PRELIMINARY **CGIAR**
INITIATIVE OUTLINES

Sustainable Intensification of Mixed Farming Systems

Initiative Lead and Co-Lead	Primary CGIAR Action Area	Estimated 2022 - 2024 Budget
Irmgard Hoeschle-Zeledon Bruno Gerard	Resilient Agri-food Systems	$30 - $30 M

Challenge

Most agricultural production in the global south takes place in mixed farming systems (MFS). Key drivers - climate change, population pressure, urbanization, water scarcity, changing diets, volatile food prices - mean that flexible and accelerated changes in MFS will be needed to achieve global targets such as the UN Sustainable Development Goals (Herrero et al. 2010 - https://bit.ly/3e5NYRH).
Sustainable intensification (SI) research outputs must address multiple biophysical and socio-economic issues in MFS to deliver critical outcomes, involving a range of farm products and stakeholders, that result in inclusive multiple desired impacts at scales. Two types of hurdle must be overcome for the CGIAR to adequately meet the challenge at farming systems level. One hurdle is to ensure efficient coordination, integration, and transfer of innovations, information, tools, and standardized methodologies. A second hurdle is to integrate multiple biophysical and socio-economic thematic-level outputs and identify strategies that minimize tradeoffs and maximize synergies, resulting in multiple impacts at scale.
Accelerating SI of MFS will require well-coordinated, prioritized, and focused efforts that efficiently bring together multiple thematic elements (e.g. agronomy, plant health, genetics, livestock, aquaculture, soil and water management, mechanization, socio-economics) in order to minimize sectoral tradeoffs (e.g. between productivity and environment) and maximize synergies (e.g. women's empowerment and mechanization). This will only be possible with streamlined coordination, integration, and transfer of innovations, information, tools, and standardized methodologies from thematic levels to regional and global levels. Similar coordination, integration, and transfer activities are also critical across each level (e.g. farming systems levels).

Objective

The objective is to provide equitable, transformative pathways for improved livelihoods of actors in mixed farming systems (MFS) through sustainable intensification (SI) within target agro-ecologies and socio-economic settings. We aim to improve overall systems productivity by 15% across regions by 2024, while reducing the environmental footprint, covering over 10 million ha and benefiting 15 million men and women equally in sub-Saharan and Northern Africa, South and Southeast Asia, and Latin America. By 2024, strong innovation systems will be initiated in relevant regions and MFS. NARES, local universities, and international partners will have made efforts towards incorporating systems thinking for SI in their programs.
This will be achieved through:
(i) identification and dissemination of validated SI pathways applying robust, flexible approaches and tools to target, support, and scale a co-design process with MFS actors to equitably improve resource-use efficiency, resilience, and sustainability;
(ii) support for an enhanced enabling environment to transform policies, markets, institutions, socio-cultural norms, and governance for increased, inclusive participation with equitable benefits;
(iii) participatory design, implementation, and monitoring of interventions at systems level, following e.g. the DEED cycle (Descheemaeker et al. 2016 - https://bit.ly/3gf62eN), to provide guidance and generate evidence for SI approaches that respond to the CGIAR impact areas and the SDGs;
(iv) coherent application of tools and methods across CGIAR farming systems initiatives, integrating outputs from CGIAR thematic initiatives, and contributing to regional and system transformation initiatives through multiple partnerships enabling scaling of SI from field/farm to landscape, from household to community, and from national to regional.

Theory of Change

Sustainable intensification (SI) of farming systems aims to achieve the increased food production needed to support the growing global population without compromising the needs of future generations. This initiative focuses on SI to deliver more productive and equitable livelihoods for current and future actors in crop-tree-livestock farming systems (subsequently called mixed farming systems, MFS), along with a reduced environmental footprint. When those within these farming systems share this vision and contribute to co-designing and sustainably intensifying MFS, productivity, income generation, and resilience are significantly improved. This initiative aims to lift 50 million households out of poverty and provide healthy diets by 2030.
Coordinated, integrated approaches at farm and landscape levels will eliminate waste and improve resource-use efficiency. Participatory development of technical, institutional, and social innovations will amplify synergies among MFS components, and minimize associated tradeoffs. Farmers, value chain actors, researchers, extensionists, and development partners (MFS actors) will jointly identify, develop, and assess tailored, adoptable, and scalable options for SI of MFS in a wide range of agro-ecological and socio-economic settings.
This initiative will engage stakeholders in building capacity to support mainstreaming of supportive and transformative policies, markets, and institutions, creating an enabling environment for SI through socio-technical innovation packages and gender-transformative approaches.
Key activities include identification, co-development, and adaptation of SI pathways; provision of decision-support methods; and capacity-building strategies for a paradigm shift among MFS actors. Multi-disciplinary country teams will co-implement activities and provide technical backstopping to national agricultural research and extension systems (NARES), and public and private sectors.
This initiative will work with all CGIAR regional integrated initiatives (RIIs) to identify needs of focal farming systems, while benefiting from their local partnerships and exchanging data.
It will also collaborate with the other farming systems initiatives - ASPIRE-building integrated agro-silvo-pastoral food systems resilient to climate change and other crises, and Resilient Cities through Urban and Peri-urban Agrifood Systems - on harmonization of tools and methods, indicators, and metrics for systems design, analysis, and impact assessment. Importantly, this initiative will integrate outputs from thematic initiatives, especially those on Excellence in Agronomy, Sustainable Animal Productvity for Livelihoods, Nutrition and Gender Inclusion (SAPLING), Nature-Positive Solutions: enhancing productivity and resilience, while safeguarding the environment, and promoting inclusive growth within communities, and Accelerated Breeding: Meeting Farmers' Needs with Nutritious, Climate-Resilient Crops.
We anticipate drawing MFS-related data from, and providing data to, the initiative on Foresight and metrics to accelerate inclusive and sustainable agri-food system transformation. We also see synergies with the initiative NEXUS Gains: Realizing Multiple Benefits Across Water-Energy-Food-Forest-Biodiversity Systems, and the initiative on Transformational agroecology across food, land and water systems, regarding co-development and harmonization of agro-ecological system approaches for MFS. We will also connect with the initiative on National Policies and Strategies for Food, Land and Water Systems Transformation to inform agricultural, economic, and social policy development in support of sustainable intensification of MFS.

Sustainable Intensification of Mixed Farming Systems

Highlights

This initiative addresses coordination and integration challenges. It will respond to prioritized needs of focal farming systems co-identified with CGIAR regional integrated initiatives and their partners, and support harmonization of the use of proven tools and methods to guide and capitalize on other relevant CGIAR initiatives.

An inclusive, participatory, gender-transformative approach will be used to identify, co-develop, and adapt sustainable intensification (SI) pathways for more productive, effective, resilient mixed farming systems (MFS). This will ensure equitable distribution of the benefits among MFS actors, increasing the acceptability and sustainability of proposed MFS adjustments (Mulema et al. 2020 - https://bit.ly/3ebhN3t).

The initiative will generate evidence-based, context-specific design and assessment toolboxes to support the improvement of MFS. These toolboxes will guide the co-design and assessment of future development investments in SI and farming systems research within and beyond the CGIAR (e.g. the Sustainable Intensification Assessment Framework; Stewart et al. - https://bit.ly/3x0xsew).

There is the potential to generate a high rate of return on research investment. Data from ongoing analysis of the returns on investment of the Africa RISING project in the Ethiopian Highlands, attributable to adoption and scaling of SI pathways, suggest a benefit of at least USD7 per USD1 invested.

The initiative adds value to the achievements of existing efforts by CGIAR and other institutions to sustainably intensify MFS, placing previous disciplinary component research within a holistic systems approach. It harnesses synergies among different objectives, reduces tradeoffs and unintended consequences, maximizes synergies, and bundles social and technical innovations.

Work Packages

	Scope of Work	3-year Outcomes
Engaging, communicating, and integrating with other initiatives	Build links with CGIAR regional integrated initiatives (RIIs) and locally active partners to describe and contextualize mixed farming systems (MFS), and with thematic initiatives and their networks to identify research priorities and capitalize on outputs of separate disciplines for integration in MFS.	Jointly identified and implemented synergistic research activities lead to sustainably intensified mixed farming systems (MFS), based on shared understanding of the challenges and opportunities for sustainable intensification (SI) in priority MFS within this initiative, and the CGIAR's regional integrated initiatives (RIIs) and relevant thematic-level initiatives.
Building methods and tools	Develop proven methods and tools for foresight, targeting and implementing sustainable intensification innovations for MFS in specific agro-ecological and socio-economic settings. Capture the diversity of farming systems including gender inequalities and how SI innovations may equitably transform MFS, allowing assessments of what might work, where, and for whom.	Actors in research for development jointly use a systems approach and a set of novel tools adapted to different agro-ecologies and socio-settings to identify potential context-specific, integrated and gender-transformative solutions for SI in MFS.
Supporting, co-designing, and validating sustainable intensification pathways	Co-design MFS and validate SI innovations for improved efficiency, equity and resilience using proven tools and methods, mainly through RIIs and local partners, taking into account local realities and multiple objectives at different scales.	CGIAR RIIs, local partners, and farmers develop, implement, and validate, through a participatory and inclusive process, SI options to increase efficiency, equity, and resilience in selected MFS.
Advancing and supporting scaling of innovations	Scale proven and gender-transformative approaches to SI and build an enabling environment for more sustainably intensified MFS. Generate policy, market, and institutional innovations to ensure the scalability of interventions that amplify the synergies of MFS components in context, together with local partners and actors.	Local development partners apply proven approaches and scaling mechanisms within an improving enabling policy and institutional environment to scale validated and gender-transformative SI innovations for MFS.
Capacity building for systems design and analyses	Develop training materials and build capacity of MFS actors in socio-technical, inclusive, participatory, and gender-transformative approaches for systems design and analyses to support understanding of context-specific challenges and identification of opportunities for systems intensification with suitable SI innovations.	Academic training and education partners gradually implement a capacity development strategy aiming at mainstreaming in their curricula farming systems thinking and gender-transformative approaches for SI in MFS. Extension services use novel training materials to build capacity of their agents in participatory approaches to farming systems design and analysis.

Sustainable Intensification of Mixed Farming Systems

Impact Area Contributions

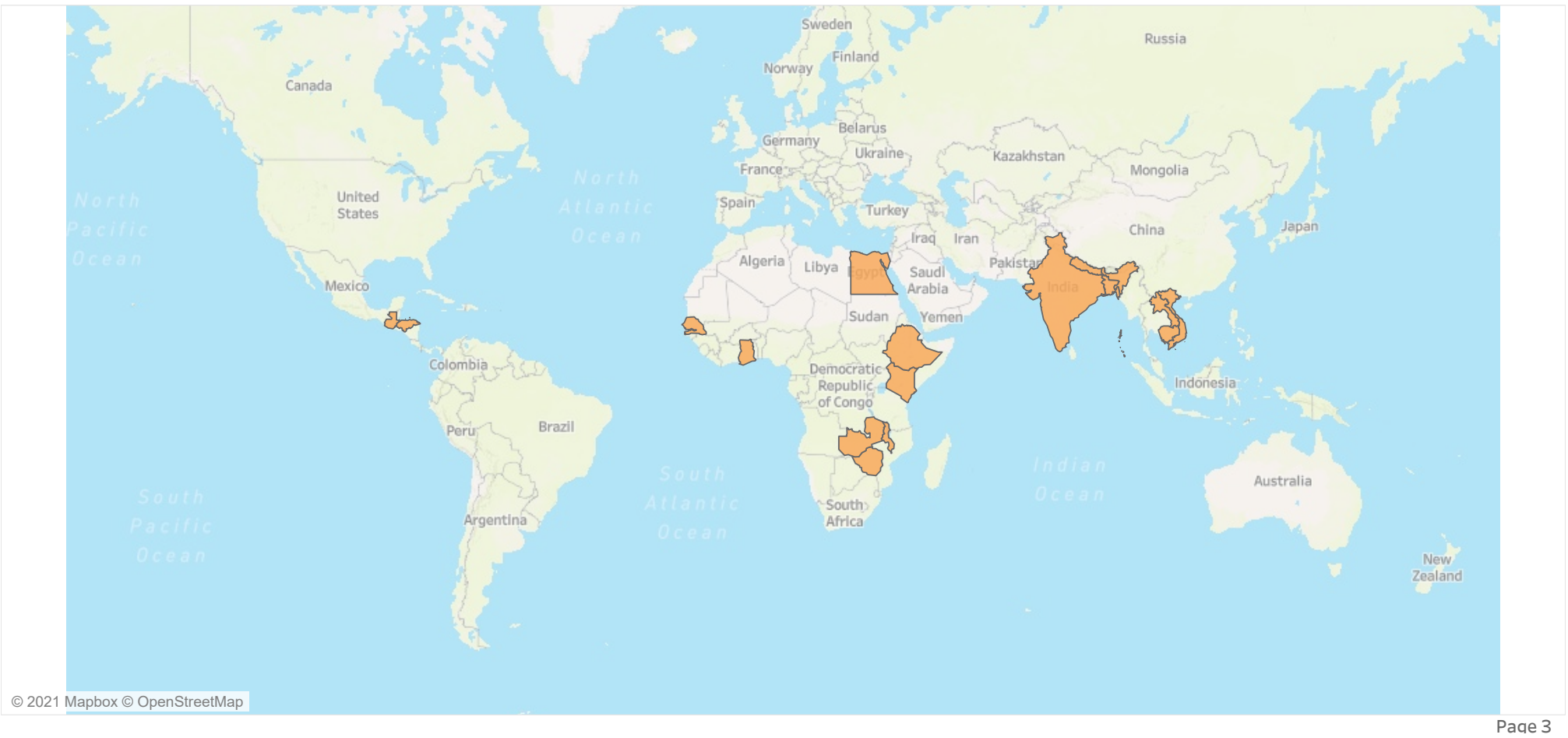
Nutrition, health & food security	Higher efficiency and diversity of products generated by mixed farming systems (MFS) will provide more and diversified food and nutritional security to rural and urban households through healthy and affordable diets, contributing to SDGs 2 and 3.
Poverty reduction, livelihoods & jobs	Increased incomes from sustainably intensified MFS, along with participation by rural households in multiple associated value chains, will be crucial for generating jobs, reducing poverty, and improving livelihoods, contributing to SDGs 1 and 8.
Gender equality, youth & social inclusion	Redressing discriminatory norms and institutions in MFS will result in enhanced and equitable livelihoods for women, youth, and other disadvantaged social groups through increased co-design of and benefits from innovations, contributing to SDGs 5 and 10.
Climate adaptation & greenhouse gas reduction	Diversity in MFS will allow farmers to adapt resource allocation to different climatic situations, increasing efficient use of renewable and non-renewable resources by whole systems, thus reducing greenhouse gas emissions, contributing to SDG 13.
Environmental health & biodiversity	Sustainably intensified MFS will generate more agricultural production with less use of water, pesticides, fuel, and in many cases external inorganic nutrients, reducing their release into natural ecosystems and water bodies and thus shrinking the environmental footprint of MFS, contributing to SDGs 14 and 15.

Impact on SDGs

Regions

Global	Central and West Asia and North Africa (CWANA), East and Southern Africa (ESA), Latin America and the Caribbean (LAC), South Asia (SA), South East Asia and the Pacific (SEA), West and Central Africa (WCA)

Countries



Sustainable Intensification of Mixed Farming Systems

Innovations

Socio-technical innovations, gender-transformative approaches, and decision-support tools that enable actors in mixed farming systems (MFS) to define, fine-tune, adapt, and transform MFS in specific agro-ecologies and socio-economic settings. These will support the co-creation of more efficient, equitable, and resilient MFS. See Fischer et al. 2019 - https://bit.ly/3agrXys
A toolbox for multi-criteria assessment of MFS, providing methods for systems actors, the CGIAR, and partners to minimize tradeoffs and capitalize synergies. For example, whole-farm modelling in India allowed quantification of tradeoffs between profit and water savings, and targeting SI innovations at different farm types. See Toorop et al. 2020 - https://bit.ly/3skOyjQ
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A strategy for capacity building and curriculum development, aiming for a long-term shift by all MFS actors towards more integrated approaches in the design and assessment of these systems, which will be co-designed with and co-implemented by international, regional, and national development, research, and training institutions.
A research and development strategy, co-developed and based on a systems approach, to guide the CGIAR, donors, and partners in addressing main tradeoffs and capitalizing on synergies in MFS, e.g. using the Sustainable Intensification Assessment Framework (Stewart et al. - https://bit.ly/3x0xsew) to highlight interdependencies across MFS and conduct tradeoff assessments.

Key Partners

Demand	Academic, Training and Research	National agricultural research and extension partners in implementing countries
		Universities in implementing countries
	Multilateral	African Union
		Development Banks
	Other Public Sector	International Development Agencies (GIZ, SDC, DFID, USAID, BMGF, EU,…)
Innovation	Academic, Training and Research	Feed the Future Innovation Laboratories
		International agricultral research institutions
		National agricultural research institutions in implementing countries
		Universities in implementing countries
	Private Sector in Aid Recipient Country	Private sector companies in implementing countries
Scaling	Academic, Training and Research	Universities in implementing countres
	International NGO	International NGOs (e.g., Promundo, OXFAM, CRS,…)
	National NGO	Local NGOs
	Other Public Sector	Public extension services in implementing countries
	Private Sector in Aid Recipient Country	Private sector organizations in implementing countries

Sustainable Intensification of Mixed Farming Systems (MFS) Initiative: Theory of change

Challenges

- **Mixed Farming Systems are under pressure from key drivers –** climate change, water scarcity, diet change
- Biophysical and socioeconomic research outputs are **insufficiently integrated to achieve critical outcomes**
- **Inequalities in resource access and restrictive norms** do not support decent and equitable livelihoods for MSF actors
- **Limited consideration of the system as a whole** results in unintended consequences
- **Disconnected efforts to support sustainable intensification** fall short of the effectiveness and scale needed

Work Packages

- **Engaging, communicating, and integrating** with *RIIs and Thematic Initiatives* to identify integration research priorities
- **Building methods and tools for foresight, targeting and implementing gender-transformative** SI innovations for MFS
- **Supporting, co-designing, and validating SI pathways** for improved efficiency, **equity** and resilience
- **Advancing and supporting the scaling** of innovations while building an enabling environment to scale validated **and gender-transformative** SI innovations for MFS
- **Capacity building for systems design and analyses** through developing training materials in socio-technical, inclusive, participatory and gender-transformative approaches for systems design and analyses

Outputs

- ***Synergistic CGIAR efforts*** *for co-designing, targeting and foresight towards SI in integrated MFS*
- **Toolboxes adapted to different contexts** in MFS to improve synergies and minimize tradeoffs
- **Support services with gender and social inclusive** co-designing and validation of SI innovations
- **Programs and policies for scaling** more sustainable and equitable MFS pathways adapted for specific contexts
- **Capacity building strategy** for systems design and analysis with gender-transformative options and training materials

sphere of control

Outcomes

- ***Jointly identified and implemented synergistic research activities*** *lead to sustainably intensified MFS*
- **MFS actors jointly use a systems approach and a set of novel tools** adapted to different settings
- **MFS actors develop, implement, and validate in an inclusive participatory process** SI options for efficient, **equitable**, and resilient MFS
- **Scaling of validated SI innovations** for intensified MFS applying proven **gender-transformative** approaches
- Academic training and education **partners gradually implement a capacity development strategy**

sphere of influence

Impact areas

Nutrition, health and food security
Higher efficiency of MFS & greater diversity of products result in food and nutritional security

Poverty reduction, livelihoods and jobs
Increased incomes from intensified MFS generates jobs

Gender equality, youth and social inclusion
Redressing institutional issues in MFS leads to equitable livelihoods for women and youth

Climate adaptation and mitigation
Diversity in MFS will allow farmers to adapt their resource allocation

Environmental health and biodiversity
Sustainably intensified MFS generate more production with higher resource use efficiency and lower environmental footprint

sphere of interest

contributing to SUSTAINABLE DEVELOPMENT GOALS

Innovation Partners
(i) *RIIs*
(ii) Other Farming Systems level Initiatives
(iii) Thematic Initiatives: e.g., EiA, SAPLING, Foresight, Accel. Breeding, Agroecology, Nat. Policies, & NEXUS Gains
(iv) Universities
(v) Nat. Agric. Res. Institutions
(vi) Int. Agric. Res. Institutions
(vii) Feed the Future Innov. Labs
(ix) Private Sector

Demand Partners
(i) African Union (iii) Intern. Dev. Agencies (iv) NARES
(ii) Universities (v) Dev. Banks

Scaling Partners
(i) Extension (iii) Int. NGOs (v) Private Sector
(ii) Universities (iv) Local NGOs

Demand Partners
(i) African Union (iii) Intern. Dev. Agencies (iv) NARES
(ii) Universities (v) Dev. Banks

2022 2024 2030