



RESEARCH PROGRAM ON  
**Climate Change,  
Agriculture and  
Food Security**



# SITUATION ANALYSIS AND NEEDS ASSESSMENT REPORT

MY LOI VILLAGE | *A Selected Climate Smart  
Ha Tinh Province, Vietnam | Village Site*

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://ccaafs.cgiar.org/resources/baseline-surveys>).

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## Summary

My Loi village is located in the uplands of Ky Son commune, Ky Anh district, Ha Tinh province in the north central coast of Viet Nam. In 2014, it was chosen as a site for climate-smart village because of its exposure to multiple extreme weather events (temperature and water stress, storm and typhoon) and potential for climate-smart solutions.

The purpose of situation analysis and needs assessment was to understand the current situation at the village and province levels, on a number of issues, including food security and natural resources management, and to identify and prioritize the needs for My Loi to develop agriculture and livelihoods in synergy with climate adaptation and mitigation interventions. Data collection was conducted in October 2014 alongside a Village Baseline Study. The findings were shared during a feedback meeting in December 2014.

The major findings for My Loi Village included: 1) main livelihood sources are in forestry (140 ha acacia and eucalyptus planted in near 200 ha) and rainfed agriculture (55 ha, paddy rice, peanut, maize, green bean, and sweet potato); 2) main constraints for production are water scarcity and poor soil quality; 3) livestock was promoted to improve livelihood diversification; . Low investment capital and diseases are the households' main challenges for expansion from an average of 1-2 cows per household. Larger herds could open up opportunities for biogas production. Feed sources, however, are unclear.

The villagers identified 21 stakeholders active within food security (the majority), food crisis and natural resource management. The village experienced temporary periods of food insecurity during natural disasters. While the main issues relating to natural resources were pollution (mining) and land degradation, there was little awareness of the potential impacts due to progressing climate variability and change. The CCAFS CSV projects therefore are a timely complement to help implement the province action plan and policies in response to climate change.

## Keywords

My Loi; Central Viet Nam; Situation analysis, Need Assessment, Climate Smart Village.

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## Abbreviations

CSA	Climate Smart Agriculture
CC	Climate Change
CCAFS	Climate Change, Agriculture and Food Security Program of CGIAR
CGIAR	Consultative Group on International Agricultural Research
CSV	Climate Smart Village
DARD	Department of Agriculture and Rural Development
MoNRE	Ministry of Natural Resources and Environment
DoNRE	Department of Natural Resources and Environment
FGD	Focus Group Discussion
ICRAF	World Agroforestry Center
NGO	Non-Government Organization
OBS	Organisation Baseline Study
PC	People Committee
VBS	Village Baseline Study
VND	Vietnamese Dong (USD1= VND21000)

# 1. INTRODUCTION

The Consultative Group on International Agricultural Research (CGIAR) Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic ten-year partnership between the CGIAR and Future Earth to deal with the threats posed by a changing climate in achieving food security, enhancing livelihoods, and improving environmental management. Started in 2010, CGIAR-CCAFs major initial work include collecting baseline information through the studies at the household and village levels, and the organization baseline study in selected sites in the three regions of East Africa, West Africa and South Asia (more information about CCAFS sites is available at <http://ccafs.cgiar.org/where-we-work>). The main aim is to collect data that serve as baseline information at each site to inform planning of CCAFS intervention and to form the basis for monitoring change over time (after 5 years and 10 years from the baseline period) in the selected sites.

In the South Asia region, the six selected sites with potential to become climate smart villages (CSVs) are: (1) Rohal Soung village, Battambang province, Cambodia; (2) Ekxang village, Vientiane province, Lao PDR; (3) Pailom village, Savannaket province, Lao PDR; (4) Ma village, Yen Bai province, Vietnam; (5) My Loi village, Ha Tinh province, Vietnam; and (6) Tra Hat (VN03), Bac Lieu province, Vietnam. Complementing the baseline data collection activities is the Situation Analysis and Needs Assessment (SANA). The baseline data collection in these sites was conducted in 2014. The aim is to have a deeper understanding of the selected sites to enable the design of appropriate and feasible intervention that will support their transformation to climate-smart villages in time.

Specifically, the objectives of the SANA are:

- To understand the current situation of the selected site in the following 15 areas: Natural Resource utilization; Organisational Landscape; Information Network; Mitigation Measures; Production and livelihood systems (including markets); Current and past NRM initiatives; Food security status and trends; Demographics; Institutional landscape and Governance; Social and Gender Differentiation; Hazards and vulnerability; Local climatic information and Health/Nutrition Profiles and other Livelihood Outcomes, and
- To identify the priority needs of the selected site in support of developing its agriculture and livelihoods while mitigating and adapting well to climate change.

This report presents the results of the SANA for My Loi village, Ha Tinh Province, Vietnam. The World Agroforestry Centre is the main partner of CGIAR-CCAFS for My Loi village.



## 2. METHODOLOGY

For the Situation Analysis and Needs Assessment, data were partly drawn from the Village Baseline Study (VBS) and from the Organizational Baseline Study (OBS). In Additional primary and secondary data at the province, district, commune and village levels were also collected. Sources of primary data were key informant interviews (KIIs) and three gender-differentiated focus group discussions (FGDs). Secondary data consisted of official documents and research reports collected from various offices in the province and those that are available on official websites. Prior to the CSV activities in My Loi, the World Agroforestry Centre conducted two research projects on adaptation to extreme weather events and climate change, specifically the role of trees for adaptation. Focus group discussions and a household survey were carried out in 2012 to 2013 in My Loi village among eight other villages in the district. The results of these previous research projects were useful and were updated and used for the CSV baseline. At the provincial and district levels, key informant interviews were conducted when secondary data were unavailable.

A list of topics for the SANA was drawn by a group of social scientist at a meeting during the planning workshop for the implementation of the CSV in July 2014. The list includes 15 topics with data needed at the provincial/district and village levels: Natural resource utilization, Organizational landscape, Information network, Mitigation measures, Production and livelihood systems (including markets), Current and past natural resource management initiatives, Food security status and trends, Demographics, Climate change perception, Institutional landscape and governance, Social and gender differentiation, Hazards and vulnerability, Local climatic information, Health and nutrition profile and other livelihood outcomes, and Stakeholders. Four topics were common with the Village Baseline Study: Natural resource utilization, Organizational landscape, Information network, and Mitigation measures.

CCAFS has identified the lead CG partners as well as local partners in every site in the implementation of its activities. For My Loi, the World Agroforestry Center is the lead CG partner. For the baseline activities, the teams formed by the lead CG partners in the six CCAFS sites were trained on conducting the baseline studies in September 2014 (VBS, OBS and SANA) and in November 2014 (Household Baseline Study). Guide materials were given to the teams for reference.

With VBS and SANA as complementary activities, field data collection was conducted at the same time. The FGDs conducted for VBS in My Loi village were conducted on 17- 19 October 2014. Each of the six separate FGDs either has 15 men or 15 women as participants, for a total of 90 FGD participants. Topics relevant to SANA that were collected during the FGD include Natural Resource Utilization, Organizational Landscape and Information Network (Le, Duong, Do, Le, Phan, and Simelton 2015). Additional information was collected from 15 of the 90 FGD participants on 23 and 24 October 2014. A feedback seminar was held in December 2014 with 15 of the FGD-participants, 15 villagers who had not participated in the FGDs as well as leaders from the province down to the village levels. Details from the feedback meeting are available in Le, Duong and Simelton (2015)<sup>1</sup>.

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<sup>1</sup> Le VH, Duong MT and Simelton E (2015) Feedback seminar report for the Village Baseline Study in CCAFS Climate Smart Village in My Loi (Ha Tinh province, Viet Nam)

Data on institutional landscape was collected through a participatory group exercise where important organizations were listed and their involvement in the community identified. From the list, 10 organizations were selected for interviews using the protocol set under the Organization Baseline Study (OBS). Additional information is included in the Village Baseline Study (Le, Duong, and Simelton 2015). The topic guide used for the interviews is available in the Appendix of the Organization Baseline Study report.

## 3. SITUATION ANALYSIS

### 3.1 GEOGRAPHIC LOCATION

Ha Tinh is one of six provinces in the North Central coast of Vietnam, about 340 km South of Ha Noi. It shares border with Nghe An Province in the North, Quang Binh Province in the South, and Laos in the West (Figure 1). The total land area is 6,000 km<sup>2</sup> (General Statistical Office of Vietnam [GSO], 2013). Ha Tinh is on the East of Truong Son Bac range, sloping towards the East Sea in three geographic zones: high mountainous zone, hilly mountainous zone, and coastal plains. The highest peak is Rao Co measuring 2,235 m.a.s.l, while the hilly and mountainous zone is at 200-300 m.a.s.l (ISPONRE 2009).

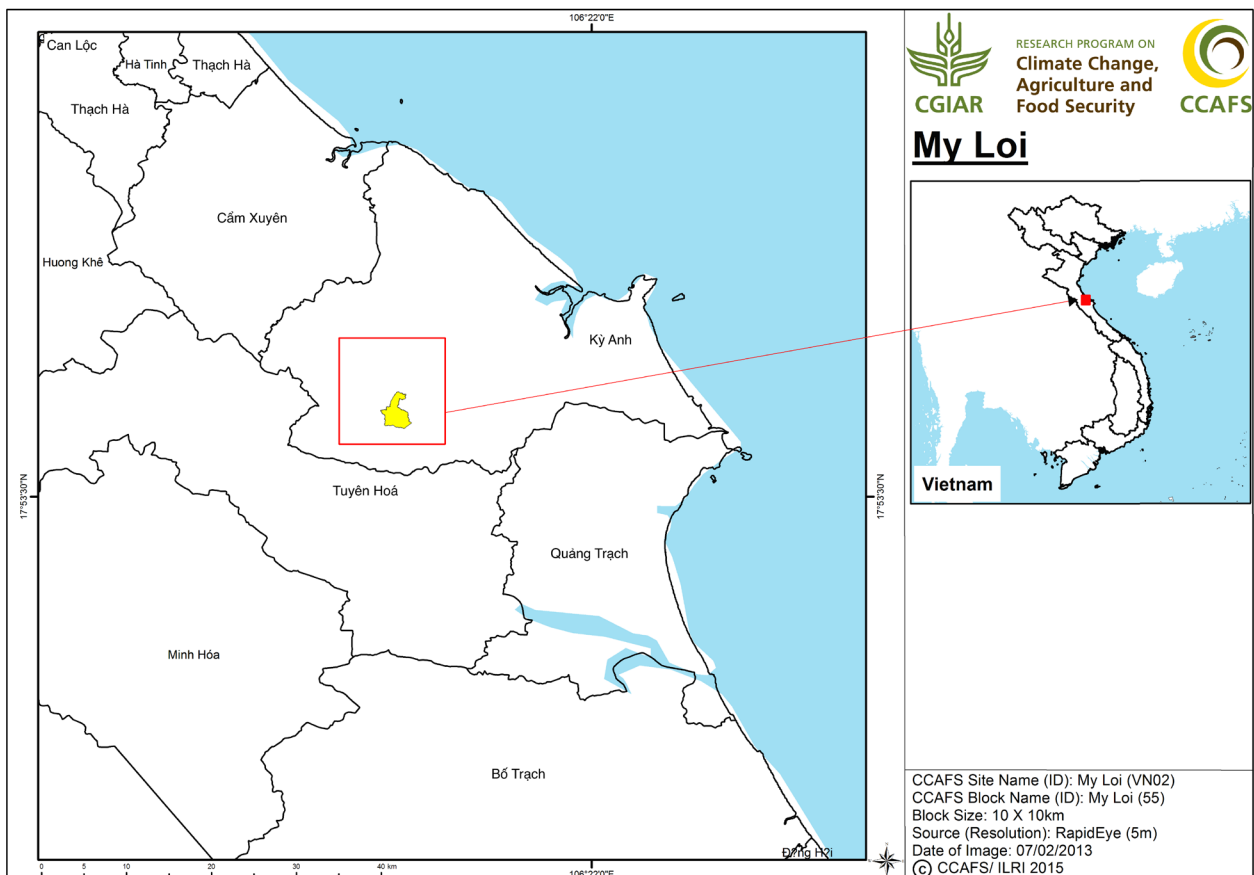
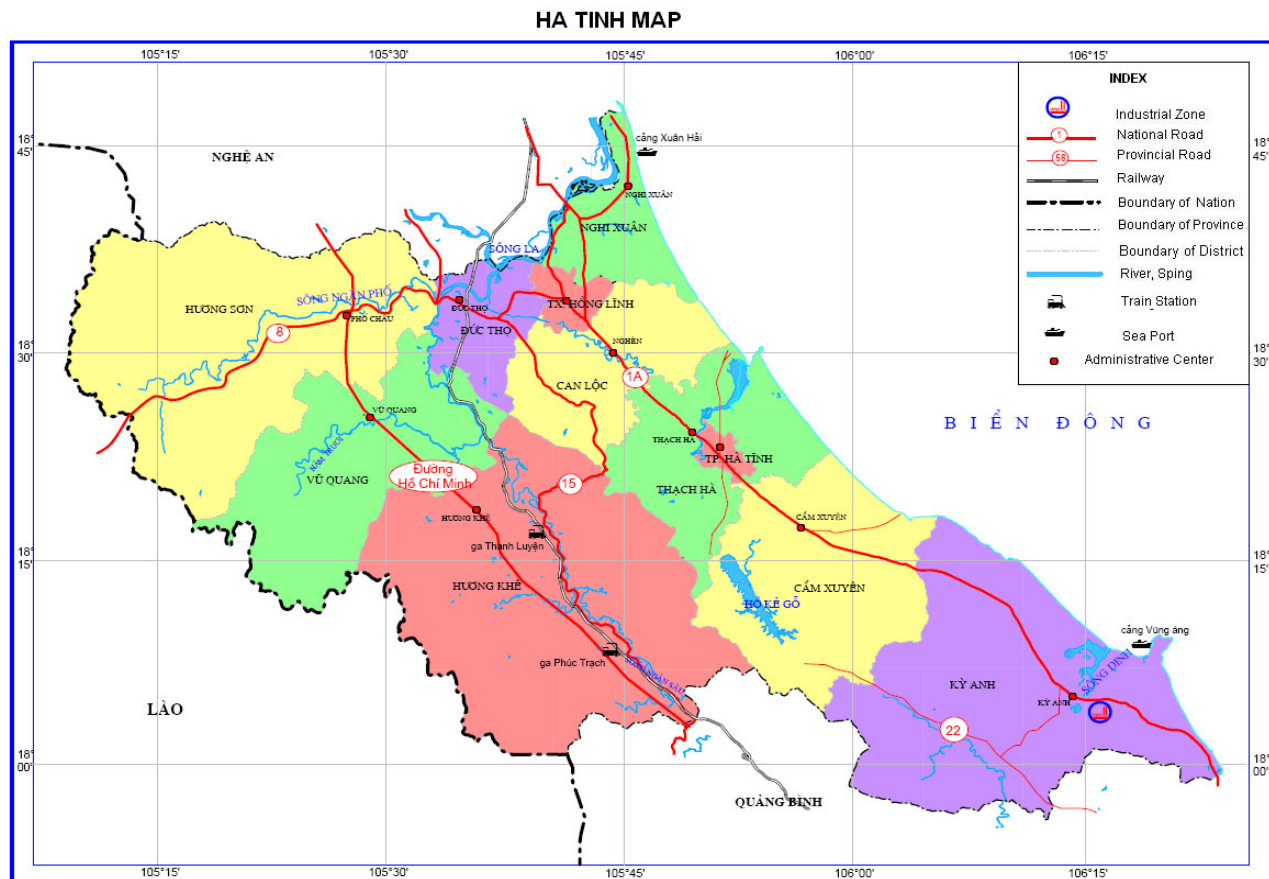


Figure 1. Location of My Loi village and Ha Tinh Province in the map of Vietnam

The province has 12 administrative units including Ha Tinh City, Hong Linh town and 10 districts (Huong Son, Duc Tho, Vu Quang, Nghi Xuan, Can Loc, Huong Khe, Thach Ha, Cam Xuyen, Ky Anh, and Loc Ha), and 262 communes and wards.

Ky Anh district is located in the southernmost part of the Ha Tinh province, covering about 1,054km<sup>2</sup> (Figure 2). With the rise of Vung Ang Economic Park, International Cau Treo Border Gate Park, and a deep-sea port cluster of Vung Ang – Son Duong, Ha Tinh, and Ky Anh district in particular is well-connected with highways 1A and 12 to Laos and expected to become a hub for national and international transport.

Ky Son commune is located in the uplands of Ky Anh district, with a total land area of 90 km<sup>2</sup>. My Loi village is in the centre of Ky Son commune with a total land area of 1.95 km<sup>2</sup>. The geographical coordinates of My Loi village centre are 17°59'54.8"N 106°09'32.7"E (Figure 1).



Source: [http://investinvietnam.vn/data/image/Ha%20Tinh\(2\).jpg](http://investinvietnam.vn/data/image/Ha%20Tinh(2).jpg)

Figure 2. Administrative map of Ha Tinh Province

### 3.2 DEMOGRAPHY

In 2013, the population of Ha Tinh was 1,242,700. The population slowly grows at 0.03% in 2010 and 0.84% in 2013. The population density of 207 persons/km<sup>2</sup> in 2013 was lower than the national average at 271 persons/km<sup>2</sup>, but higher than the rest of the North central and central coastal areas at 202 persons/km<sup>2</sup>. A

major reason for the low population growth rate is outmigration to other provinces or abroad for work or education. The Master plan for Ha Tinh until 2050 projects that the total population will be about 1.6 million by 2020. The population is primarily concentrated in the eastern coastal plain. About 85% of the population live in the rural areas. The urbanization rate, however, increased by 5% in 2013. The number of people in labor age (15-60 years for male and 15-55 for female) was around 709,000 in 2013, accounting for 56% of the provincial population. This was an increase of 70,000 compared to 2005 levels (GSO 2013). Skilled labor in Ha Tinh is from one university, four colleges, secondary vocational schools, and 33 vocational schools. The number of high school graduates is between 20,000 and 25,000 each year.

In 2014, the population in Ky Anh district was 172,000. In Ky Son commune the population was 6,000 inhabitants. In 2014, My Loi village had a population of 768 people in 213 households or an average family size of 3-4 persons. According to the FGD participants, the number of children per family had reduced in the last two decades from 4 to 5 to 1 to 2. Most villagers were native to the village. About 10 persons had moved in primarily due to marriage. About 15-20 villagers have out-migrated, primarily to Ha Tinh City, Hanoi, Ho Chi Minh City or Angola. Households classified as poor and near poor accounted for 22% and 23%, respectively in 2013.

### 3.3 LOCAL CLIMATIC INFORMATION

Ha Tinh's weather is affected by the South Asia monsoon in the summer, and the East Asia monsoon in winter (ISPONRE 2009). The average monthly temperature and monthly rainfall in the two decades (1982-2011) is shown in Figure 3. Data came from four automatic weather stations. The pattern is clear that rainfall and temperature peaks in the months of June and August and lowest in the months of December to February.

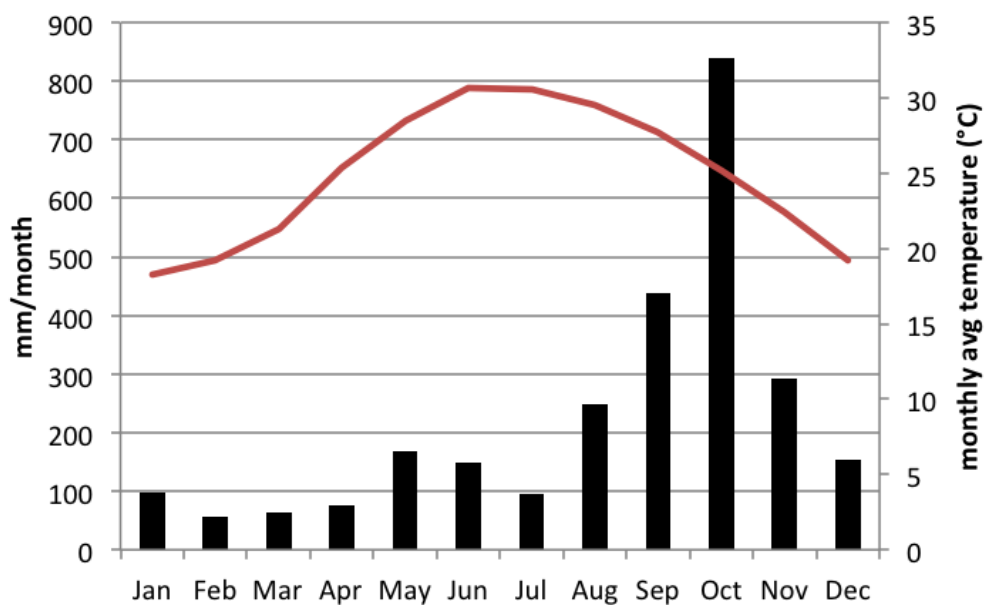


Figure 3. Average monthly temperature and monthly rainfall for Ha Tinh province (1982-2011)

### **3.3.1 Temperature**

The average annual temperature is about 23.5 - 24.5°C but as low as 14-15°C on elevated areas like Rao Co. The average annual sunshine hours are 1,350 to 1,700, with the maximum of 200 hours per month between April and September. The cold season only lasts from December to February and the hot season lasts from April to September. The average lowest temperature is around 7°C, and it can be as low 0.7°C in some places in December and January.

Early summers are warm and dry due to the dry Lao winds with the highest temperatures over 40°C; it can be as high as 42.6°C in some places in April, May or June. During summer, there are 15-22 occasions when dry and hot weather is dominant, usually at the beginning and middle of the season.

Based on the decade 1982-2011, the average annual minimum temperatures increased by +0.25°C/decade ( $R^2=0.21$ ), average temperatures by +0.31°C/decade ( $R^2=0.11$ ), average maximum temperatures by +0.37°C/decade ( $R^2=0.06$ ). The increase in maximum temperatures is driving the average temperature to increase (more than increase in minimum temperatures). A comparison of the difference in the distribution of temperature-days between two periods (1982-96, 1997-2011) shows the increase in 'maximum temperatures', especially an increase in the number of days with temperatures between 15-30°C (i.e. the hottest days are only slightly more) in Ky Anh. In terms of seasonal temperatures, winter temperatures increased by +0.5°C/decade ( $R^2=0.16$ ).

### **3.3.2 Rainfall**

The annual rainfall is on average between 2,300 and 3,000mm while the highest rainfall is reported to be 3,800-4,400mm. Rainy months start in April or May and last until November or December. There are interruption in between at several times in June and July due to dry, hot westerly winds. During winters, along the coast, northeasterly winds bring salty air (Simelton, Bac, Thuy, Phuong, Luyen, Tam, Loan, Le, Tuan, Ha, Dat, Tung, Ngoc, Hoa, Nam, Ai, Viet, and Anh 2012)Thuy, Phuong, Luyen, Tam, Loan, Le, Tuan, Ha, Dat, Tung, Ngoc, Hoa, Nam, Ai, Viet, and Anh 2012, the first half of the season has more rain while the second half has drizzling rain (ISPONRE 2009). On average, there was a decreasing trend in annual rainfall between 1982 and 2011 for Ky Anh of about 250 mm/decade ( $R^2 = 0.10$ ), however the variability between the years is high (there could also be missing data that confuses the analysis). Figure 4 shows that the inter-annual variability in rainfall during the two main rainy periods has reduced in inter-annual variability over the past ten year-period but the pattern may be cyclic, perhaps decadal. Figure 6 shows that the big amplitude is higher in the rainfall for the period August-October, due to higher rainfall amounts.

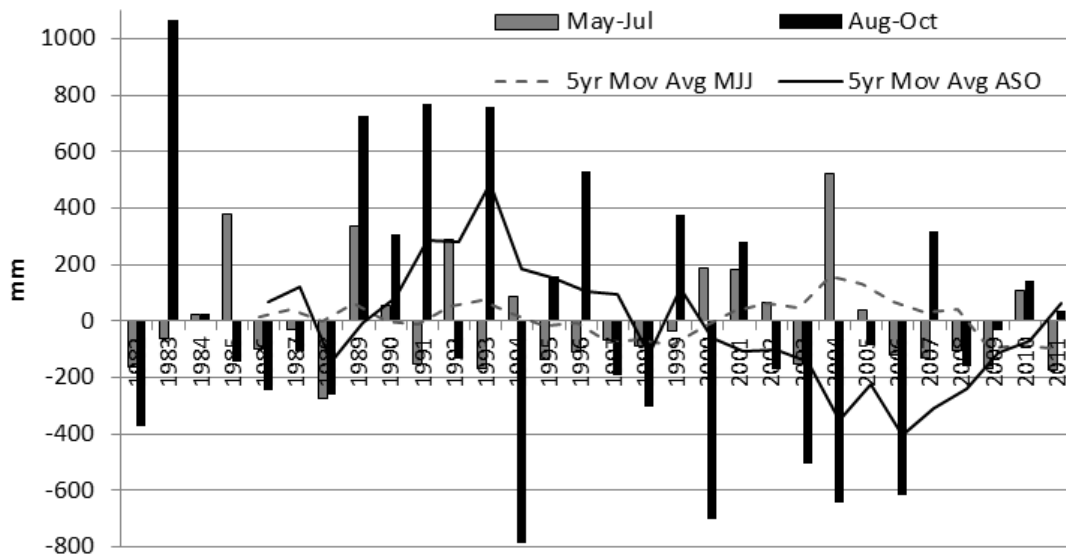


Figure 4: Rainfall anomaly for summer (May-July) and autumn (August-October) periods (1982-2011) in Ky Anh, and 5-year moving average for the respective period

### 3.4 NATURAL RESOURCE UTILIZATION

#### 3.4.1 Land use

Most of the land area of 6,000 km<sup>2</sup> of Ha Tinh province is classified as for agricultural production and forestry (81%); the rest are non-agricultural land (including homestead land and special used land) (14%), and unused land (5%) (GSO, 2013). Between the years 2010 and 2013, agricultural production land increased from 1,210 km<sup>2</sup> to 1,300 km<sup>2</sup> while forestry land remained the same area at about 3,510 km<sup>2</sup>. The area of specially used land and homestead land increased from (420 km<sup>2</sup> to 440 km<sup>2</sup>) and 85 to 96 km<sup>2</sup>, respectively (Ha Tinh GSO 2013). Of the 1,222 km<sup>2</sup> agricultural land, about half (536 km<sup>2</sup>) is used for rice production and the remaining for cash crops, industrial crops and fruit trees (GSO 2013). The protected forests are primarily inside Vu Quang and Ke Go National Parks. The province has a large area of planted forest, which is managed by households. On the planted forest, households can plant timber trees for wood processing materials.

#### 3.4.2 Soil types

Ha Tinh province has two soil main types: old Ferralit soils and recent alluvial soils. Out of the total area 5,997.82 km<sup>2</sup> (GSO, 2013), the mountainous soil types include Ferralit soil on high mountain (1,552.61 km<sup>2</sup>), yellow-grey ferralitic land on clay stone (1,486.42 km<sup>2</sup>), coarse erosive Ferralit soil (347.24 km<sup>2</sup>), yellow grey Ferralit land on sandstone (277.16 km<sup>2</sup>), yellow grey Ferralit soil on granite rock, Ryolit soil (297.20 km<sup>2</sup>), and yellow-brown Ferralit on old alluvial material (61.35 km<sup>2</sup>). Coastal plains include alluvial soil (1032.01 km<sup>2</sup>), saline and acid sulfate soil (172.65 km<sup>2</sup>), saline soils (51.40 km<sup>2</sup>), and sandy soils (aerosols) such as sand dunes and sand banks (382.22 km<sup>2</sup>). Lastly, the intermediary zone with "soils near hills and mountains" (129.63 km<sup>2</sup>). Approximately two-thirds of Ha Tinh land area is classified as poor or medium conditions and 20% unsuitable for agricultural production (ISPONRE 2009).



### 3.4.3 Water resources

Ha Tinh has four major river basins: (i) Ngan Sau and Ngan Pho rivers merge in La River basin and covers an area of 3,221 km<sup>2</sup>; (ii) Nghan and Rao Cai rivers form Cua Sot River basin and covers an area of 1,349 km<sup>2</sup>; (iii) Gia Hoi and Rac rivers that merge in Cua Nhuong River basin which covers 356 km<sup>2</sup>; and (iv) Tri, Kenh and Quyen rivers merge in Cua Khau River basin and covers 510 km<sup>2</sup>. Originating from Truong Son range are 13 rivers in Ha Tinh with a total length over 400 km and 345 lakes (the largest lakes are Ke Go, Ra and Cua Tho Trai Tieu). The rivers and reservoirs store about 11-13 billion m<sup>3</sup> annually.

The 137 km coastline and large total sea area (about 18,400km<sup>2</sup>) offers potential for salt production and fishery and aquaculture development (ISPONRE 2009). Approximately 85,000 tons of fish are annually caught offshore.

Rao Moc river runs through My Loi village supporting the water needs of fields (Figure 5). The Cay Tram reservoir was recently upgraded to provide irrigation for Bai Nai and Chu Ke fields. My Loi has a total land area of about 1.95 km<sup>2</sup>, where about 1.40 km<sup>2</sup> is forestland, mainly on sloping lands at higher elevations. About 0.4km<sup>2</sup> of the forestland is used for cassava and the remaining 0.8km<sup>2</sup> for acacia and eucalyptus. About 0.55 km<sup>2</sup> of the farmland is used for annual crops, in particular peanut (0.30km<sup>2</sup>) and paddy rice (0.085-0.095 km<sup>2</sup>), and the rest of the areas are used to plant maize, green bean and sweet potato.

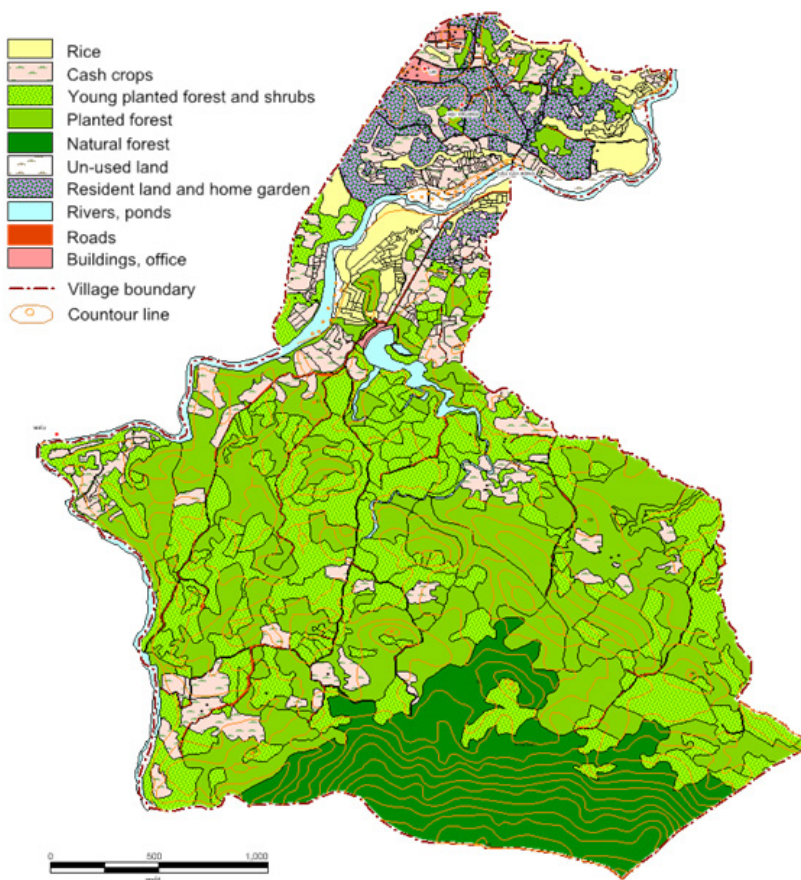


Figure 5. Land use map of My Loi village in 2015

Changes in status of natural resources over 20 years, from 1995 to 2014, are presented in Table 1 below:

*Table 1. Past and current status of selected natural resources in My Loi village*

1995	2014
<b>Forest</b>	
<p>Until the year 1986, land was managed by cooperatives. It was gradually handed over to households. In 1995 families got land tenure rights for 20 (agricultural land) or 50 (forestry) years.</p> <p>Before 1995 there were natural forests in My Loi village, rich and diverse in plant and animal resources. The area of natural forest was much larger than the planted one. The natural forest area has reduced due to deforestation for agricultural production (cassava), timber exploitation (acacia and cajuput) and especially the expansion of Cay Tram reservoir.</p> <p>Since about 20 years ago, forestland has been allocated to household to plant, protect and exploit. In addition, the forest plantation area is increasing for wood for pulp production.</p>	<p>The natural regeneration forest only exists in Hon De Mountain and consists of small trees and bush rather than full-grown trees and high-value species no longer exist. The natural forest is managed by Ky Anh Forest Ranger in cooperation with the commune People's Committee. The villagers said that the forest is important for retaining surface and ground water, avoiding landslides and climate regulation. In addition, it supplies materials for handicraft such as <i>coryphe-saribus</i> for hat making or rattan and bamboo, which contributes significant to household incomes.</p> <p>The planted forest includes mostly acacia and cajuput (keo tram) for paper pulp production with a cycle of about 5-7 years. The average planted area per household is approximately 0.5-2ha. Assigned households are responsible for afforestation, protection and utilization according to the Government's forest and forestland allocation policy and guidelines.</p>
<b>Reservoirs, lakes and dams</b>	
<p>The FGD participants said that Cay Tram reservoir made of soil and stone was built in 1962. However, it was a challenge to reach the reservoir, as there was no road at that time. Villagers were concerned about their safety during floods, storms or heavy rains.</p>	<p>Cay Tram and Da Quai are the two largest reservoirs in the commune and the main sources of irrigation water supply. Cay Tram reservoir was built in 1960 and upgraded in 2013 and early 2014 with a dam constructed by concrete. Now the reservoir storage meets the need for two crops per year in the Chu Ke and Bai Nai fields. The reservoir can also be used for flood control. At the feedback meeting, the women's group said that the reservoir/lake is about six meters deep and could hold cage fish. The farmers were unclear about who exactly manages the dam, the men said it was "the village" and the women "nobody", while the leaders said that the reservoir is managed by Binh Thuan artel of agriculture and irrigation (Tổ hợp tác thủy nông Bình Thuận) under supervision of Ky Son CPC.</p> <p>Da Quai reservoir has not been upgraded. The dam is made of soil and is damaged. The reservoir is also used for flood control and irrigation but operates less efficiently than Cay Tram dam due to leakage.</p> <p>Ky Son has two more reservoirs: Cay Song covering a small area, and Cay Trang, which no longer retains water for irrigation. Two bridges connect Cay Trang reservoir with the residential areas.</p>



1995	2014
<b>River</b>	
<p>The river system used to have a large flow, good water quality and was not polluted, according to the male participants of a FGD. Before 1995, villagers were able to catch fish and shrimp in large amounts. They consider the rivers as a drinking water source for both human and livestock. However, since the operation of mining minerals and construction sand the river flow and water quality has reduced. The construction of the National Road 12 exacerbated these problems.</p>	<p>Two rivers, Rao Tro and the slightly smaller Rao Moc run through Ky Son commune. The rivers are the main water sources for daily household consumption and irrigation. Due to mining of construction sand the river flow has changed and dislocated parts of the riverbank. The construction of the National Road 12 has also narrowed the river. Overexploitation in the sand mines in the riverhead and waste from residents further pollute the rivers and the focus group participants said the river water is no longer sufficient for their daily needs.</p> <p>Two dams with reservoirs are planned to be built on Rao Tro river in Ky Son commune to supply water to Formosa industrial zone. Villagers believe this will have negative impacts on the community and agricultural production in the area. For example, they expect that Cay Boong bridge will be flooded more frequently if water levels increase in the dams.</p> <p>On several occasions, men and women separately and together, indicated that the sand and stone mining slowed down the river flow and caused water pollution. Mining activities should, therefore, be limited and monitored closely by the responsible authorities.</p>

Source: Le et al.(2015)

### 3.5 PRODUCTION AND LIVELIHOOD SYSTEMS

#### 3.5.1 Ha Tinh Province

The province total gross domestic product was estimated at VND 32,052 billion in 2013, with agriculture, forestry and fishery contributing 22%, industry and construction 39%, trade and services 34%, and product tax 3%. The value of agriculture, forestry and fishery increased by 57% between 2010 and 2013, while its share to GDP declined from 30% to 23% (Table 2). Ha Tinh province's annual economic growth rate increased to 19% in 2013 compared to 11% in 2010.

Table 2: Gross Domestic Product by economic sector Ha Tinh province, 2010-2013

Years		2010	2011	2012	2013 (Prel.)
Total		15,623	20,418	26,022	3,2052
Agriculture	Billion VND	4,641	6,435	6,712	7,288
	%	29.7	31.5	25.8	22.7
Industry	Billion VND	4,496	5,666	8,521.88	12,577
	%	28.8	27.8	32.8	39.2
Service	Billion VND	6,293	7,493	9,814	11,053
	%	40.3	36.7	37.7	34.5
Product tax	Billion VND	193	823	975	1,133
	%	1.2	4.0	3.8	3.5

Source: Ha Tinh GSO, 2013

Within the agricultural sector, the highest share is from crop production (Table 3). The share of crop production, although 50% for years 2010-2013, has declined from 62 % in 2010 to 54% in 2013. In contrast, the share of livestock has been increasing from 34% in 2010 to 42% in 2013. Aquaculture and other activities contributed less than 5% to the gross output.

Table 3: Gross output of agriculture by production area, Ha Tinh province 2010-2013

Years		2010	2011	2012	2013 (Prel.)
Total		7,155	10,004	10,120	10,758
Crop production	Billion VND	4,429	5,941	5,662	5,804
	%	61.9	59.4	56.0	54.0
Livestock	Billion VND	2,459	3,766	4,044	4,472
	%	34.4	37.6	40.0	41.6
Aquaculture, other activities	Billion VND	266	297	414	482
	%	3.7	3.0	4.1	4.5

Source: Ha Tinh GSO, 2013

The main crops produced in Ha Tinh province are rice, peanut, orange, tea, rubber, pomelo, sweet potato, cassava, bean, maize and vegetables. Out of these, the province has identified a number of flagship crop (Table 4).

Table 4. Ha Tinh's flagship agricultural products at the province and district levels

Administrative level	Flagship product
Province	Rice, peanut, pig, shrimp, timber
District (first priority)	Orange, cattle, medical plants, tea, rubber, pomelo, vegetables, sweet potato, aquaculture products White water fish, deer
District (second priority)	Bean, cassava, maize, bonsai Duck, buffalo, chicken
Ky Anh district	Rice, peanut, rubber, sweet potato, vegetable, tea, pig, cattle, timber, buffalo, cassava, aquaculture products

Source: Monitor (2011)

**Rice:** In 2013, the total rice area was nearly 100,000 ha, including 56% spring rice, 42% autumn rice and 2% winter rice. Over the past 5 years, the winter rice area decreased by about 4,000 ha, the autumn rice has increased by 2,000ha, leading to a net decline of 2,000ha.

**Maize:** Between 2010 and 2013, the planted area decreased by 1,000ha while the annual production increased by 7,000 tons.

**Peanut:** Over the past 5 years, the peanut area has decreased by about 2,000ha to slightly over 17,000ha in 2013; while the yield increased by 0.2t/ha over the same period.

**Orange and pomelo:** The area with citrus trees increased by 175ha for pomelo and 80ha for orange over the past five years.

**Green tea:** In 2013 the total tea production was over 25,000 tons. Tea is considered as a flagship agricultural product of the province, primarily for export. Over the past 6 years, however, the area planted with tea reduced by 200 ha and the harvested area decreased by around 100 ha.

**Vegetables:** annual yield ranges between 6 - 6.5 t/ha. The sweet potato varieties include KL5, KL1, and K51 for the spring and winter crop seasons.

Table 5: Planted (harvested) area and production of selected flagship products in Ha Tinh, 2010-2013

Crops/plants	2010		2011		2012		2013	
	Area (ha)	Production (tons)	Area (ha)	Production (tons)	Area (ha)	Production (tons)	Area (ha)	Production (tons)
Rice	99,003	414,387	99,084	470,822	99,237	482,251	98,674	479,001
Maize	8,060	19,047	8,713	27,772	6,416	18,576	7,727	26,000
Peanut	19,414	40,963	17,988	38,487	17,065	35,796	17,299	41,067
Sweet potato	9,427	58,863	7,949	50,383	6,674	41,367	6,728	39,410
Cassava	3,439	39,932	3,790	54,477	3,773	53,205	3,666	47,339
Vegetables	ND	64,041	ND	62,669	ND	57,226	10,852	60,751
Orange	2,492	1,805	2,540	1,886	2,294	1,777	2,538	1,706
	ND		ND		ND		(1,850)	
Pomelo	1,587	10,686	1,566	111,352	1,462	10,213	1,360	9,554
	(1,288)		(1,289)		(1,170)		(1,109)	
Green tea	3,283	27,118	3,403	28,999	3,166	27,417	2,943	25,996
	(2,816)		(2,930)		(2,747)		(2,687)	

ND = No data available. Source: Ha Tinh GSO, 2013

The main farm animals in Ha Tinh are pigs, cattle, and poultry. Pork accounted for 75% of productivity in all kinds of meat, including beef and poultry in the province. The number of pigs increased by 45,000 and poultry increased by one million between 2010 and 2013. The number of cattle has been fairly stable at least since 2010 (see Table 6), while the number of buffalos declined by 15,000 between 2010 and 2013, mainly due to increasing mechanization. Three districts (Duc Tho, Can Loc and Huong Son) have about 41% of the total number of cattle and buffalo. Meanwhile the total beef production has increased by 41%, compared to in 2008. This could be a consequence of changing methods, applying high productivity breeds, feeding good quality feed, and applying fattening methods. In 2013 there were about 6 million poultry (68% chicken and 32% ducks); this was an increase by 12% annually over the past five years. The total production was over 10,000 tons of meat and 200 million eggs.

Ha Tinh province has the largest number of deer in the country. The number increased from 24,000 in 2010 to nearly 35,000 in 2013. Nearly all (90%) are kept in the Huong Son district, and a few in Huong Khe, Vu Quang and Duc Tho districts.

Table 6. Livestock population and production in Ha Tinh province, 2010-2013

Year		Livestock				
		Pig	Cattle	Buffalo	Poultry	Deer
2010	Amount (head)	356,065	166,346	94,675	4,956,300	24,222
	Production (tons)	42,839	7,658	3,635	7,135	-
2011	Amount (head)	333,531	159,467	89,796	4,886,000	25,584
	Production (tons)	43,458	8,236	3,944	7,532	-
2012	Amount (head)	368,036	157,859	85,974	5,213,000	31,907
	Production (tons)	47,042	8,509	4,037	8,825	-
2013	Amount (head)	400,030	161,888	78,600	6,065,300	34,199
	Production (tons)	57,309	6,385	3,502	10,211	-

Source: Ha Tinh GSO, 2013

The value of the fishery industry increased from VND 1,016 billion in 2010 to 1,603 billion in 2013. Aquaculture contributed 38% and wild catch contributed 57%. In 2013, there was 7,870 ha aquaculture area, including 2,790 ha offshore and 5,808 ha of inshore aquaculture. This represents an increase of 2.1% from 2008 levels. The area of shrimp farming was 2,125ha, which is 20% less than in 2008 due to expansion of Vung Ang Economic Zone in Ky Anh district and the urbanization in Thach Ha and Loc Ha districts.

### 3.5.2 Ky Son commune and My Loi village

Forestry accounts for half of the household incomes in My Loi village, while the other half comes from agriculture and other activities. The village has about 140 ha of plantation, including acacia, cajuput, and pine trees. Reforestation started in 1997 and increased in 2007. Between 60% and 65% of households hold between 0.5 and 10ha forest plantations, rendering an income of VND 20 to 25 million/ha once per 5-7 year-cycles. This can be compared with the investment costs of about VND10-20 million/ha for seedling, fertilizers, labor and transportation. Recently, changes include reduction in the cost of fertilizers and planting of cassava is mixed with young acacia or cajuput (taungya system) to maximize income.

All villagers have land-use certificates for farmland. About 5% lease their land to others. The area of agricultural production is decreasing due to road expansion and housing. Agricultural production is primarily rainfed, which is evidenced in the crop choices.

**Rice:** Ky Son commune has 82 ha planted to rice with total production of 410 tons in 2013 (average yield of about 5 t/ha). My Loi has 8.5 ha of rice fields in 2014 in Chu Ke, Bai Nai, Bac Muong, Cay Da and Lo Ngoi fields (Figure 3). The rice varieties include Xi23, NX30, IR35366, PC6, VNA2, Nhi Uu 838, N97, Khang Dan DB-KD 18 and HT1.

**Peanut:** The area planted to peanut in Ky Son is 220 ha and in My Loi is 30 ha. The average yield is about 2.5tonnes/ha.

**Cassava:** Ky Son commune has about 440ha cassava annually yielding about 25tonnes/ha, in total 10,000 tons in 2013. My Loi has 43ha of the cassava plantation in 2014.

**Vegetables:** The area for vegetable is around 50ha, in which 20ha planted to palanquin and 5ha planted to sweet potato.

In a commune land use planning exercise in 2013, the leaders ranked the ten most important crops and the projected most important crops by the 2030s (Table 7). The ranking is also valid for My Loi village.

Ninety percent of the households hold few heads of animals, while only one household had more than 30 heads and seven households had between 15 and 30 pigs. The number of cattle in Ky Son commune is expected to increase from 1,330 in 2013 to 1,700 in 2014. In 2013, the number of pigs was 1,920 and expected to reach 2,200 in 2014. Moreover, poultry is projected to increase from 14,700 heads in 2013 to 17,000 heads in 2014. The demand for meat in the daily diet is increasing and livestock production therefore promoted. Few households, however, can afford livestock production, even in a small scale. Only small credit schemes are available via AgriBank, Viet Nam Bank for Social policies and Co-operative Bank.

*Table 7. Economic importance of top-ten crops ranked by Ky Son commune leaders in 2013. Arrows indicating projected trends towards 2030s*

<b>Perennial species</b>	<b>Annual crops</b>
Acacia ↓	Peanut ↑
Tea ↑	Cassava ↓
Black pepper ↑	Rice ↑
Agarwood ↑	Soybean ↓
	Maize ↓
	Sesame ↑

Source: Land use planning workshop, 2013

Farmers sell fresh agricultural products at the local markets in Ky Son or Ky Lam about 10km from My Loi center. For peanut and forest products, traders buy directly in the field during harvest time or at the farm-gate immediately after harvest or slightly thereafter. For cassava, villagers sell directly to VEDAN factory. As the sole buyer of cassava, VEDAN has market power to set the price.

About 80 My Loi villagers have temporary or permanent off-farm jobs, especially in education, services and construction. My Loi has 20 teachers for kindergarten, primary and secondary schools. In addition the village has about 10 villagers in the staff of Ky Son Commune People Committee. There are 36 households running restaurants located along the national road, while 12 villagers work fulltime as carpenters. About 15-20 households have at least one family member who works abroad.

### **3.6 FOOD SECURITY STATUS AND TRENDS**

At the province level, rice production is deemed to be sufficient. In 2013, rice production was 479,000 tons. This is equivalent to production per person of 380kg. This per capita rice production has been stable since 2009.

Ky Anh district has two types of food security issues: (i) associated with poverty and malnutrition; (ii) temporary due to natural disasters. The share of malnourished children in the commune was 14% among children under 2-year olds and 18% among children under 5-year olds.

Ky Son commune produced, on average, 100kg rice/person<sup>2</sup> in 2013; the production of rice and peanut generated about 180kg/person and all staple food (including cassava, rice and peanut) gave 1,450kg/person. This, however, was unrealistically high as the cassava is primarily for industrial use. This can be compared with My Loi village, which produced, on average, 45kg rice/person/year; deemed sufficient for about six months. The lack of irrigated paddy fields mean that My Loi has developed a diverse livelihood portfolio consisting of, for example, cassava, peanut, cattle, pigs, orange, tea, black pepper, and aquilegia.

Several points of importance to household food security and potential vulnerability to natural disasters were noted. Firstly, the household survey conducted in Ky Son commune in 2013 highlighted that only 7% of the interviewed households were classified as “poor” based on government standards (the official figures are 45% poor and near-poor). Most, however, (89%) were indebted to make investments in livestock, housing, repairing after natural disasters (n=190) (Simelton et al., 2013). Secondly, the small area of rice fields (less than 10ha in My Loi) means that households depend on purchased rice and may reduce the intake of nutritious and diverse food stuff. High poverty rates (27% below poverty in My Loi) and dependence on purchased food, may explain the high number of malnourished children.

In My Loi village the major threats to food security are periodical flooding and typhoons when planted crop and/or stocks get damaged and road networks are cut off. During the two most recent major occasions of food insecurity in 2007 and 2011, villagers depended on food aid provided by Red Cross.

### 3.7 HAZARDS AND VULNERABILITY

A number of hazards have been experienced in Ha Tinh province. These are storms, Laos wind, droughts, floods, landslides.

#### 3.7.1 Storm

Wind speeds range, on average, between 1.5 and 2.5m/s; the strongest winds reach some 40m/s, speeds up to 48m/s have been recorded. About one storm and synoptically active inter-tropical convergence zone occur at the end of the season, lasting to the early winter causing heavy continuous or intermittent rains. The rains and storm frequency increase towards the end of the autumn, with risk of typhoons causing heavy rains and flash floods (ISPONRE 2009). Over the past 50 years, 18 of 47 storms hitting the north central coast hit Ha Tinh province. The peak storm period is August and September (54%), followed by July and October and associated with heavy rainfall, strong winds and coastal inundation due to high waves, and coastal landslides leading to damage on buildings and infrastructure. Between years 2000 and 2008, the province’s economic loss from tropical cyclones was estimated at VND2.7 billion (US\$150 million) for infrastructure damage alone (ISPONRE 2009).

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2 The WFP estimates 180 kg rice/capita/year for two meals per day. According to Timmer (2010) in 2007 it was estimated that Vietnamese consumed 59% of the total calorie intake (2816 kcal) from rice <http://www.adb.org/sites/default/files/publication/28552/adb-wp15-rice-food-security.pdf> (p10); 100g raw (cooked) white rice has about 350 (130) kcal <http://calorielab.com/foods/rice/21>

As results of focus group discussions conducted in 2012 (Table 3) (Simelton et al. 2012) and adaptation - Finding trees and crop that can stand the storm, flood and drought in Luc Yen District, Yen Bai province and Ky Anh District, Ha Tinh province, eight of nine groups in Ky Anh district said two worst years were (i) 1990 with heavy storm and flooding. The sea water entered the fields destroying crops and preventing the subsequent crop season, and (ii) 2007 in the upland area of Ky Son district where flashfloods, crop failures and animal diseases occurred.

Table 8: Climate and natural hazard calendar of Ky Anh, Ha Tinh

Season	Spring			Summer			Autumn			Winter		
Month	1/Feb	2/Mar	3/Apr	4/May	5/June	6/Jul	7/Aug	8/Sep	9/Oct	10/Nov	11/Dec	12/Jan
Rain	DRIZZLE					Early	HEAVY FREQUENT				DRIZZLE	
Temperature	COLD			HOT	MAX (41°C)		HOT				MIN (6-7°C)	
Wind					LAO WIND			TYPHOON			NE WINDS	
Salt	air			water						air	air	
Hazard risk				Drought, Hot spell				Flood, storm			Cold spell	

Source: Simelton et al. (2012)

### 3.7.2 Dry and hot westerly winds (Laos wind)

A Foehn is a type of dry, warm, down-slope wind that occurs in the *lee* (downwind side) of the mountain range bordering to Laos, hence called Lao winds. The winds occur in February/March until August/September with the peak period in June and July, between a short flooding period and the rainy season. The timing typically coincides with Nghe An and Thanh Hoa provinces and comes earlier than in Quang Binh, Quang Tri and Thua Thien Hue.

Annually Ha Tinh reports about 15-22 events of Lao wind, which last between 1 and 14 days. The province has, on average, 30-40 dry hot days every year with the highest frequency in Huong Son and Vu Quang districts (this is more frequent than in Thanh, similar to Nghe An and Quang Binh and less frequent than Quang Tri and Thua Thien Hue). Dry hot westerly winds play a key role in causing drought conditions and water shortage, which seriously affect the growth of many plants, especially rice.

### 3.7.3 Droughts

There are meteorological, agronomic and hydrological/technical droughts and the difference is often not clarified. Droughts can appear from February to August, often in association with dry hot winds. The chances for droughts is <5% in February; 5-25% between March and May; 15-60% in June and July and <30% in August (ISPONRE 2009). Typical for the North Central region, summer droughts and rainfall deficiency cause serious setbacks for agriculture, and are accompanied by saline water intrusion along rivers on the coastal plains. In the past, Ky Anh district faced serious droughts in 1988, 1996, 2007 and 2012 (Simelton et al. 2012).



Table 9. Timeline of hazards in nine villages in Ky Anh district, Ha Tinh province

Year	Events
1964	Storm with flooding *
1972	Storm (3)* with flooding
1978	Storm
1982	Cold spell
1985	Heavy rain with flooding
1987	Cold spell
1988	Drought (2) *
1989	Flood *
1990	Storm (4) ** with flooding
1992	Storm with flooding
1993	Storm
1996	Drought
1997	Storm with flooding
1998	Storm with flooding (2)*, hail stones
2004	Temperature increase
2005	Temperature increase, hot spell, cold spell
2007	Rain (1), storm (4) with flooding (2) **, drought
2008	Cold spell (2), flooding (2)
2010	Acid rain with hail stone; early rain; hot spell (2); cold spell (2)
2011	Long-lasting rainfall (2); cold spell
2012	Drought; hot spell (2); early lao wind

Number in brackets indicate the number of villages that identified the hazard; the asterisk (\*) indicates the worst hazard in terms of impact and/or strength identified by the groups (Simelton et al. 2012).

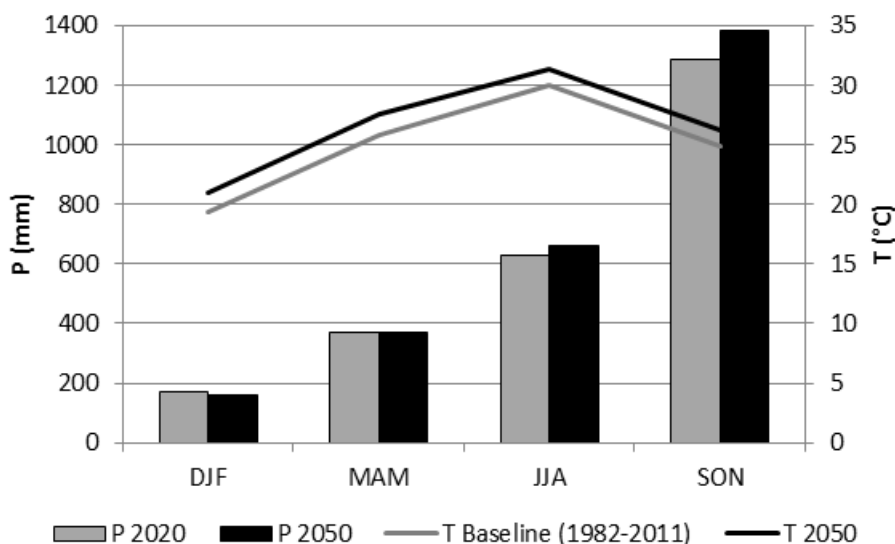


Figure 6. Climate change scenarios for Huong Khe seasonal total rainfall (mm) developed based on scenarios by Nguyen Van Thang and Hoang Duc Cuong, IMHEN Viet Nam



### **3.7.4 Heavy rains, floods**

The flood season usually begins in August and occurs most frequently in September, October and November. According to ISPONRE (2009), rainfall of >300mm in one day was recorded 15 times in Ha Tinh city and 17 times in Ky Anh district between 1958 and 2007. Over the same period, Ha Tinh City (Ky Anh district) reported 14 (17) times with monthly total rainfall >1,000mm, 4 (7) times >1,500mm, once >2,000mm, 13 (20) times >3,000mm and once > 4,000mm (ISPONRE 2009).

On average, there are two floods each year, which cause serious loss to the economic activity and human lives. The FGD participants in Ky Anh district identified the worst floods happened in in 1964, 1972, 1985, 1990, 1992, 1997 1998, 2007 and 2008 (Table 9) (Simelton et al. 2012).

### **3.7.5 Future climate scenarios**

Climate scenarios are available from IMHEN for different socioeconomic development scenarios. The main projected trends are more extreme events, especially drier springs and more intense rainfall in the autumn, combined with tropical storms.

## **3.8 MITIGATION MEASURES**

Ha Tinh is exposed to a number of extreme weather events, such as storms and typhoons, hot dry westerly winds, floods, landslides, and occasional cold spells, which are difficult to adapt to and are likely to have serious impacts on agriculture, fisheries, forestry, biodiversity, water resources, and other economic sectors. The province has issued documents to respond to climate change mainly focusing on adaptation, including:

- Directive No. 16/2010/CT-UBND issued by Ha Tinh PPC on 21 September 2010 in response to climate change
- Decision No. 275/QĐ-UBND issued by Ha Tinh PPC dated on 26 January 2011 on approval to establish the Provincial Steering Management Board to implement the National Target Program on Climate Change.
- Decision No. 2313/QĐ-UBND dated on 14 July 2011 issued by Ha Tinh PPC on approval of the Action Plan to respond to climate change for the period of 2011-2015, Vision for 2020.
- Action Program No. 963-CTr/TU issued on 19 August, 2013 to implement Resolution No. 24/NQ-TW dated on 03 June 2013 of National Congress VII of Central Communist Party Committee (Term XI) to respond to climate change, enhance natural resource management and environment protection, reduce greenhouse gas emissions and prevent extreme weather events.
- Plan No. 45/KH-UBND issued by Ha Tinh PPC on 12 February 2014 to implement Action Program No. 963-CTr/TU dated on 19 August 2013 issued by Ha Tinh Communist Party Committee. It instructs on how to implement the Action Plan and Decision No. 2313/QĐ-UBND dated on 14 July 2011 issued by Ha Tinh PPC approving Action Plan to respond to climate change in the period of 2011-2015, vision to 2020.

Consequently, some projects aiming to mitigate the impacts of climate change and reduce disaster risk implemented in the province include:

- Recover and manage 6,289ha protection forest in 14 communes in Cam Xuyen, Thach Ha, Hong Linh and Huong Son communes between 2012 and 2021, VND196 billion funded by JICA
- Prevent and mitigate climate change impacts for road infrastructure in Ha Tinh
- Forest plantation and protection of forests in upstream of Ngan Pho river
- Afforestation, reforestation and protection of coastal forest to mitigate climate change impacts in Nghi Xuan, Cam Xuyen and Ky Anh districts<sup>3</sup>
- Plant trees to protect Hoi Thong dikes, Nghi Xuan district, Ha Tinh province, funded by the Central Government<sup>4</sup>
- Integrated water management and urban development in the climate change context in Ha Tinh province (IWMC Ha Tinh) between 2013 and 2018, 8.8 million Euro funded by the Government of Belgium<sup>5</sup>
- Improving community adaptive capacity and response to climate change in Ha Tinh province, 2014 to September 2016, funded by APHEDA with AUD 90000 (VND1.76 billion). The project will conduct media and awareness raising activities on environmental protection and climate change for selected groups and vulnerable coastal communities, strengthening forecasting and climate impact warning. It will also focus on solutions for mining and rational use of natural resources through coordinating specialized agencies and community groups<sup>6</sup>
- The Climate-smart, Tree-based, Co-investment in Adaptation and Mitigation in Asia (Smart Tree-Invest) funded by the International Fund for Agricultural Development (IFAD) and the CGIAR Research Program on Forests, Trees and Agroforestry. The three-year project (2014-2017) is implemented by ICRAF in Huong Khe district, Ha Tinh and Tuyen Hoa, Quang Binh. The project aims to improve the livelihoods and resilience of smallholder farmers in the face of climate change, focusing on Improving farming practices for farmers and finding co-investment in the environmental services they provide. Activities may include carbon funding (mitigation) through REDD+<sup>7</sup>

The FGD participants were unaware of any mitigation measures either at the commune or district levels. Meanwhile, there are several local projects focused on disaster risk reduction. These include:

- Upgrading of the dike site in Loc Ha district from Km3+00 to Km11+105 in Thach Bang commune and Think Loc (a part of SP-RCC) with a total investment of VND312 billion approved by the Prime Minister as Document No. 1443/TTg-QHQT issued on 19 September 2012; and Ha Tinh PPC as Document No. 2088/QĐ-UBND issued on 23 July 2012
- “Live with floods” project in the Vu Quang district, approved by the Prime Minister as Document No. 1443/TTg-QHQT issued on 19 September 2012 with total investment of VND 238 billion, awaiting funding sources
- Upgrading of dikes in Thach Hai commune, Thach Ha district, Duc Tho district (La river) and Huong Son district (Ngan Pho)

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3 Document No.3201/UBND-NLNL1 dated on 06 September 2013, propose project “Afforestation, reforestation and protection coastal forest to mitigate climate change impacts in Nghi Xuan, Cam Xuyen and Ky Anh districts”

4 Decision 3590/QĐQĐ-UBND issued on 14/11/2013

5 Decision 2287/QĐ-UBND issued on 26/7/2013

6 <http://www.talkvietnam.com/2014/11/australia-supports-ha-tinh-to-enhance-climate-change-adaptation/>.

7 <http://www.worldagroforestrycentre.org/vi/node/4843>

- Central region urban environmental improvement project in Ha Tinh, funded by Asia Development Bank. Phase 1 was implemented between 2004 and 2011, and preparations are made for Phase 2 between 2014 and 2019.

### 3.9 CLIMATE CHANGE PERCEPTION

The authorities in Ha Tinh are aware that climate change have significant impacts in the province and have called for support from international and national agencies, such as Oxfam Belgium, ISPONRE, and the MONITOR group. For legal documents, see the chapter Mitigation Measures above.

In My Loi village, most of the interviewed participants noted variable weather patterns, increased temperatures, changing rainfall patterns, seasonal changes, and more intense or frequent weather extreme events that they believed were associated with climate change. Although My Loi is in the uplands some farmers, when visiting the coastal areas have noted rising sea levels. The villagers said there have been few initiatives relating to climate change, mitigation and adaptation for agriculture implemented in the village. Concrete farming activities include changing farming calendars and short-term duration seedlings. Figure 10 shows specifically that the majority of the male and female FGD participants conducted during the Village Baseline Study has observed events or phenomenon such as increasing temperatures, increase rainfall, drought, more frequent and intense storms and floods, change in types of vegetation, and poor harvests. They do think that they are the consequences of climate change; and they also worry for their family (or country) because of those events.

### 3.10 INSTITUTIONAL LANDSCAPE AND GOVERNANCE

The Directive No. 16/2010/CT-UBND issued by Ha Tinh Provincial People's Committee on 21 September 2010 to respond to climate change indicates the roles and responsibilities of each department under Ha Tinh PPC management. All departments are requested to assess the climate change impacts and integrate adaptation activities into respective annual action plans.

- The Provincial Steering Management Board implements the National Target Program on Climate Change and is responsible for coordinating activities to respond to climate change in the whole province;
- Ha Tinh Department of Natural Resources Management is responsible for the Action Plan to respond to climate change for Ha Tinh and assessing impacts of climate change and sea level rise in province-wide;
- Ha Tinh Department of Agriculture and Rural Development makes an Action Plan of agriculture, forestry and aquaculture in response to climate change;
- Ha Tinh Department of Construction climate-proofs the plans for housing, urban area, industrial zone and tourism;
- Ha Tinh Department of Planning and Investment integrates climate change in projects, programs, and socioeconomic plans;
- Ha Tinh Department of Science and Technology develops policies to encourage clean and environmentally sustainable technologies;
- Ha Tinh Department of Education and Training integrates climate change in teaching programs;
- Ha Tinh Department of Culture, Sport and Tourism instructs Ha Tinh Television, Ha Tinh Newspaper broadcasts climate change information;
- Ha Tinh Hydro Meteorological Center monitors, measures and collects weather observation data.

The lowest administrative level in Vietnam is a commune. Ky Son is one of 32 communes and town of Ky Anh district; it is divided into 9 villages. Each village has a village leader and a secretary of the Communist party at village level.

In Ky Son commune, People's Committee is the most important actor between the community and other organizations in implementing and monitoring plans, programs, projects and activities in general. The PC implements policies and strategies through the village leaders and civil social organizations including Women's Union, the Youth Union, Farmers' Union, The Elderly's Association, and the Veterans' Association. Youth Union assists villagers during natural disasters while Women's Union organizes micro-finance schemes for women. The PC also has commune extension, which is under supervision of Ky Anh DARD. The commune extension advises CPC on extension activities, technology, market information and price while Farmer's Union protects farmers' rights. However, in the case of Ky Son, the commune extension officer also functions as vice-chairman of Farmers' Union. Therefore, the role of Farmers' Union is more visible than the role of commune extension in Ky Son and My Loi. In addition, Women's Union and Farmers' Union are particularly active and often selected as the focal point for implementation of activities, training and farmer visits, or providing agricultural inputs in Ky Son commune.

### 3.11 NATURAL RESOURCE MANAGEMENT INITIATIVES

A number of legal documents have been issued in order to manage natural resources effectively in order to respond to climate change (see Section 3.8 on Mitigation). The *Master plan on socioeconomic development of Ha Tinh province through 2020, with a vision to 2050* (Monitor, 2011) proposes a number of criteria for environmental protection and nature resource management:

- Control natural resources (e.g., land, groundwater sources, minerals, forestry and sea resources) exploitation.
- Increase in forest covers from 54% in 2015 to 56% by 2020.
- Complete Ngan Truoi-Cam Trang irrigation system; improve water management and irrigation systems through completion of Ngan Truoi-Cam Trang irrigation system and upgrading of La Giang dike, Do Diem sluice and Nghen river canal system. Upgrade medium- and small-sized irrigation systems and fortify intra-field canals in 85% of agricultural area by 2020.
- Strengthen river and sea dike systems to prevent riverbank and coastal landslides.
- Improve safe fresh water sources and toilets. By 2015, all urban households and 95% of the rural households, aiming to reach 100% by 2020. Furthermore, by 2015, household solid waste will be collected in all urban areas and in 60% of rural areas. All sewage and solid waste from medical centers, 60% of industrial solid waste and all garbage will be collected and treated by 2020. Industrial parks will have sewage treatment systems by 2020.
- Develop the capacity of government staff at different levels on disaster risk prevention and responses. Focus the projects on environmental protection, such as reducing pollution in key production zones, controlling environmental degradation and protecting biodiversity.

## 3.12 ORGANIZATIONAL LANDSCAPE

### 3.12.1 Organizations

Ten organizations consisting of private organizations and government agencies were identified present at Ha Tinh province Ky Anh District, and Ky Son commune (Table 10). Among these, 4 have activities related to natural resource management, 8 to food security, disaster risk response and prevention, and in 6 to climate change adaptation and mitigation activities. One, a private organization, has no activities related to any of the three desirable goals. Organizations were not directly involved in any of the activities.

#### ***On natural resources management***

At the province level, the Department of Natural Resources and Environment (DONRE) is responsible for managing minerals and natural water resources (including rivers and lakes). The Department of Agriculture and Rural Development (DARD) provides services and information related to irrigation systems (including reservoirs and dams).

At the district level, natural resource management is listed as a main function of Ky Anh DONRE in cooperation with (i) Ky Anh DARD on the design and implementation of plans for agricultural production on water resources for irrigation and land use; and with (ii) Ky Anh Forest Rangers, Ky Anh Protective Forest Management Board and People's Committee for the implementation of forest and forest land allocation policy.

At the commune level, Ky Son Communes People's Committee (CPC) is responsible for managing and monitoring minerals as sand and rock mining for construction and issuing certificates for felling planted forest trees (e.g., acacia and cajuput).

#### ***On food security, disaster risk response and prevention***

Ha Tinh Farmers' Union has activities from province to village levels to inform farmers about crop calendars and shorter-duration varieties. They conduct experiments on alternative crops or varieties that are suitable to the local climatic conditions, in particular adjusting the farming calendar to avoid natural hazards. Locally, Ky Son commune level Farmers' Union together with agricultural extensions provides information on extreme weather events (especially hot and cold spells). They also support seed selection, use of fertilizers and cattle production. Staff participates in recovery efforts after extreme weather events and reports losses for compensation purposes. Early warning systems are in place through the Committee for Storm and Flood Control and village loudspeaker system, which are managed through Ky Son CPC. In addition, Ky Son Medical Centre informs other organizations such as the Red Cross and distributes disinfectants used to clean fresh water sources (e.g. wells) after floods.

At the district level, Ky Anh DARD advises farmers to use shorter-duration varieties (shifting rice varieties from 120 days to 100 days maturity). It also provides seeds and training on agricultural techniques as well as guidelines on compensation for crop failures related to natural disasters.

### **On activities related to climate change**

Overall, the activities related to climate change among the organizations are few and simple. These activities were dissemination of information about climate change and for enhancing adaptation and mitigation. The activities also include the establishment of a farmers' club for environment and forest plantation and protection. Information is given through a loudspeaker system. Adaptation actions were primarily addressed through advice on adjusted farming calendars and crop selection.

Natural resource management activities were often mentioned as related to climate change, although they did not seem to be primarily implemented for those reasons. Mitigation activities were largely limited to afforestation but not linked with carbon finance schemes, such as Reducing Emissions from Deforestation and Forest Degradation (REDD).

*Table 10. Key activities and organizations related to natural resources management, food security and climate stress*

<b>Organization</b>	<b>Natural resource management activity</b>	<b>Food security; disaster risk response and prevention</b>	<b>Activities related to climate change adaptation and mitigation</b>
Ha Tinh DARD	Guide farmers on sustainable management and use of natural resources	Advice on minimizing crop damage due to weather impacts	Responsible for managing land use, water sources, mineral exploitation and environment, meteorology and hydrology
Provincial Farmers' Union	None	Collect donations to help poor farmers repair houses after natural disasters	Raise awareness of farmers about the environment and natural resources management; Support farmers' club on environment and natural resources conservation
Vietnam Bank for Social Policies- district branch	None	None	Provides loans for afforestation
Ky Anh DARD	Protect forests Prevent forest fires	Advise farmers on short-term varieties; Provides annual agro-climatic farming calendar	Provide seedlings for forest plantation (acacia and cajuput)
Ky Anh DoNRE	Manage minerals, water resources and land use	None	Cooperate with Ky Anh Forest Ranger, Protective Forest Management Board and Commune People Committee to implement the forest and forest land allocation policy management
Commune Farmers' Union	Provide training for villagers on Land use policy and Forest protection	Participate in recovery after natural disasters; Advise farmers on farming calendar; Early warning on hot and cold spells	Inform farmers about climate change; Connect farmers with scientists, governments and agribusiness

Organization	Natural resource management activity	Food security; disaster risk response and prevention	Activities related to climate change adaptation and mitigation
Co-operative Bank-commune branch	None	Provide loans to recover production after natural disasters	None
Commune Women's Union	None	Provide loans to members (women only)	None
Ky Son commune Medical Centre	None	Staff trained in basic emergency care; Centre open during storm/flood events with mobile staff	None
Ha Tinh Tapioca Starch Processing Factory (VEDAN)	None	None	None

### 3.12.2 Stakeholders

Vietnam's political administration consists of two parallel systems: People's Committee (PC) under the Party and departments under a Ministry of the Government, e.g. MARD and MONRE. Both systems are represented at the provincial, district and commune levels outlined in Figure 6. MARD is responsible for agricultural affairs nationwide. MARD has one department for agriculture and one for forestry (VNFOREST). The main roles of MONRE are (1) to allocate forest and agriculture land and (2) to distribute weather forecasts.

The PC, Prime Minister and Ministries have jurisdictional power. The province level authorities have some capacity to refine policies with province-level adjustments, e.g. compensation rates, specifying geographical areas for implementation.

Of particular relevance for the CSV-work in My Loi is the civil society organizations that report to the People's Committee such as the Farmers' Union (FU), Women's Union, and the Youth Union. It is important to note that the extension service reports to DARD, while FU reports to PC. The FU in Ha Tinh is stronger than in many other provinces. Some FU-leaders claim that FU was established early and has been successful in receiving project funds for developing Farmer Field Schools and demonstration models, and demonstrating results. The stakeholders related to agriculture, forestry and climate change mitigation and adaptation activities in Ha Tinh and My Loi village could be grouped as follows:

- *Government:* The People's Committees at the provincial, district and commune levels are responsible for the general administration. Their role is to disseminate information and implement policies, regulations and programs via its specific departments. In My Loi, Ky Son Commune PC is responsible for activities related to agricultural production, forestry and socioeconomic development. Support programs and activities are reported to and supervised by the commune PC.
- *Department of Agriculture and Rural Development* at provincial and district levels acts as a focal point for implementing projects related to agriculture, forestry and natural resource management.
- *Social Organizations*, include Women's Union (WU), FU, Youth Union (YU), Elder Association and Veteran Association. The WU and FU protect the rights of women and farmers respectively, in the whole province and disseminate information and policies from Communist Party and Government to its members.



The YU protects youth rights and may provide emergency help during natural disasters. The Veteran Association is responsible for reuniting and supporting former soldiers.

- *NGOs:* At the time of writing this report, there were no other NGOs operating in My Loi except for ICRAF. From 2003 to 2010, the Community-Based Rural Infrastructure Project (CBRIP), funded by the World Bank, was commissioned to build a culture (community) houses in Ky Son commune including My Loi.
- *Private sector:* There are few private actors in the village. Most importantly, middlemen or women link farmers' production with markets outside the village. Generally, farmers perceive that they are at a disadvantage in this relationship because they are being less aware about prices. Ky Son in general and My Loi in particular has advantages (i.e., soil type and farming practices) in terms of peanut production, and both state-owned and private companies such as MITRACO are expressing interest in establishing partnerships for sustainable peanut production.

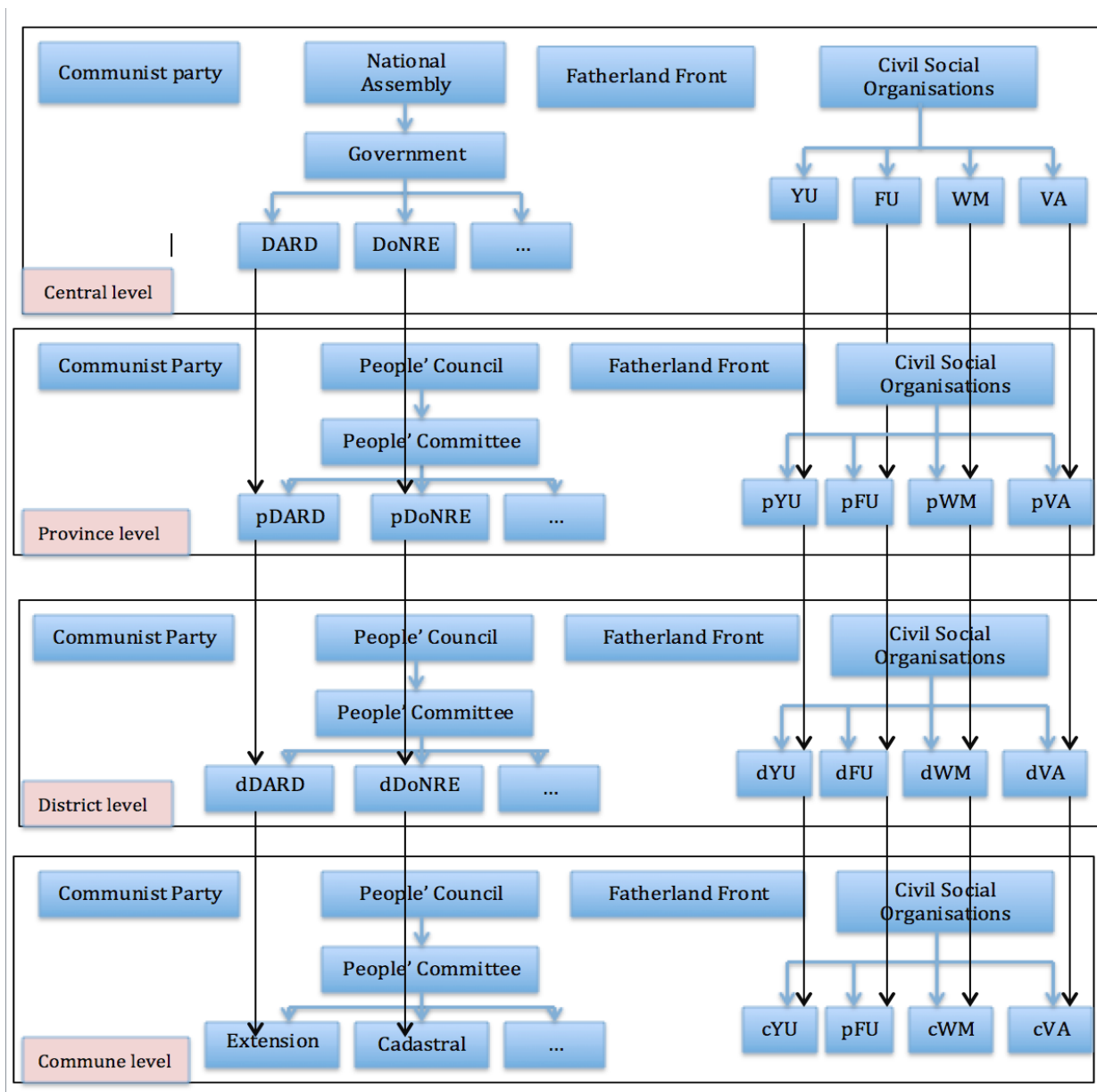


Figure 7: Vietnam's political administration from the central to commune levels



### **3.13 INFORMATION NETWORK**

#### ***3.13.1 In Ha Tinh Province and Ky Anh District***

At the district level, broadcast communication networks include 13 FM radio stations and one television station. By 2010, 244 of 262 communes in Ha Tinh had television reception. Print media include 7 national newspapers with representative offices in Ha Tinh (including Rural nowadays and Rural Economics Newspapers), 13 newspapers with correspondents, and 9 newspapers with activities in the province (Monitor Group 2011).

All major telecommunication companies, including Viettel, Vinaphone and Mobifone, have telecommunication masts in residential areas in the province. In 2013, there were 151,000 telephone subscribers: 103,000 mobile phone users and 48,000 landline phone users. Between 2009 and 2013, the number of landline subscriptions dropped from 155,000 to 48,000 subscribers while the number mobile phone users almost doubled (Ha Tinh GSO 2013).

Despite a wide-ranging Internet connectivity, only 30,800 were internet subscribers in the province in 2013 (Ha Tinh GSO 2013). This comprise about 2.5% of the provincial population, which is much below the national average (Monitor Group 2011). Relatively expensive computers could be one reason for this low demand.

Based on the Ha Tinh Master Plan, communication networks will be upgraded targeting - the installation of optical cable networks in urban centers by 2020: Vung Ang economic zone, Cau Treo international border-gate economic zone, tourist zones and industrial parks. The improvement in communication infrastructure is expected to attract investors and tourists and the general public.

#### ***3.13.2 In My Loi village***

My Loi villagers have several sources of local climatic information. The National Center for Hydro-meteorological Forecasting (MoNRE) has a network of hydro meteorological stations across the country, including 74 automatic weather stations, 168 manual meteorological station, 29 agro-meteorological stations and 231 hydrological stations. The Department of Natural Resource and Environment at the provincial level is responsible for interpreting those forecasts into daily or seasonal weather forecasts broadcast on television or radio; or provide data to DARD in order to produce an agricultural bulletin. The Agricultural bulletin reaches villagers through district and commune DARD and village leader. The weather information also distributed through an extensive network of wireless and non-wireless loudspeakers in each village

The Farmers' Union provides climate information via its departments in province, district and commune levels. Furthermore, farmers access information via their community groups through meetings, from markets and middlemen and women. Figure 7 illustrates the distribution channels for local climatic condition to My Loi village.

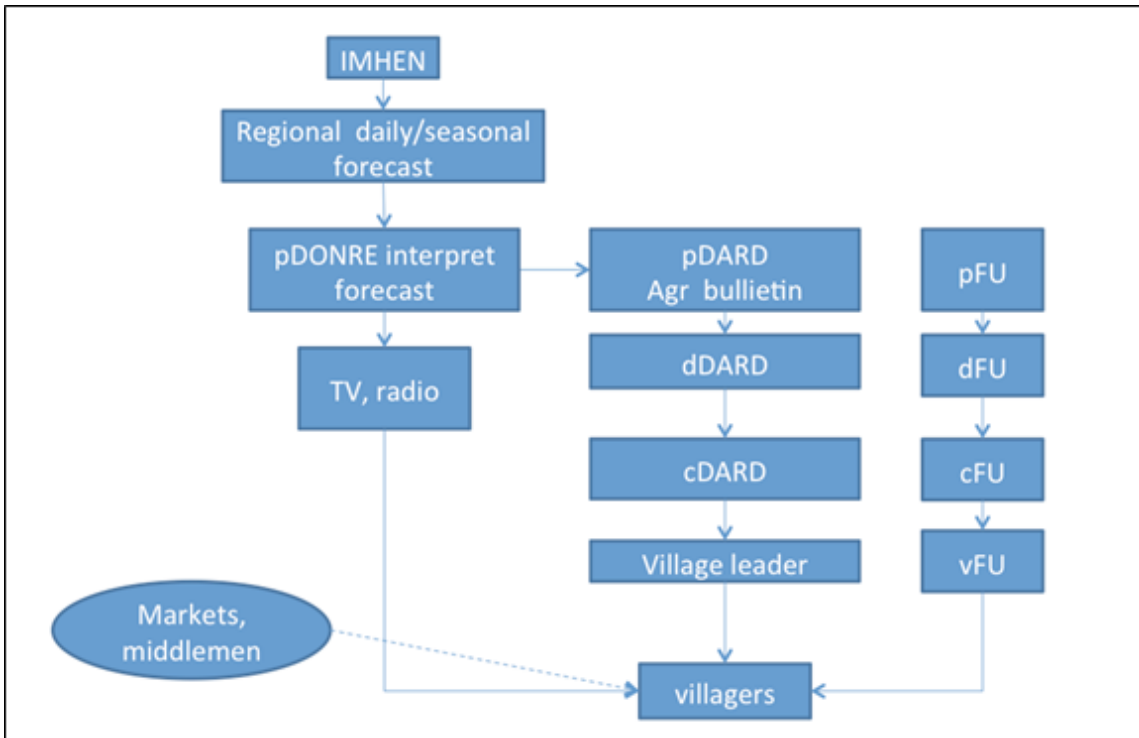


Figure 8. Structure of local climate information sources

My Loi village is connected to Viettel and Vinaphone telecommunication masts. About 95% of the villagers have access to a mobile phone, while few have smartphones. According to the FGD participants, mobile phones are the most frequently used and trusted means to obtain information. For example, it is commonly used for calls or sending messages to middlemen/women for agricultural inputs and prices. Farmers also use mobile phones to seek weather information and technical support.

Computers and internet access are limited to teachers and government officials. Farmers cannot afford to buy computers and lack computer skills.

Television is common among households (approximately 95%). People watch programs related to weather and agricultural technical support. For example, “Be farmers’ friends” on VTV2 provides information about weather, regionally suitable crops and demonstration models. Weather forecast updates are provided on VTV1 news. Radio is not common, and limited to men working in the forests or to elderly with poor eyesight. Newspapers are also not common. Both male and female FGD-participants stated that they rarely read newspapers, as they only are available in Ky Son CPC office.

Public loudspeakers exist in each village. Government announcements and weather forecasts for agricultural production are broadcasted daily using the public loudspeakers. Village leaders play important roles in providing information and feedback between villagers and commune leaders. This is a low cost way of providing information to the villagers with the village leaders playing an important role.

Currently no organization provides information to farmers about market prices or farm outputs.

### 3.14 SOCIAL AND GENDER DIFFERENTIATION

Viet Nam has several policies and programs implemented to protect and recognize the rights of women and promoting women's empowerment. During the FGDs in My Loi, both men and women-participants stated that women and men have equal voice in public and for decision making related to agricultural production such as planting and harvesting crops, selling of products, and developing new farming systems.

Nevertheless, the FGD participants identified differentiated gender roles performed by men and women at home and at work, Women were identified to be responsible for housework, child minding and household and livelihood activities and the overall responsible for planting and animals. Men were seen as primarily responsible for land preparation (i.e. ploughing) and transporting timber from the forests to a collection point. Men most often attend meetings and go for temporary off-farm jobs such as in construction work.

In terms of awareness of climate change, the previous study found major differences, 1/3 of women and 2/3 of the men had heard about climate change in 2012. While many sources of information were similar, men more often listened to the radio and women more often got information via neighbor and the Women's Union.

### 3.15 HEALTH/NUTRITION PROFILES AND OTHER LIVELIHOOD OUTCOMES

#### 3.15.1 In Ha Tinh Province

Ha Tinh province has at least one medical center in each commune. By 2013, there were 381 health facilities in the province, including 262 medical service units in communes. The ratio of a health facility to population is 0.39 medical center/1000 inhabitants, which is more than twice the national average. Due to limited funds, more than 80% of the medical centers lack specialized facilities and equipment, and were understaffed. For example, the ratio of doctors in Ha Tinh was 0.6 per 1,000 inhabitants, slightly below the national average of 0.7 while the number of nurses was similar to the national average are 0.9 per 1000 inhabitants (Ha Tinh GSO 2013). The medical college in Ha Tinh cannot train sufficient number of doctors and nurses. The probability of those who study outside of the province to return is low. Meanwhile, the access to medical stations has resulted in good achievements in food safety, tuberculosis prevention, and health care programs for children and pregnant women. For example, in 2013 nearly 90% of children below 1-year-old were fully vaccinated (Ha Tinh GSO 2013). According to Ha Tinh Master Plan, the province plans to have 0.85 doctors per 1000 inhabitants. The malnutrition rate of children below five years old is targeted to 15% by 2015 and below 13% by 2020.

In 2011, 54% of the households had standardized toilets. There is a plan to increase this figure to 75% in 2015 and 100% by 2020. All urban households have access to clean water, and corresponding plans are 95% of rural households by 2015 and all households by 2020.

In terms of child care and education, the Master plan projects that by 2015, 80% of children aged <6 years go to preschools, all children will go to primary schools and lower secondary schools, and 90% will complete upper secondary education. For 2020, the plan states that all children will attend preschools

and all the facilities from preschools to upper secondary schools will meet national standards, compared to 75% of kindergartens, 100% of preschools, and 80% of lower secondary schools and upper secondary schools in 2015.

### **3.15.2 In My Loi village**

My Loi's medical center has 7 staff, including 1 doctor, 3 nurses, 1 physician and 1 midwife. The center meets the national standards for a commune medical center. It lacks, however, specialized facilities. Patients usually seek treatment in the district or Ha Tinh town. The center has provided regular health care programs for children, pregnant women and elderly such as vaccination. The malnutrition rate is 14% for two-year-old and 18% for five-year-olds. Common diseases are liver cancer, arthropathy, osteoarthropathy and seasonal diseases such as influenza, pneumonia and trachoma.

## 4. NEEDS ASSESSMENT

### **4.1 FACILITATING FACTORS**

The following are the facilitating factors relevant in transforming My Loi village into a climate smart village:

*Trademark agriculture products:* Ha Tinh province has a diverse portfolio of agricultural staple and high value products. In particular, the province is known for peanut cakes (cu do), which encourages smallholder peanut production. Meanwhile, the Phuc Trach pomelo trademark was registered in 2004, each tree can produce 800-1200 fruits, and is particularly suitable for Huong Khe district. Moreover, the Bu orange in Huong Son district is popular during Tet holiday and has rapidly increased in value. Lastly, the forested mountains offers a favorable environment for deer-keeping.

*Forest resources:* Ha Tinh has 365, 000 ha forestland, some parts are rich in indigenous species, including rare animals, which with the potential to increase when the forest resources are conserved and well-managed.

*Marine resources:* The 137 km long coastline offers a variety of seafood and potential for aquaculture development. In particular, Ky Anh district has a new harbor, which may offer opportunities for future agriculture and aquaculture exports, but can also make local production sensitive to cheaper food imports.

*Strong local partners and farmer associations:* The Farmers' Union is a strong link between policy makers and farmers with a Vocational Training School and several agriculture-forestry-livestock demonstration models for farmers. During the baseline studies, 24 local organizations related to in My Loi were identified.

*Policy framework:* The province leaders have made some basic climate change assessments to build on, intends to link New Rural Program (Nong Thon Moi) with Master Plans (IPSARD, 2009; Monitor 2011). Ha Tinh became a pilot "REDD+ province" in 2013, attracting international attention for reforestation interventions<sup>8</sup>.

*Infrastructure and connectivity:* The province is connected through the north-south highway and to Cambodia, harbor in Ky Anh and two national airports (Dong Hoi airport 85 km and Vinh airport 115 km to Ky Anh). Some local roads are still in poor condition.

*Tourism:* Tourist areas are mainly planned around the coast with sand beaches and Vu Quang and Ke Go National parks.

*Remittance:* Ha Tinh province has a high share of its population working abroad. This should potentially result in remittances being invested at home and skilled labor returning.

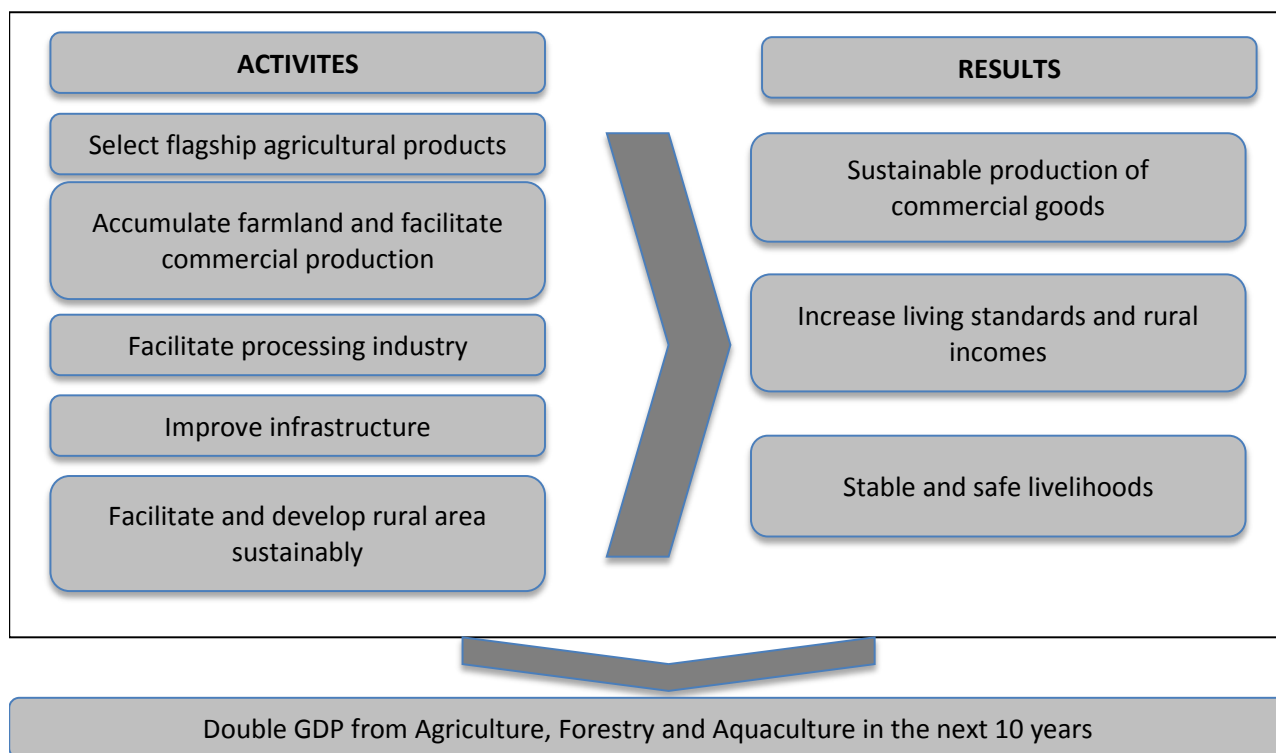
## 4.2 CHALLENGES

The main challenges faced by Ha Tinh province and My Loi villages are the following:

- *On climatic conditions:* A number of natural hazards are challenging the agricultural production in Ha Tinh. From March to August, hot and dry southwest winds (Laos winds) cause severe drought. From August to October tropical rainstorms are causing floods, landslides and storm fell, which disrupts infrastructure and causes major socioeconomic costs. Climate scenarios for Ha Tinh project an increase in seasonal variability and associated hazards such as heat waves and droughts, heavy rainfall and flooding, stronger cyclones and storm surges, and sea-level rise worsening coastal soils already affected by the saline water intrusion.
- *Soil quality:* Over 85% of Ha Tinh's total land area is unused or unsuitable for intensive agriculture production. Only 9% in the coastal area and 5% in the midland region are preferred for agricultural production (Monitor Group 2011). As result, much of the unproductive land is limited to crops that tolerate acid soils, in particular acacia and peanut (which both are leguminous and can contribute to soil fertility) and cassava, and increasingly for livestock.
- *Irrigation facilities:* Although there are over 345 lakes and reservoirs with a total water storage capacity of over 700 million cubic meters, less than 30% of the cultivated areas have irrigation systems.
- *Weak value chain:* According to surveys conducted by Monitor group in 2011, although the number of farms is rapidly declining, the remaining farms are generally small-scale and managed by households, which makes it difficult to access loans for investment or scaling up the production. On-farm and larger storage systems for agricultural products are of poor standard, which lowers the quality and value of rice, vegetable, peanut, meat and aquaculture products. Furthermore, the post-harvest production is poorly developed. For example, despite the diversity of fish and cassava, there are only two shrimp processing plants and one major cassava (MSG) factory in the province. The lack of competition reduces the prices of farmers.

## 4.3 PRIORITY NEEDS

According to the Master plan (Monitor, 2011), as a means to improve rural incomes the province aims to raise agriculture, forestry and aquaculture productivity through large-scale, hi-tech and sustainable commodity production. The reform process is illustrated in Figure 12. The plan is implemented between 2011 and 2015. The production of key agricultural products will be phased with new processing industries. During 2016 - 2020, the province aims to improve infrastructure for agricultural production such as irrigation systems, warehouses, fishing ports, fishing logistic service zones and storm shelters for fishing boats. If the province manages to attract external investment, the plan projects that by 2020; agriculture will contribute nearly VND30 billion to the province GDP.



Source: (Monitor, 2011)

Figure 9. Vision for agriculture in Ha Tinh

The province focuses on 13 key products that will lead the agricultural productivity, according to Decision No. 1373/QĐ-UBND issued on 19 May 2014 by Ha Tinh Province People’s Committee, for approving the project for reconstructing agriculture in Ha Tinh province<sup>9</sup>. Tables 11 and 12 show the priority products at province and district levels. They are high quality vegetable, Phuc Trach pomelo, high quality orange, green tea, deer, Cu đờ, planted forest’s products, pig, cattle, shrimp, rice and peanut. The priority classifications at district level depend primarily on soil and climatic conditions.

Table 11. Flagship agricultural products at the provincial and district levels

Flagship agricultural products	Product
Province level	Rice, peanut, pig, shrimp, timber
District level (first priority)	Orange, cattle, medical plants, tea, rubber, pomelo, vegetables, sweet potato, deer, aquaculture products e.g. white water fish
District level (second priority)	Bean, cassava, maize, bonsai; Duck, buffalo, chicken

Source: (Monitor Group 2011)

9 Decision No. 1373/QĐ-UBNDUBND issued on 19 May 2014 by Ha Tinh Provincial People’s Committee, approve the project of reconstructing agriculture in Ha Tinh province, forward to increase incremental value and develop sustainably, integrated with rural development

Table 12. Flagship agricultural products by district, Ha Tinh province, including Ky Anh district

District	Flagship agriculture products
Huong Son	Rubber, peanut, orange (especially Bu Orange), tea, medical plants, pig, cattle, deer, timber and maize
Duc Tho	Rice, peanut, vegetable, rubber, pig, cattle and white water fish
Vu Quang	Orange, rubber, peanut, tea, cattle, deer, timber, medical plants, bean
Nghi Xuan	Peanut, sweet potato, vegetable, cattle, pig, shrimp, aquaculture products
Can Loc	Rice, peanut, vegetable, orange, rubber, pig, cattle, deer, chicken, duck and aquaculture products
Ha Tinh city	Rice, vegetables, bonsai
Huong Khe	Orange, pomelo (Phuc Trach), peanut, tea, rubber, pig, rubber, cattle, deer, timber, medical plants, bean and maize
Thach Ha	Rice, rubber, vegetable, peanut, pig, cattle, deer, shrimp, timber, chicken and duck
Cam Xuyen	Rice, sweet potato, peanut, orange, rubber, vegetable, pig, cattle, deer, shirmp, timber, aquaculture products
Ky Anh	Rice, peanut, rubber, sweet potato, vegetable, tea, pig, cattle, timber, buffalo, cassava and aquaculture products
Loc Ha	Peanut, vegetable, pig, cattle, shrimp, buffalo and aquaculture products
Hong Linh	Rice

Source: Monitor (2011)

## 5. RECOMMENDATIONS

ISPONRE (2009) has suggested a number of strategies and measures to mitigate and adapt climate change in Ha Tinh province. The more concrete suggestions that are of particular relevance for the CSV are:

- Protection and special use forest. Evaluate forest-planning activities in the area, proposing long-term orientations and plans for development and protection suitable with Viet Nam strategy for forest protection. Special attention to watershed forests and protected forests in the coastal areas including Ky Anh district. Forest fire prevention.
- Production forest. Province plan includes 12,000ha of rubber and 42,000ha of eucalyptus and cajuput
- Uplands. Reforest thousands of hectares of bare soils and hills to plant fruit trees, medicinal tropical trees
- Integrated farming systems. Develop VAC-models (garden, pond, livestock)
- Local species conservation. Establish the cereal seed bank
- Water management. Experiments to improve irrigation and drainage (paddy fields). Build dams and water reservoirs to control floods and regulate water during drought, upgrade channels, water pumps. Timing of water management and drainage.
- Crop adaptation. Adapt crop schedules, irrigation and drainage activities to be suitable with climatic conditions. Test stress-tolerant seeds.
- Capacity building. Raise awareness about climate change and adaptation among farmers.
- Job creation. Alternative income sources during low season



### **Suggested interventions for CCAFS**

During the feedback meeting<sup>10</sup> for the Village Baseline Study<sup>11</sup> conducted in My Loi village, a group of village leaders said that in order to become a climate-smart village, it is important that the farmers are actually doing agriculture “smarter” than others before scaling out to other villages. This requires that 1) the CCAFS projects and their recommendations for land use and species are aligned with existing Master plans and land use plans, e.g. Decision 1373/QĐ-UBND of Ha Tinh People’s Committee of 19 May 2014 and New Rural Development (Nong Thon Moi) (from province to village level); and (2) CCAFs support training and information dissemination activities to organizations/agencies that effectively reach the farmers. For instance, CCAFS and its partners can support technical training via Farmers’ Association.

1. Below is a list of suggested areas of intervention for My Loi. The list was formed during consultations with the farmers (see Table 12) and local partner agencies. Information on how the Flagships plans to support the activity is added. Strengthen the capacity of the Farmers’ Association and DARD extension to reach farmers with information.
  - Capacity development of various local partners s will be covered in Flagships (FP) 1.1, 1.2 and 2.
  - Need to complement the existing training programs of the Flagships by establishing farmer field schools on nursery development, grafting, and tree domestication and agroforestry technologies and farm budgets. Possible collaboration with ICRAF projects AFLI and Smart-Tree Invest, courses may be organized by FU Vocational School.
  - Make an inventory of existing demonstration models and existing CS-technologies to derive variables for modelling integrated systems in support of land use planning using FALLOW/WANULCAS. Possible collaboration with Hue and Vinh universities can be explored.
2. Introduce climate-smart technologies. Priority activities for the farmers include the Identification of stress-tolerant varieties, shorter-term varieties or, drought tolerant varieties (especially peanut) and the development of water-harvesting techniques. Adjust farming calendar to avoid hot or cold spells during plant pollination stage, to reduce probability of crop failure and to spread harvest (FP1.1)
3. Experiment on agroforestry or intercropping systems to improve soil fertility, avoid soil erosion into the dams and reservoir and reduce wind damages on crops. Climate-smart agroforestry models that exchange 5-7 years cycles of monoculture acacia for selective or sequential cutting to more permanent tree-based systems should be explored. There are opportunities to explore the suitability of new perennial cash crops such as avocado. The proposed bamboo-plantation to reduce soil erosion from the sand mines should be monitored. CCAFS can investigate if planting trees and grass strips could help binding soil near the mines as well as providing animal feed. (FP1.1)
4. Training on nursery development and grafting techniques can help farmers start using their home gardens as experiment sites (FP1.1)

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10 Le VH, Duong MT and Simelton E (2015) Feedback seminar report for the Village Baseline Study in CCAFS Climate Smart Village in My Loi (Ha Tinh province, Viet Nam)

11 Le VH, Duong MT, Do TH, Le KH, Phan HL, Simelton E. 2015. Village Baseline Study – Site Analysis Report for My Loi, Ky Anh district, Ha Tinh province – Viet Nam (VN02) CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Copenhagen, Denmark. Available online at: [www.ccafs.cgiar.org](http://www.ccafs.cgiar.org)



5. Explore mixed reforestation stand in the 800 hectare of allocated forests, in which 200-300 ha will be to farmers in the village. Establish smallholder nurseries (within the framework of the land use planning and flagship crops).
6. Pay attention to water management issues. CCAFS may assist in identifying technical solutions such as local and district adaptive water management and land use planning (FP 1.2). Advice on water management may come from IWMI. Funds for irrigation channels may be from Nong Thon Moi.
7. Provide accurate weather information. Add information on adaptation options and water management (FP2).
8. Improve the value-chain of commodities. To build a sustainable partnership between farmers and agribusiness, the value-chain needs to be better understood. For example, are there small-scale post-harvest processing activities in the village or commune? Farmers want training on farm budgets and economic management. Farmers' Union offers such training courses.
9. Promote diversification. Once the dams are sufficiently upgraded some farmers have expressed an interest in cage-fish in the reservoir and nearby farmers are interested in grass-livestock and avocado. If the reservoir allow for more irrigation, what crops should the village invest in? More rice or higher value crops?
  - Cassava dominance and only one factory mean low prices for farmers. Ky Son farmers have asked for improved relationships with VEDAN with pricing, VEDAN has suggested they would like an extended timing of cassava harvest to have a more spread supply. Would that affect prices and farming calendars for farmers?
  - Water and air pollution issues from the VEDAN factory have some resemblance with those in cassava factories in Yen Bai climate-smart village. Possible solutions could be investigated jointly.
  - More information is needed on the potential to produce feed from cassava by-products. (FP1.1)
  - Overall, CCAFS could aim to help bridge farmers and agribusinesses, explore a more diverse portfolio of suitable crops and agroforestry systems. For example, Farmers' Union has an outlet in Ha Tinh where they sell farmers' products.
10. Improve and promote Food safety. There is no organization operating in promoting food and feed safety or environmental health issues. At the minimum, there should be , awareness raising activities at local markets and organizations that handles food. The CSV (CSV-fund)
11. Improve on nutrition. About 15% of children below five years' old are malnourished. The causes of malnutrition need to be understood. Is this related to lack of information, money spent on buying food (perhaps because the villagers are not self-sufficient in rice)?
12. Raise more livestock. The farmers would like to raise more livestock, in particular pigs, which could provide a more stable income throughout the year. There are already 19 farmers in the village who use household biogas systems.
  - Given the hot summers with maximum temperature exceeding 40 degrees, feasibility studies are necessary to ensure sufficient ventilation systems. Local veterinaries and ILRI may be advised for diseases.
  - CCAFS may play an important role in implementing waste management for bio-energy, small-scale compost production.

13. Promote gender equality. Provide equal opportunities for men and women to be partners in the development process. During the mapping exercises and organizational landscape activities, men were found to attend training more often than women, especially in forestry and water management. Women's access to training opportunities should be monitored, including offering training and project activities that do not cause additional burden to women's work (FP1.1, FP2).
14. Responsive CSV-management. The CSV Team will need to ensure they get regular updates on changes in policies (e.g. flagship crops), master plans and road quality as this will affect farmers' ability to reach markets. The CSV Team acknowledges that the number of flagship projects implemented in the village easily may overwhelm farmers, the interventions need to be coordinated not to overburden the farmers with contradictory ideas or time spent on answering various questionnaires, etc. (FP1.2, CSV-Team, Project Management Board).

The primary target groups for interventions would include ToT of educators at mass and civil society organizations, media, school teachers, extension, leaders at Peoples' Committee and departments of Agriculture and Rural Development as well as Natural Resources and Environment.

Table 13. Recommendations for major opportunities present in My Loi Village, Ha Tinh Province

<b>Gaps in knowledge/ current constraints that could provide opportunities/niches for CCAFS and partners</b>	<b>Opportunities for research (CCAFS)</b>	<b>Opportunities for Action Research (CCAFS partners)</b>	<b>Development Interventions (Partners)</b>
Suitable crop varieties (Drought-tolerant varieties, esp. peanut)		X	
Adapting farming calendar to avoid crop failure and spread harvest time (e.g. cassava)	X	X	X
Improved weather forecast	X	X	X
Enhance soil and water conservation		X	
Water harvesting methods and crop combinations for rainfed upland fields	X	X	
Water management and land use planning (i.e. specialized area for mass production of vegetable and fruit trees)	X		
Testing cage-fish in the reservoir		X	
Demonstration models for keeping livestock (cattle, pigs and chicken)	X	X	
Train staff from Ky Son Farmer' Association to deliver training on management of livestock diseases and food safety to farmers	X	X	
Introduce new higher value plants, e.g. macadamia, avocado, mandarin, custard apple		X	
Waste management for bio-energy, small scale compost production		X	
Range of products made from acacia (i.e. plywood)			X
Food and feed safety/Environmental health (i.e. pest monitoring, aflatoxin content in peanut and rice)		X	

## 6. CONCLUSIONS

My Loi village was chosen as a site for climate-smart village for its exposure to multiple extreme weather events (temperature and water stress, storm and typhoon) and potential for climate-smart solutions. Most households are dependent on agriculture, with cassava, peanuts and rice as main produce. The households are small landholders with limited access to resources to scale up production.

Aside from poor soil quality and inadequate irrigation facilities, a number of natural hazards are challenging agricultural production and food security. Reforestation has been the most common response to natural hazards. There seems to be little awareness of the potential impacts to crop production of progressing climate variability and change.

Most of the technical assistance from the government and a few other organizations in the area is directed towards increasing crop production and livelihood diversification with the promotion of livestock. The value chain of the commodities is very weak, with the farmers receiving low income from their produce. The CCAFS CSV projects therefore are a timely complement to help implement the action plans and policies in response to climate change.

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## ANNEX

### Guideline for desk review and key informant interview at provincial level

	<b>Topic</b>	<b>Key information needed</b>	<b>Suggested Method of Data Collection</b>
1	Natural Resource utilization	Availability, access, utilization and stability of natural resources Issues and actions (if any) being taken to address such issues; Drivers of change	Desk review
2	Organizational Landscape	Development partners/ organizations present in the area and their activities, particularly on climate change, agriculture , and food security	Desk Review
3	Information Network	Information available, shared Presence/operation of quad -media (radio, TV, print, internet) Projects conducted in the area	KI (Find a KI who is knowledgeable on this, probably the information officer of the province, or head of the office)
4	Mitigation Measures	Projects related to mitigation measures	Desk Review
5	Production and livelihood systems (including markets)	Major and minor livelihood strategies livelihood profiles and categories, levels poverty	Desk Review
6	Current and past NRM initiatives	Trends in changes in resource (land and water) use, pressures, forces driving the change in agriculture.	Desk Review, KI
7	Food security status and trends	Experience with food shortage Food security trend (10 years) Issues, drivers of change Past and current programs, projects and activities related to food security	Desk Review; KI
8	Demographics	Current Population, population density, Population trend, Population growth rate, drivers of change	Desk Review
9	Institutional landscape and Governance	Policies and other statutory issuances ; Local leadership and authority; historical trends; Issues, pressures, driving forces; interactions of institutions	Desk review
10	Social and Gender Differentiation	Distribution of benefits and burdens between men and women, households and other social division Access to education, health services, employment, and political position	Desk Review, KI
11	Hazards and vulnerability	History of natural disasters, shocks and stresses (what, year, impact, damage), Traditional coping strategies, Mechanisms normally available to target food assistance to the most vulnerable/ food insecure) during disasters Vulnerable population Vulnerable sectors	Desk Review

	<b>Topic</b>	<b>Key information needed</b>	<b>Suggested Method of Data Collection</b>
12	Local climatic information	Historical trend of rainfall, temperature pronounced seasons	Desk Review
13	Health/Nutrition Profiles and other Livelihood Outcomes	Health Indicators (mortality, morbidity, mental health) Nutrition indicators (undernutrition, stunting, wasting, etc) Projects on Health and nutrition (e.g. food supplementation, drinking water and sanitation, )	Desk Review