NATURE+ RESTORE

Accomplishments through 2024 and CGIAR Science Programs outlook

INITIATIVE ON Nature-Positive Solutions

NATURE+ RESTORE promotes and researches farm- and landscape-level restoration of degraded rural landscapes and provides user-friendly tools and incentives to facilitate the use of native biodiversity to restore ecosystems. The Alliance of Bioversity International and CIAT leads the research. This report covers RESTORE's key work through 2024, ongoing and future work in the CGIAR Portfolio 2025-2030.

Women in Turkana, Kenya, hold seedlings as part of NATURE+'s restoration project. (Photo by Francis Odouor/Alliance)

Contents

Authors:

Chris Kettle, Principal Scientist, Alliance of Bioversity International and CIAT; RESTORE lead, c.kettle@cgiar.org

Carlo Fadda, Lever Director (Principal Scientist) Biodiversity for Food & Agriculture, Alliance of Bioversity International and CIAT; NATURE+ lead, c.faddda@cgiar.org

Smitha Krishnan, Scientist, Multifunctional Landscapes, Alliance of Bioversity International and CIAT, s.krishnan@cgiar.org

Barbara Vinceti, Scientist, Multifunctional Landscapes, Alliance of Bioversity International and CIAT, b.vinceti@cgiar.org

Evert Thomas, Senior Scientist, Multifunctional Landscapes, Alliance of Bioversity International and CIAT, e.thomas@cgiar.org

Sean Mattson, Global Communications Officer, Alliance of Bioversity International and CIAT, s.mattson@cgiar.org

NATURE+ RESTORE Country highlights

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

Burkina Faso – Strengthening seed systems for native-tree-based restoration; a comprehensive survey of 600 small-scale tree nurseries.

India – 18200 saplings planted on 19 hectares of communal land based on NATURE+ tree diversity research and restoration goals through the convergence of the country's ambitious tree plantation schemes and community-led efforts.

Kenya – Deployment of My Farm Trees app to more than 1,000 smallholders to guide and provide payments for successful land restoration with native tree species.

Colombia – Development of agroforestry and restoration tools and application for development of pilot plots based on timber and non-timber forest products market study; identification of more than 1,200 seed trees; establishment of clonal garden with key bioeconomy species.

Vietnam – Five nature-positive restoration practices applied with 81 Indigenous farmers on 52 hectares.

All – Multidisciplinary research on hundreds of native tree species to understand physical traits, cultural value, and economic uses of native species' seed systems and alignment of tree restoration goals from local to national levels.

NATURE+ RESTORE key accomplishments

Strengthening native-tree seed systems

Even in the face of security limitations in some countries, RESTORE made remarkable progress in strengthening the capacities of native-tree seed systems. In **Burkina Faso**, NATURE+ surveyed 600 small nurseries and found they have encouragingly high levels of native-tree diversity, which will be key to the West African nation's goal of restoring 5 million hectares by 2030. Research by NATURE+ found that while basic seed system

infrastructure for native-tree restoration exists in **Burkina Faso**, **Cameroon**, **Ghana** and **Kenya,** infrastructure is insufficient to meet the 24-million-hectare restoration target set across the four countries by 2030. The main challenges are a lack of planting material, including seeds, seedlings, cuttings, and funding to professionalize and streamline restoration efforts.

In the **Colombian** Amazon, NATURE+ and partners identified and characterized 1,200 elite trees of 70 native species for seed harvesting. Additionally, seed orchards of native timber tree species are being set up in the Caribbean region as well as the Amazon, as well as clonal gardens of key bioeconomy species such as cacay (*Caryodendron orinocense*).

Digital tools offer powerful solutions for native-tree restoration and improved seed systems, including incentives and critical information for individuals, communities, policymakers and development agencies. The development and use of two such tools made substantial progress under NATURE+: Diversity for Restoration (D4R) and My Farm Trees. (See next two sections.)

Diversity for Restoration: knowledge for native tree restoration

All tree species are unique – how they need to grow, what people and other species use them for, and how they contribute to restoring healthy environments. With these factors in mind (among many others), NATURE+ researchers collected and integrated data to the Diversity for Restoration tool (D4R) on more than 600 tree species native to **Burkina Faso**, **Colombia**, **India**, **Kenya** and **Vietnam** to support tree-based landscape restoration. The tool provides farmers and restoration practitioners with site-specific guidance on which native tree species are best suited to restoration goals, including restoration and regulation of ecosystem services (such as soil fertility and water use), biodiversity conservation, and uses ranging from traditional to sustainable agroforestry. Critically, D4R includes traditional knowledge alongside scientific information to closely align the tool's recommendations with local, landscape and national restoration goals.

In addition, a more advanced version of D4R to support cacao agroforestry systems (CacaoDiversity.org) was developed for the Colombian Amazon. Researchers integrated 270 tree species, recommended species planting designs, cashflow estimates, and carbon sequestration projections based on farmer objectives and aspirations. The tool was used to co-design demonstrative plots with local cacao farmers.

My Farm Trees: app guides and incentivizes restoration from seed to tree

NATURE+ research on tree-based landscape restoration projects found multiple bottlenecks and underutilized opportunities. Projects often fail due to significant gaps in native tree seed supply, lack of involvement of local communities in seed systems, weak

policies around seed systems, the need for capacity building and investment in seed and nursery systems, and failure to involve entrepreneurial farmer-led nurseries. These factors often contribute to the inadequate selection of tree species, lack of knowledge in managing tree resources, and gaps in monitoring, tracking and verifying restoration efforts.

The need for resilient and scalable forest landscape restoration has led to the development of the My Farm Trees (MFT) platform - a combination of innovative digital apps using mobile technology, developed by the Alliance. MFT was successfully piloted in **Cameroon** and **Kenya** in collaboration with local communities. The platform now has mobile apps for capacity development, transparent tree-based restoration monitoring, and economic incentives through digital payments.

As of 2024 in Cameroon, MFT had 2,200 individual app users who planted more than 120,000 seedlings from 43 species on 1,363 hectares. Some 20,000 seedlings can be tracked to known seed sources including 75 registered tree nurseries and 315 sacred forests. Additionally, 100 schools were involved in restoration efforts. The app transferred USD 110,000 to app users. MFT directly benefitted an estimated 17,000 people in the country.

As of 2024 in Kenya, MFT had 3,400 individual app users who planted more than 100,000 seedlings from 15 species on 1,250 hectares. Restoration efforts involved 13 registered tree nurseries and 20 schools, directly benefitting some 12,500 people. Calculations on cash transfers will be completed in early 2025.

MFT is expanding across the Global South due to growing interest from multiple stakeholders to implement or partner with MFT. Scaling efforts and implementation are underway in Indonesia, Vietnam, India, Laos, Malaysia and the Philippines. NATURE+ received expressions of interest from across Asia, Africa and Latin America, MFT's next target region.

Linked to D4R, species selection for MFT is determined largely on local knowledge and community restoration goals. The International Union for Conservation of Nature (IUCN), an MFT partner, presented the tool at the Convention of Biological Diversity (COP16) meeting in 2024, helping position MFT for wider use under the CGIAR Research Portfolio 2025-2030.

Restoration in India for climate change resilience

With climate change continuing largely unabated, trees used in restoration need to withstand increasingly frequent droughts, deluges and heatwaves. By studying 110 of the functional traits of more than 246 native tree species in Western India were included in D4R (see above).

Separately, NATURE+ and partners launched a restoration project on communal lands using species that both met local restoration needs and future climate conditions. A

community-led plantation initiative resulting in planting of 18,200 plants across 19 hectares of land within a 2-year timeframe through a collaborative effort between the community and government agencies was carried out. This was achieved through the convergence of National Plantation Scheme (NPS) and community-led efforts, with the support of local villagers in three villages. The trees used for this effort were primarily focused on livelihoods, soil erosion control and adaptability of trees to local conditions.

Partners in India are keen on using D4R and MFT for their restoration efforts planned for near future.

Incentives facilitate nature-positive practice adoption in Northern Vietnam

Through Best-Worst Scaling workshops, indigenous farmers from four communes in Son La and Lao Cai provinces in **Vietnam** identified their preferred nature-positive practices. The most preferred were improving agricultural biodiversity with native trees and fruit varieties and restoring erosion-prone sloping lands through tree planting. In some villages, participating farmers were also interested in planting cover crops on sloping lands, managing pests and diseases, and establishing tree nurseries. Interested farmer groups were guided to prepare and submit competitive group tender bids for implementing preferred practices for self-determined in-kind compensation for ecosystem services provision from restored lands. Farmers commonly requested tree seedlings or fertilizer as compensation.

From the 17 received bids from 11 farmer groups, 11 bids involving 81 farmers from 9 groups in 9 villages were selected for implementation. The selection was based on implementation cost per area restored or trees planted, species choices (prioritizing native species and varieties), and equity (gender balance and aiming to support at least some activities in each village). Farmers were then trained to implement the selected practices on their land and received the requested compensation upon completion. Some 52 hectares and 18,270 trees of 11 species were successfully restored and 3 smallholder and community nurseries were established for seedling supply, for a total compensation of USD11,578. In evaluation meetings, farmers especially valued the participatory approach that provided them with a choice of practices to implement that were aligned with their farm contexts and the availability of land and labor.

RESTORE in the CGIAR Portfolio 2025-2030

Almost 25% of the world's land is degraded, negatively impacting 3.2 billion people, according to the United Nations Environment Programme. UNEP warns those numbers could dramatically rise in the coming decades without urgent and effective action to restore landscapes through research, policy and innovation. NATURE+'s RESTORE work demonstrates what effective solutions look like: they put nature and people on the same

footing, adapting restoration projects to communities' needs and environmental realities.

Under CGIAR's Research Portfolio 2025-2030, RESTORE will continue to expand its use of applied landscape research that can be widely scaled up. This will require continued generation of knowledge for what individual ecosystems require for successful restoration, and, crucially, sharing this information through easy-to-use digital tools. RESTORE also demonstrated that greater investment in research and seed system infrastructure is required from policymakers and development agencies to achieve ambitious restoration targets in the next five years.

News, blogs and videos

News: IUCN and Alliance of Bioversity International & CIAT showcase new tools and supports for restoration at CBD COP16

Blog: 600 small-scale tree nurseries in Burkina Faso hold large diversity

Blog: Neglected crops open markets, strengthen women's groups in Burkina Faso

Blog: NATURE+ in India fields two surveys; attends Wild Edible Plant Species Exhibition and Recipe Competition

Blog: NATURE+, partners, highlight need for soil sampling on degraded farms in Kenya

News release: Africa Climate Summit advanced tree restoration pledges but a big seed shortage remains

Blog: NATURE+: Moving toward a cyan and sustainable future in India!

Publication highlights

Journal article: Seeding African Forest and Landscape Restoration: Evaluating Native Tree Seed Systems in Four African Countries

Accepted journal article summary: What are the barriers and enablers for smallholders in Western Kenya to increase tree diversity on farms?

Land degradation and restoration in Lao Cai and Son La Provinces, northern mountainous region of Vietnam. Scoping study for the One CGIAR Initiative on Nature-Positive Solutions

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

Delivering tree genetic resources in forest and landscape restoration. A guide to ensuring local and global impact

Integrated participatory approach reveals perceived local availability of wild edible plants in Northwestern Kenya

Journal article: The road to recovery: a synthesis of outcomes from ecosystem restoration in tropical and sub-tropical Asian forests

Diversity for Restoration (D4R) tool for Northern Vietnam: online catalogue and spatially-explicit decision-support tool for selecting suitable tree species for nature-positive production systems

Diversity for Restoration (D4R) India - A digital solution to enhance resilience of trees-based restoration in Western Ghats, India

Implementation of Diversity for Restoration (D4R) to guide species and seed source selections for trees-based restoration in the Colombian Amazon

My Farm Trees: Digital platform with blockchain to incentivize farmer and community-led tree-based restoration of degraded landscapes: Vietnam country module

Journal article: Restoring functional integrity of the global production ecosystem through biological control

E-learning academy on Planning seed and seedling supply for forest and landscape restoration

Chris Kettle, Principal Scientist, Alliance of Bioversity International and CIAT;

RESTORE lead, c.kettle@cgiar.org

Carlo Fadda, Lever Director Biodiversity for Food & Agriculture,

Alliance of Bioversity International and CIAT; NATURE+ lead, c.faddda@cgiar.org

Sean Mattson, Global Communications Officer, Alliance of Bioversity International and CIAT, s.mattson@cgiar.org

We would like to thank all funders who support this research through their contributions to the CGIAR Trust Fund: www.cgiar.org/funders.

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

INITIATIVE ON Nature-Positive Solutions