CGIAR

INITIATIVE ON
Sustainable Animal Productivity

*An agent from the Yazerber Animal Production Center weighs a Menz meat sheep to determine its price during a purchase in a village with a community-based breeding program in Ethiopia.*

*Credit: ICARDA*

# CGIAR Research Initiative on
# Sustainable Animal Productivity

Annual Technical Report 2024

**Author:** CGIAR Research Initiative on Sustainable Animal Productivity

**Title:** Annual Technical Report 2024: CGIAR Research Initiative on Sustainable Animal Productivity

**Suggested citation:** CGIAR Research Initiative on Sustainable Animal Productivity. 2025. Annual Technical Report 2024: CGIAR Research Initiative on Sustainable Animal Productivity. Montpellier, France: CGIAR System Organization. https://hdl.handle.net/10568/174144



**Disclaimers**

This publication has been prepared as an output of the CGIAR Research Initiative on Sustainable Animal Productivity. 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 Sustainable Animal Productivity. 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.

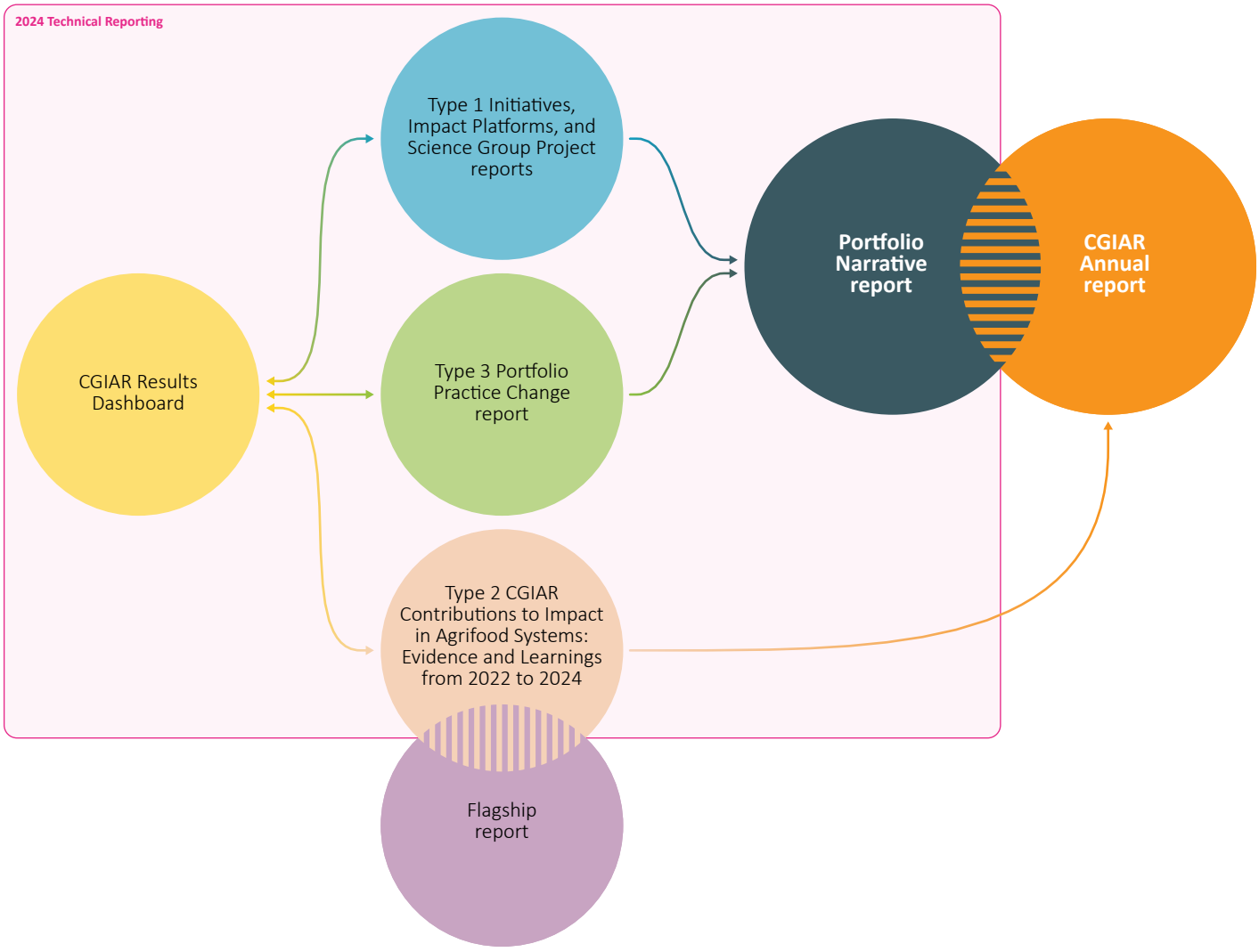



Figure 1. CGIAR's 2024 Technical Reporting components and their integration with other CGIAR reporting products.

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

| | |
|---|---|
| **Initiative name** | Sustainable Animal Productivity for Livelihoods, Nutrition and Gender Inclusion |
| **Initiative short name** | Sustainable Animal Productivity |
| **Initiative Lead** | Isabelle Baltenweck (i.baltenweck@cgiar.org) |
| **Initiative Co-lead** | Mourad Rekik (m.rekik@cgiar.org) |
| **Science Group** | Resilient Agrifood Systems |
| **Start – end date** | 01 January 2022 – 31 December 2024 |
| **Geographic scope** | **Countries**<br>Ethiopia · Kenya · Mali · Nepal · The Socialist Republic of Viet Nam · Uganda · United Republic of Tanzania |
| **OECD DAC Climate marker adaptation score[1]** | **Score 1: Significant**<br>The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives – namely, climate mitigation, climate adaptation and climate policy, even though it is not the principal focus of the activity. |
| **OECD DAC Climate marker mitigation score[1]** | **Score 1: Significant**<br>The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives—namely, climate mitigation, climate adaptation and climate policy—even though it is not the principal focus of the activity. |
| **OECD DAC Gender equity marker score[2]** | **Score 1B: Gender responsive**<br>On top of the minimum requirements for 1A, the Initiative/project includes at least one explicit gender equality outcome and the Initiative/project team has resident gender expertise or capacity. The Initiative/project includes indicators and monitors participation and differential benefits of diverse men and women. |
| **Website link** | https://www.cgiar.org/initiative/17-sustainable-animal-productivity-for-livelihoods-nutrition-and-gender-inclusion-sapling/ |

[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

Progress toward the End of Initiative outcomes (EOIO) was excellent. Innovations of the Sustainable Animal Productivity Initiative were used by 433,796 people across its seven target countries (86 percent compared to target) through innovations centered on animal feed, animal breeding, gender, and extension (EoI1). A total of USD 4.5 million was raised by partners to support and scale the Initiative's innovations (90 percent compared to target, EoI2) while 6 partners (compared to five as target) utilized the Initiative's innovations to incorporate safe livestock-derived foods into diverse diets (EoI3). Finally, 14 decision-makers (compared to 7 as target) utilized the Initiative's information to guide their decisions (EoI4), ranging from international partners on livestock master plans, to national partners on selection of superior breeds in several countries, to private-sector and breeder cooperatives working on small ruminants in Ethiopia.

Sustainable Animal Productivity employed a theory of change (TOC) approach, customizing interventions by country and value chain. Participatory workshops co-developed these TOCs, which were updated during reflection sessions. These frameworks cover dairy cattle (Kenya, Uganda, Ethiopia), dairy buffalo (Nepal), chickens (Kenya, Tanzania, Ethiopia), small ruminants (Ethiopia and Mali), pigs (Viet Nam and Uganda), and beef (Viet Nam). TOCs supported monitoring, evaluation, and learning. Between 2022 and 2024, impact assessment studies on last-mile delivery innovations (e.g., training local livestock agents) showed behavioral changes, such as improved dairy management. Approximately 38 percent of innovations led by the Initiative reached proof-of-application levels, while 31 percent were tested in controlled environments.

Country-level research-in-development deepens interdisciplinary work and drives impactful outcomes. In Ethiopia, community-based breeding programs expanded to 10,000 households. Radio campaigns on sheep fattening reached 3.6 million farmers, boosting uptake and incomes. In Kenya, the Dairy Farmer Assistant (DFA) model improved smallholder dairy productivity. In Mali, a community-based breeding program improved small ruminant production and a thermotolerant vaccine benefited 3,500 households. In Nepal, Village Livestock Promoters (VLPs) connected farmers to resources, strengthening livestock productivity and sustainability. Agrodealers and digital platforms supported youth entrepreneurs in Tanzania. Pig farmer groups in Central Uganda, using a PigSMART innovation and model farms, saw positive results. A pig weigh band empowered farmers to negotiate better prices. Farmer groups accelerated the adoption of the Initiative's innovations in Northwest Vietnam, enhancing market access. Local partners integrated this model into the National Target Program of Mai Son district.

Sustainable Animal Productivity has advanced dairy genetics by supporting genomic evaluations for bull selection in Ethiopia and Tanzania, while digital tools have aided real-time data capture and farmer support. In Nepal, an animal identification and traceability system for buffaloes is under development. For poultry, improved chicken breeds were introduced in Ethiopia, Kenya, and Tanzania, with national partners promoting adoption through various platforms. On policy development, the Initiative enhanced livestock master plan (LMP) models, integrating herd dynamics with a multimarket model and incorporating environmental considerations using the CLEANED (Comprehensive Livestock Environmental Assessment for Improved Nutrition, a Secured Environment and Sustainable Development along Livestock Value Chains) framework. The gender strategic work supported the empowerment of women and youth while promoting equitable gender norms. The Women's Empowerment in Livestock Index was refined, and a four-module tool for studying gender norms was developed. In Ethiopia, bundled innovations supported women and youth in small ruminant value chains. Tanzanian work fostered young women's participation in chicken and dairy businesses. Ugandan work promoted women's engagement in artificial insemination and pig aggregation. And work in Viet Nam implemented gender-transformative campaigns for ethnic minorities, addressing restrictive norms affecting women's mobility and decision-making.

The Sustainable Animal Productivity team produced 699 knowledge products over the three-year period, including 155 journal articles. The science and research-in-development work under the Initiative will be further developed under CGIAR's Sustainable Animal and Aquatic Foods Science Program for all the Work Packages except WP 2 ("Innovations and Practices for Safe Livestock-Derived Food Consumption as Part of Diverse Diets") that will be carried on under CGIAR's Better Diets and Nutrition Science Program.

| | 2022 | 2023 | **2024** |
|---|---|---|---|
| **PROPOSAL BUDGET** | $16.00M | $20.00M | **$24.00M** |
| **APPROVED BUDGET** [1] | $15.18M | $14.88M [2] | **$15.04M** [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.

# Section 2: **Progress towards End of Initiative outcomes**

## 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

- Transforming the livestock sector in Africa and Asia toward sustainability and equity can enhance its critical role in improving livelihoods. Livestock, a high-value agricultural subsector, contributes 15–80 percent of agricultural GDP in low- and middle-income countries. With demand for livestock products in these regions projected to grow 200–300 percent by 2030, small- to medium-scale producers have an opportunity to meet demand while supplying nutrient-dense foods. The African Development Bank emphasizes repositioning livestock as a business to boost food security and inclusive (economic) growth.
- However, productivity remains low, with cows in sub-Saharan Africa and South Asia yielding just 6 percent and 12 percent, respectively, of their counterparts in the Organisation for Economic Co-operation and Development's member countries. Key barriers include underutilized livestock genetics, insufficient high-quality feed, poor health management, and limited access to technologies. These issues increase pressure on natural resources while constraining producers' market benefits. Greenhouse gas emission intensities are high due to low yields. Addressing these challenges is crucial to prevent shortfalls in livestock-derived foods (LDFs), which are vital for nutrient-dense diets, and to reduce the environmental footprint of livestock.
- Climate change, pandemics, and systemic risks threaten to further undermine productivity and sustainability. Targeted research is needed to balance productivity, environmental impacts, and livelihood outcomes. Gender and youth inequities also persist, as women and young people often lack control over resources and income opportunities.
- Innovations in animal breeding, feed and forages, herd health, and market systems have shown potential but require scaling. Bundling these with institutional and policy support can boost sustainable productivity. The SAPLING Initiative engages stakeholders in codesigning Innovation Packages to support sustainable, resilient livelihoods and enterprises, particularly for women and youth. This approach is expected to catalyze public and private investments and create a supportive policy environment, enabling large-scale impact.

### RESEARCH QUESTIONS

- How can innovations in genetics, feed, vaccines and diagnostics, and herd health be integrated and scaled to improve livestock productivity, enhance resource efficiency, and ensure equitable benefits in changing environments?
- How can value chain actors and regulatory authorities be incentivized to invest in enhancing the supply of safe, affordable LDFs while increasing equity and inclusion in the value chain?
- Under which conditions do private-sector actors see viable business cases in SAPLING-tested innovations, and how can SAPLING and donor investments effectively reduce their risks to encourage co-investment?
- How can technical and institutional innovations in livestock and gender-transformative approaches support women's and youth's empowerment and promote gender equality?
- Under which conditions do policymakers and decision-makers allocate resources, foster an enabling environment, and support de-risking of private-sector investments to scale successfully tested innovations in livestock?

### SPHERE OF **CONTROL**

Work Packages

**Work Package 1**

Technologies and practices for sustainable productivity.

**Work Package 2**

Livestock derived foods as part of diverse diets.

**Work Package 3**

Gender equity and social inclusion.

**Work Package 4**

Competitive and inclusive livestock value chains.

**Work Package 5**

Evidence, Decisions and Scaling.

## SPHERE OF **INFLUENCE**

### End-of-Initiative Outcomes

**End-of-Initiative Outcome 1**

Co-created innovation packages used by livestock keeping households, resulting in a 10-25% increase in livestock productivity.

**End-of-Initiative Outcome 2**

Private and public sector partners invest in inclusive productivity enhancing technologies and practices.

**End-of-Initiative Outcome 3**

Public and private sector organizations utilise initiative strategies or campaigns targeted at incorporating safe LDFs into diverse diets.

**End-of-Initiative Outcome 4**

Public and private decision makers utilise initiative innovation packages to inform policies and investment towards sustainable livestock systems, including progress towards equity and inclusion.

### Action Area Outcomes

**Resilient Agrifood Systems**

4 **1** · CGIAR partners develop and scale innovations that contribute to the empowerment of women and other social groups in food, land, and water systems.

1 2 3 4 **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 4 **3** · Due to CGIAR involvement, private sector actors invest in business practices or models that have the potential to improve livelihoods, climate resilience, promote sustainable and inclusive food systems, and boost consumption of healthy diets, especially among nutritionally vulnerable population groups.

1 2 3 4 **4** · Implementation partners (e.g. NARES, NGOs, private companies) actively support dissemination, uptake, and implementation of CGIAR innovations.

1 2 3 4 **5** · Global and regional institutions, such as funding agencies, international organizations, and coordinating bodies use CGIAR research evidence in the development of strategies, policies, and investments to drive sustainable transformation of food, land, and water systems contributing to livelihood, inclusion, nutrition, environmental and climate resilience objectives.

1 2 3 4 **6** · 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 4 **7** · 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.

## SPHERE OF **INTEREST**

### Impact Areas

**Nutrition, Health & Food Security**

2 3 4 5 6 7 · 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 5 6 7 · Lift at least 500 million people living in rural areas above the extreme poverty line of US $1.90 per day (2011 PPP).

2 3 4 5 6 7 · 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**

1 2 3 4 5 6 7 · 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**

2 3 4 5 6 7 · Equip 500 million small-scale producers to be more resilient to climate shocks, with climate adaptation solutions available through national innovation systems.

**Environmental Health & Biodiversity**

2 3 4 5 6 7 · 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.

2 3 4 5 6 7 · Maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed genebanks at the national, regional, and international levels.

*Sintayehu Bashahyider feeds his sheep in front of his home. Menz, ETHIOPIA_ Bashayider is a long time beneficiary of ICARDA's community based breeding and sheep-fattening programs. Bashayider is also an active participant in ICARDA-ILRI led community conversations under the CGIAR Research Program on Livestock*

*Cedit: Apollo Habtamu, ILRI*

## Summary of progress against the theory of change

Livestock offer significant opportunities for small- and medium-scale producers to improve income and nutrition that are driven by increasing demand for livestock products. Key to this transformation are productivity-enhancing technologies, market interventions, and gender solutions developed by the Sustainable Animal Productivity Initiative across 7 countries and 15 value chains. However, challenges persist, including underutilized genetic potential, lack of resilient feed and forages, poor animal health management, and weak value chain governance, all of these further exacerbated by climate change and the global economic and trading contexts. Specific barriers for women and youth include limited access to innovations and resources. To address low technology adoption, the Initiative emphasized bundling technologies with institutional and policy support alongside stakeholder co-design and public-private investments.

Sustainable Animal Productivity employed a theory of change (TOC) approach, adapting its vision and outcomes to specific countries and value chains. Participatory workshops were held to co-develop TOCs, which were updated during reflection sessions to align with evolving needs The TOCs are documented by value chain and country in the CGSpace repository; dairy cattle (Kenya, Uganda, and Ethiopia), dairy buffalo (Nepal), chicken (Kenya, Tanzania, and Ethiopia), small ruminant (Mali), pig (Viet Nam and Uganda), and beef (Viet Nam) value chains. These TOCs facilitated monitoring, evaluation, and learning. Several impact assessment studies conducted between 2022 and 2024 focused on last-mile delivery innovations, such as training local livestock agents in Kenya, Tanzania, and Nepal. These studies revealed significant behavioral changes, including improved dairy management and shifts in gender norms around food consumption in Uganda. In Ethiopia, digital information services and collective action were tested to enhance smallholder market participation.

Approximately 38 percent of the innovations led by Sustainable Animal Productivity reached proof-of-application levels (CGIAR scaling readiness level 7 and above) and 31 percent were tested under controlled environments. These innovations span all work packages (WPs) and countries. (Diagram here)

## 9 Proven Innovation = 10

African Asian Dairy Genetics Gain data platform
Community-based sheep and goat breeding programs
Digital platform for improved small ruminant breeding
Genomic selection-based breeding programs for smallholder dairy cattle farmers
Getting women into chicken business in Tanzania
Improved access to certified sires by small-ruminant farmers
Sheep fattening by women and youth groups and cooperatives
The Women's Empowerment in Livestock Index (WELI)
Tools for control and eradication of peste des petits ruminants
Urochloa hybrids, improved forage grasses for cattle farmers

## 8 Uncontrolled testing = 8

Feeding strategies for improved livestock productivity in North-west Vietnam
From fleece to screens: Digital marketing for small ruminant producers
Novel stress tolerant, highly productive and resource efficient forages
Reproductive platform to deliver genetic gain in sheep and goats
Social media for gender-transformative change in agribusiness
Training package on animal health for cattle and pig keepers
Animal identification and traceability system for livestock keepers and stakeholders
Softwre to count racemes (flowers) in Urochloa grasses

## 7 Uncontrolled testing = 10

Cassava peel as a nutritious animal feed
Fertility management package to improve buffalo reproduction
Forage registration in Tanzania
Gendered business models for improved cattle artifical insemination delivery, Vietnam
One Health Units for service delivery to pastoralists
On-farm digitised feed advisor for livestock keepers in Nepal
PigSMART digital extension platform for pig farmers in East Africa
Thermotolerant vaccine for PEste des Petits Ruminants in Mali
Village Livestock Promoter for integrated technology delivery to farmers
Robust management practice ("ram effect") for enhanced sheep reproduction

**Scientific progress**

WP1 scientists published a total of 374 knowledge products over the 3-year period. They cover breeding and genetics, animal health, and feed and forages. Highlights for 2024 include genomic technologies for dairy seedstock selection, risk maps for peste des petits ruminants vaccination in Mali, and identification of a critical gap in accessing quality forage seeds.

WP2 published 29 knowledge products. These include the Food Systems, Environments, and Nutrition: Structured Evidence Framework (FoodSENSE Framework) for stakeholders to systematically identify at the subnational level constraints and solutions to improving food and nutrition security. The brief describes the process and application to Masaka district, in Uganda.

WP3 focused on gender and social norms, publishing 59 knowledge products. These include gendered analyses of veterinary practices in Uganda and the impact of local norms on women's engagement in Tanzania's dairy value chains. On empowerment, a scoping review identified livestock interventions that contribute to women's empowerment and gender equality; it challenges the assumption that gender-accommodative approaches 'do no harm', given the negative or unclear impacts on women's labour and workloads. Further, a framework to integrate gender in One Health was developed with CGIAR's Research Initiative on One Health.

WP4 contributed 85 knowledge products, emphasizing market-driven interventions, such as strategies to increase sheep keepers' income through targeted traits and improved price information. Collaborative studies with WP1 on East Coast fever vaccination highlighted institutional innovations to enhance adoption of the vaccine.

WP5 produced 65 knowledge products, focusing on environmental sustainability and models to inform decision-making. Tools like the Inclusive and Comprehensive Livestock Environmental Assessment (I-CLEANED) were integrated into Vietnamese university curricula, and symposiums on livestock dynamics and resilience modeling were organized to inform sector policies.

**Country-level achievements**

Research-in-development at the country level offers the opportunity to deepen interdisciplinary work and to achieve outcomes. In Northwest Viet Nam, a farmer groups model effectively accelerated the uptake of the innovations of Sustainable Animal Productivity by livestock producers, enhancing their access to input and output markets, and was taken up by local partners as a scaling model integrated into the National Target Program of Mai Son district. In the same region, Partnerships and co-investment from local partners in capacity building were instrumental in enhancing adoption of feeds and forages and animal health innovations by livestock producers.

In Uganda's Central Region, interventions implemented through pig farmer groups using a factorial research design effectively integrated work package components. Farmer groups exposed to both a PigSMART innovation and model farms coupled with herd health trainings reported positive outcomes. And use of a pig weigh band empowered Uganda's pig producers to negotiate fair market prices for their pigs.

In Mali, a behavior change communication package for small ruminant producers promoted system intensification and manure use. A community-based breeding program launched in 2023 supports long-term sheep and goat production improvements. Mali also deployed a thermotolerant vaccine against peste des petits ruminants, benefiting 3,500 households.

Ethiopia's community-based breeding programs expanded significantly, reaching over 10,000 households by 2024 and with significant investments made by research institutes, universities, and communities. Improved sheep fattening techniques promoted through radio campaigns reached 3.6 million farmers, increasing uptake by 67 percent and household incomes by 343 percent. Investments in sheep and goat breeding programs included training, distribution of superior sires, and community engagement.

In Tanzania, agrodealers played a critical role in disseminating dairy and chicken value chain technologies. Digital platforms supported young entrepreneurs, fostering entrepreneurial growth and technology adoption. Investments of over USD 40 million in poultry and dairy value chains were achieved, indicating significant progress.

In Kenya, Sustainable Animal Productivity introduced the dairy farmer assistant (DFA) extension services model to support smallholder dairy farmers. Privately contracted personnel provided targeted advice, improving farm management and productivity. Seven cooperatives participated in an experimental study, with trained graduates deployed as DFAs. The model has been well received by farmers, cooperatives, and extension personnel

In Nepal, young graduates were trained as village livestock promoters (VLPs) to support dairy farmers. VLPs connect farmers with resources, institutions, and cooperatives, enhancing livestock productivity through specialized training. A sustainable business model was developed through revenue strategies, ensuring long-term effectiveness. Strengthened partnerships with institutions enhanced support, acceptance, and resource access, improving services for livestock farmers through governmental and non-governmental collaboration.

**Specific components achievements**

In dairy genetics, genomic evaluations supported bull selection for artificial insemination in Ethiopia and Tanzania. Digital tools facilitated real-time data capture and farmer support. The Initiative also supported Nepal in developing an animal identification and traceability system in buffaloes.

For poultry, improved chicken breeds were introduced in Ethiopia, Kenya, and Tanzania, enhancing farmers' access to the improved breeds. Production practices have also been improved. To facilitate broader adoption of the introduced breeds in future, national partners of the Initiative have promoted these breeds through different platforms.

On policies, a major achievement was improving livestock master plan models by linking herd dynamics with a multimarket model using data from Tanzania. Further environmental considerations were incorporated by linking the livestock multimarket model with the CLEANED framework. Development of livestock master plans has also been strengthened by a partnership of the African Union-InterAfrican Bureau for Animal Resources (AU-IBAR), the French Agricultural Research Centre for International Development (CIRAD), the Food and Agriculture Organization of the United Nations (FAO), and the International Livestock Research Institute (ILRI) as well as by building the capacity of local experts.

The Initiative's strategic gender work focused on empowering women and youth and promoting equitable gender norms. The team refined the Women's Empowerment in Livestock Index and developed a four-module tool for studying gender norms. Baseline and endline surveys were conducted in Ethiopia, Tanzania, Uganda, and Viet Nam and findings used to co-develop gender-responsive interventions. In Ethiopia, women and youth were supported in small ruminant value chains by promoting bundled innovations such as improved livestock breeds, barley varieties, and cooperative business models. We explored how these bundles influence gender norms, finding that while some promote equity, others risk reinforcing inequalities. In Tanzania, we supported young women in chicken and dairy businesses with egg incubation, mentoring, and digital tools, with the model subsequently adopted by government officials. In Uganda, both accommodative and transformative approaches were used to promote women's participation in artificial insemination and pig aggregation services. To make progress toward gender equity, restrictive gender norms that limit women's mobility, decision-making, and resource ownership need to be addressed. In Viet Nam, a gender transformative communication campaign targeting ethnic minorities was conducted that included equality trainings for government officials and livestock keepers and poetry performances on equality for livestock communities.

*Larvae of Black Soldier Fly (hermetia illucens) are given to livestock chickens which contain high protein.*
*Credit: Faizal Afnan/Shutterstock*

# 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

Co-created innovation packages used by 490,000 people, resulting in a 10–25-percent increase in livestock productivity (metrics: number of people using innovations).

## EOIO 2

Private- and public-sector partners invest USD 5 million in inclusive productivity enhancing technologies and practices (metric: policy change in USD).

## EOIO 3

5 public- and private-sector organizations utilize Initiative-developed social behavior change communication (SBCC) strategies, tools, or campaigns to incorporate safe livestock-derived foods into diverse diets and to inform nutrition education strategies and/or campaigns.

## EOIO 4

7 public- and private-sector decision-makers utilize the Initiative's innovation packages to inform policies and investments toward an inclusive and sustainable livestock system, including progress toward equity and inclusion.

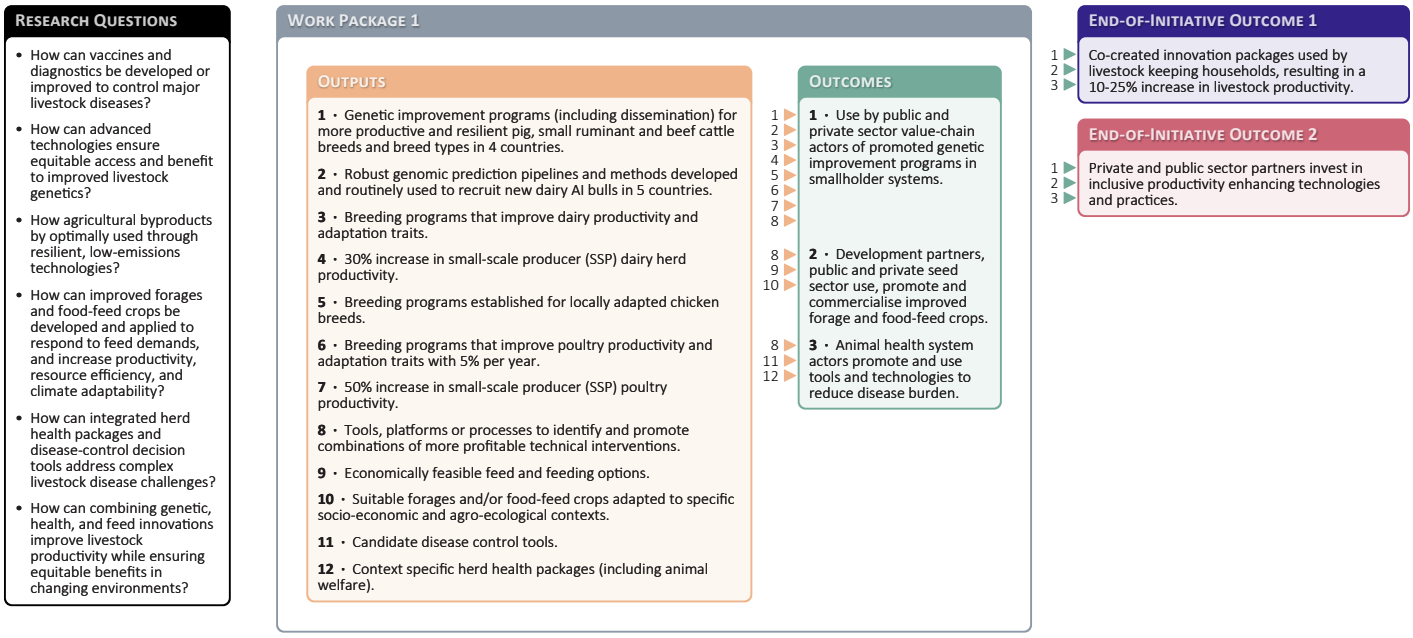
The innovations of Sustainable Animal Productivity were used by 433,796 people across the 7 target countries (86 percent compared to target). The main innovations contributing to this number of people included the Urochloa hybrids scaled in Ethiopia, Kenya, Uganda, and Vietnam. These are improved forage grasses that enhance cattle productivity and reduce soil erosion and other environmental benefits. Other innovations included community-based sheep and goat breeding programs in Ethiopia and Mali; breed information and certified sires used by dairy farmers in Tanzania, Ethiopia, Kenya, Uganda, and Nepal ( via the Africa Asia Dairy Genetic Gains project); ways for women to benefit from chicken business in Tanzania; and delivery of technologies and extension through village-based promoters in Nepal.

A total of USD 4.5 million (90 percent of the target) was raised by the Initiative's partners to support and scale its innovations. In Ethiopia, research institutions, universities, and the community invested a total of USD 1,604,250 to scale community-based sheep and goat breeding programs, which included a digital platform. Breeder cooperatives in Ethiopia invested USD 711,565 in sustaining breeding programs. The Holeta city administration invested USD1.5 million to support street vendors frying chicken. Finally, in Nepal, local governments and a farmer cooperative invested USD 223,215 in inclusive productivity enhancing technologies and practices to scale the village livestock promoter extension approach and the enriched rice straw technology.

A total of 6 partners (versus a target of 5 partners) utilized the Initiative's innovations. These partners were from public institutions and included local administrations and school communities in Kenya and Ethiopia that incorporated Initiative-led/associated school feeding programs; ministry of health and community health officers and leaders from Uganda's Buganda Kingdom used the Initiative's social behavior change communication materials on nutrition and animal-source foods to train community heath teams and to modify the ministry's nutrition counselling cards.

A total of 14 decision-makers (versus a target of 7) utilized this Initiative's information to guide their decisions. International partners (AU-IBAR, CIRAD, and FAO) renewed their commitment to support countries in developing livestock master plans. National partners in Nepal have taken up innovations led by the Initiative for selection of superior livestock breeds. Subnational governments have invested in increasing consumption of animal-source foods and scaling out chicken vendor businesses in Ethiopia as well as facilitating the uptake of Initiative-led innovations by farmers (and farmer groups) in Viet Nam. Other decision-makers included those from the private sector that invested in linking small ruminant producers to the market and the breeder cooperatives that invested in sustaining breeding program in Ethiopia.

## WP1: Technologies and Practices for Sustainable Livestock Productivity



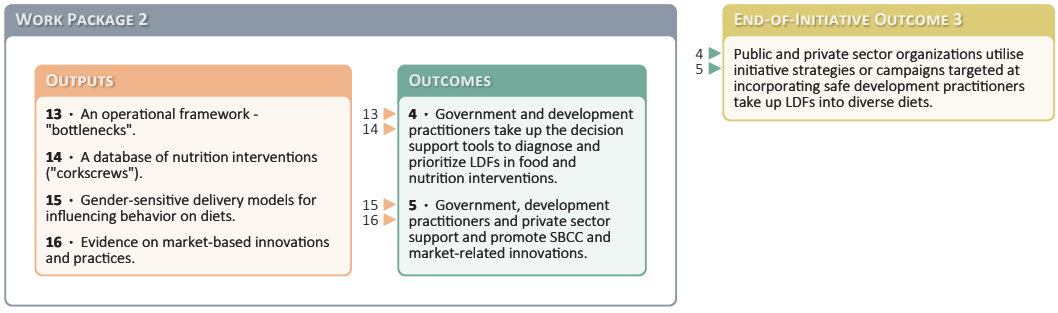

### Work Package 1 progress against the theory of change

In 2024, Work Package 1 reported results against all its outputs and significant achievements were made towards its outcomes. Teams in the countries targeted by Sustainable Animal Productivity progressed significantly by integrating improved forages and feed, animal health products, and improved genetics. Feed and forage interventions were conducted in all countries to address global challenges but tailored to local conditions, including feed shortages, drought, and inadequate roughages. One example of success supported by the Initiative was adoption of Urochloa hybrid forages, with around 3.9 million hectares and substantial reductions in greenhouse gas emissions. The Initiative also supported the access to improved forages through work on seed systems delivery. This involved strengthening seed systems by addressing challenges in forage seed availability, accessibility, and affordability through community-based systems and multilocational trials and demonstration plots, with over 40 capacity-building activities (trainings, field days, workshops) conducted, focusing on improved feeding, forage production, and ration formulation. Under genetics, an animal identification and traceability system (AITS) was supported by the Africa Asia Dairy Genetic Gains Project in the dairy sector of Nepal, a system developed in consultation with key stakeholders in the country and approved by Nepal's Ministry of Agriculture and Livestock Development. Small ruminant community-based breeding programs in Ethiopia leveraged a total investment of USD 1,604,253 by governmental and non-governmental organizations that included research centers, universities, and farmer cooperatives. Between 2022 and 2024, selection rounds in the different community-based breeding programs led to the distribution of 2,649 improved livestock sires, most of which underwent a process of certification. Herd health interventions and evaluations in small ruminants, chicken, pigs, and dairy farms and related capacity building packages were developed and deployed. These included a behaviour change communication package targeting actors in Mali's small ruminant value chain; improved capacity of 132 farm service suppliers (17 percent women) and 701 farmers (52 percent women) benefited. The peste des petits ruminants thermotolerant vaccine was deployed with 50,000 sheep and goats vaccinated in Mali's Ségou, Koutiala, and Sikasso regions, thereby improving the productivity of 3,500 rural Malian households. To support the government of in tackling this plague, a risk map was produced to inform Mali's national vaccination strategy. In Uganda, pig producers adopted improved herd health practices, thereby improving their productivity. In Ethiopia, herd health interventions significantly reduced the morbidity and mortality of small ruminants. The TOC assumptions remained valid.

# WP2: Innovations and Practices for Safe Livestock-Derived Food Consumption as Part of Diverse Diets

**Research Questions**

- What are the context-specific barriers to achieving food security and nutrition in the context of livestock-keeping communities, and which interventions should be prioritized to address these constraints?
- What approaches and integrated nutrition interventions—including social behavior change communication on LDFs as part of diverse nutritious diets, women's empowerment, and food safety—affect household food security and nutrition outcomes among livestock-keeping communities?
- What technologies, approaches, and business models enhance processing and trading efficiency and incentivize uptake by livestock value-chain actors to enhance supply of safe, nutritious, and affordable animal-source foods to consumers?




## Work Package 2 progress against the theory of change

Work Package 2 has made progress to address its 2 key research questions and delivered on its planned outputs and outcomes. The third research question was dropped due to funding constraints. To address the research question on context-specific barriers to achieve food security and nutrition for livestock-keeping communities, an innovation called FoodSENSE was developed. FoodSENSE is a decision-support framework used to identify context-specific food security and nutrition bottlenecks and potential interventions to overcome them. It is grounded in the food systems approach. The framework was operationalized in three districts in Uganda and Son La province in Vietnam, with promising interventions prioritized by partners. Results showed that constraints were related to poor market access for nutrient-dense foods, food price fluctuations, negative social norms that restrict consumption of livestock-derived foods (LDFs); and poor yields due to adverse climate.

In collaboration with the University of Alicante (Spain), the Uganda team implemented a formative study to identify the key barriers to the inclusion of LDFs in livestock keepers' diets, to guide a gendered SBCC intervention in line with the WP2 second research question. The barriers were: limited basic nutrition knowledge of men and women, and social norms that limit women and children's consumption of LDFs. Three focal SBCC modules were co-created with nutrition stakeholders to address the social norms constraints. To assess the impact of the SBCC intervention, a cluster randomized controlled trial design with three study arms was implemented. Baseline-endline surveys were implemented on 1,200 households in Uganda. The SBCC modules was implemented by community health workers and traditional leaders and reached 4,760 men and women in Uganda. The outcomes from the intervention showed mindset change in the community regarding norms associated with consumption of LDFs by women and children. There were positive nutrition outcomes for the study arm that included social norms compared to the other study arms that focussed only on nutrition education for men and women. The ministry of health integrated animal-source foods more explicitly in its MIYCAN cards.

The Tropical Poultry Genetic Solutions project implemented a home-grown school feeding program in Ethiopia, Kenya, and Tanzania to increase consumption of animal-source foods (eggs) in primary schools. The project set up a sustainable nutrition intervention by integrating poultry into the existing school feeding program via construction of a chicken house within the school compound. A farmer-friendly application was developed to improve nutrition education, especially inclusion of LDFs and other nutrient-dense foods. The TOC assumptions held.

# WP3: Sustainable Livestock Productivity for Gender Equity and Social Inclusion

**Research Questions**

- How can livestock genetic improvement, feed forages, and animal health technical innovations support women's empowerment toward gender equality?
- How can institutions (norms, markets, organizations, policies) affect women's empowerment toward gender equality?
- What gender-accommodative and -transformative approaches in livestock value chains can be adopted as pathways toward empowerment?
- What are the most profitable, and otherwise beneficial, entry points for youth to engage in different livestock value chains?

**Work Package 3**

**Outputs**

**17** · Best approaches to progress towards gender equality and women's empowerment in livestock development across the three livestock technical pillars.

**18** · Women-empowerment monitoring tools.

**19** · Best practices that lead to empowerment via implementation of accommodative and transformative approaches.

**20** · Evidence on best-bet entry points.

**Outcomes**

17 18 19 20 ▶ **6** · Policy, private sector and the development community acknowledge gender- and youth-based discrimination in livestock value-chains.

17 19 ▶ **7** · Community and household members in selected livestock value chains adopt gender-transformative approaches and show more gender-equitable behavior.

17 20 ▶ **8** · Scientists, practitioners and extension agents in animal health, feeds and forages, genetics and environment collaborate with gender scientists to generate gender- and youth-responsive livestock innovation bundles.

**End-of-Initiative Outcome 4**

6 7 8 ▶ Public and private decision makers utilise initiative innovation packages to inform policies and investment towards sustainable livestock systems, including progress towards equity and inclusion.

## Work Package 3 progress against the theory of change

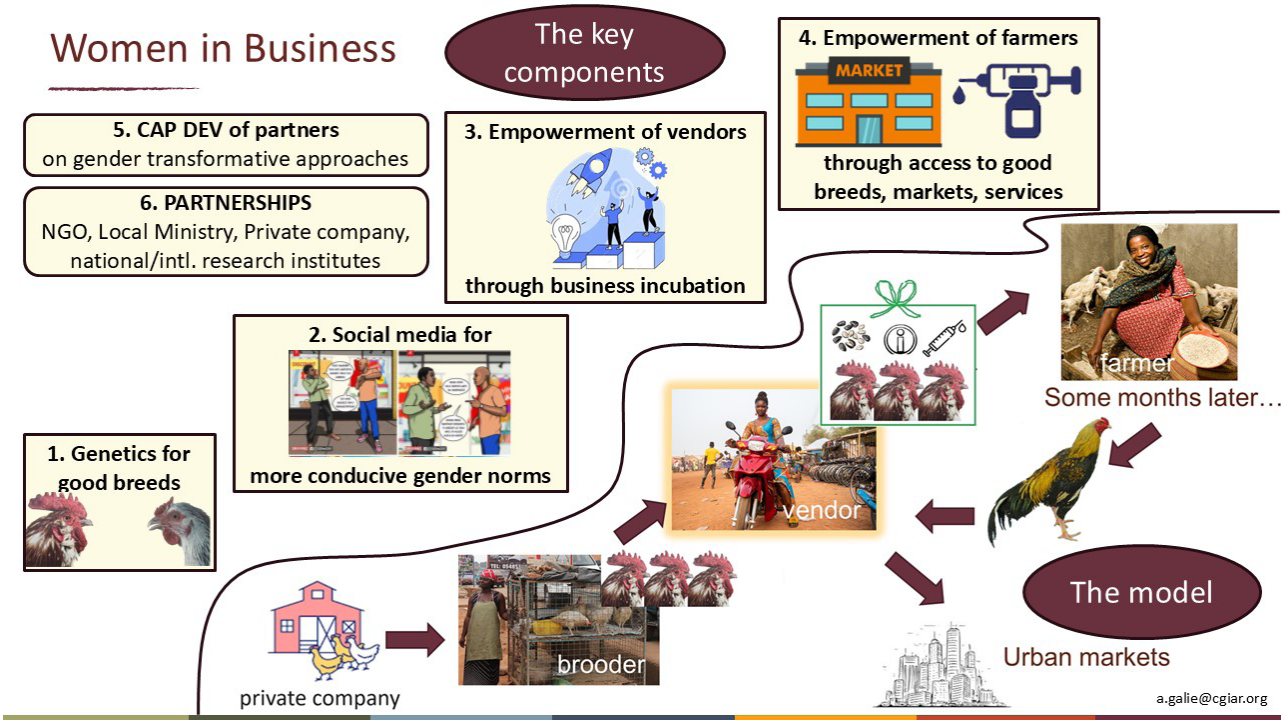
WP3 led strategic gender work and coordinated the integrated gender work (reported in the other WPs). WP3 strategic work focused on empowering women and youth and promoting equitable gender norms. We produced four types of outputs: tools, datasets, theoretical advances, and innovations.

We shortened the Women's Empowerment in Livestock Index and continued to support its uptake. We developed a standardized four-module tool to study gender norms in livestock and tested it in various contexts. We produced baselines and endlines on norms and distilled a process to use baseline data to develop data-driven interventions that are co-developed with stakeholders. We conducted qualitative and quantitative baselines and endlines using both the Women's Empowerment in Livestock Index and the Women's Empowerment in Livestock Business Index in four countries. We used the data to develop interventions targeting main domains of disempowerment in consultation with communities. At endline, we assessed what intervention impacted what domain of empowerment to improve the interventions.

Theoretical learnings: we studied the processes of changes in empowerment and norms, here, here and here; the connection between gender norms and empowerment here and here; the complementarity between transformative and accommodative approaches; how gender, youth, caste, and ethnicity interact for empowerment here, here, here, and here.

Innovations: We supported Tanzania's Ministry of Livestock and Fisheries on the country's Agenda 10/30 (TARI Set to Contribute Achievement of Agenda 10/30 | TARI) by enhancing the empowerment of young women through chicken and dairy business incubation, mentoring, and social media (Figure 1).

### The Women in Business model of Tanzania.



In Uganda, we supported young women in providing artificial insemination and pig aggregation. We used both accommodative and transformative approaches (e.g., here, here, and here).

In Ethiopia, we supported women and youth in the small ruminant value chain by promoting bundled innovations such as improved livestock breeds, barley varieties, and cooperative business models. We explored how these bundles influenced gender norms, finding that while some promote equity, others risk reinforcing inequalities. We also supported youth entrepreneurship, identifying constraints like limited market access and credit. We employed gender transformative approaches, including co-creation with communities, positive deviance, and the SASA model, a community mobilization approach to prevent violence against women, with phases of Start, Awareness, Support, and Action. These efforts led to improvements in decision-making, income control, and cooperative participation.

In Viet Nam, we worked with pig artificial insemination providers and a gender transformative communication campaign that focused on ethnic minorities and included trainings, poems and radio.

The integrated work included a set of frameworks for gender considerations across the livestock pillars, including a global overarching framework (Figure 3) and other studies here, here, here, here, and here.

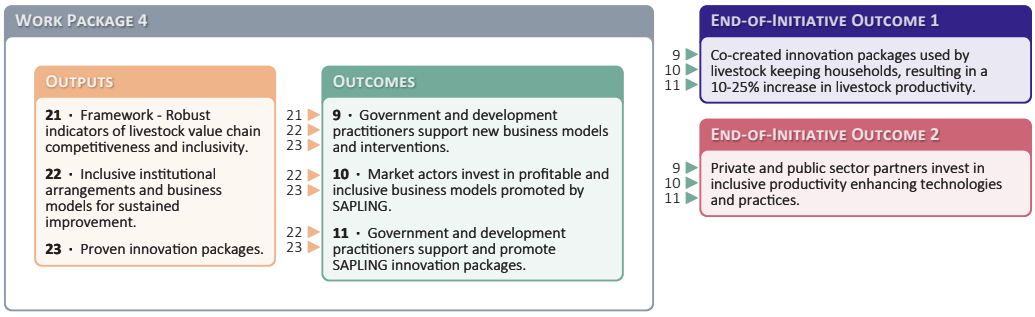
In Tanzania, the Women in Business model was adopted by government officials and the AKM Glitters chicken farming company. In Uganda and Ethiopia, our development partners appreciated the value of gender equality and social inclusion and transformative approaches. The Viet Nam Women's Academy is integrating highlights from our collaborative work into their curriculum. Collaborations with non-gender scientists are testified in numerous publications.


*Smallholder pig production in northern Viet Nam. Farmer Ma Thi Puong feeds her pigs on her farm near the northern town of Mieu Vac, Vietnam. Credit: ILRI/Stevie Mann*

# WP4: Competitive and Inclusive Livestock Value Chain

**Research Questions**

- What are the essential elements of livestock value chains that determine the level of competitiveness and inclusivity, and how can these be measured alongside the associated trade-offs?
- What type of institutional arrangements for input delivery and output market linkages are profitable, inclusive, and would lead to increased sustainable livestock productivity for different commodities?
- What Innovation Packages (including technical, policies, and incentive mechanisms) result in the highest participation by, and benefits for, women and men livestock producers and other actors?



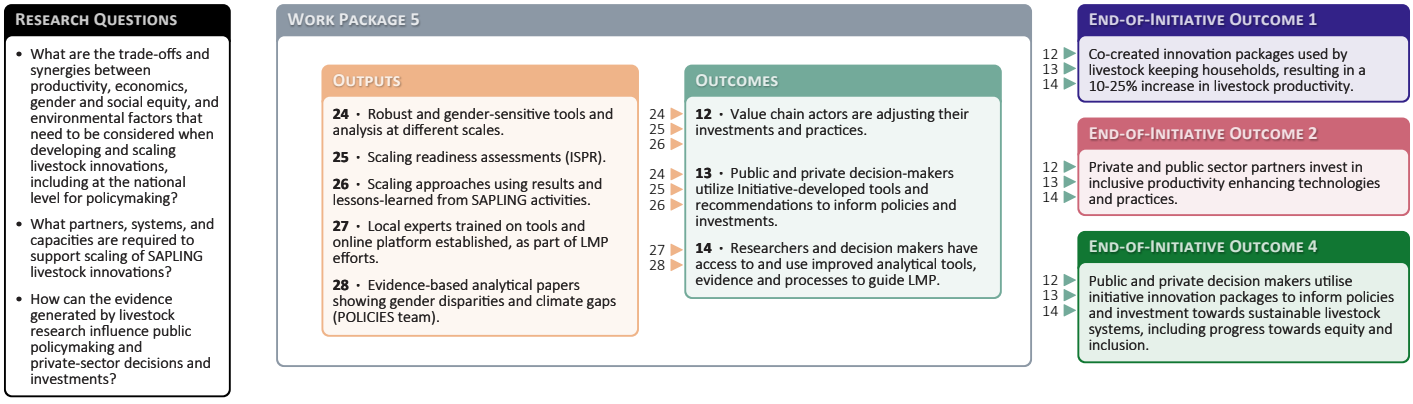

## Work Package 4 progress against the theory of change

WP4 focused on the competitiveness and inclusiveness of livestock value chains and was engaged in all of the Initiative's target countries. Based on past research, new institutional approaches were discussed with partners as part of the TOC process and field experiments were then conducted to assess their potential effectiveness.

In **Ethiopia**, digital information services and collective action were tested in 20 villages with 400 households to assess the impact of these interventions on market participation and performance. Collaboration with the poultry genetics team in WP1 led to the development of a business model incorporating financial access and digital services. In **Kenya**, a dairy extension model was implemented using DFAs. The randomized design included groups receiving DFA support, digital services, and a control group. Surveys in June 2023 and October 2024 showed a 10 percent increase in milk production during the high season and 25 percent during the low season. In **Nepal**, the VLP model was piloted for dairy buffalo keepers, supported by dairy cooperatives from six districts. Cooperatives funded para-vet training and institutional support, leading to improved buffalo fertility. About 40 VLPs participated in the pilot. In Tanzania, agri-entrepreneurs were connected to dairy and chicken farmers through an online platform and their business skills were enhanced. Findings from the TOC reflection suggested that digital tools can improve input and service delivery but that public-private partnerships may be needed for sustainable expansion. In Uganda, the Initiative's PigSMART, featuring 15 audio skits, improved pig farming practices among 1,254 farmers in four districts. An endline survey in 2024 confirmed significant practice improvements. Together with E4Impact (Entrepreneurship 4 Impact), the Initiative also ran a business incubation program from 2023 to October 2024, which boosted the operations of 54 pig agripreneurs. A pig weigh band, developed from a study of 764 pigs in Central and Western Uganda, proved useful in negotiating pig prices. In **Vietnam**, a farmer group model was tested with eight groups, demonstrating effectiveness in promoting innovation adoption and market linkages. By October 2024, membership grew from 127 to 692 households, benefiting 3,321 farmers. A livestock production and trade alliance was formed with government support, integrating into Mai Son district's National Target Program, with recommendations for regional expansion. WP4 also collaborated with WP1 on an artificial insemination business model for cattle, addressing supply shortages and establishing a service providers' cooperative.

WP4 work showed that digital tools, institutional models, and partnerships can enhance livestock productivity and market access. However, scaling up requires sustainable business models and public-private partnerships.

# WP5: Evidence, Decision, and Scaling




## Work Package 5 progress against the theory of change

WP5 on Evidence, Decision, and Scaling made progress in all of its envisioned outputs and outcomes. Toward outcome 1, a multi-pronged approach was followed. Throughout the Initiative's lifetime, targeted assessments of potential impacts and trade-offs of its intervention packages guided TOC refinements and adjustments of innovations being promoted in the different countries and value chains targeted by the Initiative. Under output 2, a total of 85 innovations were profiled over the three years the Initiative was active, while 13 were subjected to scaling readiness assessment to enhance the scalability and impact of livestock innovations across all of the Initiative's target countries. By engaging a diverse group of key stakeholders — including national agricultural research and extension systems, farmers, research institutions, policymakers, extension agents, and other relevant partners — we co-developed 13 innovation packages designed to optimize scaling readiness and address the real needs of end users. These packages provided insights into which partners, systems, and capacities were required to support the Initiative's livestock innovations to go to scale. The combination of assessed innovations and direct farmer engagement and capacity building for practitioners and extension staff established a sustainable framework for knowledge dissemination and technology adoption. Five scaling knowledge products were published here. While some capacity building efforts focused on technical innovations, others aimed at supporting the use of tools and methods for planning and prioritisation (CLEANED and the System Dynamics model). A case in point are the refined tools and in-country capacity for development of livestock master plans (outcome 3). The integration of quantitative models, particularly System Dynamics, multimarket equilibrium, and computable general equilibrium models, significantly enhanced national livestock planning. These tools offered a systematic approach for diagnosing sectoral challenges, evaluating interventions, and supporting participatory policy analysis. This participatory modeling approach bridged disciplinary gaps, ensuring that the resulting strategies were more comprehensive and evidence based. Moreover, the refinement of these tools facilitated the training of national experts from various countries, enhancing their capacity to independently conduct livestock sector assessments and policy analysis.

## Work Package progress rating summary

| WORK PACKAGE | PROGRESS RATING & RATIONALE |
|---|---|
| 1 | On track<br><br>WP1 focuses on Technologies and Practices for Sustainable Livestock Productivity.<br><br>The first outcome refers to genetic improvement programs being used. A total of 28 actors (compared to the target of 20) were reported to use SAPLING-supported models for genetic improvement, in all the seven SAPLING countries and all value chains; actors included local and national government, communities, champion farmers and private actors.<br><br>The second outcome focuses on improved forage, food-feed crops, feed options and innovations for reducing livestock feeding gaps. A total of 16 institutions used SAPLING-promoted options (compared to the target of 14). These include the Urochloa hybrids seeds (see also the 2024 key result story), other forages, decision support tools on mobile applications, improved feeding practices in various values chains and the commercialisation of biofermentated rice straw technology by a cooperative in Nepal.<br><br>The third outcome deals with animal health actors promoting herd health packages and disease control mechanisms to reduce disease burden. While the ambitious target was not achieved, a total of 53 actors were reported to have adopted SAPLING innovations. Innovations include the thermotolerant vaccine against PPR in Mali, herd health practices in Mali, Uganda and Vietnam, and use of ultrasonography to diagnose reproductive disorders in buffalo in Nepal. |
| 2 | On track<br><br>WP2 focuses on food security and nutrition in livestock keeping communities.<br><br>The first outcome on government and development practitioners prioritizing livestock-derived foods in food and nutrition interventions was partly achieved, with the Uganda ministry of health modifying its nutrition counselling cards to include such foods. Also, a town in Oromia region in Ethiopia supported street chicken frying business, based on SAPLING-supported evidence.<br><br>The second outcome on actors promoting SBCC and market-related innovations that enhance affordability and safety of livestock-derived foods was overachieved, thanks to Uganda private sector actors investing in improved pig slaughter and waste management practices, a county government in Kenya supporting the ‘one egg a day per child’ intervention, and enhanced knowledge of community health workers in Uganda. |
| 3 | On track<br><br>WP3 focuses on gender equity and social inclusion, coordinating integrated gender work and leading the strategic work on empowerment of women and youth, and equitable gender norms.<br><br>The first outcome on co-development of strategies to close the gender and age gap was met. This included policy and development partners promoting the ‘women in chicken business’ approach that supports women’s empowerment in Tanzania and beyond; development partners using the WELI tools; and NGO partners acknowledging how the collaboration on gender transformative gender work enhanced their understanding of gender considerations in Uganda.<br><br>The second outcome on community and household members adopting gender transformative approaches could not be documented, with interventions designed and implemented with partners but endline reports not finalised by end 2024.<br><br>The third outcome on collaboration between livestock scientists and gender scientists can be assessed through the various joint publications. |

| WORK PACKAGE | PROGRESS RATING & RATIONALE |
|---|---|
| 4 | On track<br>WP4 was designed to promote more competitive, inclusive, and efficient livestock markets through targeted interventions and the advancement of innovative business models.<br>Outcome 1 referred to four governmental and development practitioners supporting new business models that improve value chain competitiveness. The result was the participation of three organizations, which fell slightly short of the target. This support is substantiated by initiatives such as the integration of farmer group models for improved market access in Vietnam, mentorship programs that enhance business orientation among agricultural entrepreneurs in Tanzania, and a development organization that leverages the SAPLING platform experience. The achievement of this objective is attributed to the alignment of the innovations with the key priorities identified by governments and development practitioners in the respective countries.<br>Outcome 2 focused on governmental and development practitioners who support and promote SAPLING innovation packages. In contrast to the initial target of 8 actors, 42 individuals actively supported and promoted the initiative. This strong endorsement highlights the effective application and business strategy of the village livestock promoter model in Nepal. The impressive level of success is credited to the participatory approach employed during the development and execution phases, along with the significant sense of ownership shown by various stakeholders.<br>Outcome 3 was about engaging 175 market actors in investing in competitive and inclusive business models. The WP documented investments from 100 actors, equivalent to 57% of the target. Illustrative examples include small-scale feed producers adopting enhanced practices in Uganda through training, the enhancement of pig agripreneurs' enterprises via incubation programs, and peer-to-peer skill sharing among livestock champions in Mali. The shortfall in achievement is attributed to the fact that some of the activities are in the final stages of completion, and the evaluation reports and recommendations of the innovations have yet to be disseminated. |
| 5 | On track<br>WP5 supports scaling of innovations and provides evidence for policies and investments in sustainable livestock.<br>The first outcome focusing on value chain actors adjusting their investments based on SAPLING evidence was fully met. Four types of actors are listed: members of community-based breeding programs in Ethiopia, private sector actors investing in digital marketing systems; members of communities of 'one health' units; and the government of Tunisia using CLEANED for better reporting of its climate targets.<br>The second outcome on public and private decision makers utilizing SAPLING- developed tools and recommendations to inform policies and investments had a target of 4, and 9 cases were achieved. They include the scaling of the Africa Asia Dairy Genetics Gain platform; Ethiopian Biodiversity Institute funding community-based breeding programs; changing the livestock narrative at UNFCCC COP28, COP29 and at the UN Convention on biological diversity COP16; FAO global livestock environmental assessment model using CGIAR data; and CLEANED being used by three countries in LAC.<br>The third outcome on enhanced access to analytical tools and processes to guide livestock master plans was under-achieved, although the work progressed considerably with various outputs, trainings conducted in 2023 and 2024, and a renewed commitment by AU-IBAR, CIRAD and FAO to collaborate with CGIAR on this topic. |

## 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**

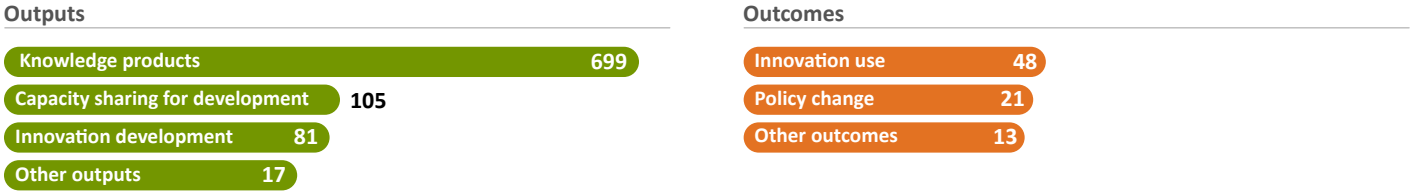
- Progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas.
- Deviations/issues/delays/risks do jeopardize success of Work Package.

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

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

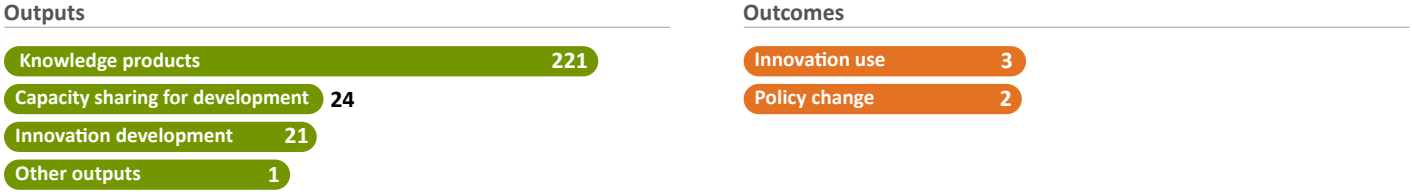
The data used to create the graphics in this section were sourced from the CGIAR Results Dashboard on 04 April 2025. These results are accurate as of this date and may differ from information in previous Technical Reports. Such differences may be due to data updates throughout the reporting year, revisions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

## Overview of results by category

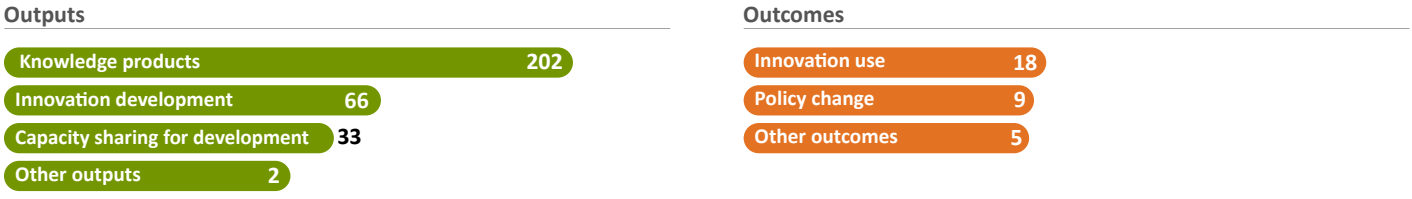



## Results by year

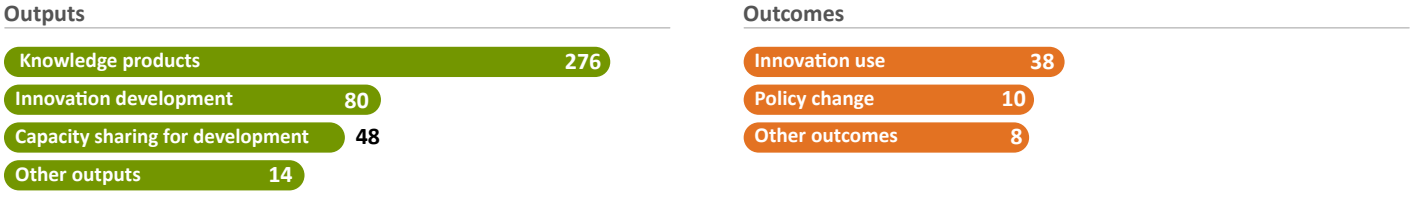
2022




2023




2024




By the end of the Initiative, SAPLING had produced 984 results. This includes 902 Outputs, the majority of which were knowledge products (699), capacity sharing for development (105), and innovation development (81). SAPLING reported 82 Outcomes which includes 48 innovation use, 21 Policy change and other outcomes.

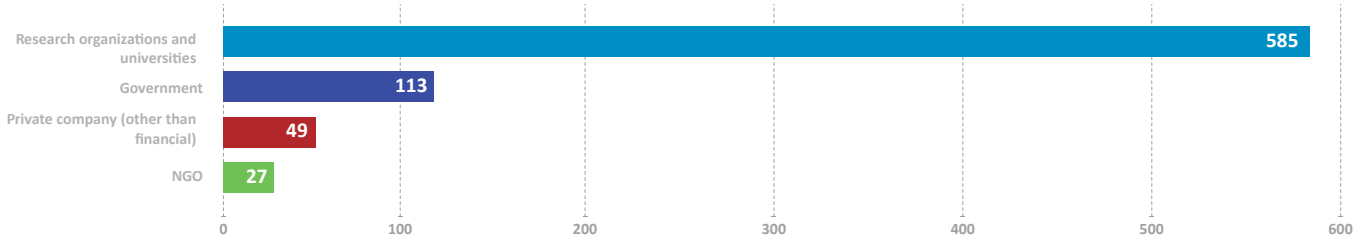
## Contributions to End of Initiative Outcomes

Cumulative 2022, 2023, and 2024 contributions to End of Initiative outcomes (EOIO1 to EOIO4) of the Sustainable Animal Productivity Initiative are given below.

| | 2022-2023 | 2024 | 2022-2024 |
|---|---|---|---|
| EOI1 - **Number of people** in livestock keeping households that have adopted SAPLING innovations | 252,310 | 181,486 | 433,796 |
| EOI – **Investment (USD)** by private and public sector partners in productivity enhancing technologies | 430,633 | 4,076,230 | 4,506,863 |
| EOI3 - Number of **organizations** using initiative developed tools or strategies for incorporating safe livestock-derived foods in diets | 2 | 4 | 6 |
| EOI4 - Number of **policies** informed by initiative work for more inclusive and sustainable livestock systems | 5 | 9 | 14 |

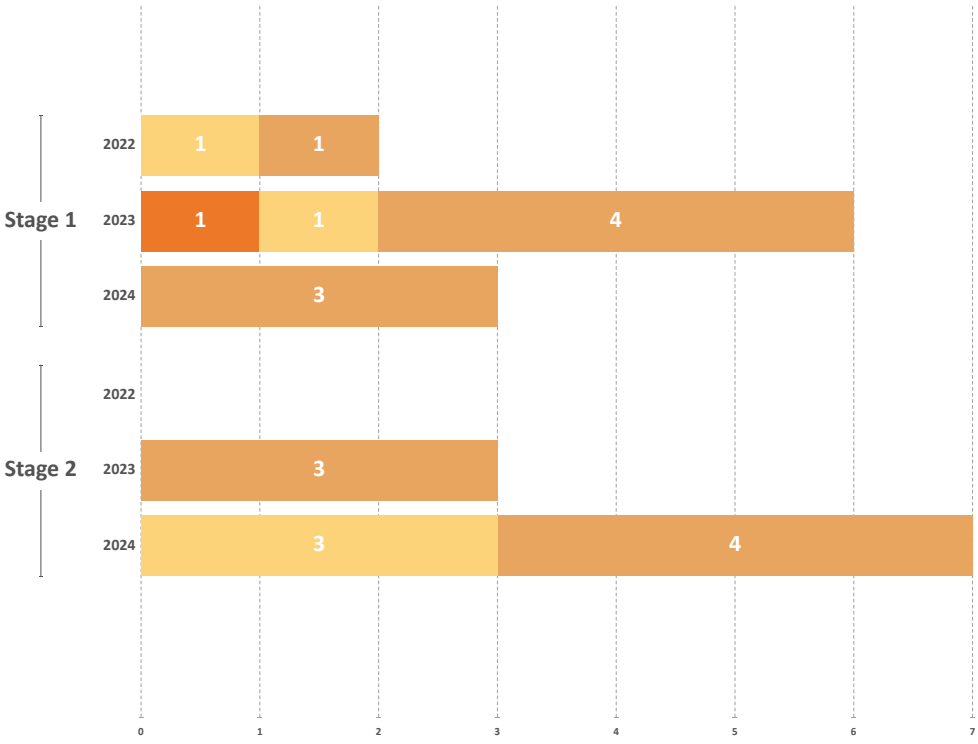
SAPLING reported 433,796 people in livestock keeping households adopting SAPLING innovations and investment of USD 4,506,863 by private and public sector partners by end of 2024. SAPLING work also led to six organizations using initiative developed tools or strategies for incorporating safe livestock-derived foods in diets and informed 14 policies for inclusive and sustainable livestock systems.

## Partner Type




SAPLING collaborated with many partners to achieve the results reported. Results were produced in collaboration with research organizations and universities (585 results), governments (113 results), private companies (49 results) and non-governmental organisations (27 results).

## Policies by stage and by type




**STAGE 1**
Research taken up by next user, policy change not yet enacted.

**STAGE 2**
Policy enacted.

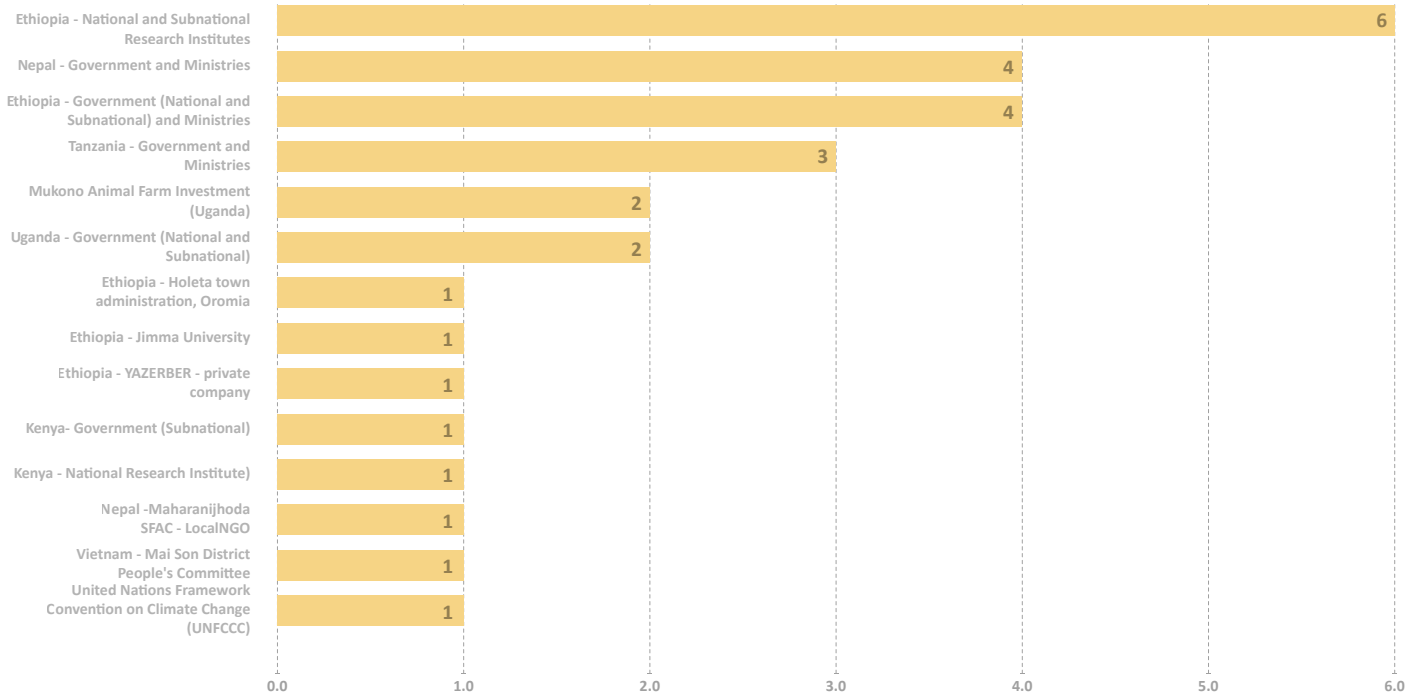
**LEGAL INSTRUMENT**
Legal instruments include laws, which are defined as Bills passed into law by the highest elected body (a parliament, congress or equivalent); or regulations, which are defined as rules or norms adopted by a government. These laws and regulations dictate very specifically actions and behaviors that are to be followed or prohibited and often include language on implications of non-compliance.

**POLICY OR STRATEGY**
Policies or strategies include written decisions on, or commitments to, a particular course of action by an institution (policy); or a (government, NGO, private sector) high-level plan outlining how a particular course of action will be carried out (strategy). These documents show the intent of an organization or entity. Examples are country growth strategies, country agricultural policies, organization strategic plans or road maps. This could also be observed as information campaigns (e.g., for improved diets). These documents set the goalposts but then require other instruments for implementation.

**PROGRAM, BUDGET OR INVESTMENT**
These are implementing mechanisms that often follow from a strategy, policy or law. There is typically a well-defined set of actions outlined over a specific period of time and with a specific budgetary amount attached. National Agricultural Investment Plans is an example, the budget within a ministry is another, investments from the private sector fit here, as well as programs launched by public, private and NGO sectors.

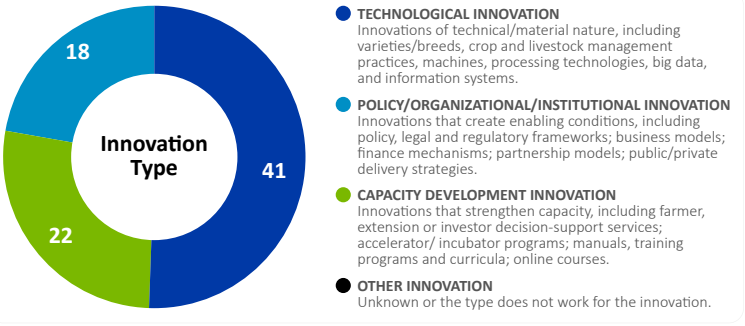
By the end of the Initiative, SAPLING had reported a total of 21 policies, 11 at stage 1 and 10 at the enactment stage (stage 2). These included 5 policies or strategies, 1 legal instrument and 15 program, budget or investments.

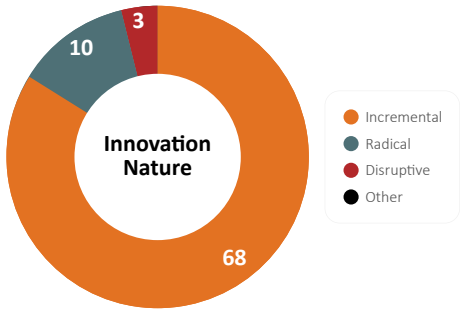
## Organizations whose policy has changed




SAPLING influenced policies changes in 30 organisations, the majority within national and subnational governments and associated ministries and national and subnational research institutions.

## Innovations by nature and by type



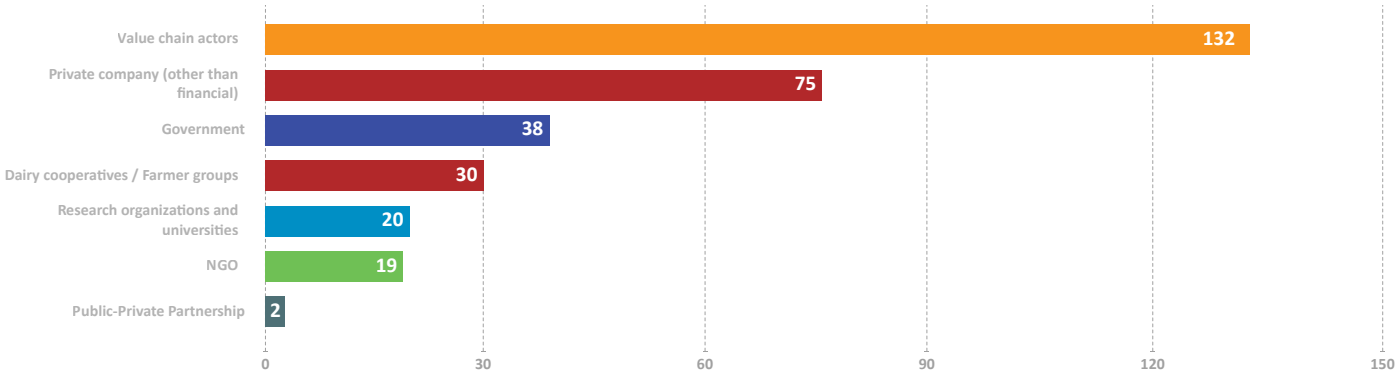

By the end of the Initiative, SAPLING had developed 81 innovations (7 co-developed with other initiatives). Typologically, 41 innovations were technological, 22 capacity development and 18 policy or organizational development. The innovations were characterized as incremental (68), radical (10) or disruptive (3).

## 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 | 11 |
| 8 | **Uncontrolled Testing** The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions | 8 |
| 7 | **Prototype** The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions | 11 |
| 6 | **Semi-Controlled Testing** The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions | 28 |
| 5 | **Model/Early Prototype** The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions | 7 |
| 4 | **Controlled Testing** The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions | 8 |
| 3 | **Proof of Concept** The innovation's key concepts have been validated for their ability to achieve a specific impact | 6 |
| 2 | **Formulation** The innovation's key concepts are being formulated or designed | 2 |
| 1 | **Basic Research** The innovation's basic principles are being researched for their ability to achieve a specific impact | 0 |
| 0 | **Idea** The innovation is at idea stage | 0 |

Thirty out of the 81 innovations have already been validated to achieve a specific impact under semi-controlled or uncontrolled conditions or are currently being tested under uncontrolled conditions. Twenty-eight of the innovations are currently being tested to achieved impact under semi-controlled conditions while the remainder are at earlier stages of readiness.

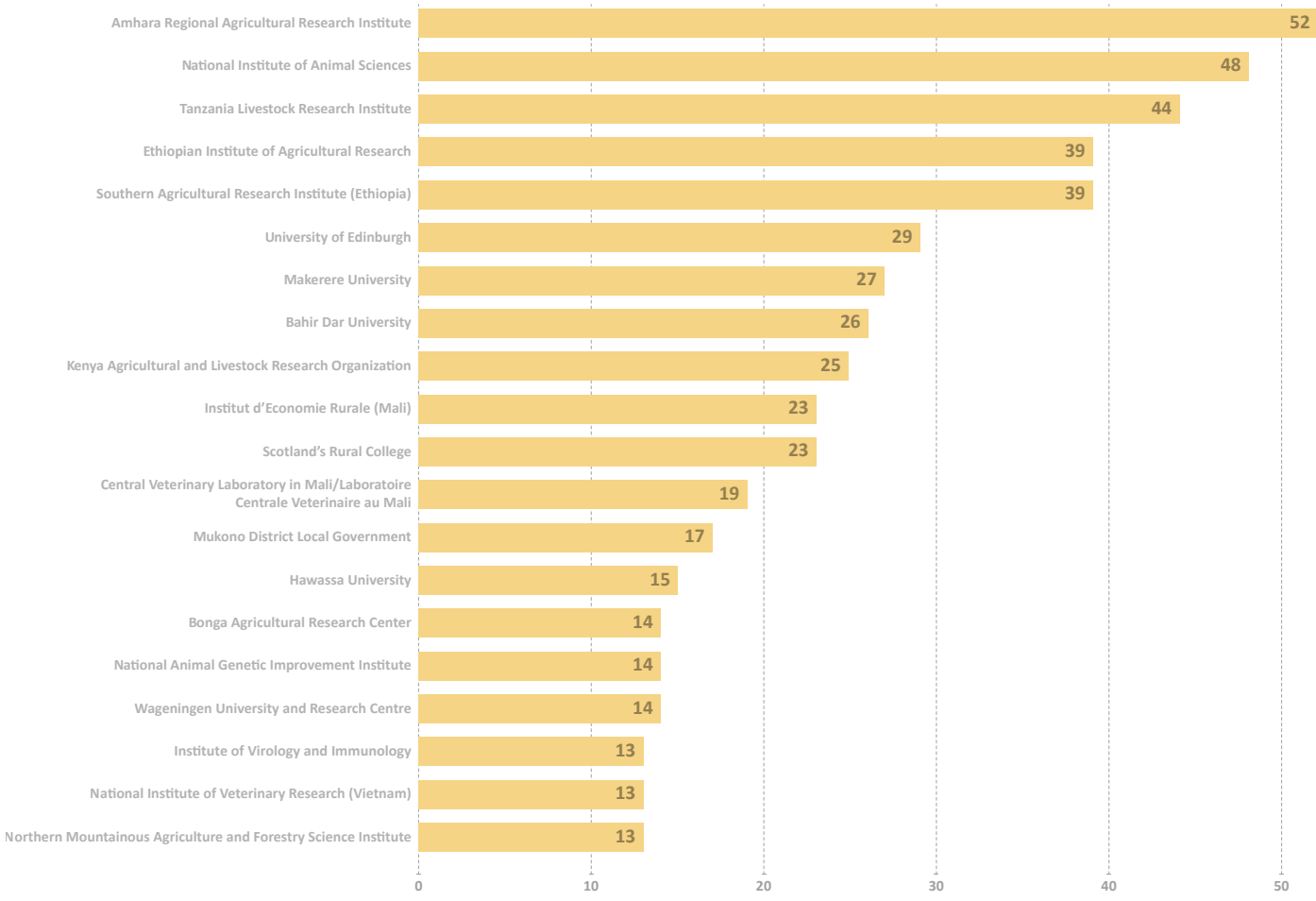
## Innovation user by institution type




Among the institutional innovation users reported between 2022 – 2024, value chain actors (132) were the highest followed by private companies (75), government (38) and dairy cooperatives/farmer groups (30).

*Sheep are standing on a lush meadow with solar panels for regenerative power in background. It is an example for dual land use as agriculture and solar farm.*
*Credit: El Benedikt/Shutterstock*

### Sustainable Animal Productivity's external partners




The results reported by SAPLING Initiative were in collaboration with various partners, and are shown in the figure below in decreasing numbers of results.

## Partnerships and Sustainable Animal Productivity's impact pathways

A total of 221 partners collaborated with SAPLING Initiative in 2024, in comparison to 192 and 150 partners in 2023 and 2022, respectively. Cumulatively for the three years, Sustainable Animal Productivity collaborated with 328 partners, of which 107 (33 percent) contributed to Initiative outcomes and 123 (38 percent) contributed to Initiative innovation development. Partner types comprised universities (34 percent); national agricultural research systems (33 percent); government (national and subnational) (13 percent); non-financial private companies (5 percent); international, national, and local NGOs (5 percent); and others (3 percent).

The Initiative's top 6 partners from 2022 to 2024 (in terms of number of shared results) were Amhara Regional Agricultural Research Institute (52), Viet Nam's National Institute of Animal Sciences (48), Tanzania Livestock Research Institute (44), Ethiopian Institute of Agricultural Research (39), Southern Agricultural Research Institute (39), Makerere University (27), Bahir Dar University (26), and Kenya Agricultural and Livestock Research Organization (25). These show a close engagement with the national agricultural research systems in the Initiative's focus countries over the three years. Other key partners included universities outside of the Initiative's focal countries: University of Edinburgh (29) and Scotland's Rural College (23), Wageningen University and Research Centre (14), University of Hohenheim (12), and University of Bern (10).

Engagement of partners in the Initiative's work ranged from innovation development (498), scaling (167), and demand (142). Engaging the partners from the onset of the Initiative using a TOC approach at country and value chain levels ensured that the innovations met the demands of the users and were well packaged for scale. The landscape of partners was reviewed annually since inception of the Initiative in reflection workshops in its seven target countries.

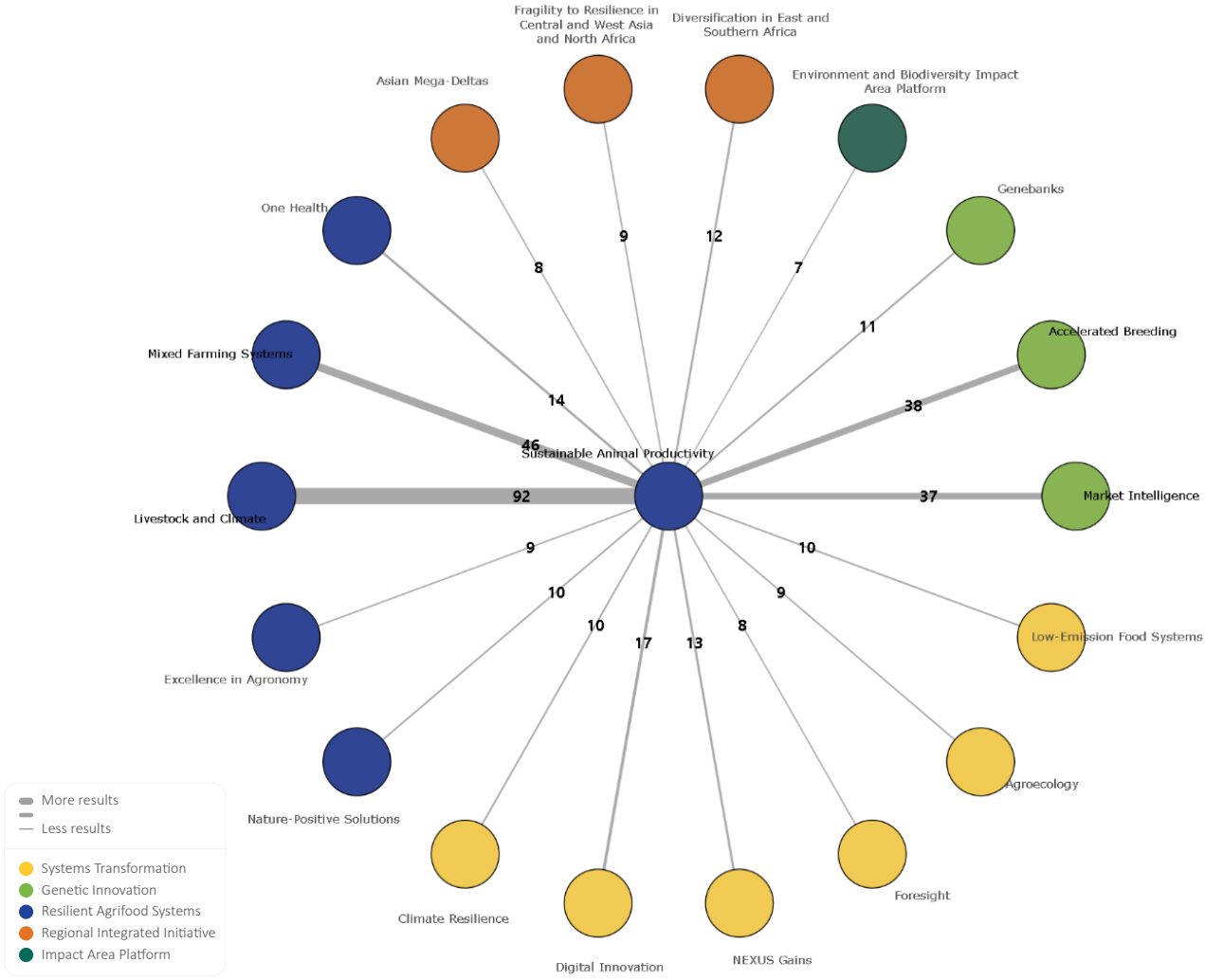
Examples of the Initiative's partnerships include in Viet Nam the co-investment model management between the Initiative and the Agricultural Service Center of Mai Son district to enhance the capacity of livestock producers to use sustainable livestock production practices, including on feeds and forages, animal health, and manure. In Nepal, the Sustainable Animal Productivity Initiative supported an extension approach through village-based promoters that was replicated in other provinces thanks to policy engagement and strong partnership with different types of organizations, including research (Nepal Agricultural Research Council), development (Heifer, Agri Kisan), academic (Agriculture

and Forestry University, Tribhuvan University), government (Ministry of Agriculture and Livestock Development, Department of Livestock Services, and the governments of Koshi and Madhesh provinces), and the private sector (Maharanijhoda, Shreenaagar Agro). Key policymakers were engaged through a coordination mechanism (a coordination committee), where decision-makers gave feedback and suggestions for effective implementation of the various research components of the Sustainable Animal Productivity Initiative. In Tanzania, the Initiative partnered with Kuza Biashara, an award-winning social enterprise, and leveraged the "One Network Ecosystem" to train young entrepreneurs and to link their startups to larger scale private-sector actors to catalyze digitally enabled extension services. Progress thus far indicates increased involvement of women and youth in training, leadership, ownership, and technical delivery roles, and in accessing finance, all contributing to new income opportunities for them and the farmers they serve. In Mali, the key innovation partners of the Initiative are the Central Veterinary Laboratory, the main partner on the improvement and delivery of the pests des petits ruminants vaccine, and Institut d'Economie Rurale. Sustainable Animal Productivity also partnered with local governments, private-sector companies, such as Collective des Vétérinaires Mandataires, and professional organization, such as Union Regionale de la Filière Lait Viande. In Uganda, the Initiative partnered with the Ministry of Health's Nutrition Division and the Baganda Kingdom to co-design and implement SBCC modules that address socio-cultural barriers associated with women and children's consumption of animal-source foods.


*A community health worker shows the social behavior change communication (SBCC) counselling cards in Uganda, where the Ministry of Health has integrated the SBCC material to their counselling cards.*

*Credit: ILRI/Pamela Wairagala*

### Sustainable Animal Productivity's internal network of collaborations




The diagram presents the internal collaborations of Sustainable Animal Productivity 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 seven 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 Sustainable Animal Productivity's impact pathways

Forty-one percent of the results of the Sustainable Animal Productivity Initiative from 2022 to 2024 were reported in partnership with one or more other CGIAR Initiative(s) or non-pooled CGIAR projects. The results of Sustainable Animal Productivity were jointly reported with 26 other CGIAR Initiatives and with two CGIAR Impact Area Platforms. The collaborating Initiatives included five from Genetic Innovations, nine from System Transformations, six from Resilient Agrifood Systems, and six from Regional Integrated Initiatives. The main collaborating Initiatives (in terms of number of joint results reported since 2022) were Livestock and Climate (92), Mixed Farming Systems (46), Accelerated Breeding (38), and Market Intelligence (37).

Sustainable Animal Productivity collaborated with Livestock and Climate across most of its Work Packages. Under WP1, the joint products focused on improved forages, including work on novel stress-tolerant, highly productive, and resource-efficient forages. The products also included development of a digital decision tool for dairy and buffalo feed optimization deployed in Nepal. Under WP5, the two Initiatives jointly developed recommendations for policymakers and investors for a supportive regulatory framework for service providers, which included formalization of forage seed supplies in Tanzania. The I-CLEANED tool was further developed and disseminated in various countries. The two Initiatives also supported the inclusion of environmental considerations in livestock master plan modeling work. On WP3, the teams work together on issues of empowerment and intersectionality.

Sustainable Animal Productivity collaborated with Mixed Farming Systems mainly in Ethiopia, where they focused on small ruminant technologies and practices, including optimizing indigenous forages, processing and formulating feed, and sheep fattening. This joint research was also conducted on performance and market orientation of sheep fattening by women and youth organized in groups and cooperatives in Ethiopia.

Collaboration between the Sustainable Animal Productivity and Accelerated Breeding Initiatives focused on breeding barley, a feed-food crop, as well as Brachiaria grass (Urochloa spp.) hybrids, and improving forage seed markets, given the key roles played by forages and feed-food crops in sustainably improving livestock productivity and progress towards EoI1.

Sustainable Animal Productivity also established productive links with the Nexus Gain Initiative, which resulted in continued engagement between SAAF and Policy Innovation Science Program on the topic of water efficiency in buffalo milk productivity. Building on that collaboration, Heifer Nepal funded an assessment of the methane emissions of a feed technology (biofermentation of crop residue).

WP3 of the Sustainable Animal Productivity Initiative worked closely with HER+ in Tanzania to assess gender norms across livestock, cassava, and fish systems and to implement gender transformative approaches through social media. This collaboration is continuing in 2025 under CGIAR's Sustainable Animal and Aquatic Foods Science Program and Gender Equality and Social Inclusion Accelerator.

WP1 of Sustainable Animal Productivity co-developed with the Agroecology Initiative integrated herd health guidelines specific for sheep and goat flocks in semi-arid, mixed crop-livestock systems of North Africa. As part of this work, preliminary specific guidelines for animal welfare have also been developed in a partnership between ICARDA, the Ecole Nationale de Médecine Vétérinaire in Tunisia, and the University of Milan. Both Initiatives contributed to the development of an innovation related to green and clean ways to manage sheep flock reproduction.

*Farmer leads his sheep and goat to market, Menz, Ethiopia.*
*Credit: ILRI\Zerihun Sewunet*

## Urochloa hybrid forages for improved livelihoods

**Adoption of improved Urochloa hybrid forages in Ethiopia, Kenya, Uganda, and Viet Nam improved livestock productivity for 42,420 people.**

*Dual-purpose cattle farmer proud of his animals grazing Urochloa hybrids in Patía, Cauca Department, Colombia.*
*Credit: Neil Palmer/CIAT*

**Primary Impact Area**

**Other relevant Impact Areas targeted**

**Contributing Initiative**

Sustainable Animal Productivity

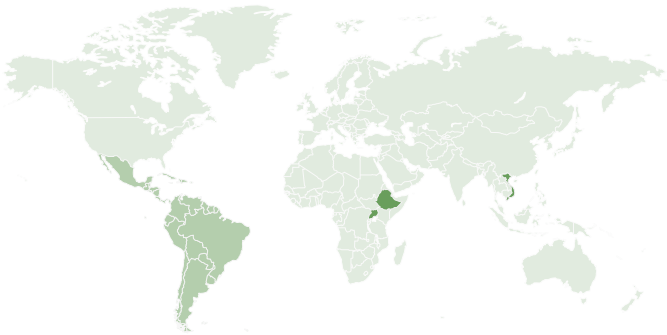
**Contributing Centers**

Alliance of Bioversity and CIAT · ILRI

**Contributing external partners**

Grupo Papalotla · Semillas Papalotla SA de DV

**Geographic scope**



**Regions:** Latin America and the Caribbean

**Countries:** 70 countries including Ethiopia · Kenya · Uganda · Viet Nam

**Adoption of Urochloa hybrid forages is improving livestock productivity, enhancing pasture quality, and raising incomes for 42,420 livestock producers across 9,469 hectares in four countries — Ethiopia, Kenya, Uganda, and Viet Nam. Developed through a public-private partnership between CIAT and Grupo Papalotla and first cultivated in 2001, Urochloa hybrids now cover 1.8 million hectares across 70 countries. Progress under the Sustainable Animal Productivity Initiative accelerated uptake of the hybrids in several countries, which enhanced food security, climate resilience, and environmental co-benefits.**

The growing global demand for animal-sourced foods places significant pressure on livestock systems, particularly in tropical regions where climate change, land degradation, and poor feed quality limit productivity. Addressing these challenges requires practical, science-driven solutions that enhance livestock productivity while reducing its environmental impact.

One feed solution is improved forage technologies, such as Urochloa (syn. Brachiaria) hybrids, which were co-developed by the International Center for Tropical Agriculture (CIAT) and Grupo Papalotla. Since the release of the first Urochloa hybrid, Mulato, in 2001, these forages have provided livestock farmers with more resilient and higher-quality pasture options. Today, more than 1.8 million hectares of Urochloa hybrid pastures have been established across 70 countries, benefiting over 1.6 million farmers and over 11 million farm household members.

The highest adoption rates have been in Latin America, covering 92 percent of the total planted area. The greatest impact has been on smallholder rural farming communities, which make up 74 percent of all adopters (over 1.1 million people). By overcoming feed shortages and improving cattle health, these farmers are able to sustain more animals, increase their milk and meat production, and boost their household incomes. Moreover, while only 16 percent of adopters have been women, their participation in Urochloa-based farming systems has led to their greater economic independence and decision-making power within households.

The adoption of Urochloa hybrids has also contributed to improved food security in local communities. More productive livestock systems mean a higher supply of milk and meat, helping to combat malnutrition, particularly in food-insecure regions.

The CGIAR Initiative on Sustainable Animal Productivity has supported the scaling of Urochloa hybrid forages across 9,468 hectares, directly benefiting 42,420 livestock producers, including 9,940 women, and reaching an estimated 179,904 farm household members in 4 countries.

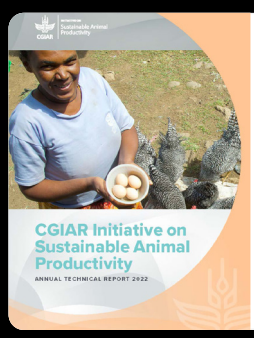
In addition to productivity gains, Urochloa hybrids are helping reduce the environmental footprint of livestock production. These forages help reduce soil erosion and improve carbon sequestration and lower greenhouse gas emissions. In Latin America alone, Urochloa adoption is estimated to have helped avoid about 23 to 54 megatons of carbon dioxide equivalent emissions. Moreover, because Urochloa hybrids increase pasture productivity, farmers can produce more livestock products on the same land area, reducing pressure for deforestation and land conversion.

The economic value of Urochloa hybrid forages adopted by 2023 is estimated to exceed USD 11 billion. This projection accounts for the expected benefits over a 10-year forage lifespan, meaning that grasses sown in 2023 will continue generating economic gains until 2032. Likewise, past plantings, such as those from 2017, will yield benefits until their productive cycle ends next year. The benefits extend across the livestock value chain, generating employment for farm workers, seed producers, and distributors while expanding market opportunities for input suppliers.

Building on this momentum, efforts supported by CGIAR's Sustainable Animal Productivity Initiative strengthened local seed markets and expanded technical support networks, laying the groundwork for more widespread adoption and long-term sustainability.

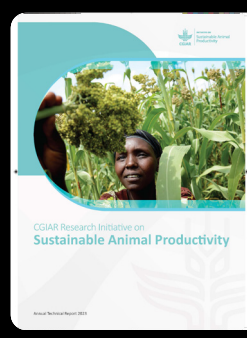
In East Africa alone, the potential exists to scale adoption on 400,000 additional hectares, creating an annual market worth more than USD 70 million. Increasing adoption in this and other regions, however, will require investments in seed systems, research, and farmer training. Strengthening partnerships between public and private actors will likewise be key to improving seed distribution networks and technical support services.

> Before, we did not use grasses like these; we managed with whatever was available. Today, when we look at the productivity of the grasses, there is a positive change. We used to have very little production, with just 4 liters of milk per day to sell. That went up to 11 liters. Today we have reached 130 liters..
>
> Patricia Ulloa, a beef and dairy farmer in Patía, Cauca, Colombia, who reports higher production from the combination of increased cow productivity and herd size




2022 key result story

**Global use of CIAT's Urochloa hybrids in cattle farming for enhancing productivity and sustainability and for improving cattle farmer livelihoods between 2001 and 2021.**




2023 key result story

**Adoption of the Urochloa hybrid improved forage grass by farmers within Ethiopia, Kenya, Uganda, and Viet Nam.**

CGIAR

INITIATIVE ON
Sustainable Animal Productivity

*A farmer ranks better fodder from the experiment plot. Farmer's field day in Robit Bahta. Innovation Lab for Small Scale Irrigation project.*

*Credit: ILRI/Apollo Habtamu*