ACCCRN
Asian Cities Climate Change Resilience Network

SUPPORTED BY
THE ROCKEFELLER FOUNDATION

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HCVA in Quy Nhon

Hazard, Capacity & Vulnerability Assessment in relation to Climate Change

Prepared by

Challenge to Change
Binh Dinh People's Committee
Quy Nhon People's Committee
DONRE and other government depts
Quy Nhon City Red Cross
Quy Nhon City mass organisations
Peoples Committees, local institutions & communities of Nhon Binh Ward and Nhon Ly Commune

Contents

Abbreviations

ACCCRN	Asian Cities Climate Change Resilience Network
CBDMR	Community Based Disaster Risk Management
CBOs	Community Based Organisations
CC	Climate Change
CFSC	Committee for Flood and Storm Control
DONRE	Department of Natural Resources & Environment
DRR	Disaster Risk Reduction
HCMC	Ho Chi Minh City
HCVA	Hazard, Capacity & Vulnerability Assessment
ISET	Institute for Social & Environmental Transition
PC	People's Committee
PRA	Participatory Rural Appraisal (tools, also useful in urban context)
RC	Red Cross
SEDP	Socio-Economic Development Plan(s)
SLD	Shared Learning Dialogue
SWOT	Strengths, Weaknesses, Opportunities, Threats (analysis)
VND	Vietnamese Dong
WU	Women's Union
YU	Youth Union

1. INTRODUCTION

1.1 Context

This assessment in Quy Nhon City has been carried out within the framework of the Asian Cities Climate Change Resilience Network (ACCCRN), supported by the Rockefeller Foundation. The network aims to catalyse attention, funding, and action on building climate change resilience for poor and vulnerable people by creating robust models and methodologies for assessing and addressing risk through active engagement and analysis of the participating cities. There are three participating cities in Vietnam: Quy Nhon, Da Nang, and Can Tho. The main local partner in each city is the People's Committee. The People's Committees are formally assigned by central government to respond to climate change at the city level.

This study is one of a series of steps being carried out in the early stages of the resilience-building process in cooperation with the Binh Dinh Provincial People's Committee, Quy Nhon City People's Committee, and other institutions at the city level and lower local levels - District, Ward/Commune, Village/Section. Other steps being carried out between 2009 and 2010 are:

1) Shared Learning Dialogues (SLDs) with local government and civil society (series of workshops)
2) City Climate Impact Assessments
3) Pilot projects
4) Community Based Disaster Risk Management (CBDRM) Training
5) Awareness raising for private sector and youth
6) City Climate Change Resilience Action Planning

This assessment was coordinated by Challenge to Change, a British NGO focusing on climate change issues in Vietnam, in cooperation with city-level government and non-government counterparts.

In order to obtain a balanced view of the hazards and vulnerabilities of Quy Nhon City, the assessment was carried out in two sample areas of the city – one a so-called urban area, and the other a so-called rural area. The subdivisions of an urban district are called Wards, while the subdivisions of rural districts are called Communes. This assessment was carried out in **Nhon Binh Ward** (urban area) and in **Nhon Ly Commune** (rural area).

1.2 Quy Nhon City

Quy Nhon City is the capital of Binh Dinh Province. It is a coastal city, a second-rank city as classified by the central government, situated in the southeast of the province. It is 1,065km from Hanoi in the north and 690km from Ho Chi Minh City in the south.

The terrain of Quy Nhon City is diverse, including mountains, hills, forests, sea, rivers, lagoon and lakes. Its ecosystem includes primeval forests in the Cu Mong mountain pass, and a wide variety of species of fauna in Thi Nai Lagoon, Phuong Mai Peninsula, which is 22km from the city centre. The city includes one island Nho Commune – the Green Isle.

Climate is tropical with high humidity, with two seasons, the dry season from January to August, and the rainy season from September to December. Average temperature during the year is 27.1 ^{0}C, highest temperature is 40.7 ^{0}C and lowest temperature is 15.5 ^{0}C. Annual average wind speed was 1.8m/s in 1976. The fastest recorded wind

speed is 40.0m/s, that is force 14. Average of humidity during the year is 79% and average annual rainfall is 1846mm, with total of rainy days/year is 137 days; the biggest rainfall in a day is 338mm. The total area of the city is 286 km^2 and the population is 268,000.

Trade-services occupies a majority in the economic structure of Quy Nhon City (45%), the next is industries- construction making up 35% and the rest is agro-forest and fisheries. There are 13 out of total 21 administrative wards/communes engaged in agro- forest and fisheries with more than 10.000ha for rice paddy fields, 1,000ha for cash crops and more than 10.000 ha of unused land and forestry land. The trend of urbanization and industrialization has been recently taking place in the city, which is in line with the common situation throughout the nation.

With total land area of 286km^2, the city has residential areas with coastal line living areas inhabited by around 50,000 residents in 3 peninsular communes and one island commune and part of Tran Phu and Hai Cang wards. There are approx 300ha of tourist zones and other coastal infrastructure facilities: Quy Nhon Port complex, Nhon Hoi- fishing port and fishery support facilities, fishery products processing plants, fishing vessel repair enterprises, petrol stations. Water source is mainly groundwater collected from riverside areas of Ha Thanh river, approx 53.000m^3 per day. The underground culverts system and gravity pipeline, outlet invert level about 0.3-0.6m lower than the flood-tide level. The network of ponds, lakes and lagoon control the volume of storm water, thus reducing the urban flooding.

Trends of climate change in Quy Nhon City are sea level rise, coastal and river bank erosion, wider expansion of flooded area, prolonged period of drought, destructive typhoons and salinised sources of fresh water which have affected seriously on existing key construction works and infrastructure system. Hence, the current status of construction works and urban infrastructure facilities needs to take into account of some issues; e.g revision of urban development plan in line with projections for impacts of climate change. The city should have a proactive distribution of populations and production in consistency with land shrinking, resulted from the sea level rise, coastal and river erosion, wider expansion of flooded areas. In addition, the adjustment of drainage system should be done in consistency with higher rainfall intensity and increased flooding. Equally important, there should be an attention to be paid to the elevation of marine works such as sea ports, vessel repair plants and fishing port due to sea level rise.

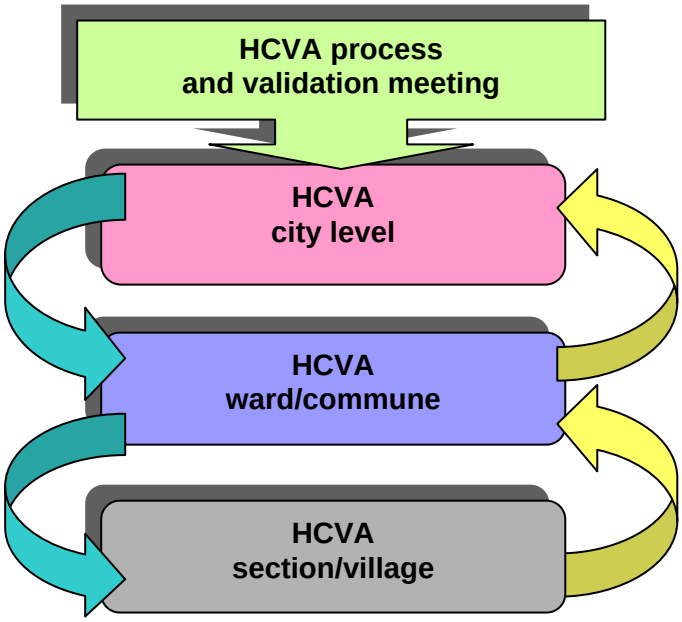
Table 1: Selected socio-economic variables for Quy Nhon City and Binh Dinh Province

Socio-economic data	Quy Nhon City	Binh Dinh Province
Area (km^2)	286	6,039
Population, 2007	268,000	1,578,890
Population Density (person/km^2)	938	235
Urban Population (%)	21	24
Poverty rate	4.5 %	11.35 %
Key Economic Sectors Agroforestry & fisheries Industry & construction Trade & services	 20% 35% 45%	 7% 43 % 50 %

2. METHODOLOGY

2.1 Conceptual Framework - see annex 1

2.2 HCVA Process



A. Levels of assessment:

1. HCVA conducted at all levels from city to section/village
2. The results of HCVA were validated from section/village to ward/commune through ward/commune meeting, then bringing these results to city validation meeting

B. Key contents of assessment:

1. Hazard assessment to identify potential hazards/secondary hazards
2. Vulnerability assessment by natural disasters and CC impacts, and identification of most vulnerable areas/groups and awareness on future vulnerability
3. Identification of affected sectors and main economic activities caused by natural disasters and CC impacts
4. SWOT analysis of affected sectors and main economic activities responding to CC
5. Capacity assessment on natural disasters, Climate change and coping experiences
6. Identification of most concern problems, needs, solutions for adaptation to CC

C. Steps of assessment:

- Preparation:

- Development of conceptual framework based on international and local sourced literature reviews, practical experiences of CtC Staffs and review discussion with other NGOs staff of Climate Change working group (Care, Oxfam, Netherlands Red Cross etc) and gender specialists
- Guideline development for participatory assessment tools, checklist of in-depth interviews, semi-structure interviews, household survey questionnaires and especially on gender mainstreaming into semi-structure interview and household questionnaires
- Developing specific assessment plan of HCVA with the key partner of the city, DONRE to organize the field work
- Selection of local facilitators to be key assistants of assessment team/project from city Gov agency and mass organization of ward/commune. There are 12 selected local facilitators of which 2 come from Provincial Red-Cross Association and DONRE, other 2 come from city economic division and Natural resource environment division, and another 08 come from ward/commune people's committee, chair of red-cross, chair of women union, and land survey officer
- Briefing climate change scenario of sea level rise for the city with supporting document provided by ISET

- Orientation session of HCVA process, methodology, expected results and specific plan for representatives' city divisions, and people committee and mass organization of ward/commune.

▪ Conducting HCVA:

- At city level (1 day): hazard assessment to identify potential hazards, most vulnerable ward/communes, most affected sectors and issues/concerns/needs assessment responding to climate change, coping experiences and good practices for disaster mitigation of the city
- At ward/commune level (2.5 days): hazard assessment to identify main hazards/secondary hazards, most vulnerable ward/communes, most affected main economic activities and problems analysis responding to climate change, coping experiences and good practices for disaster mitigation of the ward/commune
- At section/village level (2 days): hazard assessment to identify main hazards/secondary hazards, most vulnerable ward/communes, most affected main economic activities and problems analysis responding to climate change, coping experiences and good practices for disaster mitigation of the ward/commune
- Household survey: development of household questionnaire, training of surveyors, field testing of questionnaires, conducting field survey, compiling and coding the results

▪ Feedback session during field work:

- Daily feedback among members of assessment team for further improvement of the tools usage, and information collected
- Feedback session was organized right after completion of assessment for each level from section/village to ward/commune, to city. The main purpose of the feedback sessions are reporting the results of HCVA from section/village to ward/commune and to city level, validating the main source information collected, most concern problems, needs and solutions, and generating more ideas on Climate Change adaptation of city.

2.3 Tools and Methods

2.3.1 Collecting secondary data

Collecting secondary data from participants, related organizations, departments and agencies: collecting information on topography, climate, population, infrastructure, environmental sanitation, natural resources and legal documents of resources management, urban plan, disaster management and etc. This was done by survey members and facilitators of Quy Nhon.

2.3.2 Household survey

Using questionnaires to get information on livelihood, education, environmental sanitation, work share between males and females, advantages and disadvantages of households in coping disaster and keeping them alive, etc. 200 questionnaires were used. This was done by the University of Quy Nhon staff members of survey group with help of facilitators from 2 districts.

2.3.3 Focus group discussion

Focus groups discussion were organized at 4 levels: city (1 group), districts (2 group), wards (2 group) and sections (4 groups). Each group has participants who responsible or have relevant knowledge to clarify information, gather different opinions on certain issues. - discussions with elderly people groups; with poor people groups, with pupils and teachers. General issues were discussed in mix groups. However, discussions on needs for assistance were done in sex-disaggregated groups in order to ensure that the voices of both men and women were raised to express their needs.

2.3.4 PRA tools

Some PRA tools were use for HCVA during discussion:

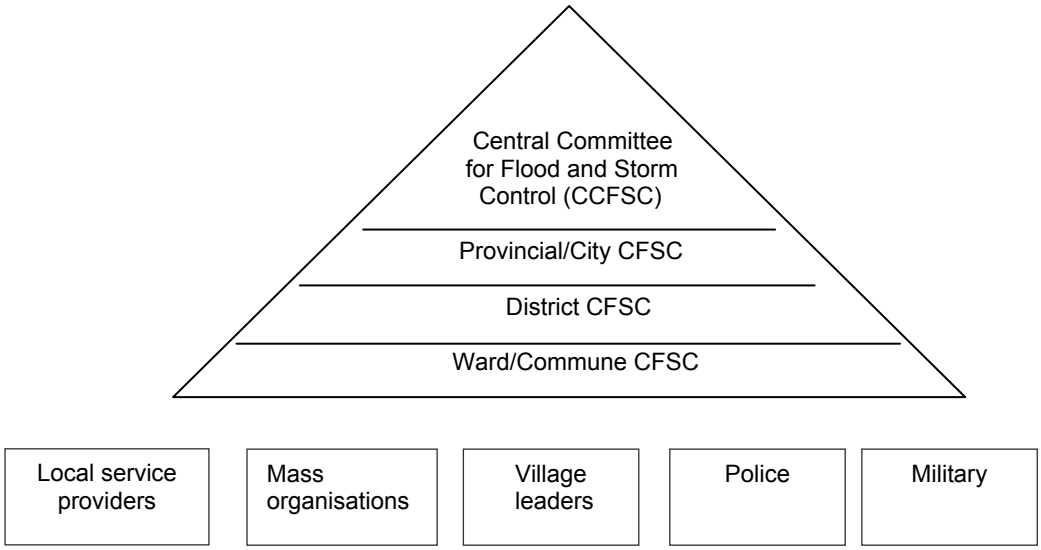
- *Historical profile*: used to get information on types of disaster during the last 20 years, types of losses, reasons to losses and the most affected zones in community and information compilation of potential hazards.
- *Timeline:* used to get historical information on changes of disaster, livelihood, population to understand local practices and attitudes in the past and at present, to get information on effects of disasters in recent years...
- *Seasonal calendar:* used to record change of weather, time of disasters and working calendar in the year, methods and capacity of community to cope with hazards.
- *Mapping:* maps drawn by local people are useful to get information related to vulnerable areas, areas at risk of erosion or deposition, places to be used as shelters...
- *Ranking:* used to I) rank the disasters and their impacts to find out the most dangerous disasters, ii) rank the affected zones by disasters to identify zones at high risks to climate change scenario, iii) rank the suggestions and needs of community to cope with climate hazards. The participants prioritize by giving a score to each of the options.
- Some other tools such as *Problem tree, wealth ranking* also applied during the survey

2.3.5 In-depth interviews

- in-depth interviews (including better-off households, average households and poor households). Poor households consist of women-headed households, men-headed households, new households, single women households, households with disability family member.
- in-depth interviews with officials at departments and agencies of city, districts and wards.
- During survey, gender balance is a requirement in group discussion and household in-depth interviews.

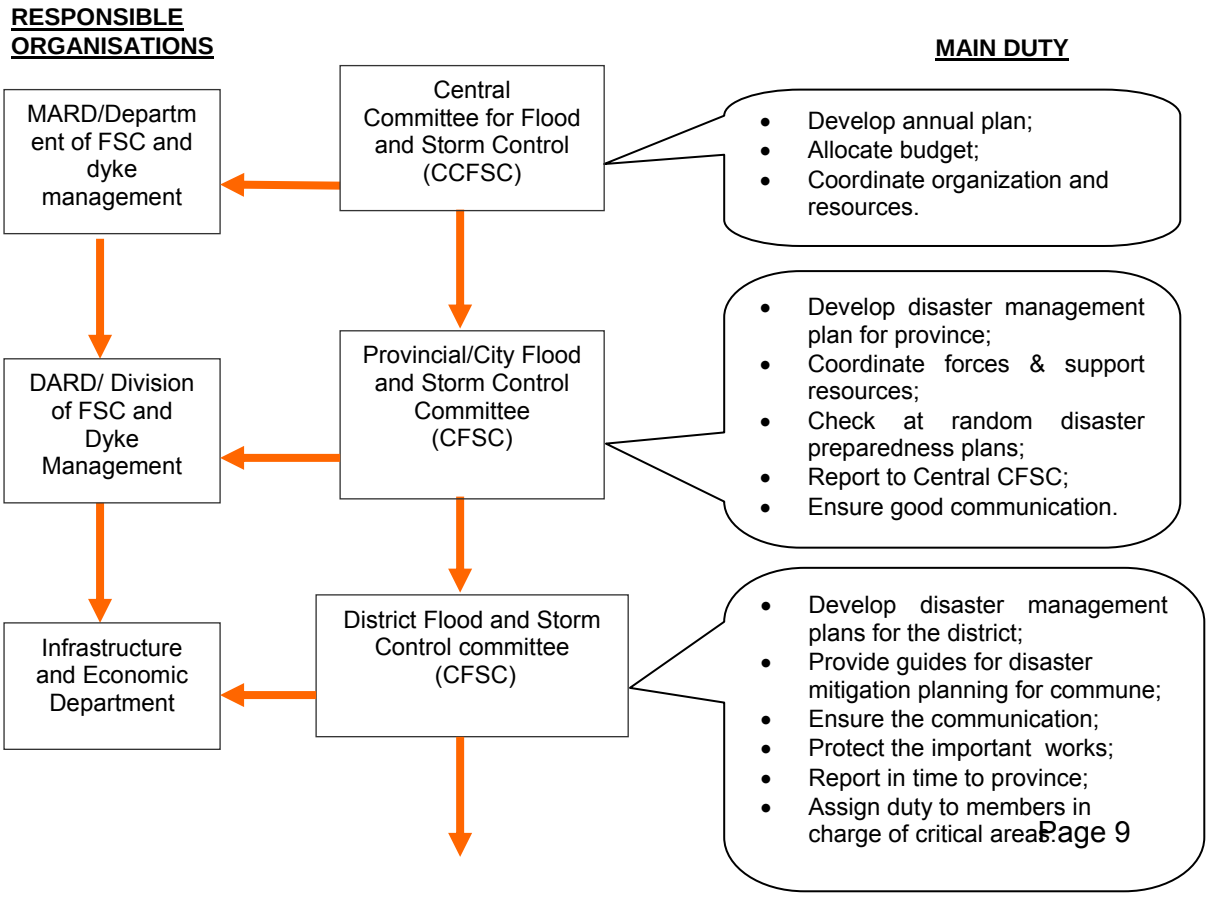
3. DISASTER MANAGEMENT

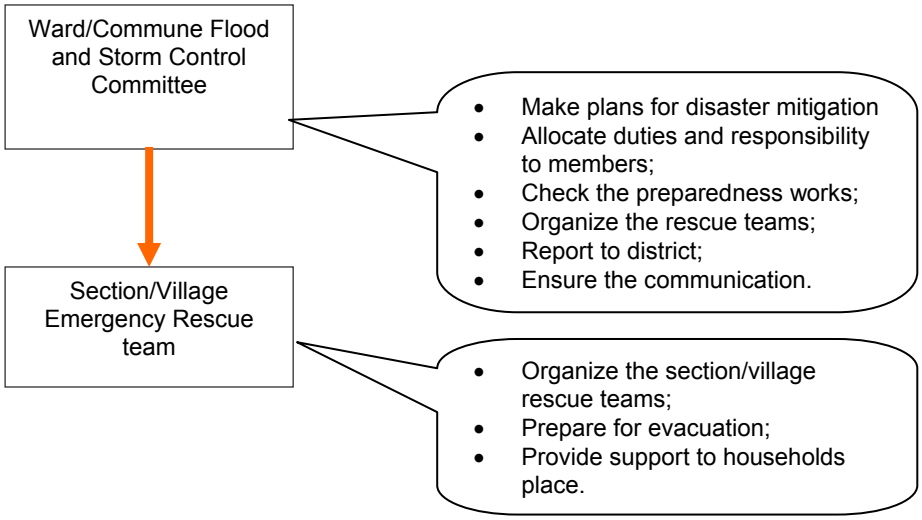
3.1 Disaster Management structure



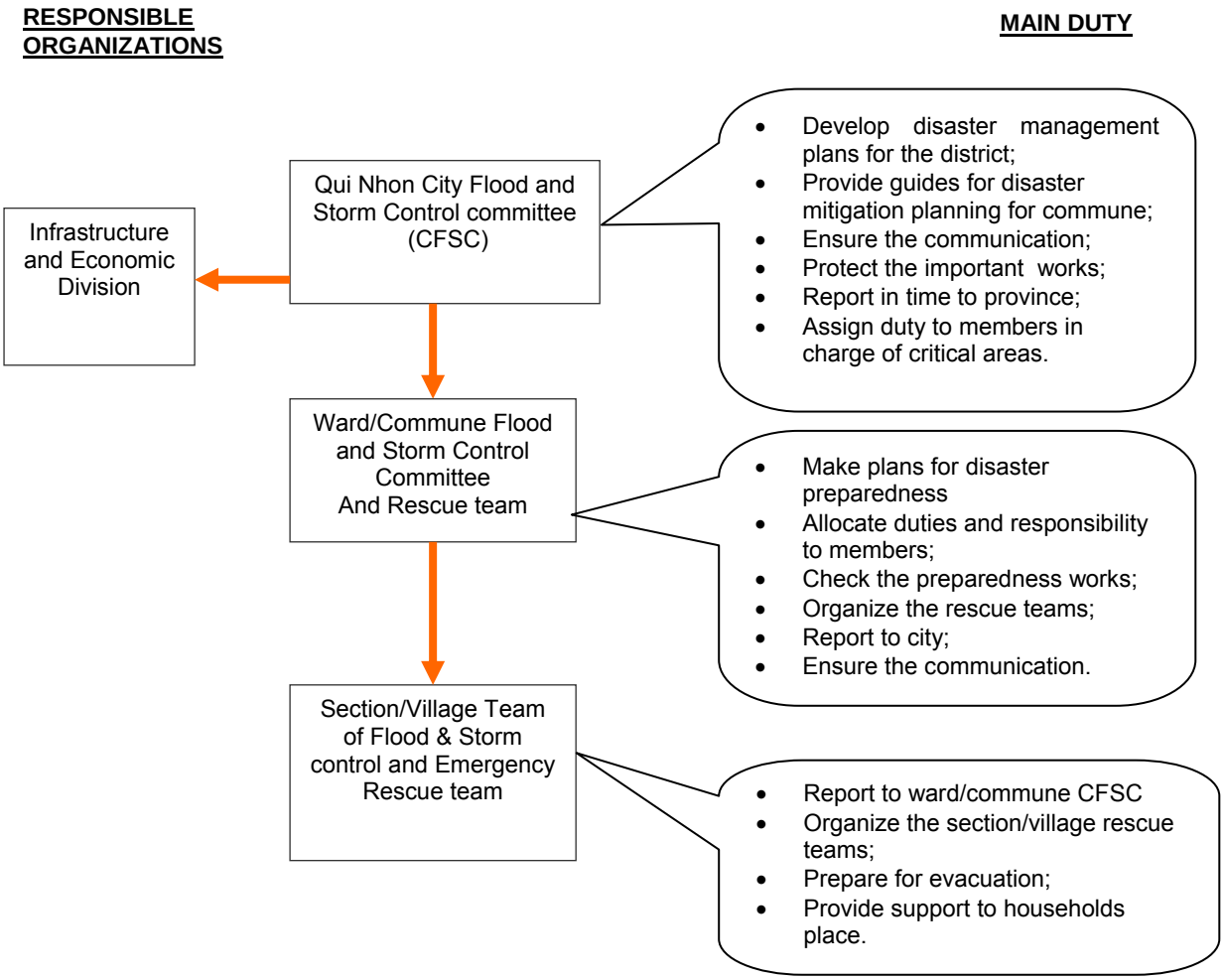
Climate change exacerbates natural disasters in Vietnam which occur regularly and increasingly irregularly. The disaster management structure in Vietnam is made up of Committees for Flood and Storm Control at all levels. From the Ward/Commune level down, disaster response is managed by a range of actors. Mass organisations include the Vietnam Red Cross. Main duties of relevant organisations are illustrated in the two diagrams below.

Committee for Flood and Storm Control of Province/City, District & Commune/Ward





Qui Nhon City Disaster Management Structure:



Description

- There is Committee for Flood and Storm Control (CFSC) at levels, from the city to the ward/commune and flood and storm control team at section/village and hamlet level.
- City committee for Flood and Storm Control has 20 members, Chairman of city PC is head of CFSC and Vice-chair of city PC is deputy head of CFSC and Head of Economic division of city PC is standing officer of CFSC and another member is all head of relevant divisions of city. As the same of ward/commune level, CFSC has 19-26 members with 2 women, Chairman of ward/commune is head of CFSC, and other is head of mass organization of ward/commune. The military team consist of 20-25 members with 2-3 women who also help with the rescue efforts, and rescue team is 20 members with 2-3 women
- Every year, Storm and Flood Control Committees of city and ward/commune levels prepare plans of storm and flood control and disaster preparedness. These plans seem to have the nature of response rather than sustainable disaster mitigation. In the plans of socio-economic development of the city and ward/communes, the plan of disaster preparedness is not emphasized and is not considered as a priority. Just only the emergency cases such as moving residential areas suffering from landslide or repairing roads were considered as priority activity.
- Principle “four on the spot” under a framework of the national strategy on Disaster Risk and Mitigation Management (DRMM), CFSC carries out annual disaster preparedness plan for DRMM as “four on the spot” including direction, human resource, material and logistic on the spot. Based on experiences, issues and areas to be exposed by hazards are identified and emergency rescue and evacuation plan for people living in most vulnerable/unsafe areas are prepared. These plans are annually approved by City People’s Committee/People Council before flood and storm season in June.

3.2 Budget for disaster preparedness

- The budget for flood and storm control and natural disaster preparedness activity is not yearly allocated. Only when there are damages, City Storm and Flood Committee will decide to use part of the local budget for relief. To deal with high value damage, local people need to wait for the City CSFC to include the reconstruction costs in their budget to higher levels for the following year. Wards/communes and sections/village have no emergency funds. In exceptional cases the Fatherland Front may launch an appeal for emergency assistance.

3.3 Coordination

- Social and political organizations and local authorities are active in disaster preparedness; especially police and military are main forces to mobilize in any cases.
- Provincial Telecommunication and Coastal Broadcast Station are assigned by Provincial CFSC to ensure communication and information for CFSC and Rescue; Coastal Army appointed to communicate with fishing boats and to give instruction and rescue including early warning to fishing boats before storms arrive. Provincial department of Agriculture Rural Development coordinated with telecommunication, coastal broadcast station, coastal army units, fishery department, city/district/commune CFSC, fishing boat owners for instruction and rescue in emergency cases. City/district CFSC are allowed to mobilize army, police forces and rescue teams on the spot for any supports as required. Urgent

message on disaster happening has been sent from section/village to ward/commune, to city and province in timely manner.

3.4 Skills and facilities

- CFSC at city and ward/commune levels are equipped with some necessary communication facility and equipment including communication system, motor-boats and mobilization of local boats and vehicles from local authorities and private companies for rescue and evacuation.
- Communication system is well operated from city to section/village level, CFSC at all levels are on duty 24 hours during disasters , however at section level, there are not enough communication stations (wireless connection) for information channels to be well communicated, especially to all different groups at section level.
- CFSC at city and ward/commune level has all telephone numbers of fishing boats to rescue them from storms.
- City provides 76.700 sand-bags for local authorities and local people to reinforce houses, dams, dykes and roads before disaster.
- Facilities for communication and emergency rescue activities in the wards/communes and sections/villages are lacking. Members of the storm and flood control committees have some life-jackets, lifebuoys, torches, raincoats, but still not enough. At city level and ward/commune level, motor-boats and communication means have been equipped but facilities are not provided at the section/village level.
- These teams are provided some necessary facilities such as life buoy, life jacket, megaphone, torches, raincoats, hats, boots and ropes...etc. But, these teams have not been trained in emergency response, first aid and evacuation. They are not equipped enough facilities to fulfill their duty.

3.5 Rescue teams at city, ward/commune and section/village level:

- Rescue teams are established at all levels. These rescue teams are consisting of young and strong men. There are 50 people at city level, 20 people at ward/commune level, and 20-30 people for section/village level. Other forces to be mobilized when necessary are 100 workers from private companies in the local areas with human resources at workplace to support impromptu rescue efforts and 100 young men from army unit and local authorities. Rescue teams are under control of CFSC and section/village heads.

3.6 Coping experiences

- In 2008, provincial CFSC evacuated 296 households with 1,118 people from risk areas to exposure for landslide. In October 2005, storm no 8 was threatening to Binh Dinh Province, a plan for evacuation of 271,000 people of Qui Nhon city, Phu My and Phu Cat districts has been prepared. On 4 November 2007, Qui Nhon city was being heavy flood; 200 m of dykes of Ha Thanh river in sub-region 2 of Nhon Phu ward were destroyed. 3,000 houses in sub region were flooded, two houses were totally collapsed. The rescue team of Nhon Nhu ward evacuated 100 households from unsafe areas.
- In 2008, economic division of the city has delivered 6 training courses on escaping skills in the sea when storm occurs for fisher men in the ward and commune such as Tran Phu, Hai Cang, Dong Da, Nhon Ly, Nhon Hai, Nhon Chau, Nhon Hoi

3.7 Annual Disaster Preparedness Plan of Qui Nhon City

3.7.1 Planning

- In Qui Nhon city, CFSC has to develop annual disaster preparedness of city to report Binh Dinh Province in the beginning of every year. City people's committee is responsible for development of annual disaster preparedness plan and victim rescue and searching. By year 2008, People's Committee of Binh Dinh Province approved annual disaster preparedness and following year of disaster mitigation of the city according to Decision no 2075/QD-CTUBND dated 29/9/2008
- Infrastructure & Economic division of the city acts as an advisor for City People's Committee and People's Council for approval of annual disaster preparedness plan for implementation. All head of relevant divisions of the city is a key member of CFSC such as finance, natural resource and environment, statistic, economic, health, education, red-cross, police and military units ...etc
- Annual disaster preparedness plan is prepared in Jan along with an estimated cost for emergency relief activities, approx 200 - 300 mil dongs per year, which is taken from the budget of social economic development.
- Throughout the province, CFSCs at all levels are placed, along with police, military forces, and local relief teams are ready for emergency relieves or evacuating local resident to safer places in urgent cases. Prior rainy season, the city authority give instruction to relevant agencies on preparing a plan for disaster preparedness and management. Wards and communes have to prepare their own plans for natural disaster and management, and budget for these activities will be based on the overall annual budget SEDP, a certain amount within the overall budget is allocated for natural disaster mitigation and management.

3.7.2 Women's participation in leaderships and management position in the local authorities

Table 2: Women in leadership positions (women/total)

	Head of PC	Communist Party member/ Total	Women head of line agencies/ Total	Head of mass organizations/ Total	Women members of Storm and Flood control Committee /Total
1. Quy Nhơn city	0/4	0/4	5/34	1/6 (Head of Women's Union	2/31
2. Nhơn Bình ward	0/3	0/3	NA	1/5 (Head of Women's Union)	2/25
3. Nhơn Lý ward	0/3	0/3	NA	1/5 (Head of Women's Union)	3/32

These figures show that women rarely hold key positions in government agencies, nor Party's units and mass organizations. In mass organizations, women are mostly Head of Women's Unions at all levels. Women's participation in the Storm and Flood Control Committee is very limited due to the perception that disaster-related tasks are tough tasks for men only.

Why do women rarely participate in the Storm and Flood Control Committee?

Members of the Storm and Flood Control Committee are mainly men. They think that women are physically weaker than men. Only men are capable of leading the preparedness. It is very familiar to see on TV images of men in the storm. This leads to the thinking that men are very important. In the community everyone thinks that men do more: strengthening houses, evacuation, youngster helping with protecting the embankment…Even women think that men play the key roles. Tasks such as preparing food, cleaning houses, keeping clothes from getting wet and keep the children are minor and unimportant.

However, the contribution is not only in working in the island or on the river in the storms. Women need to have their voice in planning for disaster preparedness and coping with climate change.

(In-depth interview with Women's Union staff)

Talks with Bình Định Provincial Women Union show that the Women Union plays an important role in disaster preparedness. For example, the project funded by CARE on disaster preparedness has been able to mobilize the active participation of women. Women also participate in the volunteer teams so that they will have the right to voice in the planning process (construction works and non-construction works). All the activities have the opinions from women.

The vice head of Bình Định Provincial Women's Union has expressed their wish to participate in disaster preparedness activities and climate change as representatives of women and for mobilizing the participation and contribution by women.

3.7.3 Key contents

- Consolidation of City Committee for Flood and Storm Control, social and political organization and the Ward/Commune Authorities are active in disaster preparedness
- Assign duty for all relevant divisions of the city and the coordination system from city to section/village levels
- Identification of most vulnerable areas/groups to be rescued/evacuated in flood and storm season, especially isolated communes such as Nhon Ly, Nhon Hoi, Nhon Chau, Nhon Hai, and the ward in prone areas of the city as Tran Phu, Hai Cang, Dong Da, Nhon Binh
- Prepare necessary facilities, materials, logistics and human resource in the spot. According to annual disaster preparedness in 2007, the city allocated budget for food reservation 10 tones of rice for Nhon Chau commune.

3.7.4 Weakness

- There is one or two women members of CFSC, especially at lower level
- Members of CFSC take on extra work along with their daily duties and lack of knowledge on disaster mitigation or CC adaptation

4. GOVERNANCE AND PLANNING

4.1 Governance

Quy Nhon City is giving its priority on the strategy of urbanization-based economic development, which has been approved by Government Prime Minister; and it is

being implemented in the period of 2004 and 2020. From this point, city planning is currently focusing on strengthening economic growth, including development areas of key economic zones, such as the development of industrial zones, tourist services and the changes of career structures. A strong emphasize is given on resettlement area planning in the most affected areas by natural disaster such as sea tides or storm at Nhon Ly, Nhon Hai communes, or in low lying and lagoon areas where can not make better their economic ability, e.g. Nhon Binh, Nhon Hai and Dong Da wards. The master city planning and infrastructure system also take into account of the parameters/indicators of flood level, the impact of natural disasters. These indicators were provided and consulted by provincial Centre of Hydrology and Meteorology. In addition to those mentioned factors, city planning has also paid attention to environment protection issues which are integrated into social-economic development, including awareness raising for local communities on planting several types of forest such as scenery forest, protective forest, economic forest, mangrove forest with scale of investment estimated approximately 2 or 3 billion dongs for the purposes of minimizing water resources pollution, and protecting natural resources of aquaculture and air pollution.

Based on these priorities, the city has received constructive cooperation on technical consultancy from relevant provincial departments, as well as those from city level during implementation of city planning. All the activities are mobilized and consulted opinions from local people by grass root democracy and participatory approaches applied in master city planning and development. After each year of implementation, the province and city always organize an evaluation workshop to assess achievement and outputs gained, difficulties and problems faced in order to get lessons learnt and best solutions to revise and improve next plan for a better implementation of the following year plan.

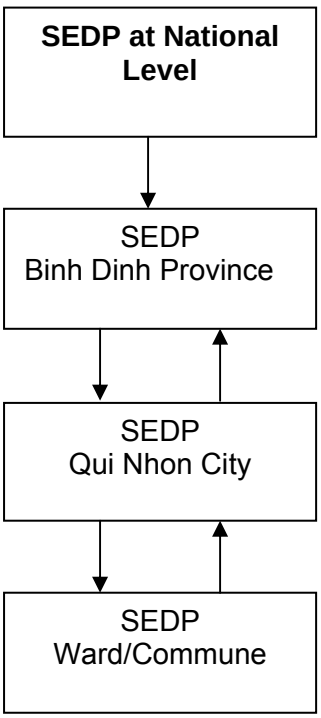
Geographically, Quy Nhon located close to coastal area; therefore, annual plan for natural disaster preparedness will be firstly prioritized. Throughout the province, Steering Committee of Flood and Storm Control (SCFSC) at all levels are placed, along with police, military forces, and local relief teams are ready for emergency relieves or emigrating local resident to safer places in urgent cases. Prior to rainy season, the city authorities give instructions to relevant agencies on preparing a plan for natural disaster preparedness and management. This plan is prepared in May along with an estimated cost for emergency relief activities, approx 200-300 mil dongs per year, which is taken from the budget of social-economic development. Wards and communes have to prepare their own plans for natural disaster preparedness and management, and budget for these activities will be based on the overall annual budget SEDP, a certain amount within the overall budget is allocated for natural disaster preparedness and management. Besides, SCFSC and their members are equipped with life jackets, safe lifebelts, rain coats, rain boots, torches, loud speakers and speed boats for emergency relief. At the same time, the principle of 4 in place (commander in place, force in place, facility in place and logistic in place) is still promoted to a high level. Mass organizations and local people themselves have to control and resilient against happened disasters in a timely manner. At the moment, the awareness of local people on natural disaster resilience is improved because they can have a better access to information.

In addition to existing advantages, there are still several constraints in social-economic development of the city, because agencies are instructed to implement their plan annually and those were based on gained experience in previous year, adding some new orientations on the plan of the following year. The main reasons are due to insufficient financial sources and poor management skills. One given point that planning and management capability of in-charge officials at grass root level is

very weak because of the limitation of their education level and unavailability of professional trainings. Consequently, the participatory planning process will not achieve good results and its feasibility. Local people mainly participated in the planning process with their roles of getting feedback. In conclusion, top-down planning process is still applied through the system from central to grass root level. For this reason, to improve planning and management skills, the Government needs to invest for developing young human resources those who are qualified for all sectors/fields. Especially, an emphasized should be paid on professional staff who are in charge of planning for natural disaster mitigation which is integrated into long-term strategy of climate change adaptation. Currently, the city has not considered seriously on integrating climate change adaptation into city SEDP, because the city has not received accurate research data from scientists; hereby, to link sustainable development factor closely with climate change adaptation, the city will need supports from Government and International Organization for investment on studies of potential hazards projection of storm, flood, drought and sea tides in the city.

4.2 Socio Economic Development Planning (SEDP)

4.2.1 Illustration



Steps of planning process:

- Based on City master plan and the strategy of urbanization-based economic development, which has been approved by Prime Minister; and it is being implemented between 2004 and 2020
- Based on sectors development plan in SEDP of the province has been approved by Central Gov, Provincial People's Committee and People Council to instruct City People's Committee for social economic development plan in five years. Ward/commune level is instructed to follow the same duration of SEDP from City level
- In coordination with relevant division of the city such as Divisions of Natural Resource & Environment, Finance, Infrastructure & Economic, Trading Commercial to review SEDP in five years and to develop action plan of SEDP in every year. Infrastructure and economic division of the city is a key unit to finalize action plan before getting approval of plan from City People's Committee and People Council
- Five year and annual SEDP at City are approved by City Communist Party and People Committee through the conclusion meeting with City People Council. After one year implementation of five year SEDP, City people's committee organize an evaluation meeting to review achievements, outputs gained and lesson learnt to revise/orient the plan for next year
- Representative of Community is informed SEDP through the meeting with members of People's Council of Ward/Commune

4.2.2 Key contents and implementation issues

- City planning is currently focusing on strengthening economic growth, including development areas of key economic zones, such as the development of industrial zones, tourist services or the changes of career structures.
- Based on these priorities, the city has received constructive cooperation on technical consultancy from relevant provincial departments, as well as those from city level during implementation of city planning. All the activities are mobilized and consulted opinions from local people. After each year of implementation, the province and city always organize an evaluation workshop to assess achievement and outputs gained, difficulties and problems faced in order to get lessons learnt and best solutions to revise and improve next plan for a better implementation of the following year plan.
- At the moment, Qui Nhon city concentrates to invest infrastructure system for the economic zone in Nhon Hoi area that is priority development program of the province and city
- Nhon Binh Ward is prioritized for job creation for resettlement areas, and promotion of traditional rice cake processing

4.2.3 Weakness

- Here are still several constraints in social-economic development of the city, because agencies are instructed to implement their plan annually and those were based on gained experience in previous year, adding some new orientations on the plan of the following year.
- The main reasons are due to insufficient financial resources and poor management skills. One given point that planning and management capability of in-charge officials at grass root level is very weak because of the limitation of their education level and unavailability of professional trainings.
- Local people mainly participated in the planning process with their role of getting feedback.

4.2.4 Observations

Qui Nhon city needs to invest for developing young human resources those who are qualified for all sectors/fields. Especially, an emphasis should be paid on professional staff who are in charge of planning for natural disaster mitigation, which is integrated into long-term strategy of climate change adaptation. Currently, the city has not considered integrating climate change adaptation into city SEDP, because the city has not received accurate research data from national scientists; hereby, to link sustainable development factor closely with climate change adaptation, the city will need supports from Government and international donors for investment on studies of potential hazards projection of storms, flood, drought and sea tides occur in the city.

Participatory planning skills, methods and process need to be provided.

Disaster management, climate change should be integrated into the socio-economic planning of the city from bottom up upward.

4.3 Urban planning

4.3.1 Overview

Qui Nhon city is belonging to Binh Dinh Province. Central Government of Viet Nam approved the master plan of the city for expanding till 2020 by year 2004. Qui Nhon is a coastal city located in the estuary area; thus resulting in large flood afflicted area. Under the city planning, a relevant assessment has been made to categorize the areas of unfavourable construction, included in which are the criteria for the evaluation of the deeply inundated areas, flood draining areas in order to avoid introducing the populations and economic construction works into the areas of unfavourable construction. The individual urban areas under construction have had a planned elevation that is ensured to be higher than the flood level at a frequency 10% and 5 %. As stipulated in the construction management, it is not allowed to perform the construction works that cause the water bodies to shrink their water storage and control capacity, namely the lakes of Bau Sen, Bau Lac, Phu Hoa and Dong Da. Along the water sources like rivers, lakes, lagoons, the construction works are controlled at the distance of more than 30 m from the edge of the water body. The buffer strip is planted with greenery and trees to protect against erosion and also these water bodies can control flooding storm water at the occurrence of the historic flood. For the socio-economic infrastructure facilities, structural calculation parameters have been established in accordance with the national standards. The province is conducting an experimental planning of land use with integration of climate change in Tuy Phuoc and Phu Cat districts. Nhon Binh Ward has a master plan for industrial development areas, but it doesn't have detailed plan yet. There just only have specific plans for commercial development in the north of Ha Thanh river, about 200 ha; the factory of waste water treatment and village 4,6 ha of which 2.8 ha has been planed in detail for 54 items of investment. Nhon Ly Commune has detailed plan for implementation. There is a general plan for 4 residential areas such as Khu Dong, Khu Tay, Khu Ly Hoa and Khu Ly Hung.

4.3.2 Key content and implementation issues

From this point, city planning is currently focusing on strengthening economic growth, including development areas of key economic zones, such as the development of industrial zones, tourist services or the changes of career structures. A strong emphasis is given on resettlement area planning in the most affected areas by natural disaster such as sea tides at Nhon Ly, Nhon Hai communes, or in low land and lagoon areas where can not promote their economic ability, e.g. Nhon Binh, Nhon Hai and Dong Da wards. The master city planning and infrastructure system also take into account of the parameters/indicators of flood level, the impact of natural disasters. These indicators were provided and consulted by provincial Centre of Hydrology, Meteorology and Environment. In addition to those mentioned factors, city planning has also paid attention to environment protection issues which are integrated into social-economic development, including awareness raising for local communities on planting several types of forest such as scenery forest, protective forest, economic forest, mangrove forest with scale of investment estimated approximately 2 or 3 billion dongs for the purposes of minimizing water resources pollution, and protecting natural resources of aquaculture and air pollution. However the scale and quality of the implementations measures are inadequate. There is still lack of participatory nature of the urban planning issues and there are a lot of challenges during the urbanization process especially with landuse changes, without inadequate support to the local people.

4.3.3 Community participation in planning

Community participation in SEDP or Urban Planning is limited because local authority has to follow the instruction system from city or higher level to carry out periodic investment plan in every year. Community is not well informed the policy of Gov issues for resettlement program like as land compensation, job creation. In Nhon Binh Ward, the most concern of local authority and community is how to support the resettlement household for job creation, especially the farmers who have long experiences on farming when their cultivated land, which now become industrial zone.

4.3.4 Household registration book

Some women and men participating in this survey said that they face certain difficulties in registering for a household book. This is mostly the case with households originally lived here. People said that there are no cases of other people moving here to live. The main reason is that Nhơn Bình is a new residential area. It is not yet as "attractive" as other locations.

There are cases in which people moved to other places for various reasons and then returned. These people could not get a household book during the first period of time when they just returned. It was not after a period of time that they could get it on the condition that they possess a house. This is a difficult condition for poor people without a house. In Vietnam, household register book is for administrative management as all policy implementation is household-based. Each household has a household register book as a basis for administrative procedures. An example can be taken from power supply: household get lower price rate for the first 50kW and higher price after that. The story below by Mr. Hien gives an example of *the circle of difficulties faced by the poor* related to household register book, land, house and job.

What people can do with a household register book?

In 1986, I moved to the South West for a living (Soc Trang province) and got married there for 12 years. During that period of time, I was not in touch with my parents. My mother thought I had died and even set up an altar for me. I have 2 sons: one is 18 and the other is 15.

I decided to return to my hometown in 1988 and stayed back. However, I do not have land and therefore have to live on the land of a pagoda. I work as a construction worker and often fall sick (kidney problem). I sometimes go fishing. My wife have one damaged eye since she was little. Now we do not have a household register book. In order to get it I need to go back to my wife's hometown to stop my family registering there. However, I cannot afford it. The land of my parents on which my brothers and I are living is very small. With a household register book, my children can get ID cards to go away for a living or to work in a Government agency. I also need a house but again, I can't afford. The Government only give money for building houses to people with land.

(Mr Trần Văn Hiền, 45 years old, Section 9, Nhơn Bình Ward)

After her divorce in 1993, Ms An moved to live in Section 9. However, it is not until 2007 that she got the household register book. She said that without it, she had to get electricity through a relative's house and it was very difficult for her children to get any paperwork.

(Ms Nguyễn Thị Hữu An, 41 years old, Section 9, Nhơn Bình Ward)

4.3.5 Mainstreaming of Climate Change into urban plan, socio-economic plan and Strategy of Disaster Mitigation

The city master planning and infrastructure system takes account of the parameters/indicators of flood level, and the impact of natural disasters. These indicators were provided and consulted by Provincial Centre of Hydrology, Meteorology and Environment. In addition, city planning has also paid attention to environment protection issues which are integrated into socio-economic development including awareness raising for local communities on planting several types of forest such scenery forest, protective forest, economic forest, mangrove forest with scale of investment estimated approx 2 - 3 billion dongs. These purposes is minimizing water resource pollution, and protecting natural resources of aquaculture and air pollution. However, climate change adaptation is quietly new approach for city and ward/commune to integrate it into SEDP or Urban planning because of lacking knowledge/methodologies and scientific information on climate change.

5. GENDER ANALYSIS

5.1 Tangible and intangible effects of climate change on women

When disasters happen, women are always more worried. In storms, houses along the river have waves bang against the walls or even jump over the roofs. Men are calmer but as women, we are too afraid to sleep. The houses are isolated as the high water floods all the roads. Women are worried for their children and for the houses. We only leave when big storms happen. However, storms usually happen at night so we do not. Storms happen every year. Life becomes insecure in storm reason. We have to evacuate when storms and high tides happen.

(Female group discussion, Nhơn Lý commune)- Photo added

When disaster happens, we lose our crops and become even poorer. Women are worried for their children and have higher sense of responsibility. A mother will very sorry if their children's clothes get worn but a father maybe does not care. Women will feel guilty if their children cannot get proper education but they do not know what to do. There is a saying that "after a father dies, his children still have fish in their meals. But if a mother dies, her children have to sleep on leaves." In a family where the wife dies, children will get less care.

(Female group discussion, Nhơn Bình commune) Photo added

According to Bình Định Women's Union staff, when disaster happens, women, children and elderly are the most vulnerable groups. They get very little update information. Poor women do not have time for watching TV as they have to take care of their children and housework. Men will get more information from the community. Women suffer more from loss and invisible impacts. Their roles in disaster preparedness has not been duly considered.

5.2 It is more difficult for women to find jobs and their incomes are lower

Why is it more difficult for women to find jobs?

Before I used to be a worker at Phú Tài Industrial Zone, more than ten kilometers from here. We have transport to work so I can go home everyday. Since last year, the company stop the pick up service and all the workers have to go to work by themselves. I have to stop working because I can't go to work on my bicycle as it is too far. My husband used to repair boats but as he had fewer and fewer customers, he had to move to Sai Gon to work. I can't go away as my mother-in-law is very sick. I'm her main caretaker. I want to have some job close to home so that I can take care of my children.

(Ms *Kiều, Lý Hưng village, Nhơn Lý commune)*

Both women and men said that it is more difficult for women to find jobs than men do, especially for women more than 30 years old and already married. Young women can go to work in Quy Nhơn city or Sài Gòn. Men can go fishing or general labouring such as construction workers. Many men said if they could not live on fishing in the near future, they will work as hired labourers on off-shore ships (Nha Trang Vũng Tàu).

5.3 Urbanization may create new jobs but on the other hand, take away jobs from women

Discussions with the poor women groups in Nhơn Lý commune reveal that some women used to work as porters for whafs before Thị Nại Bridge was built. At that time, boats were the only means of transport so people needed porters. Most of these are porters. Since the bridge was built, cars and motorbikes can travel easily and there is no need for porters. Nhơn Bình Industrial Zone is in the planning process so there are not yet many new jobs for women as in fully developed areas. It is easier for men to find jobs as they can work as construction and timber workers. Young people go the town centres or even further to find jobs.

Women lose jobs

I used to work as a porter for goods ships for years as boats are the only means of transport from Quy Nhơn city to Nhơn Lý. Boats used to carry sand, stones, bricks as there was no other means of transport. Therefore I could work a lot. Since the bridge was completed, boats are not used any more. We do not have any jobs to do.

(*Ms Nguyễn Thị Diễm, Lý Hoà village, Nhơn Lý)*

Before I used to sell rice papers at Nhơn Lý market but I stopped as very few people would buy it. After the bridge was completed, traffic has been much easier. Therefore, many people from surrounding communes come to sell in Nhơn Lý market. At the commune, there is no land for planting vegetables and fruits. People from the countryside bring these products for sale here together with rice papers. Nowadays, I am a hired labourer but there is very few jobs.

(*Ms Nguyễn Thị Hay, 40 years old, Lý Hưng village)*

Poor women and women-single headed households said that not only is it difficult for women to find jobs, their incomes are also lower than men. For example, as a construction worker, a man could earn 60,000 VND/day while a woman earns only 40,000 VND/day; when do rice thrashing, a woman earns 40,000 VND/day; when doing fishing, a man makes 50,000-70,000/VND. Women who make fishing nets (Section 9, Nhơn Bình Ward) on average make 10,000VND/day from early morning till late in the afternoon. Before, there is no industrialized nets, hand-made nets bring more money for women.

Difficulties faced by women-headed households

Ms Nguyễn Thị Thơm is 38 years old. She got married in 1995. In 1999, her husband died of stomache, leaving her with two small children. After her husband's death, her parents-in-law do not her to stay in their house any more so she went back to her parents. Her two sons stay with their paternal grandparents. In 2004, she met a married man with whom she had a twin. They are 5 years old now. This man later on also died of heart attack. Now she lives with the twin. She does not have a house and therefore has to live with her sister (she does not have land). Her parents' land is small and they are now living with Ms Thom's siblings. Once they are married, women are not entitled to their parents' land.

As the sister is woman-headed household (no children, no husband) she received assistance from the ward to build a house but there is no toilet in the house. The land for aquaculture is behind her house. Everyone has the habit of toileting in the river. She lives in the back of the house under the bamboo roof in an area of around 10m^2, with a bed where she and her three children sleep at night. The two children did not go to the kindergarten as she said she could not afford it. Before, she used to be a worker in the timber factory with a salary of 900,000/month. But later she quit the job as she was on sick leave and they did not take her back after that. She has been without a job for two months. Now she stays at home, removing the shells from cashews to earn 300-400,000 VND.

Beside, she does whatever job offered, for example: preparing the land for people to raise shrimps earning 50,000VND/day but she only gets the job once in a while. She is sick but she does not know why?

5.4 Gender prejudice

Gender prejudice firstly shows in son preference. Most interviewees, especially men said that only sons are able to carry on the family's tradition and to continue with fishing. Some said that sons are for them to rely on at old age as daughters will go away when getting married.

I want the third child to be a son as the first two are daughter. Fortunately, the third is a son. Before the 3rd child, I was often teased by my friends for not having a son, which was very annoying.

(*Ms Trần Quang Ảnh, Section 9, Nhơn Bình Ward)*

Ms An lives at Section 4, after her divorce, she lives with her daughter but still she wanted to have a son so she got him with a married man. She hopes that the son will be for her to rely on later.

It is this kind of mentality that leads to families having many children. Although currently the rate of having the 3rd child has decreased significantly, there are many young families who will not stop until they have a son. Son preference indirectly reflects the fact that men has dominant power in the coastal areas as they are considered the breadwinners.

Interviewees said that men bring home the main incomes and women are housewives. According to the Women's Union, in the Central region, men rarely share the housework. As a result, the burden is on women. Women's incomes are hardly recognized (as they grow rice and vegetables for meals while men bring home money from outside. Women's contribution is not as obvious). The research team met housewives who sell fish when their husband bring fish home. However, when disasters happen and the husbands fall due to accidents (dies or cannot continue with fishing), women become "passive). What should they do for a living? Therefore, it is necessary to eradicate prejudice. Both women and men need to understand that it is important to have flexibility in economic activities and sharing in gender roles for effectiveness in economic activities and equality in family relationships.

5.5 Violence, conflicts arising in families

> Rarely are there serious cases that need interventions from the authorities. Usually, the couples have some quarrels and then make up with each other. There are cases in which the husbands lost their temper and slap their wife's face or start quarrels. Fishermen do not have fixed working time. They often have drinks with their friends when they do not go to the sea. When they get drunk, they may fall out with each other. When the family is in difficulty, on seeing the husband getting drunk, the wife tends to be very worried and speaks out her concerns. They exchange words, which often leads to fighting. When fishing does not bring much money, the family gets into trouble and then domestic violence happens. In 2008, one husband beat his wife to bruises on the face. The guy does not have any job but is very jealous.
>
> *(Discussion with the poor group in Nhơn Bình Ward)*
>
> According to the Head of Nhơn Bình Women's Union, in 2009, the authorities received an accusation from a wife about her husband's beating. However, when the authorities came to their houses, the wife refused to meet them and said that they had made up with each other. The research team also came to see a wife who was said to have been beaten by her husband but she refused to be interviewed.

These above stories show that, in generally people do not have a full understanding of domestic violence. Their perceptions are that only serious cases that are brought to court or police are called domestic violence. Violence is still considered a private matter in each family. Even the suffering wives do not want to share their situation. Gender-based violence has the root cause from gender inequality. However, poverty is considered a catalyst for violence to get worse.

> Ms Mai Thị Hương in Lý Hưng village has 3 daughters. When she got married, her sister became a nun. Therefore, her oldest sister's family lives with her mother. She remembers that 20 years ago, there was a very big wave that collapsed her mother's house as it was very close to the sea. After that her house

was moved to a higher place. The government helped with building a new house. The sister's family kicked their mother out of the house after sharing the house for some time. Ms Huong said she will complain with the Land Administration and they promised to solve the case but so far nothing has been done. The house does not have a red certificate nor anyone has proof for possession. She brings her mother to live with her family and they have decided not to continue with the complaint.

Ms Hương told this story in tears as she felt pity for her 80 years old mother who has to suffer from mental pain as her own child "refuses" to be with hers.

6. HAZARDS

6.1 Quy Nhon City

6.1.1 Current hazards assessment based on historical profiles

Hazard assessment was done through focus group discussions at the city, ward/commune and section/village levels. The identification of potential hazards comes from the historical profiles of what disasters frequently happened within the last recent 15-20 years and are ranked according to their frequency and severity. Different areas ranked them differently depending on how severe impacts they caused on the particular area and the climate change scenario given by ISET. The city raked flood as the first priority because of its impacts on the city wide, meanwhile Nhon Binh and nhon Ly ranked typhoon as the first priority as they concentrate on their ward and commune only. Drought was ranked as the third priority by Nhon Binh as it impacts badly on the main economic activities that high percentage of population engage in agriculture and aquaculture production. Nhon Ly Commune has seen sea expansion as the third ranked potential hazard because the commune is very prone to sea level rise. Though Environmental pollution is ranked as the fifth, it is not less important because Environmental pollution is the secondary hazard of different main ones such as flood, typhoon, sea tide and drought. Environmental pollution in some areas can be happened all the year round, but the worst time is during flood and typhoon and drought seasons.

In summary, local perception of ranking the potential hazards is very much linked to (i) their particular vulnerable location either in low lying areas or in coastal line; (ii) the main and secondary disasters happened so far and the impacts that local people have coped with; (iii) the future projection of climate change impacts by given information of climate change scenarios.

The prioritized potential hazards can be summarized in Table 2 and the list of main and secondary hazards is presented in Table 3. Season and calendar of the main and secondary hazards can be seen in Table 4. Then Table 5 shows the historical profiles of disasters in Quy Nhon, from 1978 to 2008

Table 3: Types of ranked potential hazards

Disasters	Quy Nhon City	Nhon Binh Ward			Nhon Ly Commune		
		Ward	Section 4	Section 9	Com-mune	Ly Hoa	Ly Hung

Disasters	Quy Nhon City	Nhon Binh Ward			Nhon Ly Commune		
		Ward	Section 4	Section 9	Com-mune	Ly Hoa	Ly Hung
Flood	1	2	2	2			
Typhoon	2	1	1	1	2	2	1
Drought	3	3	3	3			
Saline intrusion	4	4	4	4			
Tidal Surge	5				1	1	2
Inundation	6				4	4	4
Sea expansion	7				3	3	3
Environmental pollution	8	5	5	5	5	5	5

Key: *1 = the most serious level (frequently occur with serious damages)*
2 = second serious level
3= third serious level

Table 4: Types of The identified Main and Secondary hazards

No.	Main hazard	Secondary hazards
1	Typhoon	- Heavy rain and strong wind cause high sea tide and flooding. - Landslide, land erosion, sediment, loss of cultivation land etc. - Pollution and epidemic disease.
2	Flood	- Inundation as floods always accompany with tidal surge and sea rise causing landslide, land erosion, sediment, loss of cultivated land etc. - Water pollution. - Epidemic disease.
3	Drought	- Land dissertation. - Lack of water for human life consumption and for production. - Pollution and epidemic disease in the areas having no family latrine.
4	Sea tide	- Saline intrusion on water ground that causes a very serious shortage of fresh water for human life consumption and production. - Houses, land, property, infrastructure close to the seashore are submerged, collapsed or washed away. - A lack of fresh water for living and production.

Table 5: Month of the identified Potential Hazards of Quy Nhon City

Types of Main & Secondary hazards	1	2	3	4	5	6	7	8	9	10	11	12
Flood												
Typhoon												
Drought												
Saline intrusion												
Sea tide												
inundation												
Sea expansion												

Environmental pollution												

Table 6. Historical profiles, using participatory tool, of disasters in Quy Nhon from 1978 to 2009

Year	Type of disaster	Affected areas	Main losses and reasons for loss
1978	Typhoon N^0 5	The whole city, especially 4 coastal and semi-island communes	- Loss of lives: 12 people died - Fishing ships damaged - Residential houses collapsed - A local market damaged - Summer-Autumn rice crop destroyed
1984	Typhoon N^0 9	The whole city	- Damages of houses (collapsed, roofed off - Losses of rice seedling - Damages of roads & irrigation system, etc
1996	Drought (Lasted from May to July).	Nhon Binh Nhon Phu Bui Thi Xuan	- Shortage of water for living and production and animal husbandry. - 100% of crop lost - Diseases spreading: skin, red eye, etc - Decreases of productivities of aquaculture production.
1997 (Oct)	Typhoon N^0 5 (wind level 10)	Indirectly affected (typhoon did not hit directly Quy Nhon)	- 10 men died on the way to go fishing off shore - Fishing ships were sunk and damaged
2001	Typhoon N^0 8 (wind level 12)	The whole city, especially 4 coastal and semi-island communes	- House collapsed - Two people died - Crop lost - Infrastructure damaged.
2003	Storm	4 coastal and semi-island communes And Ghenh Rang, Nguyen Van Cu ward.	- Fishing ships sunk while fishing in Quang Ngai province - Aquaculture production and facilities were damaged.
	Saline intrusion	Nhon Binh, Thi Nai lagoon and Nhon Ly, Dong Da ward.	- Marine resources destroyed and decreased - Rice and subsidiary crops were damaged - Shortage of fresh water
2004 (May)	Unusual typhoon (wind level 9)	The whole city	- Big flood: one fish man died - Rice & subsidiary crops lost - Aquaculture production facilities were damaged (traps, nets, ponds, etc) - Housing (damages, collapse, roofed off and wash away) - Infrastructure damaged.

Year	Type of disaster	Affected areas	Main losses and reasons for loss
2006	Indirectly affected by Chanchu typhoon companied with high sea tide	Nhơn Bình Nhơn Hội	- 76 ha of aquaculture were flooded - Big quantity of shrimp fry was washed away
2007 (Nov)	Flood (lasted for 20 days with very high water level and strong water pressure that has never seen before)	Nhơn Bình Nhơn Phú Phước Mỹ Nhơn hội	- Damages of dykes in Vân Hà, Nhơn Phú and river dykes, irrigation system, roads, etc - Housing - Aquaculture production ponds - Interruption of transportation - Two people died in Nhon Phu one child and one elderly) because of strong water flow companied with high sea tide
2008 (Nov)	Flood	Nhơn Bình Nhơn Phú Nhơn Lý	- 4 houses collapsed in Nhơn bình. (all temporary houses of the poor) - Irrigation system of Nhơn Phú was damaged - Winter-Spring rice crop was destroyed
2009 (Mar)	Tropical low pressure with strong wind and sea tide	Fish men fishing near shore in Nhon Ly	- 2 fish men died on the sea while fishing because of their subjective ness and did not follow the warning. - 1 fishing ship of 45 CV sunk
	Sea expansion Land erosion	Nhon Hai, Hai Cang, Tran Phu	- Some households had to relocated - Coastal communities are now very prone to land erosion.

6.1.2 Explanation of the identified potential hazards

Typhoon: Results of the focus group discussions shows that since 1978, typhoon is identified as the major disaster that has been frequently happened. Typhoon season is from October to November. Its impacts spread over a large scale of the whole city. However, the four coastal and semi-island communes have been directly hit by several typhoons and seriously affected. From 1978 to 1997 most of the typhoons happened with wind level below 10 (39-102km/h), but since 2001, wind level has tendency to be higher ranging from level 12 (118-133km/h) as typhoon number 8 in 2001 and even level 13 (>133km/h)[1] such as the fiercest one named Chanchu Typhoon in 2006. Normally, typhoon season starts from second week of October and lasts to December, but in some years typhoons came earlier in May as the ones happened in May, 1978 and in June, 2004 (see annex of historical profile on disaster happened within 20 years). However in 2007 there was no typhoon happened. In Quy Nhon, typhoons always company with a heavy rain causing flooding in low-lying areas and sea surge, sea expansion and coastal land erosion along the coastline. Main losses caused by typhoon are losses of lives to the fish men fishing on the sea and the ones who are on the way moving their fishing boats to the safer angle areas in Quy Nhon City. Main impacts caused by typhoons are the damages of residential

[1] Presentation of Mr Tran Sy Dung from Binh Dinh Centre for Forecasting Meteorology & Hydrology

temporary houses along the coastal line and in the low-lying areas, public buildings, infrastructure and property (fishing ships, boats, facilities, etc), and production including agriculture and aquaculture.

Flood: Flood season in Quy Nhon is from October to November, which is at the same period of time with typhoon season. Flood is resulted by heavy rains from tropical low pressure and typhoons. When there is a hard rain lasting for 2-3 days running, flood will be happened. Big floods have water level comes up to 0,5m to 1m higher than the surface of existing river dam and dyke. Normally, rainy season stops before 23 October according to the Luna year (i.e. November of the Solar calendar), but in the recent years after 23 November there are still heavy rains. It is very unusual that in 2008 flood season started very late because of the late heavy rains. Number of floods happened in a year is increasing in the recent years. In 2007 alone, there were 4 floods happened within one month in November. Normal floods last for 5-7 days, but big floods last from 7 days to 20 days. Due to no drainage system and narrow river flow, when the floods come, some sections of Nhon Binh Ward are isolated like islands because of their low-lying ground. Flood water pressure is also very high causing inundation in those sections as well as other urban wards such as Nhon Phu, Ghenh Rang and Dong Da. Long lasting inundation causes serious problems of living Environmental pollution and sanitation at the relocation because of insufficient drainage system and more landslides, land erosion in the new relocation areas of Nhon Hai, Quang Trung where houses constructed so close to high slope hills. Food shortage to fishing households as they can only make earning 6 months a year and no earning during disaster season.

Drought: It is ranked as the third type of disasters frequently happened in Quy Nhon. According to the local people in the last 10 years early warning signal of drought was three months of having hot sunny days without rain, but now only two months of hot and sunny days cause drought because temperature is higher than before. Main impacts of drought are on people's health, shortage of water for living and for production. During drought season the underground water at coastal areas, sea-mouths and along the rivers are affected by saline intrusion.

Saline intrusion: Saline intrusion in the recent years has become more severe as more long lasting hot and sunny days from April to August during the drought season. Saline intrusion is caused by sea tide bringing salinity to the river mouths. Its impacts are mainly on ground water resource causing a problem of fresh water shortage for living and for production.

6.1.3 Table 7: Main disaster impacts by ward/commune and sections

Disaster	Quy Nhon City	Nhon Binh Ward			Nhon Ly Commune		
		Ward	Sect. 4	Sect. 9	Com-mune	Ly Hoa	Ly Hung
Loss of life	X	X	X	0	X	X	X
House	X	X	X	X	X	X	X
Dyke	X	X	X	0	X	X	X
Agr. Production	X	X	0	X	0	0	0
Salt production	X	X	X	0	0	0	0
Aquaculture	X	X	X	0	0	0	0
Catching activities	X	X	X	X	X	X	X
Fishing boat	X	X	X	X	X	X	X

Fishing equipments	X	X	X	0	X	X	X

Key: X =losses 0 = no loss

6.1.4 The potential hazards and the most vulnerable areas of Quy Nhon City

Among the four rural communes, Nhon Ly is identified as the most vulnerable commune because of its (i) catchment's location, which has been seriously affected by natural disasters and climate change; (ii) mono economic activity relies on marine resource (fishing and sea food processing), which is very sensitive to climate change; (iii) high percent of poor households and vulnerable groups. Nhon Binh is an urban ward, which is very sensitive to climate change because of its problems related to (i) low lying areas prone to natural disasters and climate change; (ii) sensitivity to climate change in terms of urban development, job creation for alternative livelihood options; (iii) high percent of poor households and vulnerable groups.

Table 8: The Vulnerable Wards and Communes of Quy Nhon City

Ward/ Commune	Typhoon	Flood	Drought	Sea level rise	Saline intrusion	Inundation	Landslide	Sea erosion	Ranking the most prone areas to Climate change
Semi-Island and coastal communes									
Nhon Ly	X			X		X		X	1
Nhon Hoi	X			X					
Nhon Hai	X			X		X			2
Nhon Chau	X			X					
Urban wards									
Dong Da	X	X	X		X	X	X		1
Nhon Binh	X	X	X		X	X	X		1
Nhon Phu	X	X	X		X	X			2
Quang Trung		X	X						3
Ghenh Rang	X	X				X	X		2

6. 2 Nhon Binh Ward

6.2.1 Identified potential Hazards and the most vulnerable areas of Nhon Binh Ward

Nhon Binh is one of the five urban wards of Quy Nhon City, which is situated at the North gate of the city with its total natural area of 1,468 ha with 74,65 ha for residential land and 85% of agriculture production land. It borders Phuoc Thuan commune of Tuy Phuoc district to the East and Nhon Phu ward to the West. To its North is Dong Da ward and Nhon Hoi. Nhon Binh has a population of 17, 864 people, in which there are 8,820 men and 9,044 women comprising 4,303 household. Number of poor households of Nhon Binh is 198, which account for 4,74%. Population growth is 11, 3%. Nhon Binh has 9 sections

Being located in low-lying areas at the low-land of Ha Thanh River, close to Thi Nai Lake, it has been concentrated by flooding even when there is no rain. It is therefore

people often say that “Nhon Binh is a place where flood can happen without rain and drought occurs without sunny days”. As the results of focus group discussion, main potential hazards in Nhon Binh are ranked as follows:

Table 9: identified main hazards and secondary hazards in Nhon Binh

Ranking	Types of main hazards	Types of secondary hazards
1	Typhoon	- Saline intrusion - Environmental pollution - Epidemic disease
2	Flood	- Inundation, land erosion - Environmental pollution - Epidemic disease
3	Drought	- Saline intrusion - Environmental pollution - Epidemic disease

Table 10: identified Potential Hazards Calendar of Nhon Binh Ward

Types of Main & Secondary hazards	1	2	3	4	5	6	7	8	9	10	11	12
Typhoon												
Flood												
Drought												
Saline intrusion												
inundation												
Environmental pollution												

Table 11: Historical profile of Nhon Binh Ward

Year	Disasters	Affected areas	Damage and loss
1982 (Mar to July)	Drought	The whole ward	- Summer-Autumn rice crop was destroyed because of a shortage of water - Animal husbandry was stunted - Shortage of drinking water because of saline intrusion
1984	Typhoon N^0 9 (wind level 10 to 12) Landslide	The whole ward	- 1 person dead because of house collapse - 110 houses were collapsed, 60% houses were roofed off - 4 boats were wrecked, - Damages of agriculture and aquaculture because of flood and landslide
1996	Drought	The whole ward	- Summer-Autumn rice crop was destroyed because of a shortage of water - Animal husbandry was stunted - Shortage of drinking water because of saline intrusion
1999 (Nov)	Flood and strong wind Landslide	Section 9	- 15 houses were collapsed; winter spring rice crop was damaged by landslide and flood

Year	Disasters	Affected areas	Damage and loss
			- Irrigation channels and roads were degraded and eroded;
2001	Storm number 8 Landslide	The whole ward (particularly low lying sections 4, 5 and 7)	- 15 houses were collapsed, 2 classrooms were damaged; roof of 60% houses blown off; - Electricity line and pillars were collapsed; - A river dam in Van Ha was damaged to flood 20 ha of cultivated land, damages of agriculture and aquaculture by food and landslides - Irrigation channels and roads were degraded and eroded by landslides
2004 (June)	Flood and strong wind – gust - landslide	Section 9	- Roof of 30% houses was blown off; - Summer-Autumn rice crop and aquaculture were damaged by flood and landslides - Salt crop was destroyed - Electricity line, road, irrigation channels were degraded
2005	Flood (water level was 0.3 meter height above the surface of the river dam)	Section 9	- Damages of aquaculture and agriculture; - Interruption of transportation in a week, children could not go to school. - Crop damages
2007	Flood (from 17 October to 5 November with water level was 0.5 meter above the river dam companied with high water pressure)	Section 9	- Landslides of 198 meter length of the East dam - 500 m of roads were damaged and 186 m of fences were destroyed - 5 houses were collapsed; - Damage and loss of agriculture and aquaculture production (263 ha of aquatic water surface cost a loss of about 30 tons of rice seed, 10 ha of vegetable, 50 ton of salt, hundreds of animal husbandry were destroyed)
2008 (Nov)	Flood (Water level was 1 meter above the river dam with high water pressure and flow speed.	Section 9	- 5 houses were collapsed; - Summer Autumn rice seeds were ruined; - landslides and land erosion damaged 400 meter of fish ponds dam and about 1,200 meter length of irrigation channels and 20 ha of rice fields, 100 meter length of path of ground; - 500 of chicken were washed away; - Interruption of transportation, business, and schooling, etc; - 96 wells were polluted.

6.2.2 Explanation of the identified potential hazards

Typhoon: Every year from Septembers to December there are tropical low pressures with normal wind level 8 (30-61km/h), but when some of them become

stronger with the wind level above 9 they become typhoon. Typhoon always companies with heavy rain that cause flooding. Since, typhoon is formed from the ocean bringing strong wind that causes high sea tide and land erosion. The anticipated time is normally 2 or three days, but in the recent years, anticipates time was shorter, the typhoon happened faster (lasts 3 or 5 hours) and wind level was higher (level 12 or 13). Typhoon always hits land in the evening.

Flood: Flood results from typhoon after two days of raining hard. A flood often lasts long at least for 10 or 20 days. Flood water raise very fast causing inundation in low-lying areas due to narrow river flow to the sea mouth caused by land erosion and land fill-up very year. During flooding the low-lying sections like section 4 and section 9 become isolated and inundated. It is noticeable that flooding and inundation cause a very serious problem of Environmental pollution. In addition to that, when the flood comes to end water runs out due to the earthen-made irrigation system and no reservoirs for rain water storage in rainy season that results a serious shortage of water for production.

Drought: From April to August is a dry season. Before 1982 drought started from March to July and the worst time was June and July. But temperature was less hot than now. In the recent years the temperature in the hot days seems to be hotter than before because salt production are more productive due to more hot days. Although, local people cannot tell exactly the increased temperature of the hot days, they can experiences from the changes of water quality of aquaculture cultivation ponds, the normal shrimp and fish diseases due to long lasting hot days with high temperature. During the drought season, the ground water resource is affected by saline intrusion making it difficult to get enough fresh water for living and production of different types (agriculture, aquaculture and even industry).

Saline intrusion: In the recent five years, sea tide was higher than previous years, which bring more salty water to land through dry rivers. Moreover, the droughts happened more frequently in the recent years increasing higher salinity degree, therefore saline intrusion become more severe making serious impacts on water for living and for production. Saline intrusion is not easy to be forecasted as it is the slow on set hazard resulting from different other hazards such as drought, sea tide. Due to poor hygiene and sanitation when the drought season lasts for 4 to 5 months, living environment of the whole Nhon Binh Ward is polluted, particularly sections 4 and 9.

Environmental pollution: Environmental pollution in Nhon Binh is caused by (i) Chemical pesticide from agriculture, aquaculture production spread out in flooding season; (ii) no sewage system in all sections, especially sewage comes from Dinh market in section 4 and from the residential areas; (iii) no rubbish collection pools at communities particularly at low lying areas. In addition to this poor sanitation with only 30% of families having a latrine, and sewage from animal husbandry is not well managed, and damages local environment.

Table 12, using participatory tool: months of identified potential hazards in Nhon Binh Ward

Economic activities and hazards	1	2	3	4	5	6	7	8	9	10	11	12
Typhoon												
Flood												
Drought												
Saline intrusion												

Environmental pollution												

6.2.3 Potential hazards and the most vulnerable sections in Nhon Binh Ward

In Nhon Binh Ward, section 4 and section 9 are selected as the most vulnerable sections to climate change based on the following criteria:

(i) Having high numbers of poor households and vulnerable groups (children, elderly, people in disable, and women-headed households, etc)
(ii) Having vulnerable location prone to climate change (low lying ground, close to the sea or lagoon, lake, etc);
(iii) Being the most affected by recent disasters of different types;
(iv) Being sensitivity to climate change because of depending on the natural resources
(v) Having more vulnerable elements in terms of poor infrastructure, housing, Environmental pollution, water resources, etc;
(vi) Having problems related to urban planning (resettlement, job creation, poor alternative livelihood options, etc)

Table 13, using participatory tool: Historical Profile of Disasters in Section 9 of Nhon Binh Ward, 1982 to 2009

Year	Disasters	Most affected areas	Damage and loss
1982 (March to July	Drought	The whole section	- Summer-Autumn rice crop was destroyed because of a shortage of water; - Animal husbandry was stunted; - Shortage of drinking water and saline intrusion
1984	The storm number 9 with speed of 10 level – gust of 12 level Landslide	The whole section	- Many houses were collapsed, roofs of houses blown off; - Damages of agriculture and aquaculture because of flood and landslide - Roads and irrigation channels were degraded;
November 1999	Flood and strong wind Landslide	Unit 11	- 11 houses were collapsed; Winter Spring rice crop was damaged by landslide and flood; irrigation channels and roads were degraded and eroded.
2001	Storm number 5 Flood Landslide	The whole section	- Roof of some houses blown off; - Damages of agriculture and aquaculture by food and landslides - Irrigation channels and roads were degraded
June 2004	Flood and strong wind – gust - landslide	Unit 11	- Roof of 30% houses blown off; - Summer-Autumn rice crop and aquaculture were damaged by flood and landslides - Road, irrigation channels were degraded.
2005	Drought	Unit 11	- Shortage of water for rice plantation, vegetable and animal husbandry

2005 (Nov)	Flood	Unit 11	- Landslides of irrigation channel and paths of ground; - 3 houses collapsed
2007	Flood from 17 October to 5 November A level of water surface is 0.5 m	Unit 11 Especially 73, 74 and 75.	- Landslides of irrigation channel and paths of ground; - 2 houses were collapsed; - Damage and loss of agriculture production: rice and animal husbandry
2008 (Nov)	Flood	Unit 11	- Summer Autumn rice seeds were ruined, - Rice fields and irrigation channels - roads were filled up with earth because of landslides and land erosion.

Table 14, using participatory tool: Historical Profile of Disasters in Section 4 of Nhon Binh Ward, 1982 to 2009

Year	Hazard	Location	Key Damage
1982 (Mar-July)	Drought	The whole section	- Summer-Autumn rice crop was destroyed because of a shortage of water - Animal husbandry was stunted
1984	The storm number 9 with speed of 10 level – gust of 12 level Landslide	The whole section	- Many houses were collapsed, roof of houses blown off; - Damages of agriculture and aquaculture because of flood and landslide - Roads and irrigation channels were degraded;
November 1999	Flood and strong wind Landslide	The whole section	- damages of agriculture and aquaculture by food and landslides - Irrigation channels and roads were degraded
2001	Storm number 5 Flood Landslide	The whole section	- roof of some houses blown off; 4 houses were collapsed; aquaculture was damaged; roads were degraded and landslide;
2004 (June)	Flood and strong wind – gust - landslide	The whole section	- Roof of 30% houses blown off; - Summer-Autumn rice crop and aquaculture were damaged by flood and landslides - Road, irrigation channels were degraded
2005 (Nov)	Flood	The whole section	- Landslides of dam, irrigation channel and paths of ground; - 4 houses were collapsed; aquaculture were damaged by flood and landslides
2007	Flood from 17 October to 5 November (water level was 0.5 m)	The whole section	- A river dam was damaged in 6 plots; - Landslides of irrigation channel and paths of ground; - 1 house was collapsed; - Damage and loss of agriculture production : rice and animal husbandry
2008	Flood	The whole	- landslides and land erosion in the rice

Year	Hazard	Location	Key Damage
(Nov & Dec)		section	field and fish pond; - agriculture and aquaculture production was damaged; - landsides and erosion in irrigation channels of ground and paths of ground

6.2.4 **Table 15: summary of main disaster impacts of Nhon Binh Ward, by Section**

Type of loss	Nhon Binh Ward		
	Ward	Section 4	Section 9
Loss of life	1 people died	None	None
House	- 110 collapsed, 60% roofed-off by typhoon 1984 - 15 houses were collapsed in section 9 by flood and strong wind in 1999 in section 9 - 15 houses were collapsed, 2 classroom were damaged, roof of 60% houses blown off by storm in 2001. - 30% houses were roofed off in section 9 by typhoon in 2004. - 5 houses were collapsed by flood 2007 - 5 houses were collapsed by flood 2008.	- Many houses were collapsed, roof of the houses blown off due to storm 1984 - 4 houses were collapsed and roof of the houses blown off by storm 2001 - Roof of 30% houses blown off by strong wind 2004. - 4 houses were collapsed by flood 2005. - 1 house was collapsed by flood 2007.	- Many houses were collapsed, roofs of the houses blown off - 16 houses were collapsed in unit 11, roof of 30% houses in unit 11
Dyke	- Irrigation channels were degraded in section 9 by flood 1999. - A river dam in Van Ha was damaged by storm and landslide 2001, - Irrigation channels were degraded in section 9 due to flood in 2004. - Landslide of 198m length of the East dam in section 9 by flood 2007.	- Irrigation channels were degraded by flood and landslide in 1999, 2004. - Landslide of dam and irrigation channels by flood 2005. - A river dam was damaged in 6 plots by flood 2007 - landslide and erosion of irrigation channels by flood 2008	- Irrigation channels were degraded due to storm 2005, flood 1999 and 2004. - Landslides of irrigation channels by flood in 2005, 2007 in unit 11, 73, 74, and 75. - Irrigation channels were filled up with earth because of landslide by the flood in 2008.

Type of loss	Nhon Binh Ward		
	Ward	Section 4	Section 9
	- 1,200m length of irrigation channels in section 9 were damaged by flood in 2008.		
Agriculture production	- Summer-Autumn rice crop was destroyed (due to drought in 1982 and 1996) - 20ha of cultivated land were flooded, damages of agriculture by storm in 2001 - Animal husbandry (chicken, pigs etc) was stunted by drought in 1982, 1996. - Winter-spring rice crop was damage by landslide in 1999 in section 9. - summer autumn crop in section 9 was damaged in 2004 , - 10ha of vegetable were damaged and hundreds of animal husbandry were destroyed by flood 2007 in section 9, - 500 chicken were washed away in section 9 by flood 2008 - hundreds of domestic animals in section 9 were killed by flood in 2007	- Summer-Autumn rice crop was destroyed, animal husbandry was stunted by drought 1982 - Damages of agriculture by storm 1984, - Damages of agriculture by flood 1999, -Summer-Autumn rice crop was damaged by flood and landslide in 2004. - Damages and loss of agriculture production: rice and animal husbandry by flood 2007. - Agriculture production was damaged by flood 2008.	- Summer-autumn crop was destroyed due to drought in 1982 - Damages of agriculture because of landslide and flood in 1984. - Winter-spring crop was damaged by flood 1999 - damages of agriculture by flood in 2001 - Summer-Autumn crop was damaged by flood 2004 - Rice, vegetable production and animal raising were affected by drought in 2005. - Damages and loss of agriculture production; rice and animal husbandry by flood 2007. - Summer-autumn rice seed were ruined by flood 2008.
Salt production	- Salt crop was destroyed in section 9 by flood in 2004. - 50 tons of salt were lost in section 9 by flood 2007.		
Aquaculture	- Damages of aquaculture due to flood and landslide by typhoon 1984, storm 2004, by flood and strong wind in 2004, 2005.	- Damages of aquaculture production by flood 1984 - Aquaculture was damaged by storm, flood in 2001	- Aquaculture production was damaged by flood in 1984, 2001,2004

Type of loss	Nhon Binh Ward		
	Ward	Section 4	Section 9
	- 263 ha of aquatic water surface in section 9 were damaged	- Aquaculture was damaged by flood and strong wind in 2004. - Landslide in fish ponds, aquaculture production were damaged by flood 2008.	
Fishing boat	4 boats were wrecked		

Observations on losses:

- The impacts of disasters happened during the last 20 years were mainly on houses of the poor households, who cannot afford themselves to build the solid ones. Every year those households have to save money for repairing their house, though their earning is too low. The government also provides some financial support for some of the poor to rebuild their houses.
- Damages of aquaculture crops in several years running make the farmers become bad debt. Low yield of salt production and rice crops affects 80% of population living on farming. Damage fishing facilities and dyke system as well as infrastructure result in interruption of going fishing, transportation, new crop production, especially schooling of the children.
- Community awareness on disaster preparedness has been raised; therefore losses of lives have also been reduced.

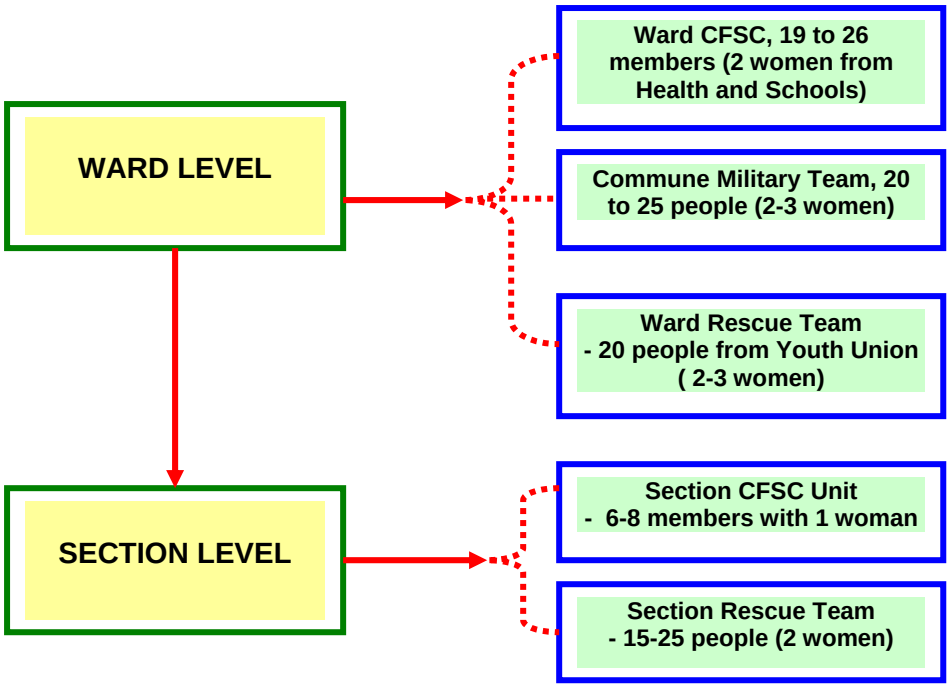
6.2.5 Capacity for disaster risk management

a) Disaster management Structure

Committee for Floods and Storm Control: At the ward level the Committee for Flood and Storm Control (CFSC) comprises of 19 or 26 members, who are the representatives of Ward People's Committee and key departments (Police and Army forces, Communication and broadcasting, transportation, Health, Schools, The Youth Union) Number of the members can be varied according to the year it is formed. At the ward level there are other teams whose tasks and responsibility are to support CFSC of ward to undertake emergency rescue activities during disasters.

At the section level, there is no CFSC, but a vanguard team at each section. In Nhon Binh there are nine sections and that there are nine vanguard teams have been formed. This is the community based rescue team with its main task is to undertake rescue activities at the section.

Diagram of Disaster management structure at ward and section levels



Disaster preparedness plan and coordination:

- CFSC has an annual preparedness plan to cope with floods and typhoon, especially an evacuation plan for the most vulnerable section (isolated or low-lying sections). This committee also has a plan to mobilize facilities available in the community for rescue activities in case of emergency.
- Though, the women Union is not a member of CFSC, it always has its own plan to help the victims when they are in need, and especially its members. Other social and political organizations and local authorities are actively involved in disaster preparedness and rescue activities. Kinship and social ties are also found to aid in these activities.
- Local people have certain experiences for disaster preparedness and good practices such as storage food and water before disaster season; reinforce their houses by using sand bags to put on the house roof, cut tree branches close to the houses, etc.
- Facilities available currently are mainly radio system, engine boats such as engine boat or jet boat used for the rescue teams. The rescue teams of ward are equipped with a few lifejackets, lifebuoys and megaphones. However, every year, province has a plan to support the most vulnerable wards and sections with basic facilities for CFSC to undertake their duties, such as torches, sandy bags, raincoats, hats, boots and ropes to reinforce houses and warning boards at low-lying areas to avoid accidents.

b) **Table 16 Good infrastructure and facilities available at community**

Safer shelter	Ward	Section 4	Section 9
Early warning system		- 2 flood water indicators at the two overflowing dams	- no early warning system
Communication	- Loudspeaker system from ward	- 2 loudspeakers in the most isolated	

Safer shelter	Ward	Section 4	Section 9
	to section - Communication channel is done through vanguard team, Red Cross at sections.	areas in the flooding season (unit 32 and 33).	
Public shelters	-Two storey buildings (church, schools, people's committee office, health centre) can be used as safer shelters in floods.	- A multiple function community house that is used as a safer shelter for households living in low lying areas, but the road to the safer shelter is eroded and in bad condition so it is not safe for the people to travel there during flooding. - There is one church in group 27.	- Solid schools and temples that can be used as safe shelters at vulnerable communities.
Solid houses	There are multi storey houses	- Some two-storey building for safer shelter.	- Some two-storey building for safer shelter.

c) coping experiences

- Due to the increasingly disasters in current time, the perception of the community on the disaster risk mitigation and preparedness is raised. Local people are ready to support their neighbours to reinforce their houses.
- Communities, especially the isolated ones are always kept informed about the disaster warning through loudspeaker system. The fishing boats have been equipped with communication equipments. It is crucial for the fish men to help each other while fishing on the sea incase of emergency case.
- Fish men themselves group into small groups of 2 or 3 fishing boats. It is effective to help each other when disasters happen in the sea.
- As a tradition, after the disaster National Farther Front together with TV, radio station launches the propaganda to support the victims and their families.
- Committee for Floods and Storms Control has an annual preparedness plan and assign clear reasonability to each member.

Table 17: Activities done before, during and after Disasters in Nhon Binh Ward

Type of disaster	Before	During	After	Involvement				
				Men	Women	Elderly	Children	Others
Typhoon Flood	Warning			X	X	X	X	TV station
	Preparation work (cut tree			X	X	X	X	Section officers

Type of disaster	Before	During	After	Involvement				
				Men	Women	Elderly	Children	Others
	branches, storage food, lamp, water)							
	Dredging earthen irrigation channels			X	X	X	X	
	Diversi-fication of seedlings			X	X	X	X	Coop-erative
Drought	Community awareness raising on water saving	Drill well to get under ground water		X	X	X	X	
		Buy tape water for living		X	X	X	X	
		Earthen up production areas		X	X	X	X	
		Water storage						
			Water treatment	X	X	X	X	
			Cleaning environ-ment	X	X	X	X	
			Dredging irrigation system	X	X			
Saline intrusion	Upgrade saline protection dyke and dams			X	X			
		Shift suitable production patterns (agri and aqua culture)		X	X			People's Committee
		Water treatment						
			Construct/upgrade saline	X	X			

Type of disaster	Before	During	After	Involvement				
				Men	Women	Elderly	Children	Others
			intrusion works					
			Instal-lation of water pipeline	X	X			People's Committee

6.2.6 Vulnerable factors

a) Disaster preparedness planning:

- The annual disaster preparedness plan is done by CFSC and is instructed to section for implementation. Level of participation of villagers is only being informed about the plan and who are the contact persons in case of emergency. They haven't got opportunities to involve in planning process properly except the representatives of sections (members of ward CFSC). Local needs and voices of villagers need to be shared during planning process so that the plan can meet the real needs of particular sections. The disaster preparedness plan needs to have situational analysis for its activities. The planning techniques should be improved to apply more participatory and situational analysis that bring more ownership to community as planners rather than implementers of the plan given by the ward only. The capacity of local planners is still limited as participatory planning techniques and skills are new to them, because they haven't got opportunities to be trained.
- The annual disaster preparedness plan focuses on reactive activities to disasters happen in a year such as what should be done before, during and after disaster, but not anticipatory activities that for longer term adaptation to disaster and climate change. It is important that mainstreaming climate change adaptation should be taken into consideration in planning process with application of new planning techniques. Integration of disaster preparedness plan and Socio-economic plan socioeconomic development, hunger elimination and poverty reduction, land use planning and urban planning, suitable to local conditions needs to be strengthen with more collaboration of different bodies. As matter of fact, the collaboration and coordination of CFSC and ward authority in planning has not been a focus and mainstreaming climate change adaptation is new to them all. Each party is responsible for its own mandate and their planning is undertaken in different time frame making difficult for their coordination and collaboration.

b) Rescue activities (facilities, techniques and skills)

- The ward rescue team only has life buoys, life jackets or engine boat for their own safety when undertaking their tasks, but not enough for people they rescue. There are no basis rescue facilities for the section team. The rescue facilities that Nhon Binh Ward team were equipped by NGOs' projects in 2004 so safety condition is not guarantee. Ward rescue teams as well as section teams need more facilities such as life buoys, life jacket, and those basic facilities are also needed for the fish men going fishing on the small boats. Since, CFSC lacks of rescue boats for evacuation and rescue activities; it has a plan to mobilize fishing boats of local people in case of emergency. It is better if the rescue teams of

ward and the most vulnerable sections can have engine boats for their rescue activities so that they can be in an active position to respond to emergency cases.

- The members of rescue teams rarely get a chance to be trained on rescue techniques and skill. Moreover, shifting members to other responsibility has been happened annually, therefore, it is very necessary to have regular rescue and first aid techniques and skills trainings for not only rescue team members, but also for the villagers living in the most vulnerable areas so that rescue activities can be community- based. There is no Health clinic at section level, no health workers and first aid facilities that can help people in need in disaster season, therefore whenever, there is a case for emergency rescue, no ambulance and a big motor boat to take the victim to the city hospital.

c) Early warning system and communication:

- Early warning system In Nhon Binh is very poor in terms of quantity and quality. In Nhon Binh there some flood water indicator poles, warning sign boards at low lying areas, but they are insufficient now because flood water level of the recent floods come up higher than existing indicators and warning sign boards at the over flow dams in Nhon Binh are old that the sign cannot be seen clearly. More and new flood water indicator pole as well as warning sign board should be for the prone areas.
- Nhon Binh has several sections in low-lying areas but it has no flood mapping that can help CFSC to manage and coordinate emergency rescue activities (at wards, communes, villages and sections). The flood map or hazard map is to help ward and communes to identify the most vulnerable areas that need timing rescue in case of disasters. It is also good for urban planning or land use planning, etc.
- Every year the city organizes one first aid demonstration or mock-drills at prone areas. These are the very effective activities for community awareness raising. However, a budget for these activities is limited so they cannot be organized regularly at a larger scale.
- Basic knowledge of climate change seems to be new to the ward officers and local people as well. The building techniques resistant to flood and typhoon are not widely applied by local people. Community awareness on environment protection is also low.
- Nhon Binh Ward has a wireless communication system to some sections in prone areas, but number of wireless station is using wireless in each section still limited (only one station for each section). Communication during disaster season is not sufficient.

6.3 Nhon Ly Commune

6.3.1 Potential hazards and the most vulnerable areas of Nhon Ly Commune

Nhon Ly is a catchment commune among the four coastal communes of Quy Nhon, which is situated in Phuong Mai semi-island to the North. It is about 22 km far from the city centre. Nhon Ly Commune borders Cat tien commune of Phu Cat district and Nhon Hai to the North. To the East is the Eastern Ocean. The commune has four villages facing to the sea with a population of 9,223 people (2,088 households), in which there are 217 poor households. A number of 256 households close to the sea are very prone to typhoon, sea expansion and sea tide.

Among the four communes, Ly Hoa and Ly Hung are selected as the most vulnerable ones because of their high level of exposure to potential hazards, particularly sea

level rise, sea expansion as they are situated close to the sea. The results of focus group discussions on historical profile of disasters happened from 1978 to 2009 show that these two communes have been badly affected by typhoon and sea expansion.

Table 18: Potential hazards identified by Nhon Ly Commune and villages

Type of potential hazards	Ranking		
	Commune	Ly Hoa village	Ly Hung village
Sea tidal surge	**1**	**1**	**2**
Typhoon	**2**	**2**	**1**
Inundation	**3**	**3**	**3**
Sea expansion	**4**	**4**	**4**
Environmental pollution	**5**	**5**	**5**

Table 19: Identified potential main hazards and secondary hazards

Ranking	Type of main hazards	Type of secondary hazards
1	Sea tidal surge	- Inundation - Sea expansion - Environmental pollution
2	Typhoon	- Sea expansion - Sea erosion - Environmental pollution

Table 20: Potential Hazards Calendar of Nhon Ly Commune

Types of Main & Secondary hazards	1	2	3	4	5	6	7	8	9	10	11	12
Sea tide												
Typhoon												
inundation												
Sea expansion												
Sea erosion												
Environmental pollution												

Table 21, using participatory tool: Historical Profile in Nhon Ly Commune

Year	Types of disaster	Affected areas	Damage and loss
1978 (25 May)	The storm number 5 with a speed at 12 - degree and gust above 12 degree	All the commune	- Losses of lives: 16 fish men in Ly Hoa village, 25 fish men in Ly Hung village were died during fishing and on the way to hide the storm; - 40 boats in Ly Hoa, and 45 boats in Ly Hung were wrecked during the way to hid the storm; - 80% of the roof of the houses in commune were blown off and 15 houses were collapsed

Year	Types of disaster	Affected areas	Damage and loss
December 1984	The storm number 8 with wind level 12	All the commune	- 80 boats in Ly Hoa village, 40 boat in Ly Hung were wrecked during the way to hide the storm - More than 50% of houses (about 500 houses) were collapsed and roof of 300 houses were blown off. - 10 of classrooms were collapsed - Tidal surge swept away of three lines of the houses near to the beach in Ly Hoa; - Forest and roads were damaged;
1998	Tidal surge (with 4 – 5 meter height above the sea level) Strong wind	The residential area in the all villages were affected, especially in Lý Chánh, Lý Hòa villages	- 70 boats were 100% collapsed and wrecked ; - 21 houses in Ly Hoa, and 20 houses in Ly Hung were swept away - 50 houses were roofed-off; - Land erosion
2004	Inundation in a long period (lacking of sewerage and a level of road surface is higher the house ground floor)	Lý hòa, lý Hưng, lý chánh	- 45 houses and assets were degraded
2005-2006	Inundation Tidal surge and strong wind	Lý hưng , lý lương	- 3 houses were damaged - The sea dikes were degraded - One boat was wrecked
2006 (December)	Typhoon number 9 (late typhoon) with wind level of 10 to above 12.	All the villages	- 3 boats were damaged - The roof of some houses was blown away;
October 2007	Inundation	Ly Hoa	- 17 houses and assets were damaged by inundation
November 2007	Tidal surge	Ly Chanh Ly Hung	- observed of the dam in Ly Hung were damaged
February 2008	Tidal surge	Ly Hung	- 2 fish men were died because of tidal surge and strong wind - A boat was wrecked
September 2008	Tidal surge	Ly Chanh	- 35 m of the sea dike and dam were damaged by tidal surge
September	Inundation	Lý hòa, lý	- A house and fence was

Year	Types of disaster	Affected areas	Damage and loss
2008		chánh and lý hưng	collapsed by the inundation which a level of the water surface is at 1.6 meter. - 20 computers were destroyed by the inundation

6.3.2 Explanation of identified potential hazards

Sea tide: It happens naturally as its season in a year and is caused by typhoons with strong wind; therefore sea tide and typhoon happen in the same period of time from September to December. Sea tide is considered as the most concerned hazard to Nhon Ly Commune as it has made tremendous impacts to the villages living close to the sea. According to the local people, sea tide in the recent years has been higher than previous years. At the focus group discussion, all informants can remember clearly each sea tide happened because it is a very fearful disaster that always threatens local people the most. From 1978 to 2008 sea tide happened frequently with increased sea tide level up to 4-5m high. Generally speaking, the four villages of Nhon Ly have been affected by sea tide; however Ly Hoa and Ly Hung villages are the worst. The main losses caused by sea tide are fishing facilities, ships, housing, and sea embankment, losses of lives, Environmental pollution and disease spreading. The early warning signal that local people have been experienced is that whenever, there are some sand dunes suddenly formed on the sea shore, there will be sea tide. Thanks to their experiences, they can get themselves prepared to evacuate to the safer areas near the mountain.

Typhoon: From September to November is a typhoon season. Ten years ago from 1978 to 1985, every year there was at least a typhoon happened and in some years there were even two or three, but from 1985 to 1998 there was no typhoon. In 1978 there was a usual typhoon happened in May. From 2002 to 2003 there were typhoons, but not very big, but in 2006 there were more and big typhoons came later in November than usual. In the previous years, the commune was indirectly affected by typhoon that directly hit other provinces, in the recent 4-5 years now most of typhoon hit directly Nhon Ly. Typhoon causes sea tides and makes tremendous loses of lives, damages of houses, market, health clinic, especially the old protection trees were damaged because of sea erosion. The experiences that local people can know about early warning signals of typhoon is if black cloud gathered in a big shape or when seeing sea water run in a stream or at night if there is a big sea water explosion occurs in the sea, then typhoon will be coming soon. These early warning signals could help fish men not to go off shore to avoid accidents caused by typhoon.

Inundation: It is caused by either heavy rain that last for three days or sea tide resulting from typhoon. Previously, inundation did not last long as there were no concrete roads and residential houses were less density that water could be gone out quickly. In a year there at least 1 to 3 inundations and water level comes up to 0.8m to 1. 5m. the impacts of inundation are property, interruption of everyday life activities, sea food processing by the local villagers, environmental pollution and disease spreading.

Sea expansion: It is a result of sea tide and typhoon and its tendency is more serious. The impacts caused by sea expansion mainly on land erosion at residential areas along the coast. In section 10 of Ly hung village, there has been three layers of residential houses were collapsed because of sea tide and sea expansion. Within

35 years now, sea expansion is 180m to the residential land in Ly Luong and about 80m in Ly Hoa and Ly Chanh villages.

Environmental pollution: There are three reasons that make living environment of Nhon Ly Commune become more polluted. Firstly, only 30% of households have family latrine, the rest use sand area as place for their waste, therefore when there is an inundation all the waste are spread out to make the environment polluted. Secondly, residential houses are so close to each other in one cluster, but there is no sewage system and no proper rubbish collections in communities. All rubbish and sewage pour out into the environment making mosquitoes and flight grow quickly that is very harmful to people's health in wet and dry seasons. Thirdly, the cemetery is situated right in the residential area, the underground water has been polluted, but 100% household has to use drilling wells to get underground water.

6.3.3 Table 21: summary of main disaster impacts in Nhon Ly comme by village

Main types of disaster impacts	Ranking		
	Nhon Ly Commune	Ly Hoa village	Ly Hung village
Loss of life	1	1	1
Damages of houses of the poor households	2	3	2
Losses of property	3	4	4
- Fishing equipments (ship, boats, nets, etc.) - Fishery processing - Logistic services of fishery - Aquaculture culture production on the sea			
Infrastructure	4	5	5
- Damage of Dyke against waves - Interruption of schooling - Transportation road - Protection dykes, trees - Electricity			
Sea expansion at residential areas	5	2	3
Environmental sanitation and clean water		6	6

Observation on the main losses:

- Among the significant losses caused by disasters, losses of lives in Nhon Ly are ten times bigger than that in Nhon Binh. The reasons that many fish men died are while they are fishing off shore without sufficient early warning and safety facilities, and while they are on the way to move their fishing ships and boats to the safer places in Quy Nhon City. All fish men died are main laborers of the families leading to a very big abundant to their families.
- Damages of fishing ships and boats cost a lot of reinvestment and interruption of their earning. After each typhoon it takes months to repair their boats or ships. Interruption of fishing results lacking of raw material for fishery processing. Double impacts also on lacking of food for families and school fee for their children. Families lost their ships and boats cannot be able to pay their loan to the bank, then it makes troubles for other families who want to borrow money from the bank.
- Every year number of houses damaged or collapsed or washed away sea erosion, typhoon and sea tide has a tendency to be increased. Poor households have to invest on rebuild or repair their house making it difficult for their life.

- Damages of infrastructure (road, sea protection dyke, old protection trees) cost lots of money to reinvest. Moreover, schooling and transportation are also interrupted.

6.3.4 Potential hazards and the most vulnerable villages in Nhon Ly Commune

In Nhon Ly Commune, Ly Hung village and Ly Hoa village are selected as the most vulnerable villages among the four in commune where have been frequently impacted by typhoon, sea tide and sea expansion and will be affected by climate change. The following criteria are identified for village selection:

(i) Having high numbers of poor households and vulnerable groups (children, elderly, people in disable, and women-headed households, etc)
(ii) Having vulnerable location prone to numbers of potential hazards (sea level rise, sea expansion, typhoon and inundation);
(iii) Being the most affected by recent disasters of different types;
(iv) Being sensitivity to climate change because of depending on the natural resources
(v) Having more vulnerable elements in terms of poor infrastructure, housing, Environmental pollution, water resources, etc;
(vi) Having problems related to urban planning (resettlement, job creation, poor alternative livelihood options, etc)

6.3.5 Ly Hung Village

Table 22 using participatory tool: historical profile of disasters from 1984 to 2009

Year	Type of disaster	Affected areas	Types of loss
1984 (Nov)	Typhoon $N^0$5	The whole village	- 15 semi-solid houses collapsed because of high sea tide. - 40 fishing ships sunk and damaged when being anchored at Khe Da of Nhon Hoi. - Damages of roads
1988 (Oct)	Sea tide (very high tidal surge)		- 20 semi-solid houses were damaged - Property washed away
2008 (Feb)	Sea tide	Units: 4 and 5	- 02 fishermen died at sea - 01 ship sunken
2006 (Dec)	Late Typhoon (wind level 0)	The whole village	- Many houses roofed off
2007 (Nov)	Sea tide	Units: 5,6 and 7 close to the sea shore	- 60m embankment damaged because of sea surge.
2008 (Sept)	Inundation	Units: 2,3,4,17,8,12	- Villagers had good disaster preparedness plan
2008 (Nov)	Inundation	Units: 4,17,12 (low lying areas have no drain-age system)	- Not big loss as villagers' high awareness on disaster preparedness. Only a few damages of poverty.
1978	Typhoon	The whole	- 8 semi-solid houses collapsed

Year	Type of disaster	Affected areas	Types of loss
(May)	(wind level 12)	village	and about 80% houses were roofed off. - 45 fishing ships were sunken and damaged on the way to the safer anchor in Quy Nhon City. - Fishing facilities on those ships were lost

6.3.6 Ly Hoa Village

Table 23 using participatory tool: historical profile of disasters in Ly Hoa village from 1984 to 2009

Year	Type of disaster	Affected areas	Types of loss
1978 (May)	Typhoon N^{o} 5 (wind level 12)	The whole village	- 16/50 fishermen died while fishing on the sea. - About 40 fishing ships damaged en route to safer anchorage
1984 (Nov)	Typhoon N^{o} 10 Sea tide	The whole village	- About 100 houses collapsed, 70% of houses on coastline lost their roofs, 3 houses washed out to sea by sea expansion. - 80 fishing ships sunk and fishing facilities were heavily damaged - Damages of protection trees
1998	Sea tide (very high tidal surge)	Units: 17,15,16,10	- 20 collapsed and 100% of property washed away by sea tide.
2004	Sea tide	Units: 17,16,15,10	- 9 houses collapsed because of sea tide. Sea expansion to the residential areas was 15m. - 1 man died as his ship sunk on the way to the safer anchor.
2005-2008	Inundation	Units: 28,26	- 1 semi-solid house was collapsed because of strong water low.
2006 (Nov)	Typhoon N^{o} 9 (wind level 10)	The whole village	- No loss of life as warning was made earlier advance that people had good preparedness.
2007 (Nov)	Sea tide		- No impacts on housing as they were moved away from dangerous area to sea tide.
2007 (Oct)	Inundation	Units: 28,26	- 22 houses inundated and about 10 houses damaged
2008 (Nov)	Inundation	Units: 28,26	- No losses as good prepared-ness and evacuation plan.

Table 24: Ranking of potential hazards

	Types of	Ranking	Secondary hazards

	hazards	Women	Men	Result	
1	Sea tidal surge	1	1	1	- Sea expansion - Inundation - Environmental pollution
2	Typhoon	1	1	2	- Sea tide and expansion - Inundation - Environmental pollution
3	Inundation	1	1	3	- Environmental pollution - Diseases

Table 25: Summary of main losses

Type of disaster	Main impacts	Secondary impacts
Sea tidal surge	- Houses of the poor households - losses of property - Interruption of fishery activities	- Losses of property that caused more invest for the new ones - Constraints for everyday activities - Economic problems - Losses of land
Typhoon	- Losses of lives	- Losses of main labour caused sorrow, economic constraints
	- Ship sunk and damaged	- Loss of livelihoods leads to poverty
	- Housing	- Lack of money for repair houses
	- Interruption of fishing activities	- Constraints in everyday life
	- Damages of protection trees	- Environmental pollution
Inundation	- Damages of houses - Environmental pollution	- Cycle of poverty because of money spent on repairing houses every year. - Increase diseases(dengue fever, diarrhoea, etc)

6.3.7 Capacity for disaster risk management

a) Disaster management Structure:

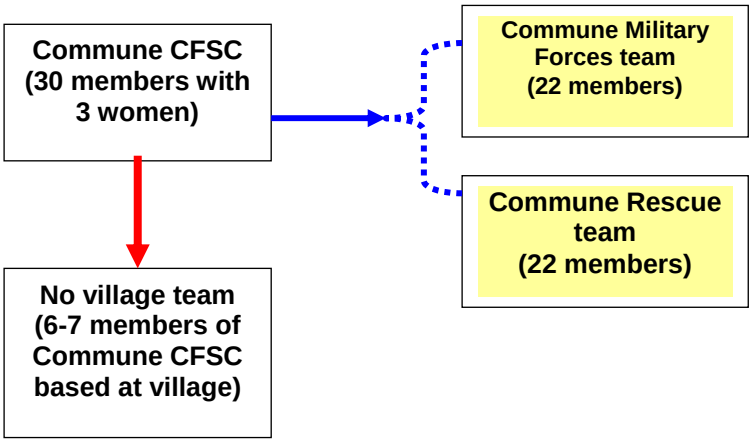
Committee for Floods and Storm Control: In Nhon Ly the Committee for Flood and Storm Control (CFSC) consists of 30 members chaired by the Chairman of Commune People's Committee (CPC). The members of CFSC are the representatives of Commune People's Committee (vice-chairman), Commune Military force and key departments (statistics, accountant, police, social and culture, Headmasters of schools, Red cross, Health clinic, The Youth Union, Women Union, etc). There are only three female representatives from Health clinic, Women's Union and CPC officer. The number of the members can be varied according to the year it is formed. In addition to the commune CFSC, there are two other teams; one is a commune rescue team which has 22 members. They are all strong and young men belong to the commune Youth Union. The other is commune military team which can mobilize at least 22 army men in case of emergency. Their main tasks and responsibility are to support commune CFSC to undertake emergency rescue activities during disasters.

At the village level, there is no CFSC, but the commune CFSC assign at least 6 to 7 members from commune CFSC to be responsible for disaster preparedness and responding in each village.

b) Disaster preparedness plan and coordination:

- CFSC has an annual preparedness plan to cope with disasters. Every year the commune evacuation plan is made to be ready for moving the vulnerable households living in temporary house close to the sea to the safer place near the mountain and temples.
- Due to living in very a vulnerable commune, local people are very experienced in the early warning signal of typhoon and sea tide. Some households in Ly Hoa have safer corner right inside or outside their houses. Food and water storage can last for 5 to 7 days.

c) Diagram of Disaster management structure at ward and section levels



d) Table 26: Good infrastructure and facilities available at community

Village	Asphalt road	Drilled wells	Concrete road	Earthen roads	Sea dike	Electricity	School	CHS	Pagoda	Market
Lý hòa	No	100%	70%	30%	3%	100%	1	0	3	1
Lý chánh	No	100%	40%	10%	20%	100%	1	0	4	0
Lý hưng	10%	100%	80%	10%	No	100%	2	1	3	0
Lý lương	No	100%	95%	5%	No	100%	1	0	1	0

e) Coping experiences

- Due to the increasingly disasters in current time, the perception of the community on the disaster risk mitigation and preparedness is raised. Local people are ready to support their neighbors to reinforce their houses.
- Communities, especially the isolated ones are always kept informed about the disaster warning through loudspeaker system. The fishing boats have been equipped with communication equipments. It is crucial for the fish men to help each other while fishing on the sea incase of emergency case.
- Fishermen themselves group into small groups of 2 or 3 fishing boats. It is effective to help each other when disasters happen in the sea.
- As a tradition, after the disaster National Farther Front together with TV, radio station launches the propaganda to support the victims and their families.

- Committee for Floods and Storms Control has an annual preparedness plan and assign clear reasonability to each member.

Table 27: Activities carried out before, during and after Disasters of Nhon Ly Commune

Type of disaster	Before	During	After	Involvement				
				Men	Women	Elderly	Children	Others
Sea tide	Warning			X	X	X	X	CPC
	Moving fishing ships to safer harbor in Quy Nhon			X				Related depart
	Evacuate vulnerable to safer places			X	X	X	X	
	Reinforce protection houses walls			X				Section staffs
	Community awareness raising on disaster prepared-ness			X	X	X	X	Commune staff, RC
		CFSC is on guard 24h/24h		X	X	X	X	CFSC
		Using sand bags for rein-forcement		X	X			Rescue team
		Evacuate people in case of emer-gency		X	X			CFSC and rescue team
			Rapid need assessme nt for relief	X	X			CFSC and Rescue teams of commune, villages
			Relief program					RC, WU, YU
Typhoo n	Prepared-ness act-ivities as for sea tide							

Type of disaster	Before	During	After	Involvement				
				Men	Women	Elderly	Children	Others
	Reinforce houses			X	X			People's Comm-ittee
		CFSC &rescue teams are on guard 24h/24h						
			Cleaning up environme nt, houses	X	X	X	X	Health clinic, WU, YU, CFSC
			Repair damaged ships, houses	X	X			People's Comm-ittee
			Moving ships back from safer harbours	X				
			Rapid needs as-sessment for relief	X	X			CFSC, RC, CBOs
			Relief program					WU, RC, CBOs
Inun-dation	Evacuation of people, property			X	X	X	X	CFSC, RC, WU, YU
		Evacuatio n in emer-gency		X	X	X	X	CFSC, RC, WU, YU
			Cleaning up envir-onment, houses	X	X	X	X	Health clinic, WU, YU, CFSC

6.3.8 Vulnerable factors

a) Disaster preparedness planning:

- Planning process and methodology is the same as other wards and communes if the city. The annual disaster preparedness plan is done by CFSC and is instructed to villages for implementation. Villagers are only being informed about the plan, but not actually participate in planning. Any opinions from the villagers are proposed to the village representatives, who are members of the commune CFSC. Planning is not villagers' responsibility. The annual plan of the next year relies on the lessons learnt of the previous year plan implementation. The

capacity of local planners is still limited as participatory planning techniques and skills are new to them, because they haven't got opportunities to be trained.

- The annual disaster preparedness plan focuses on activities responding to disasters happen in a year (activities to be done before, during and after a disaster). An action plan following National strategy 2020 is for longer term activities, however, how to link it to the longer term strategy is not sufficiently considered. Mainstreaming climate change adaptation and disaster risk reduction as well as socio-economic plans is still a big problem to the local planners.

b) Rescue activities (facilities, techniques and skills):

- The commune rescue team lacks of basic safe facilities for their given tasks such as life buoys, life jackets or rescue engine jets not boats because in Nhon Ly even strong engine boats cannot be used for rescue on the sea, only engine jets can be used.
- The members of rescue teams as well as commune CFSC haven't got any training programs on first aid techniques and skills. Fish men and villagers wish to have such trainings to help each other while fishing on the sea or at the community before rescue team can come to help them. There is no Health clinic at village level, any health workers and first aid facilities based at community, therefore whenever; there is a case for emergency rescue, no ambulance and a big motor boat to take the victim to the city hospital.

c) Early warning system and communication:

- There is no sufficient Early warning system in Nhon ly, thought, it is very important for a semi-island commune which is far from city centre with many fishing ships earning off shore. Local fishing ships are grouped into small groups of five or six when going off shore. Every ship has walkie-talkie, so they can communicate with each other on the calm sea. However, when there is a storm or typhoon they cannot contact with people in shore and even among themselves because their walkie-talkie are low quality of cheap cost. It is very dangerous for them if any accident on the sea that need emergency rescue, they cannot contact home. Normally in typhoon season, fishing off shore brings more benefit because of high quantity of fish to catch. Though, fish men know it is dangerous to go fishing in typhoon season, they still go off shore. In some cases, fishing ships cannot get warning of the coming typhoon because there is no early warning system for typhoon in Nhon Ly that can help them to get back to the shore so losses of lives will be unavoidable in that cases.
- First aid demonstration or mock-drills should be organized to raise awareness of communities in every village of Nhon Ly Commune. Basic knowledge of climate change is new to the commune officers and local people as well. The building techniques resistant to typhoon and flood are not widely applied by local people. Community awareness on environment protection is also low.
- There is no safer harbour for fishing ships and big boats at commune so all fish men have to move their ships and boats to Quy Nhon City, which is more than 30km far and it take hours to reach there. In 1978, accidents happened on their way to Quy Nhon because of typhoon caused a big loss of lives of 25 men.

7. CAPACITY AND VULNERABILITY – NHAN BINH WARD

7.1 Health

7.1.1 Health facilities

There is one health centre in Nhan Binh ward, which of poor quality, and lacking some functional treatment rooms for traditional medicine, gynecological and in-patients. There are 5 staff in the health centre catering with one medical staff, 2 assistants and 2 midwives.

7.1.2 Health services and programmes

The health centre staff implement the national target programmes such as nutrition, family planning, vitamin A, vaccination for children. They also organize periodical health-check for the children in kindergartens. Currently, the malnutrition rate for children is 16,7 %. After each storm or flood happen, the health centre is in charge of disinfecting the wells, public buildings and schools. They also organize first aid training for the health workers during the rainy season. There are two services of both western treatment as well as traditional medicine for treatment of common diseases such as flu, cough, diarrhea, wounds, menstrual regulation, plus acupuncture for headaches, backache, and paralyse.

7.1.3 Understanding on climate change related diseases

Diseases for women in particular among health staff: group discussion and in-depth interviews with health staff of the centre show that health staff have limited knowledge on climate change, but much more aware of diseases related to natural disasters. According to Mr. Nguyen Dinh Chay- head of the ward Health Centre "destruction of the ozone layers caused climate change and climate change means higher temperature, irregular rains and storms, and causing a number of diseases such flu, sore eyes, diahhrea, fever, and malaria"

7.1.4 Section Health workers network

There are 14 health workers for 9 sections. There are two in section 9 and 1 in section 4. These health workers are trained on first aids during the rainy season every year.

7.1.5 Experiences of coping with diseases

Coping worsened by natural disasters such as storms, floods, heatwaves: In 2007 there was a malaria epidemic in the city, and there were 10 cases in Nhan Binh ward. Thanks to the early identification of the cases through the health network at section level and cooperation with Sanitation and Epidemic Prevention Department of the city, they sprayed mosquitoes and stopped the spread of the diseases.

Table: Frequency of diseases in the ward and two sections

Diseases	Treatment	Storms	Floods	Heatwave/ drought
Diahrea	Traditional medicine at the health centre + treatment at home	x	x	x
Cough	At home and health	x	x	x

Diseases	Treatment	Storms	Floods	Heatwave/ drought
	centre, and City hospital			
Flu	Self treatment at home	x	x	
Sore Eye	Health centre and City hospital	x	x	x
Cold	Self treatment at home	x	x	
Gynecological	City hospital Ward health centre	x	x	
Fever	At home or ward health centre	x	x	
Uterine Fibroma	Ward health centre or City hospital	x	x	

Medical and health staff of the centre highlighted that they are most busy during the rainy season, with the treatment as well as dealing with the consequences of the disasters in the areas. There are often more diseases occuring during storm with heavy rains, floods and heatwave, especially diarrhea, sore eyes, cough and fever.

According to the data of the health centre, there are around 60 % of the local women suffering from gynecological diseases, but there are not many periodic checking organised for women, and there is no treatment or medicine for treating for the women in the local areas for free.

7.1.6 Health and nutrition status of the poor people

In general, group discussions show that unpredictable weather changes have an impact on people's health: when it gets hotter, many sicknesses happen: high blood pressure, cold and fever, headache, dizziness and sore eyes. When there is a lot of rain, many mosquitoes are bred causing dengue fever and cholera due to the contaminated water source.

Observation and group discussion with women groups in the two sections show that the disabled people, elderly, children and the poorest are often of poor health due to their own current diseases and weaknesses. The poor families especially women know about how to feed better food for the children and families, but they cannot afford a lot of good food, due to the lack of money. Poor women do not usually go to the health centre to check their health regularly. Although there are malnourished children in the ward and the two sections, the support for better conditions of the children remains very limited.

However, as Nhan Binh is a vegetable growing area of 20 ha for the city, many of the local people grow a large diversity of vegetables for sale and family consumption.

Discussion with women's group Nhan Binh ward shows that women are aware of diseases, especially gynecological one, that are worsened by disasters in the local areas, yet due to being too busy with their daily life activities, and lack of money for medicine, women normally do not pay attention to treating them.

Poor health of a poor woman

Ms. Nguyen Thi Kim Lien born in 1940 has no children and no occupation. She is living in a temporary house of around 20m2 (with the support from local government, value at 3,000,000 dongs). There is no latrine and not any valuable furniture in the house. As told by Mrs. Lien, the house is often leaked and gets wet during storming and heavy rains, and it is very hot during the summer time.

She is having asthma, high blood pressure, stomachache, and heart failure. She is worried that if there are floods/storms, her diseases are getting worse. She only wishes to have sufficient 2 meals a day. When being sick, she often buys medicines from local drug store. She is granted healthcare card subsidized by the government, if there is serious sickness; she can visit the health centre and hospital and is provided with medicine.

After floods or storms, she often receives support (rice, cash) from local authorities, however it is not enough as she does not have reserved rice when storms and floods occurs. After floods/storms, she often receives support from pagoda's charity such as rice, and vegetable, salt from neighbours.

7.1.7 Medical health insurance issues

Sharing of the poor on medical services

My family is an average household so we have to pay for medical insurance. I have problems with my limbs which sometimes get paralyzed. Last year, I went to the hospital for medical check up. I left home at 6am and did not arrive home till late afternoon while it is only 10km from here to the Provincial hospital in Quy Nhon city. The main reason is that too many people rush to this hospital. Before everyone with medical insurance come to the provincial hospital. Now the new regulation is that they have to come to the city hospital. I'm not sure whether to buy medical insurance in the years to come because my health is getting better.

(Mr. Nguyễn Văn Bình, Section 4 Nhơn Bình Ward)

The hospital is 10km away. It takes a lot of time to go there and wait for the doctors. Doctors are not very keen on patients with medical insurance. Therefore, even with free medical insurance, we rarely go to hospital unless the problems are very serious, for example for surgeons. Otherwise we just buy medicines for self-treatment.

(group discussion in Nhơn Bình Ward)

7.1.8 Other key health concerns

- Interviewed men and women complained about overloaded health services. Provincial hospitals are being overloaded with patients from many areas, consequently they have to wait long.
- Overloaded provincial hospitals reflect the fact that services at district/ward/commune levels remain limited, which motivates people to come to big hospitals. According the female group in Section 9, Nhơn Bình Ward, the ward health center provides mainly services such as vaccination for children and pregnant women, family planning (IUD, medicine supply…). Regarding IUD, many women reported they got pregnant even after they've got IUD.

- People still have limited awareness of health (only go to hospital when seriously ill, not pay attention to living environment according to the research team…)
- Discussions with female groups show that they still lack understanding of reproductive health.

Regarding reproductive health, gender prejudices are presented quite clearly. Many women said men do not use condoms because they think pregnancy is women's business and therefore rarely share the burden. At the ward, there is free supply for contraceptives and condoms but very few men come for them. According to the Ward Women's Union, the rate of women infected with reproductive diseases is up to 70% of all the patients.

Gender prejudices are also shown in son preference, which is the main reason for families to have many children for carrying on the family's name and for having someone to rely on at old age.

Reproductive health for women

Ms Gái, Nhơn Bình said she was not able to have an IUD insertion because of an infection. Once she got pregnant even with an IUD. When the baby was born, the IUD was on its forehead. She goes collecting snails everyday, dipping herself in contaminated water. After each storm and flood, the infection gets worse but she could not afford for a treatment.

Some women said they got pregnant even after IUD insertion but could not understand why. Some said that they should not work hard after IUD insertion otherwise it will get deformed or rusty if soaked in water too often. In one case, the woman felt a backache and went for a check up but the IUD could not be seen anywhere. After some time, it was found but already broken. Because of that, she had one more baby (Ms Lien's case). Ms Men has 3 children but her parents in law do not allow her to have an IUD insertion as they want to have more

grandchildren. Neither her husband no she want to have more children but they are not practicing any modern contraception techniques. They just rely on traditional methods. She said that if she gets pregnant, she will give birth and bring the child up. *(Female group discussion, Section 4, Nhơn Bình Ward)*

7.1.9 Capacity and Vulnerability

- Health centre staff and section health network, together with health facilities with both western and traditional medicine functions are good basis for taking care of the health of the local people. The experiences of the staff and health villagers network in dealing with diseases related to natural disasters are valuable.
- There are constraints such as limited understanding on climate change related diseases in the future, and limited programmes targeted children and women, as well as elderly people in the area.
- Unpredictable weather changes have an impact on people's health: when it gets hotter, many sicknesses happen: high blood pressure, cold and fever, headache, dizziness and sore eyes. When there is a lot of rain, many mosquitoes are bred causing dengue fever and cholera due to the contaminated water source.
- Poor health and high percentage of women suffering from gynecology, poor reproductive health and malnourished children are considered as vulnerable to reduce their resilience to climate change.
- Local people especially the poor women do not pay high attention to nutrition and their health care, due to poverty, lack of information, limited access to services.

7.2 Education

Most of the local population in the commune and sections have a general low education level, with primary, and secondary education. There are still some people with no literacy. Data from households survey illustrates the point.

In section 9, there are around 300 young people from those households who used to go fishing and raising aquaculture. The young people do not have high level of education, it is so difficult for them now to change into other jobs.

7.2.1 Formal education

Formal educational facilities in the ward include one secondary school with 32 classes from grade 6 to grade 9, 2 primary schools with the total of 665 children and 24 teachers. School and class infrastructure and facilities are reasonably equipped.

However, there are quite a few classrooms, which are degraded, and their roofs are still being thrown away during storms. The school yards are of earthern made, and lower than the road, resulting in more inundation during the floods in the schools. There is also lack of latrines in schools, for example, in the secondary school, there are 1,376 pupils, who are sharing only 6 latrines for boys and girls, and 70 teachers sharing one latrine. According to the teachers, the lack of latrines can affect badly the health for the children and teachers during normal time, during storms and floods as well as drought or rainy days. Bad smell, and poor sanitation occur especially during the rainy season.

In Quy Nhon, Department of Education and Traininng has directed the integration of some knowledge of disasters management and environment sanitation into some subjects such as Geography or in extra curriculum in secondary schools, depending

on the financial support of the schools and the parents. However, in Nhan Binh secondary schools, this work has been not been done intensively, due to the lack of financial support from parents.

Children do not understand much about climate change, and do not participate in any disaster preparedness activities in the schools or communities, or any safety programme especially in the rainy season, although their teachers and parents do often warn them to avoid dangerous traveling during floods.

Historical profile exercise together with group discussions with children, and teachers in the schools in the ward also show that most common disasters such as storms, and floods in the areas have caused death of the children during difficult and unsafe travelling between homes and school, more housework for the children at home to help their parents during storms and floods, as well as disruption of their learning and extra learning to compensate for their lessons.

Children also cite their difficulties in daily life during floods at home, such as "Before the floods come we help parents to move things to higher places of our houses and if any family that has grandparents, we have to send them to live temporarily in safer houses of neighbours".
"During the floods, because our houses are in low level, water overflows the floor so we have to use boat for moving around and cooking meals. Small children have to sit on higher ground in the house to be safe. Only when it is rainy and floods come to cause road erosion, it is difficult for us to go to school. Some areas where there is still floodwater, some children have to go to school with parents on boats. Back to school, we and our teachers clean and tidy up classrooms and school so that we can resume our schooling".

According to the children, during the floods, the school asks them to stay at home from 4 to 7 days depending on the seriousness of floods and the children have to take compensation classes on Saturday and Sunday.

For the teachers, although they do not understand much about climate change, but they do realize the changes in the natural disasters, and there is no more regularity in the seasons. This also affects their planning of the lessons, to ensure the quality of the teaching during the rainy season.

Case of Mr. Le Van Luu, Headmaster of the Primary School in Nhan Binh ward can illustrate this point.

Mr Le Van Luu is the headmaster of the Nhan Binh Ward Primary School. He says that serious floods in the area cause environmental pollution. Storms and floods also affect travel, study, and living conditions of the teachers and pupils, especially for those schools in lowland areas where pupils have to get through strong currents and have to pass overflowing dykes or dams.

"During the storm or flood, the school has to close, teachers and pupils stay at home. When there is a serious storm or flood, pupils an stay at home for 5 to 7 days according to school regulations. After that, they start to fall behind in the curriculum. In the past, storms and floods happened with certain regularity. But now.. we can't prepare in time. Perhaps if we begin teaching one or two weeks earlier than before, this would give us more time and flexibility."

The school can use local radio and television and newspapers to inform

parents about when children should stay at home. Also after storms and floods, local health workers spray disinfectant to prevent infection and disease.

The school now also includes lessons about environment and sanitation in its local curriculum, in relation to the situation during storms and floods. The headmaster suggests there should be more discussion on disaster mitigation and environmental protection and tree-planting, among pupils and teachers and parents.

7.2.2 Informal educational channels in the ward and in two sections

There is a centre for vocational training and community training at the ward. Interviews with mass organizations show that the some classes for women and local farmers are also organized. Topics include adolescent reproductive health, family planning communication/training, some extension classes for local farmers.

However, due to the limited budget for training and limited staff, the number of training for the local communities remains very limited.

In-depth interviews with local people in the two sections show that some local people learn or get information from each other in their neighbourhoods, and through their family network.

7.2.3 Capacity and Vulnerability

Some basic infrastructure of the formal education for the children, number and experiences of school teachers, and their readiness and experiences in integrating environment protection and disasters warnings to the children through lessons are considered the capacity to deal with climate change.

Local informal education channel facility in place, and neighbourhoods and family networks to learn, and to share information are good means to help the local people dealing with disasters and climate change.

Key vulnerable factors include: Lack of other basic facilities in schools such as strong classrooms and hygienic latrines, limited understanding of children and teachers on climate change, low level of awareness of their own safety during the natural disasters, no voice or participation into the disaster preparedness programmes in schools as well as in communities, and their poor family conditions.

High unemployment of young people due to low education level and no skills makes these group more vulnerable to low incomes, harder to deal with disasters and climate change.

7.3 Drainage system, water supply, sanitation and environment

7.3.1 Overview

There is no drainage and sewage system in the whole ward. As the height of the concrete road is higher than the ground floor of houses, long lasting inundation and pollution happen frequently in rainy season. The main reason is that impacts of floodings were not considered.

In Nhon Binh ward, 80 % of households, in all sections including section 4 can access water. However, the mainwater pipeline was installed in 2008 for section 9. Only 30% of the local households have connected to the mainline, the rest still use the pumped well water, because they cannot afford to connect to the main waterpeline, due to high cost installation, and a long distance from their houses to the waterpipes. It costs 1,200,000 VND to connect with the main pipelines for 5 m long. Many poor households who have not got even the well water, have to travel a few kilometers to buy water.

There are 70% of households having latrines in Nhon Binh ward, 65% in the section 4 and 60% in the section 9. Most of the poor and nearly poor do not have latrines. Local people show concerned that this can cause diseases in the community, especially during the flooding, storms and in the rainy season.

Living environment has been polluted in the ward, as well as in section 4 and section 9. There are several reasons for this. First of all**,** with a narrow residential area, without the sewage system, water waste and the animal husbandry has been causing poor sanitation in the areas. Secondly, in section 4 due to the narrow roads and there is no garbage area, the city garbage service does not come in, so the local people either burn their own waste or throw them around. Thirdly, local people's awareness of the environmental protection is not high. Bottles and bags of fertilizers and insecticides after use are seen to be scattered on the road sides, in the fields, in the lake and the rivers.

7.3.2 Capacity and Vulnerability

There is main waterpipes for the local areas and there are pumped water wells for daily consumption.

A lack of clean water and latrines, especially among the poor households, pollution from raising animal husbandry with the poor conditions in a narrow residential area, limitation of knowledge on water and environmental sanitation make people become more vulnerable when flood and inundation happen annually.

7.4 Infrastructure

About 2 km far from Quy Nhon city centre, Nhan Binh has most of its interroad system of earthernmade (6 out 9 sections), especially in section 9, 100% of earthern made roads, and 40% in section 4.

7.4.1 In Section 4

Dyke system resistant to intrusion of saline water and floods is combined with transportation road in section 4. The dyke is 6.5 km long including 2.5 km has been solidified. The rest of 4 km is made from gravels. Annual flooding water overflows low lying dykes making traffic stuck in the area and low and sunken areas such as section 4 and other sections isolated. (photo) Flood-tire makes dykes resistant to intrusion of saline water and river dykes erode every year. However, there is no budget to invest in the maintenance and no plan to solidify those dykes yet. When the dykes are broken, local people do not have enough boats to participate in repairing the dykes, and there is a serious lack of early warning system, loudspeakers, safe shelter.

7.4.2 In Section 9

- Most of the intersectional roads are earthernmade, resulting challenging traveling during flooding.
- The irrigational system of level 1 (main system) taking water from Nui Mot lake in An Nhon, which is 40 km far, and not benefiting section 9.
- 100% of inter-field canals is made from soil causing water leaked and therefore, a shortage of water in summer-autumn crop, reducing production and local people's income.
- The sluices at Hong Lam dyke donated by a Holland project in 2006 which operated by hand to close and open making it difficult to run.

7.5 Livelihood resilience

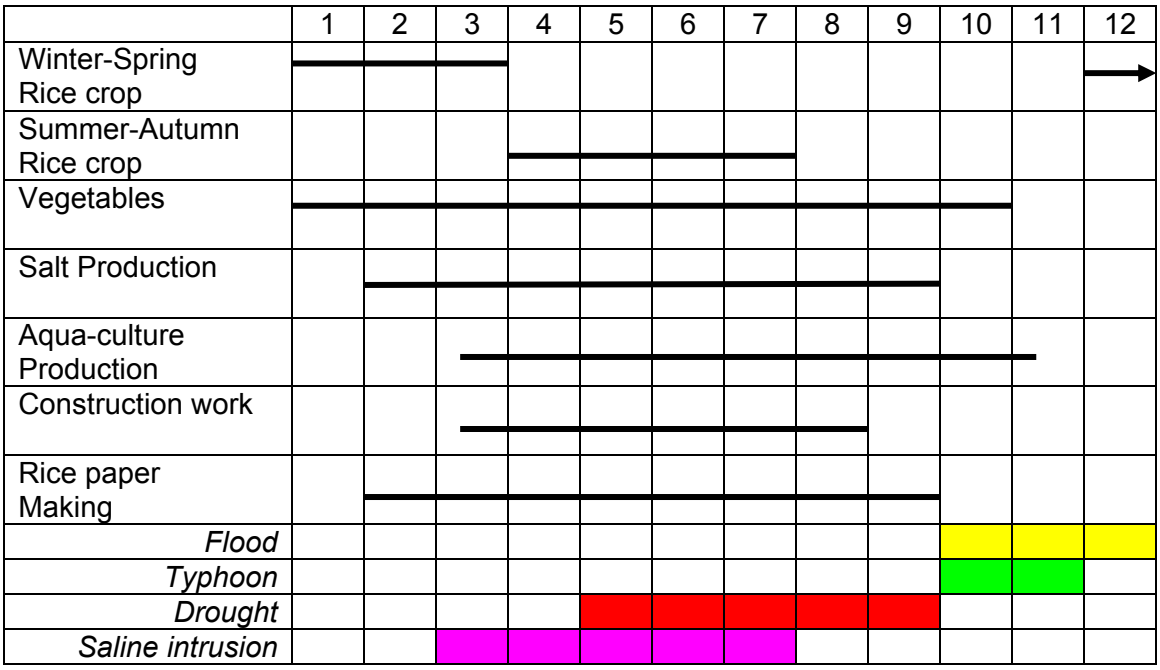
Nhon Binh ward has a total area of 1,468 ha including 410 ha of rice, 240 ha of aquaculture, 20 ha of vegetables, 15 ha of salt marsh and 75 ha of residential land. In 1994, farmers were allocated land with the average of 380 m^2 rice and 680 m^2 of aquaculture areas were allocated around the year 2000.

7.5.1 Main economic activities

Main economic activities are:

1) Agriculture: more than 80% of households producing rice, vegetables including Rau Muong and Rau Ma.
2) Aquaculture in Thi Nai lagoon: 100 people, consisting of 5% of the population.
3) Local people can do secondary jobs as workers in industrial zones, masons, building workers, small businessmen and rice cake producers.
4) Salt production: 20 households;

7.5.2 Seasonal calendar and hazards



The Seasonal calendar shows that all the hazards affect the key economic activities at various timings and stages of production cycles.

7.5.3 Agriculture production including rice and vegetable cultivation

Seasonal calendar and damage ranking table above show that the rice and vegetables production are strongly affected by the floods, storms, drought and saline intrusion. To cope with floodings, local farmers are trying to convert the three crops per year areas into safe two crops per year. However, there are still areas for three crops in the ward, and that even with two crops per year, the rice is still vulnerable to damages especially during sowing of Winter-Spring crop at the end of the year. Drought and saline intrusion also affects the rice yields. There is often lack of irrigated water for Summer Autumn rice crop from June to August, due to the lack of irrigation channels as well as during the dry periods. 100 % of the irrigation channels are earthern made, which cannot keep the water to irrigate for the field in Summer-Autumn crop. Local farmers have to drill wells in the field to irrigate this crop. However, only about 50% of the rice field is irrigated, because the underground water of a large area is affected by saline intrusion. Apart from the disasters influences on the rice and vegetables cultivation, there are other reasons for low gains from rice production for the local farmers, such as uncontrollable diseases (for example 'ray nau' in 2008), higher input costs, high labour costs for rice due to the lack of infrastructure, and market fluctuations. As a result, the average income from rice production is currently only 300,000 to 400,000 VND per a crop/500 m2, including household labor. Main labour force in the rice and vegetable production are women and elderly people in this area. Due to the urbanization process, men and young people in the ward and sections often to go the city to do other non-farm work, and women and elderly have to accept the roles of being in charge of lower income activities. Therefore, the damages caused by disasters and other factors not only affect incomes from rice and vegetable production but also make the women become more stressed.

7.5.4 Aquaculture

Aquaculture and fishing are also affected by natural disasters and climate change according to the local farmers, through group discussion, historical profile exercise, damages table and ranking. The damages are caused by floods, storms and drought. Floods can cause changes in the water environment, affecting growth, diseases and yields. Many fish and shrimp ponds overflow with flood water, sweeping away fish and shrimps, as well as breaking the pond borders. Drought affects the water level in the lake, making the fish vulnerable to diseases. Drought also makes the saline situation worse, affecting the fish and prawn growth. Besides, there are other main reasons that production of shrimps aquaculture and fishing produce lower incomes for the local farmers at the moment, including diseases, polluted water sources, lack of techniques, and reduced aquatic sources, and high debts from investment. 10 years ago there were 150 households with about 700 people in the section 9 lived on fishing on the lake, nowadays only 50 households are living by fishing on the lake. One of the key reasons, declining aquatic resources in Thi Nai Lake was explained by local government technical agencies and local people as follows:

- Polluted water in the lake due to the waste from industrial areas, pesticide from agriculture production and sewage from clusters of population living around.
- Lack of updated policy and regulations on exploitation of aquatic sources and poor enforcement: The regulations have not been updated to manage the situation of exploitation of aquatic sources. A local fisherman informed that to punish a person who use explosive materials for fishing, it is required to prove an evidence of at least 0.8 kg of explosive materials. In practice, apart from local fishermen, people who use explosive materials are often outsiders of the province, are equipped with high speed boats. When an explosion is found

offshore, they always have enough time to go far away. Besides, the regulations do not address the newly destructive tools and devices.

- Inadequate monitoring and supervision on the exploitation: Currently, to strengthen monitoring and supervision of exploitation in the lake, community teams of aquatic resource preservation have been established in all the fishing communes in the city. A community team consists of commune policeman, commune officers and representatives of fishermen, but the team does not work well because a lack of budget for operation and necessary facilities;
- Downward cycle: Due to the lower and lower productivity from aquaculture and fishing, local fishermen try to use new intensive and destructive tools, devices and explosives that can help them exploit more, even the smallest fishes and other kinds, and catching during the breeding periods.
- Destruction of wet land forest, which consisted of about 30% in the Thi Nai lake 30 years ago. To develop aquaculture, the forest was cut down to make fish ponds around the lake. For a few years, under the Japan supported projects, the wet land forest has been planted and developed to restore the ecological system in the lake and reduce the pollution. There have been some positive signals in the lake such as an appearance of crabs under the tree roots in the forest.

From their losses in shrimp raising, the local farmers also changed their industrial intensive mode of production into polyculture with a diversity of fishes, crabs and shrimps and reducing their losses. The raising of a variety of species in the lake also helps in a number of ways: reducing the loss from shrimp cultivation, solving the environment pollution in the lake, bringing more sustainable profits, increasing the species' resistance to diseases and coping better with changing water environment affected by saline intrusion and floods

- Due to the urbanization of the city, it is informed that the aquaculture area and rice production area are going to be used for other projects, by 2020. It is predictive that aquaculture as well as rice/vegetables farmers will have to change their jobs into other kinds of jobs for their livelihoods. However, according to the ward authorities, there will be challenges in supporting the local people in changing into new jobs, as most of the local people doing these livelihoods are women, elderly and middle-aged men, who are used to their traditional occupations, and facing a lot of constraints in finding new jobs.

7.5.5 Non-farm work including construction, wood-processing, garments and transportation. Although there is not so much direct impacts of disasters and climate change on these livelihoods, there is a strong 'push' factor for these kinds of work even more, when there are income loss impacted by disasters from other traditional economic activities in the families as well as 'quick' urbanization process with landuse changes. The majority of the labour for these work in the commune are young people moving away from other traditional occupations, yet with very limited educational level and almost no skills. They often have low bargaining power,

resulting in low incomes and poor working conditions such as long working hours, and no labour contracts or health and social insurance, annual and sick leave. Apart from garment workers, who often receive 4 to 6 months of training, and those who work for big enterprises in the city, the workers for other kinds are not trained or simply learning on the job. The construction work is not very stable, and also affected in the rainy season. Most of construction sites is not operated, particularly from October to December.

Non-farm activities are also affected by natural disasters

The assessment team met with some youngsters in commune who are construction workers. They were in the age group from 20-26. They were preparing for laying the foundation for a house. They said that skilled workers earn 70.000 VND/day while others earn only 40-50.000 VND/day.

They said that these jobs are not stable, especially in rainy season when all construction works are stopped. During that season, they stay at home without earning any money. During April and May, there was a lot of rain and they did not have jobs. When storms and floods happen, people suffer from losses and therefore do not have money for construction. The families of these youngster all live on agriculture and salt. They said that their jobs contribute to the household budget but it is not remarkable. Their families therefore have to live on other sources of income.

(A group of male youngsters, Nhơn Bình Ward)

7.5.6 In the section 9 of Nhon Binh commune, making rice paper – a locally famous food product is a traditional occupation. This occupation not only promotes rice value added, but also creates an employment opportunity for local people. There is a reduction of number of households who do this work from 40 to 20 in 2007, due to the limited market outlets, and unsuccessful cooperative experiences.

7.5.7 According to the local farmers, over the last three years, local people have moved into salt-making due to hotter weather conditions. In general, salt making is considered to be less risky compared to other economic activities, it can also be affected by different disasters especially storms, with heavy rains and floods, due to its long process of production from February to September every year, and most popularly carried out in section 4. In 2008, salt price is increased as high as 10 times in comparison with that in 2007. However, in 2010, 15 ha of salt mash in Nhon Binh will belong to the industrial zone, according to the urban planning of the ward.

How are people's livelihoods impacted by climate change?

In May 2009, the rain volume was the highest in several recent years. There was a flood in April. Usually in previous years, households could earn millions VND from salt-making but this year, they have not been able to make any money. Due to the prolonged rain, people could not prepare the land as they have to unplough the land then level it off before bringing water in. The unpredictable weather: lot of rain, scorching heat, sunny right after the rain. Heavy rain damages the rice and causes prolonged flooding. During the whole of May, people had to regrow the rice seedlings for three times but still, they failed with the crop. Before, they could do three crops in a year (depending on whether the field can be drained). Nowadays, they can do only two seasons. People do no know what to live on.

Rainy season starts from Lunar August to November-December. There are floods every year. Each flood lasts from 5-7 days. There are at least 3-4 floods every year. Even the dam was flooded, isolating the whole area without any means for transport. People could not go out for any work.

(Focus group with poor people, Section 4, Nhơn Bình Ward)

A story about Mrs. Ngo Thi Roi, 54 year old in sub region 4 in Nhon Binh ward illustrate the case of a single headed household who has to rely on a number of economic activities to raise the children, with a lot of constraints, and worsened by the effects of natural disasters and climate change.

Mrs. Ngo Thi Roi, 54 years old living in section 4, Nhan Binh ward. In an isolated area, her house, built 26 years ago, is like a little hut, with very short brick wall, wooden stills and rusted tin roof, which has been degraded. Her house is located illegally in agriculture land because she and her husband migrated to the area and she has not had her residential land so far. It is a high risk for her house[2] to be taken away.

Some years ago her husband left her with 7 girls to live with another woman. It was lucky that her brother, "Vietnamese oversea" in the United State helped her

[2] If the agriculture land is replaced of a project such as industrial purpose, a compensation rate of agriculture land unit is much lower than that in residential land. For example, 1 m2 of agricultural land is 200,000 VND for compensation (which is not based on market price), but 1 m2 of residential land is possibility 5 or 10 times higher (which is near to the market price).

to cover the education cost for two her children studying at university and college. Now her family had three main labors including her eldest daughter working as a village tailor, and another girl, 18 year old, dropped out a lower secondary school, helping her for house work and the field. Three other girls are still studying at school.

With 3,500 m2 of land, she can only grow one crop of rice with the earning from Winter Spring rice crop ranging from 1,050,000 VND to 1,300,000 VND[3]. She cannot grow second crop due to the shortage of water.

To feed and raise her children at school, she had to hire fish ponds from a local church, about 1.8 ha for aquaculture and 0.5 ha of salt mash. However, since 2005, her earning from aquaculture has been promptly reduced because of diseases, flooding and fluctuation market. In 2008, for buying aquaculture inputs as breeds of fish, crap and shrimp, she had to borrow 2,500,000 VND from a money lender at interest rate of 4% per month, being much higher than that of commercial bank (around 1% per month). However, after one month, most of the breed of fish, shrimp and crab died and many of them were swept away during the flooding in 2008. So she had to borrow additional 2,500,000 VND from the money lender to buy the breeds again. She expected to earn about 2,000,000 VND from aquaculture in the end of August in 2009 if most of the current breeds could survive from the diseases and there is no big flooding. In 2005, 2007 and 2008, the level of water surface at flooding time was 0.3 to 0.5 meter higher than that of the bank of her fish ponds. The flood not only swept away her her fishes, polluting the water, but also damaged the bank of the fish ponds, which cost her more money and labour to repair.

In 2008, the largest part of her income came from salt mash because the market price of salt was suddenly increased about 10 times. She earned about 15 million VND from salt mash in 2008. In April this year, it should be the time to harvest salt, but she could not do because of raining too late in comparison with last April.

When asked about how to manage for her house reinforcement before storms, there seemed to have water in her eyes and she said that each time she hears about the storm, she sends her small children to her relative house for their own safety. She and the eldest girl stayed at home, putting sand bags on the roof as well as around the wall of her house, tying up houses at her own her experience. Once a storm came at night, she could not sleep because of loudly sound from the roof, she was so afraid of the collapsed house in the isolated area.

7.5.8 Basic services for key livelihoods activities

Extension services: government extension agriculture and fishery centre has a network from the city to ward and section level. There is also a vet extension workers at commune and section level. Their key responsibilities are to provide technical support to the local farmers in disease control for rice, vegetables and aquaculture, and husbandry through training, demonstration plots, exposure visits. They also provide information on market inputs and outputs prices, policies, seasonal calendars. At the moment, there is a directive on socialization of extension services. However, there are many cases where extension staff cannot help the local farmers, for example 'Ray nau' destroyed a great deal of Winter Spring rice crop (2008 – 2009) in Nhon Binh ward, and that farmers in the section 9 informed that they

[3] Based on Focused Group Discussion of farmers in the village, it estimated that earning from rice plantation per 500 m2 is 300,000 to 400,000 VND per a crop including household labor.

sprayed the same kind of insecticide, even more times of spaying than before but it did not have any effect, and at the moment the extension staff cannot help the local people to deal with this disease.

The extension centre in Nhan Binh ward has organized demonstration plots to convert the '3 unstable rice crops into 2 safe crops' for 27,5 ha, and also helped the local farmers with the right time of starting the second rice crop in the year, avoiding the bad impacts of the weather and disasters on the rice seedlings. Model of 'three increases, three reductions' (meaning increase of yields, quality, and profitability; reduction of seeds, pesticide, fertilizer) for 30 households in Nhan Binh also helped increase the profits for local farmers.

However, due to the limited number of extension staff, as well as limited finances for training classes and demonstration models for production, the number of local people in section 9 and 4 who can access to these remains very limited. Extension workers have not been able to provide technical services to the local people in terms of rice, shrimps and fishes diseases.

Credit services

- Policy Social Bank (PSB) and Bank for Agriculture Rural Development (BARD) provide formal credits to the community. Credit Conditions: To borrow credit from PSB, borrowers are certified by a selection process by local authorities at commune and village level. Women Union, Farmer Union, Youth Union are a guarantee bodies for borrowers, while borrowers of BARD have to have a mortgage. The interest rate of PSB is subsidized, but the rate of BARD is based on the market. Except the national program on fishing offshore, a loan size of BARD ranges from 3 million VND to 20 million VND.

- PSB provide the credit to the borrowers, based on the national target credit programs. In Nhon Binh and Nhon Ly, with a loan size from 5 million to 40 million VND, the target programs include for the purposes of:
- Poverty Reduction (for certificated poor households)
- Creation of Job and Employment (for the poor, nearly poor)
- For students studying in secondary vocational schools, colleges and universities of the poor and nearly poor families.

- In Nhon Binh commune: among 415 households, only 10% of the households borrowed from PSB, 216 households (around 50%) from BRAD.

- PSB and BARD play an important role for the community to access credit for rural development, however, the following limitations of the bank loans as follows:

- Credit Conditions are a main barrier for borrowers. Availability of loan in PSB depends on the national target programs. Normally twice a year, the PSB provides credit to the community. Therefore, availability of the loan is inconvenient for borrowers. A rate of borrowers in the community is rather low;. It estimates that about 15 % of households accessed to the banks, while number of households demand for loans is still high. A loan size regulated by the banks is not feasible for a household to run business such as seafood processing, aquaculture.
- Financial services including saving and insurance have not yet operated in the area.

- Informal money lenders: In the ward as well as in both sections, local people have to depend on loans from informal money lenders with a rate of 3 to 10 % per month. There are gold lenders, with extremely high interest rates. Low

income households have to borrow loans from money lenders when their family members get sick or cover the education cost, or during the months with no incomes. However, as disasters happen, and the local farmers lose their crops, they are even more vulnerable to high debts from the interest rates as well as unpayable loans, pushing them into chronic poverty.

7.5.9 Poverty analysis

1) .Shortage of productive land is one of the causes for poverty.

According to local people in Section 4, each household is allocated with 430m^2 (less than 1 sao/person) of agricultural land. Many households have 5-6 members, still they get only 1-2 sao of land because:

- Land was allocated in the early 90s. Therefore, children who were born after this do not get any allocation.
- Many household splitting happen after this point of time. Consequently, they do not get land allocation except for some small plot from their parents.
- Many women were allocated with land before they got married. Once they got married, they moved to live the husband's family without "bringing" the land along. Therefore, their nuclear family have only one portion of land which also depends on whether they could get it from the husband's family. In reality, some women do not get any land as it has been allocated long before they move to the new locality while land allocation in her hometown takes place when she moves for marriage. Consequently, the women do not get any land in either location.
- Some poor people went away for a living and then returned to their hometown without any land.
- Some women said that their families got land allocation in the mountains. Because they have small children, they could not do upland farming and therefore have rented the land to other people.

It is very difficult for a family with at least 5-6 members to live on a 1-2 sao plot of land even when there is no disaster. The key agricultural activities in Sections 4 and 9 are rice production and salt making, which do not bring high income. These livelihoods are seriously impacted by natural disasters and climate change.

2) Poor people become hired workers after they sold the land.

The land policy of the Government of Vietnam is to allocate land to all households living on agriculture based on the number of members and the local total area of land. However, many poor households have rented their land as they need money. The transfer of land (land cannot be sold as it is the State property) is based on the negotiations between households in terms of price and timeframe. Poor households said that the rent price in 2005 was 120,000VND/sao/year usually for a period of 5 years. Poor households get poorer because they do not have production materials, especially land, the most important material for rural production. They also suffer from devaluation of the currency and inflation during recent years as the rent price remains the same as that of 2005.

Voice from the poor: Lack and shortage of land for various reasons

My family has 3 sao of land which was for rent for only 360,000VND/year as we are poor. As we urgently need money for medical bills, we then had to sell the land. I'm sick and incapable of working. My wife works as a construction worker and earns around 40,000VND/day. She can work only a few months in the dry season. My two children dropped out of school when they reached the 4th grade. As we are too poor to buy textbooks, they're too ashamed to go school.
(*Mr Hùng, Section 9, Nhơn Bình Ward).*

The Government allocates land for all the households based on the household register book. However, I don't have any land for making salt now. I married in 1992. My husband's locality allocated the land before that, so I didn't get any land over there. In my hometown, land allocation happened after my marriage. Consequently, married women who move along with their husbands did not get any land, either. Now, my three children and I did not get any land allocation except for 1 sao from my husband (*Ms Men, Section 4, Nhơn Bình Ward)*

Other poor households participating in the group discussion do not have any land as they rent their land to others. For example, both Ms Minh (Section 4) and Ms Thu (Section 9) rent their land of 2 sao. Many divorced women have no land when returning to their hometown (Ms Anh, Section 9). Many households originally from the ward went away for a living. When they come back, they do not have any land, either (Mr. Hien, Section 9: the couple are hired workers with virtually no production materials). Among the 9 people participating in in the group discussion in Section 9, only 1 household has 4 sao of land (Mr. Le Huu Lang). The rest has only 1-2 sao of land for rice production.

(*Summary of the data and information from focus group discussion and in-depth interviews at Nhơn Bình ward)*

The situation is very similar in other sections of Nhon Binh where people live mostly on aquaculture: Each person got allocated with a plot of 680m^2 of coastal land (for aquaculture). At present, many big families get only 2-3 plots as land allocation happened long time ago. Many new families do not get any land. Interviewees said that they need at least 5,000m^2 for aquaculture. As poor families cannot afford it, they rent it to the better-off with the average price of 200,000/plot/year (680m2).

Although the government land allocation policy is to ensure that even poor people have land for production. It means equality in sharing of community natural resources. **However, the problem is that: the current allocation manner of land for agriculture and aquaculture is very fragmented.** This is the cause for low productivity as well as the widespread renting by poor households. Because of this reality, the government's goal for equality in benefit sharing for the poor has not been totally achieved as expected.

Livelihoods of poor households are rice production, salt-making, working as hired labourers for better off households or off-farm. Findings also show that economic activities of the poor are substantially impacted by natural disasters, weather and climate. These are the main sources of risks.

Livelihoods of average/better-off households are quite diversified: The combination o many livelihoods have resulted in the safety in terms of jobs and incomes of average and better-off households that were surveyed. The multi-livelihood strategy: *"we will focus our investment on trade that proves a success".* They said that they cannot live on only trade as it is so dependent on weather and climate. One pertinent feature is that most average/better off families have their main income from a combination of many trades.

Livelihoods of average and better-off households	
• Co-invest with each other for shrimp production • Bicycle repairing • Construction workers (60,000/VND/day) • Pig raising • Selling petrol, soft drinks, beer, groceries … • Sell stuffs for breakfast (bread, rice steamed cakes with shrimp) • Selling alcohols • Selling fruits *(Mr. Nguyễn Văn Bình, average household, Section 4-Nhơn Bình Ward)*	• Groceries • Selling soft drinks • Selling rice (husking rice seeds and then sell it) • Selling alcohols • Selling fertilizers (in exchange of rice as people cannot pay immediately and therefore have to pay higher later on. They will have to pay for their debts with rice. It is worth noting that the price of rice at harvest time is always lower than before that. • Fishing (everyday) *(Trần Quang Ảnh, better-off household, Section 9,Nhơn Bình Ward)*

Although average and better-off households are not impacted by natural disasters regarding their housing as they live on high areas. However, they share the damage on livelihood activities. For example: cannot harvest shrimp because of heavy rain, not enough salty water for the shrimp to breed. They have not earned any money

after three months' investment (around 10 million). Problems with pig raising (due to hot weather): before: they could sell a pig which weighs 70kg after raising in 3.5 months. Now, after 4 months, the pigs weigh only 40kg.

7.5.10 Capacity and Vulnerability

Local people also changed into new livelihoods activities such as salt making; and increasing their resilience by knowing the damages from natural disasters, changing current cropping systems, polyculture with diversity of fishes, crabs, shrimps, and timings during the production cycle to reduce the loss of the production.

Diversified economic activities from farm and non-farm give the households more economic strength to deal with disasters and climate change effects.

Key economic activities of the local farmers in Nhan Binh are vulnerable to disasters and climate change in various ways and different timing.

The most vulnerable groups are the women and elderly people, and the poor who have to face with production constraints coupled with the high risks and stress of losing the crops from floods, storms, droughts and saline intrusion, affecting food security and incomes for the families.

Both areas for rice, aquaculture, fishing and salt making are being reduced or even stopped in the future due to the urban planning of the city for the projects of resettlement areas, tourism development and waste water treatment complex. Local people who work in these sectors are vulnerable to changes, and face challenges of changing their occupation, and adequate compensation for their land, food security and incomes.

Non-farm labourers/workers move into new occupation with limited training support,may instances by 'push' factors.

The extension network at the commune and section level is still weak, yet, can play a role of providing more information related to production cycles to cope better with climate change and disasters, and promoting/facilitating the indigenous practices/adaptation experiences from farmers to farmers.

Access to financial resources for local people are vital to improve their incomes as well as cope with and recover from disasters. PSB and BRAD provide most of formal credit to the community, yet the coverage is limited, resulting in local people having to rely on high interest rate informal lenders or families.

7.6 Housing

Through the historical profile in Nhon Binh, ranking of damaged houses in the past 20 - 30 years is the second after the human loss. In 2004, the storms blew off the roof about 30% of houses in Nhon Binh. In 2005, the flood swept away the three simple houses, and in 2007 two houses were collapsed by the flood and lots house' roofs are damaged during storms. Key reasons are given that there is a lack of building and reinforcement techniques resistant to floods and typhoons (among government staff, local people, local builders), as well as lack of money for rebuilding.

Most vulnerable houses in Nhon Binh ward are described as follows:

- Houses on public land on the beach of the East Dam, and it is illegal to build the houses on this areas (about 210 households including those in section 4)
- 190 houses on unsafe areas near to the river where used to be landslide, or degraded and not yet upgraded.
- 1,700 houses in the low lying flooded area.
- 65 temporary houses of the poor or single households in the section 4,5,8,9.

In Section 9:

- There are 10 temporary houses of those who are poor and do not have money to build solid ones. Some households count on the support program for the poor so that they do not rebuild houses.
- 13 temporary houses were built on illegal land so that owners did not build solid ones.
- Semi-solid houses are located next to Ha Thanh river and therefore, are often flooded since the river is narrowed down and water run very fast. The main reasons for the narrowed waterflows are: illegal housing construction, annual land fill-up and industrial complex.
- As local people make ponds to raise shrimps without following the plan of draining flooding water, inundation is long lasting and houses were damaged and collapsed.

Section 4

- 10 temporary houses of poorest households
- Illegal housing on East Dyke, therefore the house owners do not want to build solid houses.
- Unsafe houses on the broken dyke of 4 km.
- There is a lack of building and reinforcement techniques resistant to floods and typhoons (among government staff, local people, local builders), as well as lack of money for rebuilding

Problem tree exercises in Nhan Binh ward on poor and unsafe housing shows the results as follows:

- Majority of the community, particularly the poor, nearly poor and low income households cannot afford for building a concrete house, which is supposed to be safer/ or resistant to storms and flooding.
- Interviews with local people show that there is a lack of construction techniques to construct a safe house. The local people and local construction workers are also not trained or equipped with the techniques for a safe house.
- Although, the local people show high priority in having a safer house for their family, it involves a large amount of capital, and for many houses with daily struggle for expenses and food, it is almost impossible for them to reconstruct the houses.
- Local experiences are to cope with the disaster in terms of reinforcing the houses before the rainy season. For example in section 4 in Nhon Binh, some people put sand bags on the roofs to protect the roofs from the storms. However, this experience is possible to be a secondary hazard if the capacity of the house frame does not resist the weight of the sand bags on the roof.

<u>Capacity and Vulnerability in Housing</u>

1) There are some coping strategies from the local people to consolidate their houses before the disasters season.
2) The lack of finance, building techniques and skills on safe housing resistant to storms and floods are key factors that result in poor housing conditions of the local people.
3) House construction in illegal areas makes the households vulnerable to landslide, floods and they are not encouraged to build solid ones.
4) Other factors such as riverflow poor management such as construction of industrial complex also make the houses much less safe.

7.7 Most vulnerable groups in Nhan Binh ward and Nhan Ly commune

Based on the mapping exercise, group discussion and in-depth interviews, the most vulnerable group in the two communes are disabled people, elderly, children, and the poorest households, due to their special circumstances and constraints in poor health and diseases, unsafe housing conditions, low incomed livelihoods, lack of awareness, knowledge and skills for safety, limited access to credits, and other informal training opportunities.

Interview with Nguyễn Văn Rớt household - lonely poor household

Mr. Nguyen Van Rot has no employment, as he is blind and disabled, due to an accident in 1974. As he has no income, and has to rely on his younger brother, who is working as a construction worker. His younger brother assists him with food and medicine fee.

He told us that all daily activities were previously difficult, after having accident, everything became so hard to him and his life was so hard. Gradually, he tried best to get familiar with new situation and now his life is not too hard, “Living on the community's spirit” that what he did say to us after telling a long story, meaning having lots of support from the neighbours in the community where he lives.

The house where he is living now was once only low-roofed house; afterwards, the Government compensated him for reclaiming the rice field; his brother used this compensation for renovating the house, “so I had a level-3 house to get away from rain and storm” added happily by him.

When asking how he knew about incoming storms or floods in his area, he said that he normally got information from radio television, “I ask for brothers and neighbours’ help when wanting to know information” said him.

“I have high blood pressure. With the health insurance policy for the poor, I often go to city hospital for health check, about 1or 3 times per month”. he admitted.

However, he also complained that it is difficult to have health check with health insurance policy because he has difficulty in traveling, having to wait for long time and having to ask his brother for taking him to hospital.

“When being informed of big storm or flood, I try to do what I can, if not I asked for help from brother and neighbors, for example, moving utilities to a higher place”.

He also told us about some preparation for the storms and floods as as elderly people often prepare including tools, food, kerosene in advance.

“In the future, there will be more rainfall, heat and big storms; however I am most afraid of the coldness because I am old and weak. Elderly people - they always have their own needs especially for lonely poor people, they need to be provided with mosquito nets, blankets, medicine and food on a timely manner”.

Mr. Tran Van Dua, born in 1940, a blind man, is living in Nhon Binh ward, Quy Nhon city. He has no children and living alone in a very simple house of 10 m2. It was renovated with the support from local government 3 years ago. He has no work now, but used to be a beggar for living. At present, he is living by relying on income from renting half of his land plot out and receiving an annual allowance from the government (180.000 VND/month) on a quarterly basis. At the moment, he has not had sufficient food unless receiving further support from neighbours, coming to markets (Dinh market, So De market) to beg other people or to pick up rice scattered after harvest time. No one takes care of him. When he gets seriously sick, he takes care of himself. However the local authority has recently provided him with health insurance policy; he often feels sick and suffers mild flu when it is too hot or particularly prolonged coldspells.

When flood or storm occurs, he is always informed by neighbours. He always stays at home, using what ever food available in the house, mostly he is unable to buy more food because of lacking money, suffering from difficult travel conditions during this time. When rainy season or storms have gone, the house is usually leaked from the roofs and it was so wet that he could not find a suitable place for sleeping.

In the past, he often received support from the local government after natural disasters have gone. However, as a beneficiary from monthly allowance, there has been no more support.

He also recognized that there have been some common disasters occurred in

locality, such as storms, heavy rains, prolonged cold, because of such weather condition, he only wishes having sufficient 2 meals a day, having electricity for fanning when it is hot, having blanket to keep him warm enough during cold season and receiving support to renovate the existing leaking house roof as part of preparations for the next rainy season.

Nguyễn Thị Hòa is living with her sister because she is homeless. Everyday, she goes to sell lottery tickets around the ward to earn a living. She can be able to read and write but a little; therefore, she can get information of weather forecast through television and newspapers. When there is a warning of flood occurring, her younger sister and nieces help her load things up to higher place.

The house where she is living in is 4-level temporary house, and it is lower than road surface, so flood water can get into the house at 0,8 to 1m high and still lasts 3 or 4 days later. She does not know what disease she is suffering, but she is always sick and tired. When being sick, she goes to city hospital for health check with health insurance certificate for the poor; however, it takes long time for traveling and waiting for her turn to be checked.

Flood and storm are common natural disaster in her community. She said “When storm or flood occurs, it brings many bad impacts on local people’s life such as damages of trees, loss of cashcrops and houses. For me, I am afraid of coldness because we are weak and not enough clothes to be warm and we can not stand if the coldspell is prolonged”.

Before the storm or flood comes, she usually prepares rice, instant noodle and spices, kerosene lamp and loads important utilities up to the higher places. After the flood has gone out, she puts things back to normal place. She herself suffers from some diseases caused due to natural disaster, e.g itching and gyological diseases or diarrhea due to dirty flood water. Local health workers always remind people on disease prevention after flood, if there are diseases, they should buy medicine from pharmacy. She also wishes the government would help local people build a sluice and upgrading small village roads.

7.8 Issues of most concern in Nhon Binh ward

Disaster Management

Ward Level	Section Level
Planning: Low level of participation of the local people especially women in disaster planning; Not integrated into SEDP; there is no pre assessment before planning; Inadequate level of rescues teams: lack of techniques, skills and facilities, lack of demonstration. Inadequate and inefficient, old existing early warning system. Lack of communication facilities.	Inadequate level of rescues teams: lack of techniques, skills and facilities, lack of demonstration. Ineffective, old existing early warning system. Lack of communication facilities.

Governance

Ward Level	Section Level
Administrative planning process Consultation through community representatives Lack of planning techniques and skills Lack of participatory planning Urban planning: There is a master plan for Nhan Binh but no detailed plan. Upgrading small scale infrastructure with higher foundation than existing residential areas leading to more ad long lasting inundation. Lack of consideration of CC and disasters impacts in the planning and implementation. Lack of assessment of alternative livelihoods for local people before landuse conversion (for industry zones). Limited participation of the local people, especially women in planning	

Hazards

Ward Level	Section Level
Frequency and severity of hazards increasing Knowledge and awareness on climate change and causes and impacts of hazards.	Frequency and severity of hazards increasing Knowledge and awareness on climate change and causes and impacts of hazards.

Life Security

Ward Level	Section Level
Loss of lives for adults and children. Low level of awareness of self-protection	Loss of lives for adults

Health

Ward Level	Section Level
Degraded Health Centre and lack of facilities, equipment, staffing. There are constraints such as limited understanding on climate change related diseases in the future, and limited programmes targeted children and women, as well as elderly people in the area. Unpredictable weather changes have an impact on people's health and diseases. Limited programmes targeting women and children, disabled and elderly. Limited health services system. Poor health and nutrition of the disabled, and the poor. Low awareness of self health care among women. Lack of understanding of reproductive health among women. Women and children suffer from disaster related diseases with limited and poor treatment. Malnutrition among children	Poor health and nutrition of the disabled, and the poor Low awareness of self health care among women. Women and children suffer from disaster related diseases with limited and poor treatment. High malnutrition among children

Education

Ward Level	Section Level
Low level of education among main labour force. Lack of facilities and hygienic conditions in schools. Existing schools are not resistant to storms and floodings. Children do not participate in disaster preparedness programmes at schools or communities. There is not much integration of climate change and disasters management into the children's curriculum.	Low level of education among main labour force. Informal training classes for local people remain limited. Children do not participate in disaster preparedness programmes at schools or communities. High unemployment among young people.

Informal training classes for local people remain limited. High unemployment among young people	

Clean Water Supply, Drainage and Environment

Ward Level	Section Level
There is no drainage and sewage system. 20 % of Nhan Binh ward population do not have access to clean water. 30 % of households in the ward do not have family latrines. Polluted environment in the commune and in all sections: living environment and air pollution.	Lack of clean water Lack of sewage system Lack of latrines Environment pollution (living and air pollution)

Infrastructure

Ward Level	Section Level
Most of earthern intersection roads. Lack and low quality electricity lines Some part of the East Dyke is still earthern Narrowed watercourse of Ha Thanh river (land fill-up, sand exploitation, changed riverflows, construction of houses, construction of public works.	Most of earthern intersection roads. Dyke resistant to intrusion of saline water and river dyke Poor Transportation road

Livelihoods

Ward Level	Section Level
Key livelihoods most affected by disasters are resourced base. Limited incomes from agriculture, aquaculture and salt production (disasters), affecting the poor. Non-farm work is also affected, reducing the incomes of the poor especially hired labour. The poor suffer most from the impacts of disasters. Limited access to support services such as credits provision and extension High interest rate from informal money lenders Ward future development to stop the resource based livelihoods (agriculture, and salt areas) will limit the alternative livelihoods options of the local people.	Low incomes from agriculture, aquaculture, and other non-farm work. Limited access to support services such as credits provision and extension High interest rate from informal money lenders. Ward future development to stop the resource based livelihoods will limit the alternative livelihoods options of the local people

Self-Protection

Ward Level	Section Level
There are many semi-solid houses (level 4), which are most prone to damages by disasters on Ha Thanh river bank. Unsafe housing (temporary and semi-solid) Illegal housing on East Dyke Lack of building and reinforcement techniques resistant to floods and typhoons (government staff, local people, local builders) Lack of finance	There are many semi-solid houses (level 4), which are most prone to damages by disasters on Ha Thanh river bank. Unsafe housing (temporary and semi-solid) Illegal housing on East Dyke Lack of building and reinforcement techniques resistant to floods and typhoons (government staff, local people, local builders) Lack of finance for housing

8. CAPACITY AND VULNERABILITY – NHAN LY COMMUNE

Nhan Ly is a rural commune of Quy Nhon City. The assessment examined capacities and vulnerabilities at the village level in two sample villages – Ly Hoa and Ly Hung, and at the Commune level.

8.1 Health

8.1.1 **Table 28: general health data**

Data	Nhan Ly	Ly Hoa	Ly Hung
Health centre	1		
No of doctors, nurses and health workers	1 Medical staff (Man) 2 Medical Assistants (1 man and 1 woman) 1 nurse (one woman)		
Access to health centre		2 km	1.5 km
Village Health Workers Network	9 people for 4 villages	3	2
Pregnant women	75		
Children under 5	602		
Malnutrition rate (2007)	17% (122 children)		

8.1.2 Health facilities

There is one health centre in Nhan Ly Commune, with only 1 medical staff, 2 medical assistants and 1 nurse (3 women and 2 men). The health centre is of poor quality, lacking 3 more treatment rooms. Few years ago, the roofs of the health centre was badly broken, and had been repaired.

8.1.3 Village Health workers network:

There are 9 health workers for 4 villages. There are three in Ly Hoa village, and 2 in Ly Hung. Key responsibilities of the health workers include following up with

diseases/epidemics in the village, weighing for the children, monitoring the deaths and births, providing information of family planning methods for women, and carrying out any tasks given by the Commune health Centre.

Table 29

Constraints	Strengths	Recommendations
Limited monthly allowance.	Enthusiastic staff	Recruiting more health workers for densely populated areas.
Lack of staff in densely populated areas	Dealing early with epidemics, informing to higher level for timely actions	
Overloads, with many requirements of different health related programmes from the city, and combined with their own occupation.	Supporting the women and children in the village level in health care.	
Lack of training and skills in providing more common health advices to local people.		

8.1.4 Health services and programmes:

Western and traditional medicine treatment at the health centre. Traditional Medicine for treatment of common diseases such as flu, cough, diarrhea, wounds, menstrual regulation; as well as acupuncture treatment for headaches, backache, and paralysis. From 2005, the health centre started treating patients using traditional medicine, and sofar 39 patients have been treated.

There lacks a lot of equipment for testing of gynecology. There is only one room for both checking pregnant women and gynecology. There lacks also medicine for women after checking and identifying the diseases. In 2008, among 500 women in the commune (out of 1,200 women) registered at the health centre to be checked for gynecology, 260 women are found to be suffering from infection.

The health centre staff implement the national target programmes such as nutrition, family planning, vitamin A, vaccination for children.
Children-related programmes: Currently the malnutrition rate for children under two is 17 %. There is one specific programme to increase the nutrition status of children in the areas. Main activities include only periodic weighing, guiding the pregnant mothers to take care of baby before and after being born. There is also periodic health check for all the children in 3 kindergartens in the commune. Once a year, there is one meeting with mothers and small children to guide the mothers about the nutrition care for the children. Key constraints of the programe are the lack of finance for more effective activities for the women and children in the villages, and lack of staff for doing the work.

Women related programmes: Every year, there are 5 periods when the health staff at commune centres with the Health Centre of the City cooperate to carry out health check for women. The first two are for reproductive health assessment with contraceptive methods provision for women, checking gynecology for women and testing the results with technical equipment from the city. After the results, women

are provided with medicine for treatment. The funding sources are often from the various projects from the city as well as from the city authorities. The other three periods are conducted at the Commune Health Centre, for family planning, and checking of gynecology, yet there is no medicine to be provided after checking. Currently women suffer the most from gynecology and uterine infection. According to the medical assistant of the Health Centre, the main reasons are due to low income for health care, busy working and polluted working environment especially for women who patch the fishing nets, lack of clean water and low level of personal hygiene.
The health Centre also provides support to pregnant women, by registering the number of pregnant women in the commune, providing information and regular health check for pregnant women in the areas.

After each storm or floods happen, the health centre is in charge of disinfecting the wells, public buildings and schools. However, due to limited number of staff for all the villages, they cannot do all of the areas thoroughly.

8.1.5 Experiences of coping with diseases:

In 1995, there was a serious malaria epidemic in the commune, and all the health staff had to deal with the epidemics and learned a lot of lessons from this.

Due to the early identification of disease thanks to the network of village health workers, the health staff of the commune often deal with the results quickly, reducing the spread of the diseases in the community.

Table 30: Frequency of diseases in the ward and two villages

Diseases	Treatment measures	Storms	Floods	Heat wave/ drought
Coughs and lung infections	Health centre	x	x	x
Cholera	Traditional medicine at the health centre + homecare	x	x	x
Flu	Self treatment at home	x	x	
Sore Eye	Health centre and City hospital	x	x	
Cold	Self treatment at home or at health centre	x	x	
Gynecological	City hospital/health centre	x	x	
Fever	At home or ward health centre	x	x	
Malaria	Health Centre	x	x	
Uterine Fibroma	health centre or City hospital	x	x	

According to the health staff, most of the diseases appear in the rainy seasons, especially after storms, and flooding, due to the high humidity and poorer environment. Red sore eye and cholera, and coughing for children, gynecology, and uterine infections are particularly serious after the storms or floods.

At the moment, there is no specific programes to take care of the elderly and disabled, except the health insurance supported treatment at the health centre.

8.1.6 Understanding on climate change and climate change related diseases

Staff of the health centre can describe diseases related to natural disasters, and diseases for women in particular, as seen in table below and the case, yet, there is not a strong understanding of the impacts of climate change on possible diseases in the local areas. Most of their understanding of climate change is from the workshop and discussions within the framework of the ACCCRN project so far.

8.1.7 Local people's nutrition and health concerns

According to local people, when it gets hotter, there are many diseases: sore eyes, headaches, fever, nose bleeding. When there is flood, dengue fever and colds happen. Some poor people said recently many people suffer from rheumatism and cancer.

When asked about health care services, interviewees said that the commune clinic can provide services for pregnancy checkup, vaccination for children and IUD insertion. Other treatments are beyond the capability of the clinic both in terms of expertise and facilities and medicines. It is very difficult for the poor to go to the city hospital, which is 30km away and they have to pay for the motorbike "taxi" service.

Difficulties of the poor in accessing health care services

Ms Nguyễn Thị Diễm, 55 years old has 2 children. Her husband died 23 years ago on a trip heading for overseas on his boat. Her eldest daughter has already married. Now she lives with a 15 years old son at 9th grade. However, he has dropped out of school as she could not afford his schooling.

She has bone problems. She went to the city hospital once and got some medicine but it did not help. Then she did not go back again because it is too far away and she had to pay 60,000 for the transport. She has free medical insurance for the poor but still, she has to pay additionally.

Ms Huỳnh Thanh Kiều, Lý Hưng village said although the poor do not have to pay for the medicines, they still have to pay for test. Last week, when she brought her mother-in-law to the hospital, she had to pay for the blood test.

According to health staff and local women in the commune, most of the households especially the poor and disabled in the commune and two villages pay attention to taking care of their health and nutrition, but cannot afford to buy enough food and treating their sicknesses. However, according one health staff, sometimes, health workers have to persuade the women and give them a ride to the health centre for gynecology checking, if not many of them will not go for checking.

For the poor and disabled, they normally cannot afford to have enough and good food every day. During September to December, for many poor households in the commune and villages there are not enough food to eat, as the husband do not go to the sea for fishing.

Nhan Ly is a commune where local people live in very small housing areas, without any space for vegetables cultivation; therefore most of the families have to buy vegetables and other foods from the market.

High malnourished rate in the commune was explained by the lack of attention of parents to good diet for their children, but more the lack of money to buy adequate food for the children.

At the moment, local people in Nhan Ly commune and two villages are very worried about common disease such as red eyes, skin rashes and skin infection, gynecology, and cancer in the areas. Local people do not understand why there are so many cancer cases in the areas, and raising the main reason due to the cemetery nearby polluting their water sources. There is not any support from other health related agencies to deal with this issue. Local people now also raised their concern about their health or diseases due to the overexploitation of titan in the local areas.

Mr. Nguyen Van Ba, born in 1960, has 4 children, two youngest ones are in primary school age, the oldest one is studying at Quy Nhon Pedagogy University and the next one is in 10th grade. He is the only bread-winner in the family.

The house where they are settling was stabilized in 1999. It is a semi-solid house which was supported by his mother. However, the house was collapsed due to a storm and the family renovated it themselves, there is no latrine. Everyday, they use water from a drilled well for cooking, drinking, and for other daily activities.

The family is regularly in a shortage of food. They always get support from brothers, parents and pagodas in the commune. Because they do not have money, daily meals are not nutritious enough, mainly rice, very little meat or vegetables, and many times there is no meat.

During the storms and heavy rain, he cannot go out to work and earn money for the family, as a result, they lack money to buy food for the family.

8.1.8 Capacity and Vulnerability

1) Good experiences of preventive health care, control of epidemic diseases in Quy Nhon to cope with and recover from disasters.
2) A number of programmes by the health centre targeting women and children area being implemented.
3) Village Health workers network is in place to help the local people in healthcare and identify epidemics early.
4) The lack of facilities, equipments of the health centre limits their capacity to take better care of the local people.
5) There is a lack of understanding of impact of climate change to the future diseases.
6) Currently, there are common diseases among the local people, especially for women, and these are often worse by the impacts of rains or storms.
7) There are a few serious concerns by the local people over cancer and diseases by titan exploitation in the local areas.
8) The access of the poor to health care services remains limited.
9) There is still high malnourished rate among the children.

8.2 Education

According to the commune authorities, most of the local people in the commune have a level of education of up to secondary school and there is a level of illiteracy.

8.2.1 Formal education

There are 3 kindergartens, 2 secondary schools, 1 primary school and there is no high school in Nhan Ly commune. The primary school has 2 units one located in Ly Hoa village and another one is located in Ly Hung village. Total number of pupils in the two bases is 690 and total number of classrooms is 18. The school branch no1 consists of 12 classrooms, in which 4 rooms are degraded, 4 rooms are built at level 4 standard and 4 classrooms were solidly built. There is no latrine for pupils. The school branch no2 has 8 classrooms with 4 rooms were built at level-4 standard and 4 semi-solid rooms with latrines.

The secondary school can accommodate 784 pupils with 21 classes in total. The school has 11 classrooms, 9 out of them are seriously degraded, no functional rooms and the rooms are small. There is no toilet for teachers and there are not enough toilets for pupils.

Due to the poor conditions of the schools, school roofs are still being thrown away during storms. According to the teachers, the lack of latrines can affect badly the health for the children and teachers during normal time, during natural disasters such as storms and floods as well as drought or rainy days.

As there is no high school in Nhan Ly commune, the high school aged children have to travel to Quy Nhon city to study, 25 km away from the commune. There they have to hire accommodation in Quy Nhon city, which costs from 500,000 to 700,000 VND per month for accommodation, food and travel. Discussion with the people in Nhan Hoa, only 10 % of the local households who can afford high school education for their children in the city, while a majority of the children stays at home to help their families or finding a job in industrial zones in Ho Chi Minh City, Binh Duong, Bien Hoa, Quy Nhon and other provinces. To send a child to study in these schools, some households have to “sacrifice” the education of other children in the family, as in the case of Mr. Doan Van Buu, in Ly Hoa village, Nhan Ly commune.

Expenses for high school education is very high

Mr. Tho, Lý Hưng village said that he has a son at 12th grade in a school in the city so it is very expensive. If there were schools closer the commune, the children would not have to rent rooms and would save a lot on meals with the families. Moreover, they would not have to worry about them living out of our management. Each year, they have to spend 10 million of VND on one son at high school level, which is a big amount for the poor.

Mr. Khoá’s family, Lý Hòa village, is in the poor household list, has 5 children among which 2 are at school: one doing intermediate accounting, one at high school level. As the commune does not have high schools, he has to rent a room in the city. He borrows 25 million VND in the government’s loan program for pupils and students to pay for their schooling expenses.

Ms Huỳnh Thị Thanh Kiều, 42 years old, has 4 children all at school. She said the one at 12th has to pay 200.000VND/month for the room shared with other 4 pupils from the same village. They cook for themselves and meals cost 500,000VND/person/month. Additionally, she has to pay for 200,000VND for extra class fees. As a poor family, she enjoyed a subsidy of ½ of tuition fee. Every month, she has to pay 900,000VND for the child at high school level.

When asked about their possibility to pay for government loans, poor people shared the same hope that their children will be able to get a job and therefore return the money after they graduate. However, some women and men with children already graduating said that they have not been able to find a job after one year. It is possible that loans for the poor to pay for their children's schooling can be a burden for them.

School drop-out at primary level is relatively low but higher at secondary school. The rate of drop-out at primary school is 0.2%; mainly because their parents move to other places and the families are too poor. Secondary school has 21 pupils dropping out (majority is at 8^{th} and 9^{th} grades,10 boys and 11 girls). According to the teachers, they drop out of schools because their parents are too poor to send them to higher school. Most of them go to other places to work to support the families.

In Quy Nhon, Department of Education and Training has directed the integration of some knowledge of disasters management and environment sanitation into some subjects such as Geography or in extra curriculum in secondary schools, depending on the financial support of the schools and the parents. However, due to the lack of finance, these teaching are not well done yet. The children do not participate in any disaster preparedness activities in the schools or communities, or any safety programme especially in the rainy season, although their teachers and parents do warn and inform them of the storms or floods.

According to Mr. Duong Trong Ba, Head of the Secondary school in Nhan Ly, most of teachers live far from school, they are worried when storm occurs. Sometimes, they have to reduce number of classes. It was also mentioned that the pupils are also scared of storms and flood-tide as they cannot go to school.

Ms. Nguyen Thanh Huong, aged 56 years old living in Ly Hoa village. She is the main labour for the family of 6 children including 4 daughters and 2 sons. Her husband and 2 children are working far from home. The other two children staying at home are learning from 9^{th} and 7^{th} grades.

Her husband works as hired labour in the boats and she does not do any work, as she has a heart problem. Their house was built in 1971 with the total of $35m^2$, a semi-solid house and is being degraded. When there is storm and whirlwinds, its roofs is often blown off, and it costs them nearly a million dong to repair every year. There is no latrine and water can be taken from a drilled well in the house.

Their four children stopped going to school when they were only in 4^{th} and 5^{th} grade, in order to earn a living for the family. She said "as soon as we have more money, we will send one child to school and if we have some more, we will send two more. If we cannot afford for a long time, they will stop their learning permanently.

The family often lacks of food during September and October. During their Even they are still in shortage of food, especially in two months, September and October, certainly not enough money to cover for their children studying. During the non-working time, he family have to buy food with debts and borrowing money from the boat owner, or from a neighbour. Their incomes depend totally on the weather conditions.

8.2.2 Informal educational channels in the ward and in sections

There is a centre for vocational training and community training at the ward. Interviews with mass organizations show that the some classes for women and local farmers are also organized. Topics include adolescent reproductive health, family planning communication/training, some extension classes for local farmers.

However, due to the limited budget for training and limited staff, the number of training for the local communities remains very limited.

In-depth interviews with local people in the two sections show that local people do learn from each other in their neighbourhoods, and through their family network.

8.2.3 Capacity and Vulnerability

1) Some basic infrastructure of the formal education for the children, number and experiences of school teachers, and their readiness and experiences in integrating environment protection and disasters warnings to the children through lessons are considered the capacity to deal with climate change.
2) Local informal education channel facility in place, and neighbourhoods and family networks to learn, and to share information help the community to learn and share information.
3) Lack of other basic facilities in schools such as strong classrooms and hygienic latrines, understanding of children on climate change, limited awareness of their own safety during the natural disasters, no voice or participation into the disaster preparedness programmes in schools as well as in communities and their poor family conditions are considered to be the most vulnerable factors.
4) High drop-out rate among the secondary school children due to the lack of high school in the commune as well as poor family conditions in the local areas hinder the children to higher education, and this factor makes them more vulnerable to low income livelihoods activities.
5) Limited number of local people can access to other informal forms of education and training.

8.3 Drainage system, water supply, sanitation and environment

8.3.1 Overview

- There is no sewage and drainage system all over Nhan Ly commune including Nhan Hoa and Ly Hung villages. When building the inter-village roads, there is no drainage system, therefore inundation and pollution for the areas especially in Ly Hung and Ly Hoa villages.
- There is no clean water supply in the whole of Nhan Ly commune. Currently there are digging wells of 7 for 46 households, pumped wells of 580 out of 2,048 households in the whole commune. As Nhan Ly commune is around 30 km away from the main city water pipe, and that the Nhan Hoi Economic Zone is being established, the commune has to wait for water connection from the Zone. Still, with the pumped wells, the local people are concerned about the quality of the water, as they are living near a big cemetery on the top of the sand dune. There are some water sources affected by saline intrusion especially during summer time of June and July.
- 35%, 60% and 55% of households in Nhan Ly commune, in Ly Hoa and in Ly Hung respectively that do not have latrines. All the households do not have septic tanks to gather waste water from daily life activities, livestock and seafood

processing. As most of the households in the commune are poor, so they cannot afford to build a latrine in the house.

- Although there is a garbage collection service for all villages in Nhan Ly commune, yet this work is still poorly done. According to the local people and local authorities, this is due to the lack of facilities of collection, narrow inter-village roads and lack of awareness by the local people.
- Local living environment is being polluted because of various reasons. According to local people, local people's awareness of the environmental sanitation is not so high. No sewage system, with the heavy rains in the rainy season often causes inundation in the houses and on the roads in the villages, makes the living environment worse. Another reason is there is one cemetery with 4,000 graves of people of fishing villages, and one open garbage site in the commune. Similar situation is in two villages of Ly Huong and Ly Hoa. In addition, some local seafood processing businesses without hygienic conditions and sewage system, producing bad smells and causing pollution in the local area.

8.3.2 Capacity and Vulnerability

Poor drainage system, lack of clean water, lack of garbage collection service, lack of latrines in the local areas are making the local people more vulnerable. These are contributing to poor health of the local people, and making them more vulnerable especially during the rainy season with heavy rains and lot of inundation.

8.4 Infrastructure

Nhan Ly commune currently has concrete road in 4 villages (Ly Hoa 70 %, Ly Hung 80 %). There is no asphalt road in Ly Hoa, and only 10 % of asphalt road in Ly Hung. There rest earthen roads. There is one commune People's Committee building which is well built, and there is electricity all over the commune, however the electricity line has been degraded with only 60 % of coverage for all the households now.

8.5 Livelihood resilience

Nhon Ly commune has a population of 9,223 people with 2,088 households in an area of 1,535 ha, including forest land of 317 ha, and residential land of 40 ha. Therefore, an average residential land is 190 m2 per household and 43 m2 per a person. The projection for Nhon Ly residential, tourism and service zone has been approved by Binh Dinh Provincial PC on 26 November 2007.

8.5.1 Main economic activities:

- Onshore-near shore and Off shore fishing.
- Small-scale Sea products processing
- Hired labour
- Petty trading

Seasonal calendar shows that there are variety of economic activities in the commune and in the two villages. It also shows that the diversity of the activities for the local people to rely on to have incomes.

Activities such as offshore and onshore fishing are the most affected by the disasters such as typhoons, high tide. However, as the local fishermen are aware of the rainy season dangers, they do not go to the sea during the later months of the year.

8.5.2 Seasonal calendar and hazards

Months for Main activities	1	2	3	4	5	6	7	8	9	10	11	12
Off shore fishing /onshore												
Processing												
Fish for exports												
Squid, fish												
Fish source making												
Working as hire labour												
Ship making												
Ice making												
Worshipping festival for fish												
Festival												
Animal husbandry												
Petty Trading												
High Tide												
Typhoons												
Inundation												
Coastal erosion												

- Discussion with local people shows that currently offshore and onshore fishing are the most affected by the disasters such as typhoons. The most serious damage is the loss of lives of the main labourers in the families. The fishermen are facing the lower incomes due to lower yields, high risks of profits loss due to more intense storms and weather changes, and lack of labour forces. There are a few reasons for lower incomes: first of all, fishery resources are going down, resulting in lower yields, as there are people who use terminative tools such as small-mesh-sized nets, high-tension electricity in the sea bed to kills the fish, and explosives used to kill fishes, as well as more intensive catching even including the breeding times. There are also more and more modern fishing boats from other places coming to fish in the areas. Thirdly, production facilities such as boats and fishing tools often get broken and lost due to storms and floods. The constant repairs of boats are very costly to the fishermen. There is also a lack of safe anchor for ships, boats in Nhan Ly commune. The shore of Nhan Ly commune is located to the east in Ly Hung and Ly Luong villages, and the west in Ly Hoa and Ly Chanh, and there is no safe shelter for fishing boats to hide storms, this increases the vulnerability to the disasters. In 1978, there were 45 boats of Ly Hung village and 40 boats of Ly Hoa village wrecked on the way to Quy Nhon wet dock to hide the storm. Similarly 70 boats of Ly Hung and 80 boats of Ly Hoa were wrecked when they were going to Nhon Hoi to hide the storm in 1984. Quy Nhon wet dock is 25 k away from the commune, so fishing

boats are often sheltered at the beach in Nhon Ly. As a result, the boats are annually damaged by high tide. Poor infrastructure in Nhan Ly such as lack of lighting on the beach, lack of safe anchor also affects the damages the production assets. There has been no light in the beach, so boats are possible to be lost. In 2008, small boats were anchored in the beach in Ly Hoa village, high tide happened at the night. Without light, these boats were not timely observed. As consequences, they were swept away and wrecked off the coast.

- For off shore fishing, due to the destructive fishing methods, the fishes also go further out in the sea. This makes the offshore fishermen have to go further, before it was only one hour, but now four hours of going out to the sea, which is more costly to buy petrol and more dangerous, as when typhoons or strong wind come, they cannot go into shore quickly enough.

- Poorest fishermen often work as hire labour for the people with boats for off-shore and on-shore fishing. In case there is any disruption or loss with onshore and offshore fishing, the livelihoods of the these poorer fishermen are most seriously affected, compared to other groups in the community. The poor fishermen live by working on the boats for offshore fishing, as well as pulling fishing nets for the near shore boats, and earning their income, which is only around 400,000 to 500,000 VND per month. At the moment, these people also face a number of constraints as illustrated in the case: Low pay, hard work, loss of incomes, poor health, lack of support. They also want to change their jobs for better pay, but due to low education level, it is not so easy. During the rainy season, their families often lack lots of food, as there is no work.

Poor hired worker's life affected by disasters

Mr. Phan Dinh Du, born in 1971 and finished the third grade from primary school, and his wife, Ms. Le Thi Thu, born 1973, stopping at 5th grade are now living in Ly Hung village, Nhan Ly commune. There are 6 members in the family, but only one bread-winner - the husband because the wife has been suffered from paralysis for 16 years. The husband works as hired labourer, because he does not own a fishing boat.
Their house is only 9m^2, in a temporary condition, yet repaired already once in 2009. Yet, it is still easy to be collapsed if there are strong wind. There is no drilled well and no latrine.

Working as hire labour for the fishing boats, he said "my earning depends strongly on the weather conditions, and so, I cannot have stable income". The family is usually in shortage of food from April to December, worst months being from September to December. During rainy season, as they hardly have any income, they often have to borrow from the boat owners to buy food. Their children often get sick during the rainy season, such as fever, cough and flu, and they also have to buy medicine from the private pharmacy.

The family also is looking forwards to getting support from the government to build a small house to protect themselves against storms and strong wind, at the same time they wishes to have easy access to loans with low interest rate to start other income-generating activities.

Ms. Le Thi Ngoc Nga, aged 43, and her husband, Nguyen Van Ho live in Ly Hoa

village with two children aged 14 and 12. Their house was stabilized in 1989; it is a semi-solid one with a latrine and a drilled well. The husband is working as hired worker for the boat owner, and he has no other job, while the wife is selling snack stuff from their house to earn a living. According to Ms. Nga, her family do not have enough food to eat all year around. September and October are the most hungry months in a year, and the family lack lots of food and money. The earning from the husband is reduced because of the damages by storms to the fishing business and degrading aquaculture resources. Their incomes totally depend on the boat owner' business.

Living in a community by the sea, they are most scared of the storms, as their house is to be damaged, and this costs them money to repair. Ms. Nga said, " it will cost us from 500,000 VND to 1 million VND to repair, and we always have to get prepared here for that. When there are storms, we do not have any money, and still have to pay to repair the house, it makes us much poorer".

They wish to have an access to loan credit scheme of the Government for the poor, and that in case there is storm or strong wind, the local authority and other mass media should provide them with weather forecast information timely.

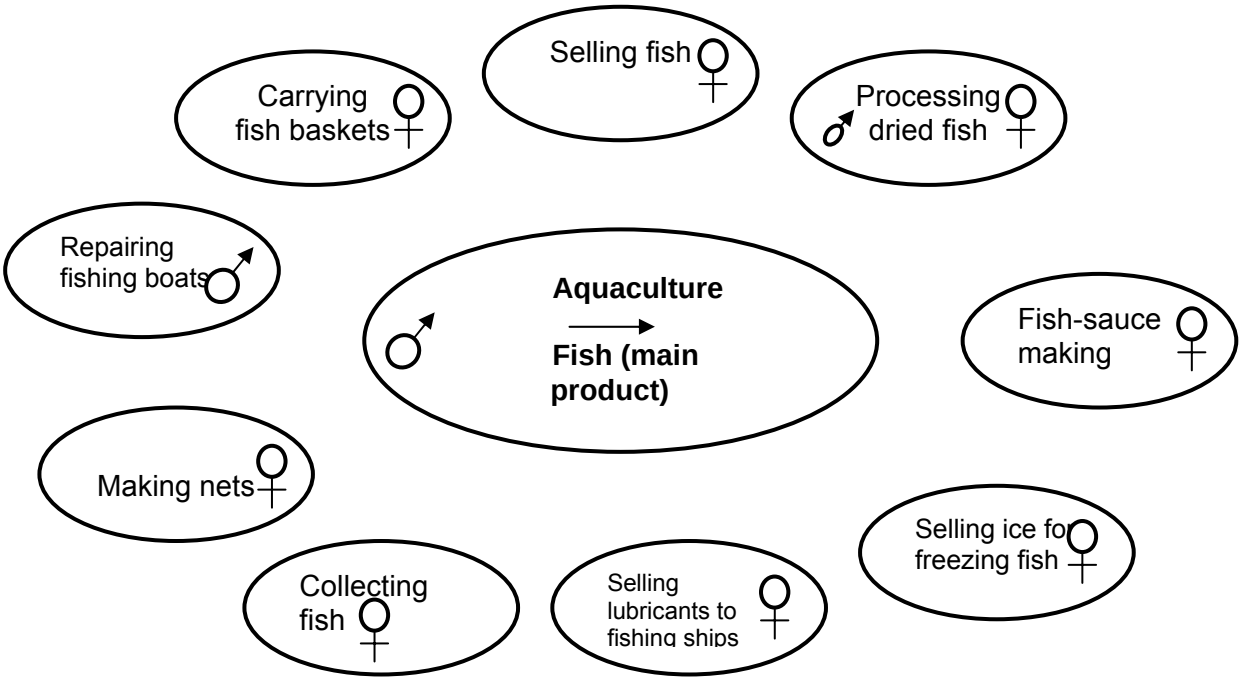
Losing livelihood and becoming a hired labourer on a ship due to impact of disasters[4]

Nguyễn Chánh Tấn, 47 years old has 2 children, is in the poverty list of Lý Hoà village. Before, he had a simple boat for fishing. He got a loan to fix the boat but then failed in the harvest. Consequently, he had to sell the boat to repay the loan and became a hired worker on fishing ship. He cannot afford to buy modern equipment such as detectors or compass machine. At present, he's working as a hired labourer. The owner of the ship hires 6 men. Everyday he works from 3pm to 5am the next day. This morning, (13/6/2009) he did not have any money to bring home as the catch was too little to pay even for the petrol. The job is very unstable. He said that in the future, if there were no more fish, he would not know what to live on. His wife carries fish baskets for other people, earning 10,000VND/day, only enough for buy cheap food. He has had diabetes since 2003. he's in debt of 7 million from the Bank for Social Policies to pay for his children's schooling. He also borrows from his brothers. He hopes that when the children graduate, they will be able to pay the loans.

- Processing businesses of sea products have been traditional occupation for the local people here, mostly for women in the local areas.

[4] In local people's conception, the term "do the trade" only applies when they have their own boats and nets. When they lose that, they become "hired workers".

8.5.3 Map of secondary jobs



The above diagram shows that livelihoods of people in Nhon Ly commune mostly depend on coastal resources. When the fish catch is not high, *related jobs* such as collecting fish, carrying fish baskets, selling fish, fish-sauce making, dried fish processing will be directly impacted.

The diagram shows that economic activities that both women and men do. Men mainly do fishing (ship owners as well as fishermen or hired workers on ships). Women do fish collecting or carrying. Most of the interviewed poor women carry fish baskets for ship owners. Nhơn Lý commune has 30 households making fish sauce and a few tens processing dried fish. The diagram shows that women play an important role in household economy. However, most people think that it is men who are the key labourers – breadwinners- in the households.

In Nhon Ly commune, a fisherman is a main income earner of his family. The wife often goes out to work as a hired labor for seafood processing or unloading and selling fish at the time from 4 to 7 am when fish boats is coming back. A quantity of fish has been dramatically declined since 2006, especially 2008. As consequence, income of the women has being severely gone down because they do have little work to do for earning, but the women often have to bear the bad connotation of "being idle and doing nothing".

The intense disasters such as typhoon and floodings not only affect the women's work in terms of fewer products but also working environment. Most of the processing is done at small scale at family level, and there is no sewage system, causing a lot of pollution to the others as well as for owners of the processing business. In addition, the reduction and poorer quality of fishes and sea products affect the work of the processing businesses. The lack of fish wharf also limits the potential of the sector, as most of the big boats often go to Quy Nhon wet dock and sell their products there.

Some average/better off households who sell or process fish for export are also impacted by the climate. For example: changed weather, unpredictable rain makes it impossible to dry fish and lowers the quality of fish and fish sauce. The fish resource is decreasing and prices are higher. Some families said that as incomes from fishing and being hired workers decrease significantly (one hired worker said he did not earn any money after 3 months at sea), while expenses for living, tuition fees increase, they have to get loans from moneylenders.

8.5.4 Credit services

- Policy Social Bank (PSB) and Bank for Agriculture Rural Development (BARD) provide formal credits to the community. Credit Conditions: To borrow credit from PSB, borrowers are certified by a selection process by local authorities at commune and village level. Women Union, Farmer Union, Youth Union are a guarantee bodies for borrowers, while borrowers of BARD have to have a mortgage. The interest rate of PSB is subsidized, but the rate of BARD is based on the market. Except the national program on fishing offshore, a loan size of BARD ranges from 3 million VND to 20 million VND.
- PSB provide the credit to the borrowers, based on the national target credit programs. In Nhon Binh and Nhon Ly, with a loan size from 5 million to 40 million VND, the target programs include for the purposes of:
  - Poverty Reduction (for certificated poor households)
  - Creation of Job and Employment (for the poor, nearly poor)
  - For students studying in secondary vocational schools, colleges and universities of the poor and nearly poor families.
- In Nhon Ly, about 15 % of the households to borrow of PSB including 7% for poverty reduction, and 8% for student and 10 % for creation of job and employment.
- PSB and BARD play an important role for the community to access credit for rural development, however, the following limitations of the bank loans as follows:
  - Credit Conditions are a main barrier for borrowers. Availability of loan in PSB depends on the national target programs. Normally twice a year, the PSB provides credit to the community. Therefore, availability of the loan is inconvenient for borrowers. A rate of borrowers in the community is rather low;. It estimates that about 15 % of households accessed to the banks, while number of households demand for loans is still high. A loan size regulated by the banks is not feasible for a household to run business such as seafood processing, aquaculture. For many poor households, when there are sick people, or lack of fees for the children or lack of food, they have to rely on the informal sources with high interest rate, making them more vulnerable to poverty.
  - Regulations of the banks on sizes of loans in agriculture are not appropriate. Loan sizes for aquaculture and processing are much higher than for rice and vegetable cultivation.
  - Financial services including saving and insurance have not yet operated in the area.
  - Most of “fishermen” have life insurance, however, only one among 400 boats in Nhon Ly has its insurance. For fishermen, a fish boat is a valuable asset of their family. They really want to have the insurance for their boat to reduce the risks. But in practice, implementation of regulations on the insurance is so difficult. For example, maintenance of the boat machines is required to have the red receives (formal one). In practice, boat maintenance is carried out by local mechanic, but it is too hard for the local mechanic to have formal receives.

- Informal money lenders: In the ward as well as in both sections, local people have to depend on loans from informal money lenders with a rate of 3 to 10 % per month. Low income households have to borrow loans from money lenders when their family get sick or cover the education cost, and so on. However, as disasters happen, and the local farmers lose their crops, they are even more vulnerable to high debts from the interest rates as well as unpayable loans, pushing them into chronic poverty.

Loans from moneylenders

Ms Nguyễn Thị Nam is 52 years old. Her husband is blind since he was small. She has 5 children: 2 married daughters, 1 graduated with an intermediate accounting degree, 1 currently doing accounting course, and 1 in 12th grade. Everyday she carries fish baskets for ships. Usually ships return at 6am. Her income depends on how much fish they get everyday. Each fish basket weighs 5-20 kg which earns her 500VND if she carries it to the shore. Sometimes she earns 10-20,000 VND. There is no more work to do after 8am.

She said that there are 10 women doing this kind of work in their village. They work together and share the money. This morning (13/6/2009), she earns 8,000VND.

As she has to pay for schooling for two children, she has to borrow money. Her family is in the poverty list so she got a loan of 13million dong at subsidized interest rate from the Government (0.6%). Apart from that, she has to borrow an extra amount of 18 million VND and has to pay 360,000VND/month for interest.

Beside carrying fish, she also makes fish sauce at home. The income from this also depends on the price and quality of fish. She tries to save money to pay for the interest and is not able to pay for the principal now. She said she would be yelled at by the lenders if she could not pay on time. She has to beg for delayed payment if she could not pay sometimes.

Reduced yields, reduced earning and more debts

Ms. Nguyen Thi Thu, living in Ly Hung village, Nhan Ly commune. In the year 2000, the business of processing of scads and anchovy was quite profitable, Mrs. Thu decided to invest in this. In 2002, she borrowed 10 million from Policy Social Bank, and 30 million dong (in gold) with the interest rate of 20% per year. During the first four years of 2002 and 2006, a business is profitable, her earning was enough to cover her living cost, interest rate and a part of the principle. In 2007 the profit has been decreased as her earning could not cover the part of the investment. But since 2008, her earning has been not profitable any more when the amount of scads and anchovy was not enough for processing. She is unable to pay the loan while the gold price is sharply increased as high as about 4 times higher than 2000.

Storms damage to boats- more loans for local fishermen from money lenders.

Mr. Đoàn Văn Bước, aged 71 started his fishing life since he was 12 till he was 60. He only stayed at home now when he did not feel strong enough.

He has 7 children and he has one boat for fishing (40 CV), there are four sons in the family who continue to be fishermen, one son and one daughter working in HCMC as workers and one last son is studying in the open university in HCMC.

In order to buy the boat in the year 2000, apart from his loans from the bank, he has to borrow more 'gold' (with the interest rate of 20 % per year). There were some profits for the last few years. However, storms also affected his boats a few times, causing them more money to fix. From the year 2005 up to now, he has lower and lower income, especially in the year 2008, 2009, there is not much profit, just enough to cover the costs. He needs to hire more labour to work on the boat but as they cannot afford to do so, so he wants to go to the sea with his children to support them. He even thought of selling the boat, but as the fishing is so risky at the moment, his boat cannot be sold for much. And he still does not know what jobs his four sons will do, if they sell the boat.

8.5.5 Poverty

Discussions show that most poor households in the village are those with sick members (loss of main labourer), lonely elderly people, single women and those with many children. Poor people said they barely have facilities in their houses. Lack of nutrition in meals leads to impoverished children. They usually have only some fish that they catch in the meals. They do not have vegetables nor meat. This definitely reflects the shortage of nutrition as fish cannot provide all the essential elements.

Causes of poverty

From the perspective of better-off/rich households	*From the perspective of poor people*
- Without any assistance from parents, if people are not hardworking, they will be poor. - Even with money from parents, if people do not know how to "do business", they will be poor. - Low education level, children do not get education. - Climate risks - Illness *(Opinions of better-off households, Nhơn Lý)*	- Being old, not physically capable of working - Sick children, main labourer in the household dies - No stable jobs - Low wage - Changed climate leading to loss from jobs - Having poor parents - Having too many children - Paying a lot fro tuition fees - High prices *(Group discussion with poor people in Lý Hòa village, Nhơn Lý commune)*

The separation of causes for poverty is only relative. In reality, poor people are in a vicious circle: one cause may worsen or lead to new causes.

Poverty is the consequence of many causes

Mr. Võ Ngọc Sử, 36 years old, Lý Hòa village, has 3 small children. He was born in a family whose parents are very poor. He was not sent to school and therefore are illiterate.

Everyday he works as a hired labourer with very unstable incomes. Some days he did not earn any money. He said that he hardly made any living during the past few months. His wife used to also work as a hired labourer too but she could not find any job these days. His house is close to the sea. There were many heavy and prolonged rain spells last May. His house collapsed and the family has to move. The Government is well aware of his situation but has not found any solution as the total land area is too limited. More importantly, the number of households in this circumstances is quite high.

Where Mr. Sử's house collapsed end of May 2009

8.6 Housing

Vulnerable houses in Nhon Ly are explained as houses on unsafe location near to the beach, impacted by coastal erosion and sea expansion. Over the last 20 years, 3 lines of houses and public works on beach fronts in Ly Hoa Village have been damaged, and the local people had to move away by themselves. Currently, there are 80 houses which are most vulnerable to the coastal erosion. These households are calling from the government for support in terms of land so that they can move away. According to the government agencies, there is no land available for this.

High risks for households living close to the sea

I have lived here for a long time and people here live on fishing only. In the past, there were not many people and therefore, the sea was far away. Families like to live close to the sea to watch their ships easily. Year in year out, waves wash away the land and the sea intrudes the mainland. The sea water rushes in and tides are very high. Life is very difficult in storm season. Families have to dig poles into the sand to stop erosion. Storms and high tides have taken away many blocks of houses. Many poor households do not know where to move, and therefore they just have to stay.

The waves are very strong and could even reach the tops of houses. Before, the sea is far away. Nowadays, due to sea intrusion, many houses are right at the sea. Many times we were very desperate and hopeless about an escape. In 2007, we had to evacuate because of a big storm for a few nights.

(Mr. Nguyễn Văn Bảy, Lý Hưng village)

Some problems related to the resettlement of the houses at risks highlighted by the local people are:

- Houses close to the sea have high risk of collapsing. However, the local authorities have not been able to find any solution for them because they do not have any empty land left.
- These are poor households, therefore, they themselves are not financially capable of moving to other locations.
- Temporary houses of the poor, nearly poor households , (79 households in Ly Hoa, 53 households in Ly Hung, Lý Hưng, 26 households in Ly Luong and 26 household in Ly Chanh)

- There are many semi-solid houses (level 4), which are most prone to damages by disaster. .Lack of building and reinforcement techniques resistant to floods and typhoons (government staff, local people, local builders)
- Lack of finance for house reinforcement and construction.
- Majority of the community, particularly the poor, nearly poor and low income households cannot afford for building a concrete house, which is supposed to be safer/ or resistant to storms and flooding.
- Interviews with local people show that there is a lack of construction techniques to construct a safe house. The local people and local construction workers are also not trained or equipped with the techniques for a safe house.
- Although, the local people show high priority in having a safer house for their family, it involves a large amount of capital, and for many houses with daily struggle for expenses and food, it is almost impossible for them to reconstruct the houses.
- Local experiences are to cope with the disaster in terms of reinforcing the houses before the rainy season.

Ms Vo Thi Yen, aged 40 is now living with her child and her husband in Ly Hoa village, Nhon Ly commune. Her child is now in the 5th grade of primary school. Her husband is working as hired labour in the city, but they still do not have enough to cover all expenses all year around.

Her house was established in 1999 with total area of 27m^2. It is a solid house which was supported to build by the government. The family uses water from a drilled well for drinking, cooking and for daily life. The house was collapsed 100% after the storm occurred in 2008, therefore, the government supported them to rebuild the house but there is no toilet yet.

She is most scared of the storms and inundation in the local area. During this time, her child has to stay at home, and she can not go out to work, and they do not have enough to buy food. In that case, they often borrow money from her neighbours living around to survive.

Housing Capacity and Vulnerability

1) Local people have strong attitude to reinforce the houses in the local areas due to their direct location by the sea..
2) Government agencies also support the poor households to rebuild their houses.
3) There are some measures of house reinforcement by the local people, and people tend to build more semi solid houses in Nhan Ly commune.
4) The constant damages from typhoons, coastal erosion, sea expansion incurring cost every year for the local people, make them become poorer and lack even more finance to rebuild the houses.
5) Large number of households living in the unsafe location by the beach are desperate to be helped to move to safe locations, as their safety is threatened every year during the disasters.
6) Lack of building techniques and skills among local builders and local people to be resistant to disasters.
7) A low level of income for a large group of local people in the area makes it much harder for safer housing.

8.7 Issues of most concern in Nhan Ly Commune

Disaster Management

Commune Level	Village Level
Planning: Low level of participation of the local people; Not integrated into socio-economic planning; there is no pre assessment before planning; Inadaquate level of rescues teams: lack of techniques, skills and facilities, lack of demonstration. There is no early warning system. Lack of communication facilities for the commune, villages, and fishermen.	Inadaquate level of rescues teams: lack of techniques, skills and facilities, lack of demonstration. Ineffective, old existing early warning system. Lack of communication facilities for village, and fishermen.

Governance

Commune Level	Village Level
Administrative planning process Consultation through community representatives Lack of planning techniques and skills Lack of participatory planning Urban planning: Upgrading small scale infrastructure with higher foundation than existing residential areas leading to more ad long lasting inundation. Lack of consideration of and climate change and disasters impacts in the planning and implementation. There is a lack of residential land for the most needed households affected by sea erosion and sea expansion (Ly Hung village)	There is a lack of residential land for the most needed households affected by sea erosion and sea expansion

Hazards

Commune Level	Village Level
Frequency and severity of hazards increasing Limited knowledge and low awareness on climate change and causes and impacts of hazards among government staff, local people including children and teachers.	Frequency and severity of hazards increasing Limited knowledge and low awareness on climate change and causes and impacts of hazards among local people including children and teachers.

Life Security

Commune Level	Village Level
Loss of lives of fishermen (main labour) Low level of awareness of self-protection	Loss of lives of fishermen

Health

Commune Level	Village Level
Degraded Health Centre and lack of facilities, equipment, and staffing, even health workers. Limited effective programmes targeting women and children, disabled and elderly. Limited health services system. Poor health and nutrition of the disabled, and the poor, due to lack of incomes especially during months when disasters happen most. (Sept to December). Low awareness of self healthcare Common diseases are prevailing such as red eyes, skin rashes, skin infection, gynecology, cough, lung infection. High malnutrition among children	Poor health and nutrition of the disabled, and the poor. Low awareness of self health care among women. Common diseases are prevailing such as red eyes, skin rashes, skin infection, gynecology, cough, lung infection. Deaths from cancer have been increased in recent years. High malnutrition among children

Education

Commune Level	Village Level
Low level of education among main labour force. Lack of facilities and hygienic conditions in schools. There is no high school in the area, and high school is located in Quy Nhon 25 km. High rate of drop-out among the high school children Existing schools are not resistant to storms and floodings. Children do not participate in disaster preparedness programmes at schools or communities. There is not much integration of climate change and disasters management into the children's curriculum. Informal training classes for local people	Low level of education among main labour force. Informal training classes for local people remain limited. Children do not participate in disaster preparedness programmes at schools or communities. High rate of drop-out among the high school children

remain limited.	

Clean Water Supply, Drainage & Environment

Commune Level	Village Level
There is no drainage and sewage system. There is no clean water supply. 35 % of the households do not have latrines. Insufficient garbage collection in the commune. Polluted living environment.	No clean water No sewage system 55% of households have no latrines Insufficient garbage collection Polluted living environment

Infrastructure

Commune Level	Village Level
Concrete roads in 4 villages cause inundation Degraded electricity line, only 60 % of coverage for all households. Lack of land for processing of sea products	70% of concrete road (causing inundation) Lack of anchor, and fish wharf. Lack of land for processing of sea products

Livelihoods

Commune Level	Village Level
There is only one main economic activity with accompanying services for local people, which is strongly affected by disasters. Women's earnings depending largely on fishing are increasingly affected by disasters. Limited incomes from off-shore and near shore fishing, small scale sea products processing, hired labour, and services businesses. Limited access to credit from government. High interest rate from informal money lenders.	Low incomes from agriculture, aquaculture, and other non-farm work. Limited access to support services such as credits provision and extension High interest rate from informal money lenders.

Self-protection

Commune Level	Village Level
There are many semi-solid houses (level 4), which are most prone to damages by disasters. Unsafe housing (temporary and semi-solid at vulnerable locations: coastal erosion, sea expansion) Lack of building and reinforcement techniques resistant to floods and typhoons (government staff, local people, local builders) Lack of finance	There are many semi-solid houses (level 4), which are most prone to damages by disasters. Unsafe housing (temporary and semi-solid at vulnerable locations: coastal erosion, sea expansion Lack of building and reinforcement techniques resistant to floods and typhoons (local people, local builders) Lack of finance for housing

9. CONCLUSIONS [5]

The following interpretation of the information presented in previous sections draws out ideas for the next steps of ACCCRN work in Quy Nhon, within four categories of activity:

1) Pilot initiatives
2) Sectoral or other technical studies
3) Capacity-Building
4) Drafting the city Climate Change Action Plan

The HCVA yielded around 65 potential ideas for ongoing activities. From this set of ideas, the following selection of potential activities appear to be the most relevant, appropriate, feasible and/or innovative.

9.1 Pilot initiatives

9.1.1 Targeted climatic hazard awareness and training

In Quy Nhon, one of the most serious impacts of climate change is likely to be the intensification of extreme weather events – especially storms and floods. Though the studies report that public awareness of hazards and engagement in disaster preparedness have been improving, they also point to shortcomings in both, especially among some of the most vulnerable groups who would most benefit from enhanced knowledge and training. A pilot capacity-building project could build on existing efforts to extend understanding and engagement in disaster preparedness activities beyond the networks of local officials involved in the CFSCs. This could be specifically targeted to a priority social group – and there is a strong argument for focusing on women in low-income households (especially women-headed poor households). The work on gender issues underlines both how women can be differentially vulnerable to hazards, but also how they play a key but often undervalued role in disaster response and recovery. Initial activities could be aimed at issues such as protecting the physical structure of the home from winds and floods, child safety, health and hygiene during extreme events, and alternative (less hazard-affected) livelihood options.

9.1.2 Practical demonstration projects

With a relatively low financial investment, a small-scale practical demonstration project can serve two purposes: to demonstrate the feasibility and benefits of a specific adaptation activity and promote its replication; to make the notion of adaptation to climate change more tangible/meaningful to people and thereby stimulate greater involvement in the process. One promising idea that features repeatedly in the HCVA documentation is the building of a 'pilot' residential house applying building techniques that can make the home more resistant to flood and storm damage. This was proposed for both Nhon Binh and Nhon Ly. It would require technical expertise that can draw on proven techniques. In order to meet the needs of the most vulnerable it would also have to be low-cost (and perhaps ultimately linked to some form of credit scheme). At present, it is the poor who are least able to afford construction of stronger houses, whose properties tend to be most damaged by extreme events, and who struggle the most to undertake housing repairs.

[5] Conclusions prepared by Dr Roger Few of the Overseas Development Group, ODG, University of East Anglia

9.1.3 Latrine construction in public buildings

The risks to health from poor sanitary conditions can be increased during flood events, when floodwaters become mixed with human waste from open defecation and simple pit latrines. Construction of hygienic latrines that are at least partially flood-proof could reduce this problem. A pilot initiative could not address the problem of lack of domestic toilet facilities – which is widespread in the city – but strategic investment could be made to build a limited number of hygienic latrines in buildings that are accessible to the public. One focus could be schools – in the study areas there was a strongly expressed need for improved latrine facilities. Children tend to be at greater risk of serious illness from diarrheal disease, and are also more likely to contract and transmit diarrheal disease.

9.1.4 Fishery management schemes

Marine and aquatic resources provide an important source of livelihood in the city, yet the reported evidence suggests the resources are threatened by environmental degradation and unsustainable exploitation. Already under pressure, the resources may suffer further as a result of climate change. On the other hand, greater protection against current threats should also enable stocks to better withstand future climatic changes. Improved management can therefore be regarded as an adaptation measure. One site of special concern is Thi Nai lake (presumably a lagoon?) in Nhon Binh Ward, which seems to have suffered declining productivity owing in part to pollution (industrial, agricultural, sewage), mangrove loss and growing use of intensive and/or destructive fishing methods. In an effort to control exploitation, special community teams for aquatic resource preservation have been set up in the fishing communes of the city – but they currently have little capacity for taking action. Thi Nai Lake could be one site where the capacity of these teams to monitor and supervise fishing is strengthened through provision of operating funds and equipment. However, regulation is unlikely to succeed without community engagement in the process. It should be combined with heightened awareness-raising among local fishers on the reasons for conserving and managing marine resources, and efforts to secure greater involvement of fishers in the teams.

9.1.5 Resettlement plans

Resettlement can be a controversial issue, and, if poorly managed, can undermine household livelihoods, but there are some situations in which people face such persistent hazards that the call to resettle comes from the communities themselves. Working with such communities and the authorities to identify needs, locate sites and draw up a resettlement plan could be a valuable project activity. A priority community could be the groups of 80 households residing close to the beach at Ly Hoa in Nhon Ly, where coastal erosion has already forced families to relocate over the last 20 years. Because of the ongoing hazard (and the likelihood that it will become worse as a result of sea level rise) these households are actively seeking support, especially in terms of access to alternative land, which the authorities have indicated is the principal barrier to resettlement.

9.1.6 Hazard mapping

It seems that existing maps for Quy Nhon are outdated, and do not reflect the modern layout and expansion of the city, nor the changes in physical aspects such as coastlines and waterways. A comprehensive mapping project (using GIS) could be undertaken, with the objective of identifying the distribution of actual hazards such as sites of coastal erosion and potential hazards such as low-lying areas prone to

flooding and salinization. Such a mapping project would also have many co-benefits, since it would also require detailed mapping of built structures, including residential areas, industrial sites and infrastructure. The digital mapping would provide a baseline resource; but it is important that this is continuously or regularly updated in subsequent years to reflect changes in hazard zones, buildings and human activities. Elements of this work are already being undertaken by local authorities, but assistance for this process in order to create a comprehensive, multi-hazard, updatable resource would seem a wise investment.

Other suggestions:

9.1.7 Support for more resilient farming practices

The agricultural extension centre in Nhon Binh has been working to reduce damage to rice crops in flood-prone areas through changes in cropping practices. In particular they have created demonstration plots to try to convince farmers to switch to a 2 crop rather than 3-crop system. Despite potential co-benefits in terms of higher yield and lower agrochemical inputs, take-up has so far been limited. Support could be provided to increase staffing and/or increase demonstration models and training classes.

9.1.8 Flood information infrastructure

Simple flood information infrastructure could be improved and extended to more sites with minor investment. From Nhon Binh in particular there was a call for new flood warning sign boards to replace existing degraded signs and for taller flood level indicator poles to reflect higher extreme flood levels (the existing poles have already been exceeded in recent floods).

9.1.9 Equipment provision

Insufficient equipment is a problem for various sectors, especially at lower administrative levels, and some of this could be provided at relatively low-cost in a pilot initiative. Examples include: wireless stations for communication; lifebuoys, life-jackets, torches, waterproof clothing for emergency rescue; sandbags and shovels for dyke protection. These may be scope to provide small equipment stores at neighbourhood level – for immediate access by households and avoidance of delay in transit from central stores.

9.1.10 Safety of fishermen

The lives and livelihoods of fishermen are a great risk during typhoons. Schemes to provide fishing vessels with walkie-talkies for warning communication have had limited success because of the quality of the equipment and fishermen's concerns about surveillance, competition and trust in warnings. A scheme combining improved equipment provision and safety awareness-raising could be valuable. It has been suggested that a coordinated warning text messaging system among fishermen might be possible using cellphones: a feasibility study for this could possibly be undertaken.

9.2 Studies

9.2.1 Land use and climate change

Sea level rise, precipitation changes and changes in storm patterns have the potential to bring intensification of various forms of climate-related hazard within Quy Nhon. To support the calls for more proactive land use planning in relation to current climatic hazards and the changes that might take place in future, a city-wide risk analysis could take place. This would build on the HCVA, but provide a more detailed analysis of the implications of climate change for the sustainable distribution of residential, commercial and industrial sectors, as well as infrastructure and utilities. An argument has been made that the process of producing such plans is prevented by lack of clear scientific predictions. The study should make use of the best available understanding through latest modeling advances, but it has to be recognized that, as for any long-term planning, there will always be uncertainty in future projections, and lack of precision should not be a reason for inaction. Land use planning will have to take place in conditions of uncertainty. It should also be recognized that an effective land use plan to counter risks requires sound analysis of the social dimensions of vulnerability and resilience – hence an interdisciplinary study is recommended.

9.2.2 Status of fisheries in Thi Nai lake

A number of contributing factors have been suggested for the reported decline in fishery productivity in Thi Nai Lake. A scientific study is recommended to investigate historic and current levels of exploitation, ecosystem change and commercial activity, and to determine current levels of fish stocks and pollution of the water body. The study will seek to clarify: a) how pressures on the fishery have changed; b) whether current pressures constitute a genuine ecological threat to the fishery; c) projections of future changes in the fishery according to different scenarios of exploitation, pollution and ecosystem change. *See 6.1.4*

9.2.3 Resettlement feasibility studies

A systematic socio-economic and environmental analysis needs to be made prior to the implementation of any relocation scheme for people living in hazard-prone sites. As well as the priority beachside community in Ly Hoa, resettlement has been suggested for people living on West Dyke, and possibly other site within the city. Careful prior analysis is required because relocation schemes too often prove unsustainable and may ultimately cause the 'beneficiaries' more harm than protection. There is a need to assess if the alternative location is itself non-hazardous, that it can support people's livelihoods, and that it can meet the needs for resources and services of the displaced population without creating conflict with neighbouring communities. This requires a participatory research element too – to ensure that all communities involved have the opportunity to express their needs and aspirations and build this into the research outcomes. *See 1.5*

Other suggestions:

9.2.4 Groundwater capacity and quality

A technical study and mapping of the groundwater resources in the Quy Nhon area has been suggested to guide future extraction and use. The key problem is saline intrusion, which affects some of the areas, depending in part on the distribution of dykes. Mapping of the status of groundwater should also be accompanied by a system for monitoring water quality at wells and other outlets.

9.2.5 Long-term resilience of shrimp aquaculture

Shrimp-farming has been expanding sector in the Quy Nhon area, and one on which the city's economy is likely to become increasingly dependent. However, according to city officials, the shrimp themselves are highly sensitive to rapid changes in water conditions – rapid shifts in temperature, salinity and pH caused by erratic weather patterns, overtopping river floods, and high rainfall can kill large numbers of stock. Studies need to be undertaken to assess the long-term vulnerability of aquaculture in relation to climate change and options for improving resilience of shrimp-farms to extreme events.

9.3 Capacity-building

9.3.1 Climatic hazard awareness and training

In addition to the targeted training activities for women noted in 9.1.1, there is a call for wider training and awareness-raising in disaster risk reduction. This can apply both to the community in general and to key decision-makers within government and business. Though the training efforts have to focus mostly on the current hazards people face if they are to be meaningful, it is important to try to nurture shoots of climate change adaptation by developing a more broad-based understanding of how risks may change in future. This is particularly important to ensure decisions are not taken now that are likely to prove inflexible or generate increased risk in future – NB the policy of raising of sea and flood defences is one measure that many countries are now reviewing as potentially increasing risk in the long-term. *See 9.1.1*

9.3.2 Resilient building techniques training

Provision of training courses/workshops on disaster-resilient building techniques could be targeted to different groups: local government staff in appropriate sectors; building trade workers; residents who wish to construct or improve their own houses. The content and technicality of each training course would vary according to building activities and existing skills levels of the target groups. As noted already, the houses of the poor tend to be the most heavily damaged by floods and typhoons, and particular attention should be given to training within poorer communities in affordable techniques to strengthen houses, possibly allied with demonstration initiatives and financial/material assistance. *See 9.1.2*

9.3.3 Support to the agricultural extension centre

In addition to the work described in 9.1.7, the centre is intended to provide advice and support to farmers on techniques of cultivation, livestock husbandry, disease control and marketing. However, public access to these services has been limited due to staffing and finances, and some elements such as disease control services have not yet been properly implemented. Changes in conditions for the spread of crop and animal diseases are one potentially severe effect of climate change, in addition to the effects of changing conditions on plant growth and vulnerability of crops and livestock to hazards. Support to build adaptation among producers can be most effective if delivered through existing institutions and networks such as the extension centre – via improved staffing and training capacity. But monitoring steps must be in place to ensure investment in the centre is used efficiently and effectively. *See 9.1.7*

9.3.4 Promoting alternative livelihoods

Damages to agriculture, aquaculture and salt production from climatic variations already cause major livelihood problems and may be set to worsen in future as a

result of climate change. Loss of income can lead to long-term debt and entrapment in poverty. At the same time, current socio-economic plans also envision a growing urbanization of the city and loss of land currently used for aquaculture and rice production. There is therefore a call for support to enable people to learn how to change occupation from primary production activities, possibly via training courses and workshops. However, re-training is often most challenging for those who need it most. It is reported that women and older men from low-income households may find it difficult to shift from their traditional occupation and skills base. Low education levels among fishermen are also cited as a reason why they find it hard to change jobs for higher and more stable incomes. Carefully-designed training, targeted to these groups, is required.

Other suggestions:

9.3.5 Community training for emergency response

The need for regular evacuation, rescue, and first aid training was raised, not only for members of rescue teams and other officials, who may change jobs frequently but also for the wider public. It is particularly important that people living or working in more remote sites – such as villagers in hazard-prone marginal sites or offshore fishermen – have these skills taught and reinforced, because they must often act as the 'first-responders' in disaster situations. There could also be an important role for safety training for floods and typhoons within schools, to raise awareness of risks among children and youth.

9.3.6 Awareness and prevention of hazard-related disease

Although understanding of transmission routes for diseases during hazards such as floods is quite high in Vietnam, even among poorer communities, there is potential to increase this understanding. But even if people know about risks they cannot always afford prevention or treatment. There is also a need therefore for strengthened and well-targeted health and hygiene promotion work – to teach people (and especially women, the primary care-givers) methods of prevention that are appropriate to their income and capabilities. This also extends to understanding how poor environmental sanitation habits such as waste disposal can lead to health and hygiene risks.

9.3.7 Sustainable fishing workshops

There is potential for tailor-made workshops designed to raise awareness of fishery resource management issues among wider fishing communities, in addition to Thi Nai lake. A key here will be to ensure the training builds on an understanding of the reasons why some fishermen engage in unsustainable practices. *See 1.4*

9.3.8 Training officials in participatory planning

Effective inclusion of community members in planning is not an easy process, and requires building the capacity of officials to undertake participatory methods. The lack of community involvement in and 'ownership' of disaster preparedness (DP) planning was especially highlighted.

9.4 Climate change action plans

Key elements to incorporate:

9.4.1 Shift toward DRR in planning

Given the prospect of climate change, disaster risk reduction (DRR) should become a central component of socio-economic planning of the city at all levels. Present efforts such as control of building works along water bodies should be extended, and the findings of experimental projects elsewhere in the province linking land use planning with climate change should be analyzed and replicated. Pro-active application of land use planning enforced by development controls would help ensure long-term development of the city does not generate increased risk from hazards. At present it appears that planning does not adequately incorporate knowledge of risks inherent in DP plans, and active planning of residential sites in relation to hazards is largely reactive in terms of relocation of households facing urgent threats. Enhanced mapping and monitoring of risks will enhance this process. *See 9.1.6, 9.2.1*

9.4.2 Develop an integrated and inter-sectoral approach

Climate change threats reinforce the need for an integrated and sustainable approach to city planning and action. Examples include:

Maintenance and upgrading of flood control structures

Since the existing reliance on structural flood control is likely to continue in the long-term, it requires an integrated programme of maintenance and upgrading of sea/river dykes (and associated roadways), drainage channels and other control structures, together with protection of dyke systems via controls on activities such as gravel extraction. Several specific dyke upgrading projects are listed in the documents. Where dykes and roadways have exacerbated rainwater accumulation for low-lying residences, drainage routes must be incorporated within the structures. System adjustments may need to be made in the context of sea level rise and potential increase in flood intensity. However, the dilemma for planning is that ever higher levels of dykes and embankments may increase risk to populations in the long run. Hence the reliance on structural measures cannot be the sole solution.

Marine resource management

Develop an integrated approach to marine resource management in general, combining interventions in fisheries support, regulation of intensive and destructive fishing methods, mangrove reforestation and water pollution control (drawing on lessons from pilot work in Thi Nai lake). Declining fish yields appear to be caused by multiple pressures: this is reportedly forcing offshore fishermen to venture farther out to sea, placing them at greater risk from typhoons. *See 9.1.4, 9.2.2, 9.3.7*

Sustainable aquaculture

The planned growth in aquaculture for Quy Nhon needs to be informed by greater consideration of long-term issues surrounding sustainable development of the city as a whole, how climate change impacts may affect the sector and how to build long-term resilience. *See 9.2.5*

Pollution control

Pollution problems interlink with land use, regulation and infrastructure provision. For example, there are calls for separation and treatment of waste water from industrial zones, relocation of cemeteries and garbage dump sites from residential areas, and provision of a seafood processing centre in Nhon Ly to reduce processing activities in the home.

9.4.3 Foster public participation

The case should be made for greater public involvement in the planning processes, in socio-economic and disaster planning, and, perhaps, in the action plan itself. The case for community involvement in DP planning was emphasized, to build on the expressed needs of different social groups and build greater engagement and

support of the public. It is argued that this will make them more effective in protecting lives, homes and livelihoods when a hazard strikes. The case for greater engagement of women in the process is already being made, and is striking, given the dominance of men in the CFSCs but the key roles played by women both as volunteers and in protecting homes, health and livelihoods during extreme events. *See 9.1.1, 9.3.8*

9.4.4 Support for income diversification

The importance of providing support for alternative livelihoods was emphasized in 6.3.4. This is a crucial component of adaptation in the context of changes in climate risks to primary producers combined with processes of urbanization and land use change. But training alone is not sufficient. Efforts to promote changes in cropping systems to 2 annual crops highlighted that livelihood adaptation can be difficult without accompanying efforts to promote as well as educate for income diversification. Farmers have proved reluctant to cease planting a 3rd crop unless there is access to temporary employment during that period such as jobs in local manufacturing. Alternative employment opportunity is therefore an integral component of adaptation. So too is the extension of national credit schemes to support income diversification and small business development. *See 9.1.7, 9.3.4*

9.4.5 House construction and latrines support

Under suggested pilot initiatives 9.1.2 and 9.1.3 the importance of strengthening houses of the poor against hazards and increasing the use of hygienic latrines as adaptation measures was emphasized. Both will become increasingly important in reducing threats to health and wellbeing. The economic drain on poor households in rebuilding and repairing damaged homes can further undermine livelihoods. Financial or material assistance is likely to be required for the poor to build more resistant houses (possibly, but not necessarily, concrete structures). Assistance is also needed if the poor are to follow health promotion advice and have ready access to hygienic latrines. Most of the poor and nearly poor in Nhon Binh do not at present have latrines, and levels of latrine ownership in parts of Nhon Ly are even lower. Poor sanitation in urban areas presents a major environmental health risk that is heightened during floods. *See 9.1.2, 9.1.3, 9.3.2*

Other technical suggestions:

9.4.6 Clean water

Provision of clean water sources has a major impact on health, wellbeing and livelihoods, and should be an adaptation priority. Piped water supplies remain very limited in the study sites within the city, and are recognized in ongoing efforts to extend the system.

9.4.7 Shelter

Completion of the network of safe shelters from hazards that are easily accessible is a priority. There is a call for a new 2-storey (multi-purpose) building in Section 4 of Nhon Binh, for example.

9.4.8 Safe anchorage

There is call for a safe anchorage area to be constructed in Nhon Ly. At present, fishing vessels have to be taken some 25km or more to the main city dock for

protection during storms: in the past this has resulted in the loss of many boats and lives.

9.4.9 Coastal infrastructure

Sea level rise may eventually mean that the design height of coastal infrastructure is no longer appropriate. Some marine works such as quays, dock facilities, vessel repair plants may have to be elevated.