FINAL REPORT for APN PROJECT

Project Reference Number: CBA2013-10NSY Visco

Communicating and Operationalizing Site-Specific Climate Change Adaptation Strategies in Vulnerable Communities in Southeast Asia

- Making a Difference –

Scientific Capacity Building & Enhancement for Sustainable Development in Developing Countries

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OVERVIEW OF PROJECT WORK AND OUTCOMES

Non-technical summary

This project is a regional collaboration of the three member-networks of the Southeast Asian Network for Agroforestry Education (SEANAFE), namely: Indonesia Network for Agroforestry Education (INAFE), Philippine Agroforestry Education and Research Network (PAFERN), and the Vietnam Network for Agroforestry Education. This capacity-building project is the third sequel of the previous APN-funded projects "Scaling Up Agroforestry Promotion for Climate Change Mitigation and Adaptation Strategy in Southeast Asia" and the "Institutionalization of Agroforestry as a Climate Change Adaptation Strategy via Local Capacity and Policy Development in Southeast Asia". These two projects dwelled on awareness-building and assessment of various farmer-led climate change adaptation strategies that work on-the-ground.

Building from the outputs and lessons of the previous projects, the recently-concluded project (Phase 3) organized localized training of farmers on the most appropriate climate change adaptation strategies for their agricultural production systems and climate; organized a forum with the local development organizations to help institutionalize the promotion of site-specific climate change adaptation strategies; established community projects that would serve as showcase of various climate change adaptation strategies; and , produced materials that would aid in the dissemination of best practices in climate change adaptation.

The project team organized a collaborators; meeting-workshop prior to the full project implementation, which served as a venue to level-off expectations; review the project deliverables; and develop implementation for each collaborating country.

Keywords: ***localized training, climate change adaptation strategies, forum, local development organizations***

Objectives

The main objectives of the project were:

1. Train farmer-trainers on various site-specific climate change adaptation strategies
2. Organize a forum with the local government units for the institutionalization of localized climate change adaptation strategies
3. Implement community project showcasing workable climate change adaptation strategies
4. Produce the best practices on climate change adaptation in local version as a result of the documentation conducted in 2011-2012 APN-funded project

Amount received and number years supported

The Grant awarded to this project was:
US$36000 for Year 1:

Activities undertaken

The project collaborators organized Localized Training on Climate Change Adaptation Strategies involving at least 25 farmer-participants in each of the three collaborating countries; conducted a Forum with the local government units to communicate with the local officials about the issues of climate change and its impacts on the agricultural production systems of farmers in their locality; established one community project showcasing the most workable and farmer-friendly climate change adaptation strategies for possible adoption by other farmers; translated the results of the documentation done in 2011-2012 pertaining to the best practices in climate change adaptation in local versions. The project collaborators have also conducted a meeting-workshop prior to the full implementation of the project.

Results

This project trained 75 farmers from upland communities in Indonesia, Philippines and Vietnam about the site-specific climate change adaptation strategies. The project team has likewise elicited from them their own observations and experiences of the effects and impacts of climate change on their agricultural production activities, and at the same time, they were able to come up with plans that would help address their climate change-related problems.

In addition, three forums with the local government units were organized by the project team in the three collaborating countries, which paved the way for the development of indicative plans that would help address the climate change-related problems of the farming communities. Moreover, three community projects showcasing the different workable climate change adaptation strategies were put up in the three collaborating countries. These serve as the demonstration farms that could help promote the adoption of climate change adaptation strategies.

Finally, the project team has developed three information materials in local versions highlighting the best practices in climate change adaptation that are being employed by the selected upland farmers. These best practices were products of the documentation that was conducted during the second Phase of the project through CBA2011-13NSY Tolentino.

Relevance to the APN Goals, Science Agenda and to Policy Processes

Foremost, the proposed project is geared towards *capacity development* of the local people/communities which are directly engaged in agricultural production, and are the directly influenced and affected by the impacts of climate change. The proponents believe that the vulnerable upland communities could only cope with the impacts of climate change if their adaptive capacities are honed and enhanced. Therefore, this project proposal centers on capacity-building activities via information education campaign or information dissemination, communicating directly with the local communities, training them on site-specific and appropriate climate change adaptation strategies, and showcasing these as models that could be possibly adopted by other farmers. Secondly, the proposed project intends to *enhance or contribute to the policy-making processes particularly at the level of the local government units*. As we all know, the concern of enhancing the adaptive capacities of the local communities, have already been mainstreamed in the national policies of the different Southeast Asian region. However, the project proponents believe that the target institutions should be the local government units which have the direct stake over the local communities that are adversely affected by the impacts of climate change.

Self-evaluation

The project team believes that it has successfully implemented the project not only based on the short-term or immediate outputs but the long-term benefits as well. Specifically, the project team has gauged the project implementation on the basis of the following indicators:

a) *Effectiveness* – the project objectives were achieved by the project team based on the planned targets, activities and timeframe
b) *Efficiency* – the planned activities and target objectives were all accomplished using the project funds that were allocated to the project. The project team was able to produce the expected outputs of the projects without entailing additional costs, and without time extension in the entire course of project implementation
c) *Relevance* – the project activities are all geared towards addressing the issues and concerns confronting the smallholder upland farmers in their agricultural production activities. Specifically, the training on appropriate climate change adaptation strategies was deemed appropriate considering the number of problems on agricultural production brought about by the impacts of climate change
d) *Sustainability* – the project implementation has engaged the active participation and support of the local government units which could serve as the strong allies of the smallholder upland farmers in addressing the impacts of climate change on their agricultural production. The active involvement of the local government units will ensure that mainstreaming climate change adaptation is being considered in the local policy making processes. This will later on pave the way for the institutionalization of localized climate change adaptation strategies.

Potential for further work

An impact evaluation of the three project sequels could be done in the next two years. Specifically, the impact evaluation will be done at the different levels and sectors that were involved in these projects either as direct beneficiaries or implementors as follows:

a) *Academic institutions*, particularly those who were involved as trainees of the national training courses on agroforestry, and climate change adaptation strategies. An impact evaluation of the training on their knowledge, skills and how these were applied in their own respective institutions. A follow-up of the re-entry plans that they have prepared during these training courses will likewise be part of the impact evaluation
b) *Farming communities*, particularly those who were trained on site-specific climate change strategies, they would be followed up whether they were able to apply their learnings on their own farms, and whether the showcase technologies and climate change adaptation strategies in the community projects that were established have been effective in enhancing the capacities of the farmer to adapt to the impacts of climate change
c) *Policy making body*, particularly the local government units, whether they have mainstreamed climate change in their local development programs

Ultimately, the project collaborators could work towards the establishment of "Agroforestry Learning Centers" (ALCs), which could be operated jointly by the local government units (for policy and institutional support), academic institution (for technical support), and the farmers (for the management and establishment support). These ALCs, which would be established with various modules, will serve as the learning laboratory of the students, farmers, practitioners and extension workers to help promote agroforestry as the key strategy to climate change mitigation and adaptation, while at the same time, serve as one of the income-generating activities of the concerned community or municipality/district.

Publications (please write the complete citation)
References

Acknowledgments

The project team acknowledges the academic institutions that served as local collaborators in project implementation, namely: Kalinga State College and University of the Philippines Los Banos-Institute of Agroforestry (in the Philippines); Lampung University (in Indonesia), and Tay Nguyen University (in Vietnam); the local government units of Kalinga Province particularly the municipalities of Tabuk, Balbalan and Rizal (in the Philippines); West Lampung District (in Indonesia); and Dak Nong Province/District (in Vietnam).

TECHNICAL REPORT

Minimum 15-20 pages (excluding appendix)

Preface

This project "***Communicating and Operationalizing Site-Specific Climate Change Adaptation Strategies in Vulnerable Communities in Southeast Asia***" has provided significant contributions in engaging the active involvement of the upland communities and the local policy making bodies towards articulating the field-level evidences of climate change, and addressing the problems brought about by climate change impacts. The project collaborators recognize the need for "communication and action" to be able to address the growing issues of climate change. This project served as a mechanism to establish the "connection and communication" between the farmers and policy makers, thereby, building partnership for future collaboration.

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1.0 Introduction

The recently-concluded project is the third sequel and Phase 3 of the previous APN-funded projects "Scaling-Up Agroforestry Promotion for Climate Change Mitigation and Adaptation in Southeast Asia", and the "Institutionalization of Agroforestry as a Climate Change Adaptation Strategy via Local Capacity and Policy Development in Southeast Asia. The previous projects dwelled on awareness-building and assessment of various farmer-led climate change adaptation strategies that work on-the-ground. These outputs will be communicated and operationalized in the selected vulnerable upland communities in the three member-countries of the Southeast Asian Network for Agroforestry Education (SEANAFE), namely: Indonesia, Philippines and Vietnam. This project promoted localized training of farmers on the most appropriate climate change adaptation strategies for their agricultural production systems and climate; established partnership with the local development organizations to help institutionalize the site-specific climate change adaptation strategies; implemented community projects that will serve as a showcase of various climate change adaptation strategies; and, produced information materials that would aid in the dissemination of the best practices in climate change adaptation.

This project is a regional collaboration of the three member-networks of the Southeast Asian Network for Agroforestry Education (SEANAFE), namely: Indonesia Network for Agroforestry Education, Philippine Agroforestry Education and Research Network, and the Vietnam Network for Agroforestry Education. The project aimed to: a) train farmer-trainers on various site-specific climate change adaptation strategies; b) produce the best practices on climate change adaptation strategies; and, d) implement one community project on enhancing adaptive capacities of the vulnerable upland communities in collaboration with the local government units or any local development organization.

The project team conducted a project meeting-workshop as its initial activity to level-off about the project deliverables and mode of operation. Localized training on site-specific climate change adaptation strategies were implemented involving the participation of the selected farmer-trainers in upland communities. The training was supplemented with the production of an information material about the best practices in climate change adaptation, which is a synthesis of the results of the previous two projects. Because this project aimed to build partnerships with the local organizations, a forum involving the local government units was organized in each of the three collaborating countries to work towards the institutionalization of appropriate and localized climate change adaptation strategies or mechanisms that would enhance the adaptive capacities of the upland communities. To be able to showcase the workability of the most simple and appropriate climate change adaptation strategy, one community project was established in the most strategic community in each of the three collaborating countries. This community project showcases the workable and appropriate climate change adaptation strategies.

Finally, this project produced the information material about the best practices in climate change adaptation that were documented in the project CBA2010-13NSY Tolentino. These information materials were translated in local version to intensify the promotion of different workable climate change adaptation strategies, particularly in Indonesia, Philippines, and Vietnam.

2.0 Methodology

With reference to the project objectives, the collaborators followed the following activities as part of its methodology:

1) ***Project team meeting-workshop***. The collaborators organized a project team meeting on August 15-17, 2013 in Ho Chi Minh City, Vietnam. The meeting served as a venue to level-off on the details of project implementation including the expected outputs and deliverables; develop country plans for the component activities of the project; and devise a project team plan and budget allocation for overall project implementation. The meeting was attended by Dr. Bao Huy of VNAFE, Dr. Christine Wulandari of INAFE, and Dr. Roberto G. Visco, Ms. Leila D. Landicho and For. Rowena D. Cabahug of PAFERN This meeting also served as a venue to draft the training design for the National Training of Farmers on Site-Specific Climate Change Adaptation Strategies.

2) ***National Training of Farmers on Site-Specific Climate Change Adaptation Strategies***. Training of farmer-trainers on site-specific climate change adaptation strategies aims to equip the farmers with the knowledge and skills in employing appropriate climate change adaptation strategies in their respective communities. Twenty-five (25) farmer-trainers from upland communities were selected as training participants based on the following criteria: a) currently engaged in agroforestry farm development; b) willingness and capability to share with other farmers the knowledge and learnings that would be gained from the training; and, c) availability. A two-day training was conducted, which revolved around the following methodologies:

   - ❑ Workshop, which served as an opportunity for the farmers to discuss among themselves their observed evidences of climate change, and their impacts to their agricultural production activities
   - ❑ Lecture-discussion, which dwelled on the concept, causes and impacts of climate change, and the different climate change adaptation strategies such as organic agriculture, agroforestry, and rainforestation, among others.
   - ❑ Field visit, which served as a cross-farm visit among the farmer-participants for them to observe some strategies that could help mitigate and/or enable them to adapt to climate change impacts
   - ❑ Re-entry plan preparation, which enabled the farmer-participants to draw up plans highlighting the most appropriate climate change adaptation strategies that could be employed in their farms, based from the lecture given to the m, and their field visit as well.

3) ***Forum with the local government units***. A forum with the local government units is intended to create awareness among the local executives about the concepts and issues of climate change, how the farming sector in their municipality experiences the impacts of climate change, and how the local government unit could help the farmers adapt to the impacts of climate change. At least 20 participants representing the local government units (where vulnerable upland communities are located) were invited to the forum. They include those from the units of the environment, agriculture, planning, and the office of the local executive who are directly involved in the policy-making processes. The forum dwelled on the presentation of the presentation of the recent trends in climate change and its impacts on agricultural production/farming sector based on those that were articulated by the farmers during the farmers' training; and, a workshop on identifying mechanisms and strategies towards enhancing the adaptive capacities of the farming communities within their jurisdiction.

4) ***Establishment of community projects showcasing workable/appropriate climate change adaptation strategies.*** From the action plans that were presented by the farmers during the Farmers' Training, the project team selected one farm where appropriate climate change adaptation strategies would be showcased. The selection of the farm where community projects were established, was based on the following criteria: a) willingness of the farmer; b) strategic location of the farm; and, c) representativeness of the farm in terms of the farming system/farm components. The project collaborators had initial reconnaissance of the farmers' farm to assess the extent of problems brought about by climate change impacts; and, suggest potential solutions and strategies to the farmers that could help them mitigate or adapt to the impacts of climate change. When the farmer agreed for his farm to become the site of the community project, farm planning was conducted with the active participation of the farmers.

5) ***Production of best practices of climate change adaptation.*** The outputs of the CBA2011-13NSYTolentino, particularly the documentation of climate change adaptation strategies in Indonesia and the Philippines, were translated into local dialects to facilitate the promotion and adoption of these strategies. Meanwhile, in Vietnam, where such initial activity was not conducted, a documentation of climate change adaptation strategies was conducted first and then the output was translated into their local version.

3.0 Results & Discussion

A. NATIONAL TRAINING OF FARMERS ON SITE-SPECIFIC CLIMATE CHANGE ADAPTATION STRATEGIES

The Participants

A total of 75 upland farmers were trained on the different climate change adaptation strategies. In Vietnam, the 25 farmer-participants came from Bu Nor Village and Dak R'Lap District, represented by the village heads, heads of the community forest management board; 16 villagers who are knowledgeable about the agricultural production in the village; commune officials in change of land administration, and representatives from the Department of Agriculture and Rural Development, and District Extension Station. Meanwhile, in the Philippines, the training participants represent the farmers of the upland communities in Kalinga Province/District, namely: Municipality of Balbalan, Kalinga; Municipality of Rizal, Balbalan, and Municipality of Rizal. In Indonesia, the 25 participants represent the Setia Wana Bakti HKm Group, Rimba Jaya HKm Group, Air Pakuan HKm Group, Rukum Lestari HKm Group and Harapan Lestari HKm Group. Thirty percent of the trainees were women who are members of the Kelompok Wanita Tani (KWT) or Farmer Women's Group of the HKm group.

Table 1. Number of training participants in each of the collaborating countries.

Collaborating countries	Participants	Total
Indonesia	25	75
Philippines	25	
Vietnam	25	

Evidences of climate change

Through a workshop, the farmer-participants were able to identify their observed indications of climate change in their own communities, and its impacts on their agricultural production. Results indicate that indeed, climate change is already being observed by the upland farmers. Climate change is indicated by the change in the temperature, delayed onset of rainy season, erratic rainfall, occurrence of strong and frequent typhoon, heavy rainfall in some areas. In sum, the normal rainfall and temperature pattern in the past were observed to have changed in recent years. In Vietnam, specifically, the climate is colder now than as usual. While there is less rainfall, the intensity is greater than normal. The farmers have also observed stronger and frequent typhoons. During the dry season, the temperature is hotter than as usual (Table 2). In the Philippines, particularly in Kaliinga Province, one of the highlands in Northern Philippines, the upland farmers have observed the long rainy season, unusual occurrence of crop pests and diseases, drought during summer/dry season, and long cold weather. Similarly, farmers in Indonesia have observed the erratic rainfall pattern and the unusual occurrence of pests and diseases.

Table 2. Evidences of climate change as observed by the upland farmers in the three collaborating countries (2014).

Country	Evidences/Indications of climate change
Vietnam	Colder than usual Stronger and more frequent typhoon Less rain but the intensity is greater than usual Hotter temperature during summer than usual
Philippines	Long rainy season Unusual occurrence of pests and diseases Drought during summer Long cold weather
Indonesia	Hotter temperature during summer than usual Drought during summer Less rain but the intensity is greater than usual Unusual occurrence of pests and diseases

Impacts of climate change on agricultural production

Table 3 shows that the upland farmers have already been experiencing the impacts of climate change on their agricultural production activities. In Vietnam, the much colder climate now has reduced the productivity of crops particularly the wetland/irrigated rice, including livestock. Meanwhile, the stronger and frequent typhoons have also led to crop failure as woody perennials such as rubber, cashew and coffee trees have been damaged. Specifically, the rubber trees have reduced the production of latex. Because of the erratic temperature and rainfall pattern, crop pests have also been observed attacking many crops. During the dry season, where temperature is much hotter than usual, the irrigation/water supply decreases, which also affects fruit trees such as cashew and coffee.

In the Philippines, on the other hand, the upland farmers in Kalinga Province have observed the rotting of vegetable crops, particularly beans, because of the long dry season. Vegetable crops are among the major crops of the farmers in Kalinga Province. There was an observed rapid incidence of insect pests that attack the annual crops such as rice, corn and vegetable crops, which led to crop damage. Consequently, the farmers spend extra costs for the additional farm inputs such as chemical pesticides to control insect pests. Meanwhile, the hotter temperature during the dry season stresses the vegetable crops, and thus, were observed to have stunted growth.

Finally, in Indonesia, the impacts are seen on the vegetable crops which are stressed with the too hot temperature. Meanwhile, there was an observed raid incidence of insect pests that damage rice, corn and cassava, including woody perennials such as rubber, coffee and cacao.

Table 3. Impacts of climate change on the agricultural production activities of upland farmers in the three collaborating countrie4s (2014).

Collaborating country	Crops affected by climate change	Impacts
Indonesia	Vegetable crops	Some crops were observed stressed because of the too hot temperature (drought) as indicated by stunted growth
	Rice, corn and cassava	Rapid incidence of insect pests and diseases has damaged most of the agricultural crops thus, reduces crop production. This also increases the expenses on farm inputs as the farmers have to spray more chemicals to control pests
	Rubber, coffee, and cacao	Increased incidence of harmful insects and diseases

Cont. Table 3

Philippines	Vegetable crops particularly beans	The long rainy season promotes rotting of vegetables particularly the beans, which are among the major crops of the upland farmers in Kalinga
	Rice, corn and vegetable crops	Rapid incidence of insect pests and diseases has damaged most of the agricultural crops thus, reduces crop production. This also increases the expenses on farm inputs as the farmers have to spray more chemicals to control pests
	Vegetable crops	Some crops were observed stressed because of the too hot temperature (drought) as indicated by stunted growth
Vietnam	Rubber, coffee, upland rice, cassava	Increased incidence of harmful insects and diseases
	Coffee, cashew, rubber, wheat, upland rice	Reduced growth and yield of crops
	Rattan, mushrooms, bamboo shoots, aquatic products	Affected the distribution, growth and seasonality

Climate change adaptation strategies

Despite the observed impacts of climate change on their agricultural production, the upland farmers in Kalinga Province, Philippines have yet to employ climate change adaptation or coping strategies, except for the use of water pump during drought, and the use of mechanical dryer for vegetable crops (Table 4). Perhaps, the lack of technical and financial capacity may have constrained them to employ strategies that could help address their problem. This implies, therefore, the need to build the capacities of the upland farmers in adapting to the impacts of climate change. Otherwise, they may be continuously experiencing declining crop productivity.

Table 4. Farmer-initiated coping strategies to climate change impacts in the upland communities in Kalinga Province, Philippines

Evidences of climate change	Effects/Impacts on Agricultural Production	Strategies Employed	Proposed Solutions	Rank (in terms of urgency and necessity)
Long rainy season	Vegetables particularly beans rot	Use of mechanical dryer during harvesting period only	Purchase of additional mechanical dryer which costs Php750000 to Php1.2M	1
			Construction of a warehouse	2
			Provide seed subsidy	2
Drought	Plants are stressed	Use of water pump	Purchase of water pump for the lowland areas and construction of small water impounding dam in the upland areas	1
Long cold weather	Plants are stressed	none	Technical training from concerned agencies	1
Rapid occurrence of pests	Low production and high expenses on farm inputs particularly insecticides	none	Technical training on the use of organic pesticides (botanical pesticides)	1
			Technical training on integrated pest management	2
Unpredicted change of weather conditions	Low quality of harvested crops	None		
	Unstable crop production	none	Need for technology transfer	1
Unusual occurrence of pests and diseases	Sheath blight Fungal diseases	none	Planting of recommended varieties	3
	Decline in crop production	none	Intervention of post-harvest faciltiies	6

The lecturers/trainors have provided some technical inputs during the training, which revolved around the menu of climate change adaptation strategies which could be employed by the farmers in their own field. These strategies include organic farming, integrated farming and agroforestry. *Organic farming* is being considered as a potential climate change adaptation strategy considering that it makes use of farm-based or local resources and inputs in farm development which are chemical-free (i.e. composts, litter as mulch, vermiculture, fruit juice extracts, etc). The practice would not contribute to greenhouse gas emission, and would lessen the cost of farm inputs as these are just sourced around the farm/community. Thus, any crop failure or crop loss brought about by the erratic rainfall and temperature pattern, would not significantly reduce farmers' income because of the lower input costs. In addition, organic farming promotes the use of botanical pesticides and planting of plants that could serve as alternate host of pests, or could repel the pests.

Meanwhile, *agroforestr*y, as a farming system, promotes the combination of annual agricultural crops and woody perennials and/or livestock/aquatic resources, which could lead to the conservation of resources and increase farm productivity. Because of the integration of different crops, agroforestry enhances the production of multiple crops and thus, ensures multiple harvests. The positive interaction of agricultural crops and woody perennials also ensures both production of goods provided by the annual crops and ecological services provided by the woody perennials.

The upland farmers have also visited the farms which employ climate change adaptation strategies to give them an idea on the potential strategies that could be applied in their own farms during their planning session. In Vietnam, the participants visited selected farms in Bu Nor Village, while those from the Philippines visited a private farm in Tabuk, Kalinga showcasing the integration of fruit trees, rice, aquaculture, vegetables, and winery. The farm showcases that indeed adoption of the farming system like agroforestry, is already a strategy to mitigate and adapt to the impacts of climate change. Meanwhile, in Indonesia, the farmer-participants conducted their field visit to Bina Wana HKm Group and KWT Melati in Tri Budi Syukur Village showcasing community forestry and agroforestry learning center.

Proposed mechanisms and strategies for climate change adaptation

Integrating their own practices and the technical inputs from the trainers, the participants were able to draw up plans in helping address climate change-related problems in their agricultural production system. Table 5a shows the existing farming systems or cultivation models of the farmers in the highlands of Vietnam, and the corresponding problems brought about by climate change. In an existing agroforestry model there seemed to be a problem on site-species matching because of the changing climate. The species planted may have been appropriate to the site conditions in the past. However, erratic climatic conditions have resulted in problem of species compatibility. Therefore, the farmer-participants proposed for the change in the cropping combination, particularly in integrating teak (a woody perennial) in the farming system. There have also been records of low productivity of fruit trees such as coffee, industrial trees such as rubber and annual crops such as rice, which are all planted in monoculture. The farmer-participants have proposed for the integration of other crop components particularly trees to serve as windbreaks and nurse trees to the associated agricultural and high value crops.

Meanwhile, Table 5b confirms that the upland farmers in Kalinga Province, Philippines simply lack the technical and financial capacities to employ climate change adaptation strategies as shown in Table 4.

Table 5b highlights that the farmer-participants have identified the need for training on integrated pest management and organic farming, to help them address the problem on insect/pest infestation. Furthermore, the proposed solutions require the purchase of infrastructure facilities to help address the problem on rotting of vegetable crops during the long rainy season, and the lack of irrigation/water during the dry season and drought. Having a Rank 1, these strategies are perceived to be very relevant and urgent which should be employed within one year.

In Indonesia, the proposed strategies revolve around the integration of appropriate species, particularly trees (woody perennials) that could help enhance the adaptive capacities of the farmers. It is noteworthy that the upland farmers have recognized the important role of trees not only in providing them the direct benefits such as food products, but also by ensuring the ecological services such as stabilizing the water source, which is one of the potential roles of the Arenga pinnata, an indigenous tree species. They have also identified the diversification of coffee species to ensure their competitiveness to the market; and, the integration of livestock and fishery as additional components of the existing agroforestry systems for additional source of food and income.

Table 5a. Mechanisms and strategies in adapting to the climate change impacts in Vietnam, 2014.

Existing farming systems	**Problems**	**Proposed strategies for implementation**
Mixed agricultural and forest tree species: cassava, rubber, cashew, litsea, avocado, jackfruit, coffee	Problem on site-species matching	Adjust mixed agroforestry model to: teak-cassava-pineapple and wheat-pineapple
Natural forest	Declining ground and surface water Declining non-timber forest products	Raising black fungus ganoderma on deadwood in the forests
Coffee tree + cashew in paddy field	Low yield of cashew Low productivity of coffee; soil erosion on cropped areas	Select tree species that would serve as windbreaks and will provide moisture for coffee such as (Acacia siamea)
Coffee monocultivation	Steep terrain, wind and changing climate affect the growth of coffee	Establish windbreak belt Develop into an agroforestry model: acacia siamea-pepper-coffee
Rubber plantation	Soil erosion Insect infestation	Integrate other components such as pineapple, livestock, grasses as soil cover to prevent erosion and as source of feeds Plant trees as windbreaks
Local varieties of upland rice cultivated on slopes	Poor soil	Develop into an agroforestry system with local or traditional rice variety mixed with other perennial crops such as teak

Table 5b. Mechanisms and strategies in adapting to the climate change impacts in Kalinga Province, Philippines, 2014

Cliimate change impacts on agricultural production	Proposed strategies and mechanisms for adaptation	Rank (in terms of urgency and necessity)
The long rainy season promotes rotting of vegetables particularly the beans, which are among the major crops of the upland farmers in Kalinga	Purchase of additional mechanical dryer which costs Php750000 to Php1.2M Planting of appropriate crop varieties	1
Rapid incidence of insect pests and diseases has damaged most of the agricultural crops thus, reduces crop production. This also increases the expenses on farm inputs as the farmers have to spray more chemicals to control pests	Technical training on the use of organic pesticides (botanical pesticides) and integrated pest management	1
Some crops were observed stressed because of the too hot temperature (drought) as indicated by stunted growth	Purchase of water pump for the lowland areas and construction of small water impounding dam in the upland areas	1
	Planting of appropriate crop varieties	2

Table 5c. Mechanisms and strategies in adapting to climate change impacts in Indonesia, 2014.

Existing farming systems	Problems	Proposed strategies for implementation
Natural forest	Declining ground and surface water	Enrichment planting with indigenous tree species such as Arenga pinnata Increasing post harvest of *Arenga pinnata* as high quality of brown sugar
Coffee tree + shading trees	Insect infestation Low productivity of coffee; soil erosion on cropped areas	Select tree species that would serve as shading trees and will provide moisture for coffee Diversification of coffee products such as kopi luwak for increasing the price of coffee
Rubber plantation	Soil erosion Insect infestation	Integrate other components such as cassava, livestock, grasses as soil cover to prevent erosion and as source of feeds

Existing farming systems	Problems	Proposed strategies for implementation
Local varieties of upland rice	Poor soil	Develop into an agroforestry system with local or traditional rice variety mixed with other perennial crops or fruit trees such as jack fruits, durian
Homegarden: Mixed agricultural and tree species: vegetables, cassava, avocado, jackfruit, coffee	Problem on site-species matching	Adjust mixed agroforestry model to: vegetables and tress mixed with livestock and fishery

B. FORUM WITH THE LOCAL GOVERNMENT UNITS

The primary objective of the forum is to create awareness among the local policy makers at the local government units about the growing concern on climate change and its impacts particularly to the farming sector. Specifically, this forum aimed to present the recent trends in climate change and its impacts in agricultural production/farming sector as articulated by the farmers during the conduct of the Farmers' Training; discuss mechanisms and strategies that will help enhance adaptive capacities of the farming communities; and, serve as a venue to draft local policies or programs that will help institutionalize climate change adaptation strategies for the farming/agriculture sector.

The Participants

With the forum aims, the project collaborators engaged the participation of key people involved in the local policy making processes. A total of 60 representatives from the different units of the local government units where vulnerable upland communities are located, served as participants to the Climate Change Forum (Table 6). In Vietnam, the 20 participants represent the different agencies of Dak Nong, namely: Department of Agriculture and Rural Development; Department of Forestry; Department of Forest Protection; Extension Center; Tuy Duc and Kien Duc DPC; Sub-Department of Agriculture and Rural Development of Tuy Dwc and Kien Duc District; Extension stations of Tuy Duc and Kien Duc District; Sub-FPD of Tuy Duc; Quang Tam CDC; Rubber Agricultural and Forestry Enterprise; and FLITCH Project of Dak Nong.

In the Philippines, the 20 participants represented the Office of the City Environment and Natural Resources of Tabuk; Office of the City Agriculturist of Tabuk; Office of the Planning and Development of Tabuk; Office of the Local Chief Executive; Village officials of Balbalan municipality; Office of the Municipal Agriculturist of Rizal; Office of Planning and Development of Rizal; and, Office of the Local Chief Executive of Rizal.

Finally, in Indonesia, the 20 participants came from the Provincial Forestry Agency, Communication of Community Forestry Forum, District Forestry Services, District Agriculture Services, District Plantation Services, Regional Development Planning Agency, District Plantation Services, District Environmental Services and District Policy Services.

Table 6. Number of participants to the climate change forum organized by CBA2013-10NSY Visco, 2014.

Collaborating country	Number of forum participants	Total
Indonesia	20	60
Philippines	20	
Vietnam	20	

How climate change has affected the farming communities?

The current scenario in farming communities was presented by the project collaborators to the local policy-making body, highlighting the field observations and experiences that were articulated by the upland farmers/ This is to ensure that the latter would have a greater appreciation of the present issues and concerns in agriculture/farming brought about by climate change. Table 7 summarizes these articulations. Overall, the agricultural production is highly affected by climate change as indicated by the attack of harmful insects, decline in crop growth and yield.

Table 7. Climate-change related problems being faced by the upland farmers in the three collaborating countries, 2014

Collaborating countries	Climate change related problems
Vietnam	The unusual changes of weather in the upland communities in recent years has increased the incidence of harmful insects on rubber, coffee and upland rice, including diseases such as fungus, powdery mildew on rubber, rust, waterlogged cassava
	The abnormal weather changes have affected the growth and yield of crops of many crops such as coffee, cashe3w, rubber, wheat, upland rice
	Climate change has caused the changes of the local conditions of the forest. These influenced the distribution, growth and seasonality of non-timber forest products such as rattan, mushrooms, bamboo shoots, and aquatic products on rivers and streams
	The more intensive rain has caused flooding in lowland areas along rivers and streams in the districts

Collaborating countries	Climate change related problems
Philippines	The long rainy season promotes rotting of vegetables particularly the beans, which are among the major crops of the upland farmers in Kalinga
	Rapid incidence of insect pests and diseases has damaged most of the agricultural crops particularly the vegetables, thus, reduces crop production. This also increases the expenses on farm inputs as the farmers have to spray more chemicals to control pests
	Some crops were observed stressed because of the too hot temperature (drought)
Indonesia	The unusual changes of weather in the upland in recent years has increased the incidence of harmful insects on rubber, coffee and cacao.
	The abnormal weather changes have affected the growth and yield of crops of many crops such as coffee, rubber, cacao
	Some crops were observed stressed because of the too hot temperature (drought)

Current initiatives in addressing the impacts of climate change

Recognizing the impacts of climate change in the agriculture sector, the local policy-making bodies at the local government units have had initial undertakings in order for the farmers to help mitigate or adapt to the impacts of climate change. In the Philippines, for instance, the main focus of the local government units is building the technical capacities of the upland farmers. For instance, the Office of the Municipal Agriculturist in partnership with the Department of Agriculture-Agricultural Training Institute implement the Farmer Field Schools which provides intensive training to the upland farmers about organic agriculture/farming (e.g. vermicomposting, IPM etc). In addition, information and education campaigns have been continuously being done by the local government units as regards tree planting and the proper solid waste management. Similarly, in Vietnam, the upland farmers are taught on the design of cultivation models which promote the reduction in the use of irrigation, chemical fertilizers, chemical pesticides and herbicides; intercropping coffee and avocado trees; agroforestry rather than monocropping.

In Indonesia, the representative from Disbun or the Plantation Services highlighted that there have been efforts made by the government of West Lampung as regards climate change adaptation. The HKm or farmers' group have also taken some initiatives to adapt to climate change impacts. These include the integration of livestock particularly goats, and coffee in the farming system; optimization of the plantation lands; planting of crop species that are suitable on steep slopes and have the ability to reduce carbon emission, while strengthening the slopes to prevent soil erosion. These species include cloves, nutmeg, and rubber grown together with coffee.

The way forward: enhancing the adaptive capacities of smallholder upland farmers

The workshop participants believed that a number of initiatives will still have to be done to enhance the adaptive capacities of smallholder farmers to the impacts of climate change. As such, they have lined up strategies that can be employed immediately or in the future depending on the urgency of the climate change-related problems of the farming communities.

Scoones (undated) highlight that there are important assets/capitals that should be enhanced to be able to implement a particular livelihood strategy. These include the physical assets/capital, natural capital, financial capital, human capital, and social capital. The natural capital includes soil, water, genetic resources and environmental services from which resource flows and services are useful for livelihoods. Meanwhile, financial capital includes the capital base such as cash, credit/debt and other economic assets which are essential for the pursuit of any livelihood activity. Human capital includes the skills, knowledge, ability to labor and good health and physical capability important for the successful pursuit of different livelihood strategies. Finally, social capital includes the networks, social claims, social relations, affiliations and associations upon which people draw when pursuing different livelihood strategies requiring coordinated actions.

Table 8a shows that in the Philippiines, the strategies are in line with the development of the five assets of the upland farmers to be able to enhance their adaptive capacities to climate change. Foremost, technical training, farmers' field school and information and education campaign about climate change are all geared towards developing the *human capital* or the capabilities of the upland farmers and other community members. This is an important aspect considering that the change in the behaviour or attitude of the farmer, particularly in adopting a particular technology or intervention depends largely on his/her knowledge, perception and mindset. Second is the enhancement of the *natural capital* such as the existing farms and farming systems of the upland farmers. These include among others, the integration of fruit trees in the existing annual crop production systems of the upland farmers in Kalinga Province. Integrating woody perennials would mean additional source of food and income, and protection and other ecological services to the annual crops and the farmers as well.

Third, the *social capital* will also need to be established within and among the community members (bonding capital), and with other organizations outside the community (bridging capital), thus, the need to strengthen collaborative efforts with non-government organizations and other agencies. This is also the reason why the workshop participants have also identified a multisectoral collaboration in the implementation of their indicative plan (Table 8a). The social capital serves as the safety nets of the community members in times of disaster and need for various types of resources.

The fourth important asset that has to be strengthened is the *physical capital,* which is oftentimes, very limited or absent in the upland farming communities because of their geographical location. These include the need to establish post-harvest facilities for their perishable vegetables which are easily rotten by the long rainy season, and easily infested by insect pests; the need to install water impounding dams to facilitate irrigation of the vegetable crops especially now that there has been an erratic rainfall and temperature patterns.

Finally, the *financial capital* plays an important role in adapting to the impacts of climate change, which is why one of the strategies for climate change adaptation is to engage in other livelihood activities (e.g. food processing) that would provide additional source of income for the farming communities. The implementation of the plans lined-up in Table 8 requires financial capital from all agencies concerned particularly the local government units , the Department of Environment and

Natural Resources, Department of Agriculture, state colleges and universities, and the farming communities as well.

Table 8a. Towards enhancing the adaptive capacities of smallholder upland farmers for climate change impacts in Kaling Province, Philippines, 2014

Climate Change-Related Problems	Proposed strategies to enhance farmers' adaptive capacities	Policy requirement	Agencies concerned
Rotting of vegetable crops because of long rainy season	Technical training IEC on climate change mitigation and adaptation strategies Farmers' field school on organic farming Seminar and training on natural composting and vermicomposting Implement agroforestry systems by integrating woody perennials particularly fruit trees Provision of planting materials particularly fruit trees and forest trees Livelihood training on food processing Strengthen collaborative efforts with different agencies and NGOs Empower stewardship agreements with communities through the community-based forest management Establishment of sustainable community barangay nursery projects Adoption of alternative solutions to solid waste management Provision of post-harvest faciltiies Ensure sustainability of the organic agriculture programs Close monitoring of regular community clean up	Community-based initiative through the passage of enabling ordinances	Local government units, Department of Environment and Natural Resources, Agricultural Training Institute, academic institutions, Department of Trade and Industry , farming communities
Crops are stressed because of drought		Adoption and local implementation of the Organic Agriculture Act of 2010	
Rapid incidence of pests and diseases		Construction and maintenance of municipal nursery	
Low crop production because of the pests		Formulate SB Ordinance to ensure sustainability of the program on organic agriculture	
High expenses of farm inputs because of pest incidence			

Meanwhile, Table 8b shows that the workshop participants in Vietnam have identified the strategies that could mitigate and adapt to the impacts of climate change. Unlike in the Philippines where plans cut across the technical and non-technical strategies, those that were identified in Vietnam are more technical in nature (Table 8b). For instance, they have recognized the need to plant more perennial trees as these would help in carbon sequestration, and therefore, could help mitigate climate change. In addition, they proposed for the rehabilitation of riverbanks , forests and watershed considering the ecological services that they provide. On the other hand, the climate change adaptation strategies that were identified include crop diversification, particularly those that are resistant to pests and diseases; engaging in sustainable farming systems; exploring the potentials of non-timber forest tree species, and industrial crops such as rubber.

Table 8b. Towards enhancing the adaptive capacities of smallholder upland farmers in the highlands of Vietnam.

Impacts of climate change on agricultural production	**Proposed strategies that could mitigate climate change**	**Proposed climate change adaptation strategies**
Climate change increases crop pests, especially in monocultivation	More perennial tree species are encouraged in farming systems to increase capacity of CO_2 absorption	- Variety selection and types of crops that are resistant to pests and diseases. Structure of seasonal plants should be suitable. - Types of crops should be mixed towards reasonable agroforestry. - Perennial systems of tree species to retain moisture, windbreaks, and water retention should be developed - Sustainable farming systems, of which focusing on environmental factors should be taken into account.
Weather changes affect the growth and productivity of plants		
Local forest conditions have changed leading to change in distribution, growth and seasonality of non-timber forest products, aquatic products in rivers and streams.	Protection and development of forests to increate CO_2 absorbed and to protect watershed should be considered.	Natural forest should be enriched by valuably indigenous species, NTFP, and species as food for wildlife.
Flooding and landslide in depression areas have occurred.	Forest rehabilitation and reforestation in watershed areas, along rivers and streams to protect water source should be considered.	The local people are advised not to cultivate crops in low depression areas, and along streams in the rainy season.

The workshop participants in Indonesia have lined up a number of policy recommendations that could lead towards strengthening the adaptive capacities of the upland farmers with the concerned districts.

1. Update the Forestry Reparda or the Regional Regulation Plan, a draft policy that is in line with the REDD. This plan should address the current scenario at the national and provincial levels

2. Representative from BP4K expressed the need to educate people about climate change and REDD. In case a climate change policy will be drafted, the Forestry Extension Services should take part in the climate change adaptation programs, particularly in creating awareness among the concerned stakeholders.

3. While the Agriculture Services of West Lampung District have been promoting agroforestry as key strategy to climate change adaptation, their efforts are concentrated only on the lowland areas particularly on the privately-owned/titled farmlands. There have yet to be any initiatives along this line for the forest or upland areas, which are not within their areas of concern. Hence, it was recommended that the climate change policy that will be drafted should stipulate the roles and functions of the concerned departments and units of West Lampung District so that no direct or indirect stakeholder will be excluded from the policies and programs. In addition, the efforts in climate change adaptation should be made via multisectoral partnership considering the scope and extent of impact to agriculture sector.

4. Capacity-building should be an important component of the climate change adaptation policy that would be drafted for West Lampung District

5. There is an urgent need to finalize the draft policy on climate change adaptation via the Forestry Ranperda or Regional Regulation Plan. The draft Ranperda needs updating particularly as regards the technical information about climate change, issues and other provisions. This policy will be very relevant as this planned for mainstreaming in the forest management sector in Lombok Barat District-Nusa Tenggara Barat Province in Indonesia.

6. The policy development on climate change adaptation should be done consistently with the polices on agriculture, plantation, food security and environmental regulations programs of the government

7. The climate change adaptation policy should be translated into a Peraturan Desa or Village Regulation to enhance the customary practices and active involvement of the indigenous people in the climate change adaptation efforts

8. The policy development should done through the Ranpeda in collaboration with BP4K or Extension Center of West Lampung District.

C. ESTABLISHMENT OF COMMUNITY PROJECT SHOWCASING WORKABLE AND APPROPRIATE CLIMATE CHANGE ADAPTATION STRATEGIES

One on-site demonstration farm which serves as the "community project" aims to showcase the most appropriate and workable climate change adaptation strategies that could possibly be adopted by the farmers within the community.

THE CASE OF INDONESIA

In Indonesia, the community project was established in West Lampung District with an altitude ranging between 500-1000 meters above sea level. According to Oldeman and Las Devies (1999), the area is classified as Climate Type A. Temperature regimes range from hot on the coastal plain to cold in hilly areas. Rainfall is between 2500 to 3000 mm per year in Balalau and Sumberjaya Distribt. The farmers cultivate coffee, cacao, rubber, jackfruit, and avocado. They also raise fish pond and goats and chickens.

The community members, however, have been experiencing climate change in their areas, particularly the changing rainfall and temperature patterns. Specifically, in Kapuas Hulu District, it is now very difficult to ascertain the onset of the rainy and dry season. In the past, March-August is considered as the dry season and the rest of the year is considered as rainy months. In recent years, however, it is difficult to predict the rainy season. This change has affected the planting and harvesting of crops, and consequently the quality and volume of production.

The farmers have employed coping strategies such as crop diversification, providing intensive inputs to crops through regular fertilization, canopy stratification arrangements. The farmers claimed that these strategies have been effective in improving the yield and quality of agroforestry products. This is confirmed by the study conducted in Lampung Province (Wulandari et al 2011). The farmers likewise integrate livestock and fish (agrisilvipasture and agrisilvifishery); planting along the riverbanks to prevent soil erosion and for additional household income. However, the farmers could not manage the incidence of pests and diseases.

The project team from the Indonesia Network for Agroforestry Education (INAFE) proposed some climate change adaptation strategies that are appropriate to the prevailing biophysical and socioeconomic conditions of the upland communities in West Lampung District. These are as follows:

1) Crop diversification, particularly those species that are appropriate to the site conditions. To optimize crop growth, the team has recommended the use of mycorrhiza prior to planting.
2) Considering the presence of rivers and creeks, the team has also recommended for the integration of agrisilvipasture and agrisilvifishery. Aside from serving as additional sources of income, the interaction of this component to the existing farming system would lessen the farm input costs of the farmers. For instance, the livestock manure can be used as organic fertilizers for crops
3) Strengthening the capacity of the farmers to market the agroforestry products.

The agrisilvipasture technology was implemented by the farmers' group in Air Pakuan and Harapan Lestari (Figures 1 and 2), while the silvofishery was established by Haparan Lestari in Simpangsari Village surrounding the forest area Register 45B, and Air Pakuan in Village Sukapura surrounding forest area Register 44B (Figures 3 and). Meanwhile, the nursery was established by the group of Rukun Lestari HKm (Figure 5) and Setia Wana Bakti HKm Group (Figure 6).

Figure 1. Goats as a component of Agrisilvipasture being showcased by the Air Pakuan Group

Figure 2. Agrisilvipasture system being showcased by the Forest Register 44B

Figure 3. Agrisilvifishery system being showcased by Harapan Lestari HKm Group

Figure 4. Agrisilvifishery system being showcased by Forest Register 45B

Figure 5. Nursery developed by Rukun Lestari HKm Group

Figure 6. Nursery developed by Setia Wana Bakti HKm Group

THE CASE OF VIETNAM

The village that was selected as the on-site demonstration area is Bu N Dor, which belongs to Quang Tam Commune, Tuy Duc District in Dak Nong Provice. This area is typical of Central Highlands of Vietnam which is collected to Cambodia. The topography of the area is mainly mountainous with a slope ranging from 15-20^{o} and is about 870 meters above sea level. The average temperature is 22.2C, while the average rainfall is 2.413mm with a maximum rainfall of 106mm. Rainy season prevails in March until November. The main stream is the stream system Dak R'Lap, Dak R'Tih, Dak Lung Dak Long, hence watershed management is necessary.

Bu N'Dor village occupies a land area of 818 hectares for agricultural production. It has a total of 395 households. Among the crops cultivated are paddy rice (14 has), shifting cultivation area (146 has), rubber (100), coffee (328), and cashew (230 has). As in the other communities in Southeast Asia, Bu N'Dor farmers have already been experiencing climate change impacts such as increasing incidence of pests particularly in farms with monocultivation; reduces growth and productivity of coffee and cashew; change in the distribution, growth and seasonality of non-timber forest products, aquatic products in rivers and streams; flooding and landslides; soil erosion, land degradation in shifting cultivation due the change in rainfall intensity.

Among the climate change adaptation strategies that were proposed by the VNAFE team are as follows:

1) FLITCH project to invest in planting Litsea to improve farmers' garden using agroforestry
2) Integration of coffee, cashew, rubber and macadamia
3) Planting of new breed of coffee (TR 4-9, 11, 13) which is resistant to rust
4) Growing vegetables on a small-scale level
5) Agroforestry development using the following crop combinations: Litsea, cassia siamea, durian, avocado, and jackfruit
6) Growing of acacia and Cassia siamea as windbreaks belt for rubber
7) Enrichment planting using dipterocarps, Hopea odorata, Cassia (in small areas)

To monitor the extent of project implementation, the project team of VNAFE together with the community members drafted an action and monitoring plan (Table 9).

Techniques to improve cultivation, natural resource mgt	**Indicators: Scale, time**	**Number of Household involved or community**	**Location**	**Monitoring**	**Assumption, conditions**	**Stakeholder support**	**Priority**
Feeding wild boar combined with local pigs in the forest	2 wild board + 4 local pigs (4/2014 – 4/2019)	Community	In the forest allocated to community	4 Leaders of forest protection team and the Board of Forest Community Management	Forest allocated to community	VNAFE	6) 2

Lingzhi mushroom, black fungus on a fallen tree in the forest	100 fallen woods x 4 team (5/2015 – 5/2018)	4 teams of forest protection	Nearby stream Dăng Blát	4 Leaders of forest protection team and the Board of Forest Community Management	Forest allocated to community	VNAFE	**5**
Agroforestry: Teak + Pineapple + Cassava	5 households: Nsế, Điểu Sen, Điểu Hương, Điểu Bốt, Điểu Phương (1ha/household, from 5/014)	5 households	On farmer garden	Farmer association at village	Famer who has suitable land	VNAFE	**1**
Agroforestry: Coffee + Cassia siamea + Pepper	5 households, 1ha/household, (from 5/2015)	5 households	On the cofffee monocultivation of the household	Farmer association at village	Famer who has coffee garden	Extortionist of commune and district	**3**
Rubber + Pineapple + Windbreak + Grazing	5 households, 1ha/household, (from 5/2015)	5 households	On the rubber monocultivation of the household	Farmer association at village	Famer who has rubber which is older than 3 years	Extortionist of commune and district	**4**

THE CASE OF THE PHILIPPINES

The province of Kalinga is situated in northern Philippines and is administratively under the Cordillera Administrative Region (CAR). It is a landlocked province which is characterized with sharp-crested interlinking mountain peaks, steep slopes, isolated flatlands. A sizeable 85.96% of the total land area has been declared under the Revised Forestry Code inalienable and disposable or public land leaving only 14.04% as alienable disposable. This can be counted as a major issue aside from the inaccessibilty attributed by the terrain of the province. Barangay Pinukpuk is one of the upland villages in Kalinga Province. Majority of the people are engaged in farming as their primary source of livelihood.

Among the crops grown are vegetable crops , upland rice, corn, banana, coconut, fruit trees such as mango, citrus, jackfruit, and forest trees. Because of the relatively steep slopes of the farm, soil erosion has become a problem among the upland farmers in the village. Aside from the physical damage to crops, the declining soil fertility has also become a cause of declining production. The changing land use is also being observed in the Province. Previously, the province of Kalinga is known for the cultivation of coffee. However, because of the fluctuating market prices, most of the farmers have shifted to monocropping of corn. This has posed problems on the soil conditions, considering that corn is highly dependent on external inputs, and considering the topography of the agricultural landscape. This problem is being aggravated by the climate change phenomenon.

The upland farmers have observed the rotting of vegetable crops, particularly beans, because of the long dry season. Vegetable crops are among the major crops of the farmers in Kalinga Province. There was an observed rapid incidence of insect pests that attack the annual crops such as rice, corn and vegetable crops, which led to crop damage.

Consequently, the farmers spend extra costs for the additional farm inputs such as chemical pesticides to control insect pests. Meanwhile, the hotter temperature during the dry season stresses the vegetable crops, and thus, were observed to have stunted growth. This is especially true considering that the general agricultural landscape in the province is considered as rainfed areas (without irrigation facilities).

Given this scenario, the project team conducted a reconnaissance visit to the representative farms and selected the farm of Mr. Uldarico Cosaldo as the on-site demonstration farm considering the strategic location of the farm and the willingness of the farmer to serve as the co-operator. The strategic location of the farm plays an important role in the establishment of demonstration farm as this would facilitate the frequent cross-farm visits of other upland farmers, and therefore, this could aid in the promotion and adoption of appropriate climate change adaptation strategies. While the farm has a size of 50 hectares, the farming system that the farm-owner employs is very much simple and easy-to-be-adopted by the smallholder farmers.

Presently, the relatively flat portion of the farm is planted to cash crops such as vegetables and corn, banana and some fruit trees (Figure 7), while the areas with steep slopes are mostly planted to fruit trees and other woody perennials including forest trees (Figure 8). The farmer makes use of organic fertilizer, particularly chicken dung, which is being bought from another community. Because the crops are also consumed by the family, the farmer does not apply chemical pesticides and inorganic fertilizers. The integration of woody perennials and annual agricultural crops (also termed as agroforestry) is already considered as a climate change adaptation strategy of the farm-owner, which is why, he could not really observe the decline in farm income or crop productivity because of the variety of harvests he gets from his farm (Figure 9).

Figure 7. Cash crops such as banana are planted in relatively flat areas

Figure 8. Fruit tree species are planted in rolling and steep slopes portion of the farm

Figure 9. The farm is composed of vegetables, corn, peanut, fruit trees and forest trees

However, considering the vulnerability of his farm to soil erosion, the project team members from PAFERN and the local collaborating school Kalinga State College, proposed for the establishment of the following interventions in his farm, which could be showcased to the other farmers within the community:

Table 9. Proposed solutions/interventions to the current biophysical conditions of the selected demonstration farm

CURRENT BIOPHYSICAL CONDITIONS OF THE DEMONSTRATION FARM	PROPOSED SOLUTIONS
Scarcity of water supply during the drought seadon and abundant water supply flowing in the creeks during the rainy season	Establishment of water catchment which could serve as the water source during the dry season. The overflowing water from the creek could be diverted to the water catchment during the rainy season when water is very abundant (Figure 10)
	Establishment of fishponds which could serve as the additional income-generating project of the family
Soil erosion	Establishment of hedgerows and planting of native fruit-bearing trees along the alleys to control soil erosion (Figure 11)
	Construction/Establishment of structures (made of locally-available materials) as soil and water conservation measure (e.g. balabag, rockwall)
Low level of soil fertility	Planting of nitrogen-fixing plants
	Construction of vermicomposting (Figure 12) which could serve as the source of organic fertilizer of the farmer. He does not have to buy from other places
Inadequate vegetation cover of the area	Adoption of the rainforestation technology

Figure 10. Water catchment/impounding dam that could store water during the rainy season

Figure 11. Utilization of native species of trees (forest and fruit trees) as hedgerows to control

Figure 12. Vermicomposting as a source of organic fertilizer

D. CLIMATE CHANGE ADAPTATION STRATEGIES IIN SELECTED COMMUNITIES: LOCAL VERSIONS

The climate change adaptation strategies of selected farmers in Indonesia and the Philippines that were documented by CBA2011-13NSYTolentino were translated by the project collaborators into the local version as an additional output of this project. The said translation was done to ensure the utility of the research results. This will be disseminated to the upland farmers in both countries. Meanwhile, in Vietnam, the documentation was done only during the current project, as it was not included in the previous APN-funded project. Thus, the collaborator from Vietnam has come up first with the best climate change adaptation strategies, which will be translated also in their local version. Copies of the outputs are appended in this report.

4.0 Conclusions

This project concludes and confirms that, indeed, climate change is already being observed and experiences by the smallholder upland farmers based on their own observations on the field. The impacts of climate change are already visible in the agricultural production activities of the farmers. The farmers need to strengthen/enhance their technical and financial capacities to employ appropriate climate change adaptation strategies, because as it is, most of them were not fully aware about the potential strategies, and do not have the financial capacity to employ such. These strategies are recognized by the farmers as very relevant and urgent to help them address their problems.

The local government units, on the other hand, are aware about the issues and impacts of climate change, but the policies towards enhancing the adaptive capacities of the agriculture sector to climate change impacts are not yet in place. They do recognize, however, the need for such policies to be able to institutionalize programs and projects that would help address climate change-related problems.

The establishment of on-site demonstration farms offer potentials and opportunities for the promotion of appropriate climate change adaptation strategies. The partnership of the young collaborators and the farmers in assessing the current farming system, identifying the problems, and determining the proper/appropriate interventions, is indeed a healthy and productive undertaking. Both learned from each other, such that the collaborators who are the technical experts could have an idea about the actual conditions on field, could propose recommendations for improvement, but at the same time, they learn also from the field experiences of the farmers. This mechanism that was employed by the project team has enhanced the capacity development.

5.0 Future Directions

An impact evaluation of the three project sequels could be done in the next two years. Specifically, the impact evaluation will be done at the different levels and sectors that were involved in these projects either as direct beneficiaries or implementors as follows:

d) *Academic institutions*, particularly those who were involved as trainees of the national training courses on agroforestry, and climate change adaptation strategies. An impact evaluation of the training on their knowledge, skills and how these were applied in their own respective institutions. A follow-up of the re-entry plans that they have prepared during these training courses will likewise be part of the impact evaluation
e) *Farming communities*, particularly those who were trained on site-specific climate change strategies, they would be followed up whether they were able to apply their learnings on their own farms, and whether the showcase technologies and climate change adaptation strategies in the community projects that were established have been effective in terms of enhancing the capacities of the farmer to adapt to the impacts of climate change
f) *Policy making body*, particularly the local government units, whether they have mainstreamed climate change in their local development programs

Ultimately, the project collaborators could work towards the establishment of "Agroforestry Learning Centers" (ALCs), which could be operated jointly by the local government units (for policy and institutional support), academic institution (for technical support), and the farmers (for the management and establishment support). These ALCs, which would be established with various modules, will serve as the learning laboratory of the students, farmers, practitioners and extension workers to help promote agroforestry as the key strategy to climate change mitigation and adaptation, while at the same time, serve as one of the income-generating activities of the concerned community or municipality/district.

References:

Scoones, Ian. (undated). Sustainable rural livelihoods: A framework for analysis. IDS working Paper 72. In: http://www.ids.ac.uk/files/dmfile/Wp72.pdf (accessed on April 30, 2014)

Appendix 1a

Conferences/Symposia/Workshops

TRAINING OF FARMER-TRAINERS ON SITE-SPECIFIC CLIMATE CHANGE ADAPTATION STRATEGIES IN KALINGA PROVINCE, PHILIPPINES

January 12-14, 2014
Kalinga Apayao State College
Tabuk, Kalinga

RATIONALE

Climate change is indeed a real phenomenon, and has in fact, become a global problem because of its impacts to the society. In the agriculture/farming sector, experiences from the field highlight the negative impacts of climate change on agricultural production. The smallholder upland farmers, are more vulnerable to the impacts of climate change because of their production orientation, their limited capital, and limited provision of social and technical services because of their location or inaccessibility, among others.

There is no way out to climate change. The very least thing that we can do is to adapt to its impacts. Thus, it is hightime to build and enhance the adaptive capacities of the smallholder farmers to climate change impacts. Thus, this training is being organized by the Philippine Agroforestry Education and Research Network (PAFERN) and the Kalinga Apayao State College (KASC) to equip the upland farmers with the knowledge, skills and attitude in adapting to the impacts of climate change. Specifically, this training aims to: a) discuss the different climate change adaptation strategies that are appropriate to the conditions of agricultural production in Kalinga Province; and, b) produce action plans that are geared towards the implementation of climate change adaptation strategies in the farms of the farmer-participants.

PARTICIPANTS

Five farmer-trainors from the five upland municipalities of Kalinga will serve as the training participants. The five upland municipalities include: Rizal, Balbalan, Tabuk, Pasil and Pinokpok. The participants will be selected based on the following criteria: a) currently engaged in agroforestry farm development; b) willingness and capability to share with other farmers the knowledge and learnings that would be gained from the training; and, c) availability.

SCHEDULE OF TRAINING ACTIVITIES

The training will be conducted on January 12-14, 2014. Participants are expected arrive in the afternoon of January 12, 2014. Please see below the detailed training schedule.

SCHEDULE	ACTIVITY	METHODOLOGY	PERSON/S RESPONSIBLE
January 12, 2014 (Sunday) PM	Arrival and Billeting of Participants		
8:00 – 8:30AM	Opening Ceremonies		
	• Invocation • National Anthem • Introduction of participants • Welcome Message • Message • Group Photo		KASC Staff KASC Dr. Eduardo T. Bagtang Dr. Roberto G. Visco
8:30 – 9:00	Expectation Setting	Workshop via metacards	Facilitators from PAFERN/IAF
9:00 – 10:00	Evidences of Climate Change and Its Impacts on Agricultural Production of the Farmer-Participants: Workshop	Workshop via metacards	Facilitators from PAFERN/IAF and Participants
10:00 – 10:30	Presentation of Workshop Outputs		Participants
10:30 – 11:30	Concepts and Issues of Climate Change (Lecture-Discussion)	Lecture-discussion/ participatory	KASC Faculty Member
11:30 – 12:00	Discussion/Open Forum		
12:00 – 12:30	Lunch		
1:00 – 2:00	Organic Farming as a Climate Change Adaptation Strategy	Lecture-discussion/ participatory	KASC Faculty Member
2:00 – 3:00	Integrated Farming and Agroforestry: Their Roles in Climate Change Adaptation	Lecture-discussion/ participatory	IAF
3:00 – 4:00	Adapting to Climate Change Impacts via Rainforestation	Lecture-discussion/ participatory	KASC
4:00 – 5:00	Farmer's Experiences in Adapting to the Impacts of Climate Change	Sharing of experiences	Mr. Arthur Delson Agroforestry Practitioner
6:00 onwards	Socials/Fellowship		KASC

SCHEDULE	ACTIVITY	METHODOLOGY	PERSON/S RESPONSIBLE
7:30– 12:00	Visit to the Agroforestry Farm (where the community project/demo farm on climate change adaptation strategies will be showcased later)	Sharing of experiences	Participants
	Lunch and back to KASC		
1:30 – 2:30	Farmers' Planning (outputs will highlight how they will share their learnings to their fellow farmers; and what strategies will they employ in their farms to adapt to climate change impacts	Workshop	Participants and Facilitators
2:30 – 4:00	Presentation of Plans		
4:00 – 5:00	Closing Ceremonies Departure		

LIST OF PARTICIPANTS

Name of Participant	Address
1. Arthur Dalsen	Tabuk City, Kalinga
2. Michelle Barila	Tabuk City, Kalinga
3. Minerva Bakiran	Tabuk City, Kalinga
4. Jean Sacki	Tabuk City, Kalinga
5. Luzviminda Valderama	Tabuk City, Kalinga
6. Mauricia Cabannag	Tabuk City, Kalinga
7. Joseph Dacio	Tabuk City, Kalinga
8. Visitacion Aguilar	Tabuk City, Kalinga
9. Freda Ladinao	Tabuk City, Kalinga
10. Honorio Clemencia	Rizal, Kalinga
11. Ferdinand Bawiit	Rizal, Kalinga
12. Henry Angli	Rizal, Kalinga
13. Teddy Kub-ao	Rizal, Kalinga
14. Gabriel Dalipog	Rizal, Kalinga
15. Dante Boyag	Rizal, Kalinga
16. Severino Gonayon	Rizal, Kalinga

Name of Participant	Address
17. John Gunnawa	Rizal, Kalinga
18. Gerry Bagsao	Balbalan, Kalinga
19. Danilo Danilo	Balbalan, Kalinga
20. Benjamin Encartado, Sr.	Balbalan, Kalinga
21. Marcelino Alejandro	Balbalan, Kalinga
22. Ruben D. Ongat	Balbalan, Kalinga
23. Jessie Nagayang	Balbalan, Kalinga
24. Johnny Carillo	Balbalan, Kalinga
25. Jun Gumabay	Balbalan, Kalinga

Appendix 1b.

Agenda of

Training of Farmers on Site-Specific Climate Change Adaptation Strategies through *Hutan Kemasyarakatan* (Community Forestry) Program

Sekincau-West Lampung, Indonesia 24-26 September 2013

First Day. Tuesday, 24 September 2013

Time	Agenda	PIC
08.30-09.15	Opening Ceremony 1. Remarks by Head of West Lampung Forestry Office 2. Welcome Speech by Local Government of West Lampung District 3. Opening Speech by or Watershed Management Office or BPDAS Way Seputih Way Sekampung	Rini Pahlawanti MC : Eni Puspa Moderator: Dr.Pitojo Budiono
09.15-09.30 09.30-12.00	*Coffee break* Session 1. 1. Climate Change Adaptive Strategies on Agricultural and Forestry Sector (Dr. Christine Wulandari) 2. Appropriate Nursery and Patterns of Agroforestry on Supporting Climate Change Adaptation Strategies (Ir. Idi Bantara/BP DAS WSS) Discussion	Moderator: Dr.Pitojo Budiono

12.30-13.00	*Lunch break*	
13.00-17.00	Session 2 1. Agroforestry as Integrated Agriculture Technique: socio-economic aspect (Rommy Qurniati, S.P., M.Si) 2. Agroforestry as Integrated Agriculture Technique: Mychorriza and others root-development technique (Dr. Melya Riniarti) 3. Integrated Pest Management on Agroforestry, (Surnayanti, S.Hut.,M.Si)	Moderator: Eny Puspa
	Coffe break	
	Discussion	Moderator

Second Day. Wednesday, 25 September 2013

07.30 – 17.00	Fieldtrips to Bina Wana – HKm Farmer Group in Tri Budi Syukur Village, Sumber Jaya	Sunarni Widyastuti
	Site 1 : agroforestry pattern and climate change adaptation strategy	• Eni Puspa • Idi Bantara • Christine Wulandari • Dishut Lambar
	Site 2 : HKm farmer group development on related to climate change adaptation strategy	• Dr. Pitojo Budiono • Dr. Agus Setiawan • Rini Pahlawanti • Dishut Lambar/ penyuluh
19.00 – 21.00	Group discussion on Draft Development of Agroforestry Planning Strategies on Climate Change Adaptation	1. Dr. PitojoBudiono 2. Dr. AgusSetiawan 3. Dr. Christine W 4. Idi Bantara 5. EniPuspa 6. RiniPahlawanti

Third Day. Thursday, 26 September 2013

08.00 – 13.00	Presentation on Draft Development of Agroforestry Planning Strategies on Climate Change Adaptation by 5 (five) HKm Farmer Group	Rini Pahlawanti
13.00-14.00	*Lunch break*	
14.00 – 16.00	Revision and finalization on 5 (Five) Draft Development of Agroforestry Planning Strategies on Climate Change Adaptation	
16.00 – 16.15	*Coffee break*	
16.15 – 17.00	Certificate distribution to training participants Training Synthesis and Announcement of Agroforestry Demplot Planning Closing remarks by Lampung Provincial Forestry Office	Sunarni Widyastuti

Appendix 1c

1.1 Venue and timing

- The training held at the meeting room of Quang Tam commune, Tuy Duc district, Dak Nong province.
- Time: 03 days, from 28 to 30 November 2013

1.2 Materials for training

- Workbook on "Climate change mitigation and adaptation through agroforestry" prepared by Prof. Dr. Bao Huy and Dr. Vo Hung with 30 pages of A4 size.

2 CONTENTS AND METHODS OF THE TRAINING

2.1 The contents

2.1.1 Main contains provided and shared by trainer

- ❑ Climate change
  - + Concept
  - + How to know climate change
  - + The situation of climate change in recent years in Vietnam in general, the provinces beloning to Central Highlands including Dak Nong province in particular
  - + The impact of climate change on the livelihoods and AFP
  - + Ethical issues in climate change
- ❑ Mitigation and adaptation to climate change
  - + How to mitigate climate change
  - + How to adapt to climate change
- ❑ Impacts of climate change on agriculture and forestry production at the local and strategic solutions
  - + Some issues in farming of the community related to climate change
  - + Climate change increase crop pests - Solution
  - + Weather changes affect growth and crop yields - Solution
  - + Local conditions change of forest caunses changes in the distribution, growth and seasonality of non-timber forest products, fisheries in rivers and streams - Solution
- ❑ Common solutions to adapt to climate change in agriculture-forestry production in upland

2.1.2 Group exercise and room discussion

The following topics were discussed:

- ❑ The phenomenon of climate change locally in recent 10 years - Causes and Effects
- ❑ The main types of farming – Problem, limitation – Solutions for improvement

2.2 Methods

Learner-centered trading method (LCTM) was used during training. The combining presentation with examples of local practice and discussion provided an opportunity for participants to share experiences and to better understand climate change and its impact on agricultural and forestry production in the local. Trainer assigned brainstorming exercises as an opportunity for attendee presenting their opinions and comments which were noted in the whole discussion. Applying the method of illustrated visually through watching the documentary movie with theme of Forest with climate change - FAO copyright movie.

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LIST OF PARTICIPANTS

Id	Full name	Position	Institution/Location
1	Điểu Lơm	Farmer	Bu Nor Community Forest Management Board
2	Điểu Lanh	Chair	Bu Nor Community Forest Management Board
3	Điểu Bích	Farmer	Bu Nơr Village, Quảng Tâm Commune
4	Điểu P'reo	Farmer	Bu Nor Community Forest Management Board
5	Điểu Nơi	Vice Chair	Bu Nor Community Forest Management Board
6	Thị B'Lơm	Farmer	Bu Nơr Village, Quảng Tâm Commune
7	Điểu Luân	Farmer	Bu Nor Community Forest Management Board
8	Điểu Chân	Farmer	Bu Nor Community Forest Management Board
9	Điểu Khăn	Farmer	Bu Nor Community Forest Management Board
10	Phạm Văn Phúc	Farmer	Bu Nơr Village, Quảng Tâm Commune
11	Phạm Xuân Nuy	Farmer	Bu Nơr Village, Quảng Tâm Commune
12	Lê Vũ Tí	Staff	Land Administration of Quảng Tâm Commune
13	Điểu Kâu	Farmer	Bu Nor Community Forest Management Board
14	Thị Ru	Farmer	Bu Nơr Village, Quảng Tâm Commune
15	Điểu Sranh	Farmer	Bu Nơr Village, Quảng Tâm Commune
16	Điểu Sen	Farmer	Bu Nơr Village, Quảng Tâm Commune
17	Điểu Thân	Farmer	Bu Nơr Village, Quảng Tâm Commune
18	Điểu Tinh	Farmer	Bu Nơr Village, Quảng Tâm Commune
19	Vũ Văn Tuấn	Staff	Farmer association of Quang Tam commune, Tuy Duc district, Dak Nong province
20	Điểu N'Sế	Village Leader	Bu Nor Community Forest Management Board
21	Trần Văn Tâm	Staff	Agriculture and Rural Development Station of Tuy Duc District
22	Đặng Văn Huyến	Staff	Extension Stations of Tuy Duc District
23	Nguyễn Đức Định	Lecturer	Tay Nguyen University
24	Ng Công Tài Anh	Staff	FREM, Tay Nguyen University
25	Nguyễn Thế Hiển	Staff	FREM, Tay Nguyen University

Appendix 2a.

TOWARDS MAINTREAMING CLIMATE CHANGE ADAPTATION IN THE LOCAL GOVERNMENT PROGRAMS: A FORUM WITH THE LOCAL GOVERNMENT UNITS IN KALINGA PROVINCE

January 15, 2014
Kalinga Apayao State College
Tabuk, Kalinga

RATIONALE

In the Philippines, most of the local government units have already been implementing programs on climate change adaptation in response to the Climate Change Act. Most of these climate change adaptation strategies, however, are non-agriculture in nature, but rather focuses on the disaster and risk preparedness for their constituents. It is also hightime to put efforts in enhancing the adaptive capacities of the agriculture sector, particularly the smallholder farmers, who are most vulnerable to the impacts of climate change.

This forum is being organized to create awareness among the local policy makers about the growing concern on climate change and its impacts on the farming sector. Specifically, it aims to: a) present the recent trends in climate change and its impacts in agricultural production/farming sector; b) discuss mechanisms and strategies that will help enhance adaptive capacities of the farming communities; and, c) serve as a venue to discuss possibility of drafting local policies or programs that will help institutionalize climate change adaptation strategies for the farming sector.

PROGRAM

SCHEDULE	ACTIVITIES	METHODOLOGY
8:00 am	Registration of participants	
8:30 – 9:00	Opening Ceremonies and Forum Overview	
9:00 – 10:00	Presentation of the Recent Trends in Climate Change and Its Impacts in Agriculture Sector	Discussion
10:00 – 10:30	Discussion/Open Forum	
10:30 – 12:00	Identifying Mechanisms and Strategies Towards Enhancing Adaptive Capacities of the Farming Communities	Plenary/Workshop/ Discussion
12:00 – 1:00	Lunch	
1:00- 2:30	Moving Forward: Possibility of drafting local policies towards institutionalizing localized climate change adaptation strategies	

LIST OF PARTICIPANTS

NAME	OFFICE
1. KENNETH DALE C. MANGAOANG	Municipal Mayor, Balbalan, Kalinga
2. ERIC GONAYON	Vice Mayor, Balbalan, Kalinga
3. ABRAHAM AROMIN	SB Chairman on Environment, Balbalan, Kalinga
4. REX DULANSI	SB Chairman on Agriculture, Balbalan, Kalinga
5. SONIA DUGCOY	MPDC Officer, Balbalan, Kalinga
6. LILIA SAGAUN	Municipal Agriculturist, Balbalan, Kalinga
7. RENATO C. VICENTE	Vice Mayor, Rizal, Kalinga
8. FRANK WILSON P. WAD-ASEN	SB Chairman on Environment, Rizal, Kalinga
9. PONZ ANTHONY L. ORODIO	SB Chairman on Agriculture, Rizal, Kalinga
10. ISABELO M. DAWATON, Sr.	MPDC Officer, Rizal, Kalinga
11. CYNTHIA A. VICENTE	Municipal Agriculturist, Rizal, Kalinga
12. FERDINAND B. TUBBAN	City Mayor, Tabuk City, Kalinga
13. DARWIN ESTRAÑERO	City Vice Mayor, Tabuk City, Kalinga
14. GEORGE ANDRES M. PADALLA	City Env't & Natural Resources Officer, Tabuk City, Kalinga
15. FATIMA SOLIMEN	City Agriculturist, Tabuk City, Kalinga
16. ARLES JOSE	City Disaster Risks, Reduction Mgt Officer, Tabuk City, Kalinga
17. JAY WACNAGAN	City Planning & Dev't Officer, Tabuk City, Kalinga
18. LORNA GUIANG	
19. ANTONIO BAKILAN	SB Chairman on Environment, Tabuk City, Kalinga
20. TINA DUYAN	DAR Provincial Office, Tabuk, Kalinga

Appendix 2b

FORUM WITH THE LOCAL GOVERNMENT UNITS

"STATUS AND DEVELOPMENT OF LOCAL GOVERNMENT POLICY ON CLIMATE CHANGE AND ITS CORRELATION TO AGROFORESTRY"

In Liwa, West Lampung District, Lampung Province

16 December 2013

ACTIVITIES	METHODOLOGY	EXPECTED OUTPUT
Presentation of the Recent Trends in Climate Change and Its Impacts in Agricultural Production/Farming Sector	Plenary Presentation	Awareness among the LGU Executives or representatives about the impacts of climate change in the farming sector
OPEN FORUM/DISCUSSION		
Identifying Mechanisms and Strategies Towards Enhancing Adaptive Capacities of the Farming Communities	Plenary Workshop	List of mechanisms and strategies
Drafting of Local Policies or Programs Towards Institutionalizing Localized Climate Change Adaptation Strategies	Workshop or Plenary Workshop	Draft local policies or resolutions

Appendix 2c

FORUM WITH THE LCOAL GOVERNMENT UNITS FOR THE INSTITUTIONALIZATION OF LOCALIZED CLIMATE CHANGE ADAPTATION STRATEGIES

The "*Forum with the local government units for the institutionalization of localized climate change adaptation strategies*" was held by Tay Nguyen University under funded by Asia – Pacific Network for Global Change Research – APN through consultant of the Vietnam Network for Agroforestry Education – VNAFE. The forum involved technical staff and managers of different agencies from district and provincial levels.

The purpose of the forum are i) to discuss impacts of climate changes on agricultural and forestry activities at the location; to find out and analyze policies of agricultural and forestry management; and to support techniques to mitigate and adapt to climate changes. With the available policies the requests of policy and technical support to sustainably develop and adapt to climate change in the location were identified.

This report summarized progress, contents, methods, and the results of the forum in different sessions below.

The objectives of the forum aimed to:

- Analyze and detect negative impact of climate changes to agro-forestry activities at the location.
- Discuss and recommend solutions to improve policies of management and technical support in agro-forestry development. This aims to adapt and mitigate impact of climate changes at the local belonging to Dak Nong province.

The participants of 20 peope came from different agencies of Dak Nong including:

- Department of Agriculture and rural development: 01 person
- Department of forestry: 01 person
- Department of forest preotection (FPD): 01 person
- Extension center: 01 person
- Tuy Duc and Kien Duc DPC: 02 persons* 2 districts = 04 persons
- Sub-Department of Agriculture and rural development Of Tuy Dwc and Kien Duc district: 02 persons * 2 district = 04 persons
- Extension stations of Tuy Duc and Kien Duc district: 02 persons * 2 district = 04 person
- Sub FPD of Tuy Duc: 01 person
- Quang Tam CDC: 01 person
- Rubber Agricultural and Forestry enterprise of Tuy Duc: 01 person
- FLITCH Project of Dak Nong: 01 person
- Venue: The meeting room number 1 of Tuy Duc DPC, Dank Nong province

Timing: 27 November 20013

The main contents discussed in this forum as follows:

1. How the climate changes have influenced to Agriculture and Forestry production in the location of Dak Nong in general and in Tuy Duc District in particular.
2. The relevant management policies and technical supports for famers to adapt and mitigate to climate change in AFP were listed.
3. Orientation solutions for mitigating and adapting in AFP in the location was recommended.
4. The gaps in institutionalization and policy and technical support to adapt and mitigate were identified.

The methods were used during the form composed of

- Input report presented using Power Point with visual pictures as illustration
- Brain storming
- Group discussion using analysis tool of two field: Policy and technique; be existed – have not yet existed
- Room discussion along with feedbacks from participants combined as the final result.

LIST OF PARTICIPANTS

Id	Full name	Position	Institution/Location
1.	Nguyễn Hữu Huân	Vice of Chair	District authority of Tuy Duc, Dak Nong province.
2.	Phạm Tấn Minh	Staff	Extension Center of Dak Nong Province
3.	Kiều Quí Diện	Chair	Quang Tam authority commune
4.	Mai Ngọc Tân	Vice Director	Tuy Duc Agriculture and forestry and Rubber state company
5.	Đậu Xuân Toàn	Staff	Extension Station of Tuy Duc District
6.	Nguyễn Thị Nhàn	Staff	Tuy Duc District
7.	Võ Công Quang	Staff	FLITCH Project at Đak Nong Province
8.	Đặng Văn Cương	Staff	Agriculture and Rural Development Station of Tuy Duc Districts
9.	Nguyễn Đức Định	Lecturer	Tay Nguyen University
10.	Ng. Công Tài Anh	Staff	FREM, Tay Nguyen University
11.	Nguyễn Thế Hiển	Staff	FREM, Tay Nguyen University
12.	Đinh Gia Thủy	Staff	Department of Agriculture and Rural Development of Dak Nong Province
13.	Nguyễn Đình Thắng	Staff	Department of Forest Protection of Dak Nong Province

14.	Hồ Ngọc Đại	Staff	Department of Forest Development of Dak Nong Province
15.	Trần Văn Tâm	Staff	Agriculture and Rural Development Station of Tuy Duc District
16.	Đặng Văn Huyến	Staff	Extension Stations of Tuy Duc District
17.	Điểu Plé	Vice of Chair	Dak RTih Government Commune
18.	Vũ Văn Tuấn	Staff	Quang Tam farmer Association
19.	Lê Vũ Tí	Staff	Land administration of Quang Tam Commune
20.	Điểu Sơn	Staff	Land administration of Dak RTih Commune
21.	Bảo Huy	Assoc.Prof.Dr.	FREM, Tay Nguyen University
22.	Võ Hùng	Dr.	FREM, Tay Nguyen University

Appendix 2 *Funding sources outside the APN*

Indonesia	Lampung University	For allowing to use the official time of the faculty members (including the collaborator) in the project implementation without additional compensation
		Use of computer facilities, cameras and other equipment
Philippines	University of the Philippines-Institute of Agroforestry	For allowing the use of the official time of the researchers in the project implementation without additional compensation
		Use of computer facilities, cameras and other equipment
	Kaliinga Apayao State College	For allowing the use of its facilities during the conduct of the National Training of Farmers on Climate Change Adaptation Strategies; and the Forum with the Local Government Units
Vietnam	Tay Nguyen University	For allowing the use of the official time of the researchers in the project implementation without additional compensation
		Use of computer facilities, cameras and other equipment

Appendix 3. List of Young Scientists Involved in Project Implementation

Country	Name and Institution	Nature of involvement
Philippines	Leila D. Landicho Institute of Agroforestry, UPLB	Technical support in all aspects of project implementation; workshop and training facilitator
	Rowena D. Cabahug Institute of Agroforestry, UPLB	Workshop and training facilitator
	Roselyn F. Paelmo Institute of Agroforestry, UPLB	Training Resource Person, and workshop facilitator
	Emerson V. Barcellano Kalinga Apayao State College	Local field coordinator of all project components
Indonesia	Pitojo Budiono Lampung University	Training facilitator
	Eny Puspa Lampung University	Training facilitator

Appendix 4. List of acronyms

ALCs	Agroforestry Learning Centers
INAFE	Indonesia Network for Agroforestry Education
KWT	Kelompok Wanita Tani
LGU	Local Government Unit
PAFERN	Philippine Agroforestry Education and Research Network
SEANAFE	Southeast Asian Network for Agroforestry Education
VNAFE	Vietnam Network for Agroforestry Education