

Center for Agriculture Forestry Research & Development

IMOLA project GCP/VIE/029/ITA - LOA/IMOLA/2006/.....



Progress report

ASSESSMENT OF THE IMPACT OF THE YEARLY FLOOD AND DEVELOP STRATEGIES AND TOOLS IN TAM GIANG AND CAUHAI LAGOON

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Hue, March 2007

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2. Developing human resources.

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A. PROJECT OVERVIEW

1. INTRODUCTION

Tam Giang - Cau Hai lagoon is a famous landscape not only of Thua Thien Hue in particular, but of the whole Vietnam country in general as well. In addition to the inhabitants living on the agricultural activities, many inhabitants live on exploiting the natural resources which are traditional from the previous years up to now and in more than recent 10 years, some households changed into aquaculture. The inappropriate exploitation and cultivation has caused the negative impacts on the environment and ecology.

Especially, the lagoon is also a place where suffers heavily every year the natural calamities such as floods, storms, droughts, salty infiltration. The annual natural calamity has caused the heavy damages not only in socio-economic aspects, but in ecological environment as well for the inhabitants living along the lagoon.

Finding the solutions with the aim at using properly the natural resources of the lagoon as well as coping with the natural calamities has become a critically immediate and long-term demand.

With the significance as above, from September - October 2006, the research group of the Center for Research and Agricultural Development, under the Hue Agrio-Forestry University carried out the research subject: "*Integrated management of the lagoon activities*" with the financial support from IMOLA project.



Picture 1: General view of the lagoon and survey site

The inhabitants living along two sides of the lagoon of the districts of Phong Dien, Quang Dien, Huong Tra, Phu Vang, Phu Loc have two main careers, namely agricultural production and aqua cultivation and exploitation. The additional livelihoods such as service, trade and traditional handcraft serving two main careers are also developed.

The natural calamity put the impact on the various inhabitants community in the various geographical areas aloong two sides of the Tam Giang - Cau Hai lagoon and the distance from the community to the river gate.

So as to identify, evaluate the impact level of natural calamity on the study site, we carried out evaluation, survey and analysis of investigation result at 4 specific study sites for the whole area under the communes of Quang Phuoc, Quang Dien district, Hai Duong, Huong Tra district, Phu An, Phu Vang district, and Vinh Hien, Phu Loc district (see picture 1).

2. OBJECTIVES

Project's objectives:

- Activity 1: Studying and accessing to the affect of yearly floods on the livelihood of the inabbitants living along the lagoon and natural environment.
- Activity 2: Setting up the map system of the loss caused by the floods.
- Activity 3: Studying the forcast for the flood system and and setting up the compatible activity
- Activity 4: Developing the strategy of minimizing the loss caused by the floods for the aquaculture activities and the related activities on the lagoon
- Activity 5: Setting up the frame and developing the training program so as to improve the capacity of protecting from the floods, especially paying attention to minimizing the loss for the inhabitants living on the lagoon's resources.

3. CONTENT

The project is implemented with the main contents:

- Content 1: Accessing to the status of floods every year at the study site
- *Content 2:* Climate changing effect and compatible activities and the application of traditional knowledge of the local for natural calamity.
- *Content 3:* Setting up the map of forecasting the flood's impact on the resident areas at the rate of 1:25,000 and the necessary notes.
- *Content 4:* Setting up the map on the loss in Tam Giang and Cau Hai lagoon at the rate of 1:25,000 and the necessary notes
- *Content 5:* Forecasting the damages and loss by the annual floods.

4. IMPLEMENTATION METHODOLOGY

- Collecting secondary data
 - Statistical report on the socio-economic status at the provincial, district and commune level (carrying out the professional survey in 4 specific communes of Phong Binh, Hai Duong, Phu An and Vinh Hien)
 - Report on the strategy of the 5-year socio-economic development at the provincial, district and commune level
 - o Technical reports and study reports were carried out by other project on the site.

- o System of base map and related maps.
- System of information relating to hydrography climate for about 20 years from 1985 to 2006
- Report on the damage and loss caused by the natural calamity of the project communes.
- Collecting data on the site
 - Organizing the survey at 4 specific communes of Phong Binh, Hai Duong, Phu An and Vinh Hien of the districts of Huong Tra, Phu Vang, Phu Loc. The survey contents are included:
 - Overview survey and updatedirectly the data of the project communes by interviewing the local experts and the meetings with the commune staff.
 - Surveying the households through questionaires (400 households in total were surveyed in 4 selected communes). The surveyed households were selected with the rate, rich: medium: poor: 30%: 40%: 30%. The households belonging to the same group were selected by random.
 - Investigating the local expert groups: the local expert groups organized the group meetings in order to contribute their ideas in the way of sharing the common knowledge of the community. The investigation groups were organized as follows:
 - Local leader groups: commune, village (2 groups: 10 people/group)
 - Groups of households with economic potential (3 groups with 10 people from 3 household groups: rich, medium and poor)
 - Inhabitants groups by livelihood (aqua cultivation, aqua exploitation, agricultural cultivation,...)
 - Inhabitants groups by gender (10 people/group with 2 main groups: women and men)
 - Surveying and interviewing the group of elderly farmers with good farming knowledge about the indigenous knowledge of forecasting and protecting from the flood in the Tam Giang and Cau Hai lagoon.
 - Surveying and collecting the data of flood's impact and flood's limit every year and the pinnacle
 - Surveying and interviewing about 1,500 households about the flood's limit and pinnacle in the history scale of natural calamity.
 - Investigating the allocation coordinate of the pilot resident areas in Tam Giang and Cau Hai lagoon.
 - o Processing the data
 - Processing the statistic data on the economic status and the potential to cope with the damages caused by the natural calamity.
 - Processing the data for the design of the forecast map and actual state map of natural calamity (ArcGIS,)
 - Analyzing the impact of climate change on the livelihood of the inhabitants in the lagoon area.

5. PROCESS

The process to carry out the project is divided into 3 main stages with 8 steps which are described in picture 2.

Stage 1:

- General survey of the inhabitant's community along Tam Giang and Cau Hai lagoon to select 4 specific study sites for the whole study area.



Picture 2: Eight steps of assessing the yearly flood impact and developing strategies to reduce the damages caused by natural disasters in Tam Giang and Cau Hai lagoon

- Collect information of the losses and damages caused by natural disasters on the livelihood and natural environment and analyze the impact at 4 study communes.

Stage 2:

- Survey the site, develop the vulnerability map
- Set up the potential impacts of yearly floods

Stage 3

- Develop the frame of training program on capacity building to reduce the natural disaster's impact based on the community
- Develop the training document on capacity building to reduce the natural disaster's impact based on the community
- Training of trainers (TOT)

Evaluation on the project

B. RESULT

6.QUANG PHUOC COMMUNE

6.1. SOCIO-ECONOMIC STATUS AND NATURAL DISASTER REDUCED IN QUANG PHUOC COMMUNE

6.1.1. Overview on natural and socio-economic conditions

6.1.1.1. Natural condition

Quang Phuoc commune is one of 11 communes and town of Quang Dien district. The commune is located in the East of Sia town (Quang Dien district), a lowland area at the end of Bo river. It is often waterlogged in the rainy season and some dykes bordered by Tam Giang lagoon are salty in the sunny season.

Administrative border of Quang Phuoc commune is described in the map 1. It is bounded by Quang Tho commune in the south, Sia town in the north, Quang An commune in the east, Quang Dien district in the west.

The whole commune has 8 villages: Thu Le 2, Thu Le 3, Khuong Pho, Mai Duong, Phuoc Ly, Phuoc Lam, Ha Do, Phuoc Lap. Among 8 villages, 3 villages of Thu Le 2, Thu Le 3 and Khuong Pho are not bounded by the lagoon. All of 5 remaining villages are bounded by Tam Giang lagoon. As a result, under the impact of the floods, these villages are often suffered the most impact.



Map 1: Administrative border of Quang Phuoc commune

Total area of natural land of the commune is 1,048ha and is divided by the using purposes like in the table 1:

Type of land	Area (ha)	Rate (%)
Total area of natural land	1,048.1	100
Agricultural land	509.3	48.6
Aqua cultivation land	161.4	15.4
Non-agricultural land	367.2	35.0
Unused land	10.2	1.0

Table 1: Structure of using land of Quang Phuoc commune

From the table above, the agricultural land of the commune occupies the highest rate (48.6%); followed by non-agricultural land (residence, garden...) occupying 35%. The land for aqua cultivation is not much (15.4%).

6.1.1.2. Socio-economic condition

The whole commune has 1,733 households with 8,030 people. Of which, 437 households belong to poor households (according to new standard) and 1,991 people, occupying 26.49% in households and 26.47% in people. Number of malnourished children is 145 (accounting for 21.4% of children); number of diarrhoea children is 54 (accounting for 8%). Number of people under labour age is 2,650 (men aged from 18 to 55; and women aged from 18 to 45.

According to the evaluation of the village leaders group, the labour force of the commune is ensured for the production activities and the people here have to do a lot of hard work, especially women. However, due to the fact that only agricultural production and aqua cultivation and exploitation are carried out in the commune, the production season is ended, the inhabitants do not have work to do. Therefore, many people (especially the youth) have to leave the homeland for the far provinces such as Ho Chi Minh, Danang,...to find a job or for labour export in Malaysia and Taiwan.

The livelihood of Quang Phuoc commune's people depends mainly on agricultal and aqua production, accounting for 64.4%. The career division in the villages is rather clear. Among 8 villages of the commune, 6 villages participate in the agricultural production (including: Thu Le 2, Thu Le 3, Khuong Pho, Phuoc Lam, and Phuoc Ly) with the participation of 1,424 households, 6,579 people. And 2 remaining villages focus on aqua exploitation (namely Phuoc Lap and Ha Do) with the participation of 193 households. Number of aqua cultivation households is 321.

According to the report of the commune People's Committee, total income of the commune inhabitants in 2005 was 33.977 billion VND. Of which, 25.3% was from cropping; 21.6% was from livestock; 17.5% from aqua cultivation and exploitation; 25.6% from handcraft; and 5% from service. The average income per head is 4,350,000 VND/year. In addition, some households received the source of income from the relatives working in the far places.

Quang Phuoc commune is a commune which has tradition in cultural history. All of 8 villages of the commune achieved the standard in cultural villages and many households were recognized by the authorities as cultural families. With such good and close relation, it facilitated the inhabitants in the commune help each other in misfortune and especially in the natural disasters.

6.1.1.2.a. Agricultural production activity.

Crop

The most important crop of Quang Phuoc commune is rice. Besides rice, other crops are hardly focused. Most of agricultural land here are used for 2-crop rice production. Structure of rice varieties is presented in table 2.

Rice variesties	Winter-Spring crop	Summer-Autumn crop
Khang Dan	Big area	Small area
4B	Small area	
TH5		Big area
Т92		Big area
Ran sticky rice		Small area

Table 2: Structure of rice varieties allocated by crops in Quang Phuoc

However, due to the affect of the weather, rice productivity is not stable. A lot of rice fields bounded by the lagoon are often salted in summer, affecting considerably to the productivity and income in summer-autumn crop of farmers.

Average rice productivity of the commune in the past years achieved 11 tons/ha. According to the statistic result in 2005, total rice yield was 3,942 tons, getting total value of 9.066 billion VND.

Besides rice as a key crop, the locals produce other crops such as groundnuts, chillies, water melons, sweet potatoes...However, they got not big yield and occupied very small rate in total source of income of the commune. Table 3 collected and described the season of main crops in Quang Phuoc based on the survey data in 2006.

Crops		Month										
	1	2	3	4	5	6	7	8	9	10	11	12
Winter-Spring rice	XXX	XXX	XXX	XXX								XXX
Summer-Autumn rice					XXX	xxx	XXX	XXX				
Groundnuts	XXX	XXX	XXX	XXX								
Sweet potatoes	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX				
Water melon	XXX	XXX	XXX	xxx	xxx							

Table 3: Schedule of some main crops

According to the schedule, the production time is concentrated from January to August every year. In the months of september, October and November, most of the land are waterlogged, illumination power is low, so it is not suitable for the crops. For that reason, at this time, the inhabitants often do not have work to do, some of them have to work in Hue city or in some southern provinces.

After analyzing the advantages and difficulties in cropping development at local, we got the following results.

Advantages	Difficulties	Reasons	Solutions
 Being the lowland, at the end of Bo river, the floods brought alluvium helping the fields fertilized, reducing the harmful pests for crops. Services of inputs, fertilizers were intime and various. Irrigation system was rather fully constituted. The policy of fusing and changing fields facilitated the production downloament 	 Selling price of agricultural products was low and not sustainable The cost for inputs and services was high → low production efficiency (the profit got 2 million VND/ha for rice planting) Lacking investment capital for production The fields bounded by the lagoon are often salted in nummer 	 Crops varieties are monotonous and cost not high. Price of inorganic fertilizer, pesticide and petrol is increased. Most of inhabitants do farming, leading to low interest and little accumulation. Located in the lowland area and low field altitude, the dyke system to protect from salt is 	 Changing the crops and animals with higher value - There were the policies to allow inhabitants receive the loans with proper time and amount. Investing in upgrading the salt protecting dyke
development.	- Weather change and flood impact	lacked and seriously broken.	system and culvert system
	 Rats developed and destroyed crops Kinds of crops were monotonous, so they were under high risk 	- Snakes and cats were caught, it was impossible to limit the development of rats and insects.	- Forbidding the catching of snakes and cats

Table 4: Advantages and difficultie	s in cropping deve	elopment in	Quang Phuoc
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Livestock

With the advantages in natural food resource and agricultural by-products, the livestock career taking the strength of agricultural production in Quang Phuoc commune are under rather good development. The livestock activities relating to the land using did not have developing tendency here.

Reported by the local authorities, in the end of 2005, total number of pigs in the commune was 4,050 heads, of which: sow: 1,900 heads, porker: 2,150 heads. The income value of sows was 5.13 billion VND , the income from orkers was 3.326 billion VNDThe development of pig raising increased the inhabitants' income, besides provided some manure for crops. Therefore, most of the households in the commune raised 2-4 pigs/year and many of inhabitants invested in raising from 10 to 12 pigs/year.

Oon the contrary of the strong development of pig raising, the cattle in the commune was under poor development. In 2005, the whole commune has only 63 cows and 51 buffaloes (used mainly for ploughing and farming).

In the past years, together with the common difficulty of thw whole country, the poultry production in the commune was affected and under unsustainable development, the amount of pultry from 14,565 heads (in 2005) reduced down to 5,565 heads in 2006.

Table 5: Advantages and difficulties in livestock development in Quang Phuoc
commune

Advantages	Difficulties	Reasons	Solutions
 The inhabitants have experience in pig raising, the breeding was active at local Animal feed was to use the agricultural by-products, so the cost for products was reduced Receiving the technical guidance and transfer from the professional agencies Vet services were ensured The product consumption market was rather easy. 	 There was no model of developing livestock in the farm tendency, many people raised in the traditional method. The price of industrial feed was very high. Many diseases happened → The cost for vet medicines was high The difficulty in animal protection 	 Limited investment capital The sole companies of producing feed, big transporting cost Varied climate and weather The hallow area, so waterlogging was serious and prolonged. 	 Supporting with credit fund Technical guidelines on processing feeds on site, using available feed resource at local Organizing the training courses on disease prevention.

6.1.1.2.b. Aquaculture activities

Quang Phuoc commune has 5 km bounded by the Tam Giang lagoon, a convenient condition for the development of aqua cultivation and exploitation.

The aqua exploitation concentrated mainly in 2 villages of Ha Do and Phuoc Lap. The aqua exploitation of the inhabitants here are mainly penculture and bottom job. However,

in the recent years, due to the development of shrimp raising, some households changed into raising shrimps.

In addition, because the water surface area belongs to the common ownership, many people in different places came here to exploit. Due to the poor awareness of natural resource protection and weak environment protection method of local authorities, many people used the exterminating exploiting tools (electricity pulse, explosive,...) leading to the serious reduce of natural resource.

Previous	Present
- Xéo, te	- No longer
- Bottom job	- Very little
- Fish corral (net's big mesh)	- Fish corral (net's thick mesh)
- Fishing net: unavailable	- Fishing nets: developped
- Hand held electronic device: unavailable	- Hand held electronic device: popular
- Exploiting only the natural resource	- Addition to exploitation, the cultivation is also done

Table 6: Changes in aqua exploiting tools by time

According to the idea of exploiting fishmen group, due to the change in aqua exploiting tools and intensity, presently, many kinds of aquaculture are caught at the little quantity (such as Dia fish siganus canaliculatus, therapon jarpua, therapon theraps, dorab, white shrimp,...).

In 2005, the turnover from aqua exploitation achieved 2.98 billion VND (equivalent to a half of the turnover from shrimp raising)

Aqua cultivation

Due to the characteristics of site condition and of the aquaculture, Quang Phuoc commune focused only on raising fish and shrimp in the brackish water while the fish raising in the fresh water was little paid attention by both two sides, the inhabitants and the local authorities.

Total turnover from the fish and shrimp raising in the brackish water achieved 5.92 billion VND (year 2005). The fish raising in the fresh water occupied a very low rate (inconsiderably). In the whole year of 2005, total turnover from the fish raising in the fresh water achieved only 70 million VND.

Shrimp career

The shrimp raising career brought about a lot of profit for the the fishmen and created employment for the local community. However, relating to this career, in Quang Phuoc commune, we met many complicated cases in both advantages and difficulties of the inhabitants. The jumbo tiger shrimp raising career has been developed at the commune since 1993. At the first time, only 40 households and the commune leaders group carried out the jumbo tiger shrimp raising in the area of about 20 ha, the productivity achieved from 250 to 300 kg/ha. The area for shrimp raising was increased promtly, after 5 years, total area for shrimp raising of the commune increased up to 160.4 ha and number of households up to 321. In addition to the increasing of area and scope, the productivity from shrimp raising also had the quick growth (in 2000, the productivity achieved about 700-800kg/ha). Due to the spontaneous development, low people's level, high breeding density,... from 2002-2004, the diseases were broken out, leading to the fact that the productivity and yield of shrimp raising decreased considerably and many family households were seriously unprofitable.

In 2005, there was a limit in the investment fund of the inhabitants and under the intime guidance of professional agencies, many households changed the raising method, from raising only shrimp with high density into raising many kinds in the same pond with lower density. The common form of integrated raising currently is to raise jumbo tiger shrimp integrated with Dia fish siganus canaliculatus, dorab, mullets, crabs...

Fish career

The kinds of brackish fishes were caught naturally, creating the traditional aquaculture resource for the inhabitants community in Quang Phuoc. However, for the recent time, because the natural fish resource was reduced considerably, the inhabitants changed into intensive cultivation. The fishes were previously caught naturally, presently the fingerlings were harvested in the beginning of crop and then raised between 4 and 6 months before harvesting from the developed shrimp and fish raising ponds. The species of Dia fish siganus canaliculatus, dorab, therapon are raised and used for fingerlings production. The first step showed that this fish group contributed remarkably in the inhabitants' income resource. A new livelihood group are being established and developed.

		Month										
	1	2	3	4	5	6	7	8	9	10	11	12
Freshwater fish	xxx	xxx	xxx	XXX	xxx	xxx	xxx	xxx				xxx
Jumbo tiger shrimp		x	xxx	XXX	XXX	xxx	xxx					
Dorab				xxx	xxx	xxx	xxx					
Dia fish siganus canaliculatus			xxx	XXX	XXX	xxx	xxx	x				
Mugil cephalus			xx	xx	xx	xx	xx					
Crab		x	x	х	x	x	x	x				
Naturally exploiting by net	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xx	x	x	x
Exploiting by trap	x	xxx	xxx	xxx	x	x	xxx	xxx	xxx	x	x	x

Table 7: Schedule of aqua cultivation and exploitation

So as to have better analysis of difficulties and find out the solutions, the meeting groups including community of natural catching people, group of aqua cultivation fishmen, representatives from the units relating to aqua cultivation and exploitation were invited to the common meetings and the seperate meetings of groups. The members analyzed the advantages and difficulties which the inhabitants and managers are facing with and used the brainstorm method to find out the reasons. The system of policies analized together with the analysis of internal force of the local communities was applied so as to give out the solutions for both the fishmen and managers.

Analysis result was presented in table 8.

Advantages	Difficulties	Reasons	Solutions
- Water surface area was rather large - With the interference of authorities at all levels, the inhabitants were able to receive loans to invest in production (preparing ponds)	 The inhabitants were still subjective The capital for reproduction was lacked Environment was polluted and degraded. Diseases were broken out on large scope and there was no effective treatment. Difficulty in consuming shrimps at the horyest season 	 Low level of the inhabitants Continuous losses from the harvests The waste from other ponds and from the fields Resource of breeds was not checked carefully and due to polluted environment There was no on-thespot product consumption factory, the traders forced the wrige 	 Training to enahance the inhabitants' awareness (of both cultivation and exploitation) The water supply and irrigation system was planned for cultivation area. Enhancing the inspection of breeds
- Awareness of diversifying the raised kinds was set up at the first step.	 Impact of natural disaster → season of raising shrimps was passive, the nets were damaged after every storm. The fish breeds depended much on nature, unsustainable. Aqua exploiting by the extraminating tools 	 Characteristics of weather in the central region. Artificial delivering was not carried out for many kinds of brackish and saltwater fish The laws were not followed seriously The local authorities did not pay proper concern. 	 Being active in raising season to avoid the difficult times. Establishing the Fish Association and allocating water surface to the inhabitanats for management.

Table 8: Advantages and	l difficulties in aqua	cultivation and exploitation
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6.1.1.3. Infrastructure irrigation traffic

Electricity system

The electricity system was available in the villages. The national net electricity system was available in the households. The electricity changed the rural face, facilitating the socioeconomic development of the local and of the households. Up to now, 100% of households in the commune used the net electricity in the common allocation system.

Traffic system:

Due to contigeous with the town, the traffic system of the commune is considerably completed. With 2.5 km of provincial way crossing the commune, the district used the local budget to build 1.3 km of concrete road, connecting the town with the center of the commune. Inter-village traffic system was upgraded. Presently, most of the traffic systems from the commune's center to the villages were concreted. However, the traffic system has rather narrow road surface and many hollow parts, causing many difficulties in the inhabitants' travelling, especially the children can go to school in the flooding season.

Due to the hollow geography, the inhabitants are often concentrated on the upland areas, so the population density is very high while the roads in the villages are very narrow, so it is very difficult for the big transport means to travel. This also causes some difficulties for the inhabitants living in the region.

In addition to the road traffic system, the waterway traffic also plays an important role for the commune inhabitants. With many canals in the fields and regularly upgraded, they helped effectively the inhabitants in the transport of crop and livestock products to the storing and consuming places.

Irrigation

Quang Phuoc commune in particular and Quang Dien district in general is a place experienced in agriculture, mainly focused on rice production, so irrigation system was focused by the authorities at all levels. The irrigation system of the commune was rather completed and able to supply water to most of rice areas (only about 16 ha along the lagoon are salted in the drought). However, in the past years, due to the low efficiency achieved from the rice production, the cost for maintenance of irrigation system was not sufficient, making a lart of canal system degraded.

One of the biggest difficulties of the commune is the water drainage in the dry season. Presently, due to the fact that some dams were built to protect the shrimp raising areas aloong the lagoon from the salt, the partial waterlogging often happens in the rainy season in some areas. According to the inhabitants, to limit this affect, the solution is to build more culverts in order for the rain water run out the lagoon easier.

School system:

The commune has a school system from kindergartens to secondary schools (high schools are unavailable). The commune has 13 rooms of kindergartens and nurseries allocated equally in the villages. There are 2 primary schools with 25 rooms and 823 pupils, 1 secondary school with 12 rooms and 723 pupils. The schools in the commune were built firmly with from 2-3 floors.

The result of surveying through interviewing by random the households about the level showed that, more than 40% of interviewees passed primary schools and only 1/3 interviewees passed the secondary schools. Number of people passing the high schools occupied a very low rate, only 10%. The result of detail statistic is presented in table 9.

		Percent	Valid Percent	Cumulative Percent
				1 0100110
Valıd	Not go to school	14,0	14,0	14,0
	Primary schools	43,0	43,0	57,0
	Secondary schools	33,0	33,0	90,0
	High schools	10,0	10,0	100,0
	Total	100,0	100,0	

Table 9: The Highest Level of Schooling

In the policy of protecting from the floods, the schools are considered as the shelters for the inhabitants.

Commune infirmaries:

The commune has a 2-floor medical station with a general practitioner as a head of the station. In addition, in the villages, there are the village medical staff. In general, the community health care at local were well carried out. Many diseases are actively prevented. The extensive vaccination program was carried out widely for the children in accordance to the state's request. Information system:

6.1.1.4. Livelihood of poor people

The survey result of classifying the households is presented in table 10. Around 74% of total interviewed households belong to medium and fairly rich according to the national classification standards in 2004. The rate of poor households occupied ¹/₄.

Table 10: households classification in accordance to the national standards in 2004

		Total by		
		random	%	Accumulation
Cate gory	Fairly rich hhs	23	23,0	23,0
	Medium hhs	51	51,0	74,0
	Poor hhs	26	26,0	100,0
	Total	100	100,0	

Reasons for poverty

The reasons cause the poverty for the poor and specially poor households are:

- Lossing in the first harvest of shrimp, causing the doubful debts. And this debt makes the households impossible to borrow more loans for their business.
- Lacking capital for business and investment in the production.
- Shorthanded, old and helpless families.
- Illness, chronic diseases
- The natural disasters destroyed assets and agricultural and aquacultural products.

6.1.1.5. Gender and livelihood

There are big differnces in the role of women and men in the production activities and in the family activities. In the communities in Vietnam in general and in Quang Phuoc in particular, the men often do the hard work which requires a god health while the women only do the light piece of work. However, considering the working time per day, the women's working hours is much more than the men's. The comparison between the aqua exploitation households group and the agriculture production households group showed that, for the aqua exploitation households group, the men's working hours are 9 hours/day. For the agriculture production households group, the equivalent figures are 9 hours/day and 13 hours/day. Especially for the young households which have just gien birth, the women's working hours could be higher.

The analysis of income density from the resources by gender in table 11 showed that, the men often occupied higher density of total income for the family than the women due to the job characteristic in this region. Especially the analysis of common income of both husband and wife, it means that the income is produced by both the husband and the wife showed that, about 20% of households are included in this item. The rate of households which the density are not able to be analyzed in the site survey sample is 36%.

		Valid	
Income	%	Percent	Total accumulation
Valid Wife	8.0	12.5	12.5
Husband	36.0	56.3	68.8
Both husband and wife	20.0	31.3	100.0
No information	36.0		
Total	100.0		

Table 11: Analysis of income density by gender

Another characteristic of the inhabitants in the rural region is that, the men rarely participate in the housework and children care and these work are charged by the women.

The result of analyzing the daily activities between the women and the men of the agriculture production group and aqua exploitation group is presented in the following table.

Table 12: The routine work of agriculture production and aqua exploitation groups

Time	Men	Women				
	4:00 – 5:30: Couple collects shrimps and fishes from the traps					
	5:30-8:00: Repairing the trap 8:00-11:00: relaxing, waiting for the lunch or visitting the neighbours.	 5:30 - 7:00: Classifying aqua products 7:00 - 9:00: selling products in the markets 				
GROUP OF AQUA	11:00 – 13:30: having lunch and sleeping	9:00-11:00: preparing lunch for family				
EXPLOITATION ON THE LAGOON	13:30 – 16:00: repairing aqua equipment	 11:00 - 12:00: having lunch 12:00 - 13:00: washing clothes, taking care of children. 13:00 - 15:00: relaxing 				
	17.00 18.00 Dettine the train	15:00-16:00: preparing dinner				
	1/:00 - 18:00: Putting the trap $16:00 - 1/:00$: taking care of children					
	18:00 - 4:00 next day: couple go to the trap to protect the trap and collect shrimps and fishes					
	5:00-7:00: cleaning the house and garden	5:00-6:30: doing hygien and preparing breakfast				
	7:00-7:30: having breakfast	6:30 – 7:30: helping children eat and go to school, having breakfast				
AGRICULTURE	7:30 – 11:00: going to the field, the wife goes to the field or to the market					
GROUP	11:00 – 12:30: having lunch and	11:00-12:00: preparing lunch				
	12:30 - 14:00: relaxing	12:00-12:30: having lunch				
		12:30 – 14:00: cleaning the house, washing clothes, taking care of children				
	14:00 – 17:30: going to the field					
	17:30 – 19:00: relaxing and visitting the neighbours	17:30 – 19:00: preparing dinner; taking care of children				
	19:00 – 19:30: having dinner					
	19:30 – 21:00: watching television and relaxing and then going to bed	19:30 – 20:30: cleaning the house, washing clothes and taking care of children				
		20:30 - 22:00: watching television and then going to bed				

6.1.1.6. Credit finance

Quang Phuoc commune is one of the poor communes of Quang Dien district. The main income resources of the commune in 2005 are from the following fields:

- Agriculture: 25.3%;
- Livestock: 21.6%;
- Aquaculture: 17.5%;
- Additional careers: 25.6%; and
- Service: 10%

Total turnover of the whole commune is 33.977 billion VND. The annual average income per head is about more than 4 million VND.

Under the support from the state and other non-government organizations, some capital resources were invested for the commune, such as: 134 program of the government, NAV project, World bank, In order to develop the production, many households have to mortgage their house to borrow loans from the bank and from the well-off households.

Presently, total number of loans of the commune's inhabitants increased up to 20 billion VND. Of which, 17 billions from the Agri-bank, 3 billions from the Policy Bank. In average, every agriculture production household borrowed about 3-20 millions VND and the auqaculture development household borrowed between 30 and 100 millions VND.

6.1.1.7. Water resource

Tap-water was available in most of villages in the commune. Presently, about 80% of inhabitants have water pipes leading to their house. The remaining households (mainly the poor households and the households living far from the resident area) have to go to get water from other villages.

Bo river is the water supply resource for the production activities, eating and drinking and the living of the inhabitants. Before 2004, the commune inhabitants had to use water from the drilled wells, or from the canals, ponds in the region, so the quality is ensured. From 2005, the government invested in the clean water pipes leading from the factory to the villages, so most of households have clean water at home. However, many poor households did not have investment budget, so they had to buy water from other households with very high price (about 15,000 - 20,000 VND/m3).

With the rather completed canal system orginated from the downstream of Bo river, the water resource supplied to the fields is abundant. However, because Quang Phuoc is a hollow commune and has a number of hectares bounded by the lagoon, some areas are often salted in the drought, on contrary, the fields are waterlogged in the rainy season. This caused the not small difficulties for production activities and the travelling of local inhabitants.

		%	Total accumulation
Valid	Public well water	3.0	3.0
	Family well water	3.0	6.0
	Village tap water	41.0	47.0
	Commune tap water	35.0	82.0
	Other water resources	18.0	100.0
	Total	100.0	

 Table 13: Survey on the actual status of using drinking water and living water

The survey result on water quality through the households was satisfatory, 98% of households answered that the living water quality is currently good (Table 14) and only 2% of households were not satisfied or did not have opportunity to access to good quality water resource.

Table 14: Survey on water quality

	%	Total accumulation
Valid Bad	2.0	2.0
Medium	10.0	12.0
Good	88.0	100.0
Total	100.0	

6.1.2. Accessing to the actual status of yearly floods

6.1.2.1. Characteristis of hydrograhpy climate

Like other communes in the Tam Giang - Cau Hai lagoon, Quang Phuoc commune suffers the impact of monsoon tropical climate.

Temperature:

In the cold season, the average temperature is less than 20°C (from December of this year to March of next year). In the hot season, the stable temperature is more than 25°C, from April to mid-August. In addition to the cold and hot seasons, there is a transition period from March to April and from September to November. At this time, the average temperature is around 20-25°C.

Rain and floods:

The annual average rainfall in Quang Phuoc commune achieved about 2,500-2,800mm. The rains are concentrated on the months of from September to December. The rainy season is also the flooding season. Every year, there are about 2-5 floods at all of different levels. According to the general evaluation, the flooding causes the most affect in the production activities and the living of the local inhabitants. Although the small floods are not severe, they happen unequally and drop in the rice harvest time and the harvest time of

aqua products, hence, they cause the considerable damages for the producers. However, many people stated that the floods make the environment cleaner and fresher, the shrimps and fishes less infected with diseases and the floods can produce fertility for the fields, increasing the nutrion resource for crops.

Winds:

There are two different kinds of wind. The dry and hot West-South wind occurs in summer with the speed of from 1.3-1.6m/s; the wet and cold East-North monsoon occurs in winter and in early spring with the speed of from 1.5 - 1.8m/s.

6.1.2.2. Damages caused by yearly floods

Some time landmarks relating to the natural disasters

The survey of actual status and impact of floods on the development process of Quang Phuoc commune showed that, the impacts were different in different times. The inhabitants indicated that from 1953 up to now, the local faced the following history floods:

Time landmark	Impact
Flood in 1952	Impact of assets, home, aqua equipment, vegetables, number of dead people was not available.
Flood in 1953	The water went up very highly and prolonged, 40% of houses were destroyed and lost, vegetables, roads and aqua equipment were damaged. Some people were dead, others had to leave for other places (number of dead people is no idea because the flood happened long time ago).
In 1973	Big flood, roads and aqua equipment were destroyed, some dead people. Many people had to leave for other places (could be alive due to the war time)
In 1976	Big flood, water level went up highly and deeply at about 2m. The crops were lost, the inhabitants meet many difficulties. Hence, after the flood, many households moved to the new economic areas (A Luoi, Central Highland,)
Flood in 1983	The impact level was similar with the flood in 1976.
Storm in 1985	The storm was very big with strong wind at level 12 and gust above level 12. Due to large geography, little firm houses and many households lived on boats (Thuy Dien village), there were 62 dead people, of which 58 people in Phuoc Lap village (living on boats) and 4 people in Ha Do village. More than 50% of houses which were collapsed and whose roofs were blown up, many parts of roads were isolated. in Mai Duong village, serious landslide was caused by waves.
Flood in 1999	This is the biggest flood in the history which the inhabitants have ever met. In this history flood, the water level was more than 3-4 m deep, the time of waterlogging proplonged near 1 week. In general, compared to previous floods, the flood in 1999 caused the biggest damages for the local inhabitants.

Table 15: Some natural disasters happened at local and their impacts

Following up the impact's frequency and level of floods at local gave us some following comments:

- The occuring frequency of natural disasters increasingly went up.
- The intensity of the natural disasters had the tendency of increasing considerably.
- The damaged level in people and assets in the first stage had the increasing tendency, but in recent time, it is limited thanking to the intime warnings and prevention from the government and from the inhabitants.

Above here are some time landmarks and damages which the local people could remember. And in fact, from 1950 on, according to the document of Do Bang (Do Bang: "Floods in 5 past decades in Thua Thien Hue"), there were many big floods and the affects caused by natural disasters were very severe.

6.1.2.3. Actual status of impacts so as to reduce natural disasters at local

6.1.2.3.a. SWOT analysis

Studying the strengths, weaknesses, opportunities and trends in the flood prevention for the community, we got the results as follows:

1- Strengths (S)	2- Weaknesses (W)		
 The natural disasters often happen every year, so the inhabitants have experience. The system of warning and forecast for natural calamity is developed (radio, television, telephone,) There were effective support from the authorities at all levels The boards of Flood Prevention were organized rather closely to assist the inhabitants at neccessary 	 2- Weaknesses (W) The technical and material facilities were backward. Traffic was obstructed Lacking upland area to move the inhabitants at neccessary Destroying the canals and irrigation works and aquaculture ponds Cattle and poultry raising met many difficulties, especially in the flooding season Natural exploitation met many obstacles Women's daily activities met many 		
	- Commodities were scarcie		
2- Opportunities (O)	4- Trends (T)		
 People's awareness of natural disaster prevention and treatment had positive changes The supply of information was faster and exacter The diversification of production activities contributed in limiting the flood's impacts The floods brought about alluvium, increasing the fertility for the fields 	 The change of global climate A part of local people started to rely on modern equipment, less focused on the traditional experiences Most of people are poor, so they do not have capability of building houses to prevent from the floods The environment is polluted, affecting the people's health 		

Table 16: Analysis table of SWOT in the flood prevention in Quang Phuoc

6.1.2.3.b. Role of members in the family in the flood prevention to reduce natural disasters

Studying the role of members in the family in the natural disaster prevention is presented in table 17.

Table	17:	Activities	and	role	\mathbf{of}	members	in	the	family	in	the	natural	disaster
prever	ntion	l											

Content of preparation work	Priority	Participators and participating level				
	order	Husband	Wife	Children		
Checking and upgrading entresol	1	XXX	XX	-		
Moving rice and assets to higher places	1	XX	XX	Х		
Preparing equipment (timbers, blocks, bamboos,) to put the domestic furnitures easy to be broken	3	XXX	XX	-		
Repairing boats	1	XXX	xx	-		
Upgrading house	3	XX	xx	x		
Selling a number of animals (pigs, chickens)	2	Х	XXXX	-		
Storing foods, foodstuff	2	-	XXXXX			
Preparing fuels (woods, bee-hive coal)	2	X	XXX	X		
Storing drinking water	4	-	xxxxx	-		
Moving cattle to higher places	3	XXX	-	XX		
Preparing bamboo and steel cages to keep pigs, chickens inside.	4	XXX	XX			
Preparing bamboo strips or shrouds	4	XXX	xx			
Moving motorbike (pulling machine, ploughing machine) to a safe place	5	XXXXX	-	-		
Buying kerosene	4	-	xxxxx	-		
Reserving cash	4	Х	xxxx	-		
Building concrete houses and constructing high buildings	4	XXX	XX			
Preparing flash light or charged light	6	XXXX	-	X		
Helping other households	7	XXXXX		-		
Preparing feed for animal (pigs)	3	-	xxxxx	-		
Preparing medicines	7	-	XXX			

6.1.2.3.c. Role of the local authority organizations in the flood prevention to reduce the natural disasters

In front of the unexpected changes of weather condition, with the support of technical means, and the economic development of the inhabitants, the control of natural disasters was changed considerably. The groups of interviewed households came the agreement in the role of authorities at all levels from village - commune - district - province - central in the control of natural disasters. Every year, before the flooding season, the local authorities establish the board of flood control at local. These boards of flood control received the instructions of upper levels to be active in organizing activities to reduce the risks caused by natural disasters.

Sno	Members of the flood control board	Role	Duties
1	Chairman of commune People's Committee (CPC)	Member of district flood control board	Guiding and having direct responsibilities for the flood control at local
2	Vice-chairman of CPC	Head of the flood control board	Watching for guidance at the center. Cooperating with the boards, sectors in the CPC
3	Head commune police station	Vice-head	Checking the activities of the board's members
4	Member of CPC	Member	- Watching for guidance at the villages
5	Communal detachment	As above	- Disseminating and encouraging the
6	Agricultural Cooperative	As above	inhabitants in the flood control
7	Village head (head of production team)	As above	- Preparing material facilities for the flood control
8	Farmers' Association	As above	- Organizing the evacuation of the households living at the low areas
9	Women's Union	As above	- Upgrading the irrigation works and canals at the low areas
10	Youth's Union	As above	Establishing the mobile A, B at the communes, villages to prepare for the evacuation and relief
11	Veteran's Union	As above	Disseminating information
12	Red Cross Union	As above	Collecting information and organization the relief
13	Communal health station	As above	Preparing medicines for 2 infirmaries with the plan of intime first aid

Table 17: Role of organizations and individuals in the flood control

6.1.2.3.d. Result of interviewing about the role of participating units

The result of interviewing 100 households about the role of participating units affects the control of natural disasters showed that:

- TTH committee of controling natural disasters

			%	
		Before	During	After
Valid	No idea	12	15	16
	Not yet done duties	16	11	2
	Less done duties	24	37	29
	Done duties	43	32	38
	Well done duties	5	5	15
	Total	100	100	100

 Table 18: Role of TTH committee of controling natural disasters

The inhabitants' evaluation by the process of before, during and after the natural disasters on the role of TTH committee of controlling natural disasters was very interesting. About 12 % of survey samples showed that they have no idea even before, during and after the natural disasters. The quantity variance of this group was inconsiderable through 3 different surveys. Other comments of the community were quite different between the questions about the role of this committee before, during and after the natural disaster. The general evaluation result was that the role of the flood control committee is very important.

- Committee of control natural disaster in Phu Vang district, the communes and villages' inhabitants

Table 19: Role of the committee of controlling natural disaster in Quang Dien district

Role of district committee of	%						
controlling natural disaster	Before	During	After				
Valid No idea	5	13	16				
Not yet done duties	21	11	1				
Less done duties	17	24	26				
Done duties	45	39	40				
Well done duties	12	13	17				
Total	100	100	100				

The role of the committee of controlling natural disaster in Quang Dien district was presented in table 19. Most of the survey sample showed that this committee has played an important role and well done their duties in limiting and overcoming the affect before, during and after the natural disaster.

Role of communal board of flood	%						
control	Before	During	After				
Valid No idea	5	4	5				
Not yet done duties	21	6	3				
Less done duties	17	22	17				
Done duties	45	37	37				
Well done duties	12	31	38				
Total	100	100	100				

Table 20: Role of communal board of flood control

Especially, the inhabitants have high confidence in the head of the village flood control board. Most of interviewed people answered that the person in charge of this position played an important role in reducing the natural disaster at local.

Table 21: Role of the village flood control board

Role of the village flood control	%						
board	Before	During	After				
Valid No idea	1	3	4				
Not yet done duties	2	4	3				
Less done duties	25	19	11				
Done duties	39	40	48				
Well done duties	33	34	34				
Total	100	100	100				

6.1.2.4. Native knowledge about the forecast and control of vulnerabilities caused by natural disaster

Previously, when the system of weather and natural disaster forecast was not developed and the economic life of the local people was not high, in order to control the impact of natural disaster, the inhabitants had to depend on the experience to forecast the weather variance to carry out the preparation. Through the information collection, the inhabitants still disseminated the experience in forecast and control as follows:

- The inhabiatnts often depended on the experience: "Look outside in July, look inside in March"; looking up the clouds, if it is cloudy with lights, there will be tropical low pressure or storms
- "It is windy with yellow sky, rainy with red sky" if the sky is in yellow colour, the storm is coming and if the sky is in red colour, big flood is coming
- Calm sea if the sound of waves are directed toward Eastern, on contrary, rough sea if the sound of waves are directed toward Western.
- In the flooding season, observing the growth position of bamboo shoot, if bamboo shoots grow among the bamboo, there will be a big storm in the year.

- If the inside of black goby has a lot of snail shells, a big flood will happen. According to the inhabitants, if so, the fish will be heavier and can keeps tightly the bottom, avoiding to be swept away by strong water.
- Observing the grass, if its head is white, a big flood will happen
- In the rainy season, if ants crew in groups and move eggs and feeds to high places, big flood will happen
- In the abandone areas in Quang Phuoc commune, there is a kind of flower (look like lily but its name is not known), when it blooms, there will be flood

6.1.2.5. Support activities to improve opportunity of livelihood development in the orientation of reducing natural disaster

To reduce the impact of natural disaster and increase the inhabitants' capability of coping with different kinds of natural disaster, the local people proposed the following solutions:

- Supporting credit so that the local people can invest in the production
- The authorities should have interference with the banks to increase the borrowing time to suit with the production scope and cultivation circle.
- Investing and enhancing capacity of the information warning systems so that the local people can have a lot of information to be active in the control of natural disaster
- Studying the crops and animal development to be suitable with the climate and weather conditions at local.
- To develop aquaculture sustainably, the breeds must be active and strong
- Establishing the proper purchasing system and price policy
- Carrying out seriously the protection of aqua resources
- Investing and upgrading the inter-village, inter-commune traffic system to be active in the relief when the water goes up high
- Limiting the wastes from agricultural production activities to the lagoon
- Supporting the groups of flood control with the necessary equipment (lifebelts, motor boats,...)
- Supporting the poor households with clean water and building toilet

6.1.2.6. Demand on training skills of reducing damages caused by natural disaster at local.

To limit and minimize the risks in the production and in life, farmers have the following demands:

- Training on the techniques of raising shrimps and kniting nets.
- Technical training on first aid for the people in danger
- Training on management of credit for the local people
- Method of treating drinking water and using water
- Introducing the flood control program in schools.
- Increasing the awareness of community in the management and treatment of wastes to prevent from the environment pollution, especially after the flood.

7.DEVELOPMENT OF STRATERY OF REDUCING THE VULNERIBILITIES ON THE AUQACULTURE AND EXPLOITATION ACTIVITIES IN THE TAM GIANG AND CAU HAI LAGOON

In the flooding season, the travelling of the commune met many difficulties. The travelling not only from the district, city to the commune, but also the between the villages in the commune are seperated. Therefore, the general policy of the local leaders informed to the households groups, the households in the commune have to apply seriously the 4 on-the-spot methods. It is detailed that: (i) on-the-spot force; (ii) on-the-spot guidance; (iii) on-the-spot logistics; and (iv) on-the-spot means. On the other hands, it must be active in using the from modern to primitive information system at necessary.

To satify the above request, the commune People's Committee set up the concrete solutions:

- There are the concrete control plan for every flood when receiving the warning information.
- The commune Flood Control Board has to check directly each resident group to give out the additional methods.
- Checking and f upgrading the broadcasting system in the commune.
- Disseminating and encouraging the local people to avoid the subjectivism.
- Preparing the foods (fast noodle) and medicines as requested by the upper levels.
- Clarifying the evacuation ways and sites for each resident area when a big flood happens

MAIN REFERENCES

- Do Bang: "Floods in 5 past decades in Thua Thien Hue". Magazine: Hue in previous and present time, June 2000.
- Nguyen Viet: "Impact of global climate's change on the status of natural calamity in Thua Thien Hue". Workshop: Enhancing the security for human, environment and disaster management. Hue, August 2006.
- People's Committee of Quang Dien district: "Carrying out the socio-economic duties in 2005 and the tendency for the socio-economic duties in 2006". Quang Dien, December 2005.
- People's Committee of Quang Dien district: " Carrying out the socio-economic duties in 6 first months of 2006 and the tendency for the socio-economic duties in 6 final months of 2006.
- People's Committee of Thua Thien Hue province: "Reporting, checking, revising and complementing the plan for the socio-economic development in Thua Thien Hue province up to 2010". Hue, May 2000.

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8.PHÚ AN COMMUNE

8.1. THE SOCIAL ECONOMIC SITUATION AND REDUCE DISASTER IN PHU AN COMMUNE

8.1.1. The social- economic and natural condition

8.1.1.1. Natural condition:

Phu An commune is far from Hue City 12km in the Northeast, the north borders Phu Tan commune, the East borders Phu Xuan commune (separated by Tam Gang lagoon), the West borders Phu Duong commune and the south borders Phu My commune



Map 1: The administrative boundary of Phu An commune

The total land area of Phu An commuen is 1.128 ha, this natural land is seperated into many usage kinds

We can see that in Phu An commune, 233.54ha of land is used for planting, people plant rice mainly (in the year 2005, the area of Winter- spring rice crop was 210 ha, the area of Summer- autumn rice crop is 60ha), the area for another

crop and area of home garden is not remarkable (look at appendix 2- map about the land usage in Phu an commune)

Beside the land for agriculture, land is also used for non- agriculture. Among them, land for living is 4924ha, land for production is 6736ha, land for religious is 105ha, land is used for nothing is 807ha, especially, land in the stream, river... is 53900ha

Order	Land usage	Area (ha)	Rate (%)
1	Agricultural land	393,86	34,84
1.1.	Agricultural production land	233,54	
1.2.	Aqua cultural land	160,02	
2	Non- agricultural land	725,44	64,27
2.1.	Land for living	49,24	
2.2.	Land for using	67,36	
2.3.	Land for religious	1,05	
2.4.	Land for graveyard	68,79	
2.5.	Land for stream, river and	539,00	
	water surface		
3.	Unused land	8,70	0, 89

Table 22: Some kinds of land usage in Phu An commune

Land for cultivation is base on the job characteristic of each households. With agricultural household, the average land area is $500m^2/$ person. With aqua cultural households, water surface area is divided according to the number of people in the family. Each households has their own land for living. Especially, in Dinah Cu hamlet, there is one household who build the house on the water surface. (appendix- picture 3), but the local authority said that, this household will build the cement house on the land with the average area less than $200m^2/$ household

The water surface resource of Phu An commune is rich. Beside the water surface area is 160.02ha that people use for aquaculture, a big area in the North and in the East of Tam Gang lagoon not only create an interesting ecological scenery but also contain many important creature resource that serve people's life. In Phu An commune, there is also a canal system and complicated such as: Hoi GAO, Hoi Vine Vệ, Hoi Bin, Hoi Co, Hoi a Loch, Hoi Lu Bụ...These "Hoi" help the irritation system of the commune.

Although this commune has advantage about water resource, but the irrigation system is not complete, the salt water prevention dam does not have high quality so the salt water always flow into the field. In the summer, because of the shortage of water, villagers use salt water for watering.

8.1.1.2. Social -economic condition

According to the survey on July 1st 2006, there are 1685 households in Phu An commune and 8642 people. They are distributed into the hamlets:

		People		
Hamlet	Total of	Agricultural	Non agricultural	
	households	household	households	
Triều thủy	484	200	284	2.495
Truyền nam	136	13	123	686
An truyền	781	138	643	3.943
Định Cư	284 -		284	1.608
Total	1.685	351	1.334	8.642

Table 23: The distribution of people into hamlet of Phu An commune

There are 781 household in An Truyen hamlet and there are 3943 people. In Phu An, agricultural household is 1/4 among total households, the left are non agricultural households.

Each hamlet has their own job characteristics

- There are 100% of agricultural household in Dinh Cu hamlet
- There are 136 household in An Truyen hamlet, among them, there are 13 agricultural households, the left are base on construction, business, handicraft...
- There are 781 household in An Truyen hamlets, among them there are 643 household base on non agriculture such as aquaculture, business, service.

With the particular of the commune, the economy of Phu An commune is base on agricultural production, aquaculture, handicraft and some traditional jobs in the local, service

- Agriculture

Planting: rice is mainly Animal husbandry: buffalo, pig, cow, chicken... The total income from planting in the year 2005 is about 2335billion VND

- Aquaculture

Beside the exploitation of natural resource on Tam Gang lagoon, Phu An commune also

encourage villagers focus on aquaculture. The total income from aquaculture in Phu An is 3245 million VND

- Handicraft

In recent years, Phu An commune has encouraged villagers to develop some traditional jobs such as: carpenter, masonry, husk... The total income from these job is about 6billion VND in the year 2005

Above all, we can see that the income of each household is diversified. With aquaculture households, their income is from the aquacultural products. With business households, their income is from the products that they sell...

System of education

In recent year, with the concern of local authority and the effort of villagers, some school are built spacious, especially the primary schools, secondary schools. They are not only the pride of teachers, students, parents but also a safety place in flood season.

There are 3 branches of the kindergarten. The 1^{st} branch is in An Truyen hamlet with 155 students (5 classes). The 2^{nd} branch is in Tried They hamlet with 60 students (3 classes). The 3^{rd} branch is in Dinh Cu hamlet with 60students (2classes)

There are 2 branches of primary school. Phu An primary school 1 has 802 students. Phu An primary school 2 has 421 students

- Before there is the flood or storm, local authority connect with the school inform to the students, allow them to stay at home to prevent the danger

Medical system

Phu An commune has one medical station with 2 floors. There is one doctor, 2 physicians, 1midwife, 1nurse. There are 12 beds in the medical station. The local authority concern about the material and health for villagers. In the year 2005, the medical staff here examined 6120 patients. There are 5800 patients that are examined inside, 320 patients are examined outside. The health of children is also concerned. The medical staff vaccinated for 254 children

8.1.1.2.a. Agricultural cultivation activities

The agricultural production in Phu An commune includes 2 main activities: planting and animal husbandry

Planting

Rice is the main tree in Phu An commune. The total area of the field in Phu An in the year 2005 was 270 ha, among them, the area for Winter- spring rice crop was 210 ha, for Autumn-summer rice crop was 60ha. The average rice productivity is 45,34 quintal/ha and the rice productivity in 2005 was 1229 ton

Animal husbandry

Animal husbandry in Phu An commune focus on the households mainly. The animal in this commune develop very well based on the technique progress and good ways to prevent insect. In the year 2005, the total number of buffalo is 160, the number of cow is 20, the number of pig is 1800 and livestock is 16000

• Seasonal schedule: In agricultural production, especially in planting, the seasonal schedule arrangement is very important (table 3)

Influence factors	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
Drought period																
Flood, storm																
period																
Salty period								-								
South west wind																
North East wind																
insect																
Bệnh đạo ôn																
Busy period																
Free period																
2. Rice planting						HT					-			ĐΧ		
season																

 Table 24: Seasonal schedule of plants (lunar calendar)

In general, this seasonal schedule of plants avoid some disadvantage for environment. However, because of the hot weather and Southeast wind, the watering system is not good so they influence the crop productivity a lot

Some advantage and disadvantage in agricultural production

Beside some advantages, there are also the disadvantages in production in Phu An commune

(table 4)

Advantages	Difficulties	Reason	Solutions
Fertility soil	- Lack of water for summer-autumn crop	- the irrigation system is not complete	- Establish the water station
Villagers have experiences in production	- Some rice filed are damaged by salty water in summer- autumn crop	- Because of the salty water the aquaculture	- Increase the dam to prevent salt water
Hard working	- Some area overflowed in September, October	- Because of the low field, rain too much	- Need to have edge of rice field
Labor force is plentiful	- In February, rice often attacked by insect	- the influence of the weather. The fertilizer is not used with right purpose	- Suitable ways of using fetilizer
	- Ladder field and graveyard intermix together. It is difficult for the mechanize	- Lack of field project	- Projet the fields again.
	- Lack of capital for raising. There are also limitation in applying the technique progress in husbandry	- the economic potential is limited. Villagers do not have chance to attend the training courses about techniques of animal husbandry	- Want to have policy for capital. Hold training courses for villagers
	-The cultivation area narrowed day by day	- Build roads, infrastructure building	- Concern the project in general

Table 25: Some advantage and disadvantage in agricultural production

8.1.1.2.b. Aquacultural activities

Phu An commune has one advantage: there are area of water surface for exploitation and aquaculture (aquaculture area is 16002ha, the area of river, stream is 539ha) In the year
2005, the area for aquaculture is 2248ha. The aquacultural productivity in this commune in 2005 was 105,2 tons.

The schedule of aquaculture has a close relationship with the climate condition (table 5)

1.Factors	1	2	3	4	5	6	7	8	9	10	11	12	1
Drought period							_						
Flood and storm period							-				-		
Salty water period			-										
Damage in aquaculture							-						
South West wind			_										
North East wind													
2.Aquaculture 2.1. In the pool (raise sugpo prawn, shrimp,													
kình)													
2.2. In girder (raise sugpo prawn, shrimp,													
crab, cá dìa, cá kình)													
3. Aquaculture exploitation													

 Table 26: The schedule of aquaculture (Lunar calendar)

We consider that the aquaculture as well as the exploitation of natural products connect with the weather conditions. The aquaculture in the lagoon often be started from January to July, the harvest starts at the end of July. The exploitation of natural products is implemented all the year. However, fro January to May, the productivity is low, from June to December, the products is higher

- In the last time, villagers in Phu An commune live base on the natural aquacultural products in Tam Giang lagoon. From the year 1996, villagers start concern the aquaculture - Beside the advantages, there are also disadvantages in aquaculture. (Table 6)

Advantages	Disadvantages	Reasons	Solutions
Large area of water surface	- Lack of capital for aquaculture	- The capital for aquaculture is too much	- Loan money at the beginning of the crop, low interest
Commune give 200ha for aquaculture	- Lack of natural food for cá dia (gracilaria, alga)	- Exploitation of gracilaria, alga (dry gracilaria: 3000vnd- 4000vnd/Kg)	- Research and restore the development of gracilaria in lagoon
Villagers have experiences in aquaculture	- Lack of varieties	- Buy varieties from another province so villagers do not know the quality of varieties	- Research to create the varieties in this commune
	- Disease of shrimp (white spot), disease of crab (red color on the back)	- The change of weather (shrimp, fish often died after the rainstorm); the water environment is polluted	- Enhance the recognition of villagers in protecting environment. Research some solutions to improve the water environment in lagoon

Table 27: Some advantages and disadvantages in aquaculture.

8.1.1.3. Irrigation and infrastructure

During the development of economy and society, the infrastructure of Phu An has some changes

Electrical system

There are electrical system in all the hamlets. There are 95% of household who are using electricity. Electricity create the conditions to develop the economy and society in this local as well as households

Transportation system:

The transportation system in Phu An commune is quite well. There are 1.0km of road across the hamlet. The road that connect many hamlets are concreted with the length is 3.5km/ the transportation system create the advantage conditions for cultural exchange, economic development in the commune. However, there are also 5 small roads that are not concreted yet. However, in rainy season, students have difficulties when go to school.

School system:

The kindergarten, especially the primary school and secondary school are built spacious and have many floors. These schools with high floors are the safety foe villagers in rainy season

Medical station of the commune:

The medical station is built spacious and have floors. This is not only the safety place for patient but also the place to store drugs

Information system:

Phu An commune has a broadcast system and propaganda information to hamlets. Especially in flood and storm season, through the broadcast system, the flood prevention Board can inform the flood situation to the hamlets, suggest everybody to have the ways to prevent flood... There are 2 generators

8.1.1.4. Livelihood for poor people

According to the figure from People commitee of Phu An commune, there are 118 poor households. In Trieu Thuy hamlet, there are 35 households, there are 45 households in An Truyen hamlet, there are 17 households in Truyen Nam hamlet and 21 households in Dinh Cu hamlet. The poor households are distributed "Poor household card", so parent an dchildren will have the benefit from the policy of Government and local about studying, examine...

- Beside the poor group, there are some special poor group. In Trieu Thuy hamlet, there are 34 households, in An Truyen hamlet, there are 35 households, in Truyen Nam, there are 18households, in Dinh Cu, there are 12 households. These households not only have benefit from Government and local policy but each month, they receive 60.000VND-70.000VND

The result of survey to classify the households: 17 households are in Ordianry group, 48% households are in average group, more then 35% are in poor group

		Total	%	Gather
Kind of household	Ordinary	17	17,0	17,0
	Average	48	48,0	65,0
	Poor Total	35 100	35,0 100,0	100,0

Table 28: Classify households base on the criterion of nation in 2004

Reason of poverty and hunger

- Lack of experiences in production
- Lack of capital for business and invest for technique
- Too many children in one family (there is one family in Dinh Cu hamlet that has 16 children). This story is known by the Government through newspaper. Or Ms. Huynh This Bong, at the age 31, she has 6 children -(card 1)

- Short of manpower in family, old people have no one to rely on
- Disease in many years
- Disaster damaged the property, agricultural and aquacultural products

8.1.1.5. Sex and livelihood

Because of the difficuties in life and need for income, villagers find many ways to increase their living conditions. Men often focus on masonary field, women go to the field, washing dishes...some sell products in the local, some go to Lao Bao (Quang Tri Card 1:

Ms. Huynh Thi Bong, Dinh Cu hamlet, 31 years old, has 6 children (4 daughters and 2 sons. The oldest one is 13 years old, the youngest one is 3 years old)4 children are beggars and now, they are living in Benh Ve pagoda. Ms Bong has no job, everyday, she is hired labour and earn 10000VND-15000VND for herself and 2 little children

province to sell products) or some another locals such as Nghe An, Thanh Hoa, Cao Bang, Lang Son, Sai Gon...The houses of most of villagers are unstable (see in appendix 6), it is dangerous for villgagers in rainy, stormy season.... and in the summer, the atmospere is hot so it also influences the health of villagers

8.1.1.6. Finance

To develop the economic as well as to have a stable life, villagers in Phu An can loan money through some credit systems:

The main credit system

When villagers want to loan money, they have some ways:

- Pledge
- Villagers can come directly to some banks such as Bank of Agricultural and Rural development (can loan from 40-50million VND, the interest 1%), Vietcombank Hue- the branch in Thuan An townlet (interest 1.1%) with the condition: pledge
 - Normally, agricultural households can loan from 10-20million VND, with aquacultural households can loan more
- **Unpledge**: Villagers can loan money through some social organisations of the local such as Women Union, Farmer Union...With this way, villagers have to register. The files will be supplied by the organisations and these organisations will come directly to the bank.

Unorthodox credit system

At present, in the local there is one kind of unorthodox credit system named "Hui", some households that want to loan money, they can come to some rich family and loan money with high interest (2-3%)

This king of credit system is considered as a spontaneous credit system of villagers in Phu An commune. There are many groups (business, service, aquaculture... or in the same neighborhood). The prestige of the head of one spontaneous credit system is important. This kind of credit system help villagers have capital to invest some activities in emergency

8.1.1.7. Water resource

Water for living in Phu An commune is originated from : rain, underground water and tap water

The underground resource is used for serving the living condition and production of villagers. Before, many housholds used underground water to serve the living condition but many areas in this commune are influenced by salt water so nowadays many households use tap water.

Villagers use rain water to drink mainly. Most of the households have the water container in their houses. The rain every year (3300mm/ year). Villagers take water from another system such as underground or tap water for another purposes.

In recent 6 years, teh water for living is improved based on the tap water supplied by the commune. However, based on each villagers areas, some households do not establish the water system yet so they have to buy water fro another households. Because tehy buy water so they save water and only use for cooking. Some households in Dinh Cu hamlet use water in low field to bath.

Base on the survey, some households do not use clean water yet, they use water from another resources mainly (Table 8)

		Frequency	Percent	Cumulative Percent
Valid	River water	2	2,0	2,0
	Rain water	8	8,0	10,0
	Water in the well	1	1,0	11,0
	Tap water of villagers groups	29	29,0	40,0
	Public tap water	2	2,0	42,0
	Another	58	58,0	100,0
	Total	100	100,0	

Table 29: Survey the tap water usage for living and drinking

The survey result about water quality is good, 79% of households have clean water, only 4% of households do not have clean water yet

Table 30: Survey on the water quality

				Valid	Cumulative
		Frequency	Percent	Percent	Percent
Valid	Bad	4	4,0	4,0	4,0
	Average	17	17,0	17,0	21,0
	Good	79	79,0	79,0	100,0
	Total	100	100,0	100,0	

8.1.2. Access the flood and storm situation every years

8.1.2.1. Hydrography and climate characteristics

Thua Thien Hue province is located in the tropical and monsoon area. The climate here is influnced directly the climate from the North and the South. The main rivers in Thua Thien Hue are Huong river, Bo river, O Lau river, Truoi river. The rainy season is from August to November (Western calendar) with 2500- 2700 mm and often have flood, overflow. The dry season coincides the dry South West wind season, from March to July (Western calendar): drought and salt water influence the rivers.

Phu An commune is up to Phu Vang district, it has some particular characteristics.

- This area have the highest temperature in the province, the averager temperature is about 24- 25,2°C
- The total temperature is from 8500- 9000 °C
- The total suuny hours: more than 2000 hours
 - In the winter, the lowest temperature can reach to less than 10° C. But in the summer, the temperature is high, sometimes 40° C or even more than that.
- This area have the lowest amount of rain among the province
 - The amount of rain every years: 2600- 2800mm
 - The amount of rain is not distributed regularly each months in a year.
 - The total rain amount fro January to August is less than 800mm. In June, this area does not alve enough water
- This area is influenced seriously from the windstorm, flood and the dry South West wind.

8.1.2.2. The rainy and flood season

According to the figure of Hydrometeorology Centre in Central Vietnam, the rainy season every year in Thua Thien Hue in general and Phu An commune- Phu Vang district in particuar often happen from May, June (Western calendar) and cause the small flood. Fro September to Novemebr (70% amount of rain appear)

From 1978- 2005:there are 98 floods happen in Huong river valley. There are average 3.5 floods above 2nd alert. La Nina happen in some years (1996, 1998, 2000) and inthese years, floods happen too many times. The time for each flood last fro 3-5 days, or even 6-7 days. The amplitude of flood is from 3-5m.

According to villagers' experiences, the flood often happen in September, October, November- Western calendar (especially in October). Beside flood, storm often occur in September, October, November

(In October or November, flood often occur twice or three times)

Flood and storm often cause damages for property, life, the production and also influence the development of economy and society of the local, and cause serious damages for environment and ecology

8.1.2.3. The damage of flood, storm

Time that related to the damage of storm, flood

Base on the group discussion (FGD), villagers remember clearly some period of time that connected closely with the disaster and the damage of disaster (Table 10)

Timing	Influence
Flood in 1953	Damage the life and property
Flood in 1975	Failure 250ha of agricultural productivities
Drought in 1977	Great damage, especially in agriculture. Crop failure, some villagers
	are hunger. Some have to leave commune to another places for earn
	living
Flood and storm in	Houses are knocked down, fishing cages are drifted
1983	
Flood and storm in	Damage to people and property. There are 40 households in Dinh
1985	Cu hamlet that are knocked down. The property damage is about
	100 million VND. There are 36 people died in this commune (there
	are 13 in Dinh Cu hamlet). After the storm and flood, in the year
	1985, Dinh Cu hamlet was established.
D 1.1.1000	
Drought in 1989	Influence seriously to the productivity and rice. Salty land.
Flood and storm in	Damage to property reach more than 300million VND. The wind is
1998	at level 6, level 7 but some villagers come to the sea and 4 people
	died
Historical flood in	Damage seriously to property, houses, roads and the amount of
1999	money is approximately 10.4 billion VND. There are 4 people died
Flood in 2004	Some aquacultural households are damaged about aquacultural
	tools, shrimp, fish The damage is about 10 million VND
Flood in 2005	Some aquacultural households are damaged about aquacultural
	tools, shrimp, fish The damage is about 20 million VND

Table 31: Some disaster happened in this local and their influences

Above is some period of time and some damages that villagers can remember. In fact, from the year 1950, according to PhD Do Bang (Do Bang: "Flood and storm in 5 centuries in Thus Then Hue province), there are many serious flood and storm and their damages are serious

The influences of disasters.

We can consider that Phu An commune is a place that often influenced by disaster. However, according to each kind of disaster, the influences are different. (table 11).

The change of climate, scenery, ecology and environment

Villagers have noticed some changes of climate, scenery, ecology and environment from the sense. These changes are from the change of nature and the impact of people.

The change of climate

According to villagers, in recent years, there are some stable changes about climate

- The flood every year reduces * (*Note: this comment is from villagers and they consider from 2000- 2006)
- It often rains too much in rainy season, in the summer: high temperature and sunny
- The direction of wind changes:

Table 32: The influences of disasters

Disaster	Areas that influenced seriously*	Households that influenced seriously	% of households that influenced seriously	Time **	The times	Influence to
Flood	Định Cư, Triều Thủy, Đồng Miệu.	Poor households	30%	September- November	4 times/ year	Property, people, environment
Storm	Whole commune	Ordinary, average and poor households	70%	September- November	Once- twice/ year	Property, agriculture, aquaculture, environment
Drought	Whole commune	Ordinary, average and poor households	35%	May, June, July	Once- twice/ year	Agriculture, aquaculture, water for living
Salty	Đồng Miệu, Triều Thủy, Truyền Nam	Ordinary, average and poor households		May, June, July	All year	Rice, aquacultural productivity

*Note: see appendix 7- Map about disaster ** Timing: Western calendar

The change of scenery

The change of scenery influenced too much by the impact of villagers. The development of economy- society lead to the change of the scenery

- Infrastructure (electricity system, transportation, schools, medical station...) are built and repaired lead to the change of village. With the development of infrastructure, the land for cultivation is narrow
- Before, villagers exploit the natural resource from Tam Giang lagoon and base on fishery mainly. Nowadays, the scenery in Tam Giang lagoon changes a lot because of aquaculture. Aquaculture bring income for villagers. However in recent years, there are a lot of disadvantages. Beside the impact of villagers, the storm, flood, drought damage the environment and ecology

Some damages to environment, ecology from disaster and people's activities

Droughts in recent years damaged the agricultural production and aquaculture. Drought often occurs in May, June, July (Western calendar). Because of the lack of water, the area for Summer- Autumn crop can reach only 60ha. Drought brings the salty, influence the planting productivity and living. With the drought, high temperature in summer increase the salty in lagoon area and fishes, shrimps died.

Storm not only damaged the crops, property, life but also the trees.

During and in flood period, the garbage, animal died... polluted the water resource.

The water environment in lagoon is polluted day after day because of the agricultural chemical substance (fertilizer, drugs to protect plants...), garbage of villagers who live along the lagoon area, the usage of chemical substance in Card 2

This is a comment of one member in average group: "In the past, the size of a crab was big, like a hand, the seaweed develop well so that boats can not move on the water surface. Please give us back the lagoon like in the past. The wish from villagers is to clear away the net enclosure. If villagers have the area again, those who live far from the village will come back lagoon

aquaculture reduce the fishery productivities, and even the death of fish, shrimps....

Villagers do not know how to apply new techniques in aquaculture, this not only prevent the circulation of water, pollute water but also prevent the move of creature from the sea to lagoon. Before villagers only use tools made from bamboo, net so the influence to water circulation and the creature is just a little. So, the project of net enclosure on lagoon area is really necessary for villagers (card 2)

Villagers nowadays use a lot of electrical equipments in aquaculture, this made many creatures died...There were a lot of kinds of fish such as: Tom back, tom run, cá on hương, các đối cóc, cá đuối, cá thờn bơn, cá ong bầu in the past but nowadays are rarely.

Before in this area, there is one kind of plant that that can live in salty water named "đước" but after 1990, people destroyed

8.1.2.4. Actual state of some impacts to reduce the disaster in this area

Analyze SWOT

Strong point	Weak point	Occasions	Challenges/
(S)	(W)	/potentials	hazards
		(0)	(T)
- From the fact of	- This commune is	- If there is a	- The polluted water
previous years,	located in low area	watering place, this	influences the
villagers had	(located at the head	commune will	production and life
experiences and	of salty water	increase the area of	of villagers
have high	resource and end of	Summer- Autumn	- Many households
recognition in	clean water	crop, the economy	catching fish
preventing flood and	resource)	of villagers will	according to
storm	- When the flood	increase, the	exterminate ways
- The Management	come, it is difficult	prevention of flood	- Lack of means for
of preventing flood	to use transportation	and storm will get	rescue
and storm have some	- Many households	better	- Disaster does not
more experiences	want to have stable	- Have the	happen base on the
- The system of	house or high floor	consideration of	rule
preventing flood and	house but they do	district, province,	
storm of hamlets,	not have money	central about	
communes is	- Lack of means of	material and spirit	
organized well and	rescue (the motor	- Hope to have the	

 Table 33 : Analyze SWOT about the actual state to reduce disaster in this area

they work	boats in this	help from some	
enthusiastic	commune are small,	organizations in the	
- There is one place	can not adapt)	country as well as	
to inform the storm	Government	outside about	
in this commune so	supplied one speed	preventing disaster	
villagers can update	boat but now it is		
information	broken. Many		
- There is an	hamlets lack of		
information system	rescue means.		
in this commune	- There are many		
(base on the radio	difficulties in		
and electric	polluted		
generator) There are	environment		
20% of households	disposal (polluted		
who have cell	water, polluted		
phones	garbage)		
- There are some			
means to rescue such			
as floats			
- Many houses are			
high floor houses.			
Many households			
have boats			
(especially in Dinh			
Cu hamlet)			

8.1.2.4.a. Roles of villagers in overcoming and reducing disaster in the local

Family is an important implement in society. To reduce the impact of disaster, the role of each family is important. However, base on the particular characteristics of each jobs, the differences of sex \rightarrow lead to the differences in strategy of preventing the flood among agricultural household and aquacultural households.

Some activities of women in preventing flood and storm

When flood and storm come, beside some daily activities, women also have some another activities (table 13, 14)

- With women who focus on agriculture

Table 34: Some daily activities of women who focus on agriculture in flood and storm period

Before	While			After		
- Harvest rice, crops @ *	- Use	oil stove	for	- Clean	the house ³	*.
- Store food, oil, drugs *	cooking,	drink	rain	-Clean	the	surrounding

F		
- Save money *	water*.	environment*.
- Help some family that lack	- Take care of children *.	- Wash clothes*.
of man power @ *	- Help some family that	- Rearrange furniture@ *.
- Move some furniture to	lack of man power@ *.	- Go to the market to buy
higher places @ *.		food*.
		- Prepare animal for raising,
		plants seed @ *.

<u>Note</u>: - @: male

- *: female

- With women who focus on aquaculture.

Table 35: Some daily activities of women who focus on aquaculture in flood and storm period

Before	While	After
- Save money*	- Use oil stove for cooking,	- Clean the house*.
- Harvest shrimp, fish@ *	drink rain water*.	-Clean the surrounding
- Store food, oil, drugs *	- Take care of children *.	environment*.
- Move some furniture to	- Help some family that lack	- Wash clothes*.
higher places @ *.	of man power@ *.	- Rearrange furniture@ *.
- Help some family that lack		- Go to the market to buy
of man power @ *		food*.
		- Prepare animal for raising,
		plants seed @ *.
		- Repair the net@ *

<u>Note</u>:: - @: male

- *:female

Some activities of men in preventing flood and storm

Table 36: Some daily activities of men who focus on agriculture in flood and storm period

Timing	Before	While	After
6am	Get up	Get up	Get up
6am-6.30am	Have breakfast	Have breakfast	Have breakfast
6.30am-11am	- Harvest	- Move person and	- Clean the house,
	productivities	furniture higher	neighborhood,
	- Block the roof	places when the big	roads
	- Move furniture to	flood happen	- Rearrange the
	higher places	- Follow the water	furniture
		level, protect the	- Repair the house
		property of family	- Help some difficult
		- Help some difficult	families
		families	- Check the rice
			varieties.
11am- 2pm	Have lunch and take	Have lunch and take	Have lunch and take
	a rest	a rest	a rest
2pm-5pm	- Continue the work	- Continue the work	- Continue the work
	- Help neighbors,	- Help neighbors,	- Help neighbors,

	friends	friends	friends
5pm-9pm	Have dinner, take a	Have dinner, take a	Have dinner, take a
	rest	rest	rest
After 9pm	Update the weather	Update the weather	Update the weather
	broadcast and go to	broadcast and go to	broadcast and go to
	bed	bed	bed

Table 37: Some daily activities of men	who focus on agriculture in flood and storm
period	

Time	Before	While	After
4am-5am	Get up	Get up	Get up
5am-6.30am	Have breakfast	Have breakfast	Have breakfast
6.30am-9am	 Rearrange the net Đóng trộ to catch natural fish 	 Move people and property to higher places Follow the water level and protect property of family 	 Clean the house, neighborhood, roads Rearrange the furniture Repair the house Help some difficult families Check the aquaculture area to overcome the consequence
9am-9.30am	Have lunch	Have lunch	Have lunch
9.30am-11am	- Block the roof - Move furniture to higher places	Help some difficult families	Continue the work
11am-1pm	Take a rest	Take a rest	Take a rest
1pm-4pm	Check the net to see if there are fish or not	 Watch weather broadcast Protect property of family Help some difficult families 	Continue the work
4pm-morning of the	-Follow weather	- Follow weather	Continue the work
next day	broadcast - Protect aquaculture area all night	broadcast - Protect property and then, take a rest and go to bed.	Take a rest and go to bed

Beside the preparation of each family, Party organizations, local authorities, Youth Union have important roles

8.1.2.4.b. The roles of local authorities organizations in preventing flood and storm, reduce disaster

organizations and	Before	While	After
individual			
1. Party committee of the commune	Outline some guidelines in preventing the flood and storm of the commune	Follow the tasks of local authorities and some organizations	Have some guidelines to prevent the flood, storm of the local
2. People committee of the commune	Receive the guidelines, organize some meetings, assign duties for each department	Follow the tasks of local authorities and some organizations	Have some guidelines to overcome the damages. Stable life, production
3. Management board of preventing flood and storm in the commune	 Build the ways to prevent flood and storm in the commune Some people will on call in the office, some go to the field trip Prepare some materials, means 	Implement some ways	Have the information about the damages situation, inform to the district to require the help (food)
4. Military command	- On call in the committee 24/24, always ready to rescue	 Follow the flood situation. Help villagers move to safety places, rescue Connect with police in the commune to protect property for villagers 	Help villagers overcome the flood frequency
5- Police station	Remain the security and safety	 Protect property for villagers Remain the security and safety 	Catch the situation after the flood. Ensure the public order in the commune
6. Medical staff	Prepare drugs	Examine patients and treat immediately	- Implement some methods to protect environment, hygiene
7. Front committee of the hamlet	- Direct some public organizations	Propaganda and encourage villagers	Launch the program "Love each other

 Table 38: Roles of organizations and individual in preventing flood, storm

organizations and individual	Before	While	After
	- Propaganda and encourage villagers to prevent flood and storm	to move to safety places	and mutual affection"
8. Farmer union	Connect with some organizations to propaganda and encourage villagers to prevent flood and storm	Help villagers move to safety places	 Participate in recovering the flood consequence Encourage villagers help some difficult families
9. Youth Union	Connect with some organizations to propaganda and encourage villagers to prevent flood and storm	Move some difficult families to safety places	 Recover the flood, storm consequence Clean environment
10. Women Union	Connect with some organizations to propaganda and encourage villagers to prevent flood and storm	Propaganda and encourage members to move to safety places	Encourage villagers help some difficult families
11. Veteran's organization	Connect with some organizations to propaganda and encourage villagers to prevent flood and storm	Help some difficult families	 Participate in recovering the flood consequence Encourage villagers help some difficult families
12. Red cross union	Prepare drugs	First aid for patient	 Direct the environmental hygiene Prevent the diseases
13. Management board of preventing flood and storm in the hamlet	 Inform the plan to prevent flood and storm to each households Check the tasks of preventing flood and storm in the hamlet 	- Help some difficult families - Rescue	-Recover the flood, storm consequence - Receive the goods and distribute goods to villagers.
14. Religious			Give rice, instant noodle, clothes, money

organizations and	Before	While	After
individual			
16. Family			Give rice, money
17. Individual			Give rice, money
(people from			
oversea)			
18. Police and	Have people come	- Participate in	Help villagers
district armed forces	to the local and help	rescue	recover the
	villagers in		consequence after
	preventing flood		the flood, storm
	and storm		
19. Bank			Allow villagers to
			loan money to
			recover the flood
			consequence and
			continue the
			production

From above results, we can consider that: beside the preparation of each households, many organizations join in and find the solutions to prevent and reduce the impact of flood, storm. However, the roles and influences of organizations in preventing flood, storm are different.

We can perform this relationship through this Map Venn (Map1)



Figure 1 The relationship among organizations in preventing disaster

Through Venn map, we can see that : People Committee and Management board of preventing flood and storm have important roles and have direct influences to preventing flood task. Red Cross and religious have a small part in preventing disaster

Preventive

- Preventive is main. Preventive method is implemented with 4 guidelines: (forces, logistics, commander, means at the same places)
- The organizations and implement some activities to prevent flood, storm are important. There is one Management board of preventing flood and storm in the commune, include 22 people (Chairman, Vice chairmen, Head of each department, farmer Union, Women Union, Youth Union, Veteran's Organization, police, leader of each hamlets...Among them , the chairman is also the head of the management board of preventing flood and storm) There are 5-7 people in Management board of preventing flood and storm in the hamlet (leader of the hamlet, police, medical staff,...) There is one militia board in each hamlet, from 5-7 people
- Before the rainy season, commune also prepares some means, materials to rescue immediately. There is one motor boat in this commune, 100 liters of petrol, 50 litres of oil, 20 floats, 50 floats are distributed to each hamlets. In Dinh Cu hamlet, there is one gale warning station, when the flood or storm come, this station will have signal by sirens or lights to call boats come back. This commune has stored 1 ton of rice and 2000 packages of instant noodle

Resist

There are some ways to resist the flood and storm:

- Management board of preventing of flood and storm will be on call 24/24 to direct immediately and solve emergency situations.
- Move villagers to safety places
- Organize activities to rescue when there are some dangerous situations happen
- Distribute food for villagers
- Inform and force some households who still live in the boats or still do aquaculture during the flood and storm period.

Recovery:

Management board of preventing of flood and storm have some ways to recover the flood and storm

- Statistic and inform the damage situation to higher organizations
- Stabilize the production and life of villagers
- Receive and distribute goods to villagers
- Implement to clean environment, prevent diseases
- Propaganda and encourage villagers help and love each other
- Summarize, get experiences, commend and reward some individual, organizations that have contributions in preventing flood, storm

8.1.2.4.c. The result of the survey about roles of organizations

Disaster prevetion Commitee of Thua Thien Hue Province

Roles of <i>Disaster prevetion</i>	%		
Province	Before	While	After
Valid Do not know	2	3	5
Do not represent responsibility yet	39	39	26
Have a bit responsibility	19	21	24
Have responsibility	29	24	32
Have high responsibility	11	13	13
Total	100	100	100

Table 39: Roles of Disaster prevetion Committee of Thua Thien Hue Province

The evaluation of villagers are complicated, about 40% of villagers said that the role of *Disaster prevetion Commitee of Thua Thien Hue Province* is good.

- Disaster prevetion Commitee of Phu Vang district, commune and villagers' organisations

 Table 40: Roles of Disaster prevetion Commitee of Phu Vang district

Roles of Disaster prevetion	%		
district	Before	While	After
Valid Do not know	3	5	5
Do not represent responsibility yet	38	42	28
Have a bit responsibility	22	19	25
Have responsibility	29	23	32
Have high responsibility	8	11	10
Total	100	100	100

 Most of villagers said that Disaster prevetion Commitee of Phu Vang district has not represented their roles yet to reduce damages from disaster (table 19) before and after the disaster happens. 85% of villagers said that the role of commune and villagers' organisations is important in preventing and reducing disaster before and after disaster. Especially, the head of Disaster prevetion Commitee of commune and villagers is appreciated, this man has an important role during the flood and storm period

Roles of Disaster prevetion Commitee of the commune		%		
		Before	While	After
Valid Do not	know	2	4	5
Do not respons	represent ibility yet	13	18	8
Have a respons	bit ibility	18	19	22
Have re	esponsibility	38	34	30
Have have have have have have have have h	igh ibility	29	25	35
Total		100	100	100

Table 41: Roles of Disaster prevetion Commitee of the commune

Table 42: Roles of Disaster prevetion Commitee of the hamlets, neighborhoods

Roles of <i>Disaster prevetion</i>		%	
neighborhoods	Before	While	After
Valid Do not know	3	6	4
Do not represent responsibility yet	14	15	8
Have a bit responsibility	17	20	21
Have responsibility	30	28	26
Have high responsibility	36	31	41
Total	100	100	100

- Some organisations (Women Union, Farmer Union...)

The organizations such as Women Union, Farmer Union, Veteran's Organization are not appreciated. However, some another organizations such as Youth Union, militia, volunteer... are highly appreciated in contributing their efforts to reduce disaster in Phu An commune. The role of these organizations are highly appreciated before and after disaster period.

- Some participants

Some activities before and after disaster are surveyed and evaluated such as family relationship, neighborhoods, friends have important roles in supporting, preventing disaster and reduce the damage from disaster

8.1.2.5. Some policy and strategy in preventing disaster of the local

This commune has some policy and strategy to prevent disaster:

- Improve livelihood and increase income, increase the capacity to prevent disaster is the most important strategy of the local
- Abolish the unstable houses, especially give land and support money (commune supports 4 million VND/ household, district support 7 million VND/ household, 4 households/ year) is the 2nd concern of the local
- The third concern is building dam to prevent salty water

The commune also concerns these policy:

- Prepare places to move villagers when there is storm or flood.
- Establish Disaster prevetion Commitee of the commune, hamlet. With the commune, implement policy 4 in the same places; with the hamlet, implement policy 3 in the same places (commander, means of transportation, force, youth volunteer)
- Prepare some means to rescue (motor boat, float...food, rice, instant noodle, fuel...)
- When there is one person died, Government will support 1million/person

8.1.2.6. NATIVE KNOWLEDGE IN PREDICTING AND PREVENTING THE LOSS FROM DISASTER

From the fact of life, villagers have some experiences to help them predict some climate change, so that they can reduce damages

Villagers get experiences from observing the change of animal complexion, the change of the moving of some animal or the change in the nature (cloud, wind, star, moon, etc...) The experience was taken from the previous generations, from the oral, or from folk song...

- Native knowledge about predicting flood
 - When the ant build the nest on high places, there will be big flood that year
 - Look at the tie on lá cỏ ống to guess how many times of flood and the damages
 - When the tree named "bông lut" blossom, there will be flood
 - Look at the bone at the back of leg of frogs, if we see the black spot at high position, there will be big flood that year
 - o If we look at the Milky Way, we see some faint line, there will be a flood
 - The gull fly from the sea to the land
 - Honey build nest on high place: big flood

- Native knowledge about predicting storm

- Bamboo grow and face into the bush \rightarrow big storm
- Northeast wind appear before 6 hours \rightarrow big storm
- Hornet build nest on the land \rightarrow big storm
- Goby eat grit \rightarrow big storm
- Stork move from island to land \rightarrow big storm

- Native knowledges about predicting drought

- "Trăng quầng thì hạn, trăng tán thì mưa".
- There are a lot of "day to" in the sky \rightarrow big drought

Nowadays, with the development of science and technology, villagers base on the modern knowledge such as weather broadcast to prevent. From the survey result, we can consider that there are 56% of villagers often follow the weather broadcast everyday, on TV or newspaper. Radio.

However, the villagers knowledges are precious in some cases. For example, according to villagers, when we see white clouds move from the sea \rightarrow whirlwind appear later. In this case, meteorological can not inform immediately. The main problem here is analyze the villagers knowledge and we can base on that to combine the native knowledge with modern knowledge.

8.1.2.7. Some supporting activities to enhance the chance to develop livelihood, reduce disaster

To the year 2006, there are 118 poor households in Phu An commune, the rest are average households so it is important to enhance the chance to develop livelihood, reduce damages of flood, storm. Villagers' requirements focus on these main points:

- Training course
 - job training (garment, electric, etc...) for teenagers so that they can find job in some industrial company or in their commune.
 - Some agricultural households want to join in the training courses about using fertilizer, preventing pesticide, about raising cattle, raising frog, etc...
 - Many households want to join in training course about raising fish such as: cá trê lai, rô phi, chim trắng, etc...
- Support technique and infrastructure
 - Help the local build the tram born in Nhu Y river to increase the Summer-Autumn rice crop area.
 - Complete dam to prevent salt water
 - Projet and multifield dam to solve the water problem in Summer- Autumn crop

Find out some solutions to solve the pollution problem in Tam Giang lagoon

- Support rescue means
 - Hamlet is the place that participate directly in preventing flood, storm so we need to equip some rescue means such as : motor boat, 50 floats for each hamlet
- Credit capital
 - Lack of capital for developing production is one of the real situation in the local so villagers have high requirements in loan money. The need of each agricultural household is that they can loan at least 5 million VND and 20million VND of each aquacultural households, the time at least 3 years and the maximum interest is < 0.5%

8.1.2.8. Requirements about training some skills to reduce damages at the local

Although Phu An is a place that often damaged by drought, flood, storm, villagers base on the experiences to prevent disaster so in some case, they are embarrassed, especially when the big storm or flood appear. So, the authority and villagers need to be trained some skills:

- The skill of access and solve information when there are the emergency flood, storm
- Some skills to prevent the big flood

- Skills of rescue, first aid
- Skills of environmental disposal after the flood

Above are some basic skills to reduce damages

9. Develop strategy to reduce injury to aquaculture in Tam Giang - Cau Hai lagoon

Tam Giang lagoon isone of the unique scenery not only in Thua Thien Hue province in particular but also in Viet Nam in general. There are a lot of creature resources inlagoon area. In recent 10 years, with the pressure of developing population, the aquaculture is not suitable and with some another reasons, people have negative impact to environment, ecology in this large area

- The long period strategy of Tam Giang, Cau Hai in general and teh water area of Phu An commune in particular is the usage natural resources suitable, solve the conflict between developing economy and protecting environment
- The first strategy is projet/ rearrange the net enclosure in Tam Giang lagoon and Cau Hai lagoon, make sure that people can exploit natural resources available.

With the strategy, there are some specific solutions:

- Re projet the waterway not only for the travelling of boats, for aquaculture but also foe safety in recueing in flood, storm season
- Each households should not use net with high density because it is too difficult for water to circulate and the movement of creature from the sea
- Should have s strict rule for those who catch fish with destroyed equipments on the lagoon

The authorities have intended to rearrange the net enclosure on Tam Giang lagoon and Cau Hai lagoon. However, if they want to have effective result, it is necessary to have the contribution and agreement of villagers. And authorities should let villagers know the advantage of this activities.

+ It is important to educate knowledge about environment for villagers those who live in lagoon.

+ Research offices should connect with the local to find the solutions to solve the water pollution in Lagoon area.

+ Have jobs for villagers, create some jobs, services, enhance the life for villagers to reduce the pressure to lagoon \rightarrow important task

REFERENCES

Đỗ Bang: "Bão lũ trong 5 thế kỷ qua ở Thừa Thiên-Huế". Tạp chí: Huế xưa và nay, tháng 6/2000.

- Lê Thị Nam Thuận: " Góp phần thực hiện sắp xếp lại nò sáo vùng đầm phá xã Phú An với sự tham gia của cộng đồng". Dự án: Quản lý tài nguyên vùng đầm phá dựa vào cộng đồng.
- Nguyễn Việt: " Ảnh hưởng của biến đổi khí hậu toàn cầu đến tình hình thiên tai ở Thừa Thiên- Huế". Hội thảo: Tăng cường an toàn cho con người, môi trường và quản lý thảm họa. Huế tháng 8 năm 2006.
- UBND xã Phú An: "Thực hiện nhiệm vụ kinh tế-xã hội năm 2005 và phương hướng nhiệm vụ kinh tế-xã hội năm 2006". Phú An tháng 12 năm 2005.
- UBND xã Phú An: "Thực hiện nhiệm vụ kinh tế-xã hội 6 tháng đầu năm 2006 và phương hướng nhiệm vụ 6 tháng cuối năm 2006". Phú An tháng 6 năm 2006.
- UBND tỉnh Thừa Thiên-Huế: " Báo cáo rà soát, điều chỉnh, bổ sung quy hoạch phát triển kinh tế-xã hội tỉnh Thừa Thiên-Huế đến năm 2010". Huế tháng 5 năm 2000.

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10. VINH HIEN COMMUNE

10.1. SOCIO-ECONOMIC STATUS AND REDUCING NATURAL DISASTER IN VINH HIEN COMMUNE

10.1.1. Overview on natural and socio-economic conditions

10.1.1.1. Natural condition

Vinh Hien is a commune belonging to a coastal plain, being a final commune in the south of the coastal cultivative land of the Tam Giang – Cau Hai lagoon (Map 1).

According to the administrative border, Vinh hien commune is bounded by Vinh Hai commune in the West-North, Vinh Giang commune in the West, Loc Binh in the East-South, the Tam Giang – Cau Hai lagoon in the south and East sea in the north.

Vinh Hien commune has the geography lower and lower from West-North to West – South and its 3 directions is bounded by water surfaces, namely East seas, Tu Hien gate and Cau Hai dam connected with Tam Giang lagoon. Its geography is rather diversified, including hills, mountains (available but inconsiderable), sea, dam and lagoon, plain. This is a potential region in developping the tourism, services, aquaculture and exploitation.



Map 2: Administrative border of Vinh Hien commune

Total area of natural land of Vinh Hien commune is 2,272 ha and is presented in table 1.

No	Types of land	Area (ha)	Percentage (%)	
1	Agricultural land	242.6	10.68%	
2	Land for aquaculture	59.76	2.63	
3	Resident land	148.3	6.53	
4	Land for rivers, springs and specialized water surface	1,728.59	76.08	
5	Forestry land	58.4	2.57	
6	Unsued land	64.05	2.82	
Total		2,272		

Table 43: Some types of land in Vinh Hien commune

Hence, total area of natural land is large, but the area of agricultural land is little. The area of rivers, springs and lagoon occupies 2/3 of total area of land and water surface. However, the land for auqaculture is only about 60 ha.

Area of forestry land in Vinh Hien commune is inconsiderable.

10.1.1.2. Socio-economic condition

The whole commune has 1,898 households, of which 157 households do not have resident land, living floatingly on boats and guardhouse. The households living on boats and guardhouse rely on aquaculture and exploitation over many generations. Therefore, they become the fisherman's associations, career villages specializing in cultivate a fixed kind of product. For that reason, population structure and labour are allocated by villages (Table 2). The commune established the project of settle cultivation and residence. This project was approved by the provincial People's Committee and will be started in 2007.

Table 44: Fopulation and labout anocation by vinage	Table 44:	Population	and labout	allocation	by	villages
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				I	/illage			
Households/Persons	Total	Dong Duong	Hien Van 1	Hien Van 2	Hien Hoa 1	Hien Hoa 2	Hien An 1	Hien An 2
Total number of households	1898	88	158	318	445	272	259	358
Number of persons	9010	376	734	1478	2131	1399	1052	1840
Number of people under labour age	4559	195	387	721	1063	719	583	891
Agriculture households	195	43	08	16	112	0	14	02
Aquaculture households	662	21	58	81	52	184	51	215

Previously, the commune leaders had the plan to evacuate the people to the off-shore places for settle residence, but the local people did not want to move to a new place. After the history flood in 1999, many households living on the boats asked for the permission to live on shore because of being afraid of the flood. Total number of persons are 9,010. The commune is divided into 7 villages (Dong Duong, Hien van 1, Hien Van 2, Hien Hoa 1, Hien Hoa 2, Hien An 1 and Hien An 2). The c/village with the biggest population is Hien Hoa 1 (445 households) and the smallest is Dong Duong (88 households) (table 2). The village with the highest rate of agricultural production households is Hien Hoa 1, and the village with the highest rate of auqaculture households is Hien An 2 and Hien Hoa 2. Total number of poor households in 2005 in the whole commune is 457 households. The rate of yearly population increament is about 1.62%.

Career group	Number of households	Percentage (%)		
Total number of households	1,898	100		
Agricultural production hhs	195	10.27		
Forestry production hhs	0	0,00		
Aquaculture hhs	662	34.88		
Industrial hhs	215	11.33		
Construction hhs	123	6.48		
Commercial hhs	310	16.33		
Transportation hhs	25	1.32		
Service supply hhs	92	4.85		
Other careers	216	11.38		

Table 45: Career structure in the commune

The livelihood of Vinh Hien commune is diversified, including agriculture, aqua exploitation, industry, construction, commerce, transportation and other services. Analizing the data in table 6.2 showed that the rate of agricultural production households occupied about 10%, no household depends on forestry production, number of auqaculture and exploitation occupies about 1/3 total number of households of the whole commune. The structure of income resource of the local people can be divided into 4 main groups, including the main income resource from agriculture and aquaculture, the main income resource from agriculture and aquaculture, the main income resource from industry and construction, the main income resource from services and others (table 6.3), of which the number of households with the income resource from agriculture and aquaculture occupied nearly 50% total number of households. Due to the geographical position, Vinh Hien is one of the tourist sites, and is a place with many aqua and sea foods, so the service and business activity are under good development. The number of households with the income resource for up to 21.34% total number of households.

Table 46: Structure of income resource

Income resource	No. of hhs	Rate (%)
HHs with main income from agriculture and aquaculture	872	45,59
HHs with main income from construction and industry	323	17,02

Hhs with main income from service	405	21,34
HHs with main income from others	298	15,70

10.1.1.2.a. Agriculture activity

Agricultural production in Vinh Hien commune is consist of the main careers:

Crops

The important crops of Vinh hien commune include rice, groundnuts, vegetables, melons, sweet potatoes and cassava. Rice is an important crop but its area is little (76.4 ha), moreover, due to the shortage of irrigation water, only one Winter-Spring crop is carried out. The rice planting was tested in Summer-Autumn crop but it lost totally. Some crops such as groundnuts, water melon, cassaba melon have 2 harvests, but the area in Summer-Autumn is very little. The above characteristic showed that, from August to November every year is the leisured time of the households with the main income from crops production. Area, productivity and planting time of some main crops are presented in table 5 and 6.

Sno	Crops	Area (ha)	Productivity/Value
1	Winter-Spring rice	76.4	36.62 quintals/ha
2	Summer-Autumn rice	1.0	0.0 quintal/ha
3	Winter-Spring groundnuts	6.0	20.0 quintals/ha
4	Summer-Autumn groundnuts	4.0	10.0 quintals/ha
5	Winter-Spring vegetable	2.0	15 millions VND/ha
6	Summer-Autumn vegetable	0.5	10 millions VND/ha
7	Casaba melon, water melon	7.0	8-10 millions VND/ha
8	Sweet potatoes	2.0	70 quintals/ha
9	Cassava	10.0	15 tons/ha

Table 47: Area and productivity of some main crops in 2005

Table 48: Schedule of some main crops

Month Crop	1	2	3	4	5	6	7	8	9	10	11	12
Rice (1 crop)	+	+	+	+	+							+
Groundnuts (2 crops)	+	+	+	+++	+	+	+					
Water melon (2 crops)	+	+	+	+++	+	+	+					
Cassaba melon (2 crops)	+	+	+	+++	+	+	+					
Cassava	+	+	+	+	+	+	+	+	+	+	+	+
Sweet potatoes	+	+	+	+	+	+	+	+	+	+	+	+

In the recent years, thanking to the change in rice planting technique such as changing from transplanting into direct sowing, using the high yield rice varieties, namely IR38, X21, X23, ... it saved the labour force and contributed in improving the rice productivity. However, in general, crop production met many difficulties and was unstable. The irrigation water resource depending on the nature, dry in summer and waterlogged in rainy season, infected with diseases and insects, degraded cultivation soil are the main difficulties in crop production (table 7).

Advantages	Difficulties	Reasons	Solutions
- Changing technique: from transplanting into direct sowing, saving labour	- Water source: depending on the nature, salted, infected with alum, dry in sunny season, waterlogged in rainy season	- There is no irrigation system	- Repairing, upgrading irrigation system
- Many new rice varieties bring about high productivity	- Degraded soil	- Inorganic fertilizer was applied too much	- Enhancing the application of organic fertilizer
- The local people are hard working and have experience in production	- The average area of wet rice/person is low (1 sao/person)	- Crowded population	- Vocational training for the youth
	- Terrace fields, hollow fields lead to the water shortage in this place but water logging in another place	- Geograhpy is not flat	
	- Diseas and insects on rice: rice blast, stem borer (January - February)	- Due to the weather, not proper fertilizer application	- Proper fertilization and preventation
	- Low rice productivity (in Dong Duong and Hien Hoa 1, the productivity of 50-100kg/sao)	- Salted soil,	- Constructing irrigation system - Changing cultivation technique
	- Strong development of rats	- Catching snakes and cats	Not catching snakes, raising cats

Table 49:	Some	advantages.	difficulties,	reasons and	solutions t	for cropping
		····· · ··· · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·

Livestock

Due to the limited conditions of natural food source and agricultural by-products and wastes, the career of cattle production is under poor development. According to the report of commune's People's Committee, in 2006, the whole commune has only 154 buffaloes and cows. However, thanking to the abundant fishery resource, the pig and poultry (chickens, ducks) production is under rather good development. Total number of pigs in

2005 is 694 heads. Although the avian flu put affect on the chicken and duck production, making total number of poultry decreased considerably compared to the previous years, total number of poultry of Vinh hien commune in 2005 remained 3,385 heads.

10.1.1.2.b. Fishery activities.

Due to the specific natural condition, aquaculture and exploitation are strength of the local. According to the division of household groups in the commune, the number of fishery households occupies near 35% total number of households in the whole commune. The raised types are very various, including shrimp, sweet snail, dorab, groupers, red snappers, Dia fish siganus canaliculatus, crabs, small crabs (table 6.7). Previous, the white shrimps was the type which many local people select to raise. Many households invested the labour and budget in raising shrimps. However, in recent years, the water environment was polluted and the breed resource was not active, hence, the shrimp diseases spred on the large scope (the shrimp disease in 2005). Some popular diseases on shrimps are consist of white spot, yellow head, black gill, zoothanium and white faeces. The diseases caused low productivity of shrimp production, and many households suffered the loss regularly.

In 2006, most of the shrimp raising area in Ha Na and Dong Nai were abandoned and some shrimp raising area were changed into raising crabs and fishes. Raising shrimps is mainly for 1 crop/year.

Month Type	1	2	3	4	5	6	7	8	9	10	11	12
White shrimp (56ha, tidal flow 12ha, return flow 44ha)		+	+	+	+	+	+	+	+			
Groupers (cage)	+	+	+	+	+	+	+	+	+			+
Dia fish siganus canaliculatus		+	+	+	+	+	+	+	+	+		
Red tilapia	+	+	+	+	+						+	+
Carps		+	+	+	+	+	+	+				
Dorab		+	+	+	+	+	+					
Crabs	+	+	+	+	+	+	ít	ít	ít	ít	ít	+
Crab potunus pelagicus			+	+	+	+	+	+	+			
Sweet snails	+	+	+	+	+	+	+	+				
Exploiting fishery products on sea and lagoon	+	+	+	+	+	+	+	+	+	+	+	+

Table 50: Schedule of aquaculture and exploitation

Sweet snail is one of the raised new types in the commune. However, to raise sweet snail, it requires a big amount of both time and budget and the construction of Tu Hien bridge is under progress, affecting to the quality of water resource, and with the high risk of diseases, the local people do not dare to do investment. Some diseases on sweet snails include dropped-down bowel and slow growth (reason is not found). The number of sweet snail cages in 2006 is reduced compared to the year of 2005 (5 cages but the target of 30 cages).

Due to the failure in raising white shrimps in the years of 2003-2004, the local people were active in changing the raising method and type. Many households cahnged from monoraising shrimps into integrated raising, focusing on raising fish in cages and other types such as crabs, potunus pelagicus. The number of brackish fish cages has the tendency of increasing from 2004 to 2006. However, when changing into raising the new species, many difficulties occurred, for example, the breed source was not active, natural feed was lacked or the water environment was changed, unsuitable (table 8).

For the fish species with high value such as red tilapia, grouper, Dia siganus canaliculatus, because the breeds production has not done, the breed resource depended totally on the clooection from the nature. The feed resource was previously available in the lagoon (seaweed), but presently, it has been exhausted due to the over exploitation and salt increament. Whereas, the use of industrial feed for these species met the difficulties because the initial study showed that the fish taste was reduced compared to the fish raised with natural feed and the price of inductrial feed was too high, over the market acceptance. Some new species are easy to raise, require little capital, have cheap breeds and large market also met difficulties due to the salt increament after the history flood in 1999, so the Tu Hien gate is openned. In addition to raising brackish fish, freshwater fish raising occupied about 0.7 ha in the whole commune.

Sea capture products include fish, squid and shrimp. Lagoon capture products include fish, shrimps, crab and crab potunus pelagicus. The capture and exploitation of aquatic products on the lagoon and on the East sea are the key economy of the commune. However, some difficulties in sea exploitation are consist of inconvenient narrow passage, shallow and narrow Tu Hien gate, reduced fish quantity and the local people lacked budget to invest in the synchronous capture equipment. The capture on the lagoon also met the difficulties such as the penculture was not planned, exterminated capture was not prevented, and the fish quantity in the lagoons, rivers was reduced. Accordig to the local people, the advantages and difficulties in aquatic capture and exploitation are presented in table 10.

Sno	Species	Advantages	Difficulties
1	Shrimp	 Easy to buy breed Easy to buy feed 	 Unstable price, high cost for feed, but the price of shrimp is not increased. Because Tu Hien bridge is under construction, the salt is increased too high, unsuitable with shrimp raising. Diseases on shrimp due to passive breed and polluted environment
2	Sweet snail	- High price	 Requiring lots of labour to dredge and clean the cage every day Big invesment, so if there is risk, the loss will be high
3	Red snapper	- Low risk, the time when fish is sensitive to diseases is able to harvest (October)	- Be not active in breed, depending on the collection in nature
4	Grouper	 Easy to sell High price (85,000- 90,000VND/kg) 	- Be not active in breed, depending on the collection in nature
5	Dia fish siganus canaliculatus	Easy to sellHigh price	- Lacking sea grass for fish, due to the salt increament, the quantity of sea grass is reduced
6	Dorab	Cheap breedEasy to raise	 Lacking experience Lacking sea grass for fish (the same feed with Dia fish siganus canaliculatus)
7	Crab	Easy to sellHigh price	- Be not active in breed
8	Crab potunus pelagicus	 Cost little for breed and easy to buy Little investment, fast withdraw 	 Limited raising area Requiring the salt at 20-25% while the salt in the lagoon depended on nature, and seasonally varied.

Table 51: Advantages and difficulties in aquaculture

- asie	Table 52 :	Schedule	of aquatic	products and	seafood capture
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Month	1	2	3	4	5	6	7	8	9	10	11	12
Capture on the sea	The main capture season on the sea, catching tuna, scad, squid (for export)			Catching shrimp (to make paste, to dry, or to sell in fresh)								
Capture on the lagoon	Catch fish a shrim (avera yield)	nd nd p age	Catching fish, shrimp, crab, crab potunus pelagicus Raising grouper, red snapper, Dia fish siganus canaliculatus		Main fish a	Main season of catching fish and shrimp		ching	Catch fish a shrim yield)	ing nd p (low		

 Table 53 : Advantages and difficulties in aquatic products capture

Advantages	Difficulties	Opportunities	Risks, challenges	Reasons	Solutions
 The commune is located near the sea, easy for capture, creating income for local people The local people The local people know the seasonal fish capture . Due to near the sea, good environment, creating condition for high yield There is two-way radio to communicate at capture, limiting the risk caused by natural calamity . There is the program of 	 The living is still poor, there is no investment capital for production Equipment is simple and primitive (wood, bamboo boats) There is no waterway sign at Tu Hien gate . Fishermen exploited too much, fish resource was exhausted. There is no exploitating organization When the fish yield is much, there is difficulty in output There is no 	 There is a fishing port near Tu Hien gate, convenient for the consumption There is Tu Hien bridge to transport goods. Receiving information about the techniques of controlling natural calamity from the organizations such as agricultural extension, fishery extension, There is a ecological tourism zone in Ham Rong sea 	 Abnormal floods and storms. Widening the consumption market. Inadequate technical advance and acquiring chance. Widening the aqua market is limited due to primitive capture equipment. Exchanging the experience in capture between communes, provinces is limited. 	 Natural calamity happens regularly and many big floods caused the serious damages The local people have only one crop of capture from January to July, and the remaining months are the flooding season. Local people's awareness is not high, the exploitation and capture are not controlled, giving bad impact on the capture environment. 	 (1) Suggest to provide loans for 3-5 years with the number of 15-50 millions VND at the interest rate of 0.5%. (2) Suggest the authorities organize the proper aqua exploitation. (3) Organizing the vocational training courses, the training course on technical advance. (4) Seeking for and widening consumption market (5) The study tours should be organized to exchange the experiences.
Program of				(4) Little	

controlling the	aquatic	(5) Planning a	capital.	
natural calamity of the province to provide information. (6) Available and experienced labour force. (7) Upgrading the capture equipment to have high yield, such as replacing bamboo trap with invory bamboo trap, widely spaced net with narrowly spaced net.	factory	new market in Dong nai of Vinh hien commune. (6) Planning a coach station near the market.	 (5) Local people's level is not equal. (6) There is few opportunities to receive technical advance 	

10.1.1.3. Infrastructure irrigation traffic

In the recent years, the infrastructure system has been improved remarkably.

Traffic system

The provincial road 49b crossing the commune is asphalted. Tu Hien bridge connecting the plain area with other areas of Phu Loc district is under construction. The coach station has been planned near the new market. Many inter-village roads have been asphalted. However, many other roads remain the dirt or sandy tracks, so the travelling was very difficult in both the rainy and sunny season. With the characteristis of geographical position, about ³/₄ of perimeter is bounded by Cau Hai dam and East sea, the waterway traffic plays an important role. The clearance to build Tu Hien fishing port is carried out.

Irrigation system

Bau Oc canal system has been asphalted, total number of asphalted canals is 2km. Being a place with a lot of auqatic products, the commodities exchange and trade in the region is under good development.

Service infrastructure

The commune has the market to serve the trade. However, due to the rather fast development in recent years, the upgrading of market is necessary. The planning project for new market in Dong Nai of Vinh Hien commune has been established.

Information system

The broadcasting system of the commune has 15 speaking trumpets/7 villages. This is an important mean of communication of the commune.

Health and education

The system of health and education has been built basically. The commune has 1 health station meeting the national standard. In the commune, there is 1 kindergarten with 11 rooms, 1 primary school with 33 rooms divided into 3 room zones in the commune, 1 secondary school with 26 rooms. The rate of pupils starting primary schools at right age achieved 98%, the rate of pupils from primary school to secondary school achieved 99%, the rate of pupils from secondary school to high school achieved 70%. Every year, from 7-15 pupils passed the exam into the universities and colleges. The rate of households using electricity achieved 95%. Planning the Dong Duong - Ham Rong beach tourism zone has been approved by the higher authorities, however, the exploitation of this beach - tourism zone has not been concerned adequately and there is no the clear change.

10.1.1.4. Livelihood of poor people

In the year of 2005, total number of poor households of the whole commune is 457 households. The poor households belong to the different groups, namely farming group, fishery group, disable and shorthanded group. As reported by communal leaders, up to 2006, 157 households still do not have resident land and have to live on boats or guardhouses and live on aquatic capture. These households live in the commune over many generations. The Resettlement Project for these households has been approved and will be implemented in 2007.

		Total sample by random	%	Progressive
Type	Rather rich hhs	17,8	17,8	17,8
	Medium hhs	62,4	62,4	80,2
	Poor hhs	19,8	19,8	100,0
	Total	100,0	100,0	

Table 54: Clasification of households by national standard in 2004

Note: Survey data in 2006 on 100 system sample by random

Reasons for poverty

There are many reasons leading to the poverty such as lacking experience in production, lacking capital, a lot of children, lacking man power, elderly, illness, diseases, diseases of aquaculture, aqua equipment was swept away by floods.

To seek for the income resource, the whole commune have more than 800 people working in far places, but their population book remained at local. The people who work in far places could be the secondary schools' pupils. The number of people working in Ho Chi Minh City occupies the highest rate. Most of them go to work all year round and often return home on Tet holiday, however, about 20% of them go to work in far places seasonally. The poor people's wish is to get the technical training, construction of irrigation system, the borrowing program suitable with the poors (the loans of 10 millions VND in minimum with the period of 3 years in minimum at the maximum interest of 0.5%/year).

10.1.1.5. Gender and livelihood

The routine work of men and women who do aqua capture on the lagoon and of the women who sell aquatic products is presented in table 13. The difference in the role of men and women who do aqua capture is presented in table 14.

Activities	Men	Women
Exploiting aquatic products on the lagoon	 4 PM this day to 5AM next day: putting corral on the lagoon 5-7AM: having breakfast 7AM-10/11AM: repairing net and corral 10/11AM: having lunch 11AM-13PM: sleeping 13PM-16PM: repairing fishery equipment, 	 4 PM this day to 5AM next day: putting corral on the lagoon 5AM-6AM : selling shrimp and fish 7AM-10/11AM: doing housework, cooking, cleaning 10AM-11AM: having lunch 11AM-13PM: sleeping 13PM-16PM: cooking, having dinner before going to the lagoon to put corral
Trading (for women who sell shrimp, fish, squid,)		 3AM: getting up 3AM-5:30AM: buying fish, 5:30AM: selling fish at the market 12AM: going home 12AM: having lunch 14PM-16PM: going to the market, cooking 19PM: having dinner 19PM-20PM: watching television 20PM: going to bed

Table 55: The routine work of men and women who do aqua capture on the lagoon
and of women who sell aquatic products

Table 56: The role of gender in the flood control (aqua capture group)

Time compared to the flood's happening	Men	Women
Before	 Borrowing capital to prepare net Replacing bamboos, mending fishing net, making nets Doing housework Binding house Repairing fish cage Preparing animal feed Binding house, boats Arranging facilities, capture equipment to safe places (in some cases) 	 Replacing bamboos, checking bamboos, fish corral Doing housework Buying noodle and other foods Preparing jute bags to put clothes into and keep at the high places when water goes up high.
During	 Tidying home facilities Folowwing up the water level Putting facilities at high places 	 Tidying home facilities Putting facilities at high places

Time compared to the flood's happening	Men	Women
	Helping neighboursMoving family to safe place (in	 Helping neighbours Taking care of children
	some cases)	- Cooking
After	 Tidying house Doing hygien for environment, roads Moving home and capture facilities to previous places Helping neighbours Checking, repairing damaged fish cage and production facilities (The seafarers do not do anything) Upturning the corral Repairing corral 	 Tidying house Washing Helping neighbours Selling shrimp and fish

10.1.1.6. Credit finance

The local people can access to many different capital resources from the banks, the NGOs and inofficial credit system of which the capital from the banks play an important role.

The whole commune have 517 households borrowing capital from the soial policy bank with the total number of loans up to 1.961 billion VND, the normal loans is from 3-7 millions VND/household, the borrowing term is about 3 years with the interest of 0.5-0.8%/year, paying interest every month or every quarter or paying the saving (paying interest and principal every month). This capital reource is operated through Veteran's Association and Youth Union. On the other hands, about 900 households carried out mortage borrowing from the VBARD for only 1 year. Some NGOs lended women such as World Vision Organization with 40 millions VND/commune, NAP organization with 24 millions VND to support the livestock development on small scope (the loans of 500,000 VND/household.

Due to the capital demand, the borrowing form "money gathering" is still used by the local people although it is banned by the government. Money gathering helps local people implement economic production on small scope, but regularly after a period of operation, the gatherring is broken. Mornally, a gathering group includes 10-12 members, gatherring 10,000 VND/day, the operation time is different (4 months, 6 months, 1 year and so on). In addition to the above borrowing forms, in the people community, there is still the "how borrowing" form with high interest and borrowing from relatives, friends, neighbours with the normal interest as from the banks.

10.1.1.7. Water resource

Presently, there is no tap water system to serve the living demand. The living water is mainly from the wells. The whole commune has 792 wells of which 305 dug wells and 487 drilled wells. The number of people using clean water is 6,900 people. In the dry season, many households which do not have wells or their wells are catched with alum, so they have to go to get or buy water from other places in the commune (table 15). The whole commune has the asphalted in-farm canal system with the length of 2km. Due to the conditions of geography and land, because the soil's capability of retaining water is bad, the geography is too narrow, the surrounding is the sea and lagoon, the water source for
production depends mainly on rain water and some underground water from the sands. It could be said that in addition to a small area of land could produce 2 crops/year and a big part of agricultural land produce only 1 crop/year. Irrigation system for aquaculture is unavailable, causing the severe pollution in many shrimp raising sites. As a result, the shrimp diseases happened on large scope for many years and most of shrimp raising areas in 2006 were abandoned or changed into extensive culture with some other species because the intensive shrimp raising people suffered the loss prolongly.

		Density	%	Progressive
Valid	River water	1	1.0	1.0
	Rain water	2	2.0	3.0
	Public wells	18	17.8	20.8
	Family wells	58	58.4	79.2
	Tap water	1	1.0	80.2
	Other water resources	20	19.8	100.0
	Total	100	100.0	

Surveying the status of using living water and drinking water on 100 samples showed that, near 60% of households in Vinh Hien used water from family wells, the number of households using tap water which was surveyed by random is only 1 %. Other resources occupied 20% (table 15).

The survey on the water quality through the households brought about unsatisfactory result, 60 % of households interviewed about the current living water quality answered good (table 16), up to 12 % was unsatisfactory or did not have opportunity to access to good quality water resource.

Table 58: Survey on water quality

	%	Density	Progressive
Valid Poor	11.9	11.9	11.9
Medium	28.7	28.7	40.6
Good	59.4	59.4	100.0
Total	100.0	100.0	

10.1.2. Accessing to the status of yearly flood

10.1.2.1. Characteristics of hydrograhpy climate

Vinh Hien is the commune in a region affected by the monsoon tropical climate, hot sun, a lot of rains and affected by the sea and continent. The annual average temperature 24oC,

nthe highest temperature is up to 44oC, the lowest temperature is 9oC. The annual average humidity is 83%. The average evaporation is 1,000mm/year. The highest evaporation is often dropped in June and July. The wind directions in summer are mainly South and West-South winds with the speed of 1.3-1.6m/s. In winter, the main wind directions are North and East-North with the speed of 1.6-1.9m/s. The storm wind often happens in September, October and November.

10.1.2.2. Yearly flooding season

A year is divided into 2 seasons: dry season lasts from March to August with the average rainfall of 47-63mm, the pinnacle is in May, June, July. The rainy season lasts from September to February next year. The biggest rainfall is in October and November, in average, the number of rain days in the pinnacle months is 20-22 days/month, the average rainfall is 680-800mm/month. This is the flooding season in the region.

10.1.2.3. Damages caused by yearly floods

Table 59: Damages caused by yearly floods

		Month											
No	Damages caused by yearly floods	1	2	3	4	5	6	7	8	9	10	11	12
1	Capture equipment is swept away and damaged									+	+	+	
2	Aquaculture is not carried out or swept away									+	+	+	
3	Raised animal is swept away									+	+	+	
4	Fish is swept and died due to the change of environment									+	+	+	
5	Diseases for human and raised animal									+	+	+	
6	Crops are broken, uprooted, waterlogged, died, swept away, lost in productivity									+	+	+	
7	Cultivation areas is limited because it is covered by sand									+	+	+	
8	Aquatic capture is affected or stopped									+	+	+	
9	Foods and foodstuff are destroyed									+	+	+	
10	Boats are swept away									+	+	+	
11	Houses are damaged									+	+	+	
12	Domestic facilities are damaged and lost									+	+	+	
13	Communication information is affected									+	+	+	
14	Electricity line system is damaged (in case of flood - cum - typhoon)												
15	Traffic roads are damaged									+	+	+	
16	Land and water are salted by the overflow from the sea and lagoon									+	+	+	
17	Landslide happens, the shrimp and fish ponds are and canal system are damaged									+	+	+	

		Month											
No	Damages caused by yearly floods	1	2	3	4	5	6	7	8	9	10	11	12
18	Landslide happens in the shore									+	+	+	
19	Pupils can not go to school (7-10 days)									+	+	+	
20	Other trade and production activities are affected or even stopped in the days of big flood and storm									+	+	+	
21	Local people's mental is affected before the coming of flooding season.												



Map 2: Disaster positions in Vinh Hien commune

Affecting level of types of natural calamity

It can be seen that Vinh Hien is also a place regularly suffered the heavy affect of the types of natural calamity. However, depending on each type of natural calamity, the affecting level is different. The result from analyzing natural calamity's impact is presented in table 18 and map 2.

Type of natural calamity	Affected place	Type of affected households	% in the commune	Month	Number of times/year
Floods	- Sea gate (Hien	- Capture	- Difficult to	- September	- Floods and
	All 2) - Regions next	- Aquaculture	- Flood in 1999	- October - November	storms often
	to the lagoon		100%		same time
	+ Hien Hoa1		- Small floods:		because the
	+ Hien Hoa 2		70%		water flows
	+ Hien Van 1 + Hien Van 2				from the sea
	+ Hien Vall 2 + Hien An 1				and springs
					- Normally,
					from the
					typhoon No. 7
					- 1-3 timos/voor
Drought	- Hien Hoa 1	- Agriculture	- 195 households	- May	times/year
Drought	- Dong Duong	- Aquaculture	lived on agriculture - Aquaculture	- June - July - August	
			households	0	

Table 60: Zones and subjects affected much by floods and drought

10.1.2.4. Actual status of impacts to reduce natural disastes at local

10.1.2.4.a. SWOT analysis

The strategy of controlling floods and storms is consist of upgrading house, establishing the board and sub-boards of flood control, 4 on-the-spot policy (guidance, facilities, force, logistics). Every village has 1 sub-board of flood control. This sub-board has many members from different sectors including village's head, village's vice-head, youth union, volunteer team of Red Cross branch, Police, Militia, Health,...). Every village has 2 motor boats used in the flooding season at necessary. These boats are used every day by local people to serve production and trade, but as requested, they are mobilized by the commune. The strength, weaknesses, opportunities, trends in reducing the damages caused by natural calamity at Vinh Hien commune are presented in table 19.

Strengths (S)	Weaknesses (W)	Opportunities (O)	Trends (T)
 There was the support from the provincial, district, communal sectors and boards. There was guidance of Executive committee and communal government to guide from the commune to the villages and local people. The local people had experience in forecasting and reducing damages caused by natural calamity Local people's awareness of controlling natural calamity was raised. There were the communal and village boards of flood control There was good communication system (radio, television, telephone). There was 4 on-the-spot policy (guidance, facilities, force, logistics) Abandant labour force The commune has upland area for emigrant at necessary A part of traffic roads were asphalted 	 Lacking rescue facilities at village level . The petrol supply at the flood met difficulty. The houses were not firm, so easy to be destroyed. In the riverside and coast, the floods happen regularly every year . Lacking capital to repair the damage after the floods . Be isolated at the big floods . Many fishermen households lack foods (in the months of January, February, September, October) 	 Vinh Hien will be a place concerned by the central and organizations There will be Tu Hien bridge to reduce the isolation at the big floods. Tu Hien fishing port will help the fishery development. The project helps to design and support the houses. There are other project to support the damages' minimization. 	 The floods happen unperiodically, not in the rule. Sea gate (Tu Hien gate) closes, opens, changes in depth and width unperiodically. Being eroded by the sea The local is the place regularly sufferring the severe affect of natural calamity.

Table 61: Strengths, weaknesses, opportunities and trends in the flood control

10.1.2.4.b. Role of local authorities in controlling floods and reducing natural calamity

The role of organizations in controlling floods can be summarized in the following table (table 20)

No.	Name of organizations	Role before the floods	Role during the floods	Role after the floods
1	Farmers' Association	Joining in the Board of Flood Control. Encouraging the local people to harvest, bind the house, parking sites, preparing foods.	Mobilizing upland people to help the neighbours and lowland people in moving people and facilities, giving emergency aid. Helping the difficult families.	Helping the difficult families. Encouraging to construct roads and repairing the houses. Encouraging the people to provide food to others. Proving the data on damages. Giving proposals
2	Women's Union	Mobilizing local people to bind houses, harvest, guiding women the binding methods.	Carrying out the 4 on-the-spot policy	Mobilizing to overcome the damages, informing the data on damages, directly helping the difficult people.
3	Youth Union	Establishing the volunteer teams (10 people/team/village), joining in the Board of Flood Control, preparing the rescuer facilities.	Cooperating with the organizations at villages (veteran, women, farmers, village's head)> saving people, moving facilities. Monitoring, checking, helping the difficult families.	Helping the damaged families, road hygien, disseminating the disease prevention (visiting directly, leaflets,)
4	Party Committee	Assigning duties to the local authorities, setting up the project for flood control, carrying out the 4on- the-spot policy, keeping regular communication	Guiding, assigning staff to the regions (3 important regions) and the unimportant regions, regular communication, encouraging local people to move to high regions	Meeting to evaluate the damages, annoucing higher authorities on facilities, dead people, immediate rescuer, long-term assistance, security policy

 Table 62: Role of some organizations in controlling floods

No.	Name of organizations	Role before the floods	Role during the floods	Role after the floods
5	Authorities	Establishing the Board of Flood Control, assigning duties, updating the situation	Carrying out the plan, mobilizing the local people with 4 on-the-spot, moving people to high areas, emergency aid, protecting people's assets	The Board of Flood Control updates the information, and then announce quickly to the district People's Committee, surveying the damages> reporting, rescuring - -> considering, safe hygien, health, schools, traffic, settle production
6	Red Cross Association	Updating the situation of local branches + checking life jacket, buoys, strips, dressing	3-5 people (young)/branch rescuer people and assets> moving to health station	Đến khu vực tổn thất nhiều, xem xét các hộ bị tổn hại nặng > trợ cấp tạm thời, vận động và cùng với các tổ chức cá nhân khác làm vệ sinh môi trường, xin đoàn cấp trên về giúp
7	Health	Preparing medicines, human, dissemination,	Preparing tools, on the duty at villages and station 24/24	Checking the enviroment hygien treatment, helping local people do hygien, treating the hollow areas (cholera, haemorrhage), helping local people in clean water
8	Religion Organization			Helping local people after natural calamity
9	Neighbours	Helping to arrange the facilities, helping the lowland households or the households whose house is not firm to avoid the flood, providing the information,	Helping neighbours under danger	
10	Border post	Assisting the boats' parking	Protecting boats, helping local people to evacuate at necessary	Not allowing the boats go to the sea when it is not safe

No.	Name of organizations	Role before the floods	Role during the floods	Role after the floods
11	Schools	Updating situation to allow pupils not to go to schools at time	Being a safe place for surrounding families to avoid the flood	
12	Communal police	Ensuring social security	Protecting facilities	Ensuring security, opposing the steeling after the flood
13	Veteran's Association	Together with other boards and sectors, disseminating and encouraging the flood control		
14	Banks			Lending capital to
15	Communal military steering committee	On the duty 24/24	On the duty 24/24	On the duty 24/24
16	Individuals			The individuals from foreign countries or other provinces send money for support,
17	Communal board of flood control	Guiding the flood control, on the duty 24/24, assigning the staff to be present at villages to guide, provide information to the villages by loudspeaker	Guiding to control the flood, reminding, on the duty 24/24, assigning people to help the heavily affected regions,	Guiding to overcome the damages, reminding, on the duty 24/24, collecting statistic data on damages at each village, guiding to do hygien for environment
18	Village board of flood control	Guiding directly the flood control	Guiding directly to against the floods.	Guiding directly to overcome the floods
19	District, provincial board of flood control	Informing, speeding up, reminding	Informing, speeding up, reminding	Informing, speeding up, reminding
20	Relatives			Helping together to restore after the flood
21	Fatherland Front	Disseminating		Disseminating, mobilizing, delivering the rescure goods

10.1.2.4.c. Result of interviewing the roles of participating units

The result of surveying the roles of participating units in controlling and reducing the natural disasters' impacts through 100 households showed that:

- TTH Natural Calamity Control Committee

Pole of TTU NCCC	%					
Kole of 11H NCCC	Before	During	After			
Valid Not yet done duties	37.6	44.6	27.7			
Less done duties	23.8	19.8	27.7			
Done duties	22.8	17.8	24.8			
Well done duties	13.9	12.9	13.9			
Total	98.0	95.0	94.1			
No idea	2.0	5.0	5.9			
Total	100.0	100.0	100.0			

Table 63:	Role of [ГТН Natural	Calamity	Control	Committee
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The local people's evaluation was rather complicated , about 35% of interviewed people indicated that the role of natural calamity control committee was rather good while the remainders gave the unsatisfactory evaluation. The difference of related units during and after the natural calamity did not have the sign of considerable increasing

- The natural calamity control committee at Phu Vang district, commune and villages

Table 64: Role of the natural calamity control committee at Phu Loc district

Polo of district NCCC	%				
Kole of district NCCC	Before	During	After		
Valid Not yet done duties	35.6	42.6	25.7		
Less done duties	31.7	28.7	34.7		
Done duties	22.8	17.8	26.7		
Well done duties	8.9	7.9	7.9		
Total	99.0	97.0	95.0		
No idea	1.0	3.0	5.0		
Total	100.0	100.0	100.0		

Due to the geographical characteristics of Vinh Hien commune, the result of surveying over 100 random samples was unsatisfactory for the role of the NCCC of Phu Loc district, only about 30% of interviewed people answered that this unit played an important role and did its duties before, during and after the natural calamity.

Polo of communal ECP	%				
Kole of communal FCB	Before	During	After		
Not yet done duties	8.9	6.9	5.0		
Less done duties	32.7	33.7	29.7		
Done duties	24.8	24.8	23.8		
Well done duties	33.7	32.7	38.6		
Total	100.0	98.0	97.0		

Table 65: Role of communal Flood Control Board

Different from the survey result on the role of provincial and district NCCC, the role of FCB in Vinh Hien commune was appreciated. Only less than 10% of surveyed samples indicated that this board did not do their duties before the natural calamity. However, the survey also showed that the role of this unit after the natural calamity was reduced considerably.

Table 66: Role of village Flood Control Board

Role of village Flood Control	0⁄0				
Board	Before	During	After		
Not yet done duties	5,9	5,0	3,0		
Less done duties	18,8	20,8	19,8		
Done duties	30,7	26,7	19,8		
Well done duties	43,6	44,6	53,5		
Total	99,0	97,0	96,0		

The role of village community was appreciated in 100 surveyed samples in Vinh Hien commune. About 95% of interviewed people answered that the community flood control board worked effectively and was trusted highly.

10.1.2.5. Some policies and strategies of natural calamity control of the locality

- Build 01 shrimp breeding station to produce shrimp breeds without disease.
- Improving the ponds with the required depth of 1.2-1.5m.
- Creating the capital resource to overcome the floods' consequence. There are the balanced capital resource, creating conditions for the local people to borrow capital quickly with low interest rate to overcome production after the flood. The local

people wish to borrow 5 millions VND/household in minimum for the term of 3 years with the maximum interest of 0.5%.

- Improving the irrigation system.
- Supporting rice varieties, water melon varieties.
- Supporting the breeds of pig with meat purpose.
- Supporting the fish source processing factory.
- Providing new rice varieties.
- Supporting the rescuer facilities: equipping with life jackets: 20 jackets/village, hurricane lamps.

10.1.2.6. Native knowledge of forecasting and preventing from vulnerabilities caused by natural calamity

Previously, the experience in forecasting the natural calamity plays very important role in reducing the damages. This experience is accumulated through many generations. With the geographical characteristics of the commune, this is a place where often copes with natural calamity. The life of majority of the inhabitants depends mainly on the waterways, so the experience in forecasting the natural calamity becomes more and more important. These are the factors making the local people's experience in forecasting the natural calamity very plentiful.

Traditional experience in forecasting

However, in the past years, due to the development of the forecasting and communication means, these experiences sre used less and less. Some native knowledges of forecasting the natural calamity of Vinh Hien commune's people are as follows:

- After the full-moon day of lunar July (15/16/17-21/22/23 of lunar July), it often rains heavily.
- On 29-30 of lunar August –20, 03 of lunar September, it has heavy rains.
- In lunar October, the streets are waterlogged for many days.
- The typhoons often happen in the lunar months of July August September.
- If any year when the bamboo shoots spring up closed to the bamboo tree or their direction to the hedges, many big storms will happen.
- Black ants crew to high places, big flood will come. .
- Snails crew to the bamboo stake on the lagoon, there is often big storm.
- On the coast, looking at the clouds and wind direction, when the clouds are orient to the East and connected together, a storm is going to come. There are 4 types of wind, namely the south wind from April to June, the contrary south wind (from Phuoc Tuong pass), the easterly wind from Bach Ma after the storm, the contrary easterly wind from the sea, there will be a storm. If there is contrary easterly wind, the sea water's level will rise highly for some hours.
- Thunderstorm has lightnings, but without sound, the rain will be very heavy. If the lightnings start from Thuan An to the pass, it is going to rain, but from Thuan An to the sea, it is not going to rain.
- If the bee nests are situated at the high places, there will be big winds, but in the low places, there will be big floods.
- The ant nests are on high places, there will be big flood with light wind.

- Discovering the floods and storms through grass. The number of ties in the middle is equivalent to the number of floods in the year and the clearer the tie is, the bigger the flood is.
- The clouds happen in the East sea, there will be big wind.
- If the wind blows from West-South to East-South, the water will go down.
- In July, looking to the sea' direction, if the clouds are gathered into a mass, there will be big rains. In March, looking to the mountain's direction, if it is much cloudy, there will be strong lightning (looking outside in July, looking inside in March).
- The ants construct their nests at the low places, there will be big storm.
- "It is dry when the halo is near the moon, it is rainy when the halo is far from the moon".

Native knowledge about flood control

Being a place coping with many floods and stomrs every year, Vinh Hien commune's people have a lot of experiences to adapt to the natural conditions. This adaptation was expressed through many different aspects such as the activities before the flood, during the flood and after the flood, the adjustment of livelihood strategies, the bilingual assistance,... The adaptation was also showed in the different levels such as household, village and commune. Some native knowledges about the flood control of Vinh Hien commune's people are as follows:

- Improving the net, upgrading the ponds from August to prevent from the flooding season.
- Buying the dry foods such as noodles, dried shrimp, dried fish, oil, lamp, woods, bags,... before the flooding season or after the weather forecast.
- Ecavating the canals.
- Binding and upgrading the house before the floods.
- For the villages, communes: establishing the resident groups, upgrading the dykes, the Board of Flood Control makes the plan in accordance to the "4 on-the-plot" policy, establishing the rescure teams, preparing the rescure facilities (life jackets, bouys...), preparing medicines.
- Selling animal before the flooding season (solar August).
- Preparing the sites for boat parking.
- Updating the information from radio, newspaper, the communal, village board of flood control.
- When the storm is going to come, arranging rice to high places, moving the domestic facilities to safe places, taking capture facilities on the lagoon to keep at home, harvesting beans and rice.
- The women prepare the dry foods for 3-5 days in minimum. It is important to move people to safe places and prevent facilities to continue the production after the flood.
- Pitching bamboo or putting sand bags in front of house to prevent from strong waves.
- Preventing from traffic landslide in the villages by sand bags.

- When the water rises fast and up to 1-1.5m, moving people and some facilities. The domestic facilities which are too heavy to move are arranged in the high places or bound or tied to be not swept away, moving the children before moving or arranging the facilities.
- Running to other houses or public house (People's Committee) when the water rises fast.
- Mobilizing all of forces to help the heavily affected households, treating and doing hygien for environment, collecting garbages, treating water according to the health's guidance, upgrading the gardens and fields for next crop. If they do not have condition, they can buy in debt and then pay debt after the harvest.
- Borrowing money to overcome the flood's consequence, to make new corral if it is swept away, ...
- Suggesting to set up more parking places because many boats remained on the lagoon when the big flood came.
- Having good production plan and intime to reduce damages caused by the natural calamity such as using the short-term rice varieties to harvest before the flooding season, raising shrimp and fish in right crop, fish in cages should be harvested early or moved to safe places or surrounded by net if the floods come early.
- Reducing the risk and damages by diversifying the income resource ("there are some careers to change from this to another when risk happened").

10.1.2.7. Suport activities to raise the opportunities of livelihood development in the orientation of reducing the natural calamity

- Demand in training

- Technical training on aquaculture (brackish fish raising, freshwater fish raising, ...).
- o Technical training on disease control for shrimp, fish.
- Technical training on crop (water melon,...)
- Technical training on disease control for crops.
- Technical training on livestock.
- Training of communal extension staff.
- Training on skills of flood control.

10.1.2.8. Demand on training the skills of reducing damages caused by natural calamity at local

Although Vinh Hien is regularly affected by the drought, floods, the preventation from natural disasters depends mainly on the experiences. Therefore, in many cases, they feel confused, especially in the big floods. For that reason, the local people and authorities have the training demand for the following skills:

- Skills of accessing and processing information when there are urgent floods or stomrs.
- Skills of preventing from the big floods or storms.
- Skills of on-the-spot rescure, first aid.
- Skills of processing environment after the floods.

Above are the basic skills so as to reduce the damages for the local people.

REFERENCES

- Do Bang: "Floods in 5 past decades in Thua Thien Hue". Magazine: Hue in the previous and present time, June 2000.
- Nguyen Viet: "Impact of global climate channel on the natural calamity situation in Thua Thien Hue". Workshop: Enhancing the safety for human, environment and disaster management. Hue, August 2006.
- People's Committee of Thua Thien Hue province: "Reporting, checking, revising, complementing the planning of socio-economic development in Thua Thien Hue up to 2010". Hue, May 2000.
- Result of general survey on agriculture and rural in 2006.
- People's Committee of Vinh Hien commune, 2005. Report on the situation of implementing the economic-cultural, socio-national security duties in 2005 and plan for 2006.
- People's Committee of Vinh Hien commune, 2006. Report on the situation of implementing the economic-cultural, socio-national security duties for the first six months of 2006 and plan for the final six months of 2006.
- People's Committee of Vinh Hien commune, 2006. Explication for the project "Infrastructure planning in the specially difficult communes in Vinh Hien commune, Phu Loc district during 2005-2010".

Result of general survey on agriculture and rural in 2006.

Result of group discussion in the days of 30 and 31 August 2006

Communal leaders group

Village leaders group

Men group

Women group

Rather rich household group

Medium household group

Poor household group

Household group with the income resource from aquaculture

Household group with the income resource from aquatic exploitation

Household group with the income resource from agriculture

Result of survey by questionaires

Annexes



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Map 3: Administrative map of Vinh Hien commune



Map 4: Natural recource map of Vinh Hien commune

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11. HAI DUONG COMMUNE

11.1. THE CURRENT SOCIO-ECONOMIC AND DISASTER RESILIENCE SITUATIONS IN HAI DUONG COMMUNE

11.1.1. Review of natural and socio-economic conditions

11.1.1.1. Natural condition

Hai Duong commune is isolated with other communes and located inside the Tam Giang-Cau Hai lagoon which belongs to the administrative boundary of Huong Tra district, Thua Thien Hue province.

Hai Duong has special position nearly separated outside the Tam Giang lagoon. The commune is bounded on the east by Indo-Chinese sea, on the west separated with Huong Phong commune by Tam Giang Lagoon, on the north by the Quang Cong commune, on the south separated with Thuan An town by Thuan An beach mouth. One most typical characteristic of Hai Duong commune is that it lasts along a single way from northwest to southeast with inhabitants concentrating along the inter-communal road. Transportation is difficult especially in the flood season. (See Map 1)



Map 2: Administrative boundary of Hai Duong commune

Total natural land area of the commune is 1.027ha lasting along the inter-communal road, and considered as the inter-village road. From the map 1, we also can see that almost land of Hai Duong commune are sandy dunes which stretch into the east, the cultivated land parts are dispersed along the Tam Giang lagoon in the west. The result of survey shows that the agricultural land is about 349,43 ha; non-agricultural land occupies 544,39 ha; unused land including mobile sandy areas and natural dunes in the east, bordering on the sea is 133,18ha. Land types are detailed in the table 1.

Order		Land type	Area (ha)	Percentage (%)
	Agricult	ural land. In which:	349,43	-
	I.1	Rice paddy land	59,95	5,84
I	I.2	Cropping land	8,86	0,86
	I.3	Forestry land (protection forest)	189,7	18,47
	I.4	Aquaculture land	90,92	8,85
II	Non-agr	icultural land. In which:	544,39	-
	II.1	Residential land	54,76	5,33
	II.2 Special-used land (Communal hall, school, culture-sport house)		24,06	2,34
	II.3	Land of religious organizations/clans	3,99	0,39
	II.4	Cemetery land	24,86	2,42
	II.5	Stream, water surface	436,72	42,52
III	Un-used	land	133,18	12,97
Total			1027,00	100

Table 67: Some of land-use types of Hai Duong commune

In the total of land using for production (349,43ha), the rice paddy land occupies around 60 ha; cropping land (chili, beans, sweet potato,...) is about 9 ha; land for aquaculture is 91 ha; land for planting protection forest and sand prevention forest is 189 ha. Thus, actual land using for production is around 40%, this reveals difficulties that the local people have to bear.

The commune has a rather large area of water surface which serves for exploiting natural sources (436 ha), and the un-used land area more than 133 ha is not yet fully invested to develop production.

From the geographic location and proportion of land types, we can see that Hai Duong is a commune still has many difficulties in economic development.

11.1.1.2. Socio-economic condition

Whole commune has 1.458 households (HHs) with 8.199 persons (on an average, it is 5,62 persons/household).

- In which:
 - Number of households with living sources mainly depending on agriculture forestry aquaculture are 756.
 - Number of households with living sources mainly depending on industryconstruction are 164.
 - Number of households with living sources mainly depending on services, trade are 352.
 - Other careers are 218 households

The detail of career-based household groups is described in table 2.

In the career distribution table, aquaculture is the work which gives main income (41,13%) for the local people of the commune. Following is services, trade activities and aquatic product processing. Agricultural production only occupies a limited proportion (9,27%).

Total value of production activities of the commune in 2005 attains 34,28 billion VND. In which:

- Value of aquaculture sector is 24,12 billion VND (70,37%)
- Value of agriculture production is 1,96 billion VND (5,72%)
- Value of small scale industrial production and services is 8,2 billion VND (23,9%)

Table 68: The distribution of career with main income in household groups in Hai Duong commune.

No.	Career	No. of participated households (HHs)	Percentage (%)
1	Agriculture (cultivation)	139	9,27
2	Aquaculture	617	41,13
3	Industry and small scale industry	76	5,07
4	Construction	100	6,67
5	Services - Trade	250	16,66
6	Transportation	54	3,60
7	Other services	46	3,07
8	Others	218	14,53
	Total ⁽¹⁾	1500	100

(1)Note: one household can have many income sources

11.1.1.2.a. Agricultural cultivation activities.

Agricultural production in Hai Duong commune comprises three main careers; those are forestry, cultivation and animal husbandry.

Forestry production

The specific characteristic of Hai Duong is coastal commune with a large area of forestry land and un-used land, so this area provisionally is planned into protection forest to prevent mobile sand and limit influences of wave and wind. Moreover, forest plantation land is sand dunes/sand knoll, so the area is limited and poor nutrition which leads to direct income from plantation is not remarkable. The main forestry species is planted is casuarina-tree (Cassuarina equisetifolia). Casuarina is introduced tree, was planted in this area 300 years ago with the aim to protect the coastal area. Spending long time, casuarina has proved its adaptive ability with this environment, and it has become the priority for planting in the coastal areas. Besides protection of coastal area, prevention of sand mobile and land slide, Casuarina plays important role in providing fuelwood for Hai Duong commune. The result of survey proves Casuarina forest again the source of fresh underground water supply for residential areas. Almost main underground water sources for production and living belong to these important maintaining sources of water. Besides casuarina, some local trees also participate in covering land and protecting coastal areas in Hai Duong commune. However, so far it not yet has many detailed researches about these species

The annual change of casuarina area is rather big, the households also dynamically exploit and plant casuarina in this area. However, a land tenure issue has limited the remarkable increase of forest cover. Noticeably, in 2005, with the investment of ODA projects funded by Finland the local people had newly planted 8 ha of casuarina forest.

To protecting the protection forest, the commune has established forest protection groups. Currently, these protection groups are working well.

Cultivation

Rice is the main crop of the local people in Hai Duong. However, due to the poor nutrition of soil, weak irrigation system, lack of fresh water for irrigating, almost rice paddy areas are used in one season so the productivity is not high (4,66 ton per ha).

Besides the rice paddy, the commune still has more than 7 ha of vegetables, crops and short-term industrial plants.

Income source from agricultural production of Hai Duong is rather low, the north villages have larger cultivated land area so they have rather big income from cultivated land, the south villages such as Thai Duong Ha has no cultivated land so their main income belongs so much to fish catching and aquaculture.

Animal husbandry

Due to isolated with other areas, transportation obstacles, the consumption and exchange goods meet many difficulties. This affects to the development of animal husbandry of the local people.

Total herd of the commune includes 6.200 heads, in which:

- Pig:1.800 heads
- Cow and buffalo: 2.070 heads.

Most of local people raise cattle by leaving unbridled which affects to the crops of local people.

Veterinary and disease prevention are well implemented so it limits the impact of epidemic disease.

Table 69: Crop calendar (Based on lunar calendar)

Category of crop and animal	1	2	3	4	5	6	7	8	9	10	11	12
Winter rice	<mark>xxx</mark>	<mark>xxxxx</mark>	<mark>xxxxx</mark>	<mark>x</mark>							<mark>></mark>	<mark>xxxx</mark>
Summer Rice					<mark>xxxx</mark>	xxxxx	xxxxx	x				
Watermelon	<mark>xxx</mark>	xxxxx	<mark>xxxxx</mark>		<mark>xxxx</mark>	xxxxx	<mark>xxx</mark>					
Sweet potato	<mark>xxx</mark>	xxxxx	<mark>xxx</mark>		x	<mark>xxxxx</mark>	<mark>xxxxx</mark>	<mark>xxx</mark>				
Beans	<mark>xxx</mark>	xxxxx	<mark>xxxxx</mark>		x	<mark>xxxxx</mark>	<mark>xxxxx</mark>	<mark>xxx</mark>				
Chili	<mark>xxx</mark>	xxxxx	<mark>xxxxx</mark>	xxxxx	(XXXXXX	<mark>xxx</mark>						
Pig)	xxxxx	XXXXXX	xxxxxx	xxxxx	xxxxx	(
	Yea	r-roun	d raisir	ig. Nui	nber of	house	holds r	aise p	oultry	are no	ot so r	many

Cattle and poultry Year-round raising. Number of households raise poultry are not so many because of bird flu.

11.1.1.2.b. Aquacultural activities.

Aquaculture is a strong force and one career giving main income of Hai Duong commune. In 2005, both catching and developing of aquaculture reach 2005,8 ton. In which, sea exploited productivity is 1.589 ton. Fish with high economic value is 227 ton.

Aquaculture productivity is 155,8 ton, increases more 21,8 ton than the year of 2004. In which productivity of Black tiger shrimp (*Peneus monodon*) is 80 ton, of caged fish is 64 ton, and of other crab and fish is 11,8 ton. Recently, basing on the support of Finland program, the local people take full advantage of fresh water area to raise 25.000 fresh fishes. The initial result reveals that these households gain rather high effectiveness.

Although bringing highest income for the local people, in recent time the aquaculture and catching have weakly developed. Many households have met epidemic disease with shrimp so they can not pay a debt for banks and other sources where they borrowed money to invest in aquaculture. Some households invested in making new boat for catching in distant sea, but because of the low technique, lack of experiences so they had to sell their boat with low price that can not compensate the invested expenditure.

Currently, in aquaculture, the local people have some changes in aquaculture pattern. Mixing many species in the same pond in order to improving quality of water environment is implemented. Some new species are introduced to diversify the raised species (caged fish raising in highly salty areas,...)

Table 70: Crop calendar of aquaculture and sea product exploitation (Based on lunar calendar)

Aquaculture and sea product exploitation.	1 2 3 4 5 6	7	8	9	10	11	12
Sea product exploitation	*****	XXXXXXXX	xxx			x x 2	хх
Lagoon and product exploitation	****	xxxxxx	x		x	xxx	хх
Raising sugpo prawn	*****	ххх	ххх	хх			
Mixing crap and shrimp	*****	xxxxxx	xxx				ххх
Collecting and raising sea fish spawn	XXXXXXX					xxx	xxxx
Raising "Ca dia" (<i>Siganus</i> <i>guttatus bloch</i>)	*****	×××××××	xxxx				
Raising "cá kình"	*****	xxxxxx	xxxx				
Raising "cá hồng, cá mú" in cage	*****	XXXXXXX	xxxx				
Raising tilapia fish	XXX	xxxxxxx	xxxx	×XXXXX	xxxxx	xxxx	

11.1.1.3. Infrastructure

During the process of socio-economic development, the infrastructure of Hai Duong commune has many changes especially in recent year.

Roads and transportation

Due to the geographic location and typical topography of Hai Duong, the roads and tranportation system are weakly developed in this area. Nowadays, the transportation and trade between other areas and the commune are mainly based on three major lines: Thuan An pier (boat station), Huong Phong pier and the the national road No.49. The traffic by waterway passing Thuan An and Huong Phong is only used in the favourable condition of weather. In rainstorm and flood days, this traffic line is nearly stagnated, all communication can only be implemented basing on the National road No.49. However, the National road No.49 from Dien Loc to Hue or to Huong Tra district is rather far (more than 70 km) and the quality of the road is bad. While the National road No.49 from Quang Cong and Quang Ngan communes to Hai Duong commune is in construction process, which is planned to complete around 2007.

Inter-village traffic is only some small roads with casted concrete. In rainy season, many road parts under water from 1,0-1,5 mettres which leads to the parcially isolated status between Hai Duong commune with nearby communes as well as among residential areas inside the commune.

Irrigation

One characteristic of Hai Duong commune as well as other coastal communes is that the fresh water providing for production and living is based on the the underground water from the sand hill and casuarina forest along the coast. Due to the sand hill of the commune is small and low, so capacity of this water source is not much. Besides, because the capacity of sand in maintaining water is weak, this water source is very abundant in the rainy season so it often creates the flooded and waterlogged status, on the contrary, in the summer season this water source is rare which creates parcial drought and leads to only one cultivation season in the year. Due to this characteristic of the water supply, the irrigation system of the commune is weakly developed. The local people mainly bank small dams to block revulets from sand dunes running out in order to water the fields and serving the production.

Other infrastructure

- *Electricity system*: Whole commune is covered by the national electricity network. However, the commune lies in the end of the power source, so the voltage is unstable and the electricity is parcially cut-off. Some households in a remove areas of the commune (outside the dunes and nearby the coast) still not yet have electricity so they have certain difficulties in living and livelihood.
- *Communication*: Telephone line was already pulled in the commune many year ago. Currently, around 10% of households in the commune has stable telephones. Many individuals have mobile phone. Therefore, the information comes to the commune is rather fast and easy. Besides, the commune has radio system setting to each village. Normally, this radio system work regularly to provide information of the commune to local people. However, during the flood and storm time, due to the cut-off of electricity, this radio system does not bring into play it role.
- *School*: The commune has from kindergarden to secondary school which were built sparciously and multistoried. In the plan of typhoon and flood prevention, the schools are used for evacuating poor and difficult households.
- *Medical station*: Medical station of the commune is located nearby the office of Commune People's Committee. The station has one general doctor and some physicians. The staffs of the station have to be on duty regularly weekdays.

11.1.1.4. Livelihood of the poor

In total of 1.458 households, the number of the poor households (basing on the new criteria of the government) are 210 (occupying nearly 15% of households in whole commune). Average income of the poor households is only around 170.000VND per person per month. In recent time, there are 185 households escaping from the poor, but 103 households are repoor again. The reason of repoor is not mentioned in the commune's report. According to the survey and household interview of the research group, some below reasons can cause the repoor of households:

- Cultivated area is small, poor nutrition and salted,... leading to the low productivity of crop.
- Impacts of natural calamity, flood, drought, land slide,... make production activities and residence of the local people become unstable.
- Households have many children or many people with poor health or illness.
- Impacts of diseases in shrimp and other sea products make many households be indebted in bank and cannot pay.
- They lack capital to invest in production.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	27	27,0	27,0	27,0
	Aquaculture	9	9,0	9,0	36,0
	Exploitation of sea products/catch fish	23	23,0	23,0	59,0
	Service/business	10	10,0	10,0	69,0
	Agriculture and Aquaculture	7	7,0	7,0	76,0
	Student	2	2,0	2,0	78,0
	Other	22	22,0	22,0	100,0
	Total	100	100,0	100,0	

Table 71: Main careers of surveyed households (using systematic random method)

The survey result of income sources of poor households reveals:

- Most poor households have only 2 to 5 different sources of income, but all these sources are dispersed and unstable.
- Major income sources of these households are mainly from agricultural production activities and hired labour. Specific income sources are detailed as following:
 - o Capture fisheries
 - o Agricultural cultivation
 - Construction activities
 - Livestock animal husbandry.

As presented in previous parts, careers and livelihood distribution of the local people depends on the geographic distribution of residencial areas. The residencial area in the

North of Hai Duong commune, where have a lot of agricultural land and favourable water source, the main income is from agricultural production activities such as cultivating wet rice, crop plants and other vegetables. On the contrary, the economy of residents in the south of the commune including villages such as Thai Duong Ha, Thai Duong Thuong, heavily depends on activities related to aquatic products such as catching (on the sea or in the lagoon), aquaculture. The services depending on these carrers are also developed in these residencial areas.

Most households in this area have few conditions to send their members to the school. The survey result on schooling level of household's head, who makes decision in all activities of the households, is presented in table 6. Only 30% of household's head attended school and graduated secondary school (9th grade) and above. The rest normally finished the primary school (5th grade) and had no condition to attend school.

The survey result of proportion of income and income sources of the households also reveals that many households have income from the help of relatives (oversea Vietnamese, migrants,...). These sources often play an important role in certain periods, especially in the time of mobilizing capital or at the end of year when households need to spend money for the Tet holidays. However, this income source in general is unstable for the Hai Duong commune.

		Percent	Valid Percent	Cumulative Percent
Valid	Illiteracy	16,0	16,0	16,0
	Primary school	53,0	53,0	69,0
	Secondary school	28,0	28,0	97,0
	High school	3,0	3,0	100,0
	Total	100,0	100,0	

Table 72: The highest level of schooling of the household's head,	who make decision
in activities of households	

11.1.1.5. Gender and livelihood

Rate of male and female in commune is unusually differencial which is recognized by the survey at the locality. In total of 8.247 persons in the commune, the female is 4.288 persons, in which male is only 3.959 persons (rate of female/male = 52/48).

To study reasons of this difference, we found that there are many young male after graduating from school, due to unemployment at locality, they go to south provinces to look for jobs. This causes gender unbalance and creates work pressure to female at the locality (especially in the rainy and storm season).

The role of women in the family is highly appreciated in group discussions. However, role of women is different depending on the different career groups. From survey result in different carrer groups, we found that:

- For households catching fisheries on the sea: the women almost take care all activities in the family because the men often go to the sea, many time they stay monthly at the sea. Therefore, besides taking care of children and other family members, they are greatly pressured in spirit (always thinking of the safeness for their husband and children). Gender role and livelihoods are presented clearly in this group. Man concentrate almost time for catching fish on the sea. Besides this

time, traditrionally, they have no habit to work at home. Except catching fish activities in the fishery, all other activities are undertaken by women. In case of natural calamity, the women in the family often take the initiative in preventing and deminishing the damages of the natural calamity. The role of men in preventing and minimizing the damages of natural calamity is limited in making important decisions more than in detail and small activities.

- For group of households exploiting lagoon: The work of women is together with their husbands directly spreading the net to exploit the aquatic products. The wives often bring catched products to the market to sell. After finish the fish capture, the women return to homework and caring their children. Especially, in the rainy and flood season, the vulnerability of these women increase so much. Different with group of households catching on the sea, the gender role of household group exploiting lagoon is balanced between men and women. Man and women often participate in almost activities even in the fishing place and on the land. The preventing natual calamity and minimising damage are implemented by both sides: women and men, in which, women often make plan for reserving food, and expenditure, while men make decisions more related to moving family, reinforcing house.
- For household groups implementing agriculture and aquaculture activities: the daily activities of women are devided basing on the production season. In the production season, the women together with their husband participate in field work, after working on the field, the women have to implement many activities in the family and take care their children. Decision making in the family depends on the role and main livelihood of the family. Women in the agricultural family participate in many detailed activities but they have less right in decision making as men. This characteristic is true for researches in traditional agriculture cultivation in other districts of Thua Thien Hue province.
- **For other groups**: The major work of women is business or aquatic product processing. They often work at home (unless they need go out to get more goods). In comparing with above groups, the women group works in services-business, their work is somewhat lighter. However, they also have to take care almost activities in their family.

Although most of interviewed groups mentioned the important role of women in the family, when exchange the right in decision making, most of inerviewees express that men play the main role in the family.

11.1.1.6. Financial credit.

Formal credit system

Being one of specially difficult communes which receives some support from nongovernment-organizations and government organizations, in recent years the credit sources used at Hai Duong commune are come from two main sources:

Credit source from bank is used and exploited thoroughly for reconstructing house and developing career. Most peole who have needs to borrow money, already borrow money from branches of Agriculture Development Bank, Bank for the poor, Policy Bank,...) through associations such as Women Union, Farmer Union,...The survey result of the banks' role and credit systems with the communities gives satisfactory results. Nearly 50% of surveyed forms show that banks and credit system play an important role in business activities and household economic development (See table7), only a few interviwees (less

than 10%) express that these systems is not important. However, 1/5 of interviewees have no remarkable activities related to cedit and bank.

		Percent	Valid Percent	Cumulative Percent
Valid	Most important	20,0	23,5	23,5
	Important	46,0	54,1	77,6
	Average	11,0	12,9	90,6
	Less important	6,0	7,1	97,6
	Least important	2,0	2,4	100,0
	Total	85,0	100,0	
Missin g	System	15,0		
Total		100,0		

Table 73: Analysing the role of banks in business activities and economic development of households

However, the loans are often small (3-5 million VND perhousehold) and only meet the small investments in short-time (Table 8). Because demand of production investment needs a big capital, many households have to mortgage their house to borrow money. Up to now, many households still do not pay all loan and interest. One issue is that many households lack business idea or dare not borrow money to implement the trade, so the effectiveness of bank activities in Hai Duong currently is not high.

Table 74: Loan period from credit system and bank branches

		Percent	Valid Percent	Cumulative Percent
Valid	Never loan	57,0	57,0	57,0
	Loaning in 1 year	2,0	2,0	59,0
	Loaning from 1 to 3 years	35,0	35,0	94,0
	Loaning from 4 to 6 year	6,0	6,0	100,0
	Total	100,0	100,0	

Besides exploiting the credit sources from banks, many programs and projects are also exploited, such as:

- ODA projects of Finland: using for building school and infrastructure
- CRS project(United States of America): Rehabilitation for the local people
- EC: Building school
- NAV: Building shrimp raising pond system.
- 773 program: Building shrimp raising pond system
- 257 program: Investing in infrastructure

- HCR: Investing in making new boat for repatriation of refugees
- UNICEF: supporting clean well system
- 661 program: Investing in plantation in coastal communes

Informal credit system

Besides the formal credit system, in order to meeting the capital need for production and sudden expenditure for living, some households have to borrow money with high interest or take part in a mutual saving and loan group (choi hui) basing on the traditional groups such as mutual saving and loan of women group, farmer group, or aquaculture group,...

11.1.1.7. Water source

Water source for production and living of the local people in Hai Duong commune mainly is taken from underground source in high sand dunes running out. Because the water maintaining capacity of sand is not big so the reserved fresh water source is not much. Therefore in the summer season, the water source for production is not enough, the fields often are salted which remarkably affects on the cultivation activities. The survey result of general agriculture development and farmer group discussion showed that more than 60% of total area only cultivate in one season (winter season). The summer season often lose due to drought and salinity.

The villages such as Vinh Tri, Thai Duong, Thuong Dong, Thai Duong Ha Bac and Thai Duong Ha Trung get water source for living from underground water which is pumped from wells, the quality of water is rather good. However, the villages such as Thai Duong Thuong Tay and Thai Duong Ha Nam lack water for living. Th underground water that people are exploiting is heavily infected by alum, so after filtering many times, this water only use for cleaning and washing. Water for drinking have to carry from Thuan An or buying from other villages.

Currently, some households in village Thai duong Thuong Bac collaborate with together to set up water supply system which can bring water to households of three village (Thai Duong Thuong Tay, Thai Duong Ha Bac, and Thai Duong Ha Trung). The survey result of 100 households randomly distribute in whole commune is detailed in table 9.

		Percent	Valid Percent	Cumulative Percent
Valid	Rainy water	7,0	7,0	7,0
	Public well	8,0	8,0	15,0
	Private well	53,0	53,0	68,0
	Piped into residence	4,0	4,0	72,0
	Piped into public tap	11,0	11,0	83,0
	Other source	17,0	17,0	100,0
	Total	100,0	100,0	

Table 75: Surveying the current water use for living and drinking.

Research result of water quality through interviewing households shows that only 18% of households, when asking the water quality, considered that this water is good (table 10), 65% of interviewed households consider that water quality is medium and 17 % of households do not satisfy or have no chance to access to the quality water.

 Table 76: Surveying water quality

		Percent	Valid Percent	Cumulative Percent
Valid	Bad	17,0	17,0	17,0
	Medium	65,0	65,0	82,0
	Good	18,0	18,0	100,0
	Total	100,0	100,0	

11.1.2. Approaching yearly flood status

11.1.2.1. Hydrography and climate characteristics

The climate in Hai Duong commune in particular and in Lagoon area in general is monsoon tropical climate.

Heat system: In the cold season, the average temperature is stable under 20° C, starting from December of previous year to March of next year. In the hot season, the temperature is stable below 25° C, starting from April and finishing at the middle of August. Besides 2 hot and cold seasons, there are transition stage from March to April and from September to November with average temperature around $20^{\circ}-25^{\circ}$ C.

Rainfall system: The yearly average rainfall is around 2.700-2.800mm. Raining mainly concentrates in September to December. Around May, it often has showery which creates small flood with the rainfall is above 100mm.

Hydrography: Hai Duong commune is directly affected by tide. Although the sea area in Thuan An-Hai Duong has low amplitude of tide (average amplitude is 0,5m), at the rough sea days and flood-tide, the sea water increases highly, sometimes it overflow to the field of the local people. Especially, for aquaculture activities, when the flood-tide occurs, it makes the salinity in the shrimp raising ponds is increased, which affects to the growth of the shrimp, simultaneously, it blows off part of the dyke, and fish and shrimp could ascape from the ponds.

Storm and flood:

Every year, Hai Duong in particular and Thua Thien Hue province in general have around 3-4 storms and typhoons. The storm mainly concentrate from August to November. Depending on the specific condition of each year, the force and degree of storms are very different. According to the general evaluation, storm is one natural calamity which damage most production activities and living of the local people.

Floods have greatly affected to production activities of the local people. According to statistic data, it often has two times of flood is time of small flood so called "Lut tieu man" (happening around May); and main season flood (from September to November). The "lut tieu man" is although not big, it happens in the end of the aquatic products so it creates remarkable damages for farmer.

For the main-season-flood, every year there are around 4 to 7 floods (sometimes only one flood in the year). Expept historical flood (as the 1999 flood), effectiveness of flood to the local people is not high. According to people opinion, the flood can make more clean, open and clear of the environment, the shrimp and fish have few diseases, simultaneously, the flood also brings alluvium to fields and improves the nutrition source for the crop.

11.1.2.2. The damage of yearly flood

Some landmarks close with natural calamities.

The natural calamities in recent year have many changes. Averagely, numbers of floods and storms occur yearly in the local area from 4-7 floods. However, the effective level of storm and flood are different. According to the memory of interviewees, from 1953 up to now, there are big floods and storms as describing below (Table 11).

Table 77: Some natural calamities happened and their effectiveness.

Point of time Effectiveness

The 1953 flood (Flood in Dragon year)	In this flood, the water level increased around 3 mettre. Due to effectiveness of flood, the previous estuary namely Eo beach mouth (belonging to the Hoa Duan village, Thuan An town presently) was filled up and the Thuan An beach mouth was opened replacing the old one and cutting the Huong Hai commune into 2 parts (the Thuan An town and Hai Duong commune as present). The traffic was heavily broken. Many people died (can not remember the number due to the flood went along time). Graves were swept away; soil dyke system preventing the salinity was broken.
The1961 storm	The locality was heavily damaged in crop, rice, property, and cattle. Fortunately, human damage was a few.
The 1976 flood	The water level was high and flooded around 1,5mettre. The residential area was isolated into 2 sub-parts. Dyke, crops was heavily damaged. This year the country is just unified, the local people's living was still unstable which was damaged by the natural calamity, so damaged level was too great.
The 1983 flood	The damage level was similar with the flood 1976. After the flood, the salted water overflow to the field which makes the production was interrupted around 1-2 years.
The 1985 storm	Big storm with 12 degree of wind level and shocking above 12 degree. In this period, the warning system was not developed; the local people after long time did not meet any big storm so they were subjective and passive. Big wind combined with flood-tide flow the property of the local people to the sea. According to statistic data, nearly 100% of households lost their property, 70% of houses were collapsed or damaged. Houses in the villages Ganh and Cho were leveled ground. In this storm whole province had hundreds died people but Hai Duong commune had no one died. After the storm, 120 households had to move to another area.
The 1999 flood	This is the historical flood. Many parts of the commune were flowed to the sea, place heavily broken was 200mettre with 15mettre of depth (until April 2002, this estuary just was closed). Two Ganh and don villages were mostly damaged. In this flood, many places were under the water around 3-4 metre depth, the time of flood around one week. Generally, this flood created biggest damages for local people if comparing with previous floods.
The 2004 flood	The 2004 flood was also a bid flood for some areas in Thua Thien Hue province. However, the rainfall concentrated mainly in Huong

river. In Bo river, the rainfall was a few. The water flowed to low land was not remarkable so it has a few impacts on the production activities of the locality.

Review the impacts of natural calamity to the local people in Hai Duong commune in particular and in the central Vietnam in general, we have some comments as following:

- The frequency of the natural calamity in recent years were more and more increase
- Intensity and degree of natural calamity were more and more big

For the flood, the water from the upper stream run to the low land is more and more fast. Before, after raining 2-3 days, we just saw mud water, but now only one night we already see thet mud water running to the lowland. During he flood, the water speed is too fast.

11.1.2.3. Current impacts in order to minimizing the natural calamity at locality

11.1.2.3.a. SWOT analysis

To evaluate advantages, disadvantages, opportunity and threaten in prevention of natural calamity of Hai Duong commune, we conducted the survey among the leader groups of commune, village, agricultural cultivation group and aquaculture and capture fishery groups. The result is presented in below table.

Table 78: Result of SWOT analysis in prevention of natural calamity activity at HaiDuong commune

No.	Strongness	Weakness	Opportunity	Threaten
1	Having sand dune along the coast as a shield to prevent the storm and place for evacuating people when flood coming.	One side is sea and one side is lagoon, so it will create difficulties in urgent case.	The government always pays attention to the storm and flood prevention activities.	Changing in weather in recent years did not obey any rule and unfolded complicated difficult to predict
2	The field is deposited alluvium so it decreases the expenses for fertilizer.	It is far from the town so the communication during the flood or storm meets many obstacles	ThereareCommitteeofFlood andStormcontrolformprovincialtocommuneandvillage levels.	Most of local people are poor with temporary house.
3	The flood water makes the environment in the aquaculture ponds more clean, which decreases disease damage for aquatic products	There is no shelter for the boats so the development of sea exploitation meets many difficulties.	Union spirit, mutual love and affection of the local people are high.	In the rainy and storm season, the electricity often cut –off, so the approach to information is not regular.

4	The rainy and storm season occurs with its rule, so the local people can take the initiative of preventing activities	Capital of the local people is limited.	The indigenous knowledge in predict and prevention of natural calamity is more and more falling into oblivion especially in the young generation.
5	The local people have high awareness in prevention of natural calamity	The traffic is interrupted so product consumption is unstable.	Many households still rely on others, and expect the support from government and local authorities
6	The local people have certain experiences and knowledge in prevention natural calamity.	Dykes are often broken seriously after flood, and the expenditure for repairing and maintaining is high.	Lacking of life- boat and rescue equipments.
7		After flood, garbage from many places running to the lagoon, which leads to impacts on the living environment of the local people.	

11.1.2.3.b. The role of the community in participating in overcoming and minimizing impacts of the natural calamity in the locality.

The survey result of current matter base, houses of the community in Hai Duong in order to identifying capacity of local people in resisting, overcoming and minimizing impact of natural calamity shows that around 40% of households have solid houses in a low level, 10% of households have solid house in the high level. Around 50% of residence living in houses with low resisting to the natural calamity. Through researching 100 houses with systematical random method on the whole commune with observation criteria being roof materials, roof structure, wall materials, and materials for windows and doors, the survey result is revealed in tables 13, 14, 15, 16.

Table	79:	Main	roof	materials	in H	lai D	uong	commune
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	Valid	Cumulative
Percent	Percent	Percent

Valid	Temporary thatch	4,0	4,0	4,0
	Metal	27,0	27,0	31,0
	Cement fibber	26,0	26,0	57,0
	Ceramic tiles	25,0	25,0	82,0
	Cement tiles	11,0	11,0	93,0
	Reinforced concrete	5,0	5,0	98,0
	Others	2,0	2,0	100,0
	Total	100,0	100,0	

Table 80: Materials for roof structure

		Percent	Valid Percent	Cumulative Percent
Valid	Bamboo	13,0	13,0	13,0
	Wood and bamboo	20,0	20,0	33,0
	wood	31,0	31,0	64,0
	Concrete and bamboo	2,0	2,0	66,0
	Concrete and wood	29,0	29,0	95,0
	Other materials	5,0	5,0	100,0
	Total	100,0	100,0	

Table 81: Main wall materials

		Percent	Valid Percent	Cumulative Percent
Valid	No walls	1,0	1,0	1,0
	Bamboo with mud	12,0	12,0	13,0
	Wood planks	6,0	6,0	19,0
	Block cement	65,0	65,0	84,0
	Bricks	12,0	12,0	96,0
	Others	4,0	4,0	100,0
	Total	100,0	100,0	

Table 82: Main materials for doors and windows

	Valid	Cumulative
Percent	Percent	Percent

Valid	Opening without doors and windows	4,0	4,0	4,0
	Temporary and insecure doors	15,0	15,0	19,0
	Bamboo doors and windows	8,0	8,0	27,0
	wooden doors and windows	69,0	69,0	96,0
	Metal doors and windows	4,0	4,0	100,0
	Total	100,0	100,0	

With the quality of houses in the surveyed area, the capacity to prevent and minimize the damage of natural calamity is great. We evaluate capacity in preventing natural calamity through the ability to stay at home of households when flood and storm occur. The result shows that most of households have tendency moving to the higher place to shelter when natural calamity come. It needs to clarify that the natural calamity in Hai Duong commune is flood and storm.

Storm creates heavy damages because the materials for making the house of the local people are not good and the house structures are not solid. Most of interview results reveal that storm is very dangerous because it has great impact to human life and property. When storm occurs, the local people move to shelter in places having better infrastructure such as pagoda, communal house, school, commune people's committee office, house with concrete structure

Flood damages the cultivation activities as well as aquaculture. However, the damages to human life causing by big floods is not remarkable. The local people have habit to move to sand dunes or move to high place before the flood comes, the damages related to human life rarely happen. Only the case of the 1999 flood, above 90% of surveyed households told that flood damages they house and human, the damages of other floods (1975, 1984, 2004, 2006) are recognized of 40% surveyed households.

The communities often help each other in prevention of natural calamity. Important information flows in the community are from the neighbor, relatives and career associations (Table 17). Around 85% surveyed people answer that the neighbor, relative and career relationships play important role in preventing and overcoming natural calamity. This role is through sharing information before, during and after natural calamity as well as capacity in sharing, safety and overcoming the spiritual consequence.

Table 83: Support role of community groups in prevention and overcoming natural calamity

Relationship with surveyed	%			
household	Neighbours	Relatives	Friends	
Valid Do not know	7	6	8	

Not responsible	7	3	13	
A little responsible	21	23	26	
Quite responsible	36	40	35	
Very responsible	29	28	18	
Total	100	100	100	

11.1.2.3.c. The role of local authorities and local organizations in preventing flood and storm and minimizing natural calamity.

The surveyed result of stakeholders influencing on preventing and minimizing damages of natural calamity through 100 surveyed households in Hai Duong reveals:

- Provincial Committee of Flood and Storm Control

Table 84: Role of Provincial Committee of Flood and Storm Control in Thua Thien Hue province

Role of PC of Flood and	%		
Storm control	Before	During	After
Valid Do not know	15	20	20
Not responsible	24	24	13
A little responsible	24	25	26
Quite responsible	35	26	31
Very responsible	2	5	10
Total	100	100	100

The evaluation of the local people is rather complicated, around 50 - 55 % (table 19) of total surveyed households considered that the role of the Provincial Committee of Flood and Storm control are quite responsible and a little responsible before, during and after natural calamity occur. Only 2% of surveyed households told that the role of provincial committee of Flood and storm control is very important and very responsible to the local people. This number increases more 10% when they are asked about the role of these organization after natural calamity occurring.

- District Committee of Flood and Storm Control in Phu Vang district.

Table 85: The role of District Committee of Flood and Storm Control in Phu Vang district

Role of District Committee	%			
of Flood and Storm control	Before	During	After	
Valid Do not know	10	20	21	
Not responsible	21	18	12	
A little responsible	29	27	24	
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Quite responsible	32	26	35	
Very responsible	8	9	8	
Total	100	100	100	

Most of interviewees (60%) answer that district committee of Flood and Storm Control has active dynamic in order to minimizing damages causing by natural calamity (table 20) at the time happening the disaster. The impact dynamic of this organization according to the evaluation of the local people is not different when comparing with the change in awareness of the local people before, during and after happening disaster.

However, the same question for before, during and after the natural calamity happens, 40% of surveyed people agree that the Commune Committee of Flood and Storm Control is very responsible in providing information and overcoming the consequence of the natural calamity (table 20, 21). This proves the role of Commune Committee of Flood and Storm Control is very important in Hai Duong commune, they can overcome the consequence of the natural calamity and they has the trust from the local people.

Especially, the village committee of flood and storm control has highly trusted, and it plays an active role in preventing and overcoming the consequence of natural calamity. The head of the village committee of flood and storm control plays he main role.

The role of Commune Committee of Flood and Storm Control		%		
		Before	During	After
Valid	Do not know	0	5	7
	Not responsible	6	13	5
	A little responsible	15	12	18
	Quite responsible	38	36	31
	Very responsible	41	34	39
	Total	100	100	100

Table 86: The role of Commune Committee of Flood and Storm Control

Table 87: The role of village committee of flood and storm control

The role of village	%		
control	Before	During	After
Valid do not know		4	8
Not responsible		8	3
A little responsible	17	18	15
Quite responsible	36	28	31
Very responsible	47	42	43
Total	100	100	100

- Social associations (Women Union, Farmer Union ...)

Other associations such as Women Union, Farmer Union, Veteran union, are evaluated that they have not yet bring into play in minimizing disaster. However, the Youth Union, Civil defense force are highly evaluated in activities tending to minimizing the damage of natural calamity in Hai Duong. These associations are considered that they have remarkable role at the time during and after the disaster (45%).

11.1.2.4. Some policies and strategies for preventing natural calamity of the commune.

Before unusual changes of climate condition, with the support of the technical means and the economic development of the local people, the flood and storm prevention activities have considerably changed. Interviewed household groups all agree about the role of the authorities from village level to commune- district-provincial and central levels in storm and flood prevention activities. Every year, before the raining and storm season, the authorities establish the committee of Flood and Storm Control at their organizations. These committees of Flood and Storm Control receive the directions of the higher level and take the initiative of organizing activities in order to minimizing the risks causing by natural calamity.

Policy system of governmental levels in natural calamity prevention

- For the Central Government:
 - Standing Committee of National Assembly issues supplemented decision on Flood and storm prevention law dated 24/8/2005.
- $\circ~$ Direction dated 13/3/2006 CT-TTg on Flood and storm prevention and seeking and rescue on the sea
- Circular letter between Financial Ministry and Labor-Society- woundish ministry on supporting damages caused by flood and storm.
- o Appealing of The Central Committee of Father Land Front
- The public telegram and urgent telegram of the Central Committee of Flood and Storm Control.
- o Guideline materials for first aid, emergency aid and environmental treatment.
- For the provincial and district levels
- The decisions of Provincial and district People's Committees at the May, June and July.
- Plan of Flood and Storm prevention and implementation plan sending to communes.
- The Telephone book of Provincial and district Committees of Flood and Storm control
- The public telegram and urgent telegram of the provincial authorities appear in the mass media and official documents
- Commune level
 - From annual June, the commune will establishes the Committees of Flood and Storm Control and making plan of flood and storm prevention which has valid until the May of next year.
- Date 4/8/2006 the Commune Committees of Flood and Storm control has meeting to evaluate the flood and storm prevention in 2005 and discuss the plan for 2006

- Establishing the sub- Commune Committees of Flood and Storm control of villages
- o Organizing rescue teams
- Informing implementation plan to sub-committees by documents and informing in mass media.
- Providing telephone list of members in Commune and village Committees of Flood and Storm control
- Village level:
- Establishing the sub- Committees of Flood and Storm control at village level, the leaders of the village will take in charge of responsibility. The head of the village will be the permanent vice –chairman of the committee.
- Organizing rescue teams to cope with urgent cases.

11.1.2.5. Indigenous knowledge in predict and prevention of damage caused by natural calamity

Before, when the weather and flood and storm forecast system was not developed, the economic living of the local people was not high, in order to preventing impact of natural calamity the local people had to base on the experiences or indigenous knowledge to predict the change ability of the weather to prepare for coping. Through collecting

information, we found that the local people still maintains experiences related to predict and prevention as follow:

- Before the raining season, observing the location of the bamboo shoot, if the shoot grows inside of the bamboo cluster, that year will has big storm.
- The sea surface is quiet, the wave lights as glow-worm. It means that after 8-10 hours it will appear storm.
- Observing one grass species (co nang). If it has many big culms, that year will has many floods. If that grass species has small and few culms, it means that very few floods occur.

<u>Box 1</u> :The story was told by one member in the exploiting. In 1976 he followed his family going to the sea to catch fish. When the boat went to the sea, the father saw the surface was quiet and lighten. The father required the child turning back but he did not obey. After that on the sea appearing one big typhoon which pushed their boat to the Tu Hien beach mouth. Fortunately, the storm was not too big so their boat landing safely.

- Disemboweling of goby, if in its bowel having many shellfishes, it may has big flood. According to local people's experiences, this fish eats a lot of shellfishes to keep its body heavy, so it can stay at bottom of river to avoid the water flow.
- Normally if "Cang" fishes run to the fish corral, it means that the weather has big changes (heavy raining or storm)
- Shellfishes stick together into big cluster, it means that big flood will appear (the cluster will keep shellfish not follow the water flow)
- When informed the storm coming, the local people cover the roof by straw to avoid the turning up the roof (straw absorbing water will be heavy).
- To avoid diseases after flooding, the fishers often eat garlic or ginger to prevent the cold.

11.1.2.6. Some support activities in order to increasing opportunity for developing the livelihoods oriented to minimize disaster

11.1.2.6.a.

Training activities

- Increasing knowledge of aquaculture technique in the pond and cage
- Guiding technique of "Ca Vuot" raising (cá chẽm)
- Opening more other career to develop secondary career (construction, machine repair...)
- Training and guiding pig raising technique.
- Credit training

11.1.2.6.b.

Investment activities

- _ Enhancing credit sources for the local people.
- Building integrated model of animal husbandry to help the local people get more income in the raining season.
- Organizing reasonable exploitation the natural benefit (cá dìa, cá kình, cá hồng, cá mú....)
- Need regulations to limit the using of exterminated equipments in catching fish

11.1.2.7. The needs related training skills to minimizing damages caused by natural calamity at locality.

To limit and minimize risks in production and living, the farmer need following demands:

- .Training skill in building house which can adapt to environment and avoid the storm and flood
- Enhancing awareness of the community in managing and treating garbage in order to prevent environmental pollution, especially the period after flood.
- Guiding first aid technique for victim.
- Training on credit management for the local people
- Training method of treating drinking water and living water.
- Providing and guiding method of using communication means for distant catching boats.
- Setting up the flood and storm prevention program in curriculum of the school

12.

DEVELOPING THE STRATEGY OF MINIMIZING VULNERABILITY TO AOUACULTURE AND CAPTURE FISHERY IN THE TAM GIANG-CAU HAI LAGOON

The strategy for natural calamity prevention of the local authorities

In the raining season, the transportation in the commune will meet many difficulties. Not only the roads from district to commune but also the inter-roads among the villages are also separated. Therefore, the common policy of the local authorities which is grasped thoroughly to groups of household is the 4-on-the spots plan, which in detailed:

- (i) on-spot labor force
- (ii) on-spot leading
- (iii) on-spot logistics; and

(iv) On-spot means.

Besides, the local authorities have to take initiatives of using communication system from rudimentary to modern means when necessary.

To make sure the requirement as above the commune leaders have built short-term, medium-term and long-term plans. The detailed description as follow:

- For short-term plan:

- Having detail plan for flood and storm period when receiving warning information.
- The Commune Committee of Flood and Storm Control will directly check each residential cluster to have supplemental plan.
- Checking and maintaining the radio system of the commune.
- Propagating and mobilizing the local people to avoid the subjective thinking.
- Preparing provisions (instant noodle) and medicine as requirement of the superior.
- Pointing out the route and evacuated sites for residential cluster when the big flood and storm appear.
- Medium term and long term
 - Planning for new dyke and dam building and preparing the dyke and dam for production
 - Identify risked or essential areas to have plan for developing safe residential areas
 - Planning areas for boat anchoring,...

The strategy for natural calamity prevention of the local people

Both the local people in the lagoon area in general and the local people of Hai Duong commune in particular understand the impacts and dangerous level of natural calamity towards their livelihood and family. Therefore, when the rainy and storm season is coming, with their best conditions, they have certain preparations. The activities the local people have to do in this time including:

- Before flood and storm season
 - Harvesting and taking all products on the fields, especially aquaculture households, they collect aquatic products before the flood and storm coming.
 - Following up weather information.
 - Repairing boats and preparing fishing equipment and net to catch fish and shrimp in the beginning of flood season.
 - Reserving provisions-food and fuel for human and animal
 - Moving household items to upper places
 - Repairing and reinforcing house
 - o Helping households lacking manpower in reinforcing their houses.
- During flood and storm time
 - Managing boats and protecting other exploitation equipments and means

- o Harvesting aquaculture products in the pond and lagoon
- o Reinforcing and protecting house
- Caring and managing children and elders
- o Selling and consuming harvested products
- After flood and storm time
 - o Repairing boats, pond, lagoon and net.
 - o Repairing field and reinforcing dyke system to prevent the salinity
 - o Repairing house
 - Preparing seedlings for the new production season.
 - o Cleaning environment

Reference

- Đỗ Bang: "Flood and storm in recent 5 centuries in Thua Thien Hue". Magazine: Huế Xua va Nay, June 2000.
- Nguyễn Việt: "Effectiveness of global climate changes to Natural calamity situation in Thua Thien Hue". Workshop: Enhancing safety for people, environment and disaster management. Hue August 2006.
- Hai Duong Commune People's Committee: "Implementation of socio-economic mission in 2005 and line of socio-economic mission in 2006". Hai Duong, December 2005.
- Hai Duong Commune People's Committee: "Implementation of socio-economic mission in first six months 2006 and line of socio-economic mission in last six months of 2006. Hai Duong, June 2006.
- Provincial People's Committee of Thua Thien Hue province: "Report on reviewing, adapting and supplementing the plan of socio-economic development in Thua Thien Hue province to 2010". Hue, May 2000.

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