NATURE+ CONSERVE

Accomplishments through 2024 and CGIAR Science Programs outlook

INITIATIVE ON Nature-Positive Solutions

NATURE+ CONSERVE researches, develops and deploys nature-positive solutions for the conservation and sustainable use of agrobiodiversity, water and soils. The International Potato Center (CIP) leads the research and collaborates with all NATURE+ work packages at the same research sites. This report covers CONSERVE's accomplishments through 2024, and ongoing and future work under the CGIAR Research Portfolio 2025-2030.

The Chinguad family in Cumbal, Colombia, shows landraces of potato, mashuas, ocas and medicinal that they conserve. The involvement of family custodians of agrobiodiversity is a key component of NATURE+ CONSERVE's work.

Contents

NATURE+ CONSERVE country highlights

NATURE+ works in five countries: **Burkina Faso**, **Colombia**, **India**, **Kenya** and **Vietnam**. CONSERVE's accomplishments in these countries include:

Burkina Faso – development of community diversity registries to map neglected and underutilized crop species (NUS)

Colombia – establishment of a community seed bank in Indigenous Andean community for improved access to NUS; transition from extractive dairy production to nature-based agriculture; collaboration with Colombia's agriculture research organization, Agrosavia

Colombia and **Vietnam**: genetic gap analysis (for detecting unique landraces of traditional crops) for populations of taro, banana and potato, both in situ and ex situ; citizen science collaboration for agrobiodiversity conservation

India: on-farm conservation centers; community seed bank establishment

Kenya: inclusion in VarScout tool, which promotes biodiversity conservation by empowering farmers, researchers, and citizen scientists to document, analyze, and share real-time data on crop traits and environmental conditions

Vietnam: work with schools, governments from local to national, and smallholder and women's groups to incentivize biodiversity conservation and its sustainable use and management

All: assessments of agrobiodiversity baselines in communities with a strong focus on neglected and underutilized crops (in collaboration with other NATURE+ work packages)

NATURE+ CONSERVE key accomplishments

Extending CGIAR conservation innovations to Colombia's Andes

While agrobiodiversity conservation is widely underprioritized globally, CGIAR centers CIP and the Alliance of Bioversity and CIAT have a proven track record of making its conservation and sustainable use a priority for communities and governments in Peru and Ecuador. Extending and adapting this work to their Andean neighbor, **Colombia**, was a logical next step and became a NATURE+ priority.

Work included gathering data on agrobiodiversity in Cumbal, one of the Initiative's priority sites in the country. In close collaboration with local Indigenous communities, the initiative characterized dozens of neglected and underutilized crop species, including identifying small farmers who still use them. The work facilitated the establishment of a community seed bank, the expanded use of tools and resources first deployed in Peru and **Colombia**, and gained support for scaling from Agrosavia, Colombia's national agricultural research organization, which plans to adopt the Initiative's Cumbal model in conservation work nationally. The Initiative also worked on gathering data on, expanding the use of, and furthering the research on dozens of maize varieties in several Colombian communities. Data from Colombia was added to existing apps and platforms already deployed in other Andean countries.

These advances provide the foundations for increased research, use and conservation of neglected crops in Colombia under CGIAR's Research Portfolio 2025-2030. (See MANAGE section for how agrobiodiversity conservation and its use by renowned chefs across Colombia and in local cuisine for agro-ecotourists.)

Citizen science growth under NATURE+

Local stakeholder participation in agrobiodiversity conservation proved critical to NATURE+'s successful conservation work. As with most of the Initiative's work across countries and work packages, conservation work successfully combined cutting-edge research with traditional knowledge and local priorities.

As part of activities for International Potato Day, Colombia's Agrosavia and Vietnam's Plant Resources Center collaborated with CONSERVE and local Indigenous schools to monitor potato landraces using digital apps (see next section). The work included the involvement of several hundred schoolchildren and smallholders. In Colombia, schoolchildren of the Intercultural school "*El Cumbe*" participated in the event either by monitoring their potato agrobiodiversity or performing traditional dances or poems.

The Initiative's citizen-science work is already proving key to successful research projects, and increased buy-in from local stakeholders, governments and potential investors. The Initiative's citizen-science collaborations provide replicable approaches that NATURE+ research expects to underpin activities under CGIAR's Research Portfolio 2025-2030.

Expansion of conservation tools and platforms

Under NATURE+, several CGIAR digital innovations for agrobiodiversity conservation grew. These include Wikipapa, RIKIYU-Agrobio, EncontrAR and VarScout tools and platforms for agrobiodiversity conservation and monitoring and applied nature-positive interventions. Originally deployed by CIP in Andean countries, these platforms now include **Colombia**. CONSERVE supported the iNaturalist app in **Vietnam** with a

teaching guide and student guide on how to use the app, which helps users identify more than a half-million species across the globe.

CGIAR researchers in **Kenya** deployed the CIP-developed VarScout app, originally developed by CIP to collect data on potato varieties in the Andes, to support the identification of crop varieties across the globe. Since its launch in 2022, VarScout has documented over 2,342 unique potato varieties and 3,200 observations in Peru, and 30 varieties and 2,000 observations in Africa. In 2024, the platform saw increased engagement, with 215 youth in Peru and 157 children and 48 teachers in Ecuador actively participating, cataloging 525 potato entries in Peru and 50 varieties in Ecuador.

These efforts were supported through citizen science contests, promoting community involvement, and strengthening local agrobiodiversity knowledge. The platform raises awareness about climate challenges, fosters sustainable agricultural practices, and promotes adaptation strategies. By uniting communities across Latin America and Africa, VarScout advances biodiversity conservation and resilience in the face of global climate change.

Data & baselines for agrobiodiversity conservation action

The essential first step to conserve agrobiodiversity is to have detailed information on what needs conservation. CONSERVE conducted detailed agrobiodiversity inventory studies across NATURE+ research sites. In northern **Vietnam**, the Initiative built a comprehensive dataset for household agrobiodiversity based on almost 200 surveys covering farm fields and home gardens. CONSERVE produced one dataset for mapping farm-level agrobiodiversity using participatory GIS (pGIS) techniques and another that assessed the conservation of priority landraces of four priority crops: banana, green mustard, pumpkin and taro.

In Cumbal, **Colombia**, CONSERVE developed datasets for participatory mapping of agrobiodiversity, agrobiodiversity conservation, and household agrobiodiversity conservation. The research was greatly facilitated by hundreds of household members and smallholder farmers and is anticipated to play a pivotal role in designing more effective conservation activities.

NATURE+ work packages also developed several agrobiodiversity baseline studies to provide scientists, local stakeholders, governments and development actors key information to support NATURE+ activities and the broader application of nature-positive agricultural activity. (See publications section for more details.)

Moving to agrobiodiversity conservation actions, two notable outputs are worth mentioning. The first is the "Agroclimatic Bulletin," which provides information on climatic conditions and the presence of frost in Cumbal, Colombia. This bulleting was created using the information of agroclimatic data collected by the same farmers. The second is the establishment of an observatory in Cumbal. In collaboration with Agrosavia, farmers in Cumbal have convened multiple times to discuss the meaning of

an observatory, the additional information—beyond baselines—that is crucial for addressing significant challenges, and to define its governance. A promising aspect of this activity is the plan to connect the observatory in Cumbal with others in the Andean region, such as those in Peru and Bolivia.

CONSERVE in the CGIAR Portfolio 2025-2030

Successful conservation, particularly of agrobiodiversity, will be one key metric for evaluating the impacts of CGIAR work in the coming years. The Initiative's CONSERVE work – including using digital innovations to increase the involvement of smallholders, communities and schools in creating inventories of neglected and underutilized crops (NUS) – is expected to be extended to several new countries under the Multifunctional Landscapes Science Program. Continued research on the genetic, nutritional and climate-resilience characteristics of NUS will likewise be a key component of conservation and sustainable use of biodiversity. Researchers will also continue work on soil biodiversity to help inform land restoration priorities.

News and blogs

News: Disseminating knowledge on biodiversity conservation in schools

News: Bảo tồn đa dạng sinh học phải tránh 'phát triển nóng và chạy theo nông nghiệp sản lượng'

Blog: Why Agriculture and Conservation Must Co-Exist

Blog: Preservation of agrobiodiversity in Colombia: CGIAR's Nature-Positive Solutions Initiative trains smallholder farmers in the conservation of Colombian native maize seeds

Blog: Underutilized yet important wild edible plants threatened in Kenya

Blog: Birds and bats ensure yields for cacao farmers in northern Peru

Blog: Understanding Soil Biodiversity

Blog: Sowing the seeds of tomorrow, one school garden at a time (Burkina Faso)

Publications and tools

Journal articles and conference papers

Adapting wild biodiversity conservation approaches to conserve agrobiodiversity

Integrating Social-Ecological and Political-Ecological Models of Agrobiodiversity With Nutrient Management of Keystone Food Spaces to Support SDG 2

Mapping research on bambara groundnut (Vigna subterranea (L.) Verdc.) in Africa: Bibliometric, geographical, and topical perspectives

Sustainability of neglected and underutilised species (NUS): Towards an assessment matrix for crop species

Neglected and underutilised species (NUS): an analysis of strengths, weaknesses, opportunities and threats (SWOT)

Mapping Above Ground Carbon Storage and Sequestration in Thoria Watershed, India: A Spatially Explicit Ecosystem Service Assessment Using InVEST Model

Traditional individual and environmental determinants of healthy eating in Vihiga County, Western Kenya

Tools

Wikipapa

RIKIYU-Agrobio

EncontrAR

VarScout

iNaturalist app

Burkina Faso

Food composition table of selected local tree species in Burkina Faso. Version 1

Evaluation des calendriers saisonniers des cultures et de la sécurité nutritionnelle. Disponibilité alimentaire saisonnière au Burkina Faso

Calendrier saisonnier de fruits et légumes pour une alimentation diversifiée au Burkina Faso

Custodian farmers of Bambara groundnut and sorrel seeds in mossi area of Burkina Faso: profile, diversity and conservation methods

Colombia

Expansion of the Cumbal model: Integrated agrobiodiversity conservation

Agrobiodiversity Baseline Assessment for the Cumbal Indigenous Reserve site in Colombia: report on preliminary findings

Recovery and conservation of the paramo ecosystem through the use of livestock management strategies and implementation of home-gardens in the Indigenous Resguardo Cumbal

EncontrAR Platform: a online knowledge management system of nature-positive solutions for climate adaptation in the Andes

Capacity building on the conservation of maize and beans landraces Smallholder farmers in Valle de Cauca, Nariño, Putumayo and Cesar in Colombia

Dataset for: Meteorological records of the Cumbal (Nariño) climate observer network – Colombia

Dataset for: Characterization database of 68 genotypes of native potatoes of the Phurejas group from the Cumbal Indigenous Reservation

Kenya

Nature-Positive Solutions Initiative baseline evaluation survey report: Kenya

Research on moringa (Moringa oleifera Lam.) in Africa

India

Spiritual values and ecosystem services of sacred groves in Karnataka, India

Measuring above-ground carbon stock using spatial analysis and the InVEST model: Application in the Thoria Watershed, India

Farmer and general public economic valuation of ecosystem services in the context of agroecological practice adoption in Western Kenya

Vietnam

Nature-Positive Solutions Initiative baseline evaluation survey report: Vietnam

Seek by i-Naturalist: A guide for teachers

Seek by i-Naturalist: An easy-to-use guide for students

The rich biodiversity of pumpkins, H'Mong mustard greens, bananas, and taro, in Mai Son District - Son La

The rich biodiversity of pumpkin, H'Mong mustard greens, banana and taro in Sa Pa – Lao Cai

Nature-positive solutions for shifting agrifood systems to more resilient and sustainable pathways WP1 and WP3 in Vietnam: 2023 Report (Soil research)

Desk review report on agrobiodiversity, agroecology/nature-positive practices, and circular economy in Vietnam

APFORGEN secures $1.48M to protect vital Asian tree species

Sa Pa Cookbook: From Sa Pa to your table: A collection of traditional recipes of Pumpkin, H'Mong mustard greens, Musa, and Taro

Mai Son Cookbook: From Mai Son to your table: A collection of traditional recipes of Pumpkin, H'Mong mustard greens, Musa, and Taro

Dataset for: Nutritional Value of Selected Landraces of Banana, Taro, Pumpkin, and Green Mustard in Vietnam

Assessing microbial diversity in soil and roots of common crops in Sapa district, Lao Cai province, Vietnam

Assessing the bacterial and fungal functional diversity in soil and roots of common crops in Sapa district, Lao Cai province, Vietnam

Assessing microbial diversity in soil and roots of longan fruit in Son La province, Vietnam

Assessing the protistan functional diversity in soil and roots of common crops in Sapa district, Lao Cai province, Vietnam

Evaluation of improved forage varieties in Mai Son district, Son La province, Vietnam

Impact of improved forages on soil health in Mai Son district, Son La province, Vietnam

All

Report on the scoping study for the project "nature positive solutions for shifting agrifood systems to more resilient and sustainable pathways"

Manuals and protocols for conservation and sustainable use of agrobiodiversity

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To learn more about this Initiative, please visit this webpage.

To learn more about this and other Initiatives in the CGIAR Research Portfolio, please visit www.cgiar.org/cgiar-portfolio

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