



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



SITUATION ANALYSIS AND NEEDS ASSESSMENT REPORT

MA VILLAGE | *A Selected Climate Smart
Yen Bai Province, Vietnam | Village Site*

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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

Ma village is one of the 15 villages of Vinh Kien commune, Yen Binh district, Yen Bai province in the northern mountainous region of Viet Nam. Ma village was selected as a site for the Climate Smart Village (CSV) development under the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). It has a topography, landscape and climate conditions representing most in the region and faces increasing challenges caused by climate variability, natural resources degradation, and environmental pollution.

The village's current production systems have low sustainability and profits. Maize and cassava are largely produced in dominant monoculture systems on sloping lands representing most of the village's total arable lands, while rice is planted in a small area. Slash and burn practices are used largely in sloping lands, while unbalanced fertilizer levels (often with too much nitrogen) are applied for all the crops, and integrated pest management is yet to be promoted. All these have caused high intensity soil erosion, land degradation, and GHG emission. In addition, improper waste management, particularly from cassava, has resulted in severe water pollution in all river and lake systems.

Organizations are present to support Ma village and the province in the areas of agriculture, forestry, food security, and climate change adaptation and mitigation. However, coordination between organizations remains poor. The local systems currently do not have the capacity to solve the multiple problems in the village. Human and financial resources. Inadequate. Support from CCAFS is important to help the village address the increasing problems caused by climate change, water pollution, soil erosion, and land degradation.

Keywords

Ma, Vietnam, situation analysis, needs assessment, village, CCAFS

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Table of Contents

1. INTRODUCTION	8
2. METHODOLOGY	9
3. SITUATION ANALYSIS	10
3.1 Geographic Location	10
3.2 Demography	12
3.3 Local Climatic Information	12
3.4 Natural Resource Utilization	14
3.4.1 Land use	14
3.4.2 Forest	15
3.4.3 Water resources	15
3.5 Production and Livelihood systems	16
3.5.1 Yen Bai province and Vinh Kien commune	16
3.5.2 Ma Village	18
3.6 Food security status and trends	22
3.7 Hazards and vulnerability	23
3.8 Mitigation Measures	25
3.9 Climate Change Perception	26
3.10 Institutional landscape and Governance	27
3.11 Current and past natural resource management initiatives	28
3.12 Organizational landscape	31
3.13 Information network	37
3.14 Social and gender differentiation	39
3.15 Health/nutrition profiles and other livelihood outcomes	43
4. NEEDS ASSESSMENT	43
4.1 Strengths and weakness	43
4.2 Priority issues	44
4.2.1 Natural resources and environment	44
4.2.3 Production systems and food security	44
4.2.3 Information systems and organizations	45
4.3 Intervention/performance recommendations	45
REFERENCES	46
Annex	47

List of Tables

Table 1.	Shares of production values from different components of agricultural sector over the year	17
Table 2.	The area of main crops in Yen Bai province	17
Table 3.	Production of main crops in Vinh Kien commune	17
Table 4.	Main hazards recorded in Yen Bai and their impacts on agriculture	23
Table 5.	Natural resources trends in Ma village	29
Table 6.	Main Natural Resource Management initiatives in Vinh Kien commune and Ma village	30
Table 7.	List of organizations operating in Ma village and their role	31
Table 8.	Roles of the most important organizations	33
Table 9.	Ratio of children giving up school in Yen Bai province	40
Table 10.	FGDs results on the livelihoods and the role of men/women	42

List of Figures

Figure 1.	Administrative map of Yen Bai province	10
Figure 2.	Location of Ma village in the map of Vietnam	11
Figure 3.	Market channels of agricultural and forestry products	21
Figure 4.	Crop calendar and impacts of weather variability	24
Figure 5.	Governance structure of a commune in Vietnam	27
Figure 6.	Flows of information and connections between organizations	32
Figure 7.	General information network to Ma community	38
Figure 8.	Works of men (above) and women (below) during 12 hours daytime (left) and 12 hours nighttime (right)	41

Abbreviations

ACIAR	Center for International Agricultural Research of Australia
CA	Conservation agriculture
CC	Climate Change
CCAFS	Climate Change, Agriculture and Food Security Program of CGIAR
CGIAR	Consultative Group on International Agricultural Research
CIAT	Center of International Tropical Agriculture
CSV	Climate Smart Village
DA	Department of Aquaculture
DARD	Department of Agriculture and Rural Development
DOLISA	District Department of Labour, Invalids and Social Affairs
DONRE	Department of Resources and Environment
FC	Food crisis
FDP	Fertilizer deep placement
FGD	Focus Group Discussion
FS	Food security
ICM	Integrated crop management
ICRAF	World Agroforestry Center
IPM	Integrated pest management
NA	Need Assessments
NGO	Non-Government Organization
NMR	Northern mountainous region of Vietnam
NOMAFSI	Northern Mountainous Agriculture and Forestry Science Institute
OBS	Organization Baseline Survey
PC	People Committee
R&D	Research and Development
R4D	Research for development
SA	Situation Analysis
TUAF	Thai Nguyen University of Agro-forestry
VAAS	Vietnam Academy of Agricultural Sciences
VBS	Village Baseline survey
VND	Vietnamese Dong
VNUA	Vietnam National University of Agriculture (before, HUA)
YSD	Yen Bai Statistics Department

1. INTRODUCTION

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

The focus of this report is to present the results of the situation analysis and needs assessment (SANA) for the Ma village in Yen Bai Province, Vietnam. The SANA was conducted in conjunction with, and to complement other CCAFS studies in Ma village including the village baseline study (VBS) and organizational baseline survey (OBS). The situation analysis is a broad and comprehensive review of information related to climate change, agriculture, and food security. The needs assessment provides information to make decisions regarding key priorities, challenges, opportunities for CCAFS interventions. Both systematic analyses were conducted at the provincial, district, and CSV levels.

The purposes of the SANA are to :

- Understand the broad context of climate change, agriculture and food security at the provincial, district and village levels.
- Be used as a guide to CCAFS project implementation.
 - › Reveal key priorities, local attitudes and core issues for CCAFS planning.
 - › Identify stakeholders (people, groups and institutions) that can influence on the outcomes of the project.
 - › Aid in the design of an appropriate modality for introducing key interventions.
 - › Identify capacity building needs of the community.
- Be used as a baseline to monitor and assess the changes occurring in the area through time in relation to adaptation and mitigation to climate change.

2. METHODOLOGY

Data collection for this study used methods developed and provided by CCAFS (<http://://ccaafs.cgiar.org/>). 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.

For Ma CSV, CCAFS activities were led by the Center of International Tropical Agriculture (CIAT). Members of the Ma CSV team, including representatives from the Northern Mountainous Agriculture and Forestry Science Institute, Vietnam (NOMAFSI) conducted focus group discussions (FGDs) as part of the CCAFS Village Baseline Study (VBS), and interviews with key informants including extension officers, farmers, and representatives of local organizations. Additional information, particularly at the provincial and district level, was collected through a comprehensive desk review of documents collected from different information sources: local statistics, government reports from relevant local organizations, and previous studies carried out by other international organizations.

For the baseline surveys, the teams in the six CCAFS sites were trained in September 2014 (Village Baseline Study-VBS, Organizational Baseline Survey - OBS and SANA) and in November 2014 (Household Baseline Study - HBS). 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 were conducted for VBS in Ma village from 30th October to 1st November 2014 with participation of 90 villagers. Focus group discussions were organized for men and women separately. Topics relevant to SANA that were collected during the FGDs include natural resource utilization, organizational landscape and information network. Additional information was collected from November to December 2014. A feedback seminar was held in the village with the participation of villagers who had not participated in the FGDs as well as leaders from the province down to the village levels.

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, 14 most important organizations were selected by the villagers for interviews using the protocol set under the OBS. Detailed information is given in the site analysis report of Ma village.

3. SITUATION ANALYSIS

3.1. GEOGRAPHIC LOCATION

Yen Bai is one of the 15 provinces in the Northern Mountain Region (NMR) in Vietnam. It is located at 21°24'40" to 22°16'32" North and from 103°56'26" to 105°03'07" East (Figure 1). The province lies between the northwest and northeast region of Vietnam, bordering Ha Giang and Tuyen Quang in the East, Son La in the West, Phu Tho in South and Lao Cai province in the North. Yen Bai has 1 town, 1 city and 7 districts.

The total area of Yen Bai is 6,886 km² (2% of the country's total area), of which 85% are for agriculture and agro-forestry production (Yen Bai people committee, 2011). There are 9 districts and towns/cities in Yen Bai, covering 180 communes, of which 62 are classified as very-difficult-to-access communes.

The Yen Bai province is elevated from the southeast to the northwest of the province. The Hoang Lien Son mountain range in the West is located in between the Red and Da rivers; the Elephant mountain range is located in between the Chay and Lo rivers in the East of the province. These mountain systems divide the province into two regions according to elevation -- the highland and lowland regions. The highland region has an average altitude of more than 600 m.a.s.l and occupies 68% of the province' territory. This region, although with low population density, has high potential for economic development (rich in land, forest, minerals and genetic resources). The lowland region has an average elevation of lower than 600 m.a.s.l., including mainly low mountains and hills, inter-located with valleys. This region occupies 32 % of the province' territory and is more developed than the other region.

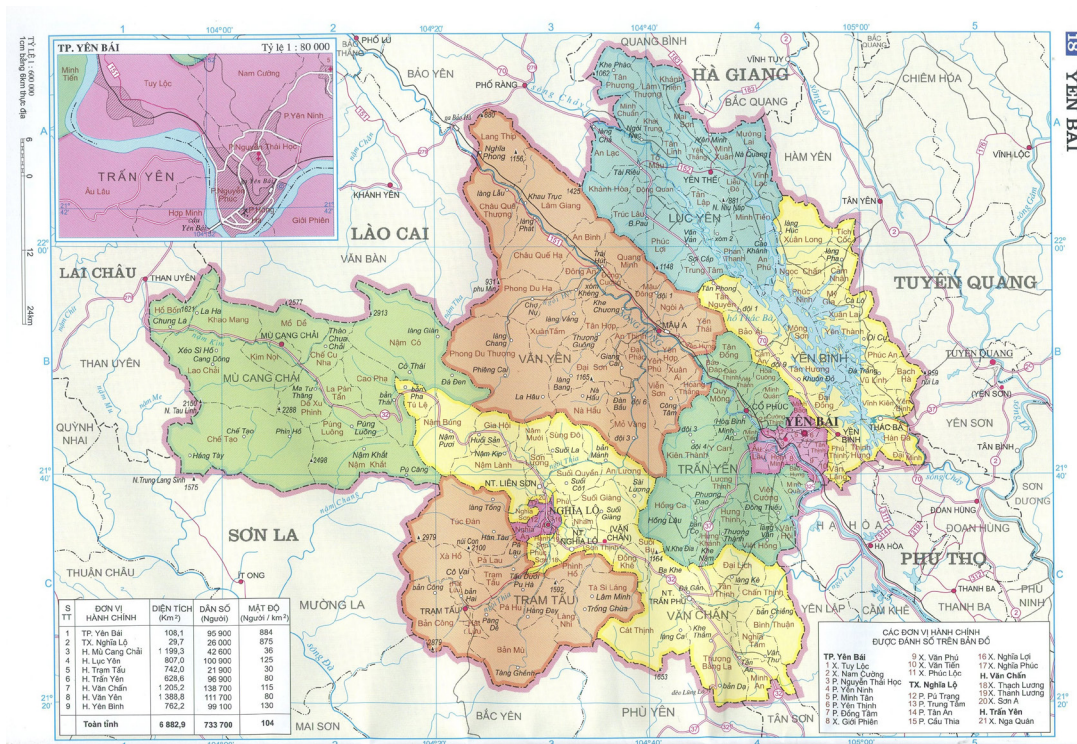


Figure 1. Administrative map of Yen Bai province

There are good roads connecting the province to the border with China (180 km), the capital of Hanoi (160 km), and other provinces (Ha Giang, Tuyen Quang, Lao Cai, Son La and PhuTho). This creates a good opportunity and conditions for trading of commodities and transportation.

One of the districts in the Yen Bai Province is Yen Binh. It has a total area of 77,262 ha, of which 57,690 ha are in agriculture and forestry production. The center of Yen Binh district is 8 km away from the Yen Bai City and 170 km away from Ha Noi City. The district is located next to PhuTho and Tuyen Quang provinces. Yen Binh district belongs to the lower region, lying in the southeast region of Yen Bai province. It, however, is elevated from the southeast to the northwest due to two mountains: Cao Bien mountain lying in the East of Thac Ba lake and Con Voi mountains in the West of Thac Ba lake. The district is located in a tropical monsoon climate with four distinct seasons: Spring, Summer, Autumn and Winter.

Within Yen Binh is Ma village located at 21.74° North and 105.08° East (Figure 2). As the largest village in 15 villages in the Vinh Kien Commune, Yen Binh District, Yen Bai Province, Ma village has a total land area of about 350 ha, with the following breakdown based on land use: double-crop rice land (12.34 ha), single-crop rice land (3 ha), other crop land (over 100 ha), forestry land (220 ha), and residential lands and flood plain (about 25 ha). The landscape of Ma village consists of mountains, river, lake, plains and hills. During the FGD with the villagers of Ma village, a map of the village was produced by the villagers.

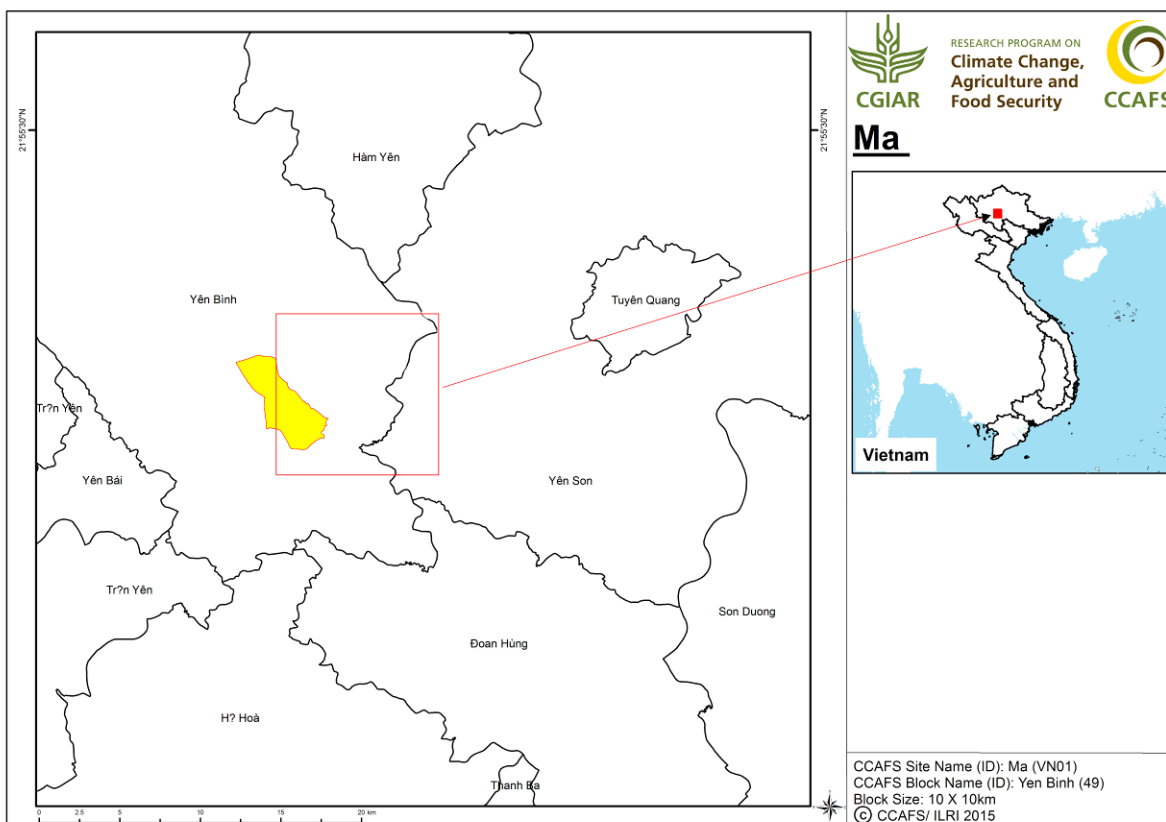


Figure 2. Location of Ma village in the map of Vietnam

3.2. DEMOGRAPHY

In 2013, Yen Bai had a population of 772,500 people (Yen Bai annual statistics). The population was very unevenly distributed. The population density was 112 people/km², but it was higher in the plains and lower areas, and lower in mountainous areas. There were 50 ethnic groups, of which Kinh people account for 46.3%; Tay people, 18.2%; Dao people, 11.3%; H'Mong people, 11.6%; and Thai people, 76.1%. The rest of the population was from other minority ethnic groups, including Cao Lan, Muong, San Chay, Kho Mu, Nung. Over 80% of the working force are in the agricultural sector (www.yenbai.gov.vn).

People from different ethnic groups live together and form communities. Due to their specific cultural and traditional features and customs, each ethnic group tends to live in areas with some specific conditions. For example, H'mong people often concentrate in high mountains in the northern part such as the high land of Tram Tau and Mu Cang Chai; Dao people live more in Van Chan and Van Yen districts. The population growth rate of Yen Bai is rather high, about 12% annually (www.yenbai.gov.vn).

In 2013, Yen Binh district had a population of 107,100 (Yen Bai annual statistics, 2013). Over 45,000 people were in working ages (18 – 60 years old), of which over 75% were in the agricultural sector. The people of Yen Binh were from many ethnic groups, including Tay, Nung, Dao, Cao Lan (San Chay), Kinh, Day, Muong, Thai, and San Diu. The population density was 139 people/km². However, in mountainous areas such as with Xuan Long, there were 49 people/km². In 2013, Vinh Kien commune had a population of 6,043 people from 1,457 households. There were nine ethnic groups that included Kinh (61%), Cao Lan (29%), and Dao (8%). The rest 2% were people from Nung, Day, Muong, Thai, Tay and San Diu. People in the working ages (18 – 60 years old) accounted for 57.6%.

Meanwhile, Ma village had 182 households with 729 people in December 2014. Seven households (3.83% of the total households) were classified as poor, with monthly income lower than 500 thousand VND per capita. There were five ethnic people groups, of which Kinh people were the biggest group (50%), and followed by Cao Lan people (48%). The rest (2%) of the people were from other minor ethnic groups, including Tay, Muong and Dao. Most (446 people, representing 61.3% of the total population) were in working age, of which over 75% work in the agricultural sector. A significant part of the population (28%, or 205 people) is under 18 years old. Eighty five people were over 60 years old (11.7%).

3.3. LOCAL CLIMATIC INFORMATION

Yen Bai has a tropical monsoon climate. The provincial average annual temperature is 22 – 23°C; the average annual rainfall is 1,500 – 2,200 mm/annum; and the relative air humidity is 83 - 87%. Rainfall intensity and distribution are much dependent on topography. The volume of rainfall has been decreasing and more experienced during the few months of the wet season.

The two distinct seasons are the wet season (also hot season) from April to October and the winter season (also cold season) from November to March. The wet season is hot and humid with the average temperature higher than 25°C, with lots of rain, accompanied by whirlwinds, cyclones and flash floods causing damage

to properties, livelihood and lives of the people. In the mountains, the dry season may start earlier and end later, and the temperatures can be very low, around or slightly below 0°C (Yen Bai People Committee, 2011). According to the topography and the main climate features, Yen Bai can be divided into two main regions. The West has an average elevation of above 700m ASL. The climate is temperate, with very low temperature (below 0°C) during the cold season. With less rain, the area is suitable for sub-tropical and temperate crops. Due to the complexity and diversity in topography in this West region, there are different micro-climate zones.

On the other hand, the Eastern region has lower average elevation, with higher average temperatures, and more rains. The plains are in good condition and suitable for intensive agriculture. The vast water surface area of the Thac Ba lake is appropriate for aquaculture.

The Yen Binh district is located in the southeast region of the province. The district's annual average temperature is around 23°C, annual rainfall is around 2,000 – 2,200 mm, concentrated in 130-140 days in the rainy season, mostly in July-August. There is a large lake, Thac Ba (15 ha), and thus the local climate conditions are rather mild.

The complicated topographical features cause problems with the production, transportation and some aspects of life of local people. But, on the other hand, they create diverse climate, water, and land conditions for agricultural and forestry production.

The people of Yen Bai, in general, and people of Ma village, in particular, have taken advantage of the complexity and diversity of climatic and topographical conditions to develop diverse farming systems with both local and introduced varieties/breeds. They have also exploited natural resources in the mountains, hills, plains, lakes and rivers for their production and livelihoods.

Yen Bai Meteorological Center has the role to forecast and disseminate information on climate and weather in the province including Ma village. It has eight stations with one located in Thac Ba town of Yen Binh district ([http:// www.yenbai.gov.vn](http://www.yenbai.gov.vn)).

The main channels for climate-related information are Yen Bai television, Yen Bai radio, district radios, and newspapers. The central government information channels like VTV, radio, newspapers also provide Yen Bai and Ma people with weather forecast information. The radio systems of the commune and village also provide information. For instance, in the event of natural disasters, the commune and village radio frequently broadcast the most updated information together with guidance on measures for preventing damages to people, houses, crops, and animals. In general, there are no problems in term of dissemination of information on climatic hazards and weather forecast. However, in terms of information on climate change and more detail information on weather conditions related to crop and animal growth and disease such as humidity, sunny hours, sunny level, hoarfrost, mist etc. there was no effective information channel. Farmers lack proper information that will allow them to prepare and manage their field in the event of disasters.

3.4. NATURAL RESOURCE UTILIZATION

3.4.1. Land use

Yen Bai has the total area of almost 688,628 ha. The distribution based on land use is as follows:

- Over 474,121 ha (69% of the total area of the province), mostly steep and high slopes, for forestry production;
- 109,320 ha (15.8%), mainly flat and not too steeply sloping lands, for production of annual and perennial crops and animals;
- 1,586 ha (0.2%) of water surface for aquaculture and fishery;
- 54,000 ha (8%) for other purpose: roads, schools, factories...;
- 50,000 ha (7%) are not yet used. Most (over 45,000 ha) of this unused land area is in high mountains. Among the unused lands, 1,358 ha are with potentials for agriculture (Yen Bai people committee, 2011).

Yen Binh district has a total area of 77,262 ha, with the following breakdown: 42,193 ha (54.6% of the total area) for forestry production, 11,501 ha (15% of the total area) for agricultural crops production, 2,753 ha (3.6%) for special purposes, and 598 ha (0.8%) for residential. There is also aquaculture area and over 10,000 ha of unused land.

In Vinh Kien commune of Yen Binh district, a total of 1,888 ha are used for agriculture and forestry production. These include 1,254 ha (66.55% of the total commune's area) of forest lands, 625 ha (33%) of both flat and sloping lands for crop and animal production, and 9 ha (0.5%) of water surface for aquaculture and fishery. There are also over 670 ha used for special purpose (infrastructures, factories, offices, water reservoir for hydropower plant, transportation etc.) and for housing.

Meanwhile, Mạ village has a total land area of about 350 ha. According to the data given by farmers during the FGDs, the distribution of the land area in Ma village is below:

- 15.81 ha of flat lands for paddy rice production. Depending on the water availability, rice can be produced in 1 or 2 crops. In significant part of rice land, upland crops were also produced after the 1st crop harvest of rice, or during the winter as the 3rd crop or after the 2nd crop harvest rice. Land for single rice cropping is about 4 ha, for double rice cropping is about 8 ha, and for two crops of rice and one crop of maize a year is about 4 ha. Rice fields were awarded to local households for usage and management in 1997 until 2015.
- Hilly lands or sloping lands with slopes up to around 30° are for the production of annual crops such as maize and cassava. Often, maize is grown in areas with better land quality and cassava in areas with poor land quality and /or with less rain.
- Most farmers still resort to slash and burn and ploughing the entire field. This practice causes a high erosion level of soil every cropping season. The high soil erosion level, in turn, creates the need for the use of greater inorganic fertilizer inputs, and causes considerable sediment in lake, river and canal systems, and reduction of water quality for domestic, agricultural and industrial use. As mentioned by farmers during the FGDs, the yield of maize and cassava reduce over the time if increased fertilizer levels are not applied. There were no projects/programs supporting farmers in the field of cassava production and selling.

- 25 ha for residential and other purposes. Home gardens are also found in residential areas. Crops such as vegetables, fruits and spices are cultivated for family consumption. These also include raising pigs and poultry.
- In many locations in the province, tea was also largely produced in sloping lands, and in Ma village , the tea area is about 6 ha. These areas were also awarded for use and management by the households in the area.

3.4.2. Forest

In 2013, the forest area of Yen Bai province reached 414,565 ha, of which 236,837 ha were natural forest and 177,727 ha was planted forests. The province's forest coverage is 60.2% of the total land area (Provincial statistics, 2013).

- Steeper slopes are often used for production of forestry trees such as acacia, eucalyptus, cinnamon, and pine.
- About 220 ha, mainly in high slope areas, were for agroforestry production. Main trees planted on this land were eucalyptus and acacia.

The total agricultural land area was allocated to 176 households for use and management. On average, each household owns 0.68 ha land.

The Yen Binh district had a total area of 42,193 ha of both natural and planted forests. Protected forests were 11,321 ha. However, plans were underway to convert the protected forests, due to their low protecting value (not really in protected zones or buffer zones), to forestry land (www.yenbai.gov.vn).

Before 1970, there were natural forests reported to be rich and diverse. There are more than 500 plant species, belonging to 210 families. Of which 200 were timber species, belonging to the *families Lauraceae, Cameliaceae, Magnoliaceae, and Leguminose*. Years of exploitation of people in Yen Bai, particularly of both timber and non-timber products, have resulted in degradation. Nowadays, natural forests are mainly newly regenerated, with low biodiversity, and not rich in non-timber products.

The total land area that used to be natural forest is now assigned to households for forest tree production. As a result, the village now has a large area of forestland (220 ha out of the total 350 ha of the village total land area). These planted forest areas are mainly planted to one crop such as eucalyptus, acacia, pine and or cinnamon. Their planting cycles normally are 5-8 years, except for cinnamon that requires long years.

3.4.3. Water resources

In Yen Bai province, water used for production activities mainly comes from Hong and Chay river systems. The Chay river also provides water for Thac Ba hydroelectricity generation plant, which is the first hydropower plant in Vietnam. There are hundreds of streams and canals, with small water source and low water flows, especially during the dry seasons. The flow of rivers and streams upstream is strong and the volume varies, sometimes causing sudden floods.

Dams and a hydropower plant were built to use Chay river for electricity generation. This created the Thac Ba lake that is 19,050 ha. For Yen Binh, Chay river system provides water resource for all activities. The government built 479 water management projects to enable use of water from this river system. Existing small streams are not significant water source.

The irrigation systems covered more than 4,300 ha of crops, including 3,674 ha of rice, 635 ha of upland crops in the flat land areas. The irrigation systems also provided water for 24 ha of aquaculture (Yen Binh district report of 2014).

In Ma village, Chay river plays a very important role for livelihoods. The people of Ma village are using water from this river for agricultural production and for cassava processing. The farmers reported during the FGDs that the river is also a fishery resource. Unfortunately, the river was also reported to be highly polluted. Currently, the river water cannot be used for domestic use and animal husbandry. The degradation of the river is attributed to unsustainable exploitation of sand and gravel and improper management of waste from tapioca processing facilities. In addition, farmers in Ma village use water from a small stream originating from Cao Bien Mountain to irrigate their crops. Unfortunately, water volume of Cao Bien stream is very low and polluted due to improper application of pesticides and other farm chemicals and waste water from tapioca processing facilities in the village.

Ma people manage a large area of water surface from Thac Ba lake located very near to the village center (only 10 -15 minutes on foot). They fish and engage in aquaculture in a water surface area of over 500 ha. During the FGDs, the participants reported the decline in fish production from the lake and the disappearance of some species.

During the dry season, the water level in Thac Ba lake is low and Ma people grow groundnut and a variety of vegetables to about 1.5 ha to 2 ha along the lake sides (Cos land). The Thac Ba lake of about 500 ha of water surface is also managed and exploited by Ma people for aquaculture and fishing.

3.5. PRODUCTION AND LIVELIHOOD SYSTEMS

3.5.1. Yen Bai province and Vinh Kien commune

Based on provincial statistics data, the agricultural sector contributes about 30% to the provincial GDP. The rate has declined through the years: 39% in 2005, 34% in 2009, 30% in 2010 30%, and 28% in 2013. Within the agricultural sector, the shares of different production areas differed and also changed over time. The highest share was from animal and crop productions, followed by forestry and aquaculture (Table 1).

The main crops in Yen Bai are rice, maize, cassava, peanut, soybean, tea, fruits, and vegetables (Table 2) (Yen Bai DARD's statistical data). Animals are domesticated at the household level. In 2014, Yen Bai had 98,226 water buffalo heads, 18,752 cow heads, 505,035 pig heads and 3.8 million heads of poultry (Yen Bai DARD's annual report). In 2014, the total production of aquaculture was about 7,000 tones. The total area for aquaculture in 2014 was 2,233 ha. Forestry production (planting forest) area reached over 470,000 ha, mostly steep and high slopes.

Table 1. Shares of production values from different components of agricultural sector over the year

Sectors	Production value share			
	2005	2008	2010	2013
Animals and crops (%)	74,6	75,7	75,6	71,8
Forestry (%)	21,8	20,7	20,7	24,6
Aquaculture (%)	3,6	3,6	3,7	3,6
TOTAL	100	100	100	100

Source: Statistic year book, 2013

Table 2. The area of main crops in Yen Bai province (DARD, 2014)

No.	Crop	Seeding/planting time		Harvest time		Growing area & yield	
		1st crop	2nd crop	1st crop	2nd crop	Area (ha)	Yield (100kg/ha)*
1	Rice	Jan - Feb	Jun	June	Late Sep- Early Oct	40,919	49.4
2	Maize	Late Feb - March	Jul	Late Jun-Early Jul	Late Oct – Early Dec	28,470	29.7
3	Cassava	Feb - March		Nov - Dec		16,170	192.2
4	Sweet potato	Late Feb- March	Late Jun – Early Jul	Late May – Early Jun	Late Sep- Early Oct	2,840	54.2
5	Peanut	Late Feb- March	Late Jun – Early Jul	Late May – Early Jun	Late Sep- Early Oct	1,957	17.2
6	Soybean	Late Feb- March	Late Jun – Early Jul	Late May – Early Jun	Late Sep- Early Oct	344	11.9
7	Vegetables	Whole year				8,470	115.0
8	Tea	Feb. – march			Apr - Nov	11,700	75.0
9	Fruits	Aug.- Oct.				6,536	58.6

* Yield for annual crops: 100 kg/ha/season; Yield for perennial plants: 100 kg/ha/year

The production level of the main crops in Vinh Kien commune in 2013 is shown in Table 3. In terms of area planted, rice was highest at 304 ha, followed by cassava at 200 ha, and maize at 128 ha. Cassava yield was highest at 225,000 kg/ha. In 2013, total production of cassava was 4,500 tons and of rice was 1,666 tons.

Table 3. Production of main crops in Vinh Kien commune

Crops	Area (ha)	Yield (100 kg/ha) (**)	Total production in 2013 (tons)
Rice	304	110	1,665.6
Maize	128	34,16	428.0
Cassava	200	225	4,500.0
Tea	91.83	95	351.5
Forestry plants	102*	-	-

*: planted area in 2013;

**: for annual crops - 100 kg/ha/season; for perennial plants - 100 kg/ha/year

Source: Vinh Kien commune report of 2013.

In 2013, the Vinh Kien commune had 656 water buffalo, 228 cows, 6,057 pigs, and 54,644 poultry heads raised in the households. Fish farming was small scale with nine ponds at the household level identified. In Thac Ba lake, 60 fish cages were under operation by the households.

3.5.2. Ma Village

In Ma village, rice is the main crop planted to 15.83 ha. Rice was produced at household level in almost all the plain, and flat land areas. Depending on water availability, rice can be cultivated in 1 or 2 cropping seasons in a year. The average rice land per capita per year was low at only 132 m². Thus, rice was mainly produced for consumption by farming households, with the small amount of surplus going to the market. In general, maize and cassava in Yen Bai province are planted in dominantly sloping lands. The quality of sloping lands in many locations is poor. Due to drought problems, cassava yield is low and unstable. Both commodities are produced for commercial purposes. The area planted to maize is 7ha, during the two cropping seasons (spring-summer and winter-spring). About 80% of the village households produce maize mainly on sloping lands and in the flat lands during the second cropping season. Maize is produced mainly for the feed production companies. Similar to other agricultural products, collectors and small traders collect maize in the field right after the harvest. The collectors sell to feed production companies, mostly to CP Com. The price of maize cobs varies across years and within a year. Given that the feed companies in Vietnam also import a large amount of maize every year, prices for locally produced maize is highly volatile and farmers' benefit share is very small.

In terms of area planted and volume of production, cassava ranks first in Ma village. Area planted to cassava is 50 to 80 ha, depending on the year and in slope of the land up to 30 – 45°. Income from cassava production comprise 30% of total crop production in the commune of Vinh Kien (personal communication with Vinh Kien leaders). Cassava planting time start from March to April and harvesting time is from November to January. Farmers often rotate cassava with forestry trees: 1 cycle of forestry trees (5-8 years) followed by 2-3 cycles of cassava (2-3 years).

Cassava is planted either as a mono-crop or as an intercrop in young forest plantations (1st year of the forest tree – mainly acacia or eucalyptus). Households with large land areas often rotate cassava with forest trees: after harvesting of forest trees they mono-cultivate cassava for about 1 to 4 years and then grow trees again. Households with small land areas grow cassava for many years in the same plot/s.

Cassava is mainly produced for commercial purpose; households often sell fresh tubers to the five small scale processors in the village and to Vu Linh Cassava processing factory located in Vu Linh commune, which is 10 km away from Ma village. Households bring the tubers to directly sell to the processors. Collectors may also pick up cassava roots in the field, but the price will be lower.

Efforts to link farmers with processors or factories or to help farmers sell their cassava at good prices have been absent. Some households also process and store tubers for feeding pigs the whole year around in the form of chips or grind tubers. Also, fiber residue from processing factories is often sold to households to feed pigs.

Local processing of cassava is identified as one of the main causes of water pollution. Some cassava processing facilities were forced to close. Participants at the FGDs expressed great concern about the water pollution in the area.

There were attempts, mostly under the local extension programs, to promote the adoption of sustainable practices, such as mulching, intercropping, and growing fodder hedgerows. The adoption of these practices remain, however, very limited due to the following reasons: (i) requires more labour at the beginning (few first years of the adoption) to adopt this practices compared to the conventional practices; (ii) requires additional attention/inputs for pest control and management of crops, because vegetation residues and intercrops can be good “houses” for mice, insects and pathogens; (iii) Local farmers have for a long-time practiced the conventional practices and are not yet ready to change; (iv) due to free grazing practice, which is normally practiced in the region after the crop harvest, it is difficult to maintain plant residues for mulch; (v) limited markets for alternatives and inter-crops (Pham Thi Sen, 2014; FGD results).

The forest in Ma village is about 220 ha or about 63% of the village’s total land area of 350 ha. The two main trees grown are eucalyptus with an average growth cycle of 5 years, and acacia with a growth cycle of 6 to 7 years. These trees are grown for commercial purposes – selling to local and nearby wood processors. The average return from a hectare of planted forest is within 30 to 50 million VND. Local people also reported other environmental services from the forest, including re-greening of fallow lands and barren hills, soil erosion reduction, land protection, water storage problems alleviation, and air regulation. Nevertheless, the concerns in reforestations are high investment cost, high labor requirement, and easy to be damaged by insects, disease and termites. Farmers lack knowledge of pest control for forest plants. Forest trees are produced mainly for selling to local wood processing enterprises.

On average, each household has 500 to 700 m² area planted with tea or a total area planted with tea at 6 ha. With support from the provincial program for tea production, new high yielding varieties, such as LPD1 and LPD2, are planted to replace the old tea plantation. As mentioned by farmers during the FGDs, 65% of tea produced is sold to local traders/collectors, the rest of 35% is used by households. Often, local traders visit households to buy tea leaves after the harvest. The traders sell to tea processing companies located in Yen Bai, Phu Tho or other location, or sell to exporters, mainly to China. Tea, as perceived by local farmers, is not popular in the village. Tea growing takes a while and its price is volatile. Also, there are pests that farmers cannot control yet.

Fruits of different kinds, such as pomelo, blue dragon, mango, and banana are also produced, but in small amounts and mainly for family consumption. The surplus is sold in local market (exchange among community mainly). The planting of blue dragon recently is for commercial purposes.

Similar to the whole province, animal production in Ma village is at the household level. The region has great potentials and advantages to develop cattle raising. In 2014, Ma village had 112 buffaloes, 50 cows, about 1,000 goats, over 1,000 pigs and over 15,000 poultry heads (statistics data of Vinh Kien Commune’s

People Committee). Twenty households had cows, 50 households had buffaloes, 20 households had goats, and almost all households were raising pigs and poultry.

As mentioned during the FGDs, the trend in the production of cows and goats is increasing while it is decreasing for buffaloes and pigs. This trend was attributed to the high regular price of beef and goat meat, relative to prices of pork and buffaloes. While big animals like goats, pigs, cows and buffaloes raised for sale at the local or nearby markets, 50% of poultry is produced for household consumption. Except for the volatile price, no significant problems for selling animals were identified. Local traders often visit households to buy animals, except for poultry farmers who sell poultry products in the local markets in the commune of Vinh Kien or in nearby locations. High cost of inputs and diseases in animals are major problems.

The most common practice of cattle raising is the combination of free grazing and man-herded grazing. Free grazing is practiced mainly in crop-free cultivated lands (after all the crops have been harvested) and in forest lands. Households do not produce much feeds and cannot afford to buy commercial feed for their cattle. Food shortage together with bad climatic conditions often causes high mortality rates of cattle during winter. Waste from animal husbandry has not been treated, and this causes problems to the environment, water resources, and climate.

Pigs and chicken are often raised in homesteads. In most cases, there are no cages. Often, extensive practice is applied, not much input are spent for animals' feeds. Under the local extension programs and with support from the local extension network, many farmers now vaccinate their pigs. Not much input has been spent for disease prevention for poultry. Most often pigs and poultry production are integrated with horticulture in home gardens in integrated systems (Vườn-Ao-Chuồng, VAC).

Ma people farm fishes in over 500 ha of water surface of Thac Ba lake near the village. During the FGDs it was reported that there are 60 fish cages with an average yield of 0.5 tons/cage/year, bringing an income of about 30 million VND per cage per year. In some parts of this lake, farmers use net as "fence" for farmed fishes. At the end of 2014, three "fenced" ponds were made and about 5 to 7 were under construction.

Farmed fish are sold at the local markets or through local traders in markets in cities and towns. The prices vary depending on the seasons with higher prices during winter.

The main problems in aquaculture, as identified during the FGDs are poor quality fingerlings provided by traders, the high price of quality fingerlings available at Yen Bai Aquaculture Department, water pollution, and diseases of fishes.

Traditionally, VAC (garden-pond-animal pens/cages, or, horticulture-aquaculture-animal husbandry) is an integral component and feature of household production and the rural self-sufficient economy, and the country culture and landscape. Nowadays, most households still practice VAC at different scales. In gardens, farmers grow plants, mostly fruits, vegetables, spices and root crops, in multilayer in such a way that all can absorb enough solar energy to express good growth and generate high productivity. Ponds are created

either in the center or close to one edge of the garden for aquaculture. Animals, mostly pigs, chickens and ducks are reared in gardens. Energy, nutrient and waste are recycled within the VAC system: vegetables and byproducts from home garden can be used to feed fish and animals; animal manure and waste to fertilize crops; pond water and byproducts to water crops and feed animals, respectively.

General features of the markets for agro-products

Rice, fruits and vegetables are mainly produced for households, consumption, while other products, including animals, fishes, tea, cassava, maize and trees are for commercial purposes. The two markets in the Vinh Kien Commune of Ma Village's agricultural products are Thac Ong Market and Vinh Kien Market. Households usually bring their products to these markets. Meanwhile, local collectors and small local enterprises are also popular marketing channels, especially for tea, forestry tree and cassava roots.

The current market channels of products are presented in Figure 3. The farmers can bring their products to the markets in the Vinh Kien commune and also to markets nearby. They can also sell their products directly to the local processors. Another channel is for farmers to sell their products through the collectors. Trading with the collectors may either be at the field right after harvest or at the farmers' house. The collectors sell the products to local small processors, or they sell at the commune's and nearby markets or to other markets including exporting to foreign markets such as in China. The processed products are also sold in domestic and foreign markets. The main problems in marketing are the instability of the prices and the absence of storage facilities and processing technology to increase the shelf life of products so they can be sold at the right time at better prices. Similar problems are present in communities in Yen Bai and all the northern mountainous region of Viet Nam.

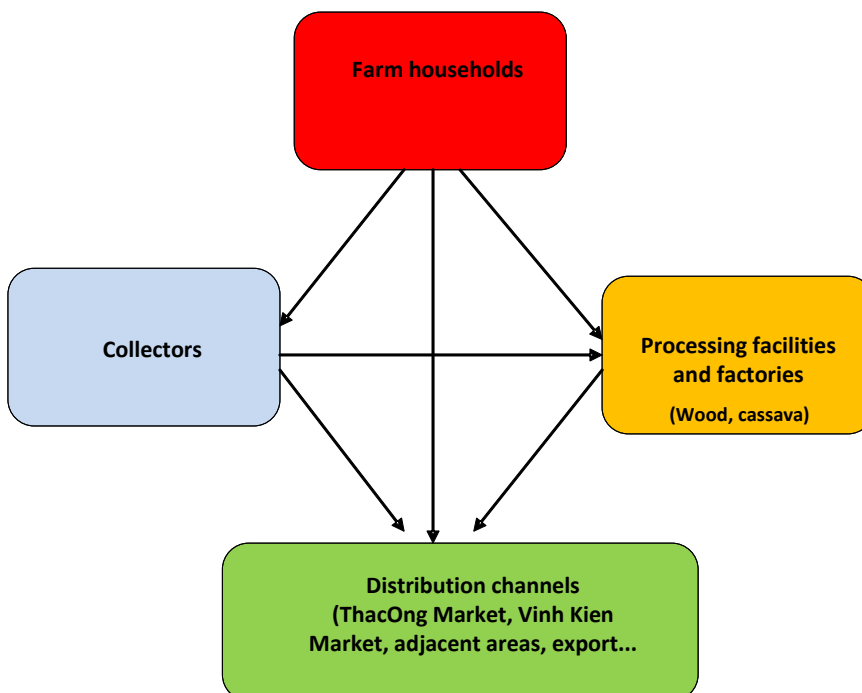


Figure 3. Market channels of agricultural and forestry products

General features of the agro-product processing

From interviews with the leader of Ma village, there are 15 wood processing and 5 cassava processing enterprises in the village. These enterprises can process a large part of cassava and wood produced by Ma villagers. Other wood and cassava processing facilities are located Vinh Kien commune, in Yen Binh district and in Yen Bai province. The biggest cassava root processor in the region is Vu Linh factory, which is located in Vu Linh commune, next to Vinh Kien commune and near to Ma village. The processing facilities create jobs for almost 230 people.

Household level processing by farmers is confined mainly to cassava roots for feeding pigs and rice to making rice noodles or cakes. Post-harvest technologies have not been developed for all the products. Products sold right after harvest is one of the reasons farmers cannot negotiate for better price even when there is opportunity.

Off-farm livelihoods

Ma villagers also earn a living by working for the processors of woods and cassava in the village and in nearby locations. They also find work in construction and woodworking industries or in Thac Ba Forestry Farm. Young people migrate to cities and other provinces to find work. During the FGDs, it was mentioned that about 15% of the youth work in companies in other provinces during the “farm-job-free time”.

3.6 FOOD SECURITY STATUS AND TRENDS

Food shortage is not a problem in most of the Yen Bai province. Food shortage is confined to households in remote locations where natural resources are scarce and where land cultivation and climate condition are difficult. In Yen Bai City, households facing food shortage problems are those whose lands were sold for real property development and the money they received were not invested in production.

In Yen Binh district, local food production (rice mainly) is not enough for its people due to small land area available for cultivation. Households, however, has income from other cash crops, cattle production, and from off-farm activities to buy enough rice for consumption.

In Ma village, during the FGDs the participants came up with a criteria in classifying households into poor and non-poor to include lack of knowledge, poor health, food shortage, lack of lands for cultivation, lack of labor force, and lack of cash income. In the village, 10 people in the middle age were identified to be illiterate. According to the farmers, for a family four, two healthy adults are needed to work, and a monthly income of VND 500,000 is needed to cover essential expenses. Households earning less than 500,000 VND/month are considered poor. Given this income criterion, an estimated 3.8% of the households in the village are poor.

According to the FGD participants, life in the village has improved. They, however, wish to receive support from the government and other organizations to develop their production systems to ensure stable income and better living conditions with reduced risks of environmental pollution, natural disasters, and climate shocks.

During the FGDs, the farmers recalled that there used to be 30% of households in the village facing food shortage during the months of February to April or before the harvest of crops during the first cropping season. For the past 2 or 3 years, only 7 out of 182 households (3.8%) were identified to face food shortage and thus, considered poor based on the criteria set by the FGD participants. The members of these households with no capacity to work for a living (too young, too old or ill) receive government support in the form of 10 – 15 kg rice during Tet time (Vietnamese New Year).

Similar to Yen Binh District, the average land area in the village available for food production (rice) is small (132 m² per person). The households, however, earn income from other productive activities that is enough to buy food for daily consumption.

Although food shortage is no longer a major problem for most households in Yen Bai province, particularly in Ma village, the local farmers are aware that they are facing new challenges. During the FGD, it was identified that farm production is facing problems such as increased climate shocks, water pollution, and soil erosion. With population growth and lack of effective measures to respond to the emerging problems, the future is uncertain.

3.7 HAZARDS AND VULNERABILITY

In general, Yen Bai province is facing increasing problems caused by natural hazards such as droughts, heavy rains, floods, landslides, severe and long, cold spells, and also disease and epidemics on crops and animals. Table 4 shows the hazards experienced in the past seven years in the province.

Table 4. Main hazards recorded in Yen Bai and their impacts on agriculture

Year	Hazard	Damage
2008	Long lasting severe cold spell (38 days)	- Rice production: Rice seedlings died (219 tons of seeds), 3800 ha of newly planted rice field died, 10,000 ha of rice were damaged, rice yield reduced with 0.5 t/ha, total rice production reduced 448 tones. - Over 7,000 cattle head died
2010	7 severe cold spells, long dry periods	- 1476 ha of rice impacted, - 423 ha of rice land could not be cultivated - Rice yield reduced with 0.5 t/ha - Maize crop was to be sown latter (10-15 days)
2011	Long lasting cold spells, Unexpected late storms in late Sept.- Oct.	- 113 ha of rice land could not be sown, - rice seedlings died (83 kg of seeds) - storms impacted rice and maize, yield reduced
2012	Long lasting cold and dull time period in Feb. & March Unexpected cold time in mid May Long dry season	- Severe problems caused by <i>Pyriculariaoryzae</i> on rice - 164 cattle head died - Rice yield reduced Cropping sowing time was to be delayed

Year	Hazard	Damage
2013	Un expected late cold spells	- 474 ha of rice was heavily affected by <i>Pyriculariaoryzae</i>
	Severe floods	- 739 ha of rice were damaged, 681 ha of rice totally lost, 706 ha of maize damaged, 52 ha of cassava damaged, 142 ha of forestry plants impacted, - 62 ha of fish pond flooded
2014	Long hot and dry period	- 404 ha of maize were damaged, yield reduced by 30-70%
	Heavy rains with whirlwinds	- 883 ha of rice and 358 ha of maize were damaged, - 7,3 ha of fish pond flooded
		- 823 chicken and 14 pigs died.

Figure 4 shows crops calendar and the occurrence of extreme weather events in Ma village. During the baseline survey conducted at the village, villagers mentioned the following risks and damage caused to crops and animals:

- Drought: impacts on crops, especially paddy rice
- Cold spell: impacts on animals, especially cattle
- Hot spell and typhoon often occur in June to September in time for the maize season and the second cropping season for rice. Reduced levels and flows of water in lakes and rivers: impacts on fish farming, more diseases in aquaculture
- Floods and landslides: impact on crops and animals, and damage to houses and infrastructure.

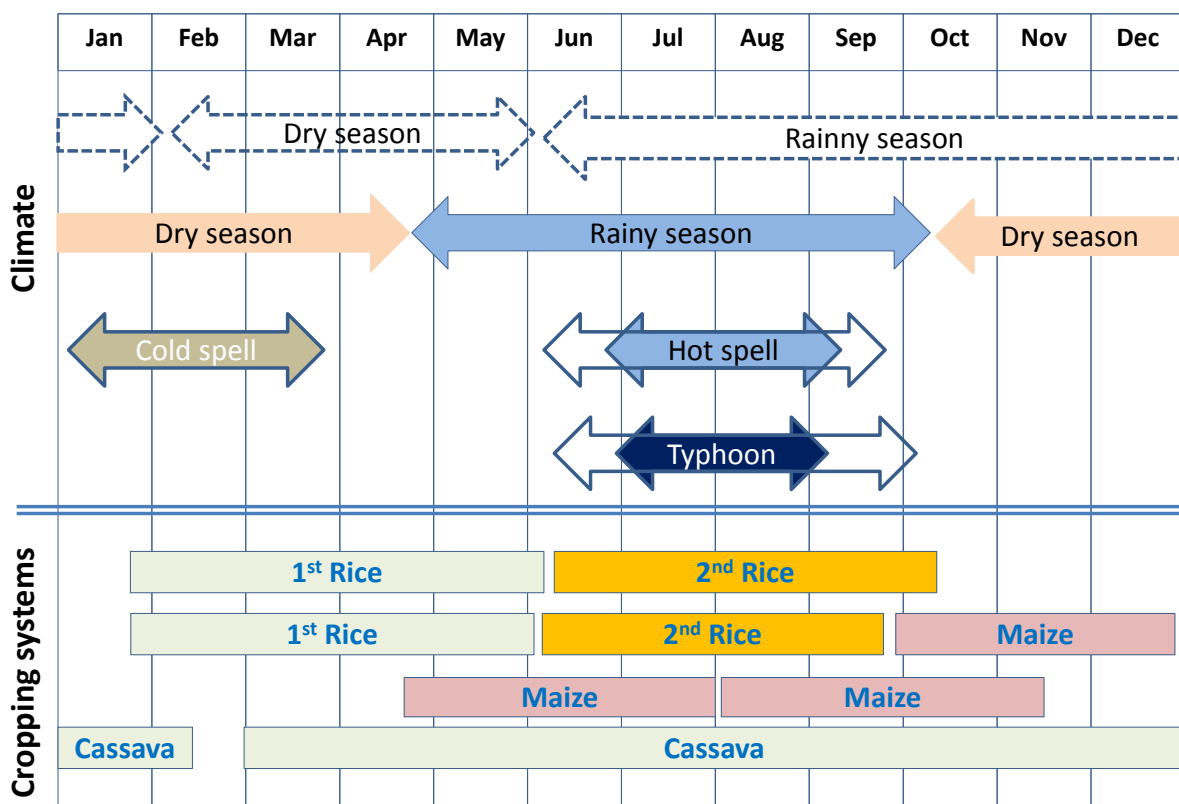


Figure 4. Crop calendar and impacts of weather variability

Farmers in Ma village have identified the following adaptive measures:

- Use crops varieties with better cold and drought tolerance. Such varieties, however, are scarce.
- Change cropping calendar: sowing the 1st crop later and the 2nd crop earlier. Use short duration varieties (but are scarce). Use advanced techniques: sowing seeds in advance in safe places, and transplant good quality seedlings later in the field.
- Use a pump to irrigate crops
- Build cages for animal; make a fire for animals when it is cold.

3.8 MITIGATION MEASURES

The province of Yen Bai has adopted initiatives to respond to climate change about 10 years ago. The main focus is adaptation and not mitigation. This is reflected in the provincial plan to respond to climate change for the period of 2011 – 2015 as approved by the Provincial People Committee in March 2012. The plan also represents the first plan of Yen Bai province where climate change (CC) was taken into consideration. In the plan, a simulation of the impacts of CC under different scenarios is presented. Accordingly, the strategic measures for the province to take to cope with CC are specified. The priority measures are:

- Communication on CC;
- Capacity building for people working in relevant areas and also for local decision makers in CC and planning activities to cope with CC;
- Capacity building in the province in forecasting CC and natural disasters;
- Develop maps of locations prone to CC and floods/landslides;
- Develop policies to support difficult communities in vulnerable locations;
- Improve infrastructure: dams, dikes, lakes, streams, canals and roads;
- Develop plans for the agricultural sector to respond to CC;
- Protect forests in the watershed areas;
- Protect biodiversity;
- Waste management; and
- People resettlement plans for communities in vulnerable locations

In the agriculture sector, the following measures were identified as a priority response to CC:

- Climate smart land use change: to grow drought-tolerant upland crops in land areas facing increasing irrigation water shortage problems;
- Use short-duration crop varieties;
- Smart change in agricultural calendars to help crops escape climate shocks;
- Use cold, drought-tolerant varieties of crops and breeds of animals;
- Adopt appropriate climate smart farming practices;
- Develop climate-smart agricultural systems;
- Develop integrated production systems: integration of animal production in crops, annual crops into perennials; and
- Grow crops of values for land protection and land fertility restoration

In realizing the provincial plan, some activities have been conducted to promote the adoption of climate-smart agricultural practices. These include The System of Rice Intensification (SRI), the Integrated Crop Management (ICM) and Fertilizer Deep Placement (FDP) for paddy rice, mulching and reduced tillage for crops in sloping lands, waste recycling, integration of animal production with crop production. Efforts, however, focused mainly on organizing training for farmers and developing demonstration models.

There have been projects in line with CC mitigation. These include:

- Government projects for forest plantation to re-green bare hills and mountains;
- A government project to develop biogas systems for recycling waste from animal production;
- Government initiatives to protect forests, especially in watershed area;
- Projects to promote ICM, IPM, FDP and SRI for paddies (by provincial DARD in collaboration with international and national research organizations and NGOs);
- The project promotes conservation agriculture (by NOMAFSI/CIRAD);
- Province's projects for developing Shan tea and new high yielding tea growing areas; and
- Projects for developing agroforestry (by DARD/ICRAF/NOMAFSI)

In Ma village and Vinh Kien commune, there are no activities targeted to mitigate the impacts of changes in climate. However, there are activities that have an impact on CC mitigation. These include promoting waste recycling (biogas project), developing tea area, developing fruit production area, developing forest plantation in the commune of Vinh Kien and in Ma village, and training on proper fertilizer and pesticide application.

3.9 CLIMATE CHANGE PERCEPTION

The government of Yen Bai province has invested in assessing the impact of climate change in the province, developing scenarios, and planning on how the province can cope with climate change. It has become a common topic in planning meetings.

Similarly, climate change has become a common topic in Ma village. According to 28 key informants and farmers participating during the FGDs, especially the older group, climate change is happening and impacting on the agriculture and other aspects of life of local people. They noted that the temperature, rainfall, beginning/ending of seasons in a year, and climate have changed and extremely different when compared what they were 20 to 30 years ago. The changes they have noted, are below:

- Rainy season and rainfall: 30 years ago, rainy season lasted from June/July to January next year with somewhat evenly distributed rains. Nowadays, rainy season starts in late March/April and ends in September with very unevenly distributed rains. During rainy season, there are months with lots of rain and also months with no rain at all.

- Drought and water level: 20 years ago, drought was rare. Water levels in Thac Ba lake and river systems were higher. Every household had at least a pond for fish farming and for other purposes. Nowadays, severe drought problems are experienced during October to March of the next year. For a number of years, during January to April, there are no rains at all. People attributed drought not only to CC but also to the loss of forests. Seasons: 30 years ago, there were four distinct seasons: Spring (January to March), Summer (April to July), Autumn (August to September), and Winter (October to December). Nowadays, Summer and Winter last longer with Summer from late March to early October and followed by Winter until end of January. Extreme climate extremes: Nowadays cold spells occur more often and last longer, causing more damages. Before, cold spell lasted only 1 to 2 days very time it occurred; nowadays it often lasts 5 to 7 days, even longer. Since 2008, there are long cold spell of up to more than a month, causing the deaths of many cattle heads and damage to rice fields.
- Natural disasters: Nowadays, floods occur more often and more heavily causing serious landslide problems. Frost also occurs more frequent nowadays when compared to 20-30 year before.

The key informants and FGD participants mentioned that no significant attempts have been made to help Mạ village mitigate and adapt to climate change, particularly in agriculture. They recommended that organizations such as provincial DARD, district DARD, district Extension Station, provincial DONRE, district DONRE and the Commune People's Committee should cooperate and coordinate their activities for better support to farmers in responding to climate change, and for strengthening media campaigns to raise awareness and commitment of all stakeholders.

3.10 INSTITUTIONAL LANDSCAPE AND GOVERNANCE

The lowest administrative level in Vietnam is commune. Each commune is divided into villages. On average, the number of villages in a commune is between 10 and 20. In Vinh Kien commune there are 15 villages, including Mạ village. The governance structure in a commune is shown in Figure 5.

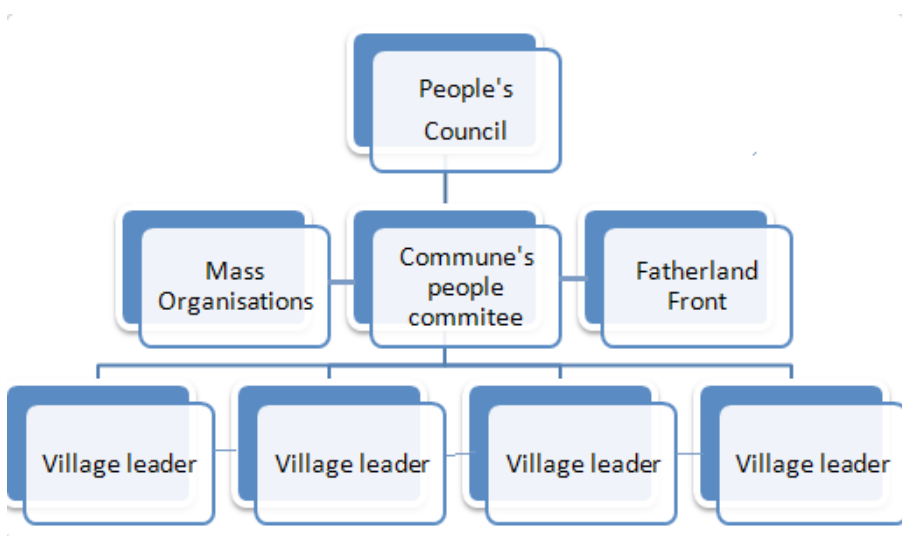


Figure 5. Governance structure of a commune in Vietnam

The People Council (PC) has the highest power. The PC is elected by the people in the commune. The commune's People Committee (CPC) is selected by the PC. The PC supervises the activities of the commune's People Committee and decides on the commune's main policies and strategies for socio-economic development.

The CPC implements all policies and strategies approved by the PC, and oversee activities related to production, trading, natural resources exploitation and management, environmental protection, livelihood development, and food security, food safety in the commune. The CPC is the liaison between the community and other organizations in implementing plans, programs, projects and activities in areas of agriculture, forestry, natural resources management, disaster risk management, and more. The CPC also monitors and supports the implementation of activities related to food security, food safety, agriculture, forestry, and natural resource management. The PC also deploys all the national and provincial plans for agriculture, forestry and natural resources management at the commune level. The PC realizes its functions through the village leaders.

The Fatherland Front has the role to unite people in the commune and support the CPC in realizing its functions. Mass organizations include women union, youth union, farmers association, elderly association, and veterans association. These organizations support the CPC in implementing policies, strategies and in supervising the implementation of activities in the communes. Mass organizations and Fatherland Front also play the liaison role between the PC and the CPC. They often provide the PC with feedbacks from people.

In the commune of Vinh Kien, the women union and farmers associations act actively and thus often are selected as the focal point for implementation of activities. They are often involved in organizing trainings and visit to farmers or building demonstration models on technical innovations in animal and crop production.

3.11 `CURRENT AND PAST NATURAL RESOURCE MANAGEMENT INITIATIVES

The main status and trends of NMR management in Yen Bai province in general and in Ma village in particular is presented in Table 5.

Table 5. Natural resources trends in Ma village

Resource	Status in the past	Current status
Forest	<p>Before 1970 there were natural forests in Ma village characterized by the richness and diversity in plant and animal resources.</p> <p>By the year 2000, the forest resources have degraded due to over-exploitation, poor management, and destruction of forests to bring land under the plough. About 10 years ago, all forest land areas were assigned to households for planting of forest trees or to Thac Ba Forestry Farm to regrow the forests.</p>	<p>There are 2,200 ha of forests (forestry land) in Thac Ba area, which belong to some communes in Yen Binh district (Vinh Kien, Phuc An, Vu Linh communes). The majority of these forests is managed by Thac Ba Forestry Farm. Ma village manages about 220 ha of this forest land.</p> <p>All forest land area of Ma village (220 ha) has been assigned to households for forest production development. The number of households with forestry land accounts for about 70% of the total 182 households in the village, with a land tenure period of 50 years (except for few cases with longer land use tenure period).</p>
Land	<p>Before 1970, when Thac Ba hydropower plant had not been built, the Thac Ba lake area was rice fields, forests, and residential area.</p> <p>According to the farmers during the FGDs, the cultivated lands of Ma village in the past were of better quality. Soils were most fertile. Lesser fertilizers were not used compared to what is practiced today.</p>	<p>The cultivated agricultural land areas were reduced with the construction of Thac Ba hydropower plant.</p> <p>The lands are degraded. Soil erosion has been caused by slash and burn practice, and application of unbalanced fertilization level (too much Nitrogen, and not enough Phosphorus and Potassium).</p> <p>The area of double rice cropping land also reduced due to the increased problem of irrigation water shortage.</p>
Water	<p>Before 2005, the water in Thac Ba lake and also in the local river systems were "clean" as described by the farmers during FGDs. Local people could use the water for animals and for household use.</p> <p>Natural aquaculture resources were plenty and diverse. After 2005, water pollution is a significant problem in production and human consumption.</p>	<p>Water quality much reduced; water pollution in all lake and river systems is happening at an alarming speed.</p> <p>Local people no longer can use water from rivers for their animals to drink.</p> <p>Water level in river systems and the lake has dropped, causing problems in irrigation, animals use, and human consumption. Naturally growing fishes, shrimps, in lake and river systems have reduced.</p> <p>Reasons (as listed by the farmers during the FGDs) are: (i) too much and improper use of fertilizers and pesticides for crops; (ii) improper management of waste from animal production, human living activities, and from cassava processing facilities; (iii) overexploitation of naturally growing fishes by local farmers, and (iv) destruction of forest.</p> <p>Recently, realizing the problems, local authority started to pay attention to restore water quality, as well as the biological resources in the rivers and lake. Not much result, however, have been obtained, as the inputs spent for this is far from being enough (as farmers point out at the FGDs).</p>

Table 6. Main Natural Resource Management initiatives in Vinh Kien commune and Ma village

	Initiative	Main focus and results	Year started	Year ended
1	Support to waste management through biogas system (government program)	Support households to build biogas systems for recycling of waste from animal production. Up to 2014, in Vinh Kien commune, 300 households have biogas systems built and operating.	2007	on-going.
2	Support to the development of commercial scale fruit production (provincial project)	Targeting at production areas of 500 m ² – 5 ha where environmental sound practices are applied. Up to the end of 2014, over 50 households in Vinh Kien commune have been supported to develop pomelo and blue dragon fruits.	2006	on-going
3	Establishing Aquaculture Cooperative in Ma village (provincial project)	The cooperative with 30 member households have been established, which is functioning to support households to raise fish in Thac Ba lake. 60 cages for fish farming in Thac Ba lake, bringing a total return of 30 million of VND/ cage/year. The cooperative is planning to increase the number of cages and also to develop 'net house fish raising' in Thac Ba lake.	2012	on-going
4	Planting new high yielding tea to replace the old one with low yield and profits in plantations (provincial project)	A total area of 13 ha in Vinh Kien commune has planted with new varieties using advanced techniques.	2010	2014
5	Support to re-greening of hills and mountains (government project)	In 2012, 102 ha of forest were planted, made Vinh Kien the commune with the highest forest coverage in the province		on-going
6	Capacity and awareness raising (provincial and national extension programs)	Some training sessions organized for farmers on improved techniques for crop/ tree management in general. No training sessions yet on CC, CC adaptation and mitigation practices in agriculture.		
7	Research for development of sustainable cultivation practice for cassava in sloping lands (CIAT/NOMAFSI/RCRDC)	Participatory design and validation of soil erosion control practices (mulch, reduced tillage, grass hedgerows) and testing new varieties of cassava	2014	on-going

3.12. ORGANIZATIONAL LANDSCAPE

A total of 29 organizations was identified to have roles in food security, food crisis, and natural resources management (NRM) operating at different levels: five beyond the province level, 15 at the province level, 4 at the district level, 2 at the commune level, and only 1 at the village level (Table 7). Nineteen of these organizations have activities related to food security, 18 on food crisis, and 19 on natural resource management. Most often organizations are involved in facilitating the access to information (technical innovations, climatic and market information) of households, and in training and demonstration of new technologies. The lone organization identified present in the village was identified to be focusing on food security.

Table 7. List of organizations operating in Ma village and their role

Name of organization	Operational of sphere (*)	Role in		
		FS**	FC	NRM
Provincial DARD (and its department and units)	4	X	X	X
Provincial DONRE (and its department and units)	4	X	-	X
Yen Bai Seed Crop Center	5	X	X	X
Thac Ba Hydropower plant	5	-	-	X
Thac Ba State Forestry farm	5	X	-	X
District DARD	3	X	X	X
District DONRE	3	-	X	X
District Extension Station	3	X	X	X
Commune People Committee	2	X	X	X
Village Council	1	X	-	X
Center of Preventive Medicine	4	-	X	-
Provincial Commune Health care Station	4	-	X	-
Fishery cooperative of Ma village	1	X	-	-
Farmer Association	4	X	X	-
Fatherland Front	4	-	X	X
Elders Association	4	X	-	X
Youth Association	4	X	-	X
Veterans Association	4	-	X	-
Army Barracks	4	-	X	-
Wood and cassava processing facilities	4	X	-	X
Yen Bai Seafood Company	4	-	-	X
Agribank	4	X	X	-
Bank of Social Policy	4	X	-	-
Local inputs stores	2	X	-	X
Local wood and cassava processing facilities	3	X	-	X
NOMAFSI	5	X	X	X
CIAT	5	X	-	X
Cao Minh church	4	-	X	-
Red Cross	5	-	X	-
Total		19	18	19

(*) Operational sphere: 1= village level; 2 = commune level; 3 = district level; 4 = provincial level; 5 = beyond the provincial level

(**) Role: FS= Food security; FC = Food Crises and NRM= Natural Resource Management

Figure 6 illustrates the flow of information and connection between organizations with most important roles in agriculture, forestry, natural resources and environment in Ma village.

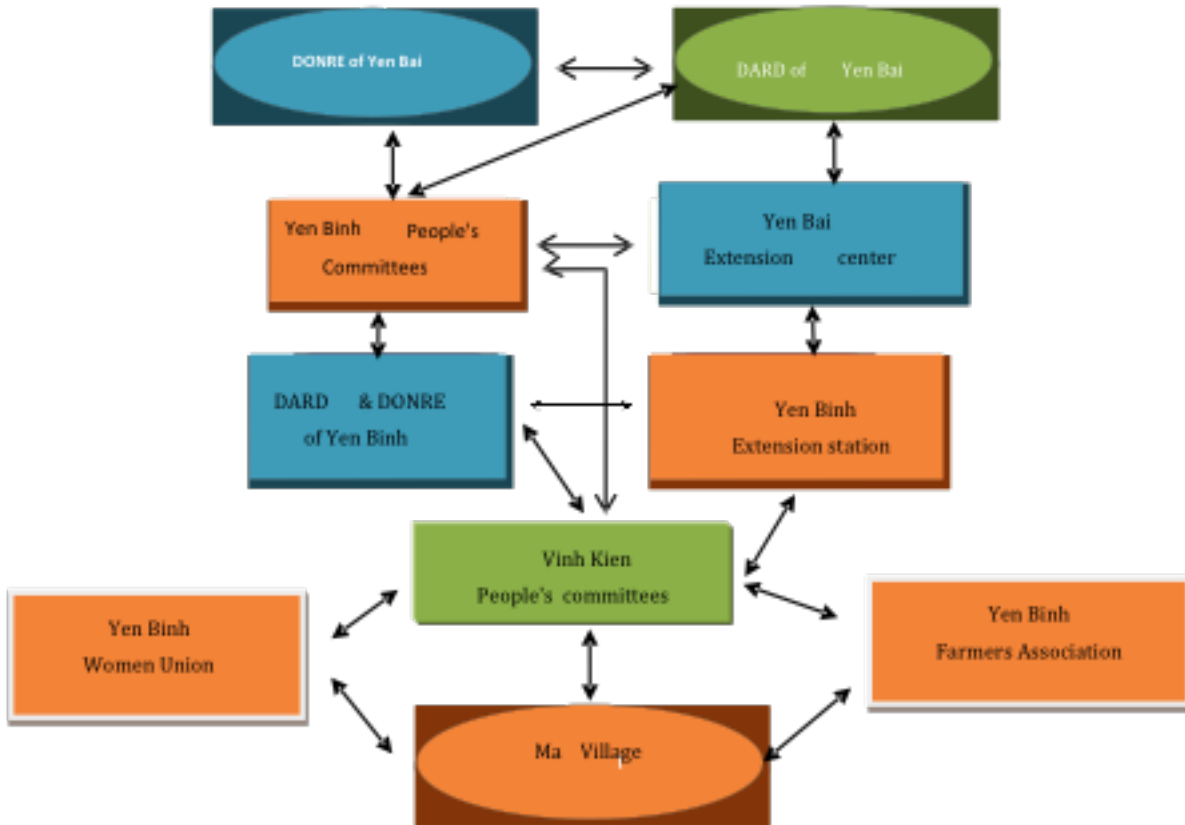


Figure 6. Flows of information and connections between organizations

Roles of the most important organizations are as described in more detail in Table 8. These organizations have been identified by farmers during the FGDs and in consultation with NOMAFSI and CIAT experts. Further descriptions of activities, roles and importance of the organization in Ma village can be found in the OBS and VBS reports of this village.

Table 8. Roles of the most important organizations

	Organization	Operation area	Main activities and roles
1	Department of Agriculture and Rural Development of Yen Bai province (provincial DARD)	Yen Bai province	<p>On the behalf of Yen Bai Provincial People's Committee (PPC) realizing the government management over agriculture, forestry, irrigation, rural development, disaster risk management, food safety and food security in the whole province;</p> <p>Formulating long- and short-term plans for provincial agriculture and forestry production, including plans for CC adaptation and mitigation in agricultural sector;</p> <p>Deploying plans, programs, projects and activities in the area of agriculture and forestry in Yen Bai province;</p> <p>Building capacity in agricultural and forestry production, post-harvest, and disaster risk management for farmers and related organizations in the province;</p> <p>Providing extension services and consultancy service to farmers and relevant organizations in the province;</p> <p>Implementing international cooperative activities for agriculture and rural development in the province.</p>
2	Department of Natural Resources and Environment of Yen Bai (provincial DONRE)	Yen Bai province	<p>On the behalf of Yen Bai Provincial People's Committee (PPC) realizing the government management over the natural resources and environment in the province, including land, water, mineral, geology, environment, meteorology, geodesy and cartography resources;</p> <p>Providing services related to environmental and natural resource exploitation, use and management;</p> <p>Building capacity environmental and natural resource exploitation, use and management for farmers and related organizations;</p> <p>Planning long- and short-term plans for provincial natural resource use, exploitation and management and for environmental protection, pollution mitigation and CC change adaptation and mitigation;</p> <p>Deploying plans, programs, projects and activities in the area of natural resource management and environment in Yen Bai province;</p> <p>Implementing international cooperative activities in related areas;</p>
3	Yen Bai Crop Seed Center	Yen Bai province	<p>Conducting researches in the field of plant breeding and seed production (mainly for rice and maize only);</p> <p>Producing, trading and supplying seed of crops (mainly hybrid rice and hybrid maize);</p> <p>Transferring techniques, mainly for intensive cultivation of new varieties, to farmers in the province;</p> <p>Introducing, testing and releasing new crop varieties in the province;</p> <p>Realizing inspection of locally produced seeds.</p>

	Organization	Operation area	Main activities and roles
4	Department of Aquaculture of Yen Bai province (belonging to the provincial DARD)	Yen Bai province	Practicing, on the behalf of the provincial DARD, the state management over the aquaculture and fishery resources in Yen Bai province; Producing, trading and supplying seed fishes (fingerlings) for farmers in Yen Bai province; Transferring aquaculture and fishery techniques to farmers; Implementing activities to support farmers in aquaculture and fishery.
5	Department of Agriculture and Rural Development of Yen Binh district (district DARD)	Yen Binh district	Functioning, on the behalf of Yen Binh district People's Committee (DPC), to realize the state management over agriculture, forestry, aquaculture, irrigation, rural development, disaster risk management; safety of foods and of agricultural, forestry and aquaculture products in the district; Playing the liaison role between the farming communities and organizations working in the district for supporting communities in agriculture and forestry production; Implementing activities supporting farmers in agriculture and forestry at the district level; Cooperating with organizations working in the district to implement researches and transfer technologies in agricultural and forestry production to local farmers.
6	Department of Natural Resources and Environment of Yen Binh district (district DONRE)	Yen Binh district	Functioning, on the behalf of the Yen Binh DPC to realize the government management over the natural resources and environment in the district; Playing a liaison role between the local communities and organization's working in the district to support communities in natural resource and environment use, exploitation and management; Implementing activities supporting farmers in natural resource and environmental protection, use, exploitation and management; Cooperating with organizations working in the district to implement researches and transfer technologies in natural resource and environment protection and management to local farmers.
7	Yen Binh District Extension Station	Yen Binh district	Training farmers in agriculture and forestry production in Yen Binh district; Cooperating with other organization's to develop demonstration models on technical innovations in the field of agriculture and forestry; Cooperating with other organization's to implement researches for technical innovation development/validation in the field of agriculture and forestry; Providing technical support to local farmers in crop production, animal husbandry, pest control, fishery production and forestry; Supporting farmers to access to input sources, including information sources.

	Organization	Operation area	Main activities and roles
8	The Vinh Kien Commune's People's Committees (CPC)	Vinh Kien commune	<p>As the local government at the community level, CPC is responsible for the state management over all activities related to production, trading, natural resources exploitation and management, environmental protection, livelihood development and food security, food safety in the commune;</p> <p>Playing the most important liaison role between the community and other organization's in implementing all the plans, programs, projects and activities in all aspects (agriculture, forestry, natural resources management, disaster risk management..);</p> <p>Monitoring and supporting the implementation of activities related to food security, food safety, agriculture, forestry, natural resource management;</p> <p>Deploying the local plans for agriculture, forestry and natural resources management at the commune level.</p>
9	Vinh Kien commune's Farmers' Association	Vinh Kien commune	<p>Playing a liaison role between farmers and input/service providers (input suppliers, extension service, microcredit, local traders) so that help farmers to negotiate for achieving better deals;</p> <p>In many cases playing the core role in awareness raising and capacity building for farmers through organizing meetings and discussions among household members;</p> <p>In many cases playing the leading role in adoption of advanced techniques transferred by the extension network or by some projects;</p> <p>Supporting household members in developing household agricultural production through providing micro-financial support and experience sharing.</p>
10	Vinh Kien Women Union	Vinh Kien commune	<p>Playing a liaison role between women and women cares/ supporting sources in order to facilitate the implementation of supporting-to-women- activities;</p> <p>In many cases playing the core role in awareness raising and capacity building for women, or representing the women in raising the voice for their rights and to increase the gender equity at the community level;</p> <p>In many cases playing the leading role in adoption of advanced techniques transferred by the extension network or by some projects, especially those focused on women's benefits;</p> <p>Supporting women members in developing household nutrition and production through providing micro-financial support and experience sharing;</p> <p>Cooperating with other organizations to organize training sessions in production techniques, food safety and nutrition for their members and also for other people in the commune</p>
11	Cassava procession facility	Vinh Kien commune	<p>Buying cassava roots from farmers in Ma village and nearby villages to produce cassava wet starch;</p> <p>Selling wet starch to different markets;</p> <p>Selling byproducts of cassava root processing to farmers for use to feed pigs;</p> <p>(Not only this, but all the 5 cassava procession facilities in Ma did not provide any inputs/support to farmers. The purchase of cassava roots was just realized at the harvest time, and without any contract.</p>

	Organization	Operation area	Main activities and roles
12	Wood processing facility	Vinh Kien commune	<p>Buying timbers from farmers in Ma village and nearby villages to process into plywood; Trading plywood (selling to Chinese markets or domestic markets). Beside selling plywood, the wood processing facilities in Ma village also sell waste wood for paper companies in PhuTho province. Like with cassava procession facilities, the wood factories also did not provide farmers with any inputs/supports in advance. No contract for the buying-selling activities.</p>
13	Production inputs store	Vinh Kien commune	<p>Trading production inputs, mainly fertilizers and small working tools, and thus having role in facilitating farmers' access to these inputs required for crop production and forestry; Often selling fertilizers to farmers, but get payment latter (only after farmers have harvested their crops, with higher price), and thereby indirectly providing support to farmers in crop production. Sometimes, with the new fertilizers, this agency and others input stores in the region could coordinate with the input producers to provide farmers with leaflets or handbooks guiding the use of the fertilizers. Selling on debt was applied only for farmers, in whom the store owner could trust. The interest rate was of 5% for livestock feed and 10% for fertilizers per year.</p>
14	Animal feed and crop seeds store	Vinh Kien commune	<p>Trading production inputs, mainly animal feeds, and thus having a role in facilitating farmers' access to these inputs required for crop production and forestry. Sometimes selling feeds to farmers, but get payment latter (only after farmers have sold their animal, with higher price), and thereby indirectly also providing support to farmers in crop and animal production. Similarly to the above input store, selling on debt was applied only for farmers in whom the store owner could trust. The interest rate was about 5% per year.</p>

From the above mentioned on the roles and involvement of organizations in NMR, FS, FC, production and processing/trading of agro-products it is seen that there are a number of stakeholders having a role in Ma village agriculture, forestry and socio-economic development as well as in CC mitigation and adaptation. The stakeholders can be divided into some groups as below:

1. Government units: These are the People Committee at the provincial, district and commune levels. The Vinh Kien CPC is directly responsible for Ma village and the whole commune of Vinh Kien. The CPC also plays a liaison role for implementing all other activities on agricultural and forestry production, FS, FC and NRM in the commune.
2. Government agencies/organizations at the provincial and district levels: Provincial DARD and its units (crops department, plant protection station, extension center, aquaculture department), DONRE and its units, and their stations at the district level (district DONRE, district DARD, district extension center, district plant protection station) are responsible for implementing relevant national and provincial programs in the whole province, including Ma village. They also play the role as a focal point for

implementation of international cooperative projects, or of projects being implemented by national research institutions in the fields of agriculture, forestry, NRM, and CC.

3. Government research institutions: NOMAFSI and other institutions under VAAS, VNUA, TUAF and some others institutions are involved in or providing advisory inputs for the provincial institutions to implement projects and programs. They, especially NOMAFSI as the leading institute in R4D of agriculture in the NMR, are often the focal point/leaders of national projects and programs in the region. They are also key partners in implementing international cooperative activities.
4. Local social organizations: women union, youth union, farmers association, elder association, Fatherland Front has a role in facilitating information sharing, farmer-farmer learning, awareness raising, and capacity building. They, especially the women union and farmers associations, often play a liaison role in developing links between farmers with extension and those with input provision services.
5. NGO: In Ma village as well as in Vinh Kien commune at the present there are no activities with involvement of NGOs.
6. Private sector: The local wood and cassava root processing facilities, input providers and collectors of agro-products play important roles by linking production with the markets. The processor's functions are of vital importance for cassava and forestry tree growers in Ma village given they are the outlet for these farm produce. They also create jobs for farmers in Ma and in other villages and communes. These stakeholders' commitment and involvement will also be of key value for solving the problems of water pollution; waste from their processing activities is considered the most important source of pollutants to water and the environment.

3.13 INFORMATION NETWORK

In Ma village, and in the province of Yen Bai as a whole, the most important information channels are through the mass media such as the television and radio. There are central government and local television channels and radio stations. In addition, each commune also has radio network, broadcasting at certain times in the day, mainly early morning and evening. From these channels, the farmers get information on market prices, weather, and natural disasters. There are also programs on VTV that aims to disseminate technical innovations for crop, animal, and aquaculture productions. Given almost all the households have television, this is really an important channel for information dissemination.

Other important information channel is through local traders, such as the ones dealing with input supply and collecting/processing of agro-products. These people often provide information on market price, and some techniques related to use of inputs, varieties, bred and equipment. They may also disseminate information on sources of crop seeds and animal breeds.

Information sharing by extension officers and technical staff, researchers, either officially through meetings/training/workshops or in officially through personal communication is of high value for households to improve their knowledge and skill in production, post-harvest of their crops and animals, as well as in natural resources management.

Not less important is the farmer-farmer information sharing channels. Through various ways farmers can communicate to one another and share information, experience, and skills. Women unions, farmers associations, elder accusation, youth union and other organization have roles in facilitating farmer-farmer information sharing. The local government at all the levels, from provincial to community has the responsibility to disseminate information on government policies and regulations.

Nowadays, information is very quickly shared via the mobile phones. The general information network present in Ma village is shown in Figure 10 below:

- Information from the province and central level include: information from VTV channels, Yen Bai TV, radio, newspapers, magazines, other printed materials (e.g., manuals, technical guidance, more);
- Communication facilities at the district and commune level include: television, radio, printed materials;
- Organizations at provincial, district and commune levels (see Table 8);

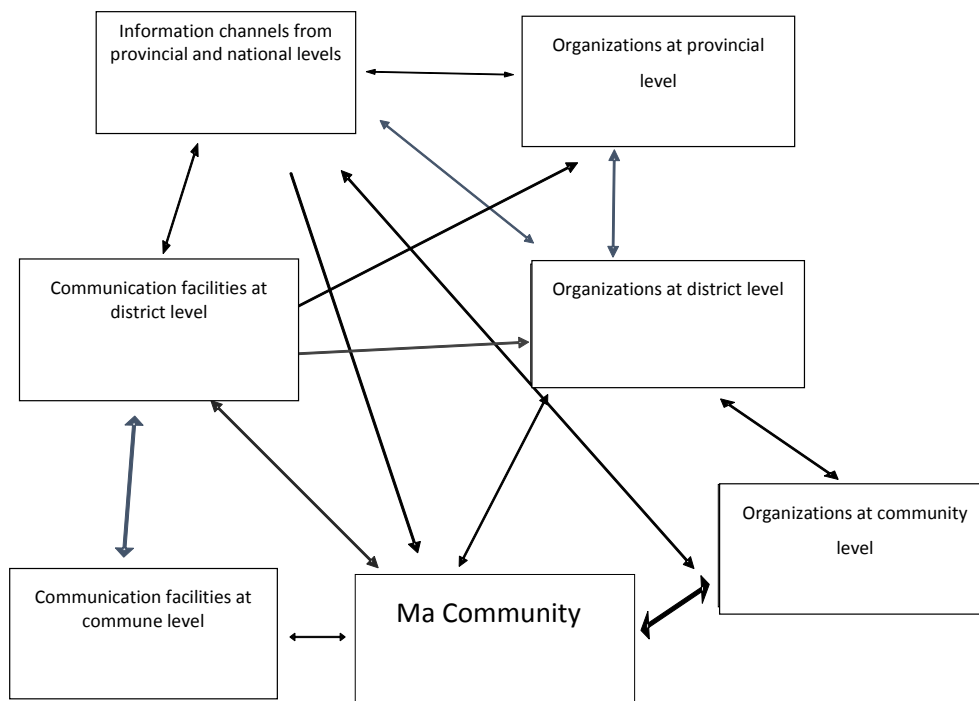


Figure 7. General information network to Ma community

Problems with information access were identified by farmers during the FGDs. These were:

- There are many entertainment programs on televisions and radios, and thus people do not pay attention to production and technical information, except a very small number of people who have a strong interest on some information;
- The private traders may give wrong information so that they can sell their goods (inputs, equipment, seeds) at higher price and can buy agro-products of farmers at low price;
- Farmers have limited internet connectivity; Technical guidance and training materials produced and supplied by DARD, DONRE or by some projects may be difficult for local farmers to understand and follow;
- Very few training sessions have been organized in Ma village, especially on CC, FS, and NRM.

3.14 SOCIAL AND GENDER DIFFERENTIATION

Vietnam has a long history of feudal regimes with the inherent culture of no respect to women. In the past, in both society and family, the women were regarded as 'second' class. Women had no voice, no rights. Nowadays, there are national policies protecting the rights of women and promoting their development. The country is also a member of international agreements that remove the discriminations between men and women, and promote the rights of children. Great efforts have been spent to support women to develop their capacity and realize their rights. Women themselves have been working hard for their own and their children's rights.

Women and men in Vietnam in general, Yen Bai province and Ma village in particular, have equal rights. In many families, however, husbands still consider themselves as 'more developed'. This is especially true in remote rural communities. Still, even in so called "gender-equal families and communities", there are differentiations between men and women, and between the rich and the poor.

Women often are responsible for housework such as taking care of small children and household chores. In agricultural production, women often do more jobs and have more voice in making decision relating to short-term investments like planting and harvest of annual crops, selling of food products, purchasing of household commodities. On the other hand, the men have more role in making decision on long-term investment such as cultivating perennial plants, developing an integrated farming systems, and selling and purchasing goods/products of big value.

When a family faces problems of food shortage, the wife has to bear the most. She has to prepare meals for all in the family and thus has to find food, which is not an easy work. If the family has no money for daily expenses, the wife is the first one to give up what is due to her. Following the wife will be eldest or older daughter/s in the family. They will have to give up their dreams to save money for the family, and if possible they will work to earn money for the family instead of going to school. This does not mean that the husband and son/s do not have to sacrifice, or that they require their women to sacrifice for them. It is just because they are "Vietnamese women."

Table 9 shows the ratio of children giving up school in Yen Bai during 2010 – 2014. Most of them were girls. The reasons were not specified together with the statistic data provided by the provincial Statistics Office, but likely gender discrimination is one of the reasons. In remote rural areas, girls of ages from 13 year olds have to work as a main labor force in the field.

Table 9. Ratio of children giving up school in Yen Bai province (Yen Bai Statistical Office, 2013)

	Percentage of children giving up school in different school years			
	2010-2011	2011-2012	2012-2013	2013-2014
Primary School	4.35	3.34	0.92	0.01
To which girls' contribution	4.21	2.21	0.86	0.01
Lower secondary school	6.28	5.41	2.69	0.57
To which girls' contribution	4.17	4.61	2.72	0.5
Higher secondary school	18.79	18.09	4.56	2.18
To which girls' contribution	15.97	16.0	4.1	1.57

The status in Ma village is better, as it is not a remote village. Although differentiation exists between men's and women's role in various activities in both family and the village level, no significant problems were recorded during the FGDs and personal communications in term of gender violation and discrimination.

FGD results on how men and how women often spend their 24 hours a day during the busy time in May (when the 1st rice crop is being harvested and the 2nd to be planted) show that, in the family:

- Men often do harder jobs requiring more energy.
- Women do lighter jobs, and are responsible for housework and taking care of small kids.
- Women often get up early in the morning to do housework.
- Women return home earlier from the field to do housework.

Figure 8 shows a daily time allocation for activities of the men and women as shared during the FGDs. Discussion results on concrete on production activities show that (table 9):

- For annual crops and forest tree production: men do the hard work, mainly at planting and harvesting times, like land preparation and transportation, while women take care of plants along the whole seasons.
- For vegetable production: only women do the job
- For animal husbandry: men take care of goats and cattle, while women take care of pigs and poultry.
- For fish raising: men mainly in charge for all the work
- For harvesting of naturally growing fish: only young men
- For wage to earn money: both men and women do different jobs when they are free from their field activities. They normally work for the wood and cassava processors in the village and in around areas, and also for other private companies in the province.

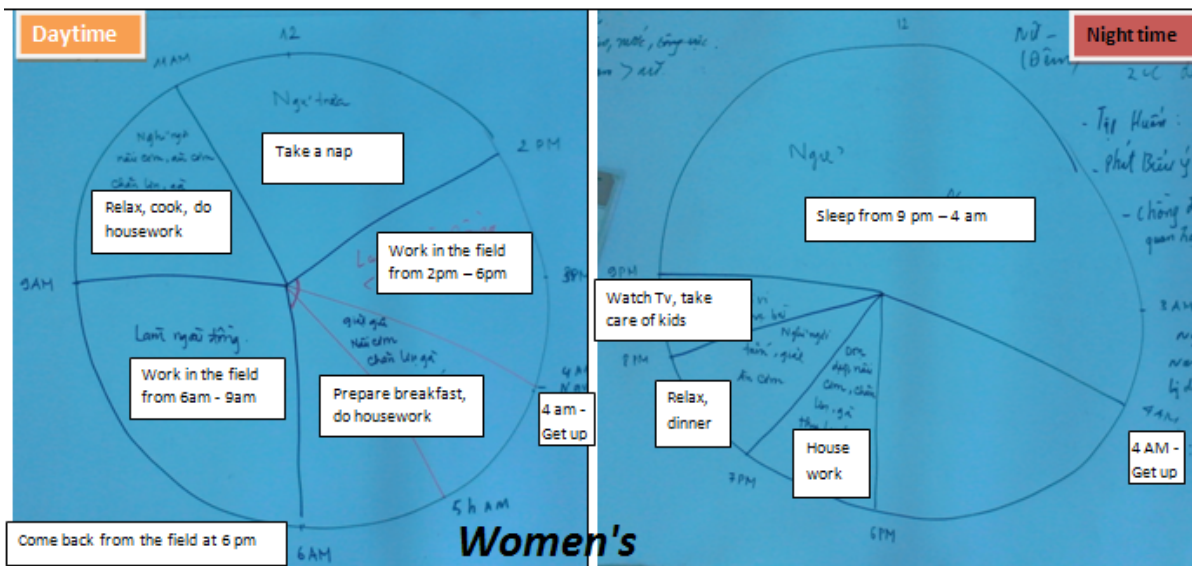
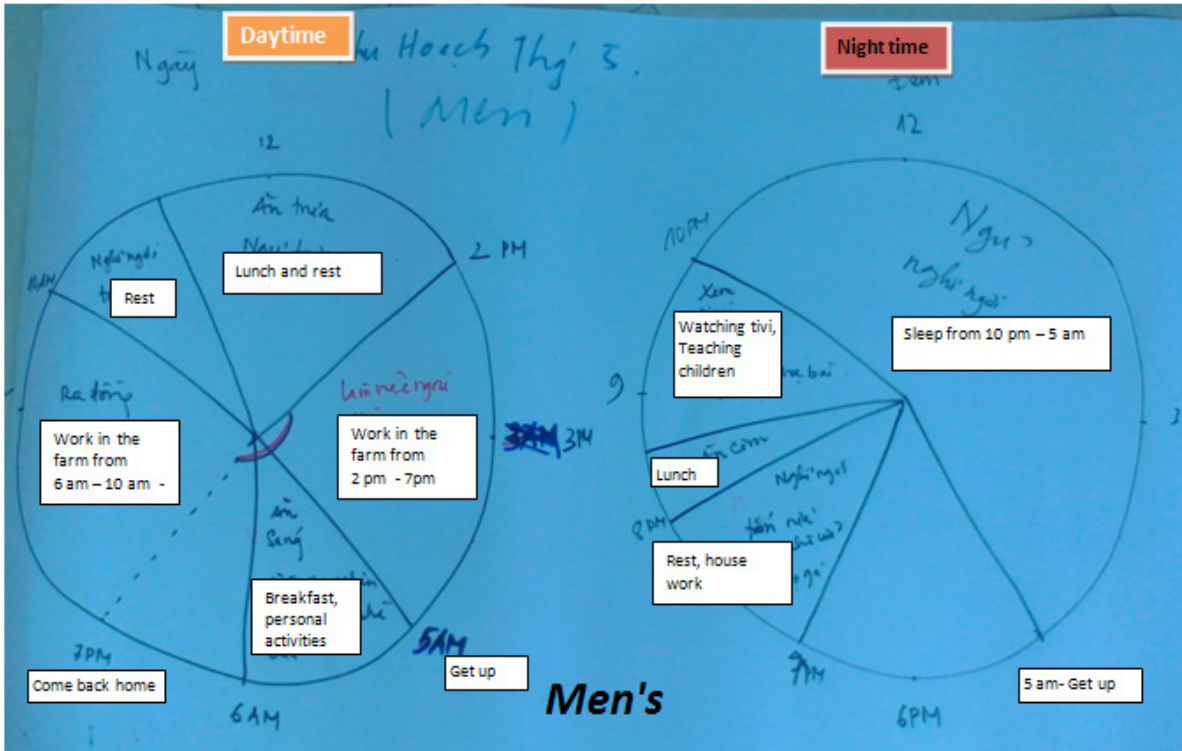


Figure 8. Works of men (above) and women (below) during 12 hours daytime (left) and 12 hours nighttime (right)

Table 10. FGDs results on the livelihoods and the role of men/women

Livelihood strategies	% of HHs	Scale/purpose	Who are involved?
Crops			
Rice	100%	Over 400 m ² /household Only for HH use	Men do hard jobs, mostly at the planting and harvest time like land preparation and transportation.
Maize	80%	Only for commercial purpose	Women do lighter job, i.e. they are also mainly in charge of plant management during the season.
Cassava	90%	Only for commercial purpose	
Tea	95%	300 – 400 m ² /household; For both HH use and for selling (50/50)	Elder and children help at the busy time with light jobs (harvest time mostly)
Forest trees	95%	For selling	
Fruits	100%	For hh; Some hh grow litchi, pomelo and dragon fruits for selling	
Vegetables	100	For HH use (only 1 HH sells)	Women
Animal and aquaculture			
Goat	10%	Selling	Mostly men
Pigs	100	Selling	Women
Cows	20 hh	Selling	Mostly men
Buffaloes	40-50 hh	Selling	Mostly men
Poultry	100%	Selling and hh use (50/50)	Mainly women
Cage fish raising	30 hh	Selling	Mainly men
Exploiting naturally growing fishes	35 hh	Selling, hh use	Young men
Other livelihoods			
Wood processing	15 hh	1 facility/hh; each requires 14-15 persons to work daily	Men and women
Cassava processing	5 hh	1 facility/hh; each requires 3 persons to work during 3-4 months at the harvest time of cassava	Men and women
Transport service	15	1 truck/hh	
Wage	85% men and women	Only during field-work-free time	
Retiring salary	10 persons		
Gov. officers	5 persons		

FGDs results also show that men are more involved in social affairs. The reasons, and mentioned by both men and women FGDs are that men are better with communication and often men are head of the households. It was also revealed during the FGDs that leaders of the local social organizations are mainly men. Women participate more in training on crop and animal production because they are the ones doing most of the work. Men and women, however, are equal in access to education, health care services and in making decisions concerning the household economy.

Both the men and women are affected by by CC. The women, given they are in charge of crop management, are likely to be more affected.

3.15 HEALTH/NUTRITION PROFILES AND OTHER LIVELIHOOD OUTCOMES

In Ma village, as well as in Yen Bai province in general, human health care has improved during the past decade. In most of the commune, there is a health care station and a hospital in each district. However, the commune and district health care systems have poor health care facilities and lack equipment and quality doctors and nurses. Local people with severe illness often go to the hospitals in cities or in Hanoi.

Community health care service has also improved, in particular the vaccination services. There are programs of government to vaccinate all children against all common diseases. During the past 10 years, no epidemics occurred, except the red-eye disease that often occurs in July to August.

There is a provincial program on nutrition for children. As a result of this project, a network of nutrition infrastructure has been developed. Now, each commune has a permanent nutrition staff. Communication on nutrition has developed focusing on mother and child care, food safety, child nutrition, and healthy meals. Trainings were organized for pregnant women and for mothers of children under 5 years old. Food of high nutrition values was provided to children with severe malnutrition problems. Pregnant women and children were also provided with vitamin A, poly-vitamins, folic acid, and iron pills.

In Ma village, the prevalence of malnutrition among children is 5% (11% during 2010 – 2011), and no epidemics occurred during the past decade, according to the village leaders and participants to the FGDs.

4. NEEDS ASSESSMENT

4.1 STRENGTHS AND WEAKNESS

Yen Bai Province, in general, and Ma village, in particular, has great potentials and strengths to develop their agriculture and forestry and to cope with climate change. They are located not far from Hanoi and China. There are good roads connecting them with cities, border gates and other provinces. They have diverse climatic conditions, diverse natural resources, diverse ethnicity with diverse cultures and traditions. They also have policies and regulations supporting production, livelihoods and food security, and dealing with poverty and the food crisis. They also have developed plans for responding to climate change, and have various organizations and stakeholders. They already have developed links to markets for some products and can process some main crops.

Meanwhile, one significant weakness is the poor coordination and links between stakeholders. According to key informants, activities have been done separately by different organizations; no coordination between initiatives. Latter initiatives do use the results and lessons from previous ones. The second weakness is attributed to the limited capability of the human resources. People doing work in the field of climate change, especially at the district, commune and village levels lack knowledge and skills. They also do not have much financial input to realize the plans developed for climate change adaptation and mitigation,

and do not have the capacity to remove the barriers to adoption of CSA practices and to build CSA systems as this requires comprehensive approach and involvement of all stakeholders. Facing great problems of water pollution, but they do not have capacity, in terms of both technology and finance.

4.2. PRIORITY ISSUES

4.2.1 *Natural resources and environment*

Natural resources and environment degradation and pollution are the main issues causing increasing problems to production and life of people in Yen Bai Province and Ma village. To overcome these problems, the FGD participants recommend the following:

1. For the province of Yen Bai:
 - Build capacity for the staff working in the NRM and FS.
 - Develop a tool kit for assessing the population of environment suitable for the province
 - Raise awareness of people, including the private sectors
2. For Ma village:
 - Total loss of natural forests, severe pollution of water in all river and lake systems, and degradation and erosion of cultivated lands are really a prime issue of concern. Possible measures could be:
 - To planting forests of plants with better values for both environment and household economic income. At the moment, acacia or eucalyptus is mainly planted singly for a cycle of 5-8 years.
 - To support private cassava processors to apply appropriate options for waste management.
 - To support farmers to apply environmental sound practices for rice in paddies, cassava and maize in sloping lands, animal husbandry and for fish farming in Thac Ba lake, including also management of waste and buy products from animals and crops.
 - To raise awareness and to improve information system.

4.2.3. *Production systems and food security*

Although food insecurity problems have been basically solved in both Yen Bai and Ma village, local communities still face greater problems in improving economic profits from their production activities while improving environmental and natural resource protection. As mentioned below, net return and benefit share farmers obtain from their current production systems are low, while the erosion of soils, degradation of lands, pollution of water and emission of GHG from current production systems occur at high levels.

All this, in the context of the climate change and the exhaustion of natural resources as already mentioned, creates urgent needs for the implementation of the following measures:

- To introduce and promote the use of cold and drought tolerant varieties of crops and breeds of animals appropriate for the local conditions
- To promote adoption of CSA practices for rice in paddies, maize and cassava in sloping lands, including also upgrading of the irrigation systems
- To diversify cropping systems with crops of higher economic and environmental values (e.g. legumes, fruits, tea, etc.)
- To develop integrated systems of perennial and annual crops with integration of animal production.

- To support producers of fish in Thac Ba lake to apply advanced practices, especially in pest control
- To improve market links and value chains for crops and animal products, including also supporting household scale processing of cassava and tea.

4.2.3. Information systems and organizations

The main issues, as identified by local farmers and officers, are related to the lack of efficient coordination between stakeholders their implementation of their various initiatives. There are information channels and many stakeholders involved in agriculture, forestry, FS, FC, NRM and CC in Ma village and in Yen Bai province as a whole. However, there is no mechanism for information sharing and for coordination to synergize their initiatives and efforts. Limited capacity and limited commitments of stakeholders are also issues. From key informant interviews, the following are proposed:

- To raise awareness of all stakeholders, especially in CC and long-term impacts of their activities;
- To develop and implement a mechanism/s for information sharing and coordination of activities at all the levels: provincial, district, commune and village;
- To build capacity of and raise commitment of local organizations, especially the commune people committee and district DARD and DONRE, as these are directly in charge of coordination of activities by all stakeholders and play the key liaison role between farmers and other stakeholders;
- To improve information on climate, focusing also on features directly impacting on local crops and animals (at present, climate information is limited to general issues in the region); and
- To improve capacity for the community to access to and use information on markets (both input and outputs).

4.3. INTERVENTION/PERFORMANCE RECOMMENDATIONS

The following should be a priority consideration for CCAFS in planning its coming activities in Ma village:

- *Coordination and network:* CCAFS to support the development and implementation of a mechanism for information sharing between stakeholders, between sectors and within sectors, at all levels.
- *Information:* CCAFS to support the development of a database on local climate and other conditions for Ma village and Vinh Kien commune to use as a basis for planning community socio-economic development and agriculture/forestry plans.
- *Capacity and awareness:* CCAFS to build the capacity of relevant stakeholders, including research institutions (NOMAFSI, ICRAF, TUAF), staff of DARD and DONRE working at all levels, officers from commune PC, local cassava and wood processors, and community mass organizations in relevant aspects.
- *Environment and NRM:* CCAFS to support DONRE to develop appropriate tool kits for environment assessment appropriate for the local conditions.
- *Rice systems:* CCAFS should coordinate with relevant organizations (NOMAFSI, DARD, commune people committee and community organizations) to test and introduce appropriate cold and drought rice varieties and rice cultivation practices for increased rice yield, reduced greenhouse gas emissions from paddies, and increased economic efficiency to help ensure food security for farmers and their households. This may require also upgrading of the 5 km of on-farm water canals.

- *Crops on sloping lands:* CCAFS could work together with CIAT, NOMAFSI, DARD, local cassava processors, and community organizations to design and promote appropriate farming practices for controlling soil erosion while improving economic profits from maize-based and cassava-based systems taking into consideration also the value chain aspect and integration with animal production.
- *Trees on sloping lands:* CCAFS could work with TUAF, DARD, DONRE, ICRAF and local communities to promote cultivation of plants of better economic and environmental values, and developing integrated systems combining perennial and annual crops.
- *Water pollution:* CCAFS could support local authorities in defining appropriate measures to overcome the pollution problems.
- *Fish farming:* CCAFS could support the Department of Aquaculture of DARD to promote the adoption of good practices, especially for pest control.
- Both men and women farmers should be in the focus of capacity building activities as they both are involved in farming and agroforestry activities. For the women, improved capacity in crop management will be important because they are mainly in charge of managing their crops in the field. While for men, techniques for cattle and fish farming and forestry should be the priority given that men in local households often take the decisive role in this aspect.

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Annex

Guideline for desk review and key informant interview at provincial level

	Topic	Key information needed	Suggested Method of Data Collection
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

Topic	Key information needed	Suggested Method of Data Collection
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
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 (under nutrition, stunting, wasting, etc.) Projects on Health and nutrition (e.g. food supplementation, drinking water and sanitation,)	Desk Review