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*“Strengthening Capacities to Enhance Coordinated and Integrated Disaster Risk Reduction Actions and Adaptation to Climate Change in Agriculture in the Northern Mountain Regions of Viet Nam”*



**Baseline Survey of Phu Tho Province**

Phu Tho, 2012

# 1. Introduction

A detailed study was conducted in each of the 6 selected districts of the 3 provinces (Bao Thang and Bat Xat districts of Lao Cai, Ha Hoa and Doan Hung of Phu Tho, and Van Yen and Yen Binh of Yen Bai province) to deepen the understanding about local vulnerabilities, natural resource endowments, institutional setting in order to address climate risks and on locally available natural disaster prevention/preparedness strategies, and their existing strengths and demands. The findings show that communities depend largely on external suppliers for rice seeds, and thus often face problems caused by poor seed quality, untimely seed supply, especially when extra volumes are required for restoring production after natural disasters. In term of disasters, the target locations face problems of storms, floods, flash floods, whirlwind, drought, landslide, forest fire and failure of water reservoir. Up to the present, in order to mitigate risks and exposure to natural disasters, the local authorities are actively implementing the national policies as expressed in the “National Strategy for natural disaster prevention, response and mitigation to 2020”, including:

- Integrating into local socio- economic development plans the issues of disaster risk reduction (DRR) and management (DRM);
- Giving priorities to disaster preparedness, study of impacts of the global climate change, storm surge and other extreme climate phenomena in order to define and take appropriate response actions in time.
- Considering traditional experiences and lessons learnt from other regions/nations and previous activities, combining them with modern knowledge and technologies for effective DRM.
- Flowing the principles of:
  - the “four-on-the-spot” (commands, man-power, materials and logistics),
  - proactive prevention,
  - timely response, and
  - quick and effective recovery

However, in fact, there are still great limitations in DRM, and the most important are as below:

- Disaster prevention, response and mitigation activities are still passive and mainly focus on addressing their impacts and effects;
- Response to disasters is slow;
- Production systems are inappropriate in terms of preparedness to disaster risk reduction;
- Infrastructure is poor and in various locations are vulnerable to disasters;
- Forecast and warning systems do not meet the requirements, particularly with regards to disasters like flash floods, landslides, whirlwinds, etc.;
- emergency relief, damage recovery and rehabilitation are limited, sometimes are disconcerted and lack of coordination;
- Search and rescue activities are limited.

The main reasons for this include poor awareness, lack of appropriate long term development plans, poor management of natural resources and other activities, lack of supportive policies encouraging farming communities to be more proactive etc.

In partnerships with local DARD, relevant officers and staff, based on the survey findings, 6 communes were selected as target for further activities, including:

1. Dai Phac commune of Van Yen district, Yen Bai province
2. Yen Binh commune of Yen Binh district, Yen Bai province
3. Son Hai commune of Bao Thang district, Lao Cai province
4. Muong Vi commune of Bat Xat district, Lao Cai province
5. Minh Hac commune of Ha Hoa district, Phu Tho province
6. Chan Mong commune of Doan Hung district, Phu Tho province

**Survey Aspects:**

- Situation of agricultural land use;
- Main features of climate conditions;
- Situation of disasters;
- Disaster risk reduction (DRR) measures, practices;
- Policies for prevention (preparedness) disaster risks and DRR.
- Bat Xat district, Lao Cai province;

## 2. General Assessment

Vietnam is located in the tropical monsoon area, one of the five storm-prone areas of the Asia Pacific region. Therefore the country often faces natural disasters of various types. Viet Nam is prone to natural disasters, with typhoons, storms, floods, droughts, mudslides, forest fires and salt-water intrusion presenting recurring risks, especially for children, women, and the elderly. The poorest people in society are the most vulnerable to natural disasters. More than one million people require emergency relief each year. Climate change models predict that that Viet Nam is one worst affected countries globally, because of sea level rise and because natural disasters such as typhoons, floods and droughts are expected to intensify and occur more frequently.

In recent years, disasters have continually occurred all over the country, causing vast losses in human life, property, socio-economic and cultural infrastructure as well as environmental degradation. In the last decade, natural disasters such as typhoons, floods and droughts have caused significant losses. According to available data, about 8,000 people were missing or killed, and asset damage is equivalent to 1.5% of GDP. Natural disasters in Vietnam have been increasingly severe in terms of magnitude, frequency and volatility. More than 80% of Vietnam' population are living at risk of direct impacts of natural disasters

So, the effective planning, preparedness and public investment are needed to minimise the adverse impacts of natural disasters and adapt to the reality of climate change.

### 2.1. The Northern mountainous region

has the most complicated geological structure compared with other regions in the country. One third of the northern mountains consist of rocks with a thin weathered layer, which is infertile and poorly water-absorption, resulting in strong surface flow of the rain water. Mountains and hills occupy 80% of the region' land area. The forest coverage in this region is lowest in the country. The northern mountains and highlands still have much bare land and hills that cannot keep the rain water, contributing to formation of severe flash floods.

At present, mountainous regions are facing a lot of difficulties due to more and unpredictable natural calamities, longer droughts and the biggest limitation are low and unstable crop yields, under-utilization of flat lands, hunger, poverty and inappropriate exploitation of natural resources in consequence of all above stated.

Regarding 3 selected provinces (Phu Tho, Yen Bai and Lao Cai), all of them are located along the Red river. Though different in agro-climatic and socio-economic conditions, they are facing the same kinds of natural hazards like: Storms, whirlwinds, flash floods, landslides, drought, forest fires, etc. (table 1).

Table 1. Common disasters in Northern mountainous region and their vulnerability level<sup>1</sup>

Types of hazards	Geographycal region	
	<i>Northwest mountain region</i>	<i>Northeast mountain region</i>
Storms	+	+++
Flood	++++	++++
Flash flood	++++	++++
Whirlwind	++++	++++
Drought	+++	+++

<sup>1</sup> Adapted from MARD

Inundation	-	-
Landslide	+++	++
Forest fire	++++	++++
Earth quake	+++	+++
Failure of water reservoir	+++	+++

In order to mitigate risk and exposure to natural disasters as indicated above, the local authorities are actively implementing the national policies expressed in “National Strategy for natural disaster prevention, response and mitigation to 2020”, including the following musts:

- Be integrated into socio- economic development master planning and plans of every region, sector, and nation-wide.
- Give priority to disaster preparedness, study of impacts of the global climate change, storm surge and other extreme climate phenomena for appropriate response actions.
- Consider traditional experience, learnt lessons, combining them with modern knowledge and technologies.
- Include the principles:
  - Of the “four-on-the-spot” (commands, man-power, materials and logistics),
  - Proactive prevention,
  - Timely response,
  - And quick and effective recovery.

In recent years, Vietnam has made considerable efforts in improving physical and technical infrastructures for disaster preparedness. The leadership and coordination in response to natural disasters from central to local levels have made substantial progress. However, with regards to the consequences of natural disasters and the socio-economic development goals in the near future, the following limitations need to be addressed:

- Disaster prevention, response and mitigation activities are still passive and mainly focus on addressing the consequences;
- Response to disasters is slow;
- Production systems are inappropriate in terms of preparedness to disaster risk reduction;
- Infrastructure is poor in in vulnerable to disaster places;
- Forecast and warning systems do not meet the requirements, particularly with regards to disasters like flash floods, landslides, whirlwinds, etc;
- Emergency relief, damage recovery and rehabilitation are limited, sometimes disconcerted and lack of coordination;
- Search and rescue activities are limited.

The above weaknesses are due to the following reasons:

**+ Awareness:**

- Inadequate awareness of natural disasters and sustainable development, especially in terms of living in harmony with the nature;
- Dependent and inactive attitude like waiting for support rather than self-preparedness to disaster risk prevention and reduction;

- Disseminating, training and raising community awareness of disaster prevention, response and mitigation are infrequent and unsystematic; training programs of natural disaster preparedness have not been included in school curriculum.

+ *Planning:*

- Lack of synchronous planning and short of coordination among ministries, sectors and localities. Lack of due attention to the integration of natural disaster prevention, response and mitigation into local and sector's socio-economic development programs;
- Construction planning is lacking due attention to safety and flood and storm avoidance, particularly in industrial zones, tourism areas, mountainous areas, residential areas and transportation roads;
- Development planning has not been linked with environment and landscape protection and preservation. For example, upstream protective forests have been destroyed for agriculture, mining, etc.

+ *Policy and mechanism:*

- Lack of penalties for failure to obey legal regulations, and the orders of relevant authorities;
- Overlaps of functions and duties due to lack of clear responsibility assignment;
- Lack of policies to encourage disaster-related insurance purchases;
- Lack of policies to encourage individuals and organizations volunteering and participating in search, rescue and response activities;
- Lack of timely adjustment in policies on mobilization of resources for disaster prevention and mitigation.

+ *Investment:*

- Investment in natural disaster prevention, response and mitigation has not been synchronous and not met the requirements of the given situation of disaster;
- Investment in the maintenance, management and utilization of existing structures is not correspondent to the new construction investment;
- Financial allocation to some critical, approved projects such as reservoirs, dyke systems, etc. is slow and does not meet current requirements.

+ *Direction and management:*

- The directions and orders in response to natural disasters have not yet been seriously executed; the implementation is slow; dependence on leaders still exists;
- The inspection and direction of four "on-the-spot" principles are not determinedly;
- There have been wrong directions of economic development without linking with natural disaster prevention, response and mitigation;
- The lax management and protection of watershed forests, coastal and riverside protective forests have led to the degradation of forest coverage in some areas, restraining the effectiveness of flood, storm and drought control and causing unexpected dangers;
- The lax management of sand exploitation on rives and other activities on river banks have resulted in harmful impacts on flood discharge and caused erosion;
- The quality control in some particular structures was insufficient, hence, damaged structures even in case of low intensity disaster. Some structures have even hindered flood discharge or made flood more serious.

- Management of implementing progress and operation of disbursement's procedures are still slow, especially ODA;
- The management and utilization of resources for disaster recovery are sometimes lax, lack of transparency or for inappropriate purposes;
- Lack of equipments and facilities for early warning and forecasting, risk prone mapping, unprofessional operations, not bringing the combined strengths of all forces and communities into full play.

*Regarding DRR in agricultural production:*

Our National Strategies oriented to enhance farmers to produce enough food for them, improving their food security status. Once food security is achieved, local people will have more ability to cope with disasters. Emergency supply is important, but may result in producing "dependency from external aids" that needs to be addressed and overcome with by empowering farmers' capacity (both mental and physical capacities) for disaster preparedness and mitigation, especially important is to achieve seed security.

Our survey findings indicate that there are good practices which can be re-developed and applied DRR in agriculture:

- Older farmers have good knowledge and skills in production of conventional rice seeds. Before, particularly during 1960-1980, most communities were self-sufficient in rice seeds: each agricultural cooperative established a rice seed production group comprising most experienced and skillful farmers, trained them in relevant techniques and provided them with appropriate land areas and necessary supplies to produce rice seeds for the whole cooperative. This is a useful lesson and great advantage for the project to build community-based rice seed production and supply systems for overcoming the above mentioned problems of seed supply towards disaster risk management. Recorded traditional knowledge is of high values for developing advanced technology for rice seed production at household level.
- Different newly improved pure-line rice varieties are adaptable to the local growth conditions, and some local rice varieties are with good/specialty quality; and their production brings higher income to farmers. However, supports from both scientists and local authorities are necessary for communities to propagate and develop/restore these valuable rice varieties, because seed companies often consider them "rare" varieties, and hence do not trade their seeds.

To this end, we propose the following activities in the communes of the project intervention:

- Establishment of farmers' groups specialized on quality rice seed production, storage and distribution;
- Establishment of systems for sustainable production through participatory on-farm demonstration and farmers field schools on integrated rice crop management technologies; through improving capacity of local institutions including research and training ones, extension staff and farmers in rice crop management;
- Improving systems for supporting community seed production and storage, ensuring supply of quality seeds for sowing and seeds reserved for emergency cases;
- Improving agricultural production systems in such a way that enhances the local preparedness, their resilience against the impacts of extremes climate change with proactive participation of the most vulnerable groups.

### 3. Brief Description of Phu Tho province

#### a. General information about the province

**Geographical position:** Phu Tho is a midland mountainous province, located in the junction point between Northeast, Red river delta and Northwest. Phu Tho has borders with Ha Tay province in the East; with Vinh Phuc in the Northeast; with Son La in the west; with Yen Bai in the Northwest; with Hoa Binh in the South and Tuyen Quang in the North. Phu Tho is also a place where 3 big rivers meet, namely Da river, Red river and Lo river. This makes Phu Tho very vulnerable to flood disasters. However, this is also an advantage for Phu Tho in terms of good access to market and public services. In addition, Phu Tho is very near to Hanoi capital (just one and half hour drive). Phu Tho is also located near the economic corridor Kunming-Lao Cai-Hanoi-Hai Phong, creating good opportunities for socio-economic development in the province.

**Natural area:** The province's total area is 3,519.6 km<sup>2</sup> (statistical survey data 2003).

**Topography:** Though located in the midlands, Phu Tho has quite complicated topography which is dissected into many ecological sub-regions. The high mountain sub region in the Southwest, though is difficult in terms of transportation, but has high potential for forestry development, mineral exploitation and farm economy development. The low hill sub regions is strongly dissected with inter-located paddy fields and river bands. This sub-region is favorable for crop production, animal husbandry and aquaculture, but is the most vulnerable to flood disasters.

**Climate:** Phu Tho is located in tropical monsoon climate, but has pretty cool winter. The annual average temperature is 23°C with the rainfall of 1,600 to 1,800 mm per year. The relative air humidity is about 85 - 87%. In general, the climate in Phu Tho is favorable for development of food crops, industrial crops, forest trees and livestock.

#### **Natural resources:**

+ *Land resources:* According to the recent pedology survey, the soils in Phu Tho are divided into the following type: yellow red feralitic soils on claystones, occupying 116,266.27 ha (amounting to 66.79%). These soils are located on the altitude of more than 100 m asl on steep slopes, with thick soil layer, heavy mechanical composition, and medium humus content. These soils are usually used for forest planting, and for industrial trees on the slopes of less than 25°. At present, Phu Tho is using only 54.8% of land potential; the unused lands occupy 81,200 ha, of which 57,860 ha are mountain and hilly lands.

+ *Forest resources:* The forest coverage in Phu Tho accounts for 42%, occupying 144,256 ha, of which 69,547 ha are natural forest; and 74,704 ha are planted forest, supplying woods for processing industry. The main trees are eucalyptus, acacia, mangletia, styrax and indigenous species (the most important species are those planted for paper pulp).

+ *Mineral resources:* Phu Tho is not rich in mineral resources, but has some high value minerals like Kaolin, fenspat and mineral water. The total amount of kaolin is estimated to be c.a. 30 million tons, of which about 25 million tons have not been exploited. Fenspat quantity is about 5 million tons, of which 3.9 million tons have not been exploited. Mineral waters quantity is about 48 million liters, of which 46 million liters have not been exploited. Besides, Phu Tho has other minerals like: quactit (10 million tons), limestone (1 billion tons, tantalcum (0.1 million tons) and many other materials.

#### **Situation and measures to prevent disasters and DRR in Phu Tho province**

The main approach that has been applied is to take prevention measures: enforcement of dyke systems, enforcement of living facilities, closely following the weather forecast news to take immediate measures to cope with storms, floods, upgrading pumping systems, cleaning drainage canals, etc.

+ *Tornadoes*: At present, there is no equipment for observation and analysis of climate and weather events, or for early warning of tornadoes and hails. So, there is a big need for establishment of information systems, early warning systems, more equipment for rescue and support to fast recovery. At present, farmers use very common methods like: tying houses, put more support poles to reinforce their houses, schools, health care stations, animal shelters, and harvest crops in safe time, even before crop ripening, etc.

+ *Flash floods*: Flash floods often occur suddenly, so it is difficult to cope with. The best method is to build the preparedness. Several measures that have been applied are: “2 reductions and 1 increase” (reduction of flow coefficient on sloping face; reduction in the volume of flow; and increase the drainage coefficient); prohibition on construction of aggregates that prevent the flood drain ability, avoidance of directing the flow to make flood interference, at the same time carry out continuously the cleaning of drainage canal systems and facilities to ensure drain ability of flood retention and divergence structures; enhancing quality of dykes, preventing dyke degradation, and reducing the number of weak sections on dyke foundation and sluices underneath the dykes; Completing designed dyke cross-sections, and harden of dyke surface to serve for rural traffic; Regularly inspecting and evaluate the situation of the existing reservoirs, repairing, upgrading and building new spillways to ensure safety for reservoirs; completing the reservoirs’ operation procedures for multi-usability, particularly in cases of large reservoirs involving to regulate water levels in flood and dry seasons for downstream areas.

Regarding agricultural production, farmers have to be proactive in making boats, rafts and the like to live with floods, the in food storage, seed reservation in safe places where flood water cannot reach.

Promote community awareness raising and information dissemination. Build the resilience to disaster and promote the tradition of mutual support in disaster situation. Organize self-response forces in communities for active emergency search and rescue. Promote the role of social organizations and associations in disaster response and recovery. Develop volunteer networks for disaster propaganda, advocacy, recovery and production rehabilitation.

Encourage national and international organizations and individuals to develop diverse and efficient ways of support for disaster affected people and areas.

***b. Situation of agricultural production and natural disasters in Ha Hoa district of Phu Tho provinces***

*Ha Hoa district in brief:*

- Total number of households: 27,573.
- Percentage of poor households: 22.8%
- Percentage of households with main income from agriculture: 22,169 households equal to 80.4% of the total number of households.
- Most of communes are located along the both sides of the Red River, so the district is the most vulnerable to floods in the province.

Table 1. Agricultural land use in Ha Hoa

No	Land use situation	Area by march 2010 ( ha)
	Total natural area	34,049.17
<b>1</b>	<b>Annual crop lands</b>	<b>18,372.45</b>
1.1	- Agricultural lands	12,667.22
1.2	- Rice area	5,018.12
1.3	- Other crops’ area	7,649.10
<b>2</b>	<b>Perennial crops’ area</b>	<b>4,720.90</b>
<b>3</b>	<b>Aquaculture area</b>	<b>613.59</b>

( Source: Statistical data of the district)

It can be seen that Ha Hoa has 34,049.17 ha of natural area. The higher region (higher than 40 m asl) is located in Northwest of the district; the lower region (Lower than 40 m asl) is located in the East of the district, where there are a lot of bare hills and lands.

The topography is dissected by high mountain ranges up to 900 m asl, inter-located with low hills. In between them are streams, rivers that have narrow sizes but steep flow bottoms, so the flow speed is very fast.

The climate is divided by 4 distinct seasons: spring, summer, Autumn and winter. The highest rainfall is in July (even up to 1,511 mm).

*Temperature:*

- Highest temperature: + 41<sup>o</sup>C
- Lowest temperature: +3,6 <sup>o</sup>C
- Average temperature: +23<sup>o</sup>C

*Storms:*

Storms occur from April to October. Every year, the district suffers from 4 to 5 storms, usually from grade 7. Besides, there are locally occurring tornadoes.

*Rainfall:* Rains occur from April to October. In average, every year, the district has 141 rainy days, of which 108 days have heavy rains.

Climate changes that affect agricultural production: In recent years, the main rainy time has shifted from July to August and September. Heavy rains often occur from mid to the end of September, causing large scale floods, especially around Ngoi Lao canal. In 2005, there was a flask flood, breaking 125 meter long dyke, submerging 95 ha of irrigated rice, 75 ha of maize. Total loss was equal to 40 billion VND.

At the beginning of 2006, there occurred a tornado in Quan Khe commune, collapsing numerous of houses, trees and destroying large area of crops.

In 2008, whole district was extremely affected by the 4<sup>th</sup> storm well known internationally as Kammuri Storm. Ha Hoa territory covers many communes in both sides of the Red river, so the district was one of the most severely damaged ones. The excess water over-spilt and/or breaks the dikes causing severe losses to agriculture and people livelihoods at large scales.

### **c. Situation of agricultural production and natural disasters in Doan Hung district of Phu Tho province**

Table 2. Agricultural land use in Doan Hung

No	Land use situation	Area by April 2010 ( ha)
	Total natural area	<b>30,261.34</b>
<b>1</b>	<b>Annual crop lands</b>	<b>21,119.12</b>
1.1	- Agricultural lands	11,555.32
1.2	- Rice area	4,392.74
1.3	- Other crops' area	9,563.80
<b>2</b>	<b>Forest lands</b>	<b>13,428.46</b>
<b>3</b>	<b>Aquaculture area</b>	<b>1,364.26</b>

( Source: Statistical data of the district)

Doan Hung is also a midland district with natural area of 30,261.34 ha. The climate is of tropical monsoon, divided by 4 distinct seasons: spring, summer, Autumn and winter. The average rainfall is 18,00 – 2,000 mm per annum.

### **Climatic conditions:**

#### *Temperature:*

- Highest average temperature: 29.2<sup>0</sup>C
- Lowest average temperature: 11.5 <sup>0</sup>C
- Average temperature: +19<sup>0</sup>C
- Relative air humidity is of 80-82%.

#### *Storms:*

The highest pick was the storm number 4 “Kammuri storms” occurred on 08/08/2008 causing heavy rain in the Northwest of the district; 23 communes were severely damaged (19 damaged items, of which 2 people were killed, 1 was injured, 17 houses collapsed, 53 houses were severely damaged, 366 houses were submerged in water, 456 houses were affected by land slide, making the total value of loss 20.72 billion VND, of which 2.85 billion to agricultural production.

From 2002 to 2008, there were 07 strong storms, causing great damages to rural infrastructure, especially for agricultural production.

**Situation of dyke systems in Doan Hung:** The district has 68 km of dyke, 85 sluices under the dykes. The dyke from Phuong Trung to Phong Phu commune is constructed with 1.0 m higher than alarm level 3, and 5.0 m wide. All the sluices under the dyke meet the standards ensuring safe regulation of flood water. The rest sluices are under upgrading process, ensuring flood safety in 2010. The most vulnerable dykes are mapped like those parts in Dong Mo and Chi Dam communes, and near the primary and secondary schools of Doan Hung town.

**Measures to prevent and reduce natural disasters:** Again, the most effective measures are prevention and avoidance.

+ *Tornado and hails:* Tornadoes and hails are sudden events and it is almost no possibility to resist if they occur. It is also difficult to forecast. At present the district does not have any equipment for early warning. So, the main methods for forecasting are based on the local knowledge. For example, when it is hot and muggy, the temperature is higher than 35<sup>0</sup>C and the sky is suddenly becomes deep dark, at that time, the risk of tornado is very high. The main measures for prevention and avoidance is to consolidate houses and community structures; building information systems; strong leadership in guidance of rescue and recovery. When the above phenomena are observed, it is necessary to find the shelters to avoid being affected by tornadoes and hails.

+ *Flash flood:* Flash floods also occur suddenly, and the occurrence time is very short, hence the causing damages at high speed. It is necessary to raise public awareness of the people in vulnerable places, example who live along streams, about the potential risks, so that they will be proactive in flash flood avoidance. In many places, the local authorities provide support to move the most vulnerable areas to the safe areas to avoid the effects of flash floods.