Sustainable farming strategies for increased resiliency of Asian sloping land agroecosystems amid climate change

SLOPING LANDS ARE DOMINANT parts of the uplands and the uplands comprise a large portion of the Asian landscapes. Ninety percent (90%) of South China subtropical regions are located on mountainous or hilly areas (Maglinao 1998). Uplands cover 35% of Thailand’s total land area. The Philippine uplands comprise 31% and Malaysia 36%. Vietnam has more than 70% of its land area as upland.

About 50% of these upland agroecosystems in Asia are presently degraded and marginalized as more people are migrating to these landscapes due to the intensified industrialization and urbanization of most of the lowlands and moderately sloping lands in most countries in the Region (WRI 2008).

The international workshop on sustainable farming strategies for increased resiliency of Asian sloping land agroecosystems to negative effects of climate change intends to address related problems, issues, and concerns. Specifically, it seeks to:

• present and assess technological innovations to strategically address the sustainable productivity and stability issues of the sloping agroecosystems, especially under the influence of climate change;
• provide a venue for strategic discussion and exchange of ideas/information/innovation to address key issues/concerns related to sustainable management of these critical landscape environment; and
• discuss information management strategies and technology dissemination modalities that will ensure that information, knowledge, and technology reach upland farming communities to enhance the sustainable productivity of the fragile sloping agroecosystems.

Workshop highlights
Regional cooperation and initiatives
Based on the open forum that transpired in keynote paper presentations, the following issues and concerns emerged.
• Lack of data and information on agrobiodiversity.
• Lack of research studies on agrobiodiversity in the uplands
• Lack of professional expertise who would do data collection on agrobiodiversity.
• Importance of sustainability of the project even after funding has ceased
• High awareness on the importance of SLM but slow adoption of technologies
Vulnerability and resilience of sloping lands to climate changes

**Biophysical issues in the uplands**

The upland catchment is plagued with issues related to its physical and biological structures. Among these are: soil erosion, poor soil fertility, stream turbidity, increased flood risk, increased landslide risk, loss of biodiversity. Damage to infrastructures such as roads due to erosion and landslides makes access to facilities and markets more difficult. Inappropriate farming practices also contribute to the problem. A case example is the cassava-corn rotation project in Bohol, Philippines, which caused large soil loss through erosion.

**Establishing a successful monitoring program can be difficult for various reasons**

Monitoring program is designed from the very start and it must continue for a longer term. However, the interest in monitoring may not be sustained and can be difficult at times. Monitoring is costly. The benefits accrue slowly. It can be too ambitious and data collection too broad, which may overwhelm decision makers. Provision of continuous support for monitoring programs is uncertain and may even be beyond the capacities of some organizations. Lack of attention to technical detail can likewise dampen monitoring programs.

**Farmers’ constraints in adopting soil and water conservation technologies**

Most people in the sloping lands are marginal farmers who need capital to be able to adopt improved technologies. The impact of soil conservation cannot easily be felt by farmers unless they see actual demonstrations of the technology. Lack of clear understanding on the benefits of soil and water conservations also causes slow adoption of technologies.

**Sustainable management and improved food production in sloping land agroecosystems**

- Accuracy of satellite images
- High cost of remote sensing projects
- It takes time to train and build capacities of individuals in geographic information systems and remote sensing.
- Construction of infrastructures, postharvest facilities in the sloping lands may have some negative environmental impact.

**Capacity building and adaptation strategies**

- Slow adoption of soil and water conservation technologies and other sustainable land husbandry in the uplands
- Weak extension arm
- Limited technological and financial support
- Many stakeholders without common agenda for community development
- Low priority given to soil conservation
- Low local government support and appreciation
- A CFV S&T-based Farm was wiped out by a strong typhoon that discouraged the farmer to continue despite his previous successful efforts in cultivating the sloping lands. It is thus important to assess the area for S&T-based model farm and check if it is prone to hazards i.e.
Prospects and recommendations
Possible development of R&D projects on the following areas:
• Agrobiodiversity inventory and assessment in the upland agroecosystems of Asia Pacific region
• Assessment of soil biodiversity in the uplands
• Implication of agrobiodiversity in the upland agroecosystem on climate change adaptation and mitigation
• Capacity-building for taxonomists and related sciences
• Capacity building on remote sensing and geographic information systems
• Need for vulnerability and impact assessment studies
• Disaster preparedness starts with identifying vulnerable areas of production and management, hence the need to locate vulnerable sloping lands considering crop productivity and resource endowments.

Technology promotion and extension strategies
Among the best approaches recommendable for technology promotion and extension strategies:
• LGU-based initiatives coupled with strong and consistent partnership.
• Functional partnership among LGUs, SUCs, other government agencies and communities is a key to sustainable land management in the uplands
• Consultation meeting as a valuable tool in ensuring stakeholders’ participation
• Technology demonstrations, field days and modeling of the viability of SLM technologies
• Participatory and bottom-up approach to project planning, implementation, monitoring, and evaluation
• Experiential learning to heighten awareness on conservation farming
• Information, education, and communication programs to promote sustainable management of upland agroecosystems

Institutional and financial support
• Sufficient funds and institutional support must be provided. Monitoring should have clear objectives and implementation strategies
• Social networking is a risk coping strategy. Building the social capital of the small landholders in the sloping lands also helps in disaster preparedness

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No. of participants: 29
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List of papers
Keynote papers
1. Regional cooperation for assessing and coping with climate change impacts for sustainable management of sloping land agroecosystems and agrobiodiversity in Asia
   - Rodrigo Fuentes
2. Strengthening regional initiatives on climate change adaptive management for the sloping land resources in Asia
   - Yuji Nino

Resource papers
1. Environmental quality monitoring and climate change impact assessment on sloping agroecosystems
   - Anthony Ringrose Voase
2. Disaster preparedness and risk management mechanisms and approaches to cope with climate change adversities in sloping agroecosystems
   - Edna Samar
3. Earth observation from space in support to better functioning of sloping agroecosystems
   - Yosio Inoue
4. Strategic R&D on climate change-sensitive land and water resources management for sustainability and quality of sloping land agroecosystems
   - Zulkeflil Malik
5. Climate change resilient agroforestry systems for livelihood improvement of smallholders in Vietnam
   - Elizabeth Simelton
6. Soil erosion potential and site specific conservation practices of Korean sloping upland
   - Kyung-Hwa Han
7. The Philippines innovative capacity building an extension delivery systems in support of sloping agroecosystems climate change adaptation and mitigation
   - Analiza Rebuelta The
   - Rex Victor Cruz

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