



Sustainable farming for slopes and wetlands
under climate change related impacts
of soil degradation along

THE KY LO RIVERSIDE IN DONG XUAN DISTRICT, PHU YEN PROVINCE



GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Sustainable farming for slopes and wetlands
under climate change related impacts of soil degradation along

THE KY LO RIVERSIDE IN DONG XUAN DISTRICT, PHU YEN PROVINCE



Project Title	► Transfer of sustainable farming techniques to local communities in slopes and wetlands under climate change related impacts of soil degradation along the Ky Lo riverside at communes Xuan Quang 2 and 3 of Dong Xuan district, Phu Yen province.
Project Code No.	► VNM/SGP/OP5/Y4/STAR/2015/08
Project Executive Agency	► Association of Farmers, Dong Xuan Dist., Phu Yen province
Project Site	► Communes Xuan Quang 2 and 3, Dong Xuan Dist., Phu Yen province
Project Duration	► 30 months (January 2016 – June 2018)

1 BACKGROUND

The coastal provinces in Central Vietnam including Phu Yen had been withstanding impacts caused by climate change. In recent years, the climate change related impacts such as tropical storms, floods, draughts, soil degradation and desertification had become more and more severe and had badly affected the local people's production and livelihoods, especially in those riverside areas where there was a large number of poor households and where people relied on agricultural production for livelihoods.

There was a need to help the local communities enable to effectively respond to and reduce the increasing climate change related impacts, and to effectively shift to a structure of crops that could be tolerant of draught, change in farming circles and their growth patterns so that they could be adaptive to conditions of the slopes and wetlands, thus helping stabilize the local people's livelihood. However, the shifting of the crop structure was very difficult and faced with great challenges due to the community's limited knowledge, technical and financial resources.

In riverside areas, the project piloted various models for intercropping peanut-cassava, growing grass for livestock and agroforestry based farming on hillsides with a view to reducing erosion, soil desertification and degradation. These models had helped enhance the efficiency of land use, the productivity of crops and economic efficiency, thus contributing to the reduction of risks to agricultural production caused by storms, floods and drought.

Communes Xuan Quang 2 and 3 of Dong Xuan district are located in the northwestern part of Phu yen province.



**Commune
Xuân Quang 2**

Xuan Quang 2 has a total natural area of 5082.9 hectares. In 2017, the commune's agricultural land area was 4662 hectares including the total annual farming area of 720 hectares and the remaining area for perennial trees, ponds, lakes and some unused parts (of which there were 230 ha for cassava, 60 ha for corn, 20 ha for peanut and 15 ha for grass...) The commune had a herd of 1445 oxen and cows (an average of 1.3 per household, which was too low to meet the commodity production requirement). The local Kinh ethnic group represented 93% of the population of the commune, and the remaining 7% was the Cham H'roi ethnic group.

Xã Xuân Quang 3



Xuan Quang 3 has a total natural area of 2142.02 hectares. In 2017, the commune's agricultural land area was 1443.8 hectares including the total annual farming area of 921 hectares and the remaining area for perennial trees, ponds, lakes and some unused parts (of which 160 ha for cassava, 15 ha for corn, 17ha for peanut and 17 ha for grass...) The commune had a herd of 350 oxen and cows

2 OUTSTANDING INITIATIVES AND INNOVATIONS

2.1. Technical initiatives/innovations

The following technical advancements in farming were deployed and brought about economic, environmental and social results:

- Selection of crops that have high tolerance to local soil conditions, require less water and a less than 10-month period of growth so that they could avoid the later flood season occurred from September to November in the year. There were various models developed for demonstration, including models for

crop rotation: winter-spring peanut crop and summer and autumn-winter corn crops; and a model for intercropping peanut with cassava, with economic results obtained that were higher than those from the intercropping of rice and corn.

- The technical advancements were deployed such as the adoption of the water –saving irrigation with a sprinkling plastic pipe system, thus consuming less water and saving labor work.

- The technical advancements were deployed to the intensive farming of peanut and cassava so as to enhance their productivity and product quality (such as the fertilization of lime and phosphate fertilizers for peanuts; the sowing of 2 peanut seeds per hole; the intercropping of peanut-cassava; adding potassium to cassava after harvesting peanuts (about 3.5 months after planting) in order to accumulate more starch for cassava, thus enabling early cassava harvest; the growing with double cassava grafts in the peanut-cassava intercropping model (had not been deployed by local people in commune Xuan Quang 3 before the project).



- Climate smart agriculture was applied in such models as planting grass for cows/oxen, the agroforestry model which shifts to intensive/semi-intensive cow raising from extensive raising.



The fertilization of manure to crops, and the minimization of the use of chemical fertilizers and pesticides



With a view to reclaiming soil and enhancing the soil fertility



Toward more sustainable farming



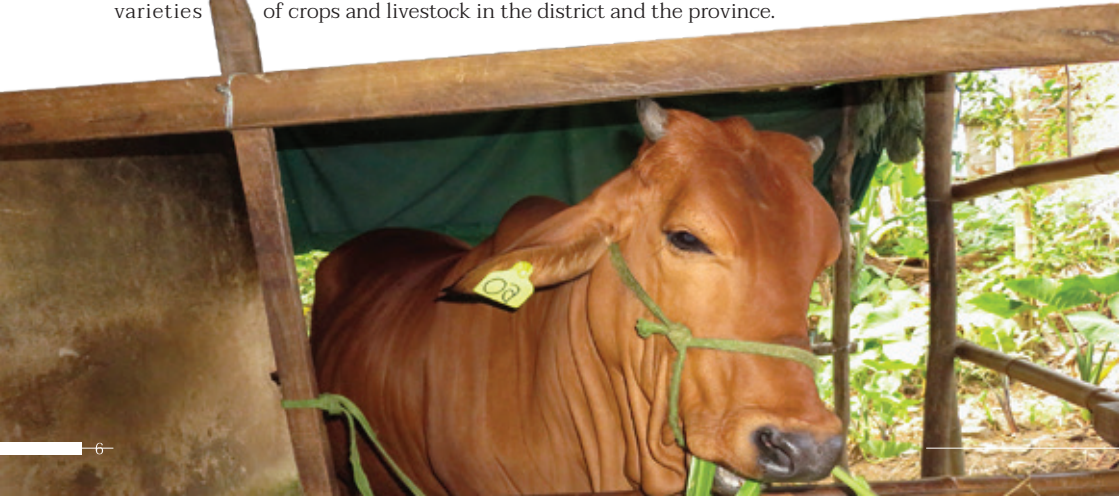
Organic agriculture



And Climate Smart Agriculture (CSA)

2.2. Initiatives in organizational/management arrangements

- Capital for the credit fund financed by SGP and other sources of capital of the Policy Bank and Agribank in combination with sources of the district and communal associations of farmers was used to lend the farmers loans at a lower interest rate for agricultural production.
- Dong Xuan DPC was encouraged to provide co-financial support taken from the district's scientific and technological capital for agricultural production for the purpose of integrating local socio-economic development with the climate change adaptation; the Dong Xuan cassava starch processing factory was encouraged to provide varieties of cassava for the development of the model.
- Initially a six - party partnership was established including: Farmers – the community, who participated in and enjoyed the benefits from the project; State – the district and communal authorities; Donor – the GEF SGP program; Business – the Dong Xuan cassava starch processing factory; Scientist – the Institute of Agricultural Science and Technology in the south central coast (AISOV), with some technicians from Dong Xuan district; and the Association of Famers. These entities constituted bases for setting up other joint entities, and other value chains for other varieties of crops and livestock in the district and the province.



3 OUTSTANDING RESULTS

a

Four models were established at two communes with the area of 83.5 hectares representing 101.8% of the plan and with 145 households (487 household times).

- A (winter-spring) peanut – (summer) hybrid corn – corn model: 60 hectares with 69 participating households (411 household times), net profit of 47.45 million VND/hectare; 3.17 times the winter-spring corn – summer-autumn corn framework, 72.6% higher than designed;
- A peanut– cassava intercropping model: 6 hectares; 32 households, net profit of 22.7 million VND/hectare, 1.58 times the exclusive cassava culture framework, 13.5% higher than designed;
- A Model for planting grass for cows/oxen (0.1 hectare of grass and 1 cow), 40 households, net profit of 12.474 million/year/household, 4.47 times higher than the two-rice-crop culture framework;
- An agroforestry model (0.2 hectare of grass, 1 cow and 1 hectare of crossbred acacia), 4 households, net profit of 14.183 million VND/year/household – a high net profit model.

“ The total 2-year profit from the models enjoyed by the community was VND 2,654.829 million (profit from the fund invested by the project was VND 1,705.829 million), of which Xuan Quang 3 enjoyed VND 824.630 million and Xuan Quang 2 enjoyed VND 1,830.199 million. The average value of a working day for the model was VND 282, 380, which was 1.81 to 2.28 times the average working day in the initial period. *The total co-financing from the local people's contribution was VND 3,734.428 million (including VND 1,245.784 from Xuan Quang 3 and VND 2,488.644 from Xuan Quang 2) and VND 100 million contributed by Dong Xuan DPC.* ”

b

The model of crop rotation system had the extended area of 60 hectares in 2 years with the participation of 411 household times, and the total net profit of the extended model was VND 949 million. All the households who participated in the setting up of the model wanted to continue with the four models and expand them. The community that had not participated in the project also wanted to apply technical advancements deployed by the project

c

The building of technical capacity, management ability and other capabilities suitable to the local community and local authorities had been conducted through exchanges of visits, technical training sessions and discussions between and among communities, groups of mutually interested farmers, technicians and scientists of AISOV through conferences, seminars and workshops with the participation by 1132 person-times including 43.7% being women and about 5% being ethnic minority people

AVERAGE NET PROFITS PRODUCED BY THE MODELS (2016-2017)

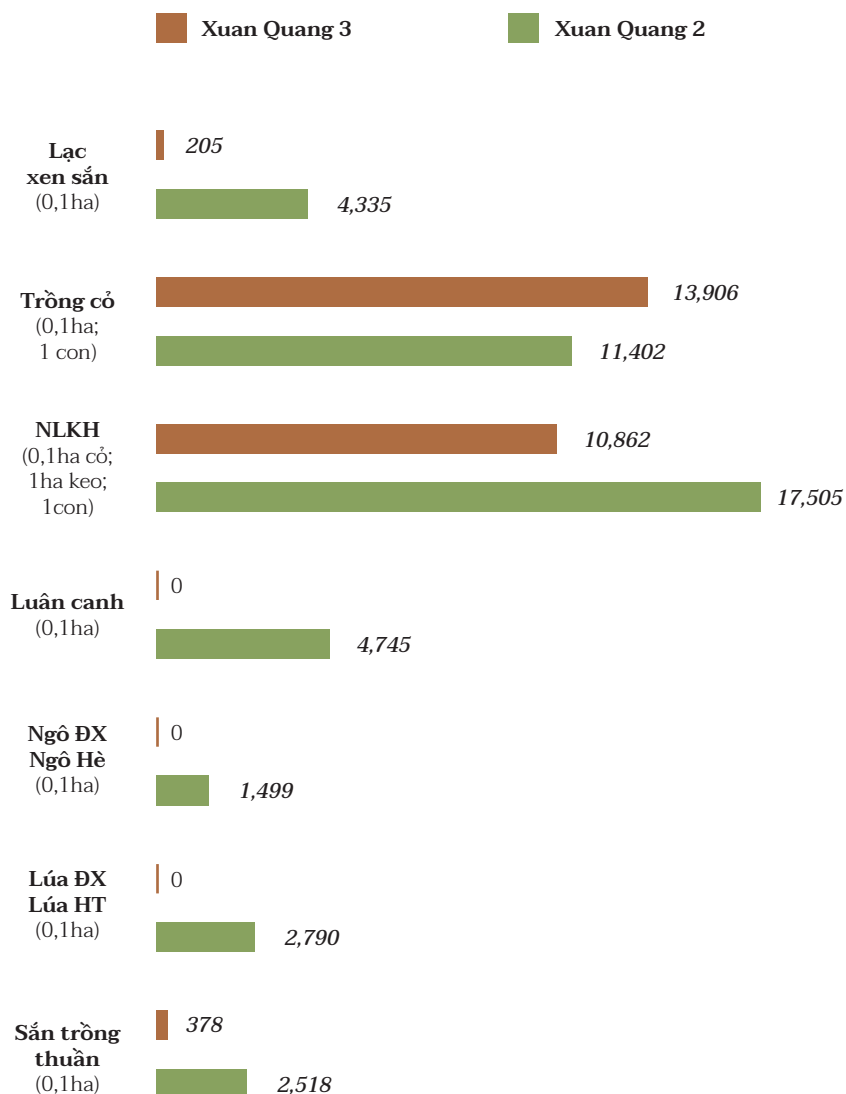


Chart 1: Average net profits produced by the Models
in the two project communes (2016 - 2017)

4 IMPACTS OF THE PROJECT

4.1. Impacts of environmental benefits

- Preventing soil degradation: the project improved soil structure, fertility and moisture retaining ability, and prevented soil erosion and washing-away through the fertilization of lime powder and grains, and organic and inorganic fertilizers adequately and proportionally to soil; the application of integrated farming methods and the development of agroforestry models. In the cattle feed model, the regime of nutrition, water, moisture and air in soil was improved due to the planting of grass and making full use of crop residues and animal wastes (6,480 tons of cattle manure collected from the project's herd of cows), ensuring the farming of 83.5 hectares of reclaimed soil with 145 households involving in the model and the fertilization of cattle manure for nearly 250 hectares of farming land per year in the locality (average 6 tons of manure / ha / crop). x 2 cases / year)



- The emission of greenhouse gas (GHG) was mitigated by shifting depleted soil areas to grass-planting from ineffective rice farming, crop rotation and/or intercropping models with the application of the water-saving sprinkling technology to consume less water.
- A climate smart agriculture (CSA) model was developed in Dong Xuan district and the South Central Coast region through the development of crop rotation, intercropping and/or agroforestry model, (whereby available natural forests are retained or Acacia was planted on the top of hills, and on lower areas of the hills where grass was grown for feeding cows, animal cages were constructed, fruit trees and vegetables were dispersedly planted, and/or chickens and ducks were raised, etc.) and the growing of grass in riverside and hilly soil areas with appropriate farming techniques

4.2. Impact of social benefits

- The capacity of communities and women had been better improved through 29 training courses, FFS workshops and study-visits for 1,132 persons. The majority of participants in the model, training and FFS workshops were poor and near poor households and poor female farmers accounting for 43.7%. Local farmers had access to new and advanced techniques, loans provided by community based projects and market information, and had learned how to develop their plans for crop farming, incomes and expenditures, and product consumption, and produce GAP safe agricultural products.

- Creating jobs: A total of 17,562 working days were provided for cultivation and husbandry with the average value of VND 258,746 per working day, increased by 1.81 - 2 , 28 times compared with that in the cropping season.

- Poverty had been reduced and people' life had been improved: by integrating the implementation of the project activities with local program on poverty reduction, creating livelihoods for farmers and building new rural

societies. With additional incomes gained, local people purchased such productive facilities as water pumps and pesticide sprayers and repaired animal cages, etc. At the same time, they focused on the intensive farming of rice, cereals, grass and forest gardens (planting Acacia trees for paper materials in hilly soil areas), increased the raising of pigs and chickens for food for local societies and manure for local farming. The percentage of poor households during the project implementation decreased to 28.4% in 2017 from 36.7% in 2015 in commune Xuan Quang 3, and to 38, 3% in 2017 from 61.4% in 2015 in commune Xuan Quang 2.

- A sustainable cassava material area had been created to provide raw materials for the Dong Xuan cassava starch processing factory. The growing of acacia provided raw materials for many wood processing factories in and outside the province. In addition, the locality also provided traders and food processing industries with supplies of beef, peanuts, and grass for animal husbandry in Phu Yen province and in the region



4.3. Tác động về lợi ích kinh tế

The level of productivity in all the models increased from 4.3 to 11.7% if compared to that of farming outside the models, and from 11-43.9% compared to that in the project design. Therefore, the total net profit from the models in the two years that the community benefited, was valued at VND 2,654,829 million (from an investment of VND 1,705,829 million made by the project)..

Models/ criteria	Peanut- cassava intercropping (1)	Grass planting (2)	Agroforestry (3)	Rotation (4)	Total/ Mean (1+2+3+4)	Total/ Mean invested by the project (1+2+3)
1. Net profit (1.000 VND)	137.822	1.282.170	285.837	949.000	2.654.829	1.705.829
• Xuan Quang 3	6.053	730.065	88.511		824.630	824.630
• Xuan Quang 2	131.769	552.105	197.326	949.000	1.830.199	881.199
2. Working day value (1.000 VND)	236,430	352,298	282,046	258,746	282,380	293,867
• Xuan Quang 3	130,578	356,456	249,496		245,510	245,510
• Xuan Quang 2	342,282	348,139	314,596	258,746	315,941	335,006

Table 1. Economic efficiency gained by the project in two years (2016-2017)



5 SUSTAINABILITY

- Local people in the project had been well aware of the need to shift to the growing of grass for raising cows on seasonally flooded land areas, and change in behaviors towards sustainable and efficient agroforestry. Local people could directly discuss about, and make comments and contributions to the development of technical procedures and the implementation of the model monitoring and evaluation activities. A group of key farmers and those with similar interests was established in the village association of farmers to enable the transfer of technology and the implementation of the model. Through these activities, local farmers had been quite capable of working in groups and independently, widely spreading out technical advancements as technical trainers.

- Fund: a revolving credit fund had been successfully operated to provide the community with non-interest loans valued at VND 544.8 million, accounting for 49% of the project budget (77 households in 1-2 revolving cycles). This fund continues to operating to support the community after the end of the project.



- Market: The cassava growing area of the South Central Coast region (8 provinces from Da Nang to Binh Thuan) accounts for over 100,000 hectares and as of 2017, Phu Yen province had the area of more than 23,000 ha (19,000 ha as planned in 2019), and of which there were 3,700 ha (against 3,100 ha as planned in 2018) in Dong Xuan district. In each of these provinces, there is at least one cassava starch processing factory for export (2 in Phu Yen, 4 in Binh Dinh and 2-3 in Quang Ngai). This shows that the regional output of cassava is very large. In 2018, the regional cassava growing area was expanded due to the increase in the price of cassava. Peanuts are export products. The market price of some agricultural products produced in the project area is usually stable, thus bringing high economic efficiency, while there is the availability of land and climate resources, simple and climate change adaptive techniques, and low investment levels that are favorable for poor farmers' participation.

- Policy: Dong Xuan District People's Committee (DPC) issued its policy on the replication of the project's techniques in areas with similar conditions across the district. The project's technical materials were reviewed and disseminated through the channel of agricultural extension communication. In addition, the Dong Xuan Cassava Starch Processing Factory continued to provide the community with varieties of cassava.

6 REPLICATION

There is a great potential for replicating the model. An area for expanding the crop rotation system would be 60 hectares with the participation of 411 households times and a total net profit of VND 949 million produced by the model. All the households who had participated in the development of the model wished to continue implementing and expanding the four models, and others who previously were not involved in the project wanted to participate in the adoption of technical advancements deployed by the project. Local communities wished to continue receiving technical and financial supports provided by GEF SGP through the District Association of Farmers.



At the workshop on results gained from the project's model development, leaders of Dong Xuan DPC, district specialized divisions, and representatives from the Provincial Association of Farmers and local authorities in the project area had committed to continue with and replicate the project's results through the provincial and district agricultural extension channel with funds that are annually allocated to local agricultural extension programs on various key crops and animals (cassava, grass, cows, forest garden economy, etc.)

Through the piloting of the models in two communes within the project area, the proved socio-economic and environmental results of the project have a great influence on the ability to replicate the models fast and sustainably to other districts and/or communes across Phu Yen province as well as others with similar conditions in the South Central Coast. In addition, capital sources for the poor, the fund for the support of farmers lending loans at preferential interest rates for agricultural production also facilitate the replication of the model.

7 EXPERIENCES & LESSONS LEARNED

a Based on the community: the local communities' wareness and capacity had been better improved. On that basis, all issues of the project were dealt with a broad consensus among local communities. Once the opinion of local communities was respected, they would seriously work together to overcome difficulties. Local communities' trust and consensus were important factors to ensure the success of the project and its replication.

b The selection of the proper concept for a project developed to meet urgent needs of the locality, and the selection of crops and animals, and areas for the development of models, and of suitable communities ensured the project be successfully implemented, and thus offered the great potential of its replication.

c Close links and responsibilities of six partners (Donor (GEF SGP), State (DPC and CPC), Farmers (community), Scientist (AISOV – team of experts), NGOs (Association of Farmers); Businesses (Dong Xuan cassava starch processing factory) were a great motivation for achieving success.

d DPC's Co-funding in cash that was allocated from the state budget for scientific activities to the project on schedule proved the full support and determination of the local authority.

e The proper selection and successful adoption of technical solutions enhanced the adaptability of the model to adverse climate change related impacts.





DONG XUAN ASSOCIATION OF FARMERS

La Hai Town, Dong Xuan Dist., Phu Yen Province

Eng. Huỳnh Văn Xuân – Chairman

Tel: 02573 670664

Email: duandongxuan@gmail.com

INSTITUTE OF AGRICULTURAL SCIENCE AND TECHNOLOGY, SOUTH CENTRAL COAST (AISOV)

Tay Son Rd, Nhon Phu Ward, Quy Nhon City, Binh Dinh Province

Dr Nguyễn Thanh Phương – Vice Director, Head of Expert Team

Tel: 0913483646

Email: ntphuongvntb@gmail.com

THE GLOBAL ENVIRONMENT FACILITY SMALL GRANTS PROGRAMME

304 Kim Ma, Ba Dinh, Hanoi, Vietnam

Tel: (+84) 24 3850 0150 | **Email:** gef-sgp-vietnam@undp.org

Website: www.undp.org | www.sgp.undp.org