



INITIATIVE ON
Sustainable Animal
Productivity



CGIAR Research Initiative on **Sustainable Animal Productivity**

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Title: Annual Technical Report 2023: CGIAR Research Initiative on Sustainable Animal Productivity

Suggested citation: CGIAR Research Initiative on Sustainable Animal Productivity. 2024. Annual Technical Report 2023: CGIAR Research Initiative on Sustainable Animal Productivity. Montpellier, France: CGIAR System Organization. <https://hdl.handle.net/10568/141675>



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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.

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>.

CGIAR Technical Reporting 2023

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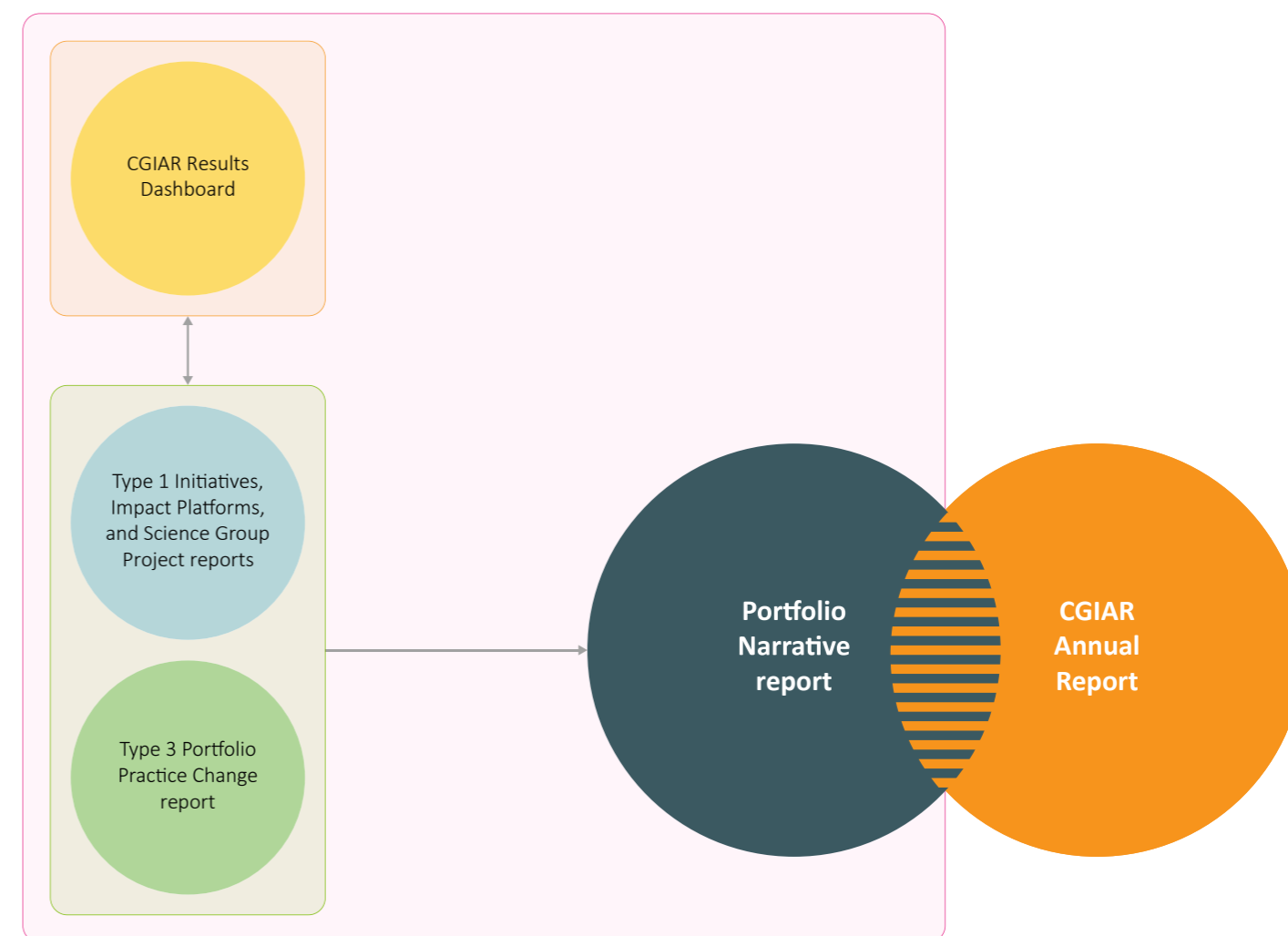
CGIAR Technical Reporting 2023

CGIAR Technical Reporting has been developed in alignment with the [CGIAR Technical Reporting Arrangement](#). This Initiative report ("Type 1" report) constitutes part of the broader [CGIAR Technical Report](#). Each CGIAR Research Initiative submits an annual "Type 1" report, which provides assurance on Initiative-level progress towards End of Initiative outcomes.

The [CGIAR Technical Report](#) comprises:

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

The CGIAR Annual Report is a comprehensive overview of CGIAR's collective achievements, impact and strategic outlook, which draws significantly from the Technical Report products above. For 2023, the Annual Report and Technical Report will be presented online as an integrated product.



Section 1: Fact sheet and budget

Initiative name	Sustainable Animal Productivity for Livelihoods, Nutrition and Gender Inclusion
Initiative short name	Resilient Agrifood Systems
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	01/01/2022 – 31/12/2024
Geographic scope	Countries Ethiopia · Kenya · Mali · Nepa · United Republic of Tanzania · Viet Nam · Uganda
OECD DAC Climate marker adaptation score¹	Score 1: Significant The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives – namely, climate mitigation, climate adaptation and climate policy, even though it is not the principal focus of the activity.
OECD DAC Climate marker mitigation score¹	Score 1: Significant The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives – namely, climate mitigation, climate adaptation and climate policy, even though it is not the principal focus of the activity.
OECD DAC Gender equity marker score²	Score 1B: Gender responsive On the 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

The Sustainable Animal Productivity Initiative has made significant strides in its mission to enhance animal productivity, as evidenced by its numerous achievements in 2023. The Initiative produced a total of 201 knowledge products, with 105 of them being journal papers. This work is deeply rooted in seven countries' specific value chains, facilitating cross-country collaboration and synthesis. Coordinated by Work Packages, the Initiative generates global outputs while guiding in-value chain and in-country activities and synthesis efforts.

Collaboration and partnership are at the heart of the Initiative, with 191 partners contributing to its results, half of whom are from national universities and NARS (National Agricultural Research Systems). Additionally, a quarter of the Initiative's outcomes were published jointly with other initiatives or non-pooled projects, highlighting its collaborative nature. The Initiative's approach is demand-driven, reflecting its commitment to national/local engagement and relevance.

In 2023, the Initiative utilized theories of change at both country and value chain levels to assess partner alignment and progress toward outcomes. This process, initiated in 2022, facilitated critical reflection among teams and partners and was documented across most value chains. The Initiative reported 24 outcomes in 2023 (compared to 5 in 2022) with all Work Packages reporting at least one outcome.

Among the outcomes achieved in 2023, ten innovations were successfully implemented by partners. These include the Africa Asia Dairy Genetic Gains (AADGG) platform that identifies and promotes wide use of appropriate superior purebred and cross-bred bulls using on-farm performance information and basic genomic data in Ethiopia, Kenya, Tanzania and Uganda. Another innovation relates to the improved dual-purpose adaptive chicken strains for smallholder farmers in Ethiopia, Kenya and Tanzania, for enhanced productivity, income and human nutrition. Also on animal genetics, the sheep and goat community-based breeding program is another innovation scaled through universities in Ethiopia. The CIAT's Urochloa hybrids forage that is resistant to (a)biotic stress and with improved productivity is another innovation in use. From the release in 2001 of the first Urochloa hybrid, today six different Urochloa hybrids are being commercialized in around 70 countries globally, mainly among cattle farmers. The Initiative also made significant progress in formal impact assessment studies, focusing on improving dairy input value chains in Kenya, Nepal, and Tanzania, as well as implementing village-level interventions in Uganda targeting nutrition and gender norms.

However, the Initiative faced several challenges in 2023, including budget reductions, insecurity in some regions in Ethiopia and political instability in Mali, and the Ebola outbreak in Uganda. Despite these disruptions, the Initiative maintained a strong focus on working towards and documenting progress towards outcomes using a theory of change approach. The Initiative demonstrated significant influence on public and private actors, achieving five out of seven planned outcomes related to policy influence. Additionally, progress toward reaching people was fair, with approximately one-third of the target achieved through various innovations, including those facilitated by the IPSR (Innovation Package and Scaling Readiness) process.

	2022	2023	2024
PROPOSAL BUDGET ▶	16,000,000	20,000,000	24,000,000
APPROVED BUDGET ¹ ▶	15,030,248	11,871,486 ²	11,326,463 ³

¹ The approved budget amounts correspond to the figures available for public access through the [Financing dashboard](#).

² This amount includes carry-over and commitments.

³ This amount is an estimation of the 2024 annual budget allocation, as of the end of March 2024.

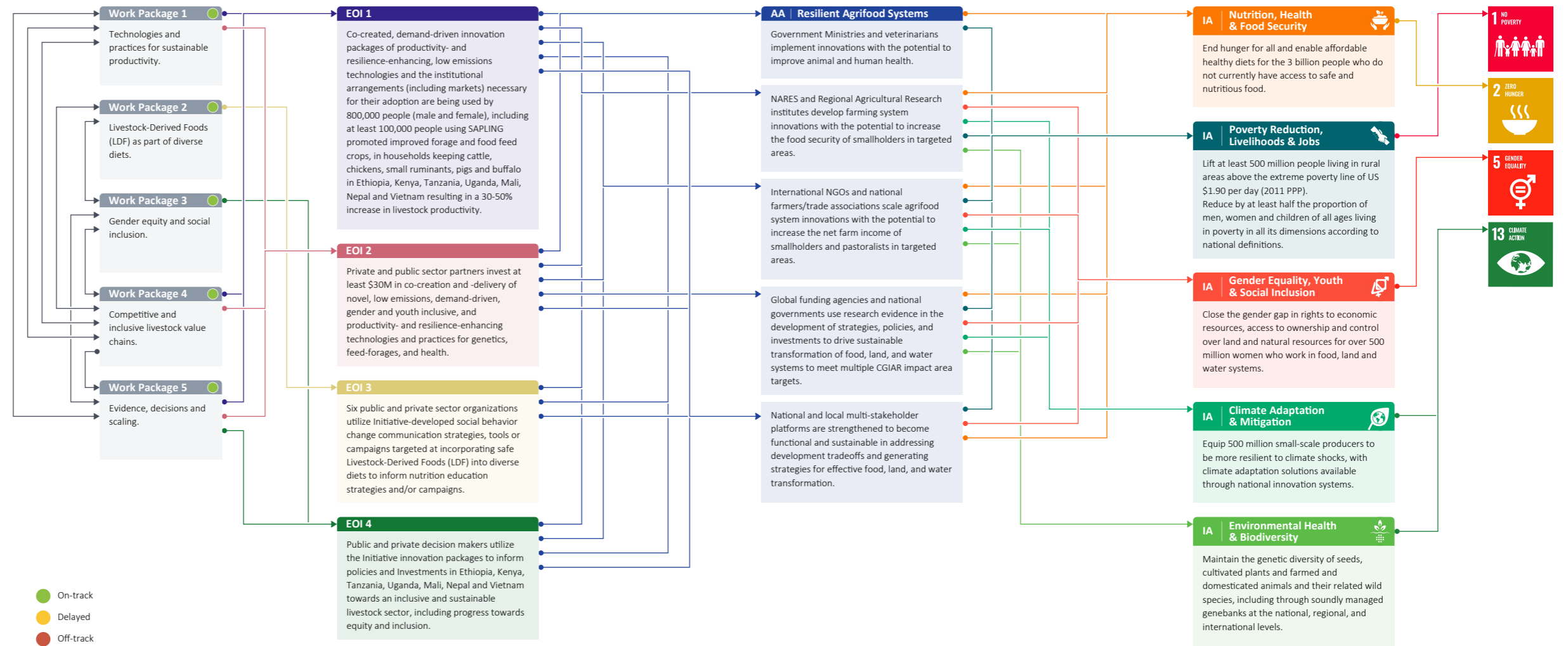


Smallholder chicken keeper from Ethiopia with a SAPLING promoted improved chicken breed. Credit: ILRI/Mulugeta Yitayih Birhanu

Section 2: Progress on science and 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.



EOI | End of Initiative outcome
 AA | Action Area
 IA | Impact Area
 SDG | Sustainable Development Goal

Note: A summary of Work Package progress ratings is provided in Section 3.



Small ruminant farmer tending to her animals, in Mali.
Credit: ILRI/ Ahmadou Sow

Summary of progress against the theory of change

The Sustainable Animal Productivity Initiative significantly progressed along its theory of change, achieving 24 outcomes in 2023 (compared to 5 in 2022) while maintaining a strong publication effort. The Initiative reported 201 knowledge products, of which 105 are journal papers. The Initiative work is embedded in specific value chains in seven countries, with the same commodity in at least two countries, allowing cross country work and synthesis. In addition, the Work Packages coordinate the generation of global outputs, guiding the in-value chain and in-country work and synthesis work. By working at different levels, Sustainable Animal Productivity is able to conduct research in development that is both grounded on local or national context and conveying the messages at higher level. The Initiative results were conducted in collaboration with 191 partners, half of them from national universities and NARS, reflecting the strong in-country and demand led approach followed by the Initiative. In addition, about a quarter of the Initiative results were published with another initiative and/or non-pooled projects.

In 2023, the theories of change at country and value chain level were used to assess alignment of the partners on the activities and assess progress towards outcomes. This process that started in 2022 as part of the co-design process allowed the teams and partners to critically reflect on the work and was documented for most of the value chains.

Outcomes achieved in 2023 included innovations being put into use by partners, like the [Africa Asia Dairy Genetic Gains](#) (AADGG) platform in Ethiopia, Kenya, Nepal and Tanzania or globally with [CIAT's Urochloa hybrids](#) forage used in more than 70 countries to increase cattle productivity. Community-based breeding of sheep and goats is [breaking records](#) of targeted beneficiaries in Ethiopia and is one of the initiative export products adopted for indigenous

[Begaria cattle](#) in Ethiopia and [Peuhl X Dwarf](#) goats in Mali. Other outcomes included nine policy changes, from local to global level.

The 4 formal impact assessment studies planned and implemented progressed considerably in 2023. The studies on improving dairy input value chains in Kenya and Nepal completed baseline surveys and initiated their interventions. In Kenya, farmers were randomly assigned to receiving support by a dairy farmer assistant or an SMS system while in Nepal, dairy cooperatives were randomly selected to receive support for a village livestock promoter in the form of training and financial incentives. In Tanzania, 100 young agripreneurs were selected and introduced to the digital KuzaOne platform for improving business links to their customers (dairy farmers) and suppliers. Out of these agripreneurs, 50 were randomly selected and received an incubation training on technical and business skills. In Uganda, the study looks at the impacts of a village-level SBCC intervention targeting women and men to promote information on nutrition and gender norms. The intervention and subsequent endline survey are planned for 2024.

Sustainable Animal Productivity faced various disruptions in 2023, including a reduction in budget announced mid-year, insecurity in Ethiopia, political instability in Mali and the Ebola outbreak in Uganda.

All Eol outcomes have quantitative indicators, allowing rigorous monitoring. Influence on public and private actors (Eol4) is particularly strong, with the Initiative recording 5 of the 7 planned outcomes. Such policy influence is the result of long term and continued partnerships, building on pre-Initiative work. Progress towards 'people reached' is fair, with about one third of the target achieved through eleven innovations used by livestock keepers and other value chain actors, including three achieved through the IPSR process.

Progress by End of Initiative outcome

EOIO 1: Outcome I1- people in livestock keeping households who adopted Initiative innovations.

A total of 252,310 people (target of 800,000) were reached by end 2023. This includes adopters of new forage varieties in various Initiative countries, pig and cattle artificial insemination technology in Viet Nam and improved chicken breeds in Ethiopia and Kenya; members of sheep and goat community-based breeding in Ethiopia; users of Africa Asia Dairy Genetic Gains platform in Tanzania, Ethiopia, Kenya, Uganda and Nepal; and early adopters of two mobile applications (to identify locally available feeds for a balanced animal diet in Nepal and to assess dairy farm profitability in Kenya).

EOIO 2: Outcome I2- investments by partners in productivity enhancing technologies.

The total documented partner investments amount to USD 430,633 (target of 30 Million). It includes the co funding by rural municipalities and milk cooperatives in Nepal when testing a new extension approach (see Key Result Story for details), private investments in the pig sector in Uganda, public investments in Kenya and Ethiopia in the chicken value chains. The achieved investment is well below the target, despite strong engagement at various levels.

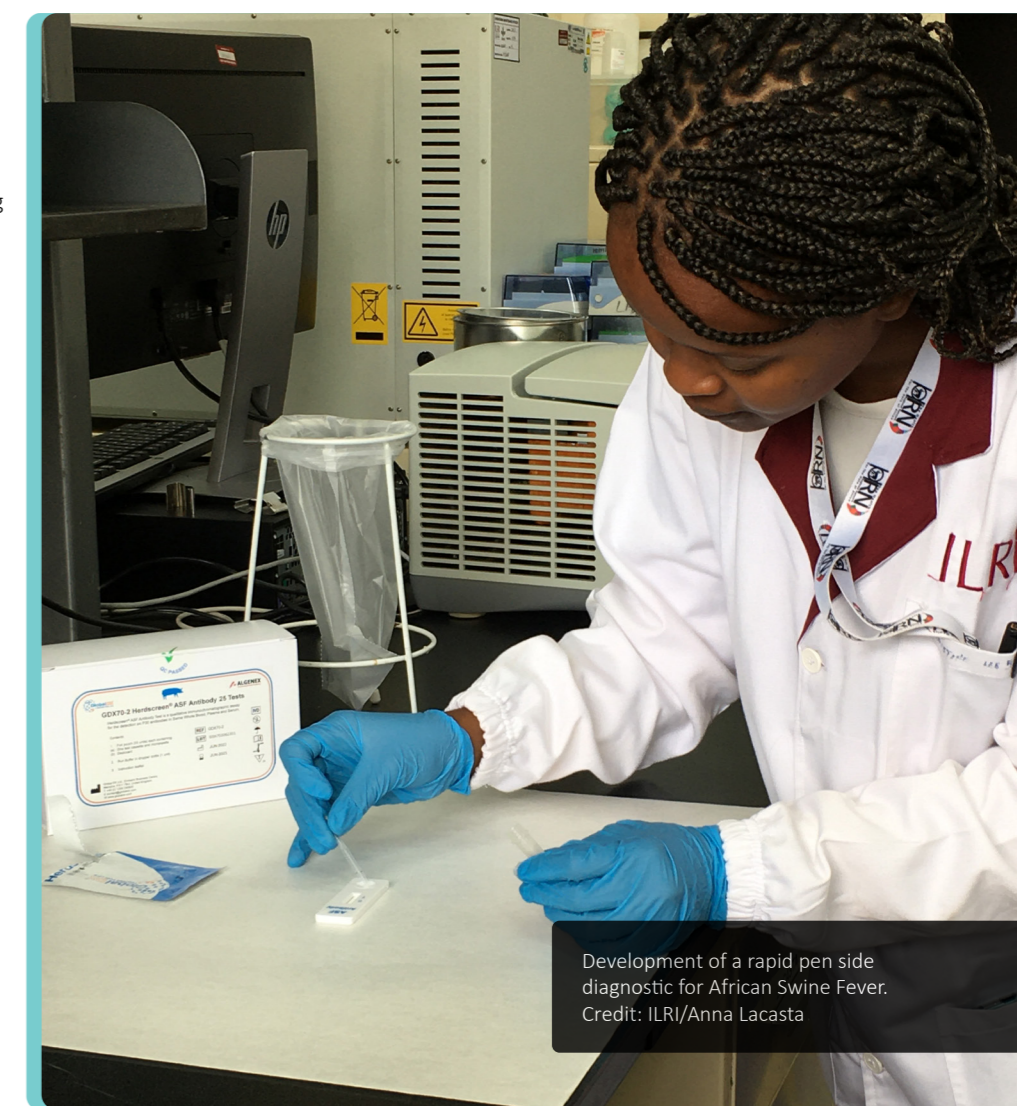
EOIO 3: Outcome I3- organisations incorporating safe livestock derived foods into nutrition education.

Two policy changes were reported by 2023 (target of 6), about the inclusion of eggs in school feeding programs in Ethiopia and Kenya.

EOIO 4: Outcome I4- decision makers using Initiative to inform policies and investments.

A total of 5 policy changes were reported by 2023 (target of 7). These include three in Ethiopia- a public partner funding community-based breeding programs, a private sector actor investing in a digital marketing system; and public funds allocated to promote a chicken frying business; one in Uganda- a by-law promoting a centralised pig slaughter; and a global one related to AU-IBAR, FAO and CIRAD commitment to support the development of livestock master plans.

Sustainable Animal Productivity aims at addressing gaps in livestock productivity. Increasing the productivity of dairy animals in Sub-Saharan Africa in the face of climate change requires both productive and resilient breeds. However, measures for resilience within tropical dairy production systems to adopt when designing genetic improvement interventions are not well defined and documented. [A study](#) defined **resilience indicators for cross-bred dairy animals** exposed to different levels of environmental stress resulting from variations in temperature and humidity. The results showed that animals with high levels (>87.5%) of exotic (*Bos taurus*) genes had the lowest level of resilience relative to those with a lower proportion of exotic genes. Variability in resilience was also greatest amongst animals reared in environments with both high temperatures and high humidity levels. Within the tropical production environments, the presence of *Bos indicus* genes in the genetic makeup of the animals improved resilience to the changing climatic conditions. To avoid bias against lower producing animals when assessing resilience, the measures for resilience need to be standardized for the targeted environment. Also on genetics, **sheep Community-Based Breeding work in Ethiopia** came to elaborate [a framework to impact the Washera sheep population with genetic improvement](#) in litter size and lamb growth rate, affecting its entire lamb meat supply chain. Predictions of meat production and economic benefits were based on current 28 Washera CBBPs reaching an estimated 22% of the total Washera sheep four million population. To reach the whole Washera population, an additional 152 CBBPs would be needed. A key integration factor within the



Development of a rapid pen side diagnostic for African Swine Fever.
Credit: ILRI/Anna Lacasta

supply chain is the production and dissemination of improved ram lambs for breeding. Further effective integration can be achieved with fattening enterprises and output markets; this could also lead to more organized structures in the Washera meat supply chains. Turning to feed, while **Napier grass** is cultivated widely for animal feed due to its palatability, high yield, and year-round growth with irrigation, its productivity is limited by weather variability and disease, emphasizing the need for genetic diversity to enhance its resilience and performance under different conditions. Genebanks and Sustainable Animal Productivity collaborated [to assess genetic variation within global Napier grass collections using genome-wide markers](#). The information of genetic variation in *C. purpureus* is useful for breeding strategies, enhancement of genetic diversity and agronomic management for increased livestock productivity under climatic uncertainties. Turning to animal health, **African swine fever** is a highly contagious viral disease affecting pigs, that results in high mortalities and economic losses in the pig sector. There is no known cure or commercial vaccine for African Swine Fever, and thus prevention and control measures are key to mitigating losses. To assist in early detection of outbreaks, Sustainable Animal Productivity is developing a rapid pen side test for African Swine Fever. [Two lateral flow assays](#), evaluated under both in-vitro and pseudo-field conditions, appear particularly promising. These tests will be further evaluated in Sustainable Animal Productivity field-sites in Uganda. All these papers are reported under Work Package 1 on technologies and practices for sustainable productivity.

Increasing animal productivity is a necessary but not sufficient step for livestock to improve livelihoods. Under Work package 2 on LDFs as part of diverse diets, the various pathways through which livestock keeping impacts **household nutrition** were examined by drawing on lessons from nutrition sensitive livestock projects implemented in East Africa by the CGIAR and through the development of an [updated livestock-to-nutrition pathways framework](#). The results show the interconnectedness of the three main pathways—own-consumption of livestock, income, and women’s empowerment—along with other pathways including contextual factors. It shows that livestock keeping does not guarantee access to animal source foods, and engaging male partners improves nutrition.

Women play important roles in the dairy sector in Tanzania yet they face local gender norms preventing them from benefitting from their enterprises. In Work Package 4 on **gender equity and social inclusion**, [a paper](#) showed that normative sanctions are applied to women who are perceived to be moving beyond acceptable gender norms in their efforts to establish their dairy related livelihoods, although the situation varies by site. Empowerment strategies which leverage local gender norms and deliberately create and build on dialog processes could be developed, using for example community conversations.

Besides gaps in animal productivity, Sustainable Animal Productivity looks at gaps in competitiveness. Low market participation by pastoral livestock producers remains a challenge. [A study in Ethiopia](#) under Work package 4 on **value chains**, shows that pastoralists are willing to pay most of the marketing services, indicating the financial feasibility of public investment in the development of market infrastructure through cost recovery schemes. The results also reveal that participation in goat marketing has a positive impact on per capita income, poverty headcount and poverty gap.

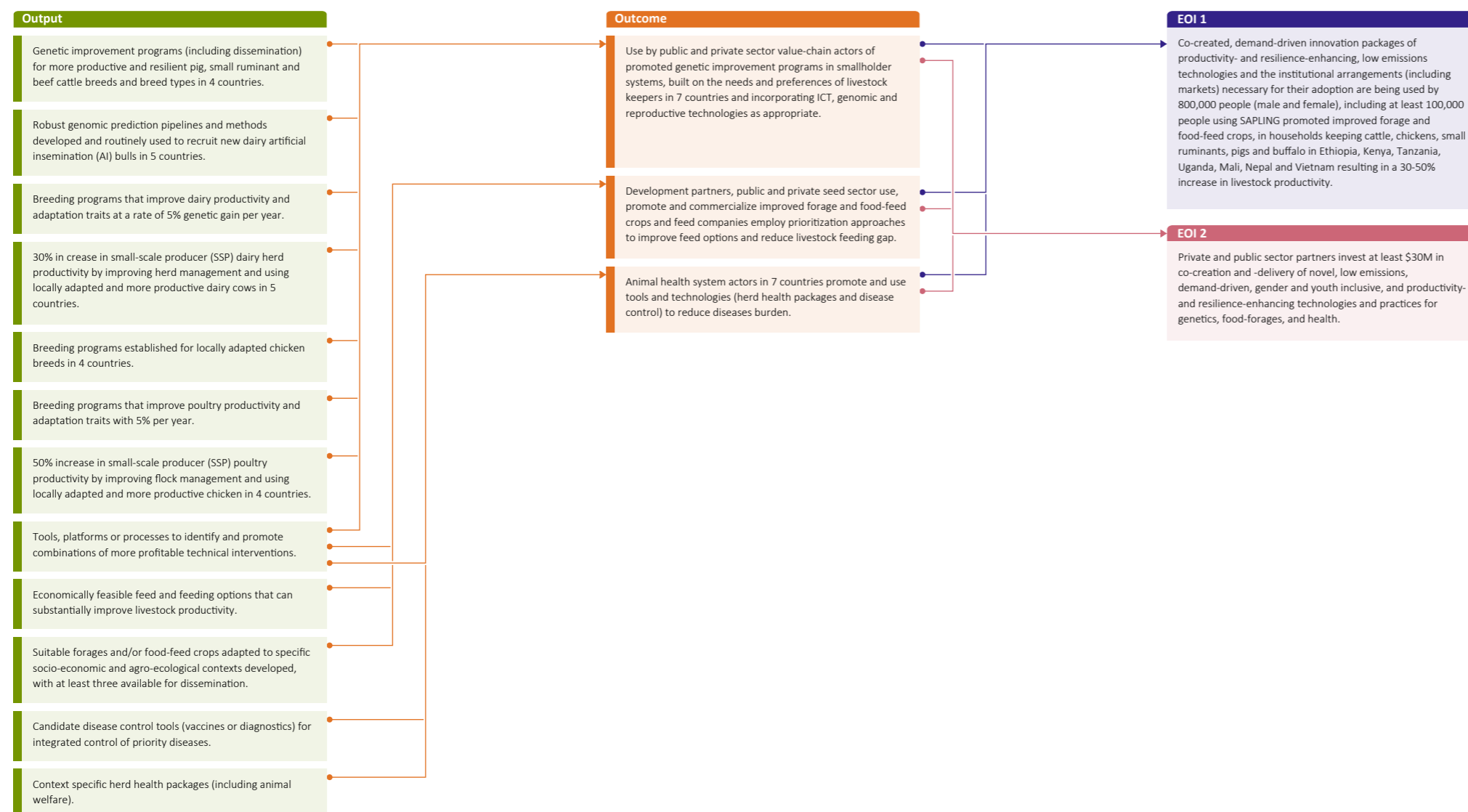


Pig farmer with her breeding sow, in Uganda.
Credit: ILRI/ Pamela Wairagala

Section 3: Work Package progress

WP1: Technologies and practices for sustainable productivity

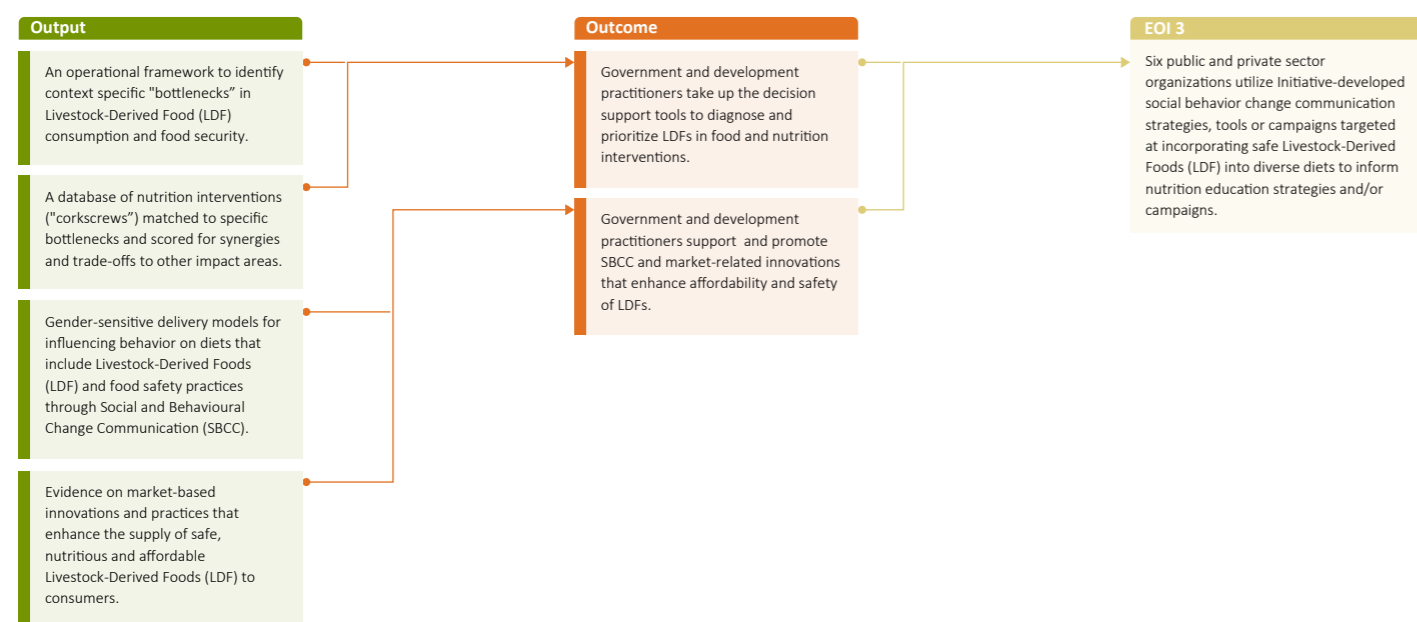
On track



Work Package 1 progress against the theory of change

In 2023, Work Package 1 reported results against all its outputs and outcomes. The country teams progressed significantly on integrating improved forages and feed, animal health products and improved genetics. Farmer adoption of the [Africa Asia Dairy Genetic Gains \(AADGG\)](#) platform in Tanzania, Ethiopia, Kenya, Uganda and Nepal attained 28,500 beneficiaries who can access multidisciplinary extension messages and technical recommendations. In Ethiopia, more than [90,000 beneficiaries](#) have access to small ruminants' superior genetics generated by [Community-Based Breeding Programs](#) together with interventions in herd health, [feed mechanization](#), [fattening](#) and [market linkages](#). In Nepal, rural municipalities have agreed to co-invest in the [delivery system](#) of an [integrated package of inputs and services](#) to 2500 small buffalo keepers where a 20% increase in daily milk yield is reported. The three 'technical pillars' also progressed on their specific research. In 2023, significant progress towards registration of [Cayman and Cobra forages in Tanzania](#) was achieved, alongside testing of a range of novel forages (Brachiaria, Panicum, Clitoria, Crotalaria) across [Kenya](#), Tanzania, Mali, Viet Nam and Global. Additionally, policy briefs regarding seed use in Kenya, Uganda, and Zambia were completed, with development of business models for [improved forage varieties](#) and [forage technologies](#) in Viet Nam. The data capture and analytics platform by AADGG has over 206,000 farms and 460,000 animals registered and continues to deliver scalable genetic improvement for small holder dairy farmers. Initially piloted in Ethiopia and Tanzania, the platform is now operational in Kenya, Uganda, Nepal (SAPLING countries) and recently in Burundi and [Rwanda](#). Work on animal health in 2023 focused on deploying and monitoring herd health packages in the main value chain in all countries. Herd health interventions and evaluation in [small ruminant](#), [chicken](#), [pigs](#), and [dairy](#) farms and related capacity building packages were developed and deployed. In Mali, Laboratoire Central Vétérinaire produced, for use in 2024, 120,000 doses of the Peste des Petits Ruminants thermotolerant vaccine. The TOC assumptions remain valid.

WP2: Livestock derived foods as part of diverse diets



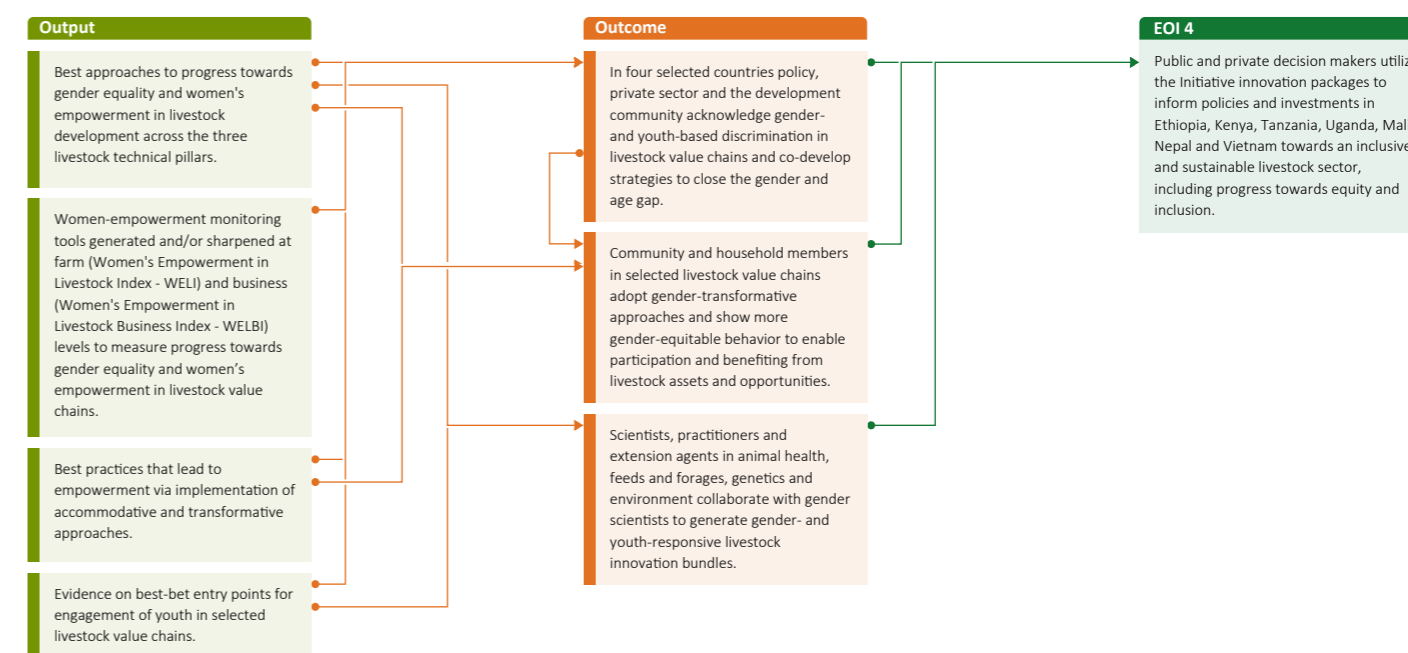
Work Package 2 progress against the theory of change

Work Package 2 on livestock derived foods (LDFs) reported results against one of the two outcomes, and all the four outputs including four innovations. Towards outcome 2, a [private sector partner in Uganda](#) invested in best practices for pig slaughter, and abattoir waste management to enhance pork safety by utilizing knowledge gained from the Initiative.

Work Package 2 addresses one main research question: What social and behavioural change communication (SBCC) approaches including food safety practices are needed to enhance inclusion of safe LDFs in diets to impact on household food security and nutrition outcomes? This research question has been addressed in three main ways. The first is through operationalising [a decision support framework](#) that utilises a food systems and food environment approaches to diagnose food and nutrition security bottlenecks to guide prioritisation of interventions by partners in Uganda and Viet Nam. The framework is a Work Package [innovation](#) developed in 2022. The

second is through collaboration with the University of Alicante on an impact assessment study in Uganda, that utilises a randomised controlled trial design to assess the impact of a SBCC intervention on nutrition outcomes for young children and women of reproductive age, and behaviour change in men. The SBCC focusses on (a) delivering knowledge to men and women on household, maternal and child nutrition, including consumption of LDFs, and food safety practices, and (b) addressing societal norms to demystify LDFs consumption particularly for women and young children. The focus of the SBCC is informed by results of [a formative study](#) implemented in 2022 in collaboration with Work Package 3. Baseline data covering 1,200 households was collected in 2023. The third is through school based model poultry farms set up in primary schools in Tanzania and Ethiopia to assess its role in delivering nutrition education and supplying LDFs to the school feeding program. The nutrition outcomes of feeding one egg/child/day will be assessed. The TOC assumptions are still holding.

WP3: Gender equity and social inclusion



Work Package 3 progress against the theory of change

WP 3 leads the strategic gender work i.e. gender analysis that focuses on progress towards gender equality; and coordinates gender integrated research i.e. gender analysis that aims to improve livestock systems – which is coordinated and reported within each WP.

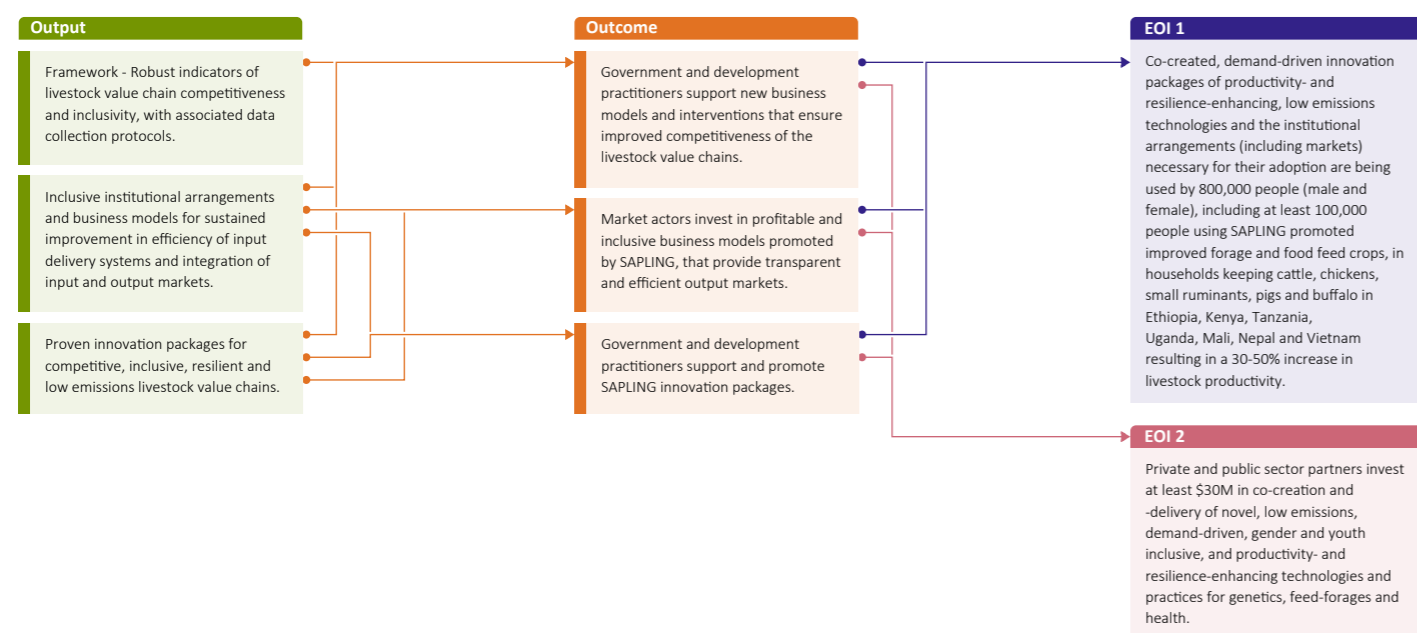
Progress towards outcome 1 was achieved in Tanzania, where [policy makers, a private poultry brooding company and an NGO](#) adopted and replicated the Women in Business model developed with Sustainable Animal Productivity. Some progress was made for Outcome 2 through GTAs in Tanzania (through social media) and Ethiopia (through community conversations). Work Package outcomes depend on the transformation of restrictive gender norms into more conducive ones but work was slowed down due to budget limitations. WP3 made good progress in terms of strategic work, specifically on: 1. **Tools and methodologies:** developing standardised research tools to assess changes in empowerment and norms; a new methodology to assess trends in [feminization of agriculture](#); and an example of intersectional analysis on gender and caste

about [women's empowerment through dairy](#) 2. **Empowerment:** providing progress on the theory of empowerment and on effective approaches to support women's empowerment, particularly through [forages in Kenya](#); on the [interrelation between gender and caste](#); and on the link women's empowerment, gender norms and resilience to [climate change](#) in Tanzania; 3. **Transformative change:** providing theoretical progress on transformative change, evidence on gender norms affecting women's involvement in livestock business in [Tanzania](#) and [Ethiopia](#), and their adoption of genetic innovations, and, evidence on effective transformative approaches; 4. Youth: we started exploring [youth-specific challenges and opportunities](#) in livestock production and marketing in East Africa. We also developed 5. a [Global framework on key gender considerations in livestock development](#) led by ILRI in collaboration with FAO, IFAD and WB.

Our assumptions held true, although the delay in the work in Ethiopia caused by the local conflict require adding one assumption: "External factors, particularly security and stability enable our implementation".

WP4: Competitive and inclusive livestock value chains

On track



Work Package 4 progress against the theory of change

Work Package 4 is about research on and for competitive and inclusive livestock value chains and produced knowledge products under all three outputs. A key research question is quantifying gender disaggregated impacts of livestock innovation packages on the different actors. The scope of the impact of the innovations being evaluated may, however, be revised downwards due to budget reductions. The assumptions of WP4 are still valid except that assumption 4 will be revised as the private sector need more incentives to invest in gender equality compared to policymakers and public development practitioners.

The first output of WP4 is a [framework](#) that identifies robust indicators of livestock value chain competitiveness and inclusivity for all Sustainable Animal Productivity value chains.

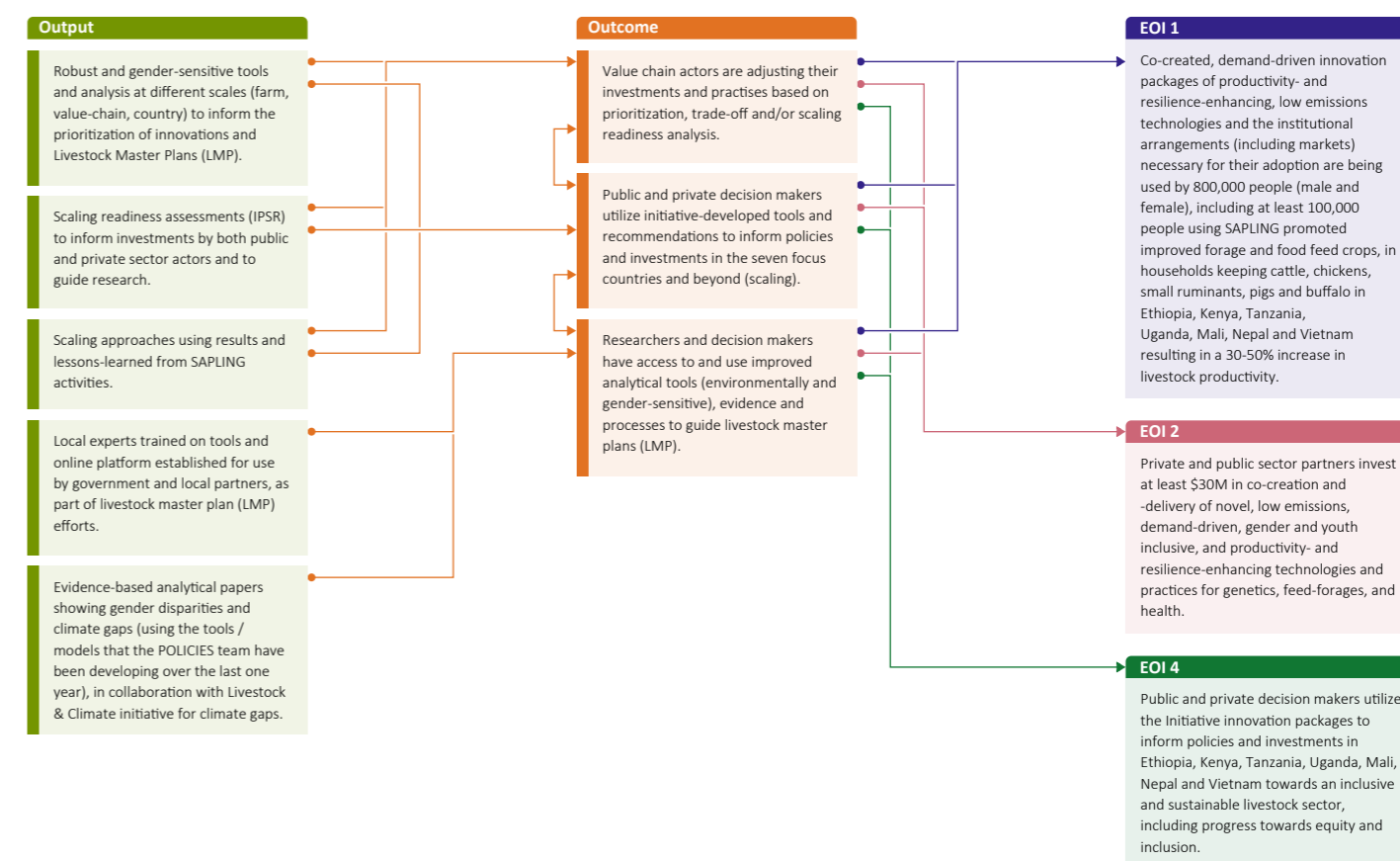
The second output of WP4 is inclusive institutional arrangements and business models. Comprehensive business models were developed for [community-based sheep breeding](#), [sheep fattening](#), and [sheep market information services](#) based on the Ethiopian context. Similarly, a technical brief on sustainable business strategy

for the provision of [artificial insemination](#) for cattle in the northwest highlands of Viet Nam has been published. Several documents have also been produced on institutional arrangements that can help smallholder farmers establish a stronger link with input and output markets. These documents include the [evolution and scope of agricultural finance in developing countries](#), the [multistakeholder analysis for the small ruminant value chain in Mali](#), [an assessment of livestock farmer groups in Viet Nam](#), and a guide on [establishing farmers groups to link smallholder poultry farmers with input and output markets in the tropics](#).

The third output of WP4 is an empirical impact assessment of innovation packages. Several randomized controlled trials and observational studies have been designed and started in 2023. The studies evaluate smart sheep marketing in Ethiopia, shared farm management model in Kenya, village livestock promoters in Nepal, entrepreneur incubation in Tanzania, and business incubator/accelerator program in Uganda. The quantification of the impact of the innovations will be finalized in 2024

WP5: Evidence, decisions and scaling

On track



Work Package 5 progress against the theory of change

Work Package 5 on Evidence, Decisions and Scaling reported results against two of the three outcomes and all five outputs. Towards outcome 1, community-based breeding programs (CBBP) for small ruminants in Ethiopia are supported by [a digital marketing system](#), developed through private sector investment, while the [scaling of the CBBP model](#) from small ruminants to beef cattle, through the investment of a national partner, the Ethiopian Biodiversity Institute, contributes to outcome 2.

In line with the WP's first research question, 26 knowledge products focused on tools and methods for and assessments of the trade-offs and synergies between productivity, economics, gender & social equity, and environmental factors that need to be considered when developing, prioritising and scaling livestock innovations. Regarding Livestock Master Plans, the [multi-partner consortium was strengthened](#), collaborating on [tool development](#) and [engagements and trainings](#) across various countries. [Trade-off scoring exercises](#) were conducted across all VCs for initial and revised innovations, facilitating awareness creation through presentations and soliciting

feedback for potential refinements. Notably, in Kenya, it instigated a comprehensive environmental assessment. [CLEANED environmental assessments](#) were conducted across [multiple countries](#), furthering [tool development](#) and garnering interest beyond SAPLING countries. Recognized as a valuable resource by diverse partners, it elevates environmental issues on the agenda, augmenting awareness and providing more quantitative data. This holds significant potential to influence policy decisions, with anticipated adjustments to interventions based on scenario assessments.

In support of scaling, the WP promotes and supports the IPSR process. In 2023, a first [scaling readiness workshop](#) was carried out in Nepal and 4 innovations prioritised for such workshops in 2024. In addition, CGIAR Research Initiative scientists [interacted with the government of Nepal](#) on linking research and policy and [deepened collaboration with the Tanzania Livestock Research Institute \(TALIRI\)](#), [the Ministry of Livestock](#) and other research and development actors in Tanzania with and aim to scale up proven innovations towards a more productive, competitive, and sustainable livestock sector.

Work Package progress rating summary

WORK PACKAGE	PROGRESS RATING & RATIONALE
1	<p>Progress rating</p> <p>In 2023, Work Package 1 further invested in generating results across the three pillars of livestock productivity, namely herd health, feeds and forages, and genetics. Results were reported against all eight Work Package outputs. Integration of the pillars across SAPLING 15 value chains is building up in a concerted manner with the country partners unfolding a steady increase in the number of beneficiaries and measurable improvements in productivity as reported above.</p>
2	<p>Progress rating</p> <p>Results were reported against all the four Work Package outputs including 4 innovations. We developed an updated version of the livestock-to-nutrition pathways framework and generated evidence on the interconnectedness of the three main pathways—own-consumption of livestock, income, and women’s empowerment. With partners, we co-created the SBCC messages to address societal norms that hinder LDFs consumption for children and women, for use in the SBCC impact assessment study.</p>
3	<p>Progress rating</p> <p>WP3 produced 12 papers and 5 innovations. Specifically, we produced 6 peer reviewed papers and 2 innovations for Output 1 (best approaches for women’s empowerment); 2 tools and 2 innovations for Output 2 (tools); 3 papers and 1 innovation for Output 3 (best accommodative and transformative approaches); and 1 paper for output 4 (youth engagement)</p>
4	<p>Progress rating</p> <p>Results were reported against all the Work Package outputs including 15 innovations. Activities are implemented as planned except for essential modifications made due to budget reduction. Results are being published in peer-reviewed journal articles and other formats.</p>
5	<p>Progress rating</p> <p>Results were reported against all five Work Package outputs including 30 knowledge products. Good progress is being made towards 2 of the 3 outcomes.</p>

Definitions

On track	Delayed	Off track
<ul style="list-style-type: none"> Annual progress largely aligns with Plan of Results and Budget and Work Package theory of change. Can include small deviations/issues/delays/risks that do not jeopardize success of Work Package. 	<ul style="list-style-type: none"> Annual 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. 	<ul style="list-style-type: none"> Annual progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas. Deviations/issues/delays/risks do jeopardize success of Work Package.

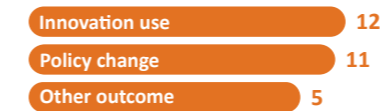
Section 4: Key results

This section provides an overview of results reported by the CGIAR Research Initiative on Sustainable Animal Productivity. These results align with the CGIAR Results Framework and Sustainable Animal Productivity’s theory of change. Source: *Data extracted from the [CGIAR Results Dashboard](#) on 29 March 2024.*

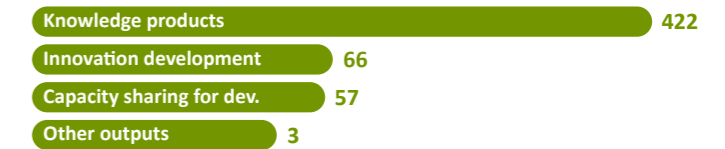
OVERVIEW OF REPORTED RESULTS

Cumulative results for 2022 and 2023

Outcomes

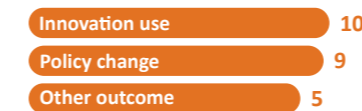


Outputs



Results for 2023

Outcomes



Outputs



Results for 2022

Outcomes

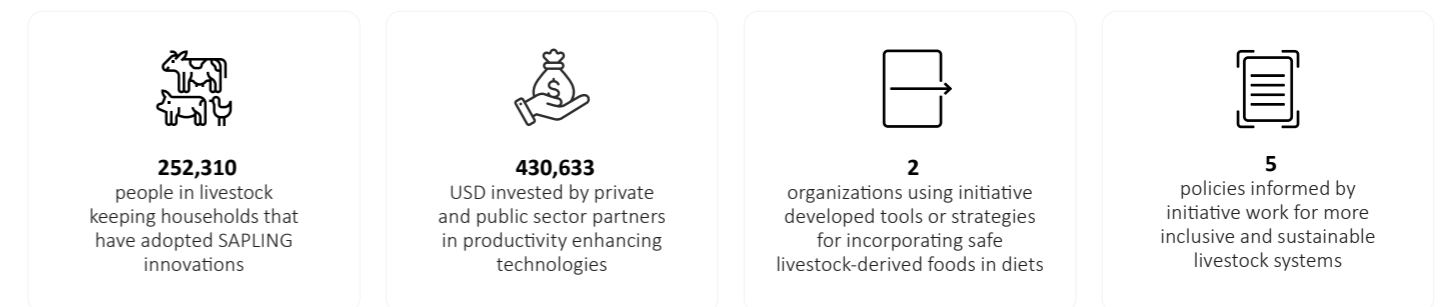


Outputs



CONTRIBUTIONS TO END OF INITIATIVE OUTCOMES

Cumulative 2022 and 2023 contributions to Sustainable Animal Productivity’s four EOIOs are shown below.



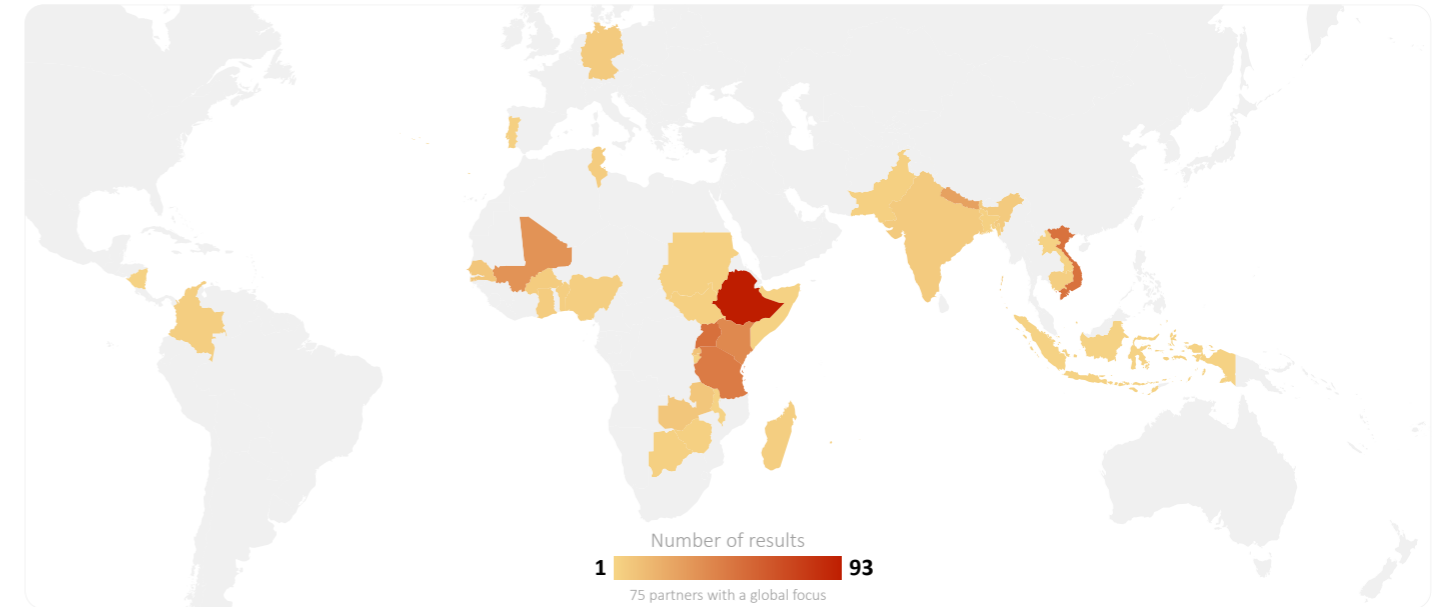
PERCENTAGE OF REPORTED RESULTS TAGGED TO CGIAR IMPACT AREAS



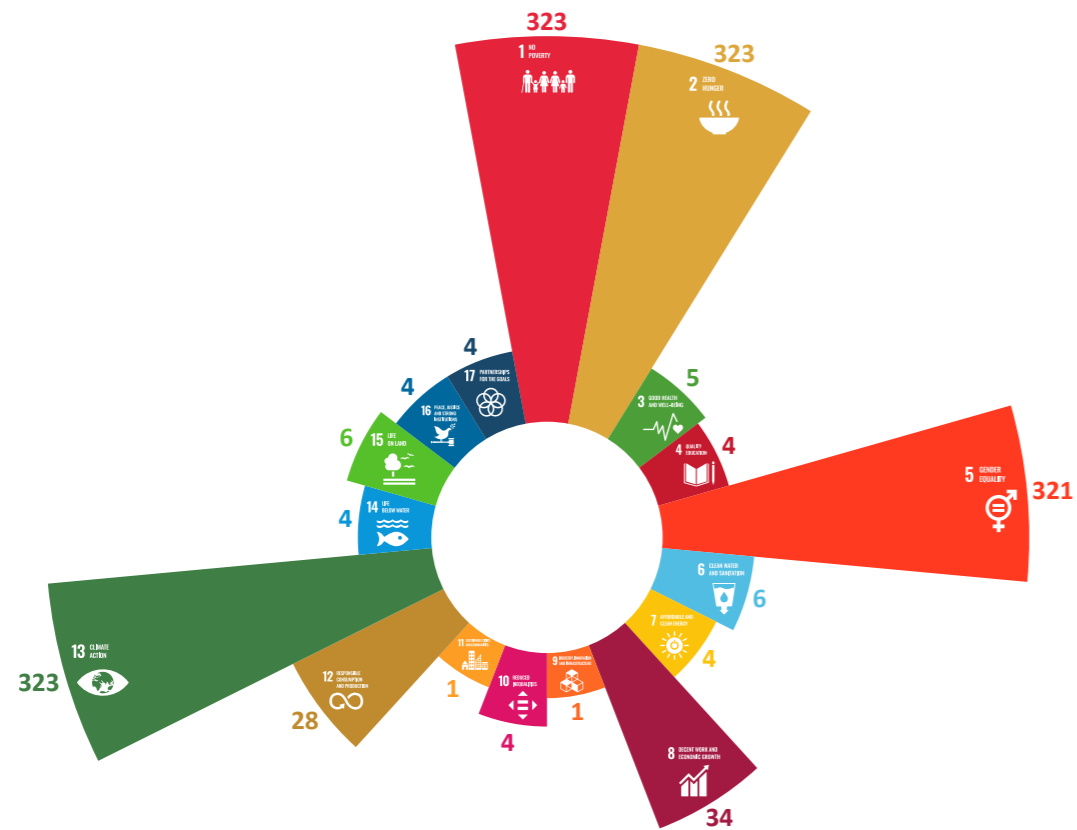
● **Principal:** The result is principally about meeting any of the Impact Area objectives, and this is fundamental in its design and expected results. The result would not have been undertaken without this objective.
● **Significant:** The result has made a significant contribution to any of the Impact Area objectives, even though the objective(s) is not the principal focus of the result.
● **Not targeted:** The result did not target any of the Impact Area objectives.

NUMBER OF RESULTS BY COUNTRY

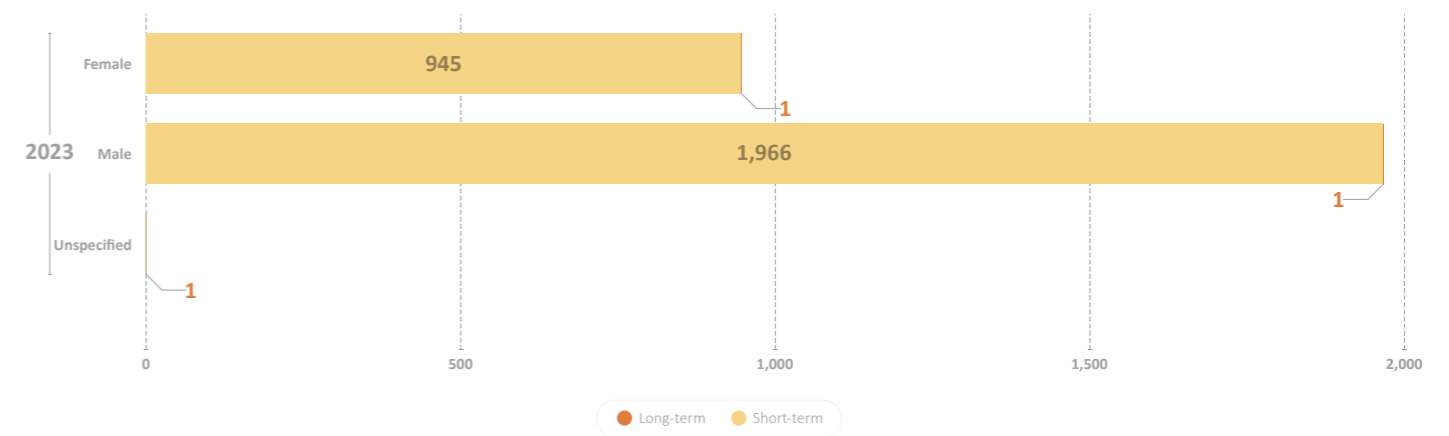
Country focus for 2023 results. Results are concentrated in Ethiopia, Kenya, Mali, Nepal, Tanzania, Uganda, and Viet Nam.



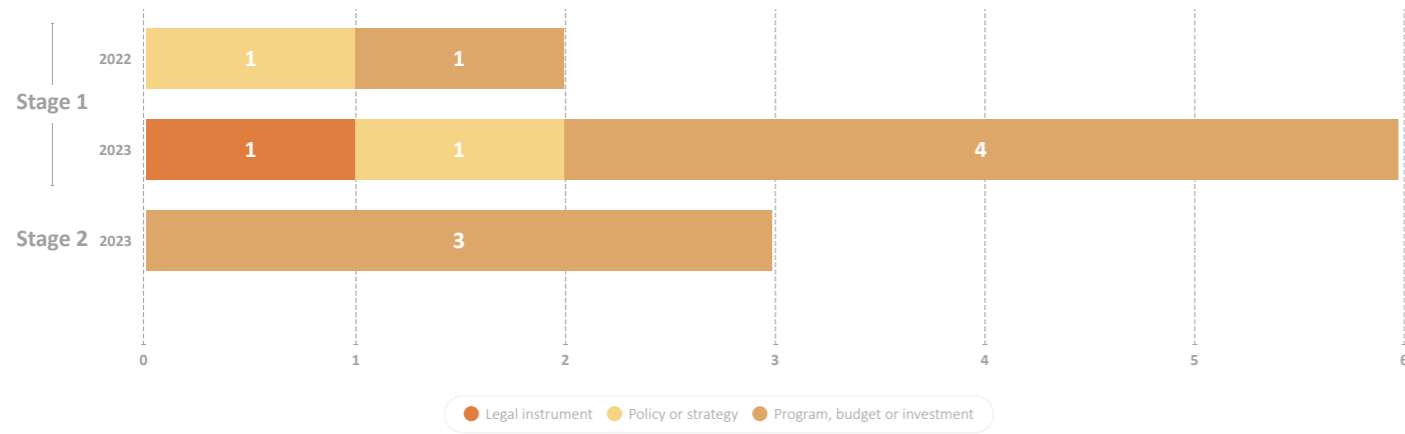
CONTRIBUTIONS TO THE SUSTAINABLE DEVELOPMENT GOALS FROM 2023 RESULTS



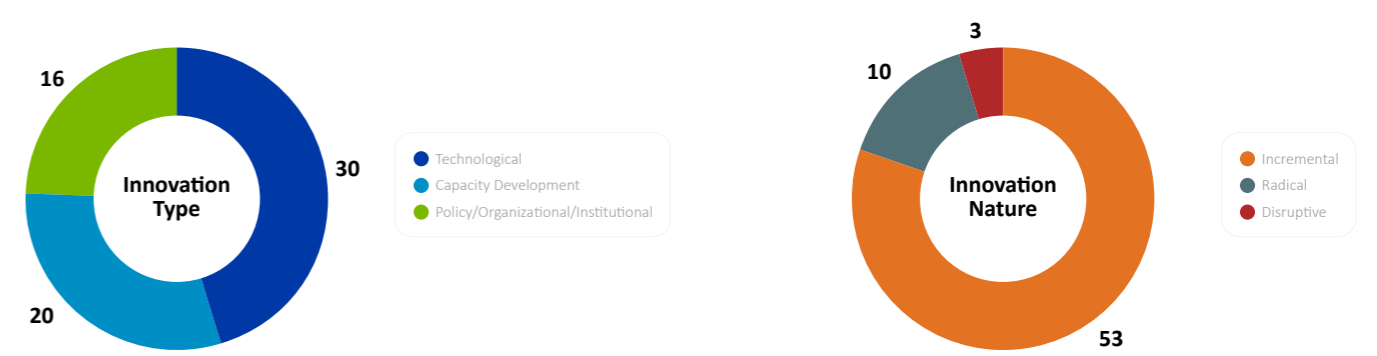
NUMBER OF INDIVIDUALS TRAINED BY THE INITIATIVE IN 2023



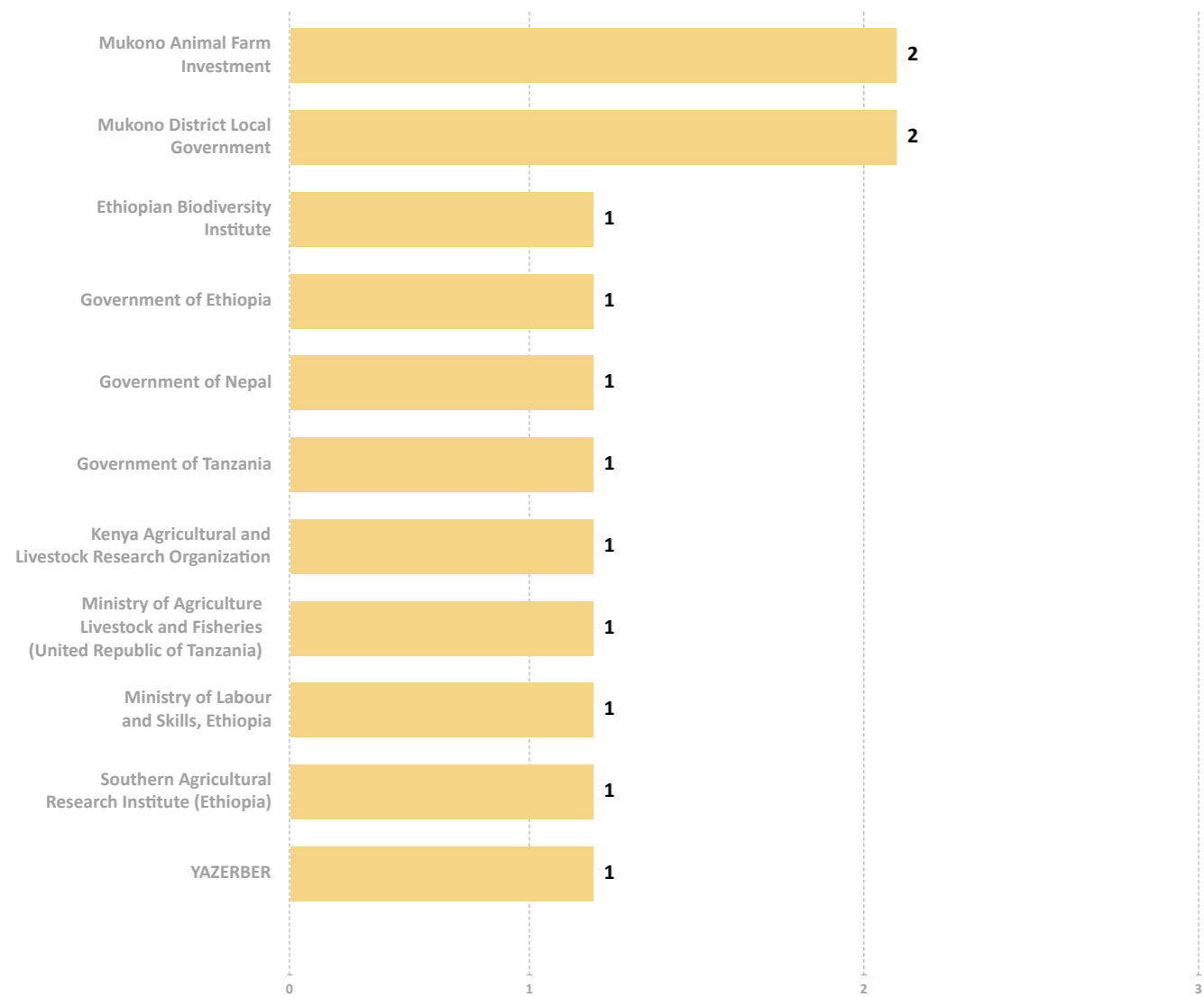
NUMBER OF POLICIES BY STAGE



INNOVATIONS BY TYPE AND NATURE



ORGANIZATIONS WHOSE POLICY HAS CHANGED



NUMBER OF INNOVATIONS BY READINESS LEVEL





Vaccination of sheep against peste des petits ruminants in Mali. A public-private-partnership is supporting vaccine scaling. Credit: ILRI/Michel Dione

Section 5: Partnerships

Partnerships and Sustainable Animal Productivity's impact pathways

SAPLING reported results for 2023 in collaboration with 191 partners, in comparison to 150 partners in 2022. Out of these partners, fifty-seven (30% of 2023 partners) contributed to SAPLING 2023 outcomes. Partner types comprised National Universities (30%), National Agricultural Research Systems (21%), National and sub-National Governments (15%), Private Companies (8%), International, national and local NGOs (8%), International Research Organizations and Universities (7%), Financial Institutions (2%), and other. SAPLING's six top partners in 2023 (in terms of number of shared results) were the National Institute of Animal Science of Viet Nam (26 shared results), the Tanzania Livestock research Institute (20), Ethiopia's Amhara Regional Agriculture Research Institute (19), Southern Agricultural Research Institute (19), and Institute of Agriculture Research (14), and the Kenya Agricultural and Livestock Research Organization (14). This is illustrative of the close engagement of SAPLING with the National Agricultural Research System in each of its focal countries. Key partners outside of SAPLING focal countries (with shared 2023 results) included the University of Edinburgh and Scotland's Rural College (Scotland), the University of Hohenheim (Germany), the University of New England (Australia), the Food and Agriculture Organisation of the United Nations (Italy), and the U.S. Department of Agriculture (United States of America).

In all countries and value-chains, the SAPLING partnership team comprises a range of demand, innovation, and scaling partners. This ensures that SAPLING work meets the demands of its clients, as is well placed to scale, as scaling partners are engaged from the onset. Partnership teams and partner roles are reviewed on an ongoing basis, including as part of SAPLING reflection workshops held in all 7 SAPLING countries in 2023.

Several illustrative partnership examples are:

- The establishment of a small ruminant [digital marketing system](#) by a private sector partner, the Yazerber Animal Production Center, which facilitates marketing of animals from community-based breeding programs (CBBP) for small ruminants in Ethiopia. The breeding programs, supported by SAPLING, have a partnership team including ICARDA, ILRI, the Ethiopian government, central and regional agricultural research centers, and several Ethiopian Universities, in addition to Yazerber. This strong partnership team has resulted in [scaling](#) of the small ruminant breeding model within Ethiopia. Further, the breeding model has been [adapted to cattle](#) with support from the Ethiopian Biodiversity Institute.
- In northwest Viet Nam, a business model for cattle artificial insemination was actualized through a partnership involving private artificial insemination service providers, the sub-Department of Animal Health of Mai Son district, the National Institute of Animal Science of Viet Nam, and Sustainable Animal Productivity. The approach is centered on an [artificial inseminators service providers co-operative](#), with shared access to facilities including liquid nitrogen. The Department of Animal Health at provincial level will be a key partner in further scaling of the model.
- In Mali, innovation platforms were created as a means for engaging stakeholders in the small ruminant vaccination process. These comprised livestock farmers, community leaders, private veterinarians, a vaccine manufacturer – the Laboratoire Central Vétérinaire, and government supported public veterinary services. [Sustainable Animal Productivity](#) is supporting the platform and capacity of the partners, such as facilitating the Laboratoire Central Vétérinaire produce a thermotolerant Peste des Petits ruminants vaccine and training animal health workers in vaccine delivery.
- Sustainable Animal Productivity is partnering with [Kuza Biashara Ltd.](#), a private agri-tech company, to pilot digitally enabled service provision through mentored agri-entrepreneurs, including women and youth, in Tanzania. The digital platform (One Network Ecosystem) developed by Kuza Biashara enables the agripreneurs to connect to both farmers and service providers, such as those in animal health, genetics, feeds, and extension, enabling delivery of advisory services and bundled inputs / technologies. Sustainable Animal Productivity is evaluating the impact of the model on adoption of profitable innovation bundles.

Section 6: CGIAR Portfolio linkages



Farmers assessing improved forages in northwest Viet Nam. Additional assessments on forage productivity and soil health impacts are jointly being undertaken by the Sustainable Animal Productivity and Nature-Positive Solutions Initiatives. Credit: ILRI/Dao Thi Thu Hang

Portfolio linkages and Sustainable Animal Productivity's impact pathways

Twenty-three percent of Sustainable Animal Productivity results for 2023 were reported in partnership with one or more CGIAR Initiative(s) or a non-pooled project. On CGIAR Initiatives, results were jointly reported with 25 other Initiatives, as well as three Platforms. The collaborating Initiatives represented all Action Areas, with four collaborating Initiatives from Genetic Innovations, six from Resilient Agrifood Systems, and ten from System Transformation. Sustainable Animal Productivity also reported joint results with five Regional Initiatives. The main collaborating Initiatives (in terms of number of joint results reported in 2023) were Livestock and Climate, followed by Mixed Farming System, Market Intelligence and Accelerated Breeding.

On non-pooled projects, results were reported with 25 collaborating non-pooled projects, from 19 funders. Key collaborating non-pooled projects (in terms of number of joint results reported in 2023) were Accelerating Impacts of CGIAR Climate Change Research for Africa funded by the World Bank, the Mali Livestock Scaling Technology Project funded by the U.S. Agency for International Development, and the Epidemiology and Control de la Peste des Petits Ruminants project funded by the U.S. Agency for International Development.

Several illustrative cross-Initiative collaborations are:

- Sustainable Animal Productivity and Livestock and Climate have collaborated on a new version of the [CLEANED tools](#) which assess the environment and other impact of livestock production systems, including on land use, water impacts, greenhouse gas emissions, soil health, productivity and economics. Sustainable Animal Productivity focused on enhancing the tool's economic aspects and modules related to land and water footprint, whilst Livestock and Climate provided insights from the landscape perspectives, which informed the algorithms for regional aggregation of results. The results generated by CLEANED are valuable

for policymaking, [intervention prioritisation](#) and extension services to farmers.

- Sustainable Animal Productivity and Mixed Farming Systems pooled expertise and resources in feed mechanization and feed fattening of sheep in Ethiopia. Groups, comprising mainly [women and youth](#), have been supported to produce and market cost-efficient and nutrition feed concentrates usually local feeds and customized small-scale feed processing units. Additionally, both initiatives' collaboration has facilitated the establishment of a public-private-partnership comprising Wachemo University and John Farm, which assist the groups with capacity building and input provision.
- Sustainable Animal Productivity and Gender Equality are collaborating to understand how restrictive gender norms limit the empowerment of rural women, and thus their ability to build their resilience to climate change through livestock. In [Tanzania](#), methodological approaches developed by both Initiatives were utilized to perform assessments around this, as well as identify opportunities to flex the norms towards a more conducive environment for gender equality. Moving forward, the Initiatives are exploring joint implementation of gender transformative approaches to achieve the norms shift.
- In northwest Viet Nam, Sustainable Animal Productivity and Nature-Positive Solutions are collaborating to evaluate eight improved forage varieties for livestock feed, including both grasses and legumes. The forages are being evaluated for [production and quality](#), as well as impacts on [soil health](#) through expertise and resources from Sustainable Animal Productivity and Nature-Positive Solutions, respectively. A local partner, the Northern Mountainous Agriculture & Forestry Science Institute, is additionally supporting the evaluations. Recommendations from the evaluation will feed into development and scaling strategies for the improved forages.

Section 7: Adaptive management

RECOMMENDATION

SUPPORTING RATIONALE

Revised end of initiative targets

During the Sustainable Animal Productivity pause and reflect of 2023, as well as the value-chain level theory of change reflection workshops in 2022, reflections were held on the end of initiative targets at both initiative and work-package levels. Due to reasons including reduced budget (37% of that anticipated), delays in starting some activities (such as due to registration issues in Viet Nam), and some site changes (such as in Ethiopia and Mali where there was unrest), we propose target reductions as below. Note that Sustainable Animal Productivity did not ask for a change of outcome targets in 2022.

Outcome code (WP= Work Package)	Outcome (abbreviated)	Indicator	Initial targets	Revised targets
Initiative 1	Co-created innovation packages	People benefiting	800,000	490,000
Initiative 1	Co-created innovation packages	Productivity	30-50%	10-25%
Initiative 2	Partners investment in technologies and practices	USD invested	30 Million	5 Million
Initiative 3	Safe livestock derived foods	Organizations adopting	6	5
WP 1-3	Reduced disease burden	Health actors adopting	320	150
WP 2-2	Affordability and safety of livestock derived foods	Practitioners adopting	4	3
WP 3-1	Gender- and youth-based discrimination	Strategies co-developed	4	2
WP 3-2	Gender-transformative approaches	People benefiting	40,000	20,000
WP 4-1	New business models and interventions	Practitioners supporting	7	4
WP 4-2	Innovation packages	Practitioners supporting	15	8
WP 4-3	profitable and inclusive business models	Actors applying	250	175
WP 5-1	Value chain actors & investments	Investments and practices modified	7	4
WP 5-2	Public and private decision-makers	Investments and policies modified	7	4

No change to the targets for outcomes EO14, WP1-1, WP1-2, WP2-1, WP3-3 and WP5-3

Internal communication and collaborative work

Additional efforts were made to provide opportunities for staff engaged in Sustainable Animal Productivity to exchange and collaborate. Besides the regular Work Package and country team calls, monthly calls with all the leads were used for general update and identification of challenges. An 'all Sustainable Animal Productivity' staff event' was organized in July, that included a presentation on the climate change work in the Initiative and group work on the same topic.

Use of theory of change as monitoring tool

Theories of changes were revised and published for most of the countries and value chains. Reflection work-shops were organized in all of them, continuing the co-design process with partners, adjusting plans and documenting outcomes.

Section 8: Key result story

Transforming Nepal's dairy buffalo through partnerships

Buffalo farmers reaping benefits from higher milk productivity, improved fertility and feeding practices in Nepal.



Buffalo keepers in Nepal.
Credit: Nils Teufel / ILRI

Primary Impact Area



Other relevant Impact Areas targeted



Contributing Initiative

Sustainable Animal Productivity

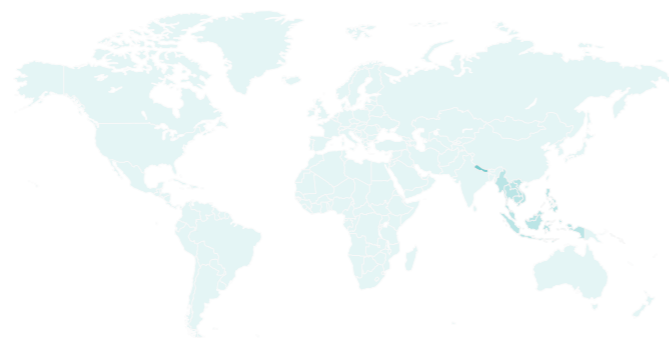
Contributing Center

ILRI

Contributing external partner

Rural municipalities · Milk cooperatives

Geographic scope



Region: Southeast Asia

Country: Nepal

A co-investment partnership between Sustainable Animal Productivity, rural municipalities and milk cooperatives in six districts of the eastern Terai region has yielded substantial transformation in the dairy buffalo value chain. Through the partnership, village livestock promoters (VLPs), jointly supported by the three organisations, are now able to provide an integrated package of inputs and services to farmers aimed at enhancing buffalo farmers' efficiency and livelihoods breaking silos between feed, health and genetics extension and paving the way towards economic sustainability.

What is the challenge? The actual challenge? Demand from farmers needs to be spelled out in the beginning

Sustainable Animal Productivity, rural municipalities (RM) and milk producer cooperatives (MPC) agreed to co-invest to improve buffalo productivity in Nepal. The three partners are signatories of a Letter of Understanding (LoU) for collaborative action to improve the dairy buffalo value chain within targeted dairy cooperatives situated in six districts of the eastern Terai namely Sunsari, Saptari, Siraha, Dhanusha, Mahottari and Sarlahi.

In this cost-sharing approach, partners agreed on activities including: organizing fertility management camps, improving nutrition, buffalo genetics, value chain development and building the capacity of farmers, technicians, veterinarians, and the value chain actors.

Dairy buffalo productivity in Nepal is low and farmers are faced with challenges of accessing quality inputs and services. Before the Sustainable Animal Productivity project, farmers prepared feed at the household level using locally available ingredients like corn flour, rice bran, wheat bran, seeds, and oilseed cakes. However, inefficient feeding practices, including the lack of chopping dry fodder and inadequate awareness of balanced diets, led to feed wastage and suboptimal utilization.

Village livestock promoters (VLP) were identified and selected from self-employed extension service providers as a possible solution to address the challenges facing the dairy buffalo farmers. Training modules were extended to Veterinarians /Veterinary Technicians from the district Veterinary Hospital, and Livestock Service Expert Centre (VHLESEC) and focused on reproductive management and health of buffaloes, animal nutrition, biosecurity, general health and hygiene. The VLPs now organise fertility camps and provide extension

services on nutrition, reproduction and data recording on animal reproduction and genetic selection, besides building farmer capacity and transform delivery of inputs, services and information.

To improve the diet quality, an [integrated nutrition package \(INP\)](#) was developed by Sustainable Animal Productivity researchers and partners and implemented through the VLPs. The package consists of nutrient balancing (using a digital tool), chopping of green and dry roughages, supplementation of roughages with concentrates in the required quantity and use of improved forages and upgraded straws/stovers.

Use of the INP yielded substantial improvements in daily milk production for the 2500 farmers reached through the initiative since its inception two years ago. Sai Krishi Cooperative located in outer Terai region, for example exhibited lower milk production compared to the other cooperatives before the intervention. Most of the cooperative farmers initially reported a modest milk production of 4.5 to 5.5 litres per day, but later observed a notable improvement post-intervention, with daily yields ranging from 5.5 to 6.5 litres. [Beyond milk, other improvements in the areas of health and reproductive performance are also reported.](#)

The positive feedback not only underscores the program's success in addressing and mitigating challenges but also the viability of the partnership approach. However, even with these achievements, challenges persist in farmers' adoption of best practices. Moving forward, Sustainable Animal Productivity will focus on using joint interventions to promote best practice on balanced diets, record keeping, improved buffalo sheds, access to finance and capacity building, and regular fertility and health improvement camps.

Learn more:-

[Buffalo dairy value chain in Nepal showing symptoms of change](#)

[Village livestock promoters in rural Nepal are changing the lives of buffalo farmers](#)

[CGIAR Research Initiative scientists advise Nepal government on linking research and policy](#)

[Building better buffalo farming in rural Nepal](#)

[Nepal overview](#)



We are glad to say that the co-investment approach in Sustainable Animal Productivity motivated our coop and local government to share the costs to the tune of NPR 190,000 and NPR 500,000 respectively to implement productivity improvement programs in our area to benefit our member dairy farmers as otherwise we could not have implemented it because of low affordability, though the project is interesting.

Hari Har Singh (Chairman, Small Farmer Agricultural Cooperative Limited, Kantibazar, Gaushala Municipality – 12, Kantibazar, Madhesh Province) reported



Front cover photo

A member of a community-based breeding program in Ethiopia with her award-winning sheep.
Credit: ILRI/Apollo

Back cover photo

A smallholder cattle keeper with his animals in northwest Viet Nam.
Credit: ILRI/Chi Nguyen



INITIATIVE ON
Sustainable Animal
Productivity