to group chief and group chief will pay to committee.

Table 5: Work plan to repair Boeung Phtolkhangtbong dam

Step	Initiate	Participant	Material & labor	Problem faced	Time frame
Select responsible persons	- Prak Pheng - Sum Song	32 families			1979
Request for contribution	- Prak Pheng - Sum Song	32 families	Money and labor	Difficult and late	April 2002
Repair	- Prak Pheng - Sum Song	32 families		Lack of money to hire somebody ...	April-May 2003
Maintenance	- Prak Pheng - Sum Song	32 families	Contribute 3,000-4,000 riel/family	Some families can not afford	Repair every two years. regulation set up since 1986

Table 6: Work plan for inorganic fertilizer credit

Step	Initiate	Participant	Material & labor	Problem face	Time frame
Select committee member	Village chief	People	Pens, books and paper		1/10/02
Organize group	Committee	People and local authority	Pens, books and paper	A bit difficult to ask people to joint the meeting	2-3/10/02
Register member	Committee	People	Pens, books and paper		4-7/10/02
Set up regulation	Committee and village chief	People	Pens, books and paper	Some difficult in discussion	7-10/10/02
Determine the need of members	Members	Members	Pens, books and paper		10-17/10/02
Communication	Committee	Government organization, red cross, NGOs	Mean of transport	Lack of money	17-31/10/02

2.6 Outcome of sustainable livelihood

Table 7: Analysis on intervention

	Intervention on				
	Increasing income	Improving welfare	Poverty reduction	Improve food security	Sustaining natural resources
Dams reparation	√	√	√	√	√
Inorganic fertilizer credit	√		√	√	

Villagers in Dong Kom village realize that if Dams were repaired they can:

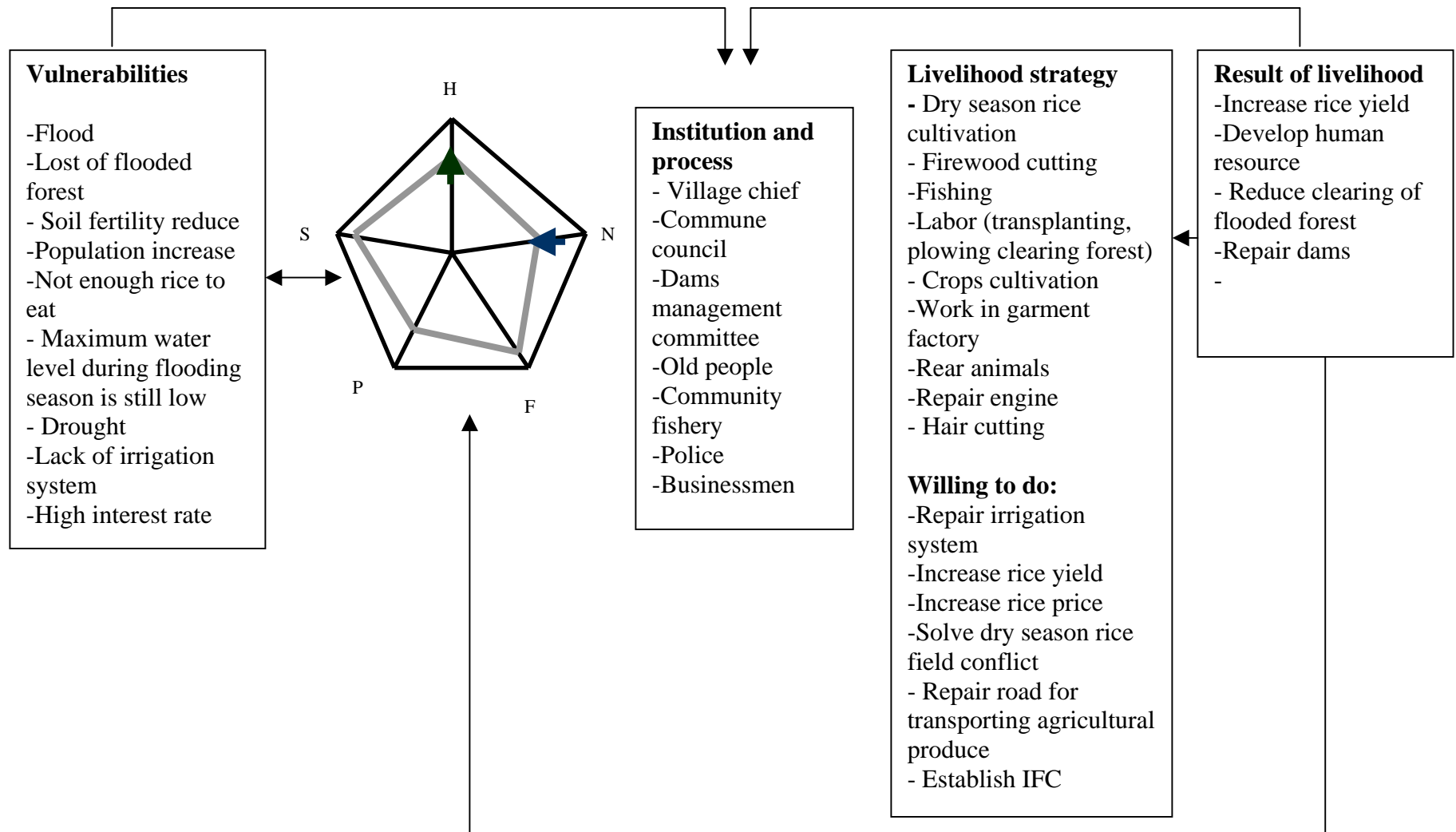
- Increase income: because they have enough water to irrigate dry season rice and they do not have to buy water from other. They also get high yield.
- Improve welfare: because they have enough food to eat and left some rice to sell.
- Improve food security: When they have enough water they get high yield so they have enough food to eat.

Beside that villagers want to establish inorganic fertilizer credit (IFC) in the village because they know it will:

- Increase income and reduce poverty: if IFC was established the incidence of villagers borrow money from money lender will reduce hence, they can sell high rice price.
- Improve food security: When they use inorganic fertilizer, their rice yield will increase therefore, food security is improved.

2.7 Analysis base on sustainable livelihood framework

Sustainable livelihood framework of villagers in Dong Kom village



3. Conclusion and recommendation

3.1 Conclusion

Most of villagers are farmers and fishers who totally depend on natural resources available in the village. They get income from selling rice, fish, firewood, secondary crops, animals and work outside village. Villagers face some difficulties as follow:

- Reservoirs and irrigation system will seriously damaged if there is no restoration
- Community fishery's by-law were not fully participated which in turn some villagers were not satisfied
- Conservation of flooded forest has impaired some people from expanding their dry season rice field and cutting for wood
- Number of very poor and poor families will increase if there is no intervention from outside institutions.
- Traditional use of organic fertilizer was disappearing as the number of animals has declined, subsequently people turn to use inorganic fertilizer instead which is believed to reduce soil quality.

3.2 Recommendation

- Food for labor and credit are the two action plans required support from outside.
- Related institutions and NGOs should provide credit service in order to reduce interest rate
- There should have some kind of intervention to built capacity of members of community fishery committee to use participatory management approach.