Enhancing Local Adaptive Capacities of Selected Upland Farming Communities in Southeast Asia: Lessons and Experiences

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ABSTRACT

This article highlights the experiences and lessons generated by the project collaborators in enhancing the adaptive capacities of selected upland farming communities in Southeast Asia. The project collaborators employed capability building programs, such as farmers' and technicians' training, local climate change awareness programs, cross-farm visits, demonstration plots showcasing agroforestry technologies as climate change adaptation (CCA) strategies, and linking science with policies. The outcomes of the project indicate that this program was able to enhance the local adaptive capacities of the upland farming communities by building their key community assets, creating knowledge and information, initiating innovations, strengthening institutions, and initiating forward-looking decision making and governance. The lessons and experiences generated from these initiatives could serve as important reference for scaling up the project. The outputs and outcomes of the capacity development initiatives have generated lessons that could contribute to the body of knowledge in CCA, particularly on enhancing the adaptive capacities for CCA.

Keywords: agroforestry, policymaking processes, communicators, upland farming communities, scaling up

JEL Classification: Q230

INTRODUCTION

In 1992, the United Nations Framework for Climate Change (UNFCC) defined climate change as a "change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." Accordingly, the discourse on climate change heightened when the Intergovernmental Panel for Climate Change (IPCC) issued its 2001 Assessment Report, highlighting, among others, that "yields of some crops in tropical agricultural areas decrease with even minimal increase in temperature because they are near the maximum temperature tolerance. Where there is also a large decrease in rainfalls in subtropical and tropical dryland/rainfed systems, crop yields would even be more adversely affected" (IPCC 2001). Among the projections and predictions of climate change experts is that agriculture and food security in Asia would be highly vulnerable to the impacts of climate change. Specifically, crop yield would decline, which may put millions of people at risk from hunger; soil moisture would decrease while evapo-transpiration would increase, which may worsen land degradation and desertification; and agricultural productivity would increase in the northern areas (UNFCCC 2007).

Climate change is now a real phenomenon. Consequently, agriculture-dependent regions such as Southeast Asia are among the most vulnerable to climate change impacts. Climate change is already being experienced in the agriculture sector, particularly in the upland farming communities in Southeast Asia. Tolentino and Landicho (2013) highlighted that the smallholder upland farmers in the Philippines and Indonesia have been experiencing abnormal rainfall and temperature patterns, which have greatly affected their agricultural production. Among these effects include higher incidence of pests and diseases, low crop productivity/yield, stunted crop growth, delays in fruiting and harvesting, and declining quality of farm product. All of these have led to increased labor costs and lower farm income. These findings are consistent with the claim of Altieri and Koohafkan (2008) that most climate change models predict that the small farmers, particularly those engaged in rainfed agriculture, would bear the brunt of the negative impacts of climate change.

Poor developing countries are vulnerable to climate change because of their geographic exposure, low incomes, and greater reliance on climate-sensitive sectors, such as agriculture. People exposed to the most severe climate-related hazards are often those who are least able to cope with the associated impacts due to their limited adaptive capacity (Davies, Ostwald, and Mitchell 2009). Many capacity building initiatives such as farmers' training, policy forum, climate change awareness program, information dissemination activities, and other related programs are seen to be valuable ways of promoting climate change adaptation (CCA) strategies that would pave the way for enhancing farmers' adaptive capacity. However, on-the-ground promotion of these CCA strategies is vital to ensure that farmers would adopt the appropriate farming technologies and practices.

Consequently, the Southeast Asian Network for Agroforestry Education (SEANAFE), through its national networks, namely, the Philippine Agroforestry Education and Research Network (PAFERN), Indonesia Network for Agroforestry Education (INAFE), Lao Network for Agroforestry Education (LaoNAFE), and Vietnam Network for Agroforestry Education (VNAFE), embarked on a capacity development program for local climate change communicators in order to enhance the adaptive capacity of upland communities in Southeast Asia. Recognizing

smallholder farmers' capability to experiment on the appropriate CCA strategy, their ability to teach other farmers, and the effectiveness of farmer-to-farmer-teaching, the proponents deemed it necessary to develop farmers' capacities for CCA. The capacity development program ran for six years in five phases, with funding support from the Asia-Pacific Network for Global Change Research (APN). The first phase commenced in 2010–2011, and the last phase was implemented from 2015–2016.

This article is founded on the local adaptive capacity (LAC) framework of Jones, Ludi, and Levine (2010). In particular, the framework argues that there are five elements contributing to adaptive capacity:

1. asset base or access to appropriate resources, which strengthens the ability of a system to cope with the effects of climate change and wider development pressures;
2. knowledge and information, which include understanding the adaptation options and the ability to assess and implement appropriate interventions;
3. innovation or the ability to alter existing practices, resources, and behaviors and to adopt new ones;
4. institutions or the rules that govern the system; and
5. flexible and forward-looking decision making and governance.

Following this theoretical framework, the project collaborators implemented capacity development programs that revolved around asset building, creating knowledge and information, innovation, strengthening of institutions, and forward-looking decision-making processes toward enhancing the adaptive capacities of the upland farming communities in Southeast Asia. This article then highlights the experiences of the project collaborators in implementing the activities aimed toward enhancing the adaptive capacities of the upland farming communities in the Philippines, Lao PDR, Indonesia, and Vietnam.

METHODOLOGY

One upland farming community in each of the four collaborating countries served as the sites of the capacity development programs. The study sites were selected based on the willingness of the community, experiences of the upland farming communities in climate change impacts, and the willingness of the local government unit to collaborate. Among the approaches applied were training of farmers, technicians, and lecturers; establishing agroforestry demonstration plots; and conducting farmer cross-farm visits, local climate change awareness program, and a policy forum with the local policymakers. These approaches are anchored on the five elements of LAC framework that was used by Jones, Ludi, and Levine (2010). The lessons garnered from the project implementation were distilled through a workshop among the project partners.

RESULTS AND DISCUSSION

Building Key Assets/Capitals of the Upland Farming Communities

Landicho (2016) argues that the quality of manpower is very critical in agricultural production. Therefore, human capital is the primary community asset that should be developed among the upland farming communities. Human capital includes knowledge, skills, experiences and capabilities of an individual to perform a specific task. Human capital is vitally important for an organization's success (Crook et al. 2011); human capital increases through education and experience (Arthur and Sheffrin 2003).

Accordingly, the human capital development component of the program was centered on the key actors in upland farming communities, namely, farmers, extension officers, and the state universities.

The farmers and technicians were trained on site-specific CCA strategies to equip them with the knowledge and skills in employing appropriate CCA strategies in their respective communities, and in communicating climate change issues and strategies to other community members. Meanwhile, agroforestry lecturers in state universities were trained on the potentials of agroforestry as a climate change mitigation and adaptation measure. The trainings revolved around the following methodologies:

1. Workshops served as a venue for the farmers to discuss their observed evidence of climate change and the corresponding impacts of these changes in their agricultural production activities.
2. Lecture-discussion dwelt on the concept, causes, and impacts of climate change, and the different CCA strategies such as organic agriculture, agroforestry, and rainforestation, among others.
3. Field visits or cross-farm visits were done among the farmer-participants such that they can observe the strategies that could help mitigate and/or enable them to adapt to climate change impacts.
4. Re-entry plan preparation, which enabled the farmer-participants to develop their own plans and would highlight the most appropriate CCA strategies that could be applied to their respective farms.

Coping with and adapting to the impacts of climate change require safety nets. Accordingly, the social capital of the individual farmers (in particular) and the community (in general) is one form of such safety net. Social capital refers to the communication and interaction among the communities, participation in group activities, and partnership with external organizations (Landicho 2016). Lin (2001) in Lin (2005) highlighted that social capital are resources that are embedded in one's social networks, and such resources can be accessed or mobilized through ties in the networks.

There are two levels of social capital: bonding social capital, and bridging social capital. Bonding social capital exists within a community, and it enables the community members to get by within that community. On the other hand, bridging social capital refers to the extra-community networks that enable individuals to tap outside sources of information, support, and resources in order to be able to get ahead (Cramb 2004).

In this program, bonding social capital was enhanced through the establishment of community demonstration plots. This initiative enabled the community members to contribute efforts and share resources in establishing and maintaining the agroforestry demonstration plots. Meanwhile, bridging social capital was formed through the local partnerships developed among state universities, farming communities, local government units, and project collaborators.

The farms cultivated by the farmers, the river, creeks and springs, forest, and other natural resources in the community utilized by the farmers for their livelihoods are all considered as their natural capital (Landicho 2016). Natural capital is the natural environment that provides life-sustaining goods and services (ESDA 2001 as cited by Voora and Venema 2008). Accordingly, the project implementers established demonstration plots that showcased agroforestry technologies (Figures 1–3) and CCA strategies (Figures 4–6), and used these demonstration plots as the primary strategy to enhance the natural capital of the selected upland farming communities.

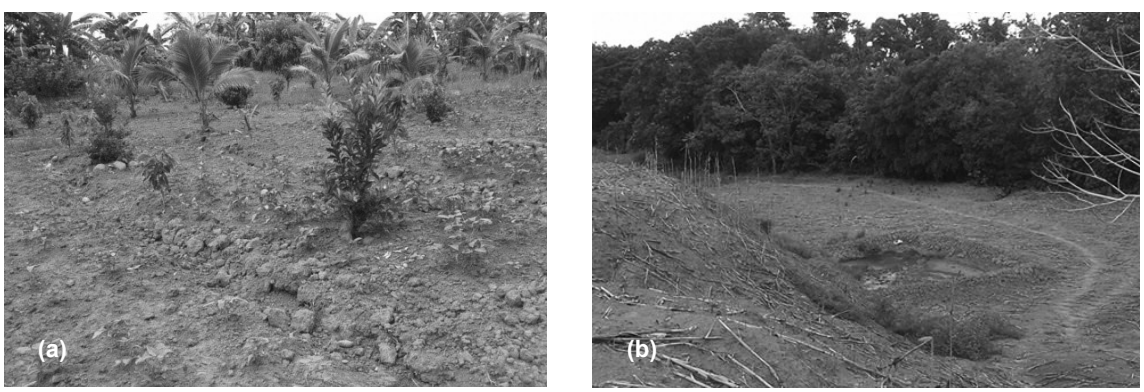
Figure 1. Demonstration plots established in Vietnam

Note: Integration of rubber, coffee, and macadamia

Figure 2. Demonstration plots established in Indonesia

Notes: (a) Agrisilvipasture system of agroforestry
(b) Agrisilvi system of agroforestry

Figure 3. Demonstration plots established in the Philippines



Notes: (a) Crop diversification, particularly integration of native tree species to control eroson
(b) Establishment of catchment ponds

Figure 4. CCA strategies showcased in the study sites in the Philippines

Notes: (a) Establishment of contour hedgerows
(b) Construction of rainwater harvesting facility

Figure 5. CCA strategies showcased in the Indonesia study sites

Notes: (a) Aqua-silvicuture
(b) Goat production

Figure 6. CCA strategy showcased in the Central Highlands of Vietnam

Note: Agroforestry development using the following crop combinations: litsea, cassia siamea, durian, avocado, and jackfruit

Creating Knowledge and Information

The body of knowledge and technologies that guarantee sustainable farming in the uplands is extensive. However, such usually do not reach the farmers because of inadequate extension services (Carandang, Tolentino, and Roshetko 2006; Van Noordwijk et al. 2008). With climate change aggravating the existing constraints to productivity of farmers and with the need to ensure the ecological integrity of upland farming communities, extension workers are all the more needed in such areas.

Carandang et al. (2016) emphasize that communicating climate change-related information is the best strategy to effect changes among concerned stakeholders. Moser and Dilling (2010) also argue that communicating climate change is essential because not all have noticed and have experienced climate change; the lack of direct experience makes climate change a problem that requires explanations from those who have expert knowledge and experiences. Visco, Landicho, and Cabahug (2014) also confirm that farmers are the best source of on-the-ground experiences on climate change and could serve as the best communicators of climate change information to other farmers within their community. Because farmers have directly experienced and observed the impacts of climate change on agriculture, they are more likely to adopt CCA strategies, considering that agriculture is their main source of income. Tolentino and Landicho (2013) cited that smallholder upland farmers in the Philippines and Indonesia have been employing their own CCA strategies without technical assistance from extension agencies. These measures include changing cropping patterns, planting different crop varieties, practicing agroforestry, and engaging in nonfarm activities.

Smallholder farmers may not have the scientific knowledge of climate change issues and impacts; but their experiences on the field with regard to the impacts of climate change on their agriculture production make them good candidates as climate change communicators to other farmers and members of the local farming communities. The collaborators of this capacity building program have seen the benefits of training farmers to be local climate change communicators. Farmers can easily communicate with other community members because they share the same symbols and languages; therefore, they can reflect on the needs and aspirations of the communities. In addition, they know and have practical experiences of the local conditions.

In the program, a total of 119 upland farmers and agricultural technicians were trained to be local climate change communicators (Table 1). The trainors' training focused on different climate change issues, climate change mitigation and adaptation strategies, and communication-building skills. Table 2 shows that the local climate change communicators were able to re-echo their training to a total of 205 individuals—comprising of students, farmers, agricultural technicians, and faculty members—through the local climate change awareness program that had been organized in each of the four collaborating countries.

Communicating climate change related information requires information materials and visual aids that would help to create awareness among the stakeholders. These information materials should be simple and be easily understood by a layman. Thus, the project collaborators in the four countries came up with their own versions of information materials, which were subsequently used in the implementation of the local climate change awareness initiatives. These information materials were developed and produced in collaboration with the participants or trained local climate change communicators.

On a broader scale, however, raising awareness and transferring knowledge do not

Table 1. Number of participants who were trained as local climate change communicators

Collaborating Countries	Participants
Indonesia	30
Lao PDR	24
Philippines	22
Vietnam	33
Total	119

Table 2. Number of participants trained by local climate change communicators

Collaborating Countries	Participants
Indonesia	38
Lao PDR	42
Philippines	90
Vietnam	35
Total	205

directly change behavior nor do they guarantee that the information and knowledge will be translated into action (Mosser and Dilling 2010; Mwazi and Ndokosho 2011). For a more effective communication and engagement, Mosser and Dilling (2010) contend that policy, infrastructure, and economic changes should also be established. They believe that communication for social change should consist of efforts that would motivate people to make a change.

As such, the project team organized policy forums with the local government and implemented local climate change awareness initiatives as well. The forum enabled the program implementers to promote awareness among the local executives about the concepts of and issues on climate change, how the farming sector in their municipality experiences the impacts of climate change, and how the local government could help the farmers to adapt to the impacts of climate change.

Karuhanga, Kiptot, and Franzel (2012) argue that in most developing countries, the factors constraining effective agricultural extension include the large number of poor farmers with small plots in geographically dispersed communities and the underdeveloped transport and communication infrastructure in the farming communities. Thus, using the farmer trainers' approach can ensure widespread and rapid agricultural knowledge diffusion. Kaminski (2011) cite Roger's theory of diffusion, which places peer networks as an important construct. The innovators and the early adopters, who serve as the opinion leaders, play a critical role in the innovation adoption process as they spark the initial take-off point. They influence their peers through peer communication, role modeling, and networking. Thus, the concept of farmer-to-farmer communication and learning is founded on this theory.

Meanwhile, Article 6 of the Climate Change Convention on education, training, and public awareness specifies the importance of communicating climate change to the general public. Specifically, this provision urges governments to develop and implement educational and public awareness programs on

climate change and its effects, to ensure public access to information, and to promote public participation in addressing the issue.

Accordingly, two major local public awareness activities were implemented in the program—the national agroforestry roadshows, and local climate change awareness initiatives. The national agroforestry roadshows, also known as caravan or motorcade, served as an information campaign to make the public aware about the potentials of agroforestry as a climate change mitigation and adaptation measure. These roadshows involved different sectors such as national government agencies, local government units, nongovernmental organizations, students, farmers, research institutions, international organizations, private organizations, and academic institutions. Experts then shared their research and field experiences in climate change and agroforestry, which helped the public become aware about the negative impacts of climate change and disseminate information on how agroforestry could help humanity, particularly farmers, to cope with the phenomenon. A policy brief was also developed as an instrument for lobbying to national and local policymaking bodies on mainstreaming CCA in their development programs.

Initiating Innovations

Afzal (1995), as cited by Khan et al. (2009), argue that using extension methods, such as establishing demonstration plots, can be an effective approach to introduce the findings of modern agricultural research. In their study, Khan et al. (2009) found that using demonstration plots can be an effective means to create awareness among farmers about modern technologies. Likewise, it also motivates them to apply these technologies to their own farming practices.

In the program, three agroforestry learning laboratories (ALLs) were established in the Philippines to showcase alley cropping system and rainwater harvesting. Alley cropping is designed for farms with gentle-to-steep slopes. The importance of contouring was highlighted in the demonstration farm, which utilized *Gliricidia sepium* as the contour hedgerows. Meanwhile, alleys were planted to vegetable crops. Rainwater-harvesting ponds were also constructed in the program site to serve as water sources for the long dry seasons. In Vietnam, the ALLs were established in Bu Nor village in Quang Tam commune, Tuy Duc district, Dak Nong province. The area is characterized by paddy rice and shifting cultivation area integrated with rubber, coffee, and cashew. Meanwhile, silvipastoral system (trees with livestock) and agrosilvofishery system (trees with aquatic resources) served as the ALL in Indonesia; goat was used as the primary livestock component. Establishing goat farms was seen as a feasible CCA strategy in the district due to the forage/grasses in state forests and clan forests. The farmers can likewise produce organic fertilizers from goat manure, which can be used in their crop farming. Meanwhile, agrosilvofishery system was established because of the availability of water resources in the community.

These cropping combinations fall under the farming system of agroforestry. Agroforestry is a dynamic, ecologically based natural resource management system that deliberately combines woody perennials with herbaceous crops and/or animals either in some form of spatial arrangement or temporal sequence on the same land. It aims to diversify and sustain production to increase social, economic, and environmental benefits (ICRAF 2007; Lundgren and Raintree 1983). Lasco and Visco (2003) also highlight that agroforestry usually has two or more species of plants (with at least one woody perennial), has two or more outputs, has longer than one cycle, and has significant interactions between woody and non-woody components.

The project team recommended practicing agroforestry to the upland farming communities due to its immense potential as a CCA strategy. Tolentino et al. (2010) highlight the potentials of different agroforestry systems in carbon sequestration, ensuring food security, improving biological conditions, and improving farm income in different provinces in the Philippines. They further argue that agroforestry is a key CCA strategy because it provides multiple harvests at different times of the year. Likewise, the diverse combination of crops can help to buffer its practitioners from the risk of income loss due to climate variability, price variability, and other unexpected problems. For instance, Beetz (2002) points out that the resulting biological interactions provide a wide range of above- and below-ground opportunities and benefits, including diversified income sources, increased biological production, better water quality, and improved habitat for both human beings and wildlife. Cunningham et al. (2008) confirm that the range and rotation of high-performing annual crops provide income and reduce disease incidence. Moreover, agroforestry shifts reliance from one or two annual crops to a range of food- and income-generating crops, and thus spread risks and reduce vulnerability to environmental shocks. In addition, labor requirements and income are spread throughout the year with agroforestry.

Cross-farm visits were also organized at the program sites to expose the upland farmers to the different agroforestry practices and CCA strategies that are being used by the other farmers in nearby communities. The program implementers considered cross-farm visit as a vehicle for promoting workable and appropriate CCA farming techniques. In their study, Millar, Photakoun, and Connet (2005) argued that cross-farm visits had the greatest impact on farmer awareness, farmer confidence, and problem solving; it was also the farmers' preferred approach for learning new technologies. The authors added that cross-farm visits offer opportunities for farmers to see the actual field situation, talk and discuss with their fellow farmers, and share experiences and lessons directly. Moreover, farmers tend to remember the strategies and methods much better with when they have seen them in the field. Through cross-farm visits, farmers find it much easier to apply the technologies to their own farms when they are back in their own villages. Accordingly, three cross-farm visits were organized in the Philippines, one in Vietnam, and one in Indonesia.

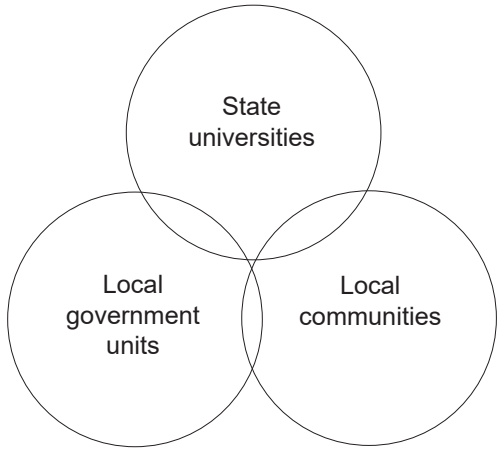
Enhancing Institutional Arrangements

Institutions encompass both formal or tangible governance and organizational structures, and the informal or cultural norms and "rules of the game," which influence behavior and nature of human interactions (Jones, Ludi, and Levine 2010). Institutions play a key role in enhancing adaptive capacities for CCA. As argued by Jones, Ludi, and Levine (2010), communities with well-developed social institutions are typically better able to respond to a changing environment than those with less effective institutional arrangements.

Consequently, the program was able to help improve the "institutions" in each study site through the relationships formed with the existing people's organizations; organizing community activities that enhanced the community's bonding capital; and establishing their bridging capital through the local partnerships formed among state universities, farming communities, and local government units.

Figure 7 shows these institutions with their corresponding functions. The state universities shared to the upland farming communities their technical expertise in agroforestry development and CCA. On the other hand, the farming communities served as the sources of field-level evidence on climate change impacts; they also

Figure 7. Local partnerships built in each of the collaborating countries



served as partners in the initiatives to promote CCA. Lastly, the local government units provided the enabling mechanisms (e.g., local policies and logistical support) for the project implementation.

Initiating Forward-Looking Decision Making and Governance

Jones, Ludi, and Levine (2010) believe that a system's capacity to anticipate change and to incorporate relevant initiatives into future planning and governance is an important aspect of adaptive capacity. In this program, the local government units responsible for local policymaking, were involved in the discourse of climate change and CCA. The policy forum and local climate change programs organized in the four collaborating countries helped to mainstream CCA in their local development programs.

Significant Contributions and Lessons Learned

The capability building component of the program was able to enhance the technical knowledge on agroforestry of the junior lecturers involved in the program. Most of them are either graduates of agriculture or forestry while only a few have specialized in agroforestry. Similarly, the training participants were graduates of agriculture, forestry, and environmental science programs; yet, they implement agroforestry education programs in their respective universities. The regional training-workshop on agroforestry and climate change conducted by the program helped to improve participants' technical knowledge on agroforestry. The knowledge that they gained was initially applied to the successful conceptualization, organization, and conduct of their national agroforestry roadshows.

Meanwhile, the public awareness component of the project served as a mechanism to promote the initiatives undertaken by the practitioners to develop and promote agroforestry development in Southeast Asia. The national agroforestry roadshows conducted in the five participating countries enabled the researchers and development workers to share their field and research experiences in agroforestry technology development and promotion. Consequently, about 20 papers were published, which highlighted the roles of agroforestry in climate change mitigation and adaptation.

The public awareness activities, through the national agroforestry initiative,

provided non-agroforestry practitioners an opportunity to learn and appreciate the many potentials of agroforestry for climate change mitigation and adaptation. Most of the participants of the national agroforestry roadshows and agroforestry seminar were non-agroforesters engaging in agroforestry development and promotion. The awareness activities were able to improve their understanding of the technical and social aspects of agroforestry, which can help them in their agroforestry advocacy programs.

The existing partnership of the project team members (as SEANAFE members) helped to efficiently implement the APN-funded projects while strengthening their existing regional collaboration. Several major activities of SEANAFE were held back-to-back with this APN-funded program. Thus, SEANAFE was able to provide a number of counterpart funding to implement these projects. Moreover, because SEANAFE has been transformed into an international nongovernmental organization, this learning experience contributed to the track record of the regional network in the implementation of its projects that deal with the technical aspects of agroforestry and climate change.

This project has also enhanced the knowledge sharing and exchange of technical expertise among the participating country networks. The lessons and experiences in the project implementation, particularly in the capability building initiatives and national agroforestry roadshows, could be replicated in other Southeast Asian countries such as Cambodia, Myanmar, Malaysia, and perhaps in other tropical countries. The program team is prepared to partner with any development organizations in these countries to promote agroforestry not only as a CCA strategy, but as a development strategy, in general.

Moreover, the program helped to promote agroforestry as a strategy for climate change mitigation and adaptation. The policy brief drafted by the project team calls for policy initiatives that would institutionalize agroforestry in the five participating countries. The project team believes that the project should not end in the development of the policy brief. The recommended policy actions should be lobbied to the concerned policymaking bodies, such that these policy initiatives would be adopted, particularly the institutionalization of agroforestry in the development programs of the concerned national government agencies and local government units.

This capacity development program has shown the importance of creating awareness of climate change at all levels and sectors. As such, these sectors could also be mobilized to help enhance CCA capacities. This program has likewise recognized the essence of engaging farmers in climate change research and capacity building. Foremost, farmers are the ones who experience the impacts of climate change in the agriculture sector. Likewise, they are capable and effective in sharing their own experiences with their fellow farmers.

The cross-farm visits that were implemented proved to be an effective mechanism of farmer-to-farmer knowledge transfer. The farmers were able to observe the actual agroforestry technologies and CCA strategies as well as directly interact with other farmers.

Establishing on-site demonstration farms through ALLs offers opportunities for promoting appropriate CCA strategies. The partnership built between the young collaborators and farmers in assessing the current farming system, identifying the problems, and determining the appropriate interventions was a healthy and productive undertaking. Both learned from each other; the collaborators, who are technical experts, were able to understand the actual field conditions and propose recommendations for improvement while learning from the farmers'

field experiences. As such, this mechanism enhanced capacity development.

The essence of a collaborative activity or project is anchored on the active participation of the different stakeholders. Capacity development for CCA requires multidisciplinary and integrated approaches. It also requires the awareness not only of a single sector, such as the farmers or farming communities, but also the awareness of policymaking bodies, academic institutions, and the general public.

Institutionalization of policies is the key to sustain the project's CCA initiatives. CCA programs at the national and local levels require manpower and financial resources, and these resources could be made available only if certain policies are in place.

CONCLUSION AND RECOMMENDATIONS

The authors conclude that the local adaptive capacities of upland farming communities in Southeast Asia can improve through asset building, creating knowledge and information, introducing innovations, strengthening institutions, and executing forward-looking decision making and governance.

Based on the lessons and experiences, this capacity development program for CCA has the potential to be scaled up in other upland communities in the four collaborating countries. Generally, the agriculture sector in these four countries is dominated by smallholder upland farmers; therefore, scaling up and promoting this kind of capacity building initiatives in many upland communities is vital for their development. The lessons and experiences and the relevant outputs of this project can be used by the project collaborators in future capacity development activities. In a broader context, the partnership built by this project with the local stakeholders (i.e., farmers, local government units, and state colleges and universities) could be harnessed to sustain and scale up the project initiatives.

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