

NATURE-BASED SOLUTIONS FOR ADAPTATION

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As climate change and unsustainable farming threaten the foundations of global food security, farmers are turning to nature to lead the way forward. Agroecology and other Nature-based Solutions (NbS) are transforming smallholder agriculture, restoring soil health, conserving biodiversity, and building resilience from the ground up. By blending traditional knowledge with innovation, and empowering farmers – especially women – as stewards of the land, these approaches are showing that climate adaptation and food security can grow hand in hand.

FARMING WITH NATURE: Agroecology and NbS for climate-resilient smallholder farming

WHY IS TRANSFORMING AGRICULTURE WITH NBS IMPORTANT?

Agriculture sits at the center of today's environmental and climate crises: it can drive biodiversity loss, soil degradation and deforestation, while increasingly suffering from droughts, floods, heat stress and shifting pests. As land health declines, productivity becomes more dependent on costly external inputs and more vulnerable to shocks. Reversing this spiral requires approaches that rebuild ecological function rather than erode it.



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Agroecology¹ provides that pathway. As a Nature-based Solution (NbS)², it restores the ecological processes – soil formation, nutrient cycling, water regulation, pollination and natural pest control – that underpin resilient and productive farming systems. By diversifying crops and integrating trees, livestock and locally adapted varieties, agroecology enhances soil organic matter, improves water retention, reduces erosion and strengthens ecosystem services across farms and landscapes. These improvements boost resilience to climate extremes while contributing to carbon storage in soils and biomass.

Tailored to local contexts through farmer-led experimentation and knowledge co-creation, agroecological systems reduce dependence on synthetic inputs, spread risk across diversified production, and strengthen the long-term viability of smallholder farming.

By “farming with nature,” agroecology positions agriculture not as a driver of degradation but as a core solution to climate, biodiversity and livelihood challenges. This integrated NbS approach is critical for achieving food system transformation, climate adaptation and land restoration goals.

AGROECOLOGY IN THE CLIMATE CONTEXT



Agroecology for Climate Adaptation: enhanced soil and water management, diversified production and strengthened ecosystem services increase smallholders’ capacity to cope with climate variability and extremes



Agroecology for Climate Mitigation: higher levels of soil organic carbon, reduced synthetic fertilizer use and integration of trees and perennials into farming systems all contribute to lower greenhouse gas emissions and increased carbon storage

ROOTS OF RESILIENCE: FARMERS LEADING CHANGE ON THE GROUND

Globally, over 80% of farms are family-run, and these smallholder and small-scale farms are already advancing many of the solutions needed for climate-resilient food systems. Yet they continue to receive just 0.8% of total climate finance and remain under-served by agricultural research and extension systems ([CPI 2023](#)). As emphasized by the [Family Farmers for Climate Action \(FFCA\)](#) alliance, farmers are innovating despite major structural barriers, not because existing systems are designed for them.

In agricultural landscapes, where pressures on ecosystems are greatest and opportunities for biodiversity gains are substantial, agroecology demonstrates how NbS can meet food security needs while conserving nature.

Restoring land health is central to addressing this gap. [IUCN’s Common Ground and Approaches to Sustainable Agriculture](#) show that healthy soils, functional water cycles and on-farm biodiversity are the foundation of resilient

¹ A holistic and integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of sustainable agriculture and food systems ([FAO 2026](#)).

² Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits (UNEA-5 2020 Resolution).

production. Tools such as the [Land Health Monitoring Framework](#) help farmers, cooperatives and governments diagnose degradation and track improvements – an especially valuable resource as countries embed NbS and agroecology into NDCs, NBSAPs and LDN strategies.

Through projects supported by the [Global EbA Fund](#), farmers’ organizations around the world are already translating EbA principles into tangible climate resilience outcomes.

In **Nepal**, floodplain farmer groups working with [Heifer International](#) are co-developing agroforestry-based adaptation plans that stabilize riverbanks, rebuild soil structure and increase water retention, showing how community-led planning turns NbS principles into practical climate risk management.



This work strengthened ward and municipal institutions’ technical capacity, coordination, and ability to integrate EbA priorities into formal planning through 16 ward-level EbA trainings, 74 ward-level meetings, and two municipal-level workshops, culminating in the adoption of two



climate-integrated municipal land-use plans and two agroforestry guidelines that institutionalize EbA across local planning and livelihoods.

Across **Lebanon, Jordan and Syria**, cooperatives supported by [Friends of Nature](#) are adopting agroforestry in dryland systems while engaging directly in national policy processes, ensuring smallholder NbS contribute to national climate commitments.

The project has supported the adoption of EbA-agroforestry practices by 700 small-scale farmers across the three countries, strengthened the institutional capacity of Syria and Jordan, developing a module for the practical application of future EbA agroforestry systems at the farmer level, and informed national climate action through three policy papers integrating EbA-agroecology into NDCs, alongside capacity-building of 90 stakeholders involved in policy enhancement.

In **Costa Rica**, cacao cooperatives partnering with [ECOM](#) are helping producers access national climate finance mechanisms to invest in diversified agroforestry systems that buffer

against drought and price volatility while regenerating degraded land. This work is underpinned by nine climate-risk and suitability maps and a biodiversity corridor analysis, and has enabled 88 farmers to secure international commercial contracts delivering USD 65,000 in regenerative agriculture packages, while low-carbon fertilization practices increased farm revenues by an average of USD 450 and reduced emissions by 25%.



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These transformations are not limited to agroforestry. In **Côte d'Ivoire**, local committees supported by [WUSC](#) have shifted restoration efforts away from top-down, externally-imposed models toward community-led strategies grounded in Indigenous knowledge. Women now lead local restoration committees, integrate seedling production into income-generating activities and guide decisions on where and how restoration occurs, resulting in more durable ecological outcomes and stronger local ownership of land stewardship.

In **Zimbabwe's Gwanda district**, farmers working with MCC and BIC-CDS through the [LINCZ project](#) demonstrate another pathway:

conservation agriculture. After consecutive years of severe drought, experienced farmers like Tshwaliteng Dube and Christopher Magwala are teaching their neighbours how minimal soil disturbance, mulching and crop rotation improve water-use efficiency and help crops withstand erratic rainfall. Their fields have become demonstration sites – proof that even in highly climate-stressed environments, agroecological practices can sustain yields when conventional plough-based systems fail.

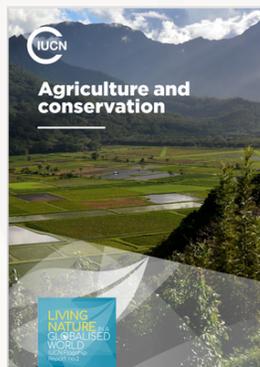
In **Guinea**, [CECI](#) empowered women farmers to produce and apply locally sourced biofertilizers through hands-on training and demonstration plots, reducing reliance on chemical inputs while strengthening climate-resilient livelihoods.

In **Benin**, the [Femmes Hwé-Nou initiative](#) supported by [UPA DI](#) is using living laboratories to turn agroecology and NbS into practical tools for women and youth farmers facing soil degradation and irregular rainfall. Across Djidja, Savalou and Adja-Ouère localities, climate-advisory clubs bring producers together with technicians and researchers to co-design and

test practices such as composting, mulching, crop rotations, bio-inoculation and small-scale agroforestry. These community-driven trials, validated through participatory field evaluations, are already restoring soil health, improving water retention, strengthening biodiversity in local farming systems, and reducing production costs. As in other regions, the approach builds women and youth’s leadership in climate-resilient agriculture while creating evidence-based NbS that can be scaled further through producer organizations and local authorities.

“
 We act as bridges...We’re helping other farmers do conservation agriculture as well. - Christopher Magwala, MCC
 ”

Together, these cases demonstrate that farmers’ organizations – cooperatives, producer associations, women’s and youth groups, and Indigenous networks – are pivotal to scaling agroecology and other NbS. They aggregate demand for training and inputs, strengthen bargaining power in markets, co-create and share knowledge through peer learning, and ensure that policies reflect the realities of those most affected by climate change. As highlighted across IUCN’s [Agriculture and Conservation](#) and [Sustainable Agriculture and Nature-based Solutions](#) publications, such collective structures are essential for aligning agriculture with biodiversity and climate goals.



Recognizing farmers as custodians of nature means designing policies, finance and programmes with them rather than for them. This includes strengthening tenure security (especially for women, youth and Indigenous Peoples), redirecting subsidies from harmful practices toward regenerative approaches, expanding access to climate finance tailored to smallholders, and investing in farmer-led research and extension. Recognizing that locally adapted seeds are the cornerstone of resilient agriculture in West Africa, [Inter Pares](#) and its counterparts in **Guinea-Bissau, Senegal, Togo and Burkina Faso** carried out a Participatory Seed Security Assessment to characterize the availability, access and quality of local seeds. The information served as a basis to then inform rural extension training on seed identification, selection, participatory breeding and conservation, thereby enhancing local agrobiodiversity and increasing farming communities’ autonomy over their seed supply.

In [Haiti’s Plateau Central](#), UCOCAB’s farmer-led research-action supported by [UPA DI](#), enabled members to collectively identify soil fertility for cacao production and diversified agroforestry systems as the most relevant pathways for climate-resilient farming in the region. By jointly

analyzing soil biology, chemistry and field conditions across altitudes, farmers generated locally grounded evidence on how to improve nutrient cycling, organic matter and shade structure. Through participatory design of altitude-specific agroforestry models, they also defined diversified systems that restore degraded lands and strengthen microclimates.

When farmers' organizations lead, agroecological NbS become more widely adopted, better adapted to local contexts, and more resilient over time, helping turn agricultural landscapes into engines of climate action, biodiversity recovery, and rural prosperity.

GROWING THE FUTURE: EVIDENCE, INSIGHTS, AND THE ROAD AHEAD

Scaling agroecology and NbS among smallholder farmers requires coherent action across policy, knowledge systems and finance. Governments should embed these approaches into national agricultural, climate, biodiversity and land-use strategies, phasing out incentives that drive degradation, and strengthening tenure security so farmers, especially women, Indigenous Peoples and marginalized groups, can invest in long-term soil, water and tree management. In **Senegal**, thanks to the relentless work of **Enda Pronat and allies**, the government has adopted an agroecology policy and is working with civil society to ensure that the policy is informed by on-the-ground expertise through the the Agroecological Transition Movement in Senegal (**DYTAES**).

Strengthening farmer-led research, extension and advisory services is essential for bridging scientific and local knowledge. Inclusive platforms that bring farmers, governments, researchers and private actors together, locally and nationally, can

accelerate co-learning and co-design of interventions. In Senegal, **DYTAES** convenes farmers, civil society organizations, researchers and community leaders from across the country to collectively identify solutions to strengthen agroecological systems.

Accessible and appropriately tailored finance must reach farmers and their organizations, including small grants, guarantees, and blended mechanisms that de-risk transitions. Markets should increasingly reward diversified production and ecosystem stewardship through territorial markets, improved procurement systems and certification schemes. Institutional procurement, including school food programs, is a proven and effective lever for scaling up agroecological production. In **Guinea-Bissau**, over 2,000 women farmers were trained to grow ecological produce for local schools, helping ensure children's access to healthy food while creating a stable market for locally and ecologically grown food by women.



To ensure these interventions lead to measurable outcomes, monitoring systems should track both land health and social inclusion. The **IUCN Land Health Monitoring Framework** and **NbS Global Standard** offer practical tools, but countries and farmer organizations can complement them with simple, farmer-accessible indicators. In the case

of Nature+'s Conservation Agriculture+ (CA+) approach, indicators, such as soil condition, water infiltration and crop performance, were found to increase confidence in NbS approaches, resulting in higher potential for long-term adoption by farmers.



Finally, equity must remain central. Women, youth and other under-represented groups should be positioned as leaders and decision-makers throughout planning, implementation and monitoring. Because instituting agroecological practices can lead to initial increases in labor burdens, particularly for women, it is imperative that they be involved in decision-making about the design of actions and their level of uptake. International agreements, such as the UNFCCC's Global Goal on Adaptation, the CBD's Global Biodiversity Framework, and the UN Decade on Ecosystem Restoration, offer supportive policy frameworks that countries can leverage to align local action with global commitments.

By cultivating autonomous, localized food systems, rather than reliance on foreign inputs and knowledge, agroecology can act as a lever

for women's economic empowerment and greater gender equality. In **West Africa**, **Inter Pares'** work through **ACF-AO and EGAL-AO** has sought to secure women's access to and control over land local seeds. This has strengthened women's economic position in the community and has also been an important way to foster greater gender equality for the benefit of the community.

Agroecology and NbS provide a practical pathway to address climate, biodiversity and food security challenges. By cultivating autonomy and equity it can also contribute to gender equality. Embedding these approaches in national food system transformation agendas, supported by robust monitoring, accessible finance and strong farmer organizations, can turn agricultural landscapes into climate-resilient, biodiverse and socially just systems that sustain livelihoods today while safeguarding ecological integrity for future generations.

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