CGIAR

INITIATIVE ON
Livestock and Climate

CGIAR Initiative on Livestock and Climate

ANNUAL TECHNICAL REPORT 2022

CGIAR Technical Reporting 2022

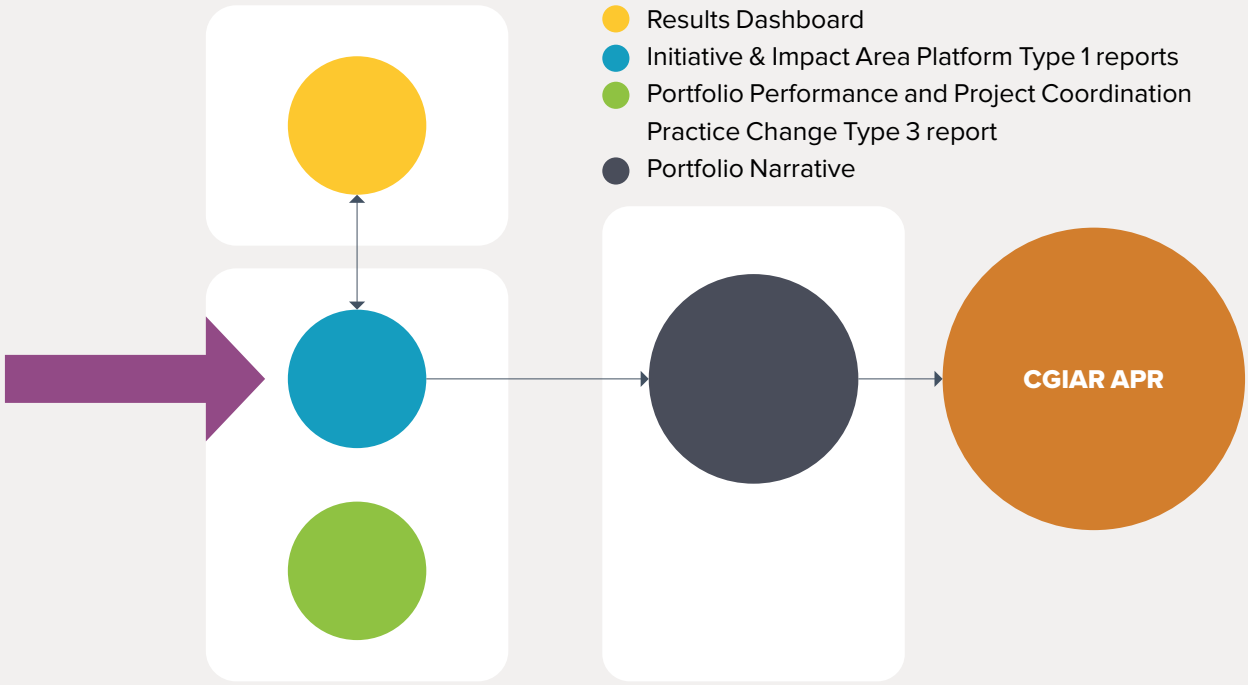
CGIAR Technical Reporting has been developed in alignment with the CGIAR Technical Reporting Arrangement.

This Initiative report is a Type 1 report and constitutes part of the broader CGIAR Technical Report. Each CGIAR Initiative submits an annual Type 1 report, which provides assurance on Initiative-level progress towards End of Initiative outcomes.

The CGIAR Technical Report comprises:

- Type 1 Initiative and Impact Area Platform reports, with quality assured results reported by Initiatives and Platforms available on the CGIAR Results Dashboard.
- The Type 3 Portfolio Performance and Project Coordination Practice Change report, which focuses on internal practice change.
- The Portfolio Narrative, which draws on the Type 1 and Type 3 reports, and the CGIAR Results Dashboard, to provide a broader view on portfolio coherence, including results, partnerships, country and regional engagement, and synergies among the portfolio's constituent parts.

The CGIAR Technical Report constitutes a key component of the CGIAR Annual Performance Report (APR).



US$	2022	2023	2024
Proposal Budget from initial submission	US$10,000,000	US$19,100,000	US$25,900,000
Approved 2022 Budget	US$7,923,298		

2022 Disbursement Target based on Approved FinPlan

Section 1 Fact sheet

Initiative name	Livestock, Climate, and System Resilience
Initiative short name	Livestock and Climate
Action Area	Resilient Agrifood Systems
Geographic scope	**Regions targeted in the proposal:** Central and West Asia and North Africa; East and Southern Africa; Latin America and the Caribbean; West and Central Africa **Countries targeted in the proposal:** Colombia; Ethiopia; Guatemala; Kenya; Mali; Senegal; Tanzania, United Republic; Tunisia
Start date	Jan. 1, 2022
End date	Dec. 31, 2024
Initiative Lead	Fiona Flintan (Interim) – f.flintan@cgiar.org
Initiative Deputy	Jacobo Arango – j.arango@cgiar.org
Measurable three-year End of Initiative outcomes (EOI-Os)	**EOI-O 1:** 80,000 households implement climate smart practices and technologies appropriate to their production systems and their gender.
	EOI-O 2: At least 320,000 livestock producers (50% women and youth) and 13 public or private organizations access climate risk management strategies.
	EOI-O 3: Pastoralists and farmers implement improved governance, management and restoration practices on 500,000 ha.
	EOI-O 4: By 2024, mobilization of US$25 million for climate-livestock investments.
	EOI-O 5: International agencies and policymakers use LCSR products to shape at least five policies or investments to strengthen socially inclusive low-emission livestock production system resilience, including at least three aimed at realizing climate-change related adaptation or mitigation progress by 2024.

OECD DAC Climate marker adaptation score*	**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*	**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*	**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/

*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.
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.

CGIAR Initiative Livestock and Climate co-lead and environmental biologist Jacobo Arango measures the root systems of the planted Brachiaria grasses developed by the Alliance of Bioversity and CIAT and used to improve pastures in Colombia.
Photo credit: Hacienda San José

Section 2 Initiative progress on science and towards End of Initiative outcomes

Shade trees in Senegal are important in preventing livestock from heat stress resulting from increased global temperatures. The Initiative is facilitating south-south sharing of experiences and knowledge across continents to strengthen the inclusion of trees in livestock production systems.
Photo credit: Mounir Louhaichi

Overall summary of progress against the theory of change

The CGIAR Research Initiative on Livestock and Climate had an excellent first year producing 224 key results — 209 contributing to outputs, 11 contributing to Work Package outcomes, and one to an End of Initiative outcome. Of these results, 161 were knowledge products, 48 of which were peer-reviewed articles.

Results concentrated in the Initiative's seven priority countries, often taking advantage of and building on a solid research and partnership foundation established under the CGIAR Research Programs (CRPs) or bilaterally funded projects. Over 100 results were co-produced with other CGIAR Initiatives, particularly the Initiatives on Climate Resilience, Sustainable Animal Productivity and Low-Emission Food Systems.

The results testify the commitment, scientific expertise, and determination of the 107 researchers from the Initiative's three partner CGIAR Centers, supported by a strong management, administration, and financial team. Work Package coordinators have been joined by country, gender, and research cluster focal points to improve coordination further, exchange research tools and methodologies, and encourage cross-center, cross-country and cross-Work Package collaboration. With capacity development an important principle of the Initiative, four post-docs, ten PhD fellows and three Master students are being supported.

Innovations form the backbone of the Initiative, with 24 innovations being reported in 2022 and several more in development. Innovations range from technological advances such as organic growth additives to enhance in vitro grassland

Close up of Nelore short cycle cattle at Hacienda San José.

propagation to more process-oriented advances, including participatory land use planning for pastoral areas and online systems for government and other actors to track livestock adaptation interventions. Thirteen innovations are at level five or above, meaning that they are close to readiness for scaling or already being scaled. The Initiative has worked closely with the CGIAR Innovation Packages and Scaling Readiness team, including to co-test the first innovation package scaling readiness stakeholder workshop in Tanzania in November 2022.

The Initiative achieved three high-profile "innovation uses" as contributions to our End of Initiative outcomes. One, Grupo Éxito, the largest retailer in Colombia, now stocks GANSO (GANaderia SOstenible, or sustainable livestock) certified products. GANSO is a guarantee for sustainable beef produced in a low-emission deforestation-free way developed by the Alliance of Bioversity and CIAT. Two, the Intergovernmental Authority for Development (IGAD) financed the Government of Ethiopia to upscale woreda (district) participatory land use planning (WPLUP) in a district of 3,449 hectares. Three, the County Government of Baringo, Kenya prioritized participatory rangeland management (PRM) in their county integrated development plan. Both land use planning and PRM are innovations developed by the International Livestock Research Institute (ILRI).

"The Government of Ethiopia appreciates the ongoing support that ILRI provides to the development of woreda participatory land use planning in pastoral areas. WPLUP is an important land use planning decision-making tool, helping to prevent land use conflicts. We look forward to continuing our partnership in this regard."

Tigistu Gebremeskel, Director, Rural Land Administration and Use Directorate, Ministry of Agriculture, Ethiopia (2023)

In addition, land use planning and PRM have directly improved the lives of pastoralists and other land users. Through the Initiative in Tanzania, joint village land use planning and PRM has been strengthened across 163,185 hectares of shared grazing lands and was newly established in 3,770 ha. In Kenya, PRM has been reinstated in 85,628 ha with new sites being established in 2023. This has contributed to improving the tenure security of pastoralists and their capacity for

development and adapting to climatic shocks and stresses. In Tanzania, this security was strengthened further with the Ministry of Livestock and Fisheries gazetting and registering the shared grazing lands — another End of Initiative result for the Initiative.

Scoping for scaling up participatory land use planning and PRM in West and North Africa is being undertaken. To understand the impact of anticipated Initiative research interventions in these areas, including the development of tools and processes for large-scale rangeland restoration, a biophysical baseline was undertaken in 2022 across all sites with the development of a new research protocol. Socioeconomic research on results is planned with the University of California — a partnership developed through the CGIAR Standing Panel on Impact Assessment matchmaking event in Cali in November 2022.

As well as rangeland restoration, the Initiative is exploring opportunities for carbon sequestration in soils and biomass in both silvopastoral and pastoral systems in Latin America and East Africa. Satellite imagery and machine-learning approaches are being used to record and model overground carbon stocks across Colombian forests and pastures. Discussions with carbon traders on improving monitoring and evidence for carbon credits took place. Water management and harvesting is also being studied.

The Initiative on Livestock and Climate is the only Initiative in the CGIAR portfolio with a strong, targeted focus on pastoral agrifood and production systems, including sown pasture ranges and silvopastoralism (Colombia and Guatemala), agropastoralism and pastoralism (East, West and North Africa). The Initiative takes a systems approach to engaging with these, seeking to identify measurable characteristics of system resilience for improving development interventions.

In mixed crop-livestock systems the Initiative's research mainly focuses on individuals, households, or groups of households to develop and validate socially inclusive technologies, tools, and methodologies for adapting to climate change at scale. A key achievement in 2022 was to undertake a household survey to identify 150 pioneer farmers in Colombia, Kenya and Ethiopia who will be at the heart of technology co-production and producer-led scaling processes. The household survey was done with 2,000 respondents in total in Ethiopia and Kenya. The remaining 300 respondents for Colombia will follow in the first quarter of 2023.

Improving climate risk management for livestock producers, including access to climate information, is an important outcome of the Initiative. In 2022, focusing on Senegal, Kenya and Guatemala, the Initiative supported several consultative studies to identify key stakeholders, dissemination channels and information systems. In addition, studies identified relevant information, characteristics, and conditions of an enabling environment for climate resilience financial services, and opportunities for scaling index-based livestock insurance as part of a bundle of services through the private sector. An agro-climate risk scoring system is in development in Kenya.

Gender is being mainstreamed across both household- and systems-level research, with approximately 80 of our results being tagged for gender. The Initiative is emphasizing research on gender-responsive and -transformative approaches, and the intersectionality of gender (and youth), climate adaptation and mitigation. This includes research being undertaken on labor-saving climate-smart technologies for women, such as more efficient biogas stoves and fodder production and preservation, and research on climate risk management products including livestock insurance or women-targeted livestock and climate information services. At a systems level, the focus is on understanding and supporting the development of approaches that build women's

status, decision-making participation, and access to resources as part of the community or collective with innovations such as "community conversations".

Another prominent stream of research in the Initiative is the mitigation and reduction of harmful environmental impacts of livestock and particularly greenhouse gas (GHG) emissions. This work is predominantly taking place in Colombia by the Alliance of Bioversity and CIAT and in Kenya by the team at ILRI's Mazingira Centre.

Under the Initiative, specialized scientists are developing accurate and verifiable GHG emission levels generated by different livestock production practices and research to reduce enteric methane emissions per unit of milk and meat while improving production including the incorporation of high tannins tree legumes in the diet of cattle. Feed additives are also being tested. Other research includes understanding the impact of nitrous oxide emissions and groundwater pollution rates from livestock enclosures (boma) in pastoral systems, measuring of carbon uptake and release at the ecosystem scale via Eddy Covariance towers, and the reduction of nitrous oxide in farms by using improved tropical grasses. The investigation of the underlying mechanisms of biological nitrification inhibition as nitrous oxide mitigation technology is ongoing.

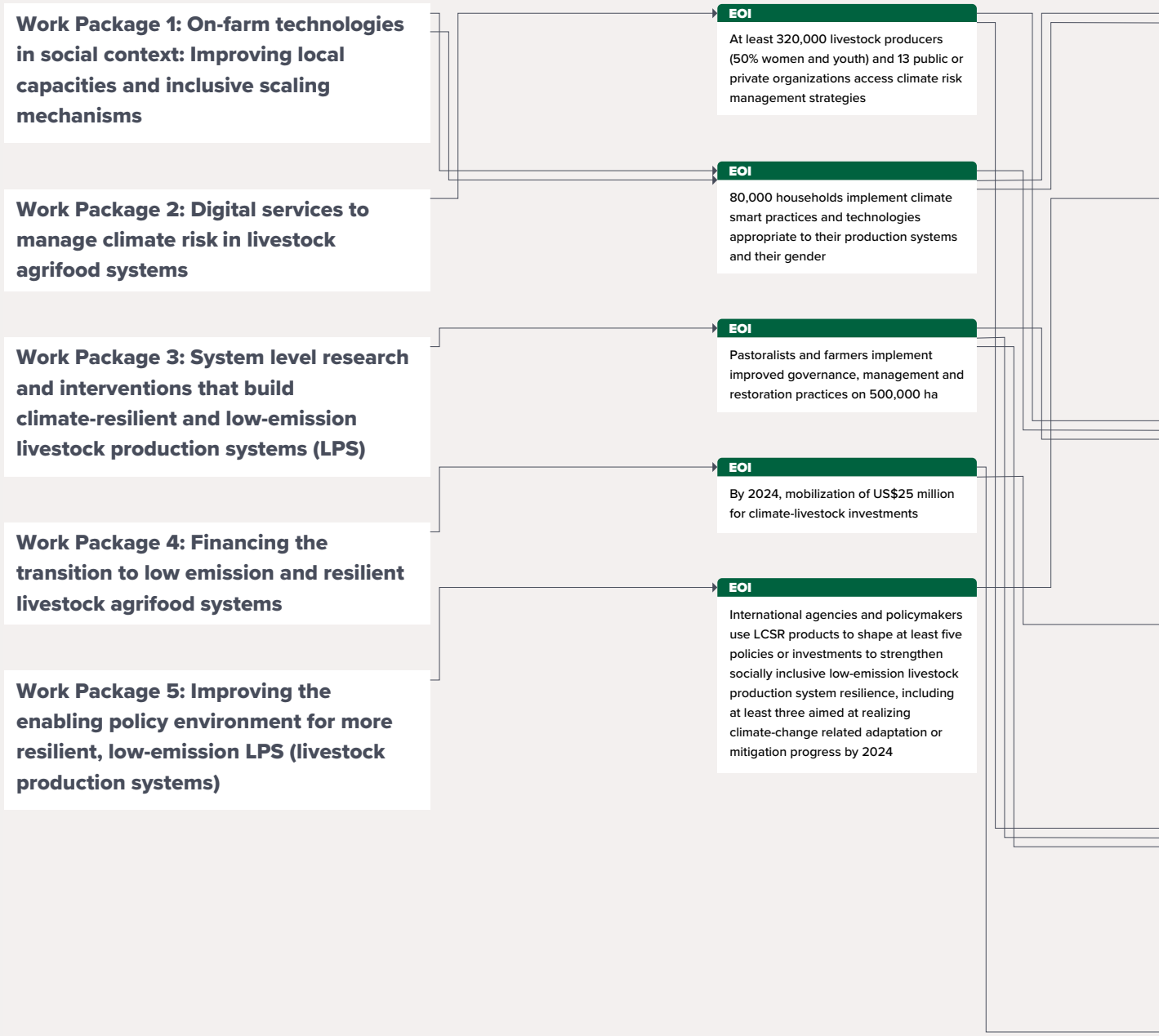
Harnessing climate or green finance for the transition to climate-smart livestock production is a new important opportunity that can result in mutual gains for investors and livestock producers. For example, the Initiative is playing a key role in assisting Latin American larger-scale livestock producers to improve the sustainability of their production through scientific innovations, making them more attractive to investors. A significant result for the Initiative's End of Initiative outcomes was the contribution of the Initiative to the US$7.7 million investment in the Hacienda San Jose (HSJ) in Colombia by &Green Fund (see Key results story below). The Initiative also played a facilitating role in securing an investment in the World Conservation Union (IUCN) by the Global Environment Facility (GEF). This US$2 million project will harness commercial sector finance for rangeland restoration through sustainable value chains. The Initiative organized a round table on the topic with the Initiative on Climate Resilience. Additionally, the Initiative carried out an investor landscape analysis, produced a number of publications on investing in livestock systems for adaptation and mitigation purposes, and contributed to developing an adaptation tracking system for the African Development Bank.

A backdrop to the above is an enabling policy environment. As a contribution to this, the Initiative has been undertaking research on climate security in livestock production systems, informing the development of the Climate Security Observatory established by the Initiative on Climate Security. The Initiative is also collaborating with the Initiative on Sustainable Animal Production to strengthen environmental issues and risk management aspects in livestock master plans and is exploring the undertaking of analyses to identify the carbon footprints of different livestock systems and value chains with a view to reducing them.

Global engagement activities culminated at COP27 of the UNFCCC (United Nations Framework Convention on Climate Change), where the Initiative co-organized the Cow in the Room and #LetsTalkLivestock campaigns and participated in over 17 side events, received coverage in British and American press among others, and contributed to a WhyLivestockMatter online resource-hub that received 4,300 views from Nov. 1–18, 2022 and 20,000 impressions on Twitter.

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.



EOI — End of Initiative outcome

AA — Action Area

IA — Impact Area

SDG — Sustainable Development Goal

Nutrition, Health, and Food Security

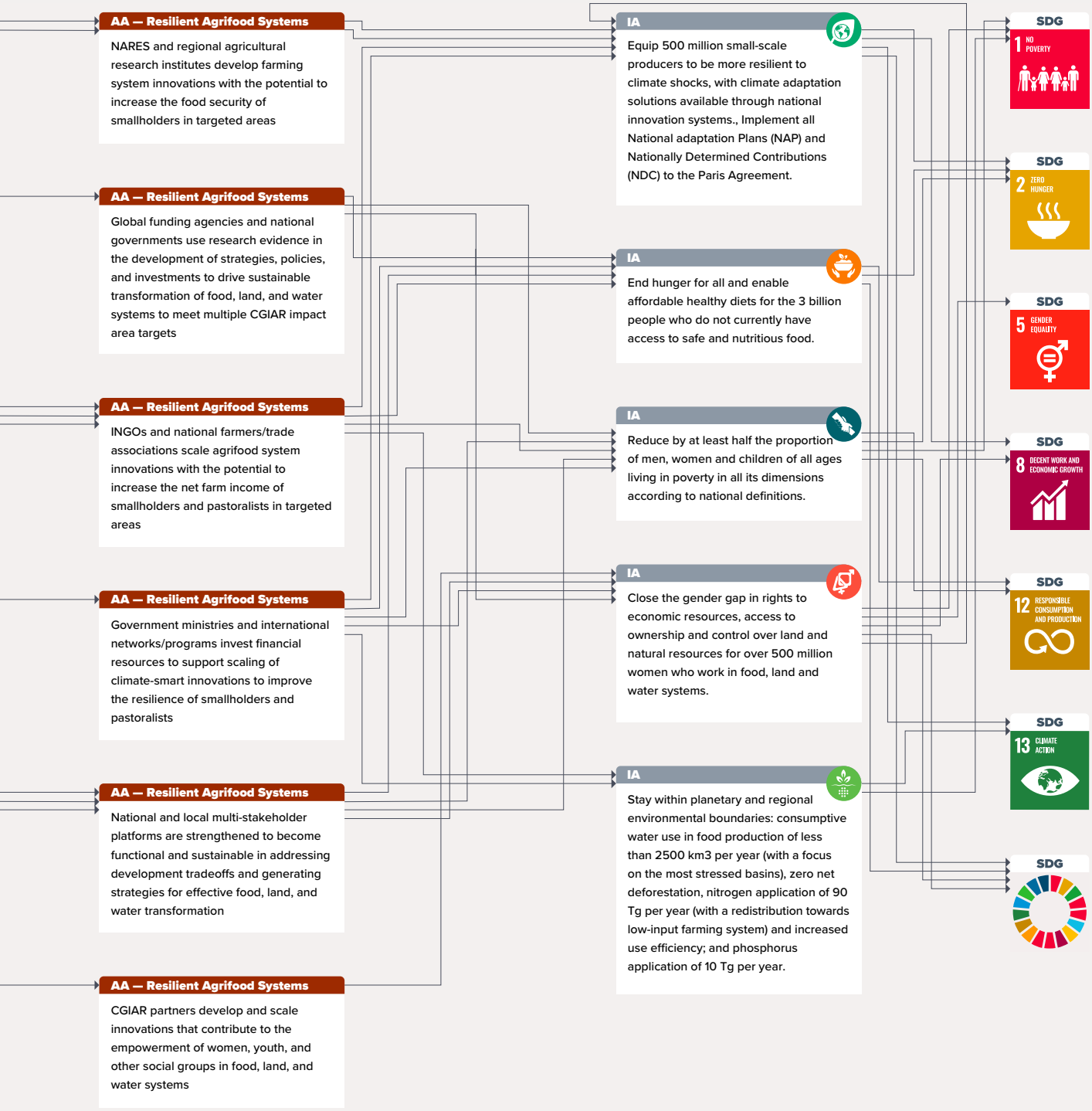
Poverty Reduction, Livelihoods, and Jobs

Gender Equality, Youth, and Social Inclusion

Climate Adaptation and Mitigation

Environmental Health and Biodiversity

Teams from CGIAR's three Action Areas — System Transformation, Resilient Agrifood Systems and Genetic Innovation — worked to develop an improved set of Action Area outcomes in October 2022. Since this was near the end of the reporting cycle for 2022, it was decided not to update the theories of change based on these new Action Area outcomes.
The exception to this is Genetic Innovation — for this Action Area, as the new outcomes had already been widely discussed among the relevant Initiatives, and with its advisory group of funders and other stakeholders, the decision was made to update their outcomes in time for the 2022 reporting cycle.



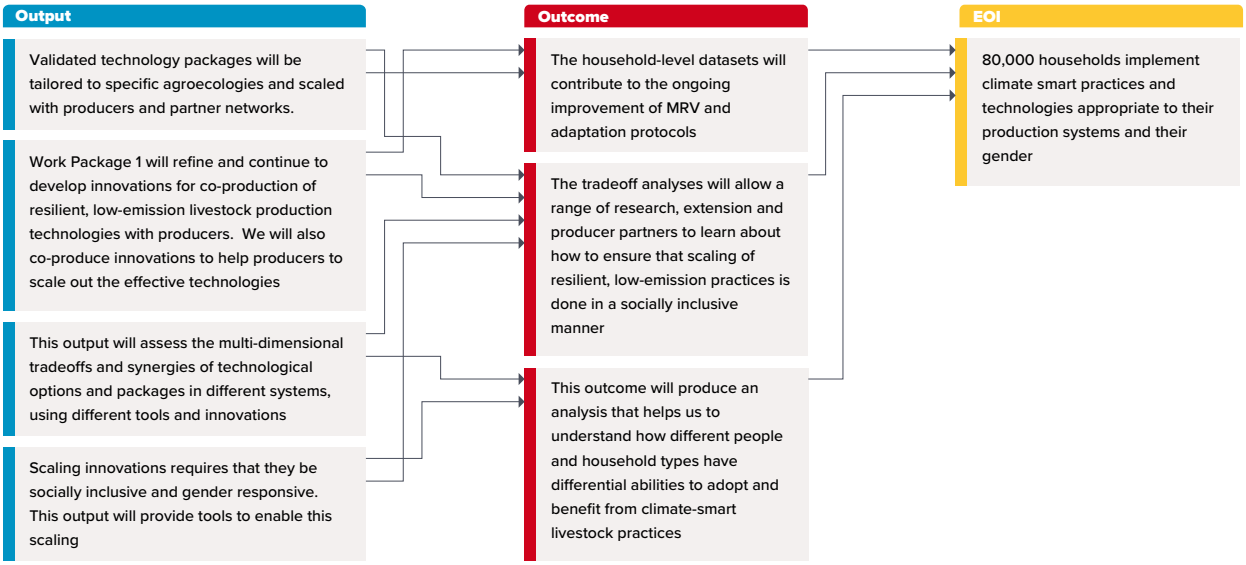
Progress by End of Initiative outcome

EOI-O 1 **80,000 households implement climate-smart practices.**	A key achievement in 2022 was a 2,000-respondent household survey to identify 150 pioneer farmers in two priority countries — Kenya and Ethiopia. Colombia will be completed in 2023. These mixed crop-livestock farmers are at the heart of the household-level climate adaptation technology co-production and producer-led scaling the Initiative will support. A gender evaluation of environmental and socioeconomic needs and benefits of different climate-smart practices, including labor demands and productivity impact, supports social inclusivity of that scaling. Climate-smart tools and technologies with potential for adoption are in development.
EOI-O 2 **320,000 producers and organizations access climate risk management.**	The Initiative supports climate risk management by providing livestock-related climate information bundled with other often improved services to climate-vulnerable livestock producers, particularly pastoralists. In this regard it works closely with the Initiative on Climate Security. In 2022, livestock producers' information needs were identified and dissemination channels strengthened, including through TV programs such as "Shamba Shape Up". Research was carried out on bundling index-based livestock insurance, a core CRP-legacy innovation in Kenya and Ethiopia, with other services. A scoping review was also undertaken to pilot it in Senegal and Guatemala. This has established a good foundation for reaching End of Initiative target producers.
EOI-O 3 **500,000 ha of land under improved governance, management and restoration.**	Significant strides were made toward this End of Initiative Outcome. Interventions in rangeland-based pastoral systems aimed at improving resource governance and management were established in over 260,000 ha. Additionally, management and productivity improvements were achieved in silvopastoral and pasture-based systems. Key innovations, some being legacy products of the Livestock CRP, have been strengthened and scaling readiness increased. This is exemplified in uptake by national governments. Rangeland and grassland restoration tools and technologies were tested. Gender-transformative approaches are in development. Tools and indicators for valuing ecosystem services and measuring system resilience are being designed.

EOI-O 4 **Investors use Livestock Climate and System Resilience science to design and track investments worth US$25 million.**	In 2022, a US$7.7 million sustainable livestock investment in climate-neutral Colombian beef by climate financer &Green was attributed to the Initiative's science, setting the Initiative clearly on track to meeting this End of Initiative. A further US$2 million was secured by IUCN from GEF due to the Initiative's direct intervention. A solid foundation has been established for similar results by establishing partnerships and participating in investment scoping workshops w ith major investors, generating evidence to aid investment design, and devising essential tools to help investors monitor projects.
EOI-O 5 **At least five livestock and climate policies or investments based on Livestock Climate and System Resilience evidence and outputs.**	In 2022 the Initiative co-developed and improved systems to support governments in their planning and reporting of climate adaptation and mitigation. Evidence was generated across the Initiative that will further build this capacity. Coupled with engagement in over 20 regional and global multi-stakeholder platforms, highly successful contributions to UNFCCC COP27, support to AGNES (African Group of Negotiators Expert Support) building their capacity in livestock and climate, and increasingly well-established regional and global partners, the Initiative is well on track to achieving this End of Initiative outcome by 2024.

Section 3 Work Package-specific progress

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



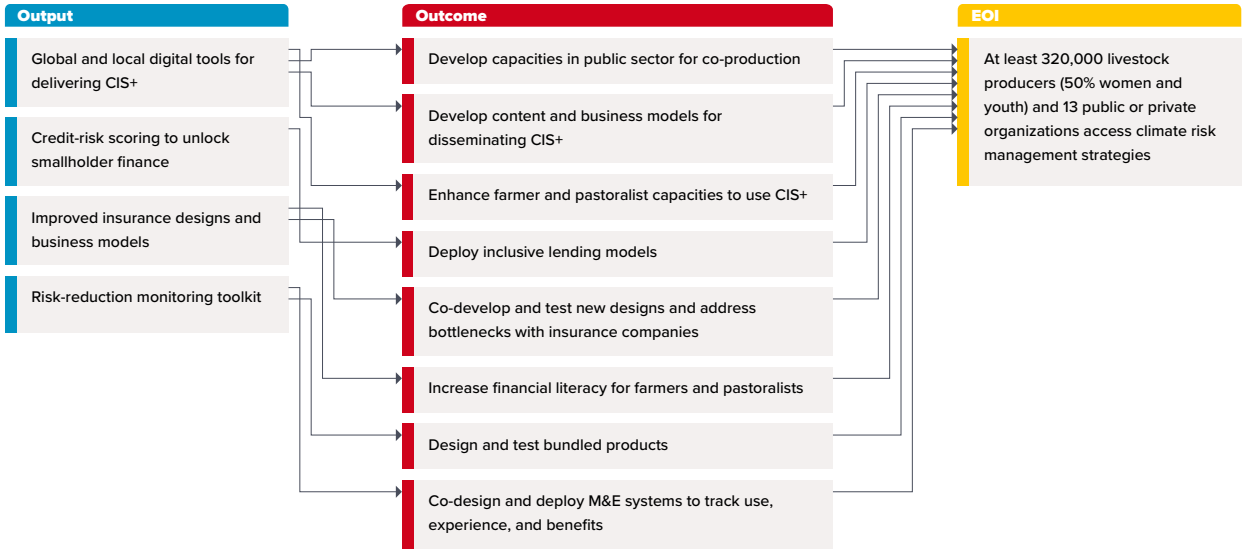
Work Package 1 progress against the theory of change

To improve local adaptive capacities, co-production and producer-led inclusive scaling of climate-smart tools, technologies and methodologies, the Initiative is developing a farmer-led approach, with a consideration of positive deviance. To identify the 150 pioneer mixed crop-livestock farmers in each priority country, a household survey of 2,000 people was undertaken in Ethiopia and Kenya, with another 300 interviews planned for 2023 in Colombia. Here, the Initiative has partnered with Procasur, an NGO specializing in farmer-led innovation. Partnerships with government extension experts are also being established to build capacity and optimize scaling opportunities.

The cornerstones for methodological innovations on gender-inclusive adaptation have been supported by delivering key knowledge products. A gender-focused evaluation of environmental and socioeconomic needs and benefits of different climate-smart practices, including labor demands and productivity impact, was undertaken. The gendered dimensions of climate-smart agriculture and women's empowerment have been explored.

Validated climate-smart low-emission technology packages are also in development, with research on feeds and forages and breeding improvements by assessments of GHG emissions and other environmental analyses. Assessment models are being refined while data compilation and collection have been deepened. This allows for the analyses to be expanded and further contributes to the progress already made on tradeoff analysis, particularly in farm- level variables. CLEANED, a multi-dimensional modeling product and legacy from the Livestock CRP is being improved and introduced in new countries such as Tunisia. Soil carbon stocks and nitrous oxide pollution are also being studied.

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



Work Package 2 progress against the theory of change

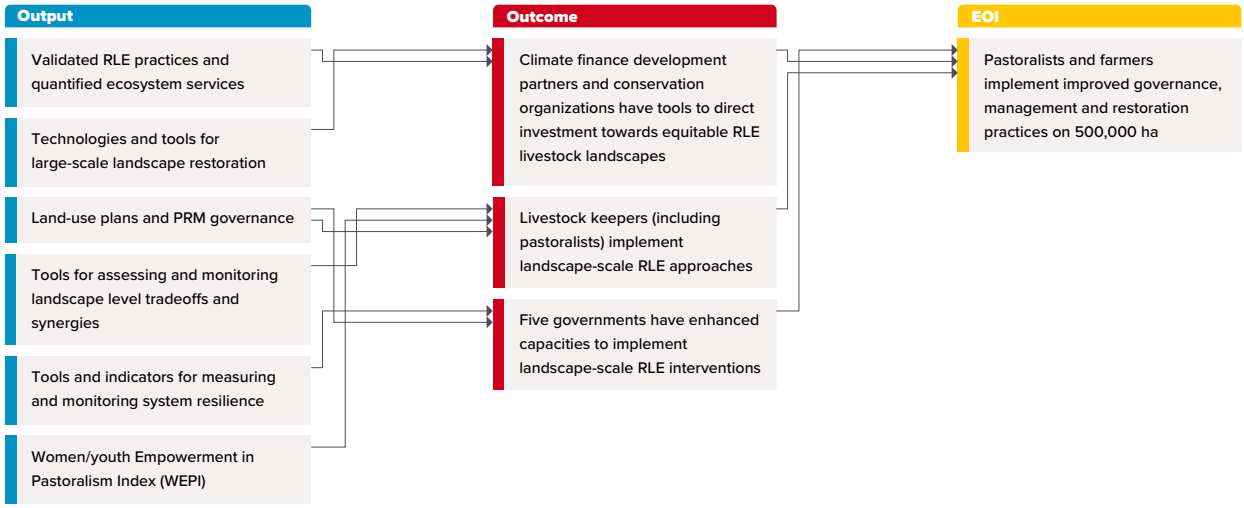
The Initiative supports climate risk management by providing bundled livestock-related climate information and other services targeting climate-vulnerable livestock producers, particularly pastoralists in Kenya, Guatemala, and Senegal.

In 2022 in Senegal, stakeholder consultations identified 15 potential livestock-focused climate information services (CIS) and dedicated dissemination channels, including community radio, short message services, and interactive voice response. Partnerships with local organisations such as the meteorological service, and relevant NGOs such as Centre de Suivi Ecologique, have been established. They will lead the production of CIS, working with multidisciplinary working groups and local technical agroclimatic committees. Livestock advisories based on the interpretation of the climate information disseminated at the local level are being established.

In Guatemala, a market study was conducted to identify relevant information, characteristics, and conditions of an enabling environment for climate resilience financial services in livestock production systems. In Senegal, a scoping study was conducted on scaling index-based livestock insurance coupled with the collection of data in "sentinel zones" through a platform called KAZNET for frequent monitoring of socioeconomic and environmental indicators. As a starting point for establishing a Climate Security Observatory and in collaboration with the Initiative on Climate Security an impact pathway analysis was conducted in Kenya to understand how climate exacerbates the root causes of livestock-related conflicts.

Digital technological innovations are important for improving climate risk management. In 2022, Work Package 2 started developing three innovations: (1) co-production and dissemination of fine-scale climate services; (2) a climate-risk scoring tool; and (3) a financial tool to assist with drought-related risks.

Work Package 3:
System level research and interventions that build climate-resilient and low-emission livestock production systems (LPS)



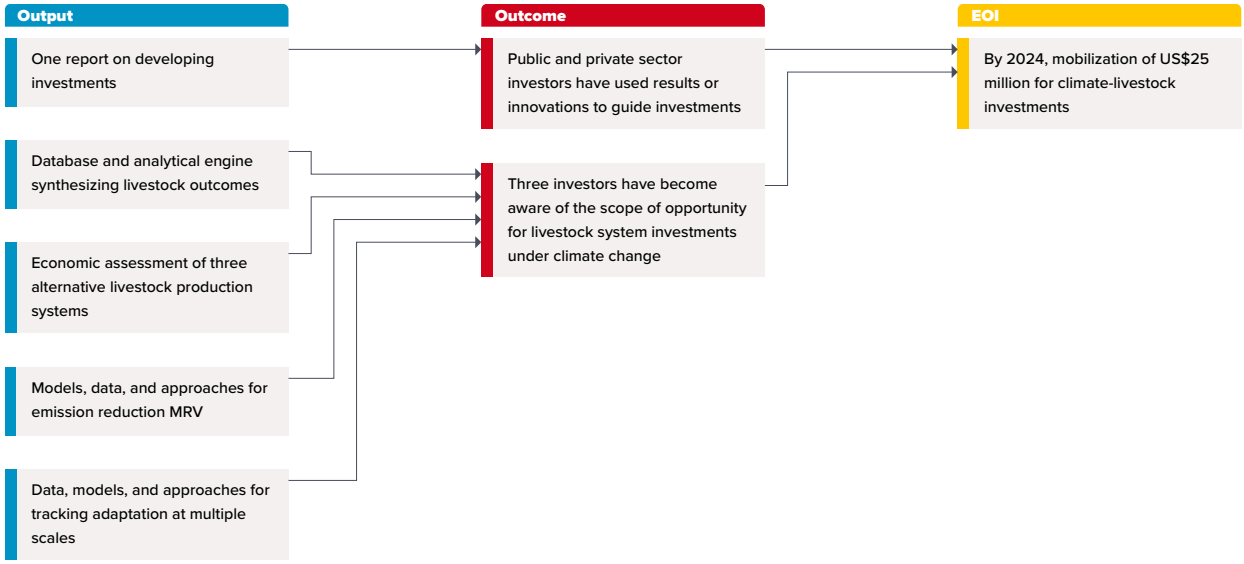
Work Package 3 progress against the theory of change

This Work Package predominantly focuses on pastoral (silvopastoral, agropastoral, and "pure" pastoral) production systems, with the emphasis on "the system" as the entry point. In 2022, interventions improving land and resource governance and management were established in over 260,000 ha, making significant progress toward End of Initiative outcomes. In Tanzania joint village land use planning and PRM (key innovation packages) were strengthened in 163,185 ha and newly established in 3,770 ha. In Kenya PRM was strengthened in 85,629 ha. In Colombia, tools for monitoring pastures and deforestation are in development and the GANSO deforestation-free certification for sustainable beef products was strengthened. In Tunisia, research on flexible rangeland resting contracts (between pastoralists and the government) based on indicators developed by the Initiative were discussed at policy level. These results are complemented and supported by guidelines, toolkits, and training materials, for example a Sustainable Rangeland Management Toolkit.

Two results contributed to Initiative policy outcomes, with IGAD providing funds to the Government of Ethiopia to upscale WPLUP across 3,449 ha and Baringo County Kenya including PRM as a priority activity in their 2023-2027 County Integrated Development Plan. A regional government panel on participatory land use planning at an IGAD conference on land and conflict was also supported. These outputs and outcomes are the result of strong relations with government partners and regional bodies, many established under the Livestock CRP.

The Work Package also focuses on understanding tradeoffs and improving system-level intervention-related decision-making, including research to improve quantification of ecosystem services and cost–benefit analysis of rangeland and/or grassland restoration, emissions of GHGs from different production systems and interventions, measuring system resilience indicators, mapping carbon across landscapes, and developing and validating large-scale rangeland restoration options.

Work Package 4:
Financing the transition to low-emission and resilient agri-food systems



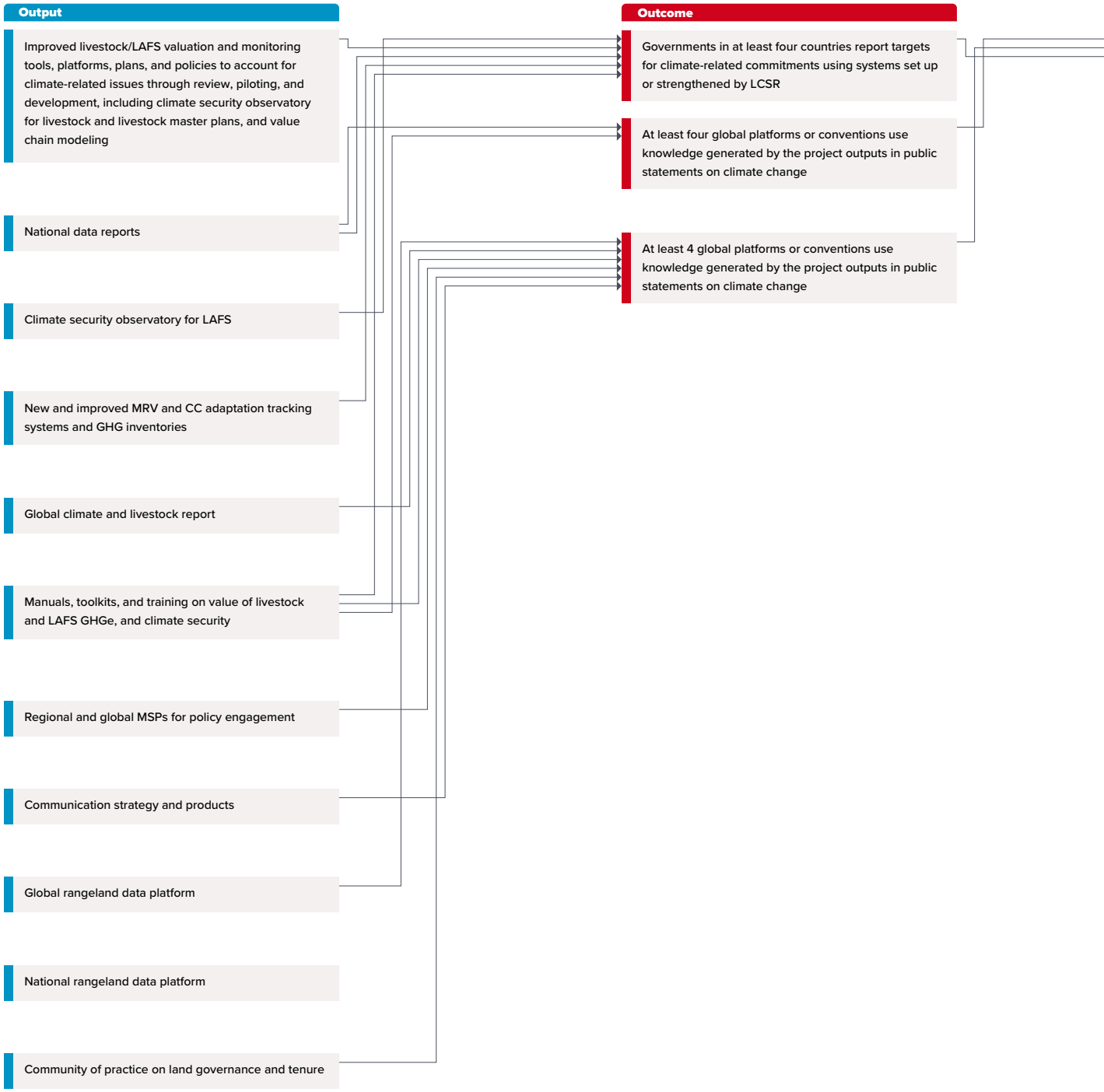
Work Package 4 progress against the theory of change

In 2022 a US$7.7 million investment in climate-neutral Colombian beef by climate financer &Green was attributed to the Initiative's science — a key result for this Work Package and the Initiative as a whole. An additional investment resulting from the Initiative's input to the proposal development was that of the Global Environment Facility to the World Conservation Union (IUCN) for a US$2 million project investing in rangeland restoration through sustainable livestock value chains.

Activities to support similar investments were undertaken. An investor landscape analysis was conducted to identify potential partners and their information needs. Partnerships have already been established with some, including the World Bank, International Finance Corporation, and Sustainable Fibre Alliance. Investment scoping meetings with the Green Climate Fund and the Bezos Earth Fund were undertaken, and the Initiative is working closely with the CGIAR Sustainable Finance Group. These engagements have highlighted the importance of research in supporting new investments, particularly during the design phase and monitoring implementation, reinforcing the assumptions and activities in the Work Package's theory of change.

Regarding investment design, the Initiative has led or contributed to highly influential livestock adaptation and mitigation investment agenda-setting. The preprint was shared with investors and is under consideration for publication at *Nature Sustainability*. In addition, country-specific evidence to support informed decision-making was synthesized, data from about 400 journal articles on the effects of livestock technologies on productivity, resilience and emissions in Africa were synthesized, and evidence from over 100 publications on the gender implications of livestock technologies targeted by major investments compiled. Regarding monitoring, scientists contributed to developing guidelines and methods for adaptation, tracking the African Development Bank's Adaptation Benefits Mechanism, aimed at catalyzing investments in adaptation projects.

Work Package 5:
Improving the enabling policy environment for more resilient, low-emission LPS (livestock production systems)



EOI

International agencies and policymakers use LCSR products to shape at least five policies or investments to strengthen socially inclusive low-emission livestock production system resilience, including at least three aimed at realizing climate-change related adaptation or mitigation progress by 2024

Work Package 5 progress against the theory of change

With over 70 results, Work Package 5 progressed significantly in 2022. The Initiative worked with Ethiopian, Kenyan, and Ugandan agricultural ministries to co-design and pilot a web-based tool to track and report on progress of livestock sector adaptation interventions. The Mazingira Centre and the Alliance researched more efficient GHG emission measurement, reporting, and verification (MRV) inventories and protocols to improve opportunities for countries to report data while developing country-specific GHG emission factors. Tools and models to green livestock master plans and livestock components of a climate security observatory were developed.

The Initiative organized or contributed to at least twenty regional and global multistakeholder platforms including through conferences or workshops, publications or the development of training courses. An example is the first in a series of pastoralist visioning youth forums with the Climate Smart Agricultural Youth Network as a contribution to the International Year of Rangelands and Pastoralists 2026. Leadership in the Colombian Roundtable for Sustainable Beef is influencing national policies on sustainable cattle in Colombia, Argentina and Costa Rica.

Work Package 5 strategically engaged in global conventions and policies, including the UNFCCC COP 27. The Initiative co-organized the Cow in the Room and #LetsTalkLivestock campaigns, participated in over seventeen side events, received coverage in British and American press among others, and contributed to a WhyLivestockMatter online resource-hub that received 4,300 views from 1-18 November and 20,000 impressions on Twitter. Behind the scenes, the Initiative worked with AGNES to build their capacity in livestock and climate and was an observer at the Koronovia negotiations. With SNV, the Initiative supported a female pastoralist from Ethiopia and participant in the above Pastoralist Youth Forum to present the forum's vision.

Work Package progress rating

WORK PACKAGE	TRAFFIC LIGHT / RATIONALE	
1		• The pioneer household survey was completed in two countries, with one to go. Technologies and technology packages are in development. Tradeoff assessments are being developed. Gender and social inclusivity tools are under development.[1]
2		• This is a relatively new area of work that has taken more time to establish but is now progressing well. Livestock climate information services (CIS) needs-assessment and scoping studies on livestock insurance and credit scoring were undertaken. Strong partnerships with public and private partners have been developed.[1]
3		• There was a strong CRP legacy on which to build, resulting in interventions established across 260,000 ha. This Work Package has a strong set of innovations from technological advances to those more process-oriented in nature.[1]
4		• There was good progress despite this being a new area of work. Partnership landscape-mapping was undertaken, and new partnerships are being established. Systems for tracking livestock investments are in development.[1]
5		• This Work Package has benefited from bilateral and CRP legacies. In 2022 the Initiative worked with still existing complementary bilateral projects to increase reach and voice. The Initiative is well embedded in global processes and with strong partners.[1]

KEY		
On track		• Annual 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 jeopardise success of Work Package
Delayed		• Annual progress slightly falls behind Plan of Results and Budget and Work Package theory of change in key areas • Deviations/issues/delays/risks could jeopardise success of Work Package if not managed appropriately
Off track		• Annual progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas • Deviations/issues/delays/risks do jeopardise success of Work Package

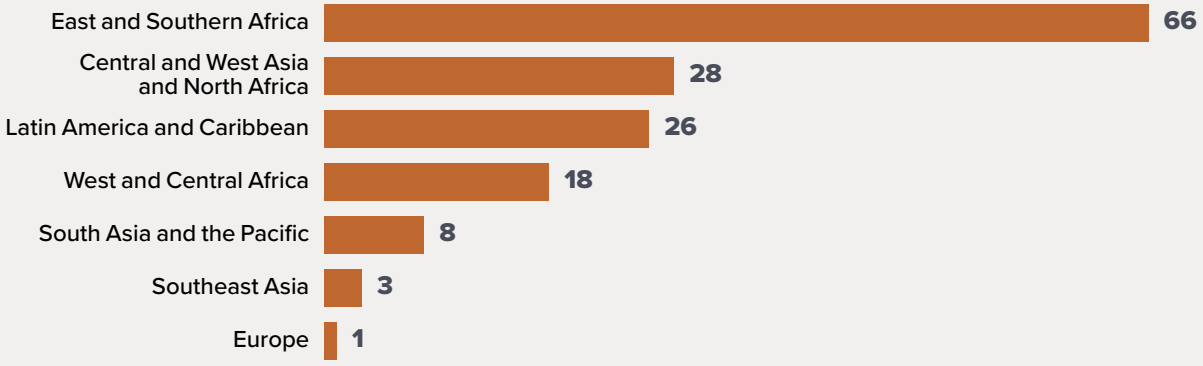
1 Across all Work Packages there has been a need to reduce intervention areas and beneficiary targets due to unanticipated budget limitations. Across all the Work Packages assumptions still hold but it is too early in the Initiative to fully evaluate their efficacy.

Section 4 Initiative key results

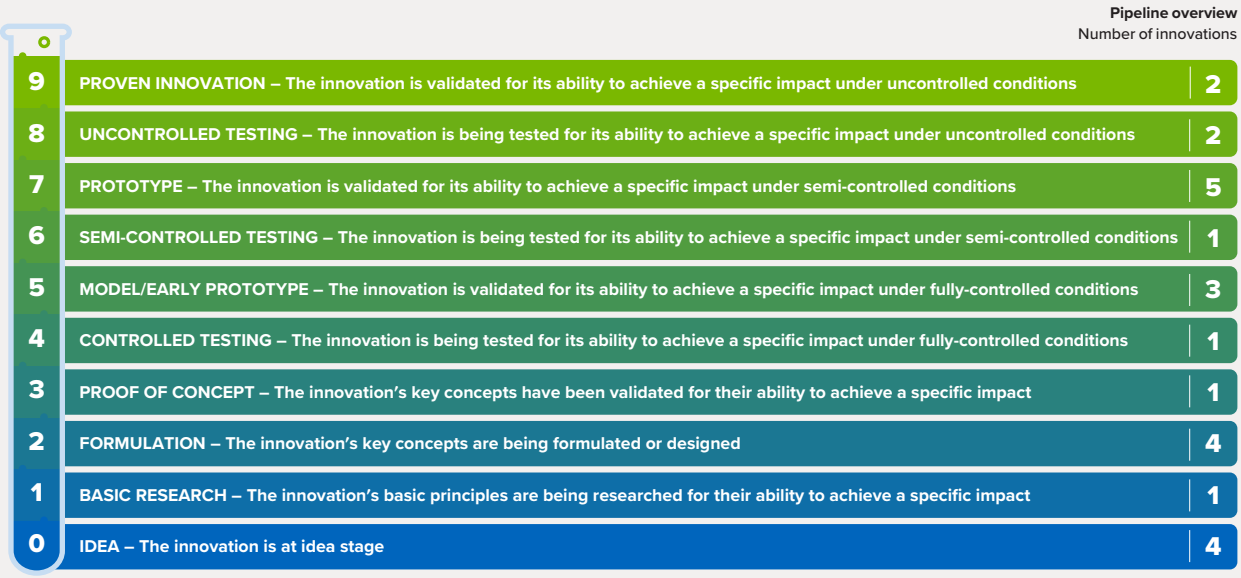
This section provides an overview of 2022 results reported by Livestock and Climate. These results align with the CGIAR Results Framework and Livestock and Climate's theory of change. Further information on these results is available through the CGIAR Results Dashboard.

Results by country

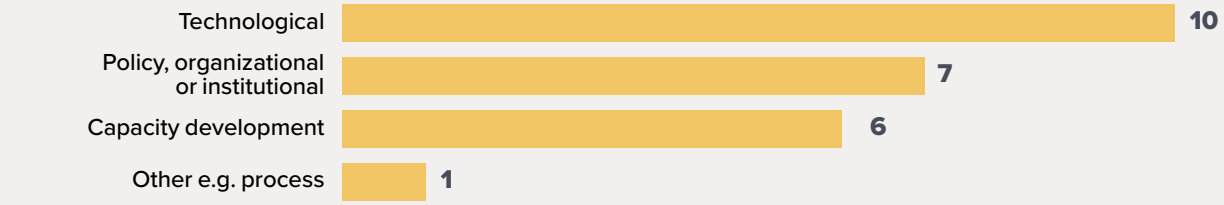
Results by region



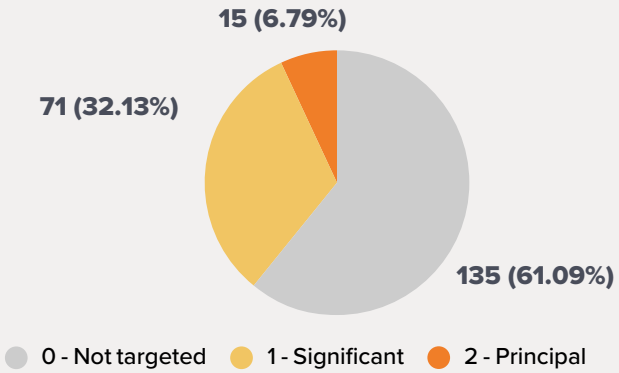
Innovations by readiness level



Number of innovations by type



Results by gender tag

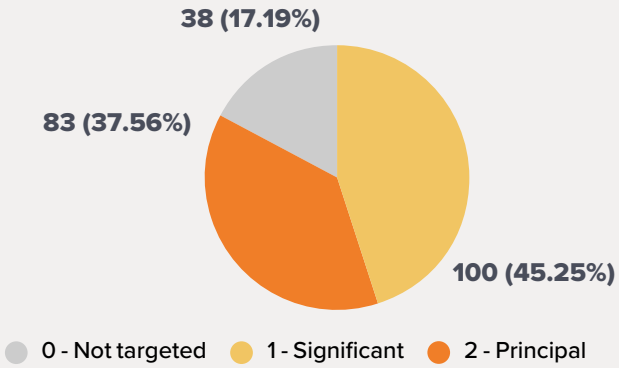


0 = Not targeted: The activity/result does not target gender equality.

1 = Significant: The activity/result contributes in significant ways to gender equality, even though it is not the principal focus of the activity.

2 = Principal: Gender equality is the main objective of the activity/result and is fundamental in its design and expected results.

Results by climate change tag

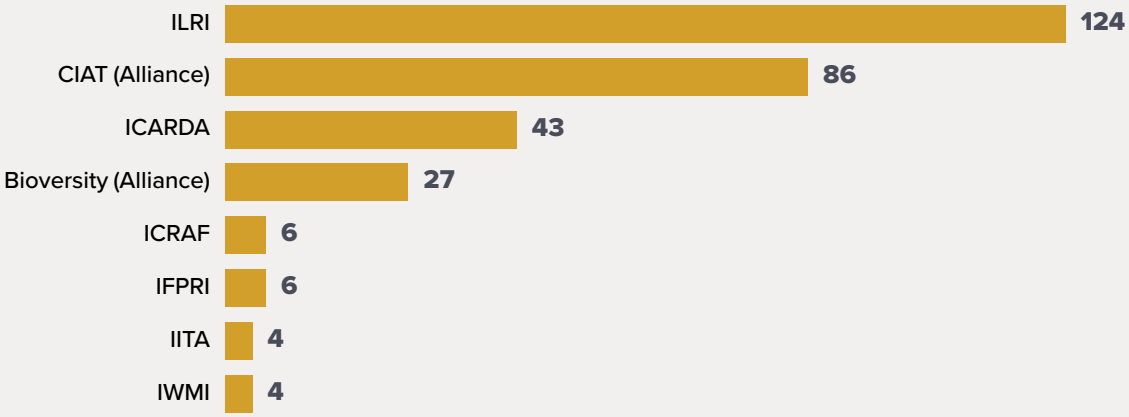


0 = Not targeted: The activity does not target climate mitigation, adaptation, and climate policy goals of the CGIAR as put forward in its strategy.

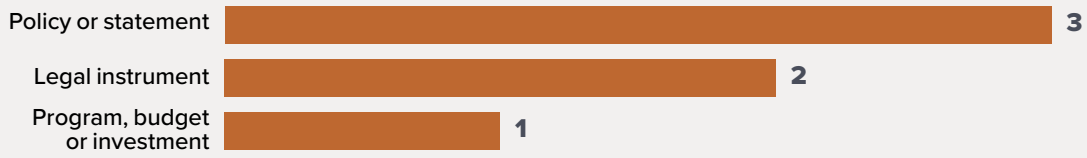
1 = Significant: The activity contributes in significant ways to either one of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation, and climate policy, even though it is not the principal focus of the activity.

2 = Principal: The activity is principally about meeting either one of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation, and climate policy, and would not have been undertaken without these objectives.

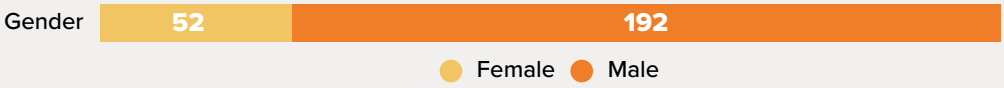
Contributing CGIAR Centers



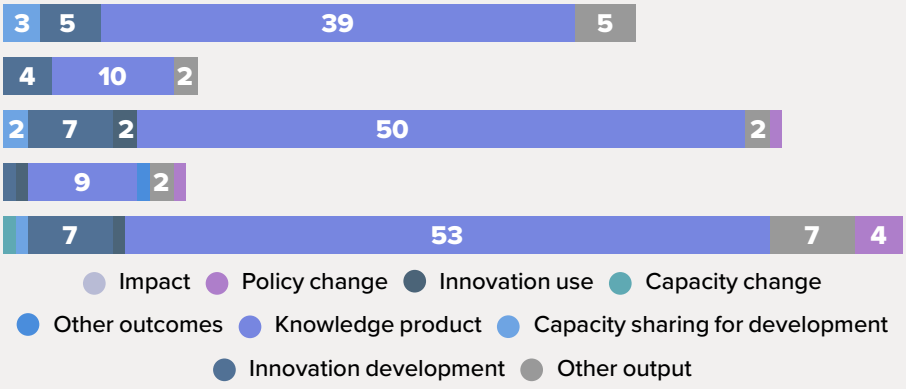
Policies by type



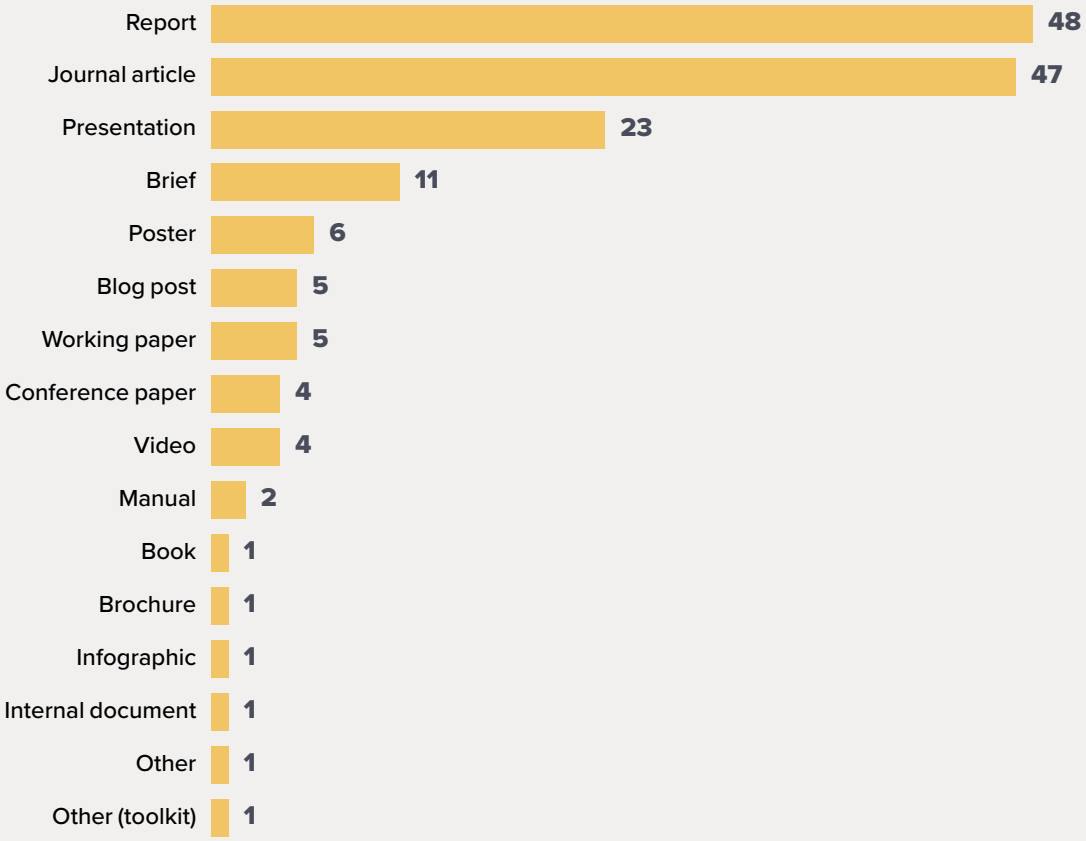
Short-term trainees



Results by Work Package

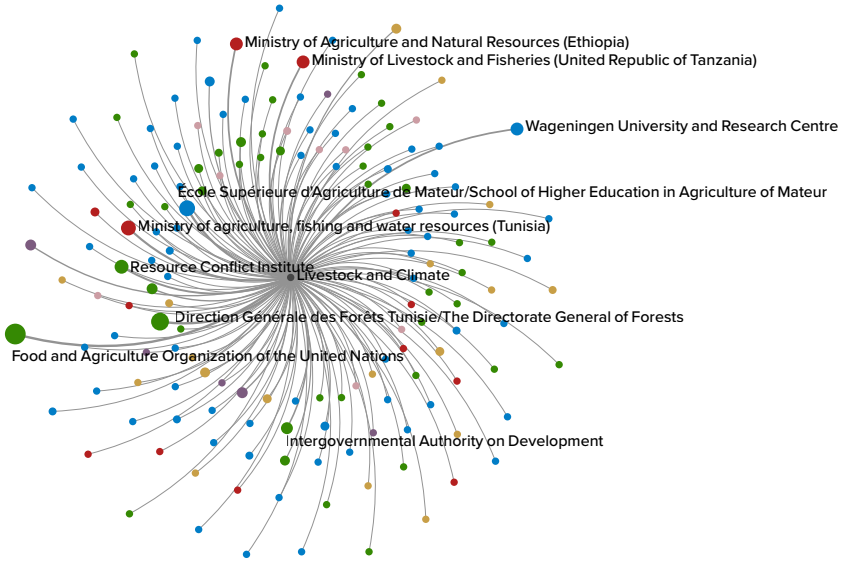


Knowledge products by category



A Kenyan Samburu mother enters nutrition data into the Mbiotishio mobile app. The app is being used in sentinel zones as part of the Initiative supported KAZNET data platform that gathers field data to ground-truth satellite data on drought conditions.
Photo credit: ILRI/Kabir Dhanji.

Section 5 Impact pathway integration – External partners



Partners typology	# of partners	% of partners
Research organizations and universities	71	41.5%
Research O&U (NARS)	18	10.5%
Government (National)	13	7.6%
Private company (other than financial)	9	5.3%
NGO International (General)	6	3.5%
All other categories	43	25.1%

Top 5 institution types

All other categories · Government (National) · NGO International (general) · Not applicable · Private company (other than financial) · Research O&U (NARS) · Research O&U (National) (Universities)

Note: CGIAR Centres are excluded from the analysis. Partners and edges are sized by the number of results. Labels are shown for the partners involved in the most results.

Partnerships and Livestock and Climate's impact pathways

Partners are vital to the Initiative's progress toward its outcomes. The Initiative has benefited from legacy Livestock CRP and bilateral partners, many of whom were consulted during the proposal design and early implementation stages. Research is breaking new ground in the climate investment arena. 2022 was spent carrying out partner landscape analyses and initial exploratory consultations and long-standing partnerships being strengthened.

Of primary importance are government partners from national to local levels in terms of demand, co-design of innovations and scaling. Trust, mutual respect and rapport have been built over time, opening doors otherwise closed. This led to high policy gains for the Initiative in 2022. Regional partnerships, such as with IGAD, also proved vital. The Initiative is working closely with National Agricultural Research Systems (NARS) in Tunisia and partnerships with NARS in other priority countries are under development. Public, private, local and national extension actors have proved essential for farmer-led adaptation and farmer-to-farmer scaling.

NGOs are key innovation and implementation partners for processes alongside which research is carried out. New partnerships include the Climate Smart Agricultural Youth Network. Commercial sector partners are key for scaling, whether unions of community radios disseminating climate information, insurance companies, supermarkets, fintech platforms expanding access to finance, or TV channels. Universities are important partners for the joint placing of Ph.D. and Master students. Discussions are underway with multilateral agencies such as IFAD and the WB together with GIZ and SNV on how to better link with their operations on the ground.

The involvement of multiple partner types is often necessary for developing and upscaling innovations (see Key Results Story). Engagement with multistakeholder platforms, regional and global initiatives and conventions has influenced Initiative science uptake. Strategically working with groups such as the African Group of Negotiators Experts Support and Global Research Alliance increases the likelihood of impact.

Section 6 Impact pathway integration – CGIAR portfolio linkages

Portfolio linkages and Livestock and Climate's impact pathways

Portfolio linking is a strong principle of the Initiative. In terms of regional initiatives, this Initiative links with AgriLAC Resiliente through its priority countries Guatemala and Colombia and Diversification in East and Southern Africa through Kenya, Ethiopia, and Tanzania. Complementary work includes activities on climate services, where the Initiative ensures that services are appropriate for livestock producers, value chain actors as well as for farmers.

Linkages are strongest with the Initiative on Climate Resilience, including complimentary research on investment in sustainable livestock value chains, and climate information services particularly in the Sahelian region and climate security. The Initiative also collaborates with AICCRA, which provides a bridge between the Initiative's research and practice through opportunities to test and improve the application of innovations in different contexts. An example is the application of participatory rangeland management in AICCRA intervention areas, alongside which the Initiative will monitor uptake and impact.

Additionally, the Initiative works closely with the Initiative on Gender Equality. The two Initiatives are implementing a gender transformative approach, which is important for household and community research. In collaboration with the Initiative on Sustainable Animal Productivity plans are underway to introduce improved breeds to communities implementing participatory rangeland management combined with approaches such as 'community conversations' to improve women's empowerment. The CGIAR's Gender Platform is assisting with the development of more detailed monitoring of Initiative gender-related impacts.

The Initiative is co-developing livestock environment impact assessment modelling tools with the Initiative on Sustainable Animal Productivity, and "greening" livestock master plans. There is also a strong partnership with the Initiative on Low Emissions Food Systems, mainly through the work of the Mazingira Centre. Both work on different aspects of improving MRVs which, as a bundle, will track interventions and help African nations move to Tier 2 GHG emissions reporting. The development of these MRVs benefits from support being provided to Mazingira by the New Zealand Agricultural Greenhouse Gas Research Centre to measure GHG emissions from animals and manure to develop better CH4 (methane) conversion factors (percentage of feed intake converted to methane).

Section 7 Adaptive management

RECOMMENDATION	SUPPORTING RATIONALE
Sourcing bilateral funding to complement Initiatives and uptake Initiative research gaps due to insufficient funds.	With less than half the anticipated Budget for 2022 and further reductions in 2023, the Initiative is having to reconsider (mainly reduce) its focus, outputs, and outcomes. Identifying bilateral funds to fill in gaps to complement the Initiative to grow the overall research portfolio is needed.
Identify a mechanism where the Initiative can fully support PhD candidates and studies.	Agreements between centers and universities to support PhD candidates have been difficult to establish given that the length of a PhD tends to surpass the lifespan of the Initiative's first phase. This is jeopardizing partnerships and potentially Initiative research outputs.
Improve partnerships with NARS, relevant government ministries, and others.	NARS and government ministries are critical demand, innovation, and scaling partners of the Initiative. It will be a priority for the Initiative in 2023 to strengthen these partnerships and, where appropriate, formalize them.
Change of End of Initiative outcome from: "Pastoralists and farmers implement improved governance, management and restoration practices on 500,000 ha" to "By 2024, pastoralists and farmers implement improved governance, management and restoration practices on 400,000 ha, with at least 30% active participation of women in decision-making processes."	Given the inability of the Initiative to expand its activities in West Africa at this current time due to limited funding, there is a need to reduce the hectares of land where the Initiative committed to improving governance, management, and restoration. Further, with the high level of participation of women in decision-making processes in some intervention areas, it would be difficult, if not impossible, to achieve a 25% increase. Therefore, 30% active participation is a more achievable goal.
Change of End of Initiative outcome from: "International agencies and policymakers use LCSR products to shape at least five policies or investments to strengthen socially inclusive low-emission livestock production system resilience, including at least three aimed at realizing climate-change related adaptation or mitigation progress by 2024" to "By 2024, policy makers use Livestock Climate and System Resilience products to shape at least four policies or investments to strengthen RLE and social-inclusive livestock agrifood systems interventions (LAFS)."	Given the restricted scope of the Initiative geographically at this current time, there is a need to reduce the number of policies and investments that the Initiative committed to influence. Further, the last part of the statement was removed as it is considered unnecessary and already implied due to the focus of the Initiative.
Greater investment in gender transformation.	The Initiative will increase its investment in developing gender-transformative approaches as a contribution to strengthening gender throughout the Initiative. Additional gender-focused staff have been employed to implement this.

RECOMMENDATION	SUPPORTING RATIONALE
Review of proposal questions and commitments in Proposal.	The proposal was developed with a significantly higher budget in mind than what has been provided. Though adjustments have been made to End of Initiative outcomes, outputs, and activities to reflect this, there is a need to revisit the proposal and adjust other commitments such as research questions, impact studies, and innovation and scaling commitments.
Strengthen the Initiative team.	Given the focus on achieving results in the first year building the ownership of, commitment to, and responsibility for the Initiative across the team was somewhat neglected. Going forward, extra effort will be made to address this by broadening-out management roles, being more inclusive and transparent, and with stronger information-sharing and communication within and across teams and centers.

Section 8 Key result story

A cattle rancher with a herd of Nelore short cycle cattle at the Hacienda San José in Colombia. Photo credit: Hacienda San José

Colombian cattle farm Hacienda San José secures US$7.5 million investment, supported by CGIAR tropical grass and sustainable livestock certification innovations

Improved forage grasses developed by CGIAR researchers and planted across 8,800 ha at Hacienda San José, a cattle ranch in Colombia, have increased not only cattle productivity but also soil carbon sequestration, helping to offset the emissions from the farm's livestock production. The ranch secured a US$7.5 million investment from the &Green Fund to expand its sustainable ranch model to 180,000 ha, leveraging the scientific evidence and sustainable livestock certification developed by CGIAR and its partners.

Hacienda San José (HSJ) is a cattle farm located in Colombia's Orinoquía region, working to become one of Latin America's most sustainable livestock producers. Their goal is to create the "perfect beef" that meets the growing demand for environmentally responsible production practices and addresses issues such as deforestation, land degradation, and climate change.

To achieve its sustainability objectives, HSJ uses the "Nerole short cycle" breed of cattle, known for its low water and feed requirements and reduced greenhouse gas (GHG) emissions. The farm also planted 8,800 ha with hybrid *Brachiaria humidicola* cv. Tully (CIAT 679) grass selected by scientists at CGIAR's Alliance of Bioversity International and CIAT (Enciso, K., et al, 2021). This grass boasts high plant biomass, providing abundant feed for livestock. When combined with a rotational grazing strategy, the grasses increase soil fertility, and their deep root systems absorb up to three times the emissions generated by ruminants, thus significantly reducing the cattle farm's carbon footprint.

HSJ first began working with CGIAR under the CGIAR Research Program on Livestock in 2019 through a partnership with the World Bank and the International Finance Corporation, and continued this partnership under the CGIAR Research Initiative on Livestock and Climate. The World Bank recognized the sustainability potential of HSJ's approach and commissioned CGIAR scientists to develop a life cycle-based model to assess its operations' annual and cumulative climate from 2017 to 2023 (Costa Jr, C., et al, 2022).

The assessments showed that the farm's GHG emissions are 44% lower than reference cow-calf farms in the region, resulting in a negative carbon footprint (Arango, J. et al, 2022).

HSJ leveraged this scientific evidence to obtain a US$7.5 million loan from impact investment firm &Green (&Green, 2022). The loan marked &Green's first investment in livestock and in the region and supports HSJ's scale-up of its sustainable livestock production model from 8,800 ha to 180,000 ha in the next decade. This investment contributes to Livestock and Climate's overall initiative goal to raise US$25 million from climate investors to help livestock producers' transition to more sustainable practices.

Further validation of HSJ's sustainability was achieved under the GANSO certification process, receiving a "responsible" classification — an advanced level endorsement that indicates a livestock company has achieved over 81% compliance for the assessed sustainability practices (GANSO, 2021). GANSO is a voluntary assessment tool for livestock producers and companies developed by Climate Focus and the Alliance of Bioversity International and CIAT. It assures consumers that the livestock products they purchase have been produced according to specified standards.

HSJ's social inclusion efforts were also recognized in the GANSO assessment. The ranch is promoting genetic improvement in neighboring farms, supporting educational initiatives for indigenous populations (particularly women) and collaborating with partners on crop and commercialization ventures that promote food security and other economic and social development initiatives. These efforts align with the ranch's Environmental and Social Action Plan (ESAP), which is part of the monitoring terms set out under &Green's loan conditions (&Green, 2021). Through this plan, HSJ is prioritizing sustainability and social responsibility in all of its operations.

Moreover, HSJ's surplus carbon resulting from its improved pasture and grazing management practices has made it eligible to access the voluntary carbon market (Arango, J., 2022). To navigate this complex market, HSJ is receiving technical guidance from the Initiative's scientists.

These collective efforts and partnerships can serve as replicable models for livestock producers worldwide seeking to transition to more sustainable practices. The lessons learned from HSJ's sustainable initiatives are paving the way for livestock producers in tropical regions to access climate finance and make the necessary transformative changes to improve productivity, reduce emissions, and increase carbon capture.

"The involvement of CGIAR as a trusted science partner of HSJ assured us that HSJ were serious about their climate mitigation ambitions. The data presented so far indicates that a climate-positive cattle ranching model is possible, which is very encouraging, not only for HSJ but for the sector globally. We are excited to see the developments over time as the CGIAR team continues to monitor the long-term changes at the farm."

Marthe Tollenaar, Environmental, Social and Governance Director &Green

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LINKS TO IMPACT AREAS

Primary Impact Area: Climate Adaptation and Mitigation

Other relevant Impact Area(s): Poverty Reduction, Livelihoods, and Jobs

GEOGRAPHIC SCOPE

Region(s): South America
Country/ies: Colombia

KEY CONTRIBUTORS

Contributing Initiative(s): Livestock and Climate
Contributing Center(s): Alliance of Bioversity International and CIAT
Contributing external partner(s): Hacienda San José, the &Green Fund, World Bank, GANSO

COVER PHOTO: Improved boran cattle at ILRI's Kapiti farm. Photo credit: J. Meyers/ILRI

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