

Ecosystem Services and Resilience



RESEARCH PROGRAM ON
Water, Land and
Ecosystems

for agricultural development, conservation and poverty alleviation

The vision of the CGIAR Research Program on Water, Land and Ecosystems (WLE) is of a world in which agriculture thrives in vibrant ecosystems, where communities engaged in agriculture live in good health, enjoy food and nutritional security, and have access to everything they need to continually improve their livelihoods. WLE considers ecosystem services as central to making this vision a reality.

Ecosystem services are the environmental conditions and processes resulting from the combined actions of species in natural and managed ecosystems that perform valuable functions to sustain and support human life (Daily 1997; Walker and Salt 2006).

What is an ecosystem service-based approach and why it is needed

Agricultural development has progressed in leaps and bounds to increase yields to feed our growing global population, but this has come at a tremendous environmental cost. An ecosystem service-based approach to agricultural development is one that evaluates the decisions we make on land and resource use so that we are able to boost agricultural yields, without destroying the natural resources and ecosystems that make it possible to grow that food. We must move beyond agriculture that 'does no harm' to the environment, to agriculture that contributes to improving soil and water quality, to conserving biodiversity, and to increasing the resilience of rural communities that are the most dependent on ecosystem services.

How do rural communities benefit from ecosystem services?

Many of the places we work are classified as life raft ecosystems. These are regions where poverty is high, populations are dense and communities are highly dependent on their ecosystems and the services they provide for their livelihoods. In many cases, these ecosystems are also highly degraded or highly variable. WLE is investigating ways to improve livelihood and food security of these populations through ecosystem service-based solutions and approaches.



Photo Credit: Neil Palmer (CIAT)

How rural communities benefit from ecosystem services:

- Agricultural productivity: ecosystems provide core services that directly impact agricultural productivity, such as soil nutrient cycling, pollination and pest control.
- Non-agricultural services: ecosystems and agricultural landscapes provide services that benefit the wider public, such as water quality, water reliability and carbon sequestration.
- Financial compensation: in some cases, farming communities who actively manage and provide an ecosystem service may be given financial compensation, such as through Payment for Ecosystem Services (PES) schemes, or certified products from a sustainably managed landscape - this may play an important role in poverty reduction.
- Other direct benefits: access to resources such as fisheries and forest products, protection from natural disasters, and cultural services that strengthen community and identity.

All of these ecosystem services can be taken better advantage of if they are proactively managed.

Principles of the WLE Ecosystem Service and Resilience Framework

Harnessing ecosystems services for poverty reduction and agricultural development requires a significant shift in perspective from more traditional ecosystem service-based approaches. WLE's Ecosystem Service and Resilience Working Group has identified seven principles that highlight this perspective.

- 1 People are fundamental** – improving the lives of rural populations is the central objective of our work. Our key focus is on how ecosystems and the services they provide can be harnessed to achieve these improvements.
- 2 Human and natural ecosystems are tightly coupled** – Humans both impact, and are impacted by the environment. We call for a systems-based approach that highlights the interactions and processes between human and natural systems.
- 3 Ecosystem services needs to be part of the global development discussion** – In the midst of many approaches to agricultural development, we emphasize the need to include ecosystem service-based approaches that restore, harness and conserve our natural resources. New technologies that permit the rapid evaluation of ecosystem service quality, use, and spatial distribution are urgently needed.
- 4 Multi-functionality** – Agricultural landscapes have long been valued for their role in food production. However, there is growing recognition that these landscapes are important for multiple functions, such as providing shelter and clean water, and reducing the effects of natural hazards and disease. We can no longer afford to value production above all other functions.
- 5 Design a resilient system** – Expect change and plan for change. Agricultural landscapes and communities are complex, adaptive systems that are constantly exposed to stress and shocks. With increasing social, climate and environmental unpredictability, these shocks and stresses are becoming more erratic and more dramatic. It is important to understand the dynamics and interdependencies between people and their environment in order to build systems that are more resilient and adaptive.
- 6 We might have to modify ecosystems** – Ecosystems services are often used as a means to justify the conservation of natural systems. In agricultural landscapes, the focus is more on engineering a semi-natural system that increases the provision of services valued by the local community. This involves finding the best strategies to enhance synergies and reduce trade-offs to satisfy different needs. Ecosystem service-based approaches to poverty alleviation will often be about modifying ecosystems.
- 7 Large Scales** – As we are working on complex, adaptive systems that take into account social, economic and environmental factors, a large-scale perspective is needed to clearly understand interactions, feedbacks and tradeoffs. Large scales allow us to consider a wider range of ecosystem services and solutions, from the hydrological services provided by protected areas, to the small-scale agroecological solutions that support productivity on farm.



Photo Credit: Neil Palmer (CIAT)

Have your say

The principles of the framework act as a guide to those who want to adopt an ecosystem service-based approach to their agricultural projects and interventions. The full framework is currently being finalized. The Ecosystem Service and Resilience Working Group welcomes your input on these principles and any insights from working with ecosystem service-based approaches. We work predominantly in the following regions – the Volta-Niger, Nile, Mekong and Indo-Gangetic river basins, and would be interested in hearing about opportunities and challenges in these areas.

To find out more about the work that we do and the CGIAR Research Program on Water, Land and Ecosystems, please visit wle.cgiar.org. The site also hosts the Agriculture and Ecosystems blog, which welcomes blog posts from guest authors on relevant topics.

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