

**CGIAR Research Program on  
Climate Change, Agriculture and Food Security (CCAFS)**

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**Village Baseline Study:**

**Site Analysis Report for Rohal Suong village  
Aek Phnom district, Battambang province,  
Cambodia (CA01)**

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**January 2015**

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## **Abstract**

This report presents findings from a village baseline study conducted in Rohal Suong village in Cambodia. Findings have been gathered from focus group discussions and participatory resource mapping with community members in Rohal Suong. The site analysis is part of the CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS) Baseline Survey work and provides information on community resources, the organizational landscape, and information networks at the village level. These indicators will be monitored over time and compared across other village sites to assess changes in food security and natural resource management.

The baseline study shows that Rohal Suong is endowed with several types of natural resources, with little farm system diversification and livelihoods, but good access to physical and institutional infrastructure.

When it comes to networks of information, the findings show that people receive and access a variety of community-level information, as more than 60% of the households can access a TV and/or radio. However, most of the accessed information does not necessarily relate to agriculture, weather, climate and/or environmental changes.

The main challenges include deteriorating natural resources, high input costs on the farm with low production profitability. The community also lacks understanding of how to adapt their agriculture practices to the now increasingly variable seasonal cycle of flooding and drought. The community has identified irrigation water management and farm trainings as priorities for increasing agriculture productivity and profitability in the village.

## **Keywords**

Baseline, Cambodia, village study, participatory mapping, organizations

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## 1. INTRODUCTION

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic ten-year partnership between the CGIAR and Future Earth to deal with the threats posed by a changing climate, to achieve food security, improve agriculture and livelihoods. In 2014, CCAFS South East Asia region identified sites for implementing Climate Smart Villages (CSVs). Six sites were selected in three countries of Vietnam, Cambodia and Lao PDR. The objectives of CCAFS CSV is to increase the adaptive capacity of small-holder farmers in light of climate change effects, improve livelihoods by sustainably increasing productivity and resilience, mitigate climate change by reducing greenhouse gases (GHGs), and enhance national food security and development goals.

In Southeast Asia, the surveys were carried out in three countries, namely Cambodia, Vietnam, and Laos. This report presents findings from the Village Baseline Study (VBS)<sup>1</sup> conducted in Rohal Suong village in Cambodia. The study evaluates three topics: community resources, organizational landscape, and information networks. The study aims to provide baseline information at the village level on basic indicators related to, for example, natural resource utilisation, organizational landscapes, and information networks for weather and agricultural information. These indicators can be compared across sites and monitored over time. As a part of the baseline study, the research team assisted the village in creating a community vision map.

The objectives of the village baseline study are to:

1. Collect baseline data on indicators that allow site comparability and monitor changes in the villages over time. In particular, these are changes that allow people to manage current climate risks, adapt to long –run climate change, and reduce/mitigate greenhouse gas emission;
2. Understand the enabling environment that mediates certain practices and behaviours and creates constraints and opportunities (policies, institutions, infrastructure, information and services) for communities to respond to change;
3. Gather information on the aspirations of the community in order to make future interventions more sustainable and easily adopted.
4. Explore gender differentiation.

This report is presented in five sections: the Introduction is followed by a brief overview of the methodologies used, brief profile of Rohal Suong village, and the results relating to the three evaluated topics – community resources, organizational landscapes, and information networks. A conclusion and recommendations for CCAFS end this report.

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<sup>1</sup> Detailed tools and guidelines used for the implementation of the VBS across all CCAFS sites, as well as the manuals, data, and analysis reports can be accessed online: <http://ccafs.cgiar.org/resources/baseline-surveys>.

## 2. METHODOLOGY

The local research team came from the non-governmental organisations, WorldFish and Aphivat Strey (AS), and the Department of Agriculture of Battambang Province and the Department of Agricultural Extension. The team first approached local authorities, the commune chief, and the village leader and informed them about the purpose and agenda of the field exercise and study. Invitation letters were then sent to sets of participants chosen through random sampling. Each set was composed of two groups of 15 participants each: one group consisting of only men and one of only women. The two groups were then separated to discuss the same topics, to better capture gender-based differences in perspectives, concerns and needs. The study was conducted over three consecutive days from the 28<sup>th</sup> to the 30<sup>th</sup> of October 2014. On each day, one set of participant groups participated in focus group discussions (FGDs).

On the first day, all community people were invited to participate in an introductory session where the team explained the purpose of the study and their expectations. After the session, the two selected groups of men and women carried on with the exercises. The whole community was again invited at the end of the third day to attend a debriefing session where the team shared a preliminary summary of the findings.

The team showed a satellite image of the area and worked with each group to identify, map and sketch important community resources, describe the current and past states of these resources, and identify the causes of the changes to happen (topic one). At the end of the exercise, each groups had produced a village resource map. . The process of identifying important resources in the community depended on how well participants were able to understand and interpret the satellite image.

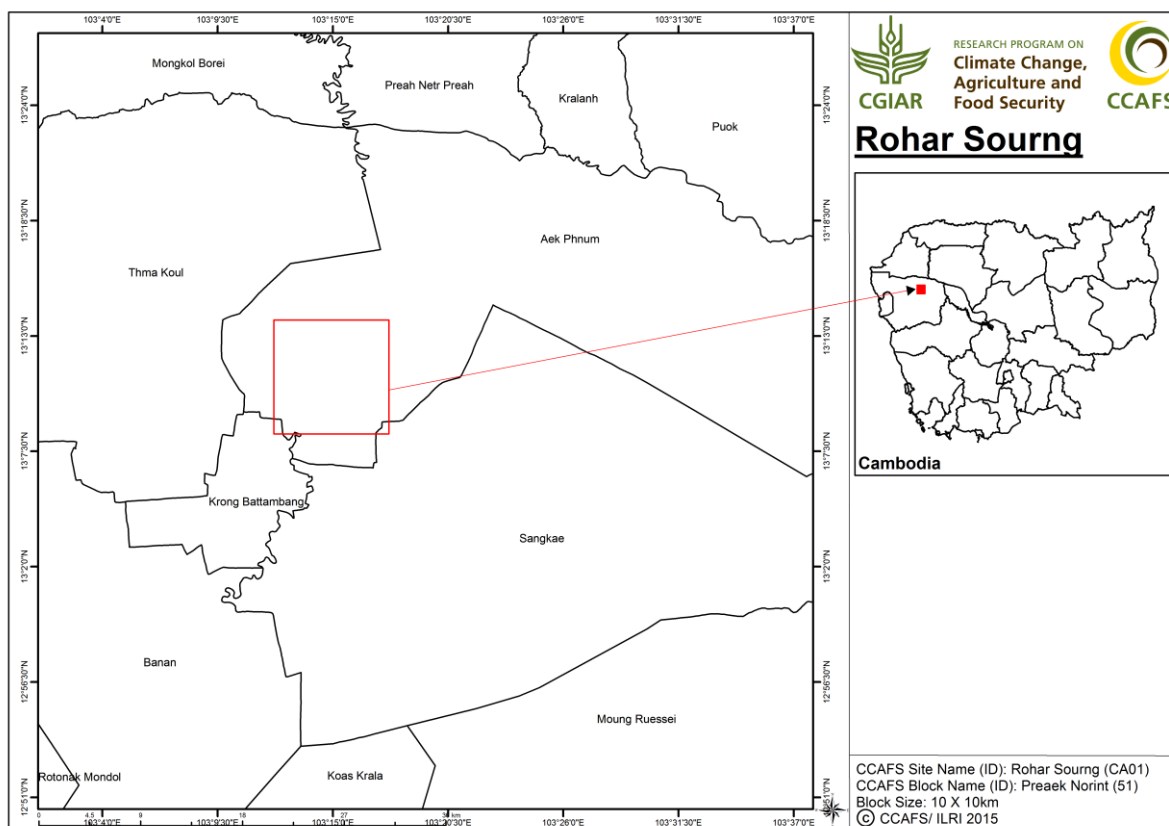
The task on day two was to work with each group to understand the organizational landscape (topic two) in the community and how organisations work with food security, food aid, and natural resource management. The outputs were diagrams illustrating the organizational landscape. Information on each organization was also captured on cards.

There were two main tasks on day three. The first task was to work with each group to understand information networks (topic three) in relation to weather issues and farming activities, illustrated through diagrams. The second task was to bring the two groups together to generate a common vision of how their village should look like in the future. The output was a map/sketch showing this community vision.



### 3. BRIEF PROFILE OF ROHAL SUONG VILLAGE

Rohal Suong village is located in Prek Norin commune, Eak Phnom district of Battambang province, Cambodia (Map1). The village is classified as a land-based village (Johnstone et al., 2013) situated along Sangke River and about 15 km distant from Battambang town. The total land size is 291 ha comprised mainly of paddy field, crop plantation field (Chamkar), and residential areas (Praek Norint Commune, 2012). Generally the agricultural land is flooded during the rainy season that starts in September and ends in November or December. Residential areas and roads are also flooded during the heavy flood years. In 2014, the total population in Rohal Suong village was 1,354 (342 families), which is comprised of 670 women and 684 men. About 35.64 percent of total families are categorized as the poor in the village (Praek Norint Commune, 2012).



**Map 1. Location of the Rohal Suong village, a climate-smart village (CSV) site, in Aek Phnom district, Battambang province, Cambodia**

## 4. RESULTS

### 4.1. Topic 1: Community resources – participatory satellite imagery interpretation and visioning

Community resources, as well as gender-differentiated access and utilisation of those resources, were analysed using a process of participatory visual interpretation of high-resolution satellite imagery (RapidEye). The aim was to create a basic understanding of existing community resources, as well as community dynamics in relation to the local environment. Initially, the participants discussed the current state of resources in terms of quality, access, management, history, and potential drivers of change. Later on, a group consisting of both men and women developed a number of sketches covering village resources and human well-being up to year 2030 in order to understand opportunities, constraints, and aspirations for the future.<sup>2</sup> Results are shown in this section.

#### 4.1.1 Current resources

Men and women in Rohal Suong village were brought in to discuss current resources in their community. Two separate discussions took place: one with men and one with women. The satellite image map and a brief introduction were given to each group who were then able to discuss in detail the current resources and land uses. As a result, current uses of land resources, water resources, and infrastructure were identified and sketched (see Maps 2, 3, and 4). These three main types of resources and how participants discussed their relevance and conditions are described in more detail below.

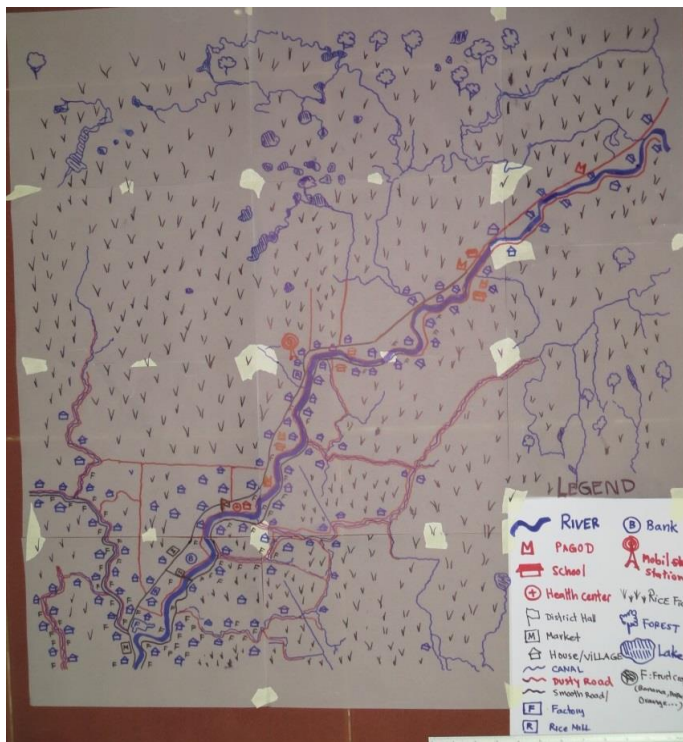


Photo 1. Current conditions: land uses, natural resources, and infrastructure identified by women

<sup>2</sup> A detailed approach to this exercise is outlined in the CCAFS Village Baseline Study Implementation Manual on CCAFS website <http://ccafs.cgiar.org/resources/baseline-surveys>

*Farmland:* Farming is classified as a major occupation in the Rohal Suong village, and every households has land for agricultural production. The average family size is six and the average land holding is seven Rai<sup>3</sup>, which covers a rice field and crop planting area, and a residence. The area of farmland has increased significantly in the last 10 years as a result of clearing flooded forests, grasslands, and filling in natural ponds. The major crop is rice, followed by maize, watermelon, and cucumber. Most farmers have increased their rice cultivations from a single crop to two crops (wet season and dry season rice) per year. New rice varieties have been introduced in the village, providing higher yields. However, these new varieties require intensive inputs such chemical fertilizer, pesticides, and water.

A good harvest will mean most farmers have adequate rice for household consumption for up to one year, and some are also able to sell some rice in the market. However, floods and droughts have in the past destroyed the community rice production. For instance, in 2012 and 2013, rice yields were severely damaged by drought and flood respectively. Thus, some households were faced with an insufficient amount of food for a few months. To cope, some household members – especially young men and women – look for work in the cities and in Thailand, while the elders and children continue to fish and farm complementing crops.

The trend of raising cattle has started to decline as households are now purchasing agricultural machinery, combined with less available grassland for grazing. However, small livestock such as pigs, chickens and ducks are increasing in number, albeit slowly.

*Grassland:* Available grassland is diminishing rapidly as a result of farmland expansion. Farmers have not been able to freely graze their cattle in last 10 to 15 years. Instead, farmers keep their cattle near their household or on their farm, feeding them grass or plants from own fields. Stop free grazing strongly influenced to share of labour in agricultural works. Small farming machines are rapidly replacing animal power in the village.

*Rivers:* The Sangke River (or Stung Sangke in Khmer) is one of the main rivers in the Battambang province. The Sangke River is approximately 250 kilometres long and flows through 27 communes in six districts in Battambang province before draining to the Tonle Sap Great Lake. The average depth of the river is 2.35m and 6.79m in dry and wet seasons, respectively (PDOWRAM, 2013)<sup>4</sup>. It flows through Prek Norint commune and is the main water source feeding into the small irrigation system, especially important for irrigating dry season rice. Villages within Prek Norint commune also use water from the Sangke River for domestic purposes. In addition, the Sangke River provides a pathway for fish to migrate from the Tonle Sap Lake to flooded forests, open fields and other river channel networks in wet season. Thus, the Sangke River is a great fishing ground for local people. Both men and women from the group discussions mentioned that fish from the river is declining and that riverbank erosion is another noticeable problem.

*Irrigation canals:* Canals bring in water from the Sangke River to the rice fields in the area. The men's FGD focused on this particular water channel because it is very important to the local rice production, especially during the dry season. A Water User Committee was formed to better manage the water and related channel, while a culvert from the river to the channel was partially installed in 2013 using locally mobilized resources. The installation of

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<sup>3</sup> Rai is local measurement unit, one hectare equals 6.25 Rai

<sup>4</sup> Provincial Department of Water Resource and Meteorology (2013) *Presentation of flood damaged in Battambang, 2013*. Provincial Department of Water Resource and Meteorology (PDOWRAM): Battambang (In Khmer version).

the culvert was completed in late 2014, co-financed by WorldFish and local villagers. The water channel has since been improved, and it is now slightly wider and deeper, which makes it easier to send water to sub waterways. The men's FGD suggested that there is a potential to expand the water channel, which could help irrigate additional rice fields and connect to the fish conservation pond. The villagers use a pump to draw water from the Sangke River into the culvert, which then drains the water channel. The village is lending the pump from the Ministry of Water Resources and has done so for the last two years. The pump is managed by the Water User Committees.

*Ponds:* There are several ponds located in the paddy rice fields and in the flooded forests. *Ta Ek* is one of the biggest ponds in the area and is being used as a fish conservation pond, managed by the Community Fisheries group. The small ponds usually dry up during the dry season and to survive, the fish move to the larger *Ta Ek* pond. During the wet season, the fish migrate out into small ponds, the water channels, and into the rice fields where local farmers catch them. There are also some small ponds in the flooded forest, which are part of the conservation area, and a few of the ponds in the area are filled up by soil and used for farming.

*Road:* There is one good road that connects Battambang town with the Rohal Suong village, and other villages that are located towards the Tonle Sap Lake. The road was built by the Royal Government of Cambodia in 2011 and can be accessed by truck, motor cart, tractor, motorbike, and bicycle. It plays a very important role in transporting agriculture products, including fish, and in connecting local people to towns and markets. Some parts of the road in Rohal Suong and adjacent villages have previously been inundated during heavy seasonal flooding. Besides the main road, there is a small road, bumpy and dusty in some parts, located along the Sangke River bank. It is currently being used to transport agricultural and fisheries products by handy-tractors, motor carts, motorbikes, and bicycles.

However, there are no proper roads to the paddy fields; only narrow pathways. These paths are flooded in the wet season and are generally not in good condition. The paths are small and bumpy and water channels and ponds cover some parts. However, they still play a very important role in transporting agricultural products from the fields to local residences using bicycles, motorbikes and handy-tractors.

*School:* There is a primary school located in the middle of the village. The school condition is good; there are adequate classrooms, teachers, and school officials, as well as a running tap water system and playground. This school is supported and funded by external development agencies and the Royal Government of Cambodia. The village children and adjacent villages attend the school and continue to secondary school in the district town.

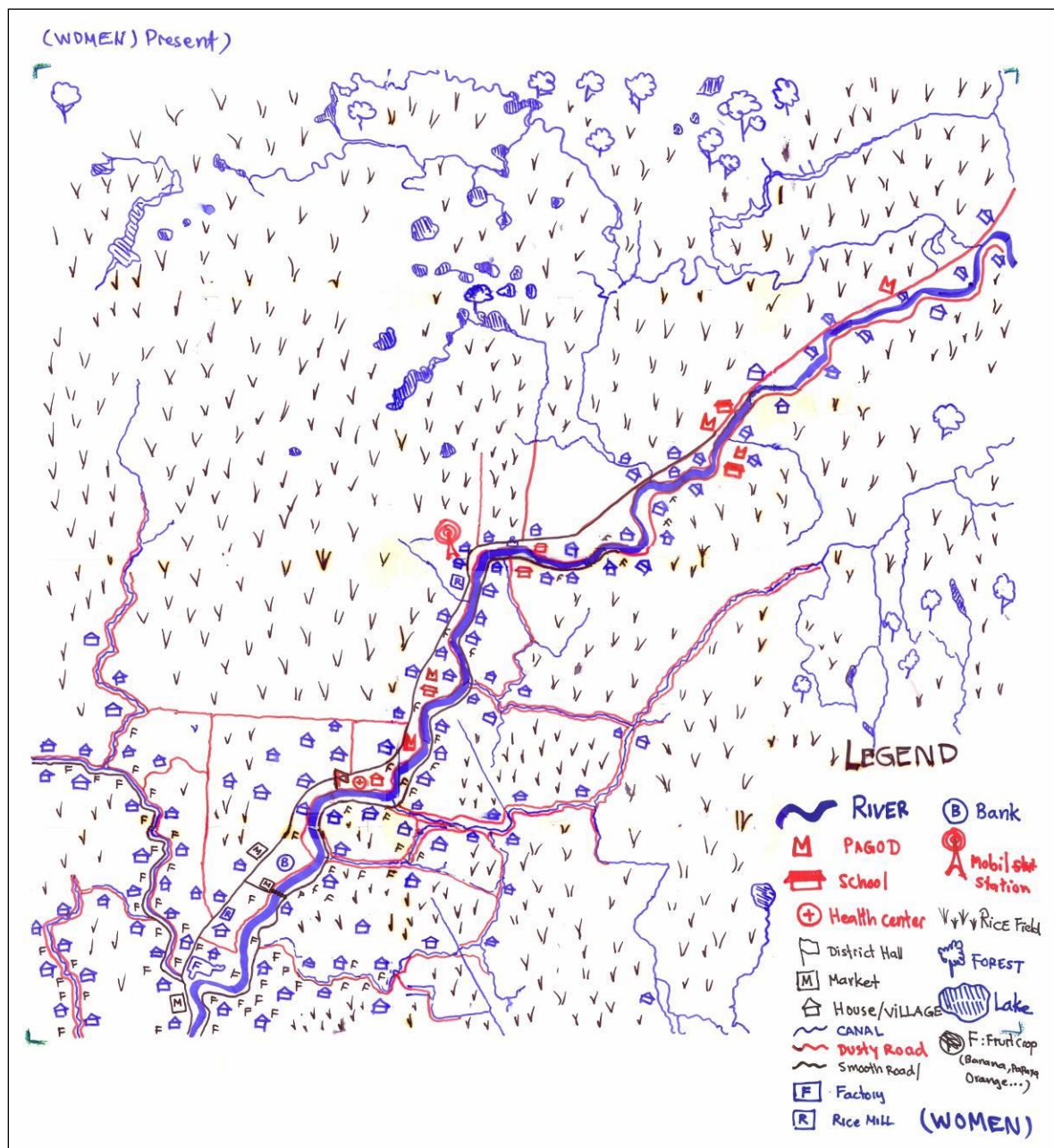
*Health Center:* There is no health care facility in the village. The villagers seek local medics for basic treatments, and in case of serious illness or when a woman needs to give birth, villagers go to the health center located in the district town. Some households who are better off usually get better service at the provincial hospital.

*Market:* Although there is no official market venue in Rohal Suong village, there are a few shops operated by villagers that sell basic supplies and groceries. There are also a few shops that offer agricultural materials and inputs. Farmers who do not have enough resources can get materials such as seeds and chemical fertilizers early in the season. They can pay back the cost during harvest season but at a higher price. In recent years, middlemen have bought rice directly from the farmers during harvest season.

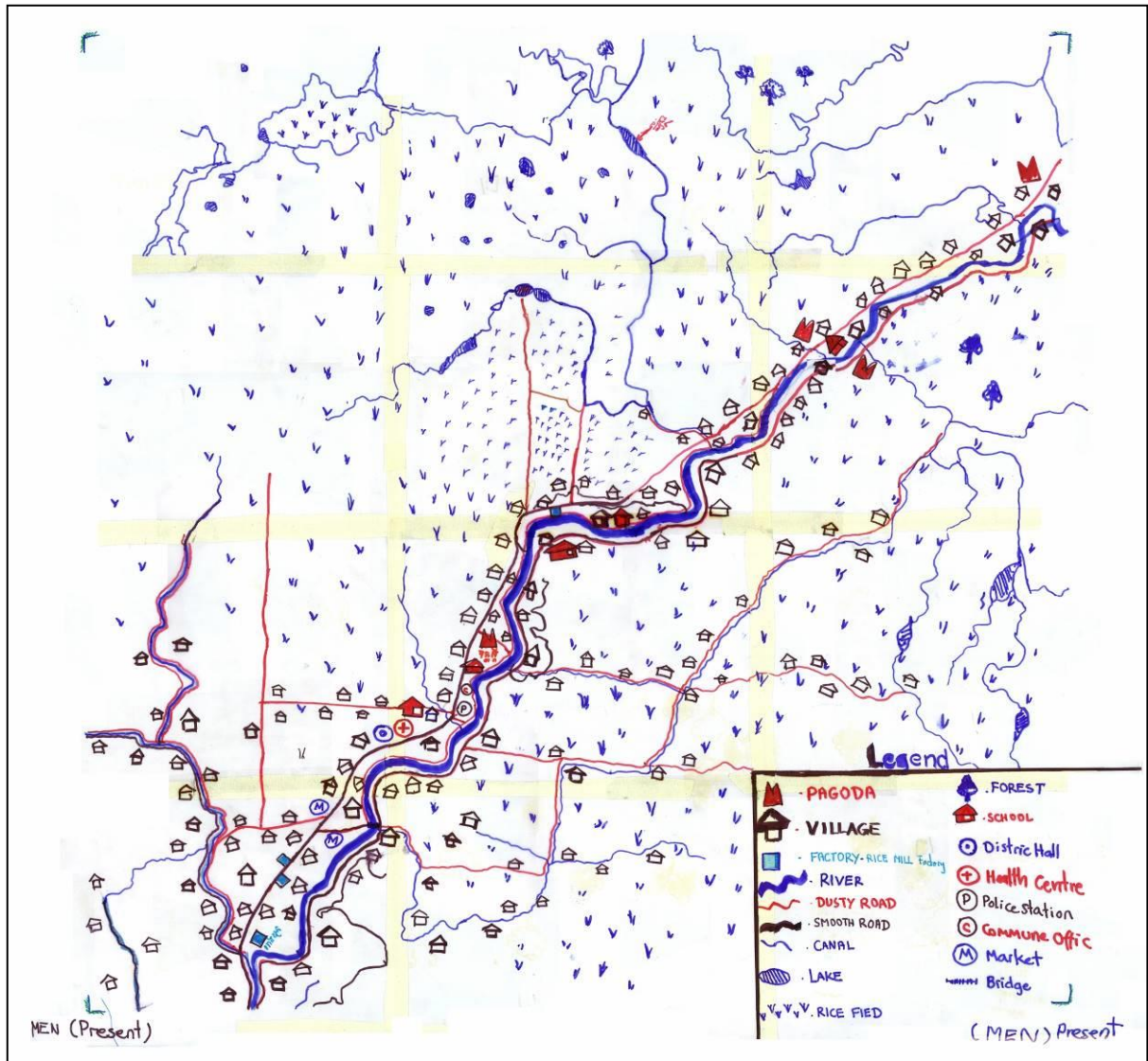
Demand for rice is generally high, but the price is fairly unstable. Low rice price

together with high input prices have reduce profit of rice farmers and made rice cultivation more difficult. However, it is not easy for farmers to benefit from growing other types of agricultural products, such as watermelons, beans, and other vegetables, since prices fall rapidly during the peak harvest season.

The fish market remains a good opportunity. Middlemen buy fish or sometimes go to the fishing grounds and transport fish to the market using motorbikes. Big fish are transported to Battambang, Phnom Penh, and Thailand, while small fish are processed in the fish processing/manufacturing area Phsar Phohuk (fish paste market) located on the way to Battambang town, about 15km from Rohal Suong village.



Map 2. Women's map of current community resources



Map 3. Men's map of current community resources

**Table 1. Current resource conditions as perceived by men (M) and women (W)**

Land cover class	Community determined land use	Location Names	Current state (quality)	Time resource to	Management and ownership issues	Environmental Benefits	Opportunities	Limitations
<b>School (M)</b>	School	Rohal Suong primary school	Good, sufficient classrooms, new toilets, children's playground, hand washing facility	5-10 min	Government (Dep of Education, Youth and Sports) & the community		Provide education to children in the community	
<b>Road (M)</b>	For travel & transport of ag. produce to market	Surfaced road to Battambang district and city	Wide enough, smooth, no dust	20-25 min	Managed by village, commune authorities and the state	Facilitate easy and fast transport, save time	Can be expanded and bridges can be built over large waterways	No limitation
<b>Small road (M)</b>	For travel & transport of ag. products	Thlear Luong	Short road, with culvert crossing	About 10 min	Public property of Rohal Suong villagers		Can be extended to facilitate travel	No limitation
<b>Road (W)</b>	Surfaced road across the village	Surfaced road to Battambang district and city	Wide and smooth, not dusty	20-25 min	Managed by village, commune authorities and the state	Facilitate fast transport, save time	Can be widened	No limitation
<b>Dirt road (W)</b>	Dirt road along the river bank	Village road	Narrow with potholes	About 10 min	Managed by village and commune authorities		Can be extended to facilitate transport	No limitation
<b>Flooded forest (M)</b>	Community flooded forest	Flooded forest at Ta Ek lake, (Rohal Suong CFi conserve-ation lake)	Some encroachment by villagers for dry season rice (DSR) farming	30-45 min; About 9km from Rohal Suong village	Managed by Rohal Suong CFi	Habitat for water birds, reptiles, fish	Trees can be replanted and conserved	
<b>Flooded forest (W)</b>	Flooded forest for conservation	Rohal Suong CFi flooded forest	Fish are plentiful	1 hr	Managed by CFi	Enhance fish stock	The habitat can be expanded	Some poachers with electro-fishing
<b>Open field (M)</b>	Wet season rice (WSR) and DSR farming	The large open field west of the village	WSR, DSR, and also other crop farming (Chamkar) in the dry season	15-20 min (1,300m)	Farmer's private property	WSR and DSR can be expanded	A primary canal can be built to irrigate the field all year round	No limitation

Land cover class	Community determined land use	Location Names	Current state (quality)	Time resource	to	Management and ownership issues	Environmental Benefits	Opportunities	Limitations
<b>Agricultural land (M)</b>	Rice field and DSR (WSR)	Sre Tum Nup Thom	Rice can be planted twice a year, yield is higher than before	10-20 (750m)	min	Private land, some minor conflict in use of water for rice/crop irrigation	Can have plenty of fish in the flood season	The surface can be levelled off to enhance rice production	
<b>Agricultural land (M)</b>	DSR and WSR fields	Vee lake	Two rice production cycles a year	20 min		Private land owned by Rohal Suong farmers, no conflict on the land of the lake	DSR planted around the lake, floating rice in the middle of the lake. Dries up in dry season, much fish in wet season, perennial water connection	Functions as drainage and source of water for DSR and WSR irrigation, between a creek and the river	
<b>Agricultural land (M)</b>	Agricultural land	Tnot Chuor	Rice field and perennial Chamkar (other crop) land	15-20 (about 2,000m)	min	Children's parents association of Rohal Suong School		Can use for alternative cropping by season as there is a perennial water source	No limitation
<b>Farmland (W)</b>	Rice and Chamkar farming	Rohal Suong village	For rice and jute farming	1 hr		Privately managed by local villagers		DSR and WSR farming, water melon and corn farming	Short of water, pest infestation
<b>River (M)</b>	Natural river used for fishing and a source of water for irrigation	Sangke River	Bank erosion, decline in fish, degraded water quality	5 min		Public property managed by the state	Provide water for rice and other crop farming, domestic use and fishing	A dike can be built to divert water for DSR irrigation	No limitation
<b>River (W)</b>	For fishing, domestic use and irrigation	Sangke River	Decline in fish resource and bank erosion at places	5 min		Public property managed by the state	Fish habitat and migration route	Water for irrigation in the dry season	No limitation



Land cover class	Community determined land use	Location Names	Current state (quality)	Time resource to	Management and ownership issues	Environmental Benefits	Opportunities	Limitations
<b>Dike with small channel (M)</b>	Water retention and source for irrigation	Dike with small channel	Holding water for irrigation in the dry season, dike is used as footpath	10-15 min (About 700m)	Communal property	Holding water for irrigation	Widen the canal and the dike, fit with pipes, extend canal to connect with the conservation lake, about 1,800m	
<b>Canal (M)</b>	Canal to transfer water from the river to the rice field	Prolay Samaki	Short, small, shallow	10 min (About 300m)	Communal property of Rohal Suong villagers	Distribute water to the field, fish in the wet season	Can be extended, expanded, deepened	No limitation
<b>Pond (M)</b>	Rice field expansion by farmers	Suong lake	Farmers do rice farming on the lake and thus make it shallower	30 min (about 3,000m)	Private land of local farmers	Provide water for irrigation, fish, water birds	Canal rehabilitation and extend footpath	No limitation
<b>Pond (M)</b>	Conservation of fish, and flooded forest for water birds and reptiles	Ta Ek lake	Multiple benefits as it provides for fish, but is not large enough to provide for fish habitat in the dry season	About 30 min (about 3-4 km)	Community 's property	Provide for plenty of fish when the flood is big and from where fish migrate and are caught for subsistence	Rehabilitate the canal to enhance water holding capacity, plant more trees to provide habitat for fish, reptiles, water birds	
<b>Grassland (M)</b>	Grazing land	Veal Suong	Become rice field	30-40 min	Private land of the villagers	Rice farming	Enhance rice production	No limitation
<b>Grassland (W)</b>	Chamkar farming	Thnot community ground	Chuor high Some grassland were converted to farm land	30 min	Managed by children's parent association of Rohal Suong primary school	Land for rice and Chamkar farming	Revenue from land rental as income to support the school to buy teaching materials, building toilets	No limitation

#### ***4.1.2. Gender-differentiated comparison of current conditions***

As seen above in Table 1, men and women in the community view key issues and available resources differently. The men wanted to focus their discussion around improvements and better management of the water supply and channels, as well as conservation of the flooded forest and the fish ponds. In contrast, the women were more concerned about the erosion of the riverbank, the need for better domestic water supply and markets for agricultural products. Landless households were mostly concerned about the degradation of the flooded forest, which is leading to declining fish production.

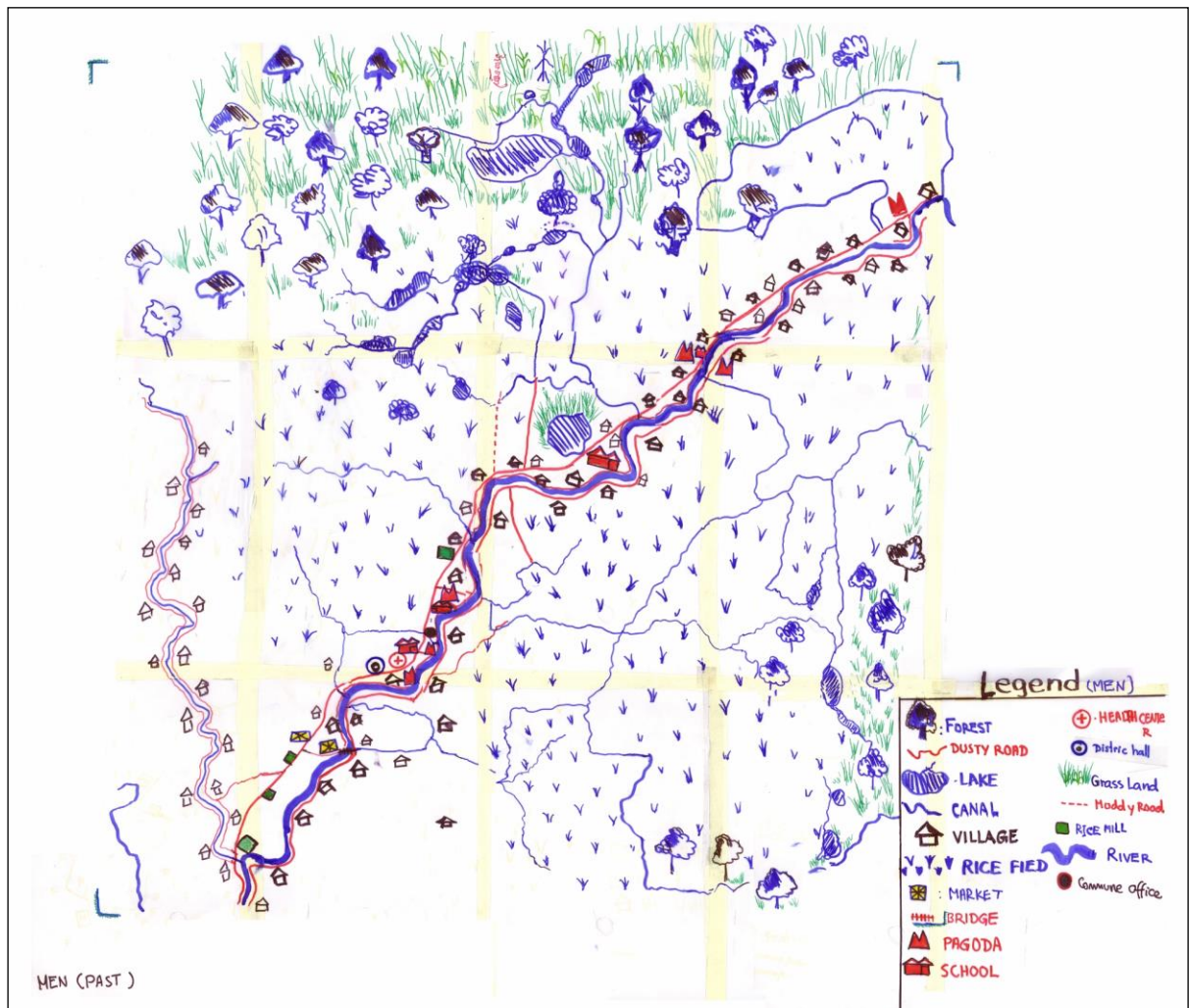
#### ***4.1.3. Major changes of resource conditions***

In order to assess major changes in resources and their condition, both the men and women focus groups were asked to consider the resources they had in their community and to identify major changes that had occurred in the landscape. In addition, participants were asked to examine why the resources were in their current condition, and to identify major drivers of those changes, as well as opportunities and constraints for the future. Results are summarized in Table 2 below.

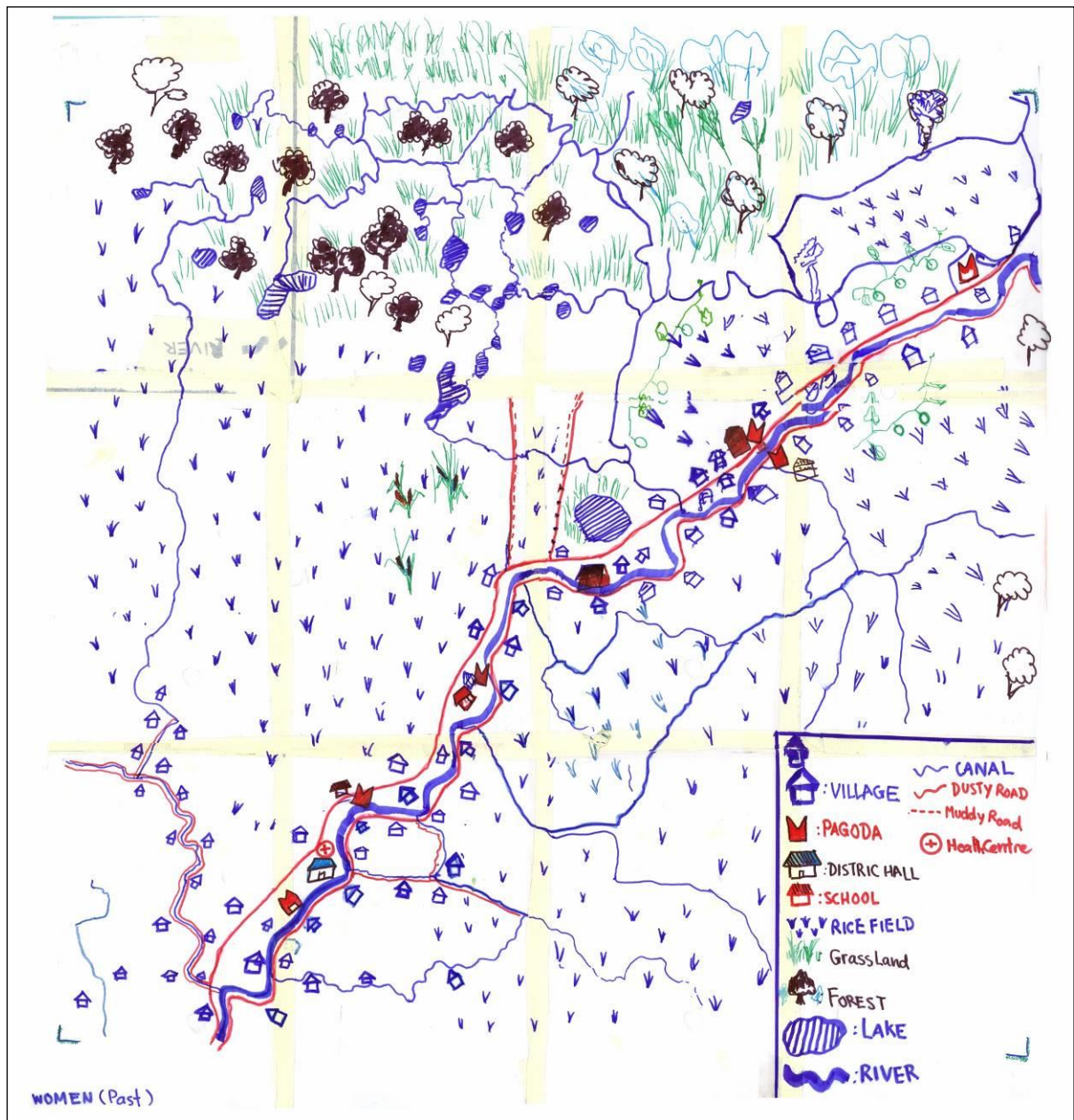
Both groups reported that Rohal Suong village is an old village that was covered largely by flooded forests before the 1990s. Both groups also recognized that the flooded forest provides high value benefits to the environment as well as to local villagers. The flooded forest provides a good habitat and feeding ground for fish, water birds, and reptiles, all used by villagers for household consumption. Both groups mentioned that the flooded forests had been degraded rapidly as a result of agricultural expansion and high demand for firewood.

The women indicated that local farmers are able to plant and cultivate rice twice per year, after they clear the land. However, rice grown during the dry season rice requires high inputs, such as seeds, chemical fertilizers, pesticide and labour, which small and poorer households cannot afford. This means they sometimes have to rent or sell their farmland.

Both groups recognized that some parts of the grassland have been converted to rice fields over last 10 years, while some parts have been kept as grassland for their cattle. Feeding farmers' cattle was not identified as a big challenge since the trend of raising cattle has decreased overall.



Map 4. Major changes in resources (comparing past and current situation) mentioned by men



Map 5. Major changes in resources (comparing past and current situation) mentioned by women

**Table 2. Major changes and drivers of change in the last 10 years, as perceived by men (M) and women (W)**

Land class	cover	Community determined use	land	Location Names	Past state (quality)	Time to resource	Drivers of change	Management and ownership issues	Environmental Benefits
<b>Flooded forest (W)</b>		Flooded forest for conservation		Ta Ek Lake Rohal Suong	Abundant flooded forest, fish and water birds	1 hr	Conversion for rice farming by local farmers	Managed by CFI, some minor conflicts between conservation group and villagers	Habitat for fish, water birds, forest
<b>Flooded forest (M)</b>		Conservation forest		Ta Ek lake flooded forest	Large extent of forest in the lake that provided for fish and had many water birds and reptiles	30 min (about 4km)	Forest degradation for over 10 years due to firewood production and conversion for agriculture	Community joint lake management and flooded forest conservation	Perennial supply of fish
<b>Grassland (W)</b>		Grassland		Rohal Suong	Plenty of grass for cattle	30 min	People converted the grassland for farming	Private	
<b>Grassland (M)</b>		The land surrounding the lake provides for grazing area		Veal Boeung Suong (Suong lake grassland)	Large extent of green grasses	20-30 min (about 3km)	Grassland surrounding the lake has been turned into rice fields for over 10 years	Privately managed by Rohal Suong villagers	
<b>Sangke River (M)</b>		Source of water for rice and Chamkar farming and provides passage for fish and boat traffic		Sangke River	The river was deep, had fish all year round, and provided for fish migration routes and boat traffic	2-3 min (About 100m)	Bank erosion every year due to large boat traffic, results in heavy sedimentation, less fish, and polluted water	The river is state owned and publicly accessible by the villagers along the river, but faced with bank erosion	Provides water for irrigation, animal farming, and is source of fish to creeks and water bodies in the floodplain and rice field
<b>Creek (M)</b>		Source of water for farming and fish		Dauem Tnot Chuor creek	Deep with perennial water and serves as fish migration channel	About 15-20 min (About 2km)	Bank erosion due to traffic by hand held tractors	Belong to Rohal Suong community and jointly managed by the villagers	Provides water for irrigation and serves as migration route for fish from the river to rice fields

Land class	cover	Community determined use	land	Location Names	Past state (quality)	Time to resource	Drivers of change	Management and ownership issues	Environmental Benefits
<b>Infrastructure (M)</b>	School			Rohal Suong primary school	Old, and dilapidated, short of class rooms and supplies	5-10 min	Initiated by local community and authority with external donators	Managed by the government, Department and Ministry of Education, Youth and Sports, and the community	More students attend and have appropriate seats in the class rooms
<b>Road (W)</b>	For travel and transport of products to market			Surfaced road across the village	Degraded and becomes dusty and murky in the wet season	5-10 min	Built by government, community participates in maintenance.	Managed by commune and district authorities	
<b>Road (M)</b>	For travel and transport of products to market			Surfaced road	Difficult to travel, dusty and murky and cannot be travelled in the wet season	5-10 min	Government development policy.	The road is managed by commune/district authority	
<b>Rice field (W)</b>	Rice field			Roha Suong village	WSR farming in fertile soil	1 hr	People also do DSR, two farming cycles – WSR and DSR	Private	
<b>Farmland (M)</b>	For rice and other crop farming			Srae Veal	Fertile land, no fertilizer or manure is required	About 20-30 min	The fertility degraded due to change in farming season, intensification.	Privately managed by local villagers	There is fish in the wet season

#### 4.1.4. Vision of the future

Both focus groups were brought together to discuss and illustrate (see Photo 4) their vision and aspirations for the future, year 2030, and to understand the opportunities and constraints in achieving their joint vision. This exercise builds upon the work completed in the previous sessions. Community visioning was not a new exercise in the village; it was introduced by the Aquatic Agricultural Systems (AAS) research program and developed by community members themselves in 2013. However, for the AAS-led exercise, the community developed a vision for the next ten years, thus only to 2023. For the visioning exercise up to 2030, both groups shared a similar future vision: “to improve agriculture productivities, markets, and community wellbeing”.

Five main components were identified as important factors in achieving the community’s vision and are outlined in more detail below. These are: roads and small bridge, irrigation scheme and master pump, natural resources, agriculture technique development, and market prices. Additional, identified ideal conditions for the future are presented and summarized in Table 3.

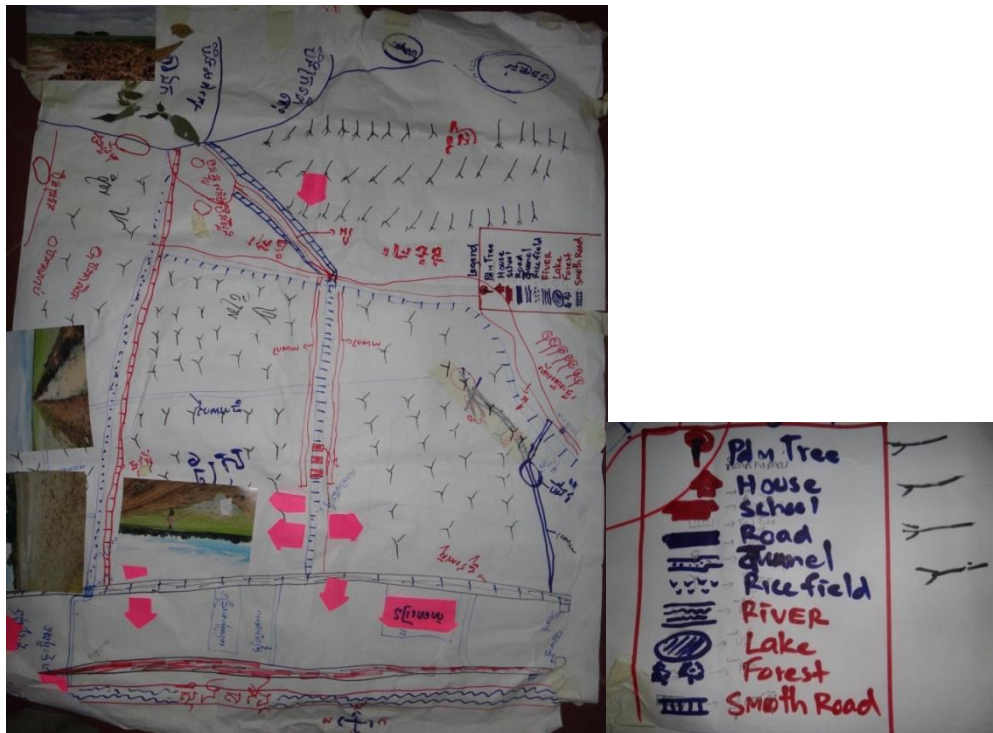


Photo 2. Community visioning map

*Roads and bridges:* The community mentioned that the current road, connecting Battambang town to other villages, is in good enough condition and that they wish to maintain it best they can. The community would, on the other hand, like to see a connecting road from the village to the paddy rice fields and the fish conservation area. They also want to have a smoother and wider gravel road, as well as connecting bridges built over the water channels. This as a connecting road would support transportation of agricultural products from paddy fields to local residences, currently being done using bicycles, tricycles,

motorbikes and handy-tractors.

*Irrigation scheme and master pump:* According to the community, farmers are experiencing a water supply shortage in their rice fields: only 50ha (20%) of rice fields and 7.5ha (7%) of land planted to vegetable are covered by the current, small irrigation system. Community members therefore want to expand the system, in order to supply enough water to paddy fields to support two yields per year. Another irrigation scheme needs to be built north of Rohal Suong village. Larger irrigation channels will not only be used to supply water to paddy fields, but they can also be used as waterways to transport agricultural products by small boats during the flooding season. The community also wants to have two functioning master pumps that can feed adequate water into the water system. As explained by farmers, expanding irrigation canals will also create habitat for natural fish, especially in dry season.

*Natural resources:* The major natural resources are the flooded forest, wild fish and ponds. The community members want to protect these resources and use them in a sustainable manner. Specifically, they want to rehabilitate the conservation ponds and other nearby ponds to retain water even during the dry season, thus protecting the fish and broodstock. Because the flooded forest provides a highly valued benefit to the natural environment, especially to fisheries, community groups want to conserve all existing flooded forest area and replant more in the fish conservation area.

*Agriculture technique development:* Farmers see agriculture technique development as very important. They want to develop their skills, to effectively apply chemical fertilizers and pesticides and to better manage water, through trainings, field farmer schools, and exchange visits. Organic agricultural production is one of their future dreams and they want to produce and send their organic agricultural products (which provide added value) to the market. Capacity development on organic agricultural production techniques is therefore needed.

*Market:* Market price of agricultural products highly fluctuates. Sometimes income is lower than cost due to the low price. This situation makes local farmers lose interest in the agricultural sector and some migrate to Thailand or other areas to look for other types of work.



**Table 3. Community vision of the future**

<b>Items</b>	<b>Preferred condition for 2030</b>	<b>Opportunities</b>	<b>Constraints</b>	<b>Organizations to be involved</b>
<b>Road to conservation area</b>	Broad good road to access the conservation area through which agricultural products can be transported	Participation by local people, government, and NGOs	Lack of trust among local people and the committee'; People owning land in the lake surrounding would not be happy with the development	Government, local people, charity, and NGOs
<b>Bridge across the creek</b>	To have a bridge crossing the creek that facilitates travel and transport of agricultural products	Participation by local people, government, and NGOs	Lack of trust among local people and the committee; People owning land in the lake surrounding would not be happy with the development	Government, local people, charity, and NGOs
<b>Irrigation scheme</b>	Large irrigation scheme to provide water in both dry and wet seasons	Participation by local people, government and NGOs	Lack of trust among local people and the committee' People owning land in the lake surrounding would not be happy with the development	Government, local people, charity, and NGOs
<b>Training farmers to know how to purify rice and crop seeds</b>	Farmers have the skills to purify rice seeds and supply to other farmers within village and in neighbouring villages	Participation and strong interest by some farmers An area with high potential for rice production	Farmer lack the skills, implements, and capital	Ministry or Department of Agriculture, private company, and NGOs
<b>Stable market</b>	Agricultural market sustains stable price	Agricultural products, particularly rice, are enough to supply to the market	Rice price is volatile	Government and private enterprises accept to buy local agricultural products
<b>Techniques for crop maintenance, application of fertilizer and pesticides</b>	Farmers in the entire community know techniques to maintain crops and apply fertilizers and pesticides	Participation by local people, government, and NGOs Dissemination by many media outlets of the impacts from pesticides	Dissemination remains limited Limited government budget	Ministry or Department of Agriculture, private company, and NGOs
<b>Master pump</b>	A master pump is available to feed water to the primary canal in response to the need for irrigation, both in dry and wet seasons	Government lent a pump for temporary use Local people share their input to buy fuel		Government (Ministry of Water Resources and Meteorology and Ministry of Agriculture)
<b>Rehabilitation of all natural lakes</b>	Rehabilitate all the lakes to hold water in the dry season and particularly to provide for fish refuge	Participation by local people, government, and NGOs	People owning land in the lake surrounding would not be happy with the development	Government, local people, charity, and NGOs
<b>Development of pure rice seeds and organic vegetables</b>	Be able to produce pure seeds and organic vegetables to supply to the market	Participation by local people, government, and NGOs Increase market demand	Farmers do not have techniques and lack implements and capital	Ministry or Department of Agriculture, private company and NGOs

## 4.2. Topic 2: Organizational landscapes

The second VBS topic helps provide an overview of village organizational activities and focuses primarily on organizations working on food security and natural resource management. Villagers can use the overview to prepare for climatic, and other future challenges, and to more effectively engage with CCAFS local partners. The results of the focus group discussions with men and women on the second topic are presented in this section.

### 4.2.1. Basic sphere of operation

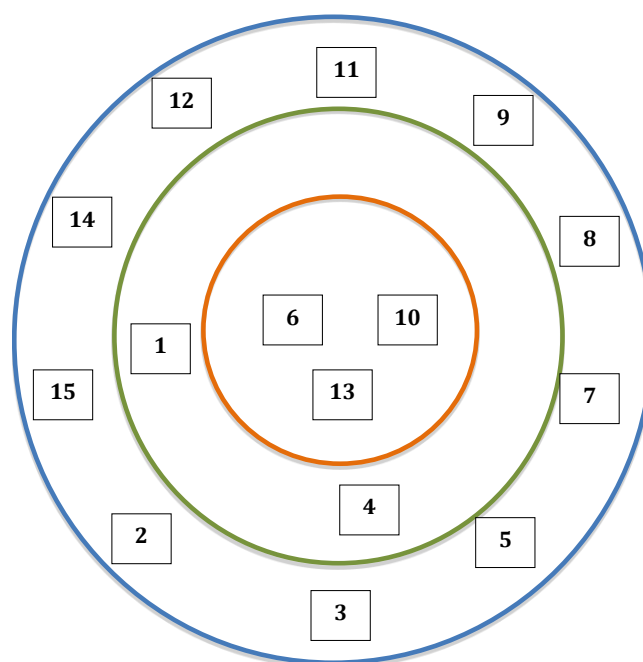
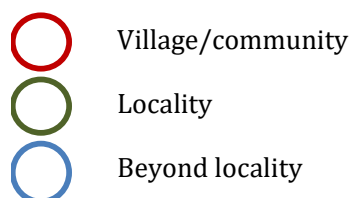
Each group, divide by gender, was asked to identify the organizations and institutions operating both within and outside the village. Each group identified several organizations, both formal and informal. Each group was also asked to draw three large concentric circles on the ground (see Photo 05). The purpose of this exercise, well explained to the participants, was to visualise the organisational structures: the inner circle represents the community level, the middle circle represents the locality, and the outer circle represents beyond the locality. In the inner circle, the groups placed the cards of organizations working within the community; in the middle circle, the cards of organizations operating in the locality; and in the outer circle, those operating beyond the locality.

Figures 1 and 2 below summarize the results from the focus group discussion respectively, and outline organizations and their operational levels. Following Figures 1 and 2, Tables 3 and 4 summarize general information on the first five organizations' functions and structures as described by the gender-differentiated focus groups.



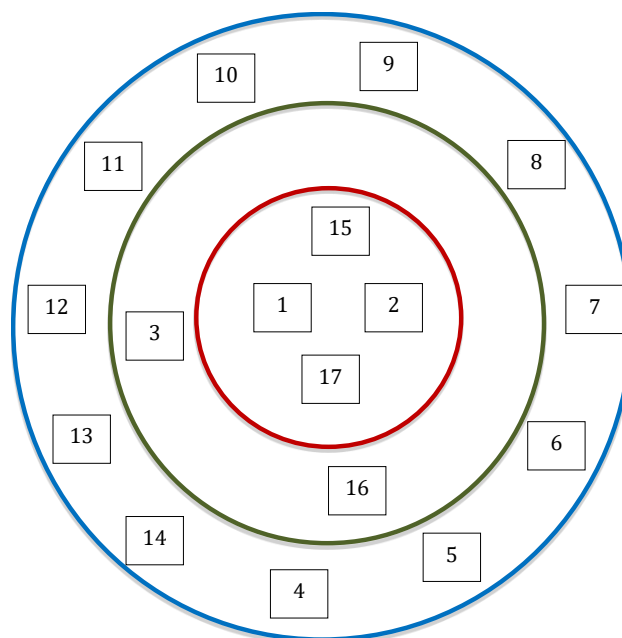
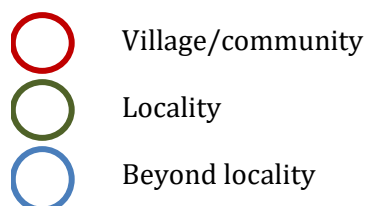
Photo 3. Organizational landscape activity in progress

1. Aphivat Strey (AS)
2. World Vision
3. HARVEST Cambodia
4. Provincial Department of Agriculture
5. WorldFish
6. Sustainable Livelihood Tonle Sap Project (SLTSP) (Saving Group)
7. Hatha Kasekar
8. Village Development
9. Hatha Kasekar
10. HOM
11. Prasak
12. Aceda
13. Ek Phnom Saving Group
14. Rhacc
15. No border Organization



**Figure 1. Organizational landscape according to the women's focus group**

1. DSR Irrigation Committee
2. Rohal Suong CFI
3. Aphivat Strey (AS)
4. Buddhist monks and Buddhists in Australia
5. HARVEST Project
6. WorldFish
7. Vision Fund
8. Prasak
9. Government of Cambodia
10. Aceda bank
11. AMK
12. FACT project
13. Thoneakea Phoum
14. Belgium Friends for Sanitation
15. Sustainable Livelihood Tonle Sap Project (SLTSP) (Cow Bank)
16. Saving groups
17. Students' parent committee



**Figure 2. Organizational landscape according to the men's focus group**

**Table 4. Information on the first five organizations ranked by the women**

	<b>Organization name</b>	<b>Main activities</b>	<b>No. of members (estimate)</b>	<b>Access (open or restricted to...)</b>	<b>Origin (indigenous, state, NGO, project)</b>	<b>Sphere of operation: community, local, beyond local</b>	<b>Sources of funding (members, external, both)</b>	<b>Existed how long (&lt; 1 yr, 1-5 yrs, &gt; 5 yrs)</b>	<b>Formal or informal</b>
1	AS	Provide seeds, technologies, inputs	20-30	Restricted	NGO	Locality (provincial)	External	>5 yrs	Formal
2	HARVEST Cambodia	Provide seeds, technologies, inputs		Restricted		beyond local	External	3 yrs	Formal
3	World Vision	Distribute chicken, feed		Restricted		beyond local	Don't know	< 5 yrs	Formal
4	Department of Agriculture	Provide seeds, feed, technologies, implements, inputs		Restricted		beyond local	Government of Cambodia	> 5 yrs	Formal
5	WorldFish	Community visioning and action plan		Restricted		beyond local	Don't know	2 yrs	Formal

**Table 5. Information on the first five organizations ranked by the men**

	<b>Organization name</b>	<b>Main activities</b>	<b>No. of members (estimate)</b>	<b>Access (open or restricted to...)</b>	<b>Origin (indigenous, state, NGO, project)</b>	<b>Sphere of operation: community, local, beyond local</b>	<b>Sources of funding (members, external, both)</b>	<b>Existed how long (&lt; 1 yr, 1-5 yrs, &gt; 5 yrs)</b>	<b>Formal or informal</b>
1	DSR Irrigation Committee	- Canal rehabilitation - Extend the existing canal - Provide additional culverts	17	Open and general participation	Local community	Community level	Membership and external	> 5 yrs	Informal
2	Rohal Suong CFi	- Control illegal fishing - Establish conservation area - Plant flooded forest - Expand conservation area - Build guard posts - Place post markers	9 mgmt members and 856 general members	Open and general participation	Local community	Community level	Member-ship and external	> 5 yrs	Formal

Organization name	Main activities	No. of members (estimate)	Access (open or restricted to...)	Origin (indigenous, state, NGO, project)	Sphere of operation: community, local, beyond local	Sources of funding (members, external, both)	Existed how long (< 1 yr, 1-5 yrs, > 5 yrs)	Formal or informal
3	AS	20-30	Restricted	NGO	Local (provincial)	External	> 5 yrs	Formal
4	Buddhist monks and Buddhists in Australia	More than 10	Restricted	Male Buddhist followers	Int'l	External	> 5 yrs	Informal
5a	HARVEST Cambodia Project	Don't know	Restricted	NGO	Int'l	External	2 yrs	Formal
5b	WorldFish		Restricted	NGO	Int'l	External	3 yrs	Formal

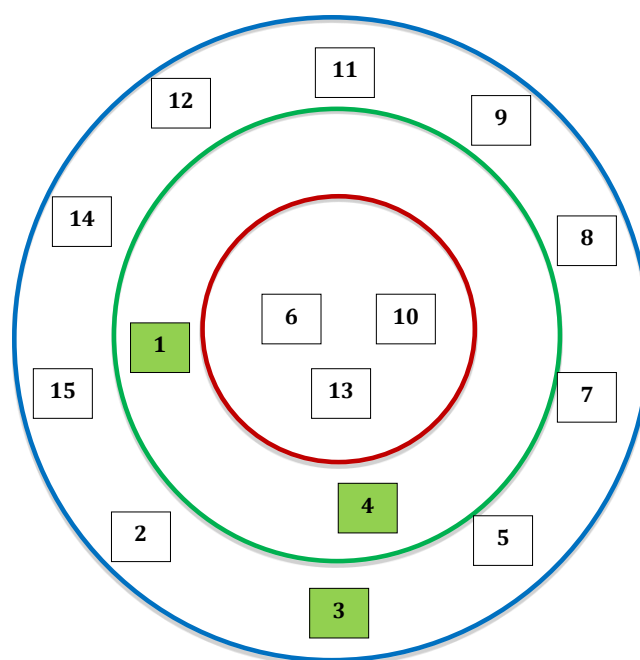
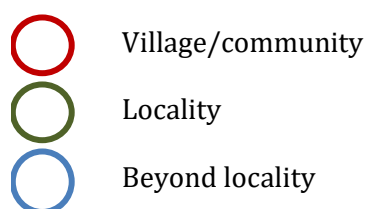
#### ***4.2.2. Organizational landscape of food security***

The goal here was to better understand how the organizational landscape contributes to local food security. Food security is usually measured at the household level, however community-based organizations and local interactions influence food security for different community groups, in different ways. The participating men and women were asked to discuss the concepts of food availability, access, and utilization in the groups. Thereafter, they were asked to review which of the identified organizations (see Figures 1, 2) were conducting activities related to any of the three food security concepts (see Tables 6 and 7).

The women found that only three of the 15 organizations were actually working on food security (see Figure 3). These are AS, HARVEST Cambodia, and the Department of Agriculture (DoA). AS and the Department of Agriculture both operate at the local level, while HARVEST Cambodia is operating beyond the locality. All three are involved with food availability and utilization. AS, HARVEST Cambodia, and DoA provide farming techniques, seeds, and input materials to farmer households. AS and HARVEST Cambodia also work on nutrition and food safety and HARVEST Cambodia has a nutrition project which provides multi-nutrient foods to children while building awareness among parents. Both AS and HARVEST Cambodia try to raise awareness on and advocate for food safety in the community.

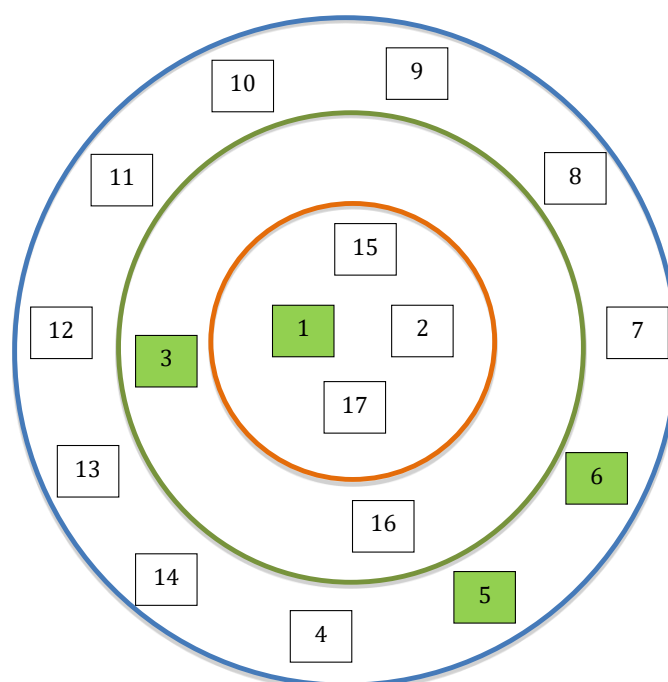
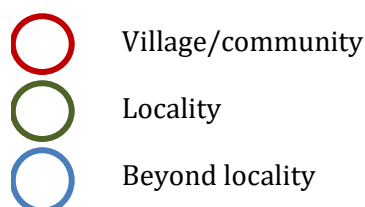
The men identified four organizations, out of 17, that were involved in food security-related projects (see Figure 4). These include DSR Irrigation Committee, AS, HARVEST Cambodia, and WorldFish. The DSR irrigation committee and AS operate at the community and local levels respectively, while HARVEST Cambodia and WorldFish operate beyond the locality. DSR Irrigation Committee, a community-based organization, mobilizes internal and external resources to install culverts and rehabilitate the water channel, while AS, a local NGO, plays a key role in providing farming techniques, market information, and awareness on nutrition and food security to farmer households. HARVEST Cambodia plays a key role in providing farming techniques for vegetable gardening, fish- and rice farming, as well as input materials. HARVEST Cambodia also focuses on food safety and provides awareness and a food provision program in the community. WorldFish plays a very important role in providing capacity building in the community and mobilized the local community to build a community vision and a community action plan. WorldFish provided significant guidance, motivational support and matching funds in order to help the community achieve their action plan for small irrigation rehabilitation.

1. Aphivat Strey (AS)
2. World Vision
3. HARVEST Cambodia
4. Provincial Department of Agriculture
5. WorldFish
6. Sustainable Livelihood Tonle Sap Project (SLTSP) (Saving Group)
7. Hatha Kasekar
8. Village Development
9. Hatha Kasekar
10. HOM
11. Prasak
12. Aceda
13. Ek Phnom Saving Group
14. Rhacc
15. No border Organization



**Figure 3. Organizational landscape of food security according to the women group**

1. DSR Irrigation Committee
2. Rohal Suong CFI
3. Aphivat Strey (AS)
4. Buddhist monks and Buddhists in Australia
5. HARVEST Project
6. WorldFish
7. Vision Fund
8. Prasak
9. Government of Cambodia
10. Aceda bank
11. AMK
12. FACT project
13. Thoneakea Phoum
14. Belgium Friends for Sanitation
15. Sustainable Livelihood Tonle Sap Project (SLTSP) (Cow Bank)
16. Saving groups
17. Students' parent committee



**Figure 4. Organizational landscape of food security according to the men group**

**Table 6. Information on the organizations working on food security according to the women group**

Organization	Availability			Access			Utilisation		
	Production	Distribution	Exchange	Affordability	Allocation	Preference	Nutritional value	Food safety	Social value
<b>AS</b>	Provide inputs and technologies, seeds for farming, health education							Education on nutrition	
<b>Harvest Cambodia</b>	Provide inputs and technologies, seeds for farming						Provide nutrition and nutritional education	Advise farmers on chemical free farming and nutritional education	
<b>Department of Agriculture</b>	Provide seeds for farming							Support for irrigation and seeds	



**Table 7. Information on the organizations that working on food security according to the men group**

Organisation	Availability		Access			Utilisation		
	Production	Distribution	Affordability	Allocation	Preference	Nutritional value	Food safety	Social value
<b>DSR Irrigation Committee</b>	Canal rehabilitation, canal extension, additional culvert provision to enhance farm production for HH food security	Access to water for all seasons rice production						Increase farm productivity and improve livelihoods
<b>AS</b>	Provide farming techniques	Provide market information to farmers				Provide training and capacity on nutrition	Education on importance of nutrition and food security	
<b>HARVEST Cambodia Project</b>	Vegetable garden, fish farming, rice farming	Provide market information to farmers			Provide quality crop seeds (incl. rice) to improve health, crop prod & generate higher incomes	Deliver child nutrition program	Educate farmers on importance of chemical free food and sufficient consumption before sale	
<b>WorldFish</b>	Collaborate with the DSR Irrigation Committee for canal rehabilitation, canal extension, and culvert provision to enhance dry season farm production							

#### ***4.2.3 Organizational landscape of food crisis***

Participants were asked to define a time when there was a food crisis in the community and to identify the organizations that were involved in providing support during that period. Both groups shared similar understandings of a food crisis: *“there was not enough food to eat, huge rice fields were destroyed by flood and drought”*. Participants stated that they experienced a heavy flood that destroyed their rice fields in 2013. The flood lasted longer than the average year. The local community experienced food shortage as a result. Both men and women groups indicated that the Cambodia Red Cross came to their community and provided food relief. The men’s group highlighted that the commune authority reported the water level, extent of damage, and numbers of households affected by the flood to the district authority, NGOs, and sectoral agencies.

#### ***4.2.4 Organizational landscape of natural resource management***

In this section, the organizational landscape in relation to natural resource management (NRM) is discussed. Focus group discussions aimed to identify the organizations that actively work to protect the environment and manage natural resources. The process involved asking the focus groups to highlight what organizations are involved in the management of natural resources within the community and developing a list of natural resources important to the community.

Both groups shared similar perceptions of organizations working on NRM (see Table 8). The women’s group identified four organizations that work on NRM: Community Fisheries (CFi), AS, HARVEST Cambodia, and local government authorities. The men’s group identified only three organizations working on NRM: CFi, AS, and HARVEST Cambodia.

These organizations focus on natural fisheries resources, the flooded forest, and pond conservation. Specifically, the fishpond and associated flooded area are a designated conservation area where fishing activities are banned. The CFi replanted the flooded forest and now patrols it to combat illegal fishing. AS works with community groups, and other stakeholders, to designate this area as part of CFi’s management regime so that the CFi is officially recognized by the Ministry of Agriculture, Forestry and Fisheries (MAFF). AS provides capacity building, including resource management, community leadership, and communication, to CFi committees and members. HARVEST Cambodia provides equipment and facilities such as guard posts, patrol boats and boundary markers for CFi and the conservation area.

Local authorities and commune councillors do not have enough funds to work on NRM directly, but they provide support to community fisheries and are willing to collaborate on joint activities.

**Table 8. Organizations working on natural resource management identified by men and women groups**

<b>Organization Name</b>	<b>Main Activities</b>	<b>Type of Natural Resource</b>
<b>Women group</b>		
<b>CFi</b>	<ul style="list-style-type: none"> <li>• Plant flooded forest</li> <li>• Patrol and control of illegal fishing</li> </ul>	<ul style="list-style-type: none"> <li>• Conserve forest, lake, and fisheries resources</li> </ul>
<b>AS</b>	<ul style="list-style-type: none"> <li>• Provide support and establish CFi</li> </ul>	<ul style="list-style-type: none"> <li>• Fisheries resources</li> </ul>
<b>HARVEST Cambodia</b>	<ul style="list-style-type: none"> <li>• Provide facility and equipment such as guard posts, patrol</li> </ul>	<ul style="list-style-type: none"> <li>• Conserve forest, lake, and fisheries resources</li> </ul>
<b>Local authority</b>	<ul style="list-style-type: none"> <li>• Support CFi and protect natural resources</li> </ul>	<ul style="list-style-type: none"> <li>• Fisheries and natural resources</li> </ul>
<b>Men group</b>		
<b>CFi</b>	<ul style="list-style-type: none"> <li>• Conserve natural resources and flooded forest</li> <li>• Plant flooded forest</li> <li>• Patrol and control of illegal fishing</li> </ul>	<ul style="list-style-type: none"> <li>• Flooded forest</li> <li>• Fisheries resources</li> </ul>
<b>AS</b>	<ul style="list-style-type: none"> <li>• Support and establish CFi</li> <li>• Provide training to build people’s capacity and awareness on the importance of natural resources and their management</li> </ul>	<ul style="list-style-type: none"> <li>• Flooded forest</li> <li>• Fisheries resources</li> </ul>
<b>HARVEST Cambodia</b>	<ul style="list-style-type: none"> <li>• Conserve fisheries resources and flooded forest</li> <li>• Provide equipment and facility such as guard post, patrol boats, boundary markers for the conservation area</li> <li>• Plant flooded forest surrounding the conservation lake</li> </ul>	<ul style="list-style-type: none"> <li>• Forest around conservation lake</li> <li>• Fisheries resources</li> </ul>

### 4.3. Topic 3: Information networks

Information networks were analysed to better describe how people access and share information within the community. The aim was to understand the diversity of options people have for accessing information on agriculture and weather, how people take advantage of sources of information available, and if some sources are not used and why that is.

Community members access a wide range of information since more than 60% of households own a TV and/or radio. However, most information does not necessarily relate to agriculture, weather, climate, and/or environmental changes. Table 9 below presents a summary, by group, of accessed agriculture and weather-related information topics.

Tables 10 and 11 outline the sources or networks from which individuals receive information related to the topics highlighted by each focus group. These sources include other individuals, organizations, media, and other.

**Table 9. Information topics discussed by men and women groups**

Women group	Men group
<ul style="list-style-type: none"> <li>• Vegetable gardening</li> <li>• Weather</li> <li>• Storm occurring</li> <li>• Start of flood</li> <li>• Change in rice variety</li> <li>• Migration</li> <li>• Canal construction</li> <li>• Fishing</li> <li>• Techniques for building chicken houses</li> <li>• Fertilizer market</li> </ul>	<ul style="list-style-type: none"> <li>• Weather forecast</li> <li>• Hydrology forecast</li> <li>• Storm</li> <li>• Agriculture</li> <li>• Livestock farming</li> <li>• Rice price</li> <li>• Price of agricultural products</li> <li>• Price for consumer products</li> <li>• Fishing</li> <li>• Dry season irrigation canal</li> <li>• Migration</li> <li>• Illegal fishing</li> <li>• Illegal transport of timber</li> <li>• Use of rice variety</li> <li>• Farming of frogs, eels, cattle, chickens, ducks and pigs.</li> </ul>

**Table 10. Sources of information listed by women group**

<b>Information Sources</b>				
<b>Topic</b>	<b>Individual</b>	<b>Organization(s)</b>	<b>Media</b>	<b>Others</b>
<b>Vegetable gardening</b>		<ul style="list-style-type: none"> <li>- AS</li> <li>- HARVEST Cambodia staff</li> <li>- CFi committee</li> <li>- Village and commune authorities</li> <li>- Relevant gov. agencies</li> </ul>		Other NGOs working in agriculture for the past few years, but cannot remember
<b>Weather, storm, and flood</b>			TV <sup>5</sup> Radio <sup>6</sup>	
<b>Change in rice variety</b>	From peer group of farmers	<ul style="list-style-type: none"> <li>- District officials</li> <li>- Provincial Department of Agriculture</li> <li>- Community committee</li> <li>- Staff of AS</li> <li>- HARVEST Cambodia staff</li> </ul>	TV (see footnote 5; except for My TV and Apsara)	
<b>Migration</b>			TV (see footnote 5; including MTV) Radio (see footnote 6)	Village and commune authorities
<b>Canal construction</b>		<ul style="list-style-type: none"> <li>- DSR irrigation committee</li> <li>- Village authority (village chief and relevant stakeholders)</li> <li>- AS</li> <li>- WorldFish</li> </ul>		
<b>Fishing</b>		<ul style="list-style-type: none"> <li>- Rohal Suong CFi committee</li> <li>- Village authority (village chief and relevant stakeholders)</li> <li>- Fisheries officials</li> </ul>	TV (see footnote 5)	
<b>Techniques for building chicken houses</b>	Peer group	AS	TV (CTN and TV 5)	Other NGOs working in agriculture for the past few years but cannot remember
<b>Fertilizer sale meeting</b>		Village and commune authority		

<sup>5</sup> TV channels: CTN; My TV; Hang Meas; Apsara; Bayon; CNC

<sup>6</sup> Radio stations: FM 88; Mongkol Sovann FM 98; Chamkar Chek FM 92

**Table 11. Sources of information listed by men group**

<b>Information Sources</b>				
<b>Topic</b>	<b>Individual</b>	<b>Organization</b>	<b>Media</b>	<b>Other</b>
<b>Weather forecast</b>			TV (see footnote 5) Radio (see footnote 6)	
<b>Hydrology forecast</b>			TV (see footnote 5; except for CNC)	
<b>Storm</b>			TV (see footnote 5; except for CNC)	
<b>Agriculture</b>			TV (CTN, Apsara and TV 5)	
<b>Livestock farming</b>	Peer famers	- AS - Agricultural officials	TV (CTN; TV5)	Other NGOs
<b>Rice price</b>	Peer farmers	Brokers	TV (TVK, CTN, Hang Meas, Bayon)	
<b>Price of agricultural products</b>	Peer farmers	Brokers	TV (see footnote 5; except for CNC) Radio (see footnote 6)	
<b>Price for consumer products</b>	Villager or peer farmers	Brokers	TV (see footnote 5; except for CNC) Radio (see footnote 6)	
<b>Fishing</b>		Village CFI committee	TV (see footnote 5; except for CNC) Radio (see footnote 6)	
<b>Dry season irrigation canal</b>	Other villagers	Relevant village committee		Village chief
<b>Migration</b>			TV (see footnote 5) Radio (see footnote 6)	
<b>Illegal fishing</b>		Village CFI committee	TV (see footnote 5; except for CNC) Radio (see footnote 6)	
<b>Illegal transport of timber</b>			TV (see footnote 5; except for CNC) Radio (see footnote 6)	
<b>Use of rice variety</b>		- AS - HARVEST Cambodia - Agricultural officials	TV (CTN, Bayon, TV 5)	
<b>Farming of frogs, eels, cattle, chickens, ducks and pigs</b>		- AS - HARVEST Cambodia - Agricultural officials	TV (CTN, Bayon, TV 5)	

## **5. CONCLUSION AND RECOMMENDATIONS**

### **5.1. Opportunities**

A majority of the Rohal Suong village members own farmland and have access to the Sangkae River as a source of water throughout the year. The river water is distributed to the village through rudimentary canal networks and water storage ponds of various sizes. The Tonle Sap Lake and associated flooded forests are also traditionally used as a source for fish, firewood, and other animals and plant products. Natural cycles of seasonal flooding from the lake and river replenishes the top soil and soil nutrients. The rice fields are also affected by large water bodies during the wet season and can then be used as fishing grounds. The village is also endowed with several types of natural resources.

In an average year, farmers typically grow rice (twice per year), some vegetables and fruits and many tend to get some surplus to sell. Raising small livestock is widely practiced as an income generation option, while large livestock is becoming less popular due to less available grassland. Basic infrastructure exists. There is one paved road to access the provincial town and other gravel roads to access key community resources.

The village has been supported by a variety of external agents through agriculture development, natural resource management, and food security programs, including some large donor programs, and has received support as well as direct agriculture input subsidies. Several community institutions exist and are functioning well.

### **5.2. Challenges and constraints**

The general perception among community members is that the condition of natural resources is declining in the village. Flooded forests are deteriorating due to deforestation and agriculture encroachment. Fisheries are declining because of overexploitation and loss of habitats (including flooded forests).

The existing smallholder agriculture production system appears not to be very profitable due to high input costs, and limited market and value chain development. With the exception of wild fish, markets and value chains for agriculture products are not well established, and rely on traders from outside. The cost of agriculture inputs is generally high and market prices are not stable.

Farming families have taken several strategies to increase their overall income: expanding the farming area, intensifying rice production, and seasonal labour migration. These strategies have negative implications: loss of forest and grassland to farmland, degradation of water quality and soil, and possible labour shortage in the village for agriculture.

Coverage of irrigation is limited to some parts of the village and the farmers report water shortages in dry season.

The local production systems are well adapted to the natural seasonal fluctuation in rainfall and flooding regime, but occasional extreme flooding events cause crop damage and food shortage situation, most recently in 2013.

### **5.3. Locally identified priorities and recommendations**

Based on the visioning exercises, conducted by AAS and CCAFS, the village seems to prioritize improved agriculture productivity and profitability and restoration of natural

resources, specifically fisheries. Both of these are key elements in an income generation strategy for the community.

The villagers identified better irrigation infrastructure and water distribution networks and related management as priority interventions. This includes improving associated water storage ponds network, for supplementary irrigation, and productivity of local fisheries.

Other more general needs include improved farming skills and training and market/value chain improvements to increase efficiency and profitability of smallholder agriculture production.

#### 5.4. Implications for CCAFS

Rohal Suong experiences seasonal and year-to-year climate variability, and has devised production systems that are well adapted to the natural conditions. However, these existing interventions are not yet adapted to climate-related variability. There is an opportunity for CCAFS to implement and promote context-specific and useful climate-smart agricultural techniques and practices that can support villages to adapt to, and mitigate, climate change.

A few of the priority interventions, specifically better water management, can help build the community’s climate resilience. CCAFS can focus its effort in supporting those interventions. On the other hand, there are many other possible climate-smart practices that are either common sense, “no regret” interventions, for example basic skills training and information access, or practices that can be tested and validated for this specific site, such as improved crops and varieties more tolerant to flood conditions. CCAFS can also support local communities to explore these additional options for future climate adaptation.

**Table 12. Potential CCAFS partners**

Organization	Sphere of operation	Activities	Strength
<b>Department of Agricultural Extension, MAFF</b>	Beyond locality	- Agricultural Extension	- Technology and crop/livestock variety research and development - Incorporate findings into gov. policies
<b>Battambang Provincial Department of Agriculture</b>	Locality	- Develop & implement agri. plans - Ag. Extension	- Technology and crop/livestock variety research and development - Inform results from piloting and implementing to MAFF
<b>Aphivat Strey (AS)</b>	Locality	- Build community capacity - Community development - Transfer ag. technologies	- Community mobilization - Community capacity building
<b>DSR Irrigation Committee/Water user committee</b>	Community	- Develop community action plan - Mobilize community and resources - Rehabilitate & manage water channel & fee	- Community mobilization - Community based organization



## 5.5. Recommendations for major opportunities

Based on the VBS findings described above, below is a list of knowledge gaps and opportunities where CCAFS or other local development partners can support. These recommendations are largely based on the local community priorities identified during the baseline survey, and the situation analysis. Therefore the feasibility of each option has not been assessed in detail.

**Table 13. Recommendations for major opportunities**

<b>Gaps in knowledge/ current constraints that could provide opportunities/niches for CCAFS and partners</b>	<b>Opportunities for research (CCAFS)</b>	<b>Opportunities for Action Research (CCAFS partners)</b>	<b>Development Interventions (Partners)</b>
Crop varieties that are suitable for this area	X	X	X
Build capacities of famers on farming techniques (including rice disease treatment)			X
Enhance soil and water conservation	X		
Build local capacity on how to manage and use water efficiently	X	X	
Extend the water channels and increase number of ponds			X
Build more fish refuge ponds			X
Replant flooded forest			X
Build capacity of Community Fisheries and famers on fish refuge pond management and rice field fisheries improvement	X	X	
Build paths and bridges to paddy fields			X
Market agricultural product with a higher price and improved access to market information			X