SGP The GEF Small Grants Programme

COMMUNITY-BASED ADAPTATION

Experiences from GEF Small Projects







gef GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

UNDP

Global Environment Facility Small Grants Programme in Vietnam (GEF SGP)
304 Kim Mã, Ba Đình, Hà Nội, Việt Nam
Tel: 84-4-38500150
Email: gef-sgp-vietnam@undp.org
Website: www.vn.undp.org; www.sgp.undp.org

Prepared by:

Institute for Asian-Pacific Scientific Research & Technological Development Cooperation (IAP)
422 Phạm Văn Đồng, Cổ Nhuế 2, Bắc Từ Liêm, Hà Nội, Việt Nam
Tel: 84-4-37525783
Email: vanphongiap@gmail.com

Co-authors:

Nguyen Thi Thu Huyen
Phan Thi Nguyet Minh
Dang Thi Thanh Thuy

Information provided by:

Nguyen To Tran
Tran Ngoc Huan
Pham Ngoc Lan
Nguyen Thanh Phuong

Designed by:

vmcomms.net

Sources of photos:

Provided by UNDP/GEF SGP and Internet

SGP The GEF Small Grants Programme

COMMUNITY-BASED ADAPTATION

Experiences from GEF Small Projects

gef GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

UNDP

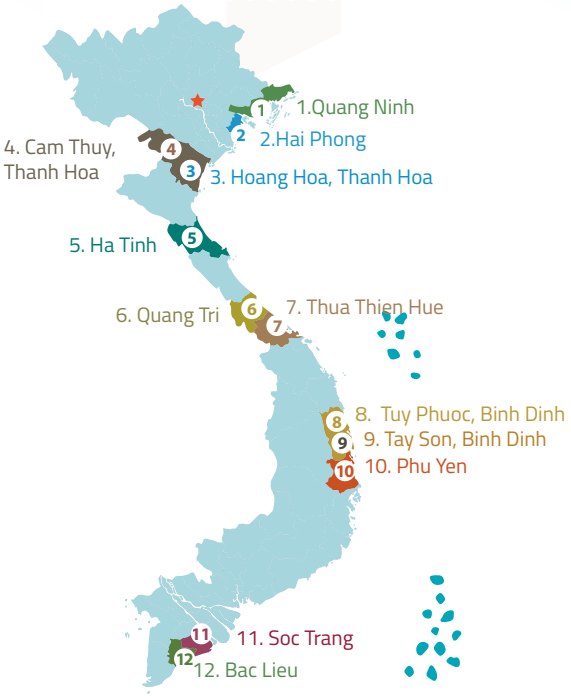
TABLE OF CONTENT

ACRONYMS

GEF	**Global Environment Facility**
GEF SGP	**Global Environment Facility Small Grants Programme in Viet Nam**
CC	**Climate Change**
SE	**Social-Economic**
PVS	**Community-based rice variety selection**
S&T	**Science and Technique**

FOREWORD

Having recognized the important role that households and communities can play in addressing global environment issues, the United Nations Development Programme (UNDP) initiated Global Environment Facility Small Grants Programme (GEF SGP) in 1992. The GEF SGP provides community based organizations (CBOs) and local non-government organizations (NGOs) with grants to enable them to tackle local environmental issues of the GEF's focal areas on the basis of solutions appropriate to local conditions.



The GEF SGP Viet Nam started its operation in 1999. Almost all of projects fall into such areas as biodiversity, climate change mitigation and adaptation and prevention of land degradation and desertification. Recipients of these projects are local NGOs and CBOs. The projects have the focus: to pilot relevant strategies and techniques for tackling local environmental issues and sustainable natural resource use by adopting the community based approach. The projects attach great importance to the objective of building capacity of local communities and people. The resources provided for SGP projects are small (USD 50,000 per project). Project results have been evaluated highly by local authorities and agencies. The SGP projects has significantly contributed to building the capacity of local civil societies and increasing their profile. Over 15 years of its implementation in Viet Nam, the SGP is one of the few effective funded programmes to provide civil societies and CBOs with resources to enable their implementation of projects/ activities in environmental protection and sustainable livelihood development on the basis of sustainable natural resource management and use. As of October 2015, the SGP Viet Nam has provided grants for a total of 140 projects implemented in 104 communes of 40 provinces throughout the country.

This paper of lessons learnt depicts results gathered from several projects on community-based adaptation implemented in localities in Viet Nam. GEF SGP expresses its thanks to IAP, particularly Dr. Phan Thi Nguyet Minh, Ms. Dang Thi Thanh Thuy and other experts for their contributions to the paper.

Nguyen Thi Thu Huyen
National Coordinator

Community-Based Solutions to Flash Flood/Drought Preparedness and Response

DEVELOPING A MODEL IN APPLYING TECHNOLOGIES TO REDUCE VULNERABILITIES AND TO INCREASE ADAPTIVE CAPACITY ADDRESSING NATURAL DISASTERS/EXTREME WEATHER (FLASH FLOOD AND DROUGHTS) IN CAM TAM COMMUNE, CAM THUY DISTRICT, THANH HOA PROVINCE

- **Project Duration:** 2009 - 2012
- **Project No:** CBA/VN/SPA/08/003
- **Project Site:** Cam Tam commune, Cam Thuy dist.,Thanh Hoa province
- **Implementing Agency:** Thanh Hoa Provincial Association of Water Resources
- **Beneficiaries:** Cam Tam communal people and authority

Cam Tam is a poor commune of Cam Thuy district, Thanh Hoa province. About 88% of the population rely on farming for their livelihood. In recent years, due to negative impacts caused by climate change, the commune has suffered from an increasing number of swift and flash floods, droughts, heat waves and lasting frigid and damaging colds causing heavy consequences to local socio-economic development and local community's livelihoods.

To help enable local people to confine impacts caused by flash flood and drought on their agricultural production, reduce their vulnerability and strengthen climate change adaptation capacity for Cam Tam community, the GEF SGP Viet Nam assisted the implementation of a project on ***"Developing a model in applying technologies to reduce vulnerabilities and to increase adaptive capacity addressing natural disasters/extreme weather (flash floods and droughts)"*** in Cam Tam commune, Cam Thuy district, Thanh Hoa province".

PROJECT'S BACKGROUND AND OBJECTIVES

Cam Tam commune of Cam Thuy district, Thanh Hoa province, has 866 households of 3,987 persons and of which 93% are the Muong ethnics and 88% rely on farming for their livelihoods. The rate of poor and nearly-poor households is rather high at approx. 53%. In recent years, many extreme weather events such as swift and flash floods, droughts, heat waves and lasting frigid and damaging colds have caused heavy consequences to local socio-economic development and local community's livelihoods.

To help enable local people to confine impacts caused by flash flood and drought on their agricultural production, reduce their vulnerability and strengthen climate change adaptation capacity for Cam Tam community, the GEF SGP Viet Nam assisted the commune in ***"Developing a model in applying technologies to reduce vulnerabilities and to increase adaptive capacity addressing natural disasters/extreme weather (flash floods and droughts)".***

- **Specific objectives**

1. Raising awareness and understanding among local people and authority of climate change related impacts on local sustainable development; and
2. Developing a model for adopting technical advancements to confine harms of drought and flash flood by strengthening the protection and sustainable use of water resources (surface and rain water collection and storage), land resources (land degradation control), and agricultural biodiversity conservation (adoption of local drought tolerant rice varieties).

MAIN ACTIVITIES AND INITIATIVES

1. Developing and implementing a programme on raising public awareness of climate change hazards through community communication campaigns;
2. Designing and testing a model for digging fishbone-shaped gullies making a 45o angle with the contours of mountain, in combination with the planting of a vegetation (of 8 ha) for flash flood control;
3. Building a reservoir and a dam for water storage;
4. Developing a model for community-based drinking water supply in order to address the shortage of water supply for domestic and productive activities;
5. Piloting a model for the rotation of rice with other suitable and drought-tolerant crops; restoring and developing one and/or two lost native varieties of upland rice; and
6. Monitoring and consolidating lessons learnt from the models, and undertaking further studies to make relevant recommendations for the commune.

RESULTS AND IMPACTS

- **Environmental Impacts**

Solutions to Climate Change Adaptation

- Rice cultivation techniques and its rotation formula with other suitable and drought tolerant crops applied have contributed to addressing the shortage of water supply for the local people's farming.
- The restoration of a native drought-tolerant variety of upland rice cultivated on the slope for use and production after a period of interruption. After the completion of the project, 20 ha of rice land were used for adopting a model for the rotation of crops with drought-tolerant varieties;
- The repair and upgrading of the Hon Coc dam not only helped to supply water for irrigating 10 - 15 ha and create a supply of water for 200 households in three villages, namely Mới, Bồng, Vót but also created a reservoir to control floods contributing to mitigate flash flood, promote local production and improve the local people's living conditions;
- The digging of 3,7km of the contoured gullies and the dredging of vertical furrow-drains (vertical gullies) helped to drain flood water into the reservoir and natural streams. Since it was first brought into operation, the contoured gully system has worked well, reducing inundation and erosion of paths for ease of transportation on foot. Besides, the planting of 8 ha of forest (mostly Acacia mangium species) has created a vegetation to control flash flood; and
- The model for household water collection and storage pilotted with 20 households constitues an effective solution to help the local community tackle the shortage of water for their production and domestic activities.

Strengthening of disaster warning and raising awareness of climate change among the local people

- Through communication activities carried out to improve awareness and understanding of climate change related impacts and solutions to climate change adaptation among the local community, authority and stakeholders, the project has contributed to promoting the conservation and development and rational utilization of local natural resources for sustainable development in the commune. The number of local people involved in the communication activities was about 1000 person/time of which women accounted for 22%; and
- In addition, through its training program, the project provided training of climate change for 600 local people/participations; and this contributed to raising awareness among local people of climate change hazards and improving the local community's climate change capacity.

- **Social Impacts:**

- The transfer of technical advancements on the basis of the handover of responsibility and self-reliance enabled local households' knowledge on how to produce and improve their livelihoods to be adaptive to climate change, contributing to improving the local people's socio-economic conditions and instilling a sense of community; and
- Capacity building activities implemented by the project have created opportunities for the local people to have access to knowledge of agroforestry, fishery extension and public resources, say, funding provided by the State or other projects, and preferential loans provided by credit institutions. Also, the project encouraged the commune to follow up on the effectiveness of the GEF SGP funded project.

- **Economic Impacts:**
  - The project has contributed to improving the local people's incomes by providing technical support to improve local cultivation and irrigation, as well as providing loans. After the project took place, average income per capita earned from the cropping was increased to nearly two million VND higher than was previously recorded. Net interest earned from the rotation of late spring and early winter rice crops on the same land area was 19 million VND higher compared to what was previously recorded; and
  - Results gained from the implementation of the project activities facilitated the development of an animal-rearing farm to provide clean products for urban areas in the province
- **Policy Impacts:**
  - The project worked with the communal People's Committee to develop an action plan to respond to climate change, which was included in the local development plan for the period of 2011-2015 and integrated with the new rural development programme; provided guidance for communes to develop communal plans for disaster preparedness and prevention, as well as climate change response, and integrate the plans with the local socio-economic development plans;
  - The project supported the local authority and state agencies in the dissemination of policies and laws on natural resources and environmental management; disaster risks management and climate change response, etc.; and
  - The local community has developed relevant plans and policies to support the replication of outcomes produced by the project.

SUSTAINABILITY

The project created a spillover effect within the project area and into neighboring communes. Today, models developed by the project have been widely replicated in terms of both scale and quality:

- **Farming model:**

  An additional area has been extended to 22 ha for planting sugar canes to replace the cultivation of one winter rice crop;

  The intercropping of the 2015 summer-spring corn crop on 46,8 ha of flood-preventing forest; and

  The rearing of breeding cows has been carried out in five households;

- **Flash flood control model:**

  A contoured gully system was built in combination with the planting of forest in an area of 46,8 ha in two communes of Cam Tam and Cam Chau; and

  A culvert was built under the Coc dam for flood regulation;

- **Water collection and storage:**

  84 households fetch and use spring water (20 in Cam Tam; 64 in Cam Chau);

  15 households collect and store rainwater and get water from drilled wells in Cam Van;

The number of households involved in the implementation of the project activities at village level account for 325 households during and after the project; and

The inheritance of results produced by the GEF SGP funded project: to bring into full play the effectiveness produced during the implementation of the project, the project executing unit has proposed the second phase of the project to "widely replicate the effective models developed by the Cam Tam CBA project, contributing to improving the local capacity in sustainable natural resources management and exploitation on the slope area of Cam Thuy district".

LESSONS LEARNT

- Local community was able to participate in and take ownership of the project and have access to its benefits: the project facilitated local people's participation in the implementation of all activities, and provided them with training, technical and financial supports. The implementation of activities such as field survey, planning as well as policy recommendation allowed the local people's participation as they are the project beneficiaries;
- The local authority well perceived the project goals and objectives and coordinated closely with the project management unit and its team of experts in mobilizing local human resources and allocating necessary resources (including financial resource) to organize the implementation of activities and community-based monitoring in order to ensure the success of the project. These activities are now continuously implemented based on a plan for the development and replication of effective models developed by the project;
- Techniques and indigenous/traditional experience was a successful combination that continues to be adopted by local community to replicate the project's results after its completion;
- A technical process proposed by the project has been reviewed by a local specialized agency, approved and transferred to local community for adoption;
- Proactive training of human resources during the project's replication process: the local community has a sense of mutual assistance in the replication of models developed by the project (especially the model for spring water exploitation and use), and in the adoption of successful techniques to improve the efficiency of local production; and
- The suitability of selected strategies and technical solutions combined with local community's aspiration/local guideline on socio-economic development with investments by local community, the project's results have been maximized.

Due attention needs to be paid to several issues

- ***With regard to the adoption of techniques:*** the model for drought-tolerant upland rice variety was not successful due to inappropriate sowing and planting time. The Coc dam building model did not performed as expected, and in the project expansion process, a culvert was built under the dam for flood regulation instead. The construction is already completed;
- ***Concerning the matching fund:*** as confidence was not gained from local authority/relevant line departments and/or divisions, a matching fund was not allocated by province/district to the project and therefore a model remains unimplemented. The project implementing organization has recommended for the allocation of matching fund many times and as the result, the Thanh Hoa provincial People's Committee has allocated a matching fund of VND 520 million for the expansion of the project from the 2015 fiscal year;
- ***With regard to communication and outreach programme:*** the dissemination and outreach of information about the project activities and results were limited. There was no articles or reports on the project performance results posted on websites of the local and other organizations specialized in the field of climate change; and
- ***Concerning the team of experts:*** the selection of technical experts for the team was dispersed in terms of distance (some live hundreds of kilometers away) and their qualifications (many of experts with the same specialty). The team now comprises of local experts selected and recruited to ensure the requirements of the expansion of the project and as the result the operation of the team is now being more facilitated.

ACTORS

- Cam Tam communal People's Committee, Cam Thuy dist., Thanh Hoa province
- Specialists from the Thanh Hoa Association of Water Resource Science

SOURCES OF DATA & INFORMATION

- Technical documents, reports of seminars, photos of the project's field activities provided by the Association of Water Resources of Thanh Hoa province
- Project's reports

Mitigating Harmful Effects Caused by Inundations and Salinization

REDUCING THE IMPACT OF FLOODING CAUSED BY SEA LEVEL RISE TO PROMOTE SUSTAINABLE AGRICULTURE PRODUCTION AND ENSURING FOOD SECURITY

- **Project Duration:** 2009 - 2012
- **Project No:** CBA/VN/SPA/08/003
- **Project Site:** Phuoc Hoa commune, Tuy Phuoc district, Binh Dinh province
- **Implementing Agency:** Union of Scientific and Technical Associations of Binh Dinh province
- **Beneficiaries:** Phuoc Hoa Communal People and Authority

Phuoc Hoa commune is located in a main rice-growing area of Binh Dinh province. As such, the local inhabitants' livelihood mainly depends on monoculture of rice. Moreover, considering the sea level, it is also the lowest-lying commune in the province (presently at only 0.5 to 1m above the sea level), which renders frequent serious effects to the cultivable land area with the risk of being made totally uncultivable due to salinization.

With a view to helping the local authority and people develop models of community-based sustainable agricultural production, reduce damages caused by flood and sea level rise, the GEF SGP supported this community to implement a project ***"Reducing the impact of flooding caused by sea level rise to promote sustainable agriculture production and ensuring food security"*** in Phuoc Hoa commune, Tuy Phuoc district, Binh Dinh province from November 2009 to 2012. The Project developed a model for cultivating inundation and salt-water tolerant rice variety in an area of 20 ha, and raising the community's awareness for achieving sustainable development and ensuring its food security.

PROJECT BACKGROUND AND OBJECTIVES

Phuoc Hoa administratively belongs to Tuy Phuoc district and is located in the downstream of the Kon River system that flows into Thi Nai Lagoon. The commune has its total population of 13,613 and per capita income is less than VND 500,000 per month. The commune's poor household rate accounts for 10% (while this figure of Tuy Phuoc district is 5.7%). Becasue of low-lying rice fields where the planting of terrestial crops is impossible, most of the communal people depend on the monoculture of rice for their livelihood, except some rely on fishing in the lagoon.

Due to the closeness to the sea and at an elevation of 0.5 – 1m above the sea level, Phuoc Hoa commune is often inundated by flood and high tide during the winter-spring crop (October and December); soil acidification and salinization occur during the autumn crop (June – August). In Phuoc Hoa, rice is a local key crop cultivated in an area of 994 ha with two crops per year. The worst affected were Kim Dong village (with 152 ha of rice fields) and Tan Gian village (with 144 ha of rice fields) as the two villages are adjacent to Thi Nai Lagoon. On average, one out of three crops is affected by flooding, soil acidification and salinization, causing 50 – 70% loss of yield or even total loss, and thus, an unstable yield. Low productivity, as a consequence, affects the livelihood of the local people.

In 2009, GEF SGP supported the Phuoc Hoa commune in implementing the project ***"Reducing the impact of flooding caused by sea level rise to promote sustainable agriculture production and ensuring food security"*** in Phuoc Hoa commune, Tuy Phuoc district, Binh Dinh province in order to develop models of community-based sustainable agricultural development to adapt to climate change, reduce damages caused by flood and sea level rise, and ensure stable income for the local inhabitants.

- **Project objectives:**

1. To raise awareness of climate change adaptation among the local authority and people and enhance their capacity in adapting to climate change for sustainable development of the community in general and for agricultural development in particular; and
2. To build models of sustainable agricultural production suitable for local conditions and adaptive to local inundation and flooding and salt water intrusion caused by climate change in Phuoc Hoa commune, Tuy Phuoc district.

MAIN ACTIVITIES AND INITIATIVES

1. Raising awareness and understanding of climate change and its impacts as well as climate change adaptation solutions among the local authority and people through communication programmes on climate change related impacts and adaptation measures; organizing study visits of climate change adaptive rice production models for local people; and including issues of climate change related impacts and adaptation measures as well as relevant information about the models in the public's activities of the Phuoc Hoa commune;
2. Developing a model for sustainable intensive cultivation of rice crop with tolerance ability to flooding/inundation and acidification, a model for demonstrating adaptive rice cultivation techniques to maintain effective production of rice, improve income and ensure food security for the local inhabitants;
3. Conducting technical training courses and field seminars to transfer technical procedures to those households under the project and local people of Phuoc Hoa commune; evaluating the results of integrated models implemented, and providing them with information on climate change;
4. Developing technical procedures for cultivating rice adaptive to flooding/inundation, salinity and acidity, on the basis of results and findings of various researches and projects in association with indigenous knowledge suitable for the local conditions; and
5. Adopting the IRRI's method on community-based rice variety selection (PVS) for the local inhabitants to proactively develop rice varieties adaptive to flooding/inundation, acidity and salinity.

RESULTS AND IMPACTS

- **Environmental Impacts:**

  Solutions to climate change adaptation

  - The Project developed four (04) models of intensive rice cultivation adaptive to flooding for four crops (2009 - 2010 winter-spring crop and 2010- 2011 winter - spring crop), adaptive to acidity and salinity (2010 autumn crop and 2011 autumn crop) for 40 ha (10 ha/crop). In Tuy Phuoc district, two models were developed for 10 ha supporting 87 farmers in Phuoc Thuan (5 ha) and Phuoc Son (5 ha);
  - A model for sustainable intensive rice cultivation that could resist flooding and acidity was developed for 10 ha/crop (20 ha/year) in an area of 40 ha/2year. Flooding and acidity-tolerant rice varieties selected by the community for cultivating in the model help keep effective rice production, increase income and ensure food security for the local people;
  - The Project provided training courses to transfer technical solutions of cultivating rice varieties adaptive to flooding, acidity and salinity for about 500 farmers who participated in large model fields in Phuoc Son, Phuoc Thang and Phuoc Thuan. By 2015 these solutions have been applied for up to 200 ha in Tuy Phuoc district;
  - With the application of PVS method, rice varieties selected by the community have proved suitable, which are SH 2 and DV 108 rice varieties; and the IR 64 Sub1 variety is suitable for deeper inundation.

- **Social Impacts:**

  - There has been a clear evidence of the community's enhanced production capacity as a result of the transfer of suitable technical solutions by the project, which helps the community to proactively respond to and minimize adverse impacts of climate change

rain, flood, high tide, abnormal increases in acidity and salinity). Also, rice production has been kept effective, food security ensured, and livelihood stabilized in specially difficult areas such as Phuoc Hoa; and

- The rice-producing community in the project area took proactive roles in the implementation of all project activities. The project's team of experts only provided technical support through the village heads and some key farmers with a group of women, who in turn very effectively transferred the techniques to other farmers. 41.5% of farmers participating in the model development and training courses/workshops were women.

- **Economic Impacts:**

- In spite of the abnormally high weather situation in the four crops that caused negative impacts to rice production, the application of adaptive technical solutions has helped Kim Dong and Tan Gian villages (with the most difficult production conditions in Phuoc Hoa) increase higher yields by 0.6 ton/ha and 1.61 tons/ha respectively, which were higher than the average of 11.1 tons/ha in the period before the project was implemented, and also higher than those in the adjacent areas of the same conditions. The more complicated the weather situation, the higher the yields were produced in the model fields than those in the out-of-model fields;

- Average rice production yield in the project area was 6.4 tons/ha, which was higher than the average of 1.14 tons/ha in the period before the project, while in the former case the investment cost was comparatively lower. In the former case, the profit recorded was VND 20 million/ha, while in the latter case it was only VND 12 million/ha. So the difference was VND 7.9 million/ha. These figures represent a significant income, as compared with the average, for a farmer in the project area (VND 500,000/month); and
- The number of households that participated in the development of models was 77 of the two villages in an area of 10 ha, and that of beneficiaries was 308 persons of both villages.

- **Policy Impacts:**

The project has partially supported and encouraged the community to design policies and action plans to support the furtherance of the results in the community. These actions include mobilization of financial resources for the expansion of the successful models. It is expected that with the use of the budget allocated for the agricultural extension, the Binh Dinh provincial and district large field programme shall replicate the model for cultivating inundation, acidity and salinity adaptive rive varieties on a rice cultivation area of 690 ha along eastern river bank in Tuy Phuoc and Phu Cat districts (with support from GEF SGP for the 2015 - 2017 period).

SUSTAINABILITY

- Based on the results obtained from the implementation of the project, the Department of Agriculture and Rural Development (DARD) has worked out plans to develop

those rice varieties that are adaptive to flooding/inundation, acidity and salinity; conducted the transfer of techniques of cultivating these rice varieties in areas along eastern river bank; Tuy Phuoc district supported the replication of these models through the district's large field programme. From 2014, GEF SGP continued its support of another project for the areas along eastern river bank in two districts of Tuy Phuoc and Phu Cat;

- The community participated in all project activities: providing required labour force and agricultural inputs; contributing indigenous knowledge in designing technical procedures for climate change adaptive intensive rice cultivation; participation by communal representatives (village heads, key farmers, women's associations) in the transfer of techniques. The community in the project area played an active role in adopting techniques in the cultivation of rice varieties that are adaptive to flooding/inundation, acidity and salinity, thus maintaining stable and effective rice production;
- Since 2013, through agricultural extension models and the district's large field programme, the People's Committee of Tuy Phuoc district has continued the transfer of adaptive cultivation techniques to four eastern riverbank communes (namely Phuoc Son, Phuoc Thuan, Phuoc Hoa and Phuoc Thang), paid 50% of the costs of procuring sowing-in-drill tools and micro-organic fertilizer, and training in technical transfer and deploying technicians to the fields. These models, however, have only been applied in slightly inundation and salinity affected areas;
- The Project's technical solutions were simple and suitable for local conditions with the use of DV 108 rice variety (and the reinvigorated DV 108 variety shall be used from 2016);
- The project's technical procedures for rice cultivation adaptive to flooding, acidity and salinity have been approved by the provincial Scientific and Technical Council and consequently delivered to the Agriculture and Fishery Extension Centre for application in rice production areas along eastern river bank; and

- **The inheriting by other programmes and/or projects:**

  - DARD has commissioned ASISOV to reingoriate the DV 108 rice variety, and conducts annual check of selected varieties that are suitable for cultivation in areas along eastern river bank in order to add them to the provincial production structure; and
  - On the basis of the results obtained from the implementation of the project, GEF SGP has continued its support of the community to implement the project ***"Transfer rice cultivation techniques adapted to water logging and salinity to improve the community's capacity to maintain the efficiency of rice production in the coastal districts (Tuy Phuoc, Phu Cat district) in Binh Dinh for the limitation of the fallow paddy land in saline conditions and increased seawater intrusion due to the impact of climate change"***.
    (Project no: VNM/SGP/OP5/Y4/STAR/2014/07).

LESSONS LEARNT

- **Factors for Success:**

  - The selection of the project site and the solutions to issues within the framework of the project has positively responded to the reality and the imperative requirements of the local authority and people. This constitutes a decisive factor for the success of the project and the possibility of replicating the results of the project;
  - The partnership between GEF SGP and Binh Dinh provincial People's Committee proved to be a very good one. The province allocated a matching fund of VND 225 million for the CBA Phuoc Hoa Project. The fact that the Project Management Unit included leaders of the provincial Union of Scientific and Technical Association, the Deputy Director of DARD, the Head of the Tuy Phuoc district's Division of Agriculture and Rural Development, and The Chairman of the People's Committee of Phuoc Hoa commune contributed to the smooth management of the project from provincial to grassroots levels;

- Through the implementation of the project, the Project Management Unit and the Project Team of Experts have improved their management capacity in implementing projects on climate change. For DARD, the People's Committees of Tuy Phuoc district and of Phuoc Hoa commune, the results of the project would constitute a basis for working out plans to support the transfer of techniques of cultivating rice adaptive to flooding, acidity and salinity in areas along eastern river bank. For the community in the project area, the capacity of producing rice adaptive flooding, acidity and salinity has been enhanced, and people's livelihood has been stabilized;
- The Project Management Unit is the provincial Union of Scientific and Technical Associations and members of the team of experts are prestigious and highly experienced in production management, all have had close coordination with provincial, district and community leaders, thus making the management of the project to carry out smoothly;
- People in the community in the project area have adhered to complete unanimity and proactively cooperated in implementing all activities of the project especially the commune's Women Association; and
- How the progress of the project was developed was based on those scientific and technical advancements, in combination with indigenous knowledge, free from any complexity, and have been proved by the formation of models that received high appreciation from the agricultural sector, the local authority and people.

- **Remaining issues need to be addressed**

  - Due attention should be paid to the survey and assessment of current state that generate baseline data for the project;
  - Anticipating more serious flooding and salinity conditions and further studies on more appropriate techniques of cultivating rice (rice varieties, nutrition management, supporting products, etc.) so as to produce more appropriate solutions; and
  - For the projects on climate change adaptation, consideration should be given to the allocation of appropriate budget for transfer of scientific and technical advancements to especially difficulty areas where weathers are often abnormal, causing possible high risks and where capacity to respond to climate change is low, and where community income is low.

ACTORS

- Department of Agriculture and Rural Development of Binh Dinh Province
- Tuy Phuoc District People's Committee
- Phuoc Hoa Commune People's Committee

SOURCES OF DATA & INFORMATION

- Technical Materials: Project performance review report and technical report
- Field workshops reports on 2009 - 2010 winter-spring crop, 2010 - 2011 winter-spring report, 2010 autumn report, 2011 autumn report; and reports of GEF SGP workshops for sharing of experience

Adapting to Draughts, Storms and Floods

EXPERIMENTING A MODEL IN PEANUT PRODUCTION TO ADAPT TO DROUGHTS AND FLOODING IN BINH THUAN COMMUNE, TAY SON DISTRICT, BINH DINH PROVINCE

- **Project Duration:** August 2010 – April 2013
- **Project No:** CBA/VN/SPA/08/003
- **Project Site:** Binh Thuan commune, Tay Son district, Binh Dinh province
- **Implementing Agency:** Binh Dinh Provincial Plant Protection Scientific and Technical Association
- **Beneficiaries:** Farmers within the project area from two villages Thuan Nhat and Thuan Truyen of Binh Thuan commune, Tay Son district, Binh Dinh province

PROJECT BACKGROUND AND OBJECTIVES

Binh Thuan commune, exclusively an agricultural commune with no supplementary job whatsoever, is home to 1,931 households consisting of 9,765 inhabitants with poor households representing 19.77% (as of 2009). The greater part of the cultivable land was sandy soil and infertile grey soil. The main crops were rice, peanut and cassava. Wet rice cultivation area covered 735 ha with 3 crops sowed and grown per year: 286 ha for winter-spring crop, 160 ha for summer-autumn crop and 354 ha for winter crop. Due to the non-existence of the irrigation system, the local rice production depended on rain and underground water. Draughts were very often but rains and storms occurred unexpectedly, which caused bad effects that resulted in very low yield. Hot and dry weather conditions often occurred at the beginning of the crop, and rains and storms often came at the early stage of the crop. Take the 2008 fall crop for instance, 160 ha out of 314 ha suffered total loss in that crop.

For that reason, GEF SGP helped the locality with this project whose objectives were to contribute to the mitigation of risks posed by storms and floods, enhance the adaptability to drought of the local agricultural production in Binh Thuan commune, Tay Son district, Binh Dinh province through the demonstration of a model for shifting ineffective rice production to the autumn-winter peanut cropping in a sustainable fashion in order to increase income for the local farmers in the project area.

The model was conducted in an area of 15-20 ha with the participation by 50-70 farming households in Binh Thuan commune, using high-yield soya seed varieties and local legume varieties for farming and also adopting technical procedures to the intensive cultivation of thee autumn-winter soya crop.

Contributing to the minimization of risks posed by storm and flood and the enhancement of the adaptability to drought of the local agricultural production in Binh Thuan commune, Tay Son district, Binh Dinh province through the demonstration of a model for shifting ineffective rice production to the autumn-winter peanut cropping in a sustainable fashion in order to increase income for the local farmers in the project area.

- **Specific objectives:**

1. To enhance awareness and understanding of climate change related impacts on people's lives and production, and on the environment and natural resources among local people and authority; and
2. To conduct a demonstration of the model for shifting ineffective rice production to the cropping of the autumn-winter peanut variety that is adaptive to abnormal draught, storm and flood in Binh Thuan commune. To consolidate and share experiences from the test of the model so as to widely replicate the model to other communes in Van Canh, Phu My, Hoai An and Hoai Nhon districts, which encountered similar conditions.

MAIN ACTIVITIES AND INITIATIVES

1. Transfer of adaptive cultivation solutions by means of building demonstration models for the intensive cultivation of seed and commercial peanuts in the autumn-winter crop shifted from rice cultivation area with the community's participation;
2. Promotion of awareness and understanding of climate change and solutions to adapt to its adverse impacts among Binh Thuan communal authority and people; and
3. Establishment of a fund that provides capital loans for participating households to recover and stabilize their production after natural disasters.

3.1. Building of a model for the intensive cultivation of seed peanut in the autumn-winter crop (high yield variety)

- Use of the LDH 01, HL 25 peanut seed varieties and the "Se" claret peanut variety to ensure their adaptability to difficult conditions and meet the community's requirements.

- Technical procedures for intensive cultivation of seed peanut in the autumn-winter crop are designed based on the technical procedures for intensive cultivation of seed peanut set up by the provincial DARD; and on the findings and results of researches and studies on peanut previously done in Binh Dinh province.

3.2. Building of a model for sustainable commercial peanut intensive cultivation in the autumn-winter crop with the adoption of cultivation methods suitable for use by participating community

A model for sustainable commercial peanut intensive cultivation in the autumn-winter crop was developed and accepted by the community. Specifically:

- Seed: the local claret peanut variety called "Se" (that is tolerant to hot and arid conditions, and of high economic value).

- Technical procedures for the commercial peanut intensive cultivation in the autumn-winter crop were developed based on local people's experiences in their cultivating practice in hot and arid conditions; and on technical procedures for the intensive cultivation of seed peanut set up by the provincial DARD; and on the findings and results of researches and studies on peanut previously done in Binh Dinh province.

3.3. Demonstration of models so as to evaluate the results in area of 15 ha/crop/year (30 ha/2 crops/2 years)

- Demonstration area: 10 ha for the intensive cultivation of seed peanut in the autumn-winter crop (5 ha/crop/year).

- Demonstration area: 20 ha for the intensive cultivation of commercial peanut in the autumn-winter crop as shifting from rice cropping (10 ha/crop/year).

3.4. Raising awareness and understanding of climate change and solutions to adapt to its adverse impacts among Binh Thuan communal authority and people

- Conducting kick-off technical training courses and farmer-field workshops for transfer of cultivating techniques.

- Launching communication campaigns including programmes on local TV channels focusing on climate change and its adaptation solutions; holding talks to the community by climate change specialists; organizing contests in community on knowledge of climate change.

- Arranging study visits in the province and elsewhere.

3.5. Establishment of a fund that provides capital loans for participating households to stabilize their production after disasters

- Establishing the Capital Loan Management Board; holding open discussions to reach agreement of a borrowing mechanism; disbursing funds for borrowing households; handing the fund over to the Binh Thuan Communal People's Committee for management and oversight of its use in accordance with agreed regulations after the end of the project.

3.6. Planning for the replication of the Project's results

- Developing a plan for duplicating widely the results produced by the project to other areas encountering similar conditions.

RESULTS AND IMPACTS

- **Environmental Impacts:**

a) Areas benefiting from the results of the project (2011 - 2012):

- A model was established for the production of commercial peanut in the autumn-winter crop: a total of 20 ha (10 ha/crop/year) which included 13 ha in Thuan Nhat village and 7ha in Thuan Truyen village; number of participating households: 40; beneficiaries: 170 people;
- A model was established for the production of seed peanut in autumn-winter crop: a total of 10ha (5 ha/crop/year) which included 5 ha in Thuan Nhat village and 5 ha in Thuan Truyen village; number of participating households: 14; beneficiaries: 65 people;
- The transfer of techniques was conducted through 12 technical training courses on intensive cultivation of seed and commecial peanut to 750 households under and out of the project model in Binh Thuan commune; six farmer field workshops and a study visit were organised to an intensive peanut cultivation area in Cat Hai commune, Phu Cat district; and
- A post-disaster production stabilisation fund of VND 100 million was raised and managed by the Association of Farmers that provide loans for the farmers to reinvest in production after natural disasters (drought, heavy rain and typhoon).

b) Evaluation of the project's impacts:

The project solved not only specific issues of Binh Thuan commune, Tay Son district but also common issues faced by other districts that encountered similar conditions such as Van Canh, Phu My, Phu Cat and Hoai Nhon. Models for effectively shifting from summer-autumn and autumn rice crops to peanut production did help the community enable to enhance their production adaptive to abnormal weathers (heat, droughts, heavy rains and storms); minimize the exploitation of underground water for irrigation resulting in the depletion of water resources; and reduce area for extensive cultivating cassava on uplands, which would otherwise lead to degraded and exhausted soil. At the same time, the project contributed to the raising of the community's awareness and knowledge of climate change by means of training courses and workshops, demonstration models, which was integrated with communication programmes on TV and other mass media in Binh Dinh province, and meetings of local mass organizations such as Youth Union, Women's Association, and Association of Farmers.

- **Social Impacts:**

- Thanks to the project, the Project Management Unit and other actors (the provincial DARD, People's Committees of Tay Son districtand Binh Thuan commune) have enhanced their capacity in managing and organising the implementation of climate change adaptation projects. The community in the project area has also improved their capacity in shifting to effecitive peanut production in the rice fields, thus increasing their incomes and maintaining their stable livelihood. The results obtained from the project serve as a base on which the local agricultural sector and the locality work out better plans for shifting to the production of more efficient terrestrial crops in ineffcient rice cultivation areas; and
- The shifting to peanut cultivation from rice production has helped reduce the consumption of ground water for irrigation. In the latter case, water used for irrigation would amount to 6,500 - 7,500 m3/ha/crop while in the former, the figure would only be 2,100 - 2,400. Also in peanut cultivation, more bio-microorganic fertilizer and manure and less nitrogenous fertiliser would be used while in rice cultivation the reverse was the case, which has contributed to the protection of soil environment. The use of VSV Trichodema for peanut cultivation has helped to prevent plant diseases, reduce the use of pesticides and minigate environmental contamination and protect the health of human beings.

- **Economic Impacts:**

  Real Incomes

  - In commercial peanut production model: In 2011 and 2012, heat spells and droughts continued throughout June and July but the average yield was 2.14 tons/ha and the average profit was VND 23,6 million, while in rice cultivation at the same time and in the same conditions the average yield was only 3 tons/ha and the average loss was VND 3,2 million/ha; and
  - In seed peanut production model in the autumn-winter crop in high-rise field, the average yield was 2.63 tons/ha and the average profit was VND 29,9 million; while in rice cultivation in the same conditions the average yield was only 4.5 tons/ha and the average gain was VND 3,5 million/ha.

- **Policy Impacts:**

  Planning, plans and policies to support the replication of the project's results within the locality

  The results obtained from the implementation of the project constituted an important basis for determining plans to support the farmers in the shifting of crop structures in hot and arid conditions in Binh Dinh province. In two years from 2013 to 2015, in its proactive efforts to mitigate the damages caused by hot and arid weather, the Binh Dinh provincial People's Committee helped provide a subsidy of 50% of the cost of various terrestrial seed plants (corn, peanut and others) for the local farmers involved in the shifting of crops in rice fileds. At present the provincial authorities are working on policies to support the shifting to the cultivation of terrestrial crops in less efficient rice rice fields for the period of 2016 – 2020 based on the 2016 - 2020 cultivation planning. It is estimated that by 2020, the planned area will have been increased by 8,000 ha to 16,400 ha mainly on less efficient rice rice land areas.

SUSTAINABILITY

- The community took proactive roles in all activities of the project: contributing labour force and agricultural inputs, contributing indigenous knowledge in formulating locally realistic technical procedures for cultivating peanut adaptive to abnormal hot and arid weather conditions, participating in establishing criteria for selecting households to participate in the models, taking part in setting up regulations of post-disaster production stabilisation fund managed by the Association of Farmers, setting up groups of key farmers that acted as a bridge for the tranfer of techniques from the team of experts to the farmers. As such, the community could proactively adopt techniques in cultivating commercial and seed peanut varieties in former rice fields, proactively responding to hot and arid weather conditions, thus improving the effectiveness of their production;
- Activities to keep up with the results of the project in the locality: at present, the People's Committees of Tay Son district and Binh Thuan commune are continuing to shift to the production of peanuts in rice growing land for summer-autumn and autumn-winter crops in 3 out of 5 villages, namely, Thuan Nhat, Thuan Hanh and Thuan Truyen through the technical transfer carried out by the local agricultural extension system and applying the policy to provide the subsidy for 50% of the price of seed varieties;
- The project's technical procedures for cultivating peanut in summer-autumn and autumn-winter crops were developed based on the results of scientific and technical advancements gained from completed researches and projects, with adoption of indigenous knowledge of how to avoid natural disasters and how to realistically select suitable land for the shifting of crops. These technical procedures were approved by the DARD's Scientific and Technical Board, which were then transferred to the Agricultural and Fishery Extension Centre for application in production;

- Follow-up programmes and projects:

- Programme on shifting to the production of terrestrial crops on former rice growing land for 2016 - 2020 of Binh Dinh province;

- Still in place is the plan to build models adopted in 2013 by the Agricultural Extension Centre, which has started to build models for shifting to the production of peanut on rice growing land in Phu Cat, Phu My, Tay Son, Hoai Nhon and An Lao districts.

- The Post-Disaster Production Stabilisation Fund managed by the Binh Thuan Farmers' Association proved to be effective with its present capital of VND 100 millions well conserved; and

- Replication of the project results: The area for peanut cultivation in summer-autumn and autumn-winder crops in Binh Thuan commune expanded to 100 ha/year in 2014 with the application of technical solutions transfered: the fertilization of balanded NPK with additional lime grains, used of Trichodema product to prevent a disease that would cause early death to the plants. The avegage yield in the summer-autumn and autumn-winter peanut crops was 2.5 tons/ha and the average profit was VND 25 million/ha.

LESSONS LEARNT

I. Basic factors for the success

1. The selection of the project site and issues that need to be addressed in conformity with the reality and with the local authority's and people's requirements were decisive factors for the success and for the possible replication of the project's results;
2. The partnership between GEF SGP and the province/district: GEF SGP and the Binh Dinh provincial People's Committee had very good relationship, the province allocated a matching fund of VND 187 million for the Binh Thuan CBA project. The membership of the Project Management Unit included the provincial DARD Deputy Director, Head of the Tay Son district Division of Agriculture and the Vice Chairman of the Binh Thuan Communal People's Committee in addition to the Executive Board of the provincial Scientific and Technical Association for Plant Protection, which facilitated the top-down manangement of the project;
3. The Project Management Unit was the province's Scientific and Technical Association for Plant Protection; and the expert team members were all prestigious professionals with experience in production management, who created a close coordination with provincial, district, commune and community leaders, making the project performance progress smoothly;
4. The community within the project area had a very high unanimity and good cooperation in implementing all activities of the project; and
5. The project's technical procedures for cultivating peanut were developed based on the results of scientific and technical advancements combined with indigenous knowledge, which, through the practical model verification, proved to be uncomplicated and scientific, was highly appreciated by the agricultural sector, the local authorities and the community.

II. Proposals for enhancing the efficiency of the Project

1. The local authorities should continue to support the farmers to replicate the project's model for adopting solutions that are adaptive to hot and arid weather conditions, and expand areas for the intensive cultivation of peanuts to the existing rice cultivation land areas especially where water supply is unsteady and where conditions are similar to those in the project area;

2 As hot and dry weather conditions tend to grow harsher and more unpredictable in other areas that encounter as many difficulties as Binh Thuan commune, Tay Son district does, GEF SGP should continue to support the implementation of other projects on enhancing the capacity to adapt to hot and dry weather conditions caused by climate change so as to transfer more solutions to the shifting of crop structures (with better tolerance to drought), effectively exploit surface water resources, use less water for irrigation, and use of humidity carriers; and

3 GEF SGP should include contents of survey, data collection and monitoring relating to the current state of the locality, adverse impacts caused by weather situations and climate change into the project's activities in order to establish databases for the evaluation of outcomes produced by the project and for the planning of other relevant programmes and/or projects.

- **Remaining issues need to be tackled**

  - For climate change adaptation projects to be implemented in difficult areas that encountered high risks posed by unpredictable weather conditions, due attention should be paid to the enhancement of local officials' capacity in responding to climate change as well as capacity in supporting the community to maintain their production so as to ensure the success of the model;
  - More consideration should be given to the soil conditions and especially to the additional source of water and drainage in selecting the site for the development of the model for shifting to the cultivation of terrestrial crops on rice growing land so as to ensure the success of the model; and
  - As hot and arid weather conditions tend to grow harsher, further studies should be conducted on technical solutions for cultivating heat-and-drought resistant peanut; and techniques to be transferred should be futher improved (such as technical aspects of peanut seed varieties, management of nutrition, use of humidity carriers for soil and use of bio-products for preventing harmful desease, etc.).

ACTORS:

- Tay Son District People's Committee
- Binh Thuan Commune People's Committee
- Department of Agricuture and Rural Development of Binh Dinh Province
- Ago-extension Center of Binh Dinh Province

SOURCES OF DATA & INFORMATION

- Technical documents, project performance progress and technical reports
- Reports on farmer-field workshops on the summer-autumn commercial peanut crops in 2011 and 2012, and autumn seed peanut crops in 2011 and 2012
- Reports/documents presented at GEF SGP workshops for sharing of experience

Climate Change Resilient Fishery Aquaculture

DEVELOPING AN ADAPTATION MODEL IN AQUACULTURE DEVELOPMENT IN CON TRUONG, HOANG CHAU COMMUNE, HOANG HOA DISTRICT, THANH HOA PROVINCE

- **Project Duration:** July 2010 – July 2012
- **Project No:** VCBA/VN/SPA/09/08
- **Project Site:** Truong Islet, Hoang Chau commune, Hoang Hoa district, Thanh Hoa province
- **Implementing Agency:** Thanh Hoa Fishery Association
- **Beneficiaries:** Fishery households in Truong Islet, Hoang Chau commune, Hoang Hoa district

Truong Islet in Hoang Chau commune, Hoang Hoa district is a floating area of over 300 ha between Ma estuary to the Southern part of East Sea and its tributaries. Aquaculture was the key source of income for local residents. However, due to the recent impacts of climate change, fishery aquaculture witnessed serious degradation of up to 70% of species composition and catch. 137 fishery households in Truong Islet faced many difficulties and challenges in doing fishery aquaculture.

In order to overcome the adverse impacts of climate change on fishery aquaculture, in 2010 and 2012, GEF SGP funded the project ***"Developing an adaptation model in aquaculture development in Con Truong, Hoang Chau Commune, Hoang Hoa District, Thanh Hoa Province"*** through the pilot models of climate change smart aquaculture to aim for sustainable development of the fishery sector in Truong Islet - the typical brackish water area of Thanh Hoa province to promote sustainable fishery for Hoang Chau commune.

PROJECT BACKGROUND AND OBJECTIVES

Located in the South-East of Hoang Chau commune, Hoang Hoa district, Thanh Hoa province, Truong Islet played a critical role in the fishery sector of the commune in particular and in Thanh Hoa province in general. Being in close proximity to Lach Hoi estuary, Truong Islet however accounted for nearly 1/10 of the province's brackish water (Truong Islet had more than 300 ha of fishery aquaculture).

In Truong Islet, there were 5 clusters of 137 fishery households. Species for aquaculture were tiger prawns, Greasy bock shrimps, crabs, Gracilaria, etc., of which tiger prawns and crabs were the key species. The primary farming season was spring-summer, taking place from March to August following the Solar calendar. All remaining months were considered as secondary seasons. Farmers here were often exposed to impacts such as climate change, water pollution, aquaculture-related risks as well as unsound farming techniques.

- **Project specific objectives:**

1. To determine and test the appropriate farming models which could bring economic benefits to local farmers and also respond to extreme weather events and salinization;
2. To plant, manage and effectively harvest mangrove forests;
3. To strengthen community-based arrangements, equip communities with knowledge on impacts of climate change on fishery exploiting and aquaculture; enhance local awareness through training courses, workshops, simulation and experts' guidance; organize study tours among communities to facilitate peer exchange of experience in sustainable fishery exploitation and aquaculture; and
4. To contribute to protect, restore and exploit reasonably the natural resources.

PROJECT ACTIVITIES AND INNOVATIONS:

- Development of pilot/test models, including:
  - *Off-seasonal farming model to avoid May-rain flood and be ready for the summer crop*
  - *Integrated shrimp-crab or shrimp-green crab model, etc. to identify the most appropriate species*
  - *Fishing model: goby, cobia, sea-bass, etc.*
- Improving the farming techniques to adapt with climate change impacts;
- Planting mangrove forests for bank protection and soil erosion: about 20 ha of mangrove forests were planted in the islet surrounding areas to create the bank protection corridor, improve habitats and natural resources;
- Developing a small credit model to overcome aquaculture-related risks: within the

model, those who did good business would contribute a fixed amount to assist losers to continue their business in the form of a loan;.

- Building capacity and raising awareness for local farmers through the organization of fishery-extension or on-site training courses;
- Protecting and regenerating natural resources through the planting of mangroves and the crab bank models; increasing recruitments (farmers constructed simple floating cages nearby or inside mangrove forests. If egg-bearing crabs were caught, they would be released in the for their eggs to hatch and disperse in the nature. After that, the crabmothers would be sold).

PROJECT RESULTS AND IMPACTS:

• Summary of project achievements:

- The project has succeeded in developing 3 models for suitable species and farming methods designed by the consultancy of experts and farmers.

– Off-seasonal aquaculture model: 12 households with the aquaculture area of 30.5 ha practiced the off-seasonal aquaculture model. The model yielded higher returns of about 154% compared to the seasonal farming practice.

– The integrated aquaculture model brought in higher economic value with an increase of 145%. The model was applied by 6 households in an area of 19.5 ha. The total yield of aquatic products was 52 tons or an equivalent of VND 1,998 million. The average turnover was VND 103 million per ha. The profit was VND 38 million per ha.

– The indigenous aquaculture model brought in higher economic value with an increase of 132%. The model was applied by 7 households in an area of 8.8 ha, bringing an average turnover of VND 100 million/ha and an average profit of VND 35 million/ha.

- Organized 10 technical training courses, 5 workshops, and 14 village meetings. Two dialogues on impacts of climate change and response measures attracted 1,092 attendees;

- Mangroves were planted, managed and harvested effectively. Local residents and local authorities concluded the development of management and protection plan for the current forests of 180 ha;
- Community-based credit model was established in November 2011 with the starting capital of VND 135 million as specified in the Project Document;
- Natural resources were regenerated. The project cooperated with Department of Aquatic Resource Exploitation and Protection of Thanh Hoa to release a batch of breed prawns worth of VND 40 million; and
- A community-based team was established for mangrove forest protection and monitoring, protecting aquatic resource, and managing water intakes from Hoang Chau sluice for the benefits of the local community.

• Environmental impacts

- Mangroves were planted, managed and harvested effectively. Local residents and local authorities concluded the development of management and protection plan for the current 180 ha of forests; and

- The integrated aquaculture model took advantage of redundant food in ponds to prevent pond pollution, and minimize risks and damages caused by extreme weather events.

- **Social impacts**

  - Local awareness and capacity were enhanced. Fishery farmers were equipped with sound techniques which were applied to increase the yields of the 2011 spring-summer crop.

- **Economic impact**

  - In comparison to non-project households, the project households gained a profit of 130% to 160% from the project's integrated shrimp and crab farming model.

- **Policy impacts**

  - The project results were practical indicators for local authorities to make climate change resilient action plan for the agricultural, fishery, navigation, irrigation sectors, etc.

SUSTAINABILITY

- Project models were upgraded to be national and provincial projects which have been implemented;
- All three technical procedures were developed and finalized after the project completion and acted as useful reference for awareness raising, capacity building and rolling-out;
- The community-based credit model was still being run to provide credit assistance for farmers in doing aquaculture;
- The integrated farming practice has been now employed very effectively by all farmers in Thanh Hoa in an area of about 1,500 ha; and
- The community-based patrolling team has been working to monitor the environment, protect mangroves, aquatic resources, and manage water intakes through Hoang Chau regulatory sluice to protect the benefits of local communities.

LESSONS LEARNT

- **Key drivers for the project success:**

  - The project was well-designed to tackle the urgent needs to improve resilience to climate change. The detailed actions were developed based on actual demands of beneficiaries, which brought benefits not only to the project but also to the commune in particular and for the whole province in general;
  - Beneficiaries were well-selected, contributing to the success of the project;
  - Project approaches to awareness raising and capacity building were sound to beneficiaries in particular as well as development viewpoints in general;
  - Project Steering Committees membership possessed rich experiences, good qualifications and whole-hearted dedications to climate change sector. They also had experiences working in development projects of non-governmental organizations in Viet Nam;
  - Project implementation approach was science-based and sound for the whole project duration, including the selection of beneficiaries, recruitment of experts, activity design and implementation; and

- Project monitoring and evaluation was well-designed to ensure that the project was on the right track and compliant with the set objectives.

ACTORS

- People's Committee of Hoang Chau commune, Hoang Hoa district, Thanh Hoa province
- Department of Aquatic Resource Exploitation and Protection of Thanh Hoa

SOURCES OF DATA & INFORMATION

- Project Technical Document

Adapting to Drought and Saline water Intrusion

DEVELOPING CULTIVATION CROPS ADAPTING TO SALINE WATER INTRUSION AND DROUGHTS IN VINH CHAU, SOC TRANG

- **Project Duration:** June 2010 to Sept. 2012
- **Project No:** CBA/VN/SPA/09/07
- **Project Site:** Vinh Chau commune (Ward No.2)- Vinh Chau district, Soc Trang province
- **Implementing Agency:** Women's Union of Vinh Chau district, Soc Trang province
- **Beneficiaries:** Households of three clumps namely Ca Lang A, Ca Sang and Vinh Binh of Ward No.2 (Vinh Chau Town), Soc Trang province.

Vinh Chau is a locality which has a large area of terrestrial crop cultivation in Soc Trang province, among these crops, red onion is a main crop that is commonly grown in coastal communes with sandbanks, like Ward No.2, Vinh Hai, Vinh Phuoc, Lai Hoa and others. Very often, the supply of water for irrigating the crop is a problem facing the localities, especially in dry season months. Due to a large demand for water use for irrigating a large cropping area, the groundwater table has fast lowered in Vinh Chau Town in recent years.

The GEF SGP funded project on ***"Developing cultivation crops adapting to saline water intrusion and droughts in Vinh Chau, Soc Trang"*** was launched since 2010 in three clumps namely Ca Lang A, Ca Sang and Vinh Binh of Ward No. 2 (Vinh Chau District) in order to reduce the local vulnerability and increase the local adaptability to drought and saline water intrusion, to prevent and confine land degradation through the piloting of drought and saline water intrusion adaptation cultivation models based on the rotation of crops including purple onion in Vinh Chau, Soc Trang.

PROJECT BACKGROUND AND OBJECTIVES

Vinh Chau is a typical commune of Soc Trang province, where drought and saline water intrusion heavily affect the communal people's livelihood. The commune has a large crop growing area of more than 10.000 ha and among the crops, red onion is a main cash crop that is commonly grown in an area of between 4.500 and 6.000 ha every year in coastal communes with sandbanks, namely the Ward No. 2, Vinh Hai, Lac Hoa, Vinh Phuoc, etc. Ground water is the only water supply source for irrigating crops grown in Vinh Chau and therefore it turns out a "headache" problem facing local functional sectors and people, especially during dry season months as demand for water use is increased for irrigating crops in a large area. In recent years, groundwater table in Vinh Chau has lowered promptly due to over-exploitation and climate change related impacts. The land for growing crops in Vinh Chau is sandy soil that is loose, soft and suitable for growing terrestrial and root crops, and not inundated during rainy season. However, fast drainage is also a disadvantage as the soil cannot maintain water after irrigation resulting in loss of nutrients due to seepage and washing process. Therefore, the cropping requires fertilization and irrigation techniques appropriate to such characteristics of this sank dune land.

In 2010, the GEF SGP supported a project on ***"Developing cultivation crops adapting to saline water intrusion and droughtst in Vinh Chau, Soc Trang"*** implemented in three clumps namely Ca Lang A, Ca Sang and Vinh Binh of the Ward No. 2 (Vinh Chau Town) in order to help the local people enable to address groundwater issues and work out new cultivation measures that are adaptive to climate change, contributing to improving the adaptability of crops to drought and saltwater intrusion and preventing local soil degradation.

MAIN ACTIVITIES AND INITIATIVES

I. Main Activities:

1. Raising awareness on impacts caused by climate change, drought and saltwater intrusion to local production, livelihoods and natural resources necessary for agricultural production (land, water, biodiversity of crops and animals) among the local people;
2. Building the community's and local people's technical capacity for sustainable land resource utilization and methods for rapid field identification of land degradation, sustainable cultivation measures that are adaptive to degraded soil conditions due to drought and saline water intrusion;
3. Piloting cultivation models that are appropriate to degraded soil conditions, adaptive to drought and saline intrusion affected soil based on crop rotation structures with the red onion (red onion – other crops - red onion; red onion – other crops – perfume rice) in Vinh Chau, Soc Trang.

4. Developing a model for adopting integrated technical measures of seed, fertilizer, plant protection and irrigation water in order to improve the efficiency of land use, maintain the fertility of soil for areas of red onion – other crops - red onion; and red onion – other crops – perfume rice cultivation in combination with the use of tradition knowledge consolidated by the community.
5. Reviewing and evaluating results of the models; consolidating lessons learnt; suggesting cultivation models to be adaptive to drought and saline water intrusion affected soil based on the rotation of crops with the red onion in Vinh Chau, Soc Trang for replication throughout the locality.

I. Main Solutions and Initiatives:

1. Enhancing straw cover for crops (red onions, turnips and green peas,...)
2. Adopting a groundwater pumping technique for irrigating crops (red onions, turnips and green peas,...)
3. Improving the quality of fields
4. Taking measures for preserving seed onion
5. Diversifying various varieties of crops for rotation and intercropping
6. Taking other measures to support actions to respond timely to abnormal weather situations

RESULTS AND IMPACTS

Summary of results achieved by the project:

- The project implemented its activities such as climate change adaptive cultivation based on the rotation of crops and appropriate cropping measures taken to confine effects of drought, saline water intrusion and soil degradation in a total land area of more than 165,5 ha in Vinh Chau commune (now the Ward No.2), Vinh Chau Town, accounting for 6,25% of a total rice land area of the Ward No.2 (3.200 hat), The project's technical procedures were widely replicated to about 16,7% (of the red onion growing area of 1.200 ha in the Ward No.2) after successful demonstration of the models;
- The project piloted the adaptive cultivation model through five crops with integrated and effective cultivation measures within the context of degraded soil due to drought and saline water intrusion, sustainable land resource protection and utilization involving 93 farming households and this model is now continuing to be scaled up and safe red onion cultivation under VietGAP is being widely replicated within the Ward No.2 and to other neighboring communes namely Vinh Hai, Lac Hoa, Vinh Phuoc.

• Environmental Impacts:

- Some technical measures for cultivation appropriate to conditions of drought and saline water intrusion are adopted such as covering straws to maintain humidity and prevent evaporation in dry and arid conditions, fertilizing organic fertilizers and maintaining the humidity and fertility of soil, in combination with the use of biological organic fertilizer to control diseases and pests of plants to enable them to improve the resistance to drought and salinity; and contributing to the protection and improvement of cultivating environments and preventing soil degradation caused by drought and saline water intrusion;
- In response to local farmers' practices to overuse agro-chemicals such as inorganic fertilizer, and plant protection chemicals in farming, the project adopted technical solutions to the fertilization of additional organic fertilizer and reduction in chemical fertilizer to improve nutrients in sand dune soil. Besides, the strengthenned utilization

of biological pesticides with some specific chemical pesticides by turns has enabled more effective plant disease and pest prevention and control, limit the damages to extent and increase in yields, contributing to the protection of sustainable cultivation environment within the context of drought, saline water intrusion, land degradation and ground water shrinkage in Vinh Chau;

- The project's demonstration model successfully selected and applied technical solutions to have improved the adaptability of crops to adverse impacts caused by climate change, and at the same time harmonized the adoption of scientific and technical achievements with the use of farmers' traditional knowledge, and a trade-off between economic gains and environmental protection helped improve the efficiency of land and water use, and the adoption of appropriate cultivation techniques to the locality. The project selected less water consumed and short day crop varieties such as green peas to replace turnip that was previously a main crop in spring-summer crop;
- Technical solutions deployed in the model really became adaptive cultivation solutions to adverse impacts caused by climate change to local farming and helped the Vinh Chau farmers enable to reduce damages, prevent risks, improve the sustainability of the community's livelihoods, and contribute to the saving of water for crops under increasing drought conditions. An amount of water saved was between 6,2% and 15,5% depending on crops and cropping seasons.

• Social Impacts

- The project has raised awareness and improved institutional and technical capacities of the local community based organisations, line departments and local authorities in conserving, developing and utilizing rational natural resources, providing traning for 800 people/participations; and of which women accounted for 47%;
- The project has had impact onthe development of organizational structures of the Women's Union of Vinh Chau district, the development of the locality and the community in the project area, particularly helped mobilize local women to join the Union and the result of the project showed that, the number of local women joining the Union increased. The project activities helped the Women's Union improve its capacities in the planning of the project activities, organizing the project implementation, reporting of its performance progress and financial reporting, which have enabled the Women's Union to implement other projects such as: "Loans provided for women to reduce poverty" or "Mobilization of women in family planning/ birth – control". The project also helped local women improve their capacity for cultivating crops such as red onion, green peas, turnip and others; develop their ability to organise the management of community projects, especially community based climate change adaptation initiatives. Through the implementation of the project activities, the project also helped the Union members benefit from the deployment of information technology so that they have enabled to use computers and internet to have better and faster access to information.
- The project supported the establishment of a credit fund and risk insurance, provision of loans and development of policies on the subsidy of seeds and agricultural inputs, and others; and.
- The project activities and outcomes contributed to improving the community's socio-economic life and sustainable development and new rural building (by creating employments for local laborers, well organized product production – consumption – streamlining of scientific works, increasing the value of workday,enabling the local people to feel secure about their lives in their homeland, etc.).

• Economic Impacts

- Through the adoption of the project's demonstration model, the local farmers' income

increased by 10 million VND per hectare in average (or 14,4%) higher than that earned from their traditional practices;

- Due to the application of integrated cultivation measures through the demonstration model in five crops, profit made by the local farmers was 1,755 billion VND from 165,5 ha in three clumps of Ca Sang, Ca Lang A and Vinh Binh, and thus contributed to improving sustainable livelihoods of the community;

- The project consolidated effectively applied technical solutions and suggested the province and the town to consider the adoption of the model for drought and saline water intrusion adaptive cultivation based on the rotation of crops including the red onion to local agricultural production since the end of 2012; and to promote post-harvest processing, diversify products made of red onions and do commercial promotion of the red onion to ensure a stable output; Add and develop green peas to the structure of crops rotation with the red onion in spring-summer crop; Mobilize local farmers to join a cooperative of red onion cultivation in order to produce it in accordance with safety standards and enhance the productive linkage for improving the product values and promote the marketing of the red onion – a Vinh Chau's specialty.

- **Policy Impacts**

- The project significantly influenced the programs for sustainable agricultural production and management of the locality in terms of the planning and replication of the model for cultivating red onion according to Global GAP and VietGAP, and other local policies on support of agricultural production, post-harvest processing and preservation, such as construction of freezing warehouse and extension of onion preservation timing (from Canadian funded project for SME development in Soc Trang, the establishment of Vinh Chau Red Onion Cooperative). Also, the project contributed to orient towards sustainable natural resources utilization, environmental protection, economic development and poverty reduction in the locality;

- The project contributed to encourage the Ward's Party in including into its resolution on, and the Ward and Vinh Chau Town People's Committees in making a plan for developing a stockpile of raw materials and promulgating several policies on the support of funds, seeds and inputs, etc., provided for areas that are likely to suffer climate change related impacts (drought, saline water intrusion, land degradation,...). Based on these rationales, Vinh Chau is defined as one of the most affected areas in the Soc Trang provincial major orientations towards planning for actions to respond to climate change and listing national target climate change response tasks/projects/programmes of Soc Trang province.

- Local policies on support and its integration with climate change actions: Upon the completion of the project, four policies were proposed to support the rotation of red onion and other crops within the context of increased intensity of drought, saline water intrusion and land degradation caused by climate change. Also, the planning of cash- and seed-red onion production was suitable for the supply-and-demand law in the town. A system of drilled wells was well arranged to improve a local water supply for irrigation (tanks + conduits) for planned areas.

- The development of Vinh Chau Town's socio-economic development plan and climate change response plan based on technical solutions to the improvement of the

local adaptability to drought and saline water intrusion to maintain sustainable livelihoods – producing red onions in the rotation of other crops in sandy soil dunes and rotating red onion with other crops and wet rice in lower lying areas in order to contribute to reduce poverty and improve living conditions of the Khmer ethnic people. The project also contributed to the provincial new rural development programme.

SUSTAINABILITY

- The local resident community actively participated in the implementation of the project, sensed their duty to participate in it for their interests, thus completed all works assigned during training and modelling;
- As the local farming households had better access to sceintific and technical information and knowledge when participating in the inplementation of the model, their capacity and accessibility to scienctific and technical information and knowledge have been improved and many of them have increased income from their participation. The community has learnt to apply effectively adaptive cultivation solutions to respond timely to changing weather phenomena, and to reduce damages as much as possible;
- The local community has mobilized local people in production, supported each other in the expansion of the project's model, adopted relevant techniques to the enhancement of productive efficiency, developed their business and extended their market: By 2012, 783 farming households in Vinh Chau district registered to crop red onion under the Global GAP standard on an area of 448 ha and many companies registered to consume this product. The area for biologically and safely cropping red onion is being expanded. The Vinh Chau Red Onion Cooperative was established on March 31, 2014 in accordance with the new Law on Cooperatives. The cooperative has 27 members to work together in the cropping of red onions on an area of 18 ha in Ca Sang clump, ward No.2, Vinh Chau town;
- With the aim to support the upgradation of the Vinh Chau red onion value chain, the project implemented its activities to affect all the stages of the whole process, from production to marketing since the third Quarter of 2013. Among them, the project helped local businesses associate with local farming households in creating a stockpile of red onions cropped in conformity with the Global GAP standard in order to meet growing demand for export; investing in the building of warehouses for preservation and helping local businesses enable to improve their commercial promotion on the foreign market;.
- The project's replication plan proved to be feasible and has been adopted by various localities with their conditions are similar to those of Vinh Hai and Lac Hoa communes, Vinh Chau district;.
- Results achieved from the project have become the prerequisite for the town, the province and DARD which therefore would orient themselves in the development of climate change response plans and agricultural production master plan for the whole province in general and areas suffering climate change related effects.

GEF SGP have approved the project: ***"Continual improvement and transferring of the cultivating models of effective land and water resource use to maintain efficient sustainable commercial production of onions on sandy lands in Vinh Chau, Soc Trang*** with the goal of further adopting integrated cultivation measures that were successfully trialed in the replicated model in Phase 1 and testing a pilot model for water-saving red onion cropping and applying the ***Trichoderma*** fungus to decompose fauna and flora residues locally for producing bio-organic fertilizer, contributing to local sustainable cultivation. This project has been carried out during 2015 - 2017.

LESSONS LEARNT

Key factors for the success of the project:

- The project combined traditional experiences with up-to-date science and technology;
- The project matched the local people's desire and the local socio-economic development plan of the People's Committee of Vinh Chau district, prompted local scientific and technical application in combination with local traditional experience, adopted integrated cultivation measures toward effective land, water and biodiversity resources utilization to maintaining commercial scaled red onion production and sustainable crop rotation on the typical sandy soil dune area of the Soc Trang coastal zone;
- The community really participated in the implementation and ownership of the project such as: participating in discussions about the selection of households, training activities, study visits, farmer-field workshops, assessment of the project (VRA), and acting as a member in the project management unit, and so on. Initially the project was defined as a community based one and thus the community of local farmers involving in the rotation of crops including the red onion in three residential clumps Ca Lang A, Ca Sang, Vinh Binh and Ward No.2, was the main focus of the project, and played a proactive role in the implementation of the project activities. Specifically:

- The community's proactive and enthusiastic participation in, and serious compliance with the regulations of the project contributed to the completion of the project as scheduled;

- The local authority paid due attention to, timely directed and facilitated the implementation of the project in the locality, contributing to achieving the results of the project as expected;

- The local agricultural officials technically helped the team of experts enable to have performed its activities more efficiently.

- The implementation of the project was well-matched organized as it was paid due attention by the GEF SGP and supported by the local authority and community. The project management unit and consultant group coordinated the implementation of its activities well resulting in a high efficiency of the project's performance. All stakeholders performed their duties with strong will and high determination;
- The project arranged work for officials with suitable management qualifications from local line departments and authorities to take part in the project management unit and the consultant group. The management capacity of members from consultant group and the group of officials attached from provincial to communal levels has been better improved through the implementation of activities such as farmer-field training, study visits, workshops, etc. Their eagerness to learn and self-reliance in doing jobs have been enhanced and the local farmers' awareness and understanding of climate change have been well promoted;
- The project implementation was well organized and managed, which contributed to improving local gender equity in the project area where the majority of people is the Khrme ethnic. The consultancy is a prestigious one with high professional qualification in the country, solved all issues facing production practices timely and promptly;
- The project built up the confidence of the local authority and received its multifaceted support, especially, positive response from grassroots level women's unions, farmers' association and the people committees of Vinh Chau commune (ward No.2), and of the Vinh Chau district, and established a strong partnership among stakeholders.

ACTORS

- People's Committee of Ward No.2, Vinh Chau district,
- People's Committee of Vinh Chau district, Soc Trang province
- Soc Trang provincial Department of Agriculture and Rural Development

SOURCES OF DATA & INFORMATION

- Project's technical documents
- Workshop reports

Resilience against droughts and saltwater intrusion

CONTRIBUTING TO CLIMATE CHANGE ADAPTATION THROUGH CONSERVATION AND DEVELOPMENT OF SALINISED AND DROUGHT TOLERANT RICE VARIETIES IN PHUOC LONG COMMUNE, BAC LIEU PROVINCE

- **Project Duration:** July 2009 - June 2012
- **Project No:** CBA/VN/SPA/08/001
- **Project Site:** Phuoc Long commune, Phuoc Long district, Bac Lieu province
- **Implementing Agency:** Bac Lieu Farmers' Association
- **Beneficiaries:** Households in Phuoc Tho and Phuoc Thanh villages, Phuoc Long commune, Bac Lieu

Phuoc Long is among the communes heavily impacted by salinization and droughts in Phuoc Long district, Bac Lieu province, hindering its agricultural production and affecting the income of local farmers. The commune was recently exposed to infrequent droughts particularly in the late dry season or early rainy season, causing serious shortage of domestic water and freshwater for rice cultivation. Salinization associated with droughts put Bac Lieu in an extremely serious situation.

In 2000, the GEF SGP supported Bac Lieu to implement the project ***"Contributing to climate change adaptation through conservation and development of salinised and drought tolerant rice varieties in Phuoc Long Commune, Bac Lieu Province".*** The project aimed to minimize the vulnerability and increase the resilience to respond to salinization and droughts by applying integrated farming practices for sustainable conservation and development of tolerant rice strains and transferring the practices to farmers.

PROJECT BACKGROUND AND OBJECTIVES

Phuoc Long was typical for communes being affected by salinization and droughts in Phuoc Long district, Bac Lieu province. The commune had a total area of 7,432 hectares, including 4,130 hectares of agricultural land; 3,700 hectares for integrated farming with 2 crops of shrimp and 1 crop of rice; 430 hectares for integrated prawn-crab-fish farming. Agricultural production in Phuoc Long faced many difficulties due to droughts, salnization, lack of freshwater for crops, which negatively impacted the farmers' income. The commune had 3,178 households, of which the poverty household rate was 3.2%. Aquaculture (prawn-rice pattern) was the key livelihood source which accounted for about 60% of farmers' income. The province recently suffered prolonged and extreme droughts in the late dry seasons and early rainy seasons, resulting in serious shortage of domestic water, freshwater for rice cultivation and increaslingly serious salinization. Despites its high resilience, Mot Bui Do was not screened for a long time, making the strain seriously degraded.

- **Project specific objectives:**

1. To enhance awareness and build community resilience to climate change and its impacts on their economic, social activities and living environment;
2. To apply the project conservation pattern by using salinity and drought-resistant strains (prioritizing local strains) with sound cultivation techniques in salinized areas in Phuoc Long district, Bac Lieu province; To identify and restore one or two traditional rice strains with high resistance against droughts and salinization to ensure high yields and good quality, andpromote the sustainable development and conservation in the coastal area of Bac Lieu in the context of increasingly serious droughts and salinization; and
3. To apply integrated farming practices in 100-105 ha of degraded areas with the best drought and salinity-resistant strains to increase income for local farmers in the project location from 10% to 12% and establish 2 or 3 production cooperatives to supply rice seeds for the community.

KEY INNOVATIONS

- The project already helped to purify Mot Bui Do over 2 crops to supply to farmers.
- New rice farming techniques were applied, including sparse sowing, sowing in rows, adjusting fertilizer amount to fit with different growth stages of rice, balancing the concentration of NPK nutrients, limiting nitrogenous fertilizers. Micro-organic fertilizers were used while potassium was reduced. The "3 reductions 3 increases" model and "Integrated intensive farming" were also applied.

- The project already helped to purify Mot Bui Do over 2 crops to supply to farmers.
- New rice farming techniques were applied, including sparse sowing, sowing in rows, adjusting fertilizer amount to fit with different growth stages of rice, balancing the concentration of NPK nutrients, limiting nitrogenous fertilizers. Micro-organic fertilizers were used while potassium was reduced. The "3 reductions 3 increases" model and "Integrated intensive farming" were also applied.
- Sound water management was applied to prevent local water shortage as the release of salt in soil colloids into the environment associated with dry condition would affect the growth of rice.
- Concentrated sowing to prevent brown plant hopper (BPH) and use of chemicals. During heavy rains, the degree of salinity in soil and water level in rice fields were sharply lowered. Heads of villages worked with farmers to set sowing schedule for a cultivation area or the whole village or commune to avoid BPH. This technique allowed to preventBPH especially during the initial stage when rice was young and also to reduce the use of pesticides.
- Gradually shifted to use biological pesticides, limit the use of chemicals; apply Integrated Pest Management (IMP) approach, not spraying chemicals periodically or for the whole crop.

RESULTS AND IMPACTS

- **Project results:**
  - The project was implemented in approximately 35 hectares of integrated rice - shrimp farming in Phuoc Long commune;
  - Besides having screened Mot Bui Do, the project also tried to diversify drought and salinity-resistant seeds such as super rice varieties (OM2517, AS996, OM576, etc.), hybrid rice such as BTE 1. During the 2011 - 2012 crop, 300 kg of Mot Bui Do was screened and supplied for 6 ha of rice for the 2012 - 2013 crop;
  - Testing models were developed and integrated farming practices were applied to produce 105 ha (35 ha/crop x 3 crops) of Mot Bui Do, 105 ha of prawn (35 ha/crop x 3 crops) to increase the productivity. Moreover, the practice also reduced production input costs and finished product prices, reduced environmental pollution as it limited the use of pesticides and chemical fertilizers. This would in turn produce clean agricultural products (rice and shrimp);
  - 12 training courses and workshops were organized with the participation of over 800 farmers and officials. 35 farmers and local technical officials were sent to visit Rice-Prawn Farming Practice in Kien Giang province. Three rounds of VRA were conducted with the participation of 90 farmers and technical officials. Farmers were also consulted directly during field visits of the expert group, radio and TV broadcastings, leaflets, banners and thematic talks; and
  - Policy recommendations were proposed based on lessons learnt from the project implementation.
- **Environmental Impacts**
  - Proper land levelling reduced about 20-25% of NPK concentration and other chemical fertilizers. This reduction has contributed to mitigate environmental pollution and maintain ecological balance of rice fields;

- Straws were partially used as forage for prawns and partially used as organic fertilizer to improve soil quality; Shrimp waste was used as a source of nutrients for the coming Mot Bui Do crop;
- Farmers' awareness was enhanced on the effective use of biological pesticides such as Ometar and Silsau in killing rice leaf folders, reducing their use of chemical fertilizers and facilitating the integrated farming practice of Mot Bui Do - Giant River Prawn or Mot Bui Do - Fish of all kinds;
- The constructed regulatory canals and sluice system already limited the early salinization of fields when rice started flowering. This also helped to regulate the amount of saltwater for prawn farming, reduce the costs for petrol and manpower to pump saltwater into shrimp farms; and
- The project followed the in-field irrigation development approach and already advised the local water regulators to set water regulation to facilitate agricultural production and aquaculture in 2012 and the following years. Water-efficient farming practices were promoted to save irrigation-related costs and reduce the water demand for production.

- **Social impacts**

  - Local people's awareness has been enhanced on climate change and resilient farming practices. Local people's improved understanding of the impacts of climate change, droughts and salinization on their production, livelihood and natural resources was very crucial for agricultural production (soil, water, diversification of plants and animals);
  - Enhanced the awareness of farmers to apply new farming practices through the integrated intensive cultivation pattern to increase their income. Thanks to the project, local authorities were equipped with improved knowledge and understanding of advanced techniques in rice and shrimp cultivation to be able to provide sound guidance for grass-roots officials and local farmers to practice in the field, andbring actual benefits for farmers in the project location;
  - Changed local farming and cultivation practices to be resilient to climate change, maintain livelihood and food security. Created and changed farmers' behaviors to shift from using inorganic fertilizers and chemical sprays to an eco-smart agriculture (using microorganism compost) which would reduce production costs, increase the cleanliness of products (both rice and shrimps), increase productivity, and improve local people health; and
  - Farmers' technical understanding has been gradually enhanced through a series of technical trainings, seminars, deployment of simulations, radio and TV broadcastings, cross study tours and on-site workshops.

- **Economic Impacts**

  - Thanks to the sound techniques, the production costs for Mot Bui Do reduced by 113 thousand dong/ha, equivalent to 1.5% of the total cost (for the 2009 - 2010 crops); reduced by 576 thousand dong/ha, or 5.3% (for 2010 - 2011 crops); reduced by 576 thousand dong/ha, or 6.4% (2011 - 2012 crops). At the same time, the average increase in rice productivity was 60 kg/ha on average or 1.2% (2009 - 2010 crops), 320 kg/ha, or 8% (2010 - 2011 crops); 390 kg/ha or 8.7% (2011 - 2012 crops);
  - The simulated prawn production pattern of the project generated an increase of VND 1.2 million/ha, equivalent to 9.6% against the current practice (two crops/2010); VND 2.3 million/ha or 9.8% (2 crops/2011); VND 4.7 million/ha or 29.2% (1 crop/2012);

- One harvesting cycle of the integrated Mot Bui Do and shrimp pattern generated an average increase of 3 million/ha or 9.9%; 6 million or 15% and 8 million/ha or 25.8%, respectively for 2009 - 2010, 2010 - 2011 and 2011 - 2012 seasons;
- The gross profit of 105 ha from applying the pattern as more than VND 899 million during the project duration;
- The project has established 105 hectares for Mot Bui Do and 105 hectares for prawn which provided clean products (approximately 450 - 500 tons of rice and 26 - 27 tons of prawn), contributing to the livelihood sustainability for around 70 households directly engaging in the project and the replication in about other 3,700 hectares in Phuoc Long commune;
- The project assisted local farmers in restructuring agricultural production to meet with the growing needs of comprehensive and sustainable development. Priorities were given to irrigation, particularly in-field irrigation and seeds production to satisfy the practical demand of agricultural production; and
- Developed and transferred effective and sustainable patterns for rolling-out to produce high-quality and competitive products in the markets, particularly for the two key local products (rice, shrimp) to meet export criteria such as high quality, size and food security. Brand advertisement should be promoted for Mot Bui Do together with other species such as goby, eel fish, blue shrimp to increase income, promote ecological agricultural production, poverty alleviation, enhancing both spiritual and material life for local farmers.

- **Policy impacts**

  - The project provided recommendations to local authorities to roll out the pattern in other suitable areas. GEF SGP was recommended to continue providing support for the second phase of the project.

SUSTAINABILITY

- Project beneficiaries have actively contributed their manpower, rice seeds, shrimp breeds, farming tools, farmlands and skills to implement the project. 35 ha (accounting for 0.95% of the whole commune farming area) was used to apply the project techniques, which was then expanded to over 429.2 ha after 2 years 11.6% of total area for integrated shrimp-rice farming in Phuoc Long commune) . The contribution from local farmers in all forms of manpower, seeds, materials, farming tools, land, equipment, etc. was estimated to be about VND 700 million/year (about VND 20 million/ha/year);
- Local authorities created favorable conditions for the best results of the project, including their contribution of in-kinds or by efforts, particularly from the staff of the Farmer's Association, People's Committee at District and Communal level of Phuoc Long commune;
- The project also received great contribution from the community which accounted for over 90 % of the input investment costs such as seeds, fertilizers, pesticides, gasoline for pump operation and 100% of the labour required to develop the simulation models. Especially, the budget for developing the shrimp model was fully contributed by the community;
- The community mutually supported each other to replicate the project model by applying project techniques to increase productivity, promote business and expand

consumption markets. The project also received attention and direction from the commune;

- The integrated shrimp-rice farming has been implemented for 3 years and reached 11% of the total farming area. Through the success of the testing, project models were rolled-out. In addition, farmers were voluntary to apply the technical advances introduced by the project after their participation in the training courses, on-site trainings or discussions with experts and technical staff;
- Through the testing models of Mot Bui Do, high-yield rice, hybrid rice (F1), and improved extensive farming for shrimps, a workshop was held to evaluate the community models and roll-out the best options to increase productivity. In addition, farmers who did not take part in the project were introduced to the project with experts and farmers of good practice for sharing experience and techniques (planting Mot Bui Do, high-yield rice and hybrid rice, integrated extensive farming prawn-giant river shrimp- crab-fish of all kinds);
- With the encouraging and easy-to-implement results, the project models were accepted by local authorities and farmers and used to replace their traditional practices (2010 - 2011), for example, using the sowing concentration, using microorganism fertilizers, balancing the concentration of N, P, K, avoiding spraying pesticides regularly and shifting to organic pesticides;
- Currently, many farmers both inside and outside of the project locations already shifted from their traditional practices to use project techniques. In particular, local farmers have paid attention to standard seeds, land preparation, lower sowing density, balanced fertilizes, contributing to reduce pests much better than before; meanwhile the production costs were reduced and the profits gained were higher; and
- According to local authorities, up to 50-55% of total farming land was entirely or partially practised with project technical procedures such as: sowing in row, dispersing sowing, using microorganism fertilizers andbalanced composition of nutrients, using biological pesticides for pest control. Noteworthy, the project implementation was a driver for local farmers to open some microorganism pesticides and bio-fertilizers to meet the local demand.

LESSONS LEARNT

I. Key drivers for the project success:

The project has employed the following approaches and innovations to organize and implement the project successfully:

- Selection of project sites: project site was Phuoc Long commune due to its exposition to salinization and droughts, in compliance with the selection criteria of a climate change project. Additionally, Phuoc Long was also a targeted commune in the master plan of Bac Lieu People's Committee for practicing the integrated rice and shrimp pattern. The pattern, if proven to be successful in Phuoc Long, will be replicated in other communes;
- The project scope was limited only to the development of a model or pattern for drought and salinity-resistant strain conservation, promotion and transferring the model was also a priority in the Action Plan to Respond to Climate Change for the Agricultural Sector of MARD;
- Project was innovative in screening Mot Bui Do, a traditional strain, in integration with the science-based selection method. The project also applied integrated approaches for conserving, developing and improving the rice and shrimp pattern which was proven by the international science to be highly resilient to salinization by using sludge from shrimp farming for rice cultivation; applying ICM, IPM to limit the

use of fertilizers and chemicals; reducing environmental pollution and producing high yield and clean shrimp and rice products;

- The project received the support from local authorities and communities. All the stakeholders shared common viewpoints and high sense of responsibilities;
- This was the first project coordinated by Bac Lieu Farm Association; therefore, they faced many difficulties in the first period. However, through implementing the project, their capacity was significantly improved to implement future projects more effectively. This is an important benefit that the project brought to the community;
- Capacity of experts, project staff at provincial, district and commune levels have been improved through a number of training courses, peer education, study tours, workshops, ect. They were also equipped with knowledge on how to conduct self-study and maximize their internal strengths. Local farmers' awareness was enhanced on climate change impacts and the capacity for sustainable agricultural practices. These were significant contributions to the success of the project;
- Indigenous knowledge was integrated in the rice and shrimp pattern which was illustrated through the digging of boundary canals, sound land preparation techniques in association with integrated, sustainable land and water management and techniquesused in rice cultivation. The techniques could be community-based purification, "3 reductions 3 increases" model for rice cultivation; integrated intensive farming; sound water management techniques; concentrated sowing; minimizing chemical use. Integrated Pest Management (IPM) was applied to gradually shift to biological pesticides.

ACTORS

- People's Committee of Phuoc Long commune, Phuoc Long district, Bac Lieu province
- Bac Lieu Department of Agriculture and Rural Development
- Bac Lieu's Phuoc Long District People's Committee

SOURCES OF DATA & INFORMATION

- Project technical document
- Workshop reports

Sustainable and integrated natural resource use in response to climate change

CONTRIBUTING TO INTEGRATED MANAGEMENT OF NATURAL RESOURCES TO ADAPT TO CLIMATE CHANGE AT HUONG PHONG COMMUNE, HUONG TRA DISTRICT, THUA THIEN HUE PROVINCE

- **Project Duration:** September 2009 – September 2012
- **Project No:** CBA/VN/SPA/09/004
- **Project Site:** Huong Phong commune, Huong Tra town, Thua Thien Hue province
- **Implementing Agency:** Consultative and Research Centre on Natural Resource Management (CORENARM)
- **Beneficiaries:** Households in Huong Phong commune, Huong Tra district, Thua Thien Hue

Huong Phong is a small commune located along the coast of Thua Thien Hue with the total geographical area of 1,596 ha and a population of about 12,000 people who are mainly reliant on agricultural production. Out of the population, 21.6% are poor households. Surrounded by Huong River and Tam Giang Lagoon, Huong Phong has been significantly impacted by natural disasters to their livelihood and agro-fishery production.

In 2009, GEF SGP supported Huong Phong to implement the project ***"Contributing to integrated management of natural resources to adapt to climate change at Huong Phong Commune, Huong Tra District, Thua Thien Hue Province"*** to enhance the resilience of local authorities and farmers in responding to climate change through the development of the Community-based Integrated Natural Resource Management Model.

PROJECT BACKGROUND AND OBJECTIVES

Huong Phong is a small commune located along the coast of Thua Thien Hue with two-thirds of its boundary surrounded by Huong River and Tam Giang Lagoon, which made it strongly affected by climate change. The commune has a total area of 1,569 hectares and a population of about 12,000 people with the poor household rate of 21.6%. Local livelihoods depend heavily on agricultural production (70%), aquaculture (20%) and services (10%), which are all strongly reliant on climatic conditions.

With 668.9 ha of water surface, Huong Phong has the potential to develop aquaculture. This is seen as the key economic sector under the development plan of the commune. Shrimp farming is the typical aquaculture here with the participation of farmers along Tam Giang Lagoon. However, this activity is frequently exposed to risks and losses due to shrimp-related diseases, water pollution, unstable prices, etc. Freshwater fish aquaculture is underdeveloped. Some farmers cultivate fish in the paddy rice fields; however, the productivity is low due to technical limitations or inappropriate methods. Agricultural land in the commune is mainly used for rice cultivation, which is troubled by salinization and shortage of irrigation water. This in turn lowers rice productivity and eventually affects the income of farmers. There are some local salt-tolerant rice strains however being degraded and in low productivity.

- **Project specific objectives:**

1. To enhance capacity of local authorities and local farmers in integrated natural resource management to respond to climate change;
2. To develop community-based natural resource management and sustainable use models to respond to climate change; and
3. To evaluate results, document lessons learnt and provide recommendations to local authorities and farmers on issues related to adaptation to climate change in agricultural production based on test results of the project's models.

KEY ACTIVITIES AND INNOVATIONS

- **Key activities:**

1. Building capacity of and advocacy for commune leaders and the community to increase awareness and take actions in response to climate change;
2. Making natural resource management plans with the participation of local communities and authorities to promote their ownership and mastering of the techniques;
3. Developing agro-fishery production models to reduce weather-born risks, increase income and respond to climate change;
4. Building mangrove conservation and sustainable development model in order to limit the impacts of natural disasters and promote the sustainable development of aquaculture.

Building community-based nurseries and afforesting mangroves to protect dykes, shrimp ponds and keep the concentration of CO2 at a stable level;

5 Strengthening local capacity in community-based ecotourism to diversify people's income through the availability of mangrove forests and local culture. Ecotourism improves local community's awareness as well as their income; and

6 Diversification of income and climate change adaptation models reduce the risks exposed to and increase the resilience of local farmers.

- **Key solutions and innovations:**

1 The participatory approach was applied to empower local farmers to master and apply the techniques;

2 Traditional knowledge on natural resource management and use as well as disaster prevention in the management of natural resources and socio-economic development of the commune was collected, verified and recommended;

3 Local rice strains and intercropping patterns of local salt-tolerant rice with freshwater fish and other fishery species were restored in order to prevent soil degradation due to salinization; and

4 Models were used to collect sufficient data and statistics to evaluate the results and compile technical guidelines. Project results and lessons learnt during the project implementation were synthesized to provide recommendations on response to climate change for local authorities in Huong Phong.

RESULTS AND IMPACTS

- **Project results**

  - 1,569 hectares covered by the project;
  - 3,000 out of 12,000 local farmers participated and benefited from the project;
  - Local rice strains were restored. Salt-tolerant rice strains were inter-cropped with freshwater fish and other fishery species in order to prevent soil degradation;
  - Traditional knowledge on prevention and mitigation of natural disasters has been documented and published as e-books. The lessons learnt and innovations related to climate change, natural disaster prevention and mitigation have been compiled and customized to fit with the local conditions of Huong Phong and Tam Giang Lagoon. The document was accepted and available for the core team of farmers and local technical agencies to provide guidance for local farmers; and
  - Project results and products were integrated into the commune development plan and the new rural programme by the local authorities.

- **Environmental impacts**

  - Project's demonstration and testing activities were all environment-friendly. The integrated rice and fish farming has reduced the use of pesticides, fertilizers and maximized IPM solutions. This has helped to improve fish habitats, produce clean rice meanwhile saving the costs and protecting the environment;
  - The integrated pattern has reduced the amount of food waste in water, leading to reduced pests and water pollutants. On the other hand, the reduced amount of antibiotics for livestock grazing also led to the reduction in chemical use for livestock disease prevention and control;
  - Forest plantation has initially improved the environmental conditions and local awareness for environmental protection. Planting mangroves brought many environmental benefits such as erosion protection, creating landscapes and shadow,fishery

habitats. Additionally, mangrove afforestation not only did not compete with rice cultivation in terms of land and water surface but also increased fishery productivity;

- By establishing the nurseries and the scattered tree planting, local farmers in Huong Phong not only master the techniques and enrich their experiences in producing seedling trees, planting forests seedling production and reforestation, but also save costs (the cost to buy seedling trees was three times higher than that produced by themselves). More importantly, this activity has enhanced and changed the awareness and behaviours of many people in protecting forests and mangroves; and
- Ecological afforestation in shrimp ponds and along the river dykes has promoted the development of mangroves in combination with local livelihood enhancement. At the same time, the mangroves have created new landscape in the planted area. Furthermore, water-coconut trees, which was once "extinct" in Huong Phong and surrounding areas were also restored.

• Social impacts

- The project has contributed to equip local farmers with fundamental information on climate change drivers and impacts as well as the role and benefits of mangroves. Local farmers were highly aware of the impacts of climate change on aquaculture, agriculture and livelihoods in coastal and lagoon areas. The households fully understood that climate change adaptation in the aquaculture industry is a critical requirement for future sustainable development;
- Local people were engaged in various models such as mangrove nursery planting, forest-based business, variety restructuring and crop shifting for flood prevention, etc. Through the models, local farmers were equipped with teamwork skills and how to maximize internal strengths of their community, which then fostered their relationships among each other;
- Gender issues were among the project priorities, particularly the participation of women in the project activities. Due to the nature of aquaculture occupation, women rarely participated in village meetings and training courses. Therefore, during the project, the Project Management Unit were required to engage a certain number of women at the events to ensure their participation in the project activities; and
- Women were also prioritized for training courses and meetings to discuss project implementation plans such as nursery establishment, afforestation, eco-tourism and production model testing. However, they accounted for only about 10% to 20% of the total number of participants.

• Economic impacts

- The average profit incurred from 2,000m2 of fish and rice harvesting was VND 9.1 million, which would be only VND 4.6 million if only rice was cultivated. Therefore, the incremental profit was VND 4.5 million for each integrated fish and rice farming model. On the other hand, rice quality and fish productivity both increased due to the reduction in the use of chemical fertilizers and pesticides;
- Additionally, local skills and knowledge were improved due to their participation in the models. All 7 assessment indicators increased from average level to good or very good level, particularly in techniques such as peer knowledge-sharing, integrated rice-fish farming, and presentation skills. According to the farmers, the

index of rice quality and fish productivity were both upgraded from average to very good. Besides that, many households already rolled out the integrated rice-fish farming models in the areas with suitable conditions. This has illustrated the high degree of sustainability of the project models;

- The integrated rice-fish farming both directly and indirectly lifted farmers in Thuan Hoa village out of poverty, gradually improving their livelihood. The households practising the models in 2010 and 2011 gained the profit of over VND 50 million per ha. On the contrary, the local households with intensive culture and monoculture suffered serious loss due to shrimp-related diseases. A number of households who were trained and applied the integrated farming practices successfully also gained profit;
- Eco-tourism has been deployed, which created new jobs for several households in Thuan Hoa village. In 2012, two groups of visitors came to visit Ru Cha mangrove. Despite its modest amount, this could bring a new source of income for villagers: to be local tourist guides; and
- Mangrove afforestation also resulted in a more beautiful landscape for the aquaculture farms and the lagoon. This could make the areas more attractive to tourists, and as a result, promoting the fishery-related services here. The statistics showed that as of August, 2012, three new seafood restaurants were opened, totalling to 4 (including 1 opened in 2011) to serve about 5,000 visitors. This has created new jobs for villagers and also ensured the consumption of their fishery aquaculture and catching.

- **Policy impacts**

  - Local authorities obtained the database to integrate, manage and coordinate all activities related to commune's plan-making and implementation;
  - The results of the project were applied by commune and village leaders as a reference into the development of annual natural resource management and use plans;
  - Participatory natural resource management and use plans: the results and products were used in the development plan and new rural programme; and
  - The natural resource mapping toolkit and the natural resource management plan were applied by land officials and those from other relevant sectors in their daily jobs. The innovation of integrated natural resources planning and use was appreciated by the district authorities and were rolled out.

THE SUSTAINABLITY AND AMPLIFICATION OF THE PROJECT

- Due to the on-site training approaches, farmers were able to master all the farming techniques as they had the opportunity to operate by themselves. The techniques are now applied by most farmers by sharing among their peers after the project completed;
- Local authorities coordinated and took part in all the project activities. Therefore, the products of the projects have met the practical demands and have already been used by local communities. For example, mangrove trees were transferred to households to plant and protect in the shrimp farms for improving shrimp habitats. Additionally, the planted mangrove areas were contracted with rural community and community-based organizations for caring and protection;
- The project activities received support from local authorities to integrate with other programmes. Particularly, the activities were rolled out by the district's budget. For example, in 2012, the District's Economic Division allocated its regular budget to continue the restoration of rice strains after the completion of the project;

- Being aware of the benefits from mangroves, local farmers were willing to use their own money to take care of and replant the mangroves (64%);
- High replicability: the integrated farming practices were applied by the project farmers and then rolled out in Huong Phong commune as a whole. At the same time, the lessons learnt were also documented, shared and applied for Tam Giang - Cau Hai areas;
- Huong Tra District People's Committee, through its agricultural extension programmes, has invested in rolling out the project models. For example, the authority allocated VND 30 million to maintain the rice restoration model. For the mangrove model, the province/district is now in the process of making plans for budget allocation;
- Local farmers believed in the integrated shrimp farming model instead of shrimp-intensive and monoculture to reduce the risks from weather events and diseases. Currently, the model has been replicated to almost all aquaculture farms in Huong Tra District, with an area of 230 hectares, including in both Huong Phong and Hai Duong communes.

LESSONS LEARNT

• The key drivers for the project success

- Engaged the participation and contribution of both local farmers and authorities in project activities. This was necessary to enhance their awareness and capacity in combination with practical training (speaking and doing together). Project information was publicized and consulted with Commune People's Committee and other functional organs of the district to mobilize their assistance, support and advices in the implementation period;
- Mobilized the participation and contribution of local communities and authorities by publicizing all sources of investment and financial assistance, consulting with both communities and local authorities, selecting beneficiaries in an open and democratic manner. These actions attracted local farmers to raise their voices, make contribution in terms of time and materials for the project;
- Regularly exchanged information with and asked for comments from communities at consultation meetings to get their consensus for project activities. On the other hand, local authorities of all levels and community-based organizations such as Dong Hoa Fish Association, Village Veteran Association were also engaged;
- Local farmers participated in testing the models and innovations, through which they accepted the risk and contributed fund to implement the innovations, together with the technical assistance from the project experts;
- Combined traditional knowledge and advanced science and technology: project activities have fully maximized the knowledge and experiences of local farmers. Project indicators were improved with local knowledge and experience. Their experience contributed to the success of the project and also helped to fine-tune the technical approach to fit with local context;
- The project activities were simple and in small size, but very effective and sustainable. With such small size, the project could provide very focused and detailed guidance. The technical procedures were documented and discussed during group discussion, on-site training between trainers, project implementers and observers (learning households). This helped to correct the techniques in a timely manner and also facilitated the two-way discussion among stakeholders. The good results were replicated at a large scale;

- Project Management Unit Head was from CORENARM while membership was representatives from District Divisions (Economic and Agricultural Extension Division), leader of Huong Phong Commune People's Committee. This structure allowed the smooth coordination of the project activities, particularly in promoting the role of Huong Phong leaders in directing, guiding and engaging local farmers;
- The Project Management Unit also maintained close cooperation with local authorities and groups of experts to set project criteria and conduct the output-based evaluation against project activities. The Steering Committee together with the group of experts organized consultation on all the relevant issues at all levels, including District level, down to commune, village and individual levels to obtain consensus and assistance from both local authorities and communities in implementing the project activities; and

ACTORS

- People's Committee of Huong Phong commune, Huong Tra district, Thua Thien Hue province
- Department of Agriculture and Rural Development, Thua Thien Hue province
- Economic and Agricultural Extension Division, Huong Tra district
- Fishery Association of Dong Hoa, Huong Phong Commune, Huong Tra district, Thua Thien Hue province
- Veteran Association of Dong Hoa village, Huong Phong Commune, Huong Tra district, Thua Thien Hue province

SOURCES OF DATA & INFORMATION

- Project technical documents
- Workshop reports

COMMUNITY-BASED ADAPTATION

Global Environment Facility Small Grants Programme in Vietnam (GEF SGP)
Address: 304 Kim Mã, Ba Đình, Hà Nội, Việt Nam
Tel: 84-4-38500150
Email: gef-sgp-vietnam@undp.org
Website: www.vn.undp.org; www.sgp.undp.org