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

Village Baseline Study:

Site Analysis Report for Tra Hat Village, Vinh Loi, Bac Lieu, Viet Nam (VNM 03)

March 2015

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Titles in this series aim to disseminate interim climate change, agriculture and food security research and practices and stimulate feedback from the scientific community.

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The tools and guidelines used for implementation of the village baseline study across all CCAFS sites, as well as the mapping outputs at a higher resolution can be accessed on our website (http://ccafs.cgiar.org/resources/baseline-surveys).

DISCLAIMER:

This Paper has been prepared as an output for the baseline activities under the CCAFS program and has not been peer reviewed. Any opinions stated herein are those of the author(s) and do not necessarily reflect the policies or opinions of CCAFS, donor agencies, or partners.

Abstract

This report presents data collected from the Village Baseline Study conducted on 2-4 October 2014 at the Tra Hat village, Vinh Loi district, Bac Lieu, Vietnam. Data were collected through focus group discussions and participatory resource mapping with community members in the village. The Village Baseline Study is part of the baseline activities conducted under the CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS) in South East Asia. The purpose is to collect data for indicators that will allow site comparability and monitoring to assess changes in terms of food security and natural resource management across time.

Results show that the men and women in Tra Hat village consider farmland, rivers and canals as important natural resources. The quality, however, of land, water and wildlife habitats has declined in the last decade along with the improvement of farming techniques and intensive use of chemical fertilizers and pesticides. Infrastructures such as roads, internal canals, hospitals, schools, water supply station and electricity transformer station have improved. The future is envisioned to have improved internal canals in farmlands and a developed irrigation system, dykes and sluices to support high agriculture production. Home garden diversification was also believed to enhance food security and improve livelihood resilience.

To turn the vision into reality, the community expects support from the different organizations working in the area considering current impacts of salinity intrusion and sea level rise, the need interventions of CCAFS and its partners. Strengthening the irrigation system, improving local rice variety, and introducing modern farming techniques taking into account negative impacts of climate change are major recommendation for future intervention. .

Keywords

Baseline; Vietnam; Climate Change; village; participatory mapping; organisations; access to information

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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 help the developing world overcome the threats posed by climate change, to achieving food security, enhancing livelihoods and improving environmental management. In 2014 and early 2015, CCAFS carried out baseline surveys at household, village and organisation levels across its target sites in South East Asia[1] (CCAFS trained survey teams from partner organisations in the three countries of Vietnam, Cambodia and Lao to conduct the baseline data collection.

This report presents the results of Village Baseline Study (VBS)[2] in Tra Hat village located in Bac Lieu province. Mekong River Delta, Vietnam. The aim of VBS is to provide baseline information at the village level on basic indicators of natural resource utilisation, organisational landscapes, information networks for weather and agricultural information, as well as mitigation baseline information, which can be compared across sites and monitored over time. These indicators can be compared across sites and monitored over time.

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; and
4. Explore gender differentiation.

[1] More information about CCAFS sites is available at website http://ccafs.cgiar.org/where-we-work

[2] The detailed tools and guidelines used for the implementation of the village baseline study (VBS) across all CCAFS sites, as well as the manuals, data and analysis reports can be accessed on our website (http://ccafs.cgiar.org/resources/baseline-surveys).

2. METHODS

The data collection for the VBS in Tra Hat village, Vinh Loi, Bac Lieu, Vietnam was conducted on October 2-4, 2014. It was conducted by a team composed of two facilitators, two note takers, and one site coordinator. They were from CCAFS-SEA office, Can Tho University, the Department of Agricultureal and Rural Development, and Cuu Long Rice Research Institute. . The team introduced the study and explained its objectives and consulted the schedule and venue of the activities. The data collection used participatory method. Separate but simultaneous activities attended by randomly selected men and women in the village were held.

Data collection was s carried out over three consecutive days. Each day, there groups of men and women, each group composed of 15 participants, respectively were invited as participants.

On the first day, members of the community were invited to participate in an introductory session with team. They were invited again on the third day for a debriefing session where a summary of findings during the survey was shared.

After the introduction session on Day 1, the invited group of 15 men and 15 women stayed for the focus group discussion on community resources (Topic 1). To identify and map/sketch all important resources in the village, their current state, past condition and what had caused the changes. The team used a satellite image of the block 10 x 10 km^2 and worked with each group to identify and map/sketch all important resources in the village, their current state, past condition and what had caused the changes. The outputs were maps and sketches. The discussion with the farmer group helped to identify the important resources of the community. However, it depended entirely on how well they were able to interpret the image and build the maps of the villages. On Day 2, the team worked with each group to understand the organisational landscape in relation to food security (in a normal year, in a year of food crisis), food security and natural resource management in the village. These were recorded on diagrams as well as notecards.

On Day 3, there were two main tasks. The first task was on understanding information networks in relation to weather issues and farming activities. The outputs were diagrams and sketchers. The second task was on generating a vision of the future of the villain. The first task was on understand information The second task was to bring the male and female groups sitting together and generate a vision of what their village will be in the future. The output also provided a map/sketch showing “the vision of the community”.

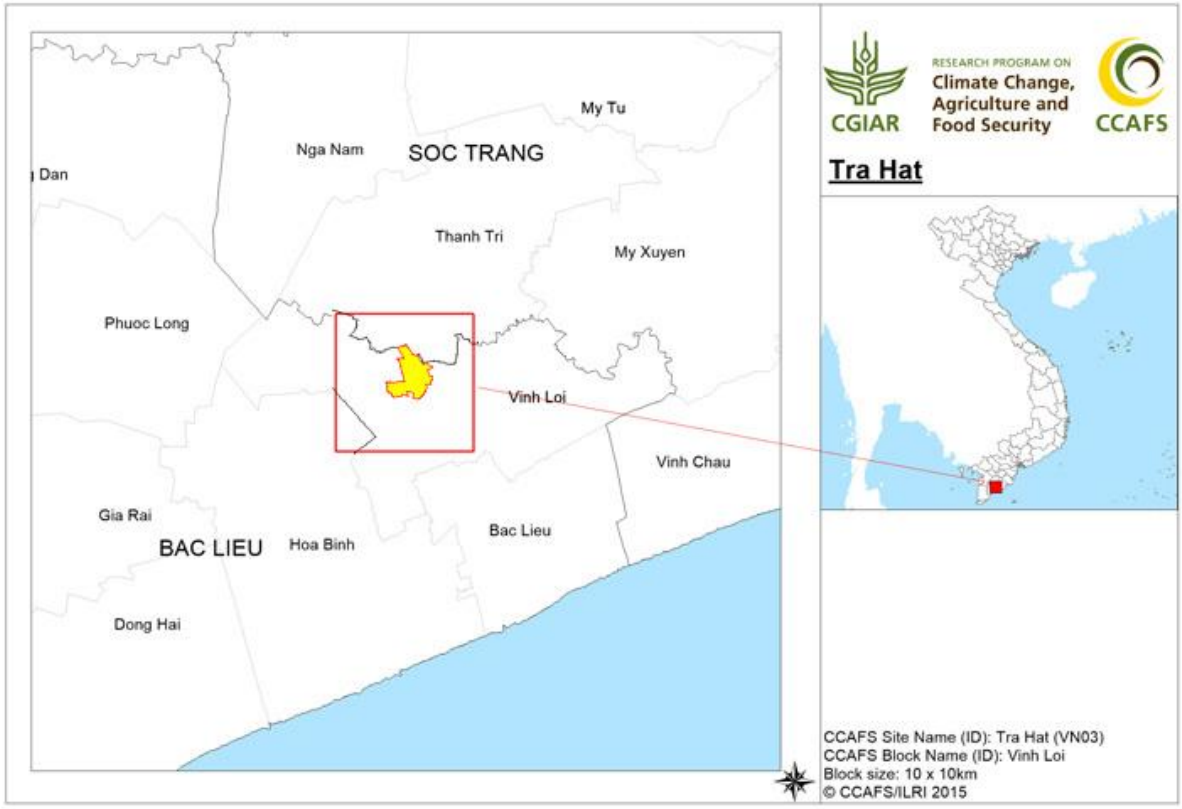
Aside from this report, a debriefing report on data collection activities was prepared while the team was at the field. The photographed sketches and maps were inserted in the debriefing report. In this report, the photos were replaced by proper maps and diagrams derived from the field outputs.

3. TRA HAT VILLAGE

Tra Hat village is located in Chau Thoi commune, Vinh Loi district, Bac Lieu Province, Vietnam (Map 1). Located at coordinates 105.65 - 105.70 E and 9.35 - 9.38 N, Tra Hat village is about 25 km from Bac Lieu city. It has a land area of 400 ha and 305 households, 1280 people (2014). The main sources of income of the people are rice production. The main challenges include climate change and sea level rise. The two rice cropping system is predominant. The rainy season is from May to November and the dry season from December to April.

The available sources of fresh water for agriculture are mainly rainfall and the water from Quan Lo Phung Hiep (QLPH) canal and groundwater. Currently, rainfall is sufficient to meet the requirements of the rice production during the rainy season (with amount of rainfall per year at > 2000 mm). During dry season, the QLPH canal is the only water source to supply irrigation water for agricultural production.

Tra Hat, one of CSVs in Southeast Asia, is located in Chau Thoi commune, Vinh Loi district, Bac Lieu Province (Figure 2); it situated along Quan Lo - Phung Hiep irrigation system and about 25 km distance from Bac Lieu City. The total land size of this village is more than 400 ha which comprised mainly by paddy field with 316 ha (the half is Large-Scale Field Model), home garden and residential areas.



Map 1: **Location of the Tra Hat CSV in the CCAFS benchmark site, Vietnam**

4. RESULTS

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

Community infrastructure and resources and gender-differentiated access and utilisation of those resources were analysed, based on a process of participatory visual interpretation of high resolution satellite imagery (RapidEye).[3] The aim was to create a basic understanding of existing community resources, as well as of community dynamics in relation to its environment. The participants discussed the current state of those resources, in terms of quality, access, management, history and potential drivers of change. Later on, a mixed group developed visions of village resources and human well-being into 2030 to understand opportunities, constraints and aspirations for the future. The results are presented below.

4.1.1 Current resources

The initial activity involved the development of the community resource map on the ground by the men and women groups separately to mapping the community resources on the ground.. The names of important landmarks (e.g. office of commune people committee, pagoda, etc.) were written on notecards and placed on the drawing on the ground, taking georeferenced distance into account. Roads, rivers, canals and other physical objects were added successively. The boundary of the village was drawn last.

After the community map was finished, the Team introduced to the participants a satellite image of the 10x10km block covering Tra Hat village. The participants were asked to recognize landmarks on the image then trace the natural resources (i.e. main roads, rivers, canals, villages, rice fields, ect.) on transparent layers. Photo 1 shows the map of current natural resources developed by women's group. These resources are described below.

Farmland: Most of land area shown in the 10x10km block is farmland. The farm lots are usually located half a kilometer from the residential area in the village. They are small, with households having, on average, 1.2 ha farm area. One cropping system is practices in elevated areas, while two cropping system is practiced in the lowlands. The farmlands were regarded as of "medium quality" with rice yield varying between 6 and 7 tons/ha. The start of the first cropping season in April is affected by the lack of fresh water. The main water sources are the rain, the water from Quan Lo Phung Hiep (QLPH) canal, and the groundwater. Farm production is threatened by a number of factors including salinity intrusion and sea level rise are major threats, diseases, high cost of inputs, and intensive use of farm chemicals. Flooding due to heavy rains and overflowing of rivers is experienced during the months of October to November.

Home garden: Each household has a small plot of less than a hectare with mix use -- planted with mixed fruit trees (e.g., guava, mango, jackfruit, plum), vegetables, and used for

[3] The detailed approach to this exercise is outlined in the CCAFS Village Baseline Study Implementation Manual (follow the link to the baseline study from our website http://ccafs.cgiar.org/resources/baseline-surveys).

raising livestock (e.g. pig, chicken, duck), and fish pond (e.g., for tilapia, catfish, common carp, silver carp). The produce is mainly for household consumption and are considered safe because no chemicals are used. Selling of the produce is discouraged by unstable prices in the market. Surplus produce are fed to the pigs.

Rivers and canals: The village is located in the lowest part of the Mekong River Delta. A number of rivers and canals cross this region The focus group participants identified 24 canals and rivers. Not only are they main source of water for irrigation but also being used as facilitate transportation route. However, the water is polluted because of heavy use of fertilizers and pesticides from the nearby rice fields and organic waste from livestock. Decrease in the number of wild fish and shrimp were observed.

Roads: As in other rural areas in Bac Lieu, the road network is well developed The roads are about 2.5 to 6m in width and most are concrete or asphalted The road network enables the community to easily access market, schools, towns, and big cities.

Bridges: Several bridges managed by the local government were recently built in the region. The focus group participants identified six bridges and identified them to be in good condition. These bridges are managed by local government. They are important in easing mobility of people and also access to market by the farm produce.

Sluice and dams: The focus group participants identified three important sluices: Cau Sap, Chau Vien, and Dung. These sluices are managed by the local government. They prevent salinity intrusion and regulate irrigation water thereby protecting the farmlands and enabling the t two cropping system. However, they also prevent migration of natural fish to canals.

Schools: There are 3 kindergartens, 2 primary schools, and 1 secondary school in the radius of less than 2 km from Tra Hat village. All schools are in good condition and under the regulation of the Vinh Loi Department of Education. The nearest school is about 2 km away from the village.

Hospitals: The nearest hospitals to Tra Hat Village are 2 km away (Chau Tho Medical Center) and 5 km away (Vinh Loi hospital). According to the focus group participants, they are in fairly good. These hospitals lack the necessary medical equipment and the medical staff is perceived not experts.

Pagodas: Chau Vien pagoda was built a long time ago, while Chau Long pagoda is relatively recent.

Infrastructures: Participants also identified a water pumping station and an electricity transformer station managed by the provincial government. The electrical transformer station is in fair condition and about 4 km from the village. The water supply station (source of clean water) is in good condition and about 2 km away from the village.

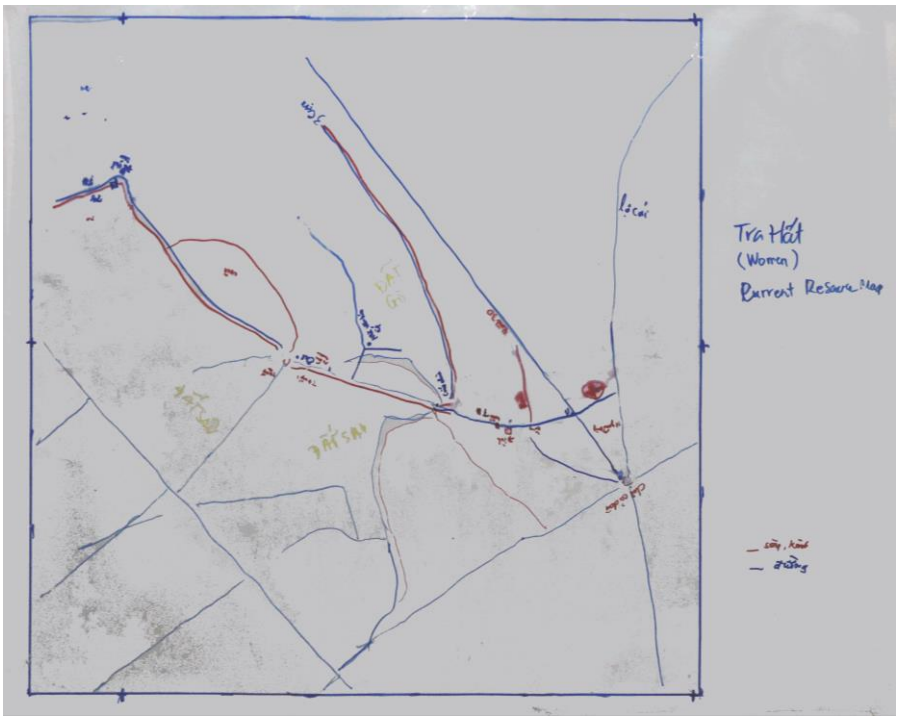
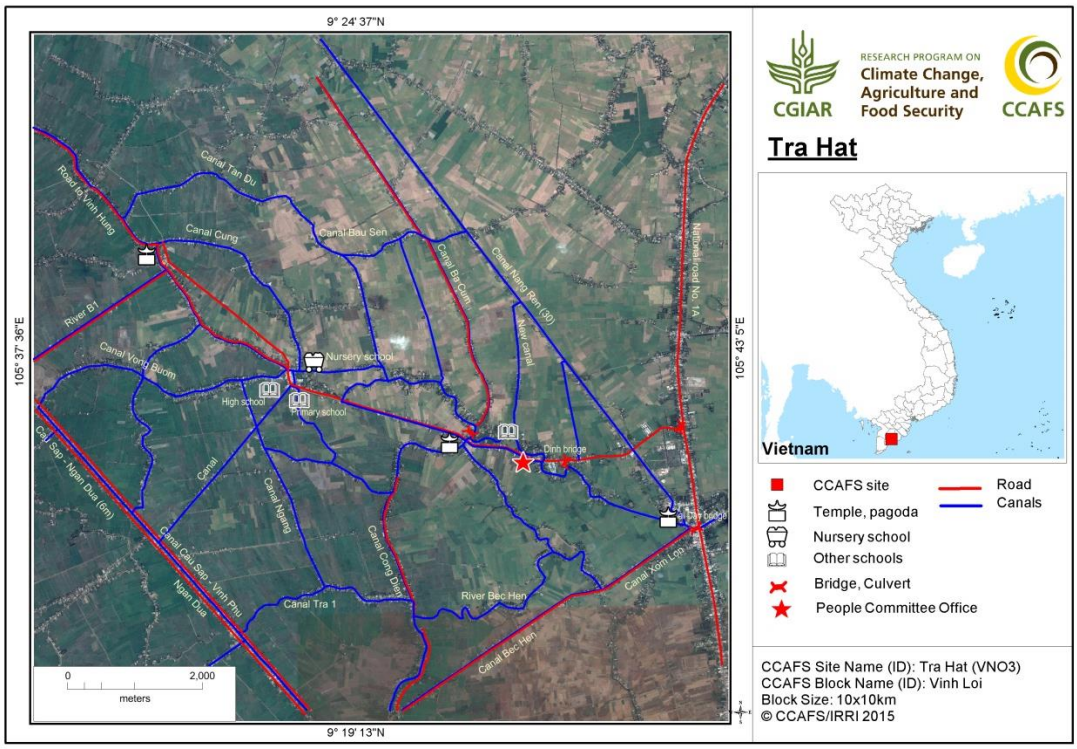
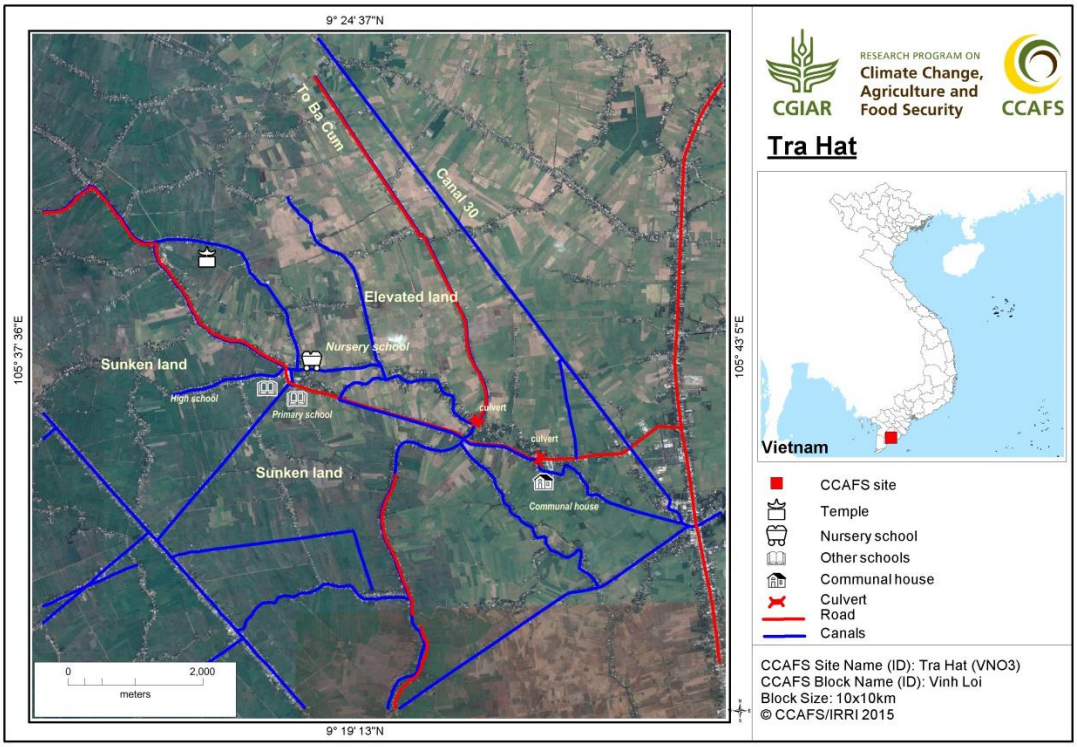


Photo 1: Current conditions mentioned by women regarding natural resources and infrastructure

Map 2 to Map 3 presents the results of the community resource mapping with men and women focus group participants, respectively. These include the natural resources (rivers, canals and farmlands) and infrastructure (roads, school, sluices, healthcare centres). Map layers were developed based on the satellite image pre-prepared by survey team. Detailed descriptions of community resources given by men and women group are shown in Table 1.



Map 2. Men's map of current community resources



Map 3. Women's map of current community resources

Table 1. Current conditions of community resources as perceived by men (M) and women (W) participants

Land cover class	Community determined land use	Location Names	Current state (quality)	Distance to resource	Management and ownership issues	Environmental Benefits	Opportunities	Limitations
Farmland (M)	Rice cultivation	Tra Hat	Medium quality of rice. Rice yield 6-7 tons/ha/crop	500m	Individual ownership		Fresh water	Saltwater intrusion sometime in the past (2010); Flooding due to rain and tide (Oct-Nov) Lack of fresh water in April (time to start first crop); High input; Fake chemical fertilisers and pesticides; Need high quality of rice variety; Rice disease; No more wild fish, shrimp
Farmland (W)	Rice cultivation	Low land	More acidity affected in low land than in elevated land, normal fertile (rice yield is not high)	Very close to farmer houses, some in other villages	Farmer can utilize their land		2 Rice crops: transplanted in rainy season and direct seeding in dry season. High yield (6.1 ton/ha in rainy season and 6.9 ton/ha in dry season)	Soil affected by pesticide and fertilizer; low land without good drainage so it is suitable for transplanting; Water level in canal could be higher 50 cm from field surface due to rain, tide, no place that could be used for pumping field water out.
	Rice cultivation	Elevated land	Average fertile	In front or back of farmer house, some farmers have land in other village	Farmer can utilize their land			High cost due to more pumping expense
Home garden (M)	Land for fruit trees, vegetables, livestock and fish pond	Home garden	Small scale, mainly for household consumption	0	Individual ownership	Do not use pesticide Food safety and hygiene		Unstable output price and high input for piggery

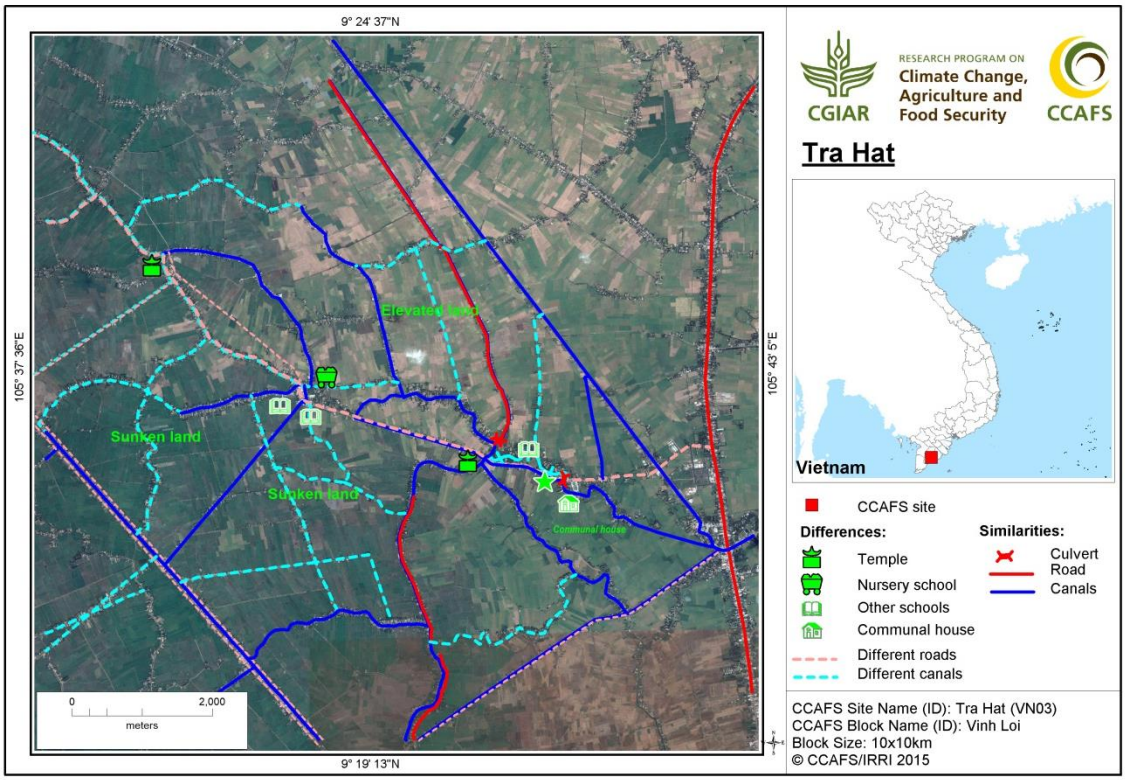
Land cover class	Community determined land use	Location Names	Current state (quality)	Distance to resource	Management and ownership issues	Environmental Benefits	Opportunities	Limitations
Rivers and canals (M)	Irrigation and transportation	many local names	Fairly good	Depending on rivers and canals	Government			Decrease number of wild fish and shrimp Yellow nail
River and canals (W)	For irrigation for rice, and upland crops	Canal 30, Canal along roads	Water quality is worse as it is affected by acidity, pesticide from rice field turbidity People who feed pigs leach waste directly into river/canal	In front of farmer house along river/ canal	Canal/river managed by local gov. (including maintenance)		Enough water for rice production in two seasons/year	Polluted canal water is not applied for domestic use. Acidity, polluted by pesticide
Roads (M)	Transportation and connect commune	Road to Uncle Ho Temple Road to Vinh Loi ruin base Other village roads	Good, upgraded (2.5m width) and asphalt covering (6m width)	Depending on the road	Government		Goods Trade and tourism development (ruin base and Uncle Ho Temple)	Some parts are still narrow
Roads (W)	Access school, market, work and sale rice.	Road to Uncle Ho temple; road to Ba Cum; road to Bau Sen; road to Vinh Hung, road to Cau Sap	Good, new constructed, only road to "Cau Sap" is damaged some parts (average quality)	6 km (road go to temple of Uncle Ho)	Investment and management by Gov.		Convenient to access to market, schools, workplace; everybody can get benefit from road system	Some roads are still damaged, some roads are narrow and cars cannot enter.

Land cover class	Community determined land use	Location Names	Current state (quality)	Distance to resource	Management and ownership issues	Environmental Benefits	Opportunities	Limitations
Bridges (M)	Transportation	Chua bridge Dinh bridge many local names	Good	Depending on the bridges and drains/dams	Government		Convenient transportation, good for developing economic	
Bridges (W)	Transportation	Xeo Chich, Dinh, Xom Tiem, Near PC of commune & near Uncle Ho temple	Good	4 km Other locations has not been estimated	Bridge is managed by local gov.		Advantage for transportation	Small bridge , small loading
Sluice/dam (M)	Protect from Salinity intrusion	Cau Sap sluice	Good, it can protect for rice production from saline intrusion	30 km	Sluice is managed by local gov.	Protected from salinity	Increasing one more rice crop	Less natural fish in canal for catching
Sluice/dam (W)	Irrigation/Drainage – water management	Sluice at Chau Vien Pagoda; Dung sluice, and name of others are unknown	Good	4 km	Sluice is managed by local gov.	Water management in rice field	Enough water for irrigation	
Schools (M)	Education	A kindergarten , 2 primary schools, 1 secondary school	fair	Less than 2km	Vinh Loi Department of education		Children go to school easily	
School (W)	Education	3 primary, 1 secondary school and a	Clean Preschool has just been built.	2 km	Investment & management by Gov.		Children can go to school	School is little far from HH (about 2km)

Land cover class	Community determined land use	Location Names	Current state (quality)	Distance to resource	Management and ownership issues	Environmental Benefits	Opportunities	Limitations
		kindergarten. No one remember the school's names	It is new					
Hospital, (M)	Examine and treat medically	Vinh Loi hospital, Chau Tho medical Center	Medium	Vinh Loi hospital (5 km), Chau Tho medical center (2km)	Bac Lieu Department of Medical service center/ Vinh Loi sub-department of medical and service center		Villagers are examined and treated regularly and on time	Lack of medical equipment, and medical staffs are weak expertise
Hospital (W)	Health check and treat	No name	Under construction	4 km	Investment & management by Gov.			
Electrical transformer station (M)	Electricity supply	Vinh Loi Electrical transformer station	fair	4km	Province		Providing electricity	
Water supply station (M)	Providing clean water	Vinh Loi water supply station	good	2km	Government	Providing clean water		
Pagodas (M)	Religion	Chau Vien Pagoda	good	2km	Pagoda			
Pagoda (W)	Religion	Chau Vien Chau Long	Just newly built	3 km	Contributed by community			

4.1.2 Gender-differentiated comparison of current conditions

The men and women groups identified similar landmarks but they deferred in the description and perceived functions. The women group separated farmland (paddy field) into two regions based on relative elevation, but according to men, it was one area. In addition to the list similar to the women's group, the men's group had additional infrastructure facilities (e.g., electrical transformer station, water supply station, hospital) While the men were able to identify more resources and infrastructures outside the village, the women were better in providing more information. Map 4 shows different perceptions on current community resources of men and women group.



Map 4. Overlay of current conditions, comparing men's and women's maps

4.1.3 Major changes of resource conditions

The men and women participants identified important events defining the changes on resource condition in the area over time:

1990: Cau Sap dam was built to prevent saltwater intrusion. Start of using direct seeding method and practicing two rice cropping per year.

1994: The road along canal heading to Uncle Ho Temple was built

1995 The Nang Ren canal was dredged and expanded from 30m to 60m width

2002 A village road was improved to be asphalt road 3.5m widtht

2004 A cemented road (2004) was improved

2010 Main road was upgraded to 6m width

2011 The vestige of Vinh Loi military base was rebuilt

2014 The Tra Hat culture house was built

Farmland: Before 1995, the average farm size was 1.7 ha/household. Farmers practiced one rice cropping season with average yield of about 3 ton/ha. During this period, farmers used less chemical fertilizers and pesticides. There were many wild fish, shrimp and other wildlife in rivers and canals. The change in farming practices with the intensive application chemical inputs and the improvement in irrigation system accounts for the yield increase to 6-7 tons /ha per cropping. This was despite decline in the average farm lots to 1.2/ha per household. The farmers have also shifted to two cropping system. However, the fish and the shrimps in the river have declined. The increase in population was also identified as a driver for the need to increase farm production.

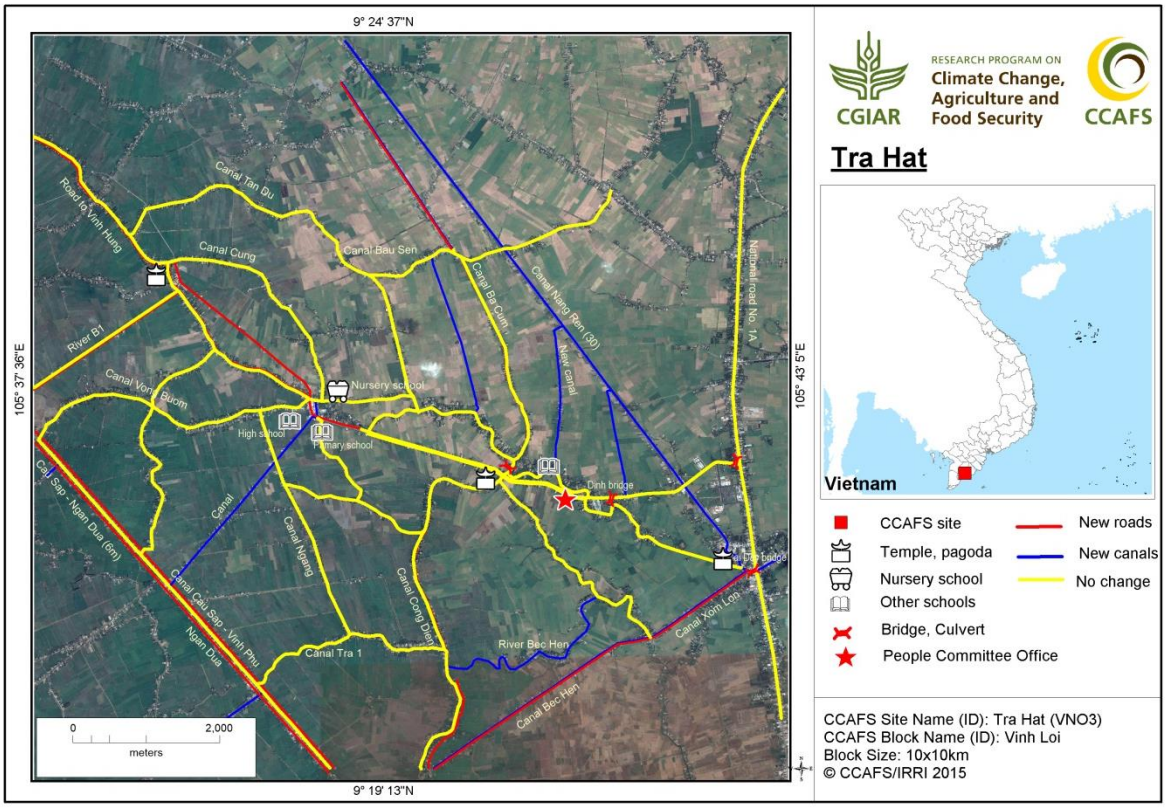
Home garden: The coconut and timber trees in home plots were replaced by different fruit trees (e.g., jackfruit, plum, mango, guava) and vegetables More households fatten pigs, raise children and ducks. The sze and number of fishponds were reduced. Instead of fattening wild fish, farmers now grow culture fish (e.g., tilapia, catfish, carps) for home consumption.

Water resource: In the past, freshwater was available for 6 months, from May to November. Salinity intrusion was mainly felt in the months of December to April. The paddy field is not submerged to water. With the improvement of the drainage and irrigation systems, freshwater is always available. However, in April, the supply of freshwater may be low. In 2010, a severe salt water intrusion was experienced. Also, flooding is now experienced during the months of October to November. All households now have own borehole to satisfy demand on freshwater for domestic use. Since 2013, the water supply station is a major source of clean water.

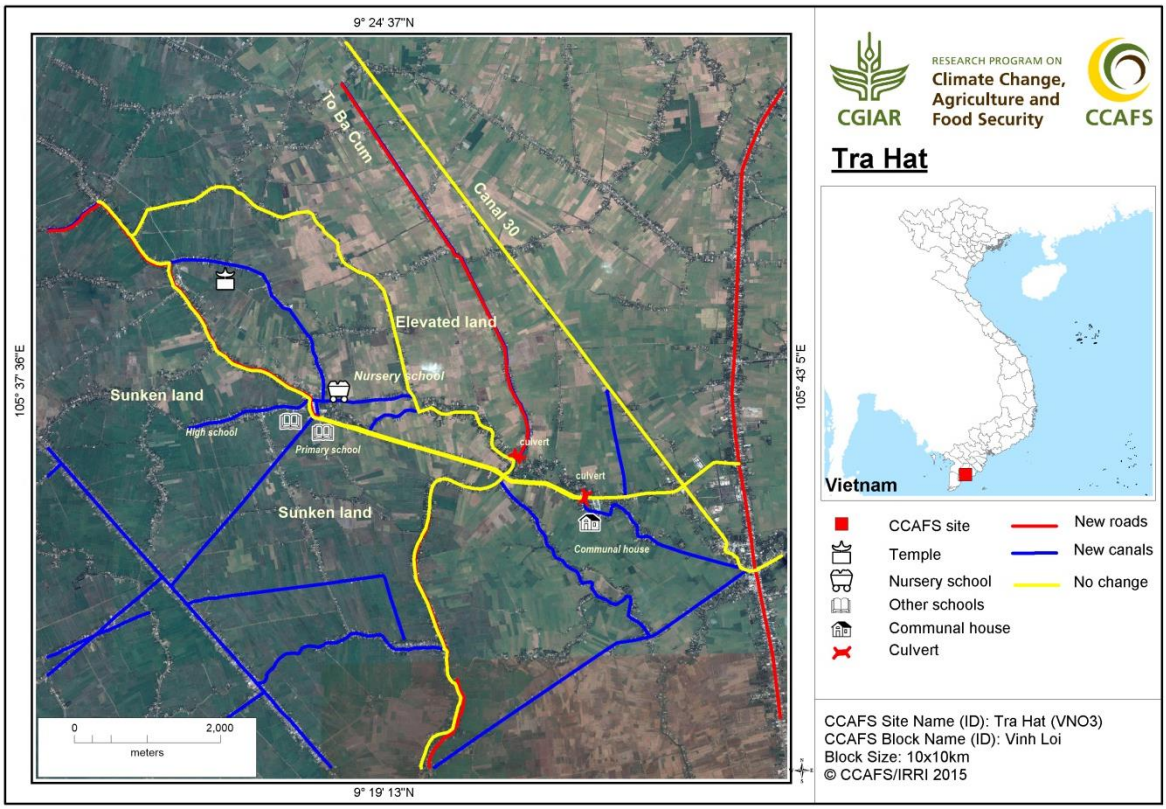
Men and Women and the changes in the area . According to the women group, rice yield was not high in the past, with the low lands of poorer quality (more acidic) compared to elevated lands. There was no canal during 1990-1995. There were mainly natural rivers or creeks. There were unpaved roads along the canals and mobility was difficult during the ready season as the roads were muddy and slippery. Water from creeks were clean and water can be used for domestic use. Fish abound. There was only a primary school. .

Meanwhile, the men identified significant changes in resource conditions since 1995. These include the improvement of the irrigation system, construction of new canals and the dredging of the old one canals (Nang Ren, QLPH), increase of groundwater use for domestic consumption, and growing livestock production. The quality of roads, school, medical center and other infrastructures has improved. Now rice farmers practice two cropping system. . They realized the degradation of their traditional rice variety (Tai Nguyen rice), The men's group identified the appearance of more rice diseases, drought, hot temperature, heavy rainfall as effects of climate change.

Map 5 and 6 show major changes in resources in last 10 years. Drivers of the change and other related information perceived by both men and women are described in Table 2.



Map 5. Major changes in resources (comparing past and present) for men



Map 6. Major changes in resources (comparing past and present) for women

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

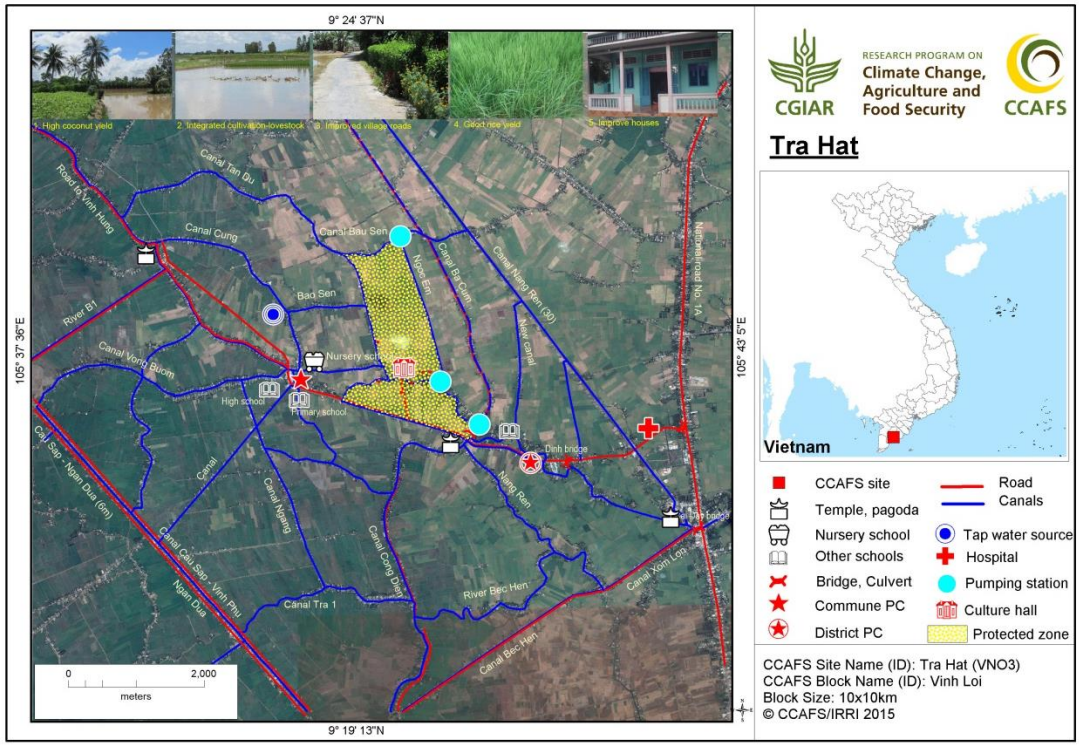
Land cover class	Community determined land use	Location Names	Past state (quality)	Distance to resource	Drivers of change	Management and ownership issues	Environmental Benefits
Farmland (M)	Rice cultivation	Tra Hat	One rice crop; poor due to salinity; farm size was bigger	500m	Increase population, Good irrigation, dams, Applying technique Using garden land to grow rice	Managed by individual but not own	
Farmland (W)	Rice cultivation	Low land	One rice crop; more acidity affected than in elevated land, normal fertile (rice yield is not high)	Very close to farmer houses, some in other villages	More irrigated water from new canals	Farmers have a right of use on their lands	
	Rice cultivation	Elevated land	Normal fertile	In front or back of farmer house, some farmers have land in other village		Farmers have a right of use on their lands	Elevated land
Home garden (M)	Land for fruit trees, vegetables, livestock and fish pond	Home garden	Use inefficiency	0m	Increase population, good irrigation	Individual, but not ownership	
Rivers and canals (M)	Irrigation and transportation	many local names	Less pollution, salinity, Canals were small and did not dredge.		Fund for Quan Lo Phung Hiep program, Dredging canals.	government	Prevent salinity, supply fresh water through year
Canal (W)	For irrigation for rice, and upland crops; transportation	Canal 30, Canal along roads with local name	Earth canal; Traffic mainly on water ways Clean water that can be used for domestic	3 km	Gov. executed new canal from the old canal. There were still natural rivers/ creeks	Canal is public for people use. Maintenance by Gov.	Enough water for irrigation 2 rice crops/ year Wildlife habitats

Land cover class	Community determined land use	Location Names	Past state (quality)	Distance to resource	Drivers of change	Management and ownership issues	Environmental Benefits
Roads (M)	transportation	Road to Uncle Ho Temple Road to Vinh Loi ruin base Other village roads	Small earth road	Depending on the road	Government invested to develop social and economic status, and convenient traveling to Uncle Ho Temple	Government	
Roads (W)	Access school, market, work and sale rice.	Along canal roads	Earth roads, difficult to go during rainfall because of mud and slippery, only used by bicycles		Investment by Gov.	For community use	
Bridge (M)	Transportation	Chua bridge Dinh bridge	Wooden bridge		Government invested to develop social and economic status, and convenient traveling to Uncle Ho Temple	Government	
School (M)	Education	Tra Hat primary school Chau Thoi primary-secondary school		2km	Government investment	Vinh Loi department of education	
School (W)	Education	primary school	It was thatched house, then become a school. Recently it has been reconstructed.	At the culture house of Tra Hat	- New road system -More investment of Gov. for building new schools	Gov. Invest and manage school	
Medical centre (M)	Health check and medical treatment	Chau Thoi medical centre	Bad conditions	2km	Government investment District divided	Department of medical and service center	

Land cover class	Community determined land use	Location Names	Past state (quality)	Distance to resource	Drivers of change	Management and ownership issues	Environmental Benefits
Electrical transformer station(M)	Make electricity available	Vinh Loi Electrical transformer station	Not existing		Government investment	Electricity sector	
Water supply station (M)	Providing clean water	Vinh Loi	Not existing. No clean water		Government investment		
Pagoda (W)	Religion	Chau Vien Chau Long	Just newly built	3 km	Religion	Contributed by local people	
Market (W)	Trading	Chau Thoi	Not much goods, not clean, waste collection is not daily done	3 km	Good location/ road system	Properties of government	

4.1.4 Vision of the future

A mixed group of men and women developed map (Map 7) reflecting their vision of the village by 2030. At the start of the activity, the farmers showed photos they took in their village. They expressed their wishes on future livelihoods through photos of rice production, gardening, livestock and aquaculture, and infrastructures such as road system, hydraulic works. In the future, they o envision an improved canal (more and better quality), irrigation system, dykes (building of two-dyke system) and sluices (more) that will support high rice production. They hoped to be able to practice a three-cropping system, for a larger farmlands with own pumping station, for higher quality of rice variety commanding higher price, more diversified vegetable garden, increased livestock production, developed hog fattening industry (wastes as input to biogas production), and to engage in fish farming (for home consumption).



Map 7. Future map of the community

Table 3. Vision of the future

Items	Preferred condition for 2030	Opportunities	Constraints	Organisations to be involved
Canals	- Digging a new canal and dredge existing canals: Bau Em canal → Ngoc Sen → village culture house - Dredging canal deeper: culture house → pagoda (to allow big boat to come); Ngoc Em canal → Ba Cụm, Tiem village (in front of culture house) → Dinh bridge	- Fresh water all around the year and no lack of water in the dry season - Drain water easier	-A large budget needed for activities and for land compensation. - Uncontrollable water quality from upstream regions	Department of Agriculture and Rural Development (DARD)
Sluice	-Relocated for pumping effective: from elevated field → shallow point (from junction of culture house # 600m); add 3 pumping machines - Build new sluices: Culture house→ sluice → pagoda sluice	Providing fresh water for agriculture production easier.	Need budget, need permission form Department of Transportation	DARD
Dyke systems	Building two dyke systems	-Building large scale modern rice field -Increasing rice crops per year (from 2 to 3 rice seasons)	Lack of budget for construction and land compensation	DARD
Pump stations	Build 3 new stations to provide sufficient fresh water	- Control water management well in area protected by dyke system - Stable fresh water supply for irrigation.	Lack of budget	DARD
Farmland	- High quality and yield rice variety - Sowing the same rice variety in a large scale - Better market price for rice	- Seedling and harvesting in the same time - applying 3 rice crops per year	- Low market price - Unpredictable climate change and extreme weather events - lack of irrigation water	DARD
Home gardens	- A part will be converted to rice field - Smaller home garden for vegetables(cucumber, okra, cilantro, papaya) and livestock - more livestock (pig, chicken, duck) - Fishponds for fish raising	- More income - Fresh and clean vegetables for self-sufficiency - Waste could be applied for producing biogas - Food for self-sufficiency	- Lack of techniques for livestock and fish raising - Low market price - Lack of capital (need a policy for home loan for livestock from bank) - livestock diseases	- Households -Commune veterinary station - Extension station

4.2. Topic 2: Organisational landscapes

This exercise aimed to understand roles of organisations operating in the region that contribute to food security, food crisis and natural resource management. Building the organisational landscape facilitated understanding about the community's capacity to adapt and mitigate future climate change challenges and how organizations operate and interact with others.

4.2.1 Basic spheres of operation

Photo 2 shows how the organizational landscape was built through focus group discussion. Figures 1 and 2 present outputs of men and women group discussion, respectively.

The men identified 12 organizations. Eight were identified to have presence in the village, while the four others are only at the commune or the district (at least). In contrast, the The women identified 19 organizations, where only two have presence in the village, 16 have presence in at the commune or district level and only one was working beyond the district level.

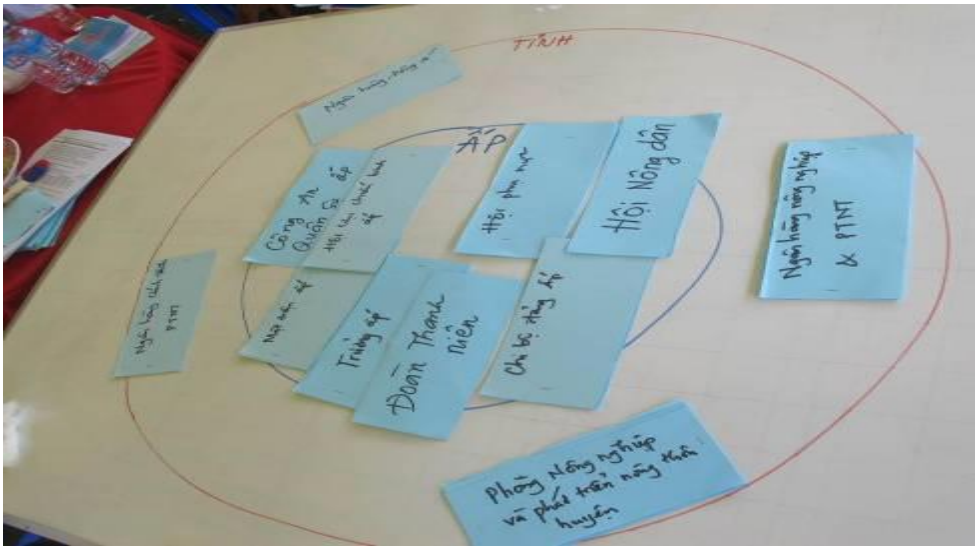


Photo 2: The organizational landscape activity in progress

1. Village committee/village head
2. Vinh Loi DARD
3. Village police/military agent
4. Village Communist party
5. Village veterans association
6. Vinh Loi AgriBank
7. Village Women Union
8. Village Farmer Union
9. Vinh Loi DongABank
10. Vinh Loi VBSP Bank
11. Village Youth Union
12. Village unit of Vietnam Fatherland Front

A: Beyond locality
B: Locality (commune, district)
C: Inside village

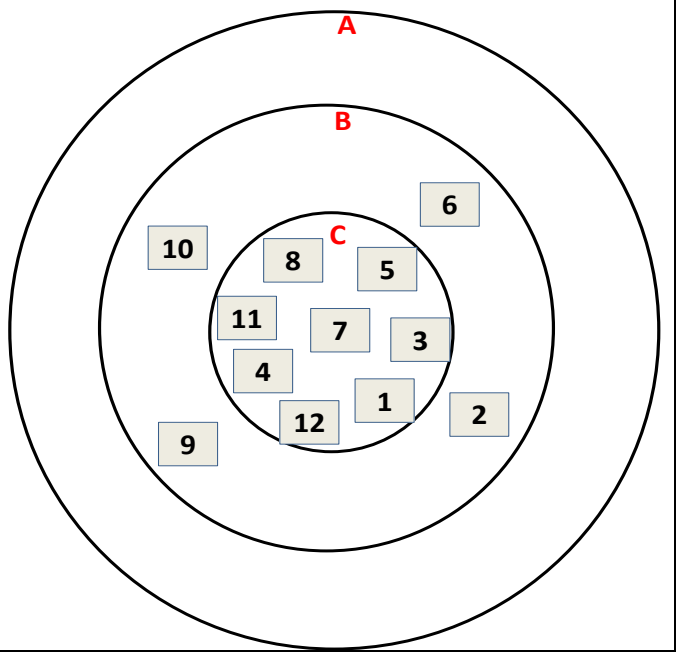


Figure 1: Organizational landscape of the men group

1. Red Cross
2. Veterinary station
3. University of Medicine and Pharmacy
4. Department of Health
5. Traditional music club
6. Commune People Committee
7. Vocational training center
8. Commune Farmer Union
9. Village Farmer Union
10. Bac Lieu DARD
11. IPM club
12. Agricultural Extension Club
13. Village Women Union
14. Provincial Women Union
15. Commune Women Union
16. Vinh Loi Agribank
17. Vinh Loi Sacombank
18. Vinh Hung Credit fund
19. Vinh Loi Dong A bank.

A: Beyond locality
B: Locality (commune, district)
C: Inside village

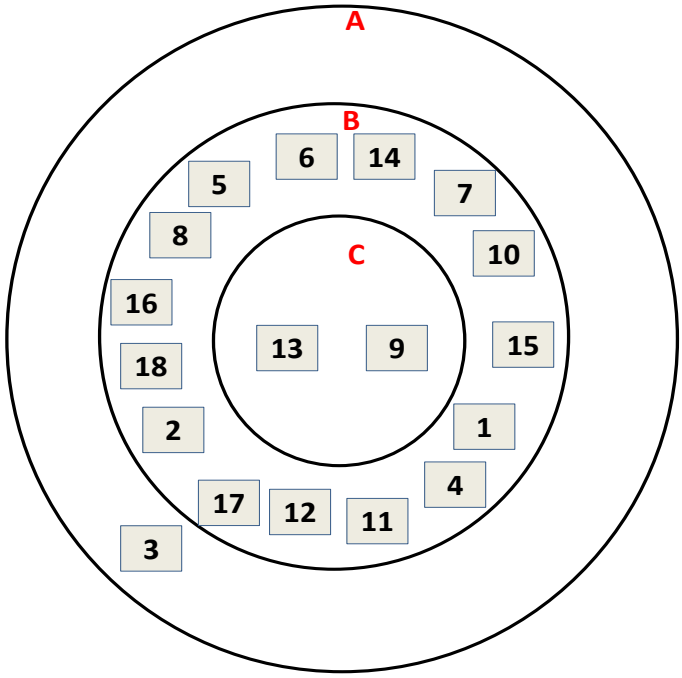


Figure 2: Organizational landscape of the women group

The participants were asked to select five most important organizations by scoring method (Table 4). Results of the ranking showed that the Commune Women Union is the most important organization to the women. The CWU was seen to be trustworthy, help farmers with loans to support livelihood activities, and provide information on health care. The next four organizations were the Vinh Loi Agriculture Bank (for the credit support), University of Medicine and Pharmacy (for the free health examination services), Commune Farmer Union (for farming technique guidance), and the pprovincial department of health (for the health care services). The results imply that the health care centre and credit provision are important to women

In contrast, the men ranked higher the village committee for the all the work they do to the village (e.g., repairing roads, infrastructure, taking care of economic status of households, representing the community at the higher levels) (Table 5). Next is Vinh Loi Sub-DARD for the technical assistance in farming. The village police/military agent, village communist party, and village veterans association follow. They were chosen mainly for the function they are supposed to exercise in the community.

Table 4. Information of the first five organisations ranked by the women

Rank	**Name of Organisation**	**Score**	**Reason for ranking**
1	Commune Women Union	31	- Trustable - Helps farmers in getting loan for piggery, aquaculture, solving household's difficulties, improving livelihood. - Provides information of regular healthcare.
2	Vinh Loi Agriculture Bank	31	- Provides credit for farming (raising pig, chicken, duck, and fish) ; - Gives low interest loan and simple procedure (need only house document as collateral)
3	University of Medicine and Pharmacy	26	- Provide free health examination service
4	Commune Farmer Union	24	- Provides farming technique guidance
5	Provincial department of health	17	- Provides healthcare services with skilled doctors - Guides to prevent sickness - Guides to eliminate mosquito larvae

Table 5. Information of the first five organizations ranked by the men

	Organisation name	Main activities	No. of members	Access	Origin (indigenous, state, NGO, project)	Sphere of operation: community, local, beyond local	Sources of funding (members, external, both)	Existed how long (less than 1 yr, 1-5, longer)	Formal/ informal
1	Village committee/Village head	Attends all activity inside and outside the village for repairing roads, protecting infrastructure, taking care of economic status of households, raising farmers' comments to higher levels	1	restricted	government	Community	government (from People's Committees of district)	> 5 years	Formal
2	Vinh Loi Sub-DARD	Provides technique and material related to agriculture activities	2	restricted	government	Locality	government (from People's Committees of district)	> 5 years	Formal
3	Village police/military agent	Maintains security in village	2	restricted	government	Community	government (from People's Committees of district)	> 5 years	Formal
4	Village communist party	Provides direction for activities of the village	18	restricted (enough eligible)	government	Community	Members	> 5 years	Formal
5	Village veterans association	Encourages villages to keep clean living environment	37	restricted (must be veterans)			Members	> 5 years	Formal

	Organisation name	Main activities	No. of members	Access	Origin (indigenous, state, NGO, project)	Sphere of operation: community, local, beyond local	Sources of funding (members, external, both)	Existed how long (less than 1 yr, 1-5, longer)	Formal/ informal
1	Commune Women Union	- Helps farmers in getting loan for piggery, aquaculture, solving household's difficulties, improving livelihood. - Provides information of regular healthcare.	No limit	Open	Gov.	Locality	Members	> 5 years	Formal
2	Vinh Loi Agriculture Bank	- Provides credit for farming (raising pig, chicken, duck, and fish) ; - Gives low interest loan and simple procedure (need only house document as collateral)		Restricted	Gov.	Locality	External	> 5 years	Formal
3	University of Medicine and Pharmacy	- Provide free health examination service		Restricted	Gov.	Beyond locality	External source	1-5 years	Formal
4	Commune Farmer Union	- Provides farming technique guidance	No limit	Open	Gov.	Locality	Members	> 5 years	Formal
5	Provincial department of health	- Provides healthcare services with skilled doctors - Guides to prevent sickness - Guides to eliminate mosquito larvae		Restricted	Gov.	Locality	External source	1-5 years	Formal

4.2.2 Organisational landscape of food security

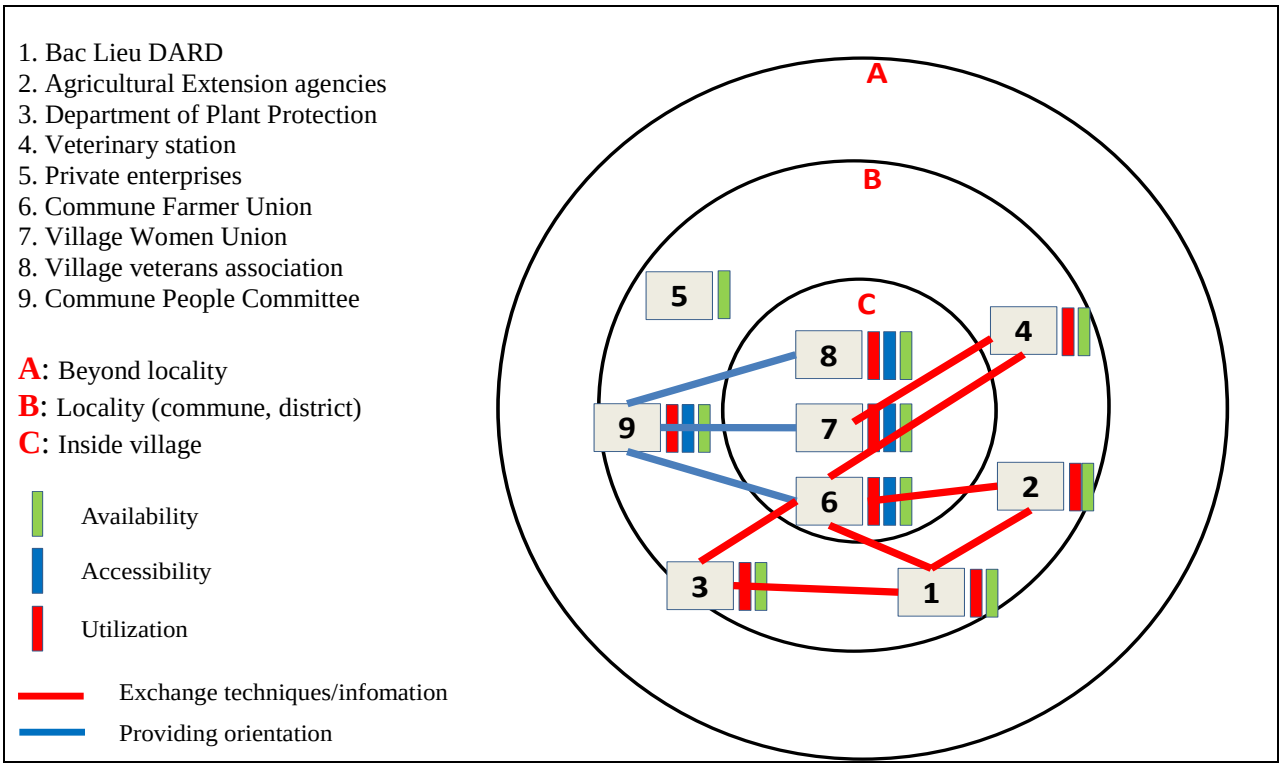


Figure 3. Organisational lanscape of food security – men group

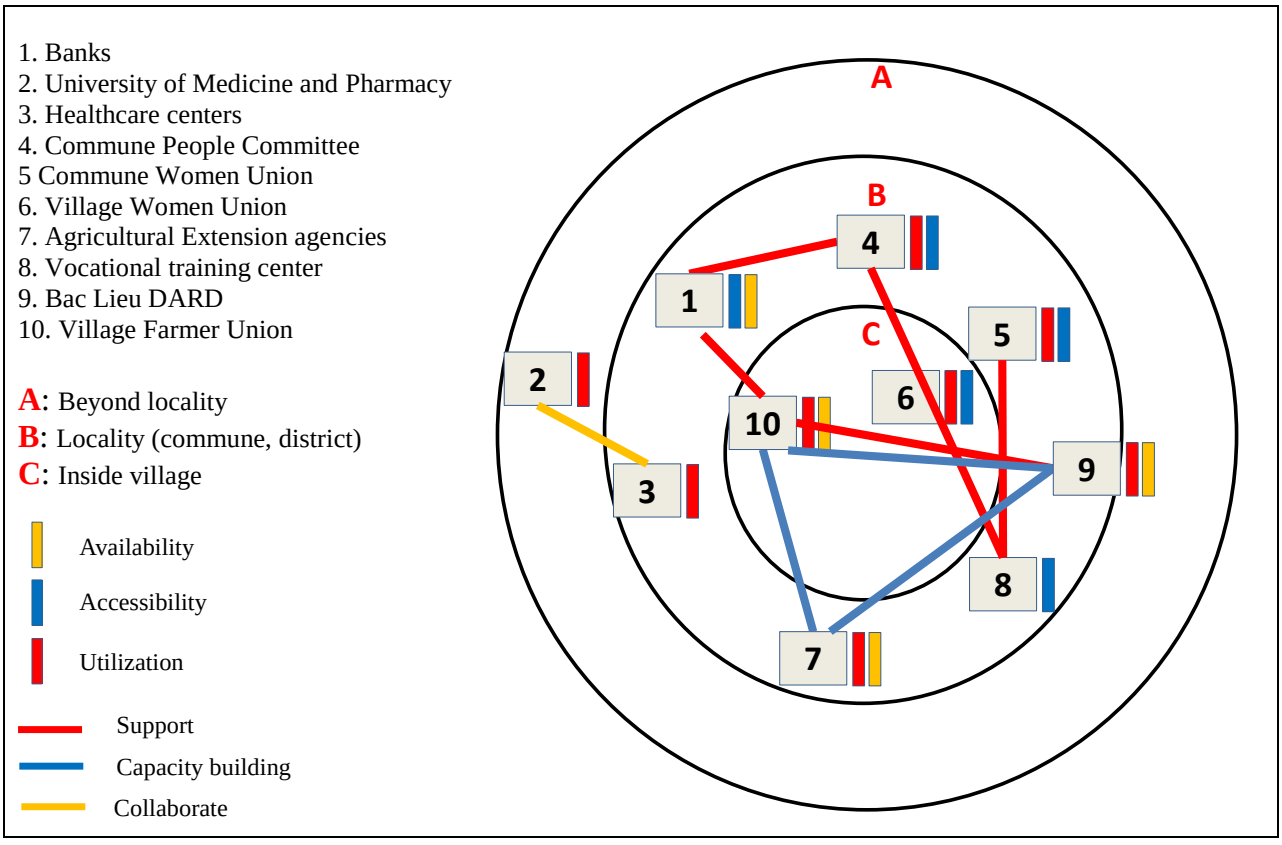


Figure 4. Organisational lanscape of food security – women group

Men and women groups identified organizations and their role in food security differently. The men listed nine organizations (Figure 4). Among these, five organizations were added as they did not mention before (Agricultural Extension, Plant protection agency, Veterinary station, private enterprises and the Commune People Committee). Women group listed 10 organizations (Figure 5). Organizations that have similar functions are combined in a group. For example, banks (number 1, Figure 4) consist of AgriBank, Sacombank, DongA Bank; health centres consist (Red Cross, Department of Health). Lines in Figure 3 and Figure 4 indicate linkage among organizations. Line colours express types of relationships, such as capacity building, supports and collaboration.

4.2.3 Organisational landscape of natural resource management

The organisational landscapes of natural resource management (NRM) developed by men and women groups are presented in Figure 5 and Figure 6. The figures show organisations that are actively working to protect the environment and manage natural resources.

According to the men group, the People Committee of the commune pays important role in the general management and coordination of activities in the commune; the Department of Agriculture and Rural Development (DARD) of the commune manages irrigation and drainage system and provide technical guidance in farming, particularly on use of fertilizer; the Department of Natural Resources and Environment (DONRE) manages natural resources and organizations at the village scale; has responsibility to encourage and motivate people to implement activities in the village.

The women, on the other hand, saw a link with regard to land resource management among the Commune People Committee, Bac Lieu DARD, and Vinh Loi DoNRE. Meanwhile, they saw a link between the Department of Health and the Commune People Committee with regard to water resource management.

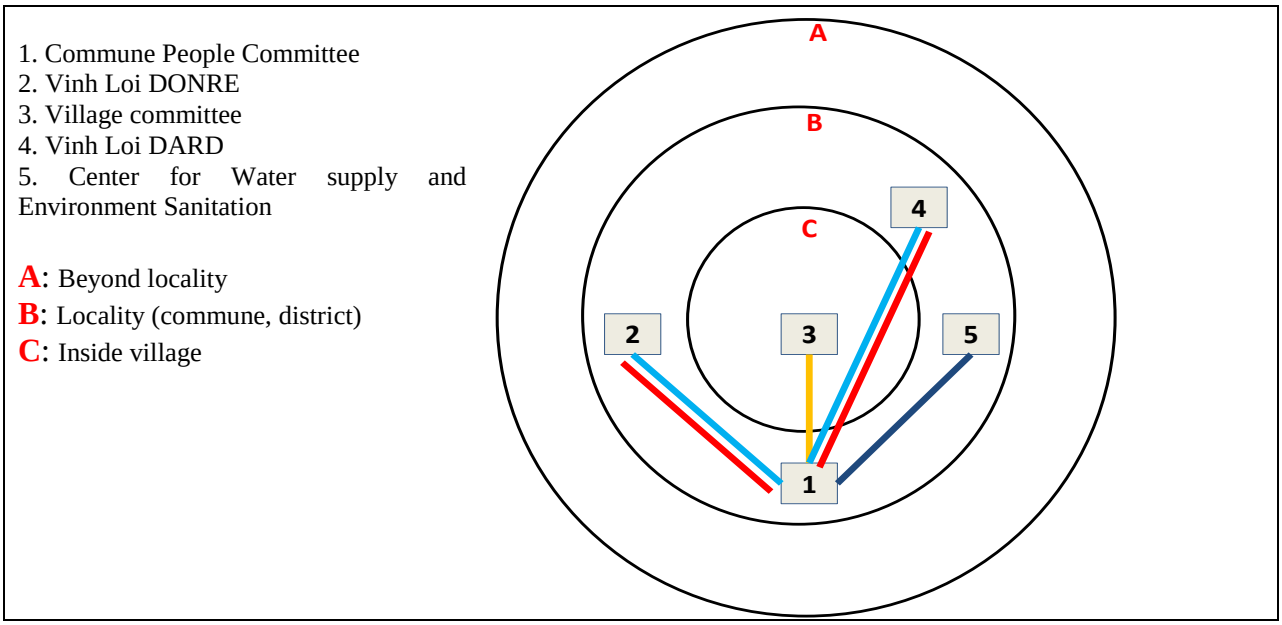


Figure 5. Organisational landscape of natural resource management – men group

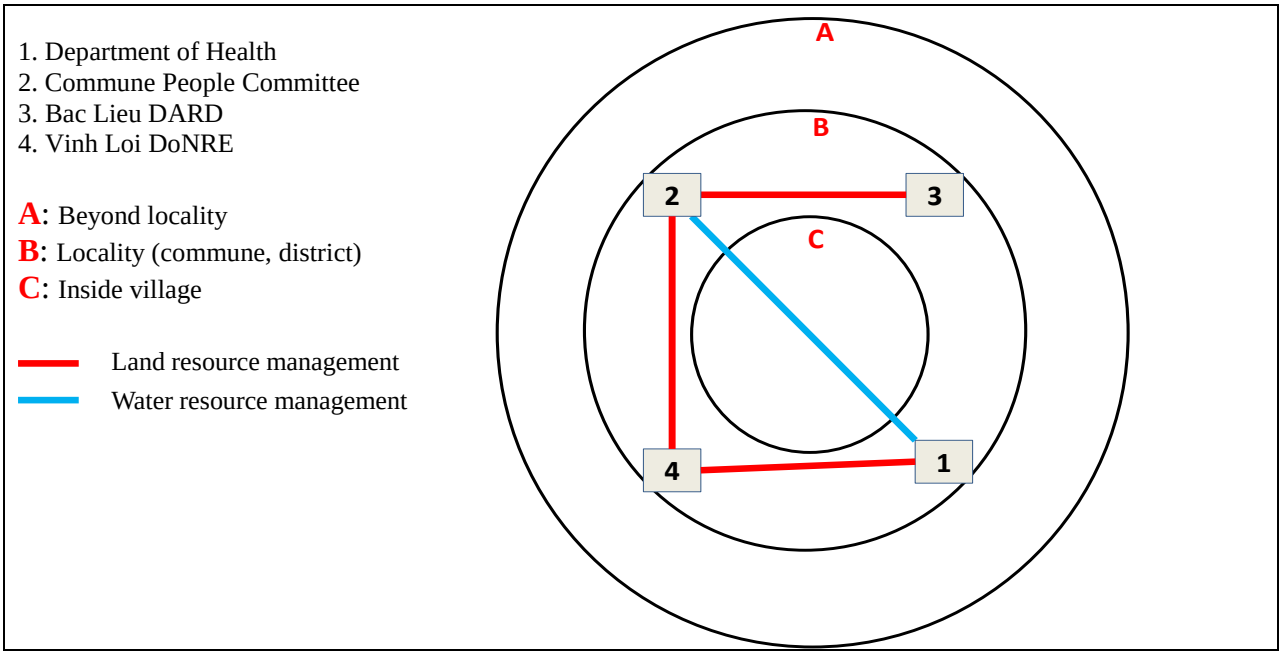


Figure 6. Organisational landscape of natural resource management – men group

Table 6 below summarizes information on organisations listed by men and women groups. The organisations are classified into three categories according to their role: food security, food crisis and natural resource management.

Table 6. Highlighted organisations listed by men and women in food security (FS), food crisis (FC) and natural resource management (NRM) (X= yes, blank = no)

	Men					Women			
Name of organisation	**ID**	**Sphere[4]**	**FS**	**FC**	**NRM**	**ID**	**FS**	**FC**	**NRM**
1. Village committee/village head		1			X				
2. Village Women Union	7	1	X	X		6	X		
3. Commune Women Union						5	X		
4. Village Farmer Union		1		X		10	X	X	
5. Commune Farmer Union	6	2	X						
6. Village Veteran Association	8	1	X	X					
7. Stores for agricultural materials		1						X	
8. Commune People Committee	9	2	X	X	X	4	X		X
9. Red Cross		2		X					
10. Agricultural extension agents	2	2	X			7	X	X	
11. Veterinary station	4	2	X						
12. Private enterprises		2							
13. Vinh Loi DARD		2		X	X				
14. Bac Lieu DARD	1	2	X			9	X		X
15. Vinh Loi DoNRE		2			X				X
16. Centre for Rural Water Supply and Environmental Sanitation		2			X				
17. Provincial Department of Health		2				3	X		X
18. Provincial Department of Plant Protection	3	2	X	X					
19. Banks		2				1	X	X	
20. University of Medicine and Pharmacy		3				2	X		
21. Vocational training Center		2				8	X		
22. Private enterprises	5		X						
TOTALS			9	7	5		10	4	4

4.3. Topic 3: Information networks

The aim of this exercise was to explore sources of information that local people can access for their farming practices. It also explored how available information is used and sourced. The information flows described by the participants explain how people access and share information within their community.

There is not much difference between discussion results of men and women groups (Table 7). In decision making, farmers consider information on weather, rice varieties, type of fertilizer, pesticide, insecticide and market price. Farmers get information from individuals such as friends, neighbours, middleman, village head or by their own experience.TV and radio were two popular media source of information for weather, rice variety, cropping calendar, farming techniques, disease outbreak and market price. Organizations such as seed company, agricultural extension agents, DARD and veterinary station were also sources of information. In addition, behaviour of insect was also other source of information

[4] Sphere: 1= Village; 2= Locality; 3 = Beyond locality

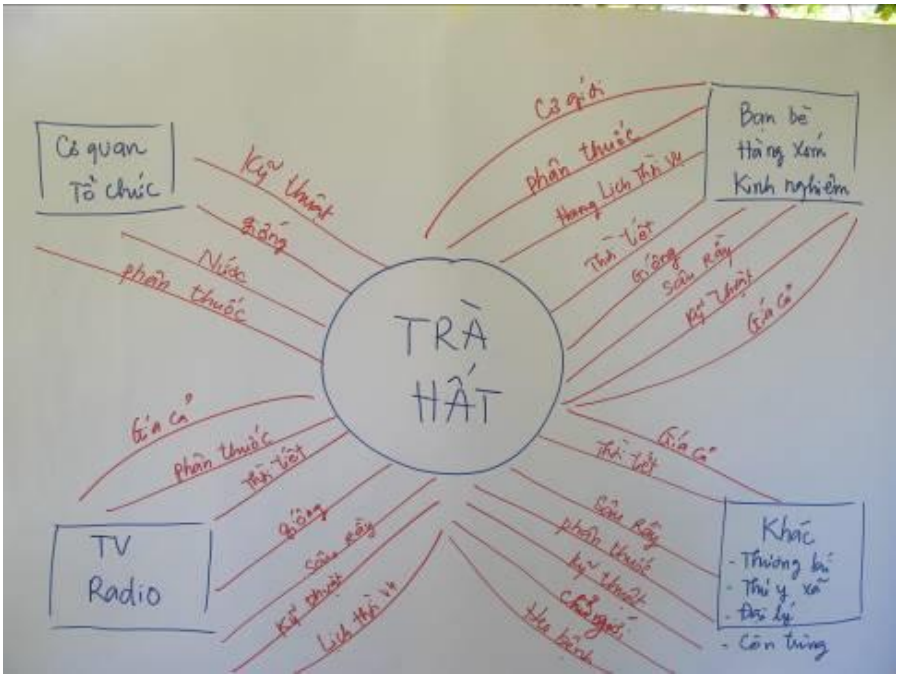


Photo 3. Information network developed by men group

Photo 4. Information network developed by women group

Table 7. Networks of information

	Mentioned by		Individual		Organizations		Media		Others	
Topic	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Weather (rain, sunshine)	1	1	1	1	0	1	1	1	1	0
Rice varieties	1	1	1	1	1	0	1	1	0	1
Water	1	0	0	0	0	0	0	0	0	0
Information of cropping calendar	1	0	1	0	0	0	1	0	0	0
Information of pest and disease	1	1	1	1	0	1	0	1	1	1
Fertilizer, pesticide and insecticide	1	1	1	1	1	1	1	1	1	1
Farming technique	1	1	1	1	1	1	1	1	1	1
Availability of agricultural machinery	1	0	1	0	0	0	0	0	1	0
Market price	1	1	1	1	0	0	1	0	1	0

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

Tra Hat Village is a CCAFS Climate-Smart Village with bio-physical and socio-economic conditions that are representative for the Mekong River Delta. The village belong to Chau Thoi commune, Vinh Loi District, Bac Lieu Province. This region is located in the commercial rice production of Vietnam. Tra Hat and other surrounding villagers are strongly affected by unpredictable extreme weather events and sea level rise. Floods, fresh water scarcity and salinity intrusion are recognized as main climate-related problems. Being located at the tail end of Quan Lo Phung Hiep canal system and current lack of internal irrigation canals, Tra Hat village has limitations on farming techniques and crop diversification.

Farmers in Tra Hat village consider farmland, rivers and canals as most important resources. There have been significant changes in the resources over last 10 years. Before 1995, farmlands were used for only one rice crop per year with low rice yield (3 tons/ha). At the present, due to improvement of farming techniques and intensive use of chemical fertilizers and pesticides, farmers practice two to three cropping seasons per year. However, the quality of the farmlands and wildlife habitats has declined.

Rivers and canals are main sources of irrigation water. Improvements were made to of the drainage and irrigation systems resulting to availability of freshwater almost the whole year for farming. Households have own borehole to satisfy demand on freshwater for domestic use. However, salinity intrusion is still a significant problem in the region. Besides, roads, internal canals, hospitals, schools, water supply station and electricity transformer station were listed as important infrastructures in the region that help to improve people livelihood. Many of these infrastructures have been improved or newly built in last 10 years.

Although men and women group listed similar natural resources and infrastructures, men tend to recognize resources outside the village better than women do. Women give more detailed information about resources and infrastructures in the village.

To improve livelihood and adapt to climate-related risks, farmer presented interesting vision of the future. They expected for improved internal canals in farmland, developed irrigation system, dykes and sluices to protect high agriculture productivity. At the household scale, they intend to develop home garden for vegetables, expand livestock and fishery. This will help diversify agricultural products and increase resilience of the households.

Currently, there are a number of formal and informal organizations operating in the region, and particularly in Tra Hat village. Among the 22 organizations mentioned by participants, the Women Union, banks, healthcare centers, Farmer Union, village committee, DARD, communist party and village veterans association are most important for villagers. In terms of food security, food crisis and natural resource management, following organizations have stronger influence than the others: the Commune People Committee, Agricultural Extension agents, Department of Agriculture and Rural Development at district and province level.

To make farming decision, farmers in Tra Hat often consider weather, rice varieties, type of fertilizer, pesticide, insecticide and market price. Farmers can get information from individual (such as friends, neighbours, middleman, village head or by their own experience), media (mainly TV and radio), organizations (seed company, agricultural extension agents, DARD and veterinary station) and others. Overall, communication information network for farmers in Tra Hat are well developed and managed.

5.2 Recommendations for major opportunities

Given current impacts of salinity intrusion and sea level rise, improving dyke and irrigation system are highly recommended by farmers. These interventions will help to improve rice production in the region. Besides, purifying seed of local rice variety (Tai Nguyen) is also expected because this traditional variety has high yield, good quality and easy to sell.

In rice framing, the main constraint is access to irrigation during the Summer-Autumn rice season and from January to March. If irrigation is available during this period, farmers could increase rice production and expand cash crop cultivation and, therefore, household economy will grow up significantly. Developing livestock, gardening and fishpond is also promising activity to improve household income and food security. This will help farmers to be less dependent on rice production.

Excessive use of chemical fertilizers and pesticides in rice farming were realized by farmers. Therefore, proper recommendations should be made in order to keep rice quality, protect environment, adapt to climate change and mitigate greenhouse gas emission. Table 8 shows a summary of the constraints and needs of the community in Tra Hat and suggested future interventions for CCAFS program.

Table 8. Recommendations for interventions

Gaps in knowledge/ current constraints that need support by CCAFS and partners	Opportunities for research (CCAFS)	Opportunities for Action Research (CCAFS partners)	Development Interventions (Partners)
1. Lack of access to irrigation		X	X
2. Degraded local rice variety (Tai Nguyen rice)	X	X	X
3. Poor management of HH waste and village sanitization		X	X
4. Develop local livestock variety (Pig)		X	X
5. Lack of techniques for fishery at household scale		X	X
6. Low capacity of Agricultural Extension services (livestock and fertilizer application)	X	X	X
7. Lack of information on sustainable agriculture techniques	X	X	X
8. Limited access to market	X	X	X
9. No household cash flow management	X	X	X

In order to fill the gaps and overcome constraints given in Table 8, CCAFS should establish partnership with national and international organizations as below:

- International Rice Research Institute (IRRI) for improvement of local rice variety
- Worldfish for techniques of fishery and aquaculture
- International Water Management Institute (IWMI) for water management
- Can Tho University and Nong Lam University for agricultural researches
- Cuu Long Rice Research Institute (CLRRI) for researches on rice production
- GIZ (CCMP) for capacity building and improving functions of Agriculture Extension agents