



CGIAR Research Initiative on Low-Emission Food Systems

Annual Technical Report 2024

Author: CGIAR Research Initiative on Low-Emission Food Systems

Title: Annual Technical Report 2024: CGIAR Research Initiative on Low-Emission Food Systems

Suggested citation: CGIAR Research Initiative on Low-Emission Food Systems. 2025. Annual Technical Report 2024: CGIAR Research Initiative on Low-Emission Food Systems. Montpellier, France: CGIAR System Organization. <u>https://hdl.handle.net/10568/174244</u>



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The Artificial Intelligence (AI) software ChatGPT was used to support the editing of parts of this report, specifically to improve clarity, grammar, and style. ChatGPT was not used to generate the content of the report. All edits made with AI assistance were reviewed and validated by the authors to ensure accuracy, coherence, and alignment with the original intent.

Acknowledgements

This work is part of the CGIAR Research Initiative on Low-Emission Food Systems. We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund: <u>https://www.cgiar.org/funders</u>.

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CGIAR Technical Reporting has been developed in alignment with <u>CGIAR's Technical Reporting Arrangement</u>. This annual report ("Type 1" Report) constitutes part of the broader CGIAR Technical Report. Each CGIAR Research Initiative/Impact Platform/Science Group Project (SGP) submits an annual "Type 1" Report, which provides assurance on progress towards end of Initiative/Impact Platform/SGP outcomes.

As 2024 marks the final year of this CGIAR Portfolio and the 2022-24 business cycle, this Type 1 Report takes a dual approach to its analysis and reporting. Alongside highlighting key achievements for 2024, the report also provides a cumulative overview of the 2022-24 business cycle, where relevant. This perspective captures the evolution of efforts over the three-year period. By presenting both annual and multi-year insights, the report underscores the cumulative impact of CGIAR's work and sets the stage for the transition to the 2025-30 Portfolio.

The 2024 CGIAR Technical Report comprises:

- Type 1 Initiative, Impact Platform, and SGP Reports: These annual reports present progress towards end of Initiative/Impact Platform/SGP outcomes and provide quality-assured results accessible via the CGIAR Results Dashboard.
- **Type 3 CGIAR Portfolio Practice Change Report:** This report provides insights into CGIAR's progress in Performance Management and Project Coordination.
- **Portfolio Narrative:** Drawing on the Type 1 and Type 3 reports, as well as data from the CGIAR Results Dashboard, the Portfolio Narrative synthesizes insights to provide an overall view of Portfolio coherence. It highlights synergies, partnerships, country and regional engagement, and collective progress.
- Type 2 CGIAR Contributions to Impact in Agrifood Systems: evidence and learnings from 2022 to 2024: This report offers a high-level summary of CGIAR's contributions to its impact targets and Science Group outcomes, aligned with the Sustainable Development Goals (SDGs), for the three-year business cycle.

The Portfolio Narrative informs the 2024 CGIAR Annual Report – a comprehensive summary of the organization's collective achievements, impacts, and strategic outlook.

Elements of the Type 2 report are integrated into the <u>CGIAR Flagship Report</u>, released in April 2025 at <u>CGIAR Science Week</u>. The Flagship Report synthesizes CGIAR research in an accessible format designed specifically to provide policy- and decision-makers at national, regional, and global levels with the evidence they require to formulate, develop, and negotiate evidence-based policies and investments.

The diagram below illustrates these relationships.



Figure 1. CGIAR's 2024 Technical Reporting components and their integration with other CGIAR reporting products.

Section 1: Fact sheet, executive summary and budget

Initiative name	Research on Low-Emission Food Systems
Initiative short name	Mitigate+
Initiative Lead	Louis Verchot (<u>l.verchot@cgiar.org</u>)
Initiative Co-lead	Wei Zhang (<u>w.zhang@cgiar.org</u>)
Science Group	Systems Transformation
Start – end date	01 January 2022 – 31 December 2024
Geographic scope	Countries China · Colombia · Kenya · Vietnam
OECD DAC Climate marker adaptation score ¹	Score 1: Significant The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation and climate policy, even though it is not the principal focus of the activity.
OECD DAC Climate marker mitigation score ¹	Score 2: Principal The activity is principally about meeting any of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation and climate policy, and would not have been undertaken without this objective.
OECD DAC Gender equity marker score ²	Score 1A: GGender accommodative/aware Gender equality is an objective but not the main one. The Initiative/project includes at least two explicit gender specific outputs and (adequate) funding and resources are available. Data and indicators are disaggregated by gender and analyzed to explain potential gender variations and inequalities.
Website link	https://www.cgiar.org/initiative/low-emission-food-systems/
Website link	https://www.cgiar.org/initiative/low-emission-food-systems/

¹ The Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) markers refer to the OECD DAC <u>Rio Markers</u> <u>for Climate</u> and the <u>gender equality policy marker</u>. For climate adaptation and mitigation, scores are: 0 = Not targeted; 1 = Significant; and 2 = Principal. ² The CGIAR Gender Impact Platform has adapted the OECD gender marker, splitting the 1 score into 1A and 1B. For gender equality, scores are: 0 = Not targeted; 1A = Gender accommodative/aware; 1B = Gender responsive; and 2 = Principal.

These scores are derived from Initiative proposals, and refer to the score given to the Initiative overall based on their proposal.

EXECUTIVE SUMMARY

Over the past three years, the CGIAR Research Initiative on Low-Emission Food Systems has steadily advanced its mission of mitigating greenhouse gas (GHG) emissions while promoting sustainable agricultural development. The initiative has fostered knowledge creation, strengthened capacity, engaged in policy development, and expanded the adoption of climate-smart innovations across key focus countries: China, Colombia, Kenya, and Vietnam. From foundational research and stakeholder engagement in 2022 to scaling innovations and global influence in 2024, these efforts have built upon one another, demonstrating a clear trajectory of impact.

In 2022, the groundwork was laid with 46 peer-reviewed publications, three book chapters, and a range of policy briefs and research summaries. Capacity-strengthening efforts took off with <u>12 CLIFF-GRADS scholarships</u> and training workshops on <u>gender-transformative research</u> and <u>multi-stakeholder collaboration</u>. Policy contributions were also significant—China's GHG accounting guidelines for the dairy sector and Viet Nam's integration of Alternate Wetting and Drying technology into its Nationally Determined Contribution marked crucial milestones. Meanwhile, the Living Labs for People (LL4P) approach took shape, launching pilot sites in Kenya, Colombia, and integration of Alternate Wetting and Drying technology into its Nationally Determined Contribution marked crucial milestones. Meanwhile, the Living Labs for People (LL4P) approach took shape, launching pilot sites in Kenya, Colombia, and integration of Alternate Wetting Labs for People (LL4P) approach took shape, launching pilot sites in Kenya, Colombia, and Viet Nam to co-develop climate-smart agricultural practices.

Building on this momentum, 2023 saw a surge in knowledge production, with a 61% increase in published outputs and the development of 13 new innovations—double the previous year's output. The launch of the FOODCLIP toolbox provided vital insights, while deeper collaborations with IIASA and WorldFish expanded modeling capabilities, particularly in fisheries foresight analysis. <u>National monitoring, reporting, and verification (MRV)</u> <u>systems became stronger, with Colombia integrating MRV protocols into its Zero-Deforestation Agreements</u> and China adopting the new dairy guidelines nation-wide. The LL4P approach gained prominence, with <u>Qingshan, China,</u> <u>piloting a "Low-Carbon Future Village"</u> and Kenya formalizing collaboration with the Kaimosi Agricultural Training Centre to advance sustainable practices. As the Initiative continued to expand its influence, 2024 marked a turning point in transforming food systems. Modeling tools like IIASA's <u>GLOBIOM and marginal abatement cost curves (MACC)</u> played a crucial role in guiding climate mitigation strategies, while policy research flourished in Colombia, examining governance and private sector engagement, and <u>China exploring carbon neutrality pathways</u>. The launch of <u>FOODGOAL and FOODPATH</u> offered structured frameworks to align national policies with sustainable food system targets. LL4P initiatives continued to thrive: <u>Agrosolidaria in Colombia hosted participatory research efforts</u>, Kenya's advisory board selected key innovation cases for funding, and <u>Qingshan in China was officially recognized by the Zhejiang provincial government</u> <u>as a low-carbon demonstration village</u>, showcasing the power of sustained rural engagement. In Viet Nam, agroecological transitions gained traction, supported by journalist training and co-creation workshops that enhanced local capacity.

On the global stage, Mitigate+ actively shaped climate discussions. Its presence at <u>COP27</u> and <u>COP28</u> reinforced the role of food systems in climate mitigation, while its contributions to the <u>UNFCCC processes—including leading</u> <u>submissions on Article 6.8</u> and presentations during in-session workshops —further solidified its impact. These efforts continued at <u>COP29</u>, ensuring that food systems remain central to the climate agenda.

Progress in research, policy engagement, and scaling solutions has strengthened the foundation for low-emission food systems, positioning the Initiative to continue leading impactful transformations in the years ahead.

	2022	2023 ⊽	2024
PROPOSAL BUDGET D	\$9.88M	\$11.18M	\$11.94M
APPROVED BUDGET ¹ »	\$6.76M	\$7.89M ²	\$7.10M ²

¹ The approved budget amounts correspond to the figures available for public access through the Financing Plan dashboard.

² These amounts include carry-over and commitments.



Training for Central American government delegations in greenhouse gas monitoring techniques. Coordination of M+ with the Kolfaci Optimo Initiative. Credit: Miguel Romero

Initiative-level theory of change diagram

This is a simple, linear, and static representation of a complex, non-linear, and dynamic reality. Feedback loops and connections between this Initiative and other Initiatives' theories of change are excluded for clarity.





INFLUENCE

Action Area Outcomes

- 1 National and sub-national government agencies use CGIAR research results to design or implement strategies, policies and programs which have the potential to transform food, land and water systems contributing to livelihood, inclusion, nutrition, environmental and climate resilience objectives.
- a > 2 National and local multi-stakeholder platforms are strengthened to become more effective and sustainable, addressing development trade-offs and generating strategies for effective food, land, and water systems transformation.
- **4** ► **3** CGIAR partners develop and scale innovations that contribute to the empowerment of women and other social groups in food, land, and water systems.
- 4 ► Implementation partners (e.g. NARES, NGOs, private companies) actively support dissemination, uptake, and implementation of CGIAR innovations.



ENVIRONMENTAL HEALTH & BIODIVERSIT

 Stay within planetary and regional environmental boundaries: consumptive water use in food production of less than 2500 km3 per year (with a focus on the most stressed basins), zero net deforestation, nitrogen application of 90 Tg per year (with redistribution towards low-input farming systems) and increased use efficiency, and phosphorus application of 10 Tg per year.





Summary of progress against the theory of change

The CGIAR Initiative on Low-Emission Food Systems (Mitigate+) over the past three years exemplified an unwavering commitment to advancing scientific inquiry, refining methodologies, and fostering global collaboration to mitigate climate change impacts within food systems. The Initiative embraced a multifaceted strategy that integrates emissions quantification, policy integration, and the scaling of sustainable agricultural practices in China, Colombia, Kenya, and Viet Nam. In 2024, these efforts gained new momentum, after two years of laying ground for the work and making steady progress, reinforcing the Initiative's standing as a global leader in climate action and sustainable development through groundbreaking research, robust policy engagement, and implementation of innovative activities.

The Initiative focused on supporting national planning processes for low-emission transformations. In 2024, this involved holding strategic dialogues with esteemed experts, including Wageningen University and Research in the Netherlands, which contributed significantly to updating country profiles (China, Colombia, Kenya, and Viet Nam) and refining data collection methods in Viet Nam. Additionally, the external partners provided several new reports and tools, such as the Food Loss Solutions website. This platform features global hotspot analysis and newly developed country profiles. In China, participation in high-level conferences such as the World Agrifood Innovation Forum (WAFI) drew national government attention to the critical need for robust food system data, while in Viet Nam, contributions to the national country profile provided valuable policy insights that signaled a shift toward inclusive, science-based carbon sink initiatives. A policy analysis for Colombia identified barriers and opportunities for low-emission food chains, assessing policy impacts and recommending strategies to scale sustainable practices. It highlights key actors and actionable steps for implementation.

The Initiative also worked on enhancing rigor and certainty in data, knowledge, tools, and capacity for improving food system greenhouse gas (GHG) emission monitoring and national communications for the UN Framework Convention on Climate Change (UNFCCC). Progress toward reaching these outcomes was achieved through various activities. Diverse databases for activity

data and emission factors were developed to enhance the rigor and certainty of GHG emissions (GHGE) quantification in the focus countries, allowing governments to adopt higher tiers in GHGE estimations, specifically, a comparative analyses of Tier 1 and 2 methodologies for estimating enteric methane emissions from <u>sheep</u> and <u>cattle</u> in smallholder systems across Africa. Technological innovations, such as the use of satellite imagery for <u>soil mapping</u> in <u>areas like Kapiti</u>, in semi-arid Kenya, and the demonstration of <u>biochar's capacity to reduce nitrogen losses</u> from manure, further bolstered the scientific rigor of these assessments. Moreover, the development of a Tier 2 protocol for estimating enteric methane emissions factors for <u>cattle</u> and <u>small ruminant production</u>, as well as novel methodologies for quantifying reductions from manure-fed biogas digesters, greatly enhanced Kenya's ability to monitor and mitigate GHG emissions.

In Colombia, progress in GHG monitoring was marked by the creation and expansion of the <u>Agriemission Monitor</u> — a tool designed to visualize emission data from diverse livestock systems, which now spans 60 municipalities and encompasses the cocoa, beef, and dairy value chains, and is on track to become the cornerstone of a national measurement, reporting, and verification (MRV) guideline. A gualitative study done by the MELIA (monitoring, evaluation, learning, and impact assessment) team highlighted that, with support from the Initiative, the Government of Colombia developed and adopted the first MRV protocol, and that this process led to changes in stakeholders' capacities and strengthening the base of support for this type of initiative. Innovative tools like an emissions calculator integrated with a geovisor allowed both technical and non-technical stakeholders to assess GHG emissions alongside deforestation data, facilitating informed decision-making. A Rice Sustainability Hub was also established to provide easy access to resources, tools, and templates to support project developers and validation and verification bodies (VVBs) in creating and validating methane reduction projects in rice cultivation in Viet Nam with spillover impacts in Thailand as well. Furthermore, the <u>RiceMoRe</u> system component for field/farm level GHG calculation was developed to allow carbon projects, researchers, field agents, and farmers to record farming activities and to estimate GHG

emissions for any rice management unit. The Thai system's <u>transfer</u> to the Ministry of Agriculture and Rural Development has not only enhanced monitoring capabilities but also contributed significantly to the nation's digital transformation in agricultural management.

The Initiative also made significant strides in implementing lowemission solutions directly within communities. The Living Labs for People (LL4P) approach was a catalyst for real-world locally led innovation. Four LL4P frameworks were established, one in each target country. From 2022 to 2024, the country teams worked to establish LL4Ps that were appropriate for each specific context, and as such, each LL4P is very different. In 2024, a memorandum of understanding with Agrosolidaria in Colombia laid the foundation for hosting <u>LL4P activities</u>. The collaborative efforts extended to include

external partners like the University of Javeriana and Agrosolidaria, thereby strengthening the social fabric of the Initiative. Additional results included a <u>Stakeholder Networking</u> <u>Mapping</u> report that characterized the structure and social capital of cocoa and livestock value chains, identifying grassroots producers as key actors for sustainability.

A key milestone in Kenya was establishment of a LL4P in Nandi County in collaboration with local stakeholders. The team started seeking out and assessing innovation cases in 2024. In Kenya, stakeholder engagement was central to the success and co-ownership of the LL4P in Nandi County, where advisory board meetings and participatory processes galvanized communityled innovation and resulted in changes in stakeholders' capacities, as documented in this MELIA (monitoring, evaluation, learning, and impact assessment) evaluation. Similarly, in China and Viet Nam, extensive stakeholder participation - ranging from village households to

national agencies — ensured that innovations were both inclusive and scalable. This <u>MELIA study</u> highlights that in China, the Initiative was able to capitalize on key events to introduce the LL4P concept, which resulted in increased stakeholder awareness about low-carbon practices, changes in local strategies, and an uptake of the concept by stakeholders beyond the target region. Media coverage and visits by international organizations, such as the Asian Development Bank's visit of the low-carbon demonstration village in Qingshan, China, further validated the potential of the LL4P model.

Parallel to these achievements, the Initiative also strived to foster an environment conducive to scaling up selected CGIAR technologies and innovations with significant mitigation potential. In Kenya, for example, a <u>scaling strategy</u> was designed to promote the adoption of improved livestock feeds and breeds. The strategy highlights key considerations and best practices to effectively scale this innovation bundle. The Initiative conducted studies on potential areas for achieving food system <u>GHG emission reductions and peace building</u>.

In Colombia, a similar scaling strategy for <u>silvopastoral systems</u> in Caquetá paved the way for zero-deforestation commitments in the livestock sector by incentivizing sustainable practices and reinforcing governance structures. In partnership with the Cocoa Chain Steering Committee in <u>Cesar</u> and <u>Caquetá</u>, efforts progressed in implementing 2023 sustainable cocoa strategies through workshops, plan evaluations, and a roadmap for eco-friendly practices. Further, a <u>MELIA evaluation</u> highlighted that the Initiative helped increase the capacity of local stakeholders to identify non-traditional funding sources (such as an "Obras por Impuestos" government program in Colombia); to co-develop proposals to submit to such funding sources; and to secure openness from officials at different levels to support green projects. Meanwhile, in Viet Nam, a scaling strategy for integrated mangrove-shrimp systems, born out of multistakeholder workshops, was introduced to combine shrimp aquaculture with mangrove conservation. Additionally, the six-step approach for scaling innovations toward low-emission food systems developed a document about enabling environments for scaling. <u>Rice Straw Management and Alternative Wetting and Drying for</u> <u>rice</u>. These guidelines were designed to inform policymakers of the steps needed to create an enabling environment for scaling these innovations.



The role of communication and policy engagement was equally critical to the Initiative's success. At the 2023 UN Climate Change Conference held in Dubai (COP28), the Initiative organized a pivotal session on <u>non-market approaches</u>, contributing to a global dialogue on innovative climate cooperation mechanisms. This event was one of five food-systems-focused side events that catalyzed further engagement with policymakers and practitioners. Following this, the Initiative submitted inputs to the UNFCCC, an effort that led to invitations to present at the June 2024 <u>UN Climate Meetings</u> in Bonn and at <u>COP29 in Baku</u>, Azerbaijan. At COP29, two CGIAR sessions showcased the Initiative's science. One presented a framework for integrating <u>climate action and sustainability</u>, while the other shared research on gender and capacity building.

Additional contributions of the MELIA team included rigorous evaluation processes of outputs and outcomes, providing critical feedback to the Initiative's leadership for a continuous refinement of methodologies and strategies across all work packages to reach the planned outcomes. In essence, the Mitigate+ Initiative over the past three years built a formidable foundation for transforming food systems into engines of climate resilience and sustainable development. By equipping policymakers and practitioners with state-of-the-art tools, facilitating cross-sectoral collaborations, and engaging in comprehensive capacity-building efforts, the Initiative set a clear trajectory for long-term environmental sustainability and food security.

Progress against End of Initiative Outcomes

This infographic provides a concise summary of the Initiative's progress toward achieving its Theory of Change Endof-Initiative outcomes for the 2022-2024 period. By drawing on reported results, it offers a comprehensive synthesis of progress made against the established outcome targets, highlighting the Initiative's overall impact and key achievements at the conclusion of this three-year cycle.



EOIO 1

Capacity and support for food system greenhouse gas emission reduction strategies.

EOIO 2

CO,

Better data for food system greenhouse gas emission monitoring.



EOIO 3

Inclusive approaches for low-emission food system transformation in Living Labs for People.



EOIO 4

Scaled up CGIAR low-emission technological solutions.



EOIO 5

Increased awareness of food system approaches to achieve low GHGE development.

National and global government agencies are beginning to co-develop data and integrate the co-developed data and analyses into their work. In Kenya, staff in the livestock department of the ministry of agriculture engaged with our findings. In Viet Nam, the director of forest certification in the ministry of agriculture and resource development helped update the Viet Nam 'country profile' with new data and valuable national policy insights. These are early steps that nevertheless reflect a growing awareness of food system greenhouse gas (GHG) emissions and carbon sink opportunities in those ministries. While this engagement has not yet led directly to the full design of new emission-reduction strategies, it marked a shift in policy consideration. These transformations take time, the more so as international processes under the Paris Agreement do not currently require working on food systems. By continuing to equip planners with robust, science-based insights, we built the groundwork for inclusive food system strategies and carbon sink initiatives that align with national and global climate goals. In China, we participated at the high-level World Agrifood Innovation Forum (WAFI), drawing the national government's attention to our work.

Enhanced data, tools, and capacity are strengthening GHG emissions' monitoring and national reporting, improving the accuracy of UNFCCC communications and the global stocktake. In Kenya, Viet Nam, Colombia, and other countries, research on emissions from dairy, rice, wetlands, and hydropower reservoirs is refining national inventories and mitigation strategies. Tools like RiceMo and digital MRV frameworks improved reporting efficiency, while country-specific livestock emission factors supported tailored climate action. Capacity building efforts, including MRV training workshops, African Group on Negotiators Experts Support (AGNES) programs, and policy dialogues with ministries, equipped stakeholders with skills to track emissions and implement low-emission practices. In Viet Nam, water data from the Mekong Delta informed methane-reduction technologies, while Colombia's MRV system enhanced deforestation emissions monitoring. By integrating remote sensing, modeling, and participatory approaches, these initiatives enhanced transparency and data reliability. Strengthened MRV frameworks enabled countries to meet their nationally determined contribution (NDC) commitments, to improve climate adaptation and mitigation planning and to align food system transformation with sustainability goals. These efforts contributed to more robust national communications under the UNFCCC, supporting evidence-based policymaking and accelerating global climate action.

WP2 research contributed to advancements in GHG mitigation approaches by promoting use of higher-tier methodologies for emissions estimation. A key outcome of this work was development of a Tier 2 GHG inventory for dairy cattle in Kenya, which improved the accuracy of emissions reporting compared to previous lower-tier approaches. This research directly informed Kenya's ability to assess whether it can meet its dairy production and GHG reduction targets by 2030. The Tier 2 inventory was officially reported in Kenya's First Biennial Transparency Report, submitted to the UNFCCC in 2024, demonstrating the country's commitment to enhanced transparency and data-driven climate action. Additionally, the inventory contributed to Kenya's Greenhouse Gas Inventory Report, further strengthening national reporting on agricultural emissions. By adopting a more detailed and country-specific approach to emissions estimations, this research supported evidence-based policy decisions for sustainable dairy production while aligning with Kenya's NDCs under the Paris Agreement.

Across several regions, innovative frameworks and capacity building initiatives helped to drive sustainable food system transformation. In Kenya, the advisory board designed a framework to support the assessment of innovation cases, ensuring a structured evaluation process. In Colombia, a dedicated framework was developed to support low-emission food system initiatives. In China, the LL4P co-designed, piloted, and scaled low-emission food system approaches. Notably, the Yangtze River Delta Zero-Carbon Smart Village Alliance fostered collaboration between universities — such as Zhejiang University and Zhejiang University of Finance and Economics — and local governments like Huanghu Town to advance low-carbon rural development. Partnerships with agricultural enterprises and agri-tech companies further supported joint research and sustainable food system development, providing replicable models for other regions. In Viet Nam, Living Lab stakeholders collaboratively developed and organized nine innovative training sessions to enhance stakeholder knowledge and capacity, enabling the design and implementation of effective, efficient, and equitable solutions. These collective efforts underscore a strong commitment to sustainable transformation and capacity building across diverse stakeholder groups.

Mitigate+ developed three scaling strategies for CGIAR innovations and innovation bundles in 2024. In Kenya, a scaling strategy was designed to promote the adoption of improved livestock feeds and breeds. The innovation bundle integrated high-yielding grasses, legumes, multipurpose trees, and improved livestock genetics to enhance productivity and reduce GHG emissions. Key challenges included limited financial access, low farmer awareness, gender disparities, and weak value chains. Proposed strategies focused on expanding dairy cooperatives, improving market linkages, increasing financial literacy, and leveraging digital platforms to enhance farmer access to resources and training. In Colombia, a scaling strategy was developed for Silvopastoral Systems in Caquetá as a key solution for zero-deforestation commitments in the livestock sector. The strategy emphasized incentivizing sustainable practices, strengthening governance, and integrating silvopastoral approaches into dairy and meat supply chains. In Viet Nam, a scaling strategy was created for Integrated Mangrove-Shrimp Systems based on a workshop involving academia, government, the private sector, and farmers. This approach combined shrimp aquaculture with mangrove conservation and promoted climate resilience, eco-certification, and sustainable livelihoods. Key solutions included enhancing market linkages, revising policies for flexible land-use ratios, and scaling financial mechanisms for smallholders. The strategy underscored collaborative governance and training programs to drive adoption.

The Mitigate+ Initiative played a pivotal role in elevating food system approaches within global climate discussions, ensuring they are recognized as essential to achieving low GHGE development. Through food-system-focused events at UNFCCC meetings, including at COP28 in Dubai, the Initiative shaped policy dialogues and influenced decision-makers. One of these side events kick-started the engagement of Mitigate+ in non-market approaches (NMAs) under Article 6.8 of the Paris Agreement, leading to deeper participation in UNFCCC processes. A subsequent submission in March 2024 resulted in an invitation to present at the June 2024 UN Climate Meetings, followed by another invitation to speak at COP29 in Baku, Azerbaijan. These engagements reinforced the role of low-emission food systems in global climate action, highlighting the importance of solid science, good governance, and gender and social equity principles in decision-making. Additionally, Mitigate+ strengthened its direct engagement with UNFCCC mechanisms by registering as a support provider for Article 6.8 implementation, positioning itself as a key resource for policymakers.

WP1: Planning for food systems transformation



Work Package 1 progress against the theory of change

Transforming food systems for a low-emission future requires both vision and action. In the early stages of Mitigate+, the groundwork was laid through deep engagement with national stakeholders, ensuring that mitigation efforts aligned with country priorities. This collaborative approach led to the development of the FOODCLIP framework, a user-friendly tool designed to guide emissions reduction and carbon capture strategies. Across <u>China, Colombia, Kenya, and Viet Nam</u>, national profiles took shape, synthesizing GHGE data, pinpointing key drivers, and assessing the costs and trade-offs of climate action. In China, policy recommendations steered agricultural support systems toward the nation's <u>2060</u> <u>Carbon Neutrality Goal</u>, while at the global level, Mitigate+ scientists contributed to the UNEP Emissions Gap Report, highlighting pathways for <u>food system transformation</u>.

As momentum grew, the focus shifted toward translating knowledge into action. Governments and decision-makers turned to Mitigate+ for targeted strategies, supported by refined country profiles that mapped emissions and identified scalable interventions. The team expanded its reach through high-profile events such as the Global Landscapes Forum in Kenya and the <u>World Food Innovation Summit</u> <u>in China</u>, forging alliances with the private sector to accelerate mitigation financing. A deeper understanding of the political and socioecological forces shaping food systems led to the creation of a comprehensive database and a series of policy briefs that helped navigate the complexities of governance. In Kenya, China, and Viet Nam, interactive workshops strengthened national planning efforts, ensuring that mitigation strategies were grounded in accurate data and aligned with development goals. By 2024, Mitigate+ had become a driving force in food system transformation. Collaboration between research teams and policymakers deepened, leading to cutting-edge modeling efforts that explored future agricultural scenarios with the GLOBIOM model. Legal and regulatory analyses, initially planned for two countries, expanded to four, revealing crucial governance insights. New analytical tools emerged, including a global overview of food systems, a structured framework for prioritizing mitigation in agriculture and land use, and refined Marginal Abatement Cost Curves (MACC) to support decision-making. In Colombia, an in-depth policy assessment identified governance challenges in transitioning to low-emission production, while in China, research on carbon neutrality governance explored the delicate balance between policy, market forces, and industry innovation. A defining moment came with the co-organization of a forum at the World Agrifood Innovation Forum (WAFI), where leading experts debated pathways to lowcarbon rural development.

The journey was not just about research but about laying the foundation for lasting change. The launch of <u>FOODGOAL and</u> <u>FOODPATH</u> provided structured roadmaps for aligning national climate ambitions with concrete implementation pathways. By fostering collaboration across disciplines, strengthening governance structures, and equipping decision-makers with evidence-based solutions, Mitigate+ established itself as a cornerstone in the global effort to build low-emission food systems — an effort that will continue to shape the future beyond 2024.

WP2: Data, evidence, and tools for food systems transformation

RESEARCH QUESTIONS

- How can greenhouse gas (GHG) mitigation models be improved by incorporating development trajectories, co-benefits, and socioeconomic tradeoffs to guide low-emission decisions at national and subnational levels?
- How can efficient, tailored MRV systems be developed for diverse food systems?
- How can the Intergovernmental Panel on Climate Change's guidelines on agriculture, forestry, and other land use be adapted for practical tools to quantify GHG emissions from food systems (FS)?
- How can quantification of FS GHG emissions and mitigation potential be improved for integration in planning for Nationally Determined Contributions?



Work Package 2 progress against the theory of change

Understanding and mitigating GHGE in food systems requires reliable data, advanced methodologies, and strong institutional engagement. From the outset, Mitigate+ focused on addressing data gaps and improving monitoring, reporting, and verification (MRV) systems to support national mitigation strategies. Stakeholder engagement in Colombia, China, Kenya, and Viet Nam laid the foundation for systematic data collection, ensuring that emission inventories reflected real-world agricultural and land-use dynamics. Early efforts leveraged spatial tools and machine learning to enhance biomass estimation and crop mapping, setting the stage for more precise emission tracking. These efforts ensured that research findings translated into actionable strategies, reinforcing the role of robust <u>MRV systems in sustainable climate action</u>.

In Colombia, technical support to the Institute of Hydrology, Meteorology and Environmental Studies improved landcover monitoring and the quantification of emissions linked to deforestation and reforestation. Meanwhile, a Tier 2 system for spatially disaggregated rice emission factors took shape, complementing field-based GHG data collection across key agricultural systems. Kenya prioritized refining dairy cattle activity data to establish baseline emissions, aligning efforts with government priorities for low-emission intensification. In China, national and provincial carbon inventories were developed in collaboration with the Chinese Academy of Agricultural Sciences, with a focus on the dairy sector. Viet Nam advanced its MRV framework for rice and aquatic food systems, laying the groundwork for sector-wide emission monitoring. The integration of digital tools and spatial analysis helped improve data accuracy and policy alignment, supporting mitigation planning in different national contexts.

Building on these efforts, Mitigate+ expanded its role in guiding national climate commitments. A review of the NDCs across all four countries assessed data quality, identified mitigation opportunities, and refined bottom-up frameworks for estimating emissions. In Kenya, a Tier 2 approach for methane emissions gained traction, while in Colombia, <u>MRV protocols developed for</u> <u>the "Zero Deforestation Agreements"</u> formalized emission tracking in agricultural supply chains. Viet Nam integrated digital systems for rice monitoring, enhancing national climate reporting, and linking activity data with emission estimates. Across all countries, engagement with policymakers ensured that research findings translated into actionable strategies and supported informed decision-making.

By 2024. WP2 had solidified its impact on national climate action. In Colombia, MRV coverage expanded to 60 municipalities, reinforcing sustainability commitments across cocoa, beef, and dairy value chains. The Agriemission Monitor and an emissions calculator were launched, enabling real-time visualization of emissions alongside deforestation data. Kenya refined livestock emissions estimations, applying spatially explicit models to enhance mitigation planning, while biochar application and soil mapping provided new insights for sustainable rangeland management. In Viet Nam, the RiceMoRe system scaled to 75 percent of rice-growing provinces, supporting the implementation of standardized low-emission practices. Meanwhile, China introduced a village-level carbon accounting framework and applied innovative modeling approaches to assess food system emissions at multiple scales. These efforts strengthened the foundation for science-based, policy-driven approaches to food system mitigation, ensuring long-term impacts in climate reporting, governance, and land-use planning.

WP3: Living Labs for People

RESEARCH QUESTIONS

- What insights can be gained from participatory action research on institutional, socioeconomic, financing, and policy factors for Living Lab success?
- What are the inclusive and effective approaches for engaging stakeholders to co-define outcomes and shared visions around food systems transformation?
- How can transformative approaches empower communities to drive mitigation, promote gender equity, and support climate-resilient food systems pathways?
- What capacities are needed for stakeholder participation in food systems mitigation in Living Labs for People, and how can they be strengthened while empowering marginalized groups?
- Which key considerations are needed to scale Living Labs for People to broader contexts?



END-OF-INITIATIVE OUTCOME 1

3 ► Capacity and support for food system greenhouse gas emission reduction strategies.

End-of-Initiative Outcome 3

Inclusive approaches for low-emission food
system transformation in Living Labs for People.

Work Package 3 progress against the theory of change

Living Labs for People (LL4P) emerged as dynamic spaces where food system stakeholders co-designed and implemented socio-technical innovations for climate mitigation. From their inception, these labs prioritized multistakeholder engagement, gender-transformative research, and participatory visioning to drive systemic change. Over three years, they evolved from conceptual frameworks to structured hubs fostering inclusive governance, context-specific innovations, and policy influence across China, Colombia, Kenya, and Viet Nam.

The initial groundwork in 2022 focused on refining the LL4P approach, developing methodological tools, and strengthening capacity through <u>multistakeholder platforms</u>. The co-production of knowledge and stakeholder co-ownership were emphasized, ensuring that LL4Ps would serve as transformative spaces rather than externally imposed projects. The year also marked the establishment of key sites: China's collaboration with the National Dairy Industrial Technology System laid the foundation for multistakeholder platform strategies, Colombia's partnership with local universities initiated a LL4P in Caquetá, Kenya's inception activities in Nandi County engaged key institutions, and Viet Nam selected <u>Can Tho</u> to focus on rice and aquatic systems.

By 2023, LL4Ps had transitioned from conceptualization to structured implementation, deepening local partnerships and refining their governance models. In China, <u>Qingshan Village was designated as a "Low Carbon Future Village,"</u> integrating low-emission development into rural planning. <u>Kenya's LL4P</u> secured a host agreement with the Kaimosi Agricultural Training Center, establishing a platform for participatory research and innovation. In Colombia, stakeholder mapping and situational analyses shaped a context-driven approach, while <u>Viet Nam expanded the LL4P beyond Can Tho to cover the</u>

entire Mekong Delta, aligning with national and regional priorities. These developments reinforced the <u>LL4Ps' role as hubs</u> for bottomup climate action, demonstrating their potential to drive lowemission food system transformation.

As the LL4Ps matured, they became hubs where local innovation and policy converged. In Caquetá, a formal agreement with Agrosolidaria positioned the LL4P as a key actor in mitigation efforts within major agricultural value chains. Efforts to integrate gender perspectives intensified, with studies on the role of women in resilient, lowemission food systems, shedding light on barriers and opportunities for greater equity. In Kenya, an advisory board defined an innovation agenda, identifying and scaling promising climate-smart practices through participatory tools. In China, collaboration in the Yangtze Delta region scaled the LL4P model to new territories, paving the way for the development of the first Zero-Carbon Smart House in rural areas. Meanwhile, research on the economic viability of low-emission agricultural technologies informed strategies for scaling solutions nationwide. In Viet Nam, the LL4P took an active role in shaping carbon credit and certification frameworks, linking local mitigation actions to global climate finance mechanisms. Co-creation workshops with farmers fostered knowledge exchange on agroecological practices, while financial dialogues opened new opportunities for funding within the low-emission rice value chain.

At the global level, LL4Ps became reference points for scaling participatory governance models. Cross-learning efforts strengthened knowledge on polycentric governance, while strategic partnership with the GENDER Impact Platform expanded dissemination.

WP4: Scaling low-emission food systems



Work Package 4 progress against the theory of change

The groundwork for scaling low emissions technologies took shape in 2022, with the development of analytical tools and pilot studies that informed future interventions. In Kenya, a ranking system based on stakeholder perceptions provided insights into the feasibility and scalability of various mitigation technologies, guiding national discussions on sustainable agricultural transitions. In Bangladesh, a workshop examined policy measures to reduce dependence on diesel-powered irrigation, sparking interest in alternative energy sources. China explored climate finance mechanisms to support water resource protection, developing a typology of financial instruments that could be adapted across multiple contexts. Efforts in Colombia focused on sustainable cocoa and livestock production, extending work initiated under a project funded by the International Climate Initiative. Research on the barriers to adopting zero-deforestation cacao practices helped design interventions that responded to producer needs, while partnerships with local organizations facilitated outreach to rural communities. Viet Nam expanded its focus on low-emission rice by integrating mitigation strategies for rice-shrimp systems, leveraging the combined expertise of IRRI, IWMI, and WorldFish to explore synergies between production efficiency and emissions reduction. Subnational spatial analyses across China, Colombia, Kenya, and Viet Nam aligned mitigation priorities with broader development objectives, offering a roadmap for future action.

By 2023, WP4 had made significant progress in fostering an enabling environment for scaling innovations that reduce GHG emissions. Collaborating closely with stakeholders, the team emphasized the mitigation potential of CGIAR-related technologies to support the achievement of NDCs by 2025 and 2030. In Kenya, the team worked with the climate-smart agriculture multistakeholder platform to assess the mitigation potential of four technologies at scale. Workshops informed the development of scaling strategies in partnership with CIMMYT. In Colombia, WP4 collaborated with the AgriLAC Resiliente Initiative on the sustainable cocoa challenge, producing business models, training materials, and engaging policymakers and investors. Efforts focused on scaling zerodeforestation cacao production and securing funding for dairy-sector interventions. Additionally, an innovative project was developed to promote sustainable cacao production in conflict-affected areas under a green business model policy instrument. In Viet Nam, the team assessed the role of integrated rice and fisheries in reducing food system emissions. In China, WP4 examined the country's role in mitigating Brazilian deforestation linked to soybean imports. The team also enhanced the third edition of the Scaling Scan Tool, integrating climate-mitigation objectives and social safeguards. These 2023 advancements laid the groundwork for scaling silvopastoral systems, low-emission rice, and improved livestock practices in 2024.

Momentum continued in 2024, with WP4 making significant strides in fostering an enabling environment for scaling innovations that reduce GHGE. Collaborating closely with stakeholders, the team strengthened policy frameworks and advanced the adoption of CGIAR innovations at scale. In Colombia, the implementation of a sustainability strategy for the cocoa value chain in Cesar and Caquetá advanced through partnerships with the Departmental Cocoa Chain Steering Committee. Key activities included green business development, capacity-building workshops, and institutional strengthening. These efforts supported sustainable land use, deforestation reduction, and climate change mitigation while contributing to peacebuilding in conflict-affected regions. Additionally, a scaling strategy for silvopastoral livestock systems was developed, promoting knowledge-sharing, regulatory improvements, and market incentives to enhance adoption. Research also informed land-use policy through studies on deforestation leakage associated with sustainable land-use systems. In Kenya, WP4 focused on scaling improved livestock breeds and feeds while conducting spatial analyses to identify areas where food system emission reductions and peacebuilding efforts could align. These studies provided critical insights into priority countries for targeted interventions. In Viet Nam, efforts centered on scaling integrated rice-shrimp systems and enhancing the enabling environment for Rice Straw Management and Alternative Wetting and Drying. Guidelines were developed to support policymakers in facilitating widespread adoption, while policy recommendations on carbon project operations aimed to integrate low-emission agricultural practices into national strategies. China's contributions included advancing the Qingshan model to drive low-carbon rural transformation through regional alliances. Research on low-carbon rice mitigation technology informed incentive structures for sustainable rice production, while studies on the impacts of Sino-Brazilian soybean trade provided insights into global deforestation dynamics. Across these countries, WP4 continued to deliver strategic studies and policy recommendations, reinforcing the role of innovation in climate change mitigation, and supporting the transition to low-emission food systems.

With each passing year, WP4 reinforced the conditions necessary for scaling climate-smart agricultural innovations, ensuring that lowemission technologies move beyond research and into real-world application. By integrating scientific expertise with policy engagement and multistakeholder collaboration, these efforts contributed to the ongoing transformation of food systems, making them more resilient, equitable, and aligned with global sustainability targets.

WP5: Engagement and agenda transformation

RESEARCH QUESTIONS

This WP is focused on external communications, outreach, and partner engagement. It is not a scientific WP and does not feature any research questions. However, we will apply a learning framework to our outreach efforts to improve information delivery and adapt formats for increased impact.



End-of-Initiative Outcome 5

9 ► Increased awareness of food system 10 ► approaches to achieve low greenhouse gas emission development.

Work Package 5 progress against the theory of change

At COP27, WP5 organized three side events at the Food and Agriculture Pavilion, addressing long-term low-emission strategies, capacity building through the Climate, Food and Farming, Global Research Alliance Development Scholarships (CLIFF-GRADS), and the role of food systems in peacebuilding. The Initiative also participated in high-level dialogues on Africa's energy transition, sustainable livestock production, and agricultural shifts in Asian Mega Deltas. Engagement extended beyond COP27, with contributions to the G20 Meeting of Agricultural Chief Scientists and a policy dialogue on sustainable land use in Colombia. WP5's communication efforts gained traction, publishing <u>16 blog posts</u>, a widely read Devex article on deforestation policies, and securing funding for 12 CLIFF-GRADS fellows. Despite funding constraints that delayed media training activities, the Initiative laid the foundation for stronger strategic engagement in the following years.

By 2023, WP5 had deepened its role in global climate negotiations, leading an in-person session at the <u>Bonn Climate Conference</u> <u>on net-zero food systems</u>. During COP28, it organized two sessions at the <u>Food and Agriculture Pavilion</u>, <u>one exploring the</u> <u>implementation of non-market approaches and another focusing on</u> <u>youth capacity building for climate action</u>. WP5 also co-hosted the official side event <u>"Shifting the Paradigm: Towards Just, Equitable Low-Emission Food Systems,"</u> bringing together Indigenous perspectives, agroecological approaches, and scientific insights. Beyond COP28, it expanded outreach efforts with eight webinars on deforestation-free supply chains and UNFCCC technical reviews while strengthening partnerships with CGIAR's UNFCCC negotiation group and the Sharm el-Sheikh joint work on agriculture and food security (SSJWA). Collaborations with Rationale Advisors resulted in key documents, including an analysis of SSJWA submissions and a UNFCCC engagement strategy. The CLIFF-GRADS program continued its growth, training 12 PhD students in GHG mitigation and awarding 7 additional scholarships for 2024.

Stepping up its efforts in 2024, WP5 significantly expanded its influence in global climate discussions. Two submissions to the UNFCCC Secretariat on Article 6.8 reinforced its role in shaping discussions on NMAs for low-emission food systems, leading to CIAT's official registration as a support provider for implementation. Research from WP4, alongside analyses developed in collaboration with Rationale Advisors, informed these submissions and was featured at the June UN Climate Meetings in Bonn and COP29 in Baku. WP5 led two key sessions at COP29, integrating mitigation strategies with sustainable development goals and highlighting gender-responsive capacity building efforts. Media outreach intensified through a partnership with SciDev, which resulted in eight feature articles, while local engagement in Viet Nam led to 50 national news articles on Mitigate+ activities. Additionally, WP5 collaborated with WP3, WP4, and the CGIAR Initiative on Nature-Positive Solutions to host webinars on food systems transformation. Strengthening its policy engagement, WP5 introduced a rapid assessment tool at COP29 to help countries align NMAs with Article 6.8, streamlining the adoption of low-emission food systems within national frameworks. These efforts reinforced Mitigate+'s presence in climate negotiations, expanded stakeholder collaboration, and positioned the Initiative as a leading voice in global food system transformation.

WORK PACKAGE	PROGRESS RATING & RATIONALE
1	Delayed The proposed indicator was ambitious, as it aimed to influence new policies, regulations, or strategies through research. These processes take time and depend on engagement with local stakeholders. While the expected target was not fully met, the results were not significantly below expectations. Moreover, there was clear recognition of the approach and its relevance among national policymakers.
2	For adoption of developed tools by policymakers and stakeholders, WP2 successfully achieved two successful cases that were highly recognized in the countries where they were implemented: the MRV Protocol in Colombia and the RiceMoRe System in Viet Nam, both adopted by technical government entities in each country. Additionally, the target for training individuals, organizations, and multi-stakeholder platforms was exceeded.
3	On track WP3 successfully achieved and exceeded nearly all proposed targets for each indicator.
4	On track WP4 successfully achieved all proposed targets for each indicator.
5	Delayed The Initiative successfully participated in UNFCCC events, strengthening key partnerships, and enhancing the visibility of its research efforts. Despite its strong dependence on progress in engaging with local stakeholders, WP5 continued to work on reinforcing engagement and connections with policymakers, as these processes require time to be effectively established. While some indicators were not achieved, most were successfully met, with additional efforts focused on disseminating results through blogs, participation in events, and high-level meetings.





- Progress largely aligns with Plan of Results and Budget and Work Package theory of change.
- Can include small deviations/issues/ delays/risks that do not jeopardize success of Work Package.



- Progress slightly falls behind Plan of Results and Budget and Work Package theory of change in key areas.
- Deviations/issues/delays/risks could jeopardize success of Work Package if not managed appropriately.



- Progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas.
- Deviations/issues/delays/risks do jeopardize success of Work Package.

Section 4: Quantitative overview of key results

This section provides an overview of results reported and contributed to, by the CGIAR Initiative on Mitigate+ from 2022 to 2024. These results align with the <u>CGIAR Results Framework</u> and Low-Emission Food Systems's theory of change. Further information on these results is available through the <u>CGIAR Results Dashboard</u>.

The data used to create the graphics in this section were sourced from the CGIAR Results Dashboard on 04 April 2025. These results are accurate as of this date and may differ from information in previous Technical Reports. Such differences may be due to data updates throughout the reporting year, revisions to previously reported results, or updates to the theory of change.

OVERVIEW OF RESULTS BY CATEGORY



Between 2022 and 2024, the Mitigate+ Initiative generated 595 results in collaboration with other Initiatives and research partners, demonstrating our strong commitment and efforts in knowledge products, innovations, and policy changes.



• 2 = Principal: Contributing to one or more aspects of the Impact Area is the principal objective of the result. The Impact Area is fundamental to the design of the activity leading to the result; the activity would not have been undertaken without this objective.

• 1 = Significant: The result directly contributes to one or more aspects of the Impact Area. However, contributing to the Impact Area is not the principal objective of the result.

• **0 = Not targeted:** The result has been screened against the Impact Area, but it has not been found to directly contribute to any aspect of the Impact Area as it is outlined in the <u>CGIAR 2030 Research and Innovation</u> strategy.

• Not applicable: Pertains to 2022 reported results when only information on Gender and Climate impact area tagging was available.

Most results of Mitigate+ contributed to CGIAR's Climate Change and Environment and Biodiversity Impact Areas, with the Initiative also generating many results aligned to CGIAR's Poverty Reduction Impact Area and, to a lesser extent, to the Gender Equality and Nutrition Impact Areas.

KNOWLEDGE PRODUCTS BY TYPOLOGY



372 out of 595 results of Mitigate+ were knowledge products, with journal articles, reports, and blog articles being the main types generated, consolidating the Initiative's leadership in generating scientific evidence and highlighting its ability to effectively disseminate its results.

INNOVATIONS BY TYPOLOGY



• TECHNOLOGICAL INNOVATION Innovations of technical/material nature, including varieties/breeds, crop and livestock management practices, machines, processing technologies, big data, and information systems.

The Initiative also generated 32 innovations, most of which were incremental innovations (as defined by CGIAR). Most (41 percent) of the innovations were technological, followed by capacity development and policy or organizational innovations.

NUMBER OF INNOVATIONS AND THEIR READINESS LEVELS

1	0		Pipeline overview # of innovations
	9	PROVEN INNOVATION The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions	5
	8	UNCONTROLLED TESTING The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions	6
	7	Ркототуре The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions	5
	6	SEMI-CONTROLLED TESTING The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions	5
	5	MODEL/EARLY PROTOTYPE The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions	1
	4	CONTROLLED TESTING The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions	2
	3	PROOF OF CONCEPT The innovation's key concepts have been validated for their ability to achieve a specific impact	1
	2	FORMULATION The innovation's key concepts are being formulated or designed	3
	1	BASIC RESEARCH The innovation's basic principles are being researched for their ability to achieve a specific impact	3
	0	IDEA The innovation is at idea stage	1

INNOVATION READINESS PROGRESS



9 Proven Innovation + 8 Uncontrolled Testing + 7 Prototype + 6 Semi-Controlled Testing + 5 Model/Early Prototype + 4 Controlled Testing + 3 Proof of Concept + 2 Formulation + 1 Basic Research + 0 Idea + D Discontinued

Most of the 32 innovations reported by Mitigate+ are at a stage where its concept has fully matured and the innovations are used under semi-controlled, prototype, or uncontrolled testing or are proven innovations. This is important because it highlights how much a particular innovation can be promoted among next and end-users and scaled.

NUMBER OF INDIVIDUALS TRAINED BY THE INITIATIVE



Short-term trainees: Short-term training refers to training that goes for less than three months.

Mitigate+ developed or contributed to 58 training sessions, reaching nearly 3,900 participants, most of whom were trained over a short term. Further, while most of the short-term trainees were women, this was not the case among long-term trainees, most of whom were men who were studying in a Masters' program. The efforts in long-term trainings focused on supporting students through the CLIFF-GRADs program.



Policies by stage and by type

2022 was a significant year regarding the number of policies enacted (Stage 2), and though this number decreased since then, in 2024 three policies were enacted. In contrast, the number of policies where research was taken up by next users (Stage 1) steadily increased over time, going from three in 2022 to six in 2024. Most of these outcomes were changes in policies or strategies, followed by changes in programs, budgets, or investments.



Partnerships and Mitigate+ impact pathways

Over the past three years, strategic partnerships played a crucial role in advancing the Initiative's goals across multiple countries. These collaborations provided essential expertise, strengthened local implementation, and expanded the Initiative's impact within national and global climate policy frameworks.

In Kenya, partnerships evolved from initial engagement in 2022 with <u>AGNES</u>, which integrated food systems into African policy discussions, to deeper collaborations with research institutions and local stakeholders. The <u>Kaimosi Agricultural Training Centre</u> became a hub for participatory innovation through the LL4P, formalized in 2023. Wageningen University and CIRAD contributed to livestock mitigation research, while universities such as the <u>University of</u> <u>Eldoret</u> facilitated community-led solutions. By 2024, the Initiative's work with Kenya's national agriculture research system advanced sustainable land-use planning, aligning local efforts with national climate commitments.

In Colombia, collaborations with research institutions, universities, and local organizations strengthened mitigation strategies. The partnership with <u>Pontificia Universidad Javeriana</u> has been central since 2022, supporting GHG modeling, stakeholder engagement,

and agroecological transition research. The Initiative also worked with the International Institute for Applied Systems Analysis and the German Research Centre for Geosciences, in Potsdam, to enhance land-use modeling, which contributed to policy dialogues on deforestation and sustainable agricultural systems. By 2023, these efforts expanded through the LL4P in Caquetá, implemented in collaboration with local partners. In 2024, research on sustainable value chains and deforestation-free production, supported by Wageningen University, reinforced Colombia's position as a leader in low-emission development.

China's engagement in the Initiative was shaped by long-standing collaborations with national research institutes and universities. Since 2022, partnerships with the Institute of Environment and Sustainable Development in Agriculture (IESDA-CAAS) and China Agricultural University have advanced research on methane reduction in rice systems and low-emission dairy production. By 2023, Zhejiang University contributed to designing market-based environmental mechanisms, including the "Zero Carbon Smart Farm" in Qingshan. In 2024, these efforts expanded through coordinated work with the Zhejiang University of Finance and Economics, which developed financial instruments to support low-carbon agriculture.

Research on food loss and waste, led by Wageningen University, further strengthened China's contributions to sustainable food system transitions.

Viet Nam's partnerships evolved significantly, with key institutions driving research and implementation. Initial collaborations in 2022 with local universities and research centers, such as An Giang University and <u>Nam Long University</u>, laid the foundation for work on rice-shrimp systems and LL4P activities. In 2023, the Initiative engaged more deeply with Viet Nam's Ministry of Agriculture and Rural Development to support national climate policies. Wageningen University and CIFOR-ICRAF contributed research on financial mechanisms and community-led climate adaptation. By 2024, the Initiative had played a key role in the national MRV system under the One Million Hectare program. Outreach efforts also expanded through partnerships with local journalists, leading to increased media coverage on sustainable food systems.

CIFOR has been a key partner in the development of the Initiative, leading the structuring and implementation of WP1 across all four countries. Through a <u>CIFOR–University of Adelaide</u> sub-

agreement, CIFOR also directed the development of the LL4P in Viet Nam, ensuring strong research coordination and integration of participatory approaches into climate mitigation strategies.

At the global level, key partnerships supported capacity building, policy engagement, and knowledge dissemination. Since 2022, AGNES facilitated African climate policy dialogues, while the University of Galway managed the CLIFF-GRADS program, strengthening early-career research capacity. Wageningen University played a cross-cutting role in research across multiple countries, particularly in food loss and waste modeling. The collaboration with Rationale Advisors, which began in 2023, was instrumental in shaping <u>UNFCCC engagement strategies</u>.

Through these partnerships, the Initiative successfully advanced research, policy engagement, and implementation efforts across multiple geographies. The sustained involvement of key institutions ensured the continuity of activities, enabling the Initiative to contribute effectively to low-emission food system transformations worldwide.



MITIGATE+ INTERNAL NETWORK OF COLLABORATIONS

The diagram presents the internal collaborations of the Mitigate+ Initiative with other CGIAR Initiatives and Impact Area Platforms. Connections are sized according to the number of shared reported results, highlighting the depth of collaboration across the CGIAR Portfolio. A results threshold filter is applied (set to a minimum of six results) to focus the view on the most significant collaborations. Thicker lines represent stronger collaborative links based on a higher number of shared results.

Portfolio linkages and Mitigate+ impact pathways

The Mitigate+ Initiative strengthened its impact by working closely with other CGIAR Initiatives, driving synergies that enhance climate resilience, sustainable agriculture, and emissions reduction strategies worldwide. Through sustained collaboration, the Initiative contributed to systemic transformations in food systems, integrating research and policy efforts across multiple regions.

In 2022, the Initiative laid the groundwork for cross-Initiative collaboration by participating in key portfolio launches in Viet Nam and Colombia, engaging with the Initiative on National Policies and Strategies for Food, Land and Water Systems Transformation (National Policies and Strategies) in Kenya and aligning LL4P locations with complementary CGIAR efforts. Joint work with the Livestock, Climate and System Resilience (Livestock and Climate) Initiative advanced mitigation strategies, while partnerships with the Initiatives on National Policies and Strategies, Resilient Agrifood Innovation Systems in Latin America and the Caribbean (AgriLAC Resiliente), and Securing the Food Systems of Asian Mega-Deltas for Climate and Livelihood Resilience (Asian Mega-Deltas) supported climatepeacebuilding and GHG mitigation efforts in Latin America and Southeast Asia. Additionally, integration with the Initiative on Nature-Positive Solutions for Shifting Agrifood Systems to More Resilient and Sustainable Pathways (Nature-Positive Solutions) facilitated advancements in land-use-based ecosystem service modeling,

reinforcing CGIAR's climate Initiatives. These collaborations set the stage for future engagement, creating a strong foundation for knowledge sharing and innovation.

Building on this foundation, 2023 saw a deepening of these collaborations. In Colombia, Mitigate+ continued working with NPS to support policy commitments and with AgriLAC Resiliente to strengthen sustainability in the cocoa value chain. In Viet Nam, joint efforts with the Asian Mega-Deltas Initiative shaped discussions on agricultural carbon markets, leading to multistakeholder dialogues that informed policy development. The Initiative's contributions to LL4P in Nandi County, Kenya, expanded through participatory workshops with the Livestock and Climate Initiative, fostered colearning and the co-design of practical solutions for low-emission food systems. Joint work with the Asian Mega-Deltas Initiative helped integrate GHG emissions calculations into carbon-credit applications, ensuring that mitigation strategies were embedded in climate finance mechanisms. New engagement with the Initiatives on Transformational Agroecology across Food, Land, and Water systems (Agroecology) and NEXUS Gains: Realizing Multiple Benefits Across Water, Energy, Food and Ecosystems resulted in the formation of a Community of Practice on Multi-Stakeholder Platforms, which facilitated peer learning and collaboration across Initiatives. A significant milestone was the co-organization of a COP28 side event

with Agroecology, highlighting diverse perspectives on transitioning to equitable low-emission food systems and strengthening CGIAR's global advocacy efforts.

In 2024, the Initiative continued to expand its partnerships, solidifying its role in CGIAR's climate research landscape. WP2 collaborated with the Initiative on Transforming Agrifood Systems in South Asia to address crop residue burning and fertilizer management policies in India, producing studies with actionable recommendations for sustainable practices. These efforts contributed to evidence-based policy dialogues aimed at balancing food security, farmer livelihoods, and environmental sustainability. WP3 deepened its work with Livestock and Climate in Kenya's Nandi County, facilitating knowledge exchange between adaptation pioneers and farmers. This partnership extended to co-hosting events like Agri-Expo/World Food Day 2024, where key stakeholders discussed scalable solutions for sustainable livestock production. Work with the Asian Mega-Deltas Initiative progressed in integrating GHG calculations into carbon-credit systems, reinforcing the importance of emissions accounting in sustainable agricultural finance. WP4 strengthened partnerships with the AgriLAC Resiliente and National Policies and Strategies Initiatives and with Sustainable Land Use Systems projects to further develop sustainable agroforestry and livestock systems in Colombia, with a focus on silvopastoral systems and climate-smart cocoa production.

Additionally, the Initiative maintained strong engagement with <u>Agroecology and NEXUS Gains</u>, fostering collaboration on multistakeholder engagement approaches. The Community of Practice on Multi-Stakeholder Platforms continued to grow, providing a space for knowledge exchange and cross-Initiative learning. Joint research efforts explored strategies to enhance participatory governance and stakeholder involvement in food system transitions, ensuring that diverse perspectives were integrated into CGIAR's sustainability agenda. A webinar series coorganized with Agroecology highlighted best practices in food system transformation, bringing together researchers, policymakers, and practitioners to share insights on scaling agroecological solutions.

Throughout these three years, collaboration with other CGIAR Initiatives was instrumental in amplifying the Initiative's reach and impact. By integrating efforts across regions and thematic areas, Mitigate+ contributed to systemic solutions for low-emission food system transitions, demonstrating the power of collective action in addressing climate challenges. These partnerships have fostered innovation, enhanced policy engagement, and supported the scaling of sustainable practices, highlighting the critical role of inter-Initiative cooperation in building climate-resilient food systems.



Colombia repurposes tax incentive program to integrate Mitigate+ low-emission development approach



Primary Impact Area



Contributing Initiative Low-Emission Food Systems

Contributing Centers

Alliance of Bioversity and CIAT



Countries: Colombia

The CGIAR Initiative on Low-Emission Food Systems, called Mitigate+, supported Colombia in repurposing its Works-for-Taxes mechanism to promote low-emission development through cocoa agroforestry in conflict-affected Belén de los Andaquíes. A pilot co-developed by the Alliance of Bioversity International and CIAT under Mitigate+ offers companies a way to offset taxes while restoring degraded lands and supporting sustainable livelihoods. Its success presents a scalable model for green investments, driving deforestation reduction, climate resilience, and economic recovery in vulnerable regions.

In Colombia, conflict-affected regions like Belén de los Andaquíes face persistent challenges of deforestation, degraded landscapes, and limited economic opportunities. Agricultural activities, often dominated by illicit crops, further accelerate forest loss and hinder sustainable development. Caquetá, where Belén de los Andaquíes is located, has experienced significant deforestation, with more than 427,000 hectares of forest lost between 2005 and 2017. Despite existing government programs to attract private-sector investments in public goods, such as the Works-for-Taxes mechanism, these initiatives had rarely been applied to support environmental restoration or low-emission development.

The CGIAR Initiative on Low-Emission Food Systems (Mitigate+), through the Alliance of Bioversity International and CIAT, aimed to address this gap by promoting sustainable land-use practices that contribute to climate resilience and economic recovery. The objective was to demonstrate how tax incentive programs could be leveraged to drive green investments, particularly in agroforestry systems that reduce deforestation, restore degraded lands, and create livelihoods. By engaging both public and private stakeholders, Mitigate+ facilitated the integration of a low-emission food systems approach into Colombia's fiscal policy landscape. To achieve this, Mitigate+ collaborated with national and local institutions, including the ministry of environment and sustainable development, the national planning department, the municipality of Belén de los Andaquíes, and ASPROABELEN, a local cocoa producers' association. Together, they developed a pilot aimed at repurposing the Worksfor-Taxes mechanism to include investments in cocoa agroforestry systems. This innovation created a direct pathway for private companies to offset their tax obligations by financing low-emission development projects.

The pilot project in Belén de los Andaquíes focused on supporting 70 cocoa-farming families through a USD-1.14-million investment over four years. By establishing agroforestry systems, providing organic fertilizers, conducting carbon footprint assessments, and offering technical training, the project is expected to improve agricultural productivity while enhancing forest conservation. The program also includes ecosystem restoration activities and formalizes conservation agreements under an environmental payment for ecosystem services scheme, which will provide participating families with annual payments of USD 147 per hectare for maintaining forest cover.

Through these efforts, private companies can contribute to lowemissions cacao production while cocoa farmers can benefit from improved livelihoods and greater market access. The project also empowers local authorities with the technical capacity to structure and manage green investment proposals, ensuring long-term sustainability and governance. Women and youth from the cocoa farming community were actively involved, promoting inclusive development and equitable access to benefits.

The success of the pilot demonstrated the potential for scaling up the model across other regions impacted by deforestation and conflict. By bridging the gap between fiscal policy and sustainable development, Mitigate+ and its partners established a replicable approach to aligning tax incentives with climate and social goals. The Initiative also contributed to Colombia's national commitments under the Paris Agreement by reducing greenhouse gas emissions, restoring ecosystems, and supporting climate-resilient agriculture.

Additionally, the project fostered knowledge sharing through workshops, technical training sessions, and policy dialogues that brought together government officials, private-sector representatives, and local communities. These engagements facilitated the co-creation of solutions tailored to the region's unique socioenvironmental context.

By repurposing Colombia's Works-for-Taxes mechanism, Mitigate+ established a scalable and sustainable financing model for lowemission development. With demonstrated success in Belén de los Andaquíes, this innovative approach holds the potential to transform fiscal policies across Colombia and beyond, promoting green investments that restore landscapes, build climate resilience, and create lasting economic opportunities for vulnerable communities.

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Our work in Belen de los Andaquies is a first for Colombia, as it targets multiple sustainable benefits: peacebuilding, ecosystem restoration, improved livelihoods, and climate change mitigation. It's a model for future initiatives knowing that similar instruments can be repurposed to foster sustainable development and climate action.

Augusto Castro-Nunez, senior scientist at the Multifunctional Landscapes lever of the Alliance of Bioversity and CIAT and leader of the Mitigate+ scaling work package



Initiative on Low Emission Food Systems

2022 key result story

Climate change mitigation fellowship program builds the capacity of over 170 early-career Global South agri-climate researchers



Low-Emission Food Systems

2023 key result story

Colombia begins testing Mitigate+-designed protocol to monitor, report and verify deforestation risk



