Agenda setting brief - 5

TOWARDS INCLUSIVE INNOVATION

Gender and Youth in Sustainable Farming Systems

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CGIAR GENDER EQUALITY AND INCLUSION

CGIAR SUSTAINABLE FARMING

Visit to farms benefiting from projects supported by the ILO - Tunisia © Marcel Crozet / ILO

1. INTRODUCTION

This brief is linked to the Science Program (SP) on Sustainable Farming, which builds on the initiatives: Excellence in Agronomy (EiA), Plant Health (PH) and Mixed Farming Systems (MFS).

The Sustainable Farming Program aims at efficient production of more nutritious foods while protecting the environment and also translating this growth into decent and equitable employment opportunities. The SP will co-develop and validate a stream of integrated agronomic, plant health, and farming system solutions. These solutions aim to catalyze adaptation and scaling through a coherent approach that integrates effective data management, prioritization tools, capacity sharing, and partnerships built around contextualized demands.

While the program makes explicit reference to women, youth, and marginalized groups as key targets for bundled innovations, there is a need for a more nuanced and inclusive focus to explain how these groups will benefit from the proposed innovations. We therefore identify three GESI focal areas for the Sustainable Farming SP. First, climate change threatens to reverse previous productivity gains in agriculture (IPCC 2022). Women and resource-poor farmers suffer disproportionally from the effects of climate change (Hallegatte 2016). **Climate-smart, gender- and socially inclusive approaches** such as Climate-Smart Agriculture (CSA) can help to enhance the resilience of all the actors in farming systems (Deering and Wright 2023).

Women's bargaining power positively influences the adoption of CSA, although some CSA approaches fail to address gender equality and social inclusion (Mutenje et al. 2019). A review of the literature on long-term adoption of CSA found that social norms and institutional barriers determined different uptake of and preferences for CSA; for example, women were more reluctant to adopt slow-maturing, weather-resistant crop varieties due to insecure land tenure (Reference?).

Second, the **gender gap in productivity** remains a major limiting factor to agricultural development (FAO 2023). The gender gap in agricultural productivity refers to the disparity in agricultural output between male and female farmers, often resulting from unequal access to resources, opportunities, and decision-making power. Puskur and colleagues (2023) attribute the gender gap to differences in access to resources such as land and inputs (endowment effect), and gendered barriers rooted in norms, policies, and institutions (structural effects). However, the gender productivity gap is difficult to measure (Doss 2017), and there is limited empirical evidence on its size across crops and countries (Bambio 2025). Moreover, it is poorly understood how variations in intra-household decision-making, the division of labor in crop and livestock management, as well as women's participation in other areas of farming affect agricultural productivity. For instance, even when interventions succeed in enhancing women's access to farm inputs or technical assistance, disparities in productivity persist between women and men farmers, largely due to enduring structural barriers. However, recent estimates suggest that if the gender gaps in productivity and wages in agrifood systems were closed, the global GDP would increase by USD 1 trillion, and the food security of 45 million people would be improved (FAO 2023).

Gender gaps in literacy, income, and biased norms and attitudes towards technical knowledge often lead to men having better access to weather forecasts and advisory services than women (Muneri, 2023). Men are often in a stronger position than women to capitalize on innovation opportunities, while women innovators are more likely to face criticism for defying local gender norms (Pyburn and Hallin 2023; Anríquez et al. 2024). By intentionally considering how gender is embedded in the system, opportunities can be unlocked to transform agricultural systems, enhance productivity, reduce poverty, and improve livelihoods (Doss 2017).

Finally, 70% of the populations in many countries of sub-Saharan Africa are below the age of 30, making the Sub-Saharan population majority youth (United Nations, 2024). There is limited understanding on how youth perceptions of agriculture vary across regions. How do age-specific barriers to input markets, financial and extension services affect youths' performance in agriculture? How can institutions and policies be designed to promote youth engagement and job opportunities in agriculture? How can youth-specific innovations be designed and promoted? Current GESI initiatives frequently overlook the unique challenges facing youth, such as limited access to land, technology and inputs. Addressing gender inequalities without considering the experiences and contributions of young people limits the overall impact of these programs.

This brief focusses on **climate-smart, gender- and socially inclusive approaches, gender gaps in productivity, and youth**. We highlight how gender equality and social inclusion (GESI) research can be integrated into the Sustainable Farming SP to enhance gender equality and social inclusion in sustainable farming and to achieve the SP's intermediate and 2030 outcomes.

Farmers work together in Khulna - Bangladesh © Farha Khan/IFPRI

2. KEY RESEARCH METHODS

This section presents gender and social science research methods, innovations, and solutions that can help to increase gender equality and social inclusion, while improving agronomic gains and plant health at scale.

CLIMATE-SMART, GENDER- AND SOCIALLY INCLUSIVE APPROACHES

Climate-smart villages (CSVs) are piloted by the Climate Change, Agriculture, and Food Security (CCAFS) Research Program in high-risk areas that suffer most from a changing climate.[1] In CSVs, agricultural interventions are tested and validated in an integrated manner. The objective is to boost farmers' ability to adapt to climate change, manage related risks and build resilience. CSVs are also locations where program partners have established vital links with local communities. For example, in Kenya's lower Nyando Valley, farmers planted maize, sorghum and other crops between rows of multi-purpose agroforestry trees to stabilize and enrich soils. Nurseries to supply tree seedlings to farmers became an important source of income for women. Working with farmers to incorporate small livestock (e.g., poultry, goats) into their farms have increased their resilience.

The climate change and food security vulnerability toolkit was developed to holistically assess and address climate change related risks in small-scale farming. The toolkit is a participatory approach to understand the interrelations between climate impacts, food systems and livelihood strategies at the community level. It values Indigenous knowledge.[2] It includes step-by-step instructions to answer the following questions: Why are people vulnerable? How are they vulnerable to climate change? What consequences does this have for their food security? The toolkit uses a multidimensional view of the vulnerability to climate change, with a focus on differentiated access and entitlements to livelihood resources and food, based on gender, ethnicity and socioeconomic status.

Gender-responsive, climate-smart agriculture (CSA) approaches aim at recognizing and addressing the needs, priorities, and realities of men and women, so that both men and women can benefit equally. However, women are often unable to benefit from CSA (Puskur and Malhorta 2024). The Gender and Climate Empowerment Index adds climate and decision-making dimensions to the Women's Empowerment in Agriculture Index. This allows assessing the degree of empowerment gained by women and men in climate-resilient agricultural projects (Duong et al. 2016). Women are usually more likely to adopt CSA when they are involved in decision-making and have equal access to information and resources (Saran and Puskur 2023). Integrating gendered perspectives has been successfully tested, for example, the CSA techniques preferred by female farmers and what influences their decisions (Nelson and Huyer 2016; Duong et al. 2016).

In Mali, in community and women's associations, climate-smart approaches introduced a technology to reduce women's workloads, save energy, and increase the quality and amount of production. Building the capacity of the women's association to process, package and market their rice products increased their incomes, gave them new skills, and increased their agency (Saito et al. 2023).

1) Climate-Smart Villages
2) Climate Change & Food Security Vulnerability Assessment Toolkit

CLOSING GENDER PRODUCTIVITY GAPS

Achieving sustainable farming systems, and closing gendered productivity gaps, requires interdisciplinary collaboration that integrates social and biophysical sciences to create innovation bundles tailored to diverse groups, such as women, youth, and resource-poor farmers (Gartaula et al. 2023a). The **co-design of these socio-technical innovation bundles (STIBs)** links science, policy, and community needs, ensuring that farming practices are inclusive and ecologically sound (Johnstone et al. 2023). A review of 22 studies found that STIBs enhanced women's resilience by improving adaptive capacities, particularly through increased agricultural productivity and asset accumulation. Yet there was no clear effect on absorptive capacities. Some STIBs had a mixed or even negative impact on women's empowerment. Key challenges include women's time constraints, especially in female-headed households. Farmer organizations strengthen social capital, but they do not always enhance women's participation in economic activities.[3]

Addressing inequalities in agriculture is essential for enabling marginalized groups to achieve equitable access to resources, decision-making, and climate adaptation technologies (Pasha et al. 2023). New resources include the Gender Equality Initiative's Guide to developing quantitative tools for measuring gender norms in agrifood systems (Seymour et al. 2024). This Guide, developed through extensive research in Nigeria and Tanzania, helps to identify ways to address restrictive norms and to design gender-transformative interventions. By integrating gender-responsive approaches into STIBs, programs can address the root causes of gender inequality, improving agronomic outcomes for women, youth, and socially excluded groups (Seymour et al. 2024; Pyburn and Hallin 2023).

The Gender Equality Initiative, and the Water Management for Enhanced Productivity project (WMfEP-Pakistan) exemplify gender equality, inclusivity, and sustainability in agriculture. Their gender-focused innovations have improved agricultural productivity and resilience in East Africa and in South Asia (Pamuk et al. 2022). In Tanzania, the combination of farmer field business schools (FFBS) with village savings and loan associations (VSLA) gave women the confidence, and resources to adopt climate-smart practices. This bundled approach led to higher productivity, while improving nutrition, and household resilience–which would not have been achieved through FFBS or VSLA alone (Pamuk et al. 2022).

Under the WMfEP project, International Water Management Institute (IWMI) Pakistan co-designed innovation bundles addressing irrigation and agronomic challenges. Through community consultations and focus group discussions (FGD), the project introduced women-friendly technologies, such as solar-powered micro-drip irrigation kits, tunnel farming, and smart spray machines, tailored to cultural contexts. These locally fabricable and affordable solutions, complemented by training, exposure visits, and follow-ups, empowered women and youth to improve irrigation, vegetable production, agricultural productivity and resilience.

3) https://www.cgiar.org/news-events/news/the-impacts-of-socio-technical-innovation-bundles-stibs-on-womens-empowerment-and-resilience/?utm_source=chatgpt.com

PROMOTING YOUTH ENGAGEMENT IN AGRICULTURE

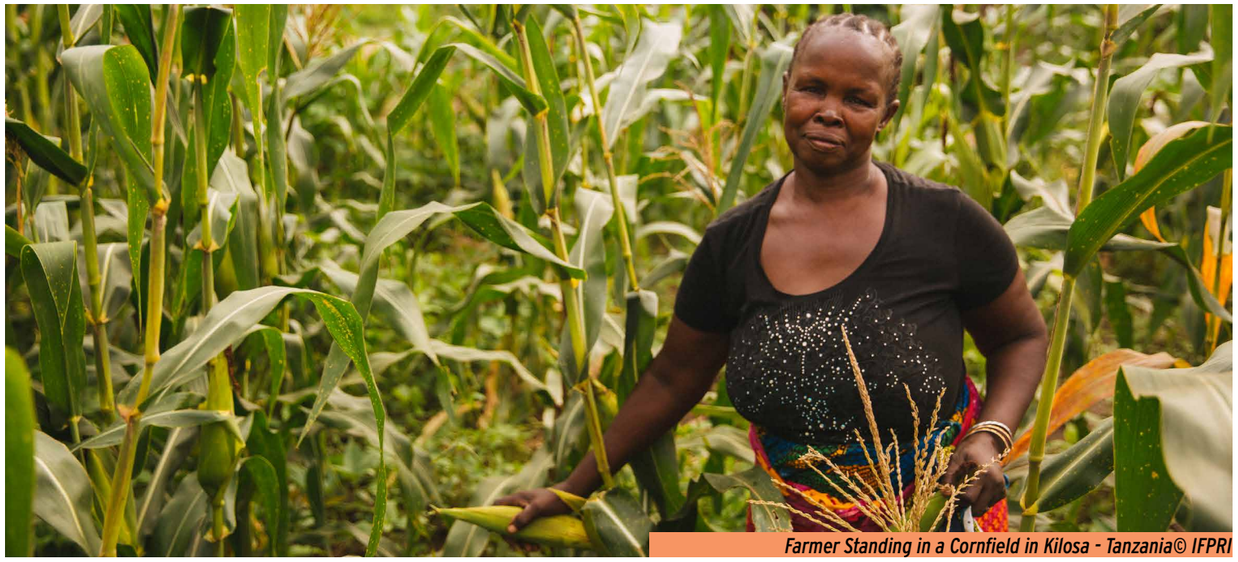
The Excellence in Agronomy (EiA) and Plant Health Initiatives created training on how to design youth- and gender-responsive agronomic solutions (GREAT and IITA 2023). Later, they published a similar, online course on the EiA's learning portal.[4] In the future, there is a need to follow up with those who participated in these trainings to determine their value. There are training materials like the Toolbox for incorporating gender and social inclusion in agricultural and livestock technical assistance (Caja de herramientas para la incorporación del género y la inclusión social en la asistencia técnica agropecuaria),[5] developed with support from the GENDER platform. The Toolbox includes modules with tools for technical assistance providers to: i) identify and characterize youth in the communities where they work, ii) understand their needs and interests and how these overlap and align with project activities and objectives, and iii) how youth can be meaningfully engaged and projects can benefit from that. These training materials can be scaled in the Sustainable Farming SP to help agronomists and plant health specialists to develop gender- and youth-responsive agronomic and plant health solutions.

GenderUp is a method that supports research teams to scale agricultural innovations in a gender-responsive way. It can be used to assess GESI impacts and refine STIBs. GenderUp enables researchers to ensure that social innovations and their benefits are equally distributed across social groups (Gregerson and Rietveld 2023). It can be used alone or with other tools, to employ sufficient and responsible scaling strategies. GenderUp enables researchers to better define innovation and scaling strategies, consider the implications of intersectionality, forecast and mitigate consequences and embrace opportunities.

4) EiA Learning

5) Caja de herramientas: Para la incorporación del género y la inclusión social en la asistencia técnica agropecuaria

Visit to Hortensia, 16, beneficiary of a project supported by the ILO in Antsirabe - Madagascar © Marcel Crozet / ILO



Farmer Standing in a Cornfield in Kilosa - Tanzania© IFPRI

3. A FUTURE AR4D AGENDA FOR GESI IN THE SUSTAINABLE FARMING PROGRAM

Attempts to integrate gender equality and social inclusion into the SP's earlier initiatives often lacked the focus and coordination needed to drive transformative change. Achieving equitable, resilient, and productive farming systems requires systematically implementing the tools, and approaches outlined in the previous section.

It will also require close collaboration with the new Gender Equality and Inclusion (GEI) Accelerator[6] to co-develop strategies that challenge unequal power relations and discriminatory institutions, to develop, bundle and scale innovations—sharing and developing capacity and informing policy in the Sustainable Farming SP. An integrated GESI approach, that aims to help individuals gain access to agricultural resources and that addresses the norms that underlie gender inequalities is essential to achieving equitable and resilient farming systems.

A future research agenda could address the following questions:

1. **How can agricultural and climate innovations be designed, bundled, and scaled to ensure equitable access, and benefits for women, youth, and marginalized groups?**
2. **What policy and institutional changes are needed to create environments that enable gender equality and inclusion in agricultural transformation and rural development?**
3. **How can capacity-sharing strengthen the agency of women and marginalized groups, ensuring their meaningful participation in innovation and decision-making?**
4. **What monitoring, evaluation, and learning frameworks best capture gender-differentiated and socially inclusive impacts of agricultural innovations and policy interventions?**

This section uses the Sustainable Farming Program's proposed operational process (1. Development, 2. Bundling, 3. Scaling of innovations, 4. Capacity sharing, 5. Policy change, 6. MELIA) as entry points for integrated GESI research to achieve the program's objectives.

6) This program has a dual mandate: to codevelop impactful solutions, and to drive systemic change within CGIAR and its partners. The Accelerator's core mission is to lead strategic and innovative research that advances gender equality, youth, and social inclusion (GESI) across CGIAR's food, land and water system portfolios.

DEVELOPMENT OF INCLUSIVE INNOVATIONS

The Sustainable Farming SP should focus its efforts on a more systematic implementation of the existing tools and approaches as part of the co-design and bundling of technical innovations.

For instance, the delivery of climate information and agro-advisory services requires a combination of digital and analog channels, designed to address the needs of women, youth, and marginalized groups. Advisory services should include feedback mechanisms that enable users to influence the design and sharing of agroclimatic information, ensuring accessibility and relevance. Strengthening the role of young men and women as knowledge brokers allows them to analyze, share, and provide feedback on key areas such as agroclimatic data, soil health, nutrient use, and water management (Saran and Puskur 2023). These tailored advisory systems play a vital role in supporting the economic and social processes necessary for sustaining program activities and driving agronomic improvements across diverse farmer groups, in collaboration with the GEI Accelerator. Additionally, implementing standard operating procedures (SoPs), such as those developed by Cole et al. (2023), can help guide the development of gender- and youth-responsive agronomic solutions, including mechanization and extension approaches. Further research is needed to assess the user-friendliness of these SoPs, so that they are designed to maximize benefits for extension agents and other users.

Recognizing young people as a diverse group with varied socio-political and economic backgrounds is essential for AR4D. Tailoring engagement to these diverse, context-specific needs is critical, as sustainable farming depends on co-designing innovations that resonate with young people across different contexts, enabling them to play active, long-term roles in food production (Thorsen et al. 2024). By addressing the unique backgrounds and aspirations of young people, research can better support their integration into sustainable food systems. As an example, embedding young people in sustainable farming through the use of innovations such as artificial intelligence (AI) can be a way to ensure that youth take up more active roles in agriculture. In Kenya, Brazil and India, AI-driven solutions, led by youth, have been used to streamline precision farming techniques, predictive analytics, and market intelligence platforms (Olagunju 2024). AI has empowered youth to engage in agriculture regardless of their geographic and cultural backgrounds.

BUNDLING OF INNOVATIONS

The Sustainable Farming SP designs socio-technical innovation bundles (STIBs) that consider socio-economic and household gender dynamics, both of which shape how well STIBs work and influence opportunities for scaling. Building on frameworks from the Gender Equality Initiative, STIBs can be co-designed to boost adaptive capacity, resilience, and women's empowerment by integrating data-driven recommendations, culturally-aware strategies, and tools that address social constraints—such as promoting collective agency, household collaboration, and critical reflections on gender norms that impact household resilience (Gartaula et al. 2023a; 2023b). For example, women farmers from the most marginal socio-economic groups in India have taken the lead in designing STIBs to support their livelihood strategies. Innovations included improved livestock housing, feed and health management, digital literacy, market access via collectives, and communication to influence social norms. Multistakeholder platforms have been instrumental in implementing and monitoring these interventions, and in learning for adaptive management. Early outcomes of these approaches have demonstrated transformative change.[7] The Sustainable Farming SP can test how well the STIBs promote inclusive development of farming systems responding to felt needs of women and other excluded farmers. STIBs can also identify entry points which have positive effects on the systems, and livelihoods. This can be done in close collaboration with GEI Accelerator.

SCALING OF INNOVATIONS

To support youth engagement in sustainable farming, the Sustainable Farming SP could create methods that contextualize youth-focused strategies for scaling innovations. One such approach is to integrate socio-cultural and technical innovations into STIBs, which emphasize participatory, inclusive processes (Johnstone et al., 2023). Inclusive development of STIBs allows young people to co-design the sociocultural, and technical solutions that suit their unique contexts. This inclusive approach helps to ensure that youth are central to innovation development and can contribute to shaping the policies that support sustainable farming.

Scaling agricultural innovations requires methods that can be tailored to diverse contexts. Platform-based approaches, such as learning labs and multi-stakeholder collaborations, can identify the practices that foster community engagement and ensure sustainable adoption of innovations. For example, livestock learning labs have demonstrated the importance of collaboration, where diverse stakeholders work together to adapt innovations that meet local needs.[8] Scaling is benefitted by adaptive learning that allows stakeholders to reflect, and improve strategies to better fit evolving circumstances. For example, in the International Rice Research Institute (IRRI), reflection guides the fine-tuning of scaling efforts.[9] These approaches underscore the need to bundle innovations within collaborative platforms for scaling in a way that supports local relevance and resilience.

7) https://www.irri.org/?q=news-and-events/news/taking-step-back-reflect-and-learn-key-distilling-learning-and-adaptive
8) Collaboration, Coordination and Convergence: Key for Livestock Learning Labs to Build Resilience of Rural Women | Agrilinks
9) Taking a step back to reflect and learn: Key for distilling learning and adaptive management | International Rice Research Institute

CAPACITY SHARING

Delivering on the above research areas requires collaboration across diverse disciplines and perspectives to address the complex agricultural challenges that the Sustainable Farming SP is set to tackle. Transdisciplinary research that integrates the knowledge and perspectives of diverse stakeholders creates a better understanding of smallholder farmers, their contexts and aspirations, and leads to more tailored solutions that resonate with farmers' lives. Power imbalances may emerge when local communities and practitioners are included in the research. The Sustainable Farming SP should learn to address these imbalances, with methods that articulate diverse perspectives. The SP should incentivize collaborative research that shares capacity among biophysical and social scientists, and engages NARS partners and community groups (especially women and youth).

During co-design of STIBs, the Sustainable Farming SP should analyze existing capacity-sharing models for climate adaptation, soil and water management and plant health, to find the most effective ones to meet the needs of different types of farmers for productivity, sustainability, and social equity. Next, pilots could be implemented in communities to validate and test the models, to integrate them into the design of STIBs, to develop gender-responsive and inclusive capacity sharing as part of integrated agricultural research.

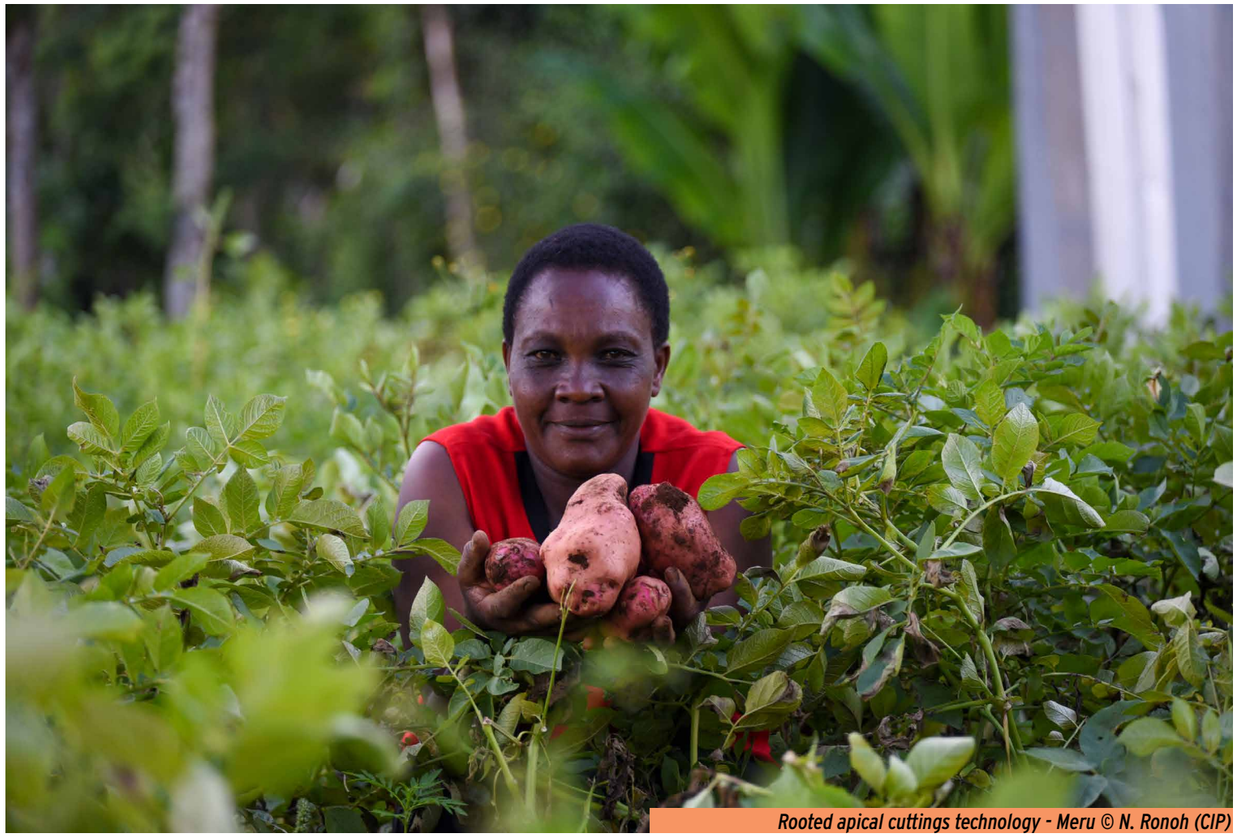
MONITORING, EVALUATION, LEARNING, AND IMPACT ASSESSMENT

Tracking progress towards the SP's intermediate and 2030 outcomes requires systematic data management systems. It also needs sound strategies for monitoring and evaluation (M&E), and robust impact assessments that allow causal inference between activities and outcomes. In coordination with the GEI Accelerator, this includes setting up systems for systematic collection and analysis of gender-disaggregated data. While the data allows monitoring, evaluation of implemented practices, and quantification of impacts, it can also feed into innovation development, innovation bundling, and implementation processes.[10]

Data often fail to explain how technologies affect gender roles in household decision-making. Quantitative and qualitative data to monitor progress in gender equity and social inclusion (e.g., decision-making power, access to resources, and agency) should be collected regularly and consistently, disaggregated by sex, age, socioeconomic status, and other relevant social categories. Data should be structured to allow for intersectional analysis to identify disparities and track changes over time. It is only with such data that we can fully understand the links between household gender dynamics, societal gender norms, and the adoption or effectiveness of agricultural innovations.

When conducting rigorous causal analysis, the program should follow best practices in impact assessments analyzing the links between gender and the adoption of agricultural innovations. These best practices include: how women's roles in decision-making (on and off-farm), local social and cultural norms, and gender biases in institutions affect the use of promoted innovations and their outcomes. Outcome indicators may also be designed to assess impacts on young farmers and marginalized groups. The resilience framework and indicators developed by the GENDER Platform could be integrated into outcome and impact assessment methods.

10) https://gender.cgiar.org/news/better-use-gender-disaggregated-data-will-improve-climate-smart-agriculture-prog



Rooted apical cuttings technology - Meru © N. Ronoh (CIP)

4. GLOSSARY

GENDER: The social and cultural differences a society assigns to people based on their biological sex, encompassing roles, behaviors, activities, and attributes that the society considers appropriate for men and women. Gender may influence a person's power and autonomy, e.g., the ability to make their own decisions.

GENDER INEQUALITY: Rights, access to resources, and opportunities are unequally distributed between men, women and people with other gender identities. This disparity stems from social norms and social structures that perpetuate discrimination and the unequal distribution of power and privileges. Gender inequality especially exacerbates the challenges faced by those who are also marginalized by poverty, caste, or social group. Addressing gender inequality is essential for achieving all forms of social justice and equality (adapted from Plan Internation, 2024).

GENDER TRANSFORMATIVE APPROACHES: Methods that actively examine, challenge and transform the underlying causes of gender inequalities rooted in discriminatory social institutions. They aim to address unequal gendered power relations and discriminatory gender norms, attitudes, and practices. They challenge discriminatory or gender-blind policies and laws that create and perpetuate gender inequalities. These approaches eradicate gendered discrimination by fostering equitable gender relations and supporting social institutions that champion gender equality (adapted from FAO et al. 2023, 1).

INTERSECTIONALITY: The analytical framework that examines how various social identities and categories—such as gender, socioeconomic status, ethnicity, and education—intersect to shape the experiences and challenges faced by different groups of people. This concept is crucial for understanding the complexities of agricultural practices and innovation among diverse populations.

SOCIO-TECHNICAL INNOVATION BUNDLES (STIBS): Contextualized combinations of interrelated technical and social innovations. STIBs can be used as a framework to address gender-specific barriers that inhibit women's empowerment and resilience. These combinations lead to impactful implementation and scaling of innovations.

YOUTH: The CGIAR Gender Platform has adopted the United Nation's definition of individuals between the ages of 15-24, adding that "the concept of youth is relational and is also a social construct, much like gender. Young people and their identities are also defined by their relationships, contexts and opportunities." Including youth is of great concern as young women and men are the biggest stakeholders in the future of sustainable agrifood systems. Their participation is an integral part of ensuring the development of sustainable and appropriate agricultural research for development interventions (Thorsen et al. 2024).

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Agenda-setting Brief - 5. Nairobi, Kenya: CGIAR Gender Equality and Inclusion.

Citation: Mokhema, S., Euler, M., Begum, K., Cole, S., Huyer, S., Mayanja, S., Mwakanyamale, D., Paez-Valencia, A.M., Puskur, R. 2025. *Towards Inclusive Innovation: Gender and Youth in Sustainable Farming Systems*. Agenda Setting Brief - 5. Nairobi, Kenya: CGIAR Gender Equality and Inclusion, CGIAR Sustainable Farming Science Program.

In 2025, the Sustainable Farming Science Program initiated a strategic reorientation of its Areas of Work, along with revisions to its proposal and theory of change. As a result, the content presented in this document, which is relevant, will require updates once the new program structure is finalized. The team sincerely appreciates the valuable feedback provided by the gender teams across the various Centers.

ACKNOWLEDGMENTS

The authors gratefully acknowledge Catherine Ragasa (IFPRI), Vidya Vemireddy (Indian Institute of Management - Center of Gender in Agriculture) and Rachel Voos (Independent consultant) for their critical review and thoughtful inputs to the draft brief. We would also like to thank all the participants of the CGIAR GENDER Impact Platform Science Exchange 2024 who provided inputs at the initial stages of document development.

The CGIAR Gender Equality and Inclusion Accelerator is also grateful for the support of CGIAR Trust Fund Contributors: www.cgiar.org/funders.

ABOUT THIS SERIES

This brief produced jointly by the CGIAR Gender Equality and Inclusion Accelerator and the CGIAR Science Programs, is one in a series of agenda-setting briefs that aim to further develop an agenda for strategic areas of gender and social inclusion research within the new portfolio of CGIAR Science Programs and Accelerators, and inform the development of gender and inclusion strategies for these moving forward. The briefs are the culmination of a collaborative work that started during the CGIAR GENDER Science Exchange 2024 that convened 72 gender researchers from across the CGIAR to bring together experiences, ideas and insights from across centres, that can help in developing a gender strategy for the SP in the future.

About CGIAR Gender Equality and Inclusion (GENDER Accelerator)

CGIAR Gender Equality and Inclusion is CGIAR's Accelerator working to put equality and inclusion at the heart of food systems research and development. The Accelerator leads strategic and innovative research that advances gender equality, opportunities for youth, and social inclusion across CGIAR's Food, Land and Water Systems portfolio.

Cover: Visit to Greenhouse Youth Group with Grand plans - East Africa © C. Schubert (CCAFS)

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