

CLIMATE CHANGE AND POVERTY IN LAGOON AND COASTAL AREAS OF THUA THIEN HUE PROVINCE, VIETNAM

Le Van Thang^a, Nguyen Huy Anh^b, Nguyen Trinh Minh Anh^c

^aInstitute of Resources, Environment and Biotechnology - Hue University
07 Ha Noi str., Hue city, Thua Thien Hue province, Vietnam; Tel: +8454.3820438
E-mail: levanthang_hue@yahoo.com

^bInstitute of Resources, Environment and Biotechnology - Hue University
07 Ha Noi str., Hue city, Thua Thien Hue province, Vietnam; Tel: +8454.3820438
E-mail: huyanhgis@gmail.com

^cInstitute of Resources, Environment and Biotechnology - Hue University
07 Ha Noi str., Hue city, Thua Thien Hue province, Vietnam; Tel: +8454.3820438
E-mail: llame7@yahoo.com

ABSTRACT: Climate Change (CC) is the emerging issue of human development discourse in our generation. All activities supporting development finally aim to promote potentialities and expand opportunities for people. In developing countries, millions of the poorest of the world is facing climate change threats. Drought, floods occur even more serious. Increasing environmental pressures are hampering the efforts of the poor to build a better life in the present and future. As one of the countries most severely affected by climate change, Vietnam considers response to climate change issues is vital. This is because rising temperatures, rising sea levels will cause flooding, salinity. As a result, water affects agriculture, creating great risks for industry and socio-economic institutions in future. This is a threat to poverty reduction objectives and the implementation of the Millennium Development Goals and sustainable development of the country.

Thua Thien Hue is the central coastal province with a long coastline, the largest lagoon system in Southeast Asia, and narrow delta which has been often affected by natural disasters such as storms, floods, and drought. In recent years, CC has a strong impact on the lives, work and manufacturing of the local people, especially people with low incomes. The article analyzes the relationship between climate change and poverty and on that ground proposing solutions to minimize the adverse impacts of climate change on the local people, especially the poor is a very practical issue.

KEYWORDS: Climate change; sea level rise; lagoon, coastal areas;

1. INTRODUCTION

Climate Change (CC) is the emerging issue of human development discourse in our generation. All activities supporting development finally aim to promote potentialities and expand opportunities for people. In developing countries, millions of the poorest of the world is facing climate change threats. Drought, floods occur even more serious. Increasing environmental pressures are hampering the efforts of the poor to build a better life in the present and future.

As one of the countries most severely affected by climate change, Vietnam considers response to climate change issues is vital. This is because rising temperatures, rising sea levels will cause flooding, salinity. As a result, water affects agriculture, creating great risks for industry and socio-economic institutions in future. The impact of climate change in Vietnam has become clear than ever, with evidence from 1960 to present that showcases that annual temperature has increased by about 0.5⁰C and sea level rise has been measured at about 20 cm. Especially, the phenomenon of El Nino and La Nina gradually increase their powerful impacts on the weather in Vietnam, causing storms, floods and droughts of increased severity. This is a threat to poverty reduction objectives and the implementation of the Millennium Development Goals and sustainable development of the country.

Thua Thien Hue is the central coastal province with a long coastline, the largest lagoon system in Southeast Asia, and narrow delta which has been often affected by natural disasters such as storms, floods, and drought. On the other hand, plains and coastal areas densely populated, mostly subsistence means is aquaculture exploitation and farming. According to poor and near poor census reports in 2010, it is showed that the total poor and near poor the province is 28,003 households (11.16%) and 17,151 households (6.83%) respectively. If included 39 coastal and lagoon communes, the poverty rate is 15.66% for poor households and 8.38% for the near poor. These rates are higher than the average provincial and national levels. In recent years, CC has a strong impact on the lives, work and manufacturing of the local people, especially people with low incomes. To ensure the objectives of poverty reduction in CC situation, the study on analysis of the relationship between climate change and poverty and on that

ground proposing solutions to minimize the adverse impacts of climate change on the local people, especially the poor is a very practical issue.

2. CONCEPTS

Poverty : Poverty is a scarcity in many ways such as income shortage due to lack of income-generation opportunities, lack of basic needs of daily life, lack of assets for urgent cases and vulnerability to losses. Conference on Poverty Alleviation in Asia - Pacific by the ESCAP held in Bangkok, Thailand (May 9 / 1993) gave the following definition: *Poverty is a condition of part of population who do not enjoy and satisfy basic needs that have been recognized according to the level of socio-economic development and social customs of the locality.*

The poverty concept itself also included different levels of poverty, as in the population groups, there are the poor people who are not the poorest in society. They are those who crashed into the state of famine. As such, different approach to shortages will distinguish different poverty lines.

Poverty describes a lack of opportunity to live a life corresponding to certain minimum standards. Measuring these standards and the causes to poverty varies by location and time. World Health Organization defines poverty according to income, under which a person is poor if his annual income is less than half the average income per capita (Per Capita Income, PCI) of the country.

Climate change : *Climate change is the change in the Earth's climate system, including atmosphere, hydrosphere, biosphere, lithosphere in the present and future by natural and man-made causes in a certain period measured in decades or millions of years. The transformation may be in forms of change in the average weather or a change in the distribution of weather events around an average. The climate is so limited in a certain area or may appear across the globe.* In recent years, particularly in the context that environmental policy generally referring to changes in current climate, referred to by *global warming*. Major cause to global climate change is the increase in activities that generated greenhouse gases, the excessive exploitation of sinks and reservoirs of greenhouse gases such as biomass, forest marine ecosystems, coastal and other land [vi.wikipedia.org].

3. OVERVIEW OF THE LAGOON AND COASTAL AREA OF THUA THIEN HUE

The plain and coastal areas of Thua Thien Hue account for about 16% of the province's natural land, stretching northwest - southeast over 100km. The width changes greatly, averaging 14 - 16km, the largest is O Lau river Delta (about 20 - 22km) and the narrowest is not more than 0.05 - 2 km (in Lang Co). The area of lagoon and sand dune is about 9% of natural land area of the province, forming a narrow strip along the coast. Most of the rivers in Thua Thien Hue flow into the lagoon system through two doors Thuan An and Tu Hien and then to the sea. The total area of the lagoon system is more than 220km², among which Tam Giang lagoon is 52km², Thuy Tu lagoon is 60km², Cau Hai lagoon is 104km². The large area of the system ensures giant capacity of water storage (300 to 350 million m³ in dry seasons and 400 to 500 million m³ in rainy seasons). Therefore, the lagoon acts as a buffer zone separating mainland to the East sea. It regulates many natural elements such as flooding, climate, etc. The total area of coastal sand dune is about 4% of total natural land area of the province. It spans the coast of Thua Thien Hue and separates plain, lagoon system with the East sea.

Average temperature in the area is ranging from 24-25⁰C. Annual average temperature decreases to the West (terrain gradually higher). In the National Park of Bach Ma, average temperature is about 18⁰C.

The rainy seasons of coastal plains start from September and end in December, lasting for four months. The dry seasons start from January and end in August, lasting for eight months. Particularly in mountainous and hilly areas, rainy seasons started earlier in May or June and end in December, lasting for six or seven months. The dry seasons start in January and end in June or May, lasting for 6 or 5 months.

Thua Thien Hue province has high rainfall. The annual average of the areas are greater than 2,600 mm, with areas of over 3,000 mm. Rainfall is concentrated in the continuous 6-7 day raining time, sometimes lasting for up to 19 to 31 days. Also, rainfall is usually concentrated on a large scale. These are the causes to more big floods to the province. Especially there are very big rainy days, rainfall reached 700 mm per day, particularly on 2 November 1999 rainfall is 1,384mm (never before in Vietnam). That resulted in flash floods, bank erosions, landslides and other consequences.

4. SITUATION OF CLIMATE CHANGE AND POVERTY

4.1. Main performances of climate change in the lagoon and coastal areas of Thua Thien Hue

Temperature: Average air temperatures from the 70s to present almost do no increase while temperature of summer months tends to decrease with speeds from 0.1 to 0.2⁰C/century, contrast to the situation of the country. There is no clear trend of increasing or decreasing in average temperature in winter. However, in the 90s, the average temperature is 0.1 to 0.4⁰C higher than the previous decade. The freezing winter appear has appeared more often in the recent 30 years.

Flood situation: According to statistics, in the recent 100 years, average annual rainfall of TT Hue has fluctuated quite well. The decades of much precipitation are the 20s, 40s and 90s and the less rainfall decades are the 30s, 70s and 80s. Therefore, the anomaly has happened more often. The year with great floods were normally related to the phenomenon La Nina such as the 1999, 1983, 1975, 1953; the year with lasting drought is often related to EL Nino phenomenon such as the 1977, 1993, 1994, 1997 - 1998.

In recent years, rainfall in TT-Hue has performed increase tendency, especially on the second of November 1999 rainfall was 978mm, the rainfall of November 1999 was 2,452mm - the record of rainfall in the past 100 years. The increased intensity of rainfall leads to frequent flooding of higher severity.

Hurricane: is the severe disaster to coastal areas. The number of storms happened to the coast of TT-Hue in the decade of 70s and 80s increased sharply; in the decade of 90s it tended to decrease. In the period from 1891 - 2000 (110 years), on average, there are 4.74 storms affecting Vietnam per year and 0.79 storms affecting TT-Hue. However, averaging from 1954 to 2002, the number of storms affecting Vietnam increased to 6.1 attacks and those affecting TT - Hue is 0.87 [4, 12].

Table 1. Number of storms landed in Vietnam and Thua Thien Hue coast during 1891-2000

	Thanh Hoa – Ha Tinh	Quang Binh – TT Hue	Nation-wide
1891-1900	6	5	36
1901-1910	10	13	54
1911-1920	5	5	33
1921-1930	6	6	31
1931-1940	13	7	53
1941-1950	2	3	29
1951-1960	8	9	44
1961-1970	10	12	55
1971-1980	15	12	68
1981-1990	12	10	66
1991-2000	8	5	54
Total	95	87	523
Frequency	18.2%	16.7%	100%
Average	0.86	0.79	4.47

Source: [Central Meteor-Hydrological Forecast Centre]

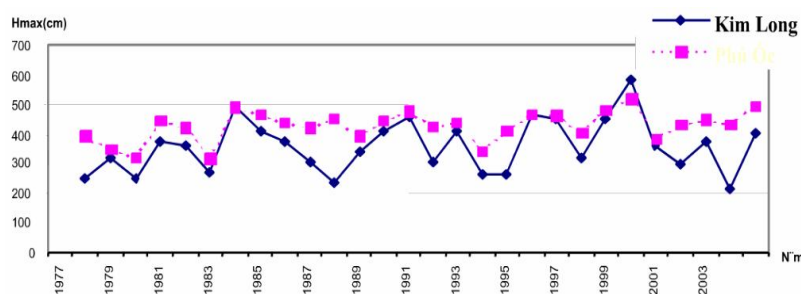


Figure 1. Maximum fluctuation of yearly sea level [4]

ENSO stands for El Nino Southern Oscillation indicating El Nino and La Nina phenomenon as a result of air surface pressure gradient between Eastern Pacific Ocean and Western Indian Ocean. It is called Southern Oscillation to distinguish with air pressure oscillation in Northern Atlantic Ocean.

The analysis of SOI index in the last 5 decades illustrates that the magnitude of these phenomena is in increasing trend. ENSO has a significant and proportional impact on weather conditions and extreme climatic events such as storms, floods, drought, landslides and erosion of coastline.

4.2. Poverty status of Thua Thien Hue coastal area

Survey data on poor households in Thua Thien Hue shows that by 12/2010, there were: 28,003 poor households (11.16%); 7,151 households just above poverty line (6.83%). Administrative unit where the poverty rate is lowest is Hue City where rate of poor households and households just above poverty line are 4.80% and 4.88% respectively. In contrast, the administrative unit with highest poverty rate is A Luoi district where poor households and households just above poverty line are 27.6% and 13.96% respectively.

Table 2. Summary of poverty survey in Thua Thien Hue, 2010 [3]

Order	Administrative Unit	Total households	Poor households		Just above poverty line	
			Total	Ratio (%)	Total	Ratio (%)
1	Hue City	68,880	3,305	4.80	3,360	4,88
2	Huong Thuy town	22,659	1,795	7.92	1,337	5,90
3	Phong Dien district	22,639	3,244	14.33	2,216	9,79
4	Quang Dien district	22,698	3,599	15.86	1,901	8,38
5	Huong Tra district	25,835	2,673	10.35	1,579	6,11
6	Phu Vang district	39,920	5,272	13.21	2,867	7,18
7	Phu Loc district	32,880	4,554	13.85	1,958	5,95
8	Nam Dong district	5,178	717	13.85	494	9,54
9	A Luoi district	10,305	2,844	27.60	1,439	13,96
Provincial total		250,994	28,003	11.16	17,151	6.83

A large share of poverty households concentrates in 6 communes of extremely harsh conditions. These are the communes within the scope of Program 135 where 2468 out of 6977 households are classified as poor (35.29%). Other poor communes are those of ethnic minority people where 3440 out of 12268 households are poor (28.04%) and lagoon and coastal communes where poor ratio is 15.66% (10,359/66,129 households).

Table 3. Distribution of poor households and households just above poverty line in coastal and lagoon area by district [3]

Order	Administrative Unit (Number of communes)	Total households	Poor households		Just above poverty line	
			Total	Ratio (%)	Total	Ratio (%)
1	Phong Dien district (8)	9.677	1.498	15,48	1.139	11,77
2	Quang Dien district (6)	10.512	1.989	18,92	884	8,41
3	Huong Tra district (2)	3.680	415	11,28	232	6,30
4	Phu Vang district (14)	25.375	3.961	15,61	2.179	8,59
5	Phu Loc district (9)	16.885	2.496	14,78	1.107	6,56
Toal of 39 communes		66.129	10.359	15,66	5.541	8,38

4.3. Relationship between Climate Change and poverty in lagoon and coastal area of Thua Thien Hue

It is estimated that Climate Change would lessen livelihood capital of the poor such as access to water supply, housing and infrastructure. Moreover, Climate Change also cause adverse impacts on traditional prevention and dealing mechanism of natural disasters. The impact of Climate Change on natural resources and productivity would seemingly reduce economic growth and impoverishment as a result of decreased income.

Change in total precipitation and extreme climatic condition will reduce plant and domestic animal productivity at various places, among which coastal area would be the most affected. The rise in sea level will increase rate of coastal area's submergence and salinity intrusion, leading to agricultural and aquacultural loss in productivity. The poor are more vulnerable to natural disasters such as flood, drought and other effects of Climate Change and environmental issues, threatening livelihood of the poor and food security.

Income of communities in Thua Thien Hue lagoon and coastal area is primarily from exploitation of aquatic resources and aquacultural farming. This livelihood strategy is constantly threatened due to the damage of natural disasters to livelihood tools and equipment every year, directly pushing local residents to re-impoverishment cycle. Besides difficulty in production capital, access ability to information and advanced technology is limited because limitation in knowledge and awareness of lagoon and coastal communities in the province even though the attention for local authorities for these matter is existing.

By the end of 2010 there are 3,055,566 poor households (14.2% nationally) and 1,612,381 households just above poverty line (7.53% nationally) in the country entirely. In Thua Thien Hue these 2 figures are 28,003 and 17,151 corresponding to 11.16% and 6.83% of provincial total households and much lower than national average. In contrast, this two rates in Thua Thien Hue's lagoon and coastal area are higher than provincial and national average. In this area, rate of poor households is 15.66% (10,359 households) and households just above poverty line is

- Plant protective forest along the coastline, including mangrove forest to reduce the effect of Climate Change to the area.
- Adapt agriculture structure and husbandry, change cultivation and aquacultural farming schedule to new changes in climatic conditions.
- Devolve favourable policies to the poor, especially to those living in lagoon and coastal area from local authorities, for e.g. support for fishermen affected by Climate Change, micro credit with low interest for fishermen to invest in advanced technology in aquatic resource extraction.
- Enhance awareness of the poor in lagoon and coastal area about Climate Change and adaptive measures.
- Improve resilience capacity for poor communities facing high risk of Climate Change and natural disasters.
- Integrate environmental protection agenda in poverty reduction policies.
- Reinforce infrastructure in lagoon and coastal area such as transportation, seaports, dyke, water transport, medical facilities, etc.

6. CONCLUSION

Lagoon and coastal area of Thua Thien Hue province comprises of 39 communes and towns facing the sea. It is forecasted that in the province this is the most affected area by Climate Change. Unfortunately, the population of this area also features the highest rate of poor households and just above poverty line households. These figures are 10,359 households (15,66%) and 5,541 households (8,38%) respectively. Livelihood strategies of the poor in this area are mainly agriculture, aquacultural farming and extraction which are highly dependent on climatic conditions. Climate Change is occurring unpredictably and affecting directly livelihood and economic activities of local population, especially the poor and just above poor. The study has shown that Climate Change threatens to further impoverishment in the poor while putting those just above poverty line back to poverty.

The matter of poverty is also at top national priority because it is the main obstacle to the development of economy, culture and society. It is also the main threat to environmental protection and adaptation to Climate Change. Having said that, to mitigate the impact of Climate Change to poverty condition there is a need to prepare policies to combat poverty and at the same time, execute simultaneously comprehensive solution such as improving awareness about Climate Change, enhancing adaptive capacity, integration of Climate Change matter to socio-economic development policies, increasing scientific and technical understanding and application in Climate Change matter, and institutional transformation.

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