



INITIATIVE ON
Mixed Farming
Systems



CGIAR Initiative on Mixed Farming Systems

ANNUAL TECHNICAL REPORT 2022



CGIAR Technical Reporting 2022

CGIAR Technical Reporting has been developed in alignment with the [CGIAR Technical Reporting Arrangement](#).

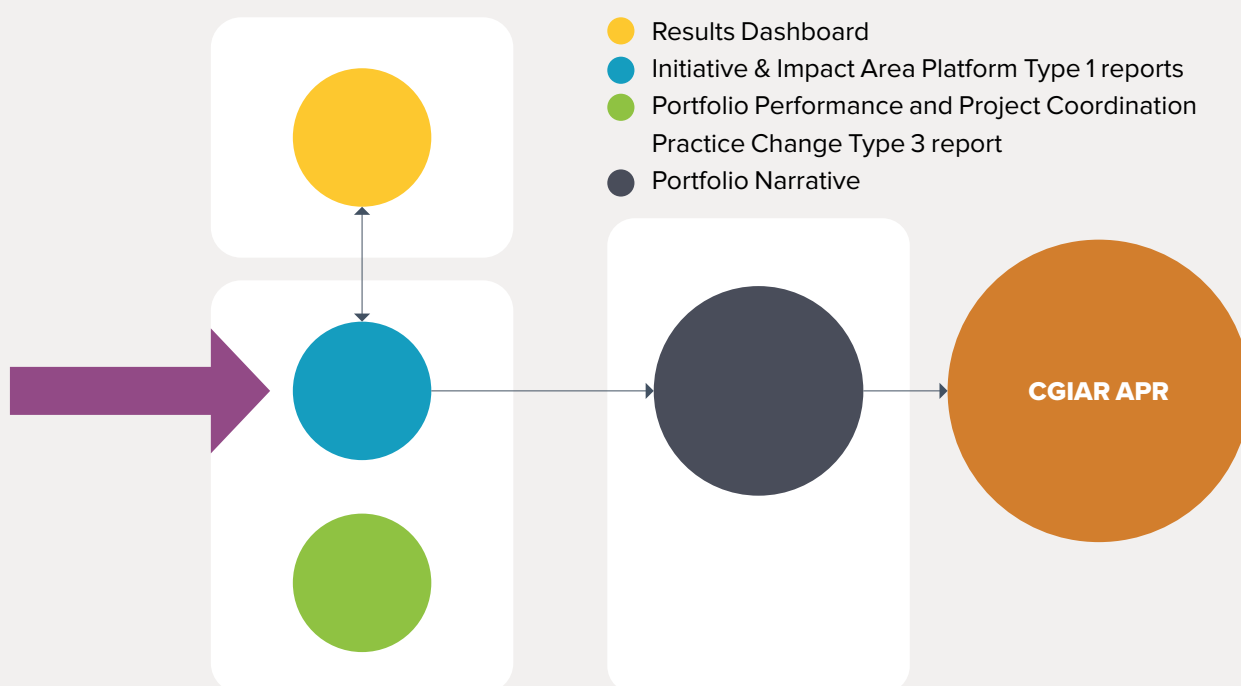
This Initiative report is a Type 1 report and constitutes part of the broader CGIAR Technical Report. Each CGIAR Initiative submits an annual Type 1 report, which provides assurance on Initiative-level progress towards End of Initiative outcomes.

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\$11,462,080	US\$14,473,235	US\$14,064,685
Approved 2022 Budget	US\$7,799,199		

2022 Disbursement Target based on Approved FinPlan

Section 1 Fact sheet

Initiative name	Sustainable Intensification of Mixed Farming Systems
Initiative short name	SI-MFS (Mixed Farming Systems)
Action Area	Resilient Agrifood Systems
Geographic scope	Regions targeted in the proposal/Countries targeted in the proposal: Bangladesh; Ethiopia; Ghana; Laos PDR; Malawi; Nepal
Start date	Apr. 1, 2022
End date	Mar. 31, 2024
Initiative Lead	Fred Kizito – f.kizito@cgiar.org
Initiative Deputy	Santiago Lopez – s.l.ridaura@cgiar.org
Measurable three-year End of Initiative outcomes (EOI-Os)	EOI-O 1: Five international research institutions, six national research institutions, seven policymakers, and two donors (key strategic actors) are transitioning research priorities, policies, and strategic financial investments toward sustainable intensification of MFS.
	EOI-O 2: Fifty percent of key innovation, demand, and scaling partners are jointly using a systems approach and a set of novel tools adapted to different scales, agro-ecologies, and socioeconomic settings, to identify potential context-specific, integrated solutions for sustainable intensification of MFS.
	EOI-O 3: Ten non-CGIAR research institutions (local and international) two CGIAR RIIs, local partners, and 1.5 million farmers are developing, implementing, and validating sustainable intensification options in selected MFS through a participatory and inclusive process.
	EOI-O 4: One and a half million MFS actors (farmers and other value chain participants) are adopting, adapting, and scaling socio-technical, gender-transformative innovation packages for sustainable intensification of MFS.
	EOI-O 5: Fifty percent of partners and CGIAR scientists are adopting MFS thinking and gender-transformative approaches, mainstreamed through a global virtual institute and regional scaling hubs promoting capacity-building.

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 1A: Gender accommodative/aware: Gender equality is an objective, but not the main one. The Initiative/project includes at least two explicit gender-specific outputs, and (adequate) funding and resources are available. Data and indicators are disaggregated by gender and analyzed to explain potential gender variations and inequalities.
Website link	https://www.cgiar.org/initiative/19-sustainable-intensification-of-mixed-farming-systems/

*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

Overall summary of progress against the theory of change

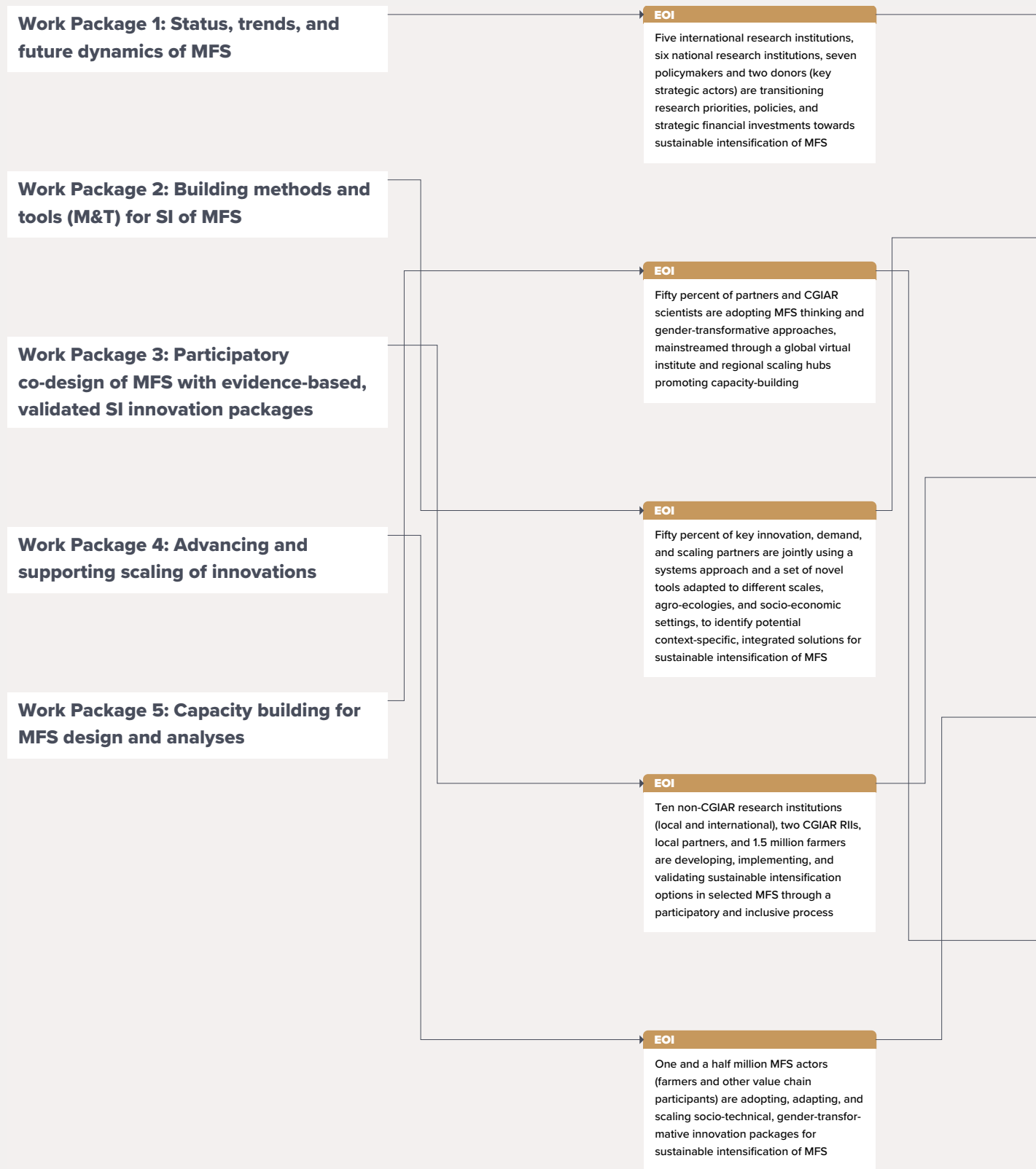
The Sustainable Intensification of Mixed Farming Systems (SI-MFS) Initiative aims to provide equitable, gender-transformative pathways for improving the livelihoods of farmers in seven prioritized Mixed Farming Systems (MFS) in Africa and Asia. The Initiative builds on the achievements and best practices of previous and ongoing research programs (e.g., **Africa RISING**, **SIMLESA**, **CSISA**). In 2022, the initiative planned and started implementing research activities under the **five interlinked work packages** as indicated in the **theory of change** and results framework. The research activities so far implemented in the six representative countries in Africa and Asia (i.e., Bangladesh, Ethiopia, Ghana, Laos PDR, Nepal, and Malawi) led to 142 results that were reported in the performance and results management system (PRMS) of the CGIAR. Of these results, 138 were research outputs achieved across the five Work Packages, and four results related to the initiative outcomes. About 40% of the outputs achieved were knowledge products, 30% were innovation development, 20% were capacity sharing for development, and 10% were other outputs. These research outputs are expected to contribute to the five measurable End of Initiative outcomes by 2025. During the reporting period, the initiative established 14 cross-initiative collaborations, and eight CGIAR Centers (members of the SI-MFS Initiative) contributed to producing the results obtained in 2022. The initiative also established

98 formal (signed contracts) and informal (contract signing still pending) partnerships among national and international research institutions, development agencies, donors, and regional state unions. This supports our assumption in the theory of change that if these partners understand the benefits that SI-MFS generates for the five impact areas of CGIAR, it will trigger genuine interest in supporting an integrated systems approach in the co-development and implementation of sustainable intensification options for MFS at scale, which is critical for the sustainability of the Initiative.

To measure the progress of the End of Initiative outcomes and five Impact Areas, the MELIA team started a baseline study in 2022. A questionnaire was developed based on the indicators in the results framework of the Initiative, which are very much related to the sustainable intensification assessment framework (SI) AF model and the five impact areas. One survey was completed in Malawi and others are planned to be implemented in the remaining five Initiative countries in 2023. Additionally, an **impact assessment plan** was designed in collaboration with the Standing Panel on Impact Assessment (SPIA) to measure the impacts and projected benefits as stipulated in the initiative theory of change. Stakeholder consultations were also implemented in some of the Work Packages. The results below indicate some significant progress in the End of Initiative outcomes. The MELIA team plans to develop a tool to track and quantify the progress toward the End of Initiative outcomes in 2023 and beyond.

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

<p>EOI-O 1 Five international research institutions, six national research institutions, seven policymakers, and two donors (key strategic actors) are transitioning research priorities, policies, and strategic financial investments towards sustainable intensification of MFS.</p>	<p>The Initiative is making progress on this EOI outcome. In total, 98 partnerships with national and international R&D organizations were established in 2022 along the discovery-proof of concept and scaling spectrum. These partners contributed to the results so far achieved. However, it will be useful to establish in 2023 (through a survey) the extent to which these organizations, policymakers, and donors are transitioning their research priorities, policies, and financial investments toward SI-MFS.</p>
<p>EOI-O 2 Fifty percent of key innovation, demand, and scaling partners are jointly using a systems approach and a set of novel tools adapted to different scales, agro-ecologies, and socioeconomic settings, to identify potential context-specific, integrated solutions for sustainable intensification of MFS.</p>	<p>An inventory of over 50 systems analysis methods and tools (M&T) was built with the aim to apply them within the DEED cycle for co-design (Describe-Explain-Explore-Design). A methodological note on the M&T available in the different steps of the DEED cycle was developed. The initiative organized a workshop with six other CGIAR Initiatives, to develop a common framework for multi-scale quantitative systems analysis and two use cases have started in East and Southern Africa (ESA). M&Ts developed by the initiative (farm typologies, farm modeling, and optimization) are being applied in some MFS sites in the target countries.</p>
<p>EOI-O 3 Ten non-CGIAR research institutions (local and international), two CGIAR RIIs, local partners, and 1.5 million farmers are developing, implementing, and validating sustainable intensification options in selected MFS through a participatory and inclusive process.</p>	<p>During the reporting period, in order to launch and kick-off deployment of interventions, the Initiative engaged with non-CGIAR research institutions, communities, decision-makers, and local stakeholders in Bangladesh, Nepal, Malawi, and Ethiopia. Forty-two socio-technical innovations have been identified so far as being relevant to the Mixed Farming Systems with two innovation bundles already in use. Empirical evidence on the performance of the different sustainable intensification options is being generated</p>

EOI-O 4

One and a half million MFS actors (farmers and other value chain participants) are adopting, adapting, and scaling socio-technical, gender-transformative innovation packages for sustainable intensification of MFS.

Profiling of socio-technical innovation packages was completed, and 42 innovations were reported in 2022. Contexts assessment in the different sites is under development, and adoption and adaptation of innovations for MFS by the farmers and value chain participants will be established through baseline and adoption studies that will be conducted by the initiative in 2023 and 2024 respectively.

EOI-O 5

Fifty percent of partners and CGIAR scientists are adopting MFS thinking and gender-transformative approaches, mainstreamed through a global virtual institute and regional scaling hubs promoting capacity-building.

Progress has been made in the **capacity assessment needs of SI-MFS scientists through a rapid virtual survey**. Site-specific capacity development on systems analysis as well as on sustainable intensification practices for MFS have been carried out and will continue in 2023 and 2024. Plans are also under way to develop tools and manuals for the creation of a **virtual institute** to promote the adoption of MFS thinking and gender transformative approaches.

Planting of symbolic tree at the sidelines of the global launch event for the Mixed Farming Systems Initiative which was held in Addis Ababa, Ethiopia on 2 June 2022.

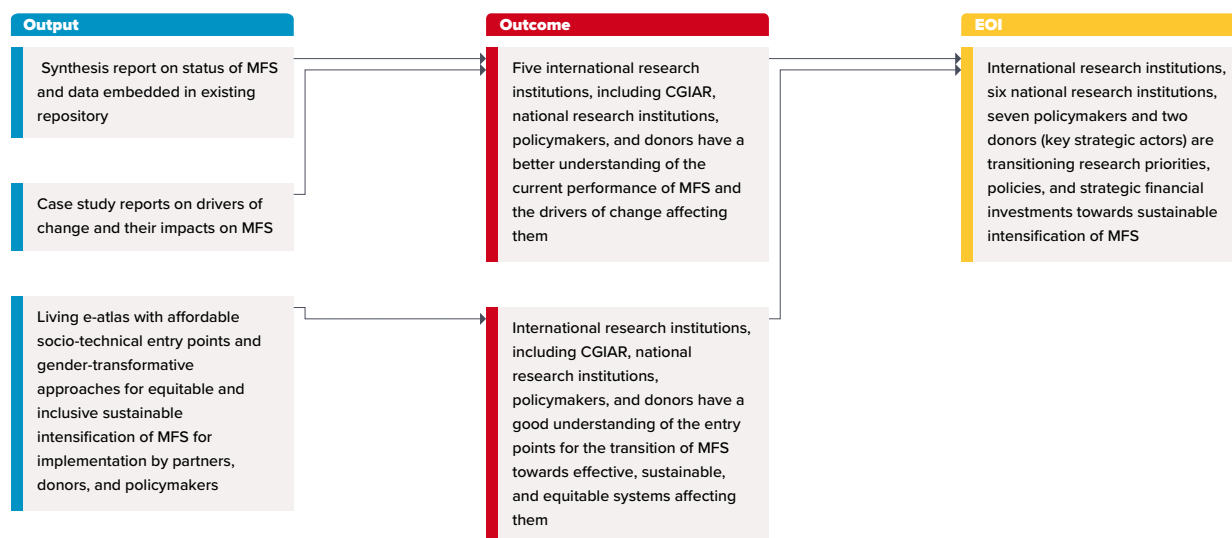
Photo credit: Apollo Habtamu/ILRI



Section 3 Work Package-specific progress

Work Package 1:

Status, trends, and future dynamics of MFS



Work Package 1 progress against the theory of change

In this reporting cycle, Work Package 1 developed seven knowledge products, four other outputs and one innovation.

Biophysical and socioeconomic characterization of mixed farming systems (MFS) was conducted in the target countries based on both past and current trends. A **methodological approach for mapping MFS** and typologies at national and sub-national levels was described and developed. **Maps on recommendation domains for conservation agriculture (CA) practices in East and Southern Africa** were generated to guide extension and development agencies in targeting the most suitable zones for impacting livelihoods.

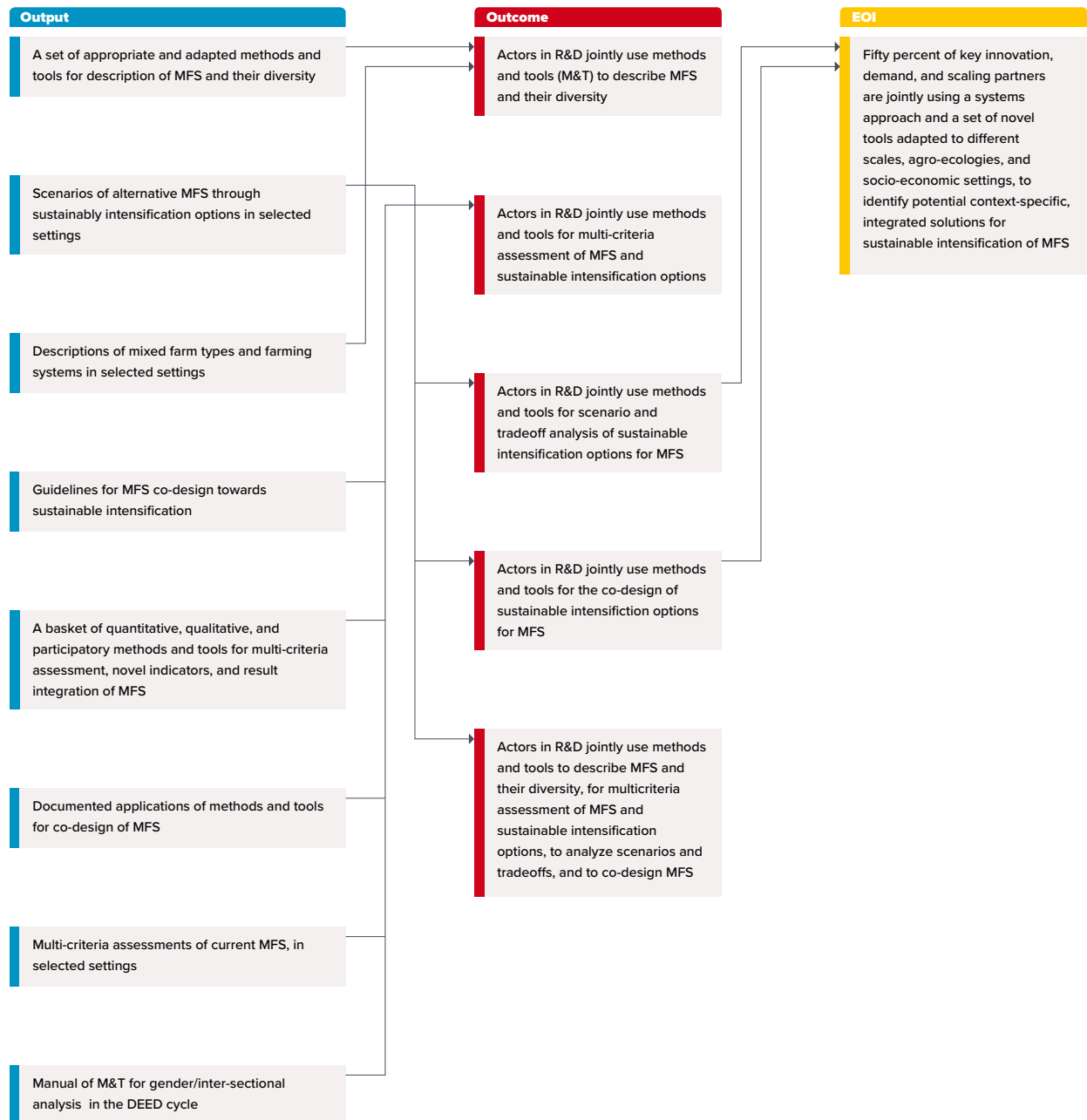
Mapping of trends of land degradation and improvement in biomass productivity in the six target countries (output 1.2) took place. The spatial-temporal trends of **extreme rainfall indices related to drought and flooding events in Ghana** were mapped and database populated.

A review of the impact and outcomes of sustainable intensification initiatives on women, men, and other social groups (output 1.3) from 160 papers and reports on sustainable intensification, with a focus on equity and social inclusion in the six target countries, was developed. The **study documented** the differences in women’s and men’s access and preferences for technologies, and gendered impacts of technologies on income and labor.

Cassava experimental station,
near Luang Prabang, Laos.
Photo credit: Neil Palmer/CIAT



Work Package 2: Building methods and tools (M&T) for SI of MFS



Work Package 2 progress against the theory of change

This Work Package produced 18 products contributing to the desired outputs. Work Package 2 develops, adapts, and applies new and existing methods and tools (M&T) for the analysis of current MFS. These M&T support decisions on what kind of sustainable intensifications options might work where, and for whom; how technical (on-farm) innovations might be bundled with facilitating institutional innovations; and the prioritization, foresight, targeting, and implementation of sustainable intensifications innovation packages in specific contexts.

The development and adaptation of M&T in Work Package 2 is situated within the DEED cycle (Describe-Explain-Explore-Design) for systems analysis and design. An inventory of over 50 systems analysis M&T was built with applications at different levels of analysis for the different stages of the DEED cycle (outputs 2.1, 2.3, 2.5, 2.7).

Work Package 2 convened a **meeting of scientists from six different One CGIAR initiatives** (ClimBeR, EIA, LCSR, Nature+, SAPLING, Ukama Ustawi), with interest in systems analysis M&T to develop **a framework for Farming Systems Analysis at multiple scales in support of user-centered research and innovation**. Two use cases building on this collaboration are under way within the ESA region. **A methodological guide for co-designing**

socio-technical innovation bundles (STIBs)

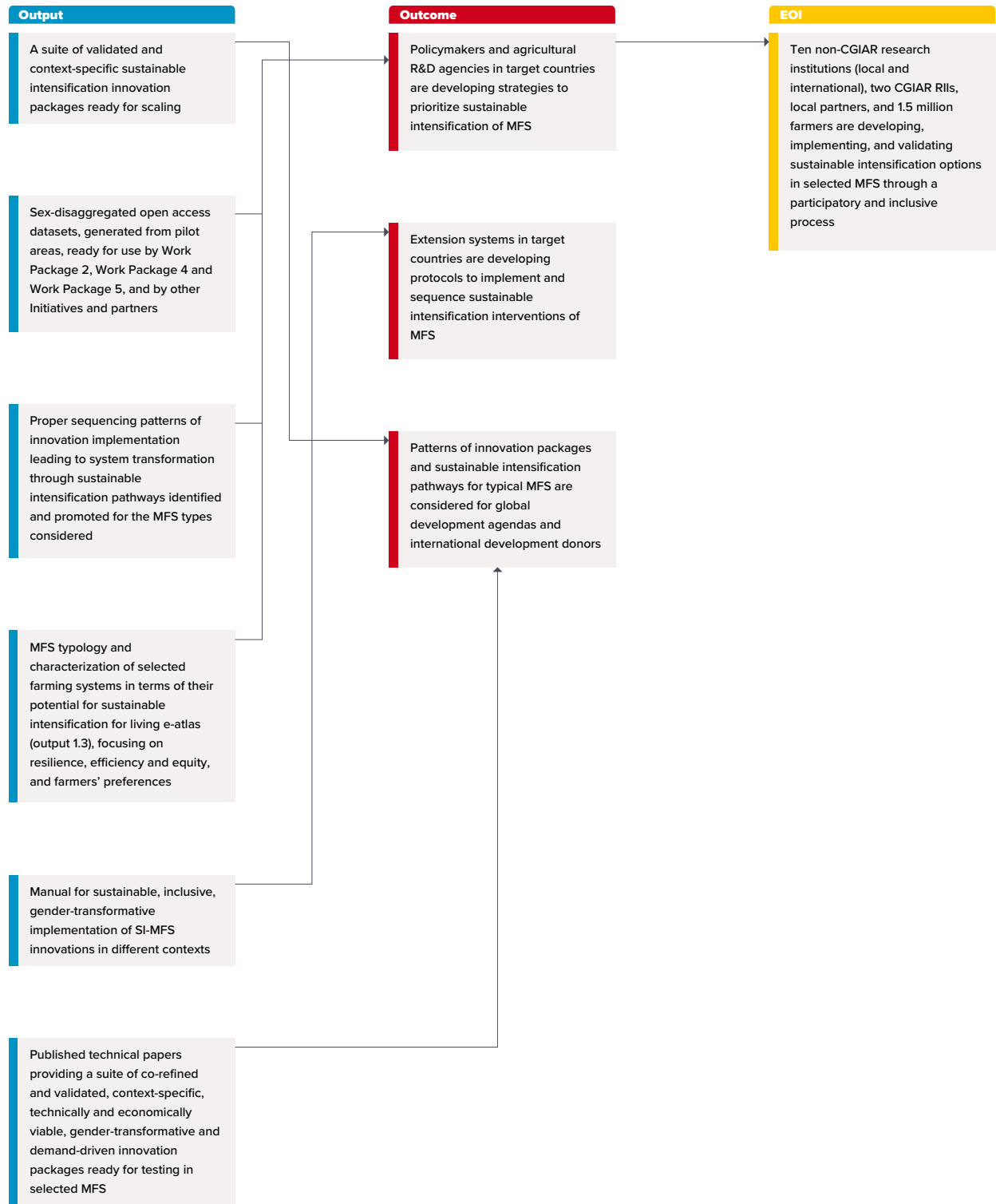
for the sustainable intensifications of MFS was developed (in collaboration with Work Package 3, Work Package 4, Work Package 5 and the Scaling Readiness team) with specific M&T for the different phases of the DEED cycle and is currently serving as the basis to accompany the development and implementation of socio-technical innovation bundles.

Integrating gender and intersectionality within the DEED cycle is priority for Work Package 2 and gender expert input has been integrated in the guide for co-designing STIBs (output 2.9). Further development with renewed gender leadership within the SI-MFS and in collaboration with the Royal Tropical Institute (KIT — the Netherlands) will provide the basis for gender transformative approaches for the design of SI-MFS.



Work Package 3:

Participatory co-design of MFS with evidence-based, validated SI innovation packages



Work Package 3 progress against the theory of change

Work Package 3 focuses on the participatory design, implementation, critical reflection, and monitoring of approaches and interventions for SI-MFS in specific socio-ecological contexts. It targets, field-tests, and pilots specific sustainable intensification options that are responsive to improving efficiency, equity, and resilience, in regions where MFS dominate the landscape.

In 2022, the country teams started with the identification of sites, farming systems, and communities to be considered, [an example from Ethiopia](#) is provided here. [Priority constraints, potential interventions and partners](#) were identified based on interactive comments with stakeholders and expert reviewers. Focus group discussions and meetings were conducted with communities, decision-makers, and local stakeholders in Bangladesh, Nepal, Malawi, and Ethiopia [and an example is provided here from the Malawi inception meeting](#). In Nepal, this field engagement was preceded by a [multi-actors workshop organized at the national level](#), where the implementation of the whole initiative was coordinated and discussed.

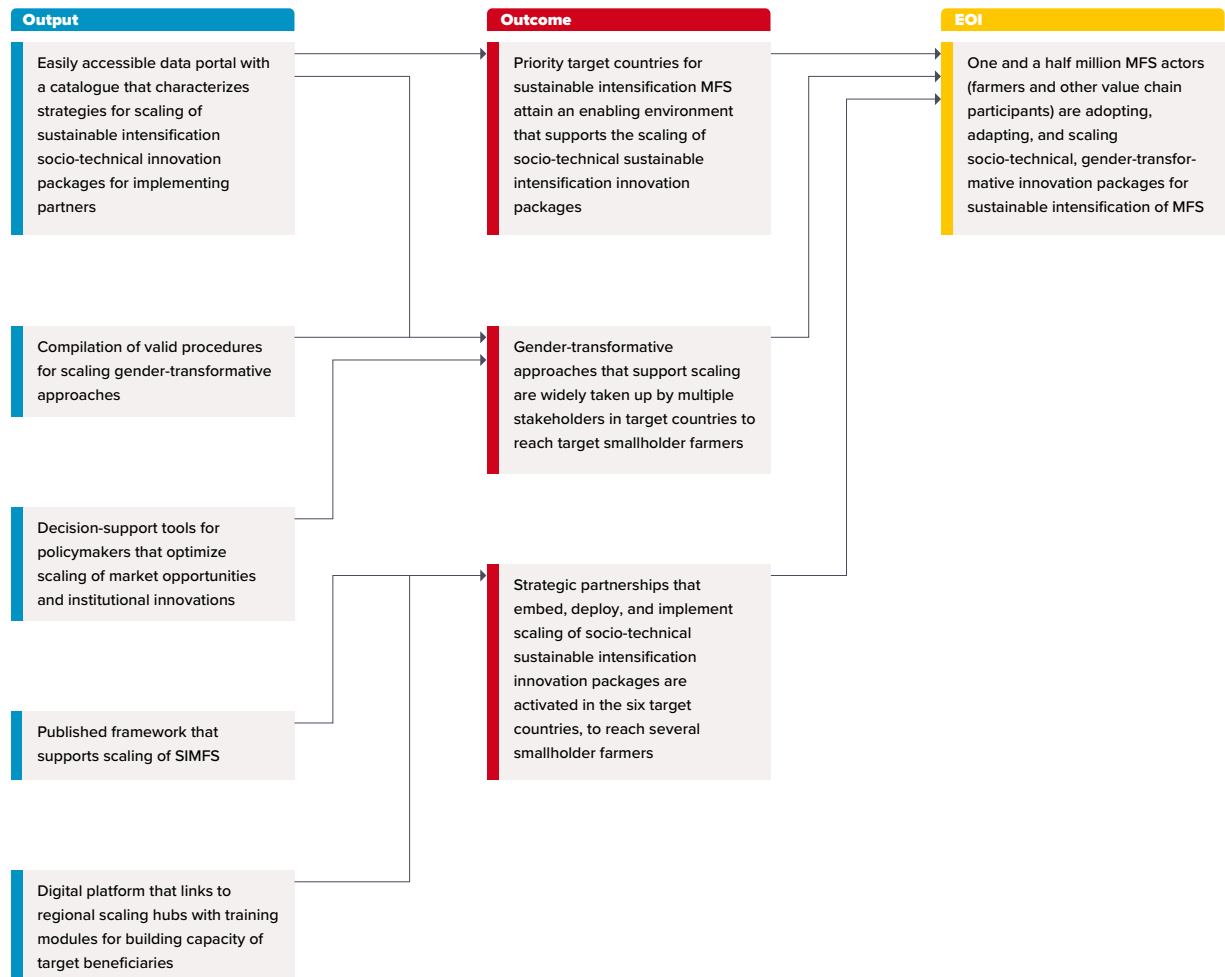
Data protocols and collection tools were developed in the six countries for the identification of the farm types to be tackled, contributing to outputs 3.1 and 3.2, and thus support the [bundling of appropriate innovations](#) which can be impactful towards sustainable intensification pathways.

[More than 40 socio-technical innovations have been identified](#) so far as being of relevance to the MFS with two innovation bundles already in use. Innovations are related to crop varieties, livestock feed, and forage innovations, use of enhanced animal breeds, landscape management options, and communities' organization, among others. Of these innovations, 38% are at the readiness level "ready for use" while 30% are under "piloting" phase.

At the end of 2022, 51 knowledge products have been submitted from Work Package 3 through the PRMS reporting system; most of them are related to production system characterization and innovations description, contributing to outputs 3.4, 3.5, and 3.6.



Work Package 4: Advancing and supporting scaling of innovations



Work Package 4 progress against the theory of change

Work Package 4 seeks to enhance the enabling environment for scaling of socio-technical sustainable intensification innovation packages for the priority MFS at multiple levels, in and beyond the target pilots. It accomplishes this through strategic partnerships and building the capacity of relevant actors in scaling approaches.

Profiling of socio-technical innovation packages which was completed in 2022 and submitted to the PRMS for the six focus countries, leading to generation of 42 innovations (reported in the PRMS). In addition, a scaling readiness assessment guide to inform readiness assessment activities of MFS was finalized. Two webinars were also made to guide the Initiative team on profiling and subsequent development of scaling strategies for the identified innovation packages. In addition, key stakeholder consultations were done in all the six focus countries (NARs) during the Initiative inception meetings to pave way for development and characterization of scaling strategies.

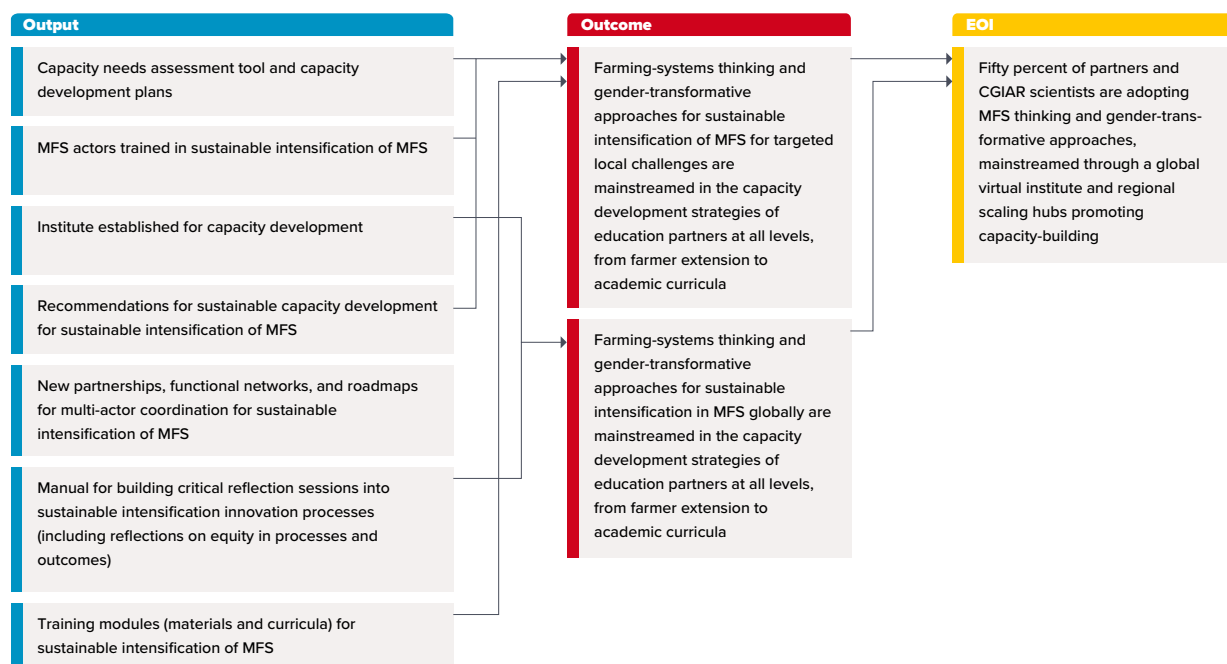
Building on previous interventions such as Africa RISING and CSISA, we used previous scaling opportunities such as the i-REACH model in Ghana, use of the digital MWANGA ICT platform, technology parks, community-based seed systems strengthening, work with national extension systems for farmer training, partnership with agro-input companies, and last-mile village-based agro-input systems strengthening to take the proven technologies to a greater scale.

As a step toward evaluating the relative sustainability of sustainable intensification socio-technical innovation bundles with the **Sustainable Intensification Assessment Framework (SIAF)**, led by the MELIA team, a baseline tool for SI-MFS with components of SIAF was developed and studies completed in Malawi. These studies have a focus on SIAF dimensions of MFS that will be monitored

and evaluated over time to provide information for further scaling.

The Work Package assumptions still hold. For instance, in all the focus countries, participatory engagement with relevant actors has started off well as exhibited during the inception meetings and establishment of the preliminary activities. Working in the realm of previous MFS-related interventions and with national partners have also contributed immensely towards our maintenance of relevance of the interventions planned under the initiative. The key gender achievement was integration of gender aspects in the development of key documents such as the scaling readiness assessment guide to be used by the team to develop and implement strategies.

Work Package 5: Capacity-building for MFS design and analyses



Work Package 5 progress against the theory of change

Work Package 5 aims to build capacity for MFS analysis and co-design. It thereby keeps a specific focus on developing capacity on systems approaches for the co-design, implementation, evaluation, and scaling of socio-technical innovation bundles (STIBs) that ensure the sustainable intensification of MFS.






A **rapid virtual survey** was sent out to 120 SI-MFS researchers to identify capacity needs within the Initiative team. As a next step, capacity needs will be assessed from country teams, including national researchers, NGOs, government, private sector, and smallholder farmers. This assessment focuses on the skills, knowledge, and tools required by different types of actors to effectively engage in the co-design process (output 5.1).

A first set of attributes of the **Virtual Institute (VI)** for systems analysis were defined in line with output 5.2. A two-track approach was proposed: (1) focus




on priority target actors and beneficiaries of the SI-MFS initiative; and (2) to continue the discussion more broadly including other CGIAR Initiatives and institutions outside CGIAR such as Institut Agro, WUR, UM6P (Morocco), and Cornell. A working group was established to elaborate further the concept, establish the partnerships and functional networks for systems analysis, and create an on-line platform; contributing to output 5.3.

Various modules for capacity development have been developed and implemented pursuing outputs 5.4, 5.5, and 5.6. The core emphasis of Work Package 5 is placed on capacity development in the context of systems thinking and research and this is being aided by engagements related to the VI as highlighted in output 5.2. To avoid missing important indicators and in conjunction with the MELIA team, an approach is being developed on monitoring capacity development activities and pursued in 2023 as well as the development of manual for to reflect on the inclusion of gender and social inclusion in the sustainable intensification innovation processes (output 5.7).

Work Package progress rating

WORK PACKAGE	TRAFFIC LIGHT / RATIONALE
1	 <ul style="list-style-type: none"> • Relevant reports on characterization of MFS in the target countries were produced. The trends in extreme weather events and land degradation were mapped in the target countries. The gendered impacts of the sustainable intensification technologies in all target countries were documented and gaps identified.
2	 <ul style="list-style-type: none"> • Well on-track technically with important advances in the development of M&T and cross-initiative interactions around systems analysis. Delay in hiring and collaborative agreements as they take time but on-track for 2023.
3	 <ul style="list-style-type: none"> • Well on-track technically with important advances in the implementation of participatory action research within the respective target countries.
4	 <ul style="list-style-type: none"> • We are slightly behind in terms of project results but are on-track to catch up now that the team and preliminary activities are in place.
5	 <ul style="list-style-type: none"> • Well on-track technically with important advances in outputs 1 and 2 all being implemented in the respective target countries.

KEY

On 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 jeopardise success of Work Package
Delayed	 <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 jeopardise success of Work Package if not managed appropriately
Off track	 <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 jeopardise success of Work Package

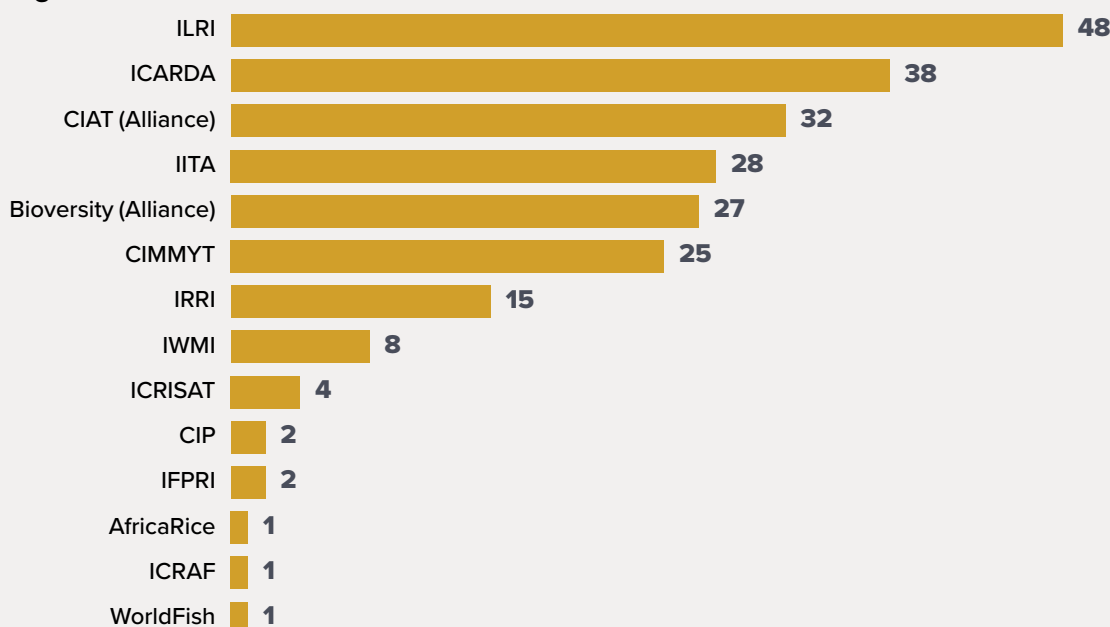
Section 4 Initiative key results

This section provides an overview of 2022 results reported by Mixed Farming Systems. These results align with the CGIAR Results Framework and Mixed Farming Systems' theory of change. Further information on these results is available through the [CGIAR Results Dashboard](#).

Overview

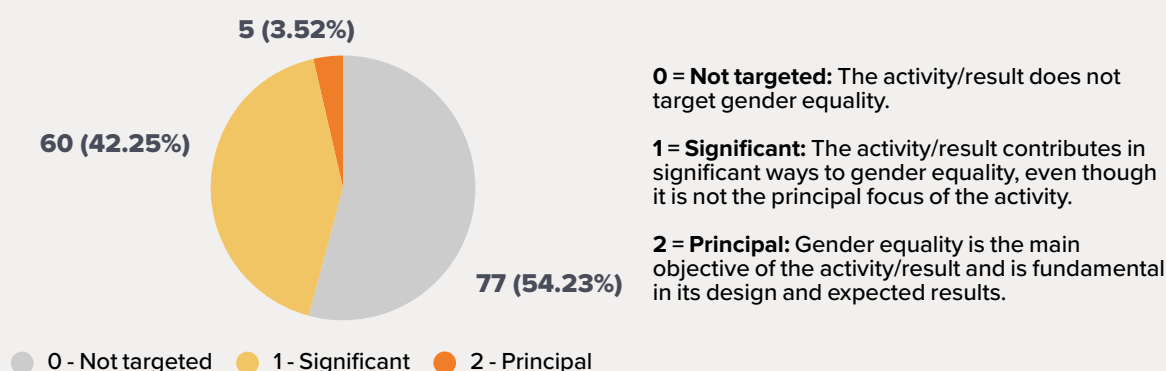


Contributing CGIAR Centers

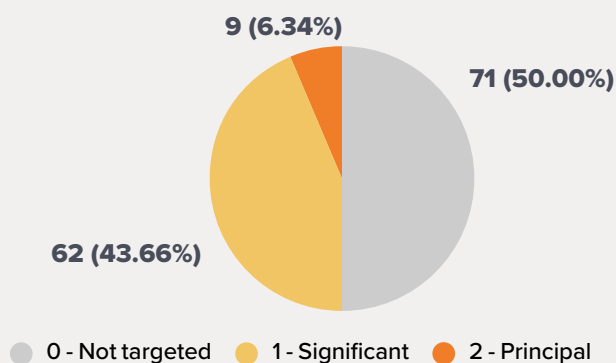


The characterisation of contributions shows that there is a skewed higher contribution of outputs from Africa than from Asia. Concerted efforts will be made to create a more balanced portfolio in future.

Results by gender tag



Results by climate change tag



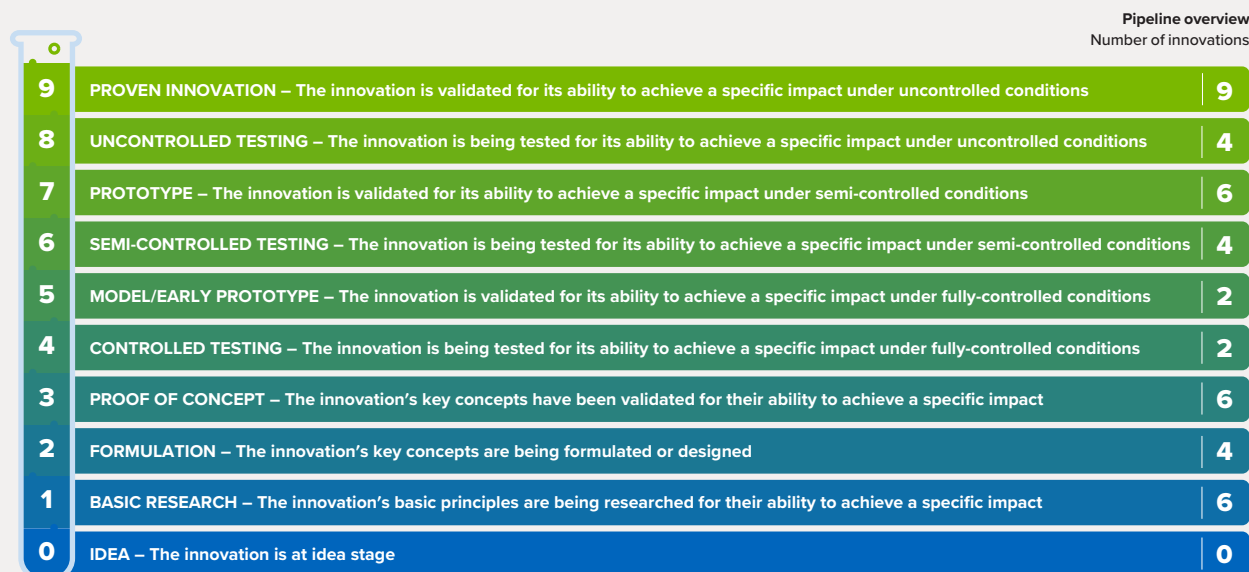
0 = Not targeted: The activity does not target climate mitigation, adaptation, and climate policy goals of the CGIAR as put forward in its strategy.

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.

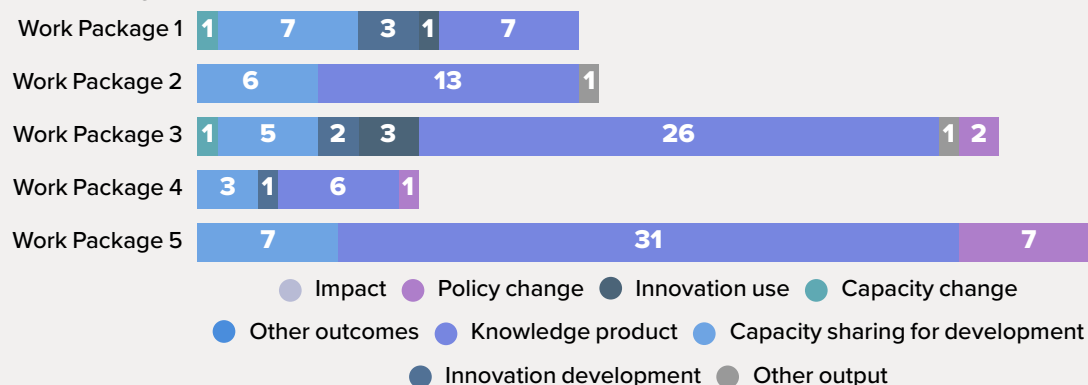
Both gender and climate change were tagged as significant in 124 results although there were few results where these are actually principal issues. Gender-nuanced innovations such as making maize threshers accessible to women farmers in Ghana has unlocked the potential to protect post-harvest losses (30% avoided losses) that would otherwise erode the positive yield gains prior to storage.

Innovations by readiness level



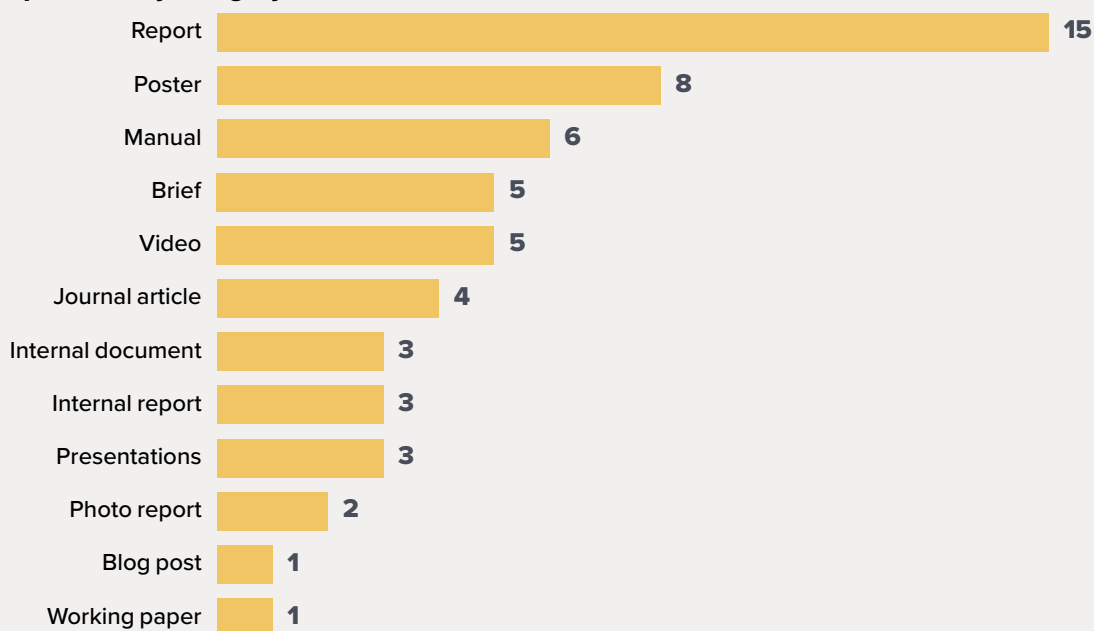
SI-MFS has 43 innovation developments with varying degrees of scaling readiness. Of these, 38% innovations are at the readiness level “ready for use” while 30% are under “piloting” phase. The Initiative has invested significantly toward training key Work Package leaders in collaboration with the Innovation Packages and Scaling Readiness (IPSR) team. This has resulted in stronger sensitization of the different CGIAR Centers on the importance of innovation profiling and innovation packages for scaling readiness.

Results by Work Package



The results show that Work Package 3 is the central research piece for implementing activities on the ground and generating primary data for the Initiative hence the highest number of outputs. Work Package 5 is cross-cutting with many other Work Packages contributing to it, therefore produced the second highest number of outputs.

Knowledge products by category



The knowledge products will increase over time during Years 2 and 3. It is anticipated that journal articles will form a core foundational product as evidence from which most of the other knowledge products can be derived such as blogs, technical briefs, and videos.

Among the short-term trainees, 42% of them were female with 58% male. There will be a need for more women's representation in future training, although the current balance is not alarming given that there was also an equal proportion among the long-term trainees.

Capacity development trainees by term

Short-term trainees	2,641	3,601
Long-term trainees	4	4
Trainees by gender	2,645	3,605

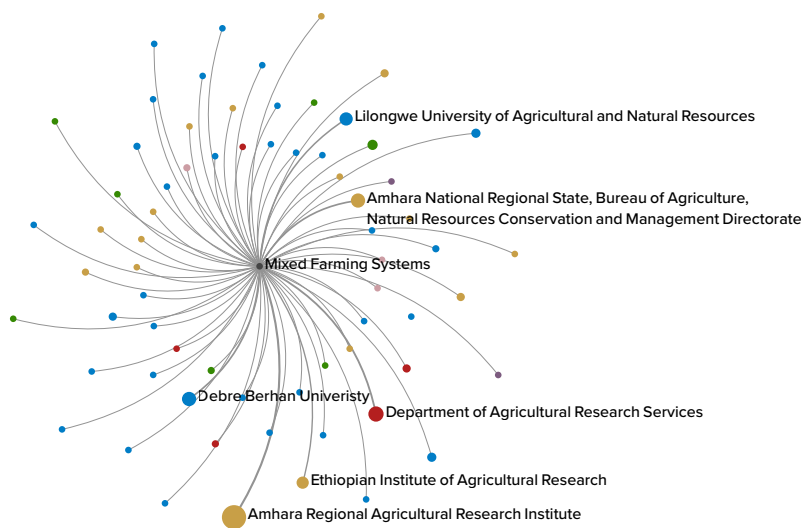
● Female ● Male

Results by country



Based on where most CGIAR Centers are located, the characterization of contributions shows that there is a skewed higher contribution of outputs from Africa than from Asia (apart from Bangladesh). Concerted efforts will be made to create a more balanced portfolio in future for Asia with an emphasis on Nepal and Laos PDR.

Section 5 Impact pathway integration – External partners



Partners typology	# of partners	% of partners
Research organizations and universities (National) (Universities)	34	43.6%
Research O&U (NARS)	17	21.8%
Government (National)	5	6.4%
NGO International (General)	3	3.8%
Research O&U Intl. (Universities)	2	2.6%
All Other Categories	7	9.0%

Top five institution types

- All other categories
- Government (National)
- NGO (International) (General)
- Not applicable
- Research O&U (International) (Universities)
- Research O&U (NARS)
- Research O&U (National) (Universities)

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

Top external partners by results: Mixed Farming Systems

The network graph shows that national partners played a critical role and represented about 71% of the partnership engagement for the Initiative (universities, NARS, and government). The external partner engagement however highlights a key gap; a clear lack of private sector involvement in the work being conducted. The engagement of private sector entities will allow the taking to scale of the products from Work Package 1 and Work Package 2 as well as the socio-technical innovation bundles developed in Work Package 3.

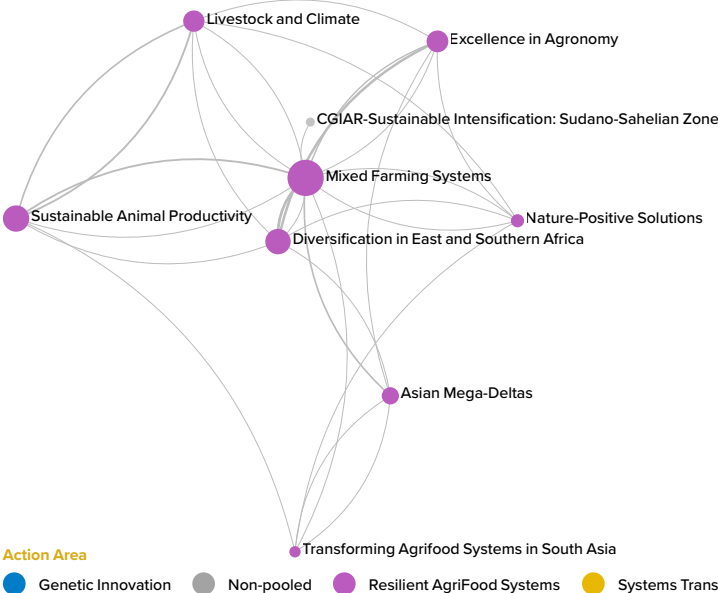
Partnerships and Mixed Farming Systems’ impact pathways

The Work Packages are interlinked but the associated interlinkages take place through a partnership matrix that operates at different levels depending on the context. For example, Work Package 5 uses the knowledge gaps identified by other Work Packages to provide capacity development of the key strategic actors and guide their investments in capacity-building on MFS. Work Package 5 has a

significant footprint of NARES involvement who are also linked from Work Package 2 and Work Package 3. These majorly operate within the sphere of control. Work Package 3 prioritizes, fine tunes, and validates socio-technical innovation packages for Work Package 4, while Work Package 4 co-designs gender-transformative approaches with the prioritized innovation packages for scaling partners to implement and take beyond the sphere of control into the sphere of influence.

Policymakers are also critical since they make decisions that enable policies and institutions in the target areas, thus impacting both the sphere of influence and sphere of control. The Initiative continues to facilitate smallholder farmers’ access to, and scaling of, improved innovations and services through public-private partnerships. This will empower smallholder farmers to implement new practices in MFS to achieve increased productivity and more resilient livelihoods. By 2030, the MFS Initiative outcomes will lead to the One CGIAR RAFS Action Area outcomes, as detailed in the caption above. By 2030, these Action Area outcomes will lead to the five One CGIAR Impact Areas, contributing to realizing several UN Sustainable Development Goals.

Section 6 Impact pathway integration – CGIAR portfolio linkages



Name	Action Area	Total connections	Total results
Mixed Farming Systems	RAFS	13	64
Sustainable Animal Productivity	RAFS	6	42
Diversification in East and Southern Africa	RAFS	7	40
Excellence in Agronomy	RAFS	6	32
Livestock and Climate	RAFS	7	31

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 Mixed Farming Systems' impact pathways

There are strong linkages between the SI-MFS Initiative and Sustainable Animal Productivity, Livestock and Climate, Excellence in Agronomy as well as the Regional Integrated Initiative on Diversification in East and Southern Africa. These linkages are conceivable given the fact that: (i) systems analysis at different scales is the center of the SI-MFS Initiative and all other Initiatives want to adopt and apply systems analysis approaches within their work; and (ii) the MFS Initiative has some sites that are co-located where the aforementioned Initiatives are but also share staff resources which allows for potential integration of key results that contribute to nutrition, health, and food security as well as environmental health and biodiversity.

Included in the linkage matrix is the project on Sustainable Intensification in the Sudano-Sahelian Zone which is the West Africa, Africa RISING Project on which Mixed Farming Systems built on various legacy products. Stronger linkages will be sought with the Asian Mega-deltas and TAFSA both of which are in Asia yet Mixed Farming Systems is also present in Asia. The Mixed Farming Systems Initiative will also strengthen ties with the Nature Positive Solutions Initiative since there seem to be marginal linkages. Efforts will also be targeted toward linkages with the Nexus Gains Initiative and Agroecology Initiatives since these appear to be totally absent yet can help contribute to CGIAR Impact areas on gender equality, youth, and social inclusion as well as climate adaptation and mitigation.

Section 7 Adaptive management

RECOMMENDATION	SUPPORTING RATIONALE
<p>Strengthen linkages within and across Work Packages for integration of work, cross-regional learnings, and portfolio harmonization.</p>	<ul style="list-style-type: none"> • The nature of MFS calls for a systems approach. Different components interact at different levels, so activities at different scales of analysis need to be articulated within a coherent whole for sustainable intensification within Mixed Farming Systems to happen. A systems approach requires a holistic view on MFS, taking into account complex interactions between components and allowing prioritized, focused efforts that strategically integrate multiple interventions at different scales. This will help unlock disciplinary knowledge gaps that will inform priority setting for other thematic level initiatives. However: <ul style="list-style-type: none"> - There is a lack of clear linkages within each Work Package in relation to how different activities support or leverage from others. This lack of clarity then carries through to the inter-Work Package linkages. - There is a plausible way this can be institutionalized through asking how much level of effort or resources are being committed toward ensuring that these interactions take place; ensure coordinated planning within each Work Package, and across different Work Packages. - Efforts on this are being conducted, unfortunately, there is a limiting factor in relation to the amount of resources that can be put on the table to elicit these critical linkages.
<p>Address the imbalance between human resource gaps and the need to have sufficient operational resources to achieve the desired impact.</p>	<p>The imbalance between human and operational resources is mainly a product of budget adjustments between what was proposed and what was actually allocated. Secondly, SI-MFS has about 70% of its staff force coming from the Africa RISING Program. With the closure of this 12-year bilateral program, in March 2023, the staff time for team members is inevitably borne by SI-MFS. The absence of Africa RISING has created a big strain on current resources that are needed to fulfil the integration and linkages at the systems level. To address this imbalance additional resources will be sought through improved coordination for staff coverage with other Initiatives and through the formulation of country and region specific bi-lateral projects.</p>
<p>Better collaboration and interlinkages with other One CGIAR Initiatives.</p>	<p>There are knowledge gaps related to the interactions of system components and their consequences for the overall sustainability of Mixed Farming Systems. In order to address this:</p> <ol style="list-style-type: none"> 1. There is a need for intentional dialogue, instituted at the RAFS level that allows a coordinated approach in relation to how the different Initiatives see a critical need to attain their impact pathways to the five CGIAR impact areas. The cross-Initiative interactions will provide a good basis for linkage in order to address identified issues. 2. Promote interactions and experience exchange on system approaches. 3. Conduct inter-Initiative collaborative/co-financed activities that add value to the participating Initiatives.

Section 8 Key result story



Seven CGIAR Initiatives collaborate to develop a common framework for multi-scale systems analysis and target/prioritize context-specific interventions and investments

CGIAR and partners need to assess “which innovations might work, where, and for whom”. The SI-MFS Initiative brought together seven CGIAR initiatives to develop and apply a common framework for quantitative Farming Systems Analysis (FSA) at different levels (e.g., the field, farm, village/landscape scales, and beyond) based on increased availability and interconnectivity of data. Through this multi-scale FSA framework, CGIAR and partners can prioritize, target, and tailor specific R&D interventions in different contexts, taking into account the complexity and diversity of MFS.

In September 2022, representatives from seven CGIAR Initiatives: [Mixed Farming Systems](#), [Livestock and Climate](#), [Nature-Positive Solutions](#), [Sustainable Animal Productivity](#), and [Diversification in East and Southern Africa](#), [Climate Resilience](#), and [Excellence in Agronomy](#), came together and held a joint workshop and develop a common quantitative [FSA framework](#). The need for coherent systems analysis at different scales was priority for all these initiatives aware of the diversity of complexity of small-scale farming systems. The development of this framework is based on the fact that:

Rachael Njeri, a farmer in Kenya’s Tana River watershed feeds her cattle on fodder harvested from the forage strips on her farm in which she also grows maize and bananas. The two initial Use Cases for the multi-scale FSA framework that will be implemented through the cross-initiative collaboration highlighted in this key result story will be implemented in the mixed farming systems of Kenya and Malawi. Photo credit: CIAT/ Georgina Smith

(i) data availability has increased drastically over the past 10 years; and (ii) new tools to analyze data, assess impact, and quantify trade-offs within farming systems have been developed and applied, as have approaches that allow for communication between datasets and tools. An example of this is the [Agriculture Adaptation Atlas](#) where data and analytics come together in new innovative ways to map climate risks and find targeted solutions.

The multi-level quantitative FSA framework encompasses the diagnosis, intervention identification and assessment, definition of baskets of alternatives for different types of MFS, and delineation of scaling-out and up pathways. The FSA framework is aligned with needs of main users and decision-makers identified at different integration levels, while the constraints and opportunities consider the wider set of actors with interests, influence, and/or stakes around the different CGIAR impact areas. This framework starts from the higher integration levels (what are the big questions, problems, or constraints?) toward the finer more micro-level scales to see how these

factors work out at the local scale. Based on these findings, the assessment of a wide range of options and their potential impact is assessed to different types of farming systems, which can be aggregated across scales to prioritize and target specific interventions. Methods and datasets at different

aggregation levels are then articulated at different levels and for different purposes, thereby generating a flexible and fit-for-purpose framework that can be used in different settings and to address different development issues.

“ We convened this meeting considering that the One CGIAR Initiatives offer different kinds of expertise and data sets that are essential for a comprehensive farming systems analysis. This is therefore an effort in the spirit of One CGIAR for greater impact. ”

Santiago López-Ridaura, Co-Lead of the Mixed Farming Systems Initiative, CIMMYT

Two use cases have been selected for the application of the multi-scale FSA framework in East and Southern Africa (ESA). ESA contains a mosaic of natural resources, human settlements, and institutions which shape the major farming systems, with a characteristic mixture of trees, crops, livestock, fish, and livelihoods — and particular development pathways. In the first use case, “Prioritization and targeting of agronomy-related sustainable intensification options in Malawi”, the team is compiling newly available micro and macro level data to diagnose investment opportunities for agronomy-related technologies and scale them up while in the second use case, “Financial instruments for climate risk management in Kenya”, the team is making better use of existing micro-level data to develop climate vulnerability assessments and better evaluate the investment in climate risk insurance to improve

climate risk management by smallholder farmers. In both cases, a thorough data landscape analysis being performed taking advantage of vast datasets publicly available and legacies of previous investments. Gridded data (e.g. [MapSpaM-IFPRI](#), [Data For Better Lives-World Bank](#), [Gridded Livestock of the World \(GLW3\)-FAO](#)), and point household level data (e.g. [LSMS-ISA World Bank](#), [RHoMIS](#), baseline and panel household surveys from bi-lateral projects such as [Africa RISING](#) and [SIMLESA](#)) are being compiled and aggregated to different levels, based on decision-makers’ needed scales and resolutions. The FSA framework enables interconnectivity of datasets, methods, and tools for systems analysis, which is allowing the regional and thematic CGIAR initiatives to interact, and search together systemic options to improve the livelihoods of small-scale farmers and influence decision-making of different actors at different aggregation levels.

References

1. <https://www.cgiar.org/news-events/news/one-cgiar-cross-initiative-collaboration-on-farming-systems-analysis-in-support-of-user-centred-research-and-innovation/>
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LINKS TO IMPACT AREAS

Primary Impact Area: Nutrition, Health and Food Security



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



Which collective global targets for the relevant Impact Area(s) from the CGIAR 2030 Research and Innovation Strategy does the key result contribute to?

- Ending hunger for all and enabling affordable healthy diets for the 3 billion people who do not currently have access to safe and nutritious food (SDG 2).

GEOGRAPHIC SCOPE

Region(s): Continental Africa
Country/ies: Kenya and Malawi



We would like to thank all funders who supported this research through their contributions to the **CGIAR Trust Fund**.

KEY CONTRIBUTORS

Contributing Initiative(s): Mixed Farming Systems, Livestock and Climate, Nature-Positive Solutions, Sustainable Animal Productivity, and Diversification in East and Southern Africa, Climate Resilience, and Excellence in Agronomy

Contributing Center(s): Alliance of Bioversity International and CIAT, ILRI, IFPRI, CIMMYT, CIP.

Contributing external partner(s): Wageningen University and Research

COVER PHOTO: A farmer in Nepal readies his rice paddy for planting with an ox-drawn plough
Photo credit: Neil Palmer/CIAT