

**GLOBAL ENVIRONMENT FACILITY
SMALL GRANT PROGRAM IN VIETNAM
(UNDP – GEF CBA)**

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Community-Based Adaptation Project (CBA)

Project title and number: Building community models to adapt to climate change through conservation and sustainable use of natural resources in Huong Phong commune, Huong Tra district, Thua Thien Hue province, Vietnam (CBA/VN/SPA/09/004)

Name of proposing organisation: Consultative and Research Center on Natural Resource Management (CORENARM)

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Expected starting date: 1.10.2009

Expected ending date: 30.4.2012

Project budget:

Total project cost: 1,786,000,000

Amount requested from CBA: 898,500,000 VND

Contributions from other sources: 887,500,000 VND

CBA Approval

Nguyen Thi Kim Anh
GEF SGP Coordinator

Proposing organisation

Do Dang Teo
Director of CORENAM

PROJECT SUMMARY

Background information

- 1. Project Name:** Building community models to adapt to climate change through conservation and sustainable use of natural resources in Huong Phong commune, Huong Tra district, Thua Thien Hue province, Vietnam. (CBA/VN/SPA/09/004)
- 2. Project Site:** Huong Phong commune, Huong Tra district, Thua Thien Hue province, Vietnam.
- 3. Proponent:** Consultative and Research Center on Natural Resources Management (CORENARM)

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4. Project Objective:

Long-term objective of the project:

Strengthening local capacity in adapting to climate change by building community-based models of natural resources synthesized management in Huong Phong commune, Huong Tra district, Thua Thien Hue province.

Specific Objectives:

1. Improving capacity for local authority and people on natural resources synthesized management to adapt to climate change.
2. Building community-based models for managing and using natural resources sustainably to adapt to climate change.
 - To contribute to conserving & developing of mangrove forest and salinity land to limit disaster and developing aquaculture in a sustainable way.
 - To contribute to preventing land degradation due to saltwater intrusion through trials and summarize the experience of alternative models of local salt-resistant rice cultivation with freshwater fish and fisheries.
 - To contribute to promoting the use of local salt-resistant rice species by restoring some rice species in order to improve quality and productivity leading to conserving agricultural biodiversity.
 - To develop community eco-tourism to vary local household income based on conserving, using and exploiting mangrove forest and native culture.
3. Documenting, evaluating, summarizing experiences and recommending local authorities and people on related issues of climate change in agricultural production based on the project models.

5. Authorized Representative:

- Tran Nam Thang – Head of Environment and Climate Change Department
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6. Project Partners:

- Project Partners: Hue university of Agriculture and Forestry (Forestry, Agricultural and Agricultural Extension and Rural Development Department).
- Centre of Social Research and Development (NGO).
- People Committee and Agriculture and Rural Development Department of Huong Tra district
- Agricultural Extension Station, Botanic Protection Station of Huong Tra district
- People Committee and Mass Organizations in Huong Phong commune.

7. Day of Starting: 01/10/2009

8. Project Duration: 30 months (10/2009 – 4/2012)

9. Total Project Cost:

- **1,786,000,000 VND** (*One billion, seven hundred and eighty six million VND*)

10. Amount Request for Funding:

- **898.500.000 VND** (*Eight hundred ninety eight million and five hundred thousand VND*)

11. Project Description:

Thua Thien Hue, a central province of Vietnam, is the place which suffers from effects of natural disaster. It reduces the protection quantity and ecology of mangrove forest as well as reducing the quantity and quality of agricultural eco-system. It also threatens directly to property and people life. The way to conserve and use resources sustainably, limit the damage caused by natural disasters and climate change is not only authorities responsibilities but also all people.

- This project is prepared to build community models to adapt to climate change by conserving, exploiting and using sustainably and integrating natural resources in Huong Phong commune, Huong Tra district, Thua Thien Hue province. Active role of local people is one of prerequisites that can solve problems and improve capacity on preparedness, prevention and adaption to the impacts of climate change. This role can be achieved by (1) *Improving capacity for local authority and people on natural resources synthesized management to adapt to climate change;* (2) *Building community-based models of managing and using natural resources sustainably to adapt to climate change;* (2.1) To contribute to conserving & developing of mangrove forest and salinity land to limit disaster and developing aquaculture in a sustainable way; (2.2) To contribute to preventing land degradation due to saltwater intrusion through trials and summarize the experience of alternative models of local salt-resistant rice cultivation with freshwater fish and fisheries; (2.3) To contribute to promoting the use of local salt-resistant rice species by restoring some rice species in order to improve quality and productivity leading to conserving agricultural bio-diversity; (2.4) To develop community eco-tourism to vary local household income based on conserving, using and exploiting mangrove forest and native culture; and (3) *Documenting, evaluating, summarizing experiences and recommending local authority and people on related issues in order to widen these models to similar sites in Thua Thien Hue in specific and Central Vietnam in general.*

1.0 RATIONALE

1.1 Community/ecosystem context:

Thua Thien Hue is located in the southernmost provinces of the north central region with an average width of 60 km, 127 km in length with varied terrain including hills and mounds, coastal plains and coastal lagoons. Being in the tropical monsoon area with rainfall intensity and the highest rainfall in

Vietnam, focusing mainly on rainy season (August to November) Thua Thien Hue often suffers from floods and severe erosion. In addition, 127 km coastline is contiguous to the Pacific Northwest storms, the largest hole of storm of the planet, Thua Thien Hue province has affected by an average of 6 storms per year. With an area of 216 km², Tam Giang - Cau Hai lagoon stretches 68km, extending the territory of Phong Dien, Quang Dien, Phu Vang, Huong Tra, Phu Loc district, Thua Thien – Hue province. Tam Giang lagoon accounts for 11% of coastal lagoon of Vietnam, with 31 communes, the total population of about 300,000. A high rate lagoon area here formerly inhabited by mangroves and it is a favorable environment for aquatic species, growth and development. However, due to the destroyed habitat and excessive exploitation, fisheries resources of the Tam Giang - Cau Hai are being exhausted and serious decline from 4,500 tons per year down to 2,000 tons / year. With the current situation of climate change, the agricultural area of the commune around Tam Giang lagoon (including 5 districts, 31 communes with a total population of about 300,000 people) is at risk, especially in the situation that Vietnam is one of the severest countries threatened by sea level rise globally.

Huong Tra is a plain district of Thua Thien Hue Province, with the total natural area of 52,089.4 ha, population of about 120.000 people, with over 50,000 employees, located on the national highway 1A, the northern gateway of Hue city, with Huong Thuy, Phu Vang form the third pole of the triangle satellite urban which are importance district of the province.

The district has 7 km long coastline, Highway 1A runs ahead and parallel with the 12 km north-south railway line, with Highway 49A connected Hue city with A Luoi mountainous district, Highway 49B prolongs 7km linking the coastal communes; provincial highway routes 8A, 8B, Provincial Route 4, economic and defense routes. There are two major rivers running through: Bo river with 25 km long, and Huong river with 20 km long, and Tam Giang lagoon with 700 ha wide.

Huong Phong is a small commune located along the coast of Thua Thien Hue province, with total natural area of 1569 hectares and about 12,000 people living in the commune. The poverty rate is 21.6%. Two-thirds of the border commune is surrounded by Huong River and Tam Giang lagoon, so the impact of natural disasters on the life and work activities agriculture, aquaculture is very serious and tremendous. Life of local people based mainly on agricultural production activities (90%) and aquaculture (10%), which highly depends on weather conditions.

Land farming area of Huong Phong commune is mainly for planting rice. Production activities in Huong Phong commune is divided into two crops: the winter - spring crop lasting from January to May (lunar calendar) and summer - fall crop lasted from May to August (lunar calendar). In terms of the weather, production activities in Winter-Spring crop are more convenient due to abundant water resources. Well-developed rice yield reached an average of 56 quintals /ha. The summer - fall crop is usually difficult because salinity and lack of fresh water for rice irrigation, so the yield reduces compared with the winter-spring crop.

Huong Phong commune has a total surface area of 668.9 ha and has the potential to develop aquaculture. It is considered as the main economic sector based on the commune development plan. Shrimp is the main aquaculture activities with the participation of farmers of some villages along Tam Giang lagoon. According to local people, this is an important livelihood activities that generate more profits but also easy to see the risks and losses when diseases occur. Local people are facing difficulties due to shrimp disease triggers, water pollution, destruction of fishing equipment and unstable price. Freshwater fish activities are poorly developed. Some fishery farmers in the rice fields with low productivity do not know well the techniques or suitable methods.

Nowadays, there is still exists a unique mangrove forest in Tam Giang lagoon area (an area of about 5 ha) managed and protected by local people (community forest protection) since 2001. Here, there used to be a large area of mangroves 20-25 ha and extends along the adjoining land between the commune and the Tam Giang lagoon. There are existence of some plants such as Duoc, Vet, Su, Coc, but because of some destructive period of time (war, local people logging Wood (1975-1980 period), expansion of shrimp breeding area (from 1996 to 2000)). Therefore, forest area has declined and these species have lost permanently in the area. Local people have tradition in the protection of mangroves and the ability for promoting and expanding franchise is completely grassroots if there are some financial and technical supports. Local people have experienced bad effects of their deforestation in the past so they wish and expect to protect what they have. The remaining species in the area are presented in the following table (until 2001)

Table 1: Some local tree species in Ru Cha area

No	Species name	Local name	Family
1	Excoecaria agallocha L.	Cha	Euphorbiaceae
2	Dolichandrone grathacea Somun	Quao	Bignoniaceae
3	Hibicus tiliaceus L.	Tra	Malvaceae
4	Deris trifoliata L.	-	Fabaceae
5	Acrostichum aureum L.	Mop	Pteridaceae
6	Acanthus ilicifolius L.	O ro	Acanthaceae

(Pham Minh Thu, 2003)

In 2001, with the support of the project: “Community-based Conserving and Developing of Ru Cha Mangrove Forest” funded by the SIDA (Swiss), local people have restored and planted the following species in Ru Cha:

- Duoc (*Rhizophora stylosa* Griff)
- Vet Khang (*Bruguiera sexdngula* (Lour) Poir.in.lamk)
- Su (*Aegyceras corniculatum* (L.) Blanco)
- Xu oi (*Xylocarpus granatum* Koenig).

All those supplemented species to Ru Cha were scattered in Tam Giang Lagoon (Vet and Su), in the Lu Bu estuary (Duoc) and along the river nearby the estuaries to Tam Giang Lagoon (Xu oi) (Pham Minh Thu, 2003). This confirms the ecology, the ability to restore mangrove forests in the area is completely possible. According to locals, the area of mangroves is often the residence of some native birds such as Diec, Vac, stork, cuckoo ... and also the location for the union of migratory birds at the end of winter and early spring.

Typically the storm No 6 in the year 2006 went through this area and many households lost houses and means of fishery. However, the area of mangroves was a shelter and safety of local residents in the storm, where boats anchored in hurricanes.

1.2 Climate context

Lying along the coast of Thua Thien Hue province with two-thirds of the border town is surrounded by the Huong River and the Tam Giang lagoon, facing Thuan An seaport, Huong Phong inherited all the characteristics of climate of Thua Thien Hue, a province located in the southernmost region of North Central on a narrow strip of 60 km wide on average of land with diverse terrain: mountains, hills and mounds, coastal plains and coastal lagoons, rivers are short and large slope. Due to geographical location and terrain conditions, Thua Thien Hue is a very vulnerable area by many types of natural disasters. Here are some natural disasters in the region:

1.2.1. Storm, heavy rain, flood: These types of natural disasters often happen in the late four months of the year (from September to December). During this period, rainfall and rainfall intensity with the highest in Vietnam, 72.2% of rainfall of the year; in which the total rainfall in November is the highest in: 771 mm (27.8%). Total flow in the last 3 months of the year (from October to December) account for 65% of the total flow of the year. The heavy rain also occurred during this period causing flooding, severe erosion. Typically, the flood in November 1999 with the rainfall in 24 hours reaching nearly 1000 mm, flood flow 14.000m³/s. The total amount of water on the entire river which downstream to the low sector of river from 1-6/11/1999 is about 3.07 billion m³, making 90% of the territory flooded and deep in water from 1-4m, 352 people died and 21 missing, material damage up to 1762 billion VND. Recently, within more than one month (from October 13 to November 16, 2007), the province has happened six consecutive major floods, including four huge floods over the alert level III. Consecutive rains and floods with high tide have caused flooding over large area; more than 90 wards, districts and communes of Hue city deep in the water from 0.5 to 2.2 m, extending several days, some places are flooded over 30 days such as Quang Dien and Phong Dien districts. Flood disaster is extremely dangerous with large capacity power, devastating fierce, causing more damages to Thua Thien Hue annually.

With 127 km coastline contiguous to north-west Pacific hole storms, the largest hole storm of the planet, Thua Thien Hue is often affected by typhoons and tropical low pressure. According to storm tracking data in 56 years (1952-2007), there were 38 storms and tropical low pressures affecting Thua Thien Hue province, of which 5 strong and very strong storms occupying the rate of 9.4%, including: storm on October 30, 1952 in Hue with the wind level 12 (122km/h), typhoon Babs on September 16, 1962 strong level 12 (118 km/h), Tilda storm on September 22, 1964, level 13 (137 km/h) , Hurricane Patsy on October 15, 1973 level 11 (104km/h) and storm Cecil on October 16, 1985 level 11 (104km/h). Besides the harmful effects caused by strong winds, storms and tropical low pressure also cause flooding, flash floods. Water rise and high tide also make sea level rise 3-4m high, filled to 2-3km inland, erode to river banks, shore. Storm combines the flood is a very dangerous weather which causes more serious damage, such as hurricanes in 1985, 2006.

Located in the coastal province of Thua Thien Hue, Huong Phong Commune is located opposite the door of Thuan An beach. Therefore, it is directly affected by natural disasters in Thua Thien Hue province. In addition, due to the relatively low elevation of 0.5 to 1 m above sea level, the impact of disasters on Huong Tra, Huong Phong Commune is very clear.

1.2.2. Drought and saltwater intrusion: Drought, salinity intrusion is the phenomenon which usually occurs every year in Thua Thien Hue in period of the dry season, especially the period from May to August, seriously affecting people's livelihoods and the economy such as agriculture, industry, environment and health. Largest distance that salinity intrudes to Huong River is about 30km. Salt water intrusion caused negative consequences to agricultural production and ecological environment in the lowlands along Huong and Bo rivers and around Tam Giang lagoon. Affected area is approximately 2.000-2.500ha. In the past, there were some heavy droughts in 1977, 1993-1994, 1997-1998, and 2002. The drought in 1993-1994 made a number of rivers and streams dry, trees died. Salt water intrusion on Huong River made 12,710 hectares of summer-autumn crop rice lost, estimated to take 20,000 tons of paddy. The drought in 2002, salt water encroached to Tuan ferry station, made many factories to close for several days, negatively affected the economy of the province.

Natural disaster in Thua Thien Hue is one of the main causes obstructing directly to economic growth, sustainable development, increasing poverty. They are major obstacles in the process to reach socio-economic development. Disaster has lost many achievements of the process of economic development, slow down economic growth, affect poverty reduction policies. From 1990 to 2007 (18 years), disaster has killed 545 people, on average 30 people died per year and material damage was estimated at 6860 billion VND, an average of 381 billion VND per year.

With 70-80 ha (14% of agricultural land) of heavy salinity soil and about 400 ha (70% of agricultural land) of slightly salinity soil, area of agricultural land is the lack of water farming in the dry season and flooded during the rainy season. These salinity land area is mainly due to natural causes (due to storms and floods combined with high tides to penetrate deep into the surface and drought during the dry season to land contaminated by salt osmosis).

These salinity land area is being planted 2 rice crops per year by local people (mainly *Chien Den* and *Chien Trang* - the local rice species). However, due to use over the years and being not be coated so the productivity and quality is not high. Local people have needs to plant rice combined with types of aquaculture such as shrimp, crab, fish, duck breeding to improve the crop performance of land use and facilitate improvement of agricultural cultivated area.

1.3 Impact context:

As analyzed above, due to geographical location and terrain conditions, Thua Thien Hue is a very vulnerable area for a variety of natural disasters. The impact of human in the past and present and climate change are already causing more harm to the socio-economic of the province and it will impact negatively in the following years.

According to climate scenarios of North Central area in the 21st century, we can realize the preliminary definition of some variable factors of temperature, rainfall and sea levels rise in the future as follows:

- In terms of the temperature, with all the high emissions scenario, medium and low, over the decades of the 21st century, temperatures have increased compared to 1990, especially in the last five decades. Notably, from the period of December to May, the temperature increased considerably, from 4.12 to 4.19 °C (for the high emissions scenario), 2.75 to 2.81 °C (medium emissions scenario) and 2.12 to 2.27 °C (low emissions scenario) in the last decade of this century.
- In terms of rain, with all emissions scenarios over the decade of the 21st century, rainfall in the period of December to May is decreased compared with 1990, especially the period of December to February, reduced to 11.8% (for the high emissions scenario), 7.9% (medium emissions scenario) and 5.8% (low emissions scenario), respectively. In contrast, in the period of June to November, rainfall increases, especially in the period of September to November, increasing to 18.8% (high emissions scenario), 12.7% (medium emissions scenario) and 9.3% (low emissions scenario) in the last decade of the century.
- The sea level would rise 330 mm (in 2050) and 621mm (in 2100). With increasing temperatures and permanent melting ice in North and South poles at present, the ability of sea level rises 1 meter or more can happen.

The weather phenomenon of Thua Thien Hue in general and Huong Phong Commune in particular tends to happen more and more seriously. With low elevation terrain, and with two-thirds of the commune boundary is surrounded by Huong River and Tam Giang lagoon, along with natural disasters of drought in the dry season, Huong Phong will be more serious harm due to the tidal intensity, rising sea levels causing coastal and river banks landslide, wetlands and saltwater intrusion, land degradation on a large scale. Impact of storms, heavy rains, floods, wind will more and more serious.

Global climate change will have immediate and potential impact to environment, life and production of the coastal local people in general and people in Huong Phong Commune in particular. According

to the National Strategy Implementation Plan report on prevention and mitigation of natural disasters in Thua Thien Hue province by 2020, changes can be predicted and found to be associated with risks to the natural life is increasing the number of population and level of storms, sunny days will make much more severe droughts in the region, there are more long cold (as in 2007, 2009 long cold lasted over 28 days), higher flood peaks of 50-60 cm over the period 1977 to 1986; more flood (increase 0.6 attack per year); storms are stronger and more anomalies; All that threaten directly to the lives of local people; create a decrease in area and quality of living fences to protect coastal areas (mangroves) and declining quality of the area of agricultural land as well as making difficult for farming activities. As a outcome, productivity of mangroves as well as productivity of the land area of agricultural will decline.

Most local people in Huong Phong commune are farmers and fishermen. They will be a group of people directly affected by the impacts of climate change, especially the poor households in the commune, due to lack of necessary conditions to adapt, change the structure of farming, crops, and support measures. Ecosystem of field which is salinity and drought will be converted from freshwater ecosystems to salinity ecosystems or brackish ecosystem, biodiversity of field will be changed with the detrimental trends to the ecosystem and livelihoods of local people.

1.4 Project approach

To strengthen local capacity to adapt to the impacts of climate changes, the approach of the project is participatory in which the community and local people take part in decision making process. This approach focus on: (i) raising awareness and improving capacity of local people to adapt to the impacts of climate change, especially under the circumstances of local people currently have limited information. Their awareness and of knowledge on the impacts of climate change is still low, even they do not care properly about the impacts of climate change. To raise awareness and capacity of the community, the project will organize training courses and propagandizing on climate change for local authorities and people in order that people are aware of the proper status of climate change, construct the planned integrated management of natural resources for the local. Besides that, collect and apply indigenous knowledge in conservation and sustainable use of communal resources; (ii) Testing pilot models in order to manage and use natural resources sustainably, including:

- Conserving and developing mangrove forests: mangrove forest area of local plays a vital role in mitigating the impacts of natural disasters (storms, floods and high tides ...). It protects life and property for local people as well as creates an enabling environment for the cultivation of aquatic and agricultural activities. The project will conduct planning conservation and development area of mangroves, building mangrove nursery, developing area as well as planting alternative tree species of mangroves in agricultural models to create sustainability for the agricultural and aquaculture activities. Some advantages of the development and conservation of mangroves in this area are as below:
 - + This mangrove forest is associated with the history of the community, local people were, are and will be ready to protect and develop this area (this area had tutelary God, where people lived in the past, is another factor supporting the conservation, local people still visit the area to incense on holidays, anniversaries and ancestor for fishing...).
 - + The local people have experienced in the management, protection of mangrove forest. They established on their own a self-helped group to protect and develop the remaining area of mangrove forest.
 - + Ru Cha is recognized and belonged to the mangrove forests development strategic planning of the province, district and commune. Recently, Huong Phong Commune has planned to expand Ru Cha area up to 10 ha. Thua Thien Hue Provincial People's

Committee also has a resolution on conservation and development of the coastal strip of forest ecology along the Ô Lau River, Ru Cha (Huong Tra), gate of Bu Lu river, Quang Loi ... (abstracted from the Resolution 06-NQ/TU dated June 15, 2007 of T.T. Hue Provincial People's Committee).

- + Ecological environment is relatively stable to develop more area because of availability of mangrove forest area which is favorable for ecology (enabling environment, protect the seedlings) and for the recovery and development activities of mangroves as well as nursery activities and restoration of the forest.
- + There were a number of planned investment activities, tourism exploitation deployed in the area and they are able to generate revenues for the local. Tourism companies may be willing to invest for the planning, developing and establishment of this mangrove forest resource for future tourism activities.
- Experimenting to determine the suitable cultivation models that are appropriate with local conditions in the trend of increasingly severe salt intrusion due to the impacts of climate change. These models will be developed on the basis of knowledge of local people and use the proved outcomes of the related research. To build successfully agricultural production models to prevent land degradation due to saltwater intrusion, the first criteria is the ability to adapt to soil conditions and salinity water. Economic efficiency and income of the people always need attention. In the Specific conditions of a local coastal lagoon such as Huong Phong, rice farming monocultures do not bring high profit per unit area (ha) of cultivation and non-exploitation of water resources. However, the existence and development of mangrove forest in the region is not only a "leaf" to support community in natural disasters prevention but also to improve income for people through the aquaculture activities.

According to the evaluation of research team in Hue University of Agriculture and Forestry, people are using local rice salt- resistance species such as Heo, Nuoc Man, Chien Den, Chien Trang as well as new rice varieties such as Xi23, 4b, 13/2, Sticky rice. Based on the outcomes of research and consultation a number of rural households, the outcomes showed that, excepting for three disadvantages are low productivity, easy to fall and labor - consuming, local rice varieties have more advantages than new rice species, especially the ability to adapt to local conditions, drought, salinity and flooding resistance (see Table 2). Economic efficiency of local rice variety (eg: Nuoc Man) is not much lower than the new species (see Table 3). Also, evaluation outcomes of Faculty of Agricultural Extension and Rural Development, Hue University of Agriculture and Forestry showed that " Chien Den and Chien Trang varieties can suffer from drought and sour salt conditions better" (Truong Van Tuyen and Associates, 2007). If assessment of the environmental impacts, local rice variety should be encouraged to develop and cultivate due to little or no use of pesticide, contributing to the environmental improvement.

Table 2: Adaptation comparison between local variety and new variety

Criteria	Local variety (Heo, Nuoc Man, White Chiên , Black Chiên)	New variety (Xi23, 4b, 13/2, Sticky rice)
Suitable to local rice field	The best	Average
Waterlogged-resistance ability	The best	Average
Fertilizer investment	Little	Much
Labour investment	Litte	Much

Suitable for preparing seedling	Suitable	Unsuitable
Pestilent insect resistance	The best	Average
Productivity	Low	high
Falling	Easy-falling	Difficult-falling
Harvest-labour	Much	Average
Drought and salt-resistance ability	good	bad

(Source: *Truong Van Tuyen and Associates 2007*)

Table 3: Comparison of economic efficiency of rice production between local species and new species in the same cultivated land

Criteria	Unit	Heo (local)	Xi23 (new)	Nuoc man (local)
Productivity	Kg/perch/crop	170	275	147.6
Price	VND/perch/crop	2,700	2,800	4,000
Total income	VND/perch/crop	459,000	770,000	590,400
Total cost	VND/perch/crop	265,400	385,500	231,600
Labour	labour	5	4	5
Income	VND/perch/crop	193,600	384,500	358,800

To increase household income, farmers have reduced rice monoculture cultivation and alternated rice cultivation with freshwater fish like tilapia, carp and brackish aquatic products such as shrimp and crab. One noteworthy issue is the outcome of initially research of Hue University of Agriculture and Forestry showed that “after the transition from local rice species to new rice species, these fisheries resources is reduced significantly (Truong Van Tuyen and Associates, 2007:15). Based on two criteria to assess adaptation and economic efficiency, there is no conclusion to encourage the development of new species on alum and salinity field.

However, the problem is that the cultivated areas of local species are gradually being narrowed. Yield was reduced due to quality degeneration. It is necessary to increase the use of local rice species which have good resistance to drought, saline intrusion and flooding to ensure stable income and food security for farmers and adaptation to the impacts of climate change, contributing to agricultural biodiversity conservation. With the above analysis, the project will focus on solutions for the models of the local farming systems.

- Raising awareness of authority and people about the importance of conserving agricultural biodiversity;
- Restoring local rice species, such as *Nuoc Man*, *Chien Den*, *Chien Trang* to increase productivity. Paying attention to the conservation and selection of seedling and production of local rice species in the community.

- Support technique and finance for people to build and develop local rice species models combined with alternating freshwater fish and brackish fisheries.
- Monitoring and evaluating outcomes to confirm the following issues:
 - Ability to adapt to saltwater intrusion of local farming models (alternating rice cultivation with local freshwater and brackish aquaculture).
 - The effect of environmental and economic model and the ability to replicate the model.
 - Lessons learned on technique of alternating local rice cultivation with freshwater and brackish fisheries.

With the environmental conditions, advantages of the local landscape, infrastructure investment of the province and district for this area as well as initial activity on tourism is being conducted. In the current conditions, eco-tourism is becoming one of the most potential activities to this local. The area of mangrove in Huong Phong commune is only the remaining forest in Tam Giang lagoon. This is the ideal attractions which can be developed to the potential route of tourism in terms of traffic and marine as well. Some tourism companies in Thua Thien Hue are intending to invest in this area. Developing community-based eco-tourism will open in a new direction in resource management as well as creating new revenue sources for local people, reducing dependence entirely on the activities of agricultural production, which is easily affected by erratic evolutions of weather and other adverse impacts of climate change such as drought, salinity intrusion and disasters.

Evaluating outcomes and documenting the lessons learned to share information with locals which have the same conditions to the replicate these models. Tam Giang lagoon covers a large area, directly affecting the lives of 31 communes in 05 districts of Thua Thien Hue. Many communes in 31 communes have similar conditions with Huong Phong; and they are all sensitive to the effects of climate change. So it is necessary to have a plan at community level to replicate to the local neighborhoods. The project will document components of the project from training to raise awareness and capacity of local people, process of planning and resource management, use indigenous knowledge. Processes of building models will be summarized on progress, participation, steps of implementation. Outcomes and lessons learned can be applied, replicated for local area in Tam Giang lagoon of Thua Thien Hue and central regions.

2.0 COMMUNITY OWNERSHIP

2.1 Project Formation

To form the idea of this project, CORENARM has conducted field surveys, discussed and consulted local people and authorities to find out the difficulties, the potential danger that local people encountered such as the decline in agricultural land area, the vulnerability due to climate change as well as the difficulties and aspirations of people in everyday life and the available potential such as community forest management for mangroves, the eco-tourism potential.... All these exchanges helped CORENARM gather ideas for building this project. The locals have also contributed very actively in the process of discussing and propose activities which should be implemented as well as the sequence of activities so that it can bring the highest impact with reasonable cost.

They also suggested for CORENARM to build components of the project. Because, through kernel interviews, core farmers and group meetings, it is suggested that local people have practical experiences in production and daily life. More importantly, they also feel the changes of weather,

climate increasingly erratic and severe in recent times as well as the desire to better understand and be better equipped to climate change adaptation. Also, the issue that people are most concerned about is how to stabilize the livelihood in adverse weather conditions. That is valuable contributions to help CORENARM form the ideas as well as the components of the project.

Local authority (communal) and the functional departments of the district also contributed an important part in the formation and construction project ideas. They support enthusiastically for the field trips to learn and evaluate the impact of natural disasters, provide secondary data as well as give suggestions, recommendations in directing, designing and building models that best suits local conditions and real capabilities of people. District Agricultural Division is the place where people can be provided information about the availability of rice species which are used in local area, and rice species which are able to apply for models of the project (based on research outcomes of Agricultural Division and Hue University of Agriculture and Forestry).

Some projects have been deployed in the area of the district which also provides valuable secondary data for forming, adjusting the project activities to match the actual local conditions as well as raising successful ability to models.

2. Project Implementation

Local people will be the core components involved in all activities of the project:

- They are the objects who store and transmit for future generations the indigenous knowledge of production and resource management as well as mitigate the impacts of natural disasters.
- They are the objects who take part in propaganda activities to raise awareness and training courses. They are also working together with experts to collect and verify their traditional knowledge.
- They, as a member of the community, will participate in voting deserved households to participate in the performance model.
- They are the people who directly implement demonstration models and learn the technical measures from technical support staff, consultants and farmers right on the field.
- They also directly monitor and evaluate the outcomes of models.

Mechanisms to ensure participation for local people:

- The project organizes mainland workshops and conferences, training courses and community meetings in order to facilitate people to participate in discussing, developing plans and making final decision.
- Project management board and consultants refer ideas and agreement of the people to make the final decision to the issues involved.
- All training activities, building models, monitoring and evaluating outcomes have active participation of local communities.

Project management board has five members, of which 02 members are from local (01 staff from functional departments of the district, 01 from commune) who participate in managing, directing, deploying and monitoring the activities of the project. With the participation of 02 members in management board, it will ensure the continued and complete participation of the community in the process of project implementation as well as ensure that the local factors will be considered during and activities and project implementation.

Through demonstration models, knowledge learned by the local people will be applied in practice. They will have benefits in terms of ecology and economics. The models created good and secure habitat due to the conservation and development of mangrove forest. This also indirectly increases the production of marine products. The agricultural model will have higher and more stable yield in difficult farming conditions; and eco-tourism activities will compensate the loss due to climate change by diversifying sources of income for locals.

By participating in the training process, deploying models, and observing the deployment models in field, local people will draw lessons for themselves and they will be able to apply the knowledge on his own field as well as adapt to the impacts of climate change. They will be able to apply and invest in their production models in the future. In addition, community forest management and eco-tourism development will create the ability to community working and promote developing capital social - a crucial factor for economic development of local.

Through participation in activities, the functional departments of district and commune also enhance professional capabilities, skills and approach to work with the community. They will be able to guide and replicate models for the area they are managing as well as neighborhoods in central Vietnam in the future.

2.3 Phase out mechanism and sustainability

Local people, after participating in developing high effectiveness models, they will believe in the techniques and experiences learned. They are the nucleus which continues to apply the techniques and experience into the actual production of their households. Models of rehabilitation and protection of mangrove forests will create the safety agricultural and fishery environment. On the basis, it motivates local people to replicate the mangrove models scattered in their aquatic area. In addition, revenue from eco-tourism activities will reinforce the link of the community. And local people will continue to implement and upgrade the involved activities.

Project management board (CORENARM) and local authority, functional departments, and local officials, through the implementation of this project, will improve their capacity in researching and implementing activities which adapted to climate change. CORENARM and local authority will continue to implement research activities on climate change and replicate the successes gained from implementation of this project. The lessons learned and outcomes achieved will be used to build recommendations for local and related departments:

- Using planning integrated management of natural resources which has been developed for implementing socio-economic development plan of the commune;
- Recommending farming models adapting to climate change and organize ecotourism community activities;
- Compile technical documents and lessons learned based on the outcomes of the project and disseminate models for replication;
- Search funds for further testing and replicate climate change adaptation solutions.

3.0 PROPONENT DESCRIPTION

3.1 Organisation background and capacity

The Consultative and Research Center on Natural Resources Management (CORENARM) was established following Decision 128/QĐ-LHH of the President of Union of Science and Technology Associations of Thua Thien Hue province (HUSTA) on October 21, 2005. This research Center was founded by a group of young people from different background and working in different areas of natural resources management and rural development.

The overall objective of CORENARM is to renovate approaches of natural resources management by applying advanced research in collaboration with local participation in order to improve ecological environment and local livelihood in rural areas of Thua Thien Hue province in particular and Central Vietnam in general. By working with other specialized agencies at local level, CORENARM aims at improving knowledge, skills, and new approaches in natural resources management for local staff who are lack of conditions to update their knowledge through academic programs and local communities.

We participated in a research project on the “change of livelihood strategies of rural mountainous region to adapt to climate change” in Nam Dong district, Thua Thien Hue province funded by the RDVIET program. Recently, we took part as researchers of a research project on “alternative agriculture solutions” as a consultant group for CARE international in Thanh Hoa district, Vietnam to cope with natural disaster and to find out suitable agriculture demonstration models which can be replicated by local people.

In order to form the ideas of this proposal, we got into contact and discuss with local people in the project area, we see the threats and difficulties that local people are facing which are the reduction of natural resources, vulnerability to climate changes as well as difficulties in their living. All those help us to wrap up this proposal.

Our center (from the date of formation in 2005) has received grants for research and development project from several sources: the World bank small grant program (twice), Ford Foundation, the Fauna and Flora International, and the Ecosystem Grants Programme - IUCN/Netherlands, which are all related to sustainable natural resource management and local capability building. Our main source of funding is project-oriented and a part comes from other consultation works for national and international organizations.

4.0 PROJECT DESCRIPTION

General objective:

Strengthening local capacity in adapting to climate change by building models of natural resources synthesized management based on community in Huong Phong commune, Huong Tra district, Thua Thien Hue province, Vietnam.

Specific objective, outcomes and expected outputs:

Objective 1- Capacity building for authorities and local people about the integrated management on natural resources in order to adapt to climate change.

Outcome 1.1

Awareness and understanding of stakeholders on the impact of climate change and adaptation measures are improved.

Output 1.1.1:

6 panels on models' content are built and propagated to raise popular awareness about the impact of climate change

Output 1.1.2:

3 Dialogs about the impact of climate change and adaptation measures with the participation of leaders of authority, departments and local communities of Huong Phong Commune (150 participants)

Output 1.1.3:

Content on impact of climate change and adaptation measures is incorporated in the meetings of mass organizations of Huong Phong commune.

Outcome 1.2

Traditional knowledge on managing and using resource and preventing disaster are collected, verified, recommended for use in the management of natural resources and socio-economic development of this commune.

Output 1.2.1: A knowledge document about communication is built and popularized (40-50 pages).

Outcome 1.3

Natural resources management practice is enhanced.

Output 1.3.1:

A map of natural resources with the ratio of 1/25000 and participatory overall resource management general plan is established and tested, as the basis for the work-oriented resource management and socio-economic development of the commune.

Objective 2. Building models of management and use resources sustainably basing on community to climate change adaptation.

- To contribute to the conservation and sustainable development of mangrove resources to limit the impact of natural disasters and sustainable development of aquaculture;
- To contribute to preventing from land degradation due to saltwater intrusion through testing models of species and structure conversion and methods of cultivation in agricultural production;
- To contribute to building local capacity in developing community eco-tourism to diversify income for people on the basis of mangroves exploitation and community culture.

Outcome 2.1. Model of conservation and sustainable development of mangrove resources to limit the impact of natural disasters and sustainable development of aquaculture is built successfully.

Output 2.1.1

A community nursery is established, with an area of 200m² providing seedlings for Ru Cha mangrove areas and surrounding areas for forest restoration (about 10,000 trees), priority propagated mangrove plants which used to appear in the area but came into extinct locally.

Output 2.1.2

Models of rehabilitation, protection and development of mangrove forests is under conducted, especially testing building models of unfocused mangroves planting (plant mangrove tree species along roads, boundaries of the aquaculture household , build models of sustainable aquaculture based on mangrove concentration and decentralization). Estimated 10,000 mangrove trees will be planted.

Outcome 2.2

Successfully restoring local rice species and alternative models of salt-resistant rice cultivation with freshwater fish and fisheries in order to prevent from land degradation due to saltwater intrusion.

Output 2.2.1

- The two local salt-resistant rice species (Nuoc Man and Chien Den or Chien Trang) are restored in order to improve quality and productivity to conserve agricultural bio-diversity.
- Three following models are implemented.
- Model 1: Restore 3 salt- resistant local rice varieties (Nuoc Man, Chien Den and Chien Trang) and test 4 crops in an area of 16ha (2 crops/year*2 year*4ha/crop = 16ha)
- Model 2: local rice varieties and freshwater fisheries (Tilapia, Carp) in an area of 4ha (2 hectares*2 years)
- Model 3: local rice varieties and brackish water aquaculture (Crab, Shrimp) in an area of 4 hectares (2 hectares*2 years)

Output 2.2.2

Training and study tour - improve technical ability of the farmer-will be held. 8 training classes with below contents will be held for 400 participants:

- Salt-resistant rice farming technique and aquaculture, rice- aquaculture alternative cultivation
- Sustainable land-use and cultivation technique.
- Impacts of Climate Change on Agricultural Production and methods to be adaptable.

A study tour of sustainable agricultural production model will be held for 30- 35 participants.

Output 2.2.3

4 workshops on evaluating outcome of model and sharing experience will be held for 200 participants.

Technical documents about transferring model of the project will be compiled, checked and popularized.

Outcome 2.3

Local abilities will be strengthened for the development of community green tourism in order to diversify the household income based on exploiting mangrove forest and community culture.

Output 2.3.1

Specific tourism tour will be established; flyers about Ru Cha area will be compiled and disseminated.

A specific plan about tourism development with the participation of local people on organizing tourism activities is built and approved at commune Peoples' Committee.

Training tourist guides for community-based eco-tourism activities.

Cooperating with provincial tourism companies to support tourism sector for the commune

Output 2.3.2

Basic infrastructure is built for the region (the diagram of visiting zone, nameplate of visiting places, rest rooms, parking)

Objective 3:

Assessing the outcomes of pilot models of the project, summarizing the experiences and recommending the government and local people about the issues concerned

Outcome 3.1

The models are followed to collect full information and data for evaluating outcomes and compiling technical handouts. Gather outcomes and lessons learned in the implementing process of the project to recommend local government of Huong Phong Commune about solutions of adapting to Climate Change.

Output 3.1.1

Report on outcome assessment, technical guidelines and recommendations are prepared in consultation with the relevant stakeholders.

4.2 Time-Frame

	2009		2010												2011												##						
	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	
Outcome 1.0																																	
Output 1.1																																	
Output 1.2																																	
Output 1.3																																	
Outcome 2.0																																	
Output 2.1																																	
Output 2.2																																	
Output 2.3																																	
Outcome 3.0																																	
Output 3.1																																	
Monitor & Document																																	

4.3 Risks and barriers

The project faces a number of key risks and barriers. The project area is very prone to the disaster, including tropical storms and flooding which happen every year and is increasing in terms of intensity and frequency over the years. There is a real need to provide early warnings and information to the community for preventive measures. It is also related to developing project appropriate planning so as to avoid negative impact from the disaster and also meeting cropping time in the area.

Due to the tropical climate and the changes, harmful pests and diseases often appear in rice fields. Diseases in aquaculture ponds also happen very frequently in recent years. The field workers of the project need to closely monitor the development process of harmful pests and to provide guidance to farmers for timely and effective control.

Climate change adaptation is a new issue and there is a real need for technical assistance in making the project direction going to the right track. The project will ensure it by employing technical experts in the climate change area to provide technical assistance to the project.

Community participation is key to project success. There may be conflicts among the local communities in terms of benefit sharing from the project. The project will adopt a transparent mechanism in selecting the participating households and this will be decided by the community at the community meetings.

Possible risks may be from project management. Untimely grant disbursement from donors and other sources may affect the project implementation schedule. The project models are of agro forestry activities which depend on cropping, which means untimely financial allocation will adversely influence the schedule and the achievement of the objectives set out by the project. In order to avoid this risk, the project must follow the management principles set out by CBA Vietnam so as to meet the requirements on project planning, budgeting and reporting.

4.4 Monitoring and evaluation Plan

4.4.1 Initial Vulnerability Reduction Assessment analysis

Vulnerability Reduction Assessment Reporting Form	
Index 1	8.60
Index 2	8.10
Index 3	5.75
Index 4	5.30
Index 5	7.20
Index 6	7.56
Index 7	8.15
Total VRA	7.23

Adaptive capacity

The Vulnerability Reduction Assessment (VRA) will be measured at the planning stage of the project, at the mid-point, and at the end of project. Given that the VRA is qualitative and is based on the community perceptions, the first VRA was conducted to establish a baseline during the Project planning phase. A second VRA will be done at mid project after all the project activities to build the model has been completed. A final VRA will be done at the end of the project to assess the overall impact of the project on the community adaptive capacity.

The VRA questions that will be used are as follows:-

1. Rate the impact of salinisation and land degradation on your livelihood
2. Rate your ability to cope with the negative impacts of salinisation and land degradation
3. Rate the impact on your livelihood if salinisation and land degradation doubles
4. Rate how effectively you would be able to cope with the doubling of salinisation and land degradation
5. Rate how effective you think this project will be in reducing your risks from increasing salinisation and land degradation.
6. Rate your confidence that the project will continue to reduce salinisation and land degradation risks after the project ends.
7. Rate your own ability to cope with increasing salinisation and land degradation and other climate changes after this project ends.

The Impact Assessment System (IAS) indicator will be measured at the end of the project using the following components:

- (1) The number of hectares of land protected from degradation due to salinisation
- (2) The number of innovations developed/applied under the project
- (3) The number of policy recommendations proposed in land and ago biodiversity management

The targets for the above are as follows:

- (1) Twenty four (24) hectares will be sustainably managed by the project
- (2) The project will apply 2 technologies (namely, salt resilient local rice varieties conservation and cultivation with fisheries, conservation and reforestation of mangrove)
- (3) Three to four recommendation on policies in land and ago biodiversity management will be proposed to local authorities

UNDP ADAPTATION INDICATORS:

The project will contribute to the UNDP adaptation indicators adopted by the Viet Nam CBA country programme strategy, namely:

1. The number of measures that address the additional risks posed by climate change deployed as part of sustainable resource management activities;
2. Percentage of area concern in which climate change risk management activities, in the context of sustainable resource management are implemented; and
3. Number of local and national level policy recommendations proposed as a result of lessons from CBA projects

The targets for the UNDP Adaptation indicators are outlined below:

- (1) Two measures will be deployed as part of the activities for sustainable farming in the project area.
- (2) Twenty percent of project area will be engaged in climate-resilient farming activities.
- (3) One hundred percent of mangrove will be protected under the project.
- (4) Three to four policy recommendations proposed as a result of lessons from the project.

4.5 Project Management

4.5.1 Management Structure

To manage the project effectively, CORENARM will form the Project management team, included the following members:

- Representatives of the grantee organization (CORENAM): three members (the project team leader, Secretary, and Accountant).
- Representatives of the local participate in the project: 02 members
 - + Representative functional department of the district, responsible for technical support
 - + Representatives of the local community

The project management team will have the following main tasks:

- Organizing to receive aid
- Directly steer and monitor and implement the project activities
- Operating based on the principles of democracy, openness and transparency
- Meeting regularly on a monthly basis (once a month) to make decision on related project issues.

a. Specific responsibilities of the project management team:

- Preparing work-plans and prepare yearly, quarterly budget estimation.
- Organizing and implementing activities according to the plan and the budget approved.
- Preparing reports on monitoring and evaluation of projects, reports on progress and finance for the donor and arrangement of local contribution.
- Cooperating with the donor to select group of experts and monitoring technical advisory contract of the project.
- Establishing relationships with local government and agencies involved.
- Managing expenditures of the project
- Selecting and monitoring of sub-contract to provide equipment and materials for the project.
- Mobilizing, monitoring the funding source contributed by the organizations, reporting on the outcomes of the activities implemented by this contributed source.
- Informing and discussing with the donor on issues arising as well as adjustments during project implementation to find out appropriate solutions.
- Keep documents related to the project.

Besides, the Project management team is also responsible for signing sub-contracts of the project:

- The project management team signs sub-contracts with other agencies and organizations at the local area to supply of materials needed for pilot models of the project.

b. The technical assistance subcontractor of the project

The technical assistance subcontractor of the project will:

- Provide consultative services and technical assistance for the implementation of the project
- The project management team recruit expert group to implement activities of the project, consisting of 3 experts on climate change, agro forestry and aquaculture, and 2 field workers.
- Providing training and technical assistance to communities and implementing the technical solutions for the project.
- Monitoring and evaluating the outcomes of the model of the project, summarize the lessons learned, recommendations on matters related to policies.
- Compiling technical documents for the project
- Adjusting the project (if necessary)

c. Management structure with expert group:

- The technical assistance services are under the supervision of the project management team based on the TORs and service contracts signed by the project management team and expert group.
- Expert group prepares operational plan, budget estimation and report under the terms of reference in the contract.
- Expert group has an internal operation structure which is approved by the project EC.
- Expert group works closely with the project management team in the implementation of project activities.
- Expert group and the project management team have meeting regularly in every six-month to evaluate the implementation of the project aimed at acquiring experience and having necessary adjustments.

d. Monitoring and supervising by the project management team

Collecting necessary information for the project management through:

- Monthly meetings;
- Organizing the field trips to project area for;
- + Checking the actual situation, reviewing the progress of implementation of the project activities

- + Resolving issues arising in the implementation process.
- + Collecting information as the basis for preparing the work-plan, budget plan, and writing reports upon the request of the donor.
- Organizing the two annual review meetings
- The project management team conducts periodical meetings with expert group in every six months to monitor and evaluate performance of the expert group.

e. Monitoring and evaluation activities of the project:

Conducting the mid-term review and final evaluation with the aim to evaluate:

- The level of achievement of the project's objectives
- The ability to replicate of the project, recommendations on applying, developing and maintaining the outcomes of the project.
- Drawing lessons on management and the techniques of building project models.
- Assessing the cost effectiveness of the project implementation.
- Content reviewed will be based on the objectives, outcomes and success criteria stated in the project proposal. Community participatory evaluation method is used.

4.5.2 The relationship and responsibilities of the proponent and the project partners:

In all activities of the project, CORENARM serves as a coordinator to coordinate the project activities, linking the donor and the local. With technical support from Research Institutes, Universities, Local NGOs, the district and commune functional departments and local authorities to achieve the given goals. All partners involved in the project have the appropriate resources with the goals of their organization. The research on climate change and adapt to climate change is extremely necessary with Research Institutions and Universities, especially at the grassroots level, the community. Local NGOs will acquire the compromised voice in supporting community development, management and sustainable use of natural resources and apply new knowledge in their field. The district, commune functional departments and local authorities will have grounds to complete the responsibilities in terms of state management in conservation activities and development resources, improving livelihoods of local people. The tourism companies will develop the model of eco-tourism with low-cost, high efficiency. Local people, with participation in the activities of the project, build capacity to manage, use and protect natural resources sustainably, create necessary social capital as well as create the additional income and improve the ability adapt to climate change conditions.

Hue University of Agriculture and Forestry will be responsible for two important segments in the process of building models: restoring and protection of mangrove forest as well as design and build farming models to be appropriate with local conditions. They will responsible for overall technical seeds, seedlings, techniques...

The district functional departments such as Agricultural Division, Agricultural Extension Station, Plant Protection Station will act as technical service providers for local beneficiaries. They will get involved in all project components to build farming models. Through the facilitation of local people, capacity and approach method of the staff of these departments are also improved.

Local government, represented by districts and communes, will create a legal basis to implement project in the commune. In addition, with the existing workforce, the local understands very clearly the local situation and will be the determining factor to implement successfully the project.

