How is Gender Relevant to Agriculture and Food Security?

The integration of gender into research can feel like a new challenge for researchers in Higher Education (HE). The international development sector has, however, been learning about the ways that gender is relevant, in all aspects of poverty alleviation and development, for several decades. As part of the University of Edinburgh /GenderED project 'Integrating Gender into GCRF Bids: Getting to Sufficiency' we have produced several thematic summaries describing how gender is relevant to different international development themes. These short briefs are intended to support HE researchers who are incorporating attention to gender issues into their research, for first time.

This document provides a **simplified and abridged summary** of over four decades of learning that has taken place within the international development sector, about the **relevance of gender in agriculture and food security.** It aims to provide a **starting point for researchers, who are unused to considering how gender may be relevant to their work or are unfamiliar with social science approaches to gender**.

This brief also provides links to more detailed, agriculture specific resources and **GenderED's Toolkit: Five Steps to Gender Sensitive Project, which is specially geared to the requirements of HE researchers**.

This briefing groups existing knowledge on gender issues in agriculture and food security into six themes: divisions of labour; access to resources; value chains; decision making and research; food security and gendered data gaps.

The Relevance of Gender

Gender is an analytical term used in the social sciences to describe shared ideals of femininity and masculinity and **associated behavioural expectations and relations between the sexes**. These expectations have been found to vary from one culture to the next and over time (Scott 1986). Gender has been observed structuring the organisation of almost every domain of social, political and economic life, including environmental and agricultural sustainability (Melchior and Newig 2021). Gender is **intrinsically linked to the distribution of power, status, wealth and security** and the subordination of women in relation to men can be seen across many domains of life. Women, for instance, are often expected to perform unpaid care or housework and have less access to and control over resources (Raworth 2017; Waring 1988). This in turn has an impact on their education, finances, and health (Kabeer 2015). Thus, just as in any other domain of life, gender is an important factor structuring opportunities and outcomes in agriculture. It is important to understand that gender intersects with other structural inequalities and identities such as a person's religion, migration status, race, age, class and caste. Social scientists refer to this phenomenon as 'intersectionality' (Charusheela 2015).

Gender in Agriculture: Divisions of Labour

In many societies, **commercial agricultural production is principally a male responsibility** and takes place outside the home – this applies equally to arable crop production, meat, timber and fishing (FAO, 2011). By contrast, **women often have heavy burdens for domestic work and subsistence agriculture** (FAO 2011). Women's subsistence agriculture work can, for example, include rearing family poultry, small livestock and the collection of fuel wood and water (FAO 2014c). Two-thirds of poor livestock

© Created by GenderED University of Edinburgh 2020, CC BY SA

owners, totalling nearly 400 million people, are women (FAO 2014c). Despite responsibilities for subsistence agriculture, women also play a role in generating family income, through for example harvesting, weeding, planting, and threshing crops, and processing products for sale (FAO, 2011). In the sub-Saharan African region, for example, women comprise around 43% on average of the agricultural work force (Croppenstedt et al 2003) devoting an average of 45% to 50% of their daily time to agricultural practices (FAO 2011). In some instances, women may also earn a small independent income through this kind of work. However, **the recognition of women *as farmers* or as producers varies and is often underestimated** (David 2015; BRIDGE 2014). Regardless of women's high inputs in agricultural sector, the mean wage for women in agriculture is significantly less than that of men, even when their qualifications are better than men's (FAO 2014c; AWARD 2017).

Crops or resources are also often marked by an association with men or women (FAO UN, IFAD, and ILO 2010). Examples of 'male crops' for example include, cocoa in West Africa (Barrientos and Owusuaa 2016) and sweet potato in Nigeria (David 2015). Female crops on the other hand include, livestock such as poultry, sheep and goats (Boogaard et al. 2015) and insects (Fiaboe, et al 2020; Coley et al. 2020). However, experience shows that gender marking of crops is fluid. It can change in relation to various aspects of local context, including market signals. Dominant groups in society (e.g. men) may shift to the production of traditionally female crops, if they become more profitable (David 2015; Boogaard et al. 2015; Njuki and Sanginga 2013). Gender differences in access to crops and resources should not therefore be addressed simplistically.

Responsibly for collecting water is also organised according to social categories. **Women and children have main responsibility for fetching water in the majority of households globally** (76 %) (FAO 2014c). As a result, access to clean water is critically important for women. Reductions in time spent fetching water can have positive gender equality impacts allowing women to divert their personal resources to income generating activities or education (FAO 2014c).

Gender in Agriculture: Access to Resources

In many countries and regions, **traditions/societal norms restrict women's land ownership or leasing rights**, or encourage them to abandon them to male relatives (FAO 2014b; Sathar and Kazi 2000). As a result, only 10 to 20 % of all landholders are women (for countries where data is available) (FAO 2014c). This lack of access to land can be **particularly acute for unmarried women or widows** – making them particularly vulnerable to shocks (Khan 2015). Small holds of female-headed households are also often on poor quality, small segments of land (Mishra et al 2017). These gender inequalities are particularly acute in conflict or post conflict situations. In wars men are usually the main casualties. This can leave surviving women without family extremely isolated, and acutely affected by post-conflict socio-economic disruption (FAO 2006; Wilcox et al. 2015).

Access to agricultural technologies and agricultural extension, including integrated pest management techniques, improved plant and animal breed varieties, agricultural machines, tools, and fertilizers, is also often marked by stark gender differences (Njuki and Sanginga 2013, 87; Carr and Hartl 2010). For example, in many countries, only half of women are likely to use fertilizers (FAO, 2014). Many factors lead to these outcomes. Women and girls have less access to **education** than men, particularly in rural areas, in almost all countries. Girls often leave school earlier to marry or care for family members and women participate less in scientific research and technological development (World Bank 2021; UNESCO 2018; Action Aid 2013). Thus participation in agricultural research and training is marked by the same gender inequalities (Diaz and Najjar 2019; Beintema and Di Marcantonio 2010; Aguiari et al 2017).

Research has also shown that the provision of **agriculture extension can entrench and exacerbate gender inequalities** when programme design or knowledge transfer methods do not take explicit account of women's lives and the barriers they may face to accessing agricultural extension or

participating in public spaces (Diaz and Najjar 2019; Carr and Hartl 2010). These differences in access to resources are directly connected to gender inequalities in decision making (see below), lead to **a large gender productivity gap** in agriculture (UN Women 2018; Aguiari et al 2017) and make women less able to adapt to threats such as climate change, conflict/displacement or natural disasters. For these reasons, researchers must take measures to ensure that any distribution of agricultural technology, or knowledge should be carefully targeted, to ensure that benefits reach those most in need and avoid co-optation by groups already dominant in society (Carr and Hartl 2010).

Access to ICTs sometimes used to disseminate agricultural knowledge or market information is also marked by gender differences. For example, the gender gap in mobile phone access gap in rural Uganda is 22% (GSM Association 2020, 11) and research shows that the promotion of women's mobile phone usage can lead to increased scrutiny of women's behaviour or even explicit surveillance from family members (Porter et al. 2020). Unfortunately, researchers and policy planners often *assume* without evidence, that ICTs can be used to contribute to gender equality. This fails to take account of evidence that these technologies can in fact worsen inequalities (Cummings and O'Neil 2015). ICT technologies for knowledge dissemination should therefore be used carefully and underpinned by thorough gender sensitive situational analysis (see below for resources on gender sensitive situational analysis).

Finally, access to credit is also marked by strong gender inequalities. In most countries, the proportion of female headed smallholders able to access financial services is 5 to 10 % lower than that of male smallholders (FAO 2014a). Micro credit interventions have, as a result, been used as a tool to improve women's autonomy in decision-making power and to increase their socio-economic status (FAO UN, IFAD, and ILO 2010).

Gender and Value Chains

Gender is also often a strong structural factor in value chains affecting bargaining power, prices, product choice and access to markets (Barrientos and Owusuaa 2016; FAO 2015; Sahel 2018; David 2015). Women can experience limited access to local markets due to seclusion; diminished personal income control as crops are commercialized (Ngoma-Kasanda and Sichilima 2016) and low levels of access of technology (see above). These factors coalesce to **decrease women's ability to access diversified value chains** as well and their capability to compete with other actors. To tackle these issues, gender-sensitive value chain analysis can be used to design interventions that can increase women's bargaining power or market access (FAO 2015; Barrientos and Owusuaa 2016; AWARD 2017). Women's farming co-operatives can play a key role in overcoming some of these market disadvantages (FAO n.d.).

Gender in Agricultural Decision Making and Research

Gender also structures participation in agricultural decision making at multiple levels. These include within the **family, at community level, in trade unions and cooperatives, and in research and policy making at national and international levels** (Ngoma-Kasanda and Sichilima 2016; FAO 2014c; Aguiari et al 2017). Depending on the national/cultural context at household and community level, men and women may have decision making power in distinct agricultural spheres (for instance cash versus subsistence farming, or small versus large livestock), or they may share decision making (FAO UN, IFAD, and ILO 2010, 13). Carefully assessing the local relevance of these gendered structures in decision making is therefore an essential step in designing agricultural interventions (FAO 2014b).

These gendered inequalities in decision making are particularly **relevant in relation to climate change adaptation strategies**. Climate adaptation always involves decisions based on multiple goals and interests. Households usually prioritise securing livelihoods and food security, increasing income and reducing vulnerability to new risks such as warmer temperatures, drought or rising sea levels. However, the competing needs and interests of men and women can play a role in these decisions. For

example, experience has shown that innovative crops that produce higher yields may require more water or longer cooking times thus producing negative trade-offs specifically affecting women's daily work (Beuchelt 2013; Action Aid 2018). Unless community planning methods actively work to include men and women equally in consultation, they risk elaborating climate adaptation solutions that disproportionately increase burdens on women (Action Aid 2018). Here, the differences between people's short term practical needs and longer term strategic needs, and the links to gender inequalities and or their transformation becomes an important factor to consider (Aguiari et all 2017, 113).

Finally, **significant gendered asymmetries in agricultural research**, are closely related to women's exclusion from the most highly qualified levels of decision making at national and international level (Aguiari et al 2017; Beintema and Di Marcantonio 2010). In common with other areas of STEMM (Science Technology, Engineering, Mathematics and Manufacturing) agricultural research is marked by an over-representation of men (Beintema and Di Marcantonio 2010; UNESCO 2017). Measures to boost women's participation in agricultural research must tackle gender discrimination (e.g. chauvinistic/ masculinist notions of merit), take account of women's caring responsibilities and work to tackle safety concerns that women face in fieldwork situations (Simmonds 2014; African Union Commision 2014; UNESCO 2018; Sherif 2009; Wawasi Kitetu 2009; AWARD 2017).

In many locations NGOs and women organisations have been established to support women's participation in agriculture (e.g. AWARD, Women in Food and Agriculture). These organisations' experiences show that interventions that support women's participation in research, their access to resources, information, labour markets and loans, and to claim their rights, can all make a contribution to boosting gender equality in agricultural decision making (Wilcox et al. 2015; FAO n.d.; 2011; FAO UN, IFAD, and ILO 2010; AWARD 2017). Strengthening the status of women, in the labour process and through education on the other hand supports both diversity of rural family income and stability and quality of non-farm earnings (Arimond et al. 2011; Fiaboe et al 2020).

Food Security and Nutrition

The Food and Agriculture Organisation (FAO) has extensively promoted attention to gender in food and nutritional security agendas, defining food security as a state where *"[at] the individual, household, national, regional and global levels all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and health life"* (BRIDGE 2014, 2).

Since the 2009 World Summit on Food Security practitioners have increasingly focused on **'four pillars' of food security -** availability, access, utilisation and stability - to critique policy responses to food insecurity. However, international development practitioners emphasise that food insecurity and malnutrition have a disproportionate influence on women and girls, emphasising as a result, the need **to consider how gender intersects with each of the four pillars** (Nisbett et al 2014; BRIDGE 2014; FAO 2014a; 2016; 2014b; Wilcox et al. 2015). For example, differences in the productivity of women's farming can affect food availability; in situations of limited food availability households often prioritise men's nutrition; women's caring responsibilities mean they pay a key role in food utilisation; and women's role as seed holders mean they are important actors in providing food stability year to year or across seasons (FAO 2014a). Intra household GBV is also known to escalate in situations of food scarcity (BRIDGE 2014, 28) whilst women's attempts to avoid GBV may limit their access to food. This latter dynamic is particularly important in situations of protracted conflict where widowed women's access to food or materials for subsistence agricultural can be severely limited by safety fears (FAO 2016, Kahn 2015).

Women's access to iron and sufficient protein-rich foods and micro nutrients has also been highlighted as a particular concern which also holds implications for infant health (BRIDGE 2014). This has

prompted a focus on gender and nutrition within agricultural production and experimentation with novel crops such as insects, which could provide sustainable and socially acceptable routes to support nutritional security for women (Beuchelt 2013; Jaenicke and Virchow 2013; Barennes et al 2015).

Gender Data Gaps

The absence of accurate and dependable statistics on women's participation in agriculture is a long-standing problem. Until recently, many national databases of agriculturally relevant data only collected household data (FAO 2019). This has led to a widespread lack of sex disaggregated data and gender analysis. Collection and comparison of sex disaggregated data has been hampered by a lack of consensus on suitable methodologies. As a result, policy-makers **lack the knowledge base required to effectively devise gender-sensitive interventions** and investments that deliver sustainable, gender-equitable outcomes (Doss 2014).

In response, the adoption of several gender sensitive, agriculture related SDG indicators, sex disaggregated data collection and gender analysis techniques are being developed (FAO 2015). These methodologies emphasise careful analysis of intra-house hold gender specific control and ownership of resources, and divisions of labour, and the importance of methodological questions such as who to interview and how to ask questions (Doss 2014; FAO 2018). The creation of relevant quantitative data is therefore a recognised empirical research priority, along with qualitative reporting of innovative gender sensitive practice and policy. Such contributions can deliver the kind of improved comprehension of gendered dynamics that and are a prerequisite for effective and inclusive policy design.

Conclusion

Gender is an important factor structuring agricultural production, access to resources, food security, agricultural planning, and policy, which intersects with other structural inequalities and identities (religion, migration status, race, age, class and caste). These complexities highlight the need for Global North researchers to **avoid imposing their own assumptions regarding the relevance of gender and to instead *investigate* how gender is relevant in each context**.

International development practitioners emphasise the importance of **local gender analysis** so that interventions or research projects are appropriate and tailored to local gender hierarchies and inequalities. These frameworks provide a structure to identify local gender responsibilities and roles, resources, constraints, and preferences, to better understand and respond to the specific local situation. Many of these analytical frameworks emphasise participatory methods and are freely available online (FAO, IFAD, and ILO 2017; Oxfam 2019; 1999; FAO 2014a; Chambers 1994; Rethinking Research Collaborative 2017; Cornwall 2016; Oxfam Novib 2014; Care International 2019).

By informing research goals, conceptual frameworks, methodologies, fieldwork planning and knowledge transfer activities, gender sensitive situational analysis helps researchers to avoid harm or asymmetrical impacts. It can also help to increase the **likelihood of successful interventions and technology uptake, delivering benefits to as a wide a population as possible.**

Useful Links: Best Practice Guides in Gender, Agriculture and Food Security

The publications and websites listed below are examples of the kinds of international development and agriculture specific tools, available on the web, that can help you to understand how gender may be relevant to your project and how you could integrate in into your work. **However, they are not geared to the specific requirements of HE projects.**

To fill this gap, **GenderED's Toolkit: Five Steps to Gender Sensitive Project**, draws on this best practice approaches from the international development sector and **provides a simplified structure geared**

towards HE research projects, to help you work out how gender may be relevant to your specific research. The GenderED toolkit helps PIs identify relevant gender differences in divisions of labour, access to resources, and access to decision-making, and shows PIs how to **apply these insights directly to the research process**.

Resources

Useful Overviews

1. UNDP (2016) How to Conduct a Gender Analysis: A Guidance Note for UNDP Staff
2. Feed the Future (n.d) Gender Integration Framework
3. Oxfam Novib (2016) Gender Action Learning System
4. Oxfam (2019) Integrating Gender in Research Planning Why Is This Important?
5. The Journal of Gender Agriculture and Food Security http://agrigender.net/index.php
6. FAO (2011) *The Role of Women in Agriculture*
7. FAO (2013) *Gender and Climate Change Research in Agriculture and Food Security for Rural Development*
8. Care International. 2019. Handbook Climate Vulnerability and Capacity Analysis Version 2.0

Gender in Agricultural Production and Value Chains

9. FAO (2020) *Developing Gender-Sensitive Value Chains*
10. FAO (2018) *Migration and Gender*

Gender and Food Security

11. FAO (2014) *Gender in Food and Nutrition Security*
12. FSL Cluster (2017) *Food Security, Sustaining Peace and Gender Equality: Conceptual Framework and Future Directions*

Gender and Agricultural Governance

13. FAO (2018) *DG Indicator 5.a.1 - Equal tenure rights for women on agricultural land*
14. FAO (2018) *DG Indicator 5.a.2 – Ensuring women's equal rights to land ownership and/or control*
15. FAO (2017) *Governing Land for Women and Men*

Data, Monitoring and Evaluation

16. IASC (2021) *Gender Equality Measures (GEMs) in Food Security with IASC Gender and Age Marker*
17. FAO (2018) Data and Information Needs for Gender-Responsive Climate-Smart Agriculture and Key Elements of a Gender-Sensitive Indicator Framework

Attributions

This briefing note was produced as part of a GenderED's multi-phase project on gender sensitive ODA Research, for the University of Edinburgh, by Dr Tefide Kizildeniz, (Niğde Ömer Halisdemir University, Turkey) and Dr Rosalind Cavaghan, (University of Edinburgh), drawing on materials produced during earlier phases of the project and feedback given to individual projects focused on agriculture. The project was funded through the University of Edinburgh's Scottish Funding Council GCRF allocation. The Principal Investigator was Prof Fiona Mackay (Director of GenderED, University of Edinburgh). The project was managed by Dr Rosalind Cavaghan (Independent Consultant and Visiting Researcher, University of Edinburgh).

References

Action Aid. 2013. 'Making Care Visible'. https://doi.org/10.4324/9780203072240-20.

———. 2018. 'Cultivating Rural Women's Economic Empowerment : Exploring Interlinkages between Unpaid Care Work, Agroecology and Violence against Women and Girls'.

African Union Commission. 2014. 'STISA-2024 Science, Technology and Innovation Strategy for Africa 2024', 52.

Aguiari, Sabrina, Apollo Nkwake, and Melody Mentz. 2017. 'Beyond the Double Gender Gap in Science and Agriculture: Is There Space for Feminist Inspired Transformation within AWARD'. *Journal of Gender, Agriculture and Food Security* 2 (1): 106–24. https://doi.org/10.19268/JGAFS.212017.6.

Arimond, M., C Hawkes, M.T Ruel, Z. Sifri, P.R Berti, J.L Leroy, J.W Low, L.R Brown, and E.A Frongillo. 2011. 'Agricultural Interventions and Nutrition: Lessons from the Past and New Evidence'. 2011. https://www.eldis.org/document/A65851.

AWARD. 2017. 'AWARD Strategy 2017-2020'. https://awardfellowships.org/wp-content/uploads/2020/06/AWARD-Strategy.pdf.

Barennes, Hubert, Maniphet Phimmasane, and Christian Rajaonarivo. 2015. 'Insect Consumption to Address Undernutrition, a National Survey on the Prevalence of Insect Consumption among Adults and Vendors in Laos'. Edited by C. Mary Schooling. *PLOS ONE* 10 (8): e0136458. https://doi.org/10.1371/journal.pone.0136458.

Barrientos, Stephanie, and Bobie Owusuaa. 2016. 'Promoting Gender Equality in the Cocoa-Chocolate Value Chain: Opportunities and Challenges in Ghana'. https://hummedia.manchester.ac.uk/institutes/gdi/publications/workingpapers/GDI/GDI_WP2016006_Barrientos_Bobie.pdf.

Beintema, Nienke M., and Federica Di Marcantonio. 2010. 'Female Participation in African Agricultural Research and Higher Education: New Insights Synthesis of the ASTI–Award Benchmarking Survey on Gender-Disaggregated Capacity Indicators'. *IFPRI Discussion Paper* 957 (January 2010): 48.

Beuchelt, T. 2013. 'Can Nutrition-Sensitive Agriculture Be Successful Without Being Gender-Sensitive? A Human Rights Perspective.' In *Nutrition-Sensitive Agriculture: A Pillar of Improved Nutrition and Better Health.*, edited by D Virchow. Stuttgart: Food Security Centre.

Boogaard, Birgit K., Elizabeth Waithanji, Elizabeth J. Poole, and Jean-Joseph Cadilhon. 2015. 'Smallholder Goat Production and Marketing: A Gendered Baseline Study from Inhassoro District Mozambique'. *NJAS - Wageningen Journal of Life Sciences* 74–75 (December): 51–63. https://doi.org/10.1016/j.njas.2015.09.002.

BRIDGE. 2014. *Gender and Food Security: Towards Gender-Just Food and Nutrition Security: Overview Report.*

Care International. 2019. 'Climate Vulnerability and Capacity Analysis Handbook Version 2.0: Informing Community-Based Adaptation, Resilience and Gender Equality'.

Carr, Marilyn, and Maria Hartl. 2010. *Lightening the Load: Labour Saving Technologies and Practices for Rural Women*. Vol. 238. International Fund for Agricultural Development and Practical Action Publishing. https://doi.org/10.1016/S0140-6736(00)76816-4.

Chambers, Robert. 1994. 'The Origins and Practice of Participatory Rural Appraisal'. *World Development* 22 (7): 953–69.

Charusheela, S. 2015. 'Intersectionality'. In *Handbook of Research on Gender and Economic Life*, edited by Deborah M Figart and L Warnecke, Tonia, 32–45. Edward Elgar.

Coley, Katrina M., Joseph E. Perosky, Aloysius Nyanplu, Alphonso Kofa, Jacob P. Anankware, Cheryl A. Moyer, and Jody R. Lori. 2020. 'Acceptability and Feasibility of Insect Consumption among Pregnant Women in Liberia'. *Maternal & Child Nutrition* 16 (3): e12990. https://doi.org/10.1111/mcn.12990.

Cornwall, Andrea. 2016. 'Women's Empowerment: What Works?' *Journal of International Development* 28: 342–59.

Croppenstedt, Andre, Markus Goldstein, and Nina Rosas. 2003. 'Gender and Agriculture: Inefficiencies, Segregation, and Low Productivity Traps', 48.

Cummings, Clare, and Tam O'Neil. 2015. 'Do Digital Information and Communications Technologies Increase the Voice and Influence of Women and Girls? A Rapid Review of The Evidence'. ODI. https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9622.pdf.

David, Soniia. 2015. 'Getting a Piece of the Pie: An Analysis of Factors Influencing Women's Production of Sweetpotato in Northern Nigeria'. *Journal of Gender, Agriculture and Food Security* 1 (1): 1–19.

Diaz, Ileana, and Dina Najjar. 2019. 'Gender and Agricultural Extension: Why a Gender Focus Matters'. ICARDA. 2019. https://www.icarda.org/publications/16319/gender-and-agricultural-extension-why-gender-focus-matters.

Doss, Cheryl. 2014. 'Data Needs for Gender Analysis in Agriculture'. In *Gender in Agriculture: Closing the Knowledge Gap*, edited by Agnes R. Quisumbing, Ruth Meinzen-Dick, Terri L. Raney, André Croppenstedt, Julia A. Behrman, and Amber Peterman, 55–68. Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-017-8616-4_3.

FAO. 2006. 'Rural Women in Sri Lanka's Post-Conflict Rural Economy'. 2006. https://www.fao.org/3/ag114e/AG114E00.htm#Contents.

———. 2011. 'Why Is Gender Equality and Rural Women's Empowerment Central to the Work of the FAO'. 2011. https://www.fao.org/gender/background/en/.

———. 2014a. 'Gender Dimensions in Food Security'. In *Gender in Food and Nutrition Security Programming*.

———. 2014b. 'Gender in Food and Nutrition Security Programming'.

———. 2014c. 'Gender Roles, Discrimination and Equality in Food and Nutrition Security'. FAO Elearning Academy. 2014. https://elearning.fao.org/course/view.php?id=172.

———. 2015. *Empowering Women in Afghanistan: Reducing Gender Gaps through Integrated Dairy Schemes*.

———. 2015. *World Programme for The Census of Agriculture 2020.*

———. 2016. 'Gender, Food Security and Nutrition in Protracted Crises'. *Gender, Food Security and Nutrition in Protracted Crises*.

———. 2018. 'C6 – 5 Data and Indicators for Gender-Responsive CSA | Climate Smart Agriculture Sourcebook | Food and Agriculture Organization of the United Nations'. 2018. https://www.fao.org/climate-smart-agriculture-sourcebook/enabling-frameworks/module-c6-gender/chapter-c6-5/en/.

———. 2019. 'Sex Disaggregated Data in Agriculture and Sustainable Resource Management: New Approaches for Data Collection and Analysis'. https://www.fao.org/3/i8930en/i8930en.pdf.

———. n.d. 'Cooperatives: Empowering Women Farmers, Improving Food Security | Gender | Food and Agriculture Organization of the United Nations'. Accessed 14 June 2021. http://www.fao.org/gender/insights/detail/en/c/164572/.

FAO, IFAD, and ILO. 2017. 'How to Improve Gender Equality in Agriculture'. 2017. https://www.iisd.org/system/files/publications/how-to-improve-gender-equality-agriculture.pdf?q=sites/default/files/publications/how-to-improve-gender-equality-agriculture.pdf.

FAO UN, IFAD, and ILO, eds. 2010. *Gender Dimensions of Agricultural and Rural*

Employment: Differentiated Pathways out of Poverty: Status, Trends and Gaps. Rome: Food and Agriculture Organization of the United Nations: International Fund for Agricultural Development: International Labour Office.

Fiaboe, Komi, Dorothy Nakimbugwe, and Elizabeth Waithanji. 2020. 'Insect-Based Feeds for the Empowerment of Women in Kenya and Uganda', 4.

GSM Association. 2020. 'GSM Connected Women - The Mobile Gender Gap Report 2020'. https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/05/GSMA-The-Mobile-Gender-Gap-Report-2020.pdf.

Jaenicke, Hannah, and Detlef Virchow. 2013. 'Entry Points into a Nutrition-Sensitive Agriculture'. *Food Security* 5 (5): 679–92. https://doi.org/10.1007/s12571-013-0293-5.

Kabeer, Naila. 2015. 'Gender, Poverty, and Inequality: A Brief History of Feminist Contributions in the Field of International Development'. *Gender and Development* 23 (2): 189–205. https://doi.org/10.1080/13552074.2015.1062300.

Khan, Rana Ejaz Ali. 2015. 'Determinants of Rural Household Poverty: The Role of Household Socioeconomic Empowerment'. *Environ. Sci.*, 6.

Melchior, Inga C., and Jens Newig. 2021. 'Governing Transitions towards Sustainable Agriculture—Taking Stock of an Emerging Field of Research'. *Sustainability* 13 (2): 1–27.

Mishra, Ashok K., Aditya R. Khanal, and Samarendu Mohanty. 2017. 'Gender Differentials in Farming Efficiency and Profits: The Case of Rice Production in the Philippines'. *Land Use Policy* 63 (April): 461–69. https://doi.org/10.1016/j.landusepol.2017.01.033.

Ngoma-Kasanda, Ednah, and Timothy Sichilima. 2016. 'Gender and Decision Making in Agriculture: A Case Study of the Smallholder Groundnuts Sector in Zambia', 26.

Nisbett, L Gillespie, and J Haddad. 2014. 'Why Worry About the Politics of Childhood Undernutrition?' *World Development* 64: 420–33.

Njuki, Jeremahi, and Pascal C. Sanginga. 2013. 'Women Livestock Ownership and Markets'. International Livestock Research Institute and the International Development Research Centre. https://reliefweb.int/sites/reliefweb.int/files/resources/Women%2C%20Livestock%20Ownership%20and%20Markets.pdf.

Oxfam. 1999. 'A Guide to Gender- Analysis Frameworks'. https://policy-practice.oxfam.org/resources/a-guide-to-gender-analysis-frameworks-115397/.

———. 2019. 'Integrating Gender in Research Planning Why Is This Important?' www.oxfam.org.uk/policyandpractice.

Oxfam Novib. 2014. 'Gender Action Learning System'.

Porter, Gina, Kate Hampshire, Albert Abane, Alister Munthali, Elsbeth Robson, Ariane De Lannoy, Augustine Tanle, and Samuel Owusu. 2020. 'Mobile Phones, Gender, and Female Empowerment in Sub-Saharan Africa: Studies with African Youth'. *Information Technology for Development* 26 (1): 180–93. https://doi.org/10.1080/02681102.2019.1622500.

Raworth, Kate. 2017. *Donught Economics: Seven Ways to Think Like a 21st Century Economist*. London: Penguin Random House.

Rethinking Research Collaborative. 2017. 'Rethinking Research Partnerships: Discussion Guide and Toolkit'. *Research and Evidence*.

Sahel Consulting Agriculture and Nutrition Ltd. 2018. 'Nigerian Dairy Development Programme: Gender Analysis of Smallholder Dairy Farmers in Oyo and Kano States'. https://sahelcp.com/wp-content/uploads/2018/10/NDDP-Gender-Study-Report.pdf.

Sathar, Zeba Ayesha, and Shahnaz Kazi. 2000. 'Women's Autonomy in the Context of Rural Pakistan'. *Pakistan Development Review* 39 (2): 89–111.

Scott, Joan W. 1986. 'Gender: A Useful Category of Historical Analysis'. *The American Historical Review* 91 (5): 1053–75.

Sherif, Elizabeth. 2009. 'Educational Policies and the Under-Representation of Women in Scientific and Technical Disciplines in Niger'. In *Gender, Science and Technology: Perspectives from Africa*, edited by Catherine Wawasi Kitetu, 49–65. Council for the Development of Social Science Research in Africa. https://muse.jhu.edu/book/16868.

Simmonds, Anna. 2014. 'Women Scientists Sexually Harassed While Doing Fieldwork'. *Nature*. https://doi.org/10.1038/nature.2014.15571.

UN Women. 2018. 'Factors Driving the Gender Gap in Agricultural Productivity in Malawi'. UN Women | Africa. 2018. https://africa.unwomen.org/en/digital-library/publications/2019/05/agricultural-production-in-malawi.

UNESCO. 2017. *Measuring Gender Equality in Science and Engineering: The SAGA Toolkit - Working Paper 2*.

———. 2018. 'Cracking the Code: Girls and Women's Education in Science, Technology, Engineering and Mathematics (STEM)'. https://doi.org/10.1080/03064229508535979.

Waring, Marilyn. 1988. *If Women Counted: A New Feminist Economics*. San Franscisco: Harper Collins.

Wawasi Kitetu, Catherine, ed. 2009. *Gender Science and Technology: Perspectives from Africa*. Dakar, Senegal: Council for the Development of Social Science Research in Africa. https://muse.jhu.edu/book/16868.

Wilcox, Clair Sophia, Stephanie Grutzmacher, Rebecca Ramsing, Amanda Rockler, Christie Balch, Marghuba Safi, and James Hanson. 2015. 'From The Field: Empowering Women to Improve Family Food Security in Afghanistan'. *Renewable Agriculture and Food Systems* 30 (1): 15–21. https://doi.org/10.1017/S1742170514000209.

World Bank. 2021. 'Girls' Education Overview'. 2021. https://www.worldbank.org/en/topic/girlseducation.