CIAT works with hundreds of partners to help developing countries make farming more competitive, profitable, and resilient through smarter, more sustainable natural resource management. We help policymakers, scientists, and farmers respond to some of the most pressing challenges of our time, including food insecurity and malnutrition, climate change, and environmental degradation.

Our global research contributes to several of the United Nations’ Sustainable Development Goals, and cuts across four key themes: big data, climate-smart agriculture, ecosystem action, and sustainable food systems.
Decision and Policy Analysis (DAPA) Research Area

Supporting Smart Decision Making
CIAT provides the private and public sectors with vital intelligence for analyzing agricultural systems at all levels - from individual farms to whole continents. Through the close involvement of farmers, this work contributes to the development of policies that help boost productivity, efficiency, and sustainability, enabling farmers and governments to plan for the future.

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Prioritizing Ecosystem Services
These are the multiple benefits that everyone receives from landscapes – ranging from nutritious food and clean water to climate regulation and outdoor recreation. CIAT develops tools and methods for quantifying, mapping, and valuing these services, and also analyzes the environmental impacts of introducing new land-use alternatives in agricultural areas. This work contributes to the development of policies for the equitable sharing of the benefits from ecosystems services and for determining the level of investment and incentives required to protect them.

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Responding to Climate Change
Our research helps guide the rapid development of robust agricultural policies and recommendations related to climate change adaptation and mitigation. It includes assessments of the likely impacts of climate change on particular crops and regions, and evaluation of best-bet technologies. We also work with partners across the developing world to help farmers manage agricultural risks related to climate variability, through options such as weather index-based insurance schemes and seasonal climate forecasting.

This work is conducted in support of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

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Better Business for Farmers
Smallholder agriculture has enormous potential as an engine of inclusive economic growth in developing countries, but the sector is often overlooked by large agribusinesses. CIAT develops tools, methods, and guidelines to nurture mutually beneficial commercial links between farmers organizations and buyers in diverse markets. In addition, we evaluate the impacts of improved market links on the livelihoods of rural women and men.

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Bringing Soils to Life

CIAT soil experts include not only soil scientists but also ecologists and anthropologists. Drawing on the latest tools and knowledge, they contribute strategically to sustainable management of rural land, with the aim of enhancing ecosystem services, while unlocking the land’s potential to deliver greater economic and social benefits.

Cutting across diverse crops and environments, CIAT’s pioneering soils research aims to restore degraded land, make agriculture climate smart, and improve soil health. Our work ranges from individual farm plots to entire landscapes.

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Restoring Degraded Land

CIAT and its partners have developed a wide range of practices (including agropastoral and agroforestry systems) that are effective in reversing land degradation. Center scientists identify new incentives for wider adoption of these practices, based on insights from different scientific disciplines and in consultation with diverse sectors of society.

Our researchers also use a range of new modeling tools and approaches to help target investments in sustainable land management. These are aimed at restoring ecosystem services, sustainably intensifying crop production, and delivering economic and social benefits – especially for marginalized groups and women.

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Soils and Climate Change

Agriculture contributes significantly to climate change, partly through greenhouse gas emissions that result from soil processes. The sector is also highly vulnerable to climate change impacts, to some extent due to greater pressure on the soil. Rising temperatures accelerate the loss of organic matter from soils, and more intense rainfall increases soil erosion.

CIAT soil scientists offer win-win solutions that show great potential for boosting crop productivity, while also keeping emissions within safe boundaries and improving carbon capture by soils.

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Sustaining Soil Fertility and Health

As part of CIAT’s wider contribution to the sustainable intensification of agriculture, our soil scientists apply cost-effective techniques to identify soil types, measure threats to soil health, and adapt improved soil management practices to specific conditions. In addition, they analyze different “what-if” scenarios, to identify best-bet soil management options and where these are likely to prove economically viable and socially acceptable, while also reducing agriculture’s impact on ecosystems.

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Beans for Income, Nutrition and Resilience

Beans offer a crucial source of vitamins and protein as well as income for millions of people, particularly in Africa and Latin America. Decades of CIAT research have led to the widespread uptake of improved varieties, with significant impacts on food security in bean-producing countries. CIAT leads the Pan-Africa Bean Research Alliance (PABRA), a large network of bean scientists and research programs working to improve bean production in 30 countries in sub-Saharan Africa.

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Rooting for Cassava

Half a billion people in Africa eat cassava every day, and this high-starch root is also an important staple in Latin America and the Caribbean (LAC). In Southeast (SE) Asia, millions of farmers grow it for industrial markets. CIAT’s cassava research has contributed to the development of new, more resilient varieties in Africa and LAC. In SE Asia, it has led to significant increases in cassava productivity, largely through the introduction and widespread adoption of new varieties but also due to improved crop management and control of emerging pests and diseases.

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Tropical Forages – Feeding a Revolution in Green Livestock Production

The use of diverse forage grasses and legumes enables livestock farmers to make meat and milk production more efficient and profitable. In Latin America, superior grasses have been widely adopted, and recent work in Africa has shown the potential of these forages to relieve the continent’s severe shortage of feed and sustain its livestock revolution. Tropical forages can also help reduce the environmental footprint of agriculture through carbon sequestration, reduction of greenhouse gas emissions, and restoration of degraded land.

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Plant Genetic Resources – Fortifying the Global Food Supply

Humankind has come to rely on just a handful of food crops. But these represent just a fraction of the plants – both wild and farmed – that can help bolster global food security.

These plants are vital for developing new crop varieties that respond to growing food demand and environmental challenges, such as climate change and emerging pests and diseases.

Safeguarding some 67,700 samples, CIAT’s genebank maintains the world’s largest collections of beans and cassava (along with their wild relatives) as well as tropical forages. CIAT scientists use these collections to search for traits that can help breeders develop harder crops. It also provides freely materials to researchers around the world under the terms of the United Nations’ International Treaty on Plant Genetic Resources for Food and Agriculture. In addition, the Center has deposited nearly 31,000 seed samples in the Svalbard Global Seed Vault as a safety backup.

CIAT’s genebank holds in trust 67,700 samples

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Rice: More Productive, Resilient and Competitive

CIAT scientists have developed new generations of high-yielding rice that are well adapted to the diverse environments of Latin America and the Caribbean. Through continued improvement of these varieties and advanced crop management, CIAT and our partners are helping build the competitive strength of the region’s rice sector and securing its role in meeting increased global demand for this, the world’s number one staple crop. Through the Latin American Fund for Irrigated Rice (FLAR), CIAT also contributes to a regional, public-private platform for collaboration on rice research.

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FUTURE SEEDS
A global hub for crop diversity

As part of a major infrastructure initiative, in the coming years, CIAT will create a state-of-the-art genebank. This will help accelerate the development of crops with urgently needed traits, such as higher productivity, improved nutritional value, and greater market competitiveness. It will also be a major global hub for knowledge sharing and public education on the importance of plant conservation and crop improvement.

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LivestockPlus – Tropical forages for more sustainable livestock production

The global demand for livestock products is expected to double by 2050, after having increased three times faster in developing than in developed countries over the last three decades. The developing world’s “livestock revolution” represents an appealing economic opportunity for the 600 million smallholder farmers who make a living from animal production. Given the huge environmental impact of livestock, the question is where and how to increase production without jeopardizing ecological health.

Through the LivestockPlus initiative, CIAT aims to create the necessary conditions for widespread establishment of agricultural systems that incorporate sown forages, which not only contribute to significant increases in meat and milk production, but also have huge potential to reduce greenhouse gas emissions, sequester carbon, and restore degraded land.

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