Women-led innovation, social inclusion and sustainability in Africa's agri-food systems

Lessons derived from fifteen case studies | June 2025

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DeSIRA LIFT

CAADP XP4 PROGRAMME

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Executive Summary

Although women play a central role in African agriculture, women's contributions to agricultural innovation and entrepreneurship remain under-researched and under-recognised. Structural gender disparities, which are reflected in limited access to resources, infrastructure, financial services, and decision-making processes, continue to hinder their potential.

This report presents fifteen case studies that highlight women-led innovations and inclusive approaches focused on sustainability and gender inclusivity, within agricultural systems across Africa (including Burkina Faso, Botswana, the Democratic Republic of Congo, Côte d'Ivoire, Ethiopia, Ghana, Mali, South Sudan, Togo, Uganda, and Zimbabwe). These cases highlight diverse economic, social, and institutional innovations that underscore women's pivotal role in transforming African food systems. The study features women innovators, entrepreneurs, farmers, researchers, and leaders, who are advancing gender-responsive practices across the agricultural value chain.

The report captures the experiences, challenges, and transformative impacts of women-led innovations on local communities, Agricultural Innovation Systems (AIS), and broader food systems. It explores how their initiatives contribute to improved livelihoods, enhanced community resilience, sustainable agricultural production, and environmental stewardship. The analysis further examines the enabling ecosystems, spanning institutional, economic, and social capacities, and the key factors that support the success of women-led innovations. It also delves into the support structures and networks that enable these innovations to thrive, including access to productive resources (land, labour, capital), entrepreneurship opportunities, education and skills development, and enabling policy frameworks.

Particular attention is given to the outcomes, success factors, challenges, and policy implications drawn from the first-hand accounts of the women featured. Through the identification of successful models and best practices, this report offers actionable recommendations for researchers, extension agents, policymakers, private sector actors, and development stakeholders, who are committed to strengthening the contributions of women to agricultural- and rural development. A transversal analysis of the case studies provides critical insights into thematic and contextual dynamics, common barriers, and the conditions and enablers needed to scale women-led innovations.

This report intends to showcase innovations led by women which trigger changes at individual-, community- or societal levels. Ultimately, the findings are intended to inform both the CAADP-XP4 programme and broader continental policy dialogues and offer practical guidance to promote inclusive, climate resilient, and innovation-driven agricultural transformation across Africa.

To strengthen gender-responsive AIS and scale women-led innovations, the following strategic actions are recommended:

Embed gender-responsiveness in AIS design and governance.

- Mainstream gender analysis in all stages of AIS strategy development.
- Mandate gender-responsive budgeting and evaluation metrics across AIS institutions.
- Ensure meaningful participation of women in national- and regional research and innovation platforms.

Strengthen gender-responsive climate resilience and agroecological practices.

- Scale up community-based, climate resilient agricultural practices tailored to female farmers.

- Improve extension systems by lowering the farmer-to-extension worker ratio and training more female extension agents.
- Promote agroecological research on NUS varieties that align with women's knowledge and resource access.

Expand women's access to finance and productive resources.

- Develop tailored financial products (e.g. microloans, flexible collateral models) for women-led agribusinesses.
- Ensure equitable land rights and tenure security through legal reform and community sensitisation.
- Support women's cooperatives in acquiring inputs, equipment, and storage infrastructure.

Promote inclusive decision-making processes informed by gender disaggregated data systems and monitoring.

- Invest in gender-disaggregated data systems to track women's participation, outcomes, and scaling potential.
- Establish robust monitoring and evaluation frameworks that incorporate real-time, community-level insights.

Foster leadership, agency and capacity-building among women.

- Support leadership training, digital literacy, and negotiation skills for women and young innovators.
- Institutionalise mentorship, peer-learning networks, and innovation incubators to scale local successes.

Promote inclusive market access and regional integration for women.

- Invest in market infrastructure, including transport, processing hubs, and cold chains.
- Streamline cross-border trade policies under AfCFTA with a gender lens.
- Develop traceability systems and certification schemes to link women producers to premium markets.

Enhance gender inclusive collaboration across AIS actors.

- Strengthen multi-actor platforms that bring together researchers, policymakers, private sector actors, and grassroots women's groups to co-design and scale gender-responsive agroecological innovations.
- Support regional learning exchanges to replicate successful models (e.g. ROCAFES, Women in Coffee, FOSCAR) across borders.

1. Introduction

1.1 Background

Despite their central role in African agriculture, women's contributions to innovation and entrepreneurship remain significantly under-researched and under-recognised. Structural gender disparities, including limited access to land, infrastructure, financial services, technology, and decision-making platforms, continue to hinder women's full participation in agricultural systems. Policy frameworks and innovation support structures often fail to address these barriers explicitly, despite mounting evidence that closing gender gaps could lead to major gains in productivity, sustainability, and overall food system resilience (FAO, 2011; Morris and Mbuya, 2024).

Women are indispensable across all stages of Africa's food systems, from production and processing to marketing and distribution. However, socio-cultural, political, and economic institutions continue to entrench gender inequalities, shaping vulnerabilities and constraining women's empowerment across agricultural value chains. Achieving equitable and resilient food systems requires moving beyond efforts to merely close gender gaps, toward gender-transformative change that addresses the root causes of inequality and promotes women's agency and leadership at all levels (Njuki et al., 2022).

Empirical studies underscore the connection between women's empowerment and improved agricultural outcomes. In Kenya and Niger, for instance, greater decision-making power among women is associated with increased productivity and adoption of climate resilient farming practices. However, harmful gender norms and systemic exclusion remain widespread.

Delivering on the United Nations' (UN) Sustainable Development Goal 5 (SDG 5) and the gender equality commitments of the Comprehensive Africa Agriculture Development Programme (CAADP) will require targeted investments in inclusive data systems, gender-responsive policy design, capacity development, and livelihood diversification strategies. Empowering women not only fosters more equitable food systems but also enhances food and nutrition security, climate resilience, and community well-being.

The global food systems transformation agenda must integrate a stronger gender lens. This means going beyond the collection of sex-disaggregated data to the design of deliberate interventions that foster women's leadership and innovation.

As Njuki et al. (2022) argue, food systems are embedded within gendered socio-political and institutional contexts that generate differentiated vulnerabilities for men and women in the face of risks and shocks. These dynamics influence how agricultural value chains operate, shape consumer behaviour, and determine food environments. A global analysis of women's empowerment in agriculture reveals that harmful social norms and persistent structural barriers underlie gender inequality at multiple levels. While gender-informed initiatives have demonstrated some progress, their long-term impacts remain limited, emphasising the need for deeper, systemic change.

Studies reveal that although women are increasingly recognised as agents of change, their roles as entrepreneurs and innovation leaders remain poorly documented (Srivastava and Pandita, 2025). There is limited understanding of the types of innovations that women develop, the enablers and constraints they encounter, and how existing policy frameworks either support or restrict their efforts. The transformative potential of women in agriculture remains largely untapped, in part because most programmes and policies fail to deliberately target or accommodate their realities.

Gender-based disparities continue to restrict women's access to productive assets, financial services, market infrastructure, and policy influence. According to the Global Findex Database, global gender gaps in financial inclusion remained at 7% between 2011 and 2021, and at 9% in developing economies (Demirgüç-Kunt et al., 2022), underscoring the persistent nature of systemic exclusion. The Food and Agriculture Organization (FAO)'s State of Food and Agriculture report (2011) suggests that if women had equal access to productive resources, agricultural output in developing countries could increase by 2.5 to 4%.

Africa's food systems are shaped not only by production but also by the complex interactions of policy, markets, nature, consumption, and power dynamics. This complexity demands intentional support for women's leadership and innovation to achieve inclusive and sustainable transformation (FAO, 2011; FAO, 2023).

1.2 Gender and Agricultural Innovation Systems

Agricultural Innovation Systems (AIS) offer a valuable framework for understanding and supporting gender-inclusive transformation of agri-food systems. AIS thinking shifts the focus from linear technology transfer to an interconnected ecosystem where innovation is co-created, adapted, and applied across social and economic contexts. According to Paunov (2013), innovation is defined as the implementation of a new or significantly improved product (good or service), process, marketing method, or organisational method in business practices, workplace organisation, or external relations. FAO (2022) expands this by framing innovation as the practical application of knowledge, emphasising the systems and capacities needed to bring innovation into widespread use.

AIS is, thus, more than a technology pipeline; it is a complex network of actors—individuals and organisations which are influenced by both informal institutions (gender/ social norms) and formal policies and governance arrangements and engaging in learning, co-creation, and knowledge exchange processes. Within this context, this report focuses on four types of women-led innovations: economically driven innovations; gender-transformative and social innovations; community- and network-based organisational innovations; research- and knowledge systems/processes-driven innovations. These domains reflect not only where women are innovating, but also how their contributions intersect with broader systemic change.

However, the capacity to innovate remains weak across many African AIS and wider agri-food systems, undermined by fragmented or unsupportive institutions, limited investment, and exclusionary practices. The lack of inclusive spaces where the needs and priorities of women, young people, and marginalised groups are recognised and acted upon remains a major constraint. Strengthening the capacities of AIS actors—especially research, extension, and advisory services—to respond to these diverse needs is essential. Improving recognition, representation and agency of women in AIS remain key for achieving transformative, gender-responsive agricultural development.

By applying the AIS framework, this report aims to elevate the visibility of women-led innovations, assess the enabling and constraining factors within their innovation ecosystems, and offer practical recommendations for strengthening gender-inclusivity within AIS thinking and practice. Understanding and supporting these dynamics is not only a moral imperative, it is a strategic necessity for building food systems that are resilient, inclusive, and fit for the future.

1.3 Objectives

The specific objectives of this report are to:

- **Identify and profile** selected women-led innovations in the agricultural and rural development sectors, with an emphasis on sustainability and gender inclusion.
- **Analyse the enabling environment and core competencies**, including institutional, policy, and capacity-related factors, that support or constrain women's innovation leadership and gender equitable outcomes.
- **Assess functional capacities through a gender lens**, highlighting the roles, relationships, and power dynamics that shape innovation processes within AIS.
- **Describe and evaluate the interplay** between women-led innovations and broader gender-inclusive approaches, examining their contribution to equitable and resilient food systems.
- **Inform gender-inclusive AIS strategies** by proposing practical recommendations and entry points for mainstreaming gender in AIS design, implementation, and policy frameworks.

Ultimately, the report seeks to strengthen the evidence base on women's roles in agricultural innovation and to support systemic change that enhances women's agency, leadership, and impact in transforming Africa's food systems.

2. Methodology

This report adopts a qualitative research approach to explore the lived experiences, challenges, and impacts of women-led innovations within local communities, AIS, and the broader agri-food systems in Africa. The research design was grounded in principles of inclusivity, co-creation, and iterative learning. All of which are hallmarks of the CAADP-XP4 initiative.

The methodology comprised of the following key components:

- **Literature review**: A comprehensive review of relevant academic and 'grey literature' provided a conceptual and empirical foundation for understanding gender dynamics in agricultural research and innovation across Africa.
- **Stakeholder consultations and engagements**: Consultations were conducted with CAADP-XP4 organisations and their extended networks. These engagements were not only data-gathering exercises but also opportunities for shared learning, validation, and contextual insight, ensuring the research remained relevant and grounded in local realities.
- **Case study identification**: Women-led innovations were identified through engagement with CAADP-XP4 organisations, including The Forum for Agricultural Research in Africa (FARA), The African Forum for Agricultural Advisory Services (AFAAS), The Association for Strengthening Agricultural Research in Eastern and Southern Africa (ASARECA), The Coordinating Centre for Agricultural Research and Development for Southern Africa (CCARDESA), and The West and Central African Council for Agricultural Research and Development (CORAF), to highlight initiatives that exemplified gender-responsive approaches in agricultural innovation.
- **Data collection**: Qualitative data were gathered through semi-structured interviews, focus group discussions, and participatory dialogues. These involved a diverse spectrum of stakeholders, including policymakers, agribusinesses, community-based organisations, NGOs, development partners, private sector actors, and other non-state institutions, across national-, sub-regional-, and continental levels (see Table 1).
- **Analysis and synthesis:** Thematic analysis was employed to identify recurring patterns, insights, and innovations across the case studies. Particular attention was paid to gender-specific outcomes, institutional enablers and barriers, and mechanisms for scaling inclusive practices.

Table 1. Demographics of key informants of case studies

Demographic variable	Participants (N=15)
Gender	
Male	3 (25%)
Female	12 (75%)
Sector	
Private sector	6 (40%)
NGO/CBO	3 (20%)
Research	2 (13%)
Extension	2 (13%)
Policy	2 (13%)
Scope	
Macro	5 (33%)
Meso	4 (27%)
Grassroot	6 (40%)

Importantly, this was an embedded process of co-learning and reflection facilitated by the CAADP-XP4 Gender Technical Working Group, in collaboration with member organisations and the DeSIRA-LIFT team. Throughout the process, collaborative learning was integral—with the research team actively engaging in feedback loops with CAADP-XP4 partners and stakeholders. This not only enriched the findings but also contributed to institutional learning and adaptive capacity within participating organisations. This was an embedded, participatory process of co-learning and joint reflection, facilitated by the CAADP-XP4 Gender Technical Working Group, in close collaboration with member organisations and the DeSIRA-LIFT team.

About CAADP-XP4

CAADP-XP4 is a strategic initiative of the African Union's Comprehensive Africa Agriculture Development Programme (CAADP), focused on enhancing agricultural research, innovation, and extension services to drive food security, economic growth, and climate resilience across Africa. Funded by the European Union through the DeSIRA programme and managed by IFAD, the initiative is implemented by five regional and sub-regional organisations:

- The Forum for Agricultural Research in Africa (FARA).
- The African Forum for Agricultural Advisory Services (AFAAS).
- The Association for Strengthening Agricultural Research in Eastern and Southern Africa (ASARECA).
- The Coordinating Centre for Agricultural Research and Development for Southern Africa (CCARDESA).
- The West and Central African Council for Agricultural Research and Development (CORAF).

Over the past five years, CAADP-XP4 has strengthened the capacity of Agricultural Research for Development (AR4D) institutions to adopt gender-responsive approaches. Early assessments, however, highlighted a lack of systematic gender-specific reporting and analysis. In response, a dedicated Gender Working Group, led by CORAF, was established to guide strategic documentation, facilitate shared learning, and foster organisational change.

Launched in 2003 by the African Union (AU), the Comprehensive Africa Agriculture Development Programme (CAADP) is Africa's leading policy framework whose driving agricultural transformation for a food-secure, prosperous Africa. The first 10 years declaration was launched in Malabo, and the continent is transitioning into the post-Malabo era, where gender equality remains central to building inclusive, resilient food systems. Women, who are disproportionately affected by climate shocks and food insecurity due to a combination of social, economic, and environmental factors that exacerbate their vulnerability, must be supported through inclusive research, targeted investments, and equitable access to leadership roles and markets. CAADP-XP4 continues to champion these goals, emphasising gender-responsive policy development, capacity building for women, and the documentation and scaling of successful gender inclusive innovations.

3. Case study summaries

This section provides a summary of each of the 15 case studies. Each summary includes the following: context and goals of innovation, description of the innovation and drivers of innovation, success factors, challenges faced, and recommendations. The full case studies can be accessed via the links in Table X/ Appendix 1.

3.1 Empowering women in fish value chains – Kati Farms Ltd, Uganda (FCS01)

Innovation goal: To empower women in Uganda's Fisheries Sector to enhance food security and livelihoods through innovative fish processing and value chain participation, promoting gender equality in a male-dominated industry.

Innovation: Processing tilapia to produce fish sausages. Supporting 1,000+ female fish farmers.

Impact | Outcomes:

- Processes 10 tonnes of fish daily, employs 38 staff (23 women), partners with 1,000+ women fish farmers.
- Improved women's incomes and livelihoods through training and market linkages, with markets expanding to Uganda, Rwanda, Burundi, Kenya, DR Congo, Canada, and Europe.
- Empowers women in fish farming/processing, by promoting cage farming and fish kilns, reducing overfishing and post-harvest losses.
- Supports entrepreneurship via incubation and connects 2M+ women through associations.
- Breaks male-dominated barriers, with women leading technical roles and Lovin as Uganda's only female fish-plant owner.

Challenges: i) Weak transport infrastructure. ii) Limited processing machines, packaging, and ice plants. iii) High-interest loans, lack of collateral, poor online banking. iv) Gender-unfriendly border facilities.

Recommendations: To effectively support women entrepreneurs in the fisheries and agribusiness sectors, this case study recommends the following policy actions: i) Invest in transport, cold chain, and ice plants to extend fish shelf life. ii) Develop gender-sensitive financial systems with low-interest loans and efficient online banking. iii) Fund research for affordable technologies and strengthen IPR protection to encourage innovation. iv) Improve gender-friendly border facilities and streamline AfCFTA trade policies for women traders. v) Simplify business formalisation with legal training.

On the other hand, recommendations for gender-responsive strategies include: i) Expanding the Fish Innovation Centre's training in business and processing skills, with online platforms for women and young people. ii) Support women's networks with digital platforms for market data and trade linkages. iii) Subsidise equipment leasing (e.g. fish nets, processing machines) for women-led businesses. iv) Ensure women's representation in policy reviews (e.g. CAADP, gear bans) via quotas. v) Develop gender mainstreaming guidelines for fisheries value chains, integrating women in leadership and resource allocation.

3.2 Empowering women; revitalising Fonio and other local cereals in Mali (FCS02)

Innovation goal: Promote food security and women's economic empowerment by enhancing local cereal processing to support smallholder farmers and increase access to markets.

Innovation: Industrial processing of fonio and millet, and product diversification by developing pre-cooked fonio, fortified millet flour ("Fortimil"), and other value-added products, such as millet couscous. Implement new traceability systems to enhance market competitiveness.

Impact | Outcomes:

- Processes 500 tonnes of cereals annually, employs 20 staff (18 women), and sources from 1,000 smallholder farmers (with 70% women).
- Increased fonio processing yields by 40% and women's incomes by 30%.
- Shifted societal perceptions, positioning women as economic leaders in the sector.
- Increased the income of women processors by 30% and doubled the number of women trained in new technologies within a year, fostering financial independence.
- Employs 20 people (90% women) and sources from 1,000 cooperative members (70% women, 60% young people), providing stable incomes for education and improved livelihoods.
- Shifted societal perceptions, positioning women as economic leaders and role models, with men increasingly supportive of their roles in processing.
- Promoted fonio as a drought-resistant, short-cycle crop, ensuring nutrition during lean seasons and supporting agrobiodiversity. Strengthened cooperative trust, enabling smallholders to access modern equipment and markets, and fostered sustainable economic growth.

Processes 500 tonnes of cereals annually, with 90% sold locally and regionally, reducing reliance on imported foods and retaining value in Mali.

Challenges: i) Limited access to finance and modern equipment hinders scalability. ii) Cultural resistance restricts women's access to training and technology. iii) Staff retention issues due to political instability in Mali.

Recommendations: The case recommends the following actions to support gender-inclusive innovation and agricultural transformation: i) Establish platforms uniting private sector, researchers, and policymakers to co-create gender inclusive innovations and scale mechanisation. ii) Create training programmes to enhance women's and young people's leadership skills for participation in policy and strategic processes. iii) Support inter-community exchanges and incubators to replicate LCT's model across West Africa, enhancing regional food systems and gender equity. iv) Enhance traceability systems to certify products and expand market reach.

On the other hand, recommendations for gender-responsive of the AIS strategies include: i) Develop gender-sensitive funding mechanisms, such as microloans or grants, to support women-led SMEs in acquiring equipment and scaling operations. ii) Promote awareness campaigns to challenge norms restricting women's access to technology and training, building on LCT's advocacy model. iii) Integrate youth-focused training and mentorship in NUS processing to sustain innovation and address staffing challenges in an unstable region. iv) Gender-Responsive Research: Advocate for research on neglected and underutilised species (NUS) from seed to value-added products.

3.3 Boosting livestock production in Botswana; the case of native feeds sustainable feed production and farmer support (FCS03)

Innovation goal: i) Enhance livestock productivity in Botswana by improving feed production. ii) Supporting women farmers in a male-dominated sector and promote sustainable forage production.

Innovation: Production of sustainable livestock feed from maize straw and lablab and offers masterclasses to transition farmers from subsistence to commercial farming.

Impact | Outcomes:

- Feed supply to 5,000+ farmers in multiple districts, targeting 10% of Botswana's feed market.
- Improved farmer incomes, nutritious and climate resilient feed solutions
- Empower women farmers through training and market access.
- Support over 5,000 farmers in Kweneng District, with a projected annual revenue of EUR 405,057, targeting 10% of Botswana's livestock feed market.
- Empowers women farmers by improving production quality, connecting them to markets, and fostering women-led associations, addressing gender disparities in livestock production.
- Enhances livestock productivity, contributing to food security by addressing feed quality issues critical for Botswana's beef industry, which accounts for 80% of agricultural income.
- Promotes sustainable forage production and organic remedies, reducing environmental degradation from overgrazing and chemical use.

Challenges: i) Limited financial resources and collateral restrict business expansion. ii) Over-reliance on imported feeds and government-subsidised supplies. iii) Lack of formal agricultural education and research access.

Recommendations: The case recommends the following policy measures: i) Incentivise local feed production through subsidies and import substitution policies. Thereby, reducing reliance on South African imports (which were 33,116,733 kg in 2022). ii) Strengthen Government laboratories to support feed formulation testing, making them accessible to small-scale entrepreneurs. iii) Develop policies under the African Continental Free Trade Area (AfCFTA) to facilitate access to export markets. iv) Invest in rural infrastructure (e.g. feed storage and transport) to support small-scale farmers, particularly women, in accessing distant markets. v) Revise loan packages to eliminate collateral requirements.

On the other hand, recommendations for gender-responsive strategies include: i) Encourage women's participation in policy dialogues. ii) Expand capacity-building programmes tailored for women in livestock and feed production, focusing on technical skills, agribusiness management, and intellectual property rights. iii) Promote women's leadership in agriculture through awareness campaigns and support for women-led associations, challenging gender norms and enhancing visibility. iv) Foster public-private-producer partnerships (PPPP) to provide research support for women innovators, particularly in natural remedies and organic feed solutions. v) Establish multilevel innovation platforms (IPs) to integrate gender inclusive approaches, ensuring fair wages and equitable access to resources.

3.4 Land access and agroecology; empowering women farmers through community co-learning (FCS04)

Innovation goal: Empower women farmers through secure land rights and agroecology to enhance economic independence, food security, and climate resilience.

Innovation: Provide support to 765,560 small-scale farmers (67% women) through 114 peer-to-peer learning centres (e.g. agroecology schools, farmer field schools). Providing training, resources, and market access for women-led enterprises, fostering entrepreneurship through initiatives, such as cassava milling (Mumbuzi) and okra processing (Goli-Mori).

Impact | Outcomes:

- Improved women's land access, economic independence, and climate resilience through agroecological practices.
- Enhanced market access via platforms, such as KilimoMart and community-based sales.
- Empowered women through leadership training, business registration, and collective savings.
- Improve economic empowerment, whereby 67% of ESAFF Uganda's 765,560 members are women, with 173,412 farmers gaining improved market access, financial resources, and climate resilience, enhancing livelihoods (e.g. Goli-Mori's okra exports to South Sudan).
- Gender Equity and advocacy for land rights have increased women's decision-making powers and economic independence, reducing reliance on male relatives.
- Improve agroecological practices, nutritional and social benefits and market expansion.

Challenges: i) Poor infrastructure limits market access and scalability. ii) Limited platforms for innovation and knowledge sharing. iii) Insufficient investment in agricultural research tailored to women's needs.

Recommendations: The case recommends the following policy measures: i) Investment in infrastructure and digital platforms to enhance market access and scalability of women-led agroecological enterprises. Ii) Increase national and international investment in gender-focused agricultural research, climate resilient practices and indigenous seed preservation. iii) Expand access to credit and grants for women farmers, using land titles as collateral, and provide tailored financial literacy training.

On the other hand, recommendations for gender-responsive strategies include: i) Establish local-, national-, and regional innovation hubs to foster co-learning, business ideation, and knowledge sharing. ii) Enhance support from local officials and extension services to provide women with agroecological training, equipment, and market linkages. iii) Scale-up agroecology clubs in schools, integrating gender equality and sustainable farming into curricula to empower young women and girls. iv) Foster collaborations to amplify women's voices in policy dialogues and support farmer-led seed systems. v) Promote digital literacy and access to online platforms to improve marketing, networking, and business scalability. vi) Implement gender-disaggregated data collection to track the impact of land rights and agroecological interventions, informing evidence-based policy adjustments.

3.5 Empowering women for fairer and more resilient Ethiopia's coffee value chains (FCS05)

Innovation goal: Enhance gender equality, sustainability, and climate resilience in Ethiopia's coffee value chain by empowering women in Ethiopia to actively participate and lead in sustainable coffee production and trade. Increase women's access to resources, training, and markets through the Women in Coffee Ethiopia (EWiC) Association.

Innovation: Women, Coffee, and Climate Initiative: Introduces eco-efficiency, social innovation, and South-South cooperation to enhance gender equality and sustainability in Ethiopia's coffee sector. Partners with global networks, such as International Women's Coffee Alliance (IWCA), to enhance market access. Provides business and life skills training, including climate-smart practices and post-harvest management transforming women from labourers to leaders. Collaborates with research institutions, private sectors, and Government (e.g. Ethiopian Coffee and Tea Authority (ECTA), Ministry of Agriculture) to develop tailored training materials and improve market access.

Impact | Outcomes:

- Reached over 800 participants (mostly women) through workshops and policy dialogues across five regions.
- Increased community acceptance of women in leadership roles, with men supporting inclusive training and women-led cooperatives.
- Enhanced coffee quality through climate-smart practices, improving livelihoods and market competitiveness for women-led businesses.
- Positive feedback on family-centred training, with demand for expanded sessions and technological support, shifting community perceptions, with women recognised as leaders in coffee production.

Challenges: i) Limited funding for equipment, such as raised beds and coffee machines. ii) Competing household demands restricted women's training participation. iii) Security issues limited outreach in some regions.

Recommendations: The case recommends the following policy measures: i) Ensure women's access to land ownership, financial services (e.g. independent credit access), and educational opportunities to close the gender gap. ii) Secure funding for equipment (e.g. raised beds, coffee machines) to support selective picking and high-quality production, addressing current limitations. iii) Collaborate with government extension services (e.g. Ministry of Agriculture) to expand training reach, particularly in remote areas, and infrastructure development. iv) Support Women-Led Cooperatives: Promote the establishment and scaling of cooperatives to enhance collective bargaining power, resource access, and market negotiation for women.

On the other hand, recommendations for gender-responsive strategies include: i) Implement gender-disaggregated data collection to track the impact of land rights and agroecological interventions, informing evidence-based policy adjustments. ii) Adapt training timings and locations to accommodate women's household responsibilities, potentially through mobile training units in remote villages. iii) Develop contingency plans, such as virtual training or partnerships with local organisations, to ensure safe delivery of programmes in regions that are politically unstable. iv) Partner with research organisations to collect gender-disaggregated data on labour, resource access, and market trends to design targeted interventions and measure impact effectively. v) Segment women's challenges (e.g. access to credit, land ownership) to tailor solutions, ensuring precise addressing of structural barriers.

3.6 Women's empowerment through sustainable agriculture; the journey of Benczedi Kékéli farm in Togo (FCS06)

Innovation goal: Build a women-led, sustainable agricultural enterprise focused on organic production and social development. Empower rural women and young people through economic inclusion and education in Togo.

Innovation: Agroforestry-based cocoa cultivation and organic production of palm oil and plantains. Processing of cocoa and a women-led cooperative (SCOOPS KEKELI).

Impact | Outcomes:

- Employs 50 full-time workers, primarily women, and supports 120 women in the SCOOPS KEKELI Cooperative.
- Improved local economies through stable employment and market access.

- Promotes biodiversity and sustainable practices through agroforestry and a protected forest zone.
- Founded EPL Kékéli, a tuition-free school for workers' and local children, reducing educational barriers (e.g. children walking for 8km to go to school) and thus empowering future generations.
- Empowered 120 women through SCOOPS KEKELI, enabling land ownership and independent farming, enhancing gender equity.
- Employs about 50 full-time workers, providing stable income and strengthening rural economies.
- HONLON Sarl U supports cocoa export, boosting local market integration and economic diversification.

Challenges: i) Unsustainable farming practices threaten environmental and economic sustainability. ii) High informality and underemployment in Togo's labour market limit scalability. iii) Climate change impacts, such as droughts and floods, affect production and resilience

Recommendations: The case recommends the following policy measures: i) Promote small-scale mechanisation subsidies to reduce labour shortages and increase productivity, to address Togo's informal labour market challenges. ii) Increase female extension agents and integrate gender-focused training (e.g. using women role models), to enhance women's adoption of sustainable practices. iii) Strengthen legal frameworks to secure women's land rights and to guide young people into agricultural careers.

On the other hand, recommendations for gender-responsive strategies include: i) Establish continuous training programmes and stakeholder platforms to share best practices, building on the farm's cooperative model to enhance capacity and innovation. ii) Support replication of women-led cooperatives, such as SCOOPS KEKELI across ECOWAS, harmonising policies to overcome regional fragmentation and promote gender-equitable market access. iii) Prioritise funding for agroecological practices, such as agroforestry to mitigate climate change impacts, ensuring gender-transformative approaches that reduce women's labour burdens.

3.7 Expanding dietary diversity with the African Indigenous Vegetables toward a sustainable food system in Uganda (FCS07)

Innovation goal: Promote African Indigenous Vegetables (AIVs) to enhance dietary diversity, nutrition, and climate resilience in Uganda and empower women and young people through market-oriented research and value chain development.

Innovation: Research on AIVs, including genome sequencing of *Solanum aethiopicum* and new variety releases. Adoption of a market-oriented, multi-stakeholder approach involving farmers, researchers, and private sector actors, establishing nine agriculture innovation platforms in Uganda and agribusiness learning alliances within Kenya and Rwanda.

Impact | Outcomes:

- A three-month feeding trial in Mukono municipality demonstrated improved health outcomes, including reduced gut issues and better blood sugar management among participants aged 50+, addressing Uganda's high undernutrition rates (29% stunting, 3.5% wasting in children under five).
- Generated US$2,000 per harvest season for farmers in urban markets.
- Enhanced income and employment for women and young people through AIV value chains.

- AIVs generate approximately eight tons of daily sales in Uganda's urban markets, enhancing livelihoods, particularly for women and young people, who dominate the value chain and gain increased income and decision-making power.
- Women's leadership in AIV cultivation has shifted perceptions, transitioning AIVs from *"poor people's food"* to profitable enterprises, fostering independence and economic opportunities in a traditionally male-dominated sector.
- Promoting AIVs preserves local food traditions, enhances dietary diversity, and strengthens food system resilience against climate variability, benefiting rural communities and smallholder farmers.

Challenges: i) Limited access to technology (e.g. bioinformatics servers) for research. ii) Shortage of skilled personnel (breeders, pathologists, agronomists). iii) Lack of streamlined regulations for AIV research and variety release. iv) Low awareness of AIV nutritional benefits, especially in urban areas.

Recommendations: The case recommends the following policy measures: i) African governments should prioritise AIVs in national agricultural plans, offering subsidies for inputs, tax exemptions for small-scale farmers, and streamlined regulations for variety release to boost production and trade. ii) Funders should support universities and research institutions with long-term investments in labs, high-capacity servers, and training for PhD-level breeders and social scientists to address technological and human capacity gaps. iii) Establish women- and youth-led agribusiness alliances and innovation platforms to enhance market linkages, provide training in entrepreneurship, and leverage digital tools to overcome cultural barriers and improve information access.

On the other hand, recommendations for gender-responsive strategies include: i) Invest in research infrastructure to promote AIVs' nutritional benefits, particularly in urban areas, and encourage young people, especially young girls, to engage in smart farming through technology integration. ii) Strengthen AU-EU collaborations (e.g. LEAP4FNSSA, IRC) to foster bottom-up research agendas, ensuring local needs drive innovation and monitoring and evaluation frameworks assess gender-equitable impacts effectively. iii) Engage social scientists and extension workers to navigate cultural dynamics, ensuring inclusive decision-making processes that empower women and young people in farmer groups and business negotiations.

3.8 Empowering women; transforming local products with Label Lafié in Togo (FCS08)

Innovation goal: Enhance the value of neglected and underutilised species (NUS), particularly néré, to promote sustainable nutrition and economic empowerment of rural women. Develop an inclusive business model to transition women from subsistence to structured market participation.

Innovation: i) Production of natural culinary products, such as "Bouillon Fatima", as alternatives to synthetic stock cubes. Modernised néré processing with mechanised fermentation and drying, improving quality, preservation. ii) Export potential and pre-financing and training programmes for women's cooperatives to enhance entrepreneurial skills.

Impact | Outcomes:

- Supports over 500 women across rural communities with fair prices and technical support.
- Expanded supply chain partners from 50 to 200, creating indirect jobs and strengthening the néré value chain.
- Enhanced women's entrepreneurial and managerial skills, fostering financial inclusion and leadership roles in cooperatives.

- Increased recognition of women's contributions to Togo's agro-food economy.
- Adopted eco-friendly processing, reducing raw material waste.
- Growing distribution network, penetrating urban and international markets, boosting local product competitiveness.

Challenges: i) Limited access to large-scale funding for industrialisation and market expansion. ii) High costs and technical requirements for export certifications. iii) Logistics costs and infrastructure constraints limit efficient distribution. iii) High costs and technical barriers to meet export standards. iv) Cultural barriers hindering women's leadership in male-dominated sectors.

Recommendations: The case recommends the following policy measures: i) Create tailored grants and low-interest loans for women-led agro-food enterprises. ii) Strengthen public campaigns and policies to prioritise locally processed products over imports. iii) Introduce tax incentives and streamlined certification processes for businesses promoting local NUS.

On the other hand, recommendations for gender-responsive strategies include: i) Expand incubation and mentorship initiatives to build women's business and leadership skills. ii) Fund research to improve NUS processing and ensure compliance with modern nutritional standards. iii) Advocate for policies addressing cultural barriers to women's leadership in agriculture.

3.9 Scaling up research products in the aquaculture sector in Uganda (FCS09)

Innovation goal: i) Promote inclusive agricultural innovation through the Uganda National Agricultural Research Organisation (NARO) to enhance job creation and entrepreneurship, particularly for women and young people, in the fish value chain. ii) Strengthen gender empowerment and sustainable agribusiness development.

Innovation: i) Introduction of business-to-consumer and business-to-business models with the Private Sector Foundation Unit (PSFU). ii) Development and dissemination of technologies, such as fish kilns, to reduce post-harvest losses.

Impact | Outcomes:

- Empowered over 1,000 women fish farmers through partnerships with companies, such as, Kati Farms.
- Kati Farms exports 17 fish-based products to 13 African countries, employing 38 staff (23 women).
- Enhanced food security and income through inclusive technology adoption.

Challenges: i) Limited land access for women due to cultural barriers and male-dominated ownership. ii) Insufficient research funding, and high interest rates and costly licenses hinder access to finance and technology adoption. iii) Policy restrictions on sardine fishing disrupt the aquaculture value chain.

Recommendations: The case recommends the following policy measures: i) Foster private-public partnerships to scale research products and improve technology access. ii) Develop gender-sensitive policy briefs to support small-scale farmers, particularly women and young people. iii) Regulate lending interest rates to make soft loans accessible for aquaculture businesses.

On the other hand, recommendations for gender-responsive strategies include: i) Enhance capacity building in group dynamics to ensure equitable participation in cooperatives. ii) Implement climate resilient interventions to mitigate drought and flood impacts on fish farming.

3.10 Women innovators driving post-harvest management of cereals in Côte d'Ivoire, Canaan Land (FCS10)

Innovation goal: Reduce post-harvest losses in cereal production (maize, rice, cassava) through innovative processing and empower women and small-scale farmers in Côte d'Ivoire, and promote financial inclusion and market access for sustainable agribusiness.

Innovation: i) Semi-industrial processing units to enhance cereal and tuber quality and reduce losses. ii) Market-driven production with direct farmer cooperative linkages. iii) Financial inclusion initiatives providing microfinance and credit access.

Impact | Outcomes:

- Created direct and indirect jobs, with 70% of the team being women.
- Increased farmer incomes by 30% through guaranteed purchase agreements.
- Improved food security and nutrition by promoting locally processed foods.
- Gained international recognition through partnerships like UNCTAD's eTrade for Women.

Challenges: i) Limited access to long-term funding for scaling operations. ii) Rural infrastructure gaps in storage and processing facilities. iii) Trade barriers and certification challenges for global market access. iv) Cultural perceptions deterring young people and investors from agriculture.

Recommendations: The case recommends the following policy measures: i) Facilitate partnerships with financial institutions to improve funding access. ii) Invest in rural storage and processing infrastructure to enhance efficiency.

On the other hand, recommendations for gender-responsive strategies include: i) Support export capabilities through simplified certification processes. ii) Promote financial literacy and leadership training for women entrepreneurs. iii) Encourage agroecological practices to improve soil fertility and reduce losses.

3.11 Integrating gender in agriculture research and development; insights from Ghana (FCS11)

Innovation goal: Promote gender inclusive agricultural research and development (ARD) to address community challenges and empower rural women in Ghana's food systems, and understand gender dynamics across agricultural value chains, particularly in rice, to enhance equitable access to resources and decision-making.

Innovation: i) Agroecological practices emphasising community-driven, small-scale production systems. ii) Gender-responsive research, focusing on women's knowledge in soil health, biopesticides, and local seed varieties. iii) Community-wide engagement involving men, women, and young people to ensure holistic value chain participation.

Impact | Outcomes:

- Increased recognition of women's expertise (e.g., identifying 13 local rice varieties in Gonre, Ghana).
- Enhanced women's participation in rice value chain roles (96% of processors and 82% of traders are women).
- Improved household food security and economic empowerment through inclusive approaches.

Challenges: i) Limited R&D funding leads to rushed research, hindering accurate data collection. ii) Sociocultural barriers, such as land tenure issues, restrict women's control over resources. iii) Difficulty scaling pilot projects due to resource dependency and reversion to status quo post-project. iv) Gender empowerment messaging often fails to target poor rural communities effectively.

Recommendations: The case recommends the following policy measures: i) Co-create solutions with communities and traditional authorities to address land tenure for women. ii) Engage policymakers to embed gender issues in political manifestos and support ministries of gender.

On the other hand, recommendations for gender-responsive strategies include: i) Develop localised, community-based gender empowerment messaging to reach marginalised groups. ii) Promote inclusive communication systems to involve men, women, and young people in R&D processes. iii) Empower men alongside women to balance gender dynamics and reduce male suspicion.

3.12 Multi-stakeholder innovation platforms supporting women's entrepreneurial activities in the Democratic Republic of Congo (FCS12)

Innovation goal: Enhance women's entrepreneurial activities in agriculture through multi-stakeholder innovation platforms (MIPs) under The Forum for Agricultural and Rural Advisory Services in the Democratic Republic of Congo (DRC) (in French: Forum de service des conseils agricoles et rural de la RDC - Foscar-RDC) and promote gender equality and sustainable agricultural practices in cassava, sweet potato, cowpea, and carp value chains.

Innovation: i) Establishment of 50 MIPs with 1,500 producers, focusing on participatory approaches to improve production, processing, and marketing. ii) Use of improved crop varieties (e.g., Obama and Mongoly cassava) and sustainable practices like organic fertilisation and drip irrigation. iii) Digital data collection via smartphones to monitor progress and identify value chain improvements.

Impact | Outcomes:

- Increased cassava yields by 20-50% (12-15 tonnes/ha) with disease-resistant varieties.
- Enhanced women's leadership and participation in decision-making, balancing gender relations.
- Strengthened partnerships with research institutes (e.g. FARA, CIP) for sustainable practices.

Challenges: i) Social, cultural, and religious constraints limit women's participation in value chains. Ii) Poor infrastructure (roads, storage) hampers marketing and economic empowerment. iii) Limited access to finance and quality inputs restricts scalability of innovations. iv) Lack of technical knowledge among some members affects platform effectiveness.

Recommendations: The case recommends the following policy measures i) Strengthen infrastructure (roads, storage) to support market access and product quality. ii) Enhance access to finance and quality inputs for women-led enterprises. iii) Partner with research, policy, and private sectors to scale innovations.

On the other hand, recommendations for gender-responsive strategies include: i) Promote women's leadership through training and mentorship programmes. ii) Support traditional seed exchange networks to preserve local varieties.

3.13 Community engagement for gender-inclusive agricultural advisory services in South Sudan (FCS13)

Innovation goal: Promote gender inclusive agricultural extension and advisory services to enhance food security and livelihoods in South Sudan and empower women, through access to land, credit, and training.

Innovation: i) Pluralistic extension system involving public, private, and NGO actors. ii) Farmer field schools integrating livelihoods, education, and entrepreneurship for women, young people, and pastoralists. iii) Digital platforms (e.g. Dogitla, VACOVAs) for women's savings, credit access, and knowledge sharing.

Impact | Outcomes:

- Increased women's access to land and livestock, enabling decision-making in production and sales.
- Enhanced women's roles in crop and livestock farming, challenging traditional gender norms.
- Improved livelihoods through EU-funded programmes providing vocational training and livestock support.

Challenges: i) Over-reliance on rain-fed agriculture, vulnerable to erratic rainfall. ii) Lack of well-trained human resources for gender-sensitive programme implementation. iii) Insufficient gender-disaggregated data hampers effective monitoring and evaluation. iv) Poor infrastructure and insecurity limit women's access to markets and training.

Recommendations: The case recommends the following policy measures: i) Increase Government investment in agriculture (per Maputo Protocol, 10% budget allocation). ii) Foster inclusive food systems to ensure equitable participation of men, women, and young people.

On the other hand, recommendations for gender-responsive strategies include: i) Develop gender-disaggregated data systems for effective programme monitoring. ii) Enhance training for grassroots extension workers in gender-sensitive practices. iii) Promote digital platforms for knowledge sharing and credit access in rural areas.

3.14 Building resilient food systems through climate-smart agriculture in Zimbabwe (FCS14)

Innovation goal: Promote climate-smart agriculture (CSA) to enhance food security and resilience among smallholder farmers, particularly women, in Zimbabwe.

Innovation: i) Women-led Goat Farming and Sweet Potato projects targeting smallholder farmers in Umzingwane and Masvingo. ii) Crossbreeding Kalahari and Matabele goats for improved meat quality and adaptability. iii) Cultivation of virus-free, orange-fleshed sweet potatoes (OFSP) with high vitamin A, yield, and drought tolerance. iv) Farmers own 50+ goats, improving income and nutrition. v) OFSP enhances food security and supports livestock feed. vi) Women-led projects break gender barriers, enhancing livelihoods.

Impact | Outcomes:

- Each farmer owns over 50 goats, enabling income generation, improved nutrition, and education access.
- Enhanced food security and economic stability through high-yield, nutrient-dense crops.

- Gender inclusivity increased women's leadership and economic empowerment, breaking traditional gender roles.
- Limited access to water, dip tanks, and training.

Challenges: i) Lack of legacy plans or sustainability mechanisms for donor-funded projects. ii) Cultural barriers restricting women's land ownership and public participation. iii) Resistance to CSA innovations due to scepticism and fear of risks (e.g. disease outbreaks). iv) Weak monitoring and evaluation systems for gender-specific indicators.

Recommendations: The case recommends the following policy measures: i) Strengthen gender mainstreaming in policies to ensure women's access to land and decision-making power. ii) Strengthen gender mainstreaming for land access.

On the other hand, recommendations for gender-responsive strategies include: i) Expand research and extension services and offer incentives for environmental services. ii) Enhance gender-disaggregated data collection.

3.15 Promoting women seed businesses in West and Central Africa; the case of ROCAFES (FCS15)

Innovation goal: Support women-led seed enterprises in West and Central Africa through the ROCAFES network and ensure seed security and promote inclusive participation in the seed sector.

Innovation: i) ROCAFES network facilitates seed multiplication, quality control training, and market access for women-led seed companies. ii) Partnerships with ECOWAS and local agricultural offices formalise and expand seed networks.

Impact | Outcomes:

- Network covers 30% of West Africa's cereal market share, addressing an 84% supply deficit.
- Women-led enterprises like AnBaloso and NOUR M'BEYANE enhance food security and economic empowerment.
- Preservation of traditional seed exchange networks strengthens local seed systems.

Challenges: i) Women have limited access to land and finance. ii) Inadequate technical knowledge and leadership capacity among members. iii) Competition from established companies and weak seed quality control standards. iv) Foster partnerships with research-, policy-, and private sectors for market expansion.

Recommendations: The case recommends the following policy measures: i) Strengthen traditional seed exchange networks to preserve local varieties. ii) Simplify seed import regulations to prevent counterfeit seeds. iii) Enhance access to finance for women-led seed businesses. On the other hand, recommendations for gender-responsive strategies include, promoting research on seed management and conservation.

4. Transversal analysis of women-led innovations in agriculture in Sub-Saharan Africa

4.1 Categories of case studies

A transversal analysis of the 15 documented case studies reveals that women-led innovations in agriculture can be grouped into four overarching categories, based on their primary drivers and mechanisms of change. While many initiatives span multiple domains, this classification helps to surface dominant themes and innovation pathways that can inform strategic planning for scaling and policy support.

The four categories - economically driven, gender-transformative and social, community-network-based, and knowledge-, and research-led innovations - reflect both the diversity and interconnectedness of women-led innovation ecosystems.

Economically driven innovations

These innovations are primarily motivated by income generation, market access, and financial empowerment. They demonstrate how women are building viable agribusinesses, improving value chains, and advancing economic resilience.

Examples include:

- Expanding access to domestic, regional, and export markets (e.g. fonio and fish value chains in Mali and Uganda).
- Creating sustainable agribusinesses and cooperatives (e.g. SCOOPS KEKELI in Togo, cereal processing in Côte d'Ivoire).
- Enhancing financial inclusion through microfinance, digital payments, and savings groups.

Key features: Entrepreneurship, agro-enterprise development, value addition, post-harvest management, export readiness, financial innovation.

Gender-transformative and social innovations

These innovations seek to address systemic gender inequalities by shifting norms, enhancing women's agency, and promoting inclusive decision-making. They are often embedded in broader social change processes.

Examples include:

- Promoting women's leadership in agricultural decision-making (e.g. Gender Action Learning Systems in Uganda).
- Challenging socio-cultural barriers to land access, participation, and visibility in agricultural R&D and policy.
- Engaging male allies and traditional leaders in transformative, community-based change processes.

Key features: Gender norm shifts, household and community empowerment, advocacy, behavioural change, inclusive governance.

Community- and network-based organisational innovations

These are collective, often grassroots-driven innovations that leverage social capital, local networks, and collaborative platforms to spread knowledge and amplify women's voices in agriculture.

Examples include:

- Strengthening innovation platforms and producer networks (e.g. Foscar MIPs in DRC, community rice networks in Ghana).
- Building peer networks among women farmers, researchers, and processors (e.g. ROCAFES in West Africa).
- Facilitating horizontal knowledge exchange across generations and disciplines, often blending indigenous and scientific knowledge.

Key features: Collective action, cooperative models, peer-to-peer learning, participatory research and development, innovation hubs.

Research- and knowledge systems/processes-driven innovations.

Rooted in scientific inquiry and AIS thinking, these innovations promote co-creation of solutions and integration of women into formal research, extension, and policy processes.

Examples include:

- Developing climate resilient and agroecological practices through co-designed research.
- Integrating women into extension systems and capacity development programmes (e.g. Women in Coffee Ethiopia).
- Advancing gender-responsive approaches in seed systems, certification processes, and knowledge dissemination.

Key features: Scientific innovation, agroecological transition, inclusive research partnerships, policy influence, capacity strengthening.

While these categories are not mutually exclusive, they offer a useful framework for understanding the main forces behind women-led innovations. Many case studies intersect multiple domains—such as combining economic empowerment with gender norm change or linking community organisation with scientific research. Recognising these overlaps is key to designing interventions that are holistic, scalable, and aligned with the principles of inclusive and sustainable agricultural transformation.

4.2 Themes of the case studies

Success in women-led innovations is highly context-specific, shaped by a range of motivations and local dynamics unique to each case. Nevertheless, several recurring themes emerged across the 15 case studies, illustrating both the areas in which women's innovations thrive and the conditions that support their growth, despite some thematic overlap.

Local knowledge systems: Most women-led innovations (14 of 15 cases) are rooted in and building on local knowledge systems, often using neglected and underutilised species (NUS). Agroecology serves both as an entry point for innovation and a strategy for sustainable production and resilience.

Enterprise development and economic empowerment: Increased income and access to niche or export markets were cited as key indicators of success in nine case studies. Examples include Mali's cereal cooperatives and Togo's organic cocoa production, both of which demonstrate how women-led enterprises are effectively linked with regional- and international markets.

Capacity building and community impact: Success was also defined by improvements in leadership, technical skills, and collective organisation. Many innovations contributed to strengthened local capacities—empowering women in agricultural production, processing, and sustainable farming, and positioning them as leaders within their communities and institutions.

Strengthened collaboration among AIS actors: Collaboration across AIS actors, including research institutions, extension services, NGOs, and private sector players, was central to the scale and sustainability of innovations, in line with CAADP-XP4's systemic approach.

4.3 Enabling conditions for success

Key enabling conditions and capacities emerged from the case studies.

Market linkages and economic viability: All 15 case studies emphasised the need for reliable market access and economic viability. Profitability and financial autonomy are central motivations. Business models built on local food systems and women-led cooperatives proved especially effective.

Institutional and policy support: Strategic partnerships with Government agencies and development partners played a crucial role in supporting women-led innovations, as seen in Mali (FCS02), Uganda (FCS01), and Ethiopia (FCS05). These collaborations facilitated access to resources, technical support, and market opportunities. In Togo (FCS06), the case study recommends scaling successful models, such as the SCOOPS KEKELI women-led cooperative across the ECOWAS region and calls for harmonised policies to address regional fragmentation and ensure gender-equitable access to markets.

Social capital and male alliance: Success was facilitated by supportive social norms or male allies who helped women navigate traditional constraints. This was critical in land access and leadership (e.g. Ghana, FCS11).

Innovation Platforms and Co-Learning: Multi-actor platforms in the DRC (FCS12) and Uganda (FCS04, FCS07) fostered peer learning, market development, and coordination. In DRC, 50 platforms engaged over 1,500 producers through participatory methods that improved production, processing, and marketing.

Empowerment through capacity building: All case studies identified training, mentorship, and access to finance as critical to success. This was especially important in areas where women lacked land, equipment, or technical knowledge.

Cross-sectoral collaboration: Public-private-producer partnerships (PPPPs) were key to scaling innovations. CAADP-XP4's regional coordination frameworks also supported knowledge transfer and shared learning across countries.

4.4 Transformative outcomes

Women-led innovations have generated transformative outcomes across multiple dimensions of agricultural- and rural development:

Income and employment: Most cases reported higher incomes and in a number of cases and the creation of economic opportunities for women and marginalised groups. Some enterprises, like in Uganda (FCS01) and Togo (FCS06), created sustainable jobs and linked thousands of producers to local and export markets.

Gender norm shifts: increased leadership and agency among women: Initiatives, such as ESAFF Uganda (FCS04) and Ethiopia's EWiC (FCS05), documented shifting community perceptions of women, from unpaid workers to business leaders and decision-makers. Twelve case studies highlighted progress in gender equality within households and communities.

Environment sustainability and climate resilience: Projects, such as AIV promotion in Uganda (FCS07) and cocoa agroforestry in Togo (FCS06), demonstrated how women-led initiatives enhance biodiversity, adapt to climate variability, and promote sustainable land use.

Food and nutrition security: Many innovations contributed to greater dietary diversity, enhanced resilience to climate change and hence food security, thus advancing inclusive and sustainable food systems.

Strengthened Agricultural Innovation Systems: Case studies demonstrate the co-design and use of new technologies, improved production techniques, and value addition across the agricultural value chain have benefited women groups. These advancements have been enabled by collaborative research, mentoring networks, and strong public-private partnerships.

4.5 Persistent barriers

Despite the progress made, several structural and systemic barriers continue to hinder the scaling and sustainability of women-led and/ or gender inclusive innovations across Africa's food systems:

Limited access to and control of resources and land rights: Deeply entrenched cultural and social norms continue to restrict women's ownership and control of land, limiting their ability to invest in and expand agricultural innovations (e.g. FCS09, FCS11). In some contexts, cultural resistance also impedes women's access to training, technology, and decision-making spaces, thereby reducing their participation in high-value agricultural activities (e.g. FCS02).

Technical and financial constraints: Women innovators face challenges including lack of capital, limited financial literacy, and barriers to certification (e.g. FCS08, FCS10).

Human resource limitations: A shortage of qualified staff to implement gender-responsive programs further limits reach (FCS13).

Weak Infrastructure: Inadequate roads, market facilities, and digital connectivity undermine value addition and trade, particularly in rural areas.

Formal and informal institutions: The absence of strong local innovation platforms and women's limited participation in decision-making further restricted progress (e.g. FCS04, FCS12). Fourteen cases emphasised the need for gender-responsive policies and improved coordination.

Individual capacity and empowerment gaps: All case studies noted gaps in training, digital literacy, and leadership development, especially among women and young people, hindering innovation uptake and scale.

This transversal analysis highlights that women-led innovations are not only viable but essential to driving Africa's agricultural transformation. Their impact is strongest when supported by enabling policies, equitable access to markets, targeted capacity development, and inclusive innovation ecosystems. As the continent moves toward a Post-Malabo Agenda, these findings provide evidence for integrating gender-equity strategies across all levels of agricultural planning and implementation. Centring women's agency, voices, leadership, and innovations is fundamental to building food systems that are sustainable, resilient, and truly equitable.

5. Conclusion and Recommendations

5.1 Conclusions

This study highlights the critical yet under-recognised role of women-led innovations in transforming Africa's food systems. Drawing on 15 country-level case studies, several key conclusions emerge:

1. **Women are leading diverse forms of innovation**: Women-led innovations are not limited to technological change. They span social, organisational, institutional, and market-oriented strategies, which are often grounded in local knowledge systems and driven by practical needs such as access to food, markets, and income.
2. **Innovation is both necessity-driven and transformative**: Women's innovations respond to immediate challenges, such as improving yields or processing neglected and underutilised species (NUS), but also generate broader social and economic change, such as job creation, environmental resilience, and leadership development.
3. **Successful innovations depend on enabling conditions**: Key enablers include access to land and finance, supportive male allies, local networks, and collaboration among AIS actors. Strategic partnerships along value chains play a crucial role in scaling impact.
4. **Persistent structural barriers limit scale and sustainability**: Challenges, such as poor market access, lack of gender-disaggregated data, limited decision-making power, and weak infrastructure continue to constrain the potential of women-led innovations.
5. **Research and innovation systems must become more gender-responsive**: National- and regional research organisations, especially those under CAADP-XP4, have a pivotal role in supporting co-learning, and improving recognition, representation and agency of women in AIS for achieving transformative, gender-responsive agricultural development.

5.2 Strategic recommendations

To strengthen gender-responsive AIS and scale women-led innovations, the following strategic actions are recommended:

1. Embed gender responsiveness in AIS design and governance.

- Mainstream gender analysis in all stages of AIS strategy development.
- Mandate gender-responsive budgeting and evaluation metrics across AIS institutions.
- Ensure women's meaningful participation in national- and regional research and innovation platforms.

2. Strengthen gender responsive climate resilience and agroecological practices.

- Scale up community-based, climate resilient agricultural practices tailored to female farmers.
- Improve extension systems by lowering the farmer-to-extension worker ratio and training more female extension agents.
- Promote agroecological research on NUS varieties that align with women's knowledge and resource access.

3. Expand women's access to finance and productive resources.

- Develop tailored financial products (e.g. micro-loans, flexible collateral models) for women-led agribusinesses.
- Ensure equitable land rights and tenure security through legal reform and community sensitisation.

- Support women's cooperatives in acquiring inputs, equipment, and storage infrastructure.

4. Promote inclusive decision-making processes informed by gender disaggregated data systems and monitoring.

- Invest in gender-disaggregated data systems to track women's participation, outcomes, and scaling potential.
- Establish robust monitoring and evaluation frameworks that incorporate real-time, community-level insights.

5. Foster leadership, agency and capacity-building among women.

- Support leadership training, digital literacy, and negotiation skills for women and young innovators.
- Institutionalise mentorship, peer-learning networks, and innovation incubators to scale local successes.

6. Promote inclusive market access and regional integration for women.

- Invest in market infrastructure, including transport, processing hubs, and cold chains.
- Streamline cross-border trade policies under AfCFTA with a gender lens.
- Develop traceability systems and certification schemes to link women producers to premium markets.

7. Enhance gender inclusive collaboration across AIS actors.

- Strengthen multi-actor platforms that bring together researchers, policymakers, private sector actors, and grassroots women's groups to co-design and scale gender-responsive agroecological innovations.
- Support regional learning exchanges to replicate successful models across borders (e.g. ROCAFES, Women in Coffee, FOSCAR).

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Annex: Case studies

Case ID	Country	Innovation Type	Value Chain	Key Impact
FCS01	Uganda	Economic and Social Innovation	Fish	Women's empowerment through fish processing, expanded markets across East Africa and Europe.
FCS02	Mali	Economic Innovation	Fonio and Millet	Increased women's income and societal leadership, traceability systems developed.
FCS03	Botswana	Economic Innovation	Livestock Feed	Feed supply to 5,000+ farmers, women-led market integration
FCS04	Uganda	Social and Agroecological Innovation	Multiple Crops	Empowerment via land rights and agroecological practices, peer-to-peer learning.
FCS05	Ethiopia	Social and Climate Innovation	Coffee	Women's leadership in coffee, improved quality, market expansion.
FCS06	Togo	Agroecological and Social Innovation	Cocoa	Women's cooperatives, agroforestry, education initiatives.
FCS07	Uganda	Research and Market Innovation	African Indigenous Vegetables	Improved nutrition, enhanced market access for women and young people.
FCS08	Togo	Economic and Social Innovation	NUS (néré)	Expanded women's cooperatives, local product competitiveness.
FCS09	Uganda	Research and Value Chain Innovation	Fish	Inclusive technology scaling, women's empowerment in aquaculture.
FCS10	Côte d'Ivoire	Post-Harvest Management Innovation	Cereals	Improved post-harvest processing, job creation, women-led initiatives.
FCS11	Ghana	Gender-Inclusive Research	Rice	Enhanced gender roles in value chains, community-wide engagement.
FCS12	DRC	Multi-Stakeholder Platforms	Cassava, Cowpea, Sweet Potato	Improved yields, women's leadership, digital monitoring.
FCS13	South Sudan	Advisory Services Innovation	Multiple Crops and Livestock	Gender-inclusive extension services, digital savings platforms.
FCS14	Zimbabwe	Climate-Smart Agriculture	Goat Farming and Sweet Potato	Improved food security, women's leadership in CSA practices.
FCS15	West and Central Africa	Seed System Innovation	Seeds (Multiple Crops)	Regional seed security, women-led seed businesses.

Empowering women in the fish value chain: a story of success and innovation in Uganda (FSC01)

Context

Fish play a crucial role in the nutrition of many Ugandan people, providing essential nutrients and significantly contributing to food security. It is an excellent source of high-quality protein, essential for growth, development, and overall health, supplying all the necessary amino acids. Fish is also rich in vital micronutrients such as vitamins A, D, and B12, and minerals like iodine, selenium, and zinc, which are crucial for maintaining good health, supporting immune function, and preventing deficiencies. Additionally, fish, especially fatty varieties like Nile perch and tilapia, are a rich source of omega-3 fatty acids, which are essential for brain development, cardiovascular health, and reducing inflammation.

Fish is a staple in many Ugandans' diets. It is a key component of many traditional dishes and is consumed regularly by a large portion of the population. Small fish from small-scale fisheries are particularly important in low-cost diets, providing a vital source of multiple nutrients for poor and remote rural populations.

The fisheries sector supports the livelihoods of millions of Ugandans, enabling them to afford a more diverse and nutritious diet. Over 10.2 million people in Uganda are nourished by fish supplied from small-scale fisheries.[1]

The role of women and gender disparities in fisheries

Women play a crucial role in the fisheries sector across Uganda, representing two-thirds of those involved in value chains. Their involvement spans various stages of the value chain, from fishing and processing to marketing and distribution, playing a vital role in sustaining livelihoods and promoting local economic growth. Women dominate the post-harvest sector, ensuring fish products efficiently reach markets and consumers. Women are engaged in fish processing activities, e.g., sorting, salting, and smoking.

However, women in Uganda are increasingly breaking barriers in the fish farming industry. Traditionally dominated by men, fish farming has seen a surge in female participation, particularly in places such as Bugiri District. Women now manage fish cages, handle feeding and harvesting, as well as engaging in marketing and trading, significantly improving their income and living standards.

Despite their substantial contributions, women in the fisheries sector face several challenges. Traditional beliefs and gender norms often limit women's access to resources, training, and decision-making roles. Financial exclusion hampers their ability to scale operations and improve productivity.

Many women in the fisheries sector work in informal settings with little job security. They are vulnerable to economic shocks, such as fluctuations in fish availability and market prices, which can severely impact their livelihoods. Limited access to education and training opportunities prevents women from acquiring the skills needed to enhance their roles in the fisheries value chain. This gap in knowledge and skills development further entrenches gender disparities.

[1] FAO. 2023. *The contribution of small-scale fisheries to healthy food systems in Uganda.* Rome. https://openknowledge.fao.org/items/207ddca8-003d-4861-b2b7-a3828f55baaa

This case study provides the experiences of a female entrepreneur whose innovative ideas have helped to change the role and support of women in fisheries in Uganda.

Kati Farms Ltd: Enabling women to break through in male-dominated sectors

After graduating in 2008, Lovin Kobusingye began her career at the Walimi Fish Cooperative Society (WAFICOS), a cooperative that assists fish farmers in maximizing Uganda's abundant fish resources to boost production. Lovin identified two significant challenges limiting market opportunities for fish farmers: (1) farmed fish was not a popular component of the Ugandan diet; and (2) fish products needed to be affordable for consumers with limited food budgets.

To address these issues, Lovin had the innovative idea of adding value to fish by creating fish sausages from locally-sourced tilapia. She invested her savings of $800 into research and development and eventually left her job to pursue this venture. In 2011, seven years after her initial idea, she founded Kati Farms LTD.

To this day, Lovin remains the only woman in Uganda who owns a fish processing plant, demonstrating her pioneering spirit and resilience in a male-dominated sector. Her enterprise is helping women and rural farmers.

Products and processing. Kati Farms processes 10 tonnes of fish per day. Their flagship product is the fish sausage made from locally sourced tilapia. The company also offers a variety of 17 other fish and healthy products, including fish samosas, frozen and chilled fish fillets, fish powder, surimi (paste made from minced fish), crude fish oil, and fish meal. New products are being developed.

Initially, Kati Farms used machines designed to make beef sausages due to the lack of specialized facilities for processing fish sausages. Although the pilot project was successful, it had low production volumes. Later, Kati Farms acquired a specialized sausage-making machine, significantly increasing weekly production. To address the challenge of transporting raw fish to regions like the Democratic Republic of Congo, Kati Farms has developed a salted sun-dried fish product that lasts over a year without refrigeration, ensuring the fish remains safe and consumable during transit.

Markets. In March 2016, Kati Farms opened its first branded outlet in Kampala, Uganda. This outlet acts as a shop for selling their products, and it features a café where customers can enjoy various fish snacks. The company has attracted investors from South Africa and the United Kingdom. Locally, the products are sold to hotels, restaurants, supermarkets, and through informal markets. Processed products are exported to Uganda, Rwanda, Burundi, Kenya, and the Democratic Republic of Congo. It also exports fish sausages to Canada and fillets, smoked and dried fish, and sardines to Europe, primarily targeting the diaspora.

Today, Kati Farms partners with over 1,000 women fish farmers. The enterprise employs 38 full-time staff, 23 of whom are women. The company has over 100 vendors, including street stands and national grocery store chains.

Creating a supportive innovation system

Kati Farms' experience highlights that contributing to and leveraging a supportive innovation system are crucial for sustainable growth. Actively engaging in innovation fosters competitiveness, while benefiting from an enabling ecosystem—through collaboration, investment, and policy support—drives expansion and long-term success.

Business incubator. Kati Farms makes its fish processing plant available as a business incubator. Entrepreneurs in the fish and meat sector can use their facilities 24/7, including its food-grade

production space, co-working and meeting space, and cold, dry, and freezer storage facilities. Kati Farms also provides supply chain management and training to fish farmers to reduce over-fishing by using cages to farm fish such as tilapia and to grow them according to the market-specific size (400–500 g).

Partnering with NARO and other research organizations was a game changer. Lovin finds that often, the research ends at the prototype level, and more could be done on scalability. More protection is also needed for Intellectual Property Rights (IPR). The collaboration between the National Agricultural Research Organization (NARO) and Kati Farms is a notable example of a public-private partnership to enhance the fisheries sector in Uganda. Key Aspects of the Collaboration included the following:

Research and Development: NARO provides scientific research and technological support to Kati Farms. This includes developing improved fish breeds, enhancing fish farming and processing techniques, and ensuring sustainable aquaculture practices. One such technology requiring financial support is the fish kiln, which costs between $2,000 and $3,000. This tool is essential for reducing post-harvest losses and is particularly valuable for women involved in post-production processes. NARO introduced the concept of business-to-consumers and business-to-business in collaboration with the Private Sector Foundation Unit (PSFU) to identify helpful and customized packages for women and youth-led businesses.

Innovation in Fish Processing: Kati Farms has been at the forefront of innovating fish processing methods. With NARO's support, they have developed value-added fish products such as fish sausages, fish samosas, and fish balls. These products not only increase the shelf life of fish, but also create new market opportunities.

Capacity Building: The partnership focuses on building the capacity of local fish farmers through training and extension services. NARO and Kati Farms have partnered to train farmers on the best practices on fish farming, processing, and marketing, thereby improving productivity and profitability.

Market Access: By leveraging NARO's extensive network and Kati Farms' market presence, the collaboration helps small-scale fish farmers access larger markets locally and internationally. This is crucial for enhancing the economic viability of fish farming in Uganda. NARO introduced a mechanism where women and youth exhibit and showcase new aquaculture technology at public or international conferences to enhance outreach and attract more women and youth to participate in the fish value chain. This further allows them to grow their networks and markets, resulting in women and youth participating in national and international trade shows and conferences.

Sustainability and Food Security: The collaboration aims to promote sustainable fish farming practices that contribute to food security in Uganda. By improving fish production and processing, the partnership helps ensure a steady supply of nutritious fish products to the population.

Strong Relationships with small-scale fish farmers: Kati Farms sources fish from smallholder fish farmers with whom it has built a trusting relationship. For Kati Farms' first order, the fish farmers agreed to supply fish on credit. Later, Kati Farms helped solve the farmers' initial capitalization problem. Kati Farms provides supply chain management and various training programs to improve productivity and ensure proper storage of fish. This includes training on feeding routines, daily feed rations, feed formulation for better productivity, and proper storage of fish in ice to ensure the products are delivered unspoiled. Kati Farms also hires out expensive equipment to its farmers for a small fee, enabling them to use implements they only need occasionally and cannot afford, such as fish nets, oxygen cylinders, and water transportation tanks for delivering live fish to the fish marketing centre.

Continuous learning and networking: Lovin emphasizes the importance of networks as a valuable asset for women, stating that continuous learning and networking open new opportunities. She also highlights the significance of women's associations for exchanging information and experiences. With support from AU-IBAR, a National Women's Association was established. This resulted in establishing the Uganda Women Fish Trader and Processors Association, where Lovin is the chair and founder of the Uganda Women Fish Network.

Kati Farms actively participates in strategic development initiatives with regional economic communities (RECs), such as the East African Community. The company also engages in AU meetings and contributes to policy reviews, such as gender and agriculture, under the (CAADP) post-Malabo declaration. Given this, Kati Farms highlights the need for extensive consultation on policies like fishing gear bans, which significantly impact local communities, and calls for more transparent and inclusive policymaking processes.

As the chair of the Uganda National Women's Fish Organisation, Lovin collaborates with the Forum for Agricultural Research in Africa (FARA) and supports women's associations in Sudan, Ethiopia, and South Africa by sharing information and best practices. The association has established a Fish Innovation Center, supported by the National Agricultural Research Organization (NARO), the Food and Agriculture Organization (FAO), and GIZ, providing manuals and equipment. The center offers training in fish handling and standards, welcoming women from Tanzania, Kenya, Rwanda, Burundi, and Somalia.

Additionally, various agencies hire the association to conduct hands-on practical training sessions at the center, further enhancing the skills and knowledge of women in the fisheries sector.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Overcoming Gender-Based Constraints: Women have successfully entered the value-addition segment in a traditionally male-dominated sector.

Innovations: By adding value to fish, Kati Farms strives to include more fish products in Ugandan diets and make them available to the largest number of consumers. The attractiveness and diversity of the products create market outlets for fish farmers.

Innovation and Value Addition: The development of innovative fish products has opened up new markets and increased the value of fish, benefiting both producers and consumers. Kati Farms ventures into innovative fish products that are adapted to customer demand.

Social Impact: In addition to sourcing fish from small-scale fishermen cooperatives, Lovin uses her fish processing plant as a business incubator for entrepreneurs in the fish and meat sector. This collaboration has empowered many small-scale fish farmers, particularly women, by providing them with the skills and resources needed to succeed in the fisheries sector.

Sustainable Practices: The focus on sustainable aquaculture practices helps protect the environment while ensuring long-term productivity and food security.

Strong Relationships with Smallholders: Kati Farms sources fish from smallholder farmers, providing them with supply chain management and various training programs to improve productivity and ensure proper storage of fish. This helps guarantee that the products are delivered unspoiled. Kati Farms also hires out expensive equipment for a small fee, enabling its suppliers to work with machinery they only need occasionally.

Research and Innovation: This partnership between NARO and Kati Farms exemplifies how collaborative efforts can drive innovation, improve livelihoods, and contribute to sustainable development in the fisheries sector. Investing in research and innovation leads to the development of new technologies and practices that enhance productivity and sustainability in the fisheries sector. The collaborative efforts between research and the private sector generate innovations which support enterprises like Kati farms.

Capacity Building: Providing targeted training programs in aquaculture, business management, and financial literacy equips women with the skills needed to succeed in the fisheries sector.

Community Engagement: Encouraging community-based approaches involving women in decision-making can help address gender disparities. By fostering inclusive value chains, communities can benefit from women's diverse perspectives and contributions. The company is a member of the Uganda National Women's Fish Organisation (UNWFO), which has over 2 million women fish processors and traders in Uganda. Kati Farms has extended its support to countries like South Sudan, South Africa, Egypt, and Ethiopia to help them develop their own fisheries chapters.

Remaining challenges

Capacities and scalability remain key game changers for Lovin and many enterprises in Africa.

Weak Transport Infrastructure: Poor road conditions and expensive flights hinder efficient transportation.

Processing constraints: The lack of adequate processing machines, packaging materials, and spices for products like fish sausages remains a significant issue. Additionally, the absence of ice plants, such as in Rwanda, limits the shelf life of fish to no more than three days before spoilage.

Inadequate Online Banking Systems: Inefficient online banking systems pose obstacles to payments and complicate financial transactions. Fundamental infrastructure issues, such as unreliable electricity, further exacerbate these challenges.

High-Interest Loans and Lack of Collateral: High-interest rates on loans, coupled with the lack of collateral and enabling policies, create financial barriers. The absence of a gender-sensitive approach contributes to the low participation of women in the fish processing sector.

Challenges in Cross-Border Trade: Basic infrastructure at border crossings is inadequate and not gender-friendly. There are no clean toilets, facilities for traveling with children, or breastfeeding areas, making cross-border trade difficult for women.

Exchanges with other women in fisheries can expand networks and increase market access. Harmonizing currencies in regional markets could also facilitate smoother trade.

Formalization of Women's Businesses: Women need to formalize their businesses to avoid displacement or eviction, which can occur for reasons such as hotel construction or beach access. Many women in the fisheries sector are unaware of their rights, despite their significant contributions to nutrition, health, and community income.

Capacity and Scalability: Building capacity and scalability remains a crucial challenge for Lovin, as these factors are essential for sustainable growth and success in the industry.

Recommendations

Addressing the above challenges requires coordinated efforts from governments, industry stakeholders, and international organizations to improve infrastructure, enhance financial systems, and support gender-sensitive policies. For example, governments should support initiatives like women-led supplier programs or strengthen partnerships that fund female entrepreneurs, and enhancing supply chain diversity. By doing so, the industry can become more resilient and inclusive, ensuring sustainable development and growth.

Partnerships have been crucial for Kati Farms, but obstacles like currency fluctuations and a lack of harmonized policies remain. Initiatives like the African Continental Free Trade Area (AfCFTA) could address these challenges, but the policies must be more applicable and accessible to small-scale businesses.

To overcome these hurdles, Kati Farms suggests creating platforms that connect buyers and sellers, document trade routes, and provide market data and trends. Such platforms could also facilitate trade missions and market linkage programs, which farmers and business owners would greatly appreciate.

Kati Farms also recommends more research to improve fish varieties and production processes and stronger collaboration between the private sector and research institutions to scale up innovations. Clear patent protection is essential to encourage private sector involvement and ensure mutual benefits in joint ventures like developing new technologies. Likewise, increased investment in research is needed, alongside a commitment from policymakers to understand its value in driving economic growth. Lovin would like to see more equipment available and also have more information on what is available.

Empowering Women: Revitalizing Fonio and Other Local Cereals in Mali (FSC02)

Context

Mali, a landlocked country in West Africa, faces numerous challenges threatening its food and nutrition security. These challenges are multifaceted, stemming from both natural and human-induced factors, and have severe implications for the well-being of its population. A surge in conflicts has exposed low-income households to food insecurity. Furthermore, the country is highly vulnerable to climate-related shocks, which impact agricultural production and the livelihoods of smallholders, many of whom are women. The rising population increases the demand for food, while poverty and unemployment limit many people's ability to purchase nutritious food. Additionally, Mali's reliance on food imports, high food prices, and reduced access to affordable and nutritious food also impact the most vulnerable communities.

Mali also faces significant challenges regarding gender equality and economic opportunities for women within and beyond primary production. Cultural and social norms play a significant role in perpetuating gender disparities, placing women in subordinate roles and limiting their autonomy and decision-making power.

Fonio food systems, the role of women, and gender disparity

Fonio (Digitaria exilis), a staple food in Mali and some countries in West Africa, is generally grown on light, sandy, or stony soils and resists drought and heavy rain well, making it adapted to climatic challenges. Depending on the variety, the crop cycle varies from 70 to 150 days, and those with a very short cycle (70 to 85 days) allow early harvests, thus ensuring food security during the lean season until the harvest of other crops. During the critical "lean" months, fonio becomes "the seed of life," ensuring a vital food transition for populations when other cereals are still immature and the previous year's reserves are exhausted.

Shelling fonio was traditionally done with a mortar and pestle, a labour-intensive process that has long slowed its development despite being the oldest known cereal in West Africa. Women would perform three or four successive poundings before having fonio ready for preparation, also undertaking the tedious task of washing and removing sand and straw from the grains.

Les Céréales de TATAM: Supporting nutrition and livelihoods by strengthening the use of neglected and underutilised species (NUS)

Les Céréales de TATAM SARL adds value to traditionally grown grains in Mali by processing local cereals such as millet, fonio, monicourou, and diouka. These crops, often considered neglected, have high nutritional content and are deeply rooted in the traditional food traditions of the population.

The story of TATAM Céréales began in 1992 when a visionary woman, Aissata Thiam Dem, from a traditional family, sought to make a difference in her community through the economic empowerment of women and support for the nutrition of infants and the population using local cereals cultivated by generations of smallholder farmers. It was not easy for a woman in a traditional context to start processing local grains. In 2018, Tatam's daughter, Halatou Dem, inherited in the family business, renamed it Les Céréales de Tatam (LCT), and pioneered innovations in the family-owned enterprise and the grain industry in Mali. Halatou was concerned about the low level of added value retained in the country, the low incomes of smallholders, and the reliance on imported

processed food at the expense of local nutritious food and neglected crops. She observed that to promote traditional cereal foods, their use had to be adapted to evolving urban trends. More women have professional activities and lack the time to cook traditional meals with grains due to the time required. With these changes in mind and the same determination to innovate as her mother, Halatou, a young woman of 24 when she took over the company, decided to positively impact women and communities.

Initially, the company processed grains produced in Mali (fonio, millet, rice, sorghum, and maize) using artisanal methods. In 2010, Halatou Dem joined the family business and significantly enhanced the processing and value addition to an industrial stage, focusing on improving quality, safety, and traceability systems. She established the country's first industrial processing factory, producing fortified millet flour named "Fortimil," along with diouka, maize flour, tiacry, dengue mougou, laro, broken maize, and millet couscous. Additionally, she introduced pre-cooked fonio and monicourou, marking a breakthrough in the industry. Initially, these products were aimed at meeting the demands of expatriates and external markets, as it was culturally frowned upon in Mali for women to purchase ready-made products; everything had to be prepared by hand from start to finish. These innovations were transformative, allowing women to dedicate time to other activities while preserving food traditions and supporting local farmers.

In the 2000s, Tatam benefitted from a newly launched husker and in 2016, one of the company's fonio washer prototypes. The acquisition of equipment, developed at the local and international levels, allowed for increased production volume and market reach, including exports to Europe and the USA, raising awareness of local cereals and their virtues. However, despite these successes, in the face of Mali's major food security issues, Halatou decided to focus on local and regional markets. Today, LCT sells 90% of its products in Malian and sub-regional markets (West Africa, Gabon, and Congo) to supermarkets, shops, retailers, and (semi-) wholesalers.

The company has two processing units, thus offering new economic opportunities. The company currently processes 500 tonnes of cereals annually and exports around 100 tonnes. The company employs 20 people, including 18 women and two men.

The cereals come from small farmer cooperatives (over 1,000 members), including women's cooperatives, which grow a wide variety of crops and with which the company has a strong relationship of trust. The company buys from a cooperative of 1,000 members, around 70% of whom are women, including a large proportion of young women, and young people represent around 60% of the total group. This female and young representation has encouraged targeted processing initiatives, including the introduction of technologies such as husking and threshing machines adapted to local conditions, enabling members to increase their yields and add value to agricultural products, such as fonio, to meet market standards. These initiatives have helped to strengthen the processing capacity of producers, creating a sustainable economic impact and promoting the inclusion of young people and women in the value chain. The farmers say that the collaboration has provided them with a stable income, enabling them to send their children to school and improve their living conditions.

Scope of the innovation

The company's innovation aims to enhance the efficiency of cereal processing, expand economic opportunities for women, and promote their inclusion in the agri-food sector. This initiative tackles the issue of limited access to modern equipment for women processors, who often endure strenuous manual labour that hampers their productivity and income. By incorporating machines like fonio huskers and washers, the company can alleviate physical strain and boost both the quantity and quality of products. This not only strengthens women's economic positions but also enhances their

roles within the value chain, directly contributing to their empowerment and greater inclusion in the sector.

The introduction of new machines has boosted fonio processing yields by 40% and cut manual labour time by 50%. This innovation allows women processors to handle more volume in less time, resulting in a 30% increase in their average income. Additionally, the number of women trained in these new technologies has doubled within a year, enhancing their financial independence. Success stories include several local women entrepreneurs who, empowered by these tools and training, have diversified their products, accessed new markets, and inspired other communities to adopt these innovations.

The innovation has significantly impacted the local communities associated to the business by encouraging changes in socio-economic practices and roles. Women processors, now equipped with modern tools, have increased their productivity and income, strengthening their positions and influence within their families and the community. This progress has also transformed perceptions of women's roles in the agricultural sector, where they are now seen as economic leaders and role models. Additionally, men in the community have become more supportive of women's involvement in processing activities, and families are more readily adopting modern technologies. This dynamic has not only empowered women but also fostered a culture of collaboration and respect for their economic contributions.

During the development of the innovation, the company faced several challenges, particularly in funding and logistics. The high cost of modern equipment and the lack of suitable funding for agri-food SMEs made acquiring and implementing technology difficult. Overcoming these obstacles required key partnerships and technical and financial support programs. Another major challenge was cultural resistance, as women processors were often constrained by norms that restricted their access to equipment and training. These perceptions were addressed through advocacy and awareness-raising by Les Céréales de Tatam, demonstrating the positive impact this innovation could have for everyone, especially women.

To extend LCT's innovation, the team is focusing on several strategic areas: (i) developing additional partnerships with funding and research bodies to acquire more advanced equipment tailored to the needs of small-scale processors; (ii) establishing an ongoing training program for women and young people in rural areas to broaden access to these technologies, and collaborating with incubators and distribution networks to facilitate the integration of processed products into regional and international markets; (iii) promoting inter-community exchanges to ensure the innovation serves as a replicable model in other regions, thereby strengthening its impact and encouraging widespread adoption.

Today, the company is concentrating on enhancing its new traceability systems. Implementing this system requires collaborating with producers' cooperatives and 30 cooperatives of women producers who supply the cereals. This is a crucial step towards obtaining certified products.

The efforts of LCT have achieved the following: (i) empowering women in the processing sector; (ii) inspiring market vendors in processing; and (iii) sourcing from women's cooperatives.

Creating a supportive innovation system: the role of research, policy, and finance

The enterprise received seed funding, which accelerated processing capabilities through equipment access provided by AFD under the ALTAAQ project (Achats Locaux, Transformation Alimentaire et Amélioration de la Qualité; Local Purchasing, Food Processing, and Quality Improvement). Technical support was also provided by WFP, Lux Development (food security), and UN Women in processing.

These partnerships enabled LCT to secure loans from Malian banks and invest in mechanization. The International Bank for Trade and Industry in Mali granted LCT its first loan of 75 million CFA francs (€114,346) in 2013 to complete the construction of the second processing facility. This marked a significant shift, as banks previously considered processing too risky and were reluctant to lend.

The most significant technical innovations in mechanisations emanated from projects by the French agricultural research centre, CIRAD, and the national agricultural research institutes of Senegal, Mali, Guinea, and Burkina Faso, reducing the labour and time required to process fonio. In 2016, the French Agricultural Research Centre (CIRAD), in collaboration with local researchers, developed equipment to facilitate both shelling and pounding. However, as the project concluded, the 2016 prototype could only do 80% of the pounding, with the remaining 20% still being done manually by women. LCT has worked with research institutions (IRD, CIRAD, CORAF, ICRISAT Institut de Recherche du Mali). LCT is a member of the Réseau Ouest-Africain des Céréaliers (ROAC) (West African Cereals Network).

The CAADP-XP4 Gender Working Group has been actively advocating for gender inclusivity and raising awareness, with increased efforts directed toward empowering women in business, particularly in the CORAF region. As a member of the CORAF network, Halatou Dem, the president of the Inter-professional Association of the Fonio Sector (IPFO-Mali), lobbies and advocates for recognizing the value of fonio and NUS. However, she believes that regional organizations have not adequately addressed the concerns of women and youth. To address this gap, a gender action plan was submitted to ECOWAS and recently discussed at a CORAF meeting in Ghana, where the chair of CAADP-XP4 and CORAF's gender expert gathered input from stakeholders.

Additionally, they are advocating for the creation of a platform that unites the private sector (already organized through the Fédération de Transformation de Céréales and Interprofession du Fonio) with researchers, carriers, and policymakers to ensure a more collaborative approach to inclusivity. Like other NUS, fonio, long considered a minor or "poor man's cereal," is experiencing renewed interest in urban areas due to its taste and nutritional qualities, drawing comparisons to quinoa. It is gluten-free, rich in amino acids often absent in other major cereals, and easily digestible, making it suitable for diabetics.

The Forum for Agricultural Research (FARA) in Africa and the Food and the Agriculture Organization (FAO)'s Regional Office for Africa produced a compendium of forgotten foods as a response to the UN Food Systems Summit and the call for collective action in the Global Manifesto on Forgotten Foods. These actions resulted in the establishment of an NUS community of practice in Africa. LCT is a member of the NUS community of practice.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Preserving and promoting traditional foods: Contributing to preserving and promoting traditional foods, supporting rural communities, and enhancing agrobiodiversity and agroecological practices.

Highlighting the role of NUS: Emphasizing the importance of Neglected and Underutilized Species (NUS) in food and nutrition security and diversifying their use among urban consumers accustomed to imported foods.

Mechanizing production and processing: Mechanization in the production and processing phases reduces the labour intensity for smallholder producers and processors, most of whom are women. This mechanization not only increases efficiency but also improves the quality and consistency of the products.

Establishing a profitable enterprise: Creating a profitable business model that increases incomes and employment opportunities for smallholders and processors, the majority of whom are women. This economic empowerment helps improve the livelihoods of these communities.

Demonstrating women's capacities: This showcases women's ability to navigate complex challenges, reflect on societal needs, engage in strategic decision-making, and form key alliances. It demonstrates the vital role women play in driving the economic and social development needed for a food systems transformation.

Identifying market opportunities: Recognizing and capitalizing on market opportunities that support using traditional foods and NUS. This includes introducing pre-cooked cereals and transforming traditional foods into innovative products and services that meet modern consumer demands.

Changing perceptions of women's capacities: Shifting societal perceptions about women's abilities to lead value-added activities and professionalize the sector helps recognize and value women's contributions to the agricultural and processing industries.

Co-creating technology: Developing and implementing technologies that address local needs, positively impacting women's employment and livelihoods. These technologies also benefit local customers by providing high-quality, locally produced food products.

Engaging with partners: Collaborating with research institutions, development partners, and other stakeholders to support innovations. These partnerships provide critical seed funding and technical support, accelerating entrepreneurial innovation and equipment acquisition.

Attracting funding and trust: Securing funding and building trust with financial institutions, thanks to investments from research and the application of innovative entrepreneurial skills. This financial support is crucial for scaling operations and sustaining growth.

Remaining Challenges

Access to finance and mechanization remain obstacles that LCT strives to overcome. The enterprise faces difficulties in hiring and retaining qualified staff to work in the agri-food processing sector due to the instability in the country, despite significant efforts in supporting training and education of key staff.

Conclusion and Recommendations

TATAM Céréales exemplifies the potential of women-led businesses in the NUS sector to ensure access to safe and nutritious food, promote nature-positive production, and build resilience to vulnerabilities and shocks. These are critical priorities for the ongoing work on NUS at FARA and its constituencies. Therefore, the following actions are recommended for the FARA-led CAADP research and innovation strategy:

- Advocate for further gender-responsive research on NUS from seed to final value-added products.
- Increase collaborative research with private-sector policymakers.
- Establish platforms to enhance women’s leadership skills and youth empowerment to participate in strategic and policy processes.


fortimil
le FONIO
précuit de TATAM
le DIOUKA
le TIACRY
le MONI COUROU
DEGUE MOUGOU
BASSI
KABA MOUGOU
MOUGOU
KABA GNEGNE
LARO


HALATOU DEM

Boosting Livestock Production in Botswana: The Case of Native Feeds Sustainable Feed Production and Farmer Support (FSC03)

Context

Since livestock are vital to the livelihoods of one billion people in Africa, improving livestock feed has been identified as a crucial step for enhancing productivity. FAO suggests that 1.3 billion people globally depend on livestock to some extent for their livelihoods[1]. Consistently, studies highlight that inadequate access to livestock feed is the primary constraint limiting productivity across Africa[2]. In Botswana, grazing land, vital for livestock survival (with its grass-fed beef renowned for its quality), has experienced significant plant cover loss due to overgrazing and recurring droughts. As a result, the current rangelands are insufficient for meeting livestock feed needs. This problem worsens during the dry season when the nutritional quality of the forage sharply declines[3] due to poor soil nutrition.

Livestock production, mainly beef, generates more than 80% of the agricultural income[4] in Botswana. However, farmers primarily focus on animal management and production, often neglecting forage production (animal nutrition). However, sustainable forage production is as vital as livestock production, as the two are inseparable for ensuring long-term productivity[5]. Despite these dynamics, young women entrepreneurs like Tlotlo Neo Phuduhudu have embraced sustainable feed production practices and chosen to break barriers in this male-dominated industry.

Livestock systems, women, and gender disparity

Studies reveal that by 2030, urban beef consumption in developing countries is expected to surge by over 361%, with rural consumption also projected to double. However, in many sub-Saharan African (SSA) nations, the limited availability of quality feed remains a significant barrier to livestock productivity. Therefore, it is vital to strengthen the feed value chain, particularly in Botswana. This includes raising awareness about the importance of feed quality, establishing marketing systems based on feed quality, and recognizing and supporting women's roles in feed production value chains.[6]

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[1] https://www.fao.org/cfs/cfs-hlpe/insights/news-insights/news-detail/livestock-engine-for-economic-growth-and-sustainability/en

[2] Mamphogoro, T., Mpanza, T., Mani, S. "Animal Feed Production and Its Contribution to Sustainability of Livestock Systems: African Perspective," 2024, 37–54, https://doi.org/10.1007/978-3-031-55185-7_3.

[3] Maphane, G.K., Mutshewa, P. "Strategies for dry season feeding of animals in Central and Southern Africa" (Zimbabwe Society for Animal Production, 1999), https://www.fao.org/4/ac152e/AC152E02.htm.

[4] AU, "Dakar 2 Botswana, Country Food and Agriculture Delivery Compact" (Addis, Ababa: African Union, 2023), https://www.afdb.org/sites/default/files/documents/publications/botswana_country_food_and_agriculture_delivery_compact.pdf.

[5] Ncube, P., Roberts, S., Zengeni, T. *Development of the Animal Feed to Poultry Value Chain across Botswana, South Africa, and Zimbabwe*, 2016, https://doi.org/10.35188/UNU-WIDER/2016/045-4

[6] Maphane and Mutshewa (1999), "Strategies for dry season feeding of animals in Central and Southern Africa." https://www.fao.org/4/ac152e/AC152E02.htm

Native Feeds: Contribution of Rural Women to Africa's Food System

In 2016, a young woman named Neo Tlotlo Phuduhudu founded Native Feeds, an enterprise that supplies seeds and fertilizer to Botswana's farming community under the Integrated Support for Arable Agricultural Development Program. Native Feeds' primary products and services include cattle meal, small stock meal, and small stock creep feed. The enterprise connects farmers to individual clients through retail spaces, links farmers to chefs and other potential markets, assists farmers in packing their products for the market, and sells products on behalf of farmers.

Neo also operates a consultancy service to help farmers transition from subsistence to commercial farming. She organizes capacity-building programs through this service, including masterclasses, associations, and partnerships with entities that enhance farmers' production, climate resilience, and profitability.

Neo's passion for transforming food systems originated from her upbringing. Raised in a farming community, she often relied on farm produce for her meals. Her love for cooking led her to use farm produce to create traditional dishes, which she sold on street markets, promoting the food of her culture. Recognizing her potential, her father encouraged her to pursue a career in agriculture. At that time, Botswana had a program called ISPAAD (Integrated Support Programme for Arable Agriculture Development), which provided farmers with seeds, fertilizers, and tractors to cultivate a five-hectare farm. Her parents loaned her the funds to start as an input supplier. During this period, Neo learned that many farmers were unaware of alternative markets for their produce beyond the Botswana Agricultural Marketing Board (BAMB). Additionally, those who grew fodder crops faced challenges in accessing trading spaces or identifying buyers.

Scaling Innovations and Providing Sustainable Solutions. Neo's experience supplying inputs to farmers sparked her interest in animal feeds, particularly in repurposing products that could not be sold in the market but were suitable for animal consumption. She began buying maize, maize straw, and *Lablab* from farmers, sometimes assisting farmers in harvest, then collecting half of the raw material as payment for the assistance and processing it into animal feed. Having no formal education in agriculture, Ms Neo took a short course on fodder production to enhance her knowledge. Her parents advised her to start rearing goats as an experiment. While working in a remote area, Neo noticed that farmers struggled to find agricultural supplies to treat common livestock diseases such as internal parasites and worms, which often led to the death of their animals due to a lack of resources.

Determined to find a solution, Neo began researching natural remedies to help alleviate internal parasites in goats and sheep. She tested these remedies on her 40 goats and was surprised they remained free of internal parasites for over two years without using conventional medicine. Encouraged by these results, she shared these remedies with farmers in other areas in the Kweneng District of Botswana, where they also proved effective, earning her positive feedback and establishing a thriving business.

Business Development, Finding Markets, and Finance. Native Feeds' largest market is Botswana, with some products entering the Zimbabwe market. Neo has identified interested buyers in Zambia and Namibia but lacks the financial resources to increase her production. Given Botswana's high demand for animal feeds, Neo imports from South Africa to help meet the gap.

So far, Native Feeds supplies her products to commercial small-stock farmers, small-stock farmers associations, and agricultural shops from Kweneng, Kgatleng, and South-East districts. The Kweneng

district's total addressable market consists of 11,470 clients, including over 5000 farmers, each owning 50-100 cattle per farm. The company intends to expand to over 5000 farmers in central, northern, and Ngamiland, with an addressable market size of 27,579 clients. With a projected annual sale of approximately EUR 405,057 from creep feed (supplemental feed to livestock that are still nursing), small stock meal, cattle meal, and cattle creep feed, Native Feed aims to meet at least 10% of Botswana's market share of livestock feeds and expand to other countries such as Zambia.

Given that her business is fully self-funded, she has had to diversify into advisory work and consultancies to raise the resources to expand her business and acquire the financial viability that will allow her to access loans from financial institutions. Neo's business premises are housed under her father's property. While her father's support has been a significant advantage in helping her start the business with minimal costs, the lack of business premises is proving to be a barrier to financing due to the lack of collateral.

Creating a Supportive Innovation System: Business, Research, and Policy

Neo discovered through Native Feeds that many farmers depend on government-subsidized feeds. However, small-scale farmers often face challenges due to limited feed supply and inadequate access. The total feedlot capacity in Botswana currently stands at 150,000 animals per year and is set to increase. At full capacity use, the feedlots need about 150,000 to 180,000 MT of thoroughly mixed feed per year. The composition of the feed includes concentrates, straw, and premix to produce summer, production, and winter licks. Nearly all of these are imported, mainly from South Africa and Zambia. This instantly creates an import substitution opportunity. For example, in 2022, Botswana imported 33,116,733kg, valued at about 14,495,292 USD, on HS230990 - feed preparations.[7] She is collaborating with experts in the feed industry to raise awareness of the benefits of proper animal feeding and feed formulation. She observes, *"Farmers only embrace new feeding methods if they are economically viable and have the necessary resources, particularly land, to implement them."*

To strengthen her policy engagement, Neo has participated in developing the 2024 National Youth Policy Review and Development by the Ministry of Youth, Gender, Sports, and Culture. She was also engaged in the review of the 2023 Gender, Youth, and Social Inclusion Policy by CCARDESA and a Policy Dialogue on Enhancing the Use of Satellite Data in Agriculture in Botswana by (ASARECA) and (CCARDESA), Digital Earth Africa (DE-Africa) and GeoScience Australia and the Regional Consultation meeting with African Union member states from Southern Africa on about the African Agribusiness Youth Strategy. Additional policy engagement includes a Regional Consultation meeting with African Union member states from Southern Africa on the Mechanisms for strengthening the Private Public Producer Partnership (PPPP) in the SADC Red meat and live animal value chain.

Key Aspects of the AIS Collaboration

Multilevel innovation platforms (IPs): Adopting a more flexible and creative approach to setting the agenda and forming partnership arrangements for multilevel innovation platforms (IPs) is essential.

Gender-inclusive food system; An innovative approach to a gender-inclusive food system should ensure fair wages and working conditions. So far, Native Feeds has helped women farmers commercialize their production, improve production quality and budget effectively, and connect with markets and butcheries.

[7] BITC, "Investment Opportunities in the Beef and Beef Derivatives" (Gaborone, Botswana: Botswana Investment and Trade Center, 2024).

Community engagement: Working with veterinarians at community events and associations (Kweneng Beef Farmers Association, Taung, Ramotswe, Otse, Mogobane Small Stock Association) increased collaborations with community leaders.

Training and skills development: Native feeds have benefited from the Centre for Coordination of Agricultural Research and Development for Southern Africa's (CCARDESA) policy training on women, youth, and people with disabilities.

Networking and knowledge sharing: Engaging with policymakers and private sector partners broadened her understanding of climate change solutions in farming. Participation in the Accelerating Nature-based Solutions Conference by Global EverGreening Alliance Limited inspired Neo in Zambia, where African countries shared their efforts to combat climate change.

Finding local solutions to local problems: The growing trend of finding local solutions to African farming challenges rather than relying on others has resulted in communities planting trees, combating land degradation, and improving food security. As a result, Native feeds have provided a means for some families to enjoy three meals daily instead of one.

Finding niche markets: She is leveraging the vast market opportunities in Botswana's beef industry, which has effectively competed in international markets. In 2019, for example, Botswana was the ninth-largest beef exporter to the European Union. Despite Botswana's enjoyment of tariff-free entry through the EU-SADC Economic Partnership Agreement, exports of beef products dropped from USD 62 million in 2015 to USD 29 million in 2019[8].

Factors contributing to successful women-led innovation and gender-equitable outcomes

Awareness creation with smallholder farmers: As part of her consultancy and farmer mobilization efforts, Neo provides a platform for farmers to discuss **climate change** and seek collective solutions.

Support for women in agriculture: Botswana's support for women in agriculture has been a positive influence. Neo notes that many women focus on poultry and horticulture rather than small stock/goats, sheep production, and cattle production due to limited support systems and difficulties in employing male workers. She also asserts, *"When I faced resistance from male customers in the industry, I chose to involve my male colleagues, whom I delegated to represent Native Feeds."*

Capacity building: Native Feeds introduced health nutritional programs emphasizing disease prevention through good agricultural practices. These programs aim to educate and train women and marginalized groups in the livestock space.

Increased community engagement: Due to the resistance to women's participation in business and women's vulnerability in the agriculture industry, some women farmers have recently started forming associations and WhatsApp groups to share information, challenges, and solutions and support one another.

Mindset change on women in leadership: A mindset change is needed for people to recognize that women can thrive and lead in agriculture. Neo has encountered situations where her leadership has been questioned simply because she is a young woman. Therefore, Neo encourages women to share stories to

[8] AU, "Dakar 2 Botswana, Country Food and Agriculture Delivery Compact."

gain recognition for their contributions and leadership and the support they receive from their male counterparts.

Capacity to navigate challenges: Although Neo wished she could have conducted more research, her lack of formal qualifications in agriculture made it challenging to access the resources needed for further studies in homemade livestock remedies. This did not stop her from seeking partnerships with international private-sector actors to provide the necessary research services.

Engagement with research institutions: Collaborations with research institutions, specifically international private sector companies, have provided the solutions needed on plant-based products to produce tick repellents and de-wormers, which are incorporated into animal feeds produced by Native feeds.

Remaining challenges and recommendations

Livestock issues in Botswana are primarily focused on animal management and production, often neglecting forage production. However, sustainable feed production is as essential as livestock production, as the two are inseparable for ensuring long-term productivity.

Expanding capacity-building efforts nationwide and in the region is necessary. By dividing Native Feeds service delivery into livestock and feed production, the company collaborates with international organic farming experts to demonstrate the industry's profitability for small-scale entrepreneurs in the SADC Region.

Current financial packages for loans typically rely on a traditional model that requires collateral, primarily targeting salaried employees. To better support women entrepreneurs who may not have collateral but are otherwise eligible, Neo recommends revising these packages to offer greater flexibility and accessibility.

The Agriculture Research for Development sector has provided many capacity-building activities, networking opportunities, and knowledge-sharing opportunities. However, increased effort is still needed to address the specific needs of the private sector, such as expertise, funding, and markets, and to address issues of intellectual property rights, especially for women innovators.

Transitioning to commercial farming practices is crucial for farmers' profitability. Therefore, policies should create a conducive environment for smallholder farmers to adopt modern farming techniques, improve their production efficiency, and increase their income. Additionally, women and youth need access to affordable land, financial resources, and technical training. This will enable them to access local and international markets, capitalizing on opportunities presented by the African Continental Free Trade Area (AfCFTA).

Strengthen government support: Government laboratories exist, but are not fully functional and accessible to farmers. Despite this, farmers continue to seek her advice on feed formulations.

Neo would greatly benefit from having a business partner bringing additional expertise and capital to venture into export markets.


feeds
native
A healthy animal, A delighted farmer


CATTLE MEAL

SMALL STOCK
MEAL


Land Access and Agroecology: Empowering Women Farmers Through Community Co-learning (FSC04)

Context: the critical role of land access and utilisation

Land rights are crucial for economic and social development, especially in rural areas where agriculture is the main livelihood. However, women face significant barriers to accessing and owning land in many parts of Africa. This not only undermines their economic stability but also perpetuates gender inequality and limits their contribution to community development.

The lack of women's land rights has far-reaching implications for economic development, social equality, and environmental sustainability. Discriminatory laws, customs, and practices often restrict women's land rights, leaving them dependent on male relatives. Even where legal frameworks exist, enforcement is weak, and social norms favour men.

Without secure land rights, women are less likely to invest in land improvements or adopt sustainable farming practices, leading to lower agricultural productivity and reduced food security. Land ownership is often a prerequisite for accessing credit and financial services, and without land titles, women cannot use land as collateral, limiting their economic opportunities and perpetuating poverty.

Women without secure land rights are more vulnerable to exploitation and displacement, especially during crises. This lack of rights reinforces gender inequality, undermining women's status and limiting their participation in decision-making and leadership roles.

Secure land rights are linked to better health and well-being for women and their families, as women with land rights are more likely to invest in nutritious food, healthcare, and education for their children. Addressing this issue requires legal reforms, education, support services, and community engagement. Rural communities in Uganda and women producers are working to overcome these obstacles and improve the sustainability of their food production.

Eastern and Southern Africa Small-scale Farmers' Forum Uganda: Strengthening women's rights and co-learning through collective action

Eastern and Southern Africa Small-scale Farmers' Forum (ESAFF) is a network of small-scale farmers in 15 countries across Eastern and Southern Africa, including Uganda, South Sudan, Rwanda, Burundi, Kenya, Tanzania, Swaziland, Zambia, Zimbabwe, Malawi, South Africa, Lesotho, DR Congo, Madagascar, Seychelles, and Mozambique. It was launched at the World Summit on Sustainable Development (WSSD) in 2002 in South Africa to create a forum to unite small-scale farmers into a social movement to influence favourable agricultural policies and practices at various levels.

ESAFF Uganda was officially registered in 2008 and is now the largest small-scale farmer-led advocacy movement in Uganda. It was created to amplify the voices of smallholder farmers and aims to influence policies and practices for a Just and Resilient Food System led by small-scale farmers. ESAFF Uganda currently has 12,588 farmer groups/ organizations in 54 districts, representing over 765,560 individual small-scale farmers, of which 67 percent are women. There are 114 learning centres, including farmer field schools, community agroecology schools, organic demonstration centres, and agroecology clubs. The organization has supported 173,412 small-scale farmers in improving resilience to climate change, accessing extension services, and entering markets. ESAFF Uganda is committed to inclusive and equitable food systems, with a strong focus on agroecology and climate justice. Access to land is a critical issue for women farmers in Uganda. ESAFF Uganda advocates for secure land rights

for women, recognizing that land ownership is essential for economic independence and agricultural productivity. Many women in remote rural areas face unequal distribution of farming benefits, with husbands often controlling the land and income, stifling their economic independence. Through cooperative groups and advocacy efforts, women farmers navigate barriers to land access, ensuring they can fully participate in agricultural activities and benefit from their labour. ESAFF Uganda is also part of La Via Campesina (LVC).

Women empowerment and co-learning are critical components of sustainable development, particularly in agriculture. In Uganda, ESAFF has been at the forefront of these efforts, creating platforms and initiatives that empower women farmers and promote collective learning.

Awareness and Education: Raising awareness about women's land rights and providing education on legal rights and land management can empower women to claim and defend their land rights. ESAFF's community-based programs and campaigns play a crucial role in changing social norms and attitudes. Providing legal aid, financial services, and technical support to women can help them secure land rights and improve their agricultural productivity. This includes access to credit, training in sustainable farming practices, and support for land registration processes.

Community Engagement: Engaging men and community leaders in promoting women's land rights is essential for creating an inclusive and supportive environment. The communities observe that collaborative approaches that involve all stakeholders can lead to more sustainable and equitable outcomes.

Enhancing climate justice and women small-scale farmers' climate resilience through agroecology: Secure land rights empower women to choose climate-resilient agricultural practices, such as agroforestry and soil conservation. These practices are crucial for adapting to climate change impacts and ensuring the resilience of rural communities. ESAFF activities focus on helping women farmers adopt sustainable farming practices, improve productivity, and enhance market competitiveness.

Goli-Mori Agro Enterprise, established in 2019, is located in Subbe Sub-county, Adjumani district in Uganda. Its membership is 30, including 21 women, and it aims to provide income for small-scale farmers, especially women and youth. The group recently acquired four acres of land to cultivate okra and other indigenous crops. One of the members offered this land, and an agreement was signed with the leaders. The okra is cultivated and sold both fresh and as value-added products, including dried and packaged seeds, okra powder, and ground and roasted okra coffee, which is in high demand due to its unique flavour and higher nutritional value.

Thanks to a business planning grant provided by the Agroecology Fund through an agreement with ESAFF, Goli Mori acquired a new okra milling machine. This game-changing equipment will help them enhance their unique products, including ground okra and a special roasted okra seed tea blend, benefiting the local community and refugees.

Goli-Mori Agro Enterprise is now set to expand its horizons by exporting its high-quality okra products to Southern Sudan. It aims to improve the packaging and branding to attract new consumers. The enterprise also grows soya beans, sesame, and cassava to diversify its income sources.

Support from ESAFF has focused on building leadership, establishing management structures, supporting registration with the Uganda Registration Services Bureau, and providing essential equipment, including the okra milling machine.

The Mumbuzi Agroecology School Enterprise utilizes leased land from the Mubuku Irrigation Scheme, which was intensively farmed in the 1960s. Over the years, the scheme's monoculture practices have

led to excessive use of agricultural chemicals, including pesticides and fertilizers. This has resulted in water, air, and soil contamination, damaging the ecosystem and degrading the environment and soil quality.

The Mumbuzi Agroecology School Enterprise was established with the goal of transitioning to sustainable, agroecological farming on community-controlled land. The smallholder community, consisting of 25 members—21 women—acquires skills and knowledge in agroecology, regenerative agriculture, and entrepreneurship, enabling them to cultivate cassava using ecological methods. The enterprise chose cassava because it is versatile, less labour-intensive, drought-tolerant, does not require agro inputs, and can grow in various soil types. The group intercrops cassava with other crops like groundnuts and beans to maximize limited space.

The enterprise grows cassava for commercial purposes. With support from the Agroecology Business Hub, the enterprise acquired a cassava milling machine to facilitate value addition and reduce production costs. The resulting cassava flour has a longer shelf life, and generates high revenue and is available on KilimoMart. KilimoMart an online platform focused on bridging the gap between consumers and small-scale organic farmers, fostering a sustainable and equitable marketplace.

It is also sold to neighbouring communities in Kasese. Additionally, they sell starch and dried cassava chips, which are in high demand in the community and the nearby Congo region. This initiative has significantly improved the livelihoods of its members. The leadership team is entirely female. The ESAFF Agroecology Business Hub has supported the Enterprise to formalize its operations through registration with the Uganda Registration Services Bureau (URSB).

The Kwegatta Gemnayi Community Association (KGCA) is a women-led enterprise in the Masaka district, Kimanya B. The association comprises 17 members, including 13 women and 4 men. KGCA focuses on recycling both organic and inorganic waste within the community to save energy, protect the environment, and improve health through safe cooking practices. They produce charcoal briquettes from organic waste and pavers from inorganic waste. The enterprise has created employment opportunities for youth and women in collecting, sorting, and processing waste. Additionally, KGCA has trained community members in briquette production and its benefits. This enterprise manages waste efficiently and contributes to broader goals of environmental sustainability and resource conservation. Supported by ESAFF Uganda through the Agroecology Business Hub, the enterprise has scaled up its business. They received a water tank to aid in water harvesting, essential for briquette production, which requires significant water usage. The enterprise significantly benefits the community by reducing the economic burden of waste disposal and landfill management.

The group also cultivates local yam and sells their produce collectively using a Participatory Guarantee System (PGS), thereby enhancing the livelihoods of its members and those buying the yams. The enterprise produces liquid soap as an alternative source of income for its members. Group members save money collectively and contribute to the group's efforts. Part of these savings is invested in the enterprise through the acquisition of production equipment, while the rest is lent to members at a small interest rate to support their other activities. Additionally, the enterprise has undergone various business trainings provided by the Agroecology Business Hub. As a result, they have enhanced their marketing efforts by utilizing social media platforms, including YouTube and Facebook, which have attracted more customers.

Creating a supportive innovation system: Fostering innovation through co-learning and community engagement.

One of ESAFF Uganda's key areas of focus is women's empowerment and co-learning. By promoting gender equality, enhancing decision-making capabilities, and fostering collective learning, ESAFF Uganda aims to empower women farmers and create a more inclusive and equitable agricultural system to drive sustainable development and social change.

Integrating agroecology into school curriculum: The Agroecology Club is a community within a learning institution where students can gain practical experience with sustainable food systems. They integrate agroecology into the school curriculum and supplement dietary diversity in school food menus. To upscale this initiative, ESAFF Uganda partners with development partners like Agroecology Fund and Humundi to facilitate and strengthen the club structures in various districts across Uganda. These efforts support the transition to a more eco-friendly and sustainable food system.

Agroecology Business Hub: This initiative supports small-scale farmers, especially women, by providing training and resources to improve their livelihoods through enterprise development, market access, and financial resources. Women emphasized the need to preserve indigenous seeds, which are disappearing due to climate change and land rights challenges.

Community Agroecology Schools (CAS) and agroecology clubs: CAS are community-based learning platforms where farmers come together to share experiences and knowledge in farming. These schools operate on principles of community mobilization and peer-to-peer learning. Farmers learn about pest control, market access, and income generation, which they replicate on their farms and households. CAS fosters a sense of community and collective action, enhancing the resilience and productivity of small-scale farmers. They use agroecology gardens, operate a curriculum of the group's choice, and carry out collective business ventures supported by the Agroecology Business Hub (ABH), which provides entrepreneurial skills focusing on agroecology to women. Farmers are mentored to undertake farming as a business through training, business development initiatives, and mentorship. The Hub connects farmers with agroecological products to organic markets, including KilimoMart and other local markets.

Agroecology clubs provide students practical experience in sustainable food systems, promoting environmental stewardship and healthy diets. Activities like tree planting, agroecology poem writing competitions, and agroecology gardens offer hands-on learning opportunities. They learn about making compost manure, mulching, irrigation, production and use of organic fertilisers, and integration of livestock to strengthen ecological interaction. This teaches members vital and sustainable agricultural skills and promotes a greater appreciation for fresh, nutritious meals for a healthy diet at school.

Agroecology gardens in schools improve nutrition by increasing access to fresh, nutritious food while simultaneously fostering education, advancing healthy diets, and cultivating environmental stewardship in students and the larger community.

Gender Action Learning System (GALS): ESAFF Uganda employs the Gender Action Learning System (GALS) methodology to empower women by enhancing their decision-making capabilities and promoting gender equality within households and communities. An essential feature of the GALS is that it motivates behavioural change in households, which fuels wider change through peer-sharing.

Gender inequalities that have existed for generations are discussed, strengthening negotiation power of marginalized stakeholders and promoting collaboration, equity and respect between value chain

actors. Women encourage the girls to participate in community farming initiatives and take advantage of programs aimed at increasing access to resources for young women in agriculture.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Empowerment of women farmers: Women farmers have reported increased confidence and decision-making power within their households and communities. They have also gained better access to markets and financial resources, improving livelihoods and economic independence.

Growth of the agroecology movement: The grassroots agroecology movement is expanding, with Community Agroecology Schools (CAS) open to individuals from all walks of life, including teachers, nurses, and local leaders.

Market and financial access: Improved access to markets provides financial resources and leads to greater economic independence and sustainability of agricultural practices.

Community involvement and co-learning: The involvement of diverse community members in agroecology schools fosters a broad-based movement, enhancing knowledge sharing and community resilience. Peer learning initiatives and farmer-to-farmer learning ensure the dissemination of best practices and continuous improvement in agricultural methods.

Recognition of land rights: Advocacy for women's land rights ensures that women can fully engage in agricultural activities, leading to better resource management and productivity.

Business registration and certification: Registering agroecological businesses and using certification systems like the Participatory Guarantee System help maintain standards and build consumer trust.

Collaborative research and solutions: Joint research helps develop tailored solutions for local agricultural challenges, promoting innovation and sustainability (use of biofertilisers).

Technical support from officials: Support from local district officials, who have shown interest in the community agroecology schools, provides technical expertise and resources, strengthening the overall agricultural framework.

Partnerships: ESAFF is a member of the World Rural Forum, a plural network that promotes family farming and sustainable rural development. They collaborate with RUFORUM, FAO, and other organisations involved in capacity development and research (NARO) on the recognition of farmer seed varieties. ESAFF Uganda has partnerships with SEATINI, CSBAG, NACCRI, PELUM, and Line ministries.

Challenges and recommendations

Poor infrastructure: Improved infrastructure and stronger adoption of digital platforms are needed to access new market opportunities.

Limited platforms to foster innovations: Platforms to foster innovations, knowledge sharing, capacity strengthening, and co-creation of business ideas should be established at the community level, linking with national and regional platforms.

Limited investments in agricultural research and innovation: There is a need for increased investment in agricultural research and innovation, both at the national and international levels, to address the specific needs of women in agriculture.

Empowering Women for Fairer and More Resilient Ethiopia's Coffee Value Chains (FSC05)

Context

Ethiopia is the world's fifth-largest coffee producer and Africa's top producer. While generating 24% of Ethiopia's export income, half of the coffee produced in Ethiopia remains within the country for local consumption. Around 86% of the coffee producers are smallholder farmers. A key challenge is climate change, with increasing temperature and reduced rainfall, making many coffee-growing areas less suitable for coffee cultivation in Ethiopia.

Despite 70% of the coffee value chain being driven by women, many gender norms and patriarchal principles limit the productivity and benefits to women smallholder farmers in Ethiopia. In general, women smallholder farmers in Ethiopia are actively involved in farming activities such as sowing, weeding, and harvesting. However, they have limited access to agricultural land, information, extension services, and agricultural inputs, especially women in male-headed households. Married women cannot access credit without spousal consent or by applying with their husbands. Women's human capital is generally lower than men's, including their formal education status. With women's limited access to both means of production and benefits from outcomes, agricultural innovations may not only fail to transform food systems, but they may even result in negative consequences.[1]

Ethiopia Women's Participation in and benefits from local and Global Coffee Markets

In 2022, Ethiopia had a 17% share of the USD127 billion global coffee market. Global market insights predict that Ethiopian coffee sales on global markets will increase at a compound annual growth rate (CAGR) of 4.72% from 2023 to 2030 and reach 1.26 million Metric Tons (MT) by 2033. Closing the gender gap in agricultural productivity in Ethiopia would increase total GDP by at least $200 million and lift more than 1,000,000 people out of poverty.[2]

This is why the Women in Coffee Ethiopia (EWiC) association was established and legally registered to equip women with the relevant skills to help them become competitive in a dynamic local and global coffee industry. EWiC invests in practical training, projects, and events, actively advancing women's roles within the coffee value chain and empowering them with skills, resources, and economic opportunities. In April 2017, EWiC signed an MOU to become a chapter member of the International Women's Coffee Alliance (IWCA), a global network of the international coffee community, with 33 members from various countries. EWiC leverages the network to increase market access and uplift rural women in coffee production, processing, and trade.

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[1] Meseret Tsige, Gry Synnevåg, and Jens B. Aune, "Exploring Effects of Climate-Smart Agriculture Innovations on Women Smallholders' Livelihoods in Ethiopia," *Environment, Development and Sustainability*, https://doi.org/10.1007/s10668-024-05070-x .

[2] Ministry of Agriculture and Natural Resources et al., "The Cost of the Gender Gap in Agricultural Productivity in Ethiopia". Ethiopia's Ministry of Agriculture and Natural Resources, UN Women, UNDP and UN Environment. https://africa.unwomen.org/sites/default/files/Field%20Office%20Africa/Attachments/Publications/2018/04/Study%20Report%20The%20Cost%20of%20the%20%20Gender%20Gap%20%20in%20%20Agricultural%20Productivity%20%20in%20%20Ethiopia%20Finalcompresse.pdf .

Fostering Innovation, gender equality, and sustainability through the Women, Coffee, and Climate initiative, EWiC empowers and supports women-owned coffee companies in Ethiopia. It provides its members with access to benefits designed to enhance their business growth and foster a vibrant community of like-minded individuals. The organization's key services include networking, business development support, market visibility, and collaborative opportunities.

Since Ethiopian coffee farmers receive only a fraction of the retail price and face unnecessary intervention from brokers, their ability to compete with established producers with better market infrastructures is reduced. Therefore, EWiC is implementing the Women, Coffee, and Climate initiative, with funding support from The European Union and Spanish Cooperation. This initiative aims to improve gender equality and sustainability in the Ethiopian coffee sector through eco-efficiency, social innovation, and South-South cooperation. It also empowers women for the socio-ecological resilience climate change in the Coffee Value Chain.

The initiative is being implemented in over five regions in Ethiopia and has reached over 800 participants, mostly women, through workshops, conventions, and policy dialogues. A key element of the program is the "family approach," where training and resources are designed to be accessible to both women and their husbands. This approach builds gender inclusivity and encourages the participation of women in all roles, from farm labor to leadership, intending to prevent resentment or unexpected outcomes at the household level.

Creating a Supportive Innovation System: Relationship with Research, Policy, and Private Sector Partners

With over 330 individual and cooperative members, EWiC collaborates with research and development partners to access technical support and policy development. Partnerships with the Ministry of Agriculture, the Ethiopia Coffee and Tea Authority (ECTA), DeSIRA-LIFT, GIZ, and other coffee training facilities have been essential for co-designing policies directly impacting women farmers, promoting better agronomic practices, and improving access to finance and markets.

Through partnerships with private-sector researchers, training materials have been developed to enhance and train women in business and basic life skills. Recognizing the level of input and labor women put into coffee production, in-depth research was carried out to better understand the benefits for women in coffee production and the necessary climate actions in Ethiopia. Collaboration with the Ethiopia Coffee and Tea Authority (ECTA) and the Ministry of Agriculture offered more significant support and infrastructure for outreach, making it possible to develop training schedules that align with women's availability.

The training for women in coffee involved developing a strong business acumen to view their coffee production as a business. Basic life skills training was critical to boost women's confidence, which has been oppressed due to social, cultural, and religious issues in the country. The life skills training has allowed the women to learn basic healthcare, hygiene, self-awareness, and how valuable they can be at home, in the community, and business. Additional skills provided to the women include climate-smart practices, post-harvest management, maintaining the moisture level, and different quality levels of red cherry beans. Women in the coffee value chain are also trained to understand their products' grading and price value.

Factors contributing to successful women-led innovation and gender-equitable outcomes

From labourers to leaders: Through strategic partnerships with international organizations and market linkage opportunities, Women in Coffee Ethiopia has created networking, training, and

resource-sharing platforms to support women's empowerment and shift mindsets from labour to leadership.

Addressing structural barriers: The Women, Coffee, and Climate initiative addresses barriers, such as limited market access and training, while advocating for gender-inclusive policies and practices.

Changing Perceptions: There has been a notable shift in the community's view of women's roles in coffee production. Women are increasingly seen as capable of more than traditional tasks like collecting and sowing beans. Now, they receive direct training previously reserved for men, enhancing their technical skills and confidence.

Behavioural shifts: Men and women in the community have become more accepting of women's involvement in coffee production, resulting in more inclusive training sessions and a rising demand for setting up women-led cooperatives.

Adoption of climate-smart practices: With technical skills in agronomy and business management, women have started adopting improved practices that increase coffee quality and contribute to better livelihoods in the local communities.

Increased capacity building: To date, 60 women have completed training sessions in essential skills, including basic life, business skills, and post-harvest management.

Policy engagement: Policy recommendations have been proposed through dialogues involving over 80 participants and conventions, supported by organizations like Spanish Cooperation, that drew over 800 participants, including government stakeholders.

Positive feedback and community response: The family-centred training approach has received overwhelmingly positive feedback, with many requesting additional training and technological support to implement what they are learning.

Up-scaling and Out-scaling

Establishing cooperatives: Women-led cooperatives provide a structured way for women to collectively organize, access resources, and negotiate better rates within the coffee value chain.

Expanding training reach: With better funding, the project will extend training to more remote villages, bringing training sessions directly to local communities. This will address the challenges of women attending the training late and leaving early due to the long distance between the venue and their homes.

Data-driven interventions: Collecting gender-disaggregated data on labour and access to resources in the coffee sector supports the development of targeted programs and policy recommendations to address specific barriers faced by women.

Remaining Challenges Faced by EWiC and Overcoming Obstacles

Lack of equipment: Limited funding constrained the initiative's ability to provide the necessary equipment, such as raised beds and coffee machines. This limited the initiative's reach and ability to implement selective picking practices essential for high-quality coffee production.

Competing demands: Many women could not attend or complete training due to household duties. To address this, training sessions were adapted for flexible timings to accommodate women's schedules. However, without sufficient resources and proper infrastructure, training reach remains limited.

Security Concerns: Some regions faced security issues, restricting the team's ability to conduct training sessions in those areas.

Recommendations

Partnerships for a robust monitoring and evaluation mechanism: EWiC needs to strengthen its partnerships with research organizations to increase the pool of relevant and real-time data, such as gender-disaggregated data, market trends, technology, and capacity needs, to help identify gaps in access to resources and labour contributions, enabling more targeted interventions. Likewise, defining the number of women and specific areas to reach will allow for better planning and impact measurement.

Problem-specific approaches: Analysing and segmenting women's issues in the coffee sector helps refine and effectively target solutions.

Strengthened partnerships with policymakers: Given that governments have better extension structures than the associations, the involvement of the relevant authorities allows for a wider reach for women in Ethiopia.

Implement inclusive policies: To further support women in the coffee value chain, it is essential to implement policies that promote gender equality and provide women with greater access to resources. This includes land ownership rights, financial services, and educational opportunities.

Women's Empowerment Through Sustainable Agriculture: The Journey of Benczedi Kékéli Farm (FSC06)

Context

Women-led cooperatives in West Africa play a crucial role in agricultural production and economic empowerment. These cooperatives often utilize traditional knowledge and sustainable practices. Most women-led cooperatives focus on value chain development, accessing markets, and providing training and resources to improve the livelihoods of women farmers[1]. On the other hand, sustainable agriculture is growing fast in West Africa, whereby countries such as Senegal, Burkina Faso, and Togo have adopted policies supporting agroecology[2].

In Togo, for example, the agricultural sector employs more than 60% of the active population, making job creation through sustainable agriculture a key strategy for reducing unemployment. Despite agroecological diversity being conducive to the development of food and nutritional security and growth, an estimated 55 percent of arable land in Togo lies unused. As such, research efforts are intensifying production, and market integration opportunities given that agricultural sector is dominated by family farms, vulnerable to climate change, with limited access to inputs and produce low yields[3].

Located in Agotimé-Akoumassi (Tsikoé), about thirty kilometres from Kpalimé, Benczedi Kékéli Farm —meaning "light" in Ewe—is a model agricultural enterprise built on 100% organic production. Led by Mrs. Benczedi Bolouvi Abra, this initiative combines women's empowerment, the promotion of sustainable agriculture, and local development. Abra is a committed farmer who manages nearly 200 hectares of land and employs around fifty full-time workers. Her vision goes beyond production; it embraces a broader social and economic development goal for rural communities.

A Calling Rooted in the Land

Behind Benczedi Kékéli Farm lies the remarkable journey of Togolese agricultural entrepreneur Benczedi Bolouvi Abra, a mother of three married to Daniel Benczedi, a Swiss national whom she considers her main support in this venture. Her love for the land was nurtured in childhood, growing up alongside her grandfather, a, a passionate subsistence farmer who passed down his love for agriculture, a legacy she chose to cultivate with determination.

In 2003, driven by a desire to contribute to her country's development, Mrs. Benczedi made a bold decision: she left a stable, well-paying position at the World Health Organization in Switzerland to

[1] African Development Bank, "Cote d'Ivoire - Women Led Staple Food Cooperatives Advisory Project (AFAWA) – Project Completion Report," Text (Abidjan, Cote d' Ivoire: AfDB, April 17, 2023), https://www.afdb.org/en/documents/cote-divoire-women-led-staple-food-cooperatives-advisory-project-afawa-project-completion-report.

[2] Goïta, M., Frison, E. "For Sustainable Agriculture in West Africa, Let's Leave Our Echo Chambers," *African Arguments* (blog), September 22, 2020, https://africanarguments.org/2020/09/for-sustainable-agriculture-in-west-africa-lets-leave-our-echo-chambers/.

[3] Jatta, S., Mc Grenra, D., Kaboré, P. "Togo Country Strategic Opportunities Programme 2022-2027" (Rome, Italy, December 13, 2021), https://www.ifad.org/en/w/corporate-documents/regions-countries/togo-country-strategic-opportunities-programme.

devote herself entirely to farming in Togo. Using her funds, she launched her farm with a clear mission: to create opportunities for her fellow citizens and build a business serving the community.

The farm began with 80 hectares dedicated to cattle and sheep breeding and a large oil palm plantation. Soon after, a small processing unit was installed to produce high-quality, healthy red palm oil for the local market. An additional 30 hectares were then developed for the organic cultivation of plantains for national consumption. In 2015, the farm expanded again with 80 hectares dedicated to cocoa cultivation, aiming at export markets.

Innovation and Diversification

Benczedi Kékéli Farm stands out for its integrated model, combining agricultural diversification with social responsibility. Initially focused on livestock, the farm evolved into cultivating high-value crops: palm oil, organic plantains, and later, organic cocoa. This strategy is supported by innovative technical choices, particularly the use of agroforestry in cocoa plantations. This system fosters a harmonious coexistence between crops and forest trees, contributing to local biodiversity conservation. The farm also includes a 24-hectare protected area where all human activity is prohibited.

In 2022, to further strengthen quality and local capacity, the farm, with support from GIZ, established a cocoa fermentation and drying unit (UFS). All other infrastructure was financed through the farm's own resources, reflecting the resilience and independence of this long-term vision-driven agricultural enterprise.

Social, Economic, and Environmental Impact

The scope of this initiative extends well beyond agriculture.

- **Socially**: Mrs. Benczedi founded the Kékéli Secular Private School (EPL Kékéli), a tuition-free institution for the children of farm workers and nearby villages (Ablévé, Agbavé, Tsikoé). The school, employing four full-time teachers, was established in response to the pressing issue of children walking up to 8 kilometres daily to attend school. Through this effort, Mrs. Benczedi aims to break down barriers to education and help children dream bigger.
- **Economically**: The business provides stable employment to nearly 50 local workers, offering reliable income that strengthens rural economies and restores workers' dignity.
- **Environmentally**: Beyond the protected forest zone, the farm actively promotes sustainable practices through agroforestry, preserving century-old trees on its land. This approach reflects a strong commitment to conserving natural resources.

In 2019, Mrs. Benczedi launched the SCOOPS KEKELI cooperative, bringing together about 120 women from the start around organic cocoa production. She fosters women's economic inclusion, land access, and progressive empowerment through training, awareness-raising, and cooperative structuring. Some women have become landowners or now farm their plots.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Benczedi Bolouvi Abra manages Benczedi Kékéli Farm, specializing in cocoa, palm oil, and *sodabi* production. She also leads the marketing and import-export company HONLON Sarl U, which is active in the cocoa sector. She is the founder of the nonprofit primary school EPL Kékéli.

A woman of both action and conviction, she continues to promote a female entrepreneurial model that is rigorous, collaborative, and impact-driven. According to her, the success of a woman-led business relies on discipline, effective coordination, and the ability to work in synergy with others.

Through Benczedi Kékéli Farm, a vision for Togolese agriculture is taking shape, whereby she is drawing lessons from other value chain actors and key partners to anchor her business in the right values, sustainability practices, and social transformation.

Challenges

Despite agriculture's critical role in Togo, some farming practices threaten the environment and sustainable agricultural production. Studies reveal that unfriendly ecosystem farming practices create a condition that makes agricultural production costly, and this traps future generations in a vicious poverty cycle, and the rural poor are the most disadvantaged[4]. On the other hand, fragmentation in the ECOWAS region has led to incoherent and inefficient policies, posing a challenge in transitioning to sustainable agricultural practices.

World Bank Group's report (2023) show that Togo's labour market is characterized by high levels of informality and underemployment, despite the large cohorts of young people entering the labour market every year. It is therefore estimated that Togo will need to create 200,000 high quality new jobs every year to absorb the influx of new entrants into the labour market[5]. Currently, the farm's primary challenge lies in consolidating and gradually improving its production yield and quality cycle of years of hard work. With the long-term goal of passing on her expertise to future generations, Mrs. Benczedi also wishes to share her experience with the youth looking to enter the agricultural job market.

However, climate change is another reality beyond this desire to integrate technology into production activities and increase market access to build a more resilient and sustainable agriculture, and increase employment opportunities for the youth.

Conclusion and Recommendations

A pillar of her personal and professional commitment, Benczedi Kékéli Farm represents the culmination of years of work, resilience, and innovation in service of a modern and inclusive agriculture. Drawing from her experience, Mrs. Benczedi emphasizes that women have a complete and rightful place in this sector, and that it is possible to move beyond subsistence farming to build successful agricultural enterprises.

Nevertheless, structural challenges remain. She calls on relevant authorities to increase their support, particularly by promoting small-scale mechanization, now essential in a context of dwindling agricultural labour. She also recommends the creation of platforms for exchange between sector stakeholders and systems for continuous training and follow-up to enhance producers' capacities. Finally, she advocates for actively guiding young people toward agricultural careers—a promising path to prosperity and stability. As she passionately states, *"The land does not lie.*

[4] Agula, C. et al., "Promoting Sustainable Agriculture in Africa through Ecosystem-Based Farm Management Practices: Evidence from Ghana," *Agriculture & Food Security* 7, no. 1 (March 1, 2018): 5, https://doi.org/10.1186/s40066-018-0157-5.

[5] Kroll, G. "Togo: Economic Inclusion of Youth and Women into High Potential Value Chains," Social Protection & Jobs (Washington DC, USA: The World Bank, November 2023), https://documents1.worldbank.org/curated/en/099110623130525072/pdf/P175453020a2f30d082180cfd5f9c7cf04.pdf.


APSONIC

Expanding Dietary Diversity with African Indigenous Vegetables Towards a Sustainable Food System in Uganda (FSC07)

Context

Rural agriculture in Africa is heavily dependent on rainfall, making it vulnerable to climate variability. This variability frequently reduces farm productivity and, in turn, limits availability and access to food. Additionally, changing dietary preferences associated with urbanisation, and the prolonged practice of monoculture with exotic crops have led to biodiversity loss, degradation of natural resources, and a decline in dietary diversity.[1] Diets in sub-Saharan Africa often have a high reliance on cereals, with insufficient consumption of fruits and vegetables. To promote sustainable food system transformation in the region, efforts should focus on understanding the drivers behind the declining use of African Leafy Vegetables (ALVs) and find ways to retain and strengthen these value chains, which are traditional staples in many diets.

African Indigenous Vegetables (AIVs) are rich in essential vitamins, minerals, micronutrients, supplementary protein, fibre, and calories[2]. Despite their significant nutritional value, research programs in most African countries have not prioritized these vegetables. Examples of these vegetables include amaranths, scarlet eggplant, African nightshade, African eggplant, jute mallow, spider plant, green cowpea, and pumpkin, among others yet to be scientifically explored. Despite the abundance of diverse vegetable varieties across East African countries, there is an increasingly heavy reliance on crops not adapted to the African Agriculture Innovation System. This is particularly frustrating given that Indigenous vegetables are well-adapted to the environment and, therefore, are resilient to the negative impacts of climate change in agricultural systems and are nutrition-sensitive.

AIVs and gender

Despite studies revealing that AIVs have made the transition from "poor people's food" to a cash crop in Kenya[3], some men are still not interested in growing them due to the traditional perception that AIVs are not economically viable. Therefore, men let women take the lead. This results in more independence, decision-making, and improved income, particularly for women.

Professor Elizabeth Kizito from Uganda Christian University (UCU): Women leading in finding sustainable solutions for a resilient food system.

A woman researcher, Professor Elizabeth Kizito from Uganda Christian University (UCU), was motivated by the challenges of adopting crops not adapted to the African ecosystems to begin her research on African Leafy Vegetables. African leafy vegetables (ALVs) aredefined as plant species that are either genuinely nativeto a

[1] FAO, *Compendium of Forgotten Foods in Africa* (Accra, Ghana: FAO, 2024), https://openknowledge.fao.org/items/d2e7ab4b-0035-45d2-b643-4ac4d75b3684

[2] CABI. (2019, September 27). *How African Indigenous Vegetables production in Uganda revealed empowered women but struggles in the private sector*. CABI Blog. https://blog.cabi.org/2019/09/27/how-african-indigenous-vegetables-production-in-uganda-revealed-empowered-women-but-struggles-in-the-private-sector/

[3] Krause, H., Faße, A., Grote, U. (2019). Welfare and food security effects of commercializing African indigenous vegetables in Kenya. *Cogent Food & Agriculture*, *5*(1). https://doi.org/10.1080/23311932.2019.1700031

particular region or were introduced to that region long enough to have evolved through natural processes or farmer selection.[4] They are primarily gathered from the wild and rarely cultivated despite their advantages over exotic vegetable species, such as dietary diversity and adaptability. From her studies, it is becoming increasingly clear that the agriculture research community still classifies these crops as neglected and underutilized species despite their significant potential in the food system. If male dominated their cultivation, they would have had more support. Given that the food system is integral to human capital development, job creation, and industrial growth, it is noteworthy that despite the potential benefits these underutilized foods could bring to Africa's food systems and women's empowerment, they have not received adequate research and development attention, nor investment.

Prof. Kizito confirms the dire need for improved nutrition and dietary diversity, especially in Uganda, her home country. She states, "*We continue to experience nutrition challenges at the household level. The statistics are screaming at us to find solutions that are within reach."* In East Africa, for example, about 4 in every 10 children and equivalent of about 35% are stunted, while about 3.5% of children below five years of age are wasted. Uganda is among the countries in East Africa with high levels of undernutrition, with some 29% or 3 in 10 children below five years of age stunted, while about 3.5% of all children below five years of age in Uganda are faced with body wasting.[5] Diversifying food production with forgotten food crops in sub-Saharan Africa could significantly improve climate resilience and dietary health among children, women, men, and youth.

Prof. Kizito's research on underutilized foods revealed the remarkable potential of African vegetables. In a three-month feeding trial with participants aged 50 and above in Mukono municipality, results showed significant health improvements, including reduced gut issues and better blood sugar management. Her research, a significant portion supported by FARA, paved the way for groundbreaking achievements, from sequencing the first-ever genome of *Solanum aethiopicum* to the release of new *Solanum* varieties. Her research team now has promising candidate lines ready for multilocation trials, underscoring the immense potential of African veggies in promoting health and agricultural innovation. She confirms that African Leafy Vegetables are generally easy to cultivate.

"These are the kinds of seeds that you throw out of the window, and you will get a harvest, whether you have watered them or not or with minimal attention."

To ensure inclusivity and gender equity, Prof. Kizito adopts the Integrated Agriculture Research for Development (IAR4D) approach, involving multi-stakeholder partnerships that include farmers, researchers, transporters, input suppliers, farmer organizations, marketers, consumers, and processors, among other value chain actors. Most importantly, she emphasizes a market-oriented approach where technologies and research products are developed with a market in mind. This approach has been successfully implemented with women and youth gaining direct access to markets and private sector partnerships with financiers and processors. So far, over nine agriculture innovation platforms have been established in Uganda to enhance the African Leafy Vegetables and set up agribusiness learning alliances in collaboration with partners in Kenya and Rwanda to increase market access for women and youth.

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[4] Maseko, I. et al., "African Leafy Vegetables: A Review of Status, Production and Utilization in South Africa," *Sustainability* 10 (December 22, 2017): 16, https://doi.org/10.3390/su10010016.

[5] Namugumya, B.S., Nakimuli-Mpungu, E., Muganzi, D. J., Wandera, S. O., & Matovu, J. K. B. (2023). Prevalence and factors associated with undernutrition among children aged 6–59 months living with HIV in Uganda: A cross-sectional study. BMC Public Health, 23(1), 15214. https://doi.org/10.1186/s12889-023-15214-9

Creating a supportive innovation system

Prof. Kizito attributes the initial research on AIV to the Forum for Agricultural Research in Africa (FARA) and the Platform for African European Partnership on Agricultural Research for Development (PAEPARD), in which she led a project focusing on enhancing nutrition security and incomes by adding value to indigenous vegetables in East and Central Uganda. Her work on the Indigenous vegetables project looked at the seasonality of the supply of vegetables, long distances between production areas and potential consumption centres, and poor post-harvest handling.

Further research has been conducted in collaboration with the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), the World Academy of Sciences (TWAS), the Dutch Research Council-WOTRO Science for Global Development (NWO/WOTRO), and the Global Challenges Research Fund (GCRF). The Uganda Christian University Research Fund has contributed significantly to advancing the development of indigenous vegetables in Uganda.

Uganda farmers benefit from some favourable agricultural policies, as small-scale farmers are not taxed, and agro-input imports are subsidized, creating a conducive environment to further developing the African Leafy Vegetables value chains. Effective mobilization strategies are needed to contribute to a resilient food system, especially once potential markets are identified and supported.

Scaling innovations: The role of research in leveraging finance and markets for women business

Factors contributing to successful women-led innovation and gender-equitable outcomes

Increasing markets and economic opportunities: A study conducted through the Platform for African European Partnership on Agricultural Research for Development (PAEPARD) project revealed that approximately 8 tons of African Leafy vegetables are purchased daily in one of Uganda's largest urban markets. These vegetables generate approximately US$2,000 for farmers in a single harvest season, highlighting their significant potential to eradicate poverty and contribute to household livelihoods.

Preserving and promoting underutilized foods: Value chain development of African leafy vegetables contributes to preserving and promoting local traditional foods, supporting rural communities, and enhancing resilience and sustainability in the food system.

Establishing profitable women, and youth-led enterprises: conducting market-driven research has provided economically viable ideas and technologies leading to establishing businesses on the African leafy vegetables value chain. This has increased the income and employment opportunities for smallholders and processors, mostly women and youth.

Strengthened innovation systems: Prof. Kizito advocates for enhanced collective action to facilitate change, believing that greater gains can be achieved when various entities within the value chain work together.

Strengthening entrepreneurship acumen of smallholder farmers: Transitioning farmers from subsistence farming to entrepreneurship remains a significant issue. Due to cultural barriers, many farmers in organized groups are still reluctant to pursue major market opportunities. For instance, when women have to seek permission to trade from male figures in their lives or community leaders who might deny them the chance to engage in business negotiations with potential male business partners.

Increase capacity to collaborate: Collaborating with social scientists and extension workers to help farmers broaden their perspectives has sometimes proven effective. However, this solution faces a significant barrier—the overwhelming ratio of extension workers to farmers is often as high as 1 to 5,000, which is unmanageable.

Adoption of digital communication technology: Moreover, there is a challenge with access to information via mobile phones. A study involving approximately 6,000 farmers revealed that most farmers rely on neighbors and community leaders for information, with only about 5% using phones to access it.

Promoting agrobiodiversity and agroecological practices: Most African leafy vegetables are well-suited to African soil and require minimal care, making them accessible to many smallholder farmers. They are short-season crops, with several species getting ready for harvest minimally by three weeks of planting. These crops offer a climate-smart solution and a source of income for women responsible for their household livelihoods.

Navigating cultural barriers: Cultural aspects are strongholds that cannot be wished away. Elizabeth believes collaborative research should focus on building infrastructural and human capacity. Many times, the cultural environment influences farmers' participation in business opportunities. For example, in some communities, the group leader has the final say in decisions, which impacts group efforts. For instance, *"In one case, a leader pulled out of a contract negotiation at the last minute without providing any reasonable explanation, affecting the women, the youth, and others in the farmer group. To satisfy the industry partner, an alternative group had to be found, highlighting the need for a more inclusive and culturally sensitive approach to development."*

Addressing nutrition challenges and transforming regional food systems: At a household level, they can provide solutions to the nutrition challenges. Through observation, these vegetables are popular in most African countries, including Kenya, Uganda, Benin, Nigeria, Malawi, Zambia, and Tanzania, and they are sold in the streets. With better-developed value chains, women and youth can adopt African leafy vegetables as profitable businesses and sell them in supermarkets and organized markets.

Cultural dynamics: Indigenous vegetables are increasingly being produced on a relatively larger scale than before and are, as such, slowly transitioning to commercial production, especially in peri-urban areas. For small-scale vegetable farmers to benefit from the current trend, a significant shift in mindset is required. Collective action can facilitate this change, and the intervention from social scientists is crucial to help farmers recognize opportunities and engage actively.

Remaining challenges

Limited access to technology: Prof. Kizito highlights access to technological and infrastructural capacity as a significant challenge for researchers and innovators working with Neglected and underutilized species (NUS). Technological advancements may be available, but reliance on labs outside Uganda to implement research causes delays and logistical issues, especially when transporting products between labs and workspaces. An example includes access to high-capacity servers capable of performing bioinformatics and sequencing analyses. Often, available servers nationally or regionally are expensive to provide support, or they prioritize medical research over agricultural applications like vegetable studies. This issue is compounded when working with underutilized foods[6], as there are often no established policies or streamlined processes at the national or regional levels. Without sufficient financial resources, support for these initiatives is limited.

Shortage of skilled personnel: Secondly, there is a shortage of skilled personnel, particularly at the PhD level, including breeders, pathologists, and agronomists. Additionally, there is a pressing need for capacity building for social scientists who can work closely with farmers and help them address their challenges. Due to inherent research limitations, more training and support are needed to expand the pool of experts in these critical areas.

[6] Munoko K. M et al., "Reflection on Africa's Underutilized Foods Towards a Sustainable Food System," *Journal of Sustainable Development* 15, no. 5 (August 24, 2022): p57, https://doi.org/10.5539/jsd.v15n5p57.

Generally, research on African Leafy Vegetables is still in its infancy, making the research process complicated as there tends to be a lot of troubleshooting due to a lack of information. There is a lot that needs information, such as seed dormancy, postharvest infrastructure, and effective agronomic practices, which are essential. Entrepreneurs also need support to add value to their products, explore export opportunities, and determine the best packaging materials and methods.

Lack of streamlined regulations: Thirdly, most national research programs in Africa have traditionally prioritized staple crops like maize, rice, and potatoes, commonly consumed by indigenous populations. Most households in Africa eat these staple foods with indigenous vegetables. However, indigenous vegetable research is not prioritized or streamlined within the country's priorities. For example, the first-ever release of *Solanum aethiopicum* shum, a leafy vegetable, in Africa faced delays during its release process, primarily due to a lack of established protocols, information, or standards. Thanks to this initiative, the released varieties have formed the benchmark for future varieties because these were developed during the variety release process. This highlights the importance of generating information on the different species for developing standards.

Enhanced awareness and outreach: Awareness of the benefits of consuming African Leafy Vegetables still needs to be improved, especially in urban areas where many people are unfamiliar with their nutritional value. Awareness campaigns need to target the youth so that they can extensively benefit from existing initiatives supporting their limited financial resources and limited access to land. Furthermore, many young girls are not interested in farming and prefer better-paying alternative jobs. Prof. Kizito envisions integrating technology in vegetable farming and encouraging smart farming, attracting more young girls to participate in the value chain development process.

Recommendations

Supporting universities and/or research institutions in building capacity and fostering innovation is critical. Investing in infrastructure and human capacity to support sustainable growth and innovation often delivers better outcomes for funders and beneficiaries. Although many universities and young people have excellent ideas, funding systems are often limited, and donors need to avoid spreading resources too thin in the name of inclusivity. Insufficient funds for given research can constrain the implementation of rigorous research and limit its outcomes. Instead, planning for a long-term approach within a consortium that engages nationally and internationally for a substantial impact on food systems is better. To address this, the Forum for Agricultural Research in Africa (FARA) builds new project on previous initiatives to ensure continuity and sustainability. Consequently, FARA and its partners advocate for a sustainable, inclusive roadmap for the Africa-Europe partnership focusing on food and nutrition security, sustainable agriculture, and evidence-based policies. This collaboration, exemplified by initiatives like the AU-EU International Research Consortium (IRC) and the Long-term AU-EU Partnership for Food and Nutrition Security for Sustainable Agriculture (LEAP4FNSSA), are recommended to foster synergies among researchers, policymakers, and stakeholders to tackle innovation challenges effectively.

Critical areas of focus for Agriculture Research and Innovation practitioners include:

- Encouraging partnerships that bring together various stakeholders to enhance innovation and share resources more effectively. Maximizing synergy through collaboration recognizes that working together can yield greater results than isolated efforts.
- Ensure that funding and research are tuned to local needs and interests. A more bottom-up approach to defining the research agenda is important. Establishing well-defined objectives and targets is essential for multi-stakeholder processes and monitoring and evaluation (M&E) to accurately assess impacts.

- Pay attention to managing the dynamics within multistakeholder processes and issues such as forming, norming, and storming within teams and communities. These dynamics are critical to the success of collaborative efforts and research outcomes.
- African governments should prioritize their underutilized crops in their development plans. Governments can create favorable environments to promote the production and trade of vegetables and their products.

Empowering Women: Transforming Local Products with Label Lafié in Togo (FSC08)

Context

One of the most significant global concerns in recent years is the impact of climate change, resulting in the loss of natural resources, leading to famine, malnutrition, and ill health[1]. Sub-Saharan Africa continues to suffer from malnutrition, which is attributed to low dietary diversity, together with low production diversity. While the principle of dietary diversity is affirmed in national agricultural policies, food-based approaches are disconnected from the current agricultural production system. Neglected and Underutilized Species (NUS) are nutrient-dense, climate-resilient, profitable, and locally available/adaptable, making them fundamental to improving nutrition, dietary, and production diversity[2].

One crop that has been considered as NUS within the agricultural innovation system is the African locust bean, or néré, Parkia biglobosa. Farmers value the crop for food, feed, and medicinal uses, and is often retained in agricultural fields to provide shade in cropping[3]. Given this, Label Lafié was founded in 2017, as a Togolese agro-food enterprise committed to enhancing the value of local products, particularly néré[4] and its derivatives. More than just a business, Label Lafié is a social enterprise promoting sustainable and healthy nutrition while fostering the economic empowerment of rural women.

Néré, a leguminous tree native to West Africa, plays a crucial role in traditional diets, producing seeds used to make soumbala, a fermented condiment rich in protein and micronutrients. Despite its nutritional and economic potential, the néré value chain in Togo remains underdeveloped. The sector faces several challenges, including limited processing facilities, inconsistent quality standards, and a lack of structured market access. Traditionally, néré processing has been dominated by women using labour-intensive techniques, which restrict scalability and profitability. Due to these constraints, the sector has been neglected, with many preferring imported seasonings over locally processed néré-based products.

Through strong collaboration with women's cooperatives, Label Lafié has established an inclusive business model that enables women to transition from mere producers to active participants in the structured market. By providing them with fair economic opportunities, the enterprise not only enhances their incomes but also preserves and modernizes traditional know-how, contributing to local

[1] Ghosh, S., Sarkar, T., Chakraborty, R."Underutilized Plant Sources: A Hidden Treasure of Natural Colors," *Food Bioscience* 52 (April 1, 2023): 102361, https://doi.org/10.1016/j.fbio.2023.102361.

[2] Ghosh, Sarkar, and Chakraborty.

[3] Pasiecznik, N. "Parkia Biglobosa (Néré)," *CABI Compendium* CABI Compendium (May 11, 2014): 44162, https://doi.org/10.1079/cabicompendium.44162.

[4] ***Parkia biglobosa***, the **African locust bean**, is a perennial tree in the family Fabaceae. It is found in a wide range of environments in Africa and is primarily grown for its pods that contain both a sweet pulp and valuable seeds. Where the tree is grown, the crushing and fermenting of these seeds constitutes an important economic activity. Various parts of the locust bean tree are used for medicinal and food purposes. As a standing tree, locust bean may have a positive effect on the yield of nearby crops, like other leguminous plants.

economic development. The initiative has positively impacted over 500 women across various rural communities in Togo.

The Company today

Today, Label Lafié has positioned itself as a key player in promoting and processing néré in Togo. The company produces a range of 100% natural culinary products, including the “Bouillon Fatima” culinary broth, an alternative to industrial stock cubes made with local ingredients. Label Lafié's supply chain is based on collaboration with groups of women who produce néré and benefit from fair prices and continuous technical support.

Studies reveal that most communities in West and Central Africa use néré for food. The fermented protein-rich seeds are ground into a paste, rolled into balls, and sold to add to soup and stews. The sweet fruit pulp is made into drinks and used in traditional ceremonies[5]. As such, faced with a growing demand, the company has increased its production capacity and is expanding its distribution network to penetrate international markets (ZLECAF).

Scope of the innovation

Label Lafié's innovation extends beyond product development to include economic, social, and environmental advancements. The company’s core innovations include the development of an all-natural, locally sourced alternative to synthetic bouillons. The company is also exploring new uses for néré by utilizing its yellow flour to create natural juices, baby porridge, and gluten-free couscous. The company is developing scalable distribution models targeting urban consumers in Togo and the West African diaspora abroad.

Through these innovations, Label Lafié is not only revitalizing a neglected agricultural sector but also creating sustainable economic opportunities for rural communities.

Innovations Deployed and Their Impact

Label Lafié has introduced various technological and social innovations that have significantly impacted women and the agro-food sector:

Technological Innovation: Traditional methods of néré processing have been improved by integrating modern techniques, including mechanized fermentation and drying processes. This has led to higher product quality, better preservation, and standardized production, making it easier to export to broader markets.

Social Innovation: The enterprise has adopted a collaborative approach with women’s cooperatives by introducing a pre-financing system and training programs. These initiatives provide women with financial stability and enhance their entrepreneurial and managerial skills, helping them transition from subsistence production to structured business models.

Economic Impact: Increased revenue for women producers, indirect job creation, and better structuring of the néré value chain have contributed to the economic growth of rural communities. Label Lafié has increased its supply chain partners from 50 to over 200, providing consistent demand for local raw materials.

Social Impact: Strengthened women’s capacities, improved financial inclusion, and greater recognition of their roles in the local economy. The enterprise also fosters leadership opportunities, enabling women to take on managerial roles within cooperatives.

[5] Pasiecznik, “Parkia Biglobosa (Néré).”

Environmental Impact: Adoption of eco-friendly processing techniques, reduction of raw material waste, and the use of sustainable packaging materials to reduce plastic dependency.

Creating a supportive innovation system: the role of research, policy, and finance Systems

The growth of Label Lafié was made possible thanks to the support of several institutions and programs, both at the national and international level. These initiatives have helped strengthen our skills, structure our growth and provide us with the tools necessary to develop our business.

Public Policy Support: The promotion of local consumption by the ministry in charge of commerce and various public institution has facilitated market acceptance of Label Lafié's products, aligning with national policies on food security and local industry development.

Access to Research: Partnerships with agro-food experts and research institutions, incubators (Tony Elumelu) have helped refine processing techniques, improve nutritional value, and ensure high-quality standards.

Financial and Business Support:

Participation in incubation and acceleration programs has played a crucial role in shaping Label Lafié's journey, providing both financial and strategic support to refine its business model and strengthen its market position. At the national level, Innov'Up facilitated the structuring of the project and strategy, while NanaTech supported the company's digitization through specialized mentorship in financial management and product packaging. In collaboration with Energy Generation, the UNDP Acceleration Program provided essential resources for business optimization, including CRM tools that enhanced productivity. Additional support from WIDU and the Togolese Diaspora initiative helped reinforce operational capacity, improve competitiveness, and earn an excellence award. UN Women and the African Development Bank (AfDB) further contributed to the company's growth by fostering financial literacy among women entrepreneurs and scaling operations. On the international stage, the Tony Elumelu Foundation's capacity-building program and startup fund in 2019 accelerated the development of Label Lafiè, while the YALI Dakar program in 2017 strengthened executive leadership skills. The participation in Finance Together (2017-2018) provided invaluable fundraising experience to Label lafiè and the Forum du Jeune Entrepreneur Togolais in 2016 was the launching pad that integrated Label Lafié into the entrepreneurial ecosystem. These diverse opportunities have not only fueled innovation and resilience but also reinforced its mission to deliver healthy, authentic products that celebrate Africa's rich natural heritage.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Several factors have driven the success of Label Lafié and other female entrepreneurs in the agro-food sector:

Access to Resources: Adequate funding, grants, and targeted training enable women to build sustainable businesses. Label Lafié has successfully leveraged microfinance institutions to offer small loans to women suppliers.

Networking and Mentorship: Engaging with other entrepreneurs, business experts, and sectoral leaders helps refine strategic vision and business structure. Label Lafié actively participates in regional business forums and women entrepreneur networks.

Market Adaptability: Businesses that address local challenges tend to thrive. Label Lafié adapts its product range to evolving consumer preferences, including producing ready-to-use néré-based products for urban households.

Digital Integration: Leveraging digital platforms for product commercialization (social media, e-commerce) is crucial for growth. The company has expanded its online presence, facilitating direct sales and customer engagement.

Remaining Challenges for Label Lafiè

Generally, the agricultural sector in Togo faces challenges such as inadequate methods employed to store agricultural produce, resulting in up to 20 per cent of the crops harvested going to waste. This, coupled with weak institutional capacity, insufficient coordination among stakeholders, and inadequate policies, has further hampered agricultural development in the country[6]. Nonetheless, despite the success of Label Lafié, the company still faces key challenges:

Access to Large-Scale Funding: Securing financing for industrialization remains a significant hurdle for women-led enterprises. The company seeks investment to scale its production capacity and enter larger regional markets.

Certification and Standards: Meeting export certification requirements demands substantial financial and technical resources. Label Lafié is in the process of obtaining regional certifications to enhance marketability.

Cultural Perceptions: Traditional mindsets still hinder women's leadership and innovation in male-dominated industries. The company continues to advocate for gender-inclusive policies and training.

Supply Chain Optimization: Ensuring efficient distribution while maintaining product quality remains a critical challenge. Logistics costs and infrastructure constraints can limit market expansion.

Conclusion and Recommendations

Women-led innovation in the agro-food sector plays a crucial role in sustainable food system transformation. Label Lafié is a testament to the power of inclusive business models in driving economic, social, and environmental impact.

To further enhance this dynamic, it is essential to:

- **Improve Access to Financing and Markets:** Create tailored funding opportunities for women-led businesses and facilitate market entry through strategic partnerships with private investors and government agencies.
- **Strengthen Training and Mentorship Programs:** Equip women entrepreneurs with skills to structure and scale their initiatives through business incubation and leadership development programs.
- **Promote Supportive Public Policies:** Advocate for regulatory frameworks that foster women's entrepreneurship and social innovation, including tax incentives for businesses engaging in inclusive value chains.
- **Encourage Research and Development:** Support R&D efforts to enhance agro-processing techniques and product quality, ensuring that traditional products meet modern safety and nutritional standards.

[6] WFP. "Togo Interim Country Strategic Plan (2021)" (Rome, October 2, 2020), https://executiveboard.wfp.org/document_download/WFP-0000119510#:~:text=1.4%20Hunger%20gaps%20and%20challenges,implementation%20of%20school%20feeding%20activities.&text=/download/.,certain%20moulds%20found%20in%20food.

Women are at the heart of food systems, and their full inclusion in agricultural innovation is imperative for a sustainable and equitable transformation. Label Lafié's journey showcases the untapped potential of women entrepreneurs in shaping a more resilient and inclusive agro-food industry.

Scaling up the Research Products in the Aquaculture Sector in Uganda and Africa more widely (FSC09)

Context

One of the persisting institutional problems confronting policy implementation in many developing nations is the lack of a close working relationship between national agricultural research organizations and other stakeholders, such as the private sector, farmers, and farmer organizations.[1] With Uganda's youth accounting for 60% of the population, the Uganda National Agricultural Research Organisation (NARO) is collaborating with organizations aimed at increasing job opportunities and entrepreneurship among youth and women. Given its mandate to conduct agricultural research on food crops, livestock, and fisheries, NARO aims to ensure inclusivity in all its innovations by increasing access and uptake of improved technologies and innovations amongst youths, women and men in agriculture.

Gender empowerment is a key pillar for NARO, providing an inclusive environment where men, women, and youth adopt research products and develop sustainable businesses. Uganda has about 38.4% women-owned businesses, the second-highest proportion in the world behind Botswana[2]. These businesses are spread across various sectors. Fish is a priority value chain, and women actively participate in post-harvest handling, including packaging, sales, and marketing.

Supporting Agribusiness Development in the Fish Value Chain

Dr. John Walakira, a principal research officer and director of fisheries at NARO Uganda, has worked on various research programs and innovations that support women and youth. The current project on Strengthening Agricultural Knowledge and the Innovation Ecosystem for Inclusive Rural Transformation and Livelihoods in Eastern Africa (AIRTEA) provides a solid platform for knowledge transfer and business development in the fish value chain. The study promotes the adoption of technologies and innovations by women and youth to produce wealth and jobs and sustain and improve food security at the family level. Funded by the European Union through a consortium of research and farmer organizations, the project is being implemented with the private sector, policy, and extension actors.

NARO introduced the concept of business-to-consumers and business-to-business in collaboration with the Private Sector Foundation Unit (PSFU) to identify helpful and customized packages. NARO has developed a mechanism where women and youth exhibit and showcase new aquaculture technology at public or international conferences to enhance outreach and attract more women and youth to participate in the fish value chain. This allows them to grow their networks further, resulting in women and youth participating in national and international trade shows and conferences.

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[1] Burton E. Swanson, *Chapter 19 - Strengthening Research-Extension-Farmer Linkages* (FAO), accessed October 16, 2024, https://www.fao.org/4/w5830e/w5830e0l.htm.

[2] *Returns to consulting for women entrepreneurs in Uganda | IPA*. (n.d.). https://poverty-action.org/study/returns-consulting-women-entrepreneurs-uganda#:~:text=In%20Uganda%2C%2038.4%20percent%20of,in%20the%20world%20behind%20Botswana.

Dr. Walakira confirmed that gender empowerment is a key pillar for NARO, providing an inclusive environment where men, women, and youth adopt research products and develop sustainable businesses. Uganda has about 38.4% women-owned businesses, the second-highest proportion in the world behind Botswana[3]. These businesses are spread across various sectors. Fish is a priority value chain, and women actively participate in post-harvest handling, including packaging, sales, and marketing.

One such example is Kati Farms. Kati Farms is a women-led private company based in Uganda, and produces and supplies fish value-added products. So far, Kati Farms sells its processed products in Uganda and neighboring countries, with its largest market being in the Democratic Republic of Congo (DRC). Kati Farms partners with over 1,000 women fish farmers, produces 17 unique fish-based products, exports to 13 African countries, and employs a full-time staff of 38, 23 of whom are women.

Scaling Innovations: Linking Research, Business, and Finance

Private sector engagement is key to NARO's approach to developing communities within the fish value chains. The private sector partners are crucial to the uptake and scaling of technologies developed and disseminated by NARO. Among the private sector, NARO also collaborates with financial institutions to ensure that new technologies are accessible and affordable for the end users. Technologies developed by NARO are often patented and sold to processors, farmers, and other interested buyers.

Financial institutions play a crucial role by offering soft loans to businesses to acquire these innovations. One such technology requiring financial support is the fish kiln, which costs between $2,000 and $3,000. This tool is essential for reducing post-harvest losses and is particularly valuable for women involved in post-production processes. However, careful consideration of capital requirements is required for these advances to flourish, as excessively capital-intensive technologies may impede their success.

Creating a Supportive Innovation System: The Role of Research, Policy

Policy drives most businesses, including aquaculture. This demands substantial handholding for small enterprises to grasp the policies that affect their areas of operation. NARO creates policy briefs from its research to provide user-friendly interpretations for farmers, especially women and youth. Regulations for Sardine fishing, also known as '*mukene*', is a frequent occurrence that necessitates ongoing legislative action in Uganda. Women and youth in *mukene* trading face challenges accessing affordable fishing nets and other items. NARO's research provides evidence-based knowledge to policymakers, which gives them real-time information on how best to support the fisherfolk. Cage farmers are also subject to restrictive policies and licenses, and they have found NARO's policy interventions valuable in making gender-sensitive and informed decisions.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Training and skills development: NARO's training ensures that the men are included; most of these are fishermen and husbands of the women they work to empower. The land that women need is mainly

[3] *Returns to consulting for women entrepreneurs in Uganda | IPA*. (n.d.). https://poverty-action.org/study/returns-consulting-women-entrepreneurs-uganda#:~:text=In%20Uganda%2C%2038.4%20percent%20of,in%20the%20world%20behind%20Botswana.

owned by the men, so soft skills are also provided to the married couple for negotiations to encourage the men to share the land or give some land to the wives.

Monitoring and Evaluation: NARO has noted that in addition to addressing most of the hurdles in businesses, monitoring and evaluating all these interventions is critical. Funds must be monitored to ensure that they have been used well and filled the existing gaps. The issues of land division need to be explored, and when NARO carries out the negotiation efforts, monitoring, evaluation, and learning need to happen to ensure that the men are participating in the process. Additionally, NARO monitors the technology and knowledge given to the farmers to assess their level and impact of adoption.

Addressing unemployment issues in Uganda requires more than a single entity's effort. Government, businesses, and research institutions must be well-capacitated to ensure a conducive environment for doing business and the uptake of technologies encouraging a participatory approach at the community level.

Development of knowledge products: The majority of the aquaculture communities are either semi-literate. Therefore, NARO develops knowledge products that can be comprehended by all communities in their local languages. Additionally, the adoption of technology – digital platforms – by the farming communities is hindered by limited access to smartphones, which would be highly appreciated, especially by the youth. NARO, therefore, develops smaller knowledge packages in collaboration with media and communication partners, such as MTN – which are compatible with the communities.

Remaining Challenges

Land ownership still poses a significant challenge for women in fish farming. While NARO empowers men to share land space with women, there is still a lot of pushback. It is becoming very expensive for youth and women to buy or access land independently.

Access to finance becomes another stumbling block for aquaculture businesses. Most farmers cannot access credit because of the high interest rates, so it becomes hard for them to scale up to the level of embracing technology. Licenses for cage farming are also costly to acquire, especially for farmers engaged in cage farming.

Some policies could sometimes limit access to sardines (*mukene*), which farmers highly depend on for making fish feed. This has disrupted the aquaculture value chain, pushing most initiatives and interventions to look for alternatives to sardines for protein because the aquaculture is disrupted, so the other alternative becomes soybean, which is equally very expensive.

Lastly, limited funding for research has affected the development of new research products. Since the COVID-19 pandemic, most research institutions have not received enough funding, which also affects government-led researchers, creating many gaps that affect breeding and access to quality fish seed.

Recommendations

Private-public partnerships: Private-public partnerships are critical in scaling research products and are highly recommended.

Policy considerations: Developing policy briefs and sharing them with policymakers within the Ministry of Agriculture and Fisheries encourages collaborative and participatory research, where even the extension

and desk officer are involved in developing recommendations within context. Additionally, involving the government ensures that some lending interests are regulated to favor small-scale farmers.

Capacity development: Most of these groups, be it the women's or youth groups, have an alpha woman or alpha male who controls everything. This hinders collective participation amongst those groups, leading to the formation of groups that don't last long. It is crucial to harness whatever government program benefits these grassroots groups or community-level initiatives. Capacity in group dynamics has to be emphasized at all levels so that benefits are accrued by every individual within that group.

Climate-related interventions: Prolonged droughts could cause the death of fish due to lack of enough water, and floods are also causing rising waters, which could wash fish into farms, leading to massive losses. An example is the recent rise of waters from Lake Albert, which led to broodstock losses that affected over 8000 women. Post-harvest handling and loss due to fish perishability is also an issue that causes losses of up to 30%. In Northern Uganda, drought causes ponds to dry up. Diseases are also coming up, contributing to many problems affecting the aquaculture value chain.

Women Innovators Driving Post-Harvest Management of Cereals in Côte d'Ivoire: The Canaan Land Journey (FSC10)

Context

Cereals are cultivated for their starch-rich grains and are critical for the human diet since they cover more than 80% of energy needs. They account for about 65% of the cultivated areas and producers in West Africa, despite the cereal imports that account for 40% of agricultural food products[1]. Studies show that from 2008 to 2018, cereal production increased from 56 million tons to nearly 66 million tons for an average yield of 1.2 t/ha. However, the FAO (2024) report notes that most crop losses occur during harvesting and post-harvest handling. Insect infestation and mould growth notably contribute to loss, especially for cereals. Post-harvest losses in many Sub-Saharan African countries are linked to complex issues that hinder farmers' access to improved post-harvest management practices, innovations, and essential technologies, including technical and business skills[2].

With this hindsight, Patricia ZOUNDI YAO established Canaan Land as a trailblazing business committed to uplifting women and small-scale farmers by boosting agricultural value chains and reducing post-harvest losses in West Africa, starting with Côte d'Ivoire. With a dedicated focus on financial inclusion, agricultural innovations, and empowering women economically, Patricia has turned Canaan Land into a significant player in rural entrepreneurship, sustainable food production, and processing.

Patricia ZOUNDI YAO, a celebrated entrepreneur and advocate for women's empowerment, has shared her knowledge and experiences on many platforms, including TEDx Talks, media events, and global conferences. She has highlighted the transformative potential of entrepreneurship, particularly for African women, and continually supports policies and initiatives that bolster the agri-food sector.

The role of women in scaling up post-harvest innovations

Initially centred on agricultural production and processing, Canaan Land soon transformed into a comprehensive agribusiness, improving local crops like maize, rice, and cassava. Recognizing that market access and product quality are essential for sustainability, Patricia spearheaded efforts to modernize processing techniques for these value chains, implement quality control systems, and establish direct market connections for small-scale farmers. The key innovations driven by Patricia included;

- **Value-added processing**: Implementing semi-industrial processing units for nutritious cereals and tubers, cutting down post-harvest losses, and elevating market value.
- **Women's economic empowerment**: Over 70% of the team comprises women, offering them stable income opportunities and training in agribusiness management.

[1] Barthélémy, Y.B., Zinse, C., Kounoutchi, K., Traoré, D. 2021. "Storage and Conservation of Cereals and Grain Legumes in West Africa." *ResearchGate*. https://www.researchgate.net/publication/358962375_Storage_and_Conservation_of_Cereals_and_grain_Legumes_in_West_Africa.

[2] Rojas, M.F., Houmy, K., Fawole, O. 2024. "Post-Harvest Management: Bridging Gaps and Embracing Innovations." *Food and Agriculture Organization of the United Nations*. https://doi.org/10.4060/cd1185en.

- **Market-driven production**: Canaan Land collaborates directly with farmer cooperatives to ensure that production meets market demands and boosts sales opportunities.
- **Financial inclusion initiatives**: The company has facilitated access to microfinance and credit for small-scale farmers and women entrepreneurs, helping them grow their businesses.
- **Youth engagement**: Patricia has been actively promoting entrepreneurial training for young individuals, showing them that agriculture can be a profitable sector.

Impact and Socio-Economic Contributions

Employment creation: The enterprise has created many direct and indirect jobs, with a focus on women and youth in rural regions.

Improved farmer incomes: Through guaranteed purchase agreements, small-scale farmers have seen an average 30% boost in their annual earnings.

Food security and nutrition: By urging the consumption of locally processed nutritious foods, Canaan Land has improved diets and reduced dependence on food imports.

Knowledge transfer and capacity building: Training programs on good agricultural practices, post-harvest handling, and business skills have empowered hundreds of farmers and processors.

International recognition and partnerships: Patricia's efforts have garnered recognition from global organizations like UNCTAD's eTrade for Women initiative and have opened up opportunities for technical partnerships to enhance innovation.

Challenges and Lessons Learned

Studies reveal critical efforts for reducing post-harvest losses, such as access to finance, market linkages, upgrading grain drying equipment, and strengthening transport of commodities[3]. Despite these efforts that stakeholders within the Agriculture Innovation System make, some challenges persist. The main challenges faced by Canaan Land include:

- **Limited access to funding**: like many women-led businesses, Canaan Land faces challenges in securing long-term investment to scale its model.
- **Infrastructure gaps**: rural areas still lack sufficient storage and transformation facilities, affecting operations.
- **Market penetration**: expanding beyond local and regional markets to access global value chains requires overcoming trade barriers and certification challenges.
- **Changing perceptions**: convincing young people and investors that agriculture can be modern, innovative, and profitable remains an ongoing challenge.

By addressing these challenges through strategic partnerships with financial institutions, research organizations, and development agencies, Canaan Land continues to strengthen its impact and growth trajectory.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Given that inadequate post-harvest storage can result in insect and rodent infestations, microbial infections, and harmful changes in moisture content, on-farm storage technology, like metal drums

[3] IFAD. 2023. "10 Ways to Reduce Food Loss: Lessons from the Field." Accessed April 24, 2025. https://www.ifad.org/en/w/explainers/10-ways-to-reduce-food-loss-lessons-from-the-field.

and hermetic bags, can eliminate grain losses. Therefore, Canaan Land has invested in advanced processing technologies to improve efficiency and productivity.

Expanding market access is important to ensuring a steady stream of buyers while reducing food loss for smallholder farmers. Canaan land has noted that farmers are not able to invest in equipment and activities that can reduce their food losses if they cannot make a profit. Additionally, the company seeks to strengthen export capabilities and build partnerships with international buyers.

Canaan Land is also keen to deepen empowerment programs, including; financial literacy, leadership training, and access to funding for women entrepreneurs. The company also collaborates with other partners to train farmers on post-harvest handling and storage skills—including timing of harvest, crop drying, moisture management, and safe storage. The company has also invested in sustainability initiatives, embracing agroecological practices that protect biodiversity, improve nutrition, and build long-term soil fertility.

Conclusion

Canaan Land demonstrates that women innovators can drive inclusive growth in Africa's food system. Under Patricia ZOUNDI YAO's leadership, the company is helping reshape the story of rural Africa—one where women lead, farming is honourable, and communities thrive. As such, investing in women as food producers, processors, and traders can reduce food loss. With innovation and purpose, Canaan Land inspires a new wave of changemakers committed to sustainable food systems and local prosperity. The company also ensures access to nutritious food products while giving women the economic opportunity to support themselves, their families, and communities.

Canaan Land

Integrating Gender in Agriculture Research and Development: Insights from Ghana (FSC11)

Context

Traditionally, agricultural research has focused on specific commodities and technical production issues, with a linear approach where technologies are developed by researchers and then delivered to farmers via extension agencies. However, there is a growing recognition that farmers and other Agricultural Innovation System (AIS) actors need to be actively involved in the research process and that the entire value chain, including postharvest activities like storage, transport, processing, and marketing, is crucial to the rural economy and should be integrated into the Research and Development (R&D) process.[1] Therefore, agricultural research and development (ARD) in Africa must be responsive to the broader context of rural communities, potentially requiring collaboration with social and communication scientists and other sectors beyond agriculture. Similarly, innovation is a critical concept in development, raising questions about its meaning, drivers, methods of stimulation, successful examples, and ways to support it.

Gender in Agriculture Research and Development

It is noted that,

> *"One cannot link agricultural research and development without accounting for gender issues."*[2]

Additionally, agricultural and farming systems research primarily focused on soil, water, and land management. Current strategies increasingly focus on understanding the distinct adaptive approaches men and women use to safeguard their livelihoods in the wake of climate change. Recognizing gender differences will enable policymakers, development practitioners, and researchers to help marginalized groups gain equitable access to information and resources. This, in turn, empowers them to make better household food security decisions.

Insights from Male Champions on Gender Inclusive Research

The University for Development Studies (UDS) in Tamala, Ghana, commits to research involving communities and researchers, including traditional authorities, who understand the critical developmental issues that must be addressed. With considerable experience in gender-responsive research and development from the 1980s, Professor Saa Dittoh from UDS contributes critical knowledge on practical approaches for gender inclusion in research and development. Saa Dittoh is an adjunct Professor at the West African Centre for Water, Irrigation and Sustainable Agriculture (WACWISA) at UDS. His expertise lies in promoting smallholder agriculture, food and nutrition security, sustainable food systems, natural resource management, and rural women's empowerment, and he is a Principal Investigator for CIRAWA, an EU-funded agroecology project promoting resilient farming in Cape Verde, Ghana, Senegal, and The Gambia.

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[1] Pound B., Conroy, C. *Agricultural Research and Development - an Overview | ScienceDirect Topics*, 2017, https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/agricultural-research-and-development

[2] FAO, "Gender and Climate Change Research in Agriculture and Food Security For Rural Development" (FAO, n.d.), https://www.fao.org/climatechange/29830-0beb869615795a9960ada6400c62b3783.pdf

Prof. Saa Dittoh states that the food system in Ghana has varied gender dynamics and representation from production through marketing to consumption. Take, for example, the rice value chain. At the production level in most communities, men constitute a more significant proportion of rice farmers in Ghana (about 67%). However, among the local processors, more than 96% of them are women, while 82% of rice traders are women[3]. Understanding the community challenges and gender dynamics within agricultural value chains and finding sustainable solutions have been central to Prof. Saa Dittoh's work at ARD.

Scaling Innovations: Emphasizing Community Engagement

Prof Saa Dittoh advocates for agroecological practices and approaches to agricultural production, research, and development. Agroecology is important to consider since it is implemented mainly in small-scale production systems and is community driven. As defined by FAO, agroecology is a holistic approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems. It seeks to optimize the interactions between plants, animals, humans, and the environment while considering the social aspects that need to be addressed for a sustainable and fair food system. Therefore, it ensures that the farm is looked at holistically and that gender is embedded clearly. There are clear paths to empowerment, and a good transition to agroecology can empower rural women.

It should not come as a surprise that women in rural communities possess a great deal of knowledge about agroecological practices. To bring out this knowledge, researchers need to explore questions that reach beyond primary and general questions when working with women as research informants. Women possess considerable knowledge of soil health, biopesticides, local seed varieties, and their traits, mainly because they are the primary users. Without this valuable knowledge and information, communities cannot be well-equipped or capacitated to harness the resources for their benefit. For example, shea butter, a women's industry, has been exploited by private sector actors and middlemen who buy the nuts at very low prices. Local governance structures should be empowered to protect community members from exploitation.

Creating a Supportive Innovation System: The Role of Farmer Networks and Policy

Notable projects and partnerships have significantly impacted R&D regarding gender inclusion.

The International Water Management Institute (IWMI): In collaboration with the International Water Management Institute (IWMI), Saa Dittoh conducted studies in northern Ghana on gender issues related to water and irrigation. He notes men focus on production while women are more into the marketing part of the value chain regarding the irrigation sector. Additionally, they have seemingly concentrated on production rather than the whole value chain. Women in this field are not usually consulted on which part of the value chain they wish to participate in, creating a situation where women's voices are often ignored. R&D approaches should encourage women to choose where they feel best suited within the value chain and not get stuck at production. There are, however, other irrigation systems in Ghana, such as the Garu and Tempani Districts of the Upper East Region, where women are actively involved and have been successful in vegetable production. The women are also the main actors in the marketing of the produce in those areas. That is to point out that women can be involved in the whole irrigation value chain, but it should be their choice.

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[3] Asante, B. O., Frimpong, B. N., Asante, M. D., Prah, S., Ayeh, S. J., Sakyiamah, B., Zenna, N., Mujawamariya, G., & Tufan, H. A. (2023). Exploring Gender Differences in the Role of Trait Preferences among Stakeholders in the Rice Value Chain in Ghana. *Sustainability*, *15*(7), 6026. https://doi.org/10.3390/su15076026

GIZ Partnership: An assessment was done in partnership with GIZ to find out why gender inclusivity was not effective. It became evident that sociocultural factors had not been adequately integrated into research. One critical element was addressing land tenure issues, where empowering women required addressing the cultural dimensions of land ownership and finding ways to navigate these challenges. Prof. Saa Dittoh points out that much of gender research is enclaved. Research and pilot projects are often carried out in controlled environments, which may show short-term successes. However, scaling up these efforts often proves difficult. The pilots tend to succeed because of the availability and allocation of project resources, but once the projects end, things often revert to the status quo.

CIRAWA Project - Agroecological Solutions for Resilient Farming in West Africa: Funded by the EU, a key lesson from this project is the value of gender integration into agricultural projects. It is a four-and-a-half-year project, and so far (in the first year), baseline surveys to understand the socio-cultural context and agroecological practices of both men and women have been carried out using focus group discussions (FGDs), key informant interviews (KIIs), and in-depth interviews. Engaging all household members was critical to this process. It has been realized from other previous surveys that respondents often assess researchers' motives and provide responses they think are expected rather than the truth. To overcome this, researchers adopted the "plug-in" principle, immersing themselves in the community and observing daily activities, encouraging more honest and open dialogue.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Community-Wide Engagement: The shift from isolating target groups to embracing community-wide engagement, where men, women, and children are part of the success of the project interventions, led to better results, leveraging each group's unique skills and expertise within the family-operated value chain.

Leveraging Gendered Expertise: Recognizing and utilizing women's specific knowledge and skills, such as their ability to identify local rice varieties in Ghana, significantly enhanced agricultural productivity and value chain success.

Contextualized Approaches to Gender: The interventions decided to embed gender-inclusive approaches that are localized and community-based to encourage and ensure that gender empowerment messaging targets the poor and hard-to-reach communities.

Empowering Women to Choose Their Role in the Value Chain: Successful interventions allow women to choose where they feel best suited within the value chain—whether in production, marketing, or other stages. A case in point; in regions like Garu and Tempani, women's active participation in both vegetable production and marketing demonstrated the importance of giving women the choice to engage and excel in different aspects of the value chain.

Sociocultural Integration in Interventions: Any research and development interventions that sought to realize long-term effects must include an element of sociocultural integration to ensure ownership and sustainability beyond the project lifespan.

Holistic Approach to Gender Transformation: While collaborating with the International Institute of Tropical Agriculture (IITA) in the 1980s on the promotion of soya bean production by women in Oyo State, Nigeria, Saa Dittoh recalls working with only women value chain actors. Men were completely ignored, and that subsequently did not auger well for the intervention. The approach was received with disdain and suspicion by the men. This informed a strategic shift to involve all members of the community in the project's interventions, leading to more successful outcomes.

Leveraging indigenous knowledge: In a particular community, Gonre, in the Upper East Region of Ghana, men couldn't identify local rice, and women could identify 13 varieties of local rice. But why is that? Local rice tastes better and is more nutritious.

Being mindful of the family farms: Saa Dittoh strongly believes that many gender studies in Africa have fallen short of their objectives due to a failure to consider social and cultural factors from the project development stage. While working as a monitoring and evaluation consultant for UNICEF Nigeria's Food Security and Nutrition project, Saa Dittoh was excited to witness the number of women involved in *gari* production and processing and the promotion of new cassava varieties. He emphasizes that since most smallholder farms are family-operated, it is challenging to distinguish disaggregated ownership and single out what belongs to specific sexes. Therefore, it is more practical to view the value chain as a family unit, with men, women, and children each playing roles in which each gender has a comparative advantage regarding skill, expertise, and convenience.

Revisiting the gender empowerment messaging: His gender-related research in rural northern Ghana, where poverty is relatively high, clearly showed that women are the most affected in terms of poverty incidence and intensity. The significant observation noted from studies within these communities is that gender empowerment messaging did not seem to target poor rural settings but had a global focus. This motivated the need to embed gender-inclusive approaches that are localized and community-based in the research and development work carried out by UDS researchers.

Remaining Challenges

It should be noted that the traditional approach of conducting studies solely on women does not work because men tend to be suspicious . Therefore, data collection interventions and other research activities ought to be strategic and involve men, women, and youth. Some persisting challenges to gender inclusion in research and development include but are not limited to:

Limited R&D funding leads to rushing through the research processes. As a result, deadlines and report milestones hinder researchers from getting accurate information from communities.

Notably, **there cannot be a one-size-fits-all type of approach** where gender interventions are the same across regions. In the regions where rice is considered men's crops, for example, women have difficulty participating in the value chains, especially when dealing with hybrid seeds. This is because the inputs for improved high-yielding rice varieties are costly and unaffordable for most women.

The **majority (over 70%) of food producers in southern Ghana are immigrants, mainly from the northern parts of the country**. Given that most landowners lease the lands to immigrants, it has significant implications for women who depend on their husbands for land to produce food. The long-term impact of this farming system is its unsustainability, and it could lead to serious food insecurity in the country and areas that depend on Ghana's produce.

Women farmers in West Africa are vulnerable to inequalities, including access to land and other critical resources, education and training, and power over agricultural decision-making nationally and at the household level that impacts their agricultural productivity.[4]

[4] *Identifying challenges and constraints experienced by women smallholder farmers in northern Ghana*. (2018, September 5). https://a4nh.cgiar.org/2018/09/05/identifying-challenges-and-constraints-experienced-by-women-smallholder-farmers-in-northern-ghana/

Recommendations

Co-creation of solutions: Communities and researchers, including traditional authorities, should co-create solutions for women's access to land. The land tenure issue cannot be addressed singly. It must involve negotiations at the community level. For example, Saa Dittoh confirms that *"The Akan, a matriarchal society, and the majority ethnic group in Ghana, has the tradition that women inherit family property including land. However, in practice, most of the women do not have control over the land, especially when it comes to the commercialization of the land. Sometimes, men (including the sons of the women) move into the lands and manipulate the system to leave the women with little or no control over their own land."*

Leveraging policymakers and political figures: Ministries of women and gender should examine communities' development aspects and address all cross-cutting issues. Issues concerning women and youth should be enshrined in the political manifestos, whereby gender champions should develop strategies and let the political parties know what should be done, adopted, and drive their manifestos.

Men empowerment: We are at a point where, in some communities, men and youth have taken a back seat because of the relatively greater investment in women empowerment. In several cases, women take over leadership positions in the homes, particularly because young men do not want to work on farms anymore. Young men must be mentored and empowered to take leadership roles in the food system.

Biased communication systems: Community-level communication systems are also fragmented, especially when researchers do not pass the right gender messages and excluding men from the discussions. Men should not be left out of the communication process because communities cannot be well-empowered without both men and women being involved. *"If we empower men, women, youth, and marginalized groups in production, marketing, processing, and storage, then we will progress toward a sustainable food system,"* says Prof. Saa Dittoh.

Multi-stakeholder innovation platforms supporting women's entrepreneurial activities in the Democratic Republic of Congo (FSC12)

Context

The Democratic Republic of Congo's agricultural sector primarily relies on subsistence farming, with commercial production less prominent. The country grows various crops, but their commercialization is limited due to political instability, inadequate infrastructure, and insufficient investment. Initiatives are ongoing to enhance the agricultural sector and improve market access for smallholder farmers. To achieve this, smallholder farmers rely heavily on agricultural advisory and extension services, which are crucial for improving production, increasing yields, and adding value to agricultural products through processing. However, gender inequalities rooted in patriarchal systems and discriminatory social norms mean that women have fewer opportunities to produce under optimal conditions and access agricultural extension services, markets, land, and formal financial services, despite their crucial role in society and their economic contributions.

Rural women in the DRC are fighting for better living conditions, greater recognition of their role in agricultural production and marketing, and increased access to innovations. Women make up more than 70% of the agricultural workforce in the DRC and contribute significantly to family income and community growth. However, they face numerous challenges that prevent them from playing a leading role in national development. These challenges include difficulties in accessing land and finance, issues related to the processing and marketing of agricultural products, and poor infrastructure that hampers their marketing activities and economic empowerment.

The Forum for Agricultural and Rural Advisory Services in DRC (Foscar-RDC)

The Forum for Agricultural and Rural Advisory Services in DRC (in French, Forum de service des conseils agricoles et rural de la RDC - Foscar-RDC) operates in 19 of the country's 26 provinces and boasts a membership of 54,949 farmers. This includes 32,968 women, 5,497 young people, and 16,484 men, many of whom are involved in various agricultural value chains, often within the informal sector. The forum main activities include improving collaboration, knowledge sharing, skills development and advocacy for efficient mobilization of agricultural advisory services amongst rural communities.

Victorine Mbombo, President of Foscar-RDC, is a committed advocate for gender equality and women's empowerment. She firmly believes in the positive impact generated by involving women in agricultural innovation systems. These systems must include capacity-building for women, and gender approaches must be systematically addressed in all development initiatives accompanied by adequate support. In view of the role of women in the agricultural sector in the RDC, women's leadership in value chains and food systems needs to be strengthened.

To successfully promote gender equality and create a sustainable and inclusive innovation system, Victorine and women members of FOSCAR-RDC apply the values of solidarity, conviviality, equality, fairness, transparency, and diligence in their on-farm and off-farm activities. They also emphasize communication and knowledge sharing to strengthen women's knowledge and ownership.

Promoting Multi-Stakeholder Innovation Platforms (MIP)

Foscar-RDC has established robust partnerships with research and policy organizations at both national and regional levels to promote the uptake of innovations in the Democratic Republic of Congo

(DRC). These efforts are notably advanced through multi-stakeholder innovation platforms, which aim to bring together various actors across the value chain. These platforms facilitate examining challenges and weak links, foster partnerships, and encourage collaborative learning among public and private sector actors. They also address business opportunities and the development of new products to improve market outcomes, food security, and natural resource management.

A Multi-Stakeholder Innovation Platform (MIP) launched by the Forum for Agricultural Research in Africa (FARA) as a participatory and inclusive approach to scaling up good agricultural practices and innovations was introduced in the DRC in 2019. This initiative, spearheaded by Foscar-RDC in collaboration with the Ministry of Agricultural Extension, focuses on promoting the cassava, sweet potato, cowpea, and carp value chains as part of the "Technologies for the Transformation of Agriculture in Africa" (Technologies pour la Transformation de l'Agriculture en Afrique - TAAT) project.

In the DRC provinces of Kwilu, Kinshasa, Congo-Centrale, Nord-Kivu, Lomami, Equateur, Kivu, Mai-Ndombe, Kwango, Kasai-Oriental, Tanganika, Sud-Kivu, Haut-Uele, and Lisala, farmers face increasing challenges linked to climate change and outdated farming practices. At the same time, the market for agricultural products is expanding and becoming more demanding in terms of quality and safety.

To address these challenges, Foscar-RDC's multi-stakeholder innovation platforms work to:

- **Identify and analyze challenges**: Foscar-RDC brings together diverse stakeholders to identify and analyze the challenges and weak links in the agricultural value chains. It has established working groups focused on the production, processing, and marketing of cassava, notably transforming cassava into chikwangue (a traditional food made from fermented cassava), sweet potato, fish farming (tilapia), and meat production. It initiated a participatory diagnosis through focus groups where farmers share their knowledge, experiences, challenges, and opportunities in these value chains.
- **Support to co-learning:** Based on the diagnostic results, Foscar-RDC developed a participatory action plan to address the needs of stakeholders at different stages of the value chain, from production to marketing, which respond to market realities. It also developed data collection and analysis utilizing smartphones to collect data from value chain actors, enabling the assessment of progress against set objectives and the identification of areas for improvement. Data was collected on the scope of innovation platforms in new agricultural zones, types of crops per farmer structure, the number of women compared to men and young people, agricultural production, sales of agricultural products, the number of new members, the presence or absence of pests and diseases, and the needs and problems of farmers.
- **Strengthen partnerships**: building and strengthening partnerships among farmers, researchers, policymakers, and private sector actors to foster collaborative learning and innovation. Foscar-RDC has partnered with research institutes such as FARA, the International Potato Center (CIP), and other CGIAR centers to increase productivity and ensure the sustainability of cassava, sweet potato, and fish farming systems. This collaboration encourages the use of environmentally friendly practices to ensure the sustainability of innovations.
- **Enhance agricultural practices**: scaling up good agricultural practices and innovations to improve productivity and resilience against climate change. For cassava, this includes selecting disease-resistant varieties, using healthy cuttings, and planting in rows, while integrating pest management with organic methods and compost-based organic fertilization. For sweet potatoes, the focus is on crop rotation and applying mulch to maintain soil fertility and conserve moisture, complemented by a drip irrigation system and the use of biopesticides. For fish farming, the integration of rigorous water quality management, high-quality fry

balance, sustainable feeding, and integrated crop-livestock systems are emphasized. These innovative approaches aim for greater sustainability and incorporate agroecological practices to boost productivity while minimizing environmental impact. Foscar-RDC held training programmes on the use of improved seeds, mastering technical itineraries for different crops, and processing agricultural products to increase value addition.

- **Promote business opportunities**: Foscar-RDC focused on establishing links with buyers, supply chain actors, and financial institutions to create a robust network that supports agricultural activities. It also focused on developing entrepreneurial skills through farmer field schools, equipping farmers with the knowledge and tools needed to succeed in the market.

As part of this pilot project, Foscar-RDC established 50 innovation platforms, each with 30 members, working with 1,500 producers from the cassava, sweet potato, and fish farming value chains. These platforms promoted knowledge of pond construction, fertilization, fish feeding, and processing into smoked and salted fish, adding economic value through good preservation of harvested products.

At the Kwuilu platforms, they improved varieties used include Obama, Mongoly, and organic yellow cassava fortified with vitamin A. Traditional varieties yielded 8 to 10 tonnes per hectare, while the new improved varieties increased yields to 12 to 15 tonnes per hectare, representing a 20% to 50% increase. The use of improved varieties also strengthened cassava's resistance to diseases like the cassava virus, which typically causes around 30% crop losses.

Factors contributing to successful women-led innovation and gender-equitable outcomes

The results achieved through implementing the MIPs strongly encourage stakeholders to strengthen their activities for greater impact. This includes seeking technical and financial partnerships to improve the quality and quantity of products, better satisfying the national market in the DRC and markets in other African countries.

Reducing existing barriers: Addressing social, cultural, and religious constraints that limit women's participation is a significant challenge. However, Foscar-RDC has seen increased participation of women in Innovation Platforms (IP) due to collaboration among women and support from men. Women have gained confidence in sharing their views and experiences, proposing new ideas, and suggesting changes based on field practices. Given that some of the IPs have involved women in leadership and in decision-making, they have enabled them to become more professional and articulate in their sectors. These efforts have helped balance gender relations within communities in the DRC.

Supporting collaboration and co-learning: The participatory approach learned through innovation platforms has significantly strengthened the ownership of activities by all members, ensuring that everyone feels a part of the process and is committed to the outcomes. Women have gained confidence and found roles in the MIP.

Leadership: Encouraging women's leadership in decision-making processes within the MIP has not always been easy. Victorine Mbombo's commitment has helped Foscar-RDC members become more professional and has strengthened women's leadership in sectors traditionally dominated by men. Adopting a participatory approach to inclusion have enabled women to emancipate themselves and achieve more significant economic and social outcomes. It is now common for women to be involved in the financial management of projects and for joint decisions to be made with men on fieldwork activities.

Access to information: Women's participation in MIP has provided better access to information on markets, partners, new technologies, and agricultural practices.

Capacity building: Providing training and resources to women in the respective value chains has significantly improved their skills and knowledge of sustainable agricultural practices, technologies, and equipment use. Awareness of digital tools has also been beneficial.

Obtaining political support: Political support for gender-inclusive institutional structures, such as that from the ministry responsible for agricultural extension in the DRC, plays an essential role in ensuring the sustainability of women-led innovations. The Ministry of Gender and Family has increased its support for entrepreneurship activities and small and medium-sized enterprises run by women, as a result of their involvement in innovation platforms.

Recommendations

Based on the results and impact already achieved by the Foscar-RDC through their participation in multi-actor innovation platforms, Ms. Victorine Mbombo has a positive outlook for the future. She envisions increasing their activities through ongoing training, solid partnerships, and expansion into markets in other African countries. However, the development of road and storage infrastructures and the availability of quality inputs need to be accelerated, as these remain obstacles to market expansion activities. Knowledge building, access to credit, and appropriate technologies remain a priority, and it is hoped that the government and partners could support this. In collaboration with men in their communities, women are eager to establish technical and financial partnerships with the public and private sectors to achieve impactful outcomes.

Community Engagement for Gender-Inclusive Agricultural Advisory Services in South Sudan (FSC13)

Context

In many African countries, there is a move towards providing agricultural extension and advisory services through a pluralistic system. This system involves a mix of public, private, and NGO actors with varying levels of internal and external funding.[1]

South Sudan is classified as a fragile state. With over 70% of its population living in rural areas[2] and 95% of the country's people depending on farming for their livelihoods, a thriving agricultural sector is crucial for long-term peace and development. However, agricultural production remains low. Like other countries in Sub-Saharan Africa, gender dynamics are interwoven in agricultural development. South Sudan is home to resilient women and girls who are essential to the survival of families, communities, and means of subsistence.[3] While the majority of women have limited opportunities for economic growth.[4]

Livelihood, Agriculture, and Food Security

South Sudan faces a severe humanitarian crisis. In 2022, approximately 8.9 million people, almost two-thirds of its population, required humanitarian assistance, an increase of 600,000 from 2021. The United Nations warns of a high famine risk, with an estimated 8.3 million people, including refugees, projected to face severe food insecurity during the rainy season. Although the country has abundant natural resources, immense agricultural potential, and abundant fertile lands, South Sudan produces only about half its cereal requirements, relying heavily on food aid and imported foodstuffs.

Women, who constitute 60.2% of the agricultural workforce, play a critical role in subsistence farming but face significant barriers. Limited access to productive assets, low literacy rates, and a lack of female agricultural extension workers restrict their technical training and support opportunities. Traditional gender roles further burden women with caregiving, household chores, and tending to children, the elderly, and the sick while they simultaneously shoulder a substantial share of agricultural labor.

The widespread conflict, high insecurity, and economic collapse in South Sudan have severely disrupted development, causing significant displacement of both urban and rural populations, as highlighted in the Agency for Technical Cooperation and Development (ACTED) article, Unspoken Resilience of Rural Women.

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[1] Nwafor, C., Ogundeji, A., Nwafor, I. (2021) "Review of Agricultural Extension and Advisory Services in Sub-Saharan Africa Progress with private sector involvement." *Journal of Agribusiness and Rural Development* 61 (October 2, 2021), https://doi.org/10.17306/J.JARD.2021.01413

[2] Kouassi, Y. "South Sudan Slider," African Futures and Innovation Programme (AUDA-NEPAD, September 8, 2024), https://www.canva.com/design/DAF2HJ86qM8/view

[3] WFP, "South Sudan, Gender Situational Analysis to Inform Safety Nets and Resilience Programming," *Development Pathways* (blog), 2021, https://www.developmentpathways.co.uk/our-work/south-sudan-gender-situational-analysis-to-inform-safety-nets-and-resilience-programming/

[4] AFDB, "Country Gender Profile: Republic of South Sudan" (Abidjan, Cote d' Ivoire, January 2023), https://www.afdb.org/sites/default/files/documents/projects-and-operations/230303-bad_south_soudan.pdf

These conditions have made it nearly impossible for women to cultivate land or engage in livestock production, as noted at the 'Gender Is My Agenda' (GIMA) forum. Despite these challenges, Section 13(1) of the Land Act explicitly prohibits discrimination in land ownership based on sex, race, ethnicity, or religion, ensuring that women have equal rights to men to access land for housing, cultivation, pasture, grazing, or fishing[5].

Changing Livestock, Land Ownership, and Traditional Gender Roles

Studies show that men in South Sudan are migrating out of their villages for social and political reasons, resulting in the female population taking control of agricultural activities. This contributes to the transformation of women's roles at the family and community levels.[6] Most small enterprises are owned by women, but there is limited support from the government to access credit facilities. With these dynamics, the women in South Sudan are gaining increasing access and the rights to own land and property out of exposure to leadership and business opportunities. Additionally, women are increasingly at the forefront of production, decision-making, and driving the economy at the local and national levels. Given these opportunities, women have diversified beyond crop production to cattle rearing and producing milk and meat.

These developments have major implications for Science, Technology, and Innovation (STI) and gender-inclusive processes. Exposure for women means they are slowly abandoning their traditional gender roles, where women are homemakers. This new dynamic has caused some discomfort among men. Where women tend to be more educated than men, some men have become insecure and feel marginalized. To foster harmony and balance, there is a need to empower men to adapt to these changes while still respecting cultural values.

Male Champions Promoting Women-led Innovations and gender equity.

Mr Atillio Augustino, the Director of Extension in South Sudan's Ministry of Livestock and Fisheries, has been driving efforts on gender inclusivity in agriculture extension and advisory services. He provides insights into the work being done at the national level with significant regional and continental implications. Mr. Atillio states, *"The national gender policy was embedded in the development and operationalization of the national agriculture and livestock extension policy by the Ministry of Livestock and Fisheries and Ministry of Agriculture and Food Security."*

The policy emphasizes gender integration across all government programs and projects. This includes gender-responsive planning, budgeting, and partnerships with development and private sector actors. It has been noted that having a gender policy has highlighted significant elements that would enhance the agricultural sector, including the importance of including men, women, youth, and marginalized groups in implementing government-led initiatives. Likewise, effective coordination of multistakeholder partnerships is crucial to ensure adherence to gender-related policies at all levels.

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[5] Ministry of Gender, Child and Social Welfare and UN Women South Sudan (2024) Country Gender Equality Profile (CGEP) for South Sudan. https://africa.unwomen.org/sites/default/files/2025-01/south_sudan_country_gender_equality_profile_0.pdf

[6] Brusadelli, I. (2023, March 8). *Women’s day. In South Sudan, agriculture is the engine of women’s empowerment*. Avsi. https://www.avsi.org/en/news-and-press/news/womens-day-in-south-sudan-agriculture-is-the-engine-of-womens-empowerment

Creating a Supportive Innovations System: Policy, Research, and Private Sector

Policy support for women in agriculture: South Sudan's constitution states that women should hold 35% of government positions. Despite cultural taboos and challenges, women have demonstrated their capability in both leadership and supporting their families. Some argue that there is an imbalance in how women's rights are being handled, suggesting the need for a more balanced approach that promotes cooperation between men and women.

Navigating poor infrastructure and political fragility: The challenging terrain, poor infrastructure, and insecurity in certain regions limit women's access to livestock areas. However, community animal health workers (CHWs) from local communities, including women, are being trained to identify diseases and provide vaccinations. In crop production training, however, the number of women involved is still low, even in training centres like Yei Crop Training Centre and Marial Lou. Nevertheless, gender awareness has led to increased participation of women in traditionally male-dominated roles.

Scaling Innovations: Policy Engagement and Research Partnerships

The government's budget allocation to agriculture extension and advisory services is minimal; hence, the sector relies heavily on donor-funded initiatives, such as those from the AFDB, World Bank, and EU. While this strategy works in the short term, it has been noted to be unsustainable in the long run. A large portion of Africa's youth remains unemployed. However, opportunities exist for them to engage in agriculture at various stages, including primary production, value addition, and the end of the value chain. Nonetheless, the value chain remains underdeveloped due to limited investment, and many young people are discouraged, perceiving the process as time-consuming.

"Bringing women and men on board and increasing chances for young people in social protection is very important" says Augustino, "This also allows them to take care of their lives and livelihoods."

Mr. Atillio mentions that concrete partnerships like civil society and farmer organizations are needed for extension work to excel. South Sudan's Ministry of Agriculture aims to produce homegrown technologies and innovations. The Department of Extension Services is open to collaborating with like-minded regional and global partners to find the best practices for adoption. They partner with the Natural Resource Sector Working Group (NRSWG) to reinforce this initiative. The NRSWG convenes five ministries and one mandated commission to coordinate efforts towards a digital agriculture sector. These ministries constitute the Ministry of Agriculture, Ministry of Livestock, Ministry of Environment and Forestry, Ministry of Water Resources and Irrigation, Ministry of Wildlife and Land Commission. This initiative organizes annual extension days to coordinate activities and bring together diverse partners to chart the way forward.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Strategic Partnerships for Extension Services: The multisectoral collaboration with civil society, farmer organizations, and ministries has been crucial in advancing agricultural extension services. These have facilitated knowledge-sharing, resource pooling, and coordination to improve agricultural practices and innovation.

Development of Homegrown Technologies and Innovations: Creating locally developed technologies, combined with regional and global collaborations, fosters the capacity for innovation. This initiative allows South Sudan to adopt contextualized best practices that will feed the local needs and address challenges while strengthening a sustainable agricultural sector.

Women's access to credit: Platforms like Dogitla have been set up specifically to promote women entrepreneurs and village savings and credit associations (VACOVAs). This allows women to improve their savings and access credit. However, most digital platforms that would support such are stronger and practical in urban centres where there is the availability of reliable internet and access to electricity. Apart from the digital lending platforms, the cooperative bank is also working with women to create a platform where the women groups can share opinions, communicate, and improve their savings and credit scores.

Implementation of farmers' field schools: One uplifting factor is that the government is particularly interested in farmers' field schools and is keen to ensure gender inclusivity within this practice. One of the programs being implemented ensures an integrated system addressing the issue of livelihoods and education, where communities are categorized into three groups. One group has non-school-going children, the second has school-going children following the standard curriculum, and the third is for youth cattle herders.

Capacity building programs: All members from the three groups undergo Technical and Vocational Education and Training (TVET) or entrepreneurship courses. A group comprising the elderly is provided for livestock to rear at the farmer field schools. This program, funded by the European Union and implemented by the Food and Agriculture Organisation (FAO), has brought a significant change in the livelihoods of South Sudan's rural communities and improved the gender-responsive approaches carried out by extensionists.

Gender sensitization and awareness campaigns: Agriculture in South Sudan is primarily divided into livestock and crop farming. Mr. Atillio estimates that over 70% of farmers rear livestock, but the challenging terrain and lack of infrastructure make it difficult, particularly for women, to improve the industry's performance. While many women excel as community animal health workers, diagnosing and treating livestock diseases, expertise in managing crop diseases remains limited for both genders. Ancient taboos restrict women from taking up extension work, but ongoing gender sensitization is helping communities realize the benefits, encouraging more women to pursue training in agriculture.

Leveraging digital platforms for knowledge sharing: The digital era is aiding with some of these problems despite the slow facilitation of internet connectivity, electricity coverage, and data communications systems. With the emergence of digital platforms, youth, especially women entrepreneurs, are helping develop the platforms. These entrepreneurs are also leveraging digital platforms to form communities where they can discuss issues and find solutions without having to trek long distances. Text messages are also being embraced for communications with extension workers. Mr. Atillio confirms that *"We also have the village saving credit facilities that have emerged with digital lending platforms to ensure that entrepreneurs can access funding."*

Women's access to land: Some women have gained ownership of land, particularly residential or community land. Women also have access to livestock, such as small ruminants, and can make decisions regarding sales.

Remaining Challenges

Overreliance on rain-fed agriculture: Like much of East Africa, farmers in South Sudan primarily rely on rain-fed agriculture. This makes them vulnerable to erratic or delayed rainfall, which leads to poor harvests. Additionally, limited access to high-quality seeds and planting materials further restricts productivity.

Lack of well-trained human resources: Empowering women economically is fundamental and essential for fostering economic growth, improving human development, and enhancing overall well-being. While the women in South Sudan have ample rights and access to land, there is a lack of well-trained human resources at the grassroots level. Consequently, applying gender-sensitive practices in program implementation is inconsistent and sporadic, particularly in monitoring and evaluation (M&E) and within pluralistic extension systems.

Lack of gender disaggregated data: Although gender considerations are well incorporated at the policy, program, and budget levels, implementation falls short due to insufficient staff capacity. Additionally, the lack of gender-disaggregated data hampers effective program execution, and when data is available, it is often fragmented and unreliable. For instance, efforts are made in farmer field schools to ensure that gender issues are addressed. Programs focusing on livelihoods, education, entrepreneurship, and pastoral communities must also integrate gender considerations to ensure women's contributions are recognized.

Poor adopting of technology and innovations: Women in South Sudan face multiple challenges, such as gender-based violence and limited access to resources that could improve their lives. There is a need to improve women's productivity by adopting technology and innovations that can reduce their burdens in production, value addition, and marketing.

Lack of localized research and innovation: Localized research and innovation in agriculture are still lacking, and much of the technology and innovations are borrowed from other countries. For example, women in fisheries are excelling in processing and are organized under various projects. While women's participation in economic activities is increasing, they still face significant challenges related to the fragility of the state and access to credit. Given the efforts to make South Sudan's national system gender inclusive, there is still a shortage of skilled workers at the local level. This presents ongoing issues, such as having data that is not gender disaggregated, resulting in weak responses to gender-related issues.

Recommendations

Augustino recommends that investment in the food system is very crucial and urges governments to follow the Maputo protocol of allocating 10% to building the food system and take the lead instead of having development organizations drive the food systems agenda.

Men and women must be at the forefront of decision-making and production. Employment opportunities arise when food systems are self-sustaining and inclusive.

A sustainable and inclusive food system should be fostered and encouraged to ensure that all community members are provided with a platform to participate meaningfully without discrimination, allowing growth at the household, national, and regional levels.

Building Resilient Food Systems Through Climate-Smart Agriculture in Zimbabwe (FSC14)

Context

Climate change and food and nutrition insecurity are among today's most significant development challenges. However, by creating a more sustainable food system, the planet can be protected while at the same time achieving food security for all. Given that the development of the agricultural sector depends heavily on the power of science to stimulate growth, one of the key issues facing the sector is the limited availability of technologies needed to drive growth and enhance competitiveness on a global scale. Climate-smart agriculture (CSA) offers a strategic approach to transforming agri-food systems, promoting environmentally sustainable and climate-resilient practices.

Effective coordination and integration among various sectors addressing climate change, agricultural development, and food security at the national, regional, and local levels are essential to creating a supportive policy environment. Zimbabwe's smallholder farmers are on the frontlines of climate change, battling erratic rainfall and prolonged droughts that threaten their livelihoods. With the country's reliance on rain-fed agriculture, these challenges are hitting rural communities hardest. However, efforts to strengthen climate resilience and adaptability are underway, leveraging scientific knowledge and technical expertise to help farmers cope.

Women Paving the Way in Groundbreaking CSA Research

The Government of Zimbabwe has made significant efforts to garner policy implementation by mobilizing networks of farmers for better agricultural practices. Mrs. Nyarai Chisorochengwe, leading from the Department of Agriculture Research Innovation and Specialist Services (ARISS) in the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (MLAFWRD), is working on two significant women-led innovations that have been implemented in parts of the country to address some of the climate-related challenges. These innovations include the Goat Farming and the Sweet Potato projects that are targeting smallholder farmers and targeting women innovators in Umzingwane and Masvingo.

With experience and expertise working with the Government of Zimbabwe, Mrs. Nyarai is providing the two projects with research insights on improving the quality of potato vines for high-yield and quality goat breeds. She also provides linkages to government extension services, connections to training opportunities through development partners, such as the Green Climate Fund (GCF), and expert advice on proper farming for transformed and sustainable food systems. The two enterprises are climate-smart and gender inclusive. The orange-fleshed sweet potato is easy to propagate and can withstand harsh conditions brought about by climate change; hence, all gender groups can afford to propagate it and have food on the table at their earliest convenience. Kalahari goat breeds are crossbred into exotic and indigenous breeds, and hence, they can adapt to local conditions in terms of the environment and the available type of feed.

Creating a Supportive Innovation System in Goat and Sweet Potato Value Chains

Men and women experience the impacts of climate change differently, and their responses vary, particularly regarding ensuring food security and livelihoods. Therefore, Mrs. Nyarai strives to ensure that agricultural responses to climate change are gender-inclusive, ensuring that women are actively involved in adaptation and mitigation efforts designed to enhance food security. Women in Zimbabwe have been at the forefront of improving livelihoods, working hard to prevent malnutrition and

embracing good agricultural practices to ensure environmental protection. In their resilience and hard work, women-led agricultural projects face numerous challenges, including limited access to water and dip tanks for livestock, inadequate training facilities, and cultural barriers restricting women's land ownership and participation in public activities. The introduction of climate-smart agricultural practices and innovations is also met with skepticism and resistance from some community members, making it difficult to convince them of the benefits of climate-smart approaches. The main reason being that some people take time to embrace innovations, and others do not believe in change. Others are also worried about taking risks in the event that the projects fail to bring out meaningful results, for instance, in the event of disease outbreaks, they fear losing the whole flock.

Key Aspects of the Supportive Innovation System

Goat Value Chain: The goat farming project involves 28 women and six (6) men connected to capacity-building activities offered by Esigodini College. Through this training, they purchased Kalahari goats. They crossbred them with the Indigenous Matabele breed to improve meat quality and frame size with support from the Ministry of Lands, Agriculture, Fisheries, Water, and Rural Development. Mrs. Chisorochengwe has seen the project grow to attract funding and training support from the GCF under the UNDP, all of which were facilitated by her collaborations with the GCF. The members also received veterinary kits to maintain their goat farming business. Currently, each farmer owns over 50 goats, which they sell to local markets. They can also address immediate family needs, including access to diverse diets, taking their children to school, improving their agricultural practices, and improving their quality of life.

Sweet Potato Value Chain: This project, led by Winnie Ndebele at the Makoholi Innovation Platform, focuses on producing virus-free, Orange-Fleshed Sweet Potatoes (OFSP). The farmers receive vines from the Horticulture Research Institute and training from lead farmers through farmer field schools. Despite the project benefiting from training and equipment provided by various partners, the research facility faces challenges such as labour shortages and facility damage due to hailstorms.

It is important to offer incentives for environmental services (like land management that provides ecological benefits), to encourage farmers to adopt climate-smart practices and help them overcome investment challenges. These will attract many farmers to adopt the approaches. For example, OFSP varieties have five significant 'highs'. They are high in vitamin A, high-yielding, have high-income potential, a high level of drought tolerance, and a high level of versatility because the roots and leaves are nutrient-dense. At the same time, the residues can be used as livestock feed. This makes a great connection between the sweet potato value chain and the goat businesses. The beauty of it is that these innovations have been co-developed with farmers, making it easy for them to adopt them.

Mrs. Nyarai leverages innovative agricultural practices to combat climate change and empower women to achieve financial independence. By focusing on goat farming for milk and meat and cultivating sweet potatoes, she pursues a vision where hidden hunger is eradicated, especially among children under five and the elderly. She confirms that, *like any other country, we still experience gender stereotypes that women in agriculture face, such as being unable to handle physically demanding tasks or technical farming roles, which are traditionally seen as male domains.*

Determined to break these barriers, Nyarai empowers women to be self-reliant and reap the financial rewards of their labor, selling farm products and benefiting equally from the proceeds.

Factors contributing to successful women-led innovation and gender equitable outcomes

Community engagement and effective capacity building: Activities like introducing new breeds or bio-fortified potato vines must be aligned with the context and involve learning from what works. In the

goat and OFSP businesses, training and demonstrating successful cases helped overcome skepticism and led to the acceptance of new agricultural practices. Practices like continuous sensitization of gender in value chains and food systems lead to awareness of women's participation and leadership in food systems.

Access to necessary resources: For the goat business to succeed beyond its current numbers, it needs water, dip tanks, and machinery, which significantly influence the success and scalability of any agricultural project.

Gender inclusivity in leadership and decision-making processes: Gender inclusivity and its promotion in leadership and decision-making processes have empowered women and led to better economic and social outcomes for the community. Because of Mrs. Chisorochengwe's advocacy for gender inclusivity within the two projects, women's involvement in leadership has increased, breaking traditional gender roles and fostering a more inclusive environment.

Policy support: Policy support and inclusive institutional structures play a vital role in the sustainability of women-led innovations. The presence of gender directors and focal persons in ministries helps ensure that women and youth are considered in agricultural initiatives.

Increased capacity building: Collaboration with ward representatives, extension staff working directly with farmers, and partner organizations such as the Green Climate Fund has increased capacity support for farmers. By involving district agriculture extension officers and college principals, she ensured that training sessions were accessible and effective for all, especially women. To ensure women are receiving support from their spouses, she invites couples to the workshop so the men can learn and be aware of their wives' activities.

Increased income sources: The Goat Farming Project has provided a reliable source of income for the group members, especially women, enabling them to send their children to school, improve household nutrition, and save for future needs. Similarly, the sweet potato project has ensured food security and economic stability for the participating families.

Positive Social relations within the communities: By increasing women's participation in leadership roles and decision-making processes, the projects have contributed to positive social relations within the communities

Balanced gender relations: This shift has empowered women and contributed to more balanced gender relations within the communities. Subsequently, the innovations have incorporated practices that promote environmental sustainability.

Prevention of environmental degradation: The goat project includes controlled grazing to prevent environmental degradation, while the sweet potato project focuses on sustainable cultivation practices. Mrs. Chisorochengwe emphasized the need for gender inclusivity across the value chains and regions. She suggests, "*The gender discussion and initiatives need to expand to other regions to ensure that all are in sync for others to appreciate the impact of gender.*"

Remaining Challenges

No legacy plans or sustainability mechanisms: Despite all the efforts to empower women and promote their innovations in Zimbabwe, several challenges persist. The projects are largely donor-funded, and there are no legacy plans or sustainability mechanisms to continue engaging stakeholders after the project ends.

Lack of strong monitoring and evaluation mechanisms: There is also a lack of strong monitoring and evaluation mechanisms to help reflect on gender-specific indicators and their contributions to the food system at the regional level.

Strengthened capacities and support for innovation platforms: Additionally, these linkages with the Agriculture Research for Development fraternity must be strengthened to leverage network support for innovation platforms and capacity needs.

Lack of spousal support for women: Given that Nyarai's daily work involves organizing farmers into groups to provide them with targeted capacity-building support, this has been far from easy. She has faced significant challenges, such as women being barred from attending meetings by their spouses, inconvenient meeting times for women with school-aged children, and unsuitable venues for those with toddlers. She states, *"It is sometimes considered disrespectful for women to be taken up leadership roles by their husbands since they do not want the women to be exposed to other men."*

Recommendations

The government of Zimbabwe strongly advocates for gender mainstreaming to ensure that women gain access to land and can make critical decisions about what to grow, when to grow it, and how to use their earnings. Nyarai emphasizes the importance of representation, hailing the government for embedding the position of a gender director in each ministry. The position holders are there to champion the interests of men, women, youth, and other vulnerable groups.

Mrs. Nyarai recommends embracing transparency and inclusive problem-solving tactics. She derives success from involving the whole team through knowledge sharing and generating collective solutions. From the success seen through the goat and OFSP projects, the Department of Agriculture Research Innovation and Specialist Services plans to extend the research and extension services to more regions, enhancing food security and economic stability across Zimbabwe. In alignment with the African Union's vision for intra-African trade, Zimbabwe's government focuses on expanding access to resources, continuous training, and strengthening support networks to ensure the sustainable involvement of women in agricultural markets.

This underscores the importance of the Africa Climate Smart Agriculture Framework (ACSAF), which was officially launched during a high-level event at the Africa Food Pavilion at CoP27 in Sharm El Sheikh, Egypt. ACSAF is a voluntary alliance focused on harnessing the power of partnerships and strategic alliances to implement climate-smart agriculture (CSA) in a coherent manner that aligns with the vision for African agriculture. As such, climate-smart agriculture (CSA) should be integrated into core government policies, budgeting, and planning frameworks.

Promoting Women Seed Businesses in West and Central Africa: The Case of ROCAFES (FSC15)

Context

Food systems face a range of climatic and socio-ecological challenges and farmers need a diversity of plant varieties to respond to these. This needs resilient and inclusive seed systems which ensure seed security for all farmers, i.e., that "men and women within the household have sufficient access to adequate quantities of good quality seed and planting materials of preferred crop varieties at all times in both good and bad cropping seasons"[1].

Seed systems are often described as including the following. The informal system—also called traditional, local, or farmers' seed system—refers to the practices and institutions that are involved in farmers' on-farm management of crop diversity and in their access to seed through their own production, farmer-to-farmer exchange, and local markets. These practices are primarily mediated by social rules and norms that have evolved over time and are closely linked to local cultures and traditions. The formal seed system is understood as the development, distribution, and sale of certified seeds of "improved" varieties in registered outlets. It usually covers only a few crops with higher commercial value. This system is generally governed by national policies and legal frameworks defining variety release, seed certification, and phytosanitary controls. Finally, a third type of seed system—the intermediate seed system is also increasingly recognized, referring to individuals or organized farmers that produce and sell seed not sufficiently covered by the formal seed system, often following simplified certification schemes. There is a lack of consensus on the best way to achieve resilient and inclusive seed systems, including pitting agendas of agricultural modernization against those of food sovereignty[2].

Gender and seed systems

In all types of seed systems, women's effective access to quality seed is determined by gender inequities in access to and control over resources (including money, credit, extension services, information, and land). These are also related to limited recognition of women's involvement and knowledge in seed systems, sometimes combined with negative attitudes toward women's leadership and management. With formal seed systems, either governmental or private sector-based, tend to reach out to men—as farmers and household heads—without formally recognizing women as seed users and making no specific efforts to reach them. In informal systems, women often play central roles as custodians, savers, and seed managers in the household and within communities. Such farmer-managed systems and community-based seed systems seem more responsive to women's needs and interests, but gender inequalities also constrain women's access to and benefits of using seeds. Challenges persist, such as a lack of participation

[1] FAO (2016) *Seed Security Assessment: A Practitioner's Guide* (Food and Agriculture Organization of the United Nations (FAO), Rome, 2016), p. 61.

[2] Westengen, O.T., Dalle, S.P., Mulesa, T.H. (2023) Navigating toward resilient and inclusive seed systems, Proc. Natl. Acad. Sci. U.S.A. 120 (14) e2218777120, https://doi.org/10.1073/pnas.2218777120.

in seed-related decision-making, a lack of ensuring good seed quality, and access to novel varieties and related information[3].

Research highlights women's critical role in African agriculture, yet challenges persist, such as the prevalence of fake seeds and weak seed quality control standards. These issues are compounded by seed-import policies and regulations that are not business-friendly due to the numerous clearances required from various government agencies.[4] Additionally, youth face similar barriers, with young women experiencing a double disadvantage as both women and youth.

Gender-responsive seed systems

Given this, gender-responsive seed systems must also be youth-responsive to ensure this doubly disadvantaged yet potentially productive group isn't left behind. This is why CORAF supported formalizing a network for women-led seed companies in West and Central Africa (ROCAFES). ROCAFES is a network of women in the seed business from 11 countries in West and Central Africa.

Women-led Network of Seed Businesses: Why it Matters

Despite increasing advocacy and awareness of women's empowerment and addressing gender gaps in agribusiness and seed systems, women still face significant challenges in accessing markets, financing, and necessary policy support to grow their enterprises. ROCAFES promotes the development of women-led seed enterprises with a mission to support inclusive participation, leadership, and contribution of women in the sustainable seed sector. This women-led network matters because it:

- **Builds capacity**: Enhances members' skills in quality seed production, regulatory aspects, and seed business management.
- **Facilitates experience sharing**: Promotes gender inclusion, women's leadership in the seed industry, and mentorship through shared experiences among members.
- **Contributes to policy formulation**: Influences policy at both country and regional levels to encourage women's participation in the seed sector.
- **Improves access to finance and markets**: Reduces the gender gap in the industry by improving access to finance and markets for women in the seed business.

Mrs. Zalissa Sawadogo, head of AnBaloso seed company in Burkina Faso and general secretary of ROCAFES, speaks of the potential for women and youth to impact seed systems through entrepreneurship. She recognizes that empowering men, women, and youth within the community creates meaningful change.

[3] Puskar R, Mudege NN, Njuguna-Mungai E, Nchanji E, Vernooy R, Galiè A, Najjar D. (2021) Moving beyond reaching women in seed systems development. In Pyburn R, van Anouka E, editors. Advancing gender equality through agricultural and environmental research: past, present, and future (Issue December, pp. 113–145). International Food Policy Research Institute. 2021. https://www.kit.nl/wp-content/uploads/2021/11/Advancing-Gender-Equality-through-Agricultural-and-Environmental-Research.pdf.

[4] "Gender and the Seed Sector," AfricaSeeds, accessed September 3, 2024, https://www.africa-seeds.org/en/why-seeds/gender-and-the-seed-sector/.

Embracing Participatory Approach to Empower Women Entrepreneurs

Seed multiplication and quality control training. The ROCAFES network addresses the challenges faced by women by leveraging opportunities within the ECOWAS seed sector. Many women involved in seed production face financial and resource constraints. By joining ROCAFES, these women gain access to seed multiplication and quality control training, strengthening their ability to sustain their businesses and contribute to food security.

Providing quality seeds, including promising varieties and advanced lines, to farmers for evaluation, multiplication, or production is critical for the sector's growth. This can be achieved through participatory variety testing or emergency seed aid that meets farmers' needs and interests.

To date, ROCAFES has attracted more than 25 seed companies from Mali, Nigeria, Ghana, Niger, Togo, Mauritania, Senegal, Burkina Faso, Benin, and Chad. Together, the network addresses an 84% cereal supply deficit projected for West Africa in the 2023/24 season. Current forecasts show a total cereal production of 58,094,021 metric tons (MT) across West Africa, leaving a gap of 69,496,449 MT.[5] So far, the network has leveraged approximately 3 million tonnes of seeds from other seed businesses, covering 30% of the market share in the region.

With a reach of over 1,000 members comprising associations and cooperatives, primarily women, in West Africa, some key companies within the network include:

- **AnBalosoI in Burkina Faso**: A seed company involved in gardening and fodder seeds, selling seeds online, and partnering with women-led enterprises in Mali and Chad. AnBaloso contributes to the Government of Burkina Faso's efforts to provide food for internally displaced people by furnishing cereal crops.
- AnBaloso seed company in Burkina Faso collaborates with contract farmers to provide inputs like foundation seeds and fertilizers. This approach enables AnBaloso to collect the best seeds for the market, ensuring a cycle of empowerment and economic independence for women within the ROCAFES network.
- **NOUR M'BEYANE in Mauritania**: A cooperative established in 2012, involved in the production and marketing of rice. The NOUR M'BEYANE family cooperative produced the Berdis Rice brand in 2019. The cooperative collaborates with Senegalese and Ethiopian researchers to source basic rice seeds.
- **Société Coopérative des Femmes Semencières du Sénégal**: The Cooperative Society of Seed Women of Senegal has a membership of 52 companies. It was established to allow women to express themselves as leading actors in the seed sector and invest in seed enterprises.

Creating a Supportive Innovation System: The Role of Policy, Research, and Private Sector

The success of ROCAFES is deeply rooted in an enabling environment fostered by strong strategic partnerships with local agricultural offices, the government, and development partners. These collaborations have been instrumental in expanding the network's impact across West Africa and formalizing initiatives under regional regulations.

[5] FEWS NET West Africa, "West Africa Regional Supply and Market Outlook," FEWS NET (USAID, December 28, 2023).

Collaborating with local agricultural offices has ensured the provision of well-informed training equipping women farmers, significantly expanding the seed network across West Africa. The partnerships have also resulted in women farmers accessing the necessary tools, training, and support to enhance their productivity and contribute more effectively to the food system.

The Ministry of Agriculture in Burkina Faso and development partners under initiatives like CAADP-XP4 have played a critical role in supporting women in the seed sector. Through these collaborations, ROCAFES has been formalized under ECOWAS regulations, enabling broader regional impact. This formalization allows the network to operate more effectively and influence agricultural practices across multiple countries.

The enabling environment created by these partnerships has empowered the women within the network to significantly impact the agricultural sector, particularly in promoting women's leadership in seed businesses. This inclusive approach has strengthened women's role in agriculture and fostered a collaborative spirit that has enhanced the success of their enterprises across West and Central Africa.

Factors contributing to successful women-led innovation and gender-equitable outcomes

Collaboration and strategic partnerships for better coordination: Working with local agricultural offices, the government, the Regional Economic Community (ECOWAS), regional research organizations (CORAD), and development partners has been crucial in expanding ROCAFES's impact across West Africa. These partnerships have helped formalize initiatives, ensure unified support, and maintain regional regulatory compliance and alignment. ECOWAS's support in creating and developing the network has been critical for linking with seed policy implementation in West Africa.

Increased capacity to enhance seed networks: Embracing partnerships has facilitated well-structured training programs for women farmers, enabling them to access essential tools, knowledge, and support. This boosts their productivity and strengthens their roles in the food system. With these skills, women can enhance seed networks and agricultural productivity.

Women leading regional market integration: The integration of ROCAFES under ECOWAS regulations has allowed for a broader and regional influence, enabling the network to operate effectively across multiple countries while influencing agricultural practices, markets, and cross-learning.

Strengthening women's leadership capacities: By fostering open communication and collaboration, women tend to mentor and support each other in developing leadership skills. This peer-to-peer learning environment empowers women to take on more significant roles within the network, driving change and innovation.

A collective approach to knowledge-sharing: While some members' lack of technical knowledge can be a barrier to success, effective communication and collaboration within the network help bridge these gaps. Sharing expertise, offering training, and supporting each other's learning journeys ensure that all members contribute meaningfully to the network.

Strengthening women's capacities to identify market opportunities: Established companies often present stiff competition, but a well-coordinated network of women develops strategies to compete effectively. Market trends, challenges, and opportunities are identified and shared openly. The women also collaborate on innovative solutions that leverage their collective strengths, such as creating unique, community-driven products that stand out in the market.

Establishing a profitable enterprise and contributing to job creation: The network has inspired new members to establish profitable enterprises, which result in job creation and economic empowerment for women and youth. Capacity-building activities, mentorship, and business development services are crucial to the growth of enterprises.

Uptake of new seed varieties: Building the technical capacity of network members and enhancing communication strategies to foster cooperation is crucial for the uptake of new seed varieties, access to funding, and increased capacity development.

Preservation of local traditional seeds: The network of women in the seed business has strengthened traditional seed exchange networks, which have been weakened in many regions. These networks help preserve local traditional seeds that most women prefer.

Recognizing the importance of gender inclusivity, collaboration between women and men in the seed sector has become crucial for success. For instance, Zalissa's former male supervisor, who owns a well-established seed business, has played a critical role in mentoring women in the seed network. This mentorship has guided operational challenges, crisis management, and strategic planning. Despite being a women-dominated group, the network acknowledges the role of gender inclusivity in their success. They understand that men are vital in the agricultural value chain. By including men and youth in meetings, training sessions, and project development, they have fostered a more supportive and collaborative environment, bridged gender gaps, and enhanced the overall effectiveness of their initiatives.

Remaining Challenges

Access to land: Like many organized food systems, the seed network faces significant gender-related challenges. Women in the seed sector often struggle with barriers such as limited land ownership.

Improved quality of inputs storage facilities: To strengthen women-led seed networks, more targeted support for emerging companies, improved access to high-quality inputs, and the development of advanced storage facilities are needed.

Limited leadership and technical capacity among members: Inadequate technical knowledge and a lack of leadership experience among some network members. These challenges are further exacerbated by communication barriers and competition from established companies, which can complicate collaboration and hinder the network's effectiveness.

Access to finance: At an individual level, it is still a challenge for women to access funds or resources without collateral or dependency on their spouses. In an industry where women often face systemic disadvantages, joining a unified group allows them to pool resources, share knowledge, and collectively advocate for their rights.

Recommendations

Greater efforts are still needed to increase the number of women involved in entrepreneurship and enhance their meaningful engagement in the seed sector despite significant progress in fostering women's participation in certain African regions.

Support traditional seed exchange networks: While the seed network is taking shape to ensure quality seed for farmers, farming households need to think more broadly about their seed quality and farming techniques. In many areas, farming households have become more individualized in their decision-making

and management of knowledge, labour, capital, and seeds. As a result, traditional seed exchange networks have weakened in many regions.

Government intervention is essential to strengthen clearance regulations and seed certification processes to prevent the spread of fake seeds. Additionally, it is recommended that farming practices shift toward market-oriented approaches. While this can yield positive outcomes, such as increased economic viability, it may also have negative impacts depending on the local context, requiring careful consideration and tailored implementation.

Improve seed import procedures: The prevalence of counterfeit seeds and weak seed quality control standards are compounded by seed-import policies and regulations that are not business-friendly due to the numerous clearances required from various government agencies.

Poor communication on women-led initiatives: Effective communication and collaboration are beneficial and essential for overcoming challenges and achieving success by attracting the right partnerships and support. Effective communication also ensures that all members align their goals, strategies, and actions, strengthening the network and making it more resilient against external pressures.

The role of research on seed management and conservation: Research on seed management practices, including new conservation technologies and methods, should be conducted. This requires strengthening linkages between seed-related government institutions and smallholder farmers and facilitating knowledge and seed sharing among farmers.

Strengthening partnerships with research, policy, and the private sector will increase the network's market share and allow it to meet the market demand for cereals and grains. Most importantly, financial packages that can be accessed by women in the seed business to expand their businesses and take advantage of the opportunities presented by the Africa Continental Free Trade Area (AfCTA) must be made available.

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