

# Sustainable soil management for enhanced productivity and climate benefits in ASEAN

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Healthy soils are vital to agricultural productivity as well as to biodiversity, air and water quality, and climate regulation. However, around the world, unsustainable land use and farming practices are leading to rapid erosion and soil degradation, imperilling food security.

Soil degradation is a serious problem in Southeast Asia, driven to a great extent by agricultural intensification as well as deforestation. Most of the available cropland is on slopes that are highly prone to erosion and have acidic,



Biochar. Photo credit: Flickr/Simon Dooley

often badly degraded soils. Across the region, many soils now have low levels of nutrients and do not hold water well; many are also polluted.

Sustainable soil management (SSM) works to protect and restore soil health by preventing erosion, adding organic matter, improving nutrient and water management, protecting the structure of the soil, protecting the soil from contamination, and preventing salinisation, acidification or alkanisation.

Among the most prominent SSM methods is conservation agriculture, which has three pillars: minimal soil disturbance (by reducing or avoiding tillage), permanent soil organic cover, and crop rotation. Crop residues are left on the land and incorporated into loosened soil. Planting is done by pushing seeds into the soil with a cultivator drill. Cover crops are used to protect the soil between the harvest and the next planting, and crops are rotated to diversify soil bacteria and fungi, protect against diseases, and recycle and rebalance nutrients in the soil.

Along with preserving the long-term productivity of soils, SSM can reduce farmers' spending on water, fertiliser and pesticides. SSM also enhances ecosystem services; increases soil carbon storage, helping to offset greenhouse gas emissions; and boosts resilience to climate change impacts such as extreme heat, droughts, heavy rains, floods, and saltwater intrusion due to sea-level rise.

SSM interventions need to be tailored to the local context and may require policy support, incentives and financial

assistance, especially at the outset. Broader issues may need to be overcome, such as securing land tenure for low-income farmers. Equity and inclusion must be prioritised to ensure that women and other marginalised groups can fully benefit. It is also important to work with local land managers, especially Indigenous Peoples, to integrate their knowledge in SSM projects.

National policies and ASEAN frameworks and guidance already support SSM, and some approaches have a long history in the region. Terracing has been used for hundreds of years to prevent soil erosion and conserve water on slopes. Organic agriculture was once the norm, though it is now very limited. Modern conservation agriculture, which combines multiple SSM strategies and uses specialised equipment, is still relatively new and limited in Southeast Asia, but there are examples of its successful deployment.

## Insights for policy-makers, donors and project implementers

A key next step is to better integrate SSM with ASEAN countries' agriculture and land use policies and strategies and ensure that agricultural extension programmes have the tools they need to promote and support SSM. It is also important to realign farm subsidies and incentives, to discourage harmful practices and facilitate SSM adoption.

At the same time, SSM needs to be integrated into national climate change mitigation and adaptation policies and strategies, as well as in national policies to achieve biodiversity and land degradation neutrality goals. This may help attract international finance to support SSM.

Governments also need to prioritise efforts to provide pathways to secure land tenure for farmers who do not currently own land. This is crucial to advancing multiple climate-smart land use objectives, and it is particularly important for SSM, as without secure land tenure, farmers have a strong incentive to maximise yields even at the expense of long-term soil health.

Another priority is to foster knowledge-sharing on SSM, including technology transfer, at the subnational, national and regional levels, aiming to build expertise on best practices within Southeast Asia, including approaches tailored to the region's landscapes, major crops and cultural contexts. Platforms developed for this purpose can also support the continued improvement of SSM guidance across ASEAN countries.

Project implementers and development partners, meanwhile, should strengthen monitoring of soil health, in collaboration with agricultural extension programmes, and share the information with farmers, together with advice on locally appropriate SSM measures. The data should also be used as part of a monitoring and evaluation framework to track the effectiveness of SSM interventions and further improve them.

It is important to collaborate with businesses that sell agricultural inputs and provide services to farmers (e.g. tilling) to promote SSM measures as well as more efficient input use. Financial incentives and policy support may be needed to ensure the interventions are economically and socially sustainable in the long term.

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*For a more comprehensive overview of sustainable soil management and its benefits, please consult the full version of this Insight Brief. This Insight Brief is part of a series prepared by the Stockholm Environment Institute on behalf of the Climate-Smart Land Use (CSLU) in ASEAN project. **All briefs are available at <https://asean-crn.org/overview/publications/study-and-policy/>**. This digest is written by Marion Davis based on Anschell, N., Salamanca, A., and Davis, M. (2021), *Sustainable soil management for enhanced productivity and climate benefits*. ASEAN Climate-Smart Land Use Insight Brief 5. Jakarta: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).*

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