

A Review of Gender in Agricultural Research and Development

Truayinet Mekuriaw

Ethiopian Institutes of Agricultural Research, Debre Zeit Agricultural Research Center, Extension and
Communication Research Program, P.O.Box 32, Debre Zeit, Ethiopia

Email address: truyem@gmail.com (Truayinet Mekuriaw)

ABSTRACT

The gender division of labor in agriculture means that female and male farmers usually have different technology and extension needs. However, technology generation and extension services worldwide remain dominated by men. Also women farmers play an important role in agriculture but this role often goes unrecognized due to perception bias. Gender plays a vital role from the farm to market. A variety of constraints however, impinge upon the ability for developing countries to perceive women as agents of food and nutritional security. Women play a vital role as agricultural producers and as agents of food and nutritional security. Yet relative to men, they have less access to productive assets such as land and services such as finance and extension. A variety of constraints impinge upon their ability to meaningfully participate in collective action as members of agricultural cooperative or water user associations. Gender inequalities result in less food being grown, less income being earned, and higher levels of poverty and food insecurity. Agriculture in low-income developing countries is a sector with exceptionally high impact in terms of its potential to reduce poverty. Yet for agricultural growth to fulfill this potential, gender disparities must be addressed and effectively reduced. The rationale for considering gender in agricultural research relates to agricultural productivity, food security, nutrition, poverty reduction, and empowerment. Generally promoting gender-responsive agricultural technologies in agricultural research and extension system can result in greater sustainability of agricultural research and rural development projects and the environment. Addressing gender disparities between women and men farmers in the developing world has a significant development potential in itself, and as such is a key element in meeting these challenges.

Key words: Gender, Disparity, Agricultural Research and Development

1. Introduction

Although women play a crucial role in farming and food production, they are often disadvantaged and face greater constraints in agricultural production than men (Meinzen-Dick et al. 2011; World Bank, FAO and IFAD, 2008). Rural women are consistently less likely than men to own land or livestock, adopt new technologies, access credit or other financial services, or receive education or extension advice (FAO 2011). In some cases, they do not even control the use of their own time. The FAO 2011 State of Food and Agriculture report estimates that if women had the same access to production resources as men, they could increase yields on their fields by 20 to 30 percent. The FAO calculates that this alone would raise total agricultural output in developing countries by 2.5 to 4 percent, and that this, in turn, could reduce the number of hungry people in the world by 12 to 17 percent, or 100 to 150 million people (FAO 2011). In addition to this, improvements in gender equality tend to enhance economic efficiency and improve other development outcomes, e.g. family food and nutrition security and education (Fafchamps et al. 2009; Quisumbing and Maluccio 2003). Finally, gender equality is also a development objective in itself: Just as reduction in income poverty or ensuring greater access to justice is part of development, so too is the narrowing of gaps in well-being between men and women (World Bank 2011).

The gap in agricultural productivity between plots managed by men and women varies across countries and crops, but ranges from 4% to 25% when measured as the value of agricultural production per hectare across Sub-Saharan Africa (Aguilar, Goldstein, & Kilic Oseni, 2015; Backiny-Yitna & McGee, 2015; Oseni, Corral, Goldstein, & Winters, 2015; World Bank & ONE, 2014). However, this measure of agricultural productivity is narrow, missing important activities typically carried out by women, such as food processing and preparation and livestock raising (Doss, 2013). Furthermore, it does not account for joint farm management systems where husbands, wives, and other family members all contribute to production and their individual contributions cannot be measured separately.

2. METHODOLOGY

This article is based on intensive literature review of published and unpublished materials like books, research articles and other materials like package manuals, etc.

3. Result and Discussion

The relevance of Gender for Agricultural Research

Gender stereotypes and social restrictions often exclude women from research programs, and from participation in farmer participatory experiments, demonstrations and field days. When men migrate and women are left in charge of the farm labor, production relations are affected. Women sometimes face several constraints in addressing these challenges, for instance a lack of access to technical knowledge and technologies which can reduce their drudgery and provide additional income (Bellon et al. 2002, Beuchelt and Badstue 2013; Mehra and Hill Rojas 2008). Moreover, women's "triple roles" are well acknowledged in the literature (Momsen 2010). To the extent that domestic and caring responsibilities may limit their mobility, women often lose out on crucial opportunities for learning and interactions that could stimulate agency and innovation.

Traits and technology preferences

Traits and technology preferences of men and women farmers are different. Men often prefer high yielding varieties in view of the associated potential to sell surplus produce. In most cultures, women are regarded as the custodians of family diets. Women's reproductive roles tend to influence their priorities towards a focus on food security and/or varieties that are both palatable and nutritious and that further meet processing and storing requirements (Smale et al 1992; Smale and Heisey 1994, 1997; Smale 1995; Doss 2001; Bellon et al. 2003; Badstue 2006; Hellin et al. 2010). Other gender differences in preferences, needs and constraints, may apply to other types of technologies (e.g. related to post-harvest storage, labor saving, crop or natural resource management practices) or manifest themselves differently under different circumstances. However, it is not necessarily possible to predict how the introduction of new technologies may affect the patterns of labor, resource and land allocation between men and women, or how this, in turn, may influence whether the new technology will be adopted or not, and who will benefit or not. Both intended and unintended impacts can occur at individual, household and/or community level. The challenge of estimating potential consequences therefore relates both to gender considerations (Doss 2001), as well as to broader aspects of human and sustainable development.

In developing countries, most women are marginalized, and they have limited access to and control over resources like land, information, markets, education, extension services, and agricultural credit (FAO, 2019, Ragasa, 2014) which adversely affects the adoption of agricultural technologies, including farm mechanization. Mechanization has often been viewed as an important

strategy to raise the productivity and reduce the drudgery of agricultural operations. Research in sub-Saharan Africa (and other regions), however, has drawn attention to the complex dynamics surrounding the introduction of these technologies, including their gender implications (Pingali, 2007; Sims and Kienzle, 2006). Therefore, closing gender inequalities is likely to enhance the adoption of mechanization and other agricultural technologies in developing countries. Nonetheless, even after closing the gender gap and having the same level of access to and control over the household assets, adoption of farm mechanization may differ between men and women, due to differences in the societal perception to consider women as farmers (Doss, 2013). In addition, social norms may regard mechanized tasks as inappropriate for women (Croppenstedt et al., 2013; van Eerdewijk and Danielsen, 2015). For example, women may have similar years of education level, land entitlements, credit access, and so on, but established societal norms may prevent women from tilling the land using machines. Under such a situation, the adoption rates of farm mechanization for both would be diverse until these deep-rooted and socially established beliefs are changed through policy interventions. Another example that could bring differential farm machinery adoption across men and women is the operationalization difficulties associated with farm machinery. Farm machinery often requires high physical effort and women may have lower physical strength (Wheaton & Crimmins 2016, Jayachandran, 2015) to operate such heavy machines. Carr and Hartl (2010) note that women's agricultural technologies – traditional technologies that are labor-intensive tend to be overlooked in technology support, particularly those for land preparation, weeding, drying, and energy. The tools that are available tend to be oriented towards men's physique or activities and will often be too heavy or culturally inappropriate for women to use them comfortably (Carr & Hartl, 2010). So Gender disparity should consider when designing agricultural machineries.

Vulnerability and risk

It has been argued that due to their socially-constructed roles and responsibilities and the various constraints that tend to weigh heavier on women, women are often particularly vulnerable to shocks such as climate variability and change, and depletion of the natural resource base (Alston and Whittenbury 2014). For example, as custodians of household food security in many contexts, women have a lot more at stake when a season fails, because they bear the brunt of managing hungry, malnourished, and sick children. The differences in vulnerabilities and capacities, women and men farmers in developing countries have different abilities to adapt to climate change (Huyer et al., 2015). For example, insecure land tenure, lack of capital and limited farm inputs pose major barriers to the adoption of conservation agriculture (a climate change

adaptation strategy) in sub-Saharan Africa (Goh, 2012). Other studies have found that financial and resource constraints as well as lower levels of access to information and extension services can prevent women from implementing adaptive practices (Jost et al., 2015; Tall et al., 2014; Twyman et al., 2014). Rural women, in particular, are at high risk of negative impacts from climate change due to increases in both household responsibilities and agricultural work from male out-migration. One of the important effects of environmental stress in farming systems, such as those imposed by climate change, is the intensification of women's workloads, while another is decreases in assets of poor households (Agwu & Okhimamwe, 2009; Goh, 2012; Jost et al., 2015). Climate variability and weather-related shocks affect women's and men's assets in different ways (Jost et al., 2015; Kristjanson et al., 2014). Women and men are changing their cropping practices in response to climate variability, with different impacts on access to and control of the income from crops, as well as their respective workloads (Jost et al., 2015; Nelson & Stathers, 2009).

Female farmers as agents of change

Women produce over 50 percent of the world's food (FAO, 2011) and comprise about 43 percent of the agricultural labor force, both globally and in developing countries (Doss, 2014). Additionally, women invest as much as 10 times more of their earnings than men do in their family's well-being, in areas including child health, education and nutrition (Duflo, 2012; Maertens and Verhofstadt, 2013; Quisumbing and Maluccio, 2000).

On average, women comprise 43 percent of the agricultural labor force in developing countries, ranging from 20 percent in Latin America to 50 percent in Sub-Saharan Africa and East Asia (Quisumbing et al 2014; FAO 2011). FAO 2014 states that closing gender gap in agriculture could increase GDP by 9-16%, reduce number of hungry people by 12-17% and increase yield by 20-30%. Women's contribution to agricultural work varies even more widely, depending on the specific crop and activity. By their sheer numbers, these women farmers represent an important potential market that needs to be understood, taken seriously and served. Given recent trends of rural out-migration primarily by men, the proportion of women in farming has either remained stable or increased. Regardless of the variations across regions, women make up a large part of the world's small-scale farmers. As such they are important agents for agricultural development and change. But these poor women farmers face a greatest constraints, access to new knowledge and reliable information on new technologies and practices. Information is important to women whether or not they are the final decision-makers on what seed, fertilizer or other inputs to buy. Women's unequal access to key agricultural inputs such as land, labour, knowledge, fertilizer, and improved seeds and seedlings contributes to the persistence of the production gap (FAO, 2011; Farnworth et al., 2016; Wambugu, Place, & Franzel, 2011; WB, 2014). Women also tend to have less decision-making authority

and face additional social, cultural, and institutional barriers to accessing and adopting agricultural technologies (Deere & Doss, 2006; Doss, 2001; Doss & Morris, 2001; Peterman et al., 2014; Peterman, Quisumbing, Behrman, & Nkonya, 2011; Perez, Kristjanson, Förch, Thornton, & Cramer, 2015).

4. Conclusions

Many authors argue that cultural ideology about men's and women's role is a critical factor in determining the way gender relations of production are ordered in a given society and, therefore, gender must be seriously considered in agricultural research and development planning. Gender disparity analysis seeks systematic attempt to identify key issues contributing to gender inequalities so that they can be properly addressed. It provides the basis for gender mainstreaming and is described as the study of differences in the conditions, needs, participation rates, access to resources and development, control of assets and decision-making powers and so forth between women and men in their assigned gender roles in agriculture and rural development. The rationale for considering gender in agricultural research relates to agricultural productivity, food security, nutrition, poverty reduction, and empowerment. In all of these cases, women play a critical but often under-recognized role and face greater constraints than men. Recognizing this sets the stage for identifying ways that the agricultural research system can redress these problems and contribute to productivity and equity. Generally promoting gender-responsive agricultural technologies in agricultural research and extension system can result in greater sustainability of agricultural and rural development projects and the environment.

5. References

- Aguilar, A., Goldstein, M., Kilic, T., & Oseni, G. (2015). Decomposition of gender differentials in agricultural productivity in Ethiopia. *Agricultural Economics*, 46 (3), 311–334.
- Agwu, J., & Okhimamwe, A. (2009). *Gender and climate change in Nigeria*. Lagos, Nigeria: Heinrich Böll Stiftung (HBS).
- Alston, M. and Whittenbury, K. (Eds.) (2014) *Research, Action and Policy: Addressing the Gendered Impacts of Climate Change*. Springer, Netherlands.
- Backiny-Yitna, P., & McGee, K. (2015). Gender differentials and agricultural productivity in Niger (World Bank Policy Research Working Paper No. 7199). Washington, DC: World Bank.
- Badstue, L.B. (2006) *Smallholder Seed Practices: Maize Seed Management in the Central Valleys of Oaxaca, Mexico*. PhD thesis. Wageningen: Wageningen University.
- Bellon, M. (2002) *Analysis of the Demand for Crop Characteristics by Wealth and Gender: A Case Study from Oaxaca, Mexico*. In: Bellon, M.R., and J. Reeves (eds.). 2002. *Quantitative Analysis of Data from Participatory Methods in Plant Breeding*. Mexico, DF: CIMMYT.

- Beuchelt, T. D. and Badstue, L. (2013) Gender, nutrition- and climate-smart food production: Opportunities and trade-offs. *Food Security* 5:709–721.
- Carr, M., & Hartl, M. (2010). *Lightening the Load: Labour saving technologies and practices for rural women*. Rugby, UK: International Fund for Agricultural Development and Practical Action.
- Croppenstedt, A., Goldstein, M., Rosas, N., 2013. Gender and agriculture: inefficiencies, segregation, and low productivity traps. *The World Bank Research Observer* 28, 79–109.
- Deere, C. D., & Doss, C. R. (2006). The gender asset gap: What do we know and why does it matter? *Feminist Economics*, 12(1-2), 1–50.
- Doss C. International Food Policy Research Institute; Washington, DC: 2013. Data Deeds for Gender Analysis in Agriculture. IFPRI Discussion Paper 01261, Environment and Production Technology Division. [Google Scholar]
- Doss, C. and Morris, M. (2001) How does gender affect the adoption of agricultural innovations? The case of improved maize technology in Ghana. *Agricultural Economics*, 25 (1): 27-39.
- Doss, C. R. (2013). Data needs for gender analysis in agriculture (IFPRI Discussion Paper 1261). *International Food Policy*
- Doss, C., 2014. If women hold up half the sky, how much of the world's food do they produce? In: Quisumbing, A.R., Meinzen-Dick, R., Raney, T.L., Croppenstedt, A., Behrman, J.A., Peterman, A. (Eds.), *Gender in Agriculture*. Springer, Netherlands.
- Doss, C., Kieran, C., 2013. Standards for Collecting Sex-disaggregated Data for Gender Analysis: a Guide for CGIAR Researchers. <https://cgspace.cgiar.org/handle/10947/3072>, .
- Doss, C.R. 2001. Designing agricultural technology for African women farmers: lessons from 25 years of experience. *World Development* 29(12): 2075–2092.
- Duflo, E., 2012. Women empowerment and economic development. *J. Econ. Lit.* 50, 1051–1079.
- FAO (2011). *The State of Food and Agriculture 2010–11. Women in Agriculture: Closing the Gender Gap for Development*. FAO, Rome.
- FAO. 2019. *Country Gender Assessment of Agriculture and the Rural Sector in Nepal*; p. 76. Kathmandu. [Google Scholar]
- Farnworth, C. R., Baudron, F., Andersson, J. A., Misiko, M., Badstue, L., & Stirling, C. M. (2016). Gender and conservation agriculture in east and Southern Africa: Towards a research agenda. *International Journal of Agricultural Sustainability*, 14(2), 142–165.
- Goh, A. (2012). *A literature review of the gender-differentiated impacts of climate change on women's and men's assets and well-being in developing countries*. Washington, DC: International Food Policy Research Institute.
- Hellin, J., A. Keleman, & M. Bellon (2010) Maize diversity and gender: research from Mexico. *Gender & Development* 18(3): 427–437.
- Huyer, S., Twyman, J., Koningstein, M., Ashby, J., & Vermeulen, S. (2015). *Supporting women farmers in a changing climate: Five policy lessons*. Agriculture and Food Security Programme. Copenhagen, Denmark: CGIAR Climate Change. Retrieved April 24, 2016, from <https://cgspace.cgiar.org/rest/bitstreams/60479/retrieve>

- Jayachandran S. The roots of gender inequality in developing countries. *Annu. Rev. Econ.* 2015;7:63–88. [Google Scholar]
- Jost, C., Kyazze, F., Naab, J., Neelormi, S., Kinyangi, J., Zougmore, R., Aggarwal, P., Bhatta, G., Chaudhury, M., Tapio-Bistrom, M., Nelson, S., & Kristjanson, P. (2015). Understanding gender dimensions of agriculture and climate change in smallholder farming communities. *Climate and Development*, 8(2), 1–12. Retrieved April 24, 2016, from <http://doi.org/10.1080/17565529.2015.1050978>
- Kristjanson, P., Waters-Bayer, A., Johnson, N., Tipilda, A., Njuki, J., Baltenweck, G. D., & MacMillan, D. (2014). Livestock and women's livelihoods: A review of the recent evidence. In A. Quisumbing, R. Meinzen-Dick, T. Raney, A. Croppenstedt, J. A. Behrman, & A. Peterman (Eds), *Gender in agriculture and food security: Closing the knowledge gap* (pp. 293–311). Dordrecht, Netherlands: Springer.
- Maertens, M., Verhofstadt, E., 2013. Horticultural exports, female wage employment and primary school enrolment: Theory and evidence from Senegal. *Food Policy* 43, 118–131. Quisumbing, A.R., Maluccio, J.A., 2000. Intrahousehold Allocation and Gender Relations: New Empirical Evidence From Four Developing Countries. IFPRI, Washington, DC.
- Mehra, R. and Hill Rojas, M. (2008) Women, food security and agriculture in a global market place. ICRW.
- Meinzen-Dick, R., Quisumbing, A., Behrman, J., Biermayr-Jenzano, P., Wilde, V., Noordeloos, M., Ragasa, C., Beintema, N. (2011) Engendering agricultural research, development and extension. International Food Policy Research Institute, Washington, D.C.
- Nelson, V., & Stathers, T. (2009). Resilience, power, culture, and climate: A case study from semi-arid Tanzania, and new research directions. *Gender and Development*, 17(1), 81–94.
- Oseni, G., Corral, P., Goldstein, M., & Winters, P. (2015). Explaining gender differentials in agricultural production in Nigeria. *Agricultural Economics*, 46(3), 285–310.
- Perez, C., Kristjanson, P., Förch, W., Thornton, P. K., & Cramer, L. (2015). How resilient are farming households, communities, men and women to a changing climate in Africa? *Global Environmental Change*, 34, 95–107.
- Peterman, A., Behrman, J. A., Quisumbing, A. R., et al. (2014). A review of empirical evidence on gender differences in nonland agricultural inputs, technology, and services in developing countries. In A. R. Quisumbing (Ed.), *Gender in agriculture: Closing the knowledge Gap* (pp. 145–186). Dordrecht: Springer.
- Peterman, A., Quisumbing, A., Behrman, J., & Nkonya, E. (2011). Understanding the complexities surrounding gender differences in agricultural productivity in Nigeria and Uganda. *Journal of Development Studies*, 47(10), 1482–1509.
- Pingali, P., 2007. Agricultural mechanization: adoption patterns and economic impact. In: Evenson, R., Pingali, P. (Eds.), *Handbook of Agricultural Economics* 3. Elsevier, Amsterdam, pp. 2779–2805.
- Quisumbing, A.; Meinzen-Dick, R.; Raney, T.; Croppenstedt, A.; Behrman, J.; Peterman, A. (Eds.) (2014) *Gender in agriculture: Closing the knowledge gap*. Springer.
- Ragasa C. (2014) Improving Gender Responsiveness of Agricultural Extension. In: Quisumbing A., Meinzen-Dick R., Raney T., Croppenstedt A., Behrman J., Peterman A. (eds) *Gender in Agriculture*. Springer, Dordrecht. https://doi.org/10.1007/978-94-017-8616-4_17
- Sims, B.G., Kienzle, J., 2006. Farm Power and Mechanization for Small Farmers in Sub-Saharan Africa. Agricultural and Food Engineering Technical Report 3. FAO. [http:// www.fao.org/3/a-a0651e.pdf](http://www.fao.org/3/a-a0651e.pdf),

- Smale, M. (1995) "Maize is life": Malawi's delayed green revolution. *World Development* 23 (5): 819-831
- Smale, M. and Heisey, P. (1994) Maize research in Malawi revisited: An emerging success story? *Journal of International Development*: Vol. 6, No.6, 689-706
- Smale, M. and Heisey, P. (1997) Maize technology and productivity in Malawi. In: D. Byerlee, C. Eicher (Eds.), *Africa's Emerging Maize Revolution*, Lynne Rienner, London (1997), pp. 63–79
- Smale, M.; Kaunda, Z.H.W.; Makina, H.L.; Mkandawire, M.M.M.K.; Msowoya, M.N.S.; Mwale, D.J.E.K.; Heisey, P.W. (1992) Chimanga Cha Makolo, Hybrids, and Composites: An Analysis of Farmers' Adoption of Maize Technology in Malawi, 1989-90. CIMMYT Economics Working Paper 91/04. Mexico, D.F.: CIMMYT.
- Twyman, J., Green, M., Bernier, Q., Kristjanson, P., Russo, S., Tall, A., Ampaire, E., Nyasimi, M., Mango, J., McKune, S., Mwongera, C., & Ndourba, Y. (2014). Adaptation actions in Africa: Evidence that gender matters (CCAFS Working Paper 83). Copenhagen, Denmark: CGIAR Climate Change, Agriculture and Food Security Programme.
- van Eerdewijk, A., Danielsen, K., 2015. Gender Matters in Farm Power. KIT. https://213ou636sh0ptphd141fqe1-wpengine.netdna-ssl.com/gender/wp-content/uploads/publications/56fe4a6ced6cd_Gender%20Matters%20in%20Farm%20Power.pdf,
- Wambugu, C., Place, F., & Franzel, S. (2011). Research, development and scaling-up the adoption of fodder shrub innovations in east Africa. *International Journal of Agricultural Sustainability*, 9(1), 100–109.
- Wheaton F.V., Crimmins E.M. Female disability disadvantage: a global perspective on sex differences in physical function and disability. *Ageing Soc.* 2016;36:1136–1156. [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
- World Bank, & ONE. (2014). *Levelling the field: Improving opportunities for women farmers in Africa*. Washington, DC: World Bank.
- World Bank, FAO, IFAD (2008) *Gender in Agriculture Sourcebook*. World Bank, Washington, D.C.