



Advancing Climate Adaptation for Smallholder Farmers

Climate change poses urgent challenges to the sustainability and stability of human societies and natural environments. As weather conditions become more extreme and unpredictable, it is critical to boost investments in adaptation mechanisms for farmers – even as we pursue mitigation measures for an agriculture sector that produces about one third of total anthropogenic greenhouse gas (GHG) emissions.

At the launch of the COP28 Food Systems and Agriculture Agenda in July 2023, the United Arab Emirates COP28 presidency emphasized that driving innovation in traditional agricultural practices has a major role to play in “responding to the realities of climate change and upgrading food systems.”

We need to ensure that innovations are available and practical for the hundreds of millions of smallholder farming households in low- and middle- income countries (LMICs), whose day-to-day existence depends on what they can grow or raise on small plots.

As climate change intensifies, smallholder farmers will face scarcer natural resources, more crop failures and livestock losses, and greater threats of food insecurity. They urgently need climate-smart solutions.



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How Heifer Advances Adaptation

Heifer International's Caring for the Earth approach anchors climate-smart and environmentally friendly practices in our programs that reach millions of people annually. We empower smallholder farming communities across Africa, Asia and the Americas to sustainably improve their livelihoods as well as their economic and climate resilience.

Heifer is committed to supporting and advancing low-cost sustainable farming methods that enable smallholder farmers to increase food production while enriching soils, preserving forests and other farm-adjacent ecosystems, and reducing food, feed and byproduct waste. With the right tools and training, smallholder farmers can earn a living income in agriculture while helping protect the planet.

Heifer's three-pronged adaptation approach focuses on:

- **Increased resilience of smallholder farming communities** to climate, environmental and economic challenges
- **Increased efficiency of local food systems**, including cutting waste and GHG emissions
- **Increased health and resilience of farms** and farm-adjacent ecosystems



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Figure 1: Summary of Heifer's Adaptation Initiatives Objectives within its Programs

Increased smallholder farmer resilience

- Production intensified sustainably
- Higher, more-stable incomes
- Diversified production
- Improved capacity and knowledge
- Increased access to resources (i.e., markets, inputs and financing)
- Improved livestock health
- Improved nutritional intake

Increased efficiency in food systems

- Reduced inorganic inputs
- Increased efficiency of resource use
- Reduced pollution
- Improved water access
- Reduced food waste and spoilage

Stronger ecosystem health and resilience

- Improved soil health
- Increased water quality and quantity
- Decreased erosion and desertification
- Improved forest cover and diversity
- Increased biodiversity
- Improved animal well-being



Adaptation in Action: Program Examples

Livestock Farming

Many smallholder farming communities rely on livestock for income, food security, transport and farm labor as well as stores of wealth. While livestock contribute a significant share of agriculture-derived GHGs – notably methane – the contribution from smallholder farms is relatively minor. There are also proven ways to partially mitigate their impact while helping smallholder farmers adopt more eco-friendly practices.

In **Nepal**, a study with the Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT) showed that adoption of climate-smart goat farming practices by Heifer-supported cooperatives allowed farmers to lower their intensity of land use by 80 percent, water use by more than 90 percent and GHG emissions by 78 percent.



The co-ops' **fodder plantations** have multiple benefits – increased soil quality, keeping continuous roots and plants in the ground, capturing carbon, reducing soil erosion and improving soil water capture, infiltration and holding capacity, thus reducing downstream flooding. Heifer is also conducting research in Nepal to estimate and compare the carbon sequestration potential of 13 common species of livestock fodder trees and one forage grass species. The results will inform the development of formulas for estimating the number of trees required to offset methane emissions from small dairy farms.

In **Honduras**, Heifer's *Sustainable Livestock Signature Program* generates systemic change in the dairy sector while directly benefiting 90,000 livestock farmers. With funding from the Global Environment Facility (GEF) and others, and in partnership with the United Nations Food and Agriculture Organization, the program also protects biodiversity and recovers degraded ecosystems while monitoring reductions in carbon footprints of demonstration farms. We estimated a 37 percent reduction in these farms' carbon footprints through improved pasture management, natural regeneration of native species, incorporation of live (vegetative) fencing and improvement of the physical and chemical conditions of the soil.



De-risking Climate Shocks

In late 2022, about 140,000 hectares of farmland across **Nigeria** were devastated by floods and heavy rainfall. Fortunately for a number of rice farmers, Heifer had partnered with Pula Advisors, Olam Agri, Thrive Agric and Leadway Assurance Limited to create the **Pay-at-Harvest Area Yield Index Insurance (AYII)** policy. It allows rice and maize farmers to reduce climate-related crop loss risks while bolstering investors' confidence in the farming sector. In total, 4,159 farmers affected by flooding in 2022 benefited from AYII coverage.

This initiative aspired to support 100,000 smallholder producers by 2025. A study by Pula showed that the insurance program has boosted resilience by helping farmers double yields, increase farm investment nearly 20 percent and household savings by as much as 170 percent. Nigerian rice farmers are also receiving daily weather forecast and weekly climate-smart extension advisory messages via Heifer partner Ignitia's SMS and app delivery channels, helping the farmers adjust agricultural practices accordingly.

Preserving Ecosystems and Livelihoods

Ecuador's ecologically rich but fragile mangrove forests are under serious threat from the logging industry, commercial shrimp farming and pollution. Local communities rely on these ecosystems to make a living from collecting and selling clams and crabs. Heifer partners with local governments and the communities to establish a system whereby the communities form cooperatives that protect swaths of the mangrove forests in exchange for the right to collect the shellfish.

On the livelihoods side, Heifer Ecuador connects native collectors' cooperatives to viable markets, providing technical assistance and guidance, and has supported them to develop community nurseries for reforestation. To date, these collectors have reforested more than 50 hectares of mangroves. In August 2023, in a major achievement, the Ecuadorian government granted custodial rights to sections of the mangrove forest to four Heifer-supported farmer associations to continue this work.

Advancing Regenerative Farming

In the **U.S.**, the Heifer Ranch Center for Regenerative Agriculture is certified by the Savory Institute Global Network Hub to train smallholder farmers in holistic management of their land to increase farm productivity and build more resilient food systems. One technique used is Savory's Ecological Outcome Verification (EOV) process to measure key indicators of a healthy ecosystem, including soil health, soil water infiltration rates and the presence of essential plants. This helps foster regenerative operations that increase plant and animal diversity and are better equipped to manage climate and other challenges.

Heifer **Guatemala** and Indigenous farmers in the Alta Verapaz region are working to produce cardamom and spices in an environmentally friendly way while also securing fair prices for their product. This program, called the *Green Business Belt*, promotes agroforestry among farmers, helping communities with plant nurseries, and investing low-carbon, energy efficient dryers that use electricity and solar energy instead of firewood, which improves spice quality, forest management and soil carbon.



Better Adaptation Measurement

With funding from GEF, Heifer has partnered with the Ministries of Environment in Guatemala and Honduras to develop an Adaptation Equivalency Index (AEI) to measure the capacity of producers and value chain actors to adapt to climate change through improved water management, the use of crop varieties more resistant to disease and pests, crop diversification and agroforestry systems. The AEI helps smallholder producers, processors and businesses capture value from products they market in the coffee, cacao and spice supply chains by confirming the impact of adaptive farming practices. For corporate buyers, the AEI simplifies reporting on investments and their outcomes related to climate adaptation, making it easier to support and communicate sustainable supply chain initiatives.

Partner with Heifer to Advance Smallholder Farmers' Resilience

Since 1944, Heifer International has worked with more than 56 million people in farming communities — 1.3 million in 2024 alone — across Africa, Asia and the Americas to help them address hunger and poverty in their communities. Our locally led strategy focuses on supporting farming households to generate lasting systemic change while caring for the Earth and reducing climate impacts.

Our approach is partnership-driven — with farming organizations, governments, donors, businesses, researchers and other food systems stakeholders. We aim to:

- Collaborate with technical actors to define innovative and efficient approaches to farming.
- Increase resources and boost investment to scale up sustainable farming models.
- Support sustainable locally led development for the benefit of smallholder farmers.

Contact us to learn more about partnering with Heifer International: heifer-dc@heifer.org

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