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

Summary of Baseline Household Survey Results:

**Vinh Loi district
Bac Lieu province
Viet Nam**

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Abstract

The household baseline survey conducted in December 2014 to January 2015 collected data from 140 households in seven villages, including Tra Hat village, in Bac Lieu province, Vietnam. This is part of the baseline data collection activities in Tra Hat Climate Smart Village of the CGIAR Research Program on Climate Change, Agriculture and Food Security. The objective is to collect household baseline data where data in five or 10 years in the same households will be compared to capture changes that may occur over time. Results showed that the households were highly dependent on farming, particularly rice, for food and income. Farming, however, was characterized by low crop and commercialization index. They diversified income sources by engaging in off-farm work within the area or migrating to other places to find work. The market influenced more farmers' decisions related to crops, but climate-related factors were becoming significant. Adaptation and mitigation measures need to be enhanced. Providing the farmers with correct information can help them make better decisions about the future. Access to land, increased production, few natural disasters in the area, and improved irrigation were likely the reasons for enough food supply among most of the households.

Keywords

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1. INTRODUCTION

This is the report of the household baseline survey conducted in the research site in Tra Hat, Bac Lieu province, Vietnam by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). The household baseline survey is part of the baseline data collection activities in Tra Hat Climate Smart Village (CSV) of CCAFS as initial activities toward local engagement in participatory action research.

The objective of the household baseline survey was to gather household level data that include basic indicators of welfare, information sources, livelihood/agriculture/natural resource management strategies, needs and uses of climate and agriculture-related information and current risk management, mitigation and adaptation practices. The main aim was to capture some of the diversity in the landscape, across communities and households, with sufficient precision in some of the indicators to capture changes that may occur over time. The same households covered by the household baseline survey will be revisited in 5-10 years.

The household baseline survey was conducted in December 2014 to January 2015 in seven (out of 23) randomly selected villages in the research site including Tra Hat CSV and covered 140 households. Figure 1 shows the location of the survey area. Among the seven selected villages, six are in Vinh Loi district and one is in the Hoa Binh district, Bac Lieu province.

The Tra Hat CSV is a village in a block of 10km x 10km located at the tail end of a primary canal on Quan Lo Phung Hiep system (QLPH), the Mekong Delta of Vietnam. It is located near the coastal area and protected by dykes and a sluice gate system of QLPH. It has two pronounced dry and rainy seasons. The main farming systems in the village comprise of two or three-rice crop per year and small livestock such as pig, chicken, and ducks. Mixed fruit garden and cash crops were common in residential areas. The village has not been affected by saline intrusion for the last 15 years.

The HBS questionnaire was divided into 10 sections, as follows: Household respondent and type; Demography; Sources of livelihood, Crop, farm animals/fish, tree, soil, land and water management changes; Food security; Land and water; Input and credits; Climate and weather information; Community groups; and Assets. Questionnaires were translated into Vietnamese to facilitate communication with farmers. Training for data collection and refining questionnaire were done before implementing the actual survey.

This report provides a summary of the main findings of the analysis of the household survey data. The three main sections are Introduction, Results and Conclusions. The Results and Discussion section has 10 sub-sections following the sections of the questionnaire used (see Section 1.2).

For the full details of the survey process and villages surveyed, see Appendices A and B. The questionnaire and training materials use, including data entry and management guidelines, can be found at www.ccafs.cgiar.org/resources/baseline-surveys.
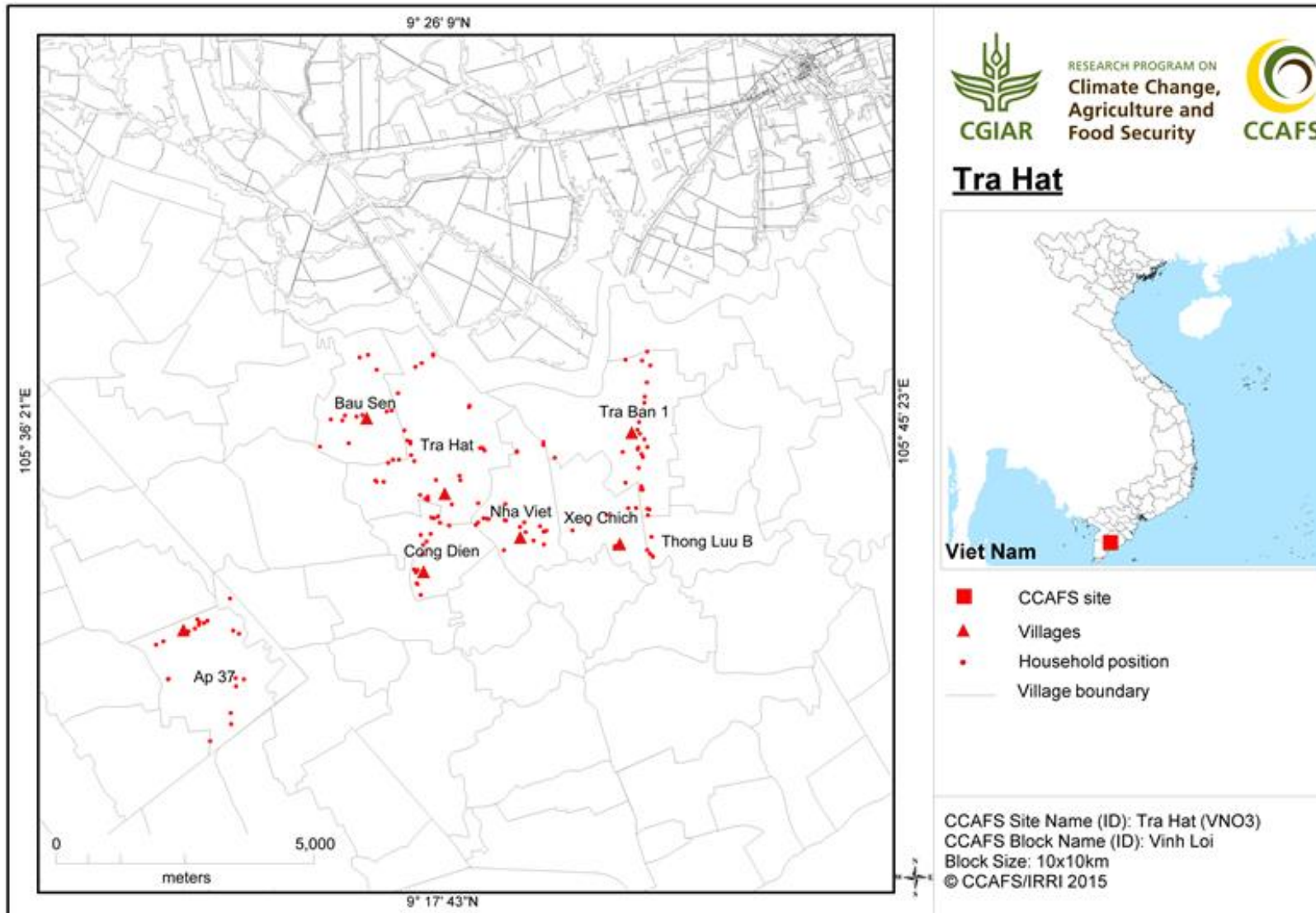
Figure 1. Research site map and location of sampled villages

2.   RESULTS

2.1.   Household types and survey participants

Among the 140 household survey respondents, 65% were males and 35% were females. In terms of household headship, however, 78% of households were identified to be male-headed. Almost all of the survey participants (97%) belonged to the Kinh ethnic group and only few belonged to Hoa or Khmer groups (3%).

It should be noted, however, that statistics on the general population of Vietnam and particularly in Bac Lieu province, showed more women than men. In 2012, male population in Vietnam was 43,912.6 while female population was 44,860.3 (General Statistics Office, 2014)[1]. In Bac Lieu, male population was 434,600 while female population was 439,000.

2.2. Demography

2.2.1. Household size and composition

Household size (number of persons staying in the household during survey time) ranged between 1 and 10 members or, on average, five members (Table 1). In terms of distribution, 21% of the households had one to three members, 70% had four to six members, while 9% had seven to 10 members. For every 10 households, three had children aged less than five years old and also had members older than 60 years old.

Table 1. Demographic characteristics of the households

Characteristics	% of households (N=140)
Household size (mean)	4.5
Household with (%)	
1– 3 members	21.4
4 - 6 members	70.0
7- 10 members	8.5
With household members <5 years old (%)	29.3
With household members >60 years old (%)	29.3

Most of the households (81%) had most of their household members (60% to 100%) aged between 5 and 60 years old (Figure 2). Few (3%) households had less members (20% to 60%) aged between 5 and 60 years old.

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[1] General Statistics Office. 2015. Statistical Yearbook of Vietnam 2014. Hanoi: Statistical Publishing House. https://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=15197
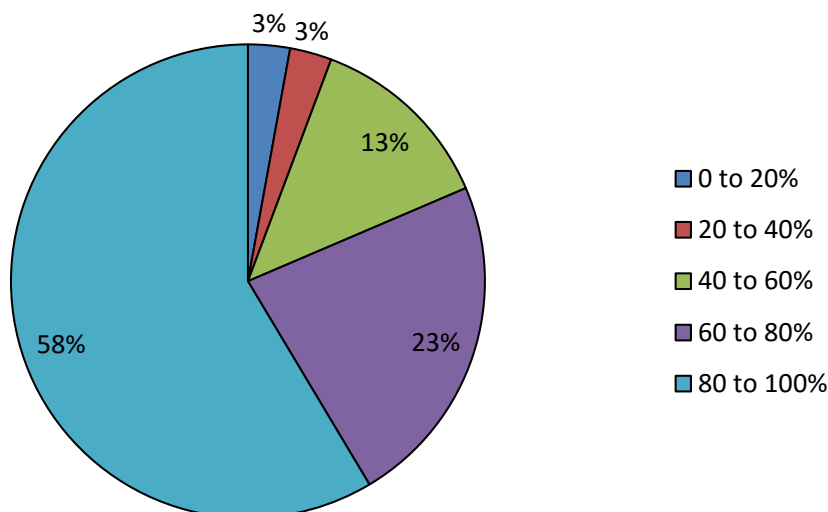
Figure 2. Percentage of the households with members between 5 and 60 years old

2.2.2. Education levels

Two-thirds of the households had a member who attained secondary education (Table 2). One-fourth of the households had a member who attained more than secondary level of education (i.e., high school, vocational school training, or reached college/university). Still, there were households with members who only attained primary education (9%) or no formal education at all (1%).

Table 2. Highest level of education obtained by any household member

Level of education	% of households (N=140)
No formal education	0.7
Primary (Grades 1- 6)	8.6
Secondary (Grades 7-9)	65.7
Post-secondary*	25.0

* Grades 10-12, vocational training school and college/university

2.3. Sources of livelihood

2.3.1. On-farm livelihood sources

Generally, the households engaged in on-farm production for consumption and for sale. Only two households were identified to be subsistence households (i.e., they produce crops and livestock for consumption only).

Households practiced product diversification. The number of products produced by the households ranged between one and 10 (Table 3). Among the households, near one-fourth (24%) were producing two or three products, while more than the majority (63%) were producing four to six products. Few households (6%) were producing seven to 10 products.

Table 3. Number of products produced in own farm

Number of products	% of households (N=140)
One product	7.9
2 or 3 products	23.6
4 to 6 products	62.9
7 to 10 products	5.7

Table 3 and Figure 3 show that the popular products were food crops, fruits, small livestock, fish, and wood for fuel. Most households sold (97%) and consumed (87%) food crops. Rice was the predominant food crop and considered as the most important source of both cash income and food supply for households. Although income from rice production may sometimes be less than the income from livestock or off-farm activities, the rice was still considered as the most reliable product by most of the households.

Livestock was important in the farming system of households. More than 75% of the households raised small livestock for consumption (66%) and for the local market (56%). Swine fattening was considered to be the second important source of income. Chicken and duck raising was considered more important to the households during occasions (e.g. new year, birthday, anniversary). The main problems with chicken and duck raising were disease control and low market price.

No large livestock or cattle was reported in all villages. The likely reason for this was the highly mechanized farming system in the low land where the seven villages are located. Near three-fourth (72%) of the households produced fruits and mainly for home consumption (72%). Only one-fourth of the households (26%) reported selling fruits. The fruit trees were grown around the residential areas or on field border. Common fruit trees were coconut, star apple, durian, and jack fruit.

Table 4. Production, consumption, and sale of own farm produce

Products	Producing (N=140)	Consuming (N=140)	Selling (N=140)
Food crop (raw)	98.6	87.1	97.1
Food crop (processed)	0.7	0.7	0.7
Other cash crops	8.6	6.4	7.9
Fruit	72.1	72.1	26.4
Vegetables	30.0	27.9	10.7
Fodder	0.7	0.7	-
Small livestock	75.7	65.7	55.7
Livestock products	2.9	2.9	1.4
Fish	63.6	63.6	11.4
Timber	12.9	12.1	2.1
Fuel wood	42.9	41.4	-
Manure/compost	0.7	0.7	-
Others	5.0	4.3	3.6
Not applicable[2]	0	1.4	1.4

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[2] The households did not consume and/or sell agricultural products
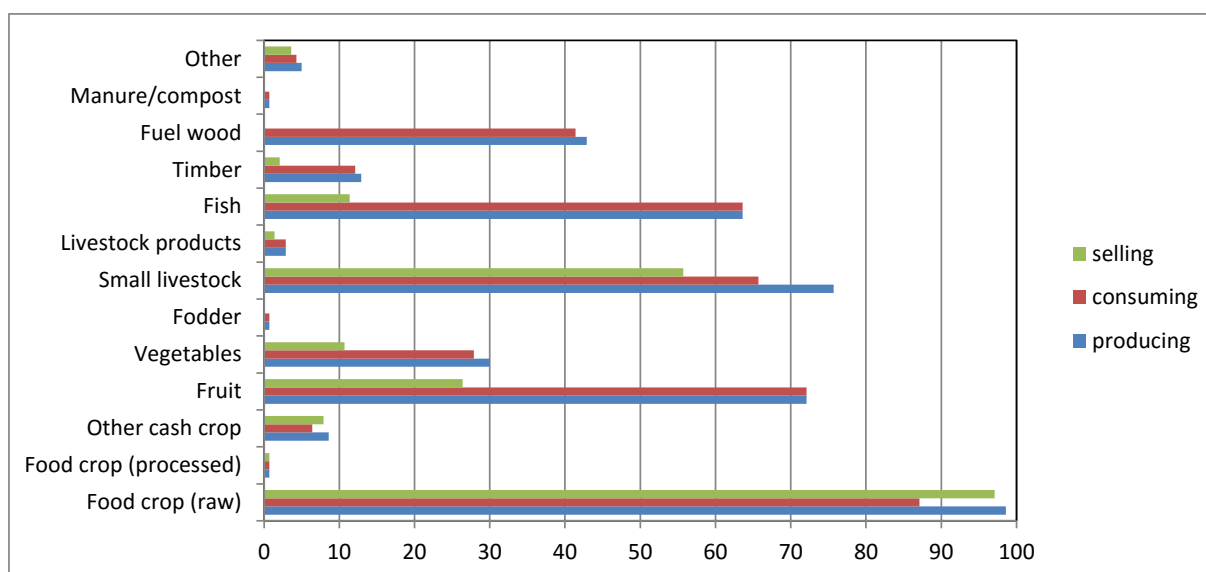
Figure 3. On-farm diversity in the products produced, consumed and sold

Households were also undetaking fish farming (64%) in small ponds. The fish they produce were mainly for consumption. Only 11% of the households reported selling fish. No fishing in marine waters was reported.

Despite the lack of forest and tree cover in the area, 43% of the households reported collecting wood for fuel, which likely in residential area, and for own consumption (42%). Meanwhile, vegetables were produced by only 30% of the households and mainly for consumption (30%), with only 11% of the households selling them.

2.3.2. Off-farm livelihood sources

As a result of land allocation policy applied in Vietnam since 1990s, land use right was awarded to individual households. Few resources were open access, including rivers or swamps. Only 35% of the households reported having produced and consumed off-farm produce (i.e., harvesting from the wild or communal lands), with fish as the common produce (86%) (Table 5). Fishing was conducted in rivers or swamps.

Table 5. Production, consumption, and sale of off-farm produce

Products	Producing (N=140)	Consuming (N=140)	Selling (N=140)
Food crop or fruit	2.9	2.9	0
Fish	85.7	85.7	1.4
Others (timber, fuel wood, charcoal, honey, manure, etc.)	28.6	28.6	0

2.3.3. Diversification index

A production diversification index was created by summing up the total number of products harvested on-farm: 1 = 1 to 4 products (low production diversification); 2 = 5 to 8 products (intermediate production diversification); 3 = 9 or more products (high production

diversification). The households were almost equally divided between low (54%) and intermediate (46%) production diversification (Table 6).

Table 6. Diversification index

Diversification Index	% (N=140)
1-4 (low production diversification)	53.6
5-8 (intermediate production diversification)	46.4

2.3.4. Commercialization index

In terms of commercialization index based on the number of products sold, near two-thirds of the households belonged to low commercialization index and one-third belonged to an intermediate commercialization index (Table 7). As shown in Section 3.2.1, most of the produce by the households were for consumption

Table 7. Number of products produced on-farm and sold in the last 12 months

Commercialization index	% (N=140)
No products sold (no commercialization)	1.4
1 to 2 products sold (low commercialization)	63.6
3 to 5 products sold (intermediate commercialization)	33.6
6 or more products sold (high commercialization)	1.4

2.3.5. Division of labor in on- and off-farm products

Farm work was predominantly done by men (42%). The women also work with men (16.4%) or work alone (15%) (Figure 4). Farm work was also reported to be shared by several individuals (26%).
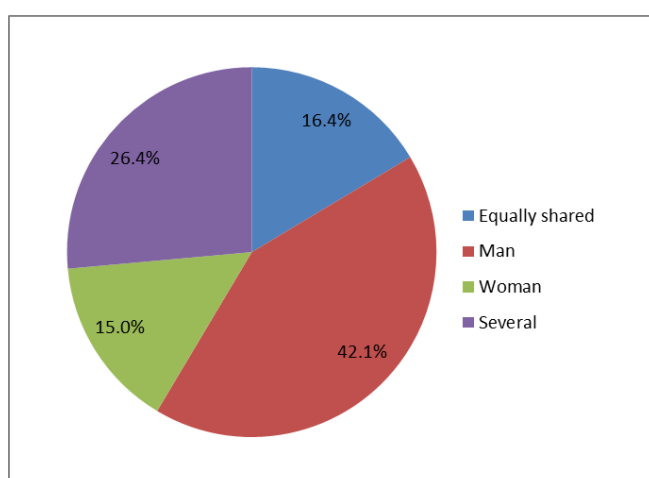
Figure 4. Agricultural workload on-farm by gender/sex

Women were reported to be responsible for taking care of small livestock and gathering wood for fuel in 37% and 24% of the households, respectively. For the other products from own farm, women's participation in production was reported by less than 15% of the households. In 39% of the households, the women were reported to be not responsible for the production of any product from own farm. Similarly, children were reported by all households to be not responsible or involved in any production.

In contrast, production off-farm was predominantly shared by the men and women (77.9%) (Figure 5). Still, there were production activities where the responsibility rested on the men alone (15.7%) or the women alone (2.9%).
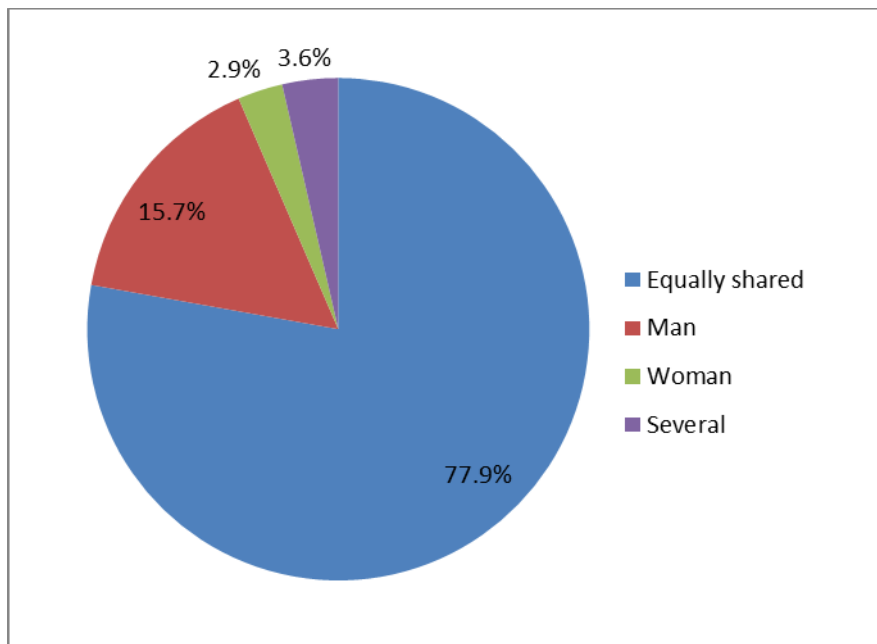
Figure 5. Agricultural workload off-farm by gender/sex

2.3.6. Sources of off-farm cash income

About 92% of the households reported to have off-farm cash income (Table 8). One-third of the households had one or two sources of off-farm cash income. One-fifth of the households had at least three sources of off-farm cash income. No household reported having a new source of off-farm cash income for the past 12 months.

The top sources of off-farm cash income reported by the households include other paid work (48%), formal loan or credit (34%), other payments from projects/government (27%), business (23%), and working on someone else's farm (21%). Few households received cash income from an informal loan or credit (13%), remittances (8%), and renting out own land (3%) or farm machinery (1%). Few households (8%) reported not having other sources of cash.

Table 8. Sources of off-farm cash income

Sources	% of the households (N=140)
Other -paid work	47.9
Formal loan or credit	34.3
Other payments from projects/government	27.1
Business	22.9
Employment on someone else's farm	21.4
Informal loan or credit	12.9
Remittances/gifts	7.9
Renting out own land	2.9
Renting out farm machinery	0.7
No off-farm cash source	7.9

The results imply that farming, particularly rice farming from own land, and small livestock raising were more important to the households as sources of food and income. With low crop and commercialization index, income is low for these activities. Households diversify income sources by working on someone else's farm, engage in off-farm work for wages, and migrating to other cities or to Thailand to find work. This has an effect in the rural area such as shortage of farm labor.

2.4. Recent changes in crop, farm animals/fish, tree, soil, land, and water management

2.4.1. Crop-related changes

Almost all households (97%) made changes to one or more important crop over the last 10 years. Most households (80%) changed a crop, which was mostly rice (Table 9).

Table 9. Number of crops to which changes were made over the last 10 years

Number of crops	% of the households (N=140)
None	2.9
One	80.0
Two	6.4
Three or more	10.7

Among the households who made changes in their farming practices, 97% cited multiple reasons for the changes they have made. These reasons were related to the markets (82%), weather (46%), land (49%), labor (25%), pest/diseases (60%), and project (3%) (Table 10).

The market reasons provided included new opportunities to sell (85%), better yield (61%), and better price (49%). Near the majority (49%) cited land-related reasons that included availability of more land. This, however, was negated by 35% of the households who cited less land. Near one-fourth of the households also cited as a reason the "land as becoming less productive."

Table 10. Reasons for changing cropping practices

Categories	% of the households
Reason for changing cropping practices, related to: (N=136)	
Markets	82.4
Pests/diseases	59.6
Land	48.5
Weather/climate	46.3
Labor	25.0
Projects	2.9
Market-related reasons (N=112)	
Better yield	60.7
Better price	49.1
New opportunities to sell	84.8
Land-related reasons (N=66)	
Land is less productive	24.2
Land is more productive	7.6
Less land	34.8
More land	47.0
Households made changes to their most important crops because of climate reasons (N=63)	98.4
Weather/Climate-related reason (N=63)	
More erratic rainfall	1.6
Less overall rainfall	34.9
More overall rainfall	49.2
More frequent droughts	20.6
More frequent floods	7.9
Strong winds	28.6
Later start of the rains	17.5
Earlier start of the rains	19.0
More cold spells or foggy days	39.7
More frequent cyclones	7.9
Higher salinity	1.6
Higher tides (sea level has risen)	1.6
Higher temperatures	34.9
Longer canicula - dry period during rainy season-	17.5
The rains stopped too early	9.5

Almost all households (98%) made changes to their most important crops because of climate reasons. Among the climate-related reasons, "more overall rainfall" was cited by almost half of the households (49%). This, however, was negated by one-third of the households who cited "less overall rainfall." For every 10 households, four cited "more cold spells or foggy days", and three cited "higher temperatures" or "strong winds".

2.4.2. Changes in farming practices

The common changes in farm practices for the last 10 years were cropping-related and soil-management related. Among the households who made changes in their farming practices, 92% introduced cropping-related changes, which include one or more of the following: introduced intercropping; earlier land preparation and earlier planting; late planting; expanded or reduced area of cultivation; started using pesticides/herbicides; integrated pest management; integrated crop management; growing fodder crops; and started to use greenhouse or polytunnel (Table 11). Also, 91% of the households introduced soil management changes that include one or more of the following: stopped burning; introduced

intercropping, cover crop, micro-catchments, ridges or bunds, terraces, stone lines, hedges, contour ploughing, and rotation; and started using more mineral/chemical fertilizers or manure/composite.

Table 11. Changes in farming practices over the last 10 years

Type of change	% of the households (N=136)
Cropping	91.9
Soil management	91.2
New crops or varieties	41.9
Tree/Agro-forestry management	28.7
Water management	2.2

Near half (42%) of the households reported introducing new crop or variety for the last 10 years. One-fourths of the households reported changes related to trees or Agroforestry. That means, only those households have planted or protected trees within the year. Very few households adopted water management, which include using irrigation and introduced micro-catchments, improved irrigation, mulching, and improved drainage.

2.4.3. Livestock-related changes

For every 10 households, eight reported at least one animal type being domesticated (Table 12). The distribution was as follows: one type, 18%; two, 29%; and 3 or more, 31%.

Table 12. Number of animal types reported

Number of animal types	% of the households (N=140)
None	22.1
One	17.9
Two	28.6
Three and more	31.4

Only four of every 10 households reported having made changes in farm animals being domesticated in the last 10 years (Table 13). The adoption of new animal types/breeds was low, with only 17% of the households reported to have adopted at least a new animal type or breed. One-third of the households introduced herd-related changes that include an increase in herd size and change in herd composition. Only one of every 10 households introduced animal management-related changes that include introduction of stall keeping, fencing, and cut and carry. No feed-related changes (such as growing fodder crops, improved pastures, and fodder storage) were reported.

Explaining about reasons for changes in livestock rearing practices, the majority of the households (54%) provided multiple reasons for the changes they have adopted on livestock rearing practices. These can be categorized into labor related (45%), pest/diseases-related (45%), market-related (35%), and weather/climate-related (24%) (Table 14). To most of the households (86%), the reasons were not limited to climate and markets.

Table 13. Changes related to livestock over the last 10 years

Type of change	% of the households (N=115)
Changed one or more of the most important animals	55.0
Adopted a new animal types/breeds	22.0
Herd- related changes	45.9
Introduced animal management	12.8

Table 14. Reasons for the changes related to livestock over the last 10 years

Reasons	% of the households
Changed in livestock practices (N=75)	
Labor	45.3
Pests/diseases	45.3
Markets	34.7
Weather/climate	24.0
Reasons for changing (N=140)	
Climate reasons only	2.9
Climate and market reasons only	13.6
Reasons not limited to climate & markets	86.4
Weather/Climate-related reason (n=18)	
More overall rainfall	44.4
Strong winds	38.9
Higher temperatures	38.9
Less overall rainfall	27.8
More cold spells or foggy days	27.8
Earlier start of the rains	11.1
More frequent floods	5.6
The rains stopped too early	5.6
Lower groundwater table	5.6
Market –related reasons (n=26)	
New opportunities to sell	80.8
Better price	50.0
More productive	15.4

Specifically, only 13% of the households cited weather/climate-related reasons. The top weather/climate related reasons were "more overall rainfall" (44%), strong winds (39%), higher temperatures (39%), and "less overall rainfall" (39%). Similarly, only 19% of the households cited market-related reason such as "new opportunities to sell" (89%), and "better price" (50%).

2.4.4. Adaptability/Innovation index

Results show that most households (81%) belonged to the intermediate level in terms of adaptability index (Table 15). An adaptability/innovation index was defined as the number of changes made in farming practices over last 10 years, as follows: low level = 0 to 1 change; intermediate level = 2 to 10 changes; high level = 11 or more changes.

Table 15. Adaptability/innovation index

Index	% of the households (N=140)
0-1 (low)	3.6
2 to 10 (intermediate)	80.7
11 or more (high)	15.7

2.4.5. Mitigation indices

Several climate mitigation-related behavioral changes were used to create the indices that include tree management, soil amendments, input intensification, and a productivity index (Table 16). Results show low mitigation among the households. Tree management was adopted by only one-third of the households. Soil amendments (applying fertilizer to the soil) were adopted by almost all households (99%). Input intensification was adopted by almost all households: low (39%) and high (60%). Half of the households reported in increase in productivity.

Table 16. Mitigation indices

Index	% of the households (N=140)
With soil amendments	99.3
With tree management	37.1
With input intensification	
Low input	39.3
High input	60.0
Increase in productivity Index	50.0

The results imply that the market remains as a major determinant in the households' decisions related to changes in crop and farming practices. It was also implied, however, that the climate is becoming an important factor, which could explain the intermediate adaptability level found among households. More effort, however, on mitigation was needed. Application of more fertilizers on the soil was a common practice among households to increase production. Meanwhile, decisions related to livestock rearing were more influenced by factors other than the market or the climate.

2.5. Food security

2.5.1. Food security index

Food sources throughout the year of households were either their own farm or off-farm. Three-fourths of the households depended on their own farm as a source of food for all months in a year. One in every five households source food from own farm for the period between 7 and 11 months. All households reported securing food off-farm for less than 7 months in a year.

Two-thirds of the households reported that they have not experienced hunger throughout the year. One-third of the households reported having experienced hunger at least one month in a year. Relatively more households experienced hunger in the months of November to January.

With households having about a half hectare of land to cultivate, hunger was out of the question. As mentioned in Section 2, crops and livestock were the main sources of food and income of the households. The results imply that the supply of food in terms of quantity (quality is another matter) was enough to prevent hunger to be experienced by most of the households. The practice of having two to three rice seasons in a year was likely to have contributed to the sufficient supply of food in the area. It was recognized, however, that the months before harvest season were the difficult months likely because the households are running out of cash and food at home.

2.5.2. Climate related crisis

Three out of 10 households reported having experienced a climate related crisis in the last five years (Table 17). Among them, only 44% received assistance. Among the 20 persons who identified the source indicated that they all received assistance from government agencies.

Table 17. Climate-related crisis experienced by the households in the last 5 years

	% of the households
Experienced climate-related crisis in the last 5 years (N=140)	32.9
Received assistance for climate related crises (N=46)	43.5
Source of assistance (N=20)	
Government agencies	100.0

2.6. Land and Water

2.6.1. Water for agriculture

Irrigation was the most common source of water for farming (99%) (Table 18). This was followed by boreholes (30%). Few households sourced water from water ponds (6%), and water pumps (1%).

Table 18. Water sources for on-farm agriculture

Availability of on-farm water sources	% of the households (N=140)
Irrigation	99.3
Boreholes	30.0
Water ponds	5.7
Water pumps	0.7

The establishment of the dyke system in the region was considered as one of the important interventions that improved the irrigation system. This enabled the shift from one to two or three rice croppings in a year. Irrigation water was the source of water for agriculture in the region. Farmers mostly use water pumps to water their fields. They often need to pump water out during traditional seasons (two-crop system) and spring – winter (three-crop system).

2.6.2. Land use

In terms of household distribution by access to land, two-thirds of the households had access to lands with an area between 1 and 5 hectares, while near one–third of the households had access to land of less than one hectare (Table 19). Few households (5%) had access to land of more than 5 hectares. The lands were mostly for crop production. According to 91% of the households, the land available for expansion was less than a hectare. Few households can expand to more than one hectare (3%). The rest (6%) reported no land available for expansion.

Table 19. Total land size and land use

Area	% of households (N=140)		
	Has access to land	Has land available for crops	Has land currently dedicated to crops
Less than one hectare	30.0	32.1	38.6
Between 1 and 5 hectares	65.0	62.9	57.1
More than 5 hectares	5.0	5.0	4.3

2.6.3. Communal Land

Almost all households did not use the communal lands (99%). The 1% of the households who reported using the communal land also mentioned using the land under tree cover but the land is degraded or unproductive.

2.6.4. Rental of machinery or hiring of labor

Rental of farm machinery was common to almost all households (96%) (Table 20). Half of the households also hired farm labor (54%). Few households did not hire labor (use family labor only) or rented machines (3%). This result implies that the machines had replaced manual labor in some aspects of farming.

Table 20. Rental of farm machinery and hiring of labor

Items	% of households (N=140)
Rental tractor or other farm machinery	96.4
Hire farm labor	54.3
Do not rent/hire machinery or labor	2.9

2.7. Input and credit

In the last 12 months, the households purchased farm inputs (Table 21). These include seed (70%), fertilizer (99%), pesticides (99%), and veterinary medicine (54%). Half of the households (54%) reported receiving credit for their agricultural activities.

Table 21. Farm inputs

Inputs	% of households (N=140)
Purchased seed	70.0
Purchased fertilizer	99.3
Purchased pesticides	99.3
Purchase veterinary medicine	54.3
Received credit for agricultural activities	53.6
None of the above	0.7

The results of the use of the fertilizer and pesticides **wer**e consistent with the results in previous sections pointing to soil intensification being practiced in the area. Moreover, most of households buy fertilizers and agro-chemicals on credit with a promise to pay at the end of the harvest season. This was one of the reasons why they have to sell their produce even when market price is low.

2.8. Climate and weather information

Almost all households received a weather/climate-related information in the last 12 months (94%). The different types of weather-related information that households were using and the recipient, and the use of the information were examined.

2.8.1. Forecast for extreme events

Four of every 10 households reported receiving information on extreme weather events (Table 22). The television was their main source of information (100%), followed by friends/relatives/neighbors (33%). Few households received information from technical experts, other forms of mass media (newspaper, radio, internet), and other sources. The men (62%) or both the men and women (33%) receive information, but few women alone (5%).

Almost all who received extreme weather information (92%) reported that the information included advice on what to do and they were able to use. As a response to the information, many households changed the inputs (86%), changed the timing of farm activities (64%), or engaged in feed management (23%). There were other responses adopted by few households.

Table 22. Forecast for extreme events

	% of households
Received extreme weather information (N=140)	42.9
Sources of information (N=60)	
Television	100.0
Friends/relatives/neighbors	33.3
Own observations	13.3
Govt. agricultural extension or veterinary officers	10.0
Newspaper	6.7
Traditional forecaster/indigenous knowledge	6.7
Internet	6.7
Radio	3.3
Teachers in local schools	1.7
Local group/gathering/meetings	1.7
Recipient of information on extreme weather events by (N=60)	
Men	61.7
Women	5.0
Both	33.3
Received advice on forecast of extreme event (N=60)	91.7
Actions taken in response to extreme events advisory (N=55)	
Change in inputs (seed, fertiliser, pesticide)	85.5
Timing of farming activities	63.6
Feed management	23.6
Soil & water conservation	9.1
Crop variety	5.5
Irrigation	3.6
Land management	1.8
Livestock breed	1.8
None	1.8

2.8.2. Forecast for pest or disease outbreak

Nine of every 10 households reported receiving information on pest or disease outbreaks (Table 23). The main sources of information were television (96%), from traditional forecaster/indigenous knowledge (34%), friends/relatives/neighbors (26%), and local technical people (20%). Three-fourths of the households reported that the men were the recipients of information, while 19% of the households reported that both men and women received the information.

Among those households who received the information, 95% reported that advice was included in the information received and 97% of them reported that they have used the advice given. Their main actions were changed in inputs (99%) and changes in timing of farming activities.

Table 23. Forecast for pest or disease outbreak

	% of households
Received pest or disease outbreak information (N=140)	89.3
Sources of information about pest or disease outbreak (N=125)	
Television	96.0
Traditional forecaster/indigenous knowledge	34.4
Friends/relatives/neighbors	25.6
Govt. agricultural extension or veterinary officers	20.0
Radio	12.8
Teachers in local schools	2.4
Newspaper	2.4
Own observations	2.4
Internet	1.6
Local group/gathering/meetings	0.8
Others	0.8
Information on pest or disease outbreak received by (N=125)	
Men	75.2
Women	5.6
Both	19.2
A forecast for pest or disease outbreak provided with advisory (N=125)	95.2
Actions taken in response to the forecast advisory (N=119)	
Change in inputs (seed, fertilizer, pesticide)	99.1
Timing of farming activities	57.8
Feed management	7.8
Crop type	1.7
Crop variety	1.7
Land management	0.9
Soil & water conservation	0.9

2.8.3. Forecast for the start of the rains

One of every five households reported receiving information about the start of the rain. All of them received the information from the radio (Table 24). Other sources include friends/relatives/neighbors (21%), local technical people (14%) and own observations (10%). Two-thirds of those who received the information reported that the men received the information, and one-fourth of them reported both the men and women. Almost all of them (97%) reported that advice was included in the information and they have used it. Their main actions were to change the timing of farming activities (89%) and the change in inputs (82%).

Table 24. Forecast for the start of rains

	% of households
Received information about the start of the rains (N=140)	20.7
Sources of information (N=29)	
Television	100.0
Friends/relatives/neighbors	20.7
Govt. agricultural extension or veterinary officers	13.8
Own observations	10.3
Newspaper	6.9
Traditional forecaster/indigenous knowledge	6.9
Radio	3.4
Information on the start of the rains received by (N=29)	
Men	62.1
Women	10.3
Both	27.6
The forecast for the start of the rains provided with advisory (N=29)	96.6
Actions taken in response to forecast of the start of the rains (N=28)	
Timing of farming activities	89.3
Change in inputs (seed, fertilizer, pesticide)	82.1
Feed management	14.3
Crop variety	7.1
Land management	3.6
Soil & water conservation	3.6
Irrigation	3.6

2.8.4. Weather forecast for the next two to three days

Nine in every 10 households reported to have received weather forecasts for the next 2 to 3 days (Table 25). All of them cited the television as the source of information. The other sources were friends/relatives/neighbors (14%) and radio (11%). Less than 10% of the households source information from multiple sources. The men were reported to receive the information (72%), or both the men and women (20%). Advice was included according to 94% of the households who received the information. The main actions to the information they received were to change in inputs (72%) and timing of farming activities (61%).

Table 25. Weather forecast for the next two to three days

	% of households
Received information (N=140)	91.4
Sources of information (N=128)	
Television	100.0
Friends/relatives/neighbors	14.1
Radio	10.9
Own observations	8.6
Govt. agricultural extension or veterinary officers	4.7
Newspaper	3.1
Traditional forecaster/indigenous knowledge	2.3
internet	1.6
Cell phones	0.8
Received information of weather for next 2-3 days (N=128)	
Men	71.9
Women	7.8
Both	20.3
Advice was included in forecast of weather for next 2-3 days (N=128)	93.8

	% of households
Response to forecast of weather for next 2-3 days (N=116)	
Change in inputs (seed, fertilizer, pesticide)	72.4
Timing of farming activities	61.2
Feed management	12.9
Soil & water conservation	1.7
Irrigation	1.7
Land management	0.9
Others	1.7

2.8.5. Weather forecast for the next two to three months

Only two of the 140 households reported having received weather forecast for the next 2 to 3 months (Table 26). They received the information from television. They were male and female. One of them reported that advice was included in the information. Their actions to the information were to make changes in inputs or to change the timing of farming activities.

Table 26. Weather forecast for the next two to three months.

	% of households
Receive information (N=140)	1.4
Television as main source of weather information about the next 2-3 months (N=2)	100.0
Received weather information about the next 2-3 months (N=2)	
Men	50.0
Both	50.0
Advice included in weather information about the next 2-3 months (N=2)	50.0
Response to forecast of weather information about the next 2-3 months (N=2)	
Change in inputs (seed, fertilizer, pesticide)	50.0
Timing of farming activities	50.0

The results regarding information show an area for intervention to help farmers in the face of climate change challenges. The kind of information they received is reflective of what is available and also of their interest over need. For instance, most of them have received information on pest and diseases because aside from this is important, the show is also available on TV. Also, most have received information on weather forecast of 2-3 days because this is regularly given on TV. Relatively less number of households indicated receiving information on extreme weather and very few received information on weather forecast for 2-3 months, which could help farmers make decisions about the future.

Meanwhile, TV remained as the common medium to reach the farmers. With word-of-mouth or farmer-to-farmer information as another significant route of information, provision of correct information to even a small group of farmers can likely have a significant effect on the decision-making of the farmers. This also highlights the need of technical assistance from government staff in charge of information, education, and communication (IEC) materials in farming and for the materials to be easily understood by the farmers.

2.9. Community groups

Membership in community groups was very low with only 11% of the households reported membership in any community groups (Table 27). There were nine community groups identified that include those related to farming (e.g., irrigation, soil improvement, crop introduction, seed production, and vegetable production), savings and credit, tree planting, and productivity enhancement group. This does not include the common community groups such as the farmers' association (which work for productivity enhancement, seed production, vegetable, other group related to soil, water and land management, tree nursery), women's union (savings and credit), and youth union.

Table 27. Membership in community groups

Community groups	% of households (N=140)
Tree nursery/tree planting	2.1
Soil improvement activities group	1.4
Crop introduction/substitution group	2.1
Irrigation group	4.3
Savings and/or credit group	5.0
Productivity enhancement group	4.3
Seed production group	0.7
Vegetable production group	0.7
Other group related to soil, land or water management	0.7
Not a member of any group	88.6

2.10. Assets

The assets the households likely owned were divided into five categories: energy (generator, solar panel, biogas digester, battery); information (radio, television, cell phone, internet access, computer); production means (tractor, mechanical plough, thresher, and mill); transport (bicycle, motorbike, car or truck); and luxury (refrigerator, air conditioning, fan, bank account, improved stove).

Results showed that that 94% of the households belonged to high level in the Asset Index (Table 28). The number of assets per category owned by the households is shown in Table 29. Relatively more households owned information and transportation assets. The common assets per category included the motorcycle (89%) and bicycle (39%) for transportation; water pump (51%) or motor powered spraying tank (54%) for production assets; LPG (78%) for energy; television (98%) and cellular phone (94%) for information; and electric fan (89%) for luxury items.

As expected in Viet Nam, ownership of the motorcycle was high at 89%. It was previously shown that farming was more mechanized and yet ownership of productive assets, particularly machineries have been low. This result implies that rental of farm machineries was likely to be common.

Table 28. Asset Index

Asset index	% of households (N=140)
1-3 assets (Intermediate Level)	6.4
4 or more assets (High Level)	93.6

Table 29. Specific assets owned

Asset	% of households (N=140)
Transportation assets	
Motorcycle	89.3
Bicycle	39.3
No transport asset	4.3
Production assets	
Water pump/treadle pump	51.4
Motor powered spraying tank	54.3
Boat	26.4
Mechanical plough	17.1
Fishing nets	5.0
Thresher	2.1
Mill	1.4
Petrol trimmer	1.4
Energy Assets	
Liquid pressurized gas	77.9
Battery (large - e.g. car battery)	5.0
Generator	3.6
Biogas digester	3.6
Information Assets	
Television	97.9
Cell phone	94.3
Radio	24.3
Computer	13.6
Internet access	12.1
Luxury items	
Electrical fan	89.3
Refrigerator	41.4
Bank account	10.0
Air conditioning	1.4

3.   CONCLUSIONS

A typical household was characterized by male-headship, relatively bigger than the national average, and low education. Farming, particularly rice farming from own land, and small livestock raising were the main sources of food and income. Farming, however, is characterized by low crop and commercialization index. Households diversify income sources by engaging in off-farm work within the area or migrate to cities or to Thailand to find work.

Farmers made changes related to crop practices primarily in response to market signals. They, however, have low control over timing of harvest and price of their produce. This was especially true among farmers who purchased or rent farm inputs via credit. Farming was highly mechanized in the area, but less than half of the households owned production assets. On the other hand, decisions related to livestock rearing were more influenced by diseases and pest or factors other than the market or the climate.

Challenges brought by changes in climate, however, are becoming a factor in the farmers' decision related to crop changes. The adaptability of households needs enhancement from the current common measure of fertilizer application. Mitigation was still not given the needed attention. Providing farmers with correct and timely information on extreme weather events, start of rain, on weather forecast in two to three months will benefit them in making decisions about their farming activities in the future. Although TV remains as the common medium by which farmers access information, it is still limited to pest and diseases. Farmers need more information to guide and help them make decisions. Provision of correct information to even a small group of farmers can have significant impact given information travels faster via information sharing among farmers. Helping farmers form farmers' group can also enhance the sharing of knowledge and best practices.

Access to land among the households, two to three rice cropping a year, and few natural disasters in the area are likely reasons for food supply (in terms of quantity) to be enough for most of the households. The establishment of the dyke system has improved the irrigation system that contributed to higher farm production.

Acknowledgements

Appendix A: Survey process and implementation

The household survey was conducted following the steps below:

1. Identify list of villages within the 10km x 10km block.
2. Randomly select seven villages within a 10km x 10km block, including Tra Hat village
3. Collect information on all households in the seven villages selected.
4. Randomly select 20 households in each selected village.
5. Select a village for pilot testing of the questionnaire.
6. Conduct pilot testing of questionnaire with 20 households
7. Revise the questionnaire and train the data collectors on the use of the questionnaire.
8. Conduct household baseline survey of 140 selected households in seven selected villages
9. Replacement of households who refused interview or were unable to answer the interview. The process strictly followed the sequence of survey participants resulting from random sampling.

The survey used the digital tablet-based method. The questionnaire was divided into 10 sections, as follows: Household respondent and type; Demography; Sources of livelihood, Crop, farm animals/fish, tree, soil, land and water management changes; Food security; Land and water; Input and credits; Climate and weather information; Community groups; and Assets.

Questionnaires were translated into Vietnamese to facilitate communication with farmers. Training for data collection and refining questionnaire were done before implementing the actual survey. Some questions and answer lists were modified based on consultations with senior researchers and experts from survey team and local community groups.

Pre-testing questionnaires was conducted by all survey team members in Nang Ren village to ensure the questionnaires reflect reality in the field and for the survey team to get familiar with the tablet-based approach.

Before the questionnaire was administered, several meetings were convened with the commune and village authorities to inform about the purposes, scope, and procedure of the survey. The authorities then informed the villagers of the forthcoming household survey by the team to avoid suspicions or conflicts.

The actual survey was conducted in December 2014. Before every interview the enumerator had to explain the purpose and contents of the survey to household member(s) and also asked for consent for picture and GPS location recording, from each household. For the cases that selected households could not participate, the team made substitution using the reserve list of households that were randomized selected in the same village.

The survey team was composed of six enumerators. One of them played the role of supervisor. The supervisor provided enumerators supports as needed and checked all survey questionnaires for completeness at the end of survey each day. In cases errors were found, the supervisor talked directly to individual enumerator concerned for correction. If the mistakes could not be easily corrected, the enumerator had to go back to their interviewed household and ask for the lacking information.

Appendix B. Sampling Frame – List of Villages

No.	Village name	District	Province	Surveyed
1	Ap 37	Hoa Binh	Bac Lieu	X
2	Ap B1	Hoa Binh	Bac Lieu	
3	Ap Tram 1	Hoa Binh	Bac Lieu	
4	Ba Chang A	Hoa Binh	Bac Lieu	
5	Ba Chang B	Hoa Binh	Bac Lieu	
6	Bac Hen Nho	Hoa Binh	Bac Lieu	
7	Bau Sen	Vinh Loi	Bac Lieu	X
8	Cai Day	Vinh Loi	Bac Lieu	
9	Cai Dieu	Vinh Loi	Bac Lieu	
10	Cao Dieu	Vinh Loi	Bac Lieu	
11	Cong Dien	Vinh Loi	Bac Lieu	X
12	Giong Buom A	Vinh Loi	Bac Lieu	
13	Giong Buom B	Vinh Loi	Bac Lieu	
14	Nang Ren	Vinh Loi	Bac Lieu	
15	Nha Viet	Vinh Loi	Bac Lieu	X
16	Quang Vinh	Thanh Tri	Soc Trang	
17	Tan Du	Thanh Tri	Soc Trang	
18	Tra Ban 1	Vinh Loi	Bac Lieu	X
19	Tra Hat	Vinh Loi	Bac Lieu	X
20	Tran Nghia	Vinh Loi	Bac Lieu	
21	Xeo Chich	Vinh Loi	Bac Lieu	X
22	Xom Lon	Vinh Loi	Bac Lieu	
23	Xom Tro	Thanh Tri	Soc Trang	

Note: X: Villages have been visited for household baseline survey