



POLICY BRIEF

Agroforestry in the uplands of Southeast Asia



Prepared by World Agroforestry Centre Southeast Asia Regional Program
in collaboration with the ASEAN Working Group on Social Forestry

World Agroforestry Centre Policy Brief No. 77

Conservation agriculture with trees

Photo: Robert Finlayson

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List of acronyms and abbreviations

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| AMS | ASEAN Member State |
| ASEAN | Association of Southeast Asian Nations |
| ASFCC | ASEAN-Swiss Partnership on Social Forestry and Climate Change |
| AWG-SF | ASEAN Working Group on Social Forestry |

Uplands in Southeast Asia are areas with rolling to steep topography and are often home to numerous villages and small towns. With high human populations there has been significant impact on natural and socioeconomic systems. Soils, in particular, are often degraded owing to widespread erosion resulting from deforestation and inappropriate farming practices, leading to decreasing productivity and incomes and severe, negative environmental impact.

Upland systems are characterized by mosaics of diverse, small landholdings mixed with patches of forests (both primary and secondary), larger-scale industrial plantations of commodity crops, and private sector or government landholdings. Perennial (that is, trees) agricultural systems are common, with naturalized and exotic species dominating. Native ecosystems are usually limited to forests. Infrastructure and access to urban resources vary greatly by location. Upland systems comprise 19% of the land area and support 27% of the agricultural population in Southeast Asia and the Pacific (Dixon et al. 2001).

Upland agroforestry systems have been proven to have a positive impact on smallholders' livelihoods: they contribute to economies from local through to global and also provide valuable environmental services. However, these systems are often overlooked and face several major barriers.

Upland smallholders are particularly vulnerable to the threats of climate change, notably, erratic rainfall patterns and more frequent extreme weather. Consequently, upland populations are increasingly migrating to urban areas where opportunities are perceived to be better. However, with improved support, upland farmers can enhance their agroforestry systems and livelihoods and thereby strengthen local through to global economies and also enhance environmental services.

| No. | Key messages | Policy implications |
|-----|--|---|
| 1 | Smallholders who use traditional farming technologies and have limited access to capital and information are nevertheless major providers of many globally-traded tree commodities and critically-important ecological services. | Smallholders need to be more clearly recognized and supported by local and national governments and regional bodies to strengthen their role as important providers of agroforestry and forestry products and environmental services. |
| 2 | A regional increase in human populations and wealth has led to increased demand for agroforestry and forestry products and services. Simultaneously, the regional forest resource is decreasing. | Policies are required that support the role of upland agroforestry systems in maintaining stable populations, sustainable production and rural livelihoods. |
| 3 | Although many smallholders have established viable agroforestry systems, there are five common barriers to development: 1) insecure land tenure; 2) policy disincentives; 3) limited access to quality germplasm; 4) limited management capacity; and 5) inadequate market access. | A systematic approach to policy and implementation at local, national and regional levels that removes the five barriers would not only benefit individual smallholders and their communities but also local through to global economies and the provision of environmental services. |

| No. | Key messages | Policy implications |
|-----|---|---|
| 4 | Agricultural practices and economic pressures have severely degraded the agricultural resource base, with accelerated soil erosion, siltation of irrigation and hydropower systems, flooding and water pollution. The costs of land degradation are even more serious when off-site costs are considered. | The long-term benefit of soil conservation is healthy, productive soils. Direct interventions, such as agroforestry and conservation-farming technologies, are worth the investment and need to be promoted in local, national and regional policies. |
| 5 | Farmers' groups are an effective way of empowering smallholders and their communities with the knowledge and skills needed to improve upland agroforestry and marketing systems. | Policies of local and national governments and regional bodies that support farmers' groups can help smallholders improve the quantity and quality of their agroforestry and forestry products and environmental services. |
| 6 | Smallholders in uplands often have limited or no access to agroforestry advisory or extension services from government. Farmer-trainers can play a major role in assisting other farmers to improve the productivity of their agroforestry systems. | Farmer-trainers need to be better recognized as advisory and extension agents, provided with rewards and have their capacity further strengthened in order to increase their motivation, skills, reach and impact. |
| 7 | Clear land tenure and supportive policies are essential enabling conditions that facilitate the development of upland agroforestry systems and the adoption of sustainable land management. | Local and national governments and regional bodies need to create effective policies that encourage collaboration with smallholders to provide secure land tenure and related matters as rewards for smallholders' investments in agroforestry systems and sustainable land management. |

Findings

1. Smallholders' livelihoods from agroforestry in the uplands of Southeast Asia

Smallholders are the predominant land-management grouping in the uplands of Southeast Asia. They are major contributors to rural, national and global economies (Tscharntke et al 2012, Jackson et al 2010). Smallholdings are major sources of many agroforestry and forestry products and services. Globally, smallholders produce 90% of cocoa, 75% of rubber, 67% of coffee, approximately 40% of palm oil and 25% of tea, with a total approximate export value of USD 60 billion (Dawson et al 2013). Smallholders' agroforestry systems also provide essential environmental services, including conservation of biodiversity, habitats, genetics, water and soils; more resilient ecosystems that are better able to adapt to climate change; and carbon storage (Roshetko 2013).

Individual upland smallholders generally cultivate 1–2 ha that are often initially established on degraded land and are frequently richly planted with trees. The systems are usually dynamic, comprised of multiple perennial and annual species that change over time to meet the needs of



Figure 1. Left: farmer in Indonesia harvesting her coffee crop; Right: farmer in Indonesia inspecting his cocoa trees.
Photos: World Agroforestry Centre/Yusuf Ahmad

households and markets. Tree planting and management by smallholders are successful on their own terms. With limited time and financial resources, the agroforestry systems planted by smallholders represent conscious investments for which other options are forfeited. These agroforestry systems benefit from the farmers' vested self-interest to profit from their efforts (Roshetko et al 2008). Smallholders have been proven to be effective land managers, however, they need support to optimize the opportunities for improved production and profitability.

2. Barriers to the development of agroforestry

Human population growth in Southeast Asia, with a corresponding increase in size of a wealthier middle class, has increased the demand for agroforestry and forestry products while also exerting more pressure to convert remaining forests to agricultural, industrial and residential uses. Across the region, the loss of forests continues, with the remaining forests required to supply more products and services (Roshetko 2013). In the uplands of Southeast Asia, integrating a variety of useful tree species in local farming systems to develop agroforestry systems is a proven strategy for smallholders to strengthen their livelihoods through crop diversification and risk reduction (De Royer et al 2016).

The common bottlenecks to agroforestry development in Southeast Asia are policy disincentives; lack of secure land tenure; limited access to, and capacity to use, quality planting material; limited tree management skills and information; and inadequate market information and access (Do et al 2016, Roshetko et al 2007a). Policy support for secure land tenure and the other critical factors is a key enabling condition required to facilitate the development of smallholders' upland agroforestry systems (De Royer et al 2016, Roshetko et al 2007a).

3. 'Conservation agriculture with trees' for soil and water conservation

Soil erosion, siltation of irrigation and hydropower systems, flooding and water pollution are common environmental problems in the uplands. Establishing natural vegetative strips (NVS) along contour lines is a simple, low-cost, proven conservation measure that has direct environmental and economic benefits. NVS on sloping land involves growing grasses or other vegetation in 50 cm-wide strips spaced at 8–10 m. The technique forms the basis of 'conservation agriculture with trees'.

The integration of trees into annual cropping systems on sloping land employs the following principles: 1) minimal soil disturbance; 2) diverse crop species; 3) continuous ground cover; 4) judicious integration of trees; and 5) integrated water, nutrient and pest management. Depending upon which tree species are planted and how they are managed, their incorporation into crop fields and within wider agricultural landscapes contributes to 1) maintaining vegetative soil cover year-round; 2) bolstering nutrient supply through nitrogen fixation and nutrient cycling; 3) enhancing suppression of insect pests and weeds; 4) improved soil structure and water infiltration; 5) greater direct production of food, fodder, fuel, fibre and income from products of the intercropped trees; 6) enhanced carbon storage both above- and belowground; 7) greater quantities of organic matter in soil surface residues; and 8) more effective conservation of above- and belowground biodiversity (Mercado et al 2016). NVS can effectively reduce soil erosion by more than 90% (Mercado et al 2001) and improve the production of the associated annual crop by 40% (Mercado et al 2012). NVS provide the foundation for establishing commercial tree crops along the contours.

4. Farmers' groups as learning centres

Farmers' groups are used to reach a larger number of motivated smallholders and communities and empower them by providing the skills needed to enhance and diversify the productivity and profitability of their upland agroforestry systems. This approach to agroforestry development includes pursuing market and enterprise opportunities (Roshetko et al 2007b) and also encourages individuals and groups to develop agroforestry innovations that are appropriate for their specific conditions.

Farmers' groups that deal with the management of nurseries and trees might be different from those that address marketing but the principles of the approach are the same. What's more, in any community, knowledge of agricultural and natural-resource management will differ between women and men (Mulyoutami et al 2015), thus, it is essential to include both in all group activities. The minimum participation level in group activities for either gender is 33%. It might be necessary to organize activities at specific times to meet women's limitations. Initial group activities are carried out with select female and male leaders who can analyse conditions, identify priorities and develop work plans. Subsequent activities are carried out with groups of farmers associated with the leaders, implementing the work plans. The approach should be dynamic and oriented toward impact, adjusting to the conditions and priorities of each community (Roshetko et al 2007b). Organizing smallholders into farmers' groups will give them improved access to information and the training they need to develop agroforestry (Cramb 2004, Khususiyah et al 2017).

5. Agroforestry advisory and extension services and farmer-to-farmer learning

Improving agroforestry advisory and extension services for upland smallholders will improve farm productivity (De Royer et al 2016, Do et al 2016), particularly, building the capacity of advisors and extensionists in disseminating agroforestry technologies. Upland smallholders tend to have limited access to information and markets owing to poor road, electricity, telephone and digital networks. Thus, farmer-to-farmer advice and extension has become one of the best approaches for providing



Figure 2. Left: nursery and vegetative propagation training in Sulawesi, Indonesia; Right: intercropping NVS with annual crops in Mindanao, the Philippines. Photos: Left: World Agroforestry Centre/Yusuf Ahmad; Right: World Agroforestry Centre/Robert Finlayson

agroforestry advisory and extension services (Yao and Garcia 2002, Gallen 2004, Kelly 2014). Language barriers—which often occur when implementing agroforestry advice and extension in uplands—can be eliminated by using farmer-to-farmer advisors and extensionists (Martini et al 2016). Selecting the most motivated farmers who are excellent communicators and building their capacity further is the key to success (Franzel et al 2015). Farmer-trainers learn by attending a series of agroforestry farmers’ field schools, being involved in farmers’ demonstration trials, and through links to agroforestry research agencies. Developing technical material, such as manuals and information sheets, with farmer-trainers encourages their self-learning after formal training. The best advisory material combines short descriptive texts with clear, ‘how to’ diagrams and is tested with smallholders before publication. Radio and other communication media can increase the dissemination of agroforestry information but production expenses and limited network coverage in remote uplands can restrict effectiveness (Paramita et al 2014).

6. Secure land tenure

Clear land tenure supported by strong policies are essential enabling conditions that facilitate the development of upland agroforestry systems. Without guaranteed rights to use land and trees, smallholders are less likely to establish agroforestry systems. Providing access rights to land and trees to individuals or communities increases smallholders’ confidence to invest in agroforestry systems, strengthens local livelihoods, supplies local to global markets, and provides environmental services, including the restoration of degraded land. Hence, tenure and supportive policies must be a priority for local and national governments. Secure tenure rights can be a reward for sustainable management of land resources by communities and are best put in place as part of wider negotiations regarding local development (Roshetko et al 2007a). Social forestry schemes and livelihoods-and-conservation agreements (where governments support the development objectives of communities that sustainably manage local natural resources) are two mechanisms that can provide secure tenure and supportive policies.

Recommendations

Towards achievement of the goals of the ASEAN Vision and Strategic Plan for Food, Agriculture and Forestry 2016–2025, we recommend that ASEAN member states undertake the following.

1. Modify or create policies that recognize and support the role of upland smallholder farmers as providers of agroforestry and forestry products and environmental services.
2. Develop policies and regulations that recognize and nurture the important role of upland smallholders' agroforestry systems in maintaining stable populations, sustainable production and rural livelihoods.
3. Establish secure land tenure policies and incentives that support the development of upland smallholders' agroforestry systems and provide increased technical support for accessing quality seeds and seedlings, building capacity in tree management, and improving market access.
4. Support farmers' groups, including building capacity regarding quality seeds and seedlings, tree management, market access and soil and water conservation.
5. Enhance agroforestry advisory and extension services for smallholders not only by focusing on improvement of government agricultural and forestry advisory systems but also on other methods, such as farmer-trainers.
6. Strengthen incentives for agroforestry by providing secure tenure through social forestry schemes, livelihoods-and-conservation agreements and other supportive policies and mechanisms.

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ASEAN Working Group on Social Forestry (AWG-SF) is government-initiated network that aims to strengthen social forestry in Southeast Asia through the sharing of information and knowledge. AWG-SF established by the Association of Southeast Asian Nations (ASEAN) Senior Officials on Forestry (ASOF) in August 2005, linking government forestry policy makers directly with the civil society organizations, research organizations, academia, private sector, and all of whom share a vision of promoting social forestry policy and practices in ASEAN.

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