CGIAR

INITIATIVE ON
Sustainable Animal Productivity

CGIAR Initiative on Sustainable Animal Productivity

ANNUAL TECHNICAL REPORT 2022

CGIAR Technical Reporting 2022

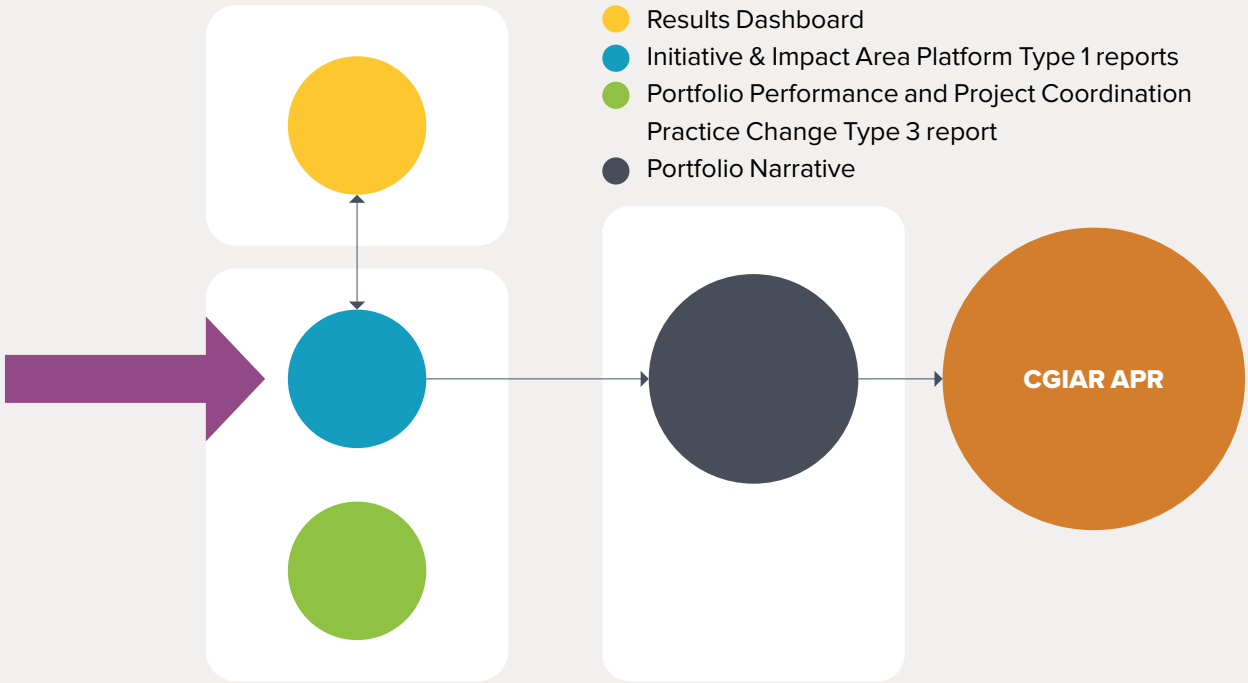
CGIAR Technical Reporting has been developed in alignment with the CGIAR Technical Reporting Arrangement.

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

The CGIAR Technical Report comprises:

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

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



US$	2022	2023	2024
Proposal Budget from initial submission	US$16,000,000	US$20,000,000	US$24,000,000
Approved 2022 Budget	US$15,184,203		

2022 Disbursement Target based on Approved FinPlan

Section 1 Fact sheet

Initiative name	Sustainable Animal Productivity for Livelihoods, Nutrition, and Gender Inclusion
Initiative short name	Sustainable Animal Productivity
Action Area	Resilient Agrifood Systems
Geographic scope	**Countries targeted in the proposal:** Ethiopia; Kenya; Mali; Nepal; United Republic of Tanzania; Socialist Republic of Viet Nam; Uganda
Start date	Jan. 1, 2022
End date	Dec. 31, 2024
Initiative Lead	Isabelle Baltenweck – i.baltenweck@cgiar.org
Initiative Deputy	Mourad Rekik – m.rekik@cgiar.org
Measurable three-year End of Initiative outcomes (EOI-Os)	**EOI-O 1:** Co-created, demand-driven Innovation Packages of productivity- and resilience-enhancing, low-emissions technologies and the institutional arrangements (including markets) necessary for their adoption are being used by 800,000 people (male and female), including at least 100,000 people using SAPLING-promoted improved forage and food feed crops, in households keeping cattle, chickens, small ruminants, pigs, and buffalo in Ethiopia, Kenya, Tanzania, Uganda, Mali, Nepal, and Viet Nam resulting in a 30–50% increase in livestock productivity.
	EOI-O 2: Private and public sector partners invest at least US$30 million in co-creation and co-delivery of novel, low-emission, demand-driven, gender- and youth-inclusive, and productivity- and resilience-enhancing technologies and practices for genetics, feed-forages, and health.
	EOI-O 3: Six public and private sector organizations utilize Initiative-developed social behavior change communication strategies, tools, or campaigns targeted at incorporating safe livestock derived foods (LDFs) into diverse diets to inform nutrition education strategies and/or campaigns.
	EOI-O 4: Public and private decision-makers utilize the Initiative Innovation Packages to inform policies and investments in Ethiopia, Kenya, Tanzania, Uganda, Mali, Nepal, and Viet Nam toward an inclusive and sustainable livestock sector, including progress toward equity and inclusion.

OECD DAC Climate marker adaptation score*	**Score 1: Significant:** The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation, and climate policy, even though it is not the principal focus of the activity.
OECD DAC Climate marker mitigation score*	**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 score*	**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 gender equality indicators and monitors the participation of and differential benefits for diverse men and women.
Website link	https://www.cgiar.org/initiative/17-sustainable-animal-productivity-for-livelihoods-nutrition-and-gender-inclusion-sapling/

*The Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) markers refer to the OECD DAC Rio Markers for Climate and the gender equality policy marker. For climate adaptation and mitigation, scores are: 0 = Not targeted; 1 = Significant; and 2 = Principal.
The CGIAR GENDER Impact Platform has adapted the OECD gender marker, splitting the 1 score into 1A and 1B. For gender equality, scores are: 0 = Not targeted; 1A = Gender accommodative/aware; 1B = Gender responsive; and 2 = Principal.
These scores are derived from Initiative proposals, and refer to the score given to the Initiative overall based on their proposal.

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

Co-development of theories of changes with stakeholders in Vietnam. Photo credit: Karen Marshall, ILR

Overall summary of progress against the theory of change

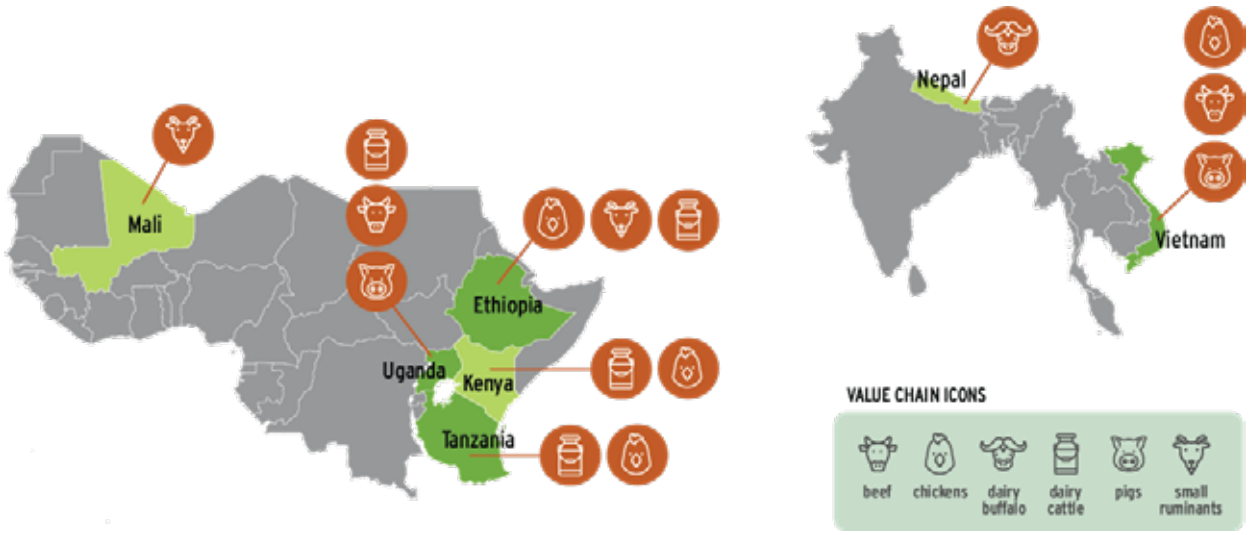
SAPLING successfully progressed toward development outcomes and scientific generation by building on well-established partnerships from the CGIAR Research Program on Livestock and large bilateral projects. SAPLING brings together committed and experienced staff from the three centers: the International Center for Tropical Agriculture (CIAT), the International Center for Agricultural Research in the Dry Areas (ICARDA) and the International Livestock Research Institute (ILRI). The team is composed of 172 members, corresponding to 83 full-time equivalents (60 women and 112 men), 74% based in East Africa.

SAPLING focuses on seven types of livestock (beef, chicken, dairy cattle and buffalo, pigs, sheep, and goats) in seven countries (Ethiopia, Kenya, Tanzania, Uganda, Mali, Nepal and Viet Nam), resulting in 15 livestock value chains as shown in the figure below. Activities are undertaken at both the livestock value-chain level (where solutions are contextualized) as well as at a "global" level for each Work Package (where solutions will span across value chains). For value chains within several countries, this work builds on that of the Livestock CGIAR Research Program (CRP) and various bilateral projects.

The process of co-design and co-implementation of solutions with local and national stakeholders is central to SAPLING's approach, for both discovery and delivery. Co-creation was initiated during the proposal stage, where virtual country-level stakeholder workshops were held to inform SAPLING's design. This was continued in 2022, where theories of changes for each livestock value chain were co-designed with stakeholders though a series of in-person workshops within each country (Ethiopia,[1] Kenya,[2] Mali,[3] Nepal,[4] Tanzania,[5] Uganda,[6] and Viet Nam[7]). Co-design of the value-chain level theories of change allows co-implementation and learning and paves the way for sustainable transformation at scale. Each theory of change is nested – value-chain level theories of change are linked to those at SAPLING Work Package level, which in turn nests into that at the Initiative level.[8]

1 https://www.cgiar.org/news-events/news/new-research-initiative-to-address-challenges-facing-ethiopias-dairy-poultry-and-small-ruminants-sectors-launched/
2 https://www.ilri.org/news/kenyan-dairy-and-poultry-sectors-benefit-new-research-initiative
3 https://www.cgiar.org/news-events/news/313610-autosave-v1/,
4 https://www.cgiar.org/news-events/news/enhancing-livelihood-opportunities-from-buffalo-value-chains-the-focus-of-the-cgiar-animal-productivity-initiative-in-nepal/
5 https://www.cgiar.org/news-events/news/new-research-initiative-to-address-challenges-facing-tanzanias-dairy-and-poultry-sectors-launched/
6 https://www.cgiar.org/news-events/news/cgiars-sapling-initiative-targets-ugandas-pig-and-cattle-sectors-to-expand-benefits-for-farmers/
7 https://www.ilri.org/news/new-one-cgiar-initiative-transform-livestock-productivity-nutrition-and-gender-inclusion
8 https://cgspace.cgiar.org/handle/10568/128150

SAPLING focus countries and value chains.



Progress on generating scientific knowledge was strong with 221 knowledge products, out of which 59 are journal articles, from across all the five Work Packages. Additionally, SAPLING reported 21 innovations in development and two in use.

Example research results from various Work Packages and an innovation for Work Package 4 include:

- A vaccine candidate for African swine fever (ASFV), a disease which has caused massive economic loss, was evaluated.[9] This candidate was developed by the International Livestock Research Institute (ILRI) and Friedrich-Loeffler-Institut (FLI). Through deletion of a specific gene (CD2v) from the genome of an ASFV strain found in East Africa, partial, although not complete, protection from ASFV was conferred to the pigs in experimental closed clinical trials, although there were also side-effects. These findings represent progress towards developing an ASFV vaccine for Eastern and Central Africa. [**Work Package 1**]
- The potential impact of climate change on three forage grass species recommended for Ethiopian dairy systems was investigated.[10] The study found that two forages (Rhodes grass and Napier grass) may have improved suitability under future climates whereas one forage (Buffel grass) may be negatively affected. However, even with improved management, current forage resources may not meet the demand if land availability is reduced, and herd composition shifts toward higher-productivity breeds. Thus, new, improved forage varieties are needed [**Work Package 1**]
- Animal breeding programs in pastoral systems remain difficult to implement because of herd/flock mobility, recurrent drought, among other issues. A study in the Borana pastoral system of Ethiopia optimized community-based goat-breeding programs.[11] Results showed that the breeding program should address both milk-yield and growth, and management should focus on improved feeding to reduce mortality. Integration of institutions, breeder and producer cooperatives, mobile data capture, veterinary support, and feed supply were also found to be crucial. [**Work Package 1**]
- Potential pathways by which livestock-ownership could affect health and nutritional status of women and children were assessed through a systematic review focusing on low- and middle-

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income countries (LMICs). The findings reveal an association of livestock production with better nutritional outcomes but also a higher risk of disease-transmission or morbidity among women and children.[12] [**Work Package 2**]

- An analysis of gender norms in livestock and how women achieve expanded agency while living within a constraining normative environment was undertaken in Ethiopia.[13] Results suggest that women have the capacity to deviate and that new behaviors emerge not only from individuals' attitudes, subjective norms, and perceived behavioral control, but also in combination with demographic and economic factors. The results suggest alternative empowerment pathways that could inform the design of transformational interventions. [**Work Package 3**]
- A Dairy Profitability Simulator mobile application was developed to help small-scale dairy farmers project their expected annual production and profitability.[14] The app provides insights into the inputs, services, and practices that require adjustment to ensure profitability. It also facilitates engagement and structured communication between farmers and extension service providers. The app is undergoing testing in four SAPLING countries. [**Work Package 4**]
- Drivers of change of a backyard poultry farming system were identified using an innovative system dynamics model.[15] The study finds that disease prevention, especially for day-old chicks, is a critical driver of change and that a focus on meat production is the most profitable strategy. The study shows the usefulness of system dynamics modeling, feeding into a model toolkit. [**Work Package 5**]

Monitoring, evaluation, learning, and impact assessment (MELIA)[16] focused its efforts on developing theories-of-change workshops as well as two other activities. The first relates to obtaining the baseline values for the Results Framework indicators. Existing information was available for most value chains for the indicators around farmer-level adoption of SAPLING innovations and livestock-productivity and thus was not recollected. For the remaining Results Framework indicators, where baseline information was required, protocols to obtain this information were designed and data collection initiated.[17] This included indicators on value-chain performance and inclusion, innovation adoption by input/output service providers, and gender norms and women's and youth empowerment. The second activity relates to impact assessment. SAPLING participated in the Standing Panel on Impact Assessments match-making event to strengthen the design of its impact assessment studies. The impact assessment studies are designed around three types of interventions: bundling of services and inputs (dairy in Kenya, Nepal, and Tanzania), enhancing links to output markets (small ruminants in Ethiopia), and strengthening nutrition-related communication (Uganda). The teams have defined intervention activities, engaged partners, agreed on protocols, and sought ethical approvals, for a start of the baseline surveys and interventions in 2023.

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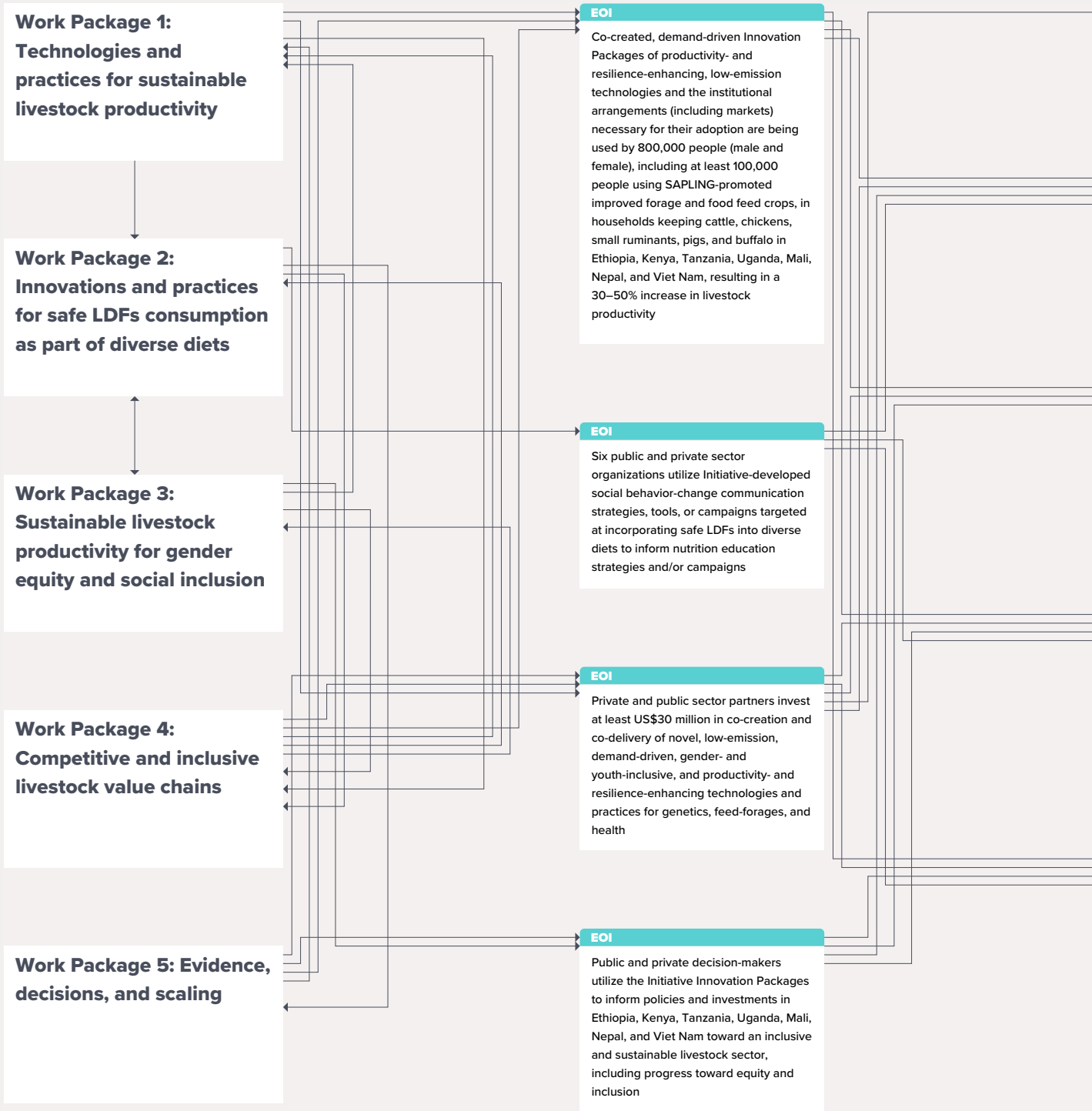
17 https://cgspace.cgiar.org/handle/10568/128151

Initiative-level theory of change diagram

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



EOI — End of Initiative outcome

AA — Action Area

IA — Impact Area

SDG — Sustainable Development Goal

Nutrition, Health, and Food Security

Poverty Reduction, Livelihoods, and Jobs

Gender Equality, Youth, and Social Inclusion

Climate Adaptation and Mitigation

Environmental Health and Biodiversity

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

Progress by End of Initiative outcome

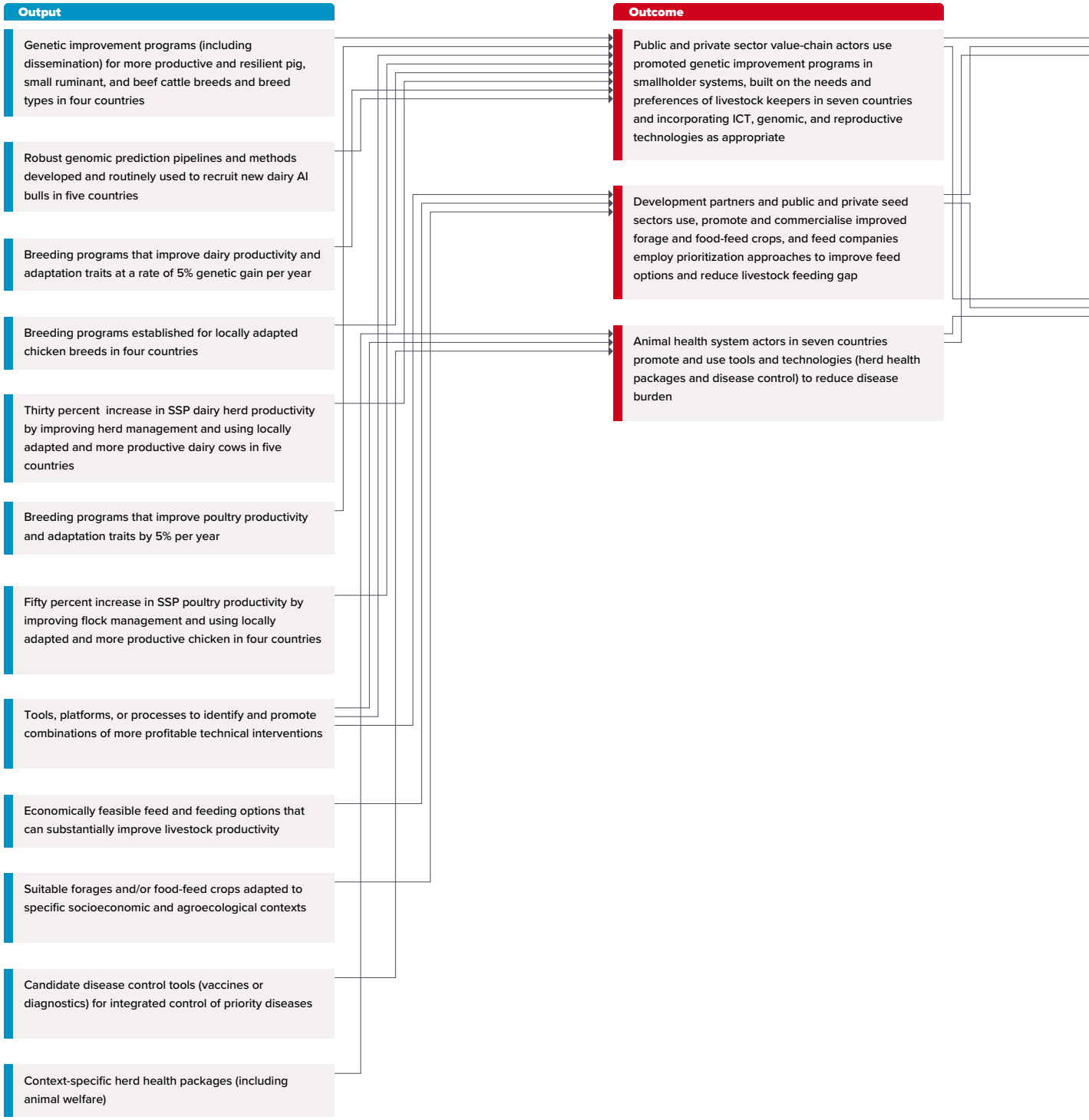
EOI-O 1	SAPLING reported two innovations in use and 21 innovations in development, out of which 14 are stage five and above in the Innovation Readiness Framework.[1] Innovation Packages combining livestock productivity interventions on health, feed, and genetics, as well as business approaches, have been identified in all the seven SAPLING countries through a co-design process with public and private partners. Working with local and national partners, testing of selected Innovation Packages is ongoing in four countries, with implementation partners identified in the other three (Mali, Nepal, and Viet Nam). Building on previous activities during the Livestock CRP, SAPLING is on track reaching this outcome through its public and private partners. While SAPLING has not started collecting systematic evidence on EOI outcomes, progress on uptake of improved fodder is that, globally, 113,356 hectares of Urochloa hybrids were planted in 2021.[2]
EOI-O 2	The co-creation process at country and value-chain levels during the theories of change workshops resulted in synergies between the SAPLING activities and those of stakeholders. Examples include local governments in Nepal co-financing fertility management of buffalo. In Ethiopia, the Washera sheep-breeding program is fostering more than 22,000 and 470,000 ewes respectively in the breeding and production units. This has led to regional institutions already investing US$760,000 in Ethiopia.
EOI-O 3	Progress toward this outcome is through development of partnership with national institutions in charge of human nutrition and health in Uganda (district health offices) and Viet Nam (National Institution of Nutrition), which are the priority countries for the nutrition work.
EOI-O 4	SAPLING influenced policies and investments at global and country levels. Advocacy efforts toward a balanced view on the contribution of livestock to livelihoods in LMICs continued: African Green Revolution Forum (AGRF),[3] the Food and Agriculture Organization (FAO) science week,[4] and the Conference of Parties (COP27).[5] Africa-wide, the collaboration with the Interafrican Bureau for Animal Resources (AU-IBAR) continued to capture livestock in the National Agriculture Investment Plans. In Tanzania, SAPLING gender approach on chicken women-entrepreneurs was emulated by the government that is rolling out a similar program in two other districts. In Ethiopia, the Ministry of Agriculture adopted community-based breeding as the formal approach for small ruminant breeding.

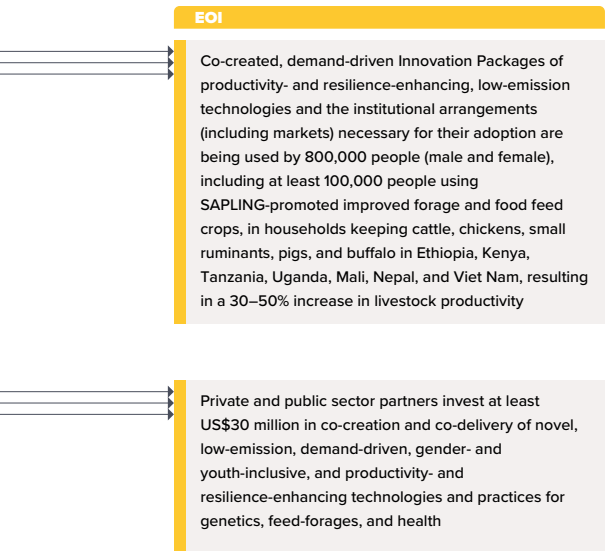
1 https://drive.google.com/file/d/1muDLtqpeaSCIX60g6qQG_GGOPR61Rq7E/view
2 https://cgspace.cgiar.org/handle/10568/125759
3 https://www.ilri.org/news/cow-room-roles-milk-meat-and-eggs-play-sustainable-food-systems-transformation
4 https://www.ilri.org/news/working-towards-sustainable-livestock-systems-focus-three-cgiar-initiatives-fao-science-and
5 https://whylivestockmatter.org/cop27-livestock-resources

Empowering women
through poultry.
Photo credit: ILRI/Apollo Habtamu

Section 3 Work Package-specific progress

Work Package 1:
Technologies and practices for sustainable productivity





Work Package 1 progress against the theory of change

In 2022, Work Package 1 reported results against all its outputs and outcomes including 10 innovations. The bundling of technologies is predicated on integrating improved feeds, animal health products, and improved genetics, and aims at answering one of the main research questions on how to best combine innovations. For example, in Tanzania, the package of animal nutrition, reproductive health management, and herd recording information was disseminated through digitally enabled agri-preneurs to 68,000 households in the dairy sector.[1] While working on integration, the three "technical pillars" also progressed on their specific research. The feed and forage team collaborated with Work Package 3 on gender-specific forage traits, also looking at different socioeconomic/agroecological niches and progressed on seed registration and supply. The team made significant progress towards finalizing the CGIAR Barley Breeding Toolbox.[2] Priority herd health packages (including animal welfare) were produced for the 15 targeted value chains.[3] The dairy and chicken genetics activities that started as the Bill & Melinda Gates Foundation (BMGF) funded bilateral projects that are now embedded in SAPLING. Dairy genetics partners in Ethiopia used SAPLING genomic evaluation and selection of bulls in artificial insemination centers.[4] Analysis of various traits of tropically adapted, improved chicken breeds and their F1 crosses is used to guide farmers' breed choice.[5] The theory of change assumptions remain valid.

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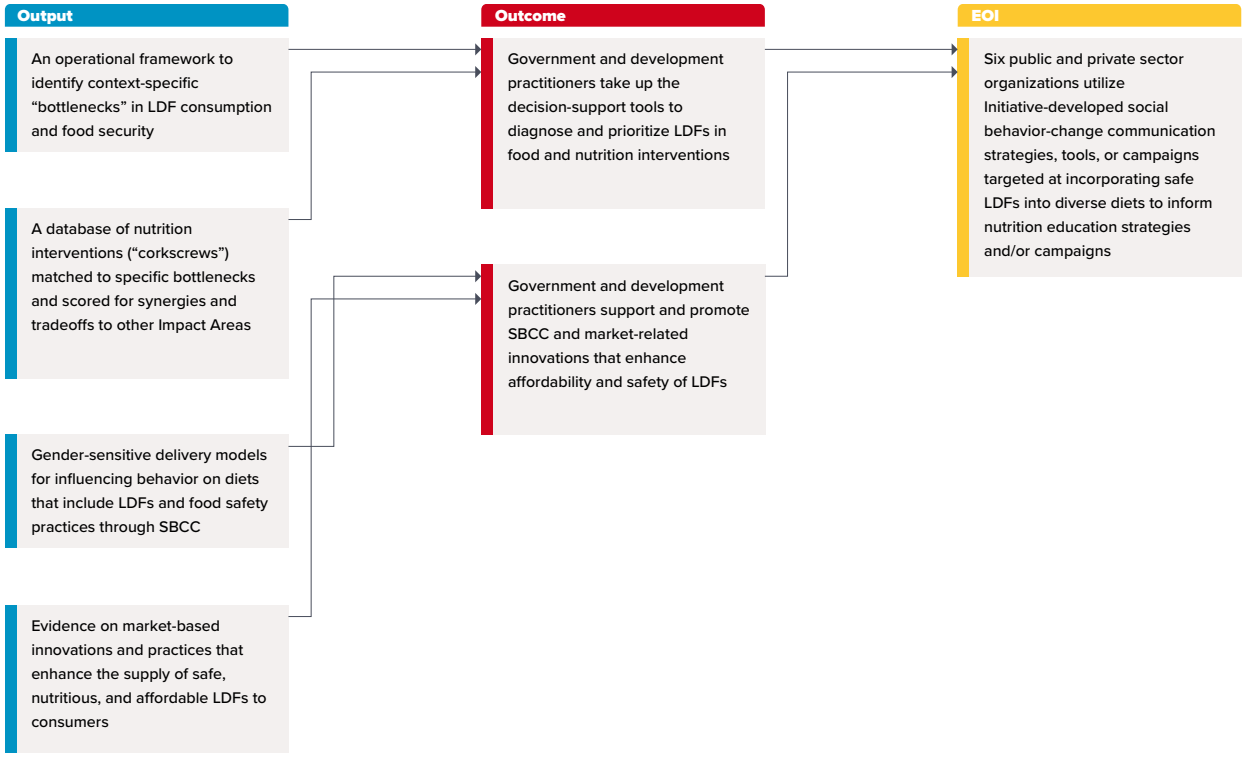
Work Package 2:
Innovations and practices for safe LDFs consumption as part of diverse diets



Work Package 2 progress against the theory of change

Work Package 2 on consumption of LDFs reported results against all the four outputs, including two innovations. Progress was made toward EOI outcome 1 as partners such as the National Institute of Nutrition in Viet Nam and the Masaka and Mukono District Health Offices in Uganda expressed interest in the application of these tools. Work Package 2 addresses one main research question: "What social and behavioral change communication (SBCC) approaches needed to include LDFs in livestock keepers' household diets impact their food security and nutrition outcomes?"

An SBCC strategy[1] for improving LDFs' consumption was developed. A decision support framework[2] was built to identify food and nutrition challenges, with a particular focus on inclusion of LDFs in diverse diets. The framework utilizes the four food security pillars – access, availability, utilization, and stability – and food system and food environment concepts. It has been operationalized in Uganda, and results will be validated during nutrition stakeholder workshops in Uganda and Viet Nam. In collaboration with the University of Alicante, the Uganda team started formative research to identify the key constraints to the inclusion of LDFs in livestock keepers' diets, to guide the randomized controlled trial planned for 2023. Also, in collaboration with Work Package 3, a study on gender norms around consumption of LDFs for household members in Uganda was implemented. It revealed cultural taboos hindering the consumption of specific LDFs for women and children. The theory of change assumptions are still holding.

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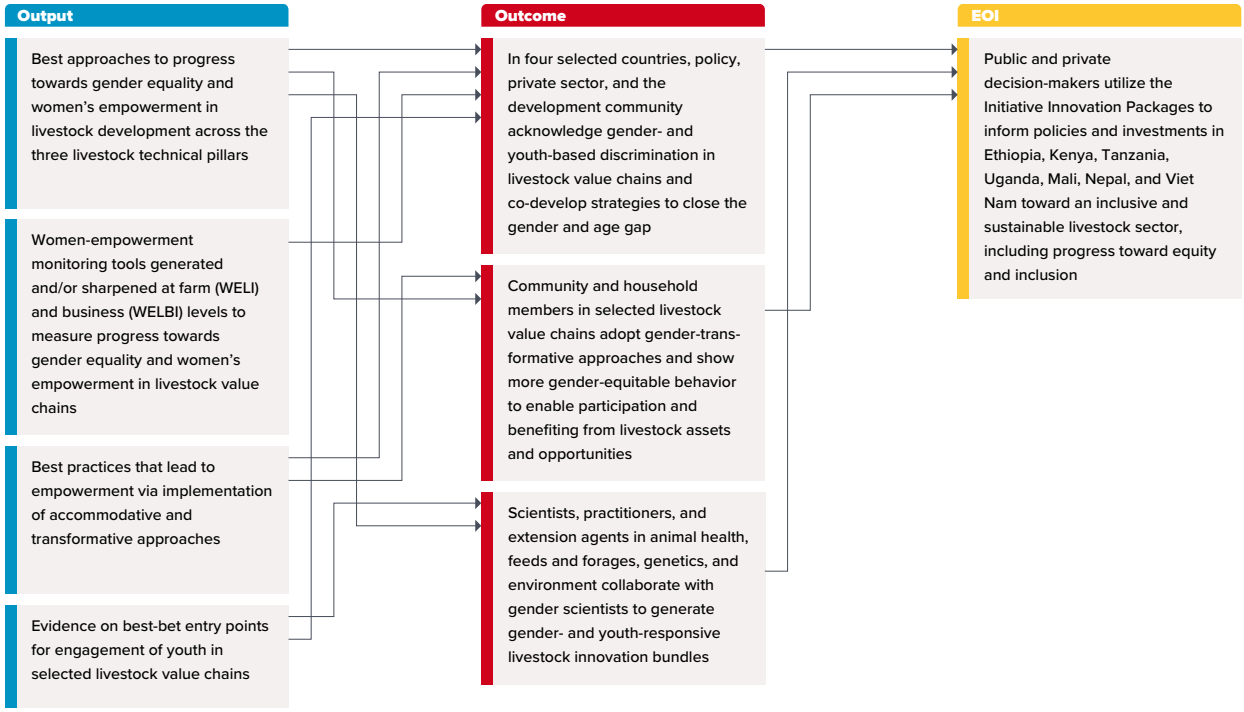
Work Package 3:
Sustainable livestock productivity for gender equity and social inclusion



Work Package 3 progress against the theory of change

Work Package 3 on gender equity and social inclusion reported results against two out of three outcomes and all outputs, including one innovation. Toward EOI outcome 1, the Government of Tanzania replicated the women in chicken business model.[1] This model also contributed to progress toward EOI outcome 3, where we reported the adoption of SAPLING-supported women in chicken business model by 20 women vendors.[2] Moreover, a number of researchers and development agencies expressed interest to use the Women's Empowerment in Livestock Index (WELI tool), a Work Package innovation.[3]

Work Package 3 addresses one main research question: "What are the best approaches to progress toward social equality through livestock by enhancing the empowerment of women and youth?" In 2022, researchers developed a scientific design to answer the question in two ways. First, by assessing changes in women's empowerment and gender norms associated to SAPLING interventions – within each country. Second, by comparing the performance of such interventions across countries. Standard baseline and endline tools and approaches were used across countries and interventions. These were developed in collaboration with the other Work Packages and based on demand from stakeholders. In Uganda, the team developed a youth-focused business approach. In Tanzania, the team used social media to change perceptions on women-led chicken businesses. Work Package 3 also coordinates the integrated gender-work undertaken in the other Work Packages.[4] [5] The theory of change assumptions are currently holding.

1 https://www.youtube.com/watch?v=UgJRjSfVi0U
2 https://cgspace.cgiar.org/handle/10568/128523
3 https://idl-bnc-idrc.dspacedirect.org/handle/10625/61035
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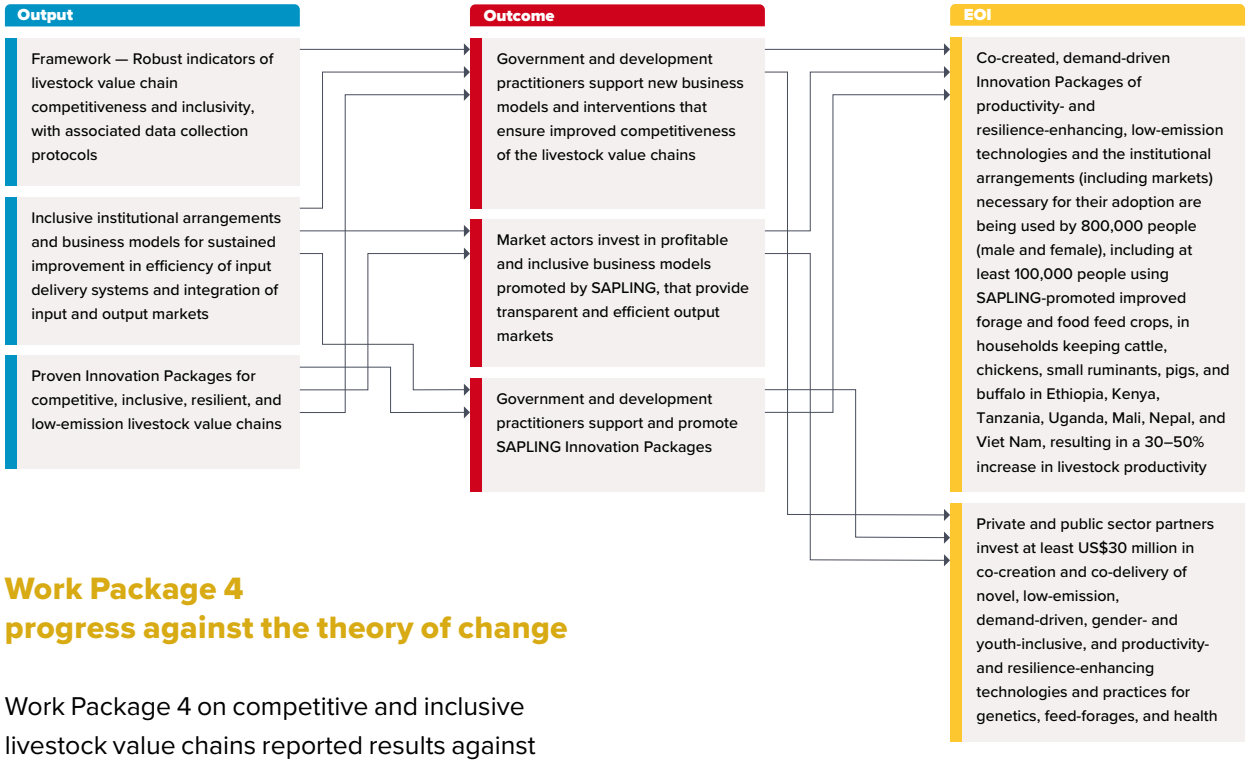
Work Package 4:
Competitive and inclusive livestock value chains



Work Package 4 progress against the theory of change

Work Package 4 on competitive and inclusive livestock value chains reported results against all three outputs, including two innovations. Work Package 4 addresses the following research questions: "What drives competitiveness and inclusivity in livestock value chains?" – with a focus on performance of institutional arrangements for input delivery and output market linkages; and "What are the gender disaggregated impacts of livestock Innovation Packages on the different actors?"

Literature review and initial identification of indicators for competitiveness and inclusivity of livestock value chains have been completed in Ethiopia[1] and Mali.[2] As part of the generation of evidence on institutional arrangements and business models, a scoping study was carried out on small ruminant value chains in Mali.[3] In Tanzania, agri-preneurs were selected for testing the delivery of the SAPLING dairy technology packages[4] while the gendered business models for improved cattle artificial insemination service delivery were developed in Viet Nam.[5] We have identified existing business models and innovations to build upon. The innovations identified are smart marketing for small ruminants (Ethiopia), dairy farm assistant (DFA) model (Kenya), entrepreneurship incubation (Tanzania), artificial insemination for pig and cattle (Viet Nam), and pig traders (Uganda). Working with the impact assessment team, Work Package 4 is setting impact assessment design for "smart marketing" (Ethiopia- baseline completed), DFA (Kenya), agri-preneurs (Tanzania), and village livestock promoters (Nepal). The four assumptions of the Work Package are still valid in their entirety.

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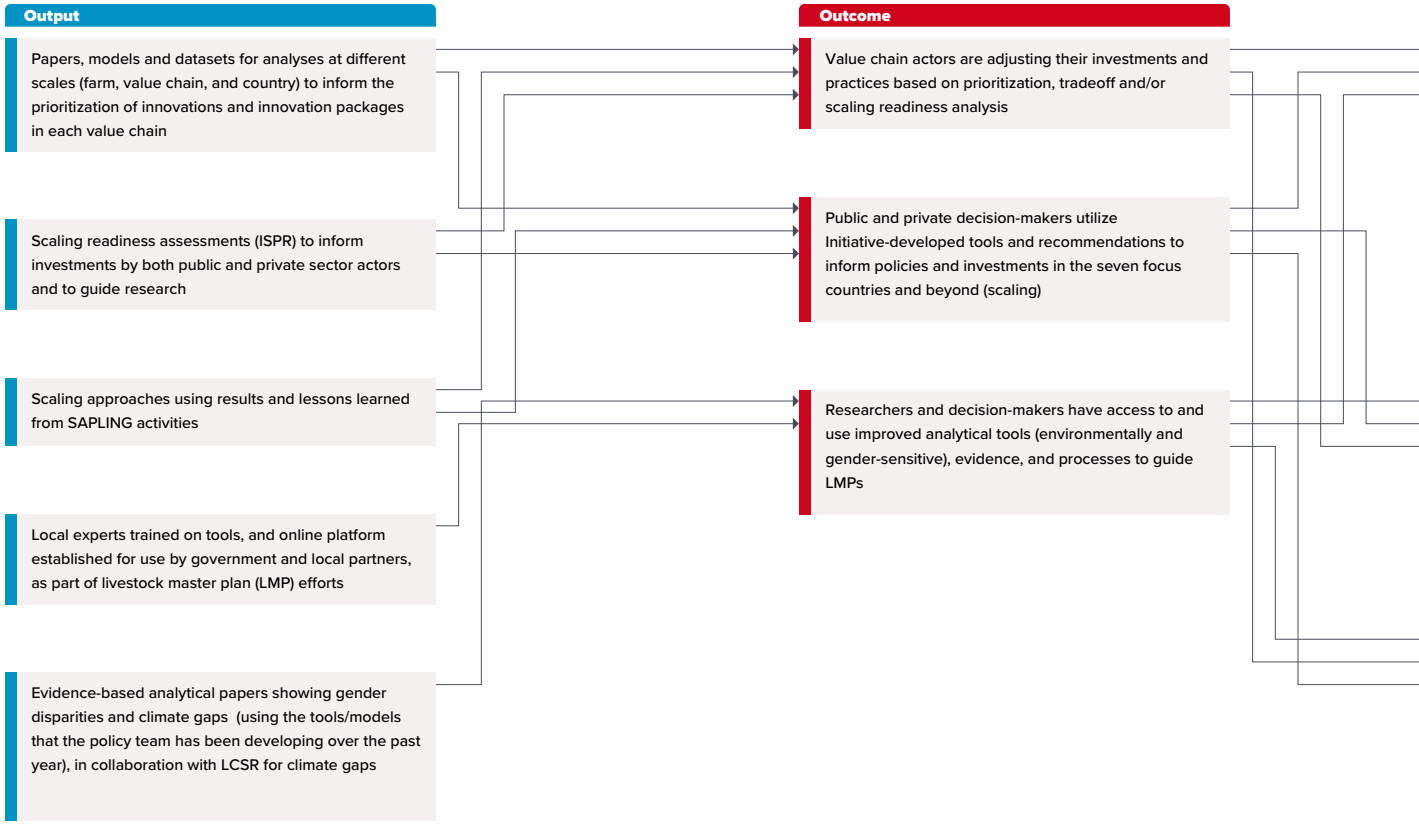
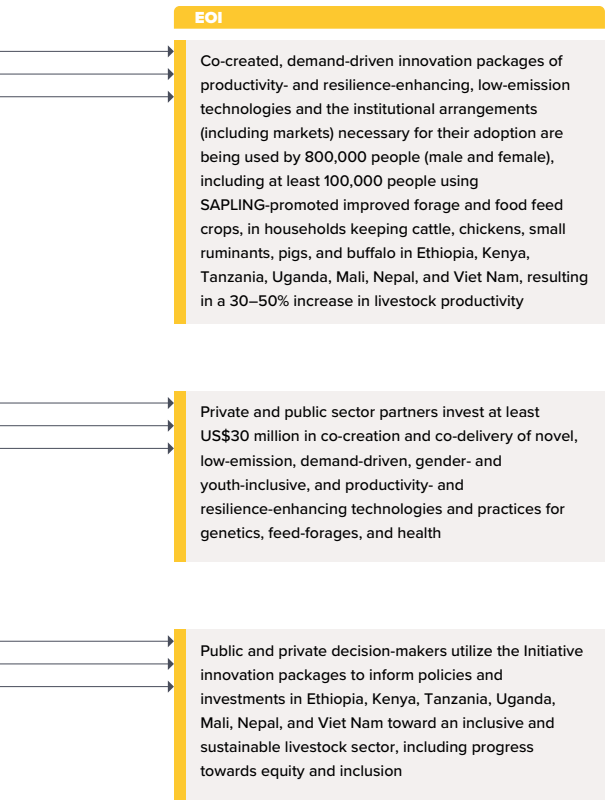
5 https://cgspace.cgiar.org/handle/10568/126009

Lukas Kimpole Mwambona and his 2 year old cow, Mkombozi, at Mwambona's home in the village of Ilemi, on the outskirts of Mbeya, Tanzania.
Photo credit: ILRI/K Dhanji

Work Package 5:
Evidence, decisions, and scaling





Work Package 5 progress against the theory of change

Work Package 5, on evidence, decision, and scaling, has made progress across three of the five outputs. The trade-off scoring exercise[1] of short-listed Innovation Packages across priority countries and value chains looked at potential impacts on gender and equality, productivity, economics, and environment. Sharing these results with stakeholders will allow us to refine the theories of change and intervention-package implementation (outcome 1). In addition, they will highlight major knowledge gaps and guide further research priorities. Extensive work was carried out on the tools for impact assessments and trade-off analysis at different scales enabling Work Package 5 to respond to the identified research priorities and answer the research question on trade-offs and synergies between sustainability domains. Under output 2, 21 innovations were profiled; at least five will be subject to scaling readiness assessment in 2023. This will provide insights into which partners, systems, and capacities are required for supporting the scaling of SAPLING innovations. Lessons from these and other scaling efforts will inform output 3. In support of the livestock master plans (outcome 3), the team worked on multi-market sector-level[2] and system dynamic value-chain level models[3] and provided training to about 25 national stakeholders (output 4). Monitoring of the processes described above will enable us to answer a revised research question 3: “Will increased provision of evidence on gender and environmental impacts lead to prioritization of inclusive and environmentally friendly investments and value chains?”

1 https://cgspace.cgiar.org/handle/10568/125560
2 https://cgspace.cgiar.org/handle/10568/126361
3 https://cgspace.cgiar.org/handle/10568/126822

Work Package progress rating

WORK PACKAGE	TRAFFIC LIGHT / RATIONALE	
1		Work Package 1 built on previous work to generate 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 is mainly through in-country work.
2		Results were reported against all the four Work Package outputs. We generated evidence on the association between livestock, and human nutrition and health needed for advocacy. A decision support framework to identify food and nutrition challenges, with a particular focus on inclusion of LDFs in diverse diets, was designed to guide interventions.
3		We reported results against two out of three Work Package outcomes and all outputs. We developed the building blocks and initial evidence needed to produce the theory of change outputs. Tools were improved and a research design agreed to systematically assess effects of gender interventions in four countries, leveraging on partners' interventions.
4		We reported results against all the three Work Package outputs. Improved institutional arrangements and business models have been identified in all countries, with strong global or national partnerships either identified or initiated.
5		We reported results against three out of the five Work Package outputs. Solid progress was achieved on trade-offs analysis, involving research and development partners. LMP modeling work included environment and gender aspects. A process is in place to document scaling approaches and policy engagements and strengthen policy work.

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

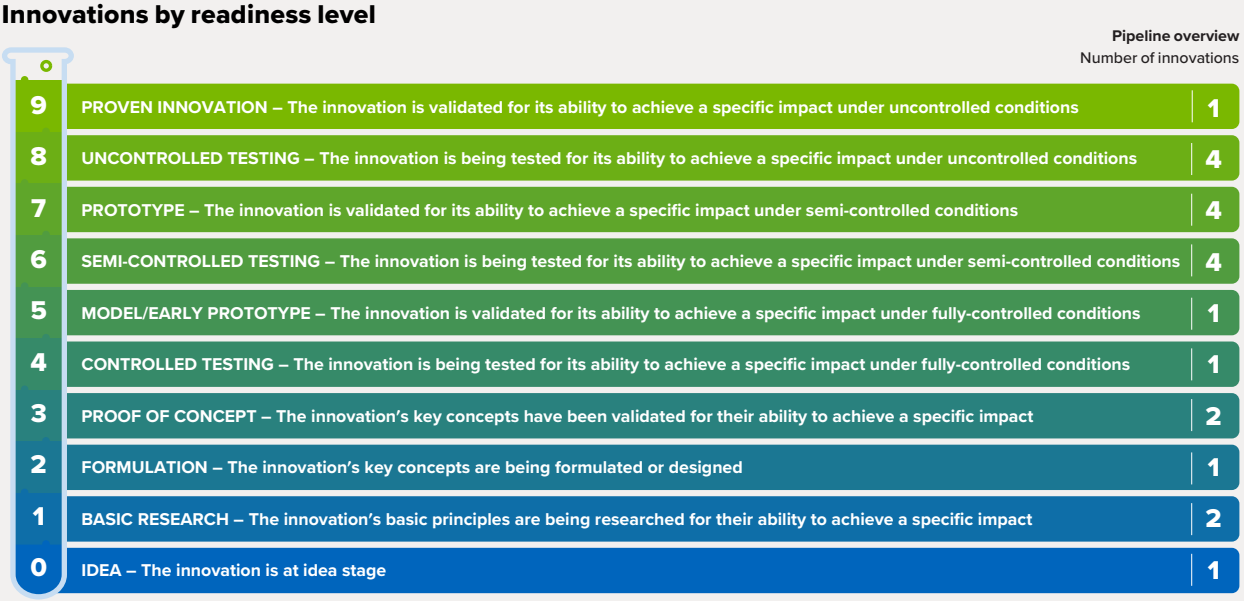
Section 4 Initiative key results

This section provides an overview of 2022 results reported by Sustainable Animal Productivity. 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.

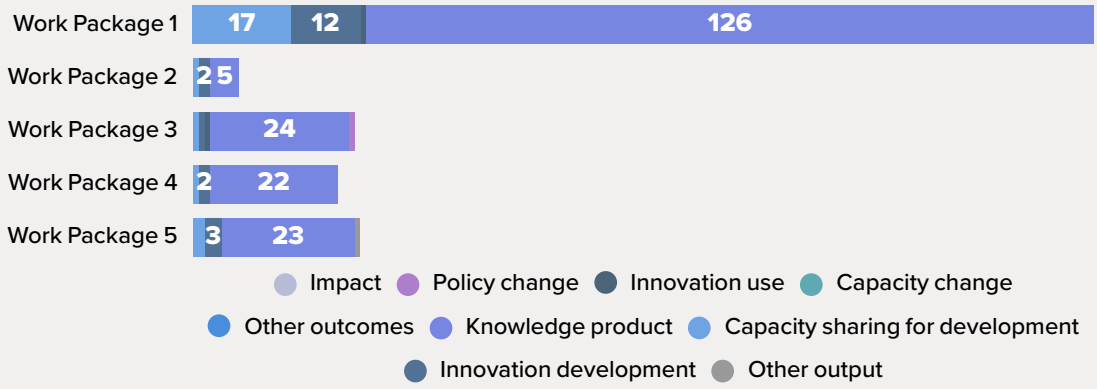
Overview

Results	Outputs					Outcomes		
272	4 SDGs	24 Capacity sharing for development	21 Innovation development	221 Knowledge products	1 Other outputs	3 Innovation use	2 Policy change	15 Centers

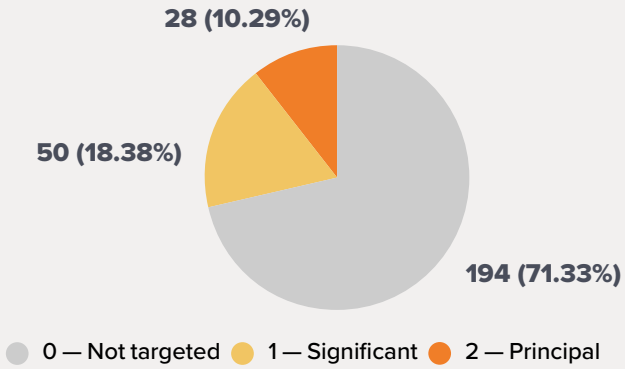
Innovations by readiness level



Results by Work Package



Results by gender tag

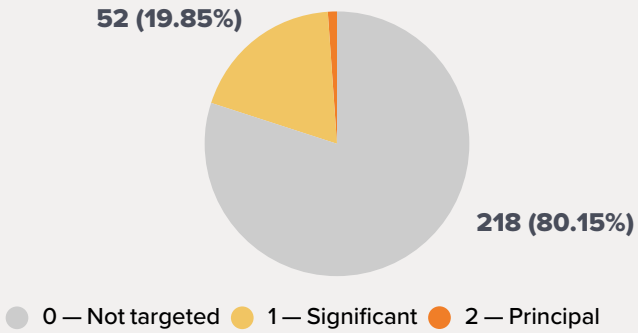


0 = Not targeted: The activity/result does not target gender equality.

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

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

Results by climate change tag



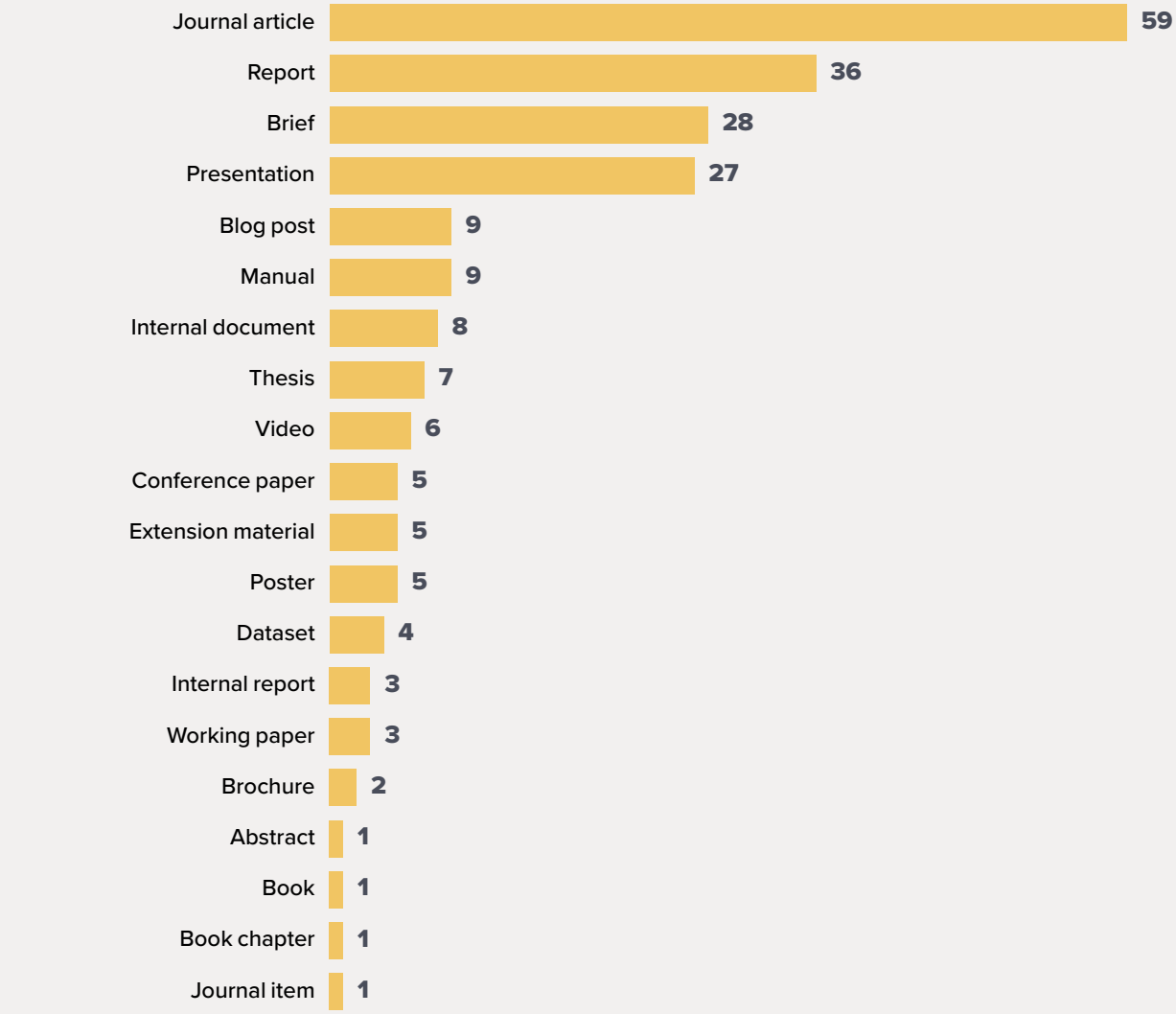
0 = Not targeted: The activity does not target climate mitigation, adaptation, and climate policy goals of the CGIAR as put forward in its strategy.

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

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

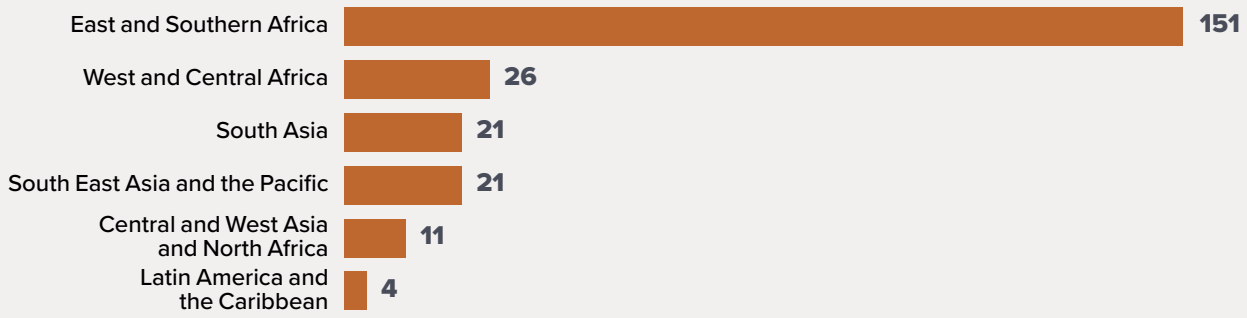
Results by country

Knowledge products by category

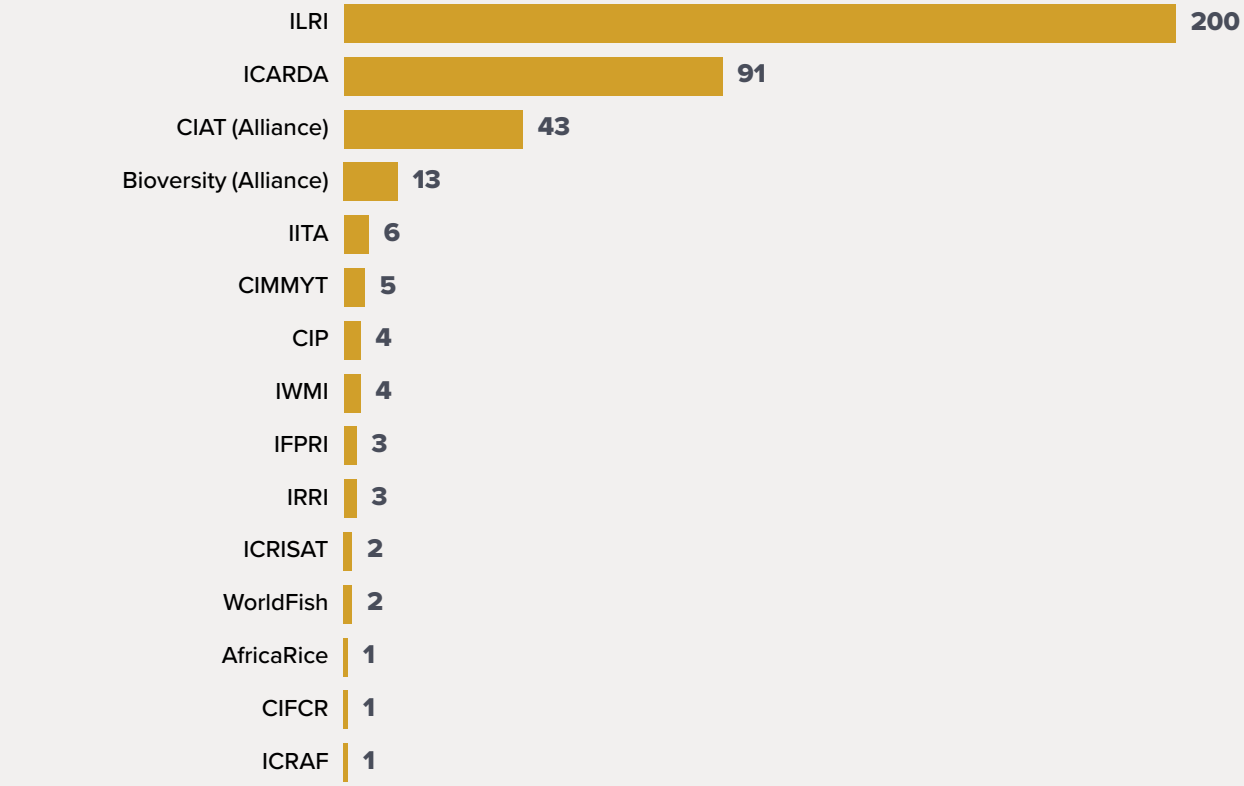


Policies by type

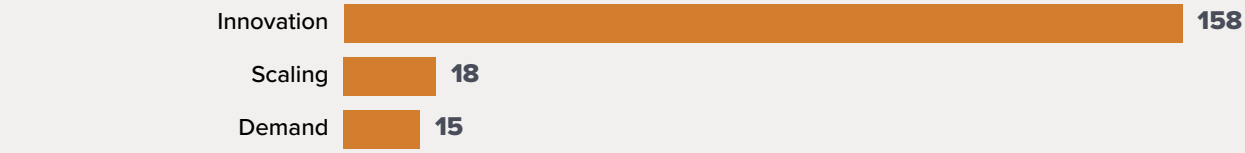
Results by region



Contributing CGIAR Centers

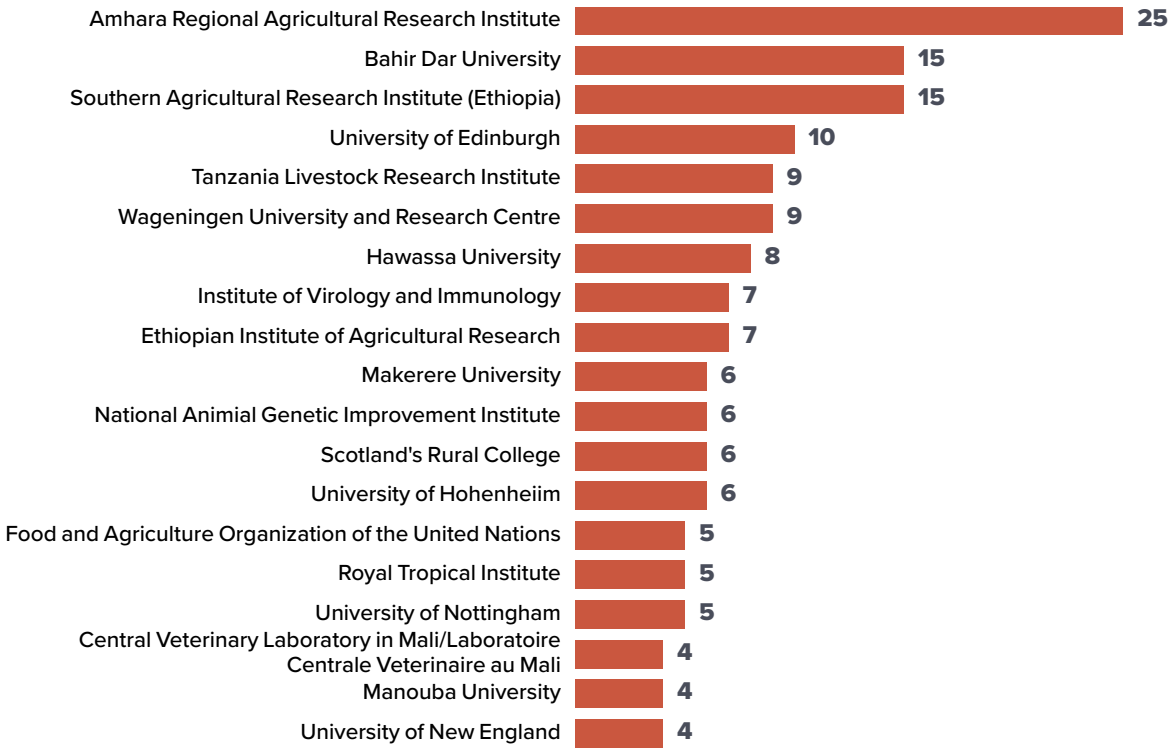


Partners by results main delivery type



Results by top 10 partner typology

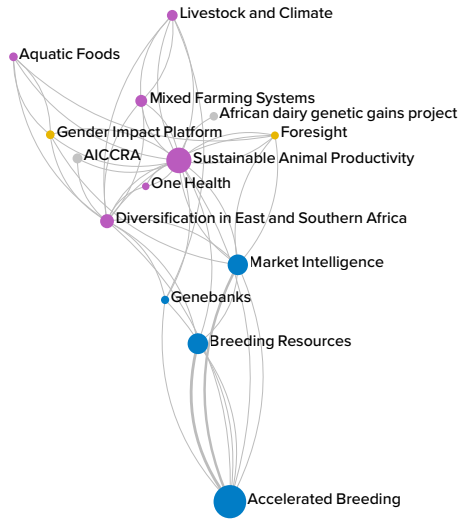
Section 5 Impact pathway integration – External partners



Partnerships and SAPLING's impact pathways

SAPLING reported results for 2022 in collaboration with 150 partners. Of these, the main partner types were national universities (43% of all partners), National Agricultural Research Systems (NARS) (21%), national governments (10%), and international or regional research organizations and universities (9%). Other partner types (17%) included NGOs, private companies, and financial institutions. Most partners were innovation partners, while others were scaling and demand partners. Partners were both from LMICs and developed countries. For example, as shown above, the top 13 partners (based on number of shared results) comprised national universities or NARS from East Africa (Ethiopia, Tanzania, and Uganda) and universities or institutes from Europe (Scotland, the Netherlands, Switzerland, Germany, Italy). SAPLING's total partnership network comprises partners with which we reported results, as well as additional partners with whom we did not report results in 2022. This includes critical partnerships with numerous demand partners, including ministries of agriculture and livestock, smallholder livestock keepers (and farmer cooperatives), development partners, and other actors within livestock value chains. Local and national partners were identified during the theory of change process, also building on previous engagement. In all countries, SAPLING is working with ministries or local authorities in charge of agriculture and livestock. This ensures that SAPLING research synergizes with its plans and also facilitates uptake of innovations. NARS are also key partners – for example, the Central Veterinary Lab in Mali. Examples of private sector partners are Papalotla on forage seed supply systems at global level, Nimbus Feeds (feed supplier) in Nepal, Hive-Colab and E4Impact (business accelerators) in Uganda, Northwest Viet Nam Clean Agricultural Products Joint Stock Company (market agent) in Viet Nam, and dairy cooperatives in Kenya, Tanzania, and Nepal.

Section 6 Impact pathway integration – CGIAR portfolio linkages



Name	Action Area	Total connections	Total results
Accelerated Breeding	GI	8	183
Sustainable Animal Productivity	RAFS	54	130
Breeding Resources	GI	5	97
Market Intelligence	GI	9	96
Diversification in East and Southern Africa	RAFS	13	50

Genetic Innovation Non-pooled Resilient AgriFood Systems Systems Transformation

Note: Initiatives, non-pooled projects, and the connections are sized by the number of results. The table includes the given initiative's top connections and is sorted by Total Results. The network and summary table include all connections for the given initiative, as well as the connections between the given initiative's connections (i.e. the ego network).

Portfolio linkages and SAPLING's impact pathways

Forty-one percent of SAPLING results for 2022, including all outcomes, were reported in partnership with other CGIAR Initiatives or a non-pooled project. On CGIAR Initiatives, results were reported with 24 collaborating Initiatives as well as the Gender Platform. The collaborating Initiatives represented all Action Areas, with five collaborating Initiatives from Genetic Innovations, 11 from Resilient Agrifood Systems, and eight from Systems Transformation. The main collaborating CGIAR Initiatives were Mixed Farming Systems, and Livestock and Climate (both from Resilient Agrifood System). SAPLING also collaborated with Accelerated Breeding, Breeding Resources, Market Intelligence, and the Regional Initiative Diversification in East and Southern Africa.

Joint work with other Initiatives is key to achieving SAPLING outcomes. Livestock and Climate provides the expertise on climate adaptation and mitigation angle, complementing the livestock technical expertise in SAPLING, through Work Package 1 of the two Initiatives. The collaboration is also done though the modeling work on livestock systems (including in relation to Livestock Master Plans) and gender.

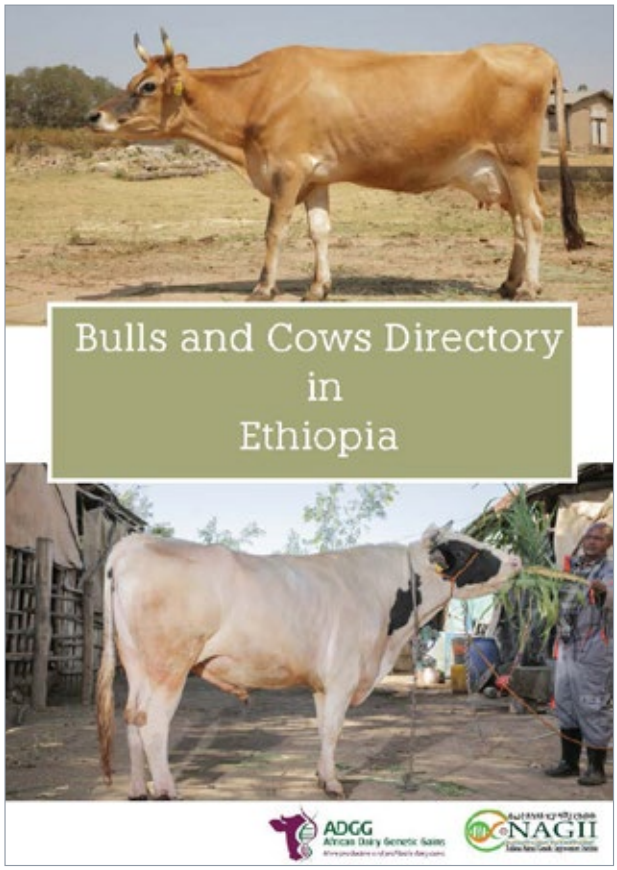
SAPLING and Mixed Farming Systems are operating on the same sites in Ethiopia and are synergizing resources toward common outputs and outcomes. Both Initiatives collaborate in the areas of forage intensification and innovative interventions along the feed value chains in mixed agro-pastoral systems. Assessing and modeling the environmental footprint of mixed crop–livestock systems is a joint research question between the two Initiatives.

On non-pooled projects, results were reported with 20 collaborating non-pooled projects, of which the main ones were Accelerating Impacts of CGIAR Climate Change Research for Africa (AICCRA) funded by the World Bank and several BMGF projects (African Dairy Genetics Gains (ADGG)), Tropical Poultry Genetics Systems (TPGS), Policy Options for Livestock Investment, Capacity Improvement, and Equitable Solutions (POLICIES) and GENDER.

Section 7 Adaptive management

RECOMMENDATION	SUPPORTING RATIONALE
Strengthen internal communication in particular cross-Work Package activities and with the wider SAPLING community	Internal communication is key to successful Initiative implementation. We will make two changes: Encourage stronger cross Work-Package discussions and involve more SAPLING staff. Up to now, internal discussions took place within Work Packages, within countries and between the leads. The cross Work-Package collaboration has been mainly through country work, yet global Work-Package activities also require alignment. In addition, with 172 staff engaged in SAPLING, deliberate efforts to provide regular updates and get inputs are needed. This will be realized by conducting bi-yearly online review and planning meetings. For administrative and budget matters, we have set a good, fair, and transparent forum of discussion between the three collaborating Canters. This will be maintained and strengthened.
Prioritize collaborative activities, cross- Work Packages, countries, Centers, or Initiatives for carry-over funds	We propose that the carry-over funds remain in the Centers and have agreed on principle to allocate these funds: Prioritize integration by allocating strategic resources to support cross-Work Packages, Centers, value chains or Initiatives work. Teams are developing mini-concept notes. Cross-Initiative work will also be supported on sharing data-collection protocols that cover productivity and climate resilience (SAPLING and L&C) livestock and environmental sustainability (SAPLING and SI-MFS) and livestock intensification and agroecological transitions (SAPLING and AE-i).
Strengthen use of theory change at country and value-chain level and monitor progress toward outcomes	Country-specific value chain theories of change have been developed, guiding selection of innovations through a co-creation process with stakeholders and sharpening research questions based on assumptions. Specific outcomes, linked to the SAPLING ones, were set, and it is now time to collate information on progress toward these. This will allow us to make adjustments, possibly by shifting resources or adding partners. Collating evidence on progress toward outcomes will also allow us to report in a more systematic way in the 2023 Report.
Start science seminars, external and internal audiences	There is a lot of exciting science generated in SAPLING, and we propose to have a seminar series with the other Livestock Initiatives, for both within SAPLING and external audiences, to share science more effectively. A greater presence of SAPLING science in international conferences and meetings is expected in 2023.
Improve coherence between SAPLING core and BMGF projects	Four former BMGF bilateral projects were moved into SAPLING. These are ADGG (working in Work Packages 1, 4, and 5), TPGS (working in Work Packages 1, 2, 4, and 5), GENDER (Work Package 3) and POLICIES (Work Package 5). 2022 was a transition year, and in 2023 joint workplan activities including field work and planning for joint publications will be prioritized.
Adjust outputs and outcomes	During the “pause and reflect” in-person meeting in Moshi, Tanzania, the Work Package teams reflected on progress – both outputs and outcomes, as well as contribution to EOI outcomes. A number of changes at Work Package outputs were proposed and will be further assessed by the MELIA team. No change is proposed for the EOI outcomes.

Section 8 Key result story



Bulls and Cows Directory in Ethiopia.
Ethiopian Dairy Animal Parade.
Photo credit:ILRI/Apollo Habtamu

The pathway to genetic gains in Ethiopian dairy cattle project

Improving the genetic merit of dairy cows is essential to increasing sustainable production and improving livelihoods and nutrition. Building on years of both CRP Livestock and bilateral projects work, this year, three top-ranked bulls were selected by the Ethiopian Livestock Development Institute (LDI) for use in the national Artificial Insemination (AI) breeding program. This has been achieved through a transformation in Ethiopia's breeding system, brought about by the CGIAR and partners' research, whereby farmers provide feedback on performance through a digital app – thus facilitating feedback loops between farmers, extension agents, and the LDI.

Ethiopia's population is rising by 2.57% per year and will likely reach 205.4 million by 2050. Incomes are rising, too, and the combination is putting pressure on provision of animal-sourced foods. To meet demand, agriculture – including livestock–must become more productive and efficient.

Dairy is key for Ethiopia's economy. Around 85%[1] of the population lives rurally, and livestock provides a living for about 80% of that population. Dairying is mostly practiced by smallholders and provides significant nutrition and livelihood benefits – particularly for women and children. But most cattle are relatively unproductive, meaning there's a missed opportunity to meet Ethiopia's milk-producing potential and serve growing demand. Improved genetics is an essential element to boosting productivity while reducing environmental harm: Selecting animals for genetic merit means production can be increased while reducing the number of unproductive cows – with positive impacts for land health and climate-change mitigation.

Under the SAPLING[2] CGIAR research Initiative, researchers are applying digital, genomic, and reproductive technologies to identify and deliver locally adapted improved genetics to smallholder dairy farmers, within the ADGG[3] program. ILRI,[4] LDI,[5] Ministries of Agriculture and other national partners, funded by the BMGF,[6] have established a national database, introduced an animal identification and registration system, and developed and implemented digital herd

1 https://hdl.handle.net/10568/4188
2 https://www.cgiar.org/initiative/17-sustainable-animal-productivity-for-livelihoods-nutrition-and-gender-inclusion-sapling/
3 https://www.ilri.org/research/projects/african-dairy-genetic-gains
4 https://www.ilri.org/
5 https://m.facebook.com/profile.php?id=100063957557875&sk=groups&_rdr
6 https://www.gatesfoundation.org/

performance recording tools, platforms, extension services, and genomic evaluation pipelines for Tanzania, Kenya, and Ethiopia. This story focuses on ADGG activities, results, and outcomes in Ethiopia.

ADGG's initial target was to register 12,000 dairy herds in each country, but in Ethiopia that number has been far surpassed, with over 58,000 herds and 134,000 animals registered between 2016 and 2022. The size and diversity of its database is growing. It includes 440,000 test-day milk-yield and 313,000 body-weight records, and genotype information for 6,000 cross-bred animals.

This has been used to undertake genomic evaluations, with results publicized in the national Cow and Bull Catalog[7] for locally bred, genetically superior cattle. Three top-ranked bulls were recruited into the National Artificial Insemination Center for use in the national AI breeding program. A mobile app[8] made the catalog available to farmers and breeding technicians, enabling them to co-select bulls based on phenotypic characteristics and genetic potential. Identifying, publicizing, and certifying top-ranked animals is opening doors for farmers to sell breeding cattle at better prices, and for buyers to develop confidence to buy a replacement herd from herds with records and information on genetics evaluation and secure loans.

To date, 73,000 semen straws have been extracted from three highly ranked bulls and are being used to breed cattle in 14 districts. This benefits many smallholders and saves the country about US$702,000 in foreign exchange from importing bulls and semen: "Genomic selection enabled the evaluation of both locally bred and imported bulls. Semen selection of the top three genetically superior ones (i.e. the productive and locally adapted ones) was done from three ranked bulls, thus substituting semen imports and leading to increased genetic gains," said Asrat Tera, LDI's Director General.

Farmers are guided through a digital advisory system implemented with iCow.[9] To date, 26,500 farmers have received 10,000,000 educational messages, while 5,300 have received 165,000 cow-calendar messages. Four digital training courses were developed with Farm-ink.[10] Local infrastructure has been developed and capacity built to ensure gains are maintained beyond the project. The resources have also been used by post-graduate students for research.

ADGG has transformed Ethiopia's genetic improvement to a two-way system that distributes semen and evaluates progress from the data collected and feedback. This required systematic animal identification and consistent performance recording – crucial for sustained evaluation, identification, and use of genetically superior, locally adapted breeding stock. Identifying roles and responsibilities, strengthening collaboration, and strong government leadership and support were critical. Now, efforts must be scaled-up to attract long-term resourcing and investment for sustained genetic improvement, and its multiple benefits for Ethiopia's dairy sector and other countries.

7 https://hdl.handle.net/10568/113558
8 http://45.79.249.127/adggapi/
9 https://icow.co.ke/
10 https://www.facebook.com/farmink/

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2. *Gebreyohanes, G., Meseret, S., Mrode, R., Ojango, J., Ekine, C., Tessema, E., Jufare, B., Negussie, E., Lidauer, M., Tera, A., Kahumbu, S., and Okeyo, A.M. 2022. Application of ICT tools and genomics technology for the transformation of dairy cattle genetic improvement in Ethiopia: ADGG approaches, experiences, and prospects. Proceedings of the 29th Ethiopian Society of Animal Production (ESAP) Conference, Addis Ababa, 28–30 October 2021.* https://hdl.handle.net/10568/116186
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4. *ILRI. 2021. Bulls and cows directory in Ethiopia. Nairobi, Kenya: ILRI.* https://hdl.handle.net/10568/113558
5. *Meseret, S., Gebreyohanes, G., Mrode, R.A., Ojango, J.K., Chinyere, E., Hassen, A., Tera, A., Jufare, B., Kahumbu, S., Negussie, E., and Okeyo, A.M. 2022. The pathway to genetic gains in Ethiopian dairy Cattle: Lessons learned from African Dairy Genetic Gains Program and tips to ensure sustainability. Paper presented at the 30th Annual Conference of Ethiopian society of animal production (ESAP), Hawassa, Ethiopia, 15–17 September 2022.* https://hdl.handle.net/10568/126004

COVER PHOTO: Woman farmer with eggs and chicken, Addis Ababa, Ethiopia.
Photo credit: ILRI/Apollo Habtamu

LINKS TO IMPACT AREAS

Primary Impact Area: PovertyReduction, Livelihoods, and Jobs

Other relevant Impact Area(s): Climate Adaptation and Mitigation; Environmental Health and Biodiversity; Gender Equality, Youth, and Social Inclusion

GEOGRAPHIC SCOPE

Country/ies: Ethiopia

KEY CONTRIBUTORS

Contributing Initiative(s): ILRI - International Livestock Research Institute
Contributing Center(s): ILRI - International Livestock Research Institute
Contributing external partner(s): Ministry of Agriculture, Federal Government of Ethiopia, Livestock Development Institute (LDI), participating Ethiopian dairy farmers, Green Dream TECH Ltd., Natural Resources Institute Finland (Luonnonvarakeskus), Scotland's Rural College, University of New England

LINK TO CGIAR RESEARCH PROGRAMS

Livestock and Fish CRP; Livestock CRP

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