

**Men and Women's Adaptation to Climate Change**  
**The Cases of Aquaculture and Salt Production**  
**in Ha Tinh Coastal Area of Viet Nam**

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## LIST OF ACRONYMS

%	Percentage
ADB	Asian Development Bank
Cm	Centimeter
COP	Conferences of the Parties
DARD	Department of Agriculture and Rural Development
DFID	Department for International Development
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
Ha	Hectares
Km	Kilometer
Km <sup>2</sup>	Square Kilometer
IPCC	Inter-governmental Panel on Climate Change
ISPONRE	Institute of Strategy and Policy on Natural Resources and Environment
IFRC	International Federation of Red Cross and Red Crescent Societies
MOLISA	Ministry of Labour, Invalids and Social Affairs
MoNRE	Ministry of Natural Resources and Environment
NGO	Non-Government Organization
NTP-RCC	National Target Program to Respond to Climate Change
OARD	Office of Agriculture and Rural Development
OECD	Organisation for Economic Co-operation and Development
REDD	Reduced emissions from Deforestation and Forest Degradation



SLA	Sustainable Livelihoods Approaches
SLF	Sustainable Livelihoods Framework
UN	United Nations
UNFCC	United Nations Framework on Climate Change
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VND	Vietnam Dong
WEDO	Women's Environment and Development Organization

## **ABSTRACT**

Climate change is affecting men and women differently, influencing their priorities and adaptation strategies for coping with the challenges. The challenge of climate change could impede people's livelihood opportunities in terms of salt production and aquaculture, particularly of those living in the coastal areas, affecting their lives and production greatly. In this study, the researcher has identified the impacts of climate change on women and men's salt production and aquaculture, as well as the ways they are currently responding to these changes in two rural communes in the North Central coastal area of Viet Nam which are predicted to be severely impacted by sea level rise and other climate change impacts. Qualitative research has been predominantly used and data collected through household interviews, focus group discussions, informal talks, observations, as well as a literature review. The results reveal that both men and women perceive climate change as a serious threat to their salt production and aquaculture operations; the impact of climate change affects men and women differently and their adaptation strategies differ correspondingly; and their coping and adaptation strategies to the gendered impacts of climate change are unlikely to be sufficient in some cases, particularly for women. While their coping strategies are unlikely to be sufficient, other adaptation options that have long-term implications do not appear to be available for them yet. To date, there is little evidence that Viet Nam has seriously considered the gendered impacts of climate change on people's production and life as well as the implications for gender equality in the two coastal communes where this study was conducted. The researcher hopes that the information provided in this study encourages immediate consideration and action by the responsible local governmental agencies, as well as in the action agenda of different levels in the country.

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## **1. Introduction**

### **1.1 Background and Rationale for the Study**

“Climate is statistical information, a synthesis of weather variation focusing on a specific area for a specified interval; climate is usually based on the weather in one locality averaged for at least 30 years” (Ramamasy et al., 2007 cited in Le Thi Hong Phuong, 2011:3). It is widely accepted that adverse effects of climate change are felt clearly through much more abnormal weather and natural disasters such as floods or droughts, with the loss of biodiversity and gradual degradation of the environment, as well as posing a threat to human development and prosperity (UN’s Human Development Report, 2007). Climate change has greatly impacted social, economic and environmental systems and shaped prospects for sustainable agricultural and rural development (Fischer et al., 2002 cited in Le Thi Hong Phuong, 2011). Global climate change and its impacts are attributed to both natural phenomena and human activities in the recent years (Dow & Downing, 2007).

The IPCC has indicated that the impacts of climate change “will be differently distributed among different regions, generations, age classes, income groups, occupations, and genders” (IPCC, 2001a:680). Although climate change affects everyone, it is not gender neutral. Women are often more vulnerable to disasters than men due to differences of socially constructed roles and responsibilities, and because they are poor (Pan American Health Organization, 1998; Mitchell et al., 2007). Women are often poorer and less educated than men and often excluded from political and household decision-making processes that affect their lives. In addition, women “tend to possess fewer assets and depend more on natural resources for their livelihoods” (UNDP, 2011:2). It is recognized that the poor are among the most vulnerable to climate change effects and studies indicate that climate change worsens gender inequalities, creates extra work for women, and exacerbates the vulnerability of women in poor households (BRIDGE, 2008). According the World Bank (2011:2), “the change in the patterns of climatic variability is

likely to add to the already high vulnerability of poor households, which would exacerbate the incidence, severity and persistence of poverty”. In particular, it is pointed out that the climate change has shifted from being perceived as an environmental issue to becoming a growing threat to development to the low-income countries which are poorly equipped to adapt to the rapidly changing climatic risks (OECD, 2009:12).

It is estimated that two-thirds of many developing countries populations directly or indirectly earn their living from agricultural activities, according to Fischer et al. (2002). In many developing countries, particularly in South Asia, there will be a decline in yields for the most important crops as a result of climate change (Nelson et al., 2009). The results of Nelson’s analysis also suggest that agriculture and human well-being will be negatively affected by climate change. Agricultural outcomes are determined by complex interactions among people, policies and nature. Climate change is one of the most important impact threats to agriculture in the present and future (Burton & Lim, 2005). As a result it is predicted that, crop yields will decline, production will be affected, and thus crop and meat prices will increase. Climate change adaptation efforts in agriculture should therefore focus on implementing measures that help build rural livelihoods that are more resilient to climate variability and disaster (Nelson et al., 2009).

According to the National Target Program to Respond to Climate Change (NTP-RCC) developed by the Government of Viet Nam in 2008, the country is considered to be one of the most seriously impacted by climate change in the world. This considers the country hit most severely by the adverse effects of climate change, and in Viet Nam, worse especially along coastal and lowland regions (Oxfam and UN, 2009). Among the Vietnamese population of 87.84 million in total (2011), 9.3 million people are expected to become directly affected as a result of a one meter sea level rise, causing a decline in GDP and urban area by 10% (Dasgupta, S. et al., 2007). Viet Nam experiences an average of 6-8 typhoons annually and these are seem to be getting worse

(UNDP's factsheet, 2011), which causes considerable damage to agriculture, as well as hardship and stress in people's lives.

UNDP's review in 2008 indicated that there is a high dependence on agriculture for sustaining livelihoods in Viet Nam, though agricultural productivity is low. Of 12 million rural households, 80% are directly or indirectly living on agricultural production and according to the 1999 national population census, women accounted for about half (54%) of the people engaged in agricultural production (Hoang Ba Think, 2009). In aquaculture production and harvesting of littoral<sup>1</sup> organisms, women play a greater part than men (Aguilar, 2008 cited in UNDP, 2008). Sea level rise and other aspects of climate change will have important effects on the physical, biological, and chemical composition of coastal zones, which will result in the loss of many marine resources essential to women's livelihoods in the country (UNDP, 2008).

Within Viet Nam, the central coast is one of the most vulnerable areas to typhoons, storm surges, flash floods, drought, and saline water intrusion (Chaudhry and Ruyschaert, 2007). Ha Tinh is a coastal province in north central Viet Nam, east of Truong Son mountain range, where the selected communities for study are situated. The province is one of the most disaster prone areas in Viet Nam, and it is experiencing more variable weather and associated disasters than in the past, such as rainfall extremes, severe floods and droughts, stronger cyclones, and increased sea level.

It is difficult to say to what extent the observed climatic changes and the enhanced variability in the climate in Ha Tinh may be attributed to anthropogenic factors and to what extent the changes are "due to a combination of natural variability and human activities" (ISPONRE, 2009:24). Nonetheless, the adverse impacts of climatic changes in the province are unquestionable. The increased hazards and damages are also felt and

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<sup>1</sup> "Littoral" is the part of the shore zone of a large body of water or the land bordering on the shore of the sea or ocean and thus affected by tide currents ([InvestorWords.com](http://InvestorWords.com)). The littoral zone (also called the intertidal area) is where the land and sea meet, between the high and low tide zones. It is rich in nutrients and oxygen and is home to a variety of organisms ([EnchantedLearning.com](http://EnchantedLearning.com)).

experienced by people themselves, as I will show in this thesis, thus adaptation strategies are necessary. Salt production and aquaculture operations are two main economic activities in the province, in addition to agriculture. Salt production is a traditional practice that has been handed down from one generation to the next. Although the annual revenue from salt production is not very high per family, it has served as an important additional source of household income. Aquaculture is a fast-growing sector which contributes significantly to people's livelihoods and economic development in the region. Both these activities seem to have been significantly affected by the climatic disasters hitting the area.

The disasters affect seriously those two types of production in many ways. The aquaculture sector is particularly vulnerable to natural rapid-onset disasters because aquaculture is so heavily dependent on reliable natural resources like water. This sector is affected by a wide range of natural disasters including droughts, floods, storms, sea level rise, and coastal erosion. The impacts of these disasters on aquaculture can be directly seen in individual households, their community production systems, and beyond to the whole sector. The immediate damage “can be loss of livelihoods, assets (e.g. cages, ponds, bunds and water supply systems, nurseries, hatcheries, feedmills, broodstock), post-harvest and processing facilities” (Brown, D. et al., 2010:40). The dry and sunny climate in this region is essential for salt production. Disasters such as continuous rains can cause high humidity in the atmosphere, making the salt dry slowly and hence decreasing the efficiency of salt production and yield. The heavy rain and floods can break the protective dyke systems for salt fields, reducing nutrition and polluting soil used to make salt, and washing away huge quantities of salt. These disasters can also threaten the salt stored in warehouses and the tools for salt production.

Generally, climate variability and extremes have led to big changes in many aspects of livelihoods and the social life of people, including loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, and environmental damage. These



contribute to the changes in the social structure, such as labor migration to urban destinations, poor school attendance, and increased violent crime. Economic losses in the province due to storms were estimated at approximately 2,697 billion VND (US\$150 million) during the period of 2000 – 2008 according to ISPONRE (2009).

Responses to climate change impacts need to be gender sensitive. Integrating gender into climate change adaptation has been recently considered in the national target programmes and NGO's work. Gender equality is mentioned in the first viewpoint of the NTP-RCC as one of the guiding principles:

*Response to climate change should be carried out following the principle of sustainable development, encompassing sectors and inter-sector links, regions and inter-regional links, gender equality, and hunger eradication and poverty alleviation.*

The NTP-RCC serves as the main framework for the management and coordination of climate change activities to achieve sustainable development objectives (UNDP, 2008). This policy tool includes plans for comprehensive scientific assessment and adaptation of climate change as a roadmap for action over the period 2009-2015. The potential impacts of climate change on women in the NTP-RCC are also identified within the context of climate change and its impact on achievement of Millennium Development Goals (MDGs) for the country. However, there are no specific targets or activities which address women's vulnerability or gender issues at the community level, and there are no priorities in the NTP-RCC's project related to gender issues (Oxfam, 2009). For implementing the NTP-RCC in the period of 2009-2015, there is only one project related to women and gender which is "*to propagate and promote awareness on the role of women and gender issues in climate change responding activities*" (SRV, 2008:15). The action plans to be developed by other sectors or agencies are not specifically mandated to address gender equality (UNDP, 2008). In fact, the term "gender" only occurs three times and "women" only twice in the NTP-RCC documents. Another important

observation is that “the NTP-RCC identifies gender equality as a guiding principle, but women’s involvement in consultations was limited” (Oxfam, 2009:28).

Many important gender issues still need to be addressed in Vietnam. One is the pressing need for greater recognition of women’s roles in the agricultural sector. Their vulnerability as well as their capacities to adapt should be priorities for research and analysis (UNDP, 2008). Two recommendations among others from this UNDP desk review is to “identify barriers to women’s participation in decision making on responses to climate change at the household and community level” and “identify the gendered impacts, adaptation strategies and priorities of women and men in different context” (UNDP, 2008:30/29). The report from Oxfam (2009:51) on climate change and opportunities for improving gender equality in Viet Nam has also stated that research on gender and climate change links can be “a further vulnerability and adaptation research, covering different geographical areas and social groups in needed.”

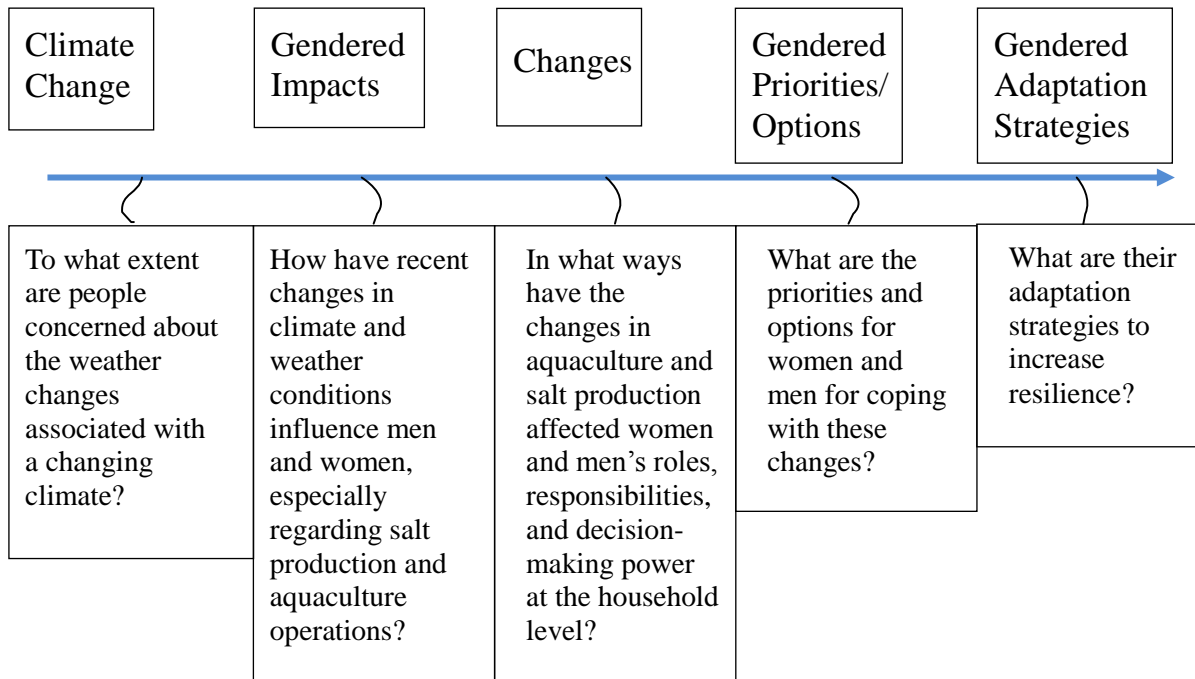
The title of the present thesis, “*Men and women’s adaptation to climate change. The cases of aquaculture and salt production in Ha Tinh coastal area of Viet Nam*”, was selected to help clearly understand some key perspectives related to gendered impacts of climate change on men and women’s production and lives, as well as the ways they respond to the changes. Climate change is hitting the area hard, and women and men here are being forced to adapt. In these two coastal communes, what aspects of their lives are affected by adverse weather phenomena, as well as by changes in the production and output of aquaculture and salt production? What are their priorities and options for coping with the impacts of climate change on salt production and aquaculture operations, and how are women’s adaptation strategies different as compared with men? These are just a few of the questions this study will address in greater detail.

## **1.2 Research Objectives and Research Questions**

The objective of this study is to assess the gendered impacts of – and responses to – climate change by focusing on salt production and aquaculture practices in two rural communes of the coastal province in north central Viet Nam. This aims at gaining an in-depth and detailed understanding of impacts of changing climate on men and women engaged in these production activities, the differences in gendered responses, and the effects on men and women’s roles, responsibilities, and decision-making power at the household level of these coastal communities. The study focuses on people residing at Ho Do and Thach Chau coastal communes of Loc Ha District, Ha Tinh Province, Viet Nam. The study is based on the following research questions:

- (1) To what extent are people concerned about the weather changes associated with a changing climate?*
- (2) How have recent changes in climate and weather conditions influence men and women, especially regarding salt production and aquaculture operations?*
- (3) In what ways have the changes in aquaculture and salt production affected women and men’s roles, responsibilities, and decision-making power at the household level?*
- (4) What are the priorities and options for women and men for coping with these changes, and what are their adaptation strategies?*

**Figure 1: Typology of research questions**



*Source: Vu Phuong Thao, 2011*

## 1.3 Methodology

### 1.3.1 Central Concepts and Theoretical Framework

The central concepts of this thesis are defined through review of available literature and theories, keeping in mind the research questions, with special focus on the concepts of “gender”, “vulnerability”, “adaptation”, and “sustainable livelihoods”. These main concepts are relevant for treating the research questions, as this study focuses on answering questions about men and women’s livelihoods in climate change adaptation. By choosing the key concepts, this study does two things. Firstly, it clarifies for the audience what this study is investigating, and secondly, the researcher avoids misunderstandings by settling on a single understanding of the key terms.

This study uses the “Sustainable Livelihoods Framework” to analyze links between gender and climate change. This theoretical framework is a type of intermediate theory that attempts to connect all aspects of the study (e.g.,

problem definition, purposes and questions, literature review, methodology, data collection and analysis). This framework acts like a map that gives coherence to empirical findings and analysis. This also represents the foundation of the research topic, from which further data collections are deduced. The analytical framework guiding this study draws upon sustainable livelihoods approaches, as this study looks at understanding how vulnerabilities and livelihood strategies differ between men and women in the coastal area selected for the study. The central concepts and theoretical framework this thesis will be using are further described in Chapter 3.

### **1.3.2 Data Collection Methods**

This section describes the different approaches that have been used to collect necessary information to develop the study and produce this thesis.

Qualitative methods were predominantly used in this study. Quantitative research methods were applied to collect the demographic information of respondents including age, number of family members, income etc. The interviews, focus group discussions, and observation were three data collection instruments that this study used during the field study. The fieldwork was conducted from October to December, 2012 in the coastal communes of Ho Do and Thach Chau. A literature review was also conducted to place the research problem within a context of related studies in order to assist the study in achieving its objectives. The research methods and fieldwork will be elaborated on in the Chapter 4.

An exploratory research design was chosen to help determine the study design and data collection method, as well as to gain insight into the research topic. All main elements of the study, comprising theory, empirical findings and analysis were incorporated to address the central study questions appropriately (Hair et al., 2007:153; Hair et al., 2006:174 cited in Landua, 2008).

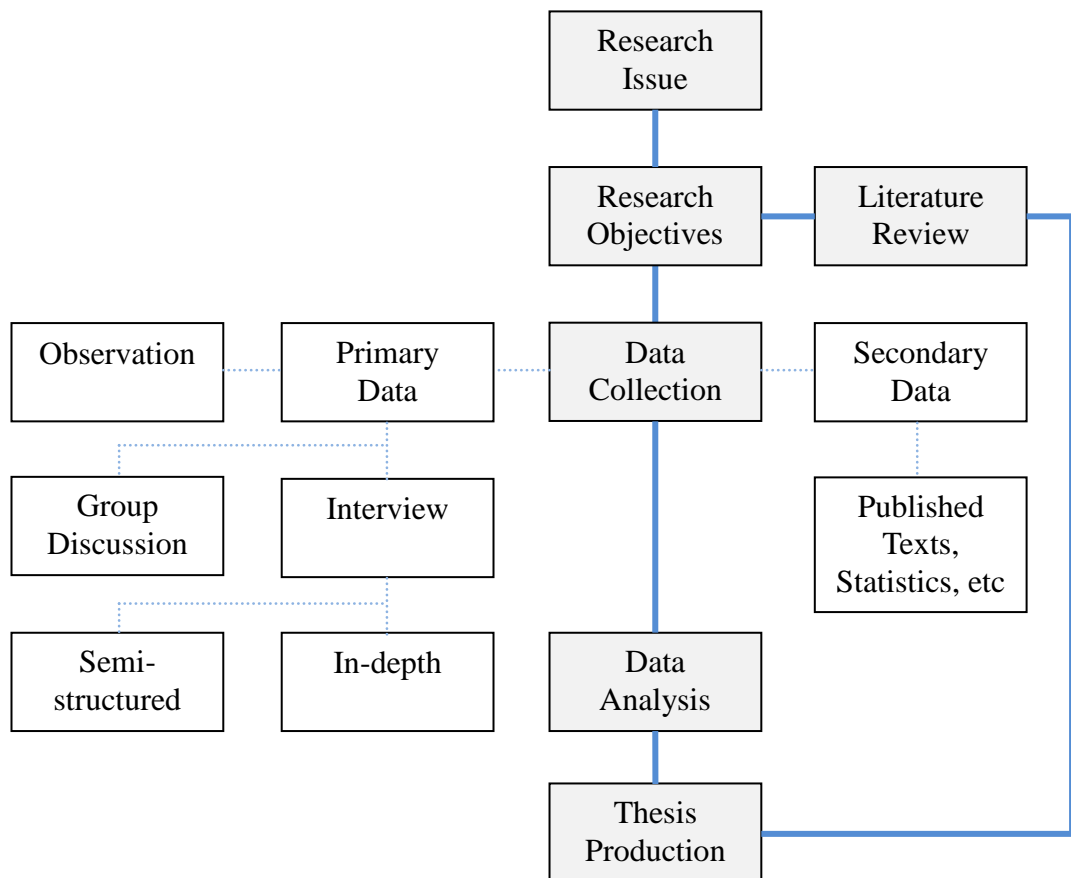
The qualitative approach was used to provide an in-depth and detailed understanding of impacts of climate change phenomenon on men and women in the study area, as well as their responses to these changes. Qualitative research “is used to gain insight into people's attitudes, behaviors, value systems, concerns, motivations, aspirations, culture or lifestyles” (QSR International, 2011:1). “Qualitative rather than quantitative techniques are better at providing an understanding of people’s needs and aspirations” (Kelly, 1980 in Veal, 1997 cited in Ferrari, 2010:47) and is very well suited in a situation where individuals’ attitudes and awareness tend to vary (Ferrari, 2010). Because “the prospect of covering all aspects of the sustainable livelihoods framework, or even all questions identified as critical for assessing the livelihood research, can be daunting” (Adato and Meinzen-Dick, 2006:32), it should be an integrated, interdisciplinary approach that draws upon both quantitative and qualitative data collection and analysis. The combination is almost always considered the best, triangulating research from multiple sources (Rudestan and Newton 1992:39).

A combination of closed-ended and open-ended questions was used in the in-depth semi-structured interviews which included a list of questions related to the research topic arranged in a different order depending on the context and interviewee characteristics. Some informal interviews with commune leaders were also conducted. Focus group discussions with persons involved in salt production or aquaculture operations was conducted at each commune. In addition, direct observation which allows the researcher to learn and understand the issue further was performed during the interviews and group discussions, as well as during the times the researcher lived and laughed with people.

This study is also based on a solid theoretical framework. Secondary information and statistic on the research topic was collected and reviewed and the theoretical structure was built up as a basis for the thesis. The secondary data was of specific use to gain an insight into the field of study as well as to define the scope of the thesis and identify particular variables of interest for

further investigation. In addition, it assists in how to approach the primary research as well as the design, content, and conduction of the questionnaires (Landua, 2008). Information and statistics on the issue under consideration were collected from books from the library of Oslo University, scientific articles from online libraries and journals, as well as non-government organization’s published texts, annual reports, statistics, and reliable websites. Different sources of data have been used to get necessary background information and knowledge about the research topic, which also included reports and working documents prepared by government agencies at the province, district and commune levels. The data used was the most recent available, and though some is a bit dated, it was chosen to make use of secondary data, and so that larger data sets could have been analyzed (Saunders et al. 2007:257-260 cited in Landua, 2008).

**Figure 2: Research process**



*Source: Vu Phuong Thao, 2011*

Further details on using questionnaire and interview, focus group discussions and observation methods during the field work are presented in Chapter 4.

#### **1.4 Limitations of the Study**

It is important to consider the limitations of this study. Clearly, the scientific methods that this study employed are powerful research tools, but they have limitations associated with this work.

The research strategy of case study chosen to investigate the research problem in this study refers to individuals and households, and therefore may not be representative of the coastal population in this region as a whole. In addition, the data collected was predominantly qualitative, which relies on descriptive information of the past events. Some respondents may answer a interview question incorrectly simply because they have a poor memory, while others may not even speak the truth. In other words, information provided by respondents might contain several potential sources of bias such as selective memory, telescoping, attribution, and exaggeration. The researcher has to take what people say, whether in interviews or focus group discussions, at face value. Data triangulation involves the use of different data collection methods including observations, focus groups discussions, and individual interviews, which will hopefully compensate for these limitations, as well as exploit their respective potential and advantages.

More interviews could have been conducted at more targeted groups of people in order to gain a holistic overview of all the various aspects of the issue over time. Further study would be necessary to acquire these, and more interviews need to be conducted, but this was not the aim of this study.

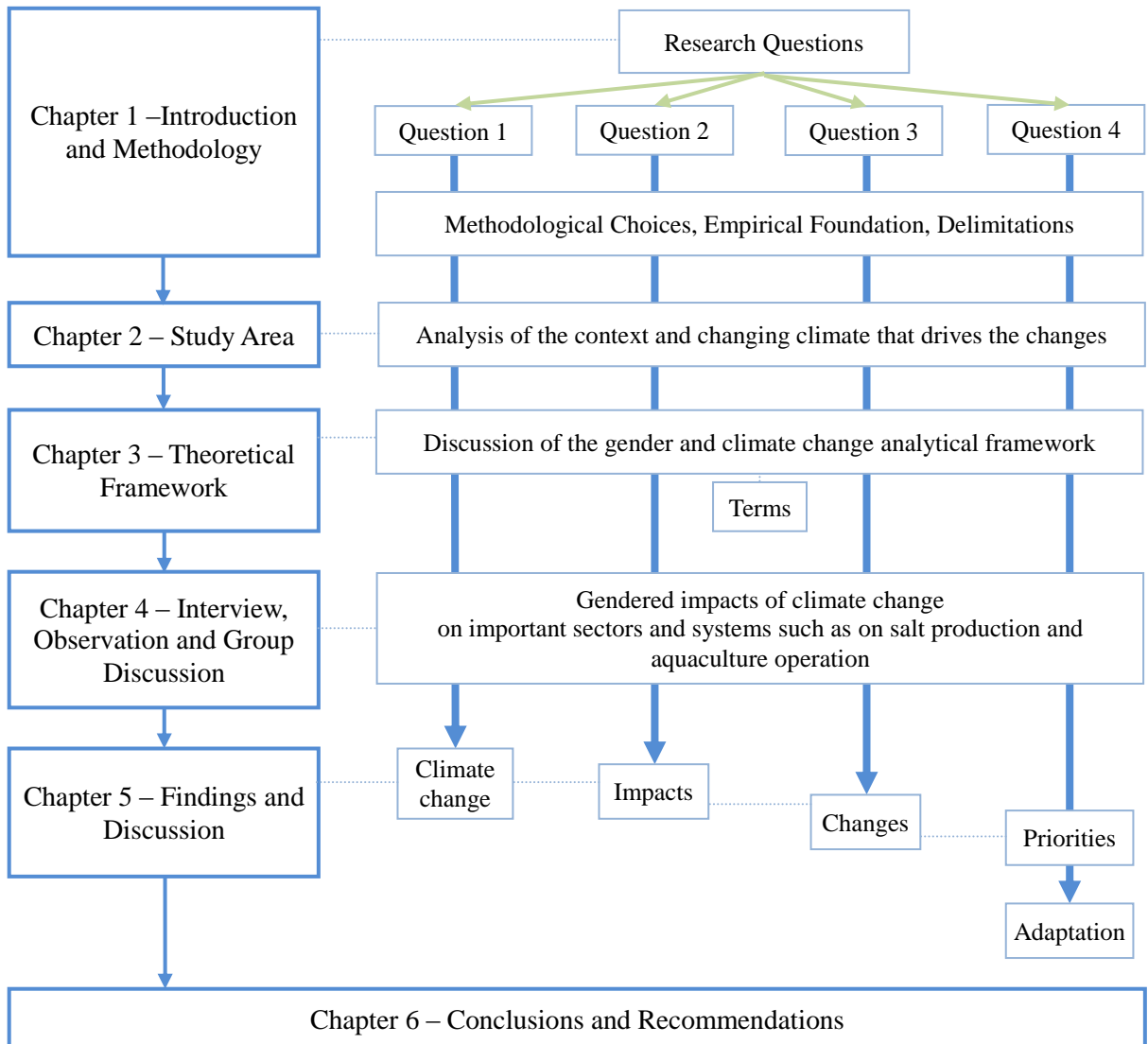
Other limitations and challenges in the process of conducting this study regarding fieldwork preparation, language, and approaching the respondents is discussed in Chapter 4. The following chapter describes in detail and analyses the context of the study area.



## 1.5 Structure of the Thesis

The thesis consists of six chapters as follows.

**Figure 3: Structure of the thesis paper**



*Source: Vu Phuong Thao, 2011*

**Chapter 1** has set the scene for the study by providing an overview of the problem that motivated the study, describing the study purposes and questions which the study is designed to answer.

**Chapter 2** describes in detail the context of the study area and the problem of focus. The chapter argues that there is an urgent need for this type of study.

**Chapter 3** describes the conceptual framework for integrated analysis and assessment of the context and situation. The chapter presents the conceptual framework to the study, which can act like a map that gives coherence to empirical inquiry.

**Chapter 4** focuses on how the investigation was conducted as well as how qualitative data was collected, analyzed and interpreted thoroughly.

**Chapter 5** presents the findings of the investigation and offers answers to the study questions.

**Chapter 6** is the final chapter and provides some key recommendations while concluding on the study's findings.

## **2. The Study Area in Geographic and Temporal Context**

### **2.1 Viet Nam at a Glance**

Located in the eastern part of the Indochina peninsula, Viet Nam is an S-shaped, long strip of land with a total land area of 329,314 km<sup>2</sup> and a coast line of approximately 3,200 km. According to the Viet Nam General Office of Statistics, the total population of the country was estimated at 87.84 million in 2011, of which women accounted for 50.5 % of the total. Viet Nam's average annual population growth rate was 1.2% between 1999 and 2009, which was down from 1.7% in the previous 10 years (UN in Viet Nam, 2012). Reports recently showed that the rural population accounted for about 69.4% of the total in 2011 and Viet Nam's total population will grow to 88 million in 2012.

Viet Nam has five cities and 58 provinces. There are 54 different ethnic groups in the country. Ha Noi in the north is the capital city with the population of approximately 6.57 million people, whilst Ho Chi Minh City in the south is the largest urban area with a population estimated at 7.41 million in 2011. GDP growth was an estimated 6.3% in 2011, one of the highest rates in the world, but lower than past years due to the effects of the global economic crisis.

Despite this growth, major development challenges persist, including a high poverty rate and poor human resources, and new issues have emerged in recent years such as “climate change and increasing social and economic disparities” (UN in Viet Nam, 2012). Associated with rapid economic growth over the past two decades, inequality in Viet Nam has increased, particularly widening the rural-urban income gap. The UN in Viet Nam (2012) also reports that while poverty still affects close to 15% of Vietnamese people, about 90% of the poor live in rural areas, including around 50% of the ethnic minority populations.

Vietnam is one of the most disaster-prone countries in the world (The World Bank, 2012). The major natural disasters that occur periodically in Viet Nam include typhoons, storms, floods, droughts, mudslides, and forest fires, “with the poorest people in society often being the most vulnerable” (UN in Viet

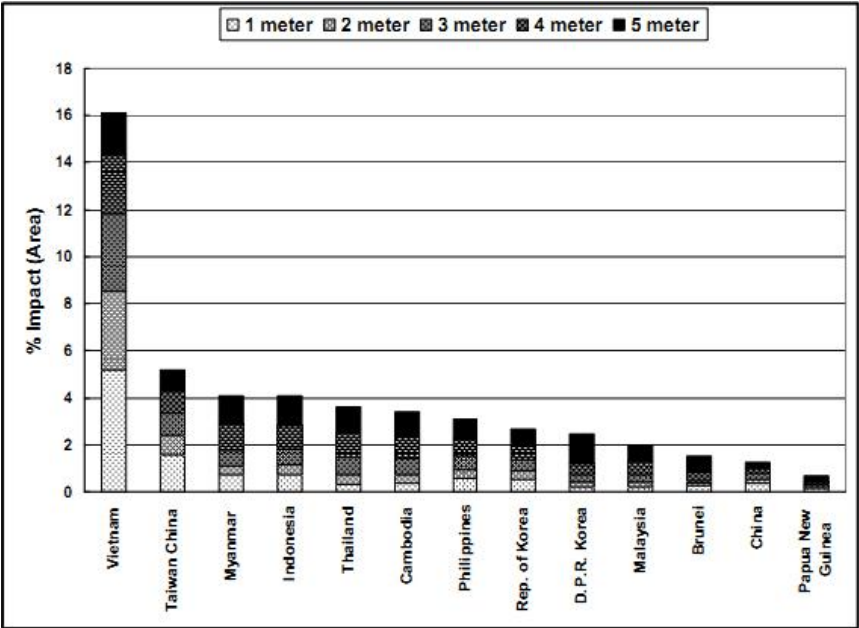
Nam, 2012). Also, climate change models predict that Viet Nam will be one of the world’s most adversely affected countries globally (Dasgupta et al., 2007).

**2.2 Natural Disasters and their Impacts**

**2.2.1 Climate Change as a Priority for the Government of Viet Nam**

Cities in Viet Nam are an engine of economic growth but also facing many challenges concerning energy consumption, higher volumes of traffic and waste disposal, and rapid conversion of agricultural land into land for urban construction and industrial zones. As many cities are located on the long coast line and in the low delta regions, climate change also presents unique challenges for Viet Nam’s cities and their growing population (UN in Viet Nam, 2011; Dasgupta et al., 2007).

**Figure 4: Country area impacted by sea level rise**



*Source: Dasgupta et al. (2007)*

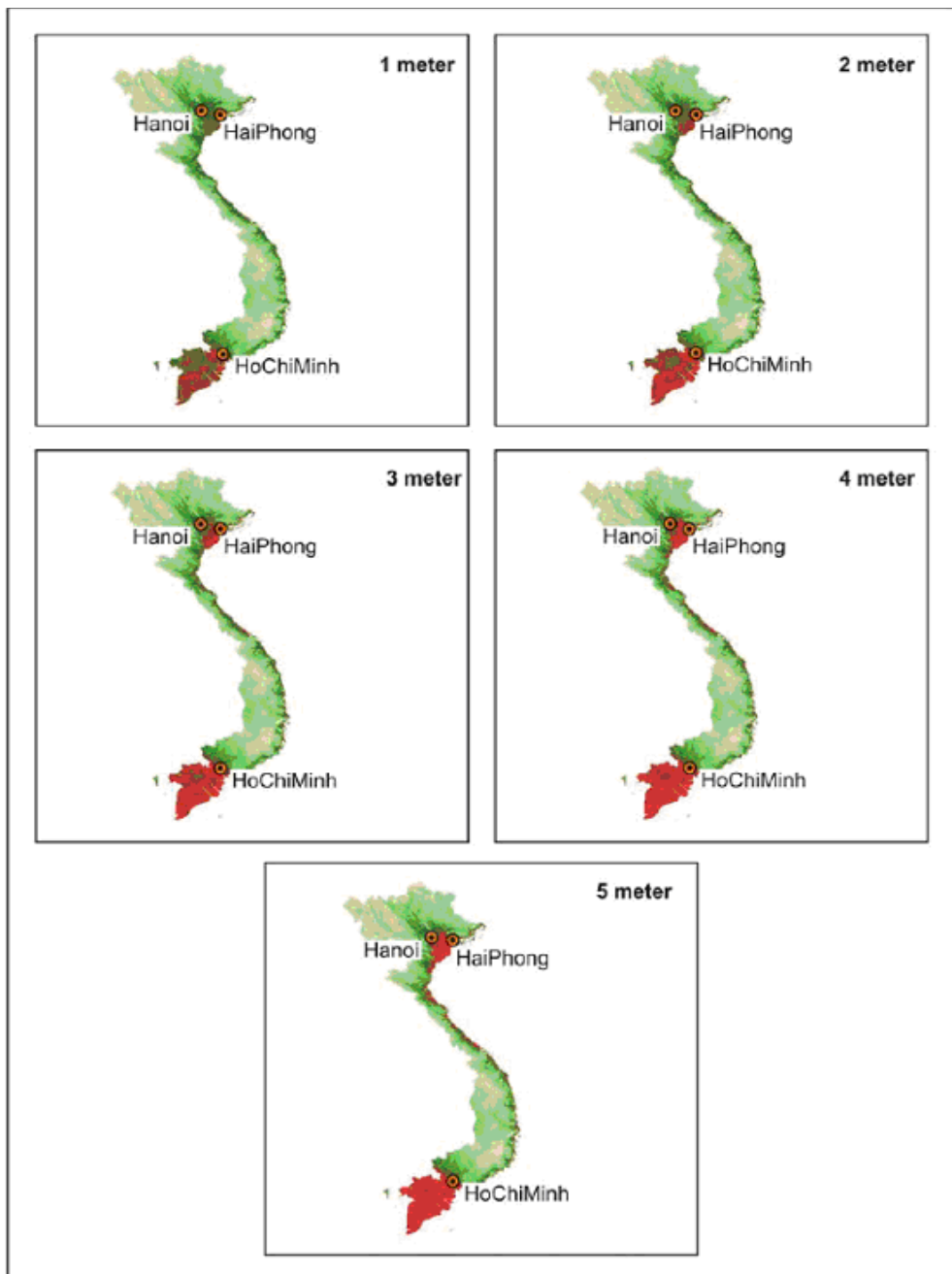
“Vietnam ranks fourth behind China, India, and Bangladesh in terms of the absolute number of people living in vulnerable, low elevation coastal zones (...), defined as the contiguous area along the coast that is less than 10 m above sea level” (Waibel, 2008:26). Climate change could have many negative

effects, including greater frequency of heat waves; increased intensity of storms, floods and droughts; rising sea levels; a more rapid spread of disease; and loss of biodiversity. Sea level rise poses a particular threat to Viet Nam as there are heavy concentrations of population and economic activity in its coastal cities.

As shown in Figure 4, Viet Nam is the most seriously impacted by sea level rise in East Asia. Also according to a recent World Bank study on the impact of sea level rise in 84 coastal developing countries including Viet Nam, Dasgupta et al. (2007) predicted that up to 16% of Viet Nam's area could be impacted by a 5m sea level rise. Of these coastal countries, "Viet Nam ranks first in terms of impact on population, GDP, urban extent, and wetland areas, and ranks second in terms of impact on land area (behind the Bahamas) and agriculture (behind Egypt)" (Waibel, 2008:26). The consequences of sea level rise for Viet Nam are "potentially catastrophic" and "planning for adaptation should begin immediately" (Dasgupta et al., 2007: 2/44).

Note in Figure 5 below that most of this impact is in the Mekong and Red River Deltas and the central coastal provinces of Viet Nam. The land area of central Viet Nam, including the area this study looks at in particular, would be severely impacted by a 5m sea level rise. Large percentages of Viet Nam's population and economic activity are located in these two river deltas and this central coastal area. "The sea level along the coasts of Viet Nam has already increased slightly in the past 30 years and is expected to rise by up to 33 cm by 2050, and by 1 meter by 2100" according to the first national report on climate change in the "Vietnam Initial National Communication" to the UNFCCC, published in 2003 (SRV and MoNRE, 2003 cited in Waibel, 2008:26). It is estimated that up to 10.8% of Viet Nam's population would be impacted by a 1m sea level rise, making it the largest impacted population among all 84 countries (Dasgupta et al., 2007:28). With a 5m sea level rise, the adversely impacted population of Viet Nam would reach 35%, and the impacts of sea level rise on GDP and urban extent of Viet Nam closely follow the impacts on its population.

**Figure 5: Inundation zone of Viet Nam from sea level rise (in red)**



*Source: Dasgupta et al. (2007)*

Research by GIZ and AusAid found that climate change was exacerbating existing gendered vulnerabilities due to men and women's different livelihood roles in Vietnam (GIZ, 2010:29). An UNDP desk study on gender and climate change in Vietnam noted that women face challenges from climate change in three areas: the productive, reproductive, and community spheres. Addressing gender-specific impacts of climate change in Viet Nam has been identified as a

cross-sectoral issue in the UN's work with the Government of Viet Nam (UNDP, 2008:1). In this light, mainstreaming gender in climate change mitigation and adaptation strategies are cross-cutting issues for donor governments' development cooperation with Vietnam.

Over the past few years, the perception on climate change by the main policy makers and the leadership in Viet Nam has shifted. Within Viet Nam the Ministry of Natural Resources and Environment (MoNRE) has been designated to be the National Focal Agency for implementing the United Nations Framework on Climate Change (UNFCCC)<sup>2</sup> and the Kyoto Protocol, and is the managing government institution for all climate change activities (Nguyen Huu Ninh, 2007). Climate change is now considered one of the most serious challenges facing the country. The political resolution of the Fifth Session of the 11<sup>th</sup> National Congress of the Communist Party (adopted in January 2011) states that climate change will seriously affect Viet Nam and prioritizes responses to climate change for the period 2011-2015.

Viet Nam has shown a strong commitment to sustainable development and to responding to the challenges posed by climate change, according to the UN in Viet Nam (2011:1). It is contributing to the global effort in making a difference in the fight against climate change by pushing forward strong mitigation policies, “particularly since the UNFCCC COP13 held in Bali in 2007, the implementation of the Bali Roadmap and the subsequent Copenhagen and Cancun agreements” (UN in Viet Nam, 2011:1). Also according to this agency, the Government of Viet Nam has gradually strengthened the national legal frameworks related to climate change, disaster risk reduction, cleaner production, and energy (UN in Viet Nam, 2011:2). The National Strategy for Natural Disaster Prevention, Response and Mitigation to

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<sup>2</sup> Viet Nam signed the UNFCCC in 1992 and ratified it in 1994. In 1998, the Viet Nam Government signed the Kyoto Protocol and ratified it in 2002. The United Nations Convention to Combat Desertification was ratified by Viet Nam in 1998. In 2005, Viet Nam signed the Hyogo framework for Action 2005-2015.

2020<sup>3</sup> was approved in 2007 and then the NTP-RCC was issued in 2008. Viet Nam is currently preparing the National Green Growth Strategy to encompass the principle of supporting low-carbon development as well as addressing other environmental challenges. Because Viet Nam is considered as one among the countries most heavily affected by the consequences of climate change (Waibel, 2008), its vulnerability as well as its programmes and plans to reduce climate change-related risks and adapt to climate change should be explored. The above discussions on the challenges posed by climate change have led to a practical understanding of the current situation of climate change in Viet Nam, which will get this study started with some key perspectives on the impacts of climate change on people's production and life in the selected area of study, as well as the way people here may respond to the changes.

## **2.2.2 Ha Tinh Province**

### **a. Ha Tinh Province**

The selected area of study is Ha Tinh Province situated in the North Central coastal area of Viet Nam, where it is predicted that it would be severely impacted by sea level rise. Ha Tinh is one of six North Central coastal provinces of Viet Nam with the total area of 6,026 km<sup>2</sup>, occupying about 1.8% of the total area of the country. With more than 137 km of seashore, Ha Tinh borders Lao People's Democratic Republic to the West and the East Sea to the East.

Located in the north east of Truong Son mountain range, the topography of Ha Tinh slopes from West to East, with the average slope of 1.2%. Because of this terrain, there are three adjacent natural zones: high mountainous zone; hilly, mountainous zone; and coastal plains. The mountainous area comprises 80% of the total area, while the delta is very small and separated by mountains and

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<sup>3</sup> The strategy aims to “mobilize all resources to effectively implement disaster prevention, response and mitigation from now up to 2020 in order to minimize the losses of human life and properties, the damage of natural resources and cultural heritages, and the degradation of environment, contributing significantly to ensure the country sustainable development, national defense and security”.



rivers. High and medium mountainous areas make up 45% of the land mass in the province, while the lowland and coastal areas account for 17.3% and 12.7% of the natural land respectively (Nguyen Ba Trinh, 2006 cited in MoNRE and UNDP, 2010:13-14). Ha Tinh has thirteen river systems with a total length of more than 400 km flowing into the East Sea. It has the highest rainfall in the north with an average of over 2000 mm (over 3000 mm in some places), in which 54% of the total rainfall appears during the rainy season from August to September (ActionAid, 2010).

**Map 1: The study area: Ha Tinh Province (in the frame)**



Source: Maps of World (<http://www.mapsofworld.com/vietnam/vietnam-map.html#>)

The province's land area for agriculture is 460,182 ha (76% of the total area) whilst the forest area is about 773.46 ha (13% of the total). The remaining 65 thousand hectares of land is not in use (11%), 70% of which is rocky mountain area. There are four mountainous districts, six coastal districts including Loc Ha, one town and one city. In 2006, Ha Tinh had a population of 1,280,549 people with more than five ethnic minority groups, mainly the Kinh people.

The working age population here is around 702,000, but 92.7% of them are low-skill laborers or unskilled workers, considerably higher than the national average of 75%. About 89% of the total population lives in rural areas, also higher than the national average of 74%. The province's average population density is about 213 people per square kilometer which is higher than the average density of the North Central but lower than that for the country as a whole.

Ha Tinh is one of the poorest provinces in Viet Nam. Around 30% of the people in the province are classified as poor and as of 2006, GDP per capita stood at around US\$ 250 per year, compared to the national average of US\$ 700<sup>4</sup>. Being a rural economy, Ha Tinh depends significantly on small holder subsistence agriculture which is closely connected to nature. Cropping systems in Ha Tinh include three crops of rice followed by maize, sweet potato and cassava. The rice cultivation area in winter-spring crop is the highest and most productive while the winter crop is small. Rice producers have less risk of stand loss for winter-spring crop than summer-autumn crop, with flooding after heavy rains or storms and the spread of diseases caused by insects. In addition, fishing and aquaculture are very dominant economy sectors of Ha Tinh due to long coastal line with four estuaries, namely Cua Khau, Cua Sot, Cua Nhuong and Cua Hoi.

## **b. Climate Change Challenges**

According to the ISPONRE report on the impacts of climate change on Ha Tinh, “global climate change has resulted in changes for almost all climatic elements in Ha Tinh and the climate has become more extreme” and that “the average temperature of the province has increased by 0.7°C - 1.0°C over the past 50 years” (ISPONRE, 2009:55/24). Dry and hot weather prevails from March to August, when temperatures can reach up to 41°C, regularly bringing drought. During the peak of the drought season (May, June and July) sea water

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<sup>4</sup> Ha Tinh Hunger and Eradication and Poverty Reduction Board report, 4 July 2001.

intrusions into water sources can occur. The wet season, which is from September to February, brings much lower temperatures and is punctuated by flooding, and notably, Ha Tinh is one of the provinces with the highest rainfall in the central regions, averaging 2,000 mm per year (ActionAid in Viet Nam, 2008:13).

Typical climatic phenomena in Ha Tinh include storms, severe and damaging cold, flash floods, dry and hot westerly winds, and whirlwinds. Typhoons regularly strike the province, sometimes causing extreme damage. Storms that affect Ha Tinh begin from the Northwest Pacific or East Sea. Impacts of climate change on fishery and aquaculture sectors in Ha Tinh have included the rise in sea level and sea surface temperature, salinity intrusion, and precipitation intensity (heavy and very heavy precipitation events). To “ensure safety for the dyke systems” at Ha Tinh Province was one of the specific objectives of the National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020, in order to minimize the losses and damages related to human life and properties as well as natural resources and environmental degradation (SRV, 2007:4).

The North-Central coastal region in Viet Nam where Ha Tinh is situated is not only one of the geographical areas most at risk of climate change hazards but also is one of the regions with the highest incidence and severity of poverty (Wilderspin and Hung, 2007 cited in MoNRE and UNDP, 2010:10). This may in part be due to the historical impact of natural disasters.

Ha Tinh is one of the North Central coastal provinces of Viet Nam which is experiencing almost every kind of severe weather, and in the coming decades, in the context of climate change, disasters and other stresses in the province are likely to be more serious, both in frequency and impact. What makes the province choice special is that it enables the study to investigate the issue of climate change and its gender perspective within a real-life context, addressing the gaps in our knowledge base on gender and climate, as well as providing key information on these factors for further research. This province was also

chosen because it reveals the complexity of climate change and its gender impacts in the north-central coastal area of Viet Nam, as the province is typical for this region. Another crucial aspect of this area is its socioeconomic importance, as large percentages of Viet Nam's population and economic activity are located here, with salt and aquaculture being the two dominant economy sectors which contribute to people's sources of income, yet the region is predicted to be severely impacted by a 5m sea level rise and other climate change impacts as presented in the above sub-section. The two coastal communities selected for this study are situated in a particular district of Ha Tinh, which happens to be one of the poorest districts of the province, where people focus primarily on salt production and aquaculture operations.

### **2.2.3 Loc Ha District**

#### **a. Loc Ha District**

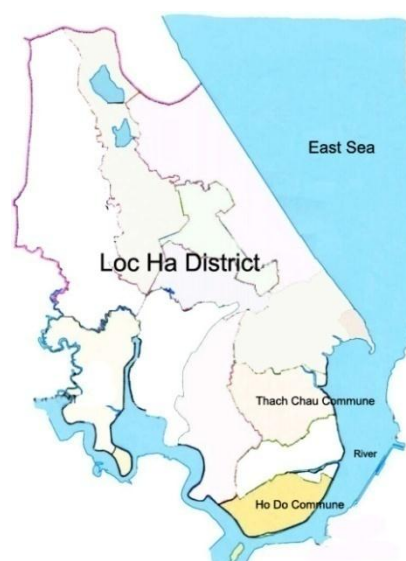
Loc Ha District stretches out along 12 km of coastline and comprises 13 communes<sup>5</sup>, representing 1.96% of the province's total land area. It is located in the North East of Ha Tinh Province and is a new district established in 2007.

The district's terrain is divided into two main areas: (i) Low lying areas of riverside, including the two communes selected for this study, Ho Do and Thach Chau, where people focus on salt production and extensive farming of aquatic products in brackish ponds and who generally have better economic conditions compared to other communes in the district; and (ii) high-lying areas, including the communes of both delta and mountainous areas where people rely on subsistence small-scale agricultural activities and near-shore fisheries (ActionAid in Viet Nam, 2008:14).

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<sup>5</sup> In Vietnam, the rural commune is one of three types of third-level (commune-level) administrative subdivisions, which consists of a number of villages (Wikipedia, 2011).

## Map 2: Loc Ha District



*Source: Vietnam Women's Union (2010)*

Loc Ha is one of the poorest districts of Ha Tinh Province. In 2009, the district has a population of 79,896 people in 20,984 households (87,000 people in 2011). According to a survey also from 2009, 16.05% of the district population lived in poverty and was hungry (Nguyen Ba Trinh, 2011). People rely on subsistence salt production, small-scale agriculture, animal husbandry and near-shore aquaculture and fishing. Extensive fish and shrimp farming in brackish ponds is the principal form of aquaculture in the area. The average annual income of Loc Ha has grown 10% per year in recent years, with GDP per capita here up from US\$ 250 in 2006 to US\$ 350 in 2009 (ActionAid in Viet Nam, 2008:14).

The Office of Agriculture and Rural Development (OARD) is the district government agency responsible for management and development of agriculture, fisheries and aquaculture, animal husbandry, forestry, water resources, and natural disaster and pest management in Loc Ha. The sub-office of Fisheries and Aquaculture and the sub-office of Agriculture are executive agencies within OARD responsible to the operations and development of fishery, aquaculture and agriculture sector. OARD is subject to the overall

direction of the District People Committee and under oversight of the Ministry of Agriculture and Rural Development.

**Table 1: Annual food production of Ha Tinh Province and Loc Ha District**

Item	Unit	Ha Tinh (2006)	Loc Ha (2007)
Population	<i>person</i>	1,288,513	87,610
Cereal production	<i>Ton</i>	494,937	17,688
Rice production	<i>Ton</i>	475,938	17,577
Cereal production per capita	<i>kg/year</i>	230	121.1
Rice production per capita	<i>kg/year</i>	222	120
Maize production per capita	<i>kg/year</i>	14.7	1.3
Cassava production per capita	<i>kg/year</i>	30.2	-

*Source: ActionAid in Viet Nam (2008)*

### **b. Climate Change Challenges**

There have been significant changes in the weather in Loc Ha recently, especially since 2002. The weather now does not appear to follow the normal patterns as before, making forecasting activity more difficult. The temperature is now higher during the summer and the hot periods last longer than before (e.g. 42°C in 2008 while the highest temperature previously recorded was only 40°C). In the winter of 2007-2008, the whole area had a record cold period with 38 days of continuous cold, and with Loc Ha recording the lowest temperature at 7°C. The rainy flood season normally comes from September to November but this has also changed recently, as it now comes earlier and lasts longer, such as from August until December, and may hit harder, often destroying infrastructure (houses, transportation, irrigation, and dyke systems). In addition, from December to March, the area experienced an unusually cold weather period, as well as a prolonged extremely hot weather in the dry season (between April and September). It is commonly felt that it is now more difficult to see the differences between seasons during the year.

Flood is a natural phenomenon which happens annually in the area, but it has recently become more intense and complex with the crest of floods being higher and its flows are stronger (ActionAid in Viet Nam, 2008:14). Furthermore, the flood recurrence intervals per month are shorter and floods can appear quickly and dramatically. Heavy rain of up to 1000 mm caused by the Storm Number Two in 2007 had seriously flooded the whole area for several days. There was also a serious flood in October 2010, which caused great losses and damage to people properties. In 2011, the abnormal rainy days and extremely hot days significantly affected people's lives and productivity of salt and aquaculture sectors in the area. Although there was much more rain than before, the area still faces great threats from drought due to its sloped terrain and high temperatures. Many villagers are saying this is a new phenomenon of "drought even when there was not sun" which the irregular weather conditions have recently brought to the area during the hot season.

Reports from the Department of Agriculture and Rural Development of Ha Tinh (DARD) Province and inhabitants living along the coastline of Loc Ha District have confirmed the rise of sea levels. According to observations, the tidal current is now 10-12 cm higher than 10 years ago. Now storms of level seven and eight can give water rise to the levels of storms rated ten in the past (i.e. 1999). Consequently, all of the wells which were dug three years ago in Ho Do Commune have become useless due to salt invasion, making life for inhabitants much more difficult. Experts of DARD also reported that sea water has now intruded 10 km or more up the river compared to previous years (ActionAid in Viet Nam, 2008).

Loc Ha is known for being one of the poorest and most underdeveloped districts of Ha Tinh, and all of its sectors are likely to be affected by climatic change impacts, with the most noticeable issue likely to be the negative impacts on its salt and aquatic productions which would adversely affect the lives and livelihoods of people. We will now move to explore the two coastal communes selected for this study. Climate change is also predicted to have various impacts upon different sectors that exist in these

communities which are beyond the scope of this thesis project. While salt production and aquaculture operations are the two main livelihood activities of people here which contribute to their sources of income, the recent climate changes will have important changes in many aspects of their livelihoods and social life.

## **2.2.4 Ho Do and Thach Chau Communes**

### **a. Ho Do and Thach Chau Communes**

The study was conducted in the coastal communes of Ho Do and Thach Chau. Ho Do is a commune located to the south of Loc Ha District, adjacent to Ha Tinh Town, with 7,384 people in 1,881 households (3,200 of whom are under the working age) in 13 villages on a area covering a total of 668.96 ha (People Committee of Ho Do Commune, 2011:2). During the last ten years, the commune experiences more variable weather and regular natural disasters such as rainfall extremes, severe floods and droughts, stronger cyclones, and trends of sea level rise on its descending slopes in the Eastern sections.

Surrounded by Ha Vang river for 3.3 km, two-thirds of the commune's total land area is brackish and strongly influenced by the tidal cycle of the river. Around 44% of the commune land area is used for salt production, and 40% (approximately 1,380 people) of the commune's total labor force are involved in this activity(People Committee of Ho Do Commune, 2011). According to the 2010 census, of 1,881 households in Ho Do, 247 families are ranked as poor (13.2%) and 102 as near poor (5.4%) based on the commune's GDP per capita at US\$ 457 (People Committee of Ho Do Commune, 2011). Fairly large areas of land of the commune are used for salt production (around 12.4%) and aquaculture operations (81.51 ha representing 12.2%). People conduct extensive farming of aquatic products in brackish water ponds (e.g., shrimp, crap, carp, grass carp, major cap, silver carp etc) and on Ha Vang's river water surface (clam, oyster, fish etc). According to the People Committee of Ho Do



Commune (2011), only one fishery cooperative is currently in operation, as compared with two salt and fishery cooperatives in the past.

Thach Chau Commune is a coastal commune located to the north east of Loc Ha District. The commune spans an area of 734.57 ha and has 5,933 inhabitants in 1,518 households at 11 villages. Around 67% of the commune land area (491.30 ha) is used for agriculture purposes, 2.8% for salt production (20.64 ha), and 4.7% for aquaculture operations in brackish and sea water (34.12 ha) and 0.7% in freshwater (5 ha). Of the total labor force of 2,255 people, 59%, or approximately 1,325 people, rely on these activities for subsistence (People Committee of Thach Chau Commune, 2011). The barren, sandy coastal lands are one of the fairly large areas of land occupied in the total land area of Thach Chau. Low soil fertility is a problem throughout the commune, limiting plant growth.

**Table 2: Ho Do and Thach Chau at a glance**

Item	Unit	Ho Do Commune (2010)	Thach Chau Commune (2010)
Total Land Area	<i>Ha</i>	668.96	734.57
Population	<i>Person</i>	7,384	5,933
GDP per capital	<i>US\$</i>	457	409
Total Labor Force	<i>Person</i>	3,200	2,255
Number of Households	<i>Number</i>	1,881	1,518
Number of Poor Households	<i>Number</i>	247 (13.2%)	173 (11.4%)
Agricultural Land	<i>ha</i>	n/a	491.30 (67%)
Aquaculture Area	<i>ha</i>	81.51 (12.2%)	39.12 (5.4%)
Salt Production Area	<i>ha</i>	83 (12.4%)	20.64 (2.8%)
Number of People Relies on these Above Activities for Subsistence	<i>person</i>	1,380 in salt production (40%)	1,325 (59%)

*Sources: People Committee of Ho Do Commune (2011) and People Committee of Thach Chau Commune (2011)*

Of 1,518 households in Thach Chau, 173 families are ranked as poor (11.4%) according to the 2010 census, and the commune's GDP per capita of US\$ 409 (People Committee of Thach Chau Commune, 2011). People in Thach Chau rely on subsistence small-scale agricultural activities (such as coconut, corn,

green bean, sesame, vegetable, sweet potatoes, rice production) and semi-extensive farming of aquatic products in brackish, sea and fresh water ponds (e.g., shrimp, crab, clam, oyster, carp, grass carp, major cap, silver carp etc).

### **b. Climate Change Challenges**

According to ISPONRE (2009) and ActionAid in Viet Nam (2008), the irregular fluctuations of the sea water level have caused considerable difficulty for those involved in aquaculture operations in the area. Abnormal weather conditions such as heavy rains and storms following a long sunny period have caused the water to separate into layers, making various aquatic species die from oxygen shock (ActionAid in Viet Nam, 2008:16). As a result, many families have already lost all of their farming shrimp. It is a catastrophic loss for those households who do not have extra capital to recover from this shock or to re-invest in their production. Chapter 5 presents the data collected from the field study on how people perceive and respond to these changes.

Encroachment of sea water into rivers near Ho Do Commune has made water here become salty and as a result, water cannot be used for agricultural production (ActionAid in Viet Nam, 2008:17). Lack of fresh water for production activities and daily life is another challenge for people. Due to lack of water in ponds used for aquaculture production, it is reported that some villagers now have to fill their ponds for cultivation purposes. The lack of freshwater creates a very critical situation. For those who produce salt, the drainage of salt fields does not work well anymore, but people still have to try to use it to make salt even when they know that it now becomes contaminated (ActionAid in Viet Nam, 2008:17). Furthermore, the irregular climate brings less sun but much more rain than before, which causes the moisture in the air to remain very high. This makes salt dry slowly and decreases the productivity of salt production and yield. Heavy rain and floods also breaks the dykes protecting the salt fields, reducing nutrition and polluting soil that is used to

make salt. In addition, rain and humidity melts salt stock quickly (ActionAid in Viet Nam, 2008:17; People Committee of Ho Do Commune, 2011).

The largest loss can be found on off-season vegetable farms in Ho Do commune, which used to bring rather high incomes for villagers in the past (ActionAid in Viet Nam, 2008:16). The study of ActionAid reported that now people must stop farming off-season vegetables due to drought and start to plant peanut and sesame instead. With regard to livestock activities, given that now poultry and cattle do not have enough water and food, the farm owner may invest more to buy food, but get less return than they used to (ActionAid in Viet Nam, 2008:16).

Recent climate changes have created important changes in other aspects of livelihoods and social life of the rural communities in the area including, for example, impacts on health, labor migration to urban destinations, poor school attendance, and increased violent crime (ActionAid in Viet Nam, 2008; ISPONRE, 2009; MoNRE, 2010). Due to particular social, economic and environmental conditions that amplify susceptibility to negative impacts and contribute to low capacity to cope with and adapt to climatic changes in the area, the vulnerability of all socio-economic activities to climate change is likely to increase here in the future (ISPONRE, 2009:v).

As discussed in this section, it is an acknowledged fact that climate change would have various impacts upon different sectors of the selected area of study including water availability, agricultural productivity, aquaculture operations. Of these, climate change would most drastically affect agriculture and aquaculture production which can adversely affect the livelihoods of local communities. The aim of this study is to gain an in-depth understanding of people's priorities and options for coping with these challenges of climate change. More particularly, I will in Chapter 5 present to what extent men and women perceive climate change as a threat to their salt production and aquaculture operations, how they are impacted and how they respond to these changes.

## **2.3 Conclusion**

Taken as a whole, this chapter serves as a base platform from which the study began. By selecting a place where it is clear fact that the climate has become more extreme and that the related changes have various impacts upon different sectors, this study investigates how people perceive and respond to these changes. With the emphasis on salt production and aquaculture operations as the two main production activities, as well as on men and women as the two vulnerable groups, the effects of climate change can be seen on subject's lives in the two selected coastal communities of study in many ways.

Due to the climatic changes, people's domestic and production work as well as their everyday sustenance in the two communities selected for study are being made more difficult. The main challenge is that people here are more vulnerable to climate change since they are more dependent on land and natural resources for their livelihoods, yet they currently have low capacity to adapt and their awareness of the risks of changing climate might be still low. Because of the speed at which climate changes are happening, it is urgent that the vulnerable groups in those two coastal communities be studied and the findings presented to help educate them and devise mitigation and adaptation measures.

The coastal communities of study remain a predominantly rural area where salt production and aquaculture operations play a major role in the local economy and women participate in most production activities. The impacts of climate change are not evenly distributed (IPCC, 2001a:680). Projected impacts of climate change on these two communities appear to be gendered, where adaptation strategies and capacities to increase resilience, and priorities and options of women and men for coping with changes in different contexts, including livelihoods tied to aquaculture operations and salt production, are different and insight research is imperative.

Because of the high levels of vulnerability, information about the gendered impacts of climate change on important sectors and systems in the study area,

such as salt production and aquaculture operations, is considered important for understanding key vulnerabilities and planning appropriate adaptive strategies. Viet Nam is striving to have adequate capacity to systematically evaluate potential impacts and adaptation responses, particularly among the most vulnerable groups. Discussion of the survey results and observations from this study will hopefully contribute to a practical understanding of the issues and further assess the impacts of climate change on gender roles, responsibilities and decision-making power at the household level, as well as potentially effective adaptation responses, which are critically needed for developing national policies and strategies of Viet Nam.

### **3. Theoretical Framework for Analysis**

#### **3.1 Definitions and Concepts: Vulnerability, Adaptation, and Livelihoods**

Vulnerability, according to Webster's Online Dictionary (2012), is being prone to or susceptible "to physical or emotional injury or attack". The definition of "vulnerability" has been refined by Blaikie, Cannon and others (Vulnerability Network, 2012). In their explanation, they state that "by vulnerability we mean the characteristics of a person or group of people in terms of their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard". They also argued that vulnerability occurs at the tangent between two opposing forces: the processes that generate vulnerability that can be observed and the physical exposure to hazards (e.g., storms, floods, etc.). This, however, involves a combination of factors that "determine the degree to which someone's life and livelihood is put at risk by a discrete and identifiable event in nature or in society" (Vulnerability Network, 2012). It is when these factors coincide that vulnerability happens.

The vulnerability concept is relative and dynamic. "Vulnerability is most often associated with poverty, but it can also arise when people are isolated, insecure and defenseless in the face of risk, shock or stress" (IFRC, 2012). This term is now a central concept in a variety of research contexts including, for example, disaster management, climate impacts and adaptation. From a climate change perspective, according to the IPCC (2001b):

Vulnerability is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

From the above definition, the term "vulnerability" may therefore refer to the vulnerable system itself, the impact to this system, or the mechanism causing these impacts. Vulnerability may also arise from individual or group challenges; and is differentiated between and within groups given that the

factors that affect individual or group might be more (or less) vulnerable because of their capacities and resources, coping mechanisms, supports, and size and complexity of the group. Complementing the above definition of IPCC, an individual or group's vulnerability to climate change can be defined as the diminished capacity of an individual or group to anticipate, cope with, resist and recover from the adverse effects of risk, shock or stress (IFRC, 2012). Still, in the report on gender – climate change relationships in Viet Nam, Oxfam (2009:15) defined vulnerability for climate change as follows, based on a proposed definition in Neefjes (2008) aimed to capture different social groups, sectors, etc. and climate change related stress:

The degree to which a person, household, social group, business, organization, locality or a sector is unable to cope with, resist or recover from adverse effects of shocks and stresses, including climate variability and climate extremes that are enhanced by climate change.

More importantly, vulnerability may differ across groups within communities or individuals within a household, as well as over time (Chambel, 1989; Eriksen *et al.*, 2007). As an example, at household level, the ability to adapt to climate change depends on control over land, money, credit, and tools; low dependency ratios; good health and personal mobility; households entitlements and food security; secure housing in safe locations; and freedom from violence (Lambrou and Piana, 2006 cited in BRIDGE, 2008).

O'Brien shows that the consequences of climate change are closely related to the context in which individuals or groups experience the changes (O'Brien, 2007). By context, O'Brien means the multiple, interacting processes and factors that create or contribute to climate change vulnerability. Adaptation, therefore, is necessary, though there are different definitions of adaptation. According to Burton *et al.*, (1998) adaptation is referred to as all those responses to climate change that may be used to reduce vulnerability, whilst Rennie and Singh's (1996) definition of adaptation is that adaptive strategies are ways in which local individuals, households and communities have

changed their mix of productive activities, and modified their community rules and institutions in response to vulnerabilities in order to meet their livelihood needs (Schipper, 2007). Another definition from the IPCC describes adaptation as adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability (IPCC, 2001b). In the present work, I assume that the aim with adaptation is to “reduce the vulnerability and improve the adaptive capacity, or resilience, of people who rely on climate-dependent resources for their livelihoods” (FAO, undated:1). This is especially relevant when considering that poor communities can be especially vulnerable because they “tend to have more limited adaptive capacities, and are more dependent on climate sensitive resources” (IPCC, 2001c:359).

A livelihood comprises the capabilities, assets (including both material and social resources), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and for the future, while not undermining the natural resource base (Chambers & Conway, 1991). In this definition, the central point is that people’s living is improvised and sustained through personal capacities, tangible assets (e.g., resources and stores) and intangible assets (claims and access) that people have in their possession.

“Sustainable livelihoods” came to prominence as a development concept in the early 1990s (Eldis, 2012a). In sharing and learning lessons about the sustainable livelihoods approaches, Ashley and Carney (1999:6) defined sustainable livelihoods as “a way of thinking about the objectives, scope, and priorities for development”. Also, according to them, livelihoods approaches are conceptual frameworks that promote people-centered, responsive, and



multi-level approaches to development. By empowering the poor to build on their own opportunities, supporting their access to assets, and developing an enabling policy and institutional environment, livelihoods approaches contribute to development and poverty reduction interventions (Eldis, 2012b).

In the *Guidance Note on Recovery: Livelihoods* developed by the International Recovery Platform and United Nations Development Programme India (IRP and UNDP-India, 2010:3), “livelihoods are also shaped by the changing natural environment. The quality of soil, air and water; the climatic and geographic conditions; the availability of fauna and flora; and the frequency and intensity of natural hazards all influence livelihood decisions.” Similar to trends in politics and governance, technology use, and economics, which are more gradual and often predictable, the climate-related stress and shocks can create new livelihood obstacles or opportunities, strengthening the role of livelihoods-based responses. Under such shocks and trends, livelihoods have been identified as the greatest recovery priority since disaster affected populations must adapt existing strategies or develop new strategies in order to survive.

Climate change would have wide-ranging, serious effects on the environment, and on socio-economic and related sectors. Because of the speed at which climate changes are happening, it is urgent that the vulnerability of affected populations be reduced and their capacity to adapt increased, ensuring that their livelihoods are insulated or improved. The present work would aim toward gaining an in-depth and detailed understanding of the impacts of climate change phenomenon on people’s livelihoods in the selected coastal communities of the north-central coastal area of Viet Nam. Since the purpose of this study is to address questions on livelihoods approaches in climate change vulnerability, the researcher bases her analysis on livelihoods in climate change adaptation. But the climate change livelihood impacts are gendered and adaptive capacity is thus differentiated along gender lines. For those reasons, this study is part of a process of sharing, learning and analyzing men and women’s adaptation responses. This study uses the vulnerability and

“Sustainable Livelihoods Framework” – meaning a set of principles, backed up with a set of analytical tools, to analyze links between gender and climate change. The combination of these two factors is employed to highlight the fact that gender adds a specific dimension to vulnerability analysis. The analytical framework guiding this study draws upon sustainable livelihoods approaches, which would serve as a way to improve our understanding on how assets, vulnerabilities, and livelihood strategies differ between men and women in the coastal area selected for the study.

### **3.2 Gender and Climate Change Analytical Framework**

The concept “gender” refers to the ‘socially constructed’<sup>6</sup> roles, behaviors, aptitudes, and relative power associated with being female or male in a given society at a particular point in time (Esplen, 2009:2). In analysis of climate change, the gender approach is necessary to understand not only how the identities of women and men determine different vulnerabilities and capacities to cope with climate change impacts, but also how to tackle both the causes and consequences of climate change. It is recognized that people who are already the most vulnerable and marginalized, experience the greatest impacts (IPCC, 2007). At the same time, they have the least capacity or opportunity to prepare for the impacts of a changing climate (BRIDGE, 2008). As women constitute the largest percentage of the world’s poorest people, they are the ones who would experience the greatest impact of these changes they are least responsible for. There is little existing research that explores the linkages between climate change and gender. More recent research is the integration of the gender-sensitive perspective in climate change (BRIDGE, 2008:1).

Since this study focuses on answering different questions about men and women’s livelihoods in climate change adaptation, the Sustainable

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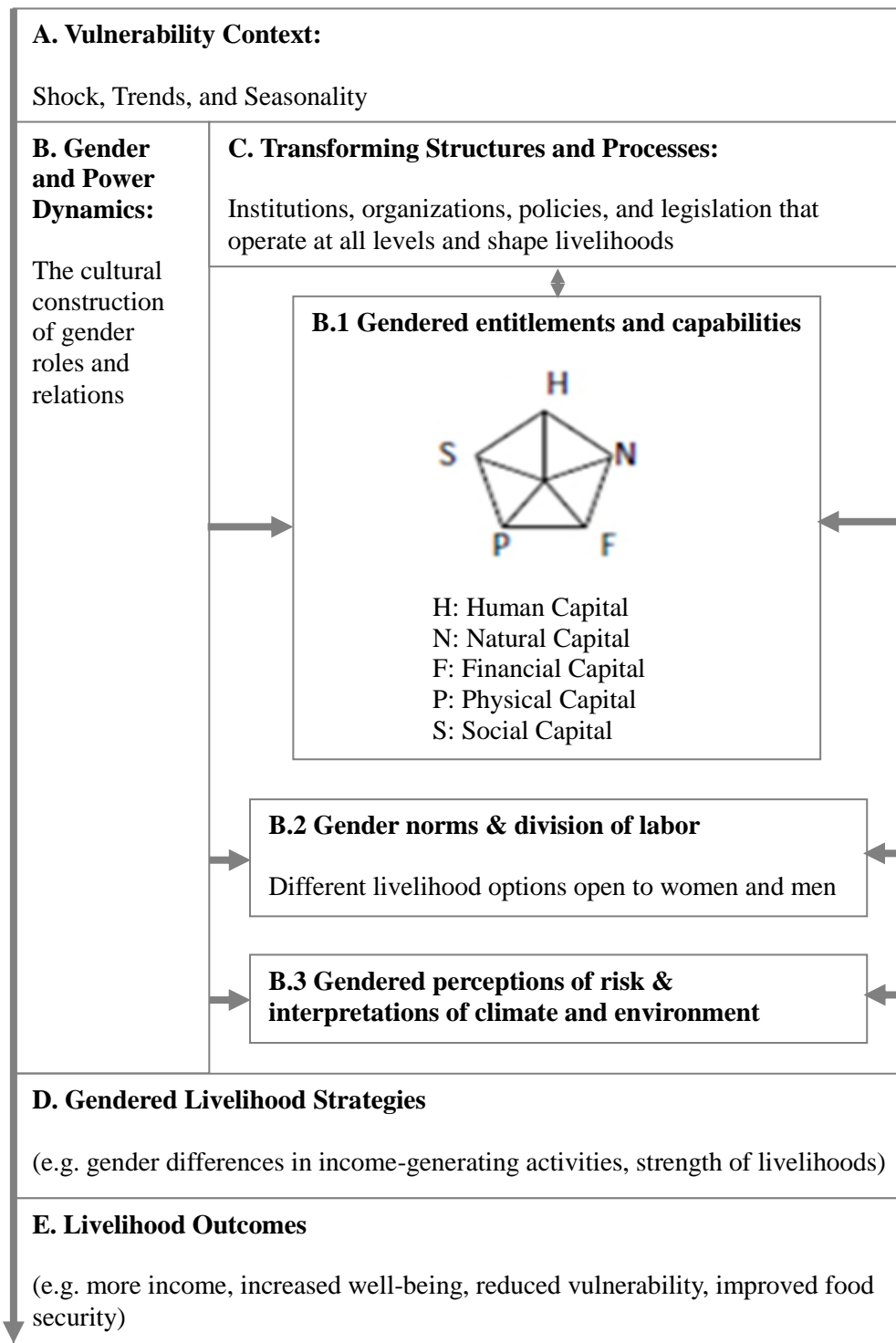
<sup>6</sup> ‘Socially constructed’ means that these are not ‘givens’ or ‘natural’ but are constructed or produced by society and as such can be modified or changed (Aboud, 2011).

Livelihoods Approach (SLA), including both the Sustainable Livelihoods Framework (SLF) and gender theory, is used. SLA has been influential within the field of international development in expanding our understanding of the vulnerability context, the policies and institutions which affect actions of individuals and households, and the diverse livelihoods strategies undertaken by women for their households. The SLF is a tool to improve our understanding of livelihoods, particularly the livelihoods of the poor and women who are among the most vulnerable to climate change effects, and when used with participatory research methodologies, it becomes useful to analyze complex rural and urban realities (Oxfam, 2009).

The gender analytical framework is used to analyze what and how gender relations would be shaped or changed in the process of adaptation. SLA framework was developed by Department for International Development (DFID) of the United Kingdom, UNDP, and NGOs (e.g., CARE, Oxfam, etc), and is considered an important tool to improve the understanding of livelihoods, especially livelihoods of the poor and women who make up a large proportion of the poor.

Figure 6 describes the SLF, which presents the main factors that affect women and men's livelihoods and typical relationships between these factors. This framework shows that livelihoods are shaped by a multitude of different factors and forces, which include "vulnerability context", "gender and power dynamics", "transforming structures and process", "livelihood strategies", and "livelihood outcomes", that are all constantly shifting, but are ultimately centered on gender and climate change. Gender-centered analysis begins with simultaneous investigation of men and women's assets, their objectives (i.e. the Livelihood Outcomes which they are seeking), and the Livelihood Strategies which they adopt to achieve these objectives.

**Figure 6: Gender and climate change analytical framework**



*Sources: DFID (1999) and Oxfam (2009)*

There are likely important feedback relationships that affect livelihoods which are between: (a) Transforming Structures and Process and the Vulnerability Context; and (b) Livelihood Outcomes and Gender and Power Dynamics. The arrows within the framework are used as shorthand to denote a variety of

different types of relationships, all of which are highly dynamic. None of the arrows imply direct causality, though all imply a certain level of influence.

The Vulnerability Context (part A) frames the external environment in which people exist. Women and men's livelihoods and their wider availability of livelihood assets are fundamentally affected by critical trends as well as by shocks and seasonality, over which they have limited or no control. Trends may include, but are not limited to, population trends, resource trends (including conflict), national and international economic trends, trends in governance (including politics), and technological trends. Shocks may range from natural shocks, economic shocks, human health shocks, and conflict, to crop and livestock health shocks. As an example from the field study, floods, extremely hot weather, and storms were the three biggest natural shocks that both women and men experienced in the area.

Not all the trends listed above are negative or cause vulnerability, but all of the factors that make up the Vulnerability Contexts which are beyond people's control are important because "they have a direct impact upon people's asset status and the options that are open to them in pursuit of beneficial livelihood outcomes" (DFID, 1999:3). Also, "the form of the framework is not intended to suggest that the starting point for all livelihoods (or livelihood analysis) are the Vulnerability Context, which through a series of permutations yields Livelihoods Outcomes" (DFID, 1999:2).

The relative vulnerability or resilience of men and women to comparable shocks and stresses is determined under the Gender and Power Dynamics (part B). These power dynamics and cultural values shape gender roles and the division of labor, differences in resource rights and livelihood options open to women and men, and their varying capabilities (Oxfam, 2009). The ways in which women and men perceive risks and interpret their climate and environment are also influenced by these dynamics and values.

The livelihood framework identifies five core asset categories or types of capital upon which livelihoods are built, including human capital (H), social

capital (S), natural capital (N), physical capital (P), and financial capital (F). These five capitals “are perhaps best thought of as livelihood building blocks”, where “a single physical asset can generate multiple benefits” (DFID, 1999:5). The centre point of the pentagon where the lines meet represents zero access to assets while the outer perimeter represents maximum access to assets.

These pentagons are constantly shifting, given that asset endowments are constantly changing. The asset pentagon lies at the core of the livelihoods framework, and its assets combine in a multitude of different ways to generate positive livelihood outcomes. These interact through sequencing and substitution relationship, two particularly important types of interactions. Relationships also happen with other framework components which are highly complex to understand the process of livelihoods analysis.

The trends, shocks and seasonality of the Vulnerability Context can destroy and create assets, while the access to assets is influenced profoundly by the institutions and policies of the Transforming Structures and Processes. Still, “those with more assets tend to have a greater range of options and an ability to switch between multiple strategies to secure their livelihoods” (DFID, 1999:6), or in other words, assets determine the choice of livelihood strategies. Achievement of different livelihood outcomes also requires different assets. For example, both women and men in the study area require a high level of access to natural capital to provide freshwater, river water surface, food security, and access to and control over land. It is imperative that a time dimension should be incorporated into any analysis of assets (DFID, 1999:6).

The Transforming Structures and Processes (part C) within the SLF are the institutions, organizations, policies, and legislation that operate at all levels and shape livelihoods. The influence of the Transforming Structures and Processes extends throughout the framework and maintains a two-way ‘influence and access’ with men and women’s entitlements and capabilities and a direct feedback to the Vulnerability Context. Institutions and their transforming processes can restrict men and women’s choice of the Gendered

Livelihood Strategies and may be a direct impact on the Livelihood Outcomes. It is always important to think beyond the state of the structures and transforming processes themselves to the effect that these have on the livelihoods of women and men in the study area.

The Gendered Livelihood Strategies (part D) denote the range and combination of activities and choices that men and women make and undertake in order to achieve their livelihood goals (DFID, 1999). Gendered livelihood strategies are greatly varied across sectors, between gender, within households, and over time. This is also a dynamic process where many different factors exist that affect choice of livelihood strategy. The more choice and flexibility present in livelihood strategies of men and women or, in other words, their access to different levels and combinations of assets, the greater their ability to withstand, or adapt to, the shocks and stresses of the Vulnerability Context. With regard to the Transforming Structures and Processes, they can reinforce positive choices, or act as a major constraint to choice in other cases that makes 'negative choices' as to the livelihood strategies of men and women (DFID, 1999: 24). Also according to DFID (1999), different livelihood strategies have different requirements, and those who have ample assets are more likely to be able to make positive livelihood choices. That is, they would be choosing from a wider range of options in order to maximize their achievement of positive livelihood outcomes, rather than being forced into any given strategy because it is their only option.

The Livelihood Outcomes (part E) are the achievements or outputs of the Gendered Livelihood Strategies. The richness of potential livelihood goals maximizes the efficacy of the outcomes that are pursued. As livelihood outcomes examples from the field study, both men and women in the two communes wanted to earn more income, increase their general well-being, reduce vulnerability, improve food security, and develop more sustainable use of their natural resource base. The achievement of livelihood outcomes depends not only on the aims of particular groups but also the extent to which these are already being achieved. The feedback arrow in the framework

indicates a close relationship between the Livelihood Outcomes and the Gender and Power Dynamics, the two being linked through the Gendered Livelihood Strategies.

The above analytical framework provides an overview of key aspects of climate change and gender linkages which need to be understood. All factors, except the Transforming Structures and Processes which fall outside the scope of this thesis, were used to guide the field study as well as the broader analysis presented in this study.

### **3.3 Gender and Climate Change Analytical Framework as a Research Method of this Study**

The above mentioned SLA outlines the gender dimensions of climate change which guides this study. At its core, it emphasizes a gendered analysis of stakeholders, entitlements, capabilities, division of labor, and livelihoods nature, opportunities and perceptions. These are the primary properties addressed by this study's research questions, specifically examining the gender roles, responsibilities, and decision-making power which shape the livelihood strategies available to women and men in the Ha Tinh coastal area as the relevant case studies. The investigation is focused on how local stakeholder activities, population trends, resource trends, a changing climate, and natural resource endowments all contribute to the relative vulnerability of men and women, their households, and communities in the study area. This study also concentrated on understanding: what types of livelihood strategies are employed by women and men in the area; what factors constrain them in their choice of livelihood strategies, with aquaculture operations and salt production as targeted schema; and how these choices impact on their livelihood outcomes.

In order to understand gender-sensitive adaptation strategies, this study focuses more on gender differences in the impacts of climate change as well as on gendered roles and capacities in coping with these phenomena. Women



face particular constraints in their capacity to adapt to existing and predicted impacts of climate change. In fact, gender-related patterns of vulnerability mean that the impacts of climate change are different on women compared to men. As such, gender-sensitive priorities and processes would be mainstreamed at all stages of this study around climate change impact and adaptation strategies. Equally important for distillation and analysis of existing mechanisms is for climate change adaptation designed to promote women's participation in disaster risk reduction to be gender-sensitive in the study area. Particular attention is given to documenting the different participation patterns of women and men to inform targeted adaptation strategies which poor women and men need for their security. To date, little attention has been paid to the ways in which gender has an effect on people's lifestyles and livelihoods and the impact this has on climate change in the selected coastal communities. This study seeks to address this gap in our knowledge base and support climate adaptation planning and decision making.

### **3.4 Conclusion**

This chapter describes the analytical framework to be used to analyze the impacts of climate change on men and women in the two selected coastal communes of study, as well as how these impacts are not felt equally between them. Adaptive capacity is differentiated along gender, and climate change livelihood impacts are gendered. Women are not only victims of climate phenomena, they are also "powerful agents of change" (UNDP, 2007). The SLF offers a way of thinking about livelihoods that helps order complexity and makes clear the many factors that affect livelihoods in the study area. This tool focuses our attention on the underlying processes of poverty as well as taking into account a wide range of factors that cause or contribute to poverty. This framework does not provide an exhaustive list of the factors and forces to be considered and as it continues to develop as a flexible approach, is expected

to lead to the identification of major constraints to, and opportunities for, poverty reduction in the targeted area of study.

The field study intends to provide insights into adaptation strategies of the Ha Tinh coastal communities and a gender based analysis is presented in the following sections of the thesis to demonstrate how women's and men's strategies differ and that the options open to them vary, particularly in aquaculture operations and salt production. All main factors and points, except the Transforming Structures and Processes, that affect women and men's livelihoods and relationships between these factors and points, are considered in this study. Because this analytical framework aims to provide the key aspects of climate change and gender linkages which need to be understood clearly, it fits well with the ultimate aims of this study.

## **4. Research Design and Methods**

### **4.1 Research Design**

A research design is the logic that links the data to be collected to the initial questions of a study (Yin, 1989:27).

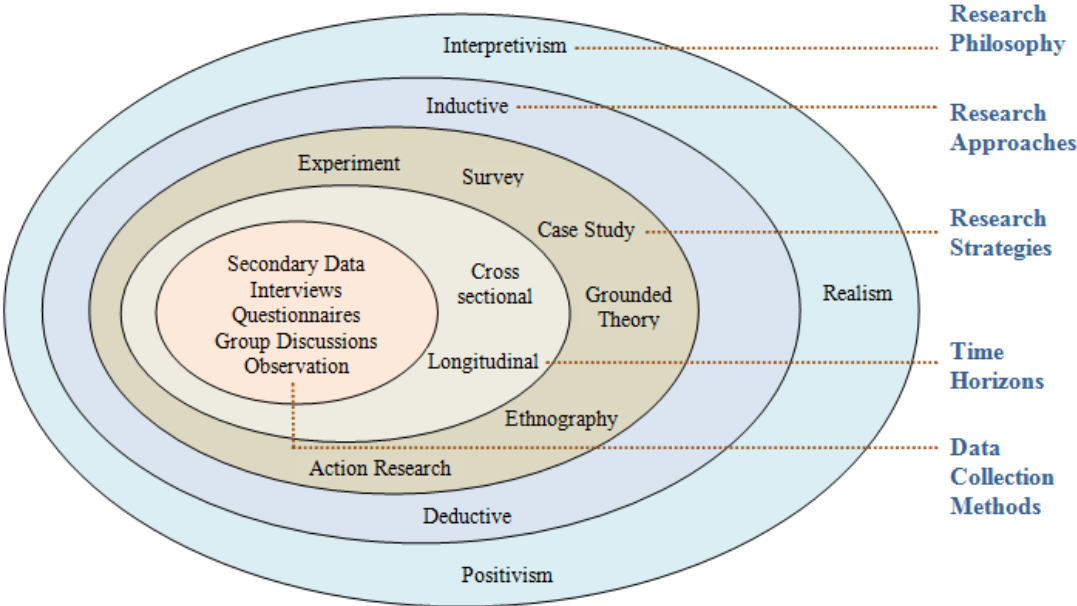
The research design for this study can be compared to an action plan for getting from A to Z. 'A' is defined by an initial set of questions or issues, and 'Z' a set of answers or conclusions about the questions. Between the 'A' and 'Z', a number of events occur, such as the collection and analysis of data (Korpel, 2005).

The objective of this master's thesis is to assess gendered impacts of climate change in two coastal communes of Ha Tinh Province, a North Central coastal region of Viet Nam, with a focus on important sectors and systems including salt production and aquaculture operations. This study aims at gaining an in-depth and detailed understanding of impacts of changing climate on gender roles, responsibilities, and decision-making power at the household level, as well as men and women's adaptation responses. The research methodology of this master's thesis is influenced and structured by the research process 'onion', developed by Saunders et al. (2003), which helps the researcher to gain insights into the issues underlying the choice of data collection methods. Figure 7 shows how the research process 'onion' has been applied in this study. The inner part of the 'onion' describes the methodology portion whereas the outer part discusses the strategies that can be utilized in interpreting the results of the findings.

A research philosophy represents a researcher's perception of how knowledge is constructed and the meanings that can be drawn from this construction (Saunders et al., 2003). It is important for the research process to clearly establish its research philosophy since it has a significant impact on the methodological framework. There are three general research philosophies in the literature, including the philosophies of interpretivism, realism, and

positivism, and each of them provides a distinctive view on the way knowledge is developed. The research philosophy of this thesis is **interpretivism** as the researcher believes that knowledge is a complex phenomenon which is influenced and developed by various contextual perceptions and variables (Saunders et al., 2003). Furthermore, this research topic was explored by the application of critical interpretations and gradually establishing research conclusions (Remenyi et al., 1998), so it is more suitably situated within the interpretivism research philosophy.

**Figure 7: The research process 'onion' by Saunders et al. (2003)**



The research philosophies of realism and positivism are irrelevant to this study, as positivism involves scientific reasoning and law-like generalizations in the process of knowledge development (Remenyi et al., 1998), while realism recognizes the existence of a number of external social objectives and realities which influence people's interactions and respectively the construction of knowledge. In other words, the research methodology influenced by the philosophy of positivism is characterized by a highly transparent structure to facilitate replication (Gill and Johnson, 1997), whereas realism highlights the inappropriateness of exploring people's interactions in the style of natural science (Saunders et al., 2003).

The research approach indicates whether the use of “theory is explicit within the research design” (Saunders et al., 2000:87). **Inductive** reasoning is a “bottom up” approach where data is collected and the findings are constructed as a result of the data analysis, moving from specific observations to broader generalizations. In addition to the SLF, this study uses the inductive research approach to combine theory use with the empirical work. This study gradually formulates the findings through the critical evaluation of the variables, thus the inductive research approach is applied to ensure that all angles are covered in terms of understanding the deeper structure of the study issue. Also, this approach provides the researcher with greater flexibility to modify the research emphasis depending on the accumulated research findings (Easterby-Smith et al., 2002).

A research strategy is how an author answers the research questions (Yin, 1994 cited in Linnemann, 2010). Saunders et al. (2000:92) describes the research strategy as “a general plan of how [the researcher] will go about answering the research question(s) [the researcher] has set.” In this study, **case study** is chosen to investigate the problem within its real-life context. Case study is known as a triangulated research strategy where the researcher can bring out the details from the viewpoint of the respondents by using multiple sources of data and add strength to what is already known through accessing previous research literature.

The time horizon of this study was limited to the period of the field study, which was from October – December 2011, when the targeted groups were involved. It represents a snapshot or cross-sectional view of the systemic reality. The ability to conduct a **longitudinal** examination was constrained by limited period of time of the study.

**Interviews, focus group discussions** and **observation** were used as data collection methods of this study. “Interviewing, observation, and analyzing activities are central to qualitative research” (Merriam, 1989:2). According to Kvale (1996:14), interviews are considered as “an interchange of views

between two or more people on a topic of mutual interest, [which] sees the centrality of human interaction for knowledge production, and emphasizes the social situations of research data.” Furthermore, interviews provide opportunities for interviewees to get involved and talk about their views, as well as discuss their perceptions and interpretations regarding a given situation.

According to Trochim (2006), observation is probably the most common method for qualitative data collection, in which participant observation is also one of the most demanding tools. Observation methods can be used for “trustworthiness and continuity” purposes (Merriam, 1998). The observation process involves looking and listening carefully in order to discover particular information about people’s behavior (Langley, 1987).

The above information has provided a detailed explanation of the methods which were the most appropriate research methods for this study. The case study was described as the appropriate research strategy, while interviews, focus group discussions, and observations were used as the data collections methods. These methods and instruments were used to obtain first hand data from the respondents so as to formulate rational and sound conclusions and recommendations for the study.

#### **4.2 Field Preparation, Challenges and Experiences**

There was plenty of preparatory work to be done before going into the field including logistics, transportation, and accommodation. The fieldwork plan was developed based on the research proposal, goals, and schedule for the fieldwork. During the preparation process, it was useful to stay in contact with the commune's leaders who could act as communicators with the targeted population for the study. In order to encourage stakeholders’ interest and gain permission for the field work, the schedule and benefits of the study had to be clearly explained to proposed participants beforehand. As soon as the field study started its first day, the vice chairman of Loc Ha District had put the

researcher in contact with the leaders of the two targeted communes. These leaders then helped the researcher with accommodation and transportation arrangements as well as communication with respondents later on.

There were some minor changes to the study area and the number of interviewees. The field work was initially planned for two coastal communes, namely Ho Do and Thach Bang of Loc Ha District, Ha Tinh Province. However, the study was finally conducted in Ho Do and Thach Chau Commune instead of Thach Bang Commune as per recommendations made by the district officials. This change was based on the acknowledged fact that there are a large number of people in Thach Chau Commune relying on salt production and aquaculture operations as the principal forms of subsistence, which was an important research factor for this site choice. However, the most important factor for the successful choice of the field study site was actually the open-minded people of Thach Chau Commune.

Regarding the change in the number of interviewees, thirty persons (16 females and 14 males; 10 persons involved in aquaculture and 20 persons in salt production) were interviewed instead of forty as initially planned (20 persons involved in aquaculture and 20 persons in salt production). Ten persons that were not interviewed were in Thach Chau Commune and this was because there were only ten households actively engaged in aquaculture operations in this commune, so it was more suitable and convenient to group them in a group discussion. In order to have confidence that the field survey results are representative, participants were intentionally selected to ensure they were involved in salt production and aquaculture operations, recommended by the concerned commune leaders, gender balanced, their availability, and not of the same family.

Approaching the people was not at all difficult, but taking an hour or more of their time for an interview proved to be a potential challenge. Some respondents were very busy with their own business and some other people felt a bit uncomfortable or impatient during their interview, but the majority of

respondents were very friendly and hospitable. Some interviews were flexible enough to take into account various circumstances, including some instances of conducting the interview process at their home or on the paddy field.

The respondents were very open when talking about the observed climatic changes and impacts on their production and life during the interviews and tended to give “positive” answers to some interview questions. Still, some households initially refused to participate in the interviews or were very reserved during the interview process.

Interviews were conducted in Vietnamese, as the interviewer is a native-speaker and the respondents cannot speak English. In addition, related documents and data collected from the local government authorities and civil society organizations were also in Vietnamese, with some being unorganized and unclear. Therefore, it took some time for the researcher to translate them into English, as well as to fully understand and use them within scope of the research.

## **4.3 Data Collection Methods**

### **4.3.1. Secondary Data**

This portion of the study relies on secondary data including a review of available literature and statistics on the topic areas, including reports and working documents prepared by government agencies and NGOs as well as other official publications. The secondary data analysis also involved archival research from books, journals, magazines, articles, internet materials and other related information.

The literature review process provided the study with an integral theoretical framework to allow and justify an in-depth analysis of the empirical findings. The literature review was divided into two main parts: the first part elaborated the context of the study area and the issues of concern, addressing the critical need for this study to be conducted to investigate what we do not know; and



the second part elaborated upon the theoretical approach for integrated analysis and assessment of the study context and situation, which can act like a map that gives coherence to the empirical inquiry. Based on the theoretical structure from the literature review, which acts as a clear and comprehensive basis for the thesis, the primary and secondary information and statistics on the topic of the study is combined, and the empirical data interpreted for a complete analysis.

Though there is not a wealth of previous research on this topic of study, climate change and adaptations being relatively new phenomena, the overall findings and conclusions of this study were not affected as the researcher has sought to overcome this challenge by drawing on the theoretical framework and qualitative research approach, triangulating data sources in relation to data collection and analysis.

#### **4.3.2. Primary Data**

While the secondary data provides solid theoretical foundation for the research, primary data contributes to the researcher's ability to address the most important issues in the research context (Robson, 2002). The primary data was collected through the fieldwork conducted from October to December, 2012 in Ho Do and Thach Chau Communes. In order to gather reliable and valid data, the study employed two methodological approaches in which the qualitative methods were used predominantly in comparison with the quantitative methods, which were applied to collect the demographic information of respondents such as their age, number of family members, income, etc. In this study, three data collection instruments were used including interviews, focus group discussions and observation.

### **a. Sampling Procedure**

In this study, the respondents were purposely selected from a number of people who were available during the field study period to ensure the best possible samples in terms of occupation and gender, but the interviews were conducted somewhat less methodically and more according to opportunity, in terms of time and place.

The researcher's attempts at this study included small groups of people and may not be representative of the coastal population in this region as a whole. This study was aimed toward gaining an in-depth and detailed analysis of phenomena of growing concern regarding climate change, rather than drawing general conclusion about it. The findings were not over-generalized, or in other words, the researcher does not assume that the findings are necessarily true of every person within the focus group of people or for every person in the region.

### **b. Interviews**

The selected method for primary data collection has been done under the form of semi-structured and in-depth interviews, which provide first-hand and new information. Open-ended and close-ended questions in in-depth semi-structured interviews have been used for respondents to define and describe the context in their own words, since these are designed to encourage the participant to provide an extensive and developmental answer, and may be used to expose attitudes or obtain facts (Saunders et al., 2003:262 cited in Landua, 2008). By definition, a structured interview "asks all respondents the same series of pre-established questions with limited set of response categories" (Fontana & Frey, 2005:699 cited in Ferrari, 2010:51). Comparably, semi-structured interviews are much more flexible. Together with in-depth and open-end questions, interviews encourage respondents to talk and go more deeply into the issue of concern. All interviews in this study started with ice breakers and an informal chat to help the respondent feel relaxed. Then the

questions are narrowed down until the last point was drawn out. The use of interviews and questionnaires help to collect valid and reliable data relevant to the research questions and objectives (Saunders, 2003:245 cited in Landua, 2008).

This study employed both semi-structured and in-depth interviews, but the later was the more essential component. These are the most common qualitative research methods to conduct exploratory discussions, utilized here in order to obtain a greater understanding of people's perception of the gendered impacts of climate change on important sectors and systems in the region such as salt production and aquaculture. The interviews included open-ended questions, though there were also some close-ended questions. The closed-ended questions utilized prewritten response categories on a questionnaire with boxes to tick. As these questions followed a set format, most responses were entered easily into the spreadsheet program for analysis. With regard to the open-ended questions, the answers were written up in the related blank commentary sections of the questionnaire. The data analysis for the open-ended questions is more complex as there are no standard answers to these questions. As a result, the questionnaire started with the closed-ended questions and then finished with the section of open-ended questions for more detailed responses.

For the purpose of this study, a total of thirty people including 16 women and 14 men who were working in salt production and aquaculture in two concerned communes were interviewed during the field study. The interviews were very friendly and conversational. Trying to use personal empathy to make the respondents feel at ease, the researcher started by introducing herself, the purpose of the study and the interview process. The interviewer was responsible for asking questions and filling in the questionnaire to avoid misunderstandings and unclear responses. Questions about the respondents' demographic characteristics were asked first and in gender specific way, followed by the closed-ended and open-ended questions, on topics such as livelihoods, production, and baseline natural phenomenon of the area.

Depending on respondent characteristics and the interview context, some questions were varied by order and some questions were omitted or added for particular interviews. Following are the major questions asked to 16 female and 14 male informants:

1. *Where does your family's main income come from?*
2. *According to you, which of the following problems affect your production and output? Do you think this was caused by climate change<sup>7</sup>?*
3. *What aspects of your family and lives are affected by storm, drought, rain and other adverse weather phenomena, as well as by changes in the production and output of aquaculture and salt production?*
4. *What have you done or will you do to respond to changes in productivity or output? Why do you think this is necessary or useful?*
5. *What have you done or will you do to respond to extreme weather or weather challenges? Why do you think these responses are necessary or useful?*

The researcher aimed to obtain answers from both male and female for each question, so all answers provided by men and all answers provided by women respondents were grouped and analyzed separately. The subject of these questions referred directly to gender-specific roles and behaviors. Furthermore, it is a fact that the gender of the respondents affects their reply behavior, so even when these questions did not appear gender specific, the gender aspects were still indicated in the answers and during the interviews. Besides, since the researcher was of the same sex as 53% of the total respondents, this allowed greater responsiveness and solidarity from the

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<sup>7</sup> Actually some people don't understand what climate change is, so it was necessary to explain this in other words such as abnormal weather, recent changes in frequencies of climate factors etc.

female respondents and a sense of egalitarianism with male respondents to male respondents.

The informal interviews and discussions with one male district official, and four officials of two communes (three males and one female) were conducted in the preparation stage of the general commune interviews to discuss some key issues as well as to obtain the related documents and data. Following the interviews or focus group discussions, an informal discussion between the researcher and commune officials was held to get their opinions and comments on the interviews and focus group sessions.

The interviews were fairly easy to analyze, as the researcher simply went back through the answers collected and decided how to use them within scope of the study. All of the answers were then entered into a Microsoft Excel spreadsheet. The text responses to the open-ended questions were also grouped into categories of responses, or coded, in the spreadsheet. The charts showing how those answers fit within the thesis paper were produced afterwards (and can be found in Chapter 5).

Thirty people of thirty households interviewed during the field study were between the ages of 30 and 80 years old, and all involved in either salt production or aquaculture operations. None of the women respondents was the member of the same household as the men interviewed. Also, all respondent households were actively involved in salt production and aquaculture operations, and all interviews were conducted at the respondents' homes or while they were working. Table 3 provides an overview of all respondents of the household interviews: gender, age, education, number of family members, house or land owner, and main income generator. Apart from these interviews, one district official and four officials of two communes were also interviewed in the preparation stage of the interviews as well as after the interviews or focus group discussions. For detailed information on the profile of the household respondents, please see Annex 1.

**Table 3: Summary of profile of household respondents**

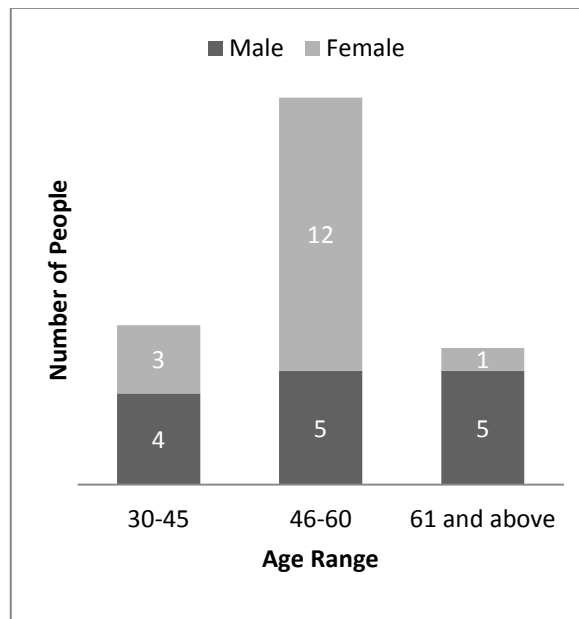
<b>Item</b>	<b>Unit</b>	<b>Result</b>
Total number of interviewees	<i>People</i>	30
Male interviewees	<i>People</i>	14
Female interviewees	<i>People</i>	16
Average household size	<i>People</i>	4.63
Average age of interviewees	<i>Year</i>	51.8
Average education level	<i>Level</i>	Secondary school (Year 7)
Household owner	<i>Number</i>	28 men (93.33%)
Main income generator	<i>Number</i>	19 men (65.5%)
Heard about climate change?	<i>Percentage</i>	83.3% confirmed

*Source: Field survey (Vu Phuong Thao, 2011)*

### **Age Distribution and Sex of Respondents**

Both age and gender have a major influence on the way people perceive things and respond to situations due to biological and psychological differences. Therefore it is very helpful to thus categorize respondents in order to be able to obtain a variety of feedback from both men and women based on their individual experiences, observations, and opinions in regard to the climatic and production changes in the area. Sixteen women and fourteen men, who were purposely selected from a number of people who were available during the field study to ensure the best possible samples in terms of gender, were interviewed and classified into three age groups, as shown in Figure 8. Please refer to Annex 4 for detailed information on the age distribution and gender of household respondents.

**Figure 8: Age distribution and gender of household respondents**



*Source: Field survey (Vu Phuong Thao, 2011)*

The youngest respondent was 30 years old while the oldest was 80 years old. The age groups of 30-45 years and 61 years and above represented respectively 23% and 20% of the total respondents. As shown in the table and the figure above, the 46-60 age group accounted for a majority (57%) of the total respondents, and more than two-third were women. In other words, there were more middle-aged women than other age groups staying at home at the time of the field study and, therefore, included in the study. As observed by the researcher and from the interviews, the main labor forces in these communes are now women, the elderly (aged over 40), and children. This fact was also mentioned by the leaders and representatives of the Commune People's Committee, social-political organizations, and villages. It was also observed by the researcher that many young women and men have migrated to the cities to engage in manual labor jobs, and notably, these young urban migrants often contribute the majority of the household's income by sending funds back to the family. The cities that these migrants usually go to are rather far from their home, so they tend to visit only two to three times a year, during the traditional New Year holidays in February and harvesting season in July. Middle-aged women and old people often try to find a job close to their residences, often as

they could not go far due to health situations and traditional responsibilities of taking care of their house and children. This suggests that these issues might be linked and worthy of further investigation.

**Household Size**

The term “household” is the basic residential unit that normally includes all individuals living the same dwelling (Sullivan et al., 2003). “Household size and composition” generally implies some socio-economic factors such as gender, income, education, and occupation. It is argued that household size and composition is a determinant factor for the capabilities, choices, and strategies available to its members (Rakodi, 2002). Therefore, understanding the household size and its composition of survey respondents is important in this study in terms of relationships between the family members and the basic necessities of life that they have access to.

**Table 4: Household size**

Household Size	Number	Percentage (%)
< 4	5	16.6
4-6	23	76.7
> 6	2	6.7
<b>TOTAL</b>	<b>30</b>	<b>100</b>

*Source: Field survey (Vu Phuong Thao, 2011)*

From Table 4, it is clear that households of 4-6 members were the largest group, comprising 76.6% of the total respondents’ households. There were only 6.7% of households with more than six members whilst the households with less than four members made up 16.6% of the total. Almost all households in the two communes included extended-family with three-generations of family or two married couples. In this type of family, a parent usually lives with their first-born son, their daughter in-law, and grandchildren. It is a custom in Vietnam that the first-born son has the responsibility

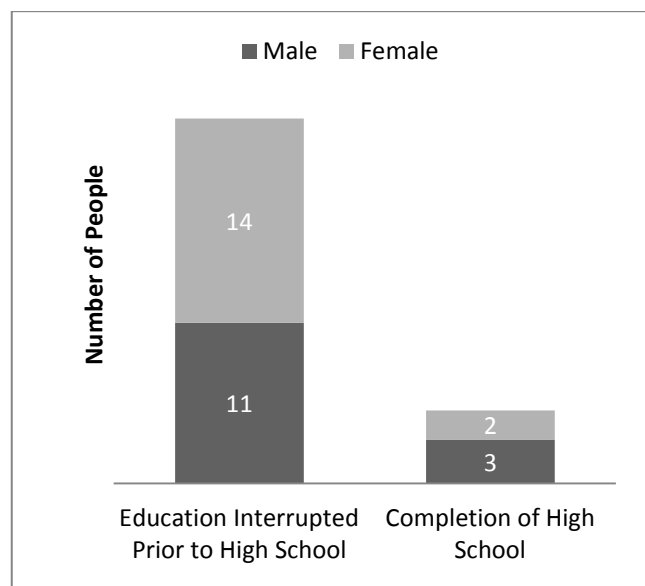


to take care of the worship ceremonies of their ancestors whenever those dates come.

The respondents also said that traditionally the number of family members were much larger than today because previously their parents and grandparents wanted to have as many children as they could, particularly boys. There are two major explanations for the decrease in household size in the study area. Firstly, the success of birth control campaigns in the 1980s and 1990s continues to encourage each couple to have one to two children with a fertility gap of 3-5 years (Nguyen Thanh Binh, 2011). Secondly, and also as stated by the informants, people now tend to have fewer children in order to be able to invest much more in the nurturing and education of each child.

### Education Level of Respondents

**Figure 9: Education level of respondents by gender**



*Source: Field survey (Vu Phuong Thao, 2011)*

Figure 9 shows the education level of respondents by gender. While most of the respondents did not finish high school, twenty-six respondents (thirteen men and thirteen women) finished the primary school, and among these people, four respondents (two men and two women) completed the high

school, and one other male respondent reported that he graduated from the university. The reason most did not have higher levels of education was explained due to the fact that they grew up during wartime (1954 – 1975), and their education suffered or was interrupted by this and other related hardships.

Further analysis and findings from the interview process would be presented in Chapter 5.

### c. Focus Group Discussion

Table 5 categorizes and indicates the age group and gender of focus group session respondents.

**Table 5: Age and gender of focus group session participants**

Category	25-45	46-60	61 and above	Total	Percentage (%)
<b>HO DO COMMUNE</b>					
<i>Male</i>	2	8	6	16	53.3
<i>Female</i>	0	8	6	14	46.7
<b>Total</b>	<b>2</b>	<b>16</b>	<b>12</b>	<b>30</b>	<b>100</b>
<b>Percentage (%)</b>	<b>6.7</b>	<b>53.3</b>	<b>40</b>	<b>n/a</b>	<b>n/a</b>
<b>THACH CHAU COMMUNE</b>					
<i>Male</i>	0	1	1	2	6.7
<i>Female</i>	17	11	0	28	93.3
<b>Total</b>	<b>17</b>	<b>12</b>	<b>1</b>	<b>30</b>	<b>100</b>
<b>Percentage (%)</b>	<b>56.7</b>	<b>40</b>	<b>3.3</b>	<b>n/a</b>	<b>n/a</b>

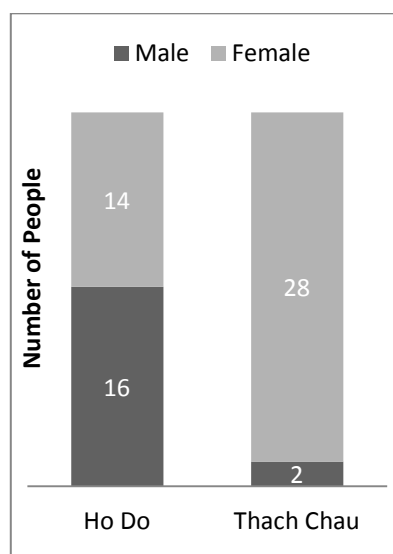
*Source: Field survey (Vu Phuong Thao, 2011)*

A focus group discussion was employed in this study to obtain greater insights into the issues. Through communication and interactions between the men and women of the group, with regard to the questions raised, the researcher collected further opinions, attitudes, and preferences toward the given topic for

discussion. Using this qualitative research technique, the ideas raised by the group members were combined with each other to form more and even better ideas and communication. By initially generating interest in the topic of concern, the researcher then involved all the participants in the discussion, as well as kept the discussion on track, but also allowed for unexpected interventions.

The focus group participants were arranged to sit in a circle in order to see each other and the sessions were recorded by a sound recorder. Flip charts, blank A4 pages, colored marking pens, and other materials were also available to capture the comments of participants and make those comments visible to the entire group. Each focus group session usually lasted one to one and half hours. In total, three focus group sessions with ten participants in each group were conducted at each commune.

**Figure 10: Focus group session participants per commune and gender**



*Source: Field survey (Vu Phuong Thao, 2011)*

Among these three sessions in each commune, two were for people involved in salt production and one for aquaculture. Both men and women were encouraged to participate in the focus group sessions to attempt gender balance and equality. Nevertheless, women tended to dominate these sessions in Thach Chau Commune (Figure 10). This could be due to the fact that

women are more active in the commune's Women Union and were more available than men.

Unlike the men, women were generally more enthusiastic and informative during the focus group discussions. Nevertheless, they seemed less prepared to raise their voice in front of others during the sessions. The same focus group questions were used in both Ho Do and Thach Chau, but employed in a flexible way to allow the participants to interact freely with each other and to express their ideas as openly as possible.

#### **d. Observation**

The observation method was used in this study to gather information to gain a clear understanding of the context, behaviors, and everyday lives of people residing in the targeted coastal communes, as well as to see how they respond under different circumstances.

The researcher stayed with the family of one respondent at Ho Do Commune during the fieldwork for a one month period. This was considered a huge advantage for the researcher during the process of observation, as it took only a very short period of time to get acquainted with the people and build trust with them. These factors allowed the researcher to study people in their “natural setting” without their behavior being unduly influenced by the presence of a researcher, assuring the natural phenomenon of the observations.

The observation method was not only used during the interviews and group discussions but also through everyday communication and dealing with people. The researcher, for example, went to the market every afternoon to buy food, and paid visits to some households and to the pagoda at the same time. During the home-stay, the researcher worked around their house, observing the type and condition of housing and the facilities, then went inside the house to converse with her subjects and see their daily activities, later recording her notes and observations from the day. This kind of activity helped

the researcher with many important observations of verbal and nonverbal communication and messages on the issues of concern. The observational data provides a deeper and richer understanding than the simply using the survey work which produced less detailed information about a larger number of people over time, thus hiding changes and subtleties.

The observation data is more difficult to analyze because when taking notes, the researcher wrote down everything that was seen. The notes were then organized into categories. After everything had been organized, the researcher makes some generalizations about what have been observed.

## **5. The Gender Dimension of Climate Change Impact and Responses in the Two Coastal Communes of Study**

Based on the collected data from the fieldwork, this chapter provides tabulation and analysis to reveal the findings on how the gender dimension is relevant to how men and women are affected by climate change and other stresses, as well as how they respond in the coastal communes of study. The gender dimension of climate change impacts and adaptation strategies are also presented in this chapter based on the gendered entitlements and capabilities described in the analytical framework which included social, natural, physical, financial and human capitals. Apart from these, this chapter also provides useful information that reflects the different status of men and women's lives and activities which are considered to have impacts on their perception and understanding of climate change and other stresses and adaptation choices. Discussion about the main findings is shown in the conclusion section of this chapter.

### **5.1 Home Owner and Livelihood Activities of Households**

#### **5.1.1 Home Owner and Main Income Generator**

All 30 respondents' households owned their own land, and the owners of the house and land were generally men, except for two cases where the women had inherited such property from their husbands after they passed away. In many cases, even when women were the main income generators, they were disregarded as property owners. In the sample material, one third reported that women were the main income generators who worked independently or with their husbands to contribute to the family income. Women were also the keepers of the household budget, but could only decide independently on small expenses, such as purchasing food items or certain tools, and they could not access this budget as much as they might need.

“My husband gives me the money he earns for buying food and small tools needed for family. I just know what he gives, and I do not argue or ask for more. He does not know anything about the current finance status of the family if I do not tell him. The amount he gives is not enough for the family living expenses, so I have to cut down on the household expenses as much as possible, or borrow from my relatives or neighbors. I never purchase valuable furniture or equipment for the family. I follow his decision on this” (extracted from interview number 15 on 30<sup>th</sup> October 2011 in Ho Do Commune).

On the contrary, according to male respondents, when men wanted to spend money on something, they would simply tell their wives to pay for.

“I do not have much money in my pocket, as I gave it to my wife already. When I think we should buy an electrical device or new equipment and furniture for our house, I ask her for the money. If I really need to buy something and it is likely that we do not have enough money, I would discuss with my wife to find a solution such as selling something in the house or borrowing from somewhere else” (extracted from the interview number 2 on the 5<sup>th</sup> November 2011 in Thach Chau Commune).

In other words, women kept the family budget, but they could not control it. They suggested that men should be the main income generators, and the male respondents shared their view. However, the fact is that men were the main income generators in some cases, and women in other cases.

Household size and composition were important factors for the respondent's family because it was considered that their livelihood activities and incomes were contributed to by the number of people in the household. The bigger the respondent's household size, the higher their income could be, and the young women could work more and the old less, compared to small families. Also in such settings, the elderly mother got more opportunities to help her spouse or daughter-in-law with domestic tasks. The small families were inevitably more

vulnerable to stresses and uncertainties because more was expected of fewer people. Thus, the household size and composition could result in a different human capital accumulation for the family and effect the intra-family specialization, consequently changing the family's production and economic power.

**Box 1: Household size and main income generators**

“I stay at home, but my husband, my son, and his wife work. I am mainly responsible for looking after my nephew and preparing lunch for the whole family. My daughter-in-law is in charge of the dinner after work. She also cleans the house and conducts other domestic activities in the evening”.

*(Interview number 2 on the 21<sup>th</sup> October 2011 in Ho Do)*

### **5.1.2 Livelihood Activities of Households**

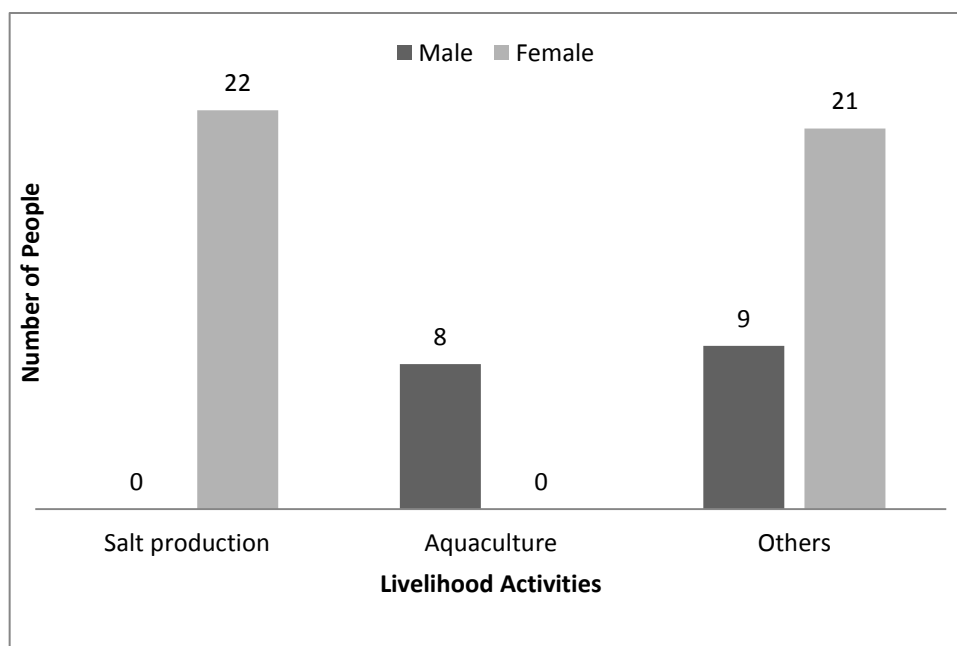
Salt production and aquaculture operations are the two main livelihood activities of all respondents which contribute to their sources of income. The total area of salt production of Ho Do commune was about 83 ha in 2010, whereas there were only 20 ha used in 2011. The salt season usually starts in February and finishes in July. The average annual revenue per capita is quite low due to low quality salt; at approximately US\$ 300 per household in Ho Do and US\$ 500 per household in Thach Chau. Extensive farming of aquatic products in brackish water ponds and in the river is conducted in both Ho Do and Thach Chau. The aquaculture area often belonged to a number of households, with four to five household on approximately 1.5 ha. There are two aquaculture farming seasons per year, from January to May, and from June to December, with average annual revenue of about US\$ 1,500 per ha.

The interview data shows that twenty-two households produced salt (73.3% of the total households visited), while only eight households practiced aquaculture (26.7%). The below figure shows that among the adult members



of the visited households, women uniquely were the salt producers while only men were involved in aquaculture operations. However, all respondents also mentioned that, while the aquaculture operations were considered largely “men's work”, women were also engaged in this production activity in order to help men to concentrate on other on-farm activities or off-farm employment.

**Figure 11: Types of income-generation by gender**



*Source: Field survey (Vu Phuong Thao, 2011)*

Women played a key role in most salt production activities, while the husband and children helped only to refurbish the salt field's surface. Maintenance of the salt storehouse was also necessary, and some respondents said that they had to do this kind of job once per year in the case of a thatched salt storehouse, and between two to three times for a concrete storehouse. Women had to hire labors to help them with this job if their husband and children were not available. All female informants stated that they tried to keep the investment in the salt production sector as low as possible, because they might face losses at the end of the production season.

Regarding the aquaculture operation, men were the main workers, but they got lots of support from their wives. Before the working season, men dredged the pond bed, reinforced the pond banks, and balanced the water level. Women

helped their husbands with the transfer of soil, pumping water, as well as other odd jobs. The men would install a net which covered the pond surface in order to prevent the shrimp, fishes and other aquatic species from getting out of the pond during storms and floods. This adaptation strategy was necessary for all households as it helped them to reduce the losses and damages. However, the effectiveness of this strategy varied considerably depending on the financial capacity of the households, their awareness and knowledge in coping with disasters, technique issues, and varied supports from the community and government. The poor households, for example, had less to invest in the protection of their aquatic products, and as a result, they needed more time and efforts to recover from the damages and losses than others.

The income of households interviewed comes not only from salt production or aquaculture operations but also from other sources such as working as hired labor outside the household, vegetable planting, poultry raising, or rice wine making (by women). The respondents believed that all households in both communes had tried to find and combine as many of the different livelihood activities as possible to meet the changing needs of their families.

Besides being involved in the salt production and helping men in aquaculture operations, all women planted vegetables or raised poultry in their home gardens. Women said that these activities provide more food for their family and they can also sell the products at the market to earn for some extra money. Some women try to find jobs in the vicinity of home, as a cleaner or cook for example, but men appeared to have more mobility than women, so men in both Ho Do and Thach Chau tended to go to the big cities in the south of Viet Nam where the economy was considered to be better, particularly Ho Chi Minh City.

The information presented in this sub-section referred to the relationships between men and women with respect to their activities, finances, decision-making power etc. As explained, salt production and aquaculture operations were the two main livelihood activities which contribute to the household

incomes of respondents. The entire salt production process was managed and operated by women, but they also involved in aquaculture operations even when this production activity was considered largely “men's work”. Women’s domestic and subsistence production tasks remained, but they were disregarded almost entirely as property owners, except inheritance instances. Roles in decision-making in the family’s budget management were also gendered, with women having less of a say in decision-making, responsibilities and experience. This sub-section also indicated that, when men had more decision-making power at home, households tended to spend more on men's preferred goods.

## **5.2 Economic, Climate Change Stresses, and Disasters**

The trends affecting local economy, seasonal fluctuations in price, and production and natural shocks (exposure to climate stresses and hazards) are vulnerability factors that men and women in the study area clearly could not control directly. These factors have a direct impact on men and women’s assets and the options available to them in pursuing optimal livelihood strategies.

It is an acknowledged fact that the two coastal communes targeted in this study are situated in one of the poorest provinces of north central Viet Nam. The leader of the Loc Ha District indicated that people’s lives here have been changed significantly recently in terms of their access to key resources and relations that enabled them to increase their production, food security and income, because of the country’s economic development; however, about 10% of households still have incomes below the country’s poverty line. It was estimated that there are more than 300 poor or nearly poor households in Ho Do Commune (16% of total households), while Thach Chau Commune has 173 similar households (11.4%). All respondents in the interviews and group discussions agreed that the local economy appeared to diversify recently, with their incomes now coming from different sources rather than just from the aquaculture operations and salt production as in the past. Thus, diversification

of income sources was a local common strategy to avoid risk, and as a consequent, additional ways of generating income were needed such as migration to the cities to engage in manual labor jobs.

Diversification of income was a practical strategy employed by survey households in order to reduce risk of external shocks since different sources of income were likely to be affected differently by external shocks. Income diversification appeared to be key for risk management and would help vulnerable respondent households to meet and smooth their family's consumption, social and labor needs, and develop incomes. Income diversification opportunities were both within and outside salt production and aquaculture operations, and include both on- and off-farm strategies. Nevertheless, as the cost of many consumer goods has also risen, often higher than their increased earnings, many have continued to face hardship and stress in trying to meet their needs.

The seasonal fluctuations in price and production of salt are other critical trends over which people in the two coastal communes have limited or no control. Salt farming is a traditional occupation in these communes which used to provide a high and steady source of income; however, now the salt still costs only 8 cent per kg in Ho Do and 16 cent per kg in Thach Chau as it used to be five years ago. This is too low to secure a stable or sufficient income for the households involved in production, particularly in 2010 and 2011 as the production costs for salt were typically higher because of greater labor inputs per unit of output and a high inflation rate (which accelerated to 22% in 2011). The respondents also noted that the cost of salt also fluctuated according to the selling time, and was lower than usual during the salt harvesting season. The harvest time price drop of salt product often happened, partly because when all salt producers were waiting to sell at harvest time, they were fully exposed to price risk, basically bearing whatever the market happens to be offering at the time. If they could not handle the volatility and switch out of production after the market crashed, then waiting until it was up again before switching back in, then they would lose money and potential income. Hence, they were likely

to be better off with low profit, or even suffer some loss, so that they could maintain their household during the market crash to retain this traditional job, or otherwise to secure a stable or sufficient income for the households some other way.

Many respondents involved in salt production had complaints about the low price of salt, the lack of a stable market for their salt in the area, and that the yield in 2011 was lower than in 2010 due to fewer sunny days. The salt production season usually lasted from February to July, but was from April to July in 2011 due to the unfavorable weather conditions. When climate change adversely affects salt production, since women are the main workers, they lose one of their important income generating activities, notably one in which they also have a certain decision-making power.

The People's Commune of Thach Chau provided funding for its people to lay down concrete for the salt fields and to invest in salt processing and refining in order to improve the salt productivity and yield. The quality of salt was thus improved and that is why its price was two times higher than that of Ho Do Commune. The same project was conducted in Ho Do, but it was not as successful as it was in Thach Chau. As income from the salt production was too low, some people preferred to find a job and make money in the cities rather than to produce salt at home. Furthermore, people believed that the water used to make salt in Ho Do had poor quality and differed from that in Thach Chau.

Notably, as reported among all survey respondents and calculated by the researcher, income from aquaculture was five times higher than that of salt production, but it required more investment and included more risks. It was indicated by the respondents that the price of aquatic products was rather stable in the local market, but the productivity of this sector also varied according to the breeding, various techniques, and weather conditions.

The respondents believed that many households involved in the aquaculture operations in Ho Do had losses for three consecutive years, especially low

during the flood season in 2010 when all of their breeding stock and working tools were swept away or destroyed. It was estimated that people invest approximately US\$ 2000 at the beginning of every working season for aquaculture, and most borrowed this amount of money from their relatives or neighbours. With the current losses, they were put in debt, and if they wanted to re-invest in these operations, they could be forced into ask the bank for a loan.

**Table 6: Respondents’ ranking of problems caused by climate change**

Ranking	Ho Do Commune	Thach Chau Commune
1	Storm	Storm
2	Shortage of fresh water	Shortage of fresh water
3	Flood	Coastal erosion
4	Saline intrusion	Flood
5	Heavy rain	Heavy rain
6	Drought	Sea level rise
7	Extremely hot weather	Saline intrusion
8	Sea level rise	Drought
9	Coastal erosion	Extremely hot weather

(1: the most seriousness problem, 9: the least one)

*Source: Group discussions in Ho Do and Thach Chau (Vu Phuong Thao, 2011)*

Other climate stresses and hazards were also observed by respondents and the researcher including, saline intrusion, fresh water scarcity, drought, and coastal erosion. All respondents reported that both Ho Do and Thach Chau lacked stable sources of fresh water, and they considered this as a serious environmental issue in both communes. Coastal erosion was another dangerous threat to Thach Chau because this commune is situated very close to the sea and its land area is largely concentrated on coastal sandy land. Table

6 shows how participants in group discussions ranked the level of seriousness of the problems caused by climate change phenomena observed in these coastal communes.

There was gender role differentiation during the different phases of the disasters. Before any disasters, women were responsible for food preparations, water storage, packing belongings, while men took care of the home maintenance and production activities. The men also cut down some overgrown tree branches and participated in the resident's disaster reduction groups. During the disasters, men had a tendency to take care of the public works while women cared for the domestic arena, including care of the children and elderly. After the disasters, both men and women were involved in preparing or rebuilding the houses and recovering from the damages, though men tended to perform the tasks that required most physical strength. In both communes, if men were absent from home, women were responsible for almost everything thus their workloads increased significantly, and consequently they may have had to ask for help from their relatives or neighbours in an extreme weather situation. Generally, both men and women suffered from the increased workloads before, during and after any disaster events.

From the information presented in this sub-section, we have learned about the vulnerability factors in terms of economic and climate change and other stresses that were affecting men and women in the coastal communes of the study area. These factors have a direct impact on both men and women's assets and the options available to them in pursuing optimal livelihood strategies, and it is clear that they could not control them directly. Women are more likely than men to suffer from these factors as they are often more vulnerable to disasters than men due to differences of socially constructed roles and responsibilities. Further information and analysis will be presented in the following sections.

### **5.3. Gender Participation in Household Decision Making**

Impacts of climate change could be affected by gender patterns, culture, and other social relations. The IPCC (2011) has indicated that these impacts would be differently distributed among different sexes, ages, occupations, and lifestyles. It is also argued that the impacts of climate change would become one of the major threats to the social relations and the future of human society. This section focuses on gender-differentiated participation in household-decision making, community activities, and local political and management structures.

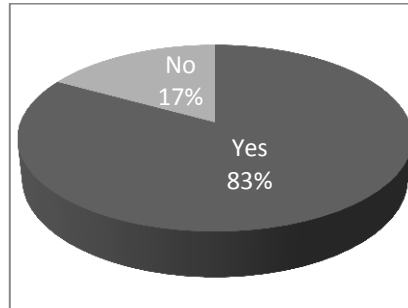
It is believed that, when there is greater gender equality in decision making and process of consultation, there are more income and nutrition security benefits. From the information provided by the respondents, this sub-section presents the discussion on the different types of roles and responsibilities of men and women in the decision making and process of consultation at the household and community levels, as well as stressing the importance of participation of both genders in the household-decision making, community activities, and local political and management structures. It is extremely important to encourage the participation of both men and women in all decision-making processes and management structures in order to promote and fulfill the right to equality for all persons, as well as to ensure the increased representation of women in decision-making, particularly during the disaster events and in the process of formation of adaptation strategies and initiatives to climate change.

Of 30 interviewees, 83.3% (25 people) had previously heard the term “climate change”, or “biến đổi khí hậu” in Vietnamese (Figure 12), mainly through television or the commune’s public radio and loudspeakers, though not many could explain what climate change was. Actually some people do not understand what climate change is, so it was necessary to explain this in other words such as abnormal weather, recent changes in frequencies of climate



factors, etc. The climate change phenomenon was understood mostly as the altered weather conditions that people in the area were experiencing.

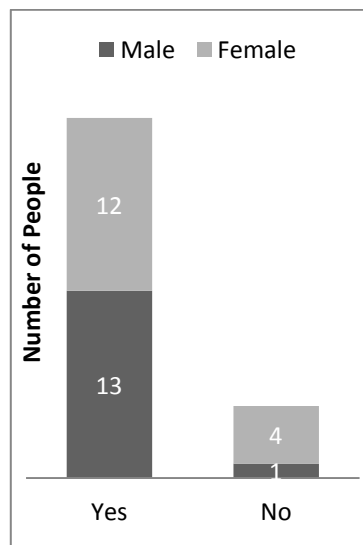
**Figure 12: Have you heard about climate change?**



*Source: Field survey (Vu Phuong Thao, 2011)*

It appeared that more men knew about climate change than women. Among those who had heard about climate change, 52% were men, which amount to 93% of the total male respondents (Figure 13), whereas only 75% of the total female respondents were familiar with the term. All respondents said that it was men who usually watched television and conveyed the information to their wives.

**Figure 13: Men and women heard about climate change**



*Source: Field survey (Vu Phuong Thao, 2011)*

According to the leader of Ho Do Commune, there was a national program on climate change in the commune in 2010, and most of the participants were

male. In this way, men tended to get more opportunities to equip themselves with a stronger skills base and deeper knowledge of climate change than women. Also, there were many more men than women in the saving group for disasters, a group established by the commune to help the families to cope with natural disasters and strengthen the community-based disaster preparedness by giving the people the opportunity to prepare and build up reserves. The focus groups discussions also showed that men had more understanding and knowledge related to climate change than women and men also looked more confident in presenting their own ideas.

The awareness of climate change issues affected the intra-household decision-making process established to manage climate change impacts, as well as for other household issues. All respondents stated that they usually discussed with their partner whenever household decisions were made, but that final decisions on the important issues or large expenses in the household, such as buying a motorbike or furniture, were ultimately decided by men. Women were often responsible for small and daily living expenses, for example, purchasing food items, clothes for family members, or working tools. With regard to salt production, as women are the main workers, they can decide to buy, for example, a brand new wheelbarrow to carry the salt, but if they want build the warehouse to keep the salt, then they would discuss this with their husband, who would make the final decision.

**Box 2: A situation observed by the researcher in Ho Do**

A family was having their house built and more bags of cement were needed. The wife told her husband that she thought they needed two more bags of cement, but her husband disagreed and said: “I said that we need three bags, so please do it”. The wife then did as per her husband’s decision without any further comment.

*(Interview number 17 on the 1<sup>st</sup> November 2011 in Ho Do)*

In male-headed households, the husband decides what he wants to buy and asks his wife to pay for it. While the husband is not the family budget keeper, he controls this budget as he wishes. In addition, once the husband makes a decision on something, the wife then has the responsibility for implementing his wishes.

**Box 3: While an interview was being conducted...**

A person came to the house with an aquatic breeding species to sell. The wife first asked for her husband's opinion, then she made a deal with the seller and paid.

*(Interview number 13 on the 27<sup>th</sup> October 2011 in Ho Do)*

The presence and participation of women in the local political and management structure could be seen from their participation in the commune's Women's Union. This observation is relevant to the study as this membership indicates the representation of women at the commune's decision-making level, as well as how the gender approach is being integrated into the local political and management structure. All female respondents reported that they were members of their commune's Women's Union<sup>8</sup>, but their frequency of attendance varied from person to person. Some women said that they did not have enough time to attend the community activities regularly, but another reason was that some women did not want to take part in social activities if they had to pay a membership fee. In general, the women the researcher interviewed said that taking part in the social activities made the female respondents feel happier and younger.

According to the leaders of the Women's Union of both communes, women's participation in the community activities such as festivals and events increased gradually as they have recently become more popular, though they were still

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<sup>8</sup> Vietnam Women's Union was found in 1930. It has a network at the central, provincial, district, and commune administrative levels with a total membership of above 13 million women. It is mandated to protect women's legitimate rights and interests, as well as to strive for women's empowerment and gender equality (Vietnam Women's Union, 2012).

most attached to their “traditional responsibilities” such as food preparation and house cleaning tasks. Maintaining an active membership in the commune’s Women’s Union could imply that the barriers to women’s meaningful participation in decision-making at the commune level might be lowered, including the decision-making for climate change.

The social activities also interested men, and all male respondents attended at least one social organization such as the Veterans Association<sup>9</sup> or the Farmer Union<sup>10</sup>. The Mission Statement of both of these organizations stated that they are mandated to care for the rights and interests of both men and women, but all respondents reported that most of the members of these organizations in their communes were male. Men were also the main staff of the political and management structures in both communes, and the leaders of the People’s Committee of these two communes were men. Only the Farmer Union of Ho Do Commune had the female leader. Other unions such as the Veterans Association and the Farmer Union elsewhere had only male leaders.

According to the respondents and the leaders of the Women’s Union, women faced many obstacles in participating and sustaining their involvement in the social activities as well as in the political and management structures. Their main barrier was that the heavy household workloads mentioned above consumed most of their time. Men also used time to take care of the children and production activities, but most tended to work outside the home for most of the year, so they could not help much. Women had to take care of all family members and at the same time, conduct most of the subsistence tasks such as cooking, washing, and water collecting. They were more tied to the house, and as a rule, worked alone, but were also expected to work with their husbands in the field during the growing seasons.

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<sup>9</sup> Vietnam Veterans Association was found in 1989, and maintains its network at all administrative levels with over 2.6 million war veterans and more than 1 million former servicemen. It is mandated to care for the spiritual and material life of the men and women who were Vietnam’s veterans (Vietnam Veterans Association, 2012).

<sup>10</sup> Vietnam Farmer Union was found in 1930, and maintains its network at all administrative levels. It is mandated to care for and protect the farmer’s legitimate rights and interests (Vietnam Farmer Union, 2012).

Results from the focus group discussions also confirmed that women were mainly responsible for child rearing, which is time-consuming. In addition, some female complained that their work was less valued than those activities carried out by men. In Thach Chau Commune, for example, when women participated in the construction of public infrastructure, and performed heavy tasks such as carrying bricks and mixing concrete, but they earned less than men, who were officially masons.

The unequal workload distribution between men and women often restricted women's access to formal education and career development opportunities. According to the leaders of the Women's Union of both communes, women tended to drop out of school earlier than men. In many households, while men worked outside the home, women's main role was seen to be in the home and their participation in social activities was often discouraged by the husband and parents-in-law.

**Box 4: Stress of household chores**

According to the leader of the Women's Union of Ho Do Commune, the housework placed a lot of pressure on her. She usually got up at 5 am to prepare breakfast for the whole family and take care of her children before going to work herself.

This woman picked up her son from school at 4 pm, then went to the market to buy food and back to home to prepare dinner. After that, she cleaned the house, and hand washed her baby's clothes. She then did some personal hygiene and went to bed around 10 pm, but it appeared that she had no time at all to take a rest during her busy day.

*(21<sup>th</sup> October 2011 in Ho Do)*

This sub-section has addressed some main types of roles and relations of men and women in the decision making and process of consultation at the household and community levels. Changes in both men and women's roles and responsibilities appear to be needed as a prerequisite for gender equality.

Equal participation of women and men in decision-making processes, with particular emphasis on participation and leadership in relation to managing climate change impacts, would ensure that both genders play vital leadership roles in potential climate change adaptation options at individual, household, and community levels. When women's participation in household decision-making, community activities, and local political and management structures is strengthened, their overall household-asset base could increase and its composition change. Similarly, when they become more engaged in household planning for food and disaster response efforts together with men, households become more food secure and prepared for climate change adaptations.

#### **5.4. Gender Dimension of Climate Change Impacts and Adaptation Strategies**

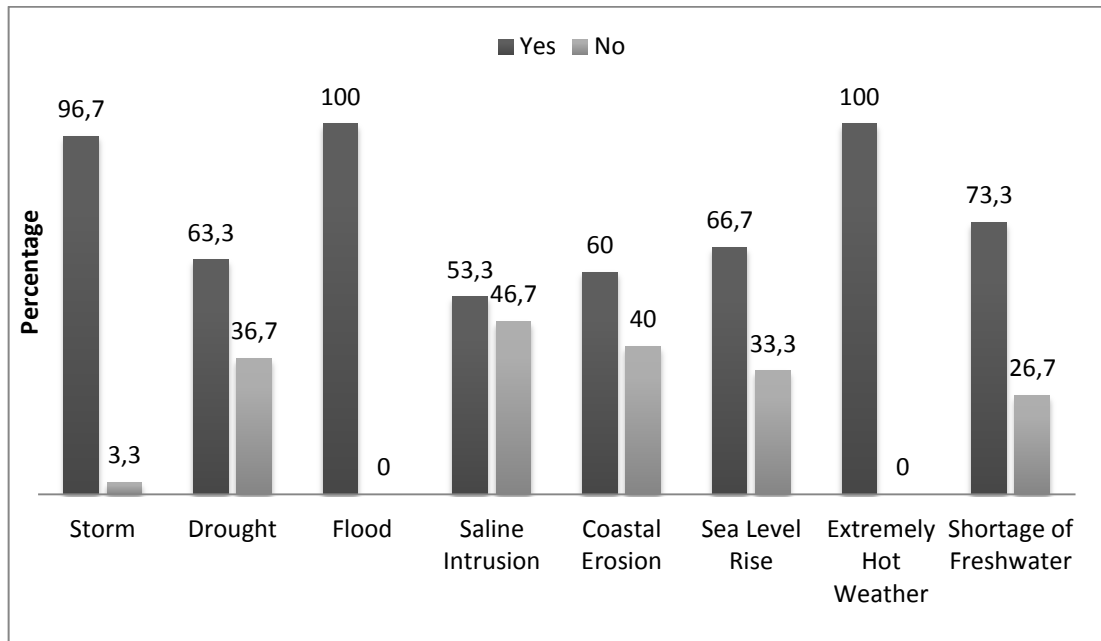
To understand women and men's adaptation strategies to climate change, it is essential to perceive the impacts of climate change on their production and livelihoods at the household level. Figure 14 shows the climatic problems that affected people's production and livelihoods according to the responses of 14 male and 16 female respondents. Please refer to Annex 4 for detailed statistics.

All respondents considered that floods and extremely hot weather had the greatest effect on their production. In terms of salt production, the extremely hot weather and floods created very harsh working conditions which affected people's health and the salt productivity, as people needed to be in good physical condition and the sunshine<sup>11</sup> to produce salt. In other words, these climate stresses were considered as true risk factors in their production and health. Regarding aquaculture, the heat was said to have changed the water environment and decreased the salinity level of brackish water, which in turn caused the death of numerous aquatic animals and increased incidences of disease.

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<sup>11</sup> Sea salt is produced by natural evaporation by heat of the sun and blowing of winds.

**Figure 14: Has your livelihood been affected by the following climate change phenomena?**

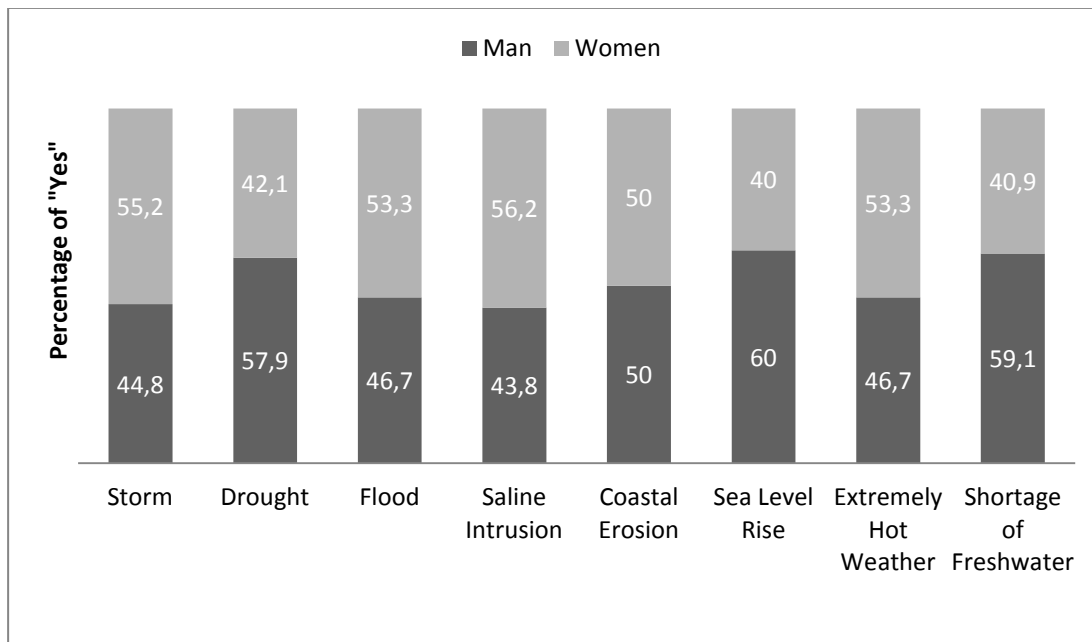


*Source: Field survey (Vu Phuong Thao, 2011)*

Floods were dangerous to both of these sectors as they could sweep away all products, as well as destroying the working tools and terrain. Only one male respondent working in aquaculture production thought that the storms did not affect his production. According to him, the storms usually came and left quickly so the damage was negligible. Five other households in the sample mentioned their intention to give up this work and lend the surface water to other people who want to borrow, as the losses and damages in the recent years made them disappointed and discouraged.

Figure 15 shows that there were differences between men and women in their perceptions about the climatic problems affecting their production and livelihoods. It is clear that the sea level rise, freshwater shortage and drought were three types of problems that men and women's perceptions differed most. This may be explained because of men and women's attachments to different sectors of production, men were more likely to have heard about climate change, and even the places they were living within the study area.

**Figure 15: Problems which affected production and livelihoods**



*Source: Field survey (Vu Phuong Thao, 2011)*

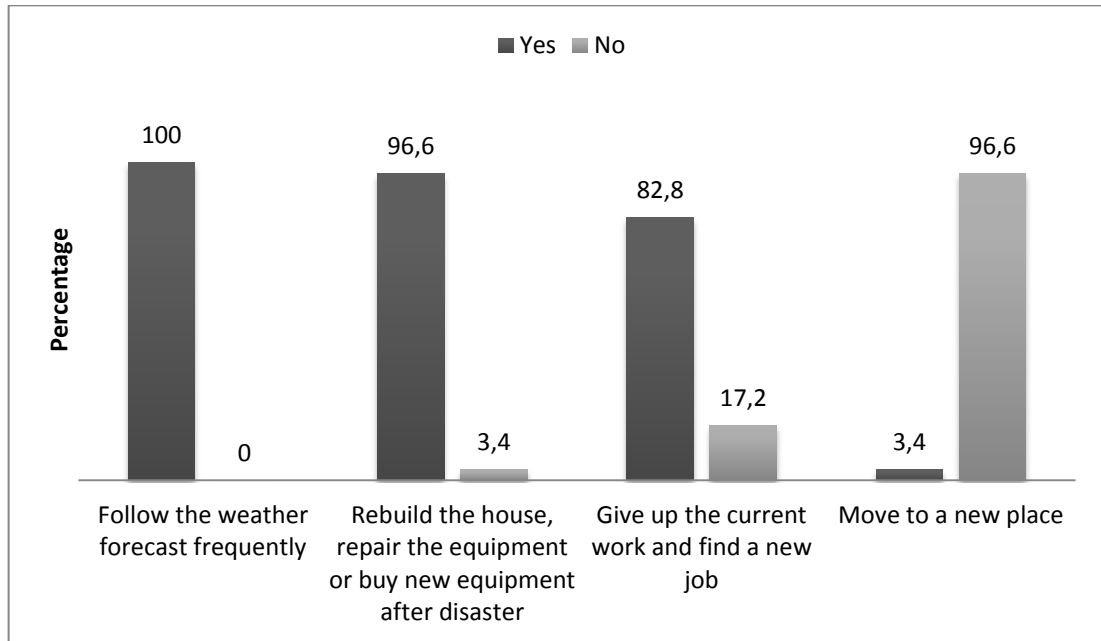
The sea level rise and coastal erosion were clearly observed by people living and conducting production activities in both Thach Chau and Ho Do. There were two men and eight women in Ho Do who disagreed about the impacts of the sea level rise on their production (33%), saying it had little impact as some sections of a dyke have been constructed in the commune. The rest of respondents believed that the tidal flow was about 10 cm higher than it was 10 years ago. As seen in Figure 15, respondents generally considered the impacts of various climate change issues on their production and yield to be considerable.

Figure 16 shows some typical adaptation strategies of people in both communes. In general, all respondents said that their work always depended on the weather, so both men (48.3%) and women (51.7%) got into the habit of watching the weather forecast on the television or listening to the weather on the radio. Every commune had a storm and flood prevention board which included the leaders and representatives of the Commune People’s Committee, social-political organizations, and villages. This board is in charge of managing, coping, and supervising the prevention activities regarding



natural disasters. At the village level, there were the volunteer groups of men which were established to deal with emergency cases.

**Figure 16: Typical adaptation strategies for extreme weather disasters or weather challenges**



*Source: Field survey (Vu Phuong Thao, 2011)*

Most of the respondent in the study area had a solid house made of brick and concrete; others owned the semi-solid houses with the thatched kitchens. Both men (50%) and women (50%) agreed that they had to repair the house, or buy the new equipment for the house, at least once already because of the disasters. Only one woman believed that her house was rather solid, since she had not had to rebuild or repair it much after the disaster events.

Slightly more male respondents (58.3% compared to 41.7% of the women) felt discouraged about the current work situation than did the women. All male respondents said that if they found a new job, they would give up the current one. In terms of aquaculture, both men and women stated that losses in recent years had put their households in debt, and this was the main reason for their disappointment and discouragement. However, some men and women in the group discussions said that they wanted to be more involved in the aquaculture sector because the income from the aquaculture operations was much better

than other sectors, so long as they had good preparation and proper techniques from the beginning of each working season.

With regard to the female respondents, some had already given up their work, or intended to do so. However, 17.2% of the total respondents continued with their current work, especially those working in the salt sector, since this was a traditional job and they would like to retain it. In addition, some women said that they had no ideas of what they would otherwise do after giving up this job. While this work was still able to provide them with some income, even small, why should they quit? They believed “it was better than nothing”.

Almost all respondents had no intention of moving to a new place, because some did not have enough money to move, some had to take care of their ancestor’s lands and graves, and last but not least, they were familiar with the neighbors and their life. Only one female said that she would move to a new place if she was able to, because she wanted better conditions for her children and particularly because she felt that her family was insecure, not only from the threats to their subsistence but also because of the severe climatic conditions.

Moving from how people perceive the general impact on their livelihood of various climate change stresses to a focus on men and women’s assets, the following sub-sections summarize the five main categories of gendered livelihood assets in the study area affected by climate change, following the gender and climate change analytical framework, which included natural capital, human capital, physical capital, social capital, and financial capital.

#### **5.4.1 Natural Capital**

As mentioned, the land and house owners are generally male. Women only inherit from the husband after his death. This gendered pattern of land ownership remains as before. The climatic changes have had a significant impact on both men and women’s access to and control over land. The land

used for salt production decreased about 45% from 2011 to 2012, and large salt production areas were fallowed afterwards. Being the main salt production workers, women lost income generating opportunities and have increasingly started planting vegetables or raising poultry in their home gardens while some are trying to find jobs in the vicinity of home, as a cleaner or cook for example.

Many households in the study area found that access to fresh water resources had become worse because most of the wells in their commune had no more fresh water or were filled with alum or saline water. Some households bought the alum water treatment equipment, but the purified water was only used for the purposes of washing and cleaning. People used tap water or rainwater for cooking, and while few households were equipped with tap water systems yet, all households in the study area already had rainwater containers.

Women are responsible for collecting water for household use as this was considered as a domestic job. However, this task has become more difficult and stressful during the hot dry season and natural disasters (e.g., floods, droughts, or long period of hot weather).

#### **5.4.2 Physical Capital**

Losses and damages of production tools and equipment caused by disasters were significant. These tools and equipment often belong to both men and women in a household, so it meant that both were sustaining a loss. With regard to salt production, natural disaster events caused the salt to melt down or swept away it, destroying the salt field. In aquaculture, the biggest loss came when aquatic animals and their offspring died because of abnormal events. Also, these species were often swept away when floods or storms happened.

All respondents believed that they had already applied some adaptation strategies to protect their production and income from the climate change and

other stresses. To minimize impacts on their production, the first thing people did was to maintain and upgrade the aquaculture ponds and salt fields annually. Respondents reported that the annual upgrades of a salt field costs about US\$ 100 or more, and about US\$ 1000 for aquaculture pond, depending on the status of degradation. Both women and men conducted the reinforcement activities before-hand to help withstand disaster events, as well as rebuild after the event. The frequency of these activities varied and was based on the severity of damage as well as the regularity of disasters. Maintenance appears as a long term adjusted habit, though these maintenance practices might also be regarded as adaptation strategies.

The change in the cultivating time was another adaptation strategy of the respondents. The working and harvesting times now were more flexible. The salt production season now started from April instead of February as before. There were two aquaculture seasons per year in the past, but now only one season started in February to avoid the flood and storm season. In order to reduce the losses and damages, people also harvested the aquatic products before predictable disasters came.

In a disaster, women were mainly in charge of saving their domestic furniture and helping the husband to collect their working tools and equipment. Men were responsible for maintaining these tools and equipment in order to reduce the damages caused by the disasters. In the salt production, salt was transported to the warehouse and the working tools were kept in a safe place in the house. For aquaculture operations, important reinforcement activities were carried out to protect the ponds and aquatic animals such as fortifying of the pond bank, and strengthening the bamboo pillars to protect the species in the ponds.

Regarding public infrastructure, some main roads were already built of concrete, but people said that since many roads were simply dirt in the past, they were very muddy after the rain. Nevertheless, these concrete roads were

still rough and easily flooded. More female respondents complained about the current state of infrastructure than did male respondents.

### **5.4.3 Human Capital**

The female respondents said that they were more worried about the natural disasters than men were, in terms of health and safety. As they directly took care of other family members and did all the housework, the threats to their physical safety increased in the immediate aftermath of a disaster. They became weaker during the disaster events and between-crop periods, as they tended to eat less than their husband and children, letting them eat first and eat more. They also faced the outbreaks of water-borne diseases such as cholera, intestinal worms, and typhoid, particularly following the exceptionally wet periods which resulted in contaminated water supply systems. Of major concern for them currently is the possibility for droughts to lead to diseases caused by contaminated water and poor hygiene. Generally, the female respondents considered that their reliance on domestic and subsistence production, coupled with existing climate stresses on health and limited financial, institutional, and human resources leave them more vulnerable and less able to adapt to the impacts of climate change. Most of the male informants believed that they also worried about these issues as much as their female counterparts did, but most of them were often absent from home so they could not do much more to relieve the concerns of their wives.

There were also some common sicknesses among men and women including headache, irritability, and back pain. Both male and female informants complained that they had to work for long hours under the hot, direct sunshine, especially in salt production, and they thought this was linked to their illnesses.

All respondents believed that now they would often quarrel with their wives or husbands regarding the loss in production and changes in the weather. Some women mentioned that their husbands would start to drink when they had

nothing to do at home and would sometimes lose their tempers. In contrast, some men said that their wife too often complained about the work and how the cost of many consumer goods has risen, which sometimes made them more annoyed. However, no respondents mentioned any forms of family violence, i.e. between husband and wife.

In addition, many female respondents mentioned the arguments between wife and husband on the nurturing and education of the children as well as family connections and general happiness. All interviewees indicated that they try their best to ensure their children finish the high school, but ultimately it is up to the child's learning ability and the family financial capacity, and a topic worthy of further study.

“I grew up in a poor family during wartime, so I did not have opportunity to complete my secondary school. I want my children to have better education and training opportunities than I did. My daughter is going into high school next year, but I worry a lot about the tuition fee and cost of study materials as they increase year by year. However, if she is able to go high school or higher study, I would try to borrow money from friends, relatives, or bank to cover for her study” (extracted from the female interview number 3 on 7<sup>th</sup> November 2011 in Thach Chau Commune).

Some respondents explained that, as their educations were interrupted in the past, they would like to see their children get a better education and have the same opportunities to go to school as others of the same age. Many respondents agreed with the fact that they really wanted their children to go to high school or further education and training beyond that, but they got stuck whenever they thought about the tuition fee and price of the school supplies, as their household's income from salt production or aquaculture and other sources were just enough to live from hand to mouth. In addition, the entrance exams for higher education are very difficult for their children, and in case

they pass, they have to go to the town and city to study and this would cost their family a lot.

According to many informants, children had to give up their studies to help their parents. In many of the households interviewed, many children had drop out of school in order to help their parents make money or take responsibility for a majority of domestic chores when their parents were absent from home. Male children usually went with their father to the cities to find jobs, while the female children took care of the house and worked in the fields with their mother. During the disasters, the children's education was also negatively affected because of damages to schools and textbooks. In some cases, children were evacuated from their home, as for example, during the floods in 2010 when they did not go to school for a month or more.

Female respondents also mentioned that when their husband went to the city to work, they could not stop worrying and thinking about the temptation and social evils such as drugs and prostitution. Secondly, the migration flows to cities might lead to an unstable socio-economic structure in the commune, in which human resources declined and remained undeveloped. Furthermore, the youth and children were under-educated and lacked the parent's care, which maintained vicious cycles of poverty associated with the family's status. All respondents also argued that they preferred staying and working at home if they could ensure the health of the family's finances. The migration trend of men in these two communes could be considered as a good adaptation strategy in the short-term, but in the long-term other adaptation options for climate change should be explored.

#### **5.4.4 Social Capital**

All interviewees took part in at least one social organization in their commune. Nevertheless, men participated in more activities with more frequency than women, especially in the training courses related to the prevention of storms and floods. Men's increased engagement in such groups might imply the

stronger local network of social and community organizations. These community-based organizations could be considered as a core pillar of the commune's capacities to adapt to changing conditions in its natural and physical environment, including the changing climate. In the rural areas of Viet Nam, these organizations in particular have an important traditional role in the local governance and management. The increased presence and participation of men in these organizations could strengthen the roles of these organizations contributed to the adaptive capacity to climate change at the community and household levels. Their increased memberships in these organizations might also indicate the dominant trend in representation of men at the commune's process of consultation and decision-making.

During and after the disasters, and in some serious cases, the households were provided with financial support from the government. Climate-related disaster has brought better access to credit and financial grants after the disaster, which seems to help the households in coping with the situation. The support of government relates to the household head, but there is no barrier for women to receive the help they need as this is not distinguished by gender.

In order to have the appropriate prevention measures and supports from the People's Committee, the commune residents had already developed the regulations for the prevention and reduction of flood and storm damages, which included some guidelines on how to strengthen the house, prepare sand bags, and to evacuate the elderly and children out of the dangerous areas before the disasters happened.

#### **5.4.5 Financial Capital**

The difficulties in production caused by climate change and income loss forced many people to migrate to the city to make extra-income for the family. In Ho Do most of the families had at least one member working in the city as hired labor. Also, men had more opportunity to migrate far from home than women did, as women had to care for their traditional responsibilities (e.g.,



cooking, washing, child care, etc). Men send home as much money as they can, but visited home only two to three times a year, mostly for traditional New Year holidays in February and harvesting season in July. They may return home to help their family when the disasters strike the area hard, but some respondents indicated that they tend to stay in the city if they did not have enough money or it cost them too much to visit home. Women also migrated to find work, but only in the local vicinity. While men were paid US\$ 10-13 a day, women were paid merely half. However, it was agreed that everyone preferred to stay at home.

There were some potentially negative implications from the changes in the household structure caused by emigration from these two communes. Primarily, these changes doubled the burden on women, which was already very hard, and caused intra-household conflicts in the extended family. Women became the main workers in almost all household activities when the husband was absent. In the past, for example, women were responsible for preparing food, cleaning the house, conducting other domestic activities, and supporting the husband's work, while the main tasks of men were to repair the house and restore the salt stocks and other family assets. But now everything was put over the shoulder of women.

Almost all households interviewed borrowed money to invest or re-invest in the production. They also tend to borrow money to pay for their children's education and re-construction of their houses after the disaster events. Some households benefited from the government's special policies for the poor or for women, so they were able to borrow money from the bank with low interest rates. The Women's Union's of both communes were also running programs to support the livelihood activities of women and higher education of female children without collateral security or third party guarantee for payment. It is a sign that women's productive activities are considered. Some female respondents were afraid that they would not be able to repay the loans, so they tried to borrow as little as possible. In general, the large loans were often provided to the men, who were the household owners.

This part has summarized women and men's adaptation strategies to climate change and other stresses in the two coastal communes of study. From the five sub-sections, it is now easier to perceive the impacts of climate change on women and men's production and livelihoods at the household level in terms of five core categories or types of capital upon which livelihoods are built following the gender and climate change analytical framework, which included the natural capital, human capital, physical capital, social capital, and financial capital. Taken as a whole, this part has served as a good platform for this study to come to a successful close. The next sub-section and part discusses the main findings and conclusion of this study.

## **5.5 Conclusion**

From the presentation of relevant gender-dimensions of the climate change responses and strategies in the two coastal communes of study, I would highlight three important points.

First, people in the study area were facing more and more difficulties, struggling to deal with the effects of climate change. The increase in both the frequency and increased magnitude of impacts of extreme weather in this area were of particular concern. The climate phenomenon happening in this region include extended times for severe storms and floods, shortages of fresh water, extremely hot weather, and saline intrusion. Several respondents recognized that such changes are affecting men and women differently. Climate change is not gender neutral, and men and women in this area have not previously faced crises on this scale. In order to recover from one climatic shock after another, as well as to rebuild assets and cope with the persistent stresses posed by changing conditions, men and women's workloads have increased substantially, even though their workloads were not equal to begin with. These factors make relations between men and women more and more stressed, resulting in negative effects on their own mental and physical health. In particular, women were strongly affected, both physically and psychologically,

because they are often forced to become the sole caretaker for family members as well as the breadwinners.

Second, the coping strategies are unlikely to be sufficient in some cases, particularly for women. Both men and women tried to take action to protect themselves and their family against the inevitable impacts of climate change, but all generally had to look for alternative sources of income due to the loss of income and reduced crop yields. Generally, women ensured both the food security and disaster response efforts, but it can be said that women, especially poor women, had a limited range of coping strategies. They lacked access and control over land as well as mobility since most of their activities revolved around the home. In addition, their participation in social activities was limited and usually behind the scenes in logistics.

Third, the current adaptation strategies to climate change for men and women in the study area could be considered good only as long as other adaptation options that have long-term implications would be available for them in the long-term. The changes in working and harvesting times, and migration trends could be adaptation options for both men and women to reduce the losses and damages caused by climate change in the short-term. Furthermore, climate change-induced migration, which is currently the main climate change adaptation strategy in the two coastal communes of study, could cause significant economic, social, and environmental problems for both their abandoned communes and the receiving cities who have to deal with the influx from all over the countryside. This migration of people creates an unstable socio-economic structure, where human resources decline and remain undeveloped, maintaining a vicious cycle of poverty and displacement, perhaps for a long time to come.

The presented material shows that these results are not speculative. To date, however, there is little evidence that these implications are seriously considered by the responsible local governmental agencies. The researcher

hopes that the information provided in this thesis paper will encourage further research to be conducted on this front.

## **6. Conclusions and Recommendations**

### **6.1. Conclusion**

This thesis has centered on the impact of climate change on men and women engaged in salt production and aquaculture operations, the gendered responses, and the effects on men and women's roles, responsibilities and decision-making power in two communities of one of the poorest districts of the North Central coastal region of Viet Nam. This final chapter provides the conclusion to the study, including some recommendations based on the study findings, which might provide a good point of departure for further research.

The gender and climate change analytical framework has guided this study. The selected conceptual framework was used as an analytical tool to facilitate a process of exploring the issues of climate change and how current changes affect men and women in these communities. The framework itself was then used to structure data collected, draw out key linkages, and as a checklist to ensure the issues of concern were adequately addressed while identifying key information gaps for further research. The advantage with taking central concepts such as gender, vulnerability, adaptation, and sustainable livelihood as the points of entry for the study was that it placed people and gender at the core of the research. The framework also facilitated a process of understanding the linkages between men and women's livelihood strategies, their ways of using available resources, and their roles, responsibilities and decision-making power, and is therefore a useful approach for understanding the topic of study.

This study employed the gender livelihood model, which tends to take gender as the basic unit of analysis. Thus, most of the attention was on how different genders relate to different types of assets and production activities, to the vulnerability context, to the adaptation responses, and to the effect on roles, responsibilities and decision-making power at the household level. This model showed the assets and production activities that men and women carried out to make a living for their families in the study area. By drawing attention to the two production activities that men and women made use of when constructing

their livelihoods, the model produced a comprehensive view on what resources, or combination of resources, were important to them, including not only physical and natural resources, but also their social and human capital. Another crucial aspect of the gender livelihood model is that it facilitated an understanding of the underlying causes and processes of poverty, which might lead to the identification of opportunities for poverty reduction, by focusing on the problems caused by climate change that directly or indirectly constrain men and women's access to the different kinds of resources and assets, and thus their livelihoods in the area. By focusing on the manner in which men and women develop their livelihood strategies (coping and adaptation strategies to the impacts of climate change) to achieve certain outcomes in response to the vulnerability context, this analytical framework made it possible to see the effect on men and women's roles, responsibilities, and decision-making power, in shaping their own livelihoods.

Climate change is causing unusual, unpredictable and extreme weather events in the two coastal communes where this study was conducted. Although this level of exposure to climate change affects everyone in these communes, its impacts are differently distributed between genders. The results show that effects of climate change are unavoidable regarding the salt production and aquaculture sectors of both communes, as well as imposing different impacts on women and men in terms of assets, gender roles, and adaptation responses. Salt production and aquaculture operations are the two main livelihood activities that contribute to people's sources of income. Women play a key role in most salt production activities, while men are the main workers of the aquaculture operations. While managing and operating the entire salt production process, women are also involved in aquaculture operations even though this production activity is considered largely "men's work". This study has shown that these two types of production are dramatically affected by the weather changes in terms of productivity and yield. The climate stresses are considered as true risk factors in these two production activities as well as negatively affecting men and women's health and safety. The impacts of

disasters on these production types are direct and differentiated between men and women. Women generally face a higher level of vulnerability than men because of the unequal workload distribution, and their limited intra-household decision-making and economic power, since they generally do not own land or houses. The inequitable workload distribution often restricts women's access to formal education and career development opportunities, while other contextual factors such as household food allocation and domestic quarrels that impact women's vulnerability might directly affect their physical and mental health. Another barrier involves the limited opportunities for women to speak out about their lives and the challenges they face in their everyday life and production, because they have less of a say in decision-making, responsibilities and experience options.

Women are more likely than men to suffer from these factors due to differences of socially constructed roles and responsibilities, largely based on tradition. These factors have a direct impact on women's assets, their access to economic resources, and the options available to them in pursuing optimal livelihood strategies, and they do not control them directly. Because their livelihood opportunities are limited, they and their families are significantly affected. They face greater challenges compared to men, but they are often left behind to try to find solutions after the disastrous events that the changing climate might cause.

It is also clear from the study that both women and men are struggling to deal with the increasing frequency and impacts of extreme weather and climate events, and their coping and adaptation strategies vary. Women and men are part of the same households, thus although they are somewhat distinctly affected by climate change their adaptation strategies within the household must also be considered jointly. People in general have few options for coping with climate change. They try to take action to protect themselves and their families against the inevitable impacts of climate change, but they also look for other adaptation strategies. Their coping strategies vary depending on the financial capacity of the households, their awareness and knowledge in coping

with disasters, technique issues, and supports from the community and government. It can be said that women, especially poor women, have a limited range of coping strategies as they lack access and control over land as well as mobility since most of their activities revolved around the home. Men appear to have less limited coping strategies than women currently do, particularly because they have more opportunity to migrate to the cities to engage in manual labor jobs and far from home than women do.

The two major issues that emanated from the study were firstly, that women's exposure to climate change was more severe since they are mainly staying at home and more dependent on land and natural resources in pursuing their livelihood strategies, and secondly, that there is a limited range of coping strategies, particularly for women. Salt production and aquaculture operations are two main livelihood activities in which women's participation plays an important role. Their role in these production activities increases significantly when they become the main workers in almost all household activities because their husbands have migrated to the cities to seek employment. Women are strongly affected, both physically and psychologically, and they are often forced to become the sole caretaker for family members as well as the breadwinners, working alone and more tied to the house, while their husbands tend to work outside the home for most of the year.

This study has also illuminated the ways in which gender has an effect on people's participation in local political and management structures, and the impact this has regarding climate change. It was seen that women form a limited part of the political and management structures in these two coastal communes, with the exception of their involvement in the Women's Union. They also face many obstacles in participating and sustaining their involvement, particularly in social activities, which might make them less informed about adaptation possibilities, and allows for fewer opportunities to develop extended social support networks. Further research is needed on the barriers to their meaningful participation in these structures and processes, as



well as their participation in decision-making for climate change, given the social stereotypes and traditional norms in these rural areas.

Discussions in the study have revealed that though men and women in the area have experienced the changes in the climate, the vast majority of them do not have many ideas about the causes or suitable adaptation strategies. Their lack of livelihood opportunities and knowledge on the causes and impacts of climate change, contribute to their limited adaptation actions. In other words, people in this vulnerable region need better access to livelihood opportunities and information related to climate change. Therefore, any fruitful discussions on the impacts of climate change in this area in the future must consider the livelihood options, especially for women, and knowledge of men and women on these causal issues.

With the impacts of climate change, the livelihood activities of men and women in the area now suffer significant losses and damages (especially as seen in livelihoods tied to salt production and aquaculture operations), but their adaptation strategies and capacities to increase resilience, as well as their options for coping with these changes in different contexts are still limited and often easily exhausted. Therefore, people's current coping strategies are unlikely to be sufficient in some cases, particularly for women, while other adaptation options do not appear to be available for them yet for the long run.

## **6.2 Recommendations**

The researcher hopes that some of the above findings might be useful for researchers, practitioners, and decision makers in helping to determine policies and allocating priorities for interventions both in the case areas and countrywide. Arising from these findings, the following recommendations are being made:

- Livelihood opportunities for women in these coastal communes should be expanded, especially for women-headed households, in order to

build their capacity to cope with climate change stresses and uncertainties on local livelihoods, as well as to increase their adaptive capacity to the impacts of climate change.

- Men and women's access to education and training related to climate change should be improved in order to ensure that men and women of all ages can acquire the information, knowledge, capacities, and skills needed to participate fully under equal conditions in climate change adaptation strategies and actions in the coastal area of study. Gender-based climate change awareness training should be targeted at all members of local households, with a special focus on women and girls since these two groups tend to be overlooked but face particular vulnerability.
- Local authorities and civil society organizations should involve themselves more in the process of developing adaptation strategies and addressing climate change impacts in the area. In addition, it is extremely important to encourage the participation of women in all management structures and processes in order to promote their rights as well as to ensure increased representation of women at decision-making levels.
- Considering the differentiated role women and men play in these rural societies, the gender impacts of climate change and gender-sensitive adaptation strategies to cope with these impacts should be seriously considered in action plans by the responsible local governmental agencies, as well as identified in the action agenda at different levels in the country.
- Awareness should be raised for practitioners and policy makers on the linkages between climate change and gender equality and their importance in relation to the achievement of the Millennium Development Goals of Viet Nam. It is necessary to include women's voices, needs, and expertise in climate change debate, policy and programming, as well as to demonstrate how women's contributions

can strengthen the effectiveness of climate change measures in the country.

- It is imperative to improve the research base on gender and climate change links to inform and support the process of decision-making, as well as mainstreaming climate change adaptation strategies into the sustainable development agenda of Viet Nam. To my knowledge, there have been few if any studies of gendered impacts of climate change on people's production and life in two coastal communes of the North Central coastal region of Viet Nam.
- The researcher believes that there is room for more research on the availability of other relevant adaptation options for men and women in this coastal area, particularly related to the long term view, and especially with regard to the salt production and aquaculture sectors.
- Other studies could offer recommendations on the viability of diversification of sources of income for both men and women in this coastal region of the country, validating that there are different sources of income that people might consider which could serve to top-up their income and increase their adaptive capacity to extreme weather events.

Some of these recommendations could be implemented immediately while the others may need more preparation and are more realistic in the medium-to-long-term depending on, among other factors, the willingness and capabilities of the local government authorities and availability of resources.

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**ANNEX:**

**Annex 1: Summary of profile of household respondents**

<b>Commune</b> ( <i>HD: Ho Do;</i> <i>TC: Thach Chau</i> )	<b>Gender</b> ( <i>M/F</i> )	<b>Age</b>	<b>Education</b> <sup>12</sup>	<b>No of Family Members</b>	<b>House or Land Owner</b> ( <i>M/F</i> )	<b>Main Income Generator</b> ( <i>M/F/B</i> ( <i>Both</i> ))
HD	F	31	7/12	5	M	M
HD	F	40	7/10	4	M	B
HD	F	42	10/10	5	M	M
HD	F	47	9/10	6	M	M
HD	F	51	3/10	5	M	B
HD	F	51	4/10	5	M	M
HD	F	53	4/10	5	M	M
HD	F	54	7/10	6	M	M
HD	F	55	7/10	5	M	M
HD	F	58	7/10	5	M	M
HD	F	58	10/10	5	M	M
HD	F	80	7/10	3	M	Husband passed away, lives with sons
HD	M	30	12/12	7	M	M
HD	M	36	9/10	8	M	M
HD	M	42	7/10	6	M	M
HD	M	45	10/10	5	M	M
HD	M	49	7/10	6	M	M
HD	M	49	7/10	4	M	B
HD	M	67	7/10	4	M	B
HD	M	73	5/10	2	M	B
TC	F	46	9/10	5	M	F
TC	F	48	7/10	3	M	F
TC	F	51	7/10	5	M	M
TC	F	54	7/10	4	F (husband passed away)	F
TC	M	48	7/10	4	M	M
TC	M	49	7/10	3	M	M
TC	M	51	7/10	4	M	M

<sup>12</sup> In Viet Nam, the educational system was from grade 1 (primary school) to grade 10 (high school) before 1976 and have been from grade 1 to grade 12 since 1976.

TC	M	65	7/10	4	M	M
TC	M	65	7/10	2	M	F
TC	M	65	10/10	4	M	B (husband lives on salary)

*Source: Field survey (Vu Phuong Thao, 2011)*

## Annex 2: Where does your family's main income come from?

Commune (HD: Ho Do; TC: Thach Chau)	Salt Production (0)	Aquaculture (1)	Others (Crops, Salary etc) (2)	Person in Charge (M/F)
HD	0		2	F
HD	0		2	F
HD	0 (but no longer)		2	F
HD	0		2	F
HD	0		2	F
HD	0		2	F
HD	0 (but no longer)		2	F
HD	0		2	F
HD	0		2	F
HD	0 (but no longer)			F
HD	0		2	F
HD	0	1	2 (but no longer)	M, F
HD		1	2	M
HD		1	2	M
HD		1	2	M
HD		1	2	M
HD		1	2	M
HD		1	2	M
HD		1	2	M
HD		1	2	M
TC	0		2	F
TC	0		2	F
TC	0		2	F
TC	0		2	F
TC	0		2	F
TC	0		2	F
TC	0		2	F
TC	0		2	F
TC	0		2	F
TC	0		2	F
TC	0		2	F

Source: Field survey (Vu Phuong Thao, 2011)



### Annex 3: Estimated total income per year

Commune (HD: Ho Do; TC: Thach Chau)	Main Income Creator (M/F/Both)	Salt Production (0)	Aquaculture (1)	Others (Crops, Salary etc)	Estimated Total Income per Year (US\$)
HD	B	0		2	1,428.57
HD	M	0 (no longer)		2	1,666.67
HD	B	0		2	1,904.76
HD	M	0		2	1,904.76
HD	M	0		2	1,904.76
HD	M	0 (no longer)		2	1,904.76
HD	M	0 (no longer)		2	1,904.76
HD	B	0	1	1 (no longer)	1,904.76
HD	M		1	2	1,904.76
HD	B		1	2	1,904.76
HD	M		1	2	2,380.95
HD	M		1	2	2,380.95
HD	M		1	2	2,857.14
HD	B		1	2	3,333.33
HD	M		1	2	4,761.90
HD	M	0		2	4,761.90
HD	M	0		2	5,714.29
HD	M	0		2	n/a
HD	Lives with sons	0 (no longer)			n/a
HD	M		1	2	n/a
TC	M	0		2	1,428.57
TC	F	0		2	1,666.67
TC	F	0		2	1,904.76
TC	F	0		2	1,904.76
TC	B	0		2	2,857.14
TC	M	0		2	3,142.86
TC	F	0		2	n/a
TC	M	0		2	n/a
TC	M	0		2	n/a
TC	M	0		2	n/a

Source: Field survey (Vu Phuong Thao, 2011)

#### Annex 4: Age distribution and gender of household respondents

Age Group	Male	Female	Total	Percentage (%)
30-45	4	3	7	23
46-60	5	12	17	57
61 and above	5	1	6	20
<b>Total</b>	<b>14</b>	<b>16</b>	<b>30</b>	<b>100</b>
<b>Percentage (%)</b>	<b>46.7</b>	<b>53.3</b>	<b>100</b>	<b>-</b>

Source: Field survey (Vu Phuong Thao, 2011)

#### Annex 5: Problems which affected production and livelihoods, by gender

	Male		Female		Percentage of "Yes"	Percentage of "No"
	Yes	No	Yes	No		
Storm	13	1	16	0	96.7	3.3
Drought	11	3	8	8	63.3	36.7
Flood	14	0	16	0	100	0
Saline Intrusion	7	7	9	7	53.3	46.7
Coastal Erosion	9	5	9	7	60	40
Sea Level Rise	12	2	8	8	66.7	33.3
Extremely Hot Weather	14	0	16	0	100	0
Shortage of Freshwater	13	1	9	7	73.3	26.7

Source: Field survey (Vu Phuong Thao, 2011)

## Annex 6: Interview Questionnaires

**Number:**

Date:.....

Time:.....

Questionnaires/Interview for the Master’s study “*Men and Women’s Adaptation. The Cases of Aquaculture and Salt Production in Ha Tinh Coastal Areas of Viet Nam*”

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Name:.....Age:..... Sex: Female/Male

Address:.....

Educational level:.....

Number of persons in your family:.....

Men:..... Women: ..... Children:..... (Girls: ..... Boys: .....)

Land owner:..... House owner:.....

Estimated total income per year:.....

Who is the main income generator in your family?.....

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### 1. Where does your family’s main income come from?

Source	Yes	Person in charge		Income for each activity	
		Men	Women	Men	Women
Salt production	<input type="checkbox"/>				
Aquaculture	<input type="checkbox"/>				
Others (food crops etc)	<input type="checkbox"/>				

### 2. According to you, which of the following problems affect your production and output? Do you think this was caused by climate change<sup>13</sup>? If Yes, please explain its affects.

(Have you heard about climate change? Is so, what are the causes of climate change and what are the effects of climate change? What kind of weather

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<sup>13</sup> Actually some people don’t understand what climate change is, so it was necessary to explain this in other words such as abnormal weather, recent changes in frequencies of climate factors etc.

changes you have experienced in the area? Please explain why the following problems affect your production)

Issue	Yes	Explanation
Storm	<input type="checkbox"/>	
Drought	<input type="checkbox"/>	
Flood	<input type="checkbox"/>	
Saline intrusion	<input type="checkbox"/>	
Coastal erosion	<input type="checkbox"/>	
Sea level rise	<input type="checkbox"/>	
Extremely hot weather	<input type="checkbox"/>	
Shortage of fresh water	<input type="checkbox"/>	
Others	<input type="checkbox"/>	

**3. What aspects of your family and lives are affected by storm, drought, rain and other adverse weather phenomena, as well as by changes in the production and output of aquaculture and salt production? If Yes, please explain how.**

Affects on:	Yes	How/Why
<b>Human capital</b>		
Mental health	<input type="checkbox"/>	
Violence against women	<input type="checkbox"/>	
Household food allocation and health impacts	<input type="checkbox"/>	
Health impacts on children and the elderly	<input type="checkbox"/>	
Education	<input type="checkbox"/>	
Gender roles in the family (productive, child rearing, and community activities)	<input type="checkbox"/>	
Lack of water and impacts on health	<input type="checkbox"/>	
Workloads	<input type="checkbox"/>	
Mortality and disasters	<input type="checkbox"/>	
Skills/Knowledge	<input type="checkbox"/>	
Others	<input type="checkbox"/>	
<b>Natural capital</b>		
Loss of belongings and equipment	<input type="checkbox"/>	
Access and control over land	<input type="checkbox"/>	
Access and control over water resources	<input type="checkbox"/>	
<b>Social capital</b>		
Participation in social organization, social networks etc	<input type="checkbox"/>	
Supports from communes and government	<input type="checkbox"/>	

agencies		
Gender relations with the community (participation and decision-making)	<input type="checkbox"/>	
Others	<input type="checkbox"/>	
<b>Physical capital</b>		
Infrastructure	<input type="checkbox"/>	
Transportation	<input type="checkbox"/>	
Others	<input type="checkbox"/>	
<b>Financial and economic capital</b>		
Crop and income damages	<input type="checkbox"/>	
Migration and income earning opportunities	<input type="checkbox"/>	
Credit	<input type="checkbox"/>	
Others	<input type="checkbox"/>	
<b>Others</b> (such as household decision-making)		

**4. What have you done or will you do to respond to changes in productivity or output? Why do you think this is necessary or useful?**

Activity	Yes	Explanation	Responsible or Decided by
Maintain or improve salt production field	<input type="checkbox"/>		
Maintain or reconstruct aquaculture ponds	<input type="checkbox"/>		
Protect salt warehouses	<input type="checkbox"/>		
Change working or harvesting season	<input type="checkbox"/>		
Maintain water balance for aquaculture ponds	<input type="checkbox"/>		
Find an extra-job	<input type="checkbox"/>		
Others			

**5. What have you done or will you do to respond to extreme weather or weather challenges? Why do you think these responses are necessary or useful?**

Action	Yes	Explanation	Responsible by
Follow weather forecast frequently	<input type="checkbox"/>		
Rebuild house and repair equipment or buy new equipment after disaster	<input type="checkbox"/>		
Give up your current work and find	<input type="checkbox"/>		

a new job			
Move to a new place	<input type="checkbox"/>		
Others	<input type="checkbox"/>		

**THANK YOU FOR YOUR HELP!**