

CLIMATE CHANGE ADAPTATION OPTIONS FOR THUA THIEN HUE

1. Introduction

In recent years adaptation to climate change impacts has slowly established itself as an important and complementary response to greenhouse gas (GHG) mitigation. However, adaptation is still regarded as a priority primarily for developing countries. This is on account of two reasons. First, developing countries have a relatively larger proportion of their population dependent on climate sensitive natural resources. Second, they typically have significantly lower adaptive capacity, thereby making them much more vulnerable to the potential impacts of climate change (IPCC 2001b).

Considerably less attention has been paid thus far to the experiences of developed countries in planning and implementing adaptation measures. This is a significant research gap that deserves greater attention for two main reasons. First, many of the observed and projected climatic changes are considerably greater in temperate latitudes where many developed countries are located (IPCC 2001a). Therefore, the need to adapt to these changes might be quite significant. Second, developed countries have access to considerably greater technical and financial resources and often have a stronger institutional base, both of which provide a better enabling environment for adaptation planning. Examining developed country experiences can therefore highlight examples of good practices and know-how, as well as identify constraints and limits to adaptation. Such insights would be valuable not only for other developed countries but for developing countries as well.

In practice, Viet Nam governments and communities could help offset these costs by undertaking adaptation measures. The question is determining which adaptation measures are best in the face of uncertain future impacts. At this time, adapting to climate change may soon become an economic and political imperative.

2. The need for action

One of the most compelling arguments for acting now is the rising impact of extreme weather events in Viet Nam. Even those who argue that climate change may never happen cannot dispute the urgency of reducing the coastal zone vulnerability against severe climate events. The recent drought, floods and the sequence of cyclones which affected Thua Thien Hue province during the last decades attest to an increasing exposure that will, sooner or later, put mounting public pressure on governments and policy decision makers to act. No less compelling is the fact that under an increasing globalized economy, those countries which invest early on adaptation and in the process improve the quality of life and reduce investment risks are likely to hold a

competitive advantage for foreign investment. As measures to reduce vulnerability are also among the most effective in adapting to climate change, acting now to reduce current vulnerability will also prepare Viet Nam government in general and Thua Thien Hue province in particular for the long-term effects of climate change.

Another reason for acting now is that failure to do so may result in a loss of opportunities that may not exist in the future.

Finally, adaptation strategies may require several decades to be discussed and implemented. Communities living in low-lying areas, for example, may need to relocate further inland into other communities' customary land. This will require extensive public debates on how to place the common good of all above the good of the clan or immediate family, a process that cannot and should not be rushed.

A development path that takes adaptation into account might sacrifice some potential short-term gains in favor of more diversification and a reduction in vulnerability. But it would vastly decrease the downside costs should climate change scenarios materialize. The challenge will be to find an acceptable level of risk — an intermediate solution between investing in high cost solutions and doing nothing — and start adapting long before the expected impacts occur.

3. Adaptation options for Thua Thien Hue

3.1. Adaptation options for Coastal zone areas.

A coastal zone management framework that is tailored to the socio cultural conditions of each island should be used for adaptation planning. This framework should have three major goals: preventing loss of lives and property, avoiding development in inundation-prone areas, and ensuring that critical coastal ecosystems, such as coral reefs, are protected and remain functional. Specific adaptation options could include:

- *Protection populated areas.* Construction of sea dyke is the measure of choice to prevent erosion in densely populated coastal areas. However, sea dyke do not resolve the underlying cause of erosion, and they can promote offshore movement of beach sediments. They are also costly to build and maintain, and they will need to be extended as the sea level rises. Seawalls should be used only to protect valuable property and buildings that cannot be relocated. For new infrastructure, the use of setbacks and relocation could be considered.
- *Land use policies.* Land use policies should encourage settlements away from low-lying and high-risk coastal areas through, for example, the use of coastal hazard mapping.

- *Prevention of erosion.* Depending on the infrastructure and population density, adaptation options to prevent coastal erosion include (i) no response, where there is little habitation or infrastructure; (ii) accommodation, where property is replaced as it is damaged; and (iii) shoreline protection, in areas with large populations and significant infrastructure. In low lands, where it is essential to retain over-wash sediments, and other coastal vegetation to promote shoreline accretion, closing or narrowing selected passages between the lagoon and the ocean, and the strategic use of groynes to help minimize the transfer of sediments from the ocean side to the lagoons. Groynes, however, should be used only in key locations, such as the passage edges, as they tend to cause downstream erosion and require continuing maintenance. In less developed areas the use of setbacks to control future development, beach nourishment and relocation of infrastructure might be preferable.
- *Protection against inundation.* On areas with little infrastructure, the costs of protection are likely to be prohibitive, and relocation or modification of structures to accommodate surface flooding could be considered. On the more populated strategies to allow over-wash sediment to naturally increase the elevation of the coastal may help offset the impacts of inundation. Where land ownership disputes are not an issue, new structures should be set back from the shoreline and elevated to allow for periodic flooding.
- *Population relocation.* If all other measures fail, population relocation may need to be considered. While some communities may opt to move on their own, population relocation would pose immense social and political risks for Thua Thien Hue governments, as nearly all inhabitable land is under some form of customary ownership.

3.2. Adaptations options for Agriculture and rural development

a. Agriculture

Agriculture of Thua Thien Hue province is most vulnerable sector by climate change, sea level rise and disasters. The options for this sector to respond and adapt to climate change will be very important for sectors sustainable development. These options may be:

- Change the crop pattern, domestic livestock at high risk areas, focusing on the area with low effectiveness of rice production to aquaculture.
- Define and re-arrange crop season, implement the suitable technical practices for each crop plants.

- Research and apply high technology in agriculture for high quality and quantity production and protect the environment.
- Test and experiment on crop varieties which overcome waterlogged, drought and other disasters.
- Develop and implement the forestation program or projects to green bald land area, forestation on sand dunes along seashore, the mangrove forest areas in and lagoons, protect from erosion and improve the ecological system of sub-areas.

b. Water conservation and water resources use, disaster prevention

For water resources the most suitable options for adapting to climate change impacts are:

- Development of new plan on flood protection dike, irrigation system in order to protect and exploit the cultivate areas effectively.



Pic. Thao Long Dam for salinity intrusion protection

- Water resources management and access considering climate change impact and increasing of water demand
- Plan for resettlement and stabilization of local people from often effected by climate change area to safe areas.
- Develop the rescue plan, human resource and technical infrastructure development, new equipments and materials for rescuing and dealing with disaster.
- Maximum protection for reservoirs, which has most special importance in Huong river system.

c. Aquaculture

- Revert to the original state of lagoons, low effect of feeding areas. Focus on high tide feeding areas, pool on sand. Develop more feeding cage model.



Pic. Fishing is effected by disaster

- Offshore fishing management.
- Plan the aquiculture processing, materials product supply in climate change condition.

3.3. Adaptation options for Industry

Option for industrial activities should be adaptable to climate change and to contributive to GHG emission mitigation. They are:

- Apply the advance of new technologies not only to adapt with climate change but also take a part in greenhouse gases emission reduction.
- The design project of titanium exploitation and glass sand shops need to be carefully considered climate change information in order to against with huge storms, whirlwind or sand storm. The areas, where already been exploited, must be return to the first status and grow trees to against erosion and flying sand.
- Upgrade infrastructure investment (for example: roads, electric network, water supply system...), by the way, business processing must be improved to cope with disasters, which caused by climate change.
- Plan industrial groups or industrial points, industrial center focus on coastal zone, where have no effected by erosion and link to other technical infrastructures,
- Research and assess the exploitation potential and capacity of geothermal energy of hot water mines in A-roan (A Luoi district) and Tan My (Phu Vang district).

3.4. Adaptation options for Construction and Transportation

- Projection the urban areas, rural areas must be considered location, geography using climate change information.
- Revision and renovation the design standards for building, transportation, water conservation construction, hydropower under the climate change

impact assessment, which will be used as criteria for sustainable social economic development plan



- Develop and expand the ecological commune model and ecological urban centre, including using renewable energy, clean energy to reduce the greenhouse gases emission.
- Plan for resettlement, stabilize the living in river shore, hydro powers.
- Re-projection the urban centre development plan, with climate change consideration.
- Assessment of climate change impact to reservoir, hydropower construction before execute.

3.5. Adaptation options for Tourism

Tourism is the advantage of Thua Thien Hue province. But climate change can directly affect the activities in the field of culture, sport, tourism, trade and services etc. of the Thua Thien Hue province. Sea level rise affects coastal beaches of the province, some of them can be disappeared, the others have to move into inland and exploitation of the beaches may be negatively affected. Sea level rise can damage the culture and historical heritage, preservation areas and related infrastructures of the ancient of Hue city and province. The option for adaptation could be:

- Check, supplement and adjust master plan of tourism development in Thua Thien Hue province, considering climate change.
- Construct ecological countryside harmony with nature and environment with using energy saving equipment.
- Develop communally ecological tourism and part of benefits use for re-investment to the community.

3.6. Adaptation options for Biodiversity

Climate change can affect the efforts to build the conservation areas of flood land in lagoons and ecosystems that are posing to threats such as the bird flood land O Lau, the mangrove Ru Cha in lagoon Tam Giang-Cau Hai. The increase of frequency and

intensity of typhoon, flood, drought and hot sunshine ... contributes to the process of changing the ecological environment and desertification. The option for adaptation:

- Investigation and assess value of biodiversity in forest ecosystem, sand dunes, rivers, lagoons and sea, coastal ecosystem such as mangrove forest, water glass in lagoon, coral reefs and sand dunes in climate change condition.



- Forest fire management strategy, preserve stringent protective forest Forestation prefer use local plant which adapt to extreme climate.
- Prepare plan and measures to prevent and annihilate harmful creatures. Firstly, focus species that adapt to damp and wet lands.

3.7. Adaptation options for Public Health

- Adaptation strategies to minimize public health impacts do not require extensive new interventions. Rather, existing initiatives that reduce the vulnerability of the population, and particularly the poor, should be enhanced. Actions should include not only improving public health but also strengthening the resilience of the ecosystems on which the population depends for food and income. Specific measures could include:
 - Integrated adaptation strategies: Adaptation strategies should include a range of interventions to reduce the vulnerability of the population, such as improved sanitation and water supply, management of solid and liquid waste, protection of groundwater, reduction of poverty (particularly among urban squatter settlements), increased access to primary health care, and protection of subsistence food supplies. Many of these measures would also help control the incidence of diseases.
 - Control of dengue fever. Adaptation strategies should include further support to vector control programs that collaborate with communities to reduce mosquito breeding sites. They should also improve epidemic preparedness through vector monitoring, early warning systems, and better preparation of primary health care facilities to treat dengue hemorrhagic fever and dengue shock syndrome.

3.8. Integration climate change consideration into ICZM

The strategy of ICZM agrees with the strategy of adaptation to climate change in the approach, methods of implementation and objectives of environment protection for sustainable development.

However, in process of the preparing of the strategy of ICZM, it has not yet considered the changes in climate as well as their impacts on natural conditions of this area. Therefore by provincial stakeholder opinion, it is necessary to integrate some solutions of adaptation to climate change into important contents of strategy of ICZM including: Integration climate change consideration into ICZM should be based on:

- Raising management capacity for ICZM in affected by climate change condition. Raising awareness and knowledge on disaster in future causing by climate change and adaptive measures for ICZM to respond to climate change for community, local government authority and policy makers.

- Re-development the coastal zone management framework protocol and action plan in administrative system of Thua Thien Hue towards in direction of sustainable development, harmonious sector benefits and adaptive to climate change.

- Re-recognize the areas, fields and communities most vulnerable by climate change impact, identify effective measures to maintain the sustainable development for these specific zones.

- Re-assess the bearing capacity of coastal zone and lagoons and potential adaptive capacity of the sectors: agriculture, aquiculture, tourist and industrial development in the coastal zone.

Activities to be taken:

To provincial level:

- Provide updated information of climate change impact on human and socio – economic development in coastal zone.

- Measures for Thua Thien Hue province to mitigate impact of climate change when implementing ICZM strategy:(1) Good knowledge on climate change, (2) Promulgate adaptation policy, (3) Promulgate policy for sustainable exploitation and usage natural resources considering climate change disasters, (4) Set up climate change adaptation plan of actions, (5) Encourage investment in low GHG emission industry, prevent deforestation for GHG reduction.

- Construct storm shelter for ships, high strong building shelter for civilization.

To districts and communes:

- Awareness raising on the harmful effect of climate change.

- Protect dike to avoid land slide, overflow.
- Implement climate change mitigation policy and sustainable exploitation and usage of natural resources policy.
- Development and implementation commune plan on disaster protection

Household and inhabitant:

- Awareness raising on reasonable and effective usage of natural resources and energy.
- Participation in coastal forestation, protect forest, protect irrigation constructions.
- Find suitable manufacture to adapt to climate change.
- Plan to prevent and cope with natural calamities.

3.9. Climate change and Chan May - Lang Co economic zone

- The Special Economic Industrial zones Chan May Lang Co, which is serving as the province’s important economic centres located in low-lying in seashore. It is facing with increased challenges in floods from rivers and rising sea level. This requires thorough assessment and more costs for the construction and design of industrial zone and it is necessary that mitigation measures are taken;



Chan May-Lang Co Economic Industrial zones

- Climate change would cause difficulties in water and material supply for industries and construction such as textile, manufacturing, exploitation and processing of agricultural products, forest product and aquaculture products, industrial and domestic construction, and communication. There are the options for EZ better adapt to climate change and disasters:

a. Reasonable land use plan:

- Check and adjust seasonal land use plan based on vulnerable maps. Set up measures to protect coastal zone, afforest protective forest, protect coastal sand dunes and vegetation cover, preserve mangrove forest in Bu Lu river estuary.

- Stipulate separate area between coastal zone and construction area to be secure against sea level rise and natural calamity caused by climate change.

b. Research and Promulgate technical standard in design and investment

- Obey design standards of government that was adjusted in climate change condition: constructions in Chan May – Lang Co must be designed to stand wind at speed 130 – 150 Km/h (wind pressure above 72,5 daN/m²).

- Sea dyke, embankment, sea port constructions have to consider sea level rise 1m and with frequency 1%.

c. Other measures

- Afforest and protect coastal forest

- Clear floodway in Bu Lu river

- Construct storm shelter for ships, high strong building shelter for civilization.

- Develop and operate the climate change observation, monitoring system in the area.

4. Implementing Adaptation

How should this be implemented in practice? Governments cannot do it alone. Adaptation measures are and will continue to be implemented primarily by communities, the private sector, and individuals. But the role of Viet Nam governments and provincial Authority will be essential in mainstreaming adaptation into policy and development planning, in creating partnerships with communities, non-governmental organizations (NGOs) and the private sector, and in dealing with problems only the government can handle (such as disaster management).

Below are messages that could be rise in discussions as well as in workshops/interviews with local policy makers. They could be included in some awareness-raising or training/recommendation booklets for this group

To the question “Why we have to take into account climate change issues in policies and decision making? Why policy level intervention is important?”

- This is an actual global trend that all countries including Viet Nam have to comply
- Climate change could “bring” the money and opportunities
- It could bring new knowledge and technology
- It could help reduce the losses
- People may know better how to do (adapt) but they need the guidance and good organization

- The poor, the elders, women and children are more sensitive
- Knowledge and experiences are power
- From micro- to macro-adaptation, from local to national and regional
- We need quality intervention in policy making and planning
- Combination of top-down and bottom-up approach is the best way.

In global context, the climate change issues, its impacts and adaptation became a hot pot for policy making process in most developing especially in Vietnam now. It became a part of the compliance of international Conventions and agreements on global climate and environmental problems, including UNFCCC, Kyoto Protocol that Viet Nam has ratified and signed.

Thus, taking into account a climate change problems, its impacts, future trends and uncertainty factor as well as mitigation and adaptation mechanisms in the policy making process could open new opportunities, financial, technical and technological support for Vietnam from all over the world.

That would also bring into the policy development and implementation process the new scientifically based knowledge and arguments, new approaches of pro-active preparedness and prevention rather than passive response to the problems or recovery aftermath, with the view to future scenarios and trends. In the future, when the adverse impacts, extreme events or disasters really occur, it will help in coping and relief activities, mitigating the damages and losses of property and human lives.

Until certain extent, people have always been trying to respond and adapt themselves to the climate variability and changes, the extreme weather events and disasters. However, in case of stronger, larger or more severe disasters, they would usually expose their lives and properties to high risks and dangerous impacts, their responses may become chaotic, scattered and inefficient.

The most vulnerable to all types of impacts and dangers are always the poor people and special sensitive contingents: the elders, the women and children. In critical or disaster time, they may some time be paid less attention or even forgotten. That why many disaster casualties (especially the floods and storms) in Viet Nam belong to the elders, women and children. In that case, they need very much well organized help and guidance, concrete and urgent measures from local, provincial and central authorities in relief and rescue works, after-disaster aid and recovery. Moreover, they need to be informed, early warned about the events, and good trainings for different types of impacts.

Needless to say how important are awareness, knowledge and capacity of policy makers, authorities and managers at all levels in:

- Rising awareness and understanding the present and future problems and impacts for the local people;
- Leading, guiding and helping them to deepen into those problems, to take actions for coping with and adapting to climate change impacts and disasters;
- Good theoretical and practical training for local communities for proper and timely preparing to all kind of different disasters and every particular event.

The policies need to be made for the people interest of safety and prosperity, but at present are not yet in such condition so far. We definitely need quality intervention in the policy making, planning and managing processes in Viet Nam at all levels of authority.

In the other hand, in such a highly disaster-prone province like Thua Thien Hue of a disaster-prone country like Viet Nam, people always have experiences and empirical knowledge for hundred years in adapting to and coping with climate related impacts and “usual” extreme events (typhoons, storms, flood and drought), in their particular locations and they obviously have very good ideas. By these reasons, the adaptation processing has to be done firstly at local levels as “micro-adaptation”, with local knowledge and special characteristics, only then at broader, “macro” scale: provincial, national levels.

The experiences learned from the project activities show that good combination of top-down an bottom-up approach of decision making, where local people’s knowledge, opinions and experiences is discussed and considered, is the best way to effective adaptation to climate change.

5. Policy and institutions enhancement, and awareness raising to deal with climate change

– Awareness raising and knowledge on climate change for all people, especially investors of economic sectors (local and foreign) and experts at different levels.



Stakeholder Awareness raising workshop in Thua Thien Hue

– Adaptation measures to deal with Climate change will be served as indicators for approval of the social economic development program and projects in province.

– Capacity building for the forecast on dangerous weather phenomenon: storm, flood, drought, salinity, flash-flood, river bank erosion and coastal zone... over 72 hours, flood forecasting before 24 hours

– Revision and renovation the design standards for building, transportation, water conservation construction, hydropower under the climate change impact assessment, which will be used criteria for sustainable social economic development plan

– Policy encouraging for application less greenhouse gases emission technology in production activities: energy conservation, reduce deforestation, clean energy use, rational mineral exploitation, environment protection

6. Building partnerships

In building partnerships with communities, individuals, and the private sector, the province may need to play a pivotal role in the following areas:

- **Creating an Enabling Policy and Legal Framework.** This may include prioritizing adaptation into provincial planning, harmonizing conflicting sectoral policies, and providing the necessary legal and technical support for community-based adaptation measures such as co-management in coastal areas.
- **Strengthening Institutions:** The planning in Viet Nam is often sector-oriented, with little capacity to respond to local level needs and conditions. Where this is the case, there is a need to strengthen the links between local communities and provincial Authority so that the communities increasingly gain a voice in planning and budgetary decisions. Local communities should also be encouraged to work across village boundaries to reach consensus on the adaptive strategies that need to be applied to larger areas particularly if relocation is likely to be needed.
- **Supporting collaborative Programs:** Community-based programs such as vector control, water conservation, coastal management, or mangrove re-plantation will need the support of external partners such as the government or NGOs. At first, external support should focus on galvanizing community action. Later, it should shift to technical advice and assistance in areas communities cannot handle on their own.
- **Mobilizing Public Action.** Public awareness and discussion forums involving community representatives will help convey information about the

impacts of climate change and gain consensus on the adaptation options. Of special importance would be awareness efforts aimed at community leaders.

- Handling Disaster Mitigation and Providing Public Services. Some adaptation measures will need to rely on government interventions. These include early warning systems and disaster mitigation programs, improvements in primary health care, and coastal protection in town areas.