CGIAR

INITIATIVE ON
Livestock and Climate

The Livestock and Climate Initiative worked closely with women to address social inequities in livestock food systems. Here, a pastoralist milks a goat in Paka Hills, Baringo, Kenya.

Credit: G. Smith

CGIAR Research Initiative on
Livestock and Climate

Annual Technical Report 2024

Author: CGIAR Research Initiative on Livestock and Climate

Title: Annual Technical Report 2024: CGIAR Research Initiative on Livestock and Climate

Suggested citation: CGIAR Research Initiative on Livestock and Climate. 2025. Annual Technical Report 2024: CGIAR Research Initiative on Livestock and Climate. Montpellier, France: CGIAR System Organization. https://hdl.handle.net/10568/174260

Disclaimers

This publication has been prepared as an output of the CGIAR Research Initiative on Livestock and Climate. Any views and opinions expressed in this publication are those of the author(s) and are not necessarily representative of or endorsed by the CGIAR System Organization.

Boundaries used in the maps do not imply the expression of any opinion whatsoever on the part of CGIAR concerning the legal status of any country, territory, city, or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Borders are approximate and cover some areas for which there may not yet be full agreement.

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 Livestock and Climate. We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund: https://www.cgiar.org/funders.

Table of contents

CGIAR Technical Reporting 2024

CGIAR Technical Reporting has been developed in alignment with CGIAR's Technical Reporting Arrangement. 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 CGIAR Flagship Report, released in April 2025 at CGIAR Science Week. 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.

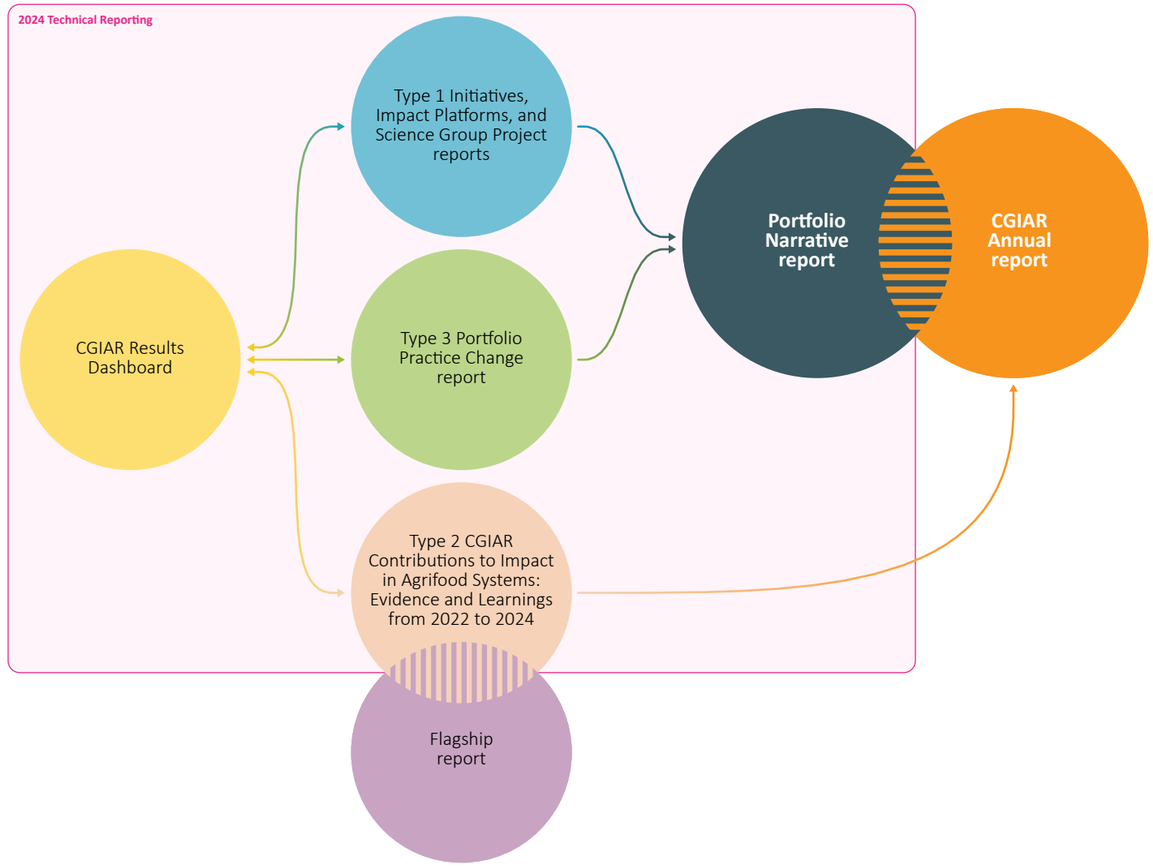


Figure 1. CGIAR's 2024 Technical Reporting components and their integration with other CGIAR reporting products.

Section 1: **Fact sheet, executive summary and budget**

Initiative name	Livestock, Climate and System Resilience
Initiative short name	Livestock and Climate
Initiative Lead	Fiona Flintan (f.flintan@cgiar.org)
Initiative Co-lead	Jacobo Arango (j.arango@cgiar.org)
Science Group	Science group
Start – end date	01 January 2022 – 31 December 2024
Geographic scope	**Regions** Central and West Asia and North Africa · East and Southern Africa · Latin America and the Caribbean · West and Central Africa **Countries** Colombia · Ethiopia · Guatemala · Kenya · Mali · Senegal · Tanzania · United Republic · Tunisia
OECD DAC Climate marker adaptation 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 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: Gender 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/34-livestock-climate-and-system-resilience/

[1] The Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) markers refer to the OECD DAC Rio Markers for Climate and the gender equality policy marker. 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

By the end of 2024, the CGIAR Research Initiative on Livestock and Climate reported 1,219 results, with more than half reported in 2024. Of these, 253 had a global focus, 324 targeted Kenya, 196 Colombia, 154 Ethiopia, and 114 Tunisia. The rest were generated in Senegal, Guatemala, El Salvador and Tanzania, with some spilling over to other countries. Results included 898 knowledge products, of which 127 were journal articles. The Initiative supported 97 capacity sharing events between 2022 and 2024, benefiting 9,968 participants, of whom just under half were women. The Initiative had 36 innovations under development, with the majority at higher levels of readiness. Eleven Innovation Packages and Scaling Readiness workshops were undertaken.

By its end, the Initiative had significantly surpassed targets for four of its five End of Initiative outcomes. Through Work Package 2 (WP2), by the end of 2024, approximately 1,057,480 livestock producers and 12 public-private organizations had received climate information services (CIS) through the Initiative. In Kenya, three organizations used the innovation KAZNET, benefiting more than 4,000 pastoralists, and new investments in index-based livestock Insurance (IBLI) meant scaling in excess of 150,000 pastoralist households and more anticipated.

Supported by highly successful innovations, including participatory rangeland management (PRM), participatory land use planning for pastoral areas, a sustainable rangeland management (SRM) toolkit, and opportunistic grazing, the Initiative was supporting 2,322,686 hectares of land (mainly rangelands) under improved management, governance, and restoration at the end of 2024 — more than quadrupling our outcome target. Additionally, WP3 had considerable policy and investment success with five governments taking up innovations and donor projects totaling more than USD 405 million, providing opportunities for scaling PRM and the SRM Toolkit over millions of hectares.

WP4 supported 13 public- and private-sector investors in designing and tracking USD 901 million in finance — more than 32 times the End of Initiative outcome target and a 400-times leverage versus the Work Package pooled funding investment of approximately USD 2 million over the three years. Comprehensive data analysis published in Nature Sustainability and made accessible through the Adaptation Atlas web application provided a robust evidence base for decision-making, shaping funding proposals.

WP5 scientists worked closely with national governments and international platforms like the United Nations Framework Convention on Climate Change (UNFCCC) directly and through the African Group of Negotiators Experts Support, United Nations Convention on Biological Biodiversity (UNCBD), and United Nations Convention to Combat Desertification (UNCCD) to share evidence on livestock interactions with climate change and combating desertification and positively influencing decision-making processes. Initiative tools and research shaped five national policies (EOIO 5), including Kenya's Third National Climate Change Action Plan and Colombia's Sustainable Cattle Policy. These achievements relied on long-term engagement strategies and partnerships, trust-building, persistence, and responding to demand.

Though only 15,424 of the anticipated WP1 20,000 households adopted climate-smart practices as a direct result of the Initiative, through the very successful Pioneer Positive Deviance (P-PD) methodology, with a farmer-to-farmer network approach, thousands more were reached indirectly through booklet distributions, training events, and field days. Gender-responsive approaches were integrated to increase the potential for equitable learning, leadership roles, and a fairer distribution of benefits. WP1 also supported the development of climate-smart technologies, making accessible nine datasets, scaled low-emission feeds and forages in Colombia, and expanded the innovation CLEANED to four new countries working with the CGIAR Research Initiative on Sustainable Animal Productivity for Livelihoods, Nutrition and Gender Inclusion, with assessments undertaken in 34 countries.

In 2024, the Initiative reported 92 WP outcome results. This made a total of 128 outcomes reported in total over the three years. The majority of these were Innovation Use (62 results) and Policy Change (mainly investments, 26), with 39 Other Outcome results focusing on making data and science accessible, its uptake, and capacity building.

Gender and social inclusion were mainstreamed across all WPs by all Centers working collaboratively. Co-designed gender accommodative and transformative approaches supported socially inclusive adaptation and resilient communities and landscapes. The Initiative helped establish and mentor the African Youth Pastoralist Initiative.

The success of the Livestock and Climate Initiative stemmed from strategic partnerships with 68 organizations to co-develop solutions and scale innovations. The results of these partnerships were seen across our WP outcomes and 180 co-reported results, reflecting robust engagement with national governments (ministries and national agricultural research and extension systems [NARES]) to influence policy, investments, and uptake of climate-smart livestock innovations.

The Livestock and Climate Initiative worked across the CGIAR research Portfolio with other Initiatives and Impact Area Platforms. This allowed us to benefit from pooling expertise and resources, to consolidate approaches and evidence, and to integrate livestock into research and innovations being developed by other Initiatives. Such cross-Initiative partnerships came together in the presentation of our work and joint influencing at global events such as the UNFCCC, UNCBD and UNCCD COPs, supported by cross-CGIAR flagship publications.

	2022	2023	**2024**
PROPOSAL BUDGET	$10.00M	$19.10M	**$25.90M**
APPROVED BUDGET [1]	$7.92M	$6.97M [2]	**$8.05M [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.

Technical Agro-climatic Committees in Jutiapa, Quetzaltenango, and Zacapa, focusing on generating recommendations to reduce climate variability risks and mitigate potential impacts on farmers' productive systems.
Credit: INSIVUMEH

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.

CHALLENGE STATEMENT

- Low- and middle-income countries (LMICs) require solutions that adapt livestock systems to climate change while improving nutritional security, reducing poverty, and increasing social equity, without accelerating greenhouse gas emissions or degrading land, water, and biodiversity. Livestock are essential to the income and livelihoods of almost 930 million poor Africans and South Asians. Animal-source foods improve cognitive development and growth, and animals are a critical safety net and source of income.
- However, livestock also cause approximately 15 percent of human-induced greenhouse gas emissions. Livestock production is highly vulnerable to rising temperatures, erratic precipitation, and increasing extreme events. About US$311 billion in livestock production value (about 40 percent of the global total) is exposed to various climate hazards, especially drought (US$88 billion), climate variability (US$84 billion), and heat stress (US$61 billion). Pastoral systems, which represent 46 percent of ruminant production systems, face additional challenges including grazing land loss, fragmentation degradation, and long-term development neglect. Climate change is a threat multiplier, exacerbating existing risks and insecurities in livestock systems that lead to further stresses, tensions, and conflict. Innovations such as climate information services show promise, but they have not been widely used in livestock systems.
- Livestock extension services are poorly developed. Land degradation in rangelands is a particular concern; while restoration offers opportunities for carbon sequestration, rangelands receive little attention compared with forests. Nearly 50 percent of LMICs prioritize livestock actions in their Nationally Determined Contributions and some are developing livestock-focused Nationally Appropriate Mitigation Actions, but implementation lags. Governments and the private sector need technical support to access finance, implement programs and investments, and report climate-related or other environmental achievements. Strategic, well-targeted evidence-based research is required to guide tough choices, address tradeoffs, and identify "investable" solutions. Facing a climate emergency, research must provide proven adaptive measures that safeguard and capitalize on livestock benefits while reducing and mitigating negative impacts on the environment.

RESEARCH QUESTIONS

- How can livestock systems adapt to climate change while improving nutritional security, reducing poverty, and increasing social equity and sociopolitical security, without accelerating greenhouse gas emissions or degrading land, water, and biodiversity?
- How can the resilience of rangeland pastoral systems be improved?
- How can climate-related risks be reduced for livestock keepers and other stakeholders?
- What innovations can mitigate livestock climate impacts, while also benefiting local communities?
- How can science on livestock and climate adaptation and mitigation support governments to access finance, implement (livestock programs), and report mitigation achievement?

SPHERE OF **CONTROL**

Work Packages

Work Package 1
On-farm technologies in social context: Improving local capacities and inclusive scaling mechanisms.

Work Package 2
Digital services to manage climate risk in livestock agrifood systems.

Work Package 3
System level research and interventions that build climate-resilient and low emission livestock production systems.

Work Package 4
Science to finance the transition to low-emission and resilient livestock agrifood systems.

Work Package 5
Improving the enabling policy environment for more resilient, low emission livestock production systems.

SPHERE OF **INFLUENCE**

End-of-Initiative Outcomes

End-of-Initiative Outcome 1 (1 ▶)
Farmers' capacity to apply farmer-led climate-smart labour-saving livestock technologies built.

End-of-Initiative Outcome 2 (2 ▶)
Livestock producers and organizations have improved access to climate risk management.

End-of-Initiative Outcome 3 (3 ▶)
Pastoralists and farmers improve governance, management and/or restoration practices.

End-of-Initiative Outcome 4 (4 ▶)
Investors design and track investments worth US$25 million.

End-of-Initiative Outcome 5 (5 ▶)
Policies and/or investments strengthen resilient low-emission and socially-inclusive livestock production systems.

Action Area Outcomes

Resilient Agrifood Systems

1 ▶ 2 ▶ 3 ▶ **1** · Implementation partners (e.g. NARES, NGOs, private companies) actively support dissemination, uptake, and implementation of CGIAR innovations.

5 ▶ **2** · Research institutions, government analytical units, and scaling partners in the Global South have improved knowledge, skills, access to data, capacity to develop tools, innovations, and undertake research to support transformation of food, land and water systems contributing to livelihood, inclusion, nutrition, environmental and climate objectives.

1 ▶ 2 ▶ 3 ▶ **3** · 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.

1 ▶ 2 ▶ 3 ▶ 4 ▶ 5 ▶ **4** · 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.

1 ▶ **5** · CGIAR partners develop and scale innovations that contribute to the empowerment of women and other social groups in food, land, and water systems.

SPHERE OF **INTEREST**

Impact Areas

Nutrition, Health & Food Security

2 ▶ 3 ▶ 4 ▶ · End hunger for all and enable affordable health diets for the 3 billion people who do not currently have access to safe and nutritious food.

Poverty Reduction, Livelihoods & Jobs

2 ▶ 3 ▶ 4 ▶ · Reduce by at least half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.

Gender equality, Youth & Social Inclusion

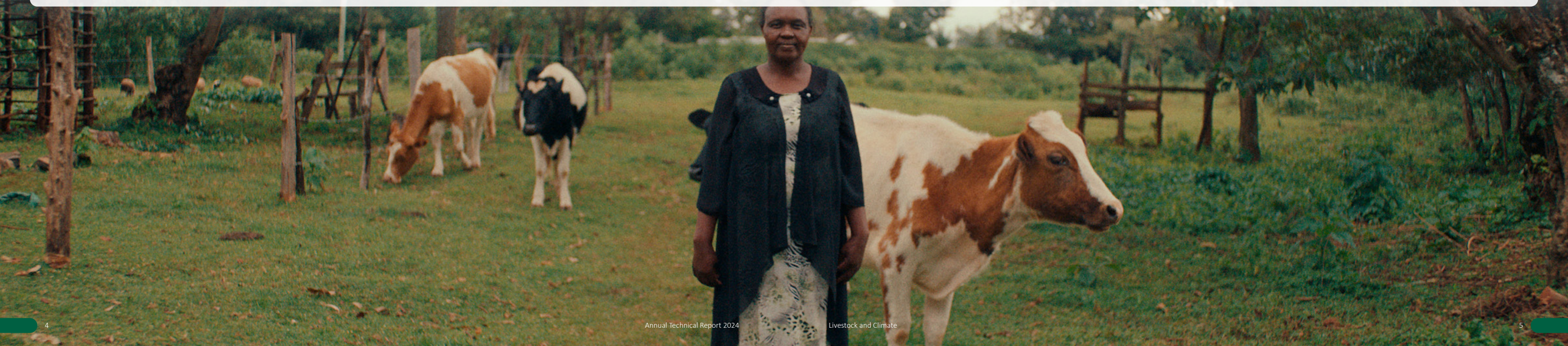
3 ▶ 4 ▶ 5 ▶ · Close the gender gap in rights to economic resources on, access to ownership of, and control over land and natural resources, for more than 500 million women who work in food, land, and water systems.

Climate Adaptation & Mitigation

1 ▶ 3 ▶ 4 ▶ 5 ▶ · Implement all National adaptation Plans (NAP) and Nationally Determined Contributions (NDC) to the Paris Agreement.

Environmental Health & Biodiversity

3 ▶ 4 ▶ · 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.



ILRI Research Associate Irene Nganga works with local pastoralist communities to undertake a particpatory rangeland resource assessment, Wajir, Kenya. Credit: Kristen Tam/ILRI

Summary of progress against the theory of change

The Livestock and Climate Initiative set out to identify solutions that adapt livestock systems to climate change while improving nutritional security, reducing poverty, and increasing social equity without accelerating greenhouse gas emissions or degrading land, water, and biodiversity.

By the end of 2024, the Livestock and Climate Initiative had significantly surpassed targets for four of its five End of Initiative outcomes, with 1,057,470 livestock producers having access to improved and bundled livestock CIS; 2,332,686 hectares of rangelands under improved planning, management, and governance; USD 901,000,000 climate finance for livestock systems mobilized; and policymakers from five countries using Livestock and Climate products to design or implement policies. Though only 15,424 of the anticipated 20,000 households adopted climate-smart practices as a direct result of the Initiative, thousands more were reached indirectly through booklet distributions, training events, and field days.

At its end, the Initiative reported 1,219 results, with more than half reported in 2024. Of these, 253 had a global focus, 324 targeted Kenya, 196 Colombia, 154 Ethiopia, and 114 Tunisia. The rest were generated in Senegal, Guatemala, El Salvador and Tanzania, with some spilling over to other countries. Results included 898 knowledge products, of which 127 were journal articles. In 2024, we strengthened our global influence by contributing to the 2024 Breakthrough Agenda report: Agriculture with insights into low-emission forages and methane inhibitors, and producing a Livestock and Climate flagship report synthesizing key scientific findings from the Initiative . Additionally, our presence at national and international platforms expanded through conferences, with 256 presentations showcasing our research and innovations.

The Initiative reported 48 capacity sharing events in 2024, taking the total between 2022 and 2024 to 97, which benefited 9,968 participants, of whom just under half were women. Most training with community members were short-term events on improving land management and field days for sharing pioneer positive-deviance farmer innovations.

Innovations were a main component of the Initiative. By the end of 2024, the Initiative had 36 innovations under development, with most at higher levels of readiness. Eleven Innovation Packages and Scaling Readiness workshops were undertaken on participatory rangeland management, flexible grazing, climate-credit risk scoring, pioneer positive deviance farmer-led scaling, GANSO standard, feed pellet production, index-based livestock insurance, and participatory land-use planning in pastoral areas.

In 2024, the Initiative reported 92 outcome results — a significant achievement. This made a total of 128 outcomes reported in total. Most of these were on innovation use (62 results) and policy change (mainly investments, 26), with 40 other outcomes (including 1 capacity sharing) results focusing on making data and science accessible, its uptake, and capacity building.

WP1 focused on co-developing innovations (practices and methodologies, tools and technologies) to support socially inclusive development and scaling climate-smart livestock practices. In terms of reach, the most successful scaling methodology was Pioneer Positive Deviance (P-PD), with a farmer-to-farmer network approach reaching 15,424 Kenyan livestock producers. As described in our Key Results Story, this was a highly effective approach—one that challenges our thinking on innovation development and sharing, putting farmers firmly in the driver's seat. This work demonstrated how local adaptative capacities and scaling can be institutionalized through a positive deviance approach, with intra-household relations influencing the role that men and women play and the benefits derived. Gender-responsive approaches were integrated to increase the potential for equitable learning, leadership roles, and a fairer distribution of benefits.

WP1 also supported the development of climate-smart technologies, making accessible nine datasets, scaled low-emission feeds and forages in Colombia, and expanded the innovation CLEANED to four new countries working with the Initiative on Sustainable Animal Productivity, with assessments undertaken in 34 countries.

WP2 drove transformative changes in livestock climate risk management, offering producers and organizations data-driven innovation solutions and real-world evidence-based impact supported by strategic public-private partnerships. By the end of 2024, approximately 1,057,480 livestock producers and 12 public-private organizations had received CIS through the Initiative. This was facilitated through innovations including Multidisciplinary Working Groups and digital advisories in Senegal, 51 Technical Agroclimatic Committees reaching 7,259 farmers in Guatemala, and a climate-credit risk scoring system that unlocked credit for around 1,500 livestock producers in Kenya and Guatemala. Also in Kenya, three organizations used the innovation KAZNET, benefiting more than 4,000 pastoralists and new investments in IBLI meant scaling in excess of 150,000 pastoralist households and more anticipated. A MELIA (monitoring, evaluation, learning, and impact assessment) study of IBLI showed the benefits and challenges of implementing insurance, highlighting the need for greater regulation and awareness raising with women.

WP2 demonstrated how tailored climate information improves decision-making and the effectiveness of inclusive, participatory approaches in increasing the adoption of climate services despite bottlenecks, including limited trust, digital literacy and institutional frameworks."

Are the bottlenecks limited trust, digital literacy and institutional frameworks", as implied? If so, change last words to something like "limited trust, digital illiteracy and inadequate institutional frameworks".

Responding to challenges of land loss, fragmentation, and degradation; intensifying risks; and insecurities, WP3 focused on livestock production systems and the land and resources on which these systems depend. Supported by highly successful innovations, including PRM, participatory land use planning for pastoral areas, an SRM toolkit, and opportunistic grazing, the Initiative was supporting 2,322,686 hectares of land (mainly rangelands) under improved management, governance, and restoration at the end of 2024 — more than quadrupling our outcome target.

WP3 developed and co-validated 14 tools, methodologies, and approaches to improve pastures, grazing, and rangelands. Pastoralists and other livestock keepers living on these lands are actively improving productivity, tenure security, management, and governance through 16 innovations. WP3 invested in improving equity and opportunities for gender response and transformation. This included community conversations and women's leadership forums to empower women to overcome barriers to leadership through natural resource management. The Initiative helped establish and mentor the African Youth Pastoralist Initiative.

Additionally, WP3 had considerable policy and investment success with five governments taking up innovations and donor projects totaling more than USD 405 million, providing opportunities for scaling PRM and the SRM Toolkit over millions of hectares. Building long-term relationships with government partners, NGOs and communities enabled parallel co-development, evidence-building and learning, and influencing for uptake.

WP4 responded to the critical challenge of increasing much-needed public- and private-sector investment in resilient and low-emission livestock systems by designing and tracking livestock climate mitigation and adaptation investments and leveraging financing through strategic partnerships. By the end of 2024, WP4 had supported 13 public- and private-sector investors in designing and tracking USD 901 million in finance — more than 32 times the End of Initiative outcome target and a 400-times leverage versus the Work Package pooled funding investment of approximately USD 2 million over the three years.

Comprehensive data analysis published in Nature Sustainability and made accessible through the Adaptation Atlas web application provided a robust evidence base for decision-making, shaping funding proposals such as the Tanzania Global Climate Fund of the International Union for the Conservation of Nature and initiatives funded by initiatives of the German Federal Ministry for Economic Cooperation and Development. Economic modelling on the cost of land restoration inaction is valuable for guiding investments.

Our partnership with Hacienda San Jose and &Green was ground-breaking, demonstrating benefits of livestock emission reduction strategies and productivity improvements, enhancing profitability, and attracting investment.

WP5 activities were designed to enhance the enabling policy environment for more resilient and low-emission livestock agrifood systems. Our research sought to answer how national governments can improve reporting of climate-related livestock targets, the most effective tools for addressing policy gaps, strategies for scaling climate-smart livestock practices, and how to integrate livestock into global climate platforms.

WP5 scientists worked closely with national governments and international platforms like the UNFCCC directly and through the African Group of Negotiators Experts Support, UNCBD, and UNCCD to share evidence on livestock interactions with climate change and combating desertification and positively influencing decision-making processes. Initiative tools and research shaped five national policies (EOIO5), including Kenya's Third National Climate Change Action Plan and Colombia's Sustainable Cattle Policy. WP5 also supported subnational governments in Baringo and Isiolo counties in Kenya to integrate rangeland management into county policy and integrated development plans.

Eight national governments improved reporting of climate targets using science and/or systems strengthened or established by the Initiative (WP Outcome 5.1) and six countries used Initiative-generated knowledge to design or implement livestock and climate policies (WP Outcome 5.2). Seven global platforms, conventions, and agencies made public statements on climate change influenced by the Initiative. This included FAO and World Bank global livestock agendas, the Climate and Clean Air Coalition (CCAC) and the Breakthrough Agenda 2023 and 2024 (WP Outcome 5.3). The Initiative also supported a new narrative on livestock and climate in Africa.

These significant achievements relied on long-term engagement strategies and partnerships, trust-building, persistence, and responding to demand.

The Initiative's work demonstrates the importance of understanding national context and needs. Each national government has unique needs for data, tools, methodologies, and processes to address gaps in designing livestock policies. Some tools, for example, CLEANED, meets needs across countries. Our influence on global platforms, conventions, and agendas, based on Initiative science, not only attracted greater attention to livestock in the global climate dialogue and action agenda but also raised climate change issues in global livestock agendas.

Gender and social inclusion were mainstreamed across all WPs by all Centers working collaboratively. Researchers generated evidence to address critical research gaps in understanding how intra-household and community-wide social dynamics impact and interact with adaptation capacities that bolster resilience by working with communities and partners in priority countries. Co-designed gender accommodative and transformative approaches supported socially inclusive adaptation and resilient communities and landscapes.

The Initiative's research and innovations provided evidence-backed solutions to enhance livestock adaptation while mitigating climate impacts. WP1 developed technologies and scaling methodologies demonstrating how livestock systems can adapt to climate change without accelerating greenhouse gas emissions or land degradation. Bundled climate and financial services in WP2 reduced climate and finance risks for livestock keepers. Participatory land-use planning, management, and governance in WP3 improved the resilience of pastoral systems, and innovations across the Initiative showed how we can mitigate climate impacts while benefiting local communities. Finally, Initiative science played an active role in unlocking climate finance, including for government-led livestock development programs (WP4), while co-developed tools and methodologies improved livestock climate mitigation and adaptation reporting, policy, and investments (WP5).

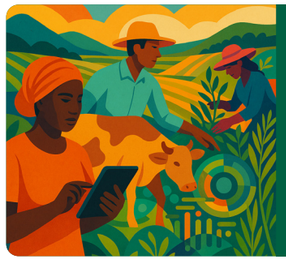
Progress against End of Initiative Outcomes

This infographic provides a concise summary of the Initiative's progress toward achieving its Theory of Change End-of-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

The co-development of technologies, tools, and methodologies build the capacity of 20,000 households to adopt and implement climate-smart practices appropriate to their production systems with equitable distribution of labor and benefits. Those 20,000 households are part of farmer learning and scaling networks in their respective countries.

WP1's work on P-PD enabled an estimated 15,424 livestock producer households in Nandi and Bomet counties, Kenya to access locally developed climate-smart practices through peer-to-peer trainings and field days. Farmers who participated in the P-PD process reported increased livestock production. Gender sensitive dissemination and scaling strategies ensured equitable participation and benefits from the P-PD process. Some 23,000 co-designed booklets in farmer-led practices for dairy feed management were distributed. The county extension systems are now adopting the P-PD approach. In Ethiopia, P-PD was piloted in the Amhara region, where 40 pioneer households invested in sheep fattening. Though security issues prevented full implementation, 13,752 co-designed booklets on feed practices for sheep fattening were distributed in 36 villages. Stakeholder workshops encouraged three universities to incorporate P-PD and it was taken up by a USD-340-million World Bank investment providing significant opportunity for scaling. The approach was tested in Colombia. While P-PD was the primary activity focused on WP1 scaling, other activities also contributed to farmers implementing climate-smart livestock practices. The innovation of pelletizing locally made livestock feed reached hundreds of farmers in Tunisia. Additionally, in Colombia an approach to scale success from one private ranch to another was established.



EOIO 2

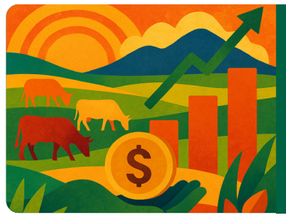
300,000 producers (50 percent women and youth) and 10 public or private organizations have access to improved and bundled climate-related information services to develop climate-risk management strategies developed through public-private partnerships.

By 2024, WP2 had significantly surpassed its EOIO with 1,057,470 livestock producers in Senegal, Guatemala, Kenya, and Ethiopia and 12 public and private organizations in Kenya, Senegal, Guatemala, Uganda, and Ethiopia having access to improved and bundled climate information and financial and market services through strategic public-private partnerships as a direct result of Livestock and Climate Initiative interventions. Of these, 449,193 were reported to be women livestock producers, with some data not being sex-differentiated. Scaling efforts meant that an additional 4,055,600 producers were reached, with 55,000 having access to services through Local Technical Agroclimatic Committees in Guatemala and the scaling efforts of the Ministry of Agriculture and Meteorological Service, Guatemala and the scaling of the climate-credit scoring efforts in Uganda reaching 600 farmers. However, though there was some reporting of access to services differentiated by men and women, due to several limitations the Initiative was unable to quantify with certainty whether service uptake among women and youth had increased by the targeted 25–50 percent.

EOIO 3

Pastoralists and farmers improve governance, management, and/or restoration practices across 400,000 hectares of land, with at least 30 percent active participation of women in decision-making processes. This will be supported through capacity building and an improved policy environment through working with government and other stakeholders.

By the end of 2024, the Livestock and Climate Initiative in collaboration with bilaterally funded projects improved governance, management, and restoration across 2,332,686 hectares of land (including 2,319,237 under participatory or sustainable rangeland planning, management, and governance and 3,449 under land-use planning only) within broader landscapes of 2,595,448 hectares in Tanzania, Ethiopia, Kenya, and Tunisia. The intensity of this engagement varied both across the different sites from intense in most to minimal in some, as well as within sites, with some parts being used intensely by the community or for rangeland restoration trials and others receiving no if any direct contact due to the extensive size of some of the rangeland management units. Additionally, 8,800 hectares have been established as a buffer zone for conservation purposes in the Hacienda San Jose, Colombia. Tools and approaches for improving gender and social inclusion in decision-making processes were developed but it was not possible to reach 30 percent inclusion of women and youth in all decision-making bodies. WP3 in collaboration with WP4 influenced USD 405 million of investment in pastoral areas.



EOIO 4

Public- and private-sector investors design and track USD 25 million of climate finance for livestock systems as a result of Livestock and Climate Initiative's innovations and research.

By 2024, WP4 successfully supported public- and private-sector investors in designing and tracking USD 901 million in finance for climate-resilient and low-emission livestock systems. This was achieved through strategic research, investment prioritization, and targeted engagement with key financial stakeholders. This represents more than 32x the End of Initiative target and a 400x leverage versus the WP's pooled funding investment of approximately USD 2 million over the three years. The investors were mostly public investors and donors, including the Green Climate Fund, European Union, United States Agency for International Development, Global Environment Facility, and World Bank among others, as well as one private sector — &Green or Sail Ventures.

EOIO 5

International agencies and national policymakers use Livestock and Climate Initiative products to shape at least four policies or investments to strengthen adaptation of socially inclusive livestock production systems to climate change and/or reduction of livestock emissions.

By 2024, five country policymakers and two international conventions had used Livestock and Climate products to shape policies that strengthen adaptation of socially inclusive livestock production systems. These included the following.

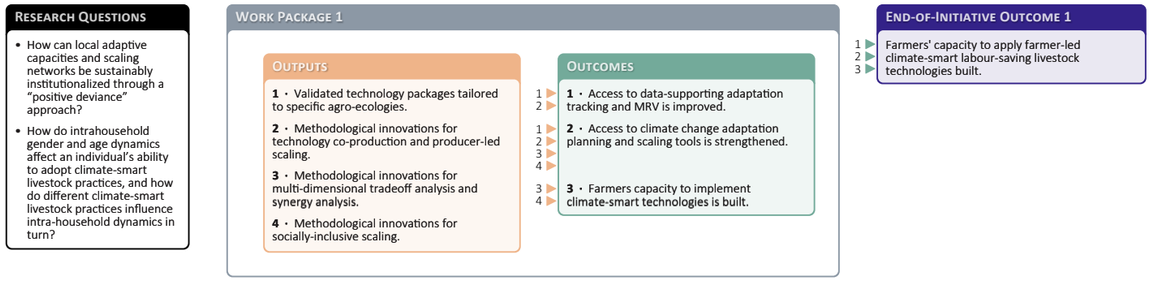
- The Government of Kenya in development of its policies on livestock and climate and the 2024 Biennial Transparency Report to the UNFCCC and the National Climate Change Action Plan III, and, additionally, development of Baringo's County Integrated Development Plan and Isiolo's Rangeland Management Bill Regulation.
- The Government of Colombia in development of its Policy Guidelines for Sustainable Cattle and in fulfilling its National Determined Contributions and Nationally Appropriate Mitigation Actions (NAMA).
- The Government of Tunisia in development of its Strategy for Sustainable Development of Forests and Pastures and in securing investments.
- The Government of Ethiopia in its national Pastoral Development Policy and Strategy and in securing investments.
- The Government of Guatemala in development of its NAMA.

Additionally, the Initiative shaped the policies of:

- UNCCD policies in development of its Rangelands Initiative and supporting sessions at the Conference of the Parties (COP16) to the UNCCD in 2024.
- UNFCCC in the Adaptation Gap reports of 2023 and 2024, capacity building of the African Group of Negotiators Expert Support, the 58th session of the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of the UNFCCC, the Intergovernmental Panel on Climate Change Sixth Assessment, and supporting sessions at the UN Climate Change Conferences in 2022 (COP27), 2023 (COP28), and 2024 (COP29).

Section 3: **Work Package progress**

WP1: Farmers' capacity to apply farmer-led climate-smart labor-saving livestock technologies buil



Work Package 1 progress against the theory of change

WP1 drove socially inclusive innovations and scaling strategies across Colombia, Ethiopia, Tunisia, and Kenya, advancing climate-smart livestock practices through co-developed methodologies, tools, and technologies. In Kenya, it enabled 39 pioneer households to disseminate livestock management innovations, reaching 15,424 people, and distributed 23,000 co-designed booklets on farmer-led feed management. P-PD has now been integrated into Kenya's Nandi and Bomet county extension systems. In Ethiopia, P-PD was piloted in the Amhara Region, where 40 pioneer households invested in sheep fattening. Though security issues prevented full implementation, 13,752 co-designed booklets on sheep fattening feed practices were distributed in 36 villages. The World Bank and the Government of Ethiopia included P-PD in the Lowlands Livelihood Resilience Programme. In Colombia, with NGO Procasur, 7 learning pathways were established with 15 pioneers or "talentos rurales," connecting with 86 farmers. An online platform now hosts 15 pioneer livestock farmers showcasing their locally developed climate-smart solutions.

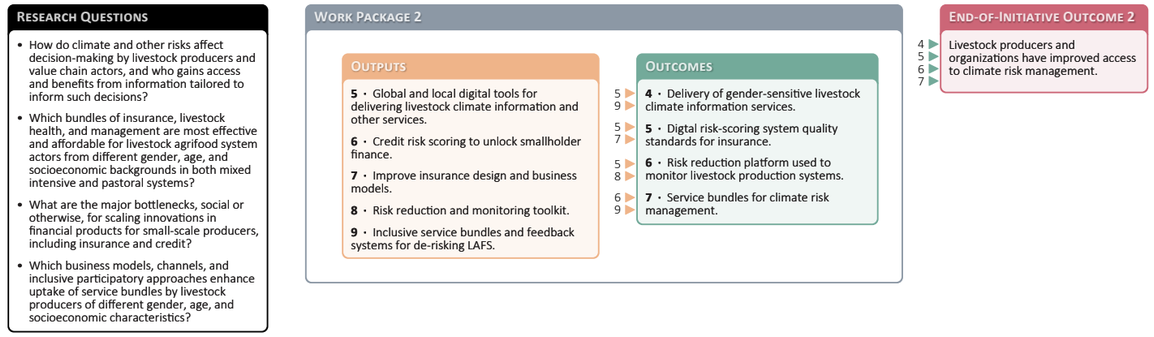
To scale gender equity, the Initiative partnered with the GENDER Impact Platform to develop a household approach to support socially inclusive climate adaptation. The approach strengthened women's capacities to learn and lead the scaling of adaptation practices through farmer-to-farmer field days of the adaptation pioneer households. This approach was strengthened by introducing women champions for scaling and strengthening women's leadership and peer learning in collectives.

Other scaling approaches included pelletizing 40 tonnes of locally made livestock feed, reaching at least 1,200 farmers in Tunisia, and an innovative private landowner conservation buffer zone scheme in Colombia now being taken up by neighboring countries.

Additionally, WP1 made accessible nine data sets on climate-smart livestock practices, feeds and fodder, ecological structures, life-cycle analysis, soils, land use and land cover, grass species, manure management, and enteric emissions. To analyze on-farm climate-smart environmental and socioeconomic tradeoffs and synergies, the Initiative helped strengthen CLEANED along livestock value chains. CLEANED has now supported environmental impact assessments in 34 countries. The Initiative enabled its use in four new countries — Ecuador, Peru, Colombia, and Tunisia — with the Office de l'Elevage et du Paturage and GIZ. A survey confirmed user benefits.

In total, the WP supported nine innovations, which included a cluster of ground-breaking low-emission forages applied in situ, including in a carbon project in the Colombian Orinoquia, and the development of performance evaluation digital tools.

WP2: Livestock producers and organizations have improved access to climate risk management



Work Package 2 progress against the theory of change

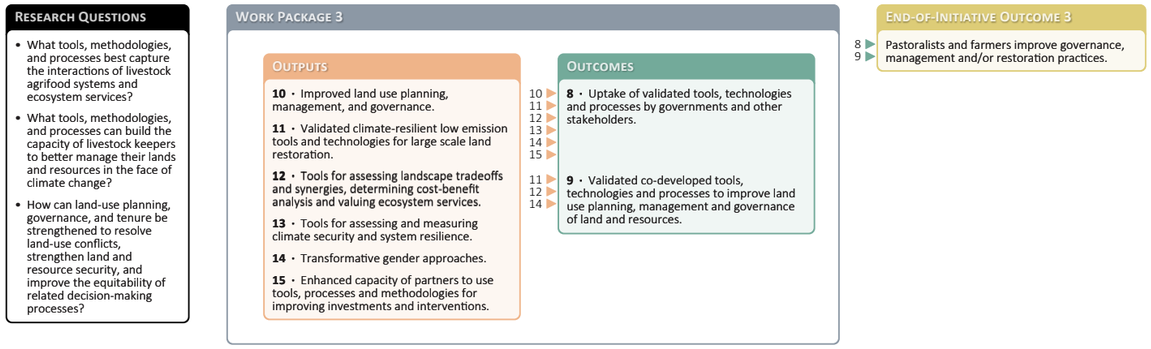
WP2 addressed the critical challenges of livestock system vulnerability to climate hazards and extreme weather events. By the end of 2024, we had helped five organizations in Guatemala, Kenya, and Senegal deliver gender-sensitive livestock CIS through partnerships with meteorological agencies and the private sector — the National Meteorological Society and Jokalante in Senegal, enhancing decision-making for 895,025 pastoralists (50 percent women), and the Agricultural Ministry and Meteorological Service and local Technical Agroclimatic Committees in Guatemala, engaging 34 organizations to co-produce and disseminate livestock CIS to 7,259 farmers, reaching 55,000 rural producers. In Kenya, we worked with the Kenya Meteorological Department in nine counties, blending scientific forecasts with community-specific insights and working with the CGIAR Initiative on Climate Resilience and its project on Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA). Throughout the three years, our partnership with the Mediae company and its agricultural TV show "Shamba Shape Up" and extension platform "iShamba" helped us reach around 4 million farmers per week with proven behavior changes as well as 1.2 million users on social media (Shamba Shape Up report).

WP2 successfully helped four financial service providers in Guatemala, Kenya, and Uganda to integrate insurance-focused digital climate-risk scoring systems into lending processes. These initiatives benefited over 600 smallholders in Uganda and 558 dairy producers in Kenya, who received loans totaling USD 139,691 with an additional USD 173,114 under review. In Guatemala, 17 loans were granted as a result, with 88 percent supporting livestock genetic improvement and 12 percent funding multispecies farming practices, with another 306 anticipated. In Guatemala, the co-developed platform Yapu Solutions reached 100,000 farmers with 105,000 loans.

Complementing these interventions, WP2 enabled four public institutions in Guatemala and Kenya to adopt reduction platforms to monitor livestock production systems. The Kenya Agricultural Observatory Platform and the Kenya Integrated Agricultural Management Information System integrated the KAZNET digital platform, providing actionable intelligence on markets and rangelands directly to 1,010 pastoralists and indirectly to another 2,979 pastoralists, significantly improving their climate risk decision-making capacity. In Guatemala, Ministerio de Agricultura, Ganadería y Alimentación and Instituto Nacional de Sismología, Vulcanología, Meteorología e Hidrología distributed CIS to livestock producers through 51 Technical Agroclimatic Committees, reaching more than 20,000 rural Guatemalans.

The Initiative continued to support IBLI and 2024 saw the Oromia Insurance Company in Ethiopia significantly scaling IBLI, reaching 150,000 pastoralist households and its inclusion in a USD-327.5-million investment by the World Bank to scale IBLI to 250,000 pastoralists regionally.

WP3: Pastoralists and farmers improve governance, management and/or restoration practices



Work Package 3 progress against the theory of change

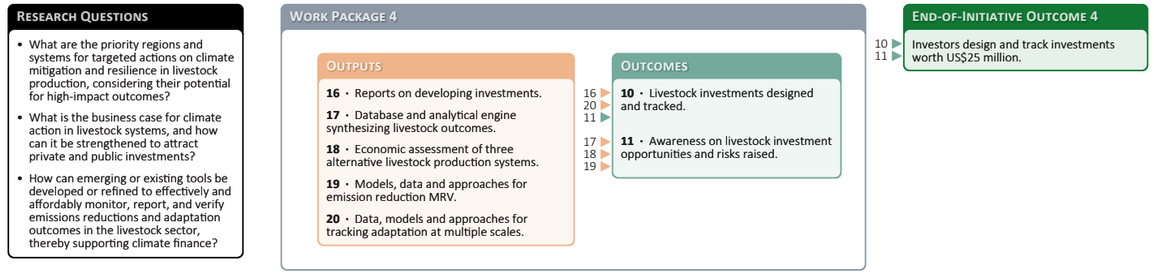
WP3 focused on livestock production systems, particularly pastoralism, agropastoralism, and silvopastoralism and the land and resources on which these systems depend. Our success stemmed from strong partnerships with governments and other stakeholders and working closely with bilaterally funded projects, including AICCRA and One Health for Humans, Environment, Animals and Livelihoods, which shared implementation costs. By the end of 2024, the Livestock and Climate Initiative saw improved governance, management, and restoration across 2,322,686 hectares of land, including 2,319,237 under rangeland planning, governance, and management and 3,449 under land-use planning only, within a broader landscape of 2,595,448 hectares. The intensity of this engagement varied across sites, with some used intensely by the community or for rangeland restoration trials and others receiving little, if any, direct contact due to the extensive size of some of the rangeland management units. Cross-Center sharing of tools and approaches supported our success.

Women participated less than 30 percent in most decision-making bodies despite interventions to support their engagement, including targeting women in capacity-building events. More than 68 such events for 2,208 men and 3,295 women were undertaken in WP3 from 2022 to 2024. Approaches such as community conversations were developed to improve gender equity and social inclusion.

WP3 developed 14 tools, methodologies, and approaches now used by pastoralists and other livestock keepers and helped develop 16 innovations. For a complete account of these, see our WP3 Fact Sheet.

The WP had considerable success with governments and other stakeholders taking up innovations. For example, (i) the Government of Tunisia took up feed pellet technology, opportunistic grazing, and the Sustainable Rangeland Management Toolkit; (ii) the Government of Ethiopia implemented PRM and Woreda Participatory Land-Use Planning; (iii) the Government of Colombia took up Initiative-developed low-emission forages; (iv) the Government of Tanzania took up Joint Village Land-Use Planning in national guidelines and gazetted grazing land secured through Initiative-led issuing of Certificates of Customary Rights of Occupancy; and (v) the County Government of Baringo, Kenya, took up PRM in its County Integrated Development Plan. The IGAD (Intergovernmental Authority on Development) Center for Pastoral Areas and Livestock Development produced a manual on PRM for scaling across the IGAD region. Between 2022 and 2024, projects funded by the European Union, Swiss Development Cooperation, and World Bank included PRM as an intervention and the European Union included the SRM Toolkit in a government project in Tunisia. This enabled scaling PRM and our other innovations across millions of hectares of Africa's drylands, with the potential for more in the coming years.

WP4: Investors design and track investments worth USD 25 million



Work Package 4 progress against the theory of change

WP4 operated globally, emphasizing regions and countries where the Initiative was active, including sub-Saharan Africa and Latin America. The Initiative engaged with investors to ensure financial flows into livestock system sustainability and resilience. By the end of 2024, WP4, working with other WPs, successfully supported public- and private-sector investors in designing and tracking USD 901 million in finance for climate-resilient and low-emission livestock systems involving 13 investors.

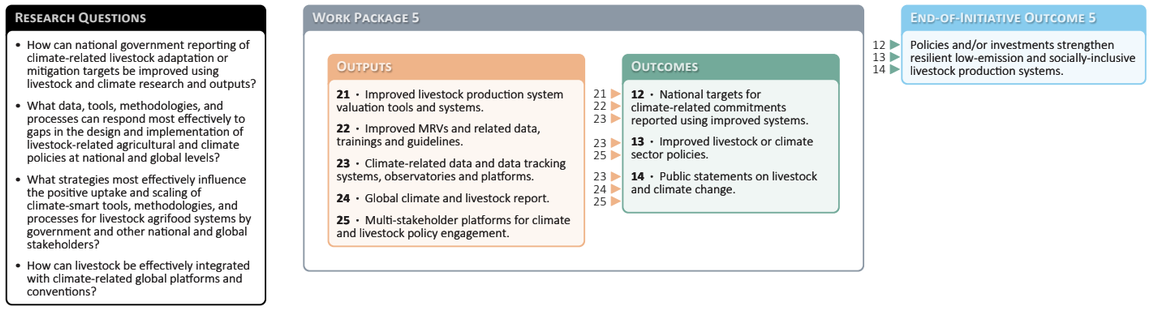
This was achieved through providing technical and analytical support to Accredited Entities for the Green Climate Fund, mobilizing livestock investment funds, and strengthening investment frameworks to align adaptation and mitigation monitoring with investor decision-making. Strategic research provided evidence and tools to meet investor needs, together with investment prioritization and targeted engagement with financial stakeholders, including major climate and development aid programs, particularly those led by the World Bank (over USD 700 million investment influenced), the European Union (USD 47.5 million) and Global Climate Funds (USD 34 million). WP4 worked with private-sector investor &Green in a long-term partnership with Hacienda San Jose. These investors took up data or tools produced by WP4 and other Livestock and Climate Initiative innovations.

WP4 raised awareness about the scope of sustainable livestock investment opportunities, potential risks, and how to measure livestock investment progress under climate change with scores of public and private investors over the three years. These engagements varied from direct technical support in investment design to awareness-raising activities shaping investor decision-making on climate-smart livestock financing. Of note was engagement with the World Bank, the International Finance Corporation, and the Bezos Fund, all acknowledging the Initiative's contributions. The development of innovative incentive tools such as the Colombian sustainable beef standard GANSO was taken up by supermarket chains.

Gender and youth considerations were integrated into investment opportunities. For example, in creating adaptation tracking frameworks, WP4 advocated for use of gender-disaggregated data and for incorporating factors affecting gender dynamics into adaptation metrics and methodology, for example, access to resources, decision-making power, and labor burdens.

Our work addressed major investment tracking challenges, including the feasibility of monitoring, reporting, and verification (MRV) systems and methods for portfolio-level adaptation tracking across multiple investments. By testing practical metrics, such as milk yields as a proxy for greenhouse gas intensity, we evaluated the potential for simple, scalable approaches. We laid the groundwork for portfolio adaptation tracking, demonstrating how aggregated indicators can enhance climate adaptation assessment across multiple portfolio investments.

WP5: Policies and/or investments strengthen resilient low-emission and socially inclusive livestock production systems



Work Package 5 progress against the theory of change

WP5 engaged with governments and other partners to better report climate targets and integrate sustainable livestock practices into agricultural policies using Initiative science and systems. By the end of 2024, WP5 scientists had engaged at subnational, national, and international levels in multiple countries and with global platforms to share Initiative science and products. At the national level, Initiative scientists engaged with the governments of Colombia, Ethiopia, Guatemala, Kenya, and Tunisia to share evidence on emissions science, greenhouse gas (GHG) indicators, abatement curves, and toolkits to develop policies and strategies.

WP5 researchers worked with eight governments to improve setting and reporting on climate-related livestock adaptation and mitigation targets using tools like Tracking Adaptation in Livestock Systems and CLEANED. Additionally, governments in six countries used Initiative-generated knowledge to design or implement livestock and climate policies, including policy guidelines for sustainable cattle production and low-emission forages in Colombia, land-use planning in Tanzania, pastoral development policy and strategy in Ethiopia, and a national climate change action plan in Kenya.

Though it is difficult to demonstrate attribution of global platforms' public statements on climate change to Initiative science, given our consistent engagement with seven global platforms, conventions, and agencies, we are confident that we have made a substantial contribution. This was manifested through the uptake of the Initiative's science in key publications such as the UN Adaptation Gap report, Global Land Outlook, and the Breakthrough Agenda; a strong and coordinated voice at UNFCCC, UNCBD, and UNCCD COPs; the input of data to global initiatives such as FAO's GLEAM; presentations made at conferences such as CCAC's annual conference; and capacity building of stakeholders such as World Bank staff in livestock and climate.

WP5 also reported several innovations to improve climate security and livestock systems data. These included the Climate Security Proofing Guidelines for Livestock Production Systems and a Global Rangelands Data Platform.

The Initiative emphasized the importance of working with local stakeholders, ensuring that tools and research aligned with national priorities. In countries like Colombia, the focus was on developing low-emission livestock strategies and sustainable beef, while in sub-Saharan Africa, the emphasis was more on adaptation. The success of WP5 demonstrates that building relationships with government experts, understanding local needs, and engaging at strategic moments in policy processes are essential for influencing positive policy change.

Work Package progress rating summary

WORK PACKAGE	PROGRESS RATING & RATIONALE
1	Delayed WP1's work on Pioneer Positive Deviance (P-PD) enabled an estimated 15,424 livestock producer households in Kenya to access locally developed climate-smart practices. While the anticipated 20,000 target was not reached directly, an additional 23,000 co-designed booklets on farmer-led practices in Kenya and 13,752 in Ethiopia were disseminated, reaching significantly more households.
2	On track WP2 significantly surpassed its EOIO with 1,057,470 livestock producers in Senegal, Guatemala, Kenya, and Ethiopia and 12 public and private organizations in Kenya, Senegal, Guatemala, Uganda, and Ethiopia having access to improved and bundled climate information, financial, and market services through strategic public-private partnerships.
3	On track WP3 improved governance, management, and restoration across 2,332,686 hectares of land (including 2,319,237 under participatory or sustainable rangeland planning, management, and governance and 3,449 under land-use planning only) within broader landscapes of 2,595,448 hectares in Tanzania, Ethiopia, Kenya, and Tunisia.
4	On track WP4 successfully supported public- and private-sector investors in designing and tracking US$ 901 million in finance for climate resilient and low-emission livestock systems.
5	On track By 2024, five country policymakers and two international conventions had used Livestock and Climate products to shape policies that strengthen adaptation of socially inclusive livestock production systems.

Definitions

On track

- 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.

Delayed

- 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.

Off track

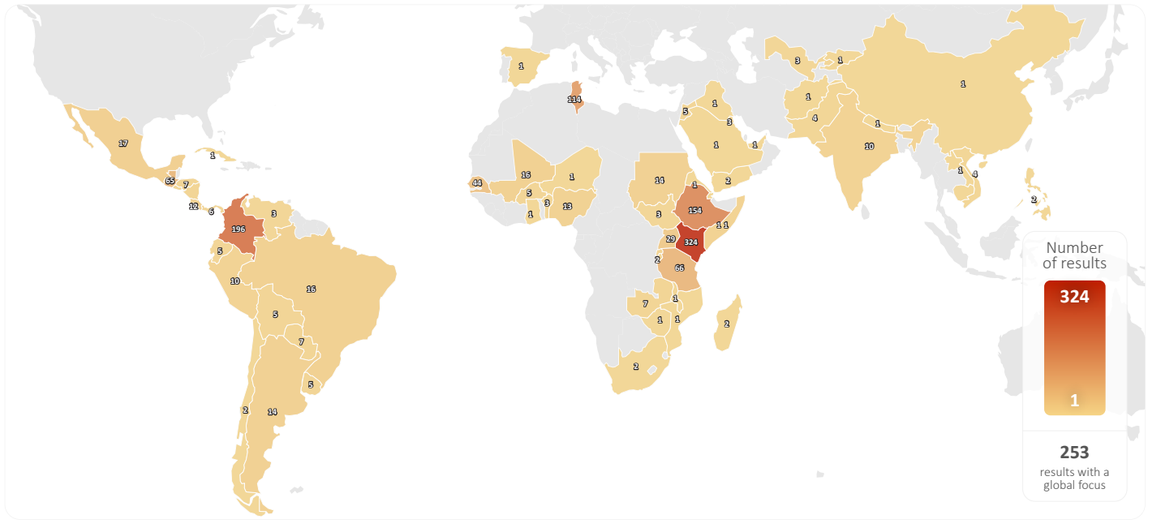
- Progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas.
- Deviations/issues/delays/risks do jeopardize success of Work Package.

Section 4: **Quantitative overview of key results**

This section provides an overview of results reported and contributed to, by the CGIAR Initiative on Livestock and Climate from 2022 to 2024. These results align with the CGIAR Results Framework and Livestock and Climate's theory of change. Further information on these results is available through the CGIAR Results Dashboard.

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.

Distribution of 2022–-2024 results across priority countries



Our 1,219 results concentrate in priority countries Kenya, Colombia, Ethiopia and Tunisia with fewer results in Guatemala and Senegal. 253 results had a global focus.

Overview of results by category

Outputs

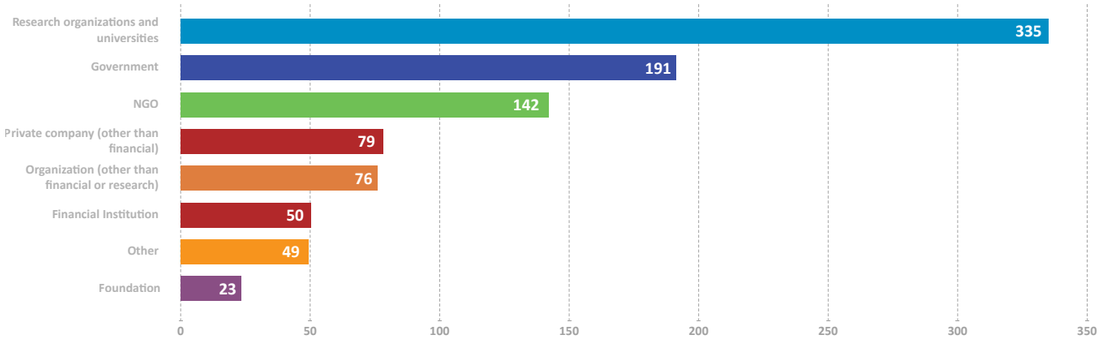
- Knowledge products 898
- Capacity sharing for development 97
- Innovation development 54
- Other outputs 42

Outcomes

- Innovation use 62
- Other outcomes 39
- Policy change 26
- Capacity change 1

By the end of the Initiative, 1,291 results had been reported, made up of 1,091 outputs and 128 outcomes.

Type of partners contributing to results



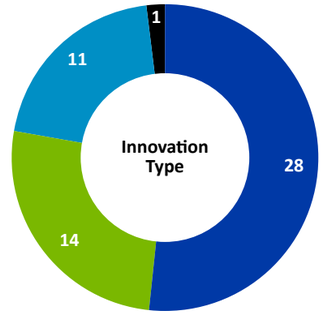
Governments at national and subnational levels were key partners for the Initiative across the WPs.

Number of innovations and their readiness levels

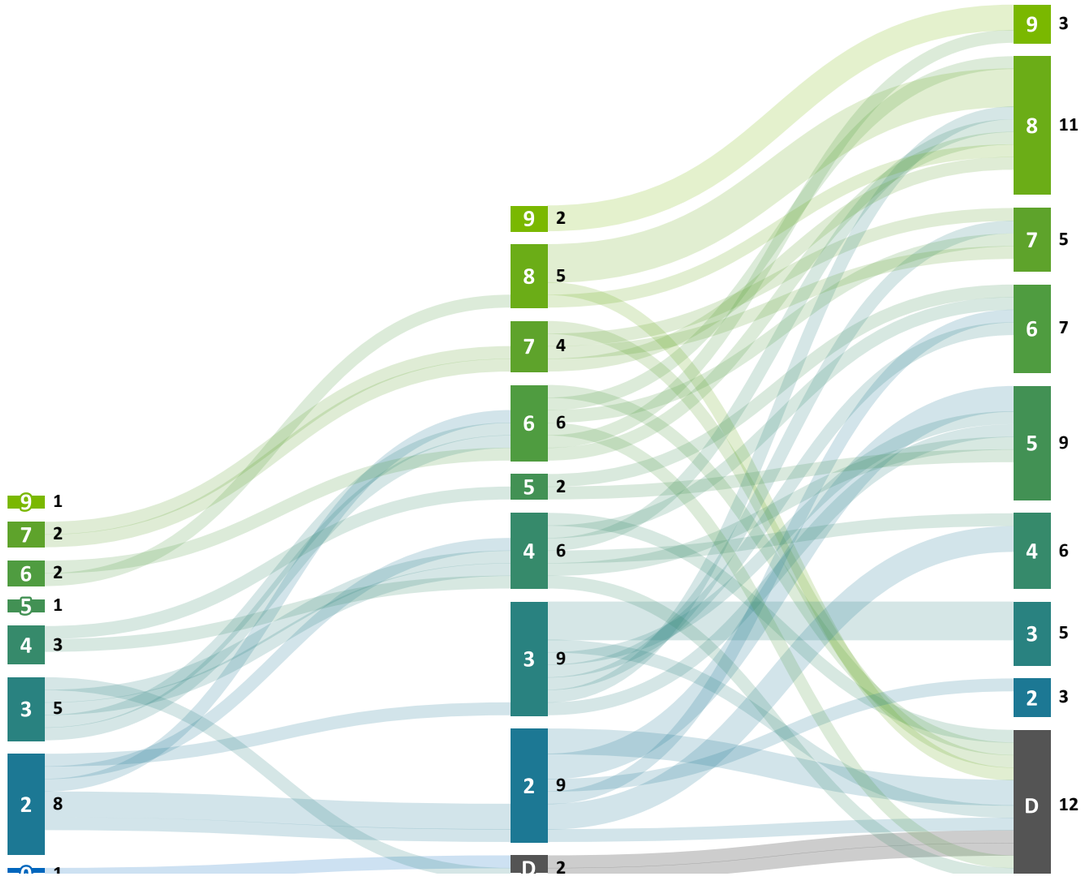
Pipeline overview
# of innovations

9	**Proven Innovation** The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions	10
8	**Uncontrolled Testing** The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions	9
7	**Prototype** The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions	12
6	**Semi-Controlled Testing** The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions	3
5	**Model/Early Prototype** The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions	5
4	**Controlled Testing** The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions	4
3	**Proof of Concept** The innovation's key concepts have been validated for their ability to achieve a specific impact	5
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	1
0	**Idea** The innovation is at idea stage	2

Innovations by typology

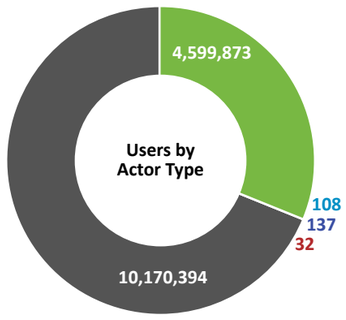


- **TECHNOLOGICAL INNOVATION** Innovations of technical/material nature, including varieties/breeds, crop and livestock management practices, machines, processing technologies, big data, and information systems.
- **POLICY/ORGANIZATIONAL/INSTITUTIONAL INNOVATION** Innovations that create enabling conditions, including policy, legal and regulatory frameworks; business models; finance mechanisms; partnership models; public/private delivery strategies.
- **CAPACITY DEVELOPMENT INNOVATION** Innovations that strengthen capacity, including farmer, extension or investor decision-support services; accelerator/ incubator programs; manuals, training programs and curricula; online courses.
- **OTHER INNOVATION** Unknown or the type does not work for the innovation.

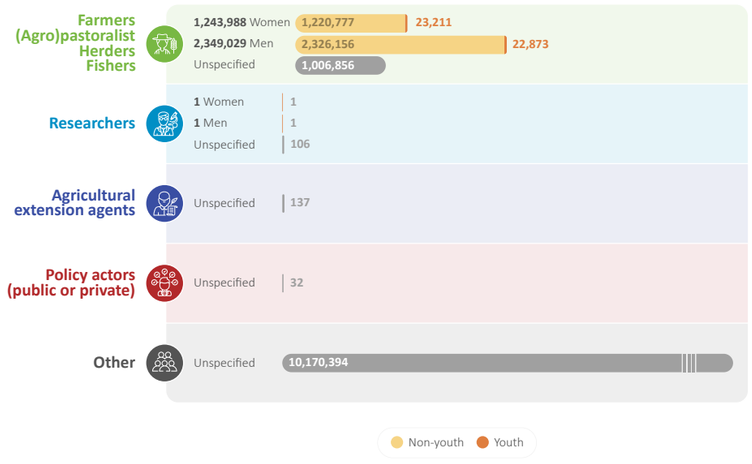


Between 2022 and 2024 the Initiative developed (including co-developed) 54 innovations, most at higher levels of readiness, with 10 proven innovations, 9 under uncontrolled testing, and 12 prototypes validated under semi-controlled conditions.

52 percent of our 52 innovations were technological, 26 percent were in capacity development, and 20 percent were in policy or organizational development.

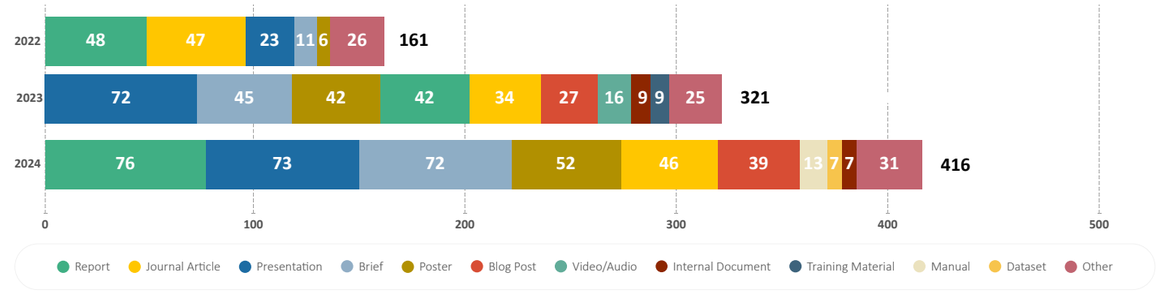


Innovations users by actor type



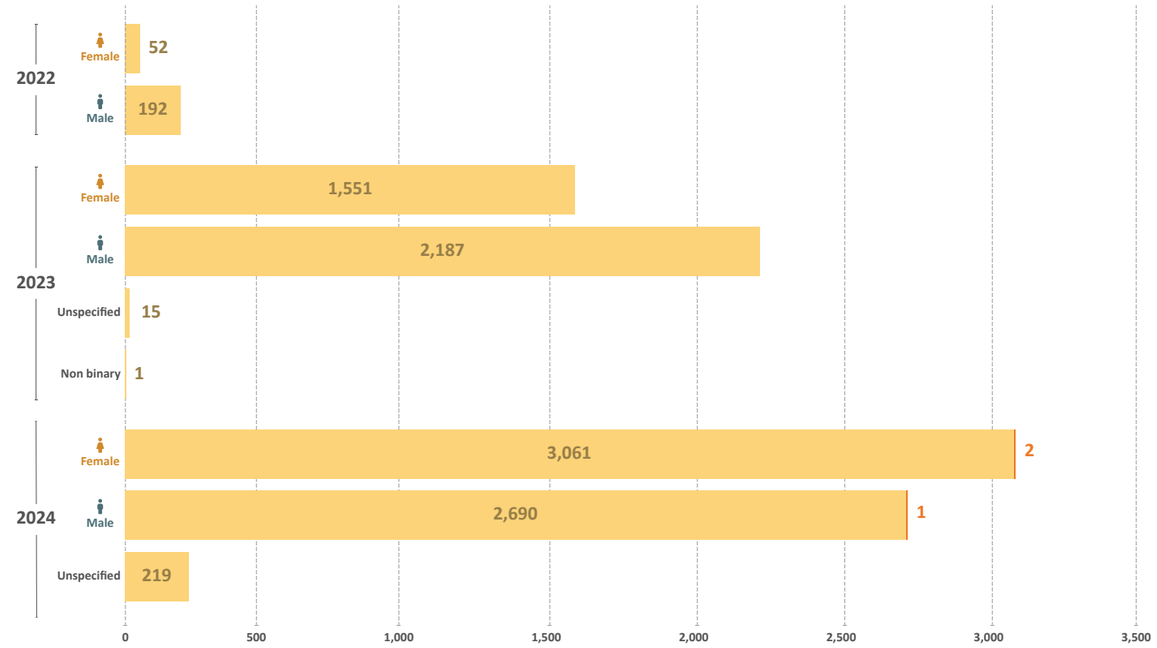
Livestock and Climate innovations have been used by 4,599,873 livestock producers, including pastoralists, and by 108 researchers, 137 extension agents, 32 policy actors, and 10,170,394 others, such as NGO staff.

Knowledge products by typology



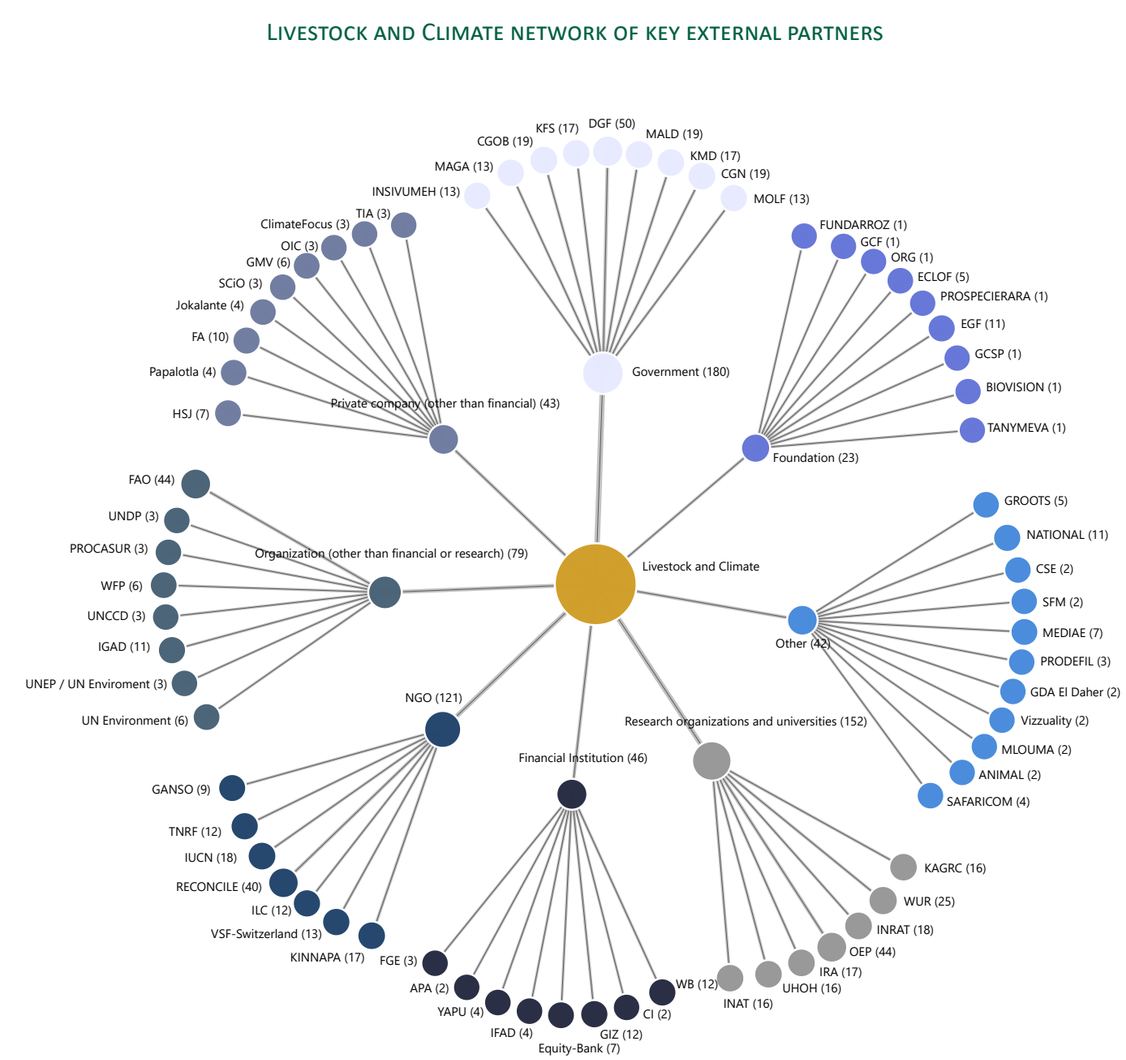
The Initiative reported 898 knowledge products, with almost half of these produced in 2024. Most of the knowledge products were reports, presentations, and briefs. The Initiative produced 127 journal articles.

Number of individuals trained by the initiative



The Initiative reported 97 capacity sharing events benefiting 9,968 participants, of which just under half were women.

Section 5: **Partnerships**



The diagram maps the external partners of the Livestock and Climate Initiative, organized by partner type. The numbers in brackets represent the number of results each partner has contributed to, reflecting the scale and diversity of collaborations. To allow for a clearer view, a maximum threshold of four partners was applied for each typology. The list of partner acronyms is available here.

Partnerships and Livestock and Climate's impact pathways

The success of the Livestock and Climate Initiative stemmed from its strategic partnerships with 68 organizations to co-develop solutions and scale innovations. These included international agencies such as FAO, NGOs such as RECONCILE in Kenya, private-sector actors for CIS, and research institutions and universities such as Wageningen University.

The results of these partnerships were seen across our 92 WP outcomes and 180 co-reported results, reflecting robust engagement with national governments (ministries and NARES) to influence policy, investments, and uptake of climate-smart livestock innovations.

For example, in Colombia, the Initiative worked with the government's Institute of Hydrology, Meteorology, and Environmental Studies to co-develop an improved MRV system for the agricultural sector's national GHG inventory using a simulation model called RUMINANT that predicts livestock productivity and GHG emissions. Co-authored articles were published. CIAT also developed strategic alliances with ministries and institutions like the Centre for Research on Sustainable Agriculture (Colombia) and the Climate and Clean Air Coalition to support ground-breaking research on low-emission forages, which the government is now incorporating into its climate action plans. As Felipe Torres, General Coordinator of Colombia's National GHG Inventory 2023–2024 said: ***"The collaboration between IDEAM and CIAT has been continuous and invaluable. The exchange of databases, methodologies and CIAT's solid scientific expertise have been instrumental in enhancing the robustness and reducing uncertainties in Colombia's National GHG Inventory."***

A similar two-pronged approach was taken in Kenya, with scientists at the Mazingira Center working hand-in-hand with the Kenya State Department of Livestock Development (SDLD) to improve livestock productivity and reduce methane emissions, ensuring policy uptake of research outputs. Scientists worked with the government to improve protocols for estimating emission factors from cattle and, later, small ruminants.

With the government as a co-author on these publications, their uptake is all but guaranteed. As Bernard Kimoro, head of SDLD's Climate Change and Livestock Sustainability section, confirms: Using these ILRI protocols, the Government of Kenya has been able to generate livestock activity data to estimate national livestock GHG emissions . . . . Kenya is now among the few countries in Africa that have transitioned to Tier 2 reporting. . . ."

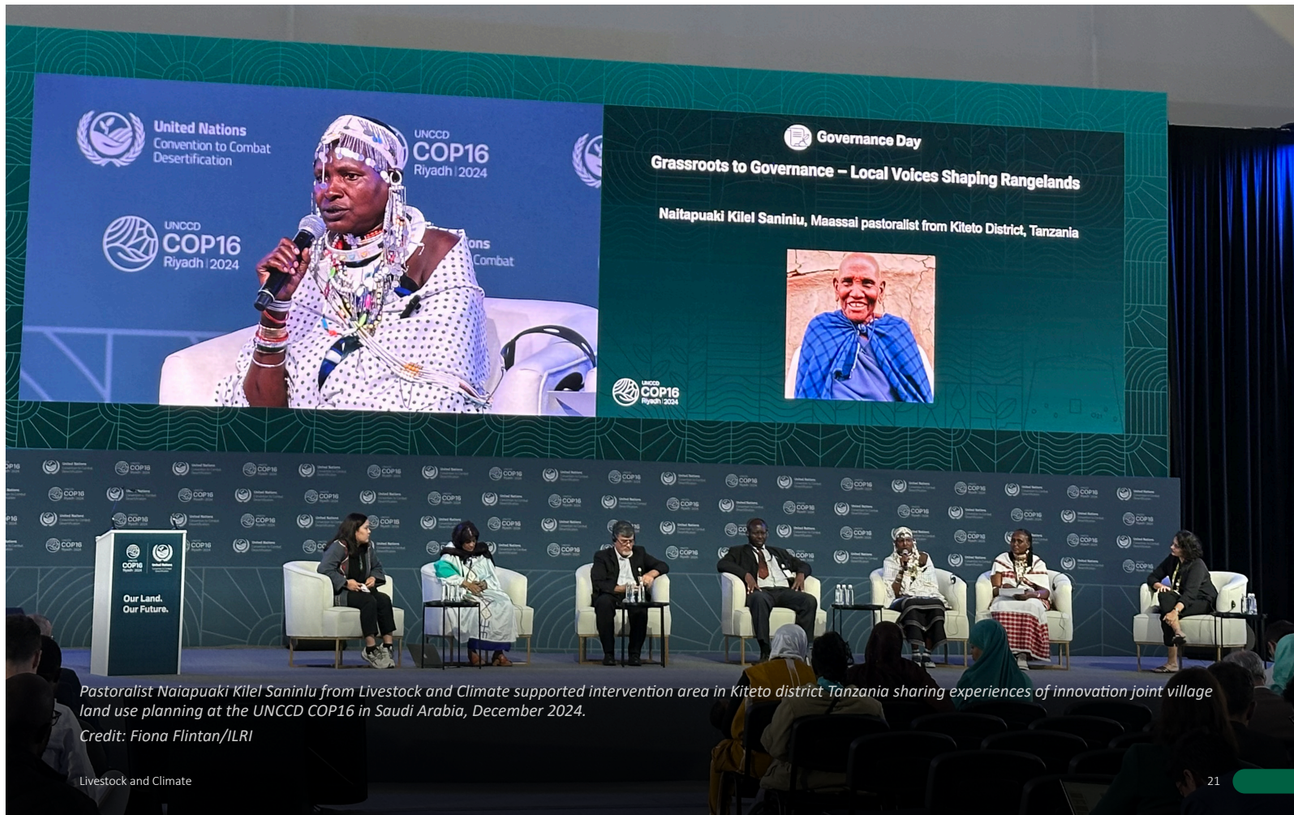
The SDLD–Mazingira partnership also bridged the science and policy divide as explained in this video. Mazingira's work on environmental and food security implications of livestock abortions and calf mortality showed that livestock health improvements increase production while reducing GHG emissions, which the SDLD will use to inform a forthcoming regional dairy mitigation and adaptation intervention. Supporting government staff to attend UNFCCC COP29 and other events enabled them to influence climate negotiations, share Kenya's experiences (including this Initiative's science) with a global audience, and garner further support.

In Tunisia, parallel outcome pathways earned high rewards by addressing rangeland degradation while supporting policy change. ICARDA tested and validated "opportunistic grazing", which builds on customary practices, while aligning with government priorities. In-depth scientific studies resulted in research and policy briefs, academic papers, meetings, and workshops co-produced with the Office de Office del'Elevage et des Pâturages and Direction Générale des Forêts, Ministère de l'Agriculture, improving over 180,000 hectares of rangelands.

Simultaneously, ICARDA worked with the International Union for Conservation of Nature to develop an SRM Toolkit and, with the DGF, applied this to 5,000 hectares of land as a "silvopastoral living lab" now visited by students and professionals and presented at the conference on Sustainable Livestock Transformation. A 2024 MELIA study captured its full impact. Ben Haha Med Naoufel, director general of Forests at DGF, expressed his agency's appreciation, saying, ***"Through the SRM Toolkit, ICARDA has promoted sustainable practices that benefit both the environment and local livelihoods. This aligns with our mission to improve land use, increase climate resilience, and secure long-term food and pasture stability."*** Similar other outcome pathway approaches were successfully taken by the Initiative:

- in Guatemala, with the establishment of agroclimatic technical committees
- in Kenya, Ethiopia, and Tanzania, with participatory rangeland management
- in Colombia, with private-sector sustainable beef initiatives working with the regional roundtable, financial, and climate information services in multiple countries
- in Tanzania, with joint village land-use planning
- in Ethiopia and Kenya, with scaling CLEANED and development of climate adaptation tracking
- In Tunisia, with the development and scaling of feed pellet technology

Working closely with government agencies resulted in greater ownership over the demand-driven knowledge and innovations generated, with a greater chance of long-term investment and uptake.

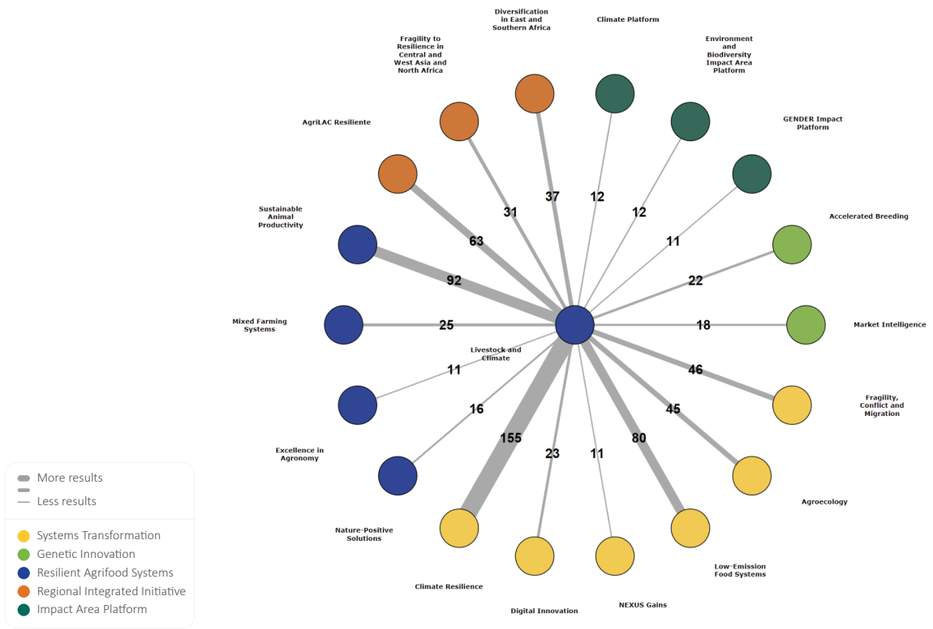


Pastoralist Naiapuaki Kilel Saninlu from Livestock and Climate supported intervention area in Kiteto district Tanzania sharing experiences of innovation joint village land use planning at the UNCCD COP16 in Saudi Arabia, December 2024.

Credit: Fiona Flintan/ILRI

Section 6: **CGIAR Portfolio linkages**

Livestock and Climate Initiative's internal network of collaborations



The diagram presents the internal collaborations of the Livestock and Climate 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 ten 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 Livestock and Climate's impact pathways

The Livestock and Climate Initiative worked across the CGIAR research Portfolio with other Initiatives and CGIAR Impact Area Platforms. This allowed us to benefit from pooling expertise and resources, to consolidate approaches and evidence, and to integrate livestock into research and innovations being developed by other Initiatives. Such cross-Initiative partnerships came together in the presentation of our work and joint influencing at global events such as the UNFCCC, UNCBD, and UNCCD COPs, supported by cross-CGIAR flagship publications.

Our most beneficial collaboration in taking our innovations to scale has been with the Initiative on Climate Resilience in climate information and financial services, additionally supported by the CGIAR project AICCRA. By working together, the Initiative reached over one million livestock producers with livestock-specific climate information, insurance, and financial services, with many facilitated by strategic public-private partnerships. Of these livestock producers, 449,193 were women. Bundled climate services, financial literacy training, and index-based insurance services enhanced their resilience and adaptation capacity and strengthened their capacity to respond and adapt to climate risks. Collaboration with meteorological agencies, financial institutions, and media partners expanded outreach, driving behavior change and resilience at scale. Additional collaborations with the regional Initiatives AgriLac Resiliente and Diversification in East and Southern Africa (Ukami Ustawi) allowed us to expand our resources and reach significantly. Assistance from CGIAR's scaling team helped us package and bundle innovations appropriately.

Another key point of collaboration was with the Initiatives on Sustainable Animal Productivity and Low-Emission Food Systems. This focused on co-developing research, tools, and methodologies for reducing the climate impact of livestock, particularly methane emissions, while maintaining or improving livestock keepers' capacity to adapt to climate change. Tools like CLEANED benefited from such collaboration, as exemplified by the significantly increased geographical reach of the tool and its uptake by many stakeholders. Similar examples are the work on low-emission forages in Colombia and research and uptake of livestock methane measurements and protocols in Kenya. Working with the Climate Adaptation and Mitigation Impact Area Platform, we shared successes through presentations made at UNFCCC COP and other prestigious events jointly influencing the global climate agenda.

Our work on gender also benefited from cross-Portfolio collaboration. Gender and social inclusion were mainstreamed across all WPs through strategically integrated gender equality and social inclusion (GESI) activities. For example, scaling with households to support socially inclusive climate-smart dairy practices in Kenya was integrated into our pioneer positive-deviance approach. Additionally, tools were developed to measure women's empowerment in agricultural development. The Gender Equality, Youth and Social Inclusion Impact Area Platform supported and amplified the Initiative's GESI work through multiple platforms, including virtual seminars and in-person conferences. In addition, the website has a resource repository and newsletters that help to increase the visibility of this important work.

Innovation flexible grazing was scaled across hundreds of thousands of hectares.
Credit: Mounir Louhaichi/ICARDA

Section 7: **Key result story**

Farmer-led knowledge networks are enabling more than 15,000 households to adopt and implement climate-smart livestock practices in Kenya, Ethiopia, and Colombia

Adaptation pioneer farm leader, Edwin Mitey, prepping forage feed for his dairy cattle.
Credit: David Ngome/ILRI

Primary Impact Area

Other relevant Impact Areas targeted

Contributing Initiative

Livestock and Climate

Contributing Centers

ILRI

Contributing external partners

Procasur · Nandi County Government · Bomet County Government · SistemaBio · Kenya Forest Service · Kenya Animal Genetic Resources Centre · Equity Bank Foundation · Livestock and Fishery Development Offices in Menz Gera, Mojana Wedera, and Basona Werena Woredas · Amhara Agricultural Research Institute- Livestock Research Directorate and Debre Birhan Agricultural Research Center (DBARC) · Debre Birhan University (DBU), University of Gondar and Bahir Dar University

Geographic scope

Regions: East Africa · Latin America

Countries: Ethiopia · Kenya · Colombia

Through the Pioneer Positive Deviance (P-PD) approach, more than 15,000 smallholder farmers in Kenya, Ethiopia, and Colombia are accessing climate-smart livestock practices. Adaptation pioneer households share locally developed solutions through farmer-led networks, promoting peer-to-peer learning and enhancing climate resilience. This has improved productivity, livestock health, and access to sustainable feed and breeding practices. The farmer-driven model is now integrated into government extension programs and expanding to new regions, ensuring long-term impact and broader adoption.

For farmers battling the growing challenges of climate change, access to practical, locally tested solutions can mean the difference between resilience and decline. Across Kenya, Ethiopia, and Colombia, the Pioneer Positive Deviance (P-PD) approach is establishing new and impactful ways to share climate adaptation knowledge by putting farmers at the center of innovation and scaling.

P-PD recognizes that within any farming community, there are pioneers — farmers who, despite facing the same resource constraints as others, have discovered effective ways to improve their livestock production. These farmers, known as "adaptation pioneer households", develop tailored solutions that boost productivity, enhance climate resilience, and optimize feed and animal health practices. The P-PD initiative is also making climate-smart livestock practices more accessible through distributed materials and digital learning platforms. By establishing networks where these pioneers share their experiences directly with their peers, the P-PD approach enables sustainable, grassroots-driven change.

In Kenya, this approach has gained significant traction, with **15,424 farmers in Kenya enabled to access climate-smart livestock practices** through farmer-to-farmer networks (1)(6). About **23,000 booklets** on dairy feed management were co-developed with pioneer farmers and shared with 16 network partners, ensuring that knowledge is scaled beyond the initial field interactions (1)(2).

A total of **39 pioneer households** in Kenya's Bomet and Nandi counties engaged more than 4,400 participants across 37 farmer-led field days (1). These events, designed and led by the pioneers themselves, bring together 50 to 100 farmers at a time to witness and discuss successful climate-smart livestock management practices. Farmers learn by doing — working alongside adaptation pioneers to establish different fodder crops, improve feeding techniques, and optimize dairy production. In addition to knowledge exchange, field days also serve as platforms for engaging partners, including county livestock production units, financial institutions, and agricultural enterprises, creating holistic support networks for rural farming communities.

Ethiopia's implementation of P-PD initially focused on **40 pioneer households** engaged in sheep fattening in the Amhara region. While security challenges limited full-scale implementation, the Initiative nonetheless distributed more than **13,000 co-developed booklets to farmers in 36 villages**, providing practical guidance on enhancing sheep production (3). The Initiative also influenced agricultural education, with three Ethiopian universities expressing interest in integrating P-PD into their curriculum, setting the stage for long-term integration into Ethiopia's national extension system. Further demonstrating its potential, the World Bank has recognized the P-PD approach, investing in its expansion under a USD-340-million initiative to strengthen climate resilience in Ethiopia's pastoral lowlands (4).

Meanwhile, in Colombia, P-PD is taking root through a partnership with Procasur, an organization specializing in rural knowledge sharing. The approach has led to the creation of **seven** learning routes across four municipalities in the Department of Caquetá, engaging 86 active participants (5). A learning route tests new modalities of learning, combining face-to-face peer learning with digital learning tools. An online platform now hosts 15 pioneer livestock farmers showcasing their locally developed climate-smart practices, facilitating knowledge exchange beyond physical farm visits (5).

Across all three countries, common adaptation strategies have emerged as key areas of farmer interest, with fodder establishment and feeding innovations ranking highest in demand. By ensuring year-round feed availability, farmers enhance both livestock productivity and environmental sustainability. Additionally, breeding improvements, biogas technology, and manure management have gained traction, reflecting a growing interest in integrated, sustainable livestock systems. Women's engagement has also been strengthened through poultry farming and kitchen gardening, offering both economic opportunities and improved household nutrition.

What makes P-PD stand out is its shift from traditional extension models to a farmer-driven approach. Instead of relying on externally imposed recommendations, farmers themselves experiment, innovate, and share insights with their peers. This method has proven highly effective, with an assessment showing that 80 percent of surveyed farmers actively pass on their learnings to neighbors and friends. Impact data highlights significant improvements, including a 75.8 percent increase in milk production, 52.5 percent better livestock health, and 29.9 percent enhanced cost efficiency (1).

> When we have the field days at the pioneer farms, it is easy for the farmers who attend to appreciate one of their own, living under the same conditions. . . . My take is that we continue the same approach, that is, we do extension through the pioneers, and we should be able to bring in other areas, such as pasture development, improvement of dairy — the field is still huge.
>
> Evans Kiplangat, Bomet County Government, Kenya

CGIAR

INITIATIVE ON
Livestock and Climate

The Livestock and Climate Initiative worked with farmers in Colombia to improve low-emission forages.

Credit: Alliance of Bioversity and CIAT