

Strengthening adaptive capacity of rural farming communities in Southeast Asia: Experiences, best practices and lessons for scaling-up

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ABSTRACT

This article highlights the experiences, contributions, and lessons generated from the ten selected APN capacity development programmes implemented from 2011–2019 and focused on enhancing the resilience and adaptive capacity of rural farming communities in Southeast Asia. These capacity development projects employed varying strategies and approaches. Some projects centred on training and building the technical capabilities of service providers, while others have directly trained and built the capacities of the farming communities. Some projects emphasised the promotion of nature-based and sustainable farming techniques such as agroforestry, conservation farming, rainwater harvesting, and indigenous agricultural practices that helped farming communities cope and adapt to climate change impacts. At the core of these capacity development programmes are collaboration and partnerships that were built and institutionalised among different sectors, such as academia, local government units, and the farming communities. These multisectoral collaborations hastened the project implementation and generation of project outputs and gave way to the sustainability of the project initiatives. These projects have generated numerous outputs that paved the way for enhanced social and human capital development of various stakeholders, science-based decision-making by policymakers; adoption of sustainable farming techniques and technologies; and knowledge generation and advancement of science. More importantly, these projects have developed a model for enhancing the adaptive capacity and resilience of rural farming communities in Southeast Asia.

KEYWORDS

Collaboration, lessons, capacity development, sustainable farming techniques, sustainability



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HIGHLIGHTS

- Ten APN capacity development projects centred on enhancing community resilience and adaptive capacity for climate change adaptation of rural farming communities in Southeast Asia were reviewed and synthesised, and whose lessons and best practices were distilled for scaling-up in the region.
- These capacity development projects employed various approaches and strategies such as technical capability-building of service providers such as the local government units and the academia, promotion of sustainable farming practices through demonstration plots, and training of farming communities.
- Multisectoral collaboration is at the core of the APN capacity development projects, with academia/universities taking the lead role.
- The APN capacity development projects have developed a model and framework for enhancing adaptive capacity and resilience of rural farming communities in Southeast Asia, which could serve as a reference for replication and scaling-up.

1. INTRODUCTION

With more than 10% contribution to the gross domestic product and creating jobs for more than one-third of the working population in the region (Zhai & Zhuang, 2009), agriculture plays a vital role in the economy of Southeast Asia. As noted by Zhai and Zhuang (2009), nearly three-quarters of the poor in the region reside in rural areas, with agriculture as their main economic activity. An estimated 100 million smallholder farmers are actively producing staple crops (i.e., maize, rice, and wheat) and other high-value crops such as cacao and coffee (Mikolajczyk, Mikulcak, Thompson, & Long, 2021). But agriculture in general and smallholder farmers, in particular, are vulnerable to numerous challenges such as natural disasters (Israel & Briones, 2013) market and policy uncertainties, climate change (ADB & IFPRI, 2009; Tolentino & Landicho, 2013; Landicho, Cabahug, Baliton, & Gonzales, 2021; Ho, Ha, Luu, & Dong, 2019; Cruz, Carandang, Galapia, Carandang, & De Luna, 2014; Pulhin et al., 2020; Visco, Wulandari, & Huy, 2014; Diana, Zulkepli, Siwar, & Zainol, 2022);

and the recent COVID-19 pandemic (Sleet, 2020; Kim, Kim, & Park, 2020; FAO, 2021)

With the crucial role of agriculture in the economy and its vulnerability to climate change impacts and other stressors, numerous studies point out the need to invest in measures that would build and enhance the adaptive capacity and resilience of rural farming communities (Silici, Rowe, Suppiramaniam, & Knox, 2021; Landicho et al., 2021; Lasco, Habito, Delfino, Pulhin, & Concepcion, 2011). Adaptive capacity is the ability of a system to adjust to climate change by moderating potential damages, taking advantage of opportunities, or coping with the consequences (IPCC, 2007). On a broader scope, Armitage (2005) defines adaptive capacity as a “critical aspect of resource management which reflects learning and an ability to experiment and foster innovative solutions in complex social and ecological circumstances”. Lasco et al. (2011) also contend that a system with high adaptive capacity will be more resilient to climate change impacts.

In their study, De Fiesta and Rapera (2014) argued that households in Dumangas, Iloilo, Philippines, with higher adaptive capacity,

employed more adaptation strategies. This finding is validated in the study of Landicho, Van, and Ximenes (2018), which emphasises that the level of adaptive capacity determines farmers' decisions to adopt climate change adaptation strategies in selected countries in Southeast Asia such as Vietnam, Philippines and Timor-Leste.

There have been numerous efforts that would help enhance the adaptive capacity of rural farming communities. These include, among others, the promotion of climate-smart agriculture (Sebastian & Bernardo, 2019; Nkumulwa & Pauline, 2021; Scherr, Shames, & Friedman, 2012); agroforestry (Baliton et al., 2017; Landicho et al., 2016, 2021); conservation farming techniques (Cruz et al., 2016; De Luna, 2018); rainwater harvesting (Landicho et al., 2021), and, training, awareness-building and capability-building programmes (Carandang, Huy, Wulandari, Visco, & Vilayphone, 2015; Landicho et al., 2019).

This article highlights the lessons and best practices of selected APN capacity development projects that were implemented to help improve the adaptive capacity of rural farming communities in various countries in Southeast Asia.

2. METHODOLOGY

From the 16 APN capacity development projects in Southeast Asia that focused on enhancing climate change adaptation of institutions and communities, the authors selected ten projects centred on building rural farming communities' capacity and resilience from 2011–2019. The collaborators' willingness to highlight their projects in the webinar and publication was the primary consideration in forming the list of the pre-selected capacity development projects.

The project reports submitted by the project collaborators to APN served as the basis for distilling the salient features of the project, as well as the significant experiences, lessons, and best practices. A webinar was conducted to validate the data and information gathered from the project reports. More importantly, the webinar allowed the project collaborators to communicate and share the

lessons and experiences of their capacity development projects with a broader audience.

3. RESULTS AND DISCUSSION

3.1. Variants of capacity development programmes for enhancing adaptive capacity of rural farming communities

APN capacity development projects have varying strategies and approaches. Some projects centred on training and building the technical capabilities of the service providers, particularly the local governments, state colleges, and universities, as in the case of the projects that (a) trained students and farmers to become local climate change communicators; (b) equipped the local government units to develop climate change action plans; (c) enhanced the knowledge and skills of state colleges and universities and local government units in exploring basket of climate change adaptation strategies; and d) trained people's organisations in effective irrigation water management. In general, capacity building is always an essential component of climate change adaptation programmes (Climate ADAPT, 2019). Landicho et al. (2021) highlighted that farmers' training, policy forum, climate change awareness programme, and information dissemination activities are valuable ways of promoting climate change adaptation strategies towards enhancing the adaptive capacity of farmers.

Other projects emphasise promoting nature-based and sustainable farming techniques that help farming communities cope and adapt to climate change impacts. These projects did not only provide training activities but, more importantly, set up demonstration plots and model farms to showcase the workability and viability of these technologies, as follows:

a) *Conservation farming techniques* via the Conservation Farming Village (CFV) programme provided enabling conditions for the engagement of upland farming communities in the Philippines in sustainable and resilient agroforestry-based livelihoods that promote the economic productivity of upland farmers and the stability of the ecosystem. Cruz et al. (2014) stressed that CFV is a strat-

egy for transforming mindsets and skills and for building on the assets of the upland farmers for the sustainable use of land and other natural resources.

b) *Agroforestry*. Agroforestry Learning Laboratories in selected upland farming communities in Indonesia, the Philippines and Malaysia showcase viable and workable agroforestry systems and soil and water conservation measures. Numerous literature cites the relevance of agroforestry as a key strategy for climate change adaptation (Tolentino, Landicho, De Luna, & Cabahug, 2010), food security, and environmental rehabilitation.

c) *Renewable energy from livestock* in the form of biogas raised awareness among stakeholders, particularly livestock producers, about opportunities for tapping biogas for climate change adaptation. Awareness-raising was undertaken through policy forums, information dissemination and training of stakeholders.

d) *Indigenous agricultural practices in the mountainous region of Vietnam*, such as planting of green mungbean, a drought-resistant crop often used in traditional dishes; raising of cold-resistant H'mong black-boned chicken that are less susceptible to diseases and that produce high-quality meat; and intercropping of local banana varieties with *khoi tia* (*Ardisia silvestris* Pitard). The local variety of bananas require less maintenance and are appropriate for sloping lands. Further, the medicinal plant *khoi tia*'s leaves are a source of tannins and glycosides for pharmacology. *Khoi tia* is also a traditional medicine used for abdominal ailments (Ho et al., 2019).

e) *Rainwater harvesting*, which showcased a model of addressing water scarcity in the upland farming communities in the Philippines through the establishment of 11 rainwater harvesting ponds, utilising the collective action of the local communities. Han (2006) argues the need for a new paradigm in managing rainwater as the weather becomes more severe and unpredictable due to climate change. Hence, Contreras, Sandoval, and Tejada (2013) stressed that rainwater harvesting through small water impounding ponds (SWIPs) addresses unbalanced rainfall distribution by

collecting and storing direct rainfall and surface run-off for future use. SWIPs play an important role in enhancing the multifunctionality of agriculture, particularly in the uplands (Concepcion et al., 2006).

Some projects utilised digital technology for more proactive solutions to agricultural uncertainties brought about by climate change, as emphasised in the Saung-Iklm project in Indonesia. This project trained various stakeholder groups on managing climate risks that affect their crop production through crop simulation models such as Aqua Crop and DSSAT to identify the potential impacts of climate fluctuation on rice productivity.

3.2. Forms of partnerships and collaboration established by the capacity development projects

While the ten capacity development projects vary in scope, approaches and intervention, it is worth noting that all of these projects emphasise collaboration and partnership at the core of their projects. The collaboration was established between the project collaborators, local government units, farming communities and local universities in building the capabilities of local climate change communicators in the Philippines, Lao People's Democratic Republic, Indonesia and Vietnam (Carandang et al., 2015); communicating and operationalising site-specific climate change adaptation strategies (Visco et al., 2014); establishment of model farms showcasing conservation farming practices and capacity development of farmer-volunteers (Cruz et al., 2014); establishment of agroforestry learning laboratories in Indonesia, Philippines and Vietnam (Comia, Landicho, Wulandari, & Huy, 2016); rainwater harvesting (Landicho et al., 2021); tapping renewable energy from livestock (Do, Nguyen, Dinh, Khanitchaidecha, & Le, 2021); and promoting indigenous farming practices in the mountainous regions in Vietnam (Ho et al., 2019). Meanwhile, the partnership between the project collaborators and the local government units was highlighted in the preparation of local climate change action plans in Aurora, Philippines (Pulhin

et al., 2020), and the capacity building of Saung-Iklm in Indonesia (Perdinan et al., 2021). Penalba et al. (2012), meanwhile, have established a direct partnership with people's organisations to enhance the latter's capacity for irrigation water management.

At the forefront of these partnerships are agricultural and forestry universities as the source of technical expertise and catalysts of development efforts. The local government units are a significant component of the collaboration as they have the capacity to execute and institutionalise local policies and provide basic social services to the community. Meanwhile, the farming communities and people's organisations were the direct beneficiaries of the capacity development programmes. The multisectoral collaboration worked in many community-based development projects and sustainable development initiatives (Landicho & Dizon, 2020; Landicho, Cabahug, & De Luna, 2008; Cruz et al., 2016; Elauria, Manilay, Abrigo, Medina, & De Los Reyes, 2017). 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.

3.3. Best practices and significant contributions of the capacity development programmes

Developed stakeholders' awareness about climate change and climate change adaptation strategies

The capacity development projects conducted policy forums, training, awareness programmes, information materials development and dissemination. These strategies provided an opportunity to inform and educate the different stakeholders, particularly the local government units, universities, farming communities and students, about the issue of climate change, its impacts, and the potential strategies and measures for climate change adaptation. As such, these stakeholders have become aware of the issue and potential solutions.

Promoted capacity development of young researchers and lecturers

Some projects have encouraged the participation of young researchers and lecturers as trainees (Tolentino, Huy, Kheowongsri, Vilayphone, & Ghani, 2012; Carandang et al., 2015) but also involved them as collaborators or technical support in project implementation (Visco et al., 2014; Cruz et al., 2014; Landicho & Dizon, 2020; Comia et al., 2016). The provision of research grants encouraged young researchers in Vietnam to focus their research on indigenous knowledge systems (Ho et al., 2019). These strategies promoted mentoring and capacity development of early-career scientists.

Enhanced the knowledge and skills of farmers, people's organisations and local government units in planning for climate change adaptation and on the different nature-based and sustainable farming practices

The project of Carandang et al. (2015) trained about 60 farmers and agricultural technicians in upland communities in Indonesia, Lao PDR, Vietnam, and the Philippines, not only on the issues and impacts of climate change adaptation strategies but also on building their communication and presentation skills as communicators and disseminators of various aspects of climate change. Pulhin et al. (2020) enhanced the capacity of local government units (LGUs) to acquire data, implement research, conduct land capability classification, and assess vulnerability and risks associated with future climate scenarios. This project harnessed the active engagement of LGU personnel in assessing the vulnerability and risks of their respective municipalities, which served as the basis for the formulation of the local climate change action plan. Farmers' knowledge and skills were further enhanced through cross-farm visits and the establishment of agroforestry learning laboratories (Comia et al., 2016) and community projects (Visco et al., 2014). The capacity development project of Cruz et al. (2014) built the technical capabilities and appreciation of 272 LGU technicians and upland farmers in agroforestry, conservation farming and sloping land management. Perdinan et al. (2021) equipped

the LGUs, extension workers, farmer groups and universities with the proper tools to enhance the farmers' capacity to utilise climate information in managing their farm activities. Meanwhile, farmers' groups were trained on effective water management (Penalba et al., 2012) and rainwater harvesting (Landicho et al., 2021).

Established multisectoral partnerships at various levels

APN capacity development projects undertaken by the Southeast Asian Network for Agroforestry Education (SEANAFE), such as that of Tolentino et al. (2012), Cruz et al. (2014), Visco et al. (2014) and Comia et al. (2016) enhanced regional collaboration. SEANAFE member universities could capitalise on this partnership for future collaborative research and development projects. Meanwhile, transboundary collaboration of universities in Japan, Thailand and Vietnam was harnessed in building public awareness about the potential of livestock waste as a renewable energy source in Vietnam (Do et al., 2021).

At the local level, the CFV Programme has strengthened the partnership among the five state colleges and universities (i.e. University of the Philippines Los Baños, Ifugao State University, University of Southeastern Philippines and the Bicol University College of Agriculture and Forestry) to work towards the replication of CFV in other provinces and share their technical expertise, as well. The partnerships of local state colleges, farming communities and local government units were strengthened and institutionalised in the different APN capacity development projects in the Philippines (Carandang et al., 2015; Visco et al., 2014; Tolentino et al., 2012; Landicho et al., 2021; Cruz et al., 2014; Comia et al., 2016).

Established demonstration plots showcasing nature-based and sustainable farming practices for climate change adaptation

Five APN capacity development projects have put up demonstration plots that showcase sustainable farming practices for climate change adaptation, such as agroforestry systems (Cruz et al.,

2014; Comia et al., 2016); conservation farming practices (Cruz et al., 2014; Comia et al., 2016; Visco et al., 2014); indigenous agricultural practices involving intercropping of local crops (Ho et al., 2019); and rainwater harvesting ponds (Landicho et al., 2021). These demonstration plots served as models for the adoption of smallholder farmers within the project sites and for scaling up in other communities.

Developed policy briefs as instruments for lobbying and linking with the policymakers

From the science-based evidence, some capacity development projects were able to produce policy briefs that provide a science-policy linkage. The policy brief developed by Carandang et al. (2015) served as the instrument of the collaborators in the Philippines, Vietnam, Lao PDR and Indonesia in lobbying with their local and national policymakers about mainstreaming climate change adaptation in their local and national development programmes, respectively. The role of agroforestry in climate change mitigation and adaptation and the urgent need to mainstream agroforestry in local governments' local climate change adaptation programmes were highlighted in the policy brief produced by Tolentino et al. (2012). Do et al. (2021) provided science-based evidence that would help policymakers in making sound decisions on tapping livestock waste as a renewable energy source.

Provided a model for enhancing adaptive capacity of rural farming communities in Southeast Asia

The APN capacity development projects vary in terms of implementation strategies, scope and approach but were conceived with a common goal of enhancing the adaptive capacity and resilience of rural farming communities in Southeast Asia. Indeed, these capacity development projects have generated a number of tangible outputs: numerous farmers, LGU personnel and junior researchers and lecturers were trained on various aspects related to climate change adaptation and mitigation (agroforestry, climate change adaptation strategies, indigenous agricultural practices, tapping biogas, CDRA, development of

local climate change action plans, and effective irrigation management); developed policy briefs; developed model farms and demonstration plots; and contributed to the advancement of science through paper presentations and scientific journal articles.

These outputs paved the way for an enhanced social and human capital development of different stakeholders and science-based decision-making by policymakers, as highlighted by the testimonies of the local chief executive in Aurora Province, Philippines and, hence, strengthening the policy-science linkage. Furthermore, the outputs have led to the adoption of sustainable farming techniques and technologies, as reflected in the testimonies of the farmers in Albay Province, Philippines and Vietnam, as well as knowledge generation and advancement of science as mentioned by local partner universities in the Philippines and Indonesia. As shown in [Figure 1](#), these outcomes would certainly contribute to attaining the potential impact of enhanced adaptive capacity and resilience of rural farming communities in Southeast Asia. The model developed by APN capacity development projects could be used as a reference in replicating these projects in other communities in the region.

3.4. Lessons Learned from capacity development programmes

Important lessons were distilled from the different experiences and best practices of APN capacity development projects. These lessons could guide other universities and development organisations whose work aligns with enhancing adaptive capacity and building the resilience of rural farming communities.

1. Essence of collaboration in facilitating smooth project implementation, achieving project goals and objectives, and sustaining project initiatives.

The APN capacity development projects confirmed that emphasising collaboration facilitates effective and efficient project implementation as this strategy promotes sharing of expertise and resources and the integration of efforts from all the collaborating institutions. The importance of

collaboration and partnerships at various levels and sectors is highlighted in a number of community-based development projects across Asia ([Landicho & Dizon, 2020](#); [Tolentino et al., 2010](#); [Cruz et al., 2014](#); [Kim, Youn, & Park, 2018](#); [Frimadani & Yonariza, 2018](#); [Pinthukas, 2018](#); [Tuan, 2018](#)).

2. Addressing the needs of farmers and local communities is of utmost importance

The genuine and sincere participation of the local communities is harnessed when the development programmes are centred on their felt needs. It also develops their sense of ownership in all of the project undertakings. This was observed by [Landicho and Dizon \(2020\)](#) in the establishment of rainwater harvesting facilities in selected upland farming communities in the Philippines. Since the farming communities were in dire need of water to irrigate their crops, the need for these facilities was expressed by the farmers themselves. As such, they have actively participated in the project even during the height of the pandemic. They were able to manage the facilities sustainably and have expanded their crop production.

3. Promoting policy-science linkage facilitates the institution of local policies that are supportive of the initiatives of the capacity development programmes. This could lead to the sustainability and scaling-up of the project initiatives.

Developing science-based evidence and organising policy forums and consultations are strategies used to raise policymakers' awareness of issues and problems, encouraging them to take action that could help address these problems. All ten APN-capacity development projects sought the partnership of local government units and made the latter aware of the climate-related problems upland farming communities face and the potential solutions.

4. Awareness-raising among the different stakeholders is an essential component of any capacity development programme

Various forms of public awareness programmes such as stakeholders' orientation, seminars, training, and policy forum were organised by the project

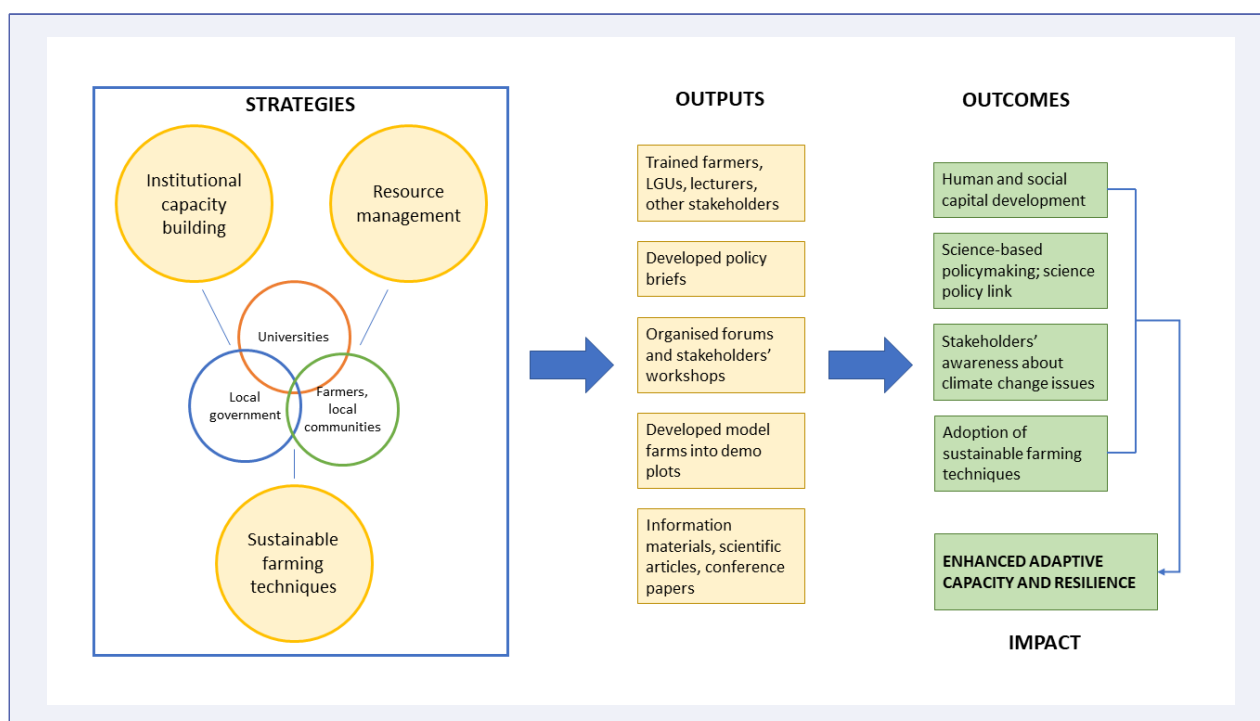


FIGURE 1. Model for enhancing adaptive capacity of rural farming communities in Southeast Asia: Experiences, lessons and best practices from APN capacity development projects.

collaborators to ensure that the concerned stakeholders are aware not only about their respective projects but, more importantly, of the issues and problems that are being faced as a result of climate change. Making stakeholders aware of the issues and problems brought about by climate change and other stressors, as well as opportunities that could be tapped to address the impacts, would prompt them to take action. Otherwise, concerned stakeholders may “do nothing” about the issue or problem.

5. *Building model farms and demonstration plots showcase the workability and viability of agricultural technologies and innovations, which could serve as vehicles for technology adoption.*

As we all know, farmers and practitioners would only adopt a particular technology or innovation if they see for themselves the viability of these technologies. Demonstration plots can be an effective means to create awareness among farmers about modern technologies and can motivate them to apply these technologies to their own farming practices (Khan, Pervaiz, Khan, Ahmad, & Nigar, 2009).

6. *Local government units should be an integral component of any capacity development programme and an active player in multisectoral collaboration.*

In multisectoral partnerships, the active role of LGUs should be harnessed to ensure the sustainability of project initiatives. Local governments have become active partners of project teams in the ten capacity development projects. Literature has pointed out the crucial role of LGUs in promoting sustainable natural resources management in the Philippines (Landicho & Dizon, 2020; Cruz et al., 2016; De Luna, 2018)

7. *Active engagement of the local communities and partners helps ensure the sustainability of project implementation and project initiatives.*

The initiatives of some of the capacity development projects, such as that of Visco et al. (2014); Cruz et al. (2014); Landicho and Dizon (2020); Ho et al. (2019); and Do et al. (2021), among others, were sustained by the LGUs and the farming communities. As argued by Conde and Lonsdale (2006), in the process of engaging the stakeholders, their adaptive capacity is being developed because people are given the time to strengthen networks, knowledge, resources, and the willingness to find

solutions (Catacutan & Tanui, 2007).

4. CONCLUSION

Southeast Asia is one of the regions reportedly vulnerable to the impacts of climate change. The APN capacity development projects featured in the present paper are just a few of many APN projects focussing on climate change adaptation and mitigation and building community resilience in Southeast Asia.

It is worth noting that all of the capacity development projects highlighted in this publication considered collaboration and partnership at the core of their projects. Agricultural and forestry universities are at the forefront of these partnerships as the source of technical expertise. These capacity development projects have varying strategies and approaches.

Indeed, these capacity development projects have generated a number of tangible outputs based on project reports: numerous farmers, LGU personnel, and junior researchers and lecturers trained on various aspects related to climate change adaptation and mitigation (agroforestry, climate change adaptation strategies, indigenous agricultural practices, tapping biogas, CDRA, development of local climate change action plans, and effective irrigation management); developed policy briefs; developed model farms and demonstration plots; and contributed to the advancement of science through paper presentations and scientific journal articles.

These outputs paved the way for an enhanced social and human capital development of different stakeholders and science-based decision-making by policymakers and strengthening the policy-science linkage. Furthermore, the outputs have led to the adoption of sustainable farming techniques and technologies, as well as knowledge generation and advancement of science. These outcomes would certainly contribute to attaining the potential impact of an enhanced adaptive capacity and resilience of rural farming communities in Southeast Asia.

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Finally, the project collaborators would like to thank the Asia-Pacific Network for Global Change Research (APN) for providing the funds to implement the project activities, such as the webinar and developing knowledge products and communication materials, such as the video of different APN projects in Southeast Asia.

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